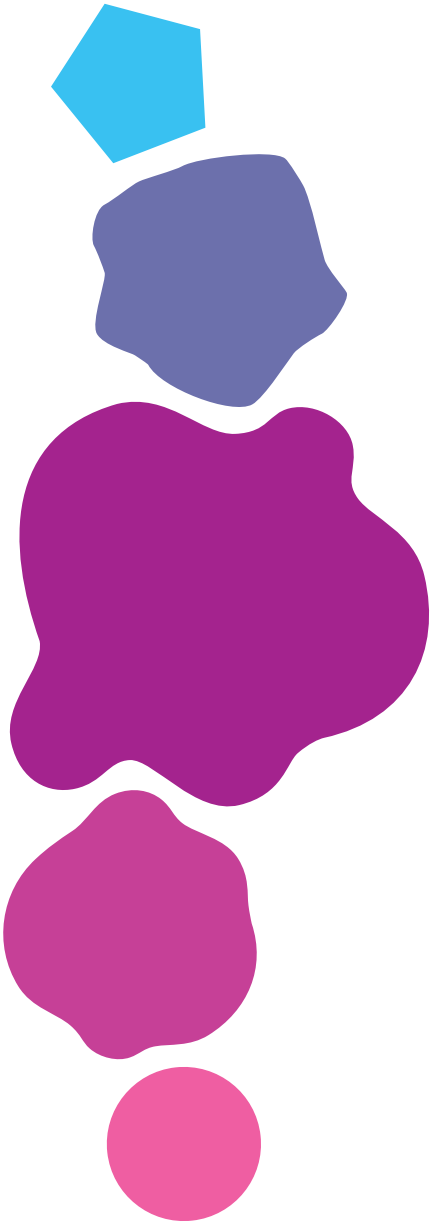
Into Transition Space

destabilisation and incumbent agency in an accelerating energy transition



Rick Bosman

Into Transition Space

destabilisation and incumbent agency in an accelerating energy transition

Into Transition Space

Destabilisation and incumbent agency in an accelerating energy transition

Transitieruimte

Destabilisatie en systeemspelers in een versnellende energietransitie

Thesis
to obtain the degree of Doctor from the Erasmus University Rotterdam
by command of the rector magnificus
Prof. dr. A.L. Bredenoord
and in accordance with the decision of the Doctorate Board.

The public defence shall be held on:

18 November 2022
at 13.00h
by Rick Bosman
born in Nijmegen, Netherlands

Erasmus University Rotterdam

Doctoral Committee

Promotors:	Prof. dr. D.A. Loorbach Prof. dr. ir. J. Rotmans
Other members:	Prof. dr. R.J.M. van Tulder Prof. dr. D.A. McCauley Prof. dr. H.C. De Coninck
Copromotor:	Dr. P.J. Beers

The research resulting in this thesis has been financially supported by the Dutch Research Council (NWO), under the TRAPESES research project 408-13-029.

ISBN	978-94-6421-880-0
Cover design and layout	Iren van Oosterom
Printing	Ipskamp Printing

Preface

Writing this book has taken about a decade. I have put in blood, sweat and tears and I am very glad that it is now finished. It has been driven by an innate curiosity for the energy system and the changes that it is undergoing and a passion to contribute to solving the climate crisis.

I have had my frustrations with academia along the way. I wondered whether publishing another article is going to save us, whether all the nitty gritty discussions about definition details were going to contribute to solving the challenges, whether it was all not going way too slow. But in the end, I am extremely happy to be able to deliver this piece of academic work. I believe it shows that critical thinking and transformative doing can go together and enrich each other. That engaging with professionals, the media, policy makers and activists enriches the scientific insights, grounds them in practice and makes them relevant, while at the same time contributing to solving the climate challenge.

The action research, as practiced at DRIFT, formed the ideal combination of thinking and doing for me. DRIFT was a place where I thrived, with lots of freedom to pursue my own goals and ambitions. With a group of highly engaged and intelligent colleagues that sharpened my thinking on a daily basis, challenged my views and greatly enriched my perspective on the world. Also, it was a very supportive and fruitful environment to co-create ideas and plans to further accelerate the energy transition: from developing a research proposal, setting-up a teaching course or masterclass for professionals, writing op-eds together to pressuring our pension fund to stop investing in fossil fuels. I've highly enjoyed the way action and thinking combine at DRIFT. And, I especially remember the delicious lunches, the engaging acceleration and deceleration sessions and especially the DRIFT-uitjes. I wish to thank all my former DRIFT-colleagues for co-creating this transformative environment.

I wish to thank my supervisors Derk Loorbach and PJ Beers for their continuous support and Jan Rotmans for his guidance on the scientivist path and the adventures we've shared.

Furthermore, I wish to thank all the inspiring professionals that I have engaged with along the way: all the people that made time to respond to my interview questions, the members of the TRAPESES user committee and the participants in the Masterclass Accelerating the Energy Transition. Also, I wish to thank Liset Meddens for hosting me at the Fossielvrij NL headquarters and Elbert Huijzer and Martijn Bongaerts for hosting me at Liander.

Many thanks go to Iren van Oosterom of Flatland Visual Thinking for his work on visualising the conceptual advancements in this thesis, developing the cover and the manuscript lay-out. It has been a truly inspiring effort and I believe the visuals provide an extra layer of meaning to this thesis.

Moreover, I am truly grateful to my friends and family for being there for me, both in the highs and the lows. And, above all, I wish to thank Eva, Teije and Noor for supporting me throughout this journey, for having patience with me when I was again working on 'the book' and for helping me to navigate the rough patches along the way.

Summary

Humankind is facing several severe societal challenges. Of these challenges, climate change is the most daunting in terms of likelihood and impact, according to the Global Risks Report prepared for the World Economic Forum. Meanwhile, it is scientifically established that the main cause for climate change is anthropogenic greenhouse gas (GHG) emissions, most prominently carbon dioxide, and that the burning of fossil fuels is the main contributor to such emissions. Research finds that if global warming is to remain below 2° C, and preferably 1,5 degrees, as has been agreed upon in the Paris climate agreement of December 2015, 82% of currently known coal reserves, 50% of gas, and 33% of oil reserves must remain unburned. Thus, in order to avoid dangerous climate change, an energy transition is necessary: a shift away from fossil fuels towards an energy system based on renewable and sustainable energy sources.

The field of sustainability transitions research focuses on understanding such fundamental shifts in societal systems towards a more sustainable state and the implications for policy and governance. Transitions are processes of parallel build-up of sustainable alternatives and break-down and phase-out of unstainable elements of the incumbent regime. When a regime comes under pressure from external developments and crises, and sustainable alternatives become increasingly viable, a radical regime shift can take place. However, in order for such a transition to occur, the incumbent regime needs to destabilize to create room for other ways of thinking, doing and organising.

By now, everywhere in the energy domain signs of such destabilisation can be observed: Coal fired power plants that have opened as recently as 2015, are being decommissioned again. Conflicts are fought out in court: cases have been won against the government for not doing enough to protect its citizens against the threats of climate change. And a case brought against oil company Shell decided in favour of the environmental NGO's who sued the company in order to bring its greenhouse gas emissions in line with the Paris climate agreement. Participants are successfully putting pressure on their pension funds to divest from the fossil fuel industry. Energy companies have lost up to 80% of their market value over the last decade and some of them are completely reinventing themselves into sustainable energy companies.

Such destabilisation is the context in which historically stable societal conditions erode. For actors used to operate in a relatively stable and coherent regime context, destabilisation is the gradual and self-reinforcing dissolution of such stability, predictability and coherence of their operating environment. For incumbents, navigating such divergence is much more challenging than a context dominated by a rather stable hegemonic regime. At the same time the increased diversity, conflicts and tensions opens up space for new entrants and their problem understandings and preferred solutions enabling courses of action and actor constellations that were unlikely before.

The main research question underlying this thesis is:

How can we understand transition dynamics in between two equilibria, what are the implications for actors that used to operate within a regime context, and how can they navigate such a regime vacuum?

Transition space

The central concept that developed in this thesis to describe the transition dynamics in between two equilibria is transition space; a context that is characterized by the absence of stability, predictability and coherence between actors and their environment. It is characterized by both build-up and break-down dynamics. In transition space new institutions and routines have to be developed while facing systemic uncertainties, diverging political and economic interests and polarizing public debates. Indicators for the opening of transition space in a societal system are:

- Societal unrest, demonstrations, protests and sustained media attention
- Tensions and clashes involving incumbents, e.g. court cases, breaking up of alliances
- Scientific basis problematizing part(s) of the incumbent regime
- Shared sense of urgency for the desired direction of sustainability transition, by change-minded incumbents, scaling niches and policy makers. This doesn't mean that there is a collectively supported blue-print for a future system, but rather a sense of which way things should be heading.
- Change-minded incumbents pro-actively repositioning
- Supported notion of elements of the incumbent regime that need to be phased out
- Scaling up of sustainable alternatives

While in the early stages of a transition, most interest goes to the niches: the seeds of transformative change where alternative modes of doing and organising are developed. In transition space, the role of incumbents comes in central focus. These are large organisations that play a key role in providing a societal function, are generally well connected politically, have ample of resources and have the power to influence societal dynamics. Ongoing transitional pressures questions business as usual and forces such incumbents to reposition and re-evaluate their business models. Increasing tensions and misalignments occur between incumbents, where different storylines on what the energy transition encompasses are increasingly competing for dominance. Existing coalitions are breaking up and new ones are being forged. Furthermore, there are increasing tensions between new practices and existing institutions and new resources become available for niche developments through the active involvement of change-minded incumbents.

Incumbent repositioning

Especially for incumbent actors, that have since long relied on stable market positions and political relations, this context creates challenges. On the one hand these actors have to reposition in order to maintain control, while on the other hand they are facing disruptive changes that require adaptation, perhaps beyond what they can cope with. In this thesis transition space is explored from the perspective of three change-minded incumbents:

- Distribution grid operator Alliander is operating an environment in which climate change and earth quakes caused by natural gas extraction in the North of Netherlands raise concerns, while decentralised and renewable energy systems are rapidly emerging. These developments are mounting pressure to radically alter the energy system and thus Alliander's business model. In response Alliander has announced an exit from natural gas, together with other actors active in the build environment. It is in the process of working out what this means for the organisation and its role and position.
- Port of Rotterdam Authority is operating the largest port in Europe, which is a heavily fossilised industrial and transport hub. Climate change, but also geopolitical concerns and receding demand for its products, due to the rise of electric transport and biobased and circular alternatives, are challenging historically developed modes of thinking and doing. It realizes that relying heavily on volume and scale and producing and transshipping bulk fossil goods is increasingly at odds with the societal drive for sustainability and is therefore exploring biobased and circular alternative futures.
- Institutional investor ABP, the largest pension fund in the Netherlands, is under increasing scrutiny by its participants, a social movement and the media for its investments in the fossil fuel industry. Citing concerns about climate change, these groups claim that the lion's share of fossil fuels needs to stay in the ground and that, because of the carbon bubble, the fossil fuel industry is an increasingly risky investment. This challenges the, until then, dominant rationale that pension funds should mainly focus on returns, and that the fossil fuel industry is a highly profitable and secure investment.

Destabilisation of an incumbent regime and the opening of transition space forces incumbent actors to reposition. And to abolish certain activities that, in light of an advancing transition, are no longer worthwhile, while developing new activities that provide a better fit. This creates a recursive loop of (perceived) delegitimisation of a shared regime leading to diversifying strategies of actors within the regime that in turn add to the destabilisation and so on. With incumbents repositioning, their resources become available for scaling-up more mature niche-developments and they draw back commitments to certain elements of the former regime, which then might become phased-out. What is meant with incumbent repositioning is that incumbents change their outlook towards their environment and future, and the priorities they assign for the organization. They change their view of their role and tasks, position in the field and their relationships. They reevaluate how they apply their resources, e.g. how time and money are spent within the organisation and the practices in the daily operation, e.g. what are worthy tasks to spend time on and what are new routines that work in a changing context.

Such incumbent actor repositioning can be described in terms of the:

- *Discourse* with which actors give meaning to their environment;
- *Institutions*: the formal and informal rules guiding actor behaviour;
- *Relations and roles*: actors' understanding of their reason of existence and how they relate to others in their ecosystem;
- *Resources*: the means that actors mobilize to achieve certain goals, in particular time and money, and;
- *Practices*: the daily routinized operations.

These five dimensions describe how incumbent actors are changing their relationship with their environment. When these five dimensions are aligned across different actors in a system, the result is a stable and coherent regime. When they become misaligned, for example because actors divert resources from traditional to new technologies, or when they develop new networks outside of the incumbent ones, a regime destabilises. This leads to the opening of transition space. An image was developed of how these change-minded incumbents navigate transition space by using the five dimensions of incumbent repositioning. Moreover, a sequence was discovered in the repositioning efforts of incumbent actors, where they start with developing new discourse on what is changing in their environment. This is followed by which rules need to change in order for them to form a better fit with the changing requirements. Which again leads to redefining its role vis-a-vis this turbulently changing environment and existing relationships with formerly allied actors become severed and new relations with other, often new actors, are developed. This then implies a reallocation of resources within the organisation, where certain activities are broadened and scaled-up, while others become obsolete and are gradually phased-out. Letting go of such routinized and strongly ingrained practices is the hardest part.

Governance for transition space

Transition space and the five dimensions of incumbent repositioning were introduced as an analytical framework to describe ongoing transition dynamics in the energy system (see figure S.1). However, they can also be used as a prescriptive framework in order to further accelerate an ongoing transition and help (incumbent) actors to navigate transition space. Trying to steer transition dynamics in a preferred direction is called transition governance.

Experimentation with transition governance interventions in this thesis indicates that it is possible to help change-minded incumbent actors to navigate transition space and to deliberately further destabilise a regime that is already under pressure in order to create more room for transformative change. By adapting the transition arena instrument to the Port of Rotterdam, it was possible to gain a sharper view of what is actually changing, to co-create new understandings that better fit this rapidly changing environment and how that influences existing roles and relations. While at the same time creating the opportunity to develop new ties with other actors that have more knowledge and experience on what strategies work in this new reality. Furthermore, it helped to shift resources within the organisation to be geared towards developing new practices.

Mobilizing participants of the ABP pension fund around the carbon bubble discourse and starting a divestment campaign resulted in an increased awareness of problems with current investment practices. Which enforced a review of existing relations with economically important industries and questioned the logic of continued support for increasingly problematic parts of the economy. It showed that under certain circumstances, it is possible to deliberately provoke further destabilisation, to force incumbent actors to let go of previously held assumptions of a stable and guiding regime, and rather to move into transition space.

As the regime dissolves and transition space opens, actors experience and increased need for new direction and sign posts. Break-down is a necessary pre-condition for transformative change, as such interventions could be developed aimed at deliberate destabilisation (and have been experimented with in this thesis). The initial experiences in this thesis suggest that it is best to combine destabilisation interventions with interventions aimed at build-up: if you ask actors to leave their comfort zone and jump to somewhere new, it requires some faith in that the new is as good or better than the old. Furthermore, transition space suggests that there is a shared sense of direction for the desired transition present, but that this requires translation into concrete business models, new coalitions, decisions about the application of resources and operational practices. As such, the challenge is to operationalize this vision into concrete business propositions, new institutions and governance arrangements, while leaving room to adjust the vision to new insights and learning experiences along the way. This thesis provides input for new transition governance strategies and a clear institutional need is observed for policies and strategies that contribute to destabilisation and navigating transition space. In absence of such policies the default option with policy makers and companies is trying to restabilise the incumbent regime and gaining back control, instead of using the momentum to embrace transformative change and navigate transition space to collectively co-create the most desired alternative future.

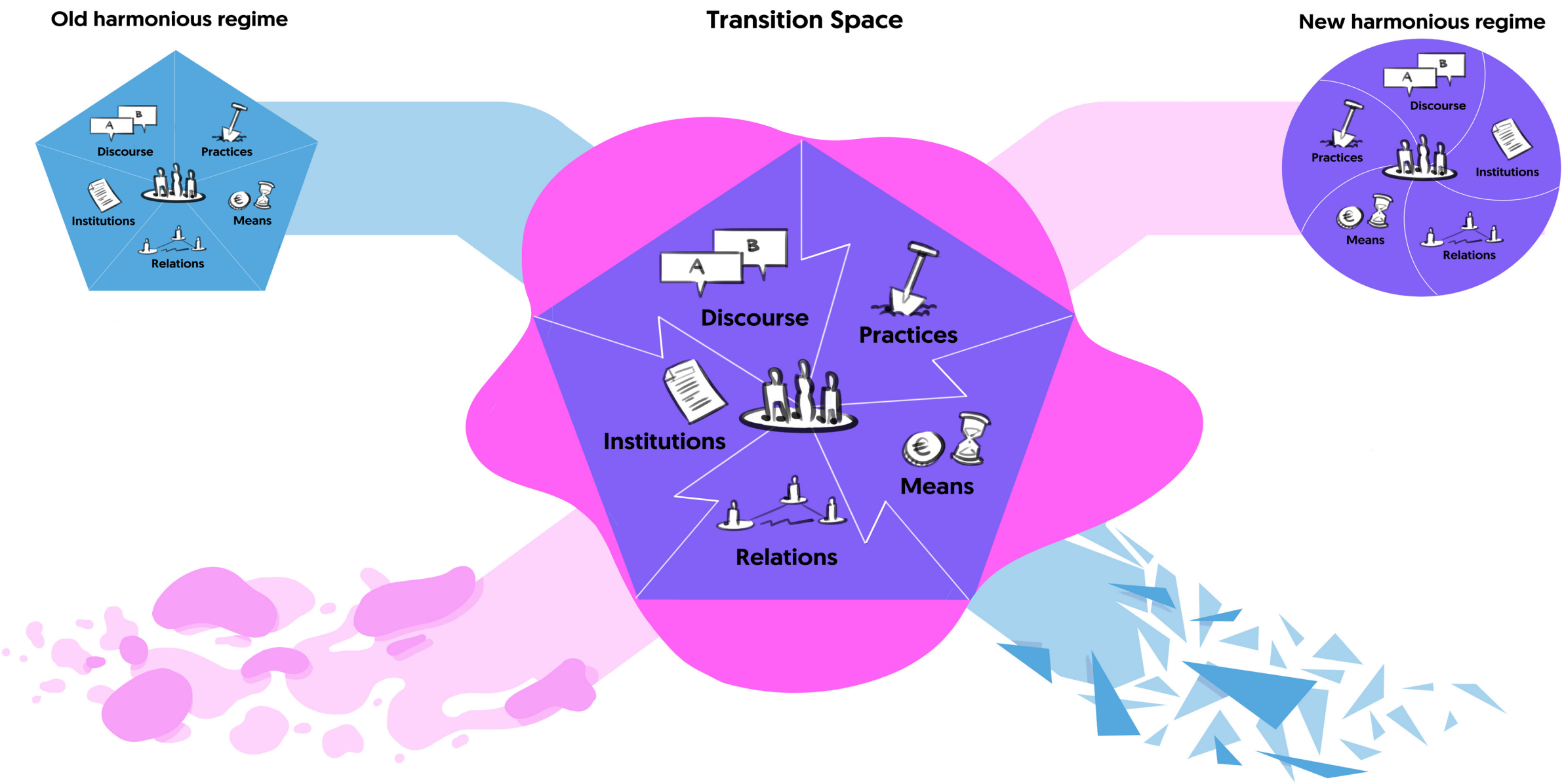


Figure S.1. Transition Space conceptual framework

Samenvatting

De mensheid staat voor een aantal forse maatschappelijke uitdagingen. Volgens het Global Risks Report voorbereid voor het World Economic Forum, is klimaatverandering van deze uitdagingen de grootste in termen van waarschijnlijkheid en impact. Ondertussen is de wetenschap erover uit dat de belangrijkste oorzaak van klimaatverandering door de mens veroorzaakte broeikasgasemissies is, met name koolstofdioxide die vrijkomt bij de verbranding van fossiele brandstoffen. Als klimaatverandering beperkt wordt tot 2 graden celsius, en het liefst 1,5 graad, zoals overeengekomen in het klimaatakkoord van Parijs in december 2015, dan moet volgens onderzoek 82% van de nu bekende kolenreserves, 50% van het aardgas en 33% van de oliereserves in de grond blijven zitten. Kortom, het voorkomen van gevaarlijke klimaatverandering vraagt om een energietransitie: een fundamentele maatschappelijke verandering weg van het gebruik van fossiele brandstoffen naar een energiesysteem gebaseerd op hernieuwbare energiebronnen.

Het onderzoeksveld van duurzaamheidstransities richt zich op het begrijpen van dergelijke fundamentele veranderingen in maatschappelijke systemen naar een meer duurzame staat en de implicaties daarvan voor beleid en sturing. Transities zijn processen van gelijktijdige opbouw van duurzame alternatieven en afbraak van onduurzame elementen van het gevestigde regime. Wanneer een regime onder druk komt van externe ontwikkelingen en crises, en tegelijkertijd duurzame alternatieven steeds bereikbaarder worden, kan er een radicale omwenteling in het regime plaatsvinden. Echter, hiervoor is het nodig dat een bestaand regime eerst destabiliseert, zodat er ruimte ontstaat voor andere manieren van denken en doen.

Overal in het energiedomein zijn intussen signalen van dergelijke destabilisatie te zien: kolencentrales die nog in 2015 werden geopend, worden alweer gesloten. Conflicten worden uitgevochten in de rechtszaal: zaken zijn gewonnen tegen de Nederlandse Staat omdat zij niet genoeg doet om haar burgers te beschermen tegen klimaatverandering. En een zaak tegen olie- en gasbedrijf Shell is beslecht in het voordeel van de milieuclubs die Shell aanklaagden om ervoor te zorgen dat het bedrijf zijn uitstoot in lijn brengt met het klimaatakkoord van Parijs. Deelnemers zetten hun pensioenfondsen succesvol onder druk om te divesteren uit de fossiele industrie. Energiebedrijven hebben in het afgelopen decennium tot 80% van hun beurswaarde verloren en sommigen vinden zichzelf opnieuw uit tot duurzame energiebedrijven.

Dergelijke destabilisatie is de context waarin historisch gegroeide stabiele maatschappelijke omstandigheden eroderen. Voor partijen die gewend zijn in een relatief stabiele en coherente regimecontext te opereren, is destabilisatie de geleidelijke en zichzelf versterkende ontbinding van stabiliteit, voorspelbaarheid en coherentie van hun omgeving. Voor gevestigde partijen is het navigeren van dergelijke divergentie veel uitdagender dan een context die wordt gedomineerd door een duidelijk en coherent regime. Tegelijkertijd zorgen de toegenomen diversiteit, conflicten en spanningen voor ruimte voor nieuwkomers en hun kijk op de problemen en oplossingen, waardoor compleet nieuwe handelingsperspectieven en allianties ontstaan die daarvoor zeer onwaarschijnlijk waren.

De onderzoeksvraag die centraal staat in dit proefschift is:

Hoe kunnen we transitiedynamiek begrijpen tussen een oud regime dat destabiliseert en een nieuw regime dat nog niet is gevormd, wat zijn de implicaties voor partijen die gewend zijn te opereren in een regimecontext en hoe kunnen zij een dergelijk regimevacuum navigeren?

Transitieruimte

Het centrale concept dat in dit proefschrift is ontwikkeld om transitiedynamiek tussen twee regimes in te beschrijven is transitieruimte; een context die zich kenmerkt door het ontbreken van stabiliteit, voorspelbaarheid en coherentie tussen partijen en hun omgeving. Het kernmerkt zich door zowel opbouw- als afbraakdynamiek. In transitieruimte moeten nieuwe instituties en routines worden ontwikkeld temidden van systemische onzekerheid, divergerende politieke en economische belangen en polariserende publieke debatten. Indicatoren voor het openen van transitieruimte in een maatschappelijk systeem zijn:

- Maatschappelijke onrust, demonstraties, protesten en media aandacht;
- Spanningen en conflicten tussen partijen, zoals rechtszaken en het uiteenvallen van allianties;
- Wetenschappelijke basis die delen van het regime problematiseert;
- Urgentiegevoel voor de gewenste richting van de duurzaamheidstransitie, onder veranderingsgezinde gevestigde partijen, opschalende niche-partijen en beleidsmakers;
- Veranderingsgezinde gevestigde partijen die zich pro-actief herpositioneren;
- Gedragen opvatting dat bepaalde elementen van het regime moeten worden uitgefaseerd;
- Opschalen van duurzame alternatieven.

In de eerste fases van een transitie gaat de meeste aandacht naar niches: de zaadjes van radicale verandering waar alternatieve manieren van denken en doen worden ontwikkeld. In transitieruimte zijn het juist gevestigde partijen die de aandacht opeisen. Dit zijn grote organisaties die een centrale rol spelen in het voorzien in een maatschappelijke functie, die over het algemeen goede politieke connecties hebben, die uitgebreide middelen ter beschikking staan en die de macht hebben om maatschappelijke dynamiek te beïnvloeden. Verdergaande maatschappelijke druk ondermijnt business-as-usual en dwingt dergelijke partijen tot herpositioneren en het evalueren van hun verdienmodellen. Er ontstaan groeiende spanningen tussen gevestigde partijen, waarin verschillende verhaallijnen over wat de energietransitie behelst steeds meer strijden om dominantie. Bestaande allianties vallen uiteen en nieuwe partnerschappen worden gesmeed. Bovendien ontstaan er groeiende spanningen tussen nieuwe praktijken en bestaande instituties en nieuwe middelen komen beschikbaar voor niche-ontwikkelingen door de inmenging van deze veranderingsgezinde systeemspelers.

Herpositioneren van systeemspelers

Transitieruimte is uitdagend, in het bijzonder voor systeemspelers die gewend waren aan stabiele marktposities en politieke relaties. Aan de ene kant moeten deze partijen zich herpositioneren om ervoor te zorgen dat ze controle houden, terwijl ze aan de andere kant disruptieve veranderingen te verstouwen krijgen die aanpassingen vergen. Misschien wel meer aanpassingen dan wat ze aan kunnen. In dit proefschrift wordt transitieruimte verkend vanuit het perspectief van drie veranderingsgezinde systeemspelers:

- Netbeheerder Alliander opereert in een omgeving waarin klimaatverandering en aardbevingen veroorzaakt door aardgaswinning in het noorden van Nederland aanleiding geven tot zorgen. Tegelijkertijd ontwikkelen decentrale en hernieuwbare energiesystemen zich razendsnel. Deze ontwikkelingen zorgen voor druk om het energiesysteem en daarmee het verdienmodel van Alliander radicaal te veranderen. Daarop heeft Alliander aangekondigd aardgas uit te faseren, samen met andere spelers die actief zijn in de gebouwde omgeving. Het bedrijf is bezig om verder uit te werken wat dit betekent voor de organisatie en haar rol en positie in het energiedomein.
- Het Rotterdamse havenbedrijf is verantwoordelijk voor de grootste haven van Europa, waarin de overslag en verwerking van fossiele brandstoffen tot de hoofdactiviteiten behoren. Klimaatverandering, geopolitieke overwegingen en het teruglopen van de vraag naar deze producten door de opkomst van elektrisch vervoer en circulaire en biobased alternatieven, zorgt voor ondermijning van historisch succesvolle manieren van denken en doen. Het havenbedrijf is zich ervan bewust dat doorgaan op de weg van volume en schaal en het produceren en overslaan van fossiele brandstoffen steeds meer haaks staat op de maatschappelijke ontwikkeling naar duurzaamheid. Daarom verkent het alternatieve biobased en circulaire toekomstscenario's.
- Institutionele investeerder ABP, het grootste pensioenfonds in Nederland, ligt onder het vergrootglas bij haar deelnemers, een maatschappelijke beweging en de media voor haar investeringen in de fossiele industrie. Deze groepen claimen dat om gevaarlijke klimaatverandering te voorkomen, het leeuwendeel van bekende voorraden fossiele brandstoffen in de grond moeten blijven zitten. En dat deze koolstofbubbel ervoor zorgt dat investeren in de fossiele industrie steeds risicovoller wordt. Deze gedachtegang ondermijnt de tot dan toe dominante logica dat pensioenfondsen voornamelijk moeten focussen op rendement en dat de fossiele industrie een winstgevende en veilige investering is.

Destabilisatie van een regime en het openen van transitieruimte dwingt systeemspelers te herpositioneren en activiteiten los te laten die in het licht van de voortschrijdende transitie niet langer de moeite waard zijn, terwijl ze nieuwe activiteiten ontplooien die beter passen bij de veranderende omgeving. Dit creëert een zichzelf versterkend patroon waarin de legitimiteit van een gedeeld regime onder druk komt, waardoor partijen binnen het regime hun strategieën diversificeren, waardoor destabilisatie verder toeneemt, enzovoorts. Door herpositionering van systeemspelers, komen er middelen vrij voor het opschalen van vergevorderde niches en vallen toezeggingen voor bepaalde elementen van het regime weg, waardoor deze worden uitgefaseerd. Wat wordt bedoeld met herpositioneren van systeemspelers, is dat ze hun kijk op de omgeving en de toekomst veranderen en de prioriteiten die zij stellen voor de organisatie. Ze veranderen hun begrip van hun rol en taken, positie in het veld en hun relaties. Ze herevalueren hoe middelen worden ingezet binnen de organisatie en ze veranderen de dagelijkse praktijk in de operatie:

ze herijken wat waardevolle taken zijn om tijd aan te spenderen en ontwikkelen nieuwe routines die beter werken in een veranderende context. Het herpositioneren van systeemspelers kan worden beschreven in termen van:

- *Discours*, waarmee actoren betekenis geven aan hun omgeving;
- *Instituties*: de formele en informele regels die het gedrag van partijen sturen;
- *Relaties en rollen*: het begrip van organisaties over hun bestaansrecht en hoe zij zich verhouden tot andere partijen;
- *Middelen* die partijen mobiliseren om bepaalde doelen te realiseren, met name tijd en geld;
- *Praktijken*: dagelijkse routinematige activiteiten.

Met deze vijf dimensies kan worden beschreven hoe systeemspelers de interactie met hun omgeving veranderen. Wanneer deze vijf dimensies bij verschillende partijen in een systeem coherentie vertonen, opereren zij in een stabiel regime. Wanneer zij uit balans raken, bijvoorbeeld doordat partijen middelen verschuiven van traditionele naar nieuwe technologie, of wanneer zij netwerken bouwen buiten de gevestigde paden, kan een regime destabiliseren. Dit leidt tot het openen van transitieruimte. Met behulp van deze vijf dimensies van herpositioneren kon een beeld worden ontwikkeld van hoe drie veranderingsgezinde systeemspelers transitieruimte navigeren. Bovendien is er een volgordelijkheid ontdekt in de herpositionering van deze systeemspelers, waarbij het begint met nieuw discours over wat er verandert in hun omgeving. Dit wordt gevolgd door welke regels er moeten veranderen om ervoor te zorgen dat hun activiteiten beter passen bij een veranderende omgeving. Wat vervolgens ertoe leidt dat haar rol in relatie tot haar veranderende omgeving wordt geherdefinieerd en bestaande allianties onder druk komen en nieuwe partnerschappen worden aangegaan, vaak met nieuwe spelers. Dit impliceert vervolgens een herallocatie van middelen binnen de organisatie, waarbij bepaalde activiteiten verbreed worden en worden opgeschaald, terwijl andere activiteiten in onbruik raken en stapsgewijs uitgefaseerd worden. Loslaten van dergelijke routinematige en sterk ingebakken praktijken gebeurt als allerlaatste.

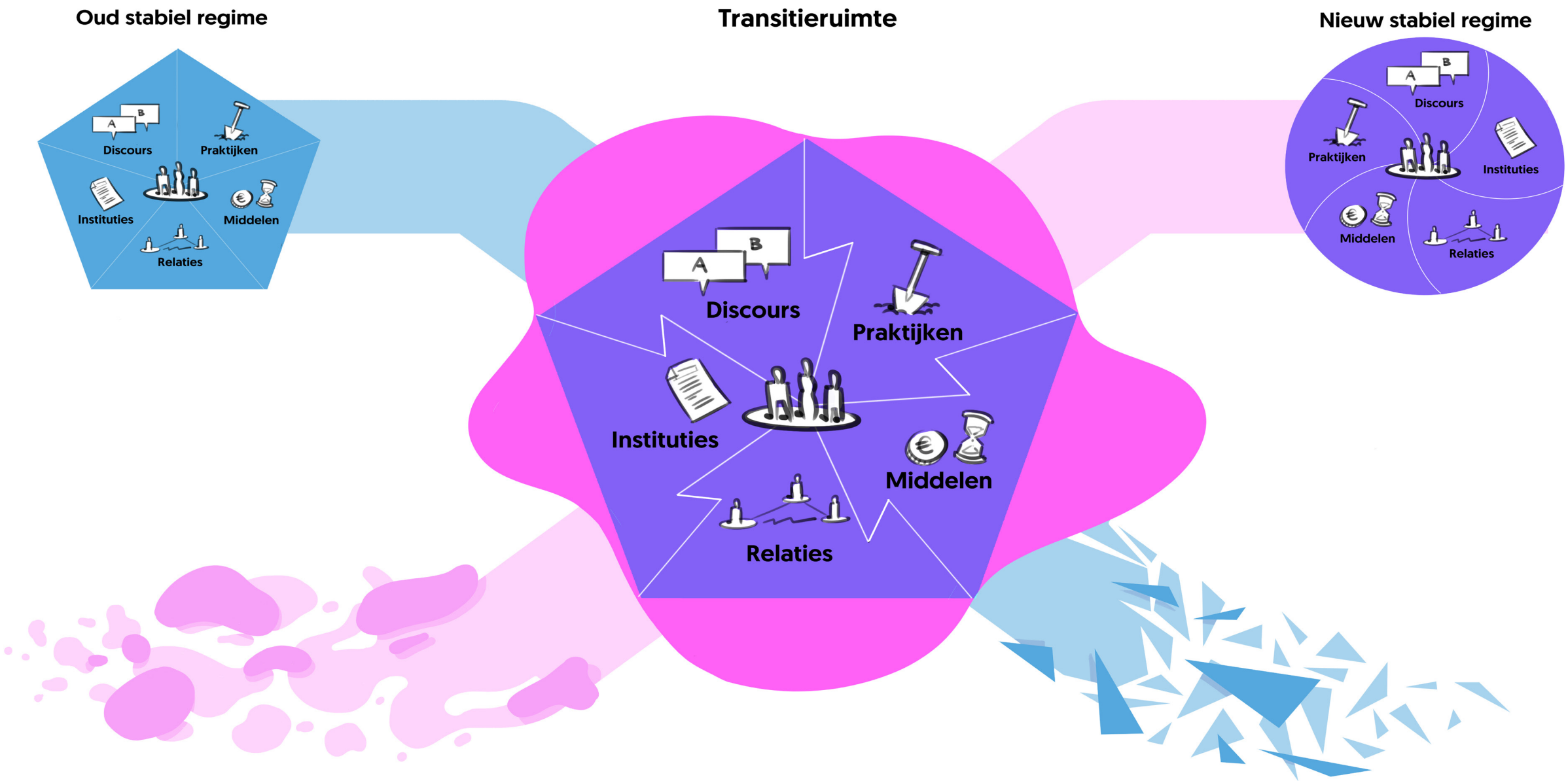
Sturen in transitieruimte

Transitieruimte en de vijf dimensies van herpositioneren van systeemspelers werden geïntroduceerd als een analytisch raamwerk om transitiedynamiek te beschrijven in het energiesysteem (zie figuur S.1). Ze kunnen echter ook gebruikt worden als een prescriptief raamwerk om ervoor te zorgen dat een transitie versnelt en om systeemspelers te helpen transitieruimte te navigeren. Proberen transitiedynamiek in een bepaalde richting te sturen en versnellen wordt transitiesturing genoemd.

Experimenteren met transitiesturing in dit proefschrift, duidt erop dat het mogelijk is om veranderingsgezinde systeemspelers te helpen transitieruimte te navigeren en om opzettelijk een regime dat al onder druk staat verder te destabiliseren om ruimte te maken voor transformatieve verandering. Door het bestaande transitie arena instrument aan te passen aan de Rotterdamse haven, was het mogelijk om scherper in beeld te brengen wat er eigenlijk verandert, om nieuwe opvattingen te co-creëeren die beter passen bij deze snel veranderende omgeving en hoe dat betaande rollen en relaties beïnvloedt. Tegelijkertijd bood het de kans om nieuwe partnerschappen aan te knopen met partijen met meer kennis en ervaring van welke strategieën werken in deze nieuwe realiteit. Bovendien droeg het bij aan het verschuiven van middelen binnen de organisatie om nieuwe praktijken te ontwikkelen.

Het mobiliseren van deelnemers van pensioenfonds ABP rondom het koolstofbubbeldiscours en het starten van een divesteringscampagne resulteerde in bewustwording over problemen met de huidige investeringspraktijk. Hiermee werd een herevaluatie afgedwongen van bestaande relaties en werd doorgaan met investeren in bepaalde onderdelen van de economie steeds problematischer. Dit laat zien dat het onder bepaalde omstandigheden mogelijk is om opzettelijk verdergaande regime destabilisatie uit te lokken, om systeemspelers te dwingen bepaalde aannames over een stabiel regime los te laten en transitieruimte in te bewegen.

Terwijl het gevestigde regime uit elkaar valt en transitieruimte opent, ervaren partijen een groeiende behoefte aan nieuwe richting. Destabilisatie en afbraak zijn een noodzakelijke voorwaarde voor transformatieve verandering, en daarom konden er interventies worden ontwikkeld om opzettelijk te destabiliseren. De eerste ervaringen in dit proefschrift suggereren dat interventies gericht op destabilisatie en afbraak het best gecombineerd kunnen worden met interventies gericht op opbouwen van iets nieuws: als je actoren vraagt om hun comfortzone te verlaten en de sprong te wagen naar iets nieuws, dan vergt het vertrouwen dat het nieuwe net zo goed is of zelfs beter dan het oude. Bovendien suggereert transitieruimte dat er een gedeeld gevoel voor richting is over de gewenste transitie, maar dat dit nog geïmplenteerd moet worden in nieuwe verdienmodellen, nieuwe coalities, keuzes voor allocatie van middelen en operationele praktijken. De uitdaging is dus om deze visie te operationaliseren in concrete waardeproposities, nieuwe instituties en sturingsarrangementen, terwijl er ruimte wordt gelaten om de visie aan te passen aan nieuwe inzichten en leerervaringen onderweg. Dit proefschrift biedt input voor nieuwe transitiesturing gericht op destabilisatie en navigeren van transitieruimte, waar ook een duidelijke behoefte voor is in de maatschappij. Bij ontbreken van dergelijke strategieën is de standaardreflex bij bedrijven en beleidsmakers om te proberen het regime te restabiliseren en controle terug te krijgen, in plaats van het momentum aan te grijpen om transformatieve verandering te omarmen en transitieruimte te navigeren om collectief de meest gewenste alternatieve toekomst te co-creëeren.



Figuur S.1. Transitieruimte conceptueel raamwerk

Contents

1. Introduction: the accelerating energy transition

Humankind is facing several societal challenges. The Global Risks report (2020) prepared by the World Economic Forum claims that of these challenges, climate change is the most daunting in terms of likelihood and impact. And, several other 'highly likely', 'highly impactful' risks can (at least partly) be related to climate change, such as water and food crises, extreme weather events, and biodiversity loss and ecosystem collapse. Meanwhile, it is established that the main cause for climate change is anthropogenic greenhouse gas (GHG) emissions, most prominently carbon dioxide (IPCC, 2021), and that the burning of fossil fuels is the main contributor to such emissions. Research finds that if global warming is to remain below 2° C, and preferably 1,5 degrees, as has been agreed upon in the Paris climate agreement of December 2015, 82% of currently known coal reserves, 50% of gas, and 33% of oil reserves must remain unburned (McGlade and Ekins 2015). Thus, in order to avoid potentially catastrophic climate change, an energy transition is necessary: a shift away from fossil fuels towards an energy system based on renewable and sustainable energy sources.

Recent developments indicate that such a transition is gradually taking shape: The European Union has introduced an encompassing Green Deal and proposed its Fit for 55 package, in order to reduce carbon emissions with 55% by 2030 in comparison to 1990 emissions levels. In some European countries, including the Netherlands, phase out dates for coal fired power plants have been set. And a rising price for CO_2-emissions under the European Emissions Trading Scheme (EU-ETS) indicates that financial markets are increasingly pricing in climate effects. Increasingly mature sustainable alternatives can be observed, a global consensus reached in Paris to tackle climate change and significantly reduce the use of fossil fuels, and incumbents that are investing relatively large sums in renewable energy. Some are even splitting their fossil fuel business from their renewable business (such as energy company E.on). And new players are entering the market, such as Tesla in the automobile industry, whose market value surpasses that of any incumbent car manufacturer.

The field of sustainability transitions research (Markard et al., 2012; Loorbach et al., 2017) focuses on understanding such fundamental shifts in societal systems towards a more sustainable state and the implications for policy and governance. However, based on the above, it can be argued that the energy transition has entered a new phase which current analytical frameworks have difficulty to adequately describe (cf. Markard, 2018). We are entering unknown territory, characterized by market transitions due to rapidly dwindling renewable energy prices (e.g., the costs of solar energy have decreased 89% over the last decade (Roser, 2020), system risks and disruptive changes and the need for rapid phase out while large parts of our economy are still dependent on fossil fuels. The literature on agency and governance in sustainability transitions has mainly focused on technological innovation, experimentation, policy and politics and empowerment of emerging transitions, but not so much on the specific dynamics of accelerating sustainability transitions. With the acceleration of the energy transition, and broader societal interest, I see an increasingly decisive role for incumbent actors, such as policy makers, institutional investors, large energy

companies and system operators. What the energy transition means for them and which role(s) they (can) play has received less attention than that of innovators and so-called niche-players. As such, I propose that new conceptual frameworks are needed to grasp the systemic dynamics of accelerating sustainability transitions, including destabilisation and phase-out of old elements of the energy system and emergence and institutionalisation of new elements and the role incumbent agency plays in such accelerating transition dynamics.

The empirical setting of this research is the energy transition in the Netherlands. The country has a history of long-term environmental policy, which, according to Verbong and Geels (2007) started in the 1970s. Moreover, with the fourth National Environmental Policy Plan published in the early 2000s, the government officially adopted a strategy of 'transition management' (TM) aimed at transforming the fossil fueled energy system to one based on renewable energy sources (Verbong & Loorbach, 2012). This strategy, which has been discussed elaborately in sustainability transitions literature (see e.g., Kern & Howlett, 2009; Kern & Smith, 2008; Loorbach & Rotmans, 2010; van der Loo and Loorbach, 2012) started from so-called 'persistent problems' which traditional approaches and environmental policies fail to resolve. It led to a host of policy efforts in which six ministries participated; seven energy transition platforms were formed with participants from government, industry and knowledge institutes; several innovation programs were launched and a new National Advisory Board on Energy Transition (Regieorgaan Energietransitie) was installed (van der Loo & Loorbach, 2012). According to van der Loo & Loorbach (2012:225), a "transition approach was formulated that focused on a long-term policy, a systematic approach, cooperation between government and societal stakeholders and specific short-term activities. Twenty-three transition paths were clustered into five main routes: efficient and green gas, chain efficiency, bio-based raw materials, alternative transport fuels and sustainable electricity." Later 'built environment' and 'the greenhouse as a source of energy' were added as transition paths. The transition approach provided new impulses to the innovation system in three ways (MinEZ, 2004; in: van der Loo & Loorbach, 2012:225):

" - through formulating visions and transition trajectories with active involvement of business, governments, societal organizations and knowledge institutes, resulting in a shared sense of direction;

- By forging new coalitions of actors that previously seemed rivals, such as the biomass coalition of business and the environmental movement and the involvement of Greenpeace in offshore wind energy;

- By seeking niche markets for a number of transition paths."

Despite the elaborate policy efforts, discussed above, the country has been rather slow in actually reducing CO_2-emissions. It currently ranks last with regards to the share of renewable energy in the European Union, with a 7.4% share of renewables in the energy mix (Eurostat, 2020). Historically, fossil fuels are an important factor in the Dutch economy. The country is a large producer of natural gas, hosting the largest onshore natural gas field in the world. And with its location on the coast, and several major ports, it has grown into a trade hub for oil, coal, and gas, and as an oil refining center for (North) West Europe. The Organisation for Economic Co-operation and Development (OECD) concludes that in comparison to other developed countries, the Dutch economy is rather fossil fuel- and GHG-intensive (IEA, 2014, p. 10). Over 90% of total primary energy supply comes from fossil fuels, and energy intensive industries contribute to around 12.5% of GDP (Weterings et al., 2013). Furthermore, decisions to develop new coal fired power plants have been made in the last decade with three brand new coal plants opening in 2015 and 2016 (NOS, 2016).

At the same time, several developments increase the pressure to resolve this fossil fuel lock-in. Non-governmental organization Urgenda has successfully sued the Dutch government up to the highest court, for not doing enough to protect its citizens from dangerous climate change, forcing the Dutch government to increase its CO_2-mitigation efforts (Rechtspraak, 2019). In turn, end dates for the use of coal in electricity production have been set for 2030 (Rijksoverheid, 2018). Also, earthquakes in the Northern parts of the Netherlands, caused by natural gas production, have forced the Netherlands to intensify its energy transition efforts and to start phasing out the use of natural gas: it announced a production stop in 2030 for the country's largest 'Groningen' gas field (MinEZK, 2017). Furthermore, it is home to the world's first 'subsidy-free' offshore wind park, which is announced for 2022 (Rijksoverheid, 2020). Still, only the COVID-pandemic has brought the CO_2-emissions reduction goal of minus 25% in 2020 relative to 1990 in sight that was enforced by the rule of law in the Urgenda climate case (PBL, 2020).

As such, this dynamic empirical setting provides interesting insights for this new phase of the energy transition, in which an old regime is destabilizing, and a new regime is in the making, in which old ways of thinking and doing are increasingly at odds with new emerging practices, giving rise to tensions and conflicts at the societal system level.

1.1 Research Context

My curiosity has been driven by what we have come to call the 'energy transition' as detailed above, and in particular questions of governance and agency in this process. Over the years, I have discovered increasing layers of complexity in the energy transition, while moving from one community setting to another and as such, deepening my understanding and research questions. Thus, the basis from which this thesis has emerged, was laid long before I actually started my PhD.

In 2006, I started my bachelor studies in Environmental Social Sciences at Utrecht University. Here, I deepened my understanding of the ways in which humans interact with their natural environments and the environmental problems resulting from this interaction. However, a direction for potential solutions was mostly lacking. At some point by the end of my bachelor degree, I came across renewable energy and the potential it provides to solve some of the major challenges of climate change and air pollution, and maybe even of concentration of wealth and power that often goes along with concentration of fossil fuel resources and the technological know-how to exploit it. The documentary 'Here comes the sun', on Germany's Energiewende (Tegenlicht, 2008), played a major role in opening my eyes to this potential.

I decided to follow this interest and got into the master program Renewable Energy Management at the University of Freiburg and the Fraunhofer Institute for Solar Energy. In this master, I learned to develop renewable energy projects, requiring knowledge of the technologies, and insight into the business case and institutional and regulatory conditions needed for the innovations to take off. The main insight I took from this program is that the technology is ready (although much can still be improved), but somehow it still failed to take off, and that this has much more to do with existing societal institutions, market structures, expectations and power constellations, than with the state of the technologies itself.

Then, I moved to the Dutch Research Institute for Transitions (DRIFT) at the Erasmus University in Rotterdam. Their work on the multi-actor, multi-level and co-evolutionary nature of fundamental societal change resonated with my knowledge and experience of the energy transition so far. At DRIFT, I got the opportunity to work as a consultant and in parallel to co-develop a proposal for the NWO funded Transition Patterns Enabling Smart Energy Systems (TRAPESES) project (see Textbox 1.1), of which this PhD-thesis is the result.

Textbox 1.1 TRAPESES: Transition Patterns Enabling Smart Energy Systems

At the moment it is far from clear how the transition to a Smart Energy System will take shape. Demographic, economic and ecological developments destabilise the centralized and fossil-fuelled energy regime. How does the transition to a smart energy system take shape? This question was addressed by DRIFT and TU Delft in the TRAPESES research project into Smart Energy Systems.

The NWO-funded TRAPESES-project focussed on the energy transition in the Netherlands and specifically developments in the area of Smart Energy Systems (SES). We conceptualise these SES-developments as a wanted and mediated process of social learning and co-creation between regime and niche actors and technologies. Through destabilisation of the incumbent energy regime, actors have to increasingly deal with structural and systemic uncertainties. Learning forms a crucial link in this development.

In the TRAPESES project the following question was central: "Which technological, social, economic and institutional factors influence the possibilities of niche, regime and landscape actors to learn from hybrid transition patterns towards a smart energy system and to co-create these?"

The goal of the project was to gain insight in the tensions, dynamics and challenges of the incumbent regime; the tensions, dynamics and synergies within and between niches and the patterns of interaction, institutional developments and collective challenges in the long run. In close cooperation with actors from practice and consortium partner Alliander we studied how synergies and conflicts emerge when top-down and bottom-up innovations meet. We explored the potential challenges and opportunities for the least disruptive development (a hybrid transition pattern) towards a smart energy system. Moreover, we developed ideas and suggestions for an institutional framework and strategies for actors.

1.2 Thesis aims

This PhD-research started from the observation that a lot of attention in the sustainability transitions research field focused on the niches as the seeds of necessary change (also known as the niche-bias; Geels & Schot, 2007). My interest went to the regime, the dominant structures that generally hamper change, according to the well-established multi-level perspective (MLP; cf. Geels, 2002; 2014). Given that transitions are defined as a regime shift (Loorbach & Rotmans, 2010), this meso-level structure warranted more careful scrutiny. Within the MLP, regimes are characterized as socio-technical ensembles in which actors and elements of the regime become abstractions. As such, regimes are a rather abstract and analytical construct. Starting from practice, the empirics of the energy transition, the question arises what actually holds a regime together and what constitutes a regime in daily practice. What is the role of companies, consumers, researchers and policy makers in it? How do they deal with the growing societal pressures and increasing competition? Which strategies do actors within the regime enact to negate transitional pressures, or to proactively embrace these to induce transformative change? And, what does it mean when that which holds the regime together starts to erode and eventually becomes obsolete?

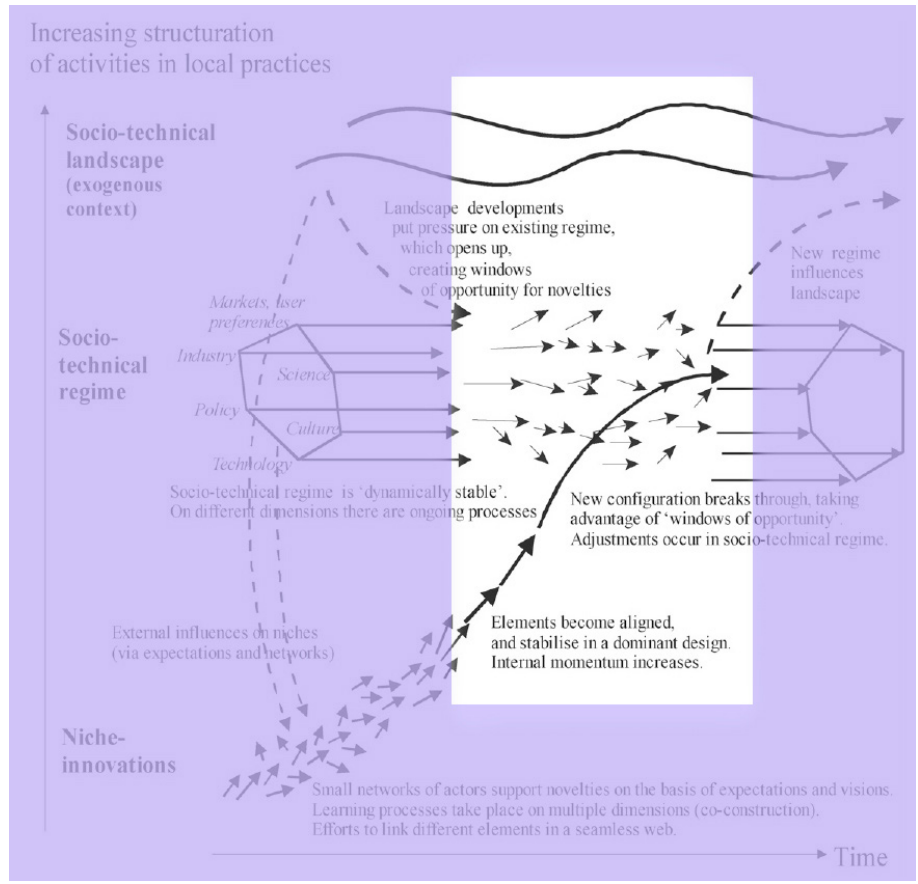


Figure 1.1 Dissolution of a regime over the course of a transition (adapted from Geels & Schot, 2007)

That there is a certain transition phase in which a regime is absent, is implied in the sustainability transitions' literature, see e.g., Figure 1.1, but it is so far not explicitly conceptualised. Explicating such regime absence raises intriguing questions for transitions research and transformative change: What happens to a system in absence of a clearly identifiable, dominant and stabilising regime? Does the whole regime disappear, or only some elements while others remain and might recombine into a new regime? What does that mean in terms of transition dynamics and patterns? How do actors influence and respond to dissolution of the regime? And, from a governance perspective: is it possible to support incumbent actors to navigate such a regime vacuum and explore more sustainable pathways?

When there is no longer a clearly identifiable, stable and dominant regime, it becomes increasingly hard to describe the transition as a systemic fight between niches and regimes. Especially assigning actors to such dissolving levels, as some MLP-inspired studies tend to do, becomes exceedingly difficult and possibly counter-productive for our understanding of accelerating transition dynamics. With a destabilized regime, incumbent actors and their (changing) activities become of focal interest. For actors previously embedded within the regime it becomes increasingly challenging to orient themselves. Some might try to restabilize accelerating dynamics while others proactively embrace possible transition. In this thesis, I introduce the concept of transition space to better explore what happens in the context of a destabilized regime and how (incumbent) actors deal with this.

As such, the aims of this thesis can be summarized as:

- Furthering the understanding of regimes and their destabilization, including the role of (incumbent) agency;
- Exploring transition space as the phase of transition when a regime destabilizes, while alternatives are still developing and a new dynamic equilibrium is not yet in sight;
- Exploring how change-minded incumbents navigate transition space;
- Exploring existing and new interventions aimed at supporting change-minded incumbents to navigate this highly challenging environment.

This thesis has come about through action research. It has evolved in an abductive manner (Schwartz-Shea & Yanow, 2011), in which I went back and forth between theory and practice. Furthermore, numerous practitioners have been involved through the casework and the TRAPESES user committee in which early research results have been discussed and deepened. The result is an empirically rich thesis that is strongly grounded in practice, in which I introduce the conceptual contribution of transition space and five dimensions of incumbent repositioning to relate agency and structure in transitions. Furthermore, I explore existing and new transition governance interventions for provoking deliberate destabilization and guiding actors through transition space. Textbox 1.2 provides an overview of the cases explored in this thesis:

With my research, I also have a normative ambition. Given that fossil fuels are so deeply entrenched in developed societies, it is impossible to envisage a future in line with the goals of the Paris climate agreement and the current stance of climate science as summarized by the IPCC (2021) without massive destabilization. It is key to develop a better understanding of this entrenchment, the role different actors play in reproducing fossil fuel production and use and the increasing pressures and potential for change, in order to explore the ways in which actors can be supported to proactively engage with these change dynamics to develop low-carbon energy futures. As such, my hope is that deepening this understanding helps to contribute to shaping a more sustainable future in time to prevent dangerous climate change.

This thesis is structured as follows: In Chapter 2, I dive in the methodological considerations and research journey of this thesis. Chapter 3 lays the theoretical groundwork pertaining to regimes, agency and destabilization. Following from this, I introduce the transition space framework to describe the phase of transition in which an old regime has destabilized, while a new regime has not yet formed. In Chapter 4 and 5, empirical evidence of the destabilization of the Dutch energy regime is provided and the empirical results confirm the need of a new conceptual framework. Chapters 6, 7 and 8 provide insights in the experience of transition space from the perspective of different incumbents, a grid operator, a port authority and port related industries and an institutional investor. Chapters 7 and 8 also provide examples of experimentation with interventions aimed at guiding actors to navigate transition space. In Chapter 9, I discuss the findings, draw conclusions and provide some future challenges.

Textbox 1.2: Cases

Grid operator Alliander:
this is the largest distribution grid operator in the Netherlands, serving 5,8 million customers. It is in the midst of reinventing itself from an electricity and gas grid operator to a sustainable area developer, given strong societal pressure to develop a more sustainable energy system. It has developed an innovation ecosystem of start-ups around the regulated core, to challenge itself and the broader energy market, resulting in (legal) clashes with energy providers. Also, it is involved in influencing institutional structures, such as changing the obligation to connect customers to a gas grid into a right to heat, to allow a swifter energy transition.

Port of Rotterdam:
this is the largest port in Europe and a large fossil fuel hub involving import and export of coal, oil and liquified natural gas, and a large petrochemical cluster. While it contributes about 6 % to Dutch GDP, it is responsible for about 16% of total Dutch GHG-emissions. Commissioned by the Port Authority, a transition arena trajectory (Loorbach, 2007) was carried out with incumbents from the port area and niche-players from outside, to explore the challenges the area faces and develop promising pathways towards more sustainable futures

ABP-fossilfree:
ABP is Europe's largest pension fund, securing retirement funding for about 3 million people working in government and education. It is one of the largest institutional investors investing about € 466 billion, of which €17,4 billion goes to the fossil fuel industry. Through action research, I contributed to the emergence of the ABP-fossilfree movement, a societal pressure group aimed at the divestment of ABP from fossil fuels. After years of pressure, in October 2021 ABP announced to divest from fossil fuels.

References

- *Avelino, F., & Wittmayer, J. M. (2016). Shifting power relations in sustainability transitions: a multi-actor perspective. Journal of Environmental Policy & Planning, 18(5), 628-649.*
- *Berkhout, F., Smith, A., & Stirling, A. (2004). Socio-technological regimes and transition contexts. System innovation and the transition to sustainability: Theory, evidence and policy, 44(106), 48-75.*
- *Bosman, R. & Gillijamse, J. (2010) Duitsland: Koploper en Aanjager. In: TWA Special Clean Energy. p. 47 – 52. Agentschap NL, Ministerie van Economische Zaken.*
- *Bosman, R., Loorbach, D., Rotmans, J., & Van Raak, R. (2018). Carbon lock-out: leading the fossil port of Rotterdam into transition. Sustainability, 10(7), 2558.*
- *Bosman (2012) Germany's Energiewende: Changing the rules of the energy game. The Hague: Clingendael International Energy Programme. Available online:* http://www.clingendaelenergy.com/publications/publication/germanys-energiewende-redefining-the-rules-of-the-energy-game
- *Brown, R. R., Farrelly, M. A., & Loorbach, D. A. (2013). Actors working the institutions in sustainability transitions: The case of Melbourne's stormwater management. Global Environmental Change, 23(4), 701-718.*
- *Clingendael International Energy Programme (CIEP) (2018) About us.* http://www.clingendaelenergy.com/about_us *[accessed 20-08- 2018]*
- *De Haan, J. H., & Rotmans, J. (2011). Patterns in transitions: understanding complex chains of change. Technological forecasting and social change, 78(1), 90-102.*
- *De Haan, F. J., & Rotmans, J. (2018). A proposed theoretical framework for actors in transformative change. Technological Forecasting and Social Change, 128, 275-286.*
- *Eurostat (2020) Renewable Energy Statistics. Available online:* https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Renewable_energy_statistics *[accessed 08-06-2020]*
- *Fischer, L. B., & Newig, J. (2016). Importance of actors and agency in sustainability transitions: a systematic exploration of the literature. Sustainability, 8(5), 476.*
- *Fuenfschilling, L., & Truffer, B. (2014). The structuration of socio-technical regimes—Conceptual foundations from institutional theory. Research Policy, 43(4), 772-791.*
- *Geels, F. W. (2002). Technological transitions as evolutionary reconfiguration processes: a multi-level perspective and a case-study. Research policy, 31(8-9), 1257-1274.*
- *Grin, J., Rotmans, J., & Schot, J. (2010). Transitions to sustainable development: new directions in the study of long term transformative change. Routledge.*
- *International Energy Agency (IEA) (2014). The Netherlands 2014 Review (Energy Policies of IEA Countries). Available online:* https://www.iea.org/reports/energy-policies-of-iea-countries-the-netherlands-2014-review *[accessed 08-06-2020]*
- *Intergovernmental Panel on Climate Change (IPCC) (2021). Climate Change 2021: The Physical Science Basis, the Working Group I contribution to the Sixth Assessment Report [accessed 01-12-2021]*
- *Kemp, R., Schot, J., & Hoogma, R. (1998). Regime shifts to sustainability through processes of niche formation: the approach of strategic niche management. Technology analysis & strategic management, 10(2), 175-198.*
- *Kern, F., & Howlett, M. (2009). Implementing transition management as policy reforms: a case study of the Dutch energy sector. Policy Sciences, 42(4), 391.*
- *Kern, F., & Smith, A. (2008). Restructuring energy systems for sustainability? Energy transition policy in the Netherlands. Energy policy, 36(11), 4093-4103.*
- *Lawrence, T. B., & Suddaby, R. (2006). 1.6 institutions and institutional work. The Sage handbook of organization studies, 215-254.*
- *Loorbach, D. (2007). Transition management. New mode of governance for sustainable development. Utrecht: International Books.*
- *Loorbach, D. (2010). Transition management for sustainable development: a prescriptive, complexity‐based governance framework. Governance, 23(1), 161-183.*
- *Loorbach, D., Frantzeskaki, N., & Avelino, F. (2017). Sustainability transitions research: transforming science and practice for societal change. Annual Review of Environment and Resources, 42.*
- *Loorbach, D., & Rotmans, J. (2010). The practice of transition management: Examples and lessons from four distinct cases. Futures, 42(3), 237-246.*
- *Markard, J. (2018). The next phase of the energy transition and its implications for research and policy. Nature Energy, 3(8), 628-633.*
- *McGlade, C., & Ekins, P. (2015). The geographical distribution of fossil fuels unused when limiting global warming to 2 C. Nature, 517(7533), 187-190.*
- *Ministerie van Economische Zaken en Klimaat (MinEZK) (2017). Minder gaswinning Groningen - Gaswinning in Groningen -* Rijksoverheid.nl *[onderwerp]. Available online:* https://www.rijksoverheid.nl/onderwerpen/gaswinning-in-groningen/mindergaswinning-groningen *[Accessed 15-04-2018]*
- *NOS (2016) Ondanks klimaatakkoord nieuwe kolencentrales nog zonder CO2-afvang. Available online:* https://nos.nl/artikel/2100426-ondanks-klimaatakkoord-nieuwe-kolencentrale-nog-zonder-co2-afvang.html *[accessed 09-12-2020]*
- *Van Raak, R. (2016). Transition Policies; connecting system dynamics, governance and instruments in an application to Dutch Healthcare. Thesis Erasmus Universiteit Rotterdam*
- *Raven, R. P. J. M. (2005). Strategic niche management for biomass: A comparative study on the experimental introduction of bioenergy technologies in the Netherlands and Denmark. Thesis Technical University Eindhoven*
- *Rechtsspraak (2019) Klimaatzaak Urgenda. Available online:* https://www.rechtspraak.nl/Bekende-rechtszaken/klimaatzaak-urgenda *[accessed 09-12-2020]*
- *Rijksoverheid (2018) Kabinet verbiedt elektriciteitsproductie met kolen. Available online:* https://www.rijksoverheid.nl/actueel/nieuws/2018/05/18/kabinet-verbiedt-elektriciteitsproductie-met-kolen *[accessed 07-12-2021]*
- *Rijksoverheid (2020) Windenergie op zee. Available online:* https://www.rijksoverheid.nl/onderwerpen/duurzame-energie/windenergie-op-zee *[accessed 08-06-2020]*
- *Rip, A., & Kemp, R. (1998). Technological change. Human choice and climate change, 2(2), 327-399.*

- *Roser, M. (2020) The price decline of electricity from renewable sources. Available online: https://ourworldindata.org/cheap-renewables-growth [accessed 07-12-2021]*
- *Rotmans, J., Kemp, R., & Van Asselt, M. (2001). More evolution than revolution: transition management in public policy. Foresight-The journal of future studies, strategic thinking and policy, 3(1), 15-31.*
- *Rotmans, J., & Loorbach, D. (2010). Towards a better understanding of transitions and their governance. A systemic and reflexive approach. In: Grin, Rotmans, Schot (Eds.) Transitions to sustainable development. New directions in the study of long term transformative change, 105-198.*
- *Schoots, K., Hekkenberg, M., & Hammingh, P. (2017). Nationale Energieverkenning 2017 (No. ECN-O--17-018). Petten: Energieonderzoek Centrum Nederland. Available online: http://www.pbl.nl/sites/default/files/cms/publicaties/pbl-2017-nationaleenergieverkenning-2017_2625.PDF [accessed 05-05-2018]*
- *Tegenlicht (2008) Here comes the sun: als het aan de zon ligt hebben we geen energieprobleem. Available online: https://www.vpro.nl/programmas/tegenlicht/kijk/afleveringen/2008-2009/here-comes-the-sun.html*
- *Turnheim, B., & Geels, F. W. (2012). Regime destabilisation as the flipside of energy transitions: Lessons from the history of the British coal industry (1913–1997). Energy Policy, 50, 35-49.*
- *Verbong, G., & Geels, F. (2007). The ongoing energy transition: Lessons from a socio-technical, multi-level analysis of the Dutch electricity system (1960–2004). Energy Policy, 35(2), 1025–1037. https://doi.org/10.1016/j.enpol.2006.02.010*
- *Verbong, G., & Loorbach, D. (Eds.). (2012). Governing the energy transition: reality, illusion or necessity? New York: Routledge.*
- *World Economic Forum (WEF). (2020). The global risk report. Geneva: World Economic Forum.*

2. *Methodology: abductive action research*

2.1 Sustainability transitions research

The research conducted for this thesis is part of the field of sustainability transitions research. This interdiscipline, which emerged over the last two decades, focusses on the complex dynamics of non-linear system change and how we can understand current grand societal sustainability challenges and explore potential ways forward. Research in this field aims to contribute to understanding of and propelling such fundamental societal change towards sustainability.

According to Loorbach et al. (2017), the field of sustainability transitions research has its intellectual roots in two broad domains, namely that of innovation research (including science and technology studies, history of technology, evolutionary economics and innovation policy) and that of environmental studies (including sustainability sciences, environmental and integrated assessment, sustainability governance and environmental policy). While these domains consist of a multitude of different disciplines, the knowledge feeding into sustainability transitions research has in common that it focusses on complex unstructured problems and is based on integrating different disciplines as well as tacit or lay knowledge. As such, it is multi-, inter- and transdisciplinary in nature. Initially, sustainability transitions research focused on transitions in socio-technical systems, such as energy, agriculture, mobility, water and waste. Gradually, the scope was broadened towards societal systems and functional domains, such as cities and regions, but also to health care, education and the academic system itself.

Three overarching research approaches, the socio-technical, socio-institutional and socio-ecological approach, can be distinguished, which differ in object of study, research methods and relevant concepts (Loorbach et al., 2017). This thesis is rooted in the socio-institutional approach, which puts institutionalized cultures, structures, and practices central stage. - RB] the emphasis is rather on how incumbent routines, powers, interests, discourses, and regulations create path dependencies and how these are challenged by (transformative) social innovations" (Loorbach et al., 2017: 610). The research often involves issues of ambiguity, social construction and normativity and emphasizes that transitions are inherently political. It draws from social sciences such as economics, political science, sociology, governance studies, geography and anthropology. The objects of study can be specific sectors or geographical areas and the methods used in this approach are often qualitative, action-oriented and transdisciplinary (Loorbach et al., 2017).

The socio-institutional approach pays particular attention to the role of governance, power and social innovation in transitions. Within this perspective, emphasis is put on transitions that are wanted, that are currently underway, or are still in the future, rather than the historical research, in which the socio-technical perspective is more dominant. When researching a transition that is unfolding as we speak, such as the current energy transition, we have to work without the benefit of hindsight, as is present in historical studies. This makes the nature of the transition much less clear and more ambiguous. In fact, not only are the direction and pace of the energy transition controversial, even its use and necessity are contested. As such, three important starting points for the socio-

institutional approach have been identified: persistent societal problems, complexity and the contested nature of knowledge.

2.1.1 Persistent societal problems

There are several persistent societal problems facing contemporary societies, in particular climate change, resource scarcity and biodiversity loss. These persistent societal problems are extreme cases of 'wicked problems' (Rittel & Webber, 1973), meaning that the nature and boundaries of the problem are uncertain, that there is disagreement over the norms and values at stake and the knowledge involved (Hoppe, 2011). Effectively dealing with such problems requires 'domestication' of the wicked problem, and (temporarily) settling of the boundaries of the problem and the norms, values and knowledge accepted to tackle the problem. This implies a research approach that is transdisciplinary and action oriented.

2.1.2 Complexity

Sustainability transitions literature has mostly moved away from the idea of linearity in governing societal change processes. Rather it acknowledges that such processes are complex, meaning they result from numerous interactions at multiple scale levels, between exogenous factors, institutions, technologies, networks, ideas and choices made by actors. These interactions are so numerous and complex that they cannot be objectively known (Rotmans & Loorbach, 2010).

This view from complexity has some far-reaching implications for sustainability transitions research, at its core the claim that "we cannot know complex things completely" (Cilliers, 2002), meaning that our knowledge of complex systems is provisional. Given this complexity, Cilliers promotes modest positions, where 'modest' is "used to describe reflective positions that are careful about the reach of the claims being made and of the constraints that make these claims possible." (Cilliers, 2005: 256)

2.1.3 Contested nature of knowledge

Relating to the first two points is the contested nature of knowledge in fundamental societal change processes. What is meant here is that in societal change processes knowledge is neither straightforward nor generally accepted. Rather, knowledge claims itself become part of the societal struggle and structuring of problems that is inherent to societal change. A point in case is the societal debate around climate change, in which scientific knowledge production, e.g., in established fora such as the Intergovernmental Panel on Climate Change (IPCC), is attacked for its trustworthiness and itself becomes part of the politicized debate. The effect is that it becomes unclear what the settled science base is on which decision makers can base their course of action.

These starting points induce a reflexive, modest and pluralistic research approach. Knowledge production is not straightforward and value free, and itself again can influence societal dynamics. As such, this type of research strives for new insights and to develop new analytical frameworks that help to grasp the complex system dynamics and develop new courses of action for participants. The result is explorative research that is conceptually creative and action oriented, with a strong grounding in practice.

2.2 Theoretical setting

Within the field of sustainability transition research, a transition is conceptualized as a long term, non-linear, fundamental societal change process, resulting from a co-evolution of technological, economic, ecological and societal developments (Rotmans et al., 2001). The multilevel perspective, one of the core frameworks in sustainability transitions research, argues that transitions can come about when interactions between innovative practices at the niche-level, incremental changes in the regime and quasi autonomous macro-dynamics at the landscape level align (Geels, 2002; Grin et al., 2010).

In this thesis it is questioned whether the regime concept and regime destabilisation are still apt for studying the phase of the energy transition in which the regime actually reconfigures and shifts away from a previously dynamic equilibrium and has not yet stabilized in a new equilibrium. The regime concept tends to bring in view the stable and dominant features of a regime, with a focus on lock-in and path-dependencies. This focus clouds the understanding of potential exponential diffusion of transformative social innovation (Avelino et al., 2019, Loorbach et al 2020) as well as the disruptive effects of destabilisation and transformative changes in incumbent strategies. As such, the concept of regime is more helpful in understanding stability and inertia than it is in understanding the destabilisation and reconfiguring dynamics. I argue that, over the course of a transition, there is inevitably a phase in which a regime is absent. Destabilisation, then, is a process that per definition renders the regime obsolete while it unfolds. As such, the concept of regime destabilisation is apt to describe the process of interest only halfway.

While experience with transition management (TM) and strategic niche management (SNM) show that abundant and assertive developments at the niche-level are a precondition for transitions, they in themselves are not enough. Also, opening up or breaking down of the regime is necessary (Loorbach & Rotmans, 2010). The earlier transitions literature tends to conceptualize transitions as a systemic fight between niches and regimes. Such conceptualizations of transitions have been criticised for obscuring the role of actors and their agency in influencing societal change (Avelino & Wittmayer, 2016; De Haan & Rotmans, 2018; Fischer & Newig, 2016). Based on the MLP, sometimes actors are assigned to a level, with incumbents being 'regime players' and innovative start-ups being 'niche-players'. Now, increasingly divergence can be observed between actors within the regime context where some persist in gradual change while other completely transform from a fossil- to a renewable-based multinational (Orsted), see themselves forced to split up (E.on) or outcompeted by new entrants to their market (cf. Tesla).
Such developments have put incumbents at the forefront of the energy transition, alongside actors that not so long ago were considered 'niche': wind energy, biomass, solar, electric vehicles and cooperatives. The regime-niche distinction in this context is of limited use and might even prove problematic, hence our quest for a more nuanced understanding of actors and their agency at regime-level within the context of accelerating transitions. In this thesis, I introduce the notion of transition space to describe the highly volatile space that emerges in a societal system when an old regime has become destabilised, while a new regime has not yet formed.

Transition space presents an interesting challenge for transition governance, which fo-

cuses on how actors can influence transition dynamics. Based on insights from literature on (meta-)governance and network governance, transition governance starts from the idea that in the network society actors organise themselves in lots of different ways to produce solutions for sustainability problems, often outside of incumbent structures. It develops ways to promote and strategically influence this societal search for solutions by different actors. As such, transition governance is positioned as a "multi-actor process in which systemic solutions, disruptive innovations, and (reflexive) institutions are formed by experimenting and learning" (Loorbach et al., 2017: 612).

In addition to the conceptual contribution of transition space in this thesis, I explore transition governance for incumbents operating in transition space. Following on destabilisation, transition space has far-reaching consequences for incumbent actors that used to operate in a relatively stable regime context. It makes it more difficult to develop and execute strategies to navigate such a highly volatile environment. Knowledge and assumptions that used to work, no longer hold up. I experimented with guiding actors to navigate this phase of transition (Chapter 7) and with inducing further destabilisation and phase-out (Chapter 8).

Finally, this thesis has a prescriptive ambition. While a large part of the literature has been focused at scaling up sustainable solutions, e.g., with approaches such as Strategic Niche Management and Transition Management; in transition space, dynamics of break-down and letting go become increasingly prominent. These are so far little understood, particularly from an (incumbent) actor perspective, let alone deliberately provoked. As such, few thoughts in transitions literature have been put into developing instruments, tools and interventions aimed at deliberate destabilisation and navigating transition space with the aim to accelerate sustainability transitions. In face of the multiple grand challenges and global risks facing humankind, it is high time to develop and experiment with interventions aimed at dealing with destabilisation and navigating transition space, informed by a sound understanding of this phase and the role actors and agency (can) play in that process.

Based on the above, the central research question of this thesis is as follows:

How can we understand transition dynamics in between two equilibria, what are the implications for actors that used to operate within a regime context and how can they navigate such a regime vacuum?

The following hypotheses are proposed on transition space and the role of repositioning incumbents:

- In accelerating transitions, tensions and misalignments will emerge at meso-level of the system;
- These can be recognized in terms of clashes in different cultures, misalignments in structures and competing deviating practices;
- Formerly well-aligned incumbents will start to reposition vis-a-vis their rapidly changing environment;
- There will be a sequence in repositioning for incumbents, based on their position in the system, where the more peripheral incumbents will experience more degrees of freedom earlier on, while the more central incumbents will pre-dominantly aim to defend their position;
- Change-minded incumbents can be supported to navigate this turbulent phase and develop more sustainable strategies and practices.

2.3 Thesis research journey

This thesis has come about at the Dutch Research Institute for Transitions (DRIFT), part of the Erasmus University in Rotterdam. At DRIFT, the transition management approach was conceived and further developed in a learning-by-doing fashion. Here, I will detail the research journey travelled to culminate in this thesis (McGowan et al., 2014).

Following Avelino (2011) and Jhagroe (2016) neither deduction nor induction were leading, rather this thesis has come about by emerging myself in the fields of academic literature and that of the empirical domain of the energy transition in the Netherlands. As such, it reflects an abductive approach (Schwartz-Shea & Yanow, 2011; Sorell, 2018): "An abductive approach lets theoretical debates and empirical experiences 'clash'. It accepts that the researcher is being 'abducted' by the puzzles, tensions, surprises and concerns that emerge during these clashes" (Jhagroe, 2016).

My thesis journey started by trying to apply the multi-level perspective to the Dutch energy transition. While the MLP suggests relative unity and dominance at the regime level, the findings from analyzing the regime by interviewing incumbent actors in the Dutch electricity system, suggested a more nuanced picture. Drawing on discourse theory, I developed a perspective that allowed for different emerging developments that challenge the unity and dominance of the hegemonic regime discourse. This initial work (Bosman et al., 2014, Chapter 4 of this thesis) provided a snap shot of the discursive state of the Dutch electricity regime in 2012. In order for a more dynamic picture, studying discursive changes over time, it was complemented with a longitudinal study of Dutch energy transition discourse in national media (Chapter 5 of this thesis). This research broadened the scope to the whole energy regime and showed that the hegemonic discourse was challenged over time by other emerging storylines, that partly displaced it. I found that discursive destabilization of the hegemonic regime discourse has already been taking place, raising the question: What after the regime? How can we describe a system in which an incumbent regime has become destabilized, but a new regime has not yet formed? Dealing with this question led me to developing the transition space concept, which was conceived in the summer of 2016. As it proved quite challenging to characterize a system without a regime deductively, as few articles in the literature deal with such a question, I decided to focus on change-minded incumbent actors and study how they engage with and deal with this new transition phase (Ch. 6, 7 and 8) and to describe transition space from the perspective of change-minded incumbents. Figure 2.2 visually summarizes the research journey leading to this thesis.

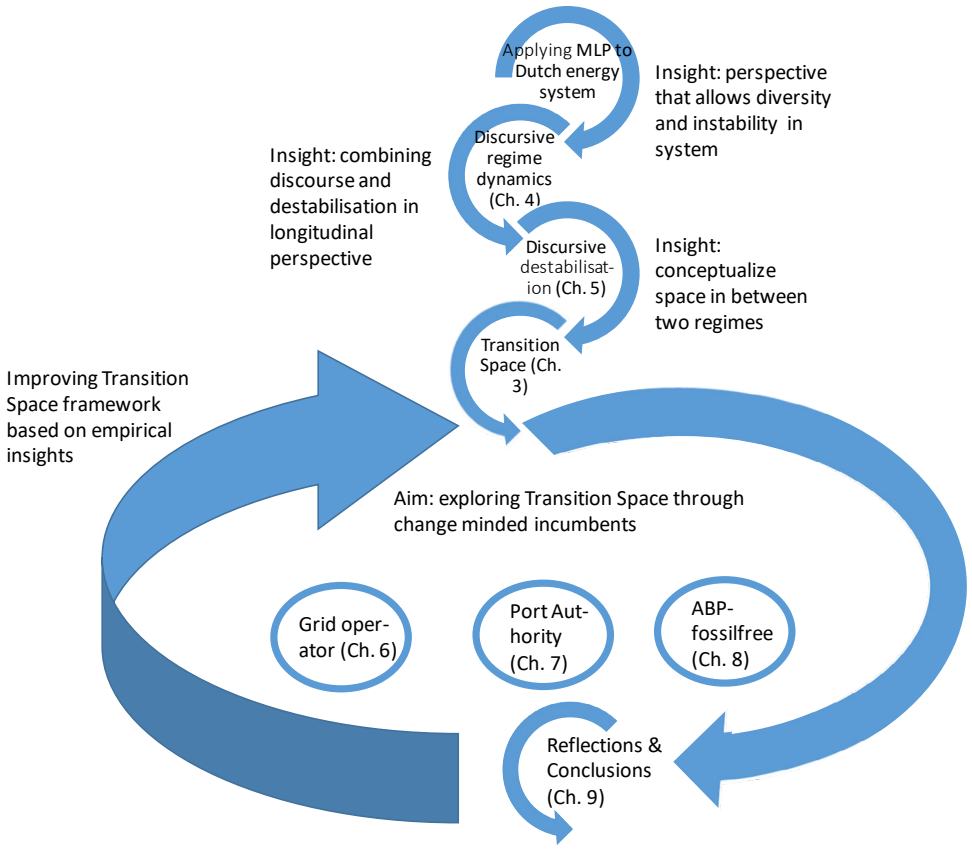


Figure 2.2 Overview of thesis research journey

This research has been influenced by a number of scholars and professionals. Of course, my supervisors Derk Loorbach, Jan Rotmans and PJ Beers, have played a large role in this, as well as other colleagues at DRIFT, other researchers within the TRAPESES-project and colleagues within the Sustainability Transitions Research Network (STRN). I actively participated in academic conferences, such as the yearly International Sustainability Transitions conference (IST), the Network for Early career researchers in Sustainability Transitions (NEST) conferences, a conference at TU Delft, and the Interpretive Policy Analysis conference in Lille, but also PhD-summer schools on energy innovation systems (Aalborg University) and on the Role of Technologies, Firms and Institutions in the energy transition (ETH Zurich). Furthermore, I took academic courses on research methods and the philosophy of science. Over the course of the PhD-process, I developed several academic collaborations of which this thesis and several publications are the result: With Till Pistorius, Niki Frantzeskaki and Derk Loorbach, I worked on discursive regime dynamics (Bosman et al., 2014; Chapter 4, this thesis). With Flor Avelino, I worked on community energy (Avelino et al., 2013; 2014). With Daniel Scholten, I worked on the international dimension and geopolitical aspects of the surge in renewables (Scholten & Bosman, 2016; Scholten & Bosman, 2018). With Jan Rotmans, I worked on a comparison of the Finnish and Dutch bioeconomy transitions (Bosman & Rotmans, 2014; 2016). With Gijs Diercks,

I worked on destabilisation dynamics and letting go and whether innovation policy could pay more attention to these processes. Parts of these deliberations found their way into Chapter three of this thesis. With Gerbert Hengelaar, I explored the role of incumbents and their agency in transition processes and methodologies for studying these (Hengelaar & Bosman, 2017). With Roel van Raak, Jan Rotmans and Derk Loorbach, I worked on developing transition pathways for the Port of Rotterdam (Bosman et al., 2018, Chapter 7, this thesis). And with Sem Oxenaar, I explored the ties between the Dutch governement and the fossil fuel industry and what is needed for a managed decline of fossil fuels (Oxenaar & Bosman, 2020).

Next to these academic collaborations, I actively pursued input from and debate with a diversity of people engaged in the energy transition in practice. It is these professionals that on a daily basis experience the perks and opportunities of being in the midst of a transition and therefore, I learned a lot from their hands-on experiences. I engaged with energy professionals and the general public through taking part in more popular conferences and meetings and writing for professional journals and national media. I also engaged with these professionals and the general public through taking part in social media, such as Twitter.

More elaborate discussions took place in the bi-yearly TRAPESES user committee meetings, for which we committed around 30 energy professionals, from different branches of the energy domain to discuss our research results and gain a better insight of how the issues play out in practice. I also co-developed a new masterclass (Accelerating the Energy Transition) for energy professionals in which we managed to involve a broad spectrum of actors from incumbent organisations, such as local and national government, energy companies and grid operators as well as from niche-players such as energy cooperatives. All these exchanges have refined, grounded and nuanced my insight in energy transition dynamics as presented in this thesis. An overview of the different publications and appearances resulting from these interactions can be found in Annex 9.1.

2.4 Thesis methodology

This thesis builds in large part on several scientific articles, which either have already been published, have been submitted to a journal, or are close to submission. These articles include methods sections which specify the ways in which the research has been carried out. In this section, I will detail the methodological choices of the overall thesis.

I have, in spirit of the learning-by-doing mentality ingrained in transition management, experimented with several different research approaches, from more traditional (distanced) ones and different shades of more engaged action research. This approach aligns with the distinction Geels et al (2016) make (based on Poole and van de Ven, 1989) between "a 'global' (or 'outside-in') conceptual logic, which "takes as its unit of analysis the overall trajectories, paths, phases, or stages in the development of an innovation" and "a 'local' (or 'inside-out') conceptual logic" in which localized action processes, focussing on "the micro ideas, decisions, actions or events of particular developmental episodes" (Poole and van de Ven, 1989:643 in: Geels et al, 2016). In their view, process theories ideally involve both.

The first Chapters of this thesis (Ch. 3 – 5) involve the more 'outside in' conceptual/analytical research approaches, including literature review and discursive regime analysis, based on existing texts, both academic as well as non-academic. In Chapters 6, 7 and 8 a more empirical/explorative inside-out approach is followed, engaging closely with change-minded incumbents to study how they deal with transformative change and how they can be supported in this process. The concluding Chapter 9 again zooms out and reflects on the insights that can be derived about the more aggregate processes of destabilisation and emergence of transition space, from these inside-out accounts of repositioning incumbents. As such, this thesis builds on a mixed-method approach, involving more detached and more engaged research approaches, including discourse analysis, ethnography, and action research.

Wittmayer and Schaepke (2014) provide a helpful categorisation of different action-researcher roles, see textbox 2.1.

In Table 2.1 an overview is provided of the methods applied in the different Chapters, the main research activities involved and the roles played. Since often different roles are played throughout a study, the role(s) that dominated in the development of the specific thesis Chapter are mentioned.

Textbox 2.1 Sustainability transitions researcher roles (Wittmayer & Schaepke, 2014)

- Reflective scientist: the activities performed in this role are closest to what is generally called 'research', including the systematic collection, analysis, interpretation and reporting of data.
- Process facilitator: performs activities to facilitate the learning process, including initiating workshops, selecting participants, and starting concrete short-term actions.
- Self-reflexive scientist: in this role the researcher is reflexive about one's role, positionality and normativity. An action researcher is part of the system that he/she would like to change and in that the researcher is their own research instrument.
- Knowledge broker: in this role activities are undertaken to mediate between different perspectives and to make sustainability relevant for different contexts.
- Change agent: in this role, the researcher actively takes part in activities to contribute to solving real-world problems, thereby becoming part of the problem and solution.

This categorisation will be used further on in this section to describe the roles I played in the different chapters constituting this thesis.

Chapter	Methods	Main research activities	Dominant researcher role
Ch. 1 Introduction			Self-reflexive scientist
Ch. 2 Methodology			Self-reflexive scientist
Ch. 3 Theory	Deduction, abduction	Document analysis, critique, conceptual development	Reflective scientist
Ch. 4 Discursive regime dynamics	Discourse analysis	Interviews, document analysis	Reflective scientist
Ch. 5 Discursive destabilisation	Discourse analysis	Document analysis	Reflective scientist
Ch. 6 Grid operator	Ethnography	Participant observation, interviews, document analysis,	Reflective scientist, self-reflexive scientist
Ch. 7 Port Authority	Action research	Workshop organizer, facilitator, challenger, interviews, document analysis	Process facilitator, knowledge broker, change agent, self-reflexive scientist
Ch. 8 ABP-fossilfree	Activist research	Campaign development, strategizing, reflective evaluation, document analysis	Process facilitator, change agent, self-reflexive scientist
Ch. 9 Reflections and Conclusions	Induction	Document analysis, critique	Self-reflexive scientist

Table 2.1 Research methods, activities and researcher roles per thesis Chapter

While Chapters 4 and 5 were pivotal in providing the foundations for the conceptual contribution of transition space, the framework has been built up around three case studies (Yin, 1993; Flyvbjerg, 2013) of incumbents navigating transition space in the Dutch energy transition (Ch. 6, 7 and 8). The case study method is appropriate when dealing with 'how' and 'why' questions since it provides the researcher with the opportunity to closely engage with the developments and phenomena of interest (Yin, 2003; 2008). It provides the means to map in-depth who did what, when and why and what the consequences are of actors' activities and strategies. Therefore, case study research is the appropriate method to study societal phenomena when it is necessary to get an understanding of the context in which they emerge. Moreover, according to Flyvbjerg (2006) case study research allows studying societal developments as they unfold. This is particularly relevant when mapping an ongoing transition process. An increasing number of researchers therefore uses case study methods to investigate changes in complex societal systems, such as the energy system.

The cases, grid operator Alliander, port of Rotterdam, and institutional investor ABP, as introduced in Chapter 1, have been selected using several criteria that can be divided into substantive and process criteria (Avelino, 2011).

Substantive selection criteria:

- Change-minded incumbents in the Dutch energy system: large organisations were included that play a central role in the Dutch energy system
- Peripheral incumbents: While most research on the role of incumbents in transitions focus on the supply side, this thesis focusses on other types of incumbents, involved in finance, distribution and regulation/facilitation of energy systems.
- Cases should provide insight in destabilisation of actors in the context of the energy transition, providing insight in both pro-active and conservative behaviour.
- Covering different subsystems of the Dutch energy system: While most energy transitions research so far focusses on the electricity sector, as transition dynamics are quite obvious in this domain, the cases for this thesis cover incumbents active in different subsystems of the Dutch energy system:
  - » Built environment (grid operator) (Ch. 6)
  - » Energy intensive industry (port of Rotterdam) (Ch. 7)
  - » Finance (ABP) (Ch. 8)

Process criteria:

- *Access to the field*
- *Access to respondents*
- *Access to relevant documents*
- *Access to relevant meetings*
- *Allowed to publish scientifically on the findings*

While listing these criteria might give the impression of a well-planned out thesis process, the case selection necessitated a degree of pragmatism and flexibility, as access to 'the field' is pivotal in the kind of research that constitutes this thesis.

2.5 Challenges and limitations of the research

This research focusses on the role of change-minded incumbents in the energy transition. A key challenge in sustainability transitions research is how to demarcate the system under study. The different Chapters in this thesis look into different subsystems of the Dutch energy system and intersections between energy and other systems:

- *Chapter 4: electricity*
- *Chapter 5: energy*
- *Chapter 6: energy and built environment*
- *Chapter 7: energy, petrochemicals and transport*
- *Chapter 8: energy and finance*

Depending on the system demarcation, different findings stand out (van Raak, 2016). Collectively, these chapters provide insight in the dynamics of the Dutch energy system and as such the reflections and conclusions in Chapter 9 hold for the whole system.

Also, studying the role of incumbents in societal change is quite challenging, as the topic is politically and economically sensitive. Insights on how such actors understand and try to advance their interests are of strategic importance to the organisation and the broader field. In order to study this relationship, the research builds on a mixed methods approach, including more outside-in conceptual research and inside-out qualitative case studies based on action research.

Such an approach is quite demanding from a researcher perspective, as it requires the acquiring of different skillsets both in terms of text analysis but also interpersonal relationships and trust building to gain access to the field. I found in particular the action research demanding, as it requires the navigation of different tensions. First of all, as an action researcher, I was not only observing phenomena, but also trying to influence them. This included, for example, engaging in normative debates about sustainability, and sometimes challenging generally accepted and ingrained views. Such interventions transcend the role generally perceived of researchers. Second, there is a certain amount of suspicion from parts of the academic community towards this kind of research, seeing it as mixing politics and science, with the risk of confusing one's beliefs with objective facts.

Although it is impossible to completely ban out such risks (as they are part and parcel of any research endeavour), I have tried to mitigate these risks in the following ways:

- First of all, I am being explicit about how I understand my role as a researcher as being part of the system under study, and transparent about my normative position and aims. This helps readers to contextualise my research and attach the appropriate value to it;
- Second, throughout my research, I have closely cooperated with my supervisors and other researchers in order to carefully interpret findings and explicate and confront beliefs and assumptions that might bias such interpretation;
- Third, I have built in 'cooling down' periods after intensive field work, in order to regain critical distance to the data and allow for careful and systematic analysis.

Further limitations result from the case study method. The upside is that case studies allow to investigate a phenomenon in-depth while it unfolds. The downside is that the sample size is by its very nature limited, in turn limiting the generalizability of the findings.

References

- *Avelino, F. (2011). Power in transition: empowering discourses on sustainability transitions. Thesis, Erasmus University Rotterdam, Rotterdam, The Netherlands.*
- *Avelino, F., Wittmayer, J. M., Pel, B., Weaver, P., Dumitru, A., Haxeltine, A., ... & O'Riordan, T. (2019). Transformative social innovation and (dis) empowerment. Technological Forecasting and Social Change, 145, 195-206.*
- *Avelino, F., Frantzeskaki, N., Bosman, R. (2013) A Complex Transition Perspective on Community Energy: Exploring the Dynamics of Community Energy from a Complex Transition Perspective. Paper presented at SCORAI Europe Workshop Proceedings, InContext Scientific Workshop 7 - 8 October 2013*
- *Avelino, F., Bosman, R., Frantzeskaki, N., Akerboom, S., Boontje, P., Hoffman, J., Paradies, G., Pel, B. Scholten, D., and Wittmayer, J. (2014) The (Self-) Governance of Community Energy: Challenges & Prospects. DRIFT PRACTICE BRIEF nr. E 2014.01, Rotterdam: DRIFT*
- *Bosman, R., Loorbach, D., Frantzeskaki, N., & Pistorius, T. (2014). Discursive regime dynamics in the Dutch energy transition. Environmental Innovation and Societal Transitions, 13, 45-59.*
- *Bosman, R., & Rotmans, J. (2016). Transition governance towards a bioeconomy: A comparison of Finland and The Netherlands. Sustainability, 8(10), 1017.*
- *Bosman, R., & Rotmans, J. (2014). Benchmarking Finnish and Dutch bioeconomy transition governance. DRIFT report*
- *Cilliers, P. (2002). Why we cannot know complex things completely. Emergence, 4(1-2), 77-84.*
- *Cilliers, P., (2005). Complexity, deconstruction and relativism.*
- *Theory Culture Society 22: 255. DOI: 10.1177/0263276405058052*
- *Diercks, G. A. (2017). Transformative innovation policy-assessing discourse institutionalisation of an emerging policy paradigm. Thesis, Imperial College London, United Kingdom.*
- *Flyvbjerg, B. (2012). Five Misunderstandings about Case Study Research. Qualitative Research: The Essential Guide to Theory and Practice, London and New York: Routledge, 165-166.*
- *Geels, F. W. (2002). Technological transitions as evolutionary reconfiguration processes: a multi-level perspective and a case-study. Research policy, 31(8-9), 1257-1274.*
- *Geels, F. W., Kern, F., Fuchs, G., Hinderer, N., Kungl, G., Mylan, J., Neukirch, N. & Wassermann, S. (2016). The enactment of socio-technical transition pathways: a reformulated typology and a comparative multi-level analysis of the German and UK low-carbon electricity transitions (1990–2014). Research Policy, 45(4), 896-913.*
- *Hengelaar, G.A. The Proactive Incumbent: Holy Grail or Hidden Gem?: Investigating Whether the Dutch Electricity Sector Can Overcome the Incumbent's Curse and Lead The Sustainability Transition (No. EPS-2016-ERIM Series 438-ORG); ERIM Ph.D. Series Research in Management; Erasmus University Rotterdam: Rotterdam, The Netherlands, 2017*

- *Hengelaar, G.A. & Bosman, R. (2017) Wrestling with words: How incumbents shape energy transition debates and policy with reactive and proactive discourses. In: Hengelaar, G.A. (2017). The Proactive Incumbent: Holy grail or hidden gem? : Investigating whether the Dutch electricity sector can overcome the incumbent's curse and lead the sustainability transition (No. EPS-2016-ERIM Series 438-ORG). ERIM Ph.D. Series Research in Management. Erasmus University Rotterdam. Retrieved from http://hdl.handle.net/1765/102953*
- *Hoppe, R. (2011). The governance of problems: Puzzling, powering, participation. Policy Press.*
- *Hoppe, R. (1999). Policy analysis, science and politics: from 'speaking truth to power'to 'making sense together'. Science and public policy, 26(3), 201-210.*
- *Jhagroe, S. (2016). Urban transition politics. How struggles for sustainability are (re) making urban space. Thesis, Erasmus University Rotterdam, Rotterdam, The Netherlands.*
- *Loorbach, D., Frantzeskaki, N., & Avelino, F. (2017). Sustainability transitions research: transforming science and practice for societal change. Annual Review of Environment and Resources, 42.*
- *Loorbach, D., Wittmayer, J., Avelino, F., von Wirth, T., & Frantzeskaki, N. (2020). Transformative innovation and translocal diffusion. Environmental Innovation and Societal Transitions, 35, 251-260.*
- *McGowan, K. A., Westley, F., Fraser, E. D., Loring, P. A., Weathers, K. C., Avelino, F., ... & Moore, M. L. (2014). The research journey: travels across the idiomatic and axiomatic toward a better understanding of complexity. Ecology and Society, 19(3).*
- *Oxenaar, S., & Bosman, R. (2020). Managing the decline of fossil fuels in a fossil fuel intensive economy: The case of The Netherlands. In: The Palgrave Handbook of Managing Fossil Fuels and Energy Transitions (pp. 139-165). Palgrave Macmillan, Cham.*
- *Penna, C. C., & Geels, F. W. (2012). Multi-dimensional struggles in the greening of industry: A dialectic issue lifecycle model and case study. Technological Forecasting and Social Change, 79(6), 999-1020.*
- *Poole, M. S., & Van de Ven, A. H. (1989). Toward a general theory of innovation processes. Research on the management of innovation: The Minnesota studies, 637, 662.*
- *Rittel, H. W., & Webber, M. M. (1973). Dilemmas in a general theory of planning. Policy sciences, 4(2), 155-169.*
- *Rip, A., & Kemp, R. (1998). Technological change. Human choice and climate change, 2(2), 327-399.*
- *Rotmans, J., & Loorbach, D. (2010). Towards a better understanding of transitions and their governance. A systemic and reflexive approach. In: (Grin, J., Schot, J., Rotmans, J., (eds.) Transitions to sustainable development. New directions in the study of long term transformative change, 105-198.*
- *Scholten, D., & Bosman, R. (2016). The geopolitics of renewables; exploring the political implications of renewable energy systems. Technological Forecasting and Social Change, 103, 273-283.*
- *Scholten, D., & Bosman, R. (2018). The strategic realities of the emerging energy game—conclusion and reflection. In: The geopolitics of renewables (pp. 307-328). Springer, Cham.*
- *Schwartz-Shea, P., and Yanow, D. (2011). Interpretive approaches to research design: Concepts and processes. Taylor & amp.*
- *Smink, M. M., Hekkert, M. P., & Negro, S. O. (2015). Keeping sustainable innovation on a leash? Exploring incumbents' institutional strategies. Business Strategy and the Environment, 24(2), 86-101.*
- *Sorell, S. (2018) Explaining sociotechnical transitions: A critical realist perspective. Research Policy. DOI:10.1016/j.respol.2018.04.008*
- *Wesseling, J. H. (2015). Strategies of incumbent car manufacturers in sustainability transitions (Doctoral dissertation, Utrecht University).*
- *Wittmayer, J. M. (2016). Transition Management. Action Research and Actor Roles: Understanding Local Sustainability Transitions. Thesis, Erasmus University Rotterdam, Rotterdam, The Netherlands.*
- *Wittmayer, J. M., & Schäpke, N. (2014). Action, research and participation: roles of researchers in sustainability transitions. Sustainability science, 9(4), 483-496.*
- *Yin (1993). Applications of case study research. Beverly Hills, CA: SagePublishing*

3. *Theory: Regimes, Agency, Destabilisation and Transition Space*

3.1 Introduction

Sustainability transitions literature studies long-term fundamental changes in societal systems. The starting points of sustainability transitions research are persistent problems confronting contemporary societies caused by unsustainable production and consumption patterns, such as climate change, loss of biodiversity and resource depletion. These persistent problems cannot be solved by incremental improvements in existing societal systems, but require more radical shifts, or sustainability transitions (Grin et al., 2010). Sustainability transitions come about through the simultaneous build-up of sustainable alternatives and break-down and phase-out of unsustainable practices. Because of benefits of scale, sunk investments and the coevolution within a regime, such path dependencies result in the inability of a regime to change beyond optimization of the existing structures, which might cause systemic tensions and problems within a regime. Internal tensions, external crises and competition from sustainable alternatives might lead to reconfiguration into a new equilibrium. Such reorganisation is "by definition shock-wise and whimsical, creating chaotic and unpredictable patterns of change" (Loorbach et al., 2017: 605).

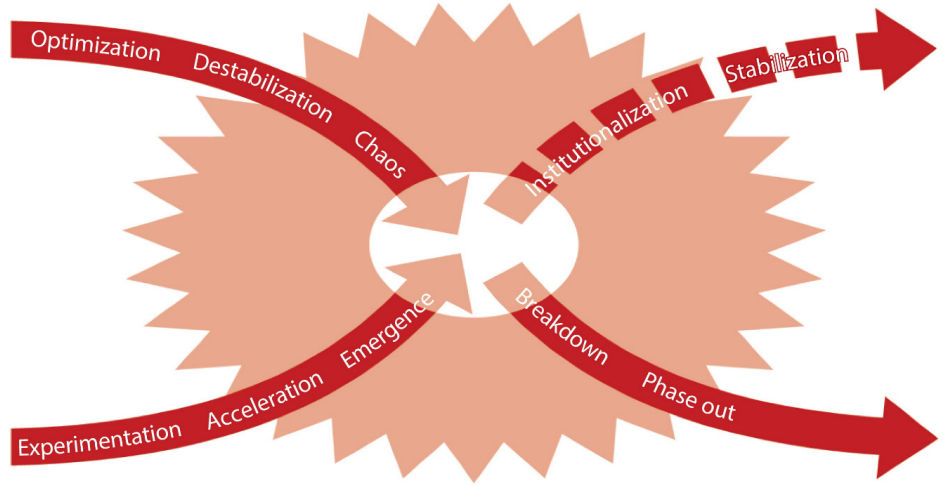


Figure 3.1 X-curve of sustainability transitions (Loorbach, 2014; Loorbach et al., 2017)

Figure 3.1 presents a conceptual framework that aims to capture such "dynamics of societal transitions as iterative processes of build-up and breakdown over a period of decades. In a changing societal context, established regimes develop path-dependently through optimization, while change agents start to experiment with alternative ideas, technologies, and practices. Over time, pressures on regimes to transform increase, leading to destabilization as alternatives start to accelerate and emerge. The actual transition is then chaotic and disruptive and new combinations of

emerging alternatives and transformative regime elements grow into a new regime. In this process elements of an old regime that do not transform are broken down and phase out" (Loorbach et al., 2017: 607).

This thesis builds on and contributes to several themes of interest in sustainability transitions research. Textbox 3.1 provides an overview of the relevant links between this thesis and the Sustainability Transitions Research Agenda.

This thesis contributes to the sustainability transitions literature in two respects: 1) understanding regime destabilisation; and 2) the role of incumbent organisations in this process. Furthermore, it goes beyond regime destabilisation, by introducing a conceptualisation for the phase of transition when an old regime has destabilized, but a new regime has not yet formed.

In order to develop the argument, I will first discuss the regime concept in sustainability transition studies. Then, I will review recent developments in the transitions literature on (incumbent) agency and introduce five dimensions of actor repositioning. This is followed by a review of the literature on regime destabilisation. Next, I will draw on different literatures to enrich the perspective on regime destabilisation. The Chapter is concluded by synthesising the insights into the transition space framework to describe a system post-regime.

Textbox 3.1 Relation to Sustainability Transitions Research Agenda

In its Research Agenda, the Sustainability Transitions Research Network (STRN) identifies nine related research themes (STRN, 2019). This thesis contributes to several of the themes and two of them in particular, namely i. understanding of transitions and v. organizations and industries in sustainability transitions. The first theme identifies regime destabilization as an important topic for further research:

"One important new topic is the destabilization, decline, and phase-out of existing systems and regimes (Karltorp and Sandén 2012; Turnheim and Geels 2012; Kungl and Geels 2018; Roberts 2017), which represent the 'flip-side of transitions'. Existing systems may decline because of pressure from niche-innovations, but systems may also be phased-out deliberately (Rogge and Johnstone 2017; Stegmaier et al., 2014) to create space for the accelerated diffusion of niche-innovations" (STRN, 2019: 9).

Theme v. organisations and industries in sustainability transitions, also identifies regime destabilisation and the role of incumbents in that process, in the future direction of the research:

"in some places and sectors, transitions progress to the next phase of development (Markard 2018). This has several implications: destabilization and decline become more prominent, struggles among actors intensify and transitions become more pervasive, i.e. they affect various industries and involve different parts of a sector (Geels 2018). Industry destabilization and decline offer many research opportunities (Turnheim and Geels 2013; Kivimaa and Kern 2016). Are there certain patterns of industry decline, how to accelerate decline, how to cope with decline (both from a business and societal perspective) or how do emerging and declining industries interact?"

"A related issue is the pace of change and increasingly fierce struggles of actors, e.g. to defer change, or to slow down the pace of change (Wells and Nieuwenhuis 2012; Smink et al. 2015). Slow pace of change represents an area of increasing concern (Sovacool, 2016). Research questions include seeking a better understanding of the expression of path dependency in organizational structures and the factors that accelerate or decrease the pace of change." (STRN, 2019: 22)

3.2 Regimes

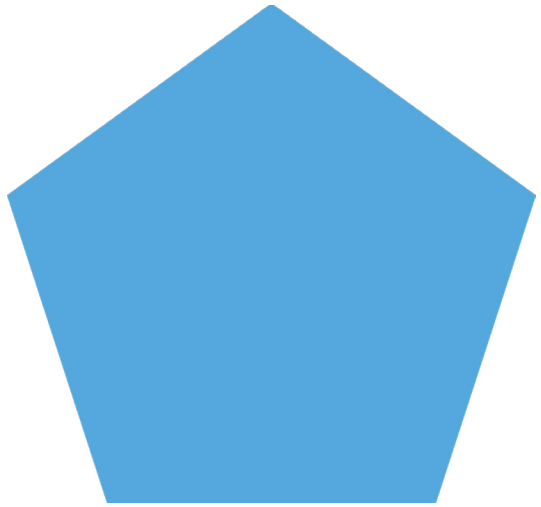


Figure 3.2 A regime

In the sustainability transitions literature, a regime is defined in various ways. In the earliest writings, it is described as "the rule set […] embedded in a complex of engineering practices, production process technologies, product characteristics, skills and procedures, ways of handling relevant artefacts and persons, ways of handling relevant artefacts and persons, ways of defining problems; all of them embedded in institutions and infrastructures" (Rip and Kemp, 1998:340). More recent literature broadens the regime concept to include the following six dimensions (with different scholars using slightly different labels): user preferences; (symbolic meanings of) technology; markets; industry structure; policy; and knowledge (Geels, 2002; Kemp et al., 1998; Berkhout et al., 2004:11). Subsequent definitions have shifted to stress the dominance over and stability that regimes provide to a system. Geels (2002) defines it as *"a semi-coherent set of rules […] that account for stability of configurations […] by providing orientation and co-ordination to the activities of relevant actor groups"* (Geels, 2002); Smith et al. (2010) stress the dominance and stability in realizing a particular societal function. In these conceptualisations, the regime is understood as a seamless web of interlinked elements and artefacts that developed historically to provide a specific function to society. As such, the different definitions share a focus on dominance, stability and guidance of actor behaviour.

An important and persistent criticism on the literature on socio-technical regimes and the multi-level perspective (MLP) is that it obscures the roles of actors and their agency in transitions (Avelino & Wittmayer, 2016; De Haan & Rotmans, 2018; Fischer & Newig, 2016). The MLP conceptualizes transitions as an ouctome of increasing tensions between niches and regimes against growing landscape pressures. It provides an analytical perspective to conceptualize multi-level dynamics at a certain point in time and, even though built on historical studies, does not necessarily address the internal regime dynamics over time nor which dynamics lead to possible future pathways.

An alternative definition that was developed in the socio-institutional approach is that a 'societal regime represents the dominant cultures, structures and practices in a societal subsystem' (Rotmans & Loorbach, 2010; Loorbach et al., 2017). This definition puts more emphasis on the cultural or discursive elements as well as the practices and behavior of actors. I follow this definition in this thesis to explore how not only structural pressures lead to destabilisation, but also to show how changes in values, preferences and discourse of actors can delegitimize and therefore destabilize a societal regime.

As such, I understand regimes as the emergent cultures, structures and practices of actors and from an actor perspective this is the aggregate of the way actors do, think and organize in a given system. The regime is both constraining certain behaviour and favouring other behaviour. In the predevelopment phase of a transition, a stable and dominant regime is present, with clear and dominant culture, structure and practices. In other words, the allowed and preferred behaviour is rather straightforward, and existing regulative and incentive structures and practices support such behaviour. Niches then are characterized by cultures, structures and practices that deviate from the regime. What happens to regimes when a transition accelerates is the focus of this thesis.

3.3 Incumbent actors and their agency

Figure 3.3 A regime with actors

Within transitions literature there is an increasing interest in the role of actors and their agency in transformative change (see e.g., the special issue on this topic by Farla et al., 2012; Avelino & Wittmayer, 2016; De Haan & Rotmans, 2018). Especially the role of incumbents is of interest to us, as they play a central role in delivering a particular societal function. Galvan et al (2020) define incumbents as "those actors that are deeply entrenched in the socio-technical regime. They have accumulated (intangible) resources which provide competitive advantages over newcomers, have a strong network position in a regime, and can influence political processes of agenda-setting." An ambiguous picture on the role of incumbents emerges from the sustainability transitions literature. I will discuss their role based on three points of contention: diversity of actors, roles and strategies and dynamics in roles over time.

Diversity of actors involved in a regime

While most MLP-informed studies tend to focus on the producers and industry regimes, the central part of figure 3.4, it becomes clear from this picture that operating a socio-technical system requires a host of different actors. Recent advances in the transitions literature show increased interest in a broader set of actors operating at the meso-level of a societal system, including service providers, intermediaries and grid operators (Kivimaa et al., 2019; Galvan et al., 2020; Andersen & Gullbrandsen, 2020; Muehlemeier, 2019). In this thesis, rather than focussing on the actors at the centre of the regime-actor network, I aim to bring in view the role of more peripheral incumbent actors. I hypothesize that these peripheral incumbents play a crucial role in accelerating transitions, as they provide elements and resources of the incumbent regime, that might play a role in and reconfigure into a future, more sustainable, regime, while at the same time they are not as highly invested in the regime elements that might become obsolete over the course of a transition as the more central incumbents generally are. Therefore, these more peripheral incumbents have more room to manoeuvre to include niche-practices at meso-level of the system.

Figure 3.4 provides an overview of the multi-actor network constituting a regime:

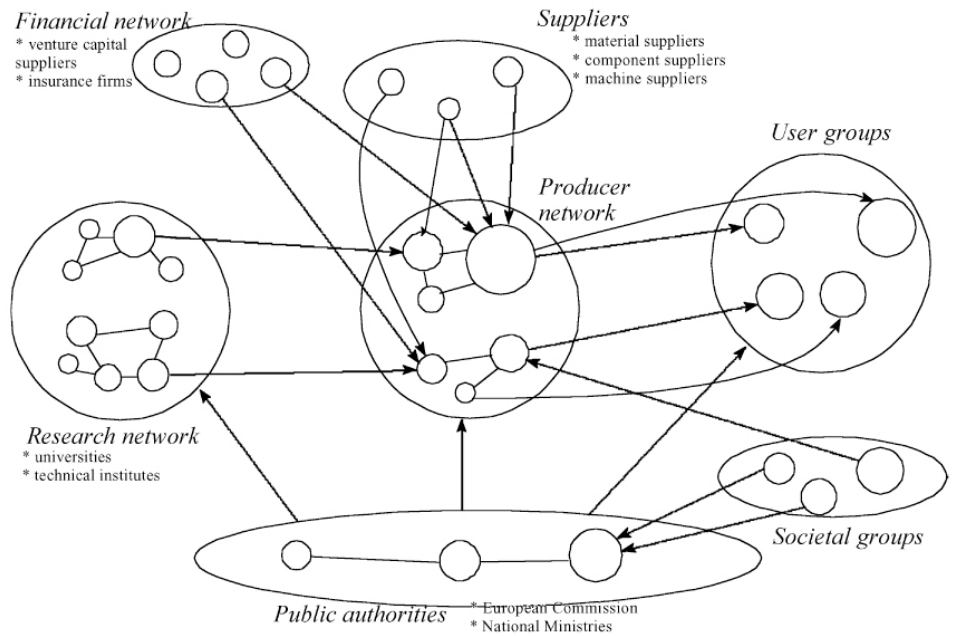


Figure 3.4 The multi-actor network involved in socio-technical regimes (Geels, 2002: 1260)

Diversity in actor roles and strategies

The second point of contention in the literature is the role and strategies of incumbent actors. Some studies claim that incumbent actors are the main carriers and active defenders of the regime (Geels, 2014; Smink et al., 2015). Vleuten & Hogselius (2012) in their study of European liberalisation of energy markets challenge this view, by showing that incumbent actors can actually also be a driver for change. Berggren et al. (2015) show that incumbents can be active both at regime and niche-level. Research by Hengelaar (2017), Mossel et al., (2018) and Andersen & Gullbrandsen (2020) underline this finding that incumbents can, under certain circumstances, be drivers for transformative change as well.

Dynamics in actor roles and strategies

The third point of contention relates to the perceived stasis in actor roles and strategies in most studies, where incumbents actively defend the regime and new entrants form niches to overthrow the regime. In more recent work there is increased attention for the changes in (incumbent) actor roles over the course of a transition. Turnheim & Geels (2012; 2013) for example claim that regime actors will defend the regime up to the point where they lose commitment to the regime. In so doing, they introduce dynamics into actors' positions. I observe that it becomes increasingly problematic in accelerating transitions to categorise actors as either niche or regime, rather this should be an empirical question based on actors' strategies and activities, assuming these can be diverse and also change over the course of a transition (Kivimaa et al., 2019).

To summarize this part, our conceptualization of incumbent actors and their agency:

- sees regimes as the emergent structures that are produced, reproduced and changed through actors' behavior;
- takes a broad view of different actors involved;
- takes heed of the relative roles actors' play in the system;
- puts focus on the activities actors engage in;
- while allowing for changes in behavior and roles over time.

3.4 Dimensions of incumbent repositioning

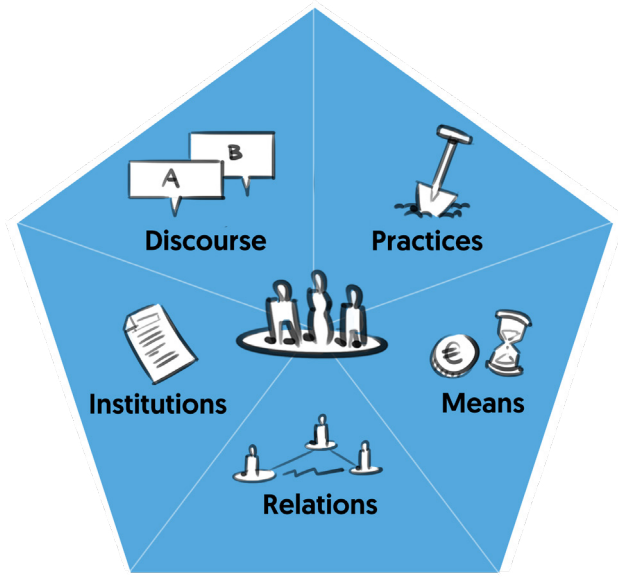


Figure 3.5 A regime with actors and five dimensions of incumbent repositioning

This thesis focusses on the (changing) role of incumbent actors over the course of a transition. As described in the previous section, the first step was to conceptualize regimes as the emergent cultures, structures and practices of actors and thus the aggregate of the way actors do, think and organize in a given system. In order to further describe how actors and regimes relate, the next step is to identify dimensions through which actors connect to their (changing) environment. Rather than identifying dimensions of the regime, as has been done in socio-technical literature on sustainability transitions (see section 3.2), I have been looking from an actor perspective for dimensions that describe the relation between actors and their environment.

By reviewing recent advances in sustainability transitions literature, especially from the socio-institutional approach (see e.g., Geels, 2004; Avelino, 2011; Bosman et al., 2014; Wittmayer, 2016; Fuenfschilling & Truffer, 2014; Kivimaa & Kern, 2016; Shove & Walker, 2010; Duygan et al., 2020)., it was possible to deduce five dimensions through which it is possible to describe actor's (re)positioning vis-a-vis their environment. By identifying these dimensions from an actor perspective, rather than a regime perspective, it becomes possible to describe actor behaviour which reproduces the regime, but also transformative behaviour which might undermine or change a regime. As such, these five dimensions of actor (re)positioning, allow to describe the nature of (incumbent) agency through which actors reproduce or change cultures, structures and practices in a given system:

- Discourse: actors' problem orientations and expectations for the future of the system (Hajer, 1995; Bosman et al., 2014);
- Roles and relations: shared conceptions of interactions and relations between actors within a particular community (Wittmayer, 2016);
- Institutions: the formal and informal rules regulating actor behaviour (Scott, 1995; Geels, 2004; Fuenfschilling & Truffer, 2014);
- Resources: supplies that can be mobilized by actors to achieve certain goals (Avelino, 2011), time and money are in specific focus;
- Practices: routinized daily activities (Giddens, 1984; Shove & Walker, 2007; 2010).

Discourse

Discourse can be defined as "a specific ensemble of ideas, concepts, and categorizations that are produced, reproduced and transformed in a particular set of practices and through which meaning is given to physical and social realities" (Hajer, 1995: 44). Actors' interpretations of the world around them can be studied through their discourse, which can be traced in speech and texts. I propose that discourse is an important medium of (de/re)structuration, because discourse and the problem framings it entails both enables and constrains the directions in which solutions can be sought (Hajer, 1995). As "politics [and transformative change for that matter] involves struggle for discursive hegemony in which actors seek to secure support for their definition of reality" (Ockwell and Rydin, 2006: 383, cited in Kern, 2010), this dimension forms an important part of understanding transformative change.

Roles and relations

By redefining their position and role, incumbents fundamentally alter their relations with their environment. Such social relations and (in)formal networks are (increasingly) seen as important for the spread of ideas, technological progress, and social change (cf. Diercks, 2017). In transition space actors fundamentally alter their social networks, e.g. new (formal) networks will be founded and existing ones will lose interest and influence, actors engage in new relationships or ending existing ones in order to navigate transitional change, in short, I expect the making of new and breaking of existing ties between actors and that this process of re-relating is crucial for transformative change.

Institutions and regulations

Institutions are the formal and informal rules that regulate (constrain and enable) actor behaviour (Scott, 1995). The important point here is that in an accelerating transition, existing institutions increasingly are at odds with the direction of transition and practices of actors. Formal institutions (necessarily?) lag behind societal developments. And it becomes clear that actors do not passively undergo institutions, but that institutions are actively shaped and changed by actors (Fuenfschilling & Truffer, 2014; Brown et al., 2013).

Resources

A fourth dimension of interest in incumbent repositioning is the (re)allocation of resources, in particular time and money (Battilana et al, 2009). Giddens (1984) and Avelino (2011) see the ability of actors to mobilise certain resources as a source of power. I hypothesize that over the course of a transition actors' allocation of resources shifts from certain technologies and activities to others. With growing sense of urgency and problem ownership, more resources become available to develop and implement solutions for the persistent problems and resources available to technologies and activities that are increasingly seen as problematic, become constrained.

Practices

Practices are the routinized behaviours of actors. In accelerating transitions, routines become disrupted and no longer work as they used to do (Shove & Walker, 2007). Actors experiment with new behaviours, and their practices are characterized by both learning and unlearning (Beers & van Mierlo, 2017).

Mapping ties between actors and the system in these five dimensions allows us to describe how actors interact with their environment, which strategic decisions they make and how that again influences transition dynamics. Starting point is that, during a dynamic equilibrium actor behaviour in these five dimensions is relatively stable and complementary: the regime functions properly and leads to few societal questions or resistance. Over time, behaviour in these five dimensions can become more deviant and contradictory, leading to increased tensions and clashes, which is called destabilisation. Using these five dimensions, it becomes possible to study the role of incumbent agency in destabilisation from practice. The next section will describe such destabilisation in more detail.

3.5 State-of-the-art on Destabilisation

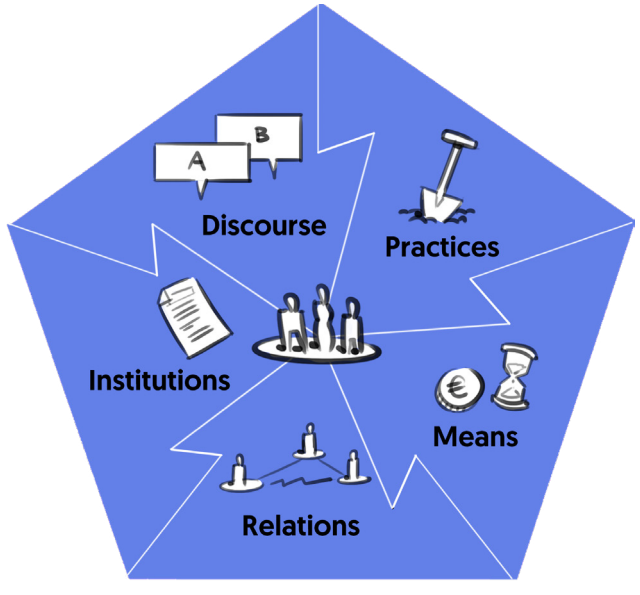


Figure 3.6 A destabilising regime

Transitions are defined as non-linear regime shifts that by definition include a phase in which a relatively stable regime destabilises to give way to the emergence of new cultures, structures and practices. It is therefore not surprising that there is an increased scholarly interest in destabilization, break-down, industry decline, and the phase-out or abolishment of certain technologies or practices. It is however, still rather scarce and also seems to be outpaced by what is actually happening real time in the energy domain.

3.5.1 Regime destabilisation

When a transition gains speed and traction, a regime comes under increasing pressure and fragments or destabilizes. In the sustainability transitions literature such regime destabilisation is described as follows.

Building on insights from industrial economics, evolutionary economics, neo-institutional theory, and management studies, Turnheim & Geels (2012; 2013) understand regime destabilisation as resulting from three mutually reinforcing processes:

1 building up of external pressure, which can be both economic (i.e., shrinking or changing markets and supply problems, or competition from new technologies or players) and socio-political (e.g., changes in policy, public opinion, or protests from social movement);

2 these pressures can lead to performance problems within the regime by undermining resource flows and legitimacy and trigger responses from actors enacting the regime;

3 if pressures and performance problems persist, actors lose commitment to regime elements, in turn again exacerbating pressures and performance problems.

Arranz (2017) details the landscape pressures that might contribute to regime destabilization and finds that regime outsiders emphasising health and lifestyle benefits can destabilise energy and transport regimes. In Bosman et al. (2014) a discursive perspective on destabilization was added, analyzing how dominant discursive positions come under pressure from alternative 'storylines in the making' that undermine the logic and coherence of the previously hegemonic incumbent discourse. Our study suggests that when incumbents' explanations no longer keep up with new developments, this impairs their legitimacy, thus contributing to instability within the regime. Leipprand & Flachsland (2018) analyse how discursive changes in the German debate around coal influence regime destabilisation.

Karltorp and Sanden (2012) show how diverging actor strategies in the face of transitional pressures can lead to regime fragmentation and destabilization. Kivimaa & Kern (2016) identify changes in rules, technologies and actor-networks as crucial factors in regime destabilisation. Fuenschilling & Truffer (2014) focus on increased diversity in institutional logics and the clashes between them as factors of destabilisation. Normann (2019) provides insight in regime destablisation processes based on case studies of the Dutch exit from coal mining and tobacco control policies in the US. He finds that exogenous developments, changes in discourse and actor alliances and tensions within established firms and organizations might drive destabilisation. Andersen & Gullbrandsen (2020) propose a distinction between technology decline and the capabilities of firms, where technologies can phase-out, while the capabilities can be put to use elsewhere in the economy. Rogge & Johnstone (2017) show, based on a case study of Germany's Energiewende, that destabilisation policies can be imperative for innovation, as they provide increased certainty for the direction of policy support.

Discontinuation

Discontinuation is a concept recently discussed most notably by Stegmaier et al. (2014) and Johnstone & Stirling (2015) who are interested in the termination of specific technologies and industries. Johnstone and Stirling take a more descriptive approach. By looking at both Germany and the UK, they try to find answers to the question why it is that one country (Germany) is phasing out its nuclear industry, while the other (UK) seems to be on the verge of a nuclear renaissance. They identify a range of factors that could explain contrasting degrees of entrenchment around nuclear power and come to the conclusion that socio-technical discontinuity cannot be properly explained using the more conventional concepts of transitions theory like 'regimes',

'landscapes' 'niches', 'incumbents' and 'challengers'. Instead, they highlight the importance of more general and pervasive qualities in political structures, discourses and processes outside of domain specific socio-technical regimes.

Stegmaier et al (2014) ask the more ambitious question whether discontinuation can be actively encouraged and how difficult it is then to abandon existing systems purposefully. They argue that discontinuation needs to be seen as an interpretive governance process, in the course of which formulation or perception of a governance problem as well as of a governance solution are changed. By taking a socio-technical perspective, this process includes a wide variety of actors ranging from academia, industry, government and civil society. In terms of policy implications, they remain at the level of the policy maker and call for further research on the potential of economic and regulatory instruments to either nudge or force a change in social processes to target discontinuation. Both studies do not explicitly define discontinuation, however.

Disruption

Johnstone & Kivimaa (2018) discuss the recent interest in disruption from a socio-technical system perspective. They claim that "disruption can extend beyond technology to, at least, the following dimensions of socio-technical systems: the composition of actors and networks, market structures, dominant forms of business models, the division of ownership between different actors, and regulations and other institutional settings (Johnstone et al., 2017). This implies that from a socio-technical system perspective, disruption portrays differently depending on whether only one or more of the dominant forms of dimensions have been disrupted." Johnstone & Kivimaa, 2018: 4

The sustainability transitions literature provides a perspective of destabilisation emphasizing technical, economic and political pressures weakening a regime. It differentiates between external pressures, both from the landscape and the niche, and regime internal processes that undermine the dominance and coherence. In the next section, we enrich this perspective from innovation, institutional and practice theories.

Table 3.1 Insights in destabilisation from sustainability transitions literature:

Literature	Object of destabilisation	Drivers for destabilisation	Enactors of destabilisation	Instruments for destabilisation
Regime destabilisation (Turnheim & Geels, 2012;2013;	Elements of industrial regimes (UK coal)	External pressures leading to performance problems, leading to actors losing their commitment to regime elements.	Social movements, incumbents, new entrants, industry associations and governments.	-
Regime destabilisation (Fuenfschilling & Truffer, 2014)	Socio-technical regimes (Australia water)	Clashing institutional logics, through increased diversity	-	-
Regime destabilisation (Leipprand & Flachsland, 2018)	Socio-technical regime (Germany coal)	Clashes in discursive framings	NGOs, incumbents, business associations, political parties, government, think tanks and science	
Regime destabilisation (Normann, 2019)	Socio-technical regime (Dutch coal & US tobacco)	Exogenous events, changing discourse and actor alliances,	Government, science, health groups, producers, farmers, trade unions,	-
Discursive regime destabilisation (Bosman et al., 2014)	Dominant discourse in socio-technical systems (Dutch electricity)	New storylines emerge that challenge dominant incumbent discourse	-	-
Regime fragmentation (Karltorp and Sandén, 2012)	Regime coherence (Sweden paper & pulp)	Incumbents develop diverging strategies in response to transitional dynamics, undermining regime coherence	Incumbents	-
Technology phase-out (Andersen & Gullbrandsen, 2020)	Technology (petroleum)	Technological progress and environmental goals	Peripheral incumbent actors	-
Destabilisation functions (Kivimaa & Kern, 2016)	Systems of functional needs (energy)	Changes in rules, technologies and actor networks	Policy makers	Control policies; changes in regime rules; reduced support for dominant regime technologies; changes in social networks.
Discontinuation (Stegmaier et al, 2014; Johnston and Stirling, 2015)	Product/technology (Light bulbs) and industry (Nuclear)	9 dimensions (Johnstone and Stirling). A changed formulation or perception of a governance problem as well as solution (Stegmaier)	Policy makers (Stegmaier) Policy makers, social movements, incumbents (Johnstone and Stirling)	Economic and regulatory instruments (carrot and stick)
Disruption (Johnstone & Kivimaa, 2018)	Dimensions of socio-technical systems, including actors and networks, market structures, business models, division of ownership, institutions	Interplay between technological and institutional factors	-	-

Table 3.1 Insights in destabilisation from sustainability transitions literature

3.5.2 Inspiration from innovation, institutional and practice theories

The perspective on destabilisation in the sustainability transitions literature can be enriched by including insights on outnovation and exnovation (innovation literature), de-institutionalisation (institutional theory) and fossilisation (practice theory). Since these strands of literature have different starting points than the transitions literature, they provide additional insights into current notions of destabilisation, including changes in institutional structures and behavioural routines. The aim here is not to provide a comprehensive review of these elaborate bodies of literature, instead I build upon those contributions that could inform our understanding of destabilisation.

Innovation studies

Exnovation

The concept of exnovation has its origins in healthcare and was coined already in 1981 by Kimberley but has not been taken up extensively, although some more recent healthcare studies are taking a renewed interest in the topic of substitution and disengagement of established interventions and practices (e.g. Williams, 2011; Romand and Asch, 2014). Only recently innovation and sustainability literature are taking an interest in the concept. Leitner (2012) defines it as "aims to exclude or destroy anything that is not sustainable" and Paech (2005) argues that "exnovation is at the end of the innovation life-cycle, where it 'discards' or even purges existing practices to allow the organisation to adopt different and fresh thinking to any new innovation activities". David (2014) raises several important questions on the role of actors (state, market and civil society/users) in exnovation, whether exnovation is an inherent part of innovation or whether it can be seen separately from it and whether it is possible to deliberately exnovate.

Outnovation

More recently, the concept of outnovation has been coined in a conference paper by (Levain et al., 2015) and is positioned at the intersection of transition and innovation studies. Closely resembling the concept of exnovation, the authors define outnovation as "a particular kind of process of detachment resulting in the de-association of a technology from a sociotechnical regime". Their case study of the pesticide DDT shows that abolishment of the pesticide came about through an intricate interplay between science that produces facts both in favour and against the use of DDT; social movements that raise public awareness of the potential detrimental effects, industry that both defends the use of DDT as well as develops alternatives and governments that eventually ban the use when there is enough evidence and societal pressure. Comparing the developments around DDT in the US, UK and France they show that the perception of risks and eventual ban differs significantly per country. Also, it shows that dealing with the contestation around DDT and its consequent ban eventually reinforced the position of the pesticide industry, because it was forced to develop alternatives and articulate and convince policy makers and the public of its usefulness for society. This also shows that the authors have a very broad conception of innovation, taking into account the whole quadruple helix of academia, business, government and civil society. However, the term 'outnovation' can lead to some confusion as it is often used linked to outcompete someone. As such, to outnovate someone, means that you are better at innovating than the competition.

Institutional theory

De-institutionalisation

While most institutional scholars have focused on understanding how certain activities become deeply embedded in society (institutionalized), few have embarked on studying the opposite process of de-institutionalization. De-institutionalization is defined as the "delegitimation of an established organizational practice or procedure as a result of organizational challenges to or the failure of organizations to reproduce previously legitimated or taken-for granted organizational actions" (Oliver, 1992: 564). Maguire & Hardy (2009) who also study the abolishment of the pesticide DDT, distinguish between insider and outsider driven de-institutionalisation, where outsiders attack certain institutionalized practices that undermine the supporting institutional pillars. They place particular emphasis on the role of texts, both scientific and popular, to undermine the legitimacy of a certain technology. Where innovation studies tend to focus on the economic and regulative aspects of diffusion of new technologies, institutional theory and de-institutionalization draw attention to the important role that (changes in) societal legitimacy plays in the societal acceptability or, in this, case the abolishment of specific activities.

Maguire & Hardy (2009) also draw attention to the ways in which actors influence the de-institutionalization process, by identifying two types of institutional work involved:

1. disruptive institutional work on the part of outsiders undermining the institutionalized practice; and
2. defensive institutional work on the part of insiders that try to portray the utility, legitimacy and necessity of their practice.

As such, they understand de-institutionalization as a process that is actively influenced by the actors involved, both working towards de-institutionalizing a specific innovation, and stakeholders working towards continuous use of the innovation by actively defending its legitimacy.

Furthermore, Zietsma & Lawrence (2010) add to this understanding by distinguishing different phases of (de)institutionalization, see figure 3.7.

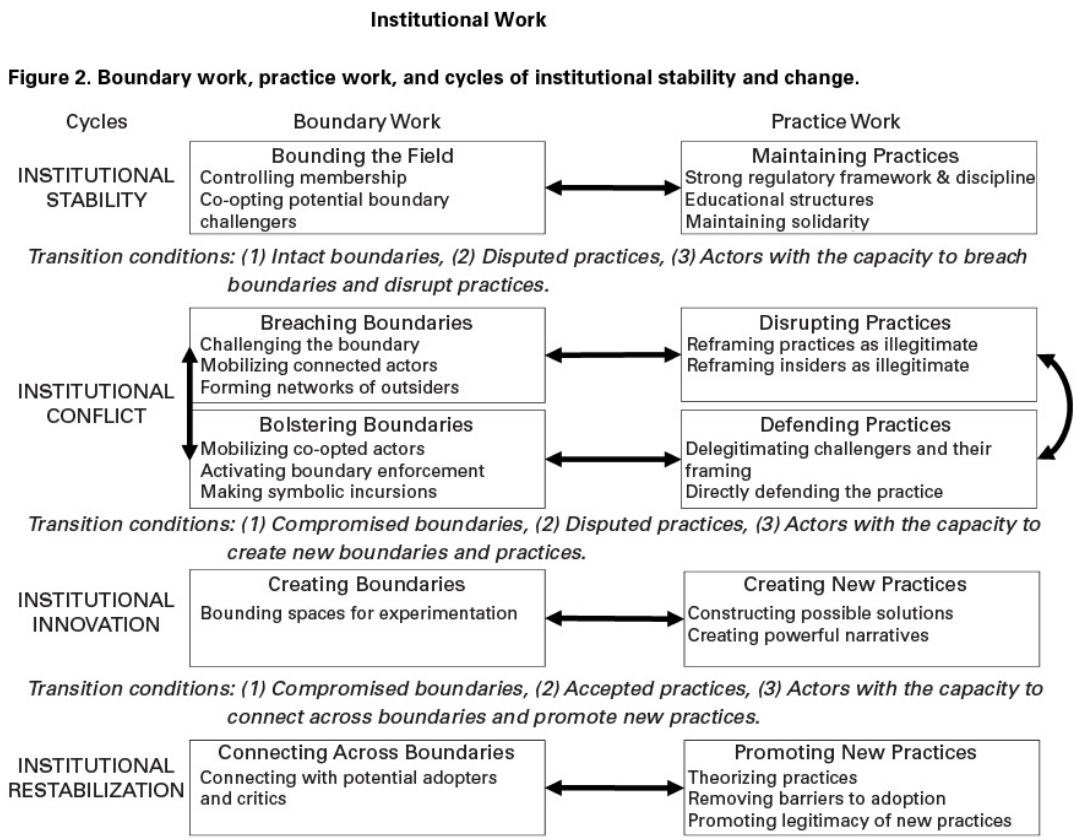


Figure 3.7. Different phases of (de)institutionalization (Zietsma & Lawrence, 2010)

This concept of (de)instutionalisation is largely similar to the core idea of the transition pattern in transitions research where longer periods of relatively stability are destabilized through conflict, tensions and disruptions, triggering systemic innovation and reconfiguration towards a new 'normal' (Rotmans et al, 2001; Loorbach et al., 2017).

Practice theory

Practice theory focusses on the ways humans interact with the world around them. Particularly, it draws attention to the user side of innovations. Practices, such as showering or driving a car, can be defined as "routinized ways in which bodies are moved, objects are handled, subjects are treated, things are described and the world is understood" (Reckwitz, 2002: 249, cited in: Hoffman & Loeber, 2016). While most studies in this field focus on habit and routine to explain social processes, scholars also become interested in understanding social change from a practice perspective, in particular how new developments become part of routinized practice (Hoffman & Loeber, 2016; Shove & Walker, 2007). Less attention is paid to how deeply embedded practices become abolished over time.

Fossilisation

The work of (Shove & Pantzar, 2005), who provide more of a research agenda than actual empirical work, is of particular interest to us, because it draws attention to how previously accepted practices become disused, de-routinized and eventually 'fossilised', as they call this process. They claim that "the notion that innovation is in essence about making new combinations of existing elements can be turned around to generate the parallel suggestion that social-fossilisation is in essence a process of breaking existing combinations of existing elements. This leads to the further proposition that social fossils are materials, ideas or skills that once formed part of an integrated social practice but that have become separated and stranded" (2005:1). Furthermore, practice theory puts a particular focus on the need for active reproduction of innovation in everyday practice of people, as Shove & Pantzar (2005) put it: "artifacts, ideas and forms of competence only have meaning and effect (they only live) when integrated into practice. In other words it is through the integrative work of "doing" that elements are animated, sustained and reproduced. When that stops, fossilisation sets in." (2005:1)

While such a practice orientation draws attention to the intimate links of elements in everyday life, a thorough understanding of how such fossilization of innovations takes place, is lacking thus far. It raises (but so far not answers) the important question of whether there are particular patterns or sequences in fossilisation over time.

Synthesis

These different literatures provide different kinds of insight into the notion of destabilisation from a more systemic to an actor level. Synthesising the insights from these different literatures, I posit that:

- From institutional theory, I gather that destabilisation involves undermining the formal and informal rules that guide actors' behaviour;
- And that destabilisation involves undermining the social legitimacy of certain activities;
- From the exnovation/outnovation and institutional theory literature, I take that different types of actors are involved in destabilisation, including incumbents, new entrants and governments, but also science, social movements and the media;
- Institutional theory shows that destabilisation goes hand in hand with resistance from actors with stakes in the activity that becomes destabilised;
- Destabilisation is a process unfolding over time, including different types of work, often taking place simultaneously by different actors (action – reaction).
- Practice theory draws attention to the linkages that are being made, remade and broken in everyday user practices. Destabilisation thus not only involves the production side of innovations that exacerbate grand challenges, but also the user side.
- Practice theory provides a warning for those wanting to destabilise certain practices. It shows that the more widespread a social practice is the more it is embedded in the social fabric and thus the harder it will be to abolish.

3.5.3 Synthesis on destabilisation

I have now identified basic dimensions and aspects of destabilisation. Based on the reviewed literature, I reconceptualize destabilisation in societal systems from a socio-institutional perspective (Loorbach et al., 2017), as a process that:

- results in the phase-out or abolishment of specific activities, practices, technologies or even whole industries;
- unfolds over time, usually decades;
- involves different types of actors, including business (incumbents and new entrants), science, civil society, media, social movements and government;
- is inherently political, involving different perspectives and potential resistance from stakeholder and user groups;
- Involves not only changes in formal rules and economics of competing alternatives, but also in the perceived legitimacy of technologies, user practices, actors and their networks and industries.

In conclusion, I define destabilisation as: the gradual and self-reinforcing dissolution of stability, legitimacy, and coherence between incumbent actors and their environment.

Table 3.2 Insights from innovation, institutional and practice theory for destabilisation:

Strands of literature	*Relevant concepts*	*Object of destabilisation?*	*Drivers for destabilisation?*	*Principal actors in destabilisation?*	*Effectuation of destabilisation?*
Innovation studies	Exnovation (Kimberly, 1981; Leitner, 2012; Paech, 2013; David, 2014)	Products, practices (healthcare, energy)	End of the innovation life-cycle;	Users	Changing settings and institutions that shape habits and routines
	Outnovation (Levain et al., 2015) "de-association of a technology from a socio-technical regime"	Product/technology (DDT)	Problematization and deligitimization of technology, development of alternatives, regulative ban	Science, social movements, industry, governments	
Institutional theory	De-institutionalization (Oliver, 1992; Maguire & Hardy, 2009)	Products/technologies (DDT)	Scientific facts and social mobilization	Science, social movements, industry, governments	Disruptive institutional work
Practice theory	Fossilization of practices (Shove & Pantzar, 2005)	Social practices (showering, baking cookies)	Breaking links between materials, ideas and skills	Users	-

3.6 Transition Space

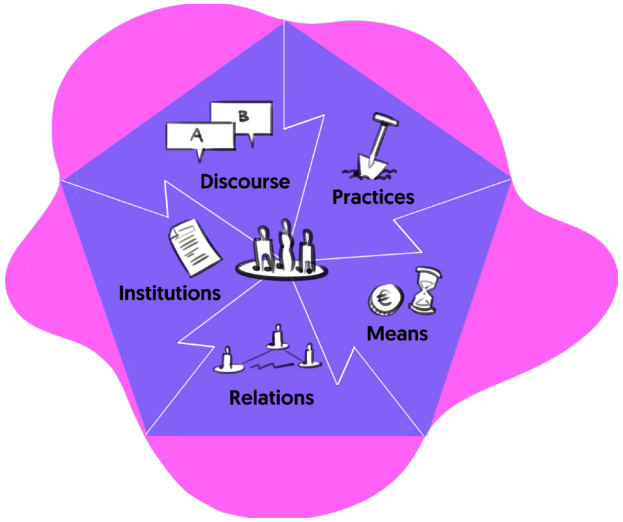


Figure 3.8 Transition space

In this section, the insights on incumbent agency and destabilising regimes are brought together. I aim to answer the question whether it is possible to conceptualise a system after the gradual erosion of formerly dominant culture, structures and practices? And what does that mean for incumbents that are used to operate within a relatively stable and coherent environment?

Sustainability transitions literature does treat the destabilisation of regimes or the diffusion of niches, but the analysis in this thesis implicates a phase of transition in which societal grip dissolves and in which the stability falls away for the actors operating in this environment, de facto the regime which provided such grip, is absent. In the sustainability transitions literature this phase of chaos and non-regime is not described or conceptualised. That is why, in this thesis, the concept of transition space is introduced. I conceive of transition space as the window of opportunity for transformative system change that 'opens' in between a dissolving existing regime and an emerging new regime that has not yet formed, and is characterized by the absence of stability, predictability and coherence between incumbent actors and their environment. The concept is co-inspired by anthropological studies into liminality (van Gennep, 1909; Turner, 1967; Thomassen, 2015) and the institutional void introduced by Hajer (2003) in institutional theory and the experiences of numerous interactions with actors operating in the practice of the energy transition in the Netherlands.

In times when a relatively stable and coherent regime is present, behaviour will more or less follow the dominant institutional logics and historical path dependencies. However, the volatility and disorder characterizing transition space, opens possibilities for deviant behaviour, e.g., the preferred course of action becomes unclear, leading to uncertainties, but also to greatly increased opportunities for agency of actors to steer developments in their preferred direction.

In transition space both 'old' and 'new' practices co-exist and interconnect in unprecedented ways, new actor coalitions are formed in the process, and ongoing changes in rules and regulations as well as physical (infra)structures keep changing the systemic parameters within which actors operate, while these parameters are itself again influenced by strategic decisions of the actors involved. In transition space new problem understandings emerge, new relations between actors and actor configurations develop, new breakthrough coalitions are forged and new resources become available (for those that are able) to develop the convincing solutions which are deemed necessary. At the same time, engaging in transition space involves letting go of existing ideas, (perceived) certainties, relations, and might result in stranded assets which become useless and worthless. While this might discourage certain actors, especially those heavily invested in such assets, networks and ideas, it becomes increasingly clear that not engaging in transition space might lead to obsolescence.

Absence of a dominant and aligned set of cultures, structures and practices makes transition space both extremely uncertain and volatile, as well as extremely fertile for transformative system change. It does not mean that all elements of the incumbent regime (suddenly) disappear, on the contrary, most of them may remain, but the configuration of these elements is increasingly challenged by growing landscape pressures and upcoming niches and thus becomes misaligned, i.e., the coherence between them dissolves, opening up the opportunity for radically different (re)combinations.

I propose that the greater the chaos experienced by actors operating in a given system, the larger the thrust for transformative system change. The larger the disorder, the larger becomes the need for new order. Transition space is at the same time unstructured and highly structuring, precisely because the lack of structure induces the need to build new structures. This also creates the risk of backlash, where relative and temporary stability into a slightly modified regime is preferred over a chaotic shift towards a new regime. Given this lack of clear structures, transition space pushes agency to the forefront, because in such a context, the strategic decisions made by actors provide the foundations for new regime structures to emerge.

3.6.1 Incumbents repositioning

A crucial phenomenon characterizing transition space is the repositioning of incumbents. I posit that such repositioning is key to understanding transformative change in a societal (sub)system. Destabilisation of an incumbent regime and the opening of transition space forces incumbent actors to reposition, abolishing certain activities that in light of an advancing transition are no longer worthwhile, while developing new activities that provide a better fit. This creates a recursive loop of (perceived) delegitimisation of a shared regime leading to diversifying strategies of actors within the regime that in turn add to the destabilisation and so on. With incumbents repositioning, their resources become available for scaling-up more mature niche-developments and they draw back commitments to certain elements of the former regime, which then might become phased-out. What is meant with incumbent repositioning is that incumbents change their outlook towards their environment and future, the priorities they assign for the organization, their view of their roles and tasks, position in the field, the relationships they develop, maintain or end, how they apply their resources, e.g. how time and money are spent within the organisation and the practices in the daily operation, e.g. what are worthy tasks to spend time on and what are new routines that work in a changing context.

I hypothesize that when the five dimensions of incumbent repositioning (as introduced in section 3.3) are aligned across different actors in a system, the result is stable and coherent regime. When they become misaligned, for example because actors divert resources from traditional to new technologies, or when they develop new networks outside of the incumbent ones, this might lead to opening of transition space. Thus, transition space can be described from an actor perspective as misalignments in discourse, roles & relations, resources, institutions, and practices and the opening up of potential new relations and resources. As such, using the five dimensions of incumbent repositioning, an image can be developed of how an (incumbent) organisation navigates transition space.

3.6.2 Synthesis

Transition space is the phase of transition when a regime is absent, in which actors are fundamentally repositioning with respect to their peers (incumbents) and niches. In transition space, important decisions are made on which elements of the former regime and which elements of the niches (re)combine into a new regime, and which elements of the former regime become obsolete and are phased-out. I define transition space as diversity in and misalignments between culture, structure and practices at the meso-level of a system which creates a window of opportunity for transformative change. As argued above, in transition space, the repositioning of incumbent actors takes central stage. As such, this perspective combines recent insights in destabilisation and (incumbent) agency. Five dimensions of incumbent repositioning are introduced: discourse, roles & relations, institutions, resources and practices.

In this thesis, several qualitative studies are performed, in which first the increasing clashes in cultures at the meso-level of the Dutch energy system are uncovered. These studies show the need of new conceptual tools to describe a system post-regime. Furthermore, three in-depth case-studies of change-minded incumbents in the Dutch energy system were carried out, to explore their experiences with navigating transition space and to help calibrate the conceptual framework above. The aim was to test and illustrate the framework from the perspective of change-minded incumbents: How do they experience the misalignments and clashes in cultures, structures and practices and how are they repositioning vis-a-vis these challenges in terms of discourse, roles & relations, institutions, resources and practices? It is showed that the transition space framework helps to conceptualize the volatile space in absence of a regime and that it provides helpful in studying the behaviour of incumbents navigating this challenging environment. Figure 3.9 summarizes the transition space framework:

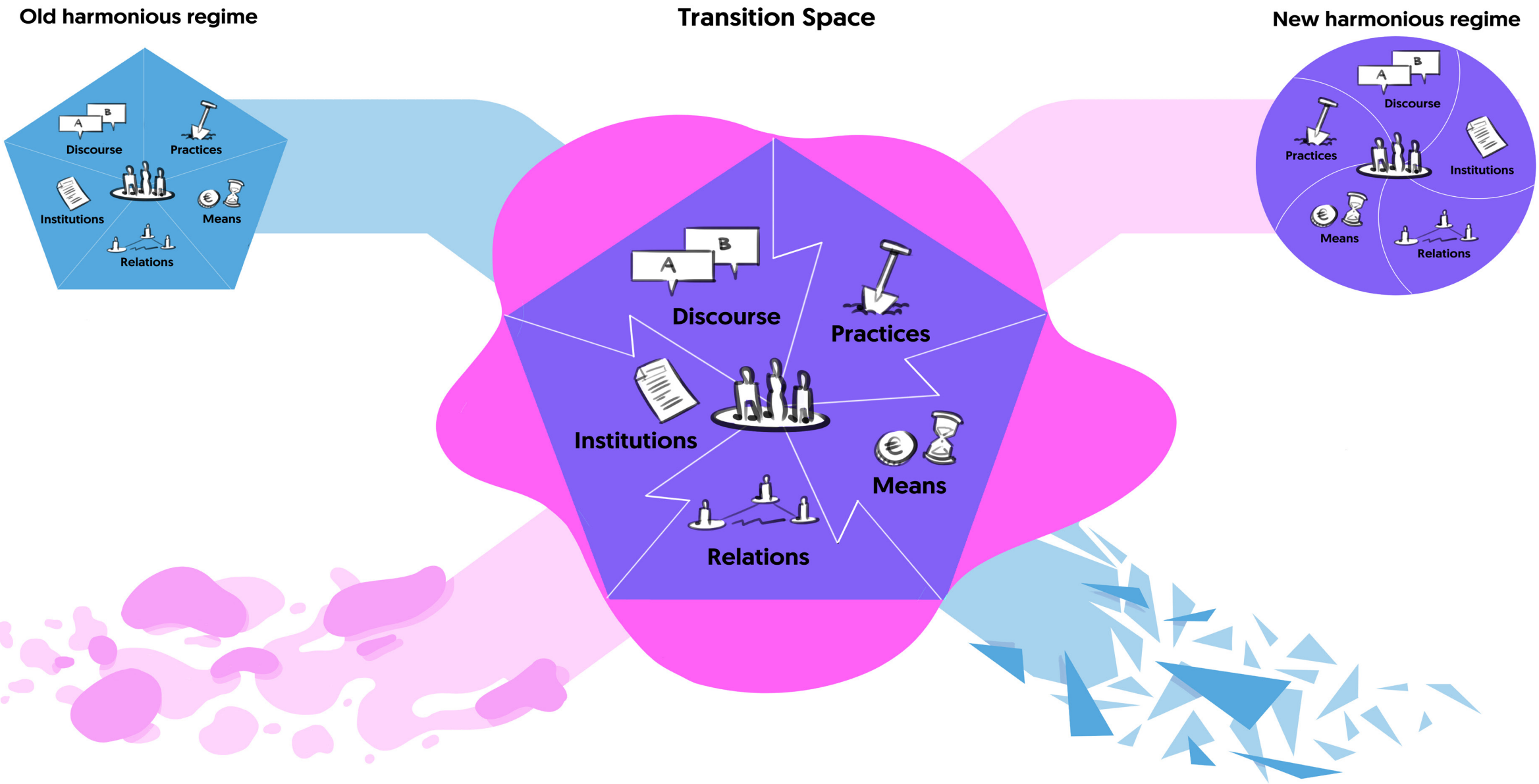


Figure 3.9 Transition Space framework

References

- *Andersen, A. D., & Gulbrandsen, M. (2020). The innovation and industry dynamics of technology phase-out in sustainability transitions: Insights from diversifying petroleum technology suppliers in Norway. Energy Research & Social Science, 64, 101447.*
- *Arranz, A. M. (2017). Lessons from the past for sustainability transitions? A meta-analysis of socio-technical studies. Global environmental change, 44, 125-143.*
- *Avelino, F. (2011). Power in transition: empowering discourses on sustainability transitions. Thesis, Erasmus University Rotterdam, Rotterdam, The Netherlands.*
- *Avelino, F., & Wittmayer, J. M. (2016). Shifting power relations in sustainability transitions: a multi-actor perspective. Journal of Environmental Policy & Planning, 18(5), 628-649.*
- *Battilana, J., Leca, B., & Boxenbaum, E. (2009). 2 how actors change institutions: towards a theory of institutional entrepreneurship. Academy of Management annals, 3(1), 65-107.*
- *Beers, P. J., & van Mierlo, B. (2017). Reflexivity and learning in system innovation processes. Sociologia Ruralis, 57(3), 415-436.*
- *Berggren, C., Magnusson, T., & Sushandoyo, D. (2015). Transition pathways revisited: established firms as multi-level actors in the heavy vehicle industry. Research policy, 44(5), 1017-1028.*
- *Berkhout, F., Smith, A., & Stirling, A. (2004). Socio-technological regimes and transition contexts. System innovation and the transition to sustainability: Theory, evidence and policy, 44(106), 48-75.*
- *Bosman, R., Loorbach, D., Frantzeskaki, N., & Pistorius, T. (2014). Discursive regime dynamics in the Dutch energy transition. Environmental Innovation and Societal Transitions, 13, 45-59.*
- *Brown, R. R., Farrelly, M. A., & Loorbach, D. A. (2013). Actors working the institutions in sustainability transitions: The case of Melbourne's stormwater management. Global Environmental Change, 23(4), 701-718.*
- *David, M. (2014). Exnovation-Governance im Nachhaltigkeitskontext: Annäherung an eine Typologie'. Regierungsforschung. de, 18.*
- *Diercks, G. A. (2017). Transformative innovation policy-assessing discourse institutionalisation of an emerging policy paradigm. Thesis, Imperial College London, United Kingdom.*
- *Duygan, M., Stauffacher, M., & Meylan, G. (2019). A heuristic for conceptualizing and uncovering the determinants of agency in socio-technical transitions. Environmental Innovation and Societal Transitions, 33, 13-29.*
- *Farla, J. C. M., Markard, J., Raven, R., & Coenen, L. E. (2012). Sustainability transitions in the making: A closer look at actors, strategies and resources. Technological forecasting and social change, 79(6), 991-998.*
- *Fischer, L. B., & Newig, J. (2016). Importance of actors and agency in sustainability transitions: a systematic exploration of the literature. Sustainability, 8(5), 476.*
- *Fuenfschilling, L., & Truffer, B. (2014). The structuration of socio-technical regimes—Conceptual foundations from institutional theory. Research Policy, 43(4), 772-791.*
- *Galvan, M. G., Cuppen, E., & Taanman, M. (2020). Exploring incumbents' agency:*
- *Institutional work by grid operators in decentralized energy innovations. Environmental Innovation and Societal Transitions, 37, 79-92.*
- *Geels, F. W. (2002). Technological transitions as evolutionary reconfiguration processes: a multi-level perspective and a case-study. Research policy, 31(8-9), 1257-1274.*
- *Geels, F. W. (2004). From sectoral systems of innovation to socio-technical systems: Insights about dynamics and change from sociology and institutional theory. Research policy, 33(6-7), 897-920.*
- *Geels, F. W. (2014). Regime resistance against low-carbon transitions: introducing politics and power into the multi-level perspective. Theory, Culture & Society, 31(5), 21-40.*
- *Geels, F. W., & Schot, J. (2007). Typology of sociotechnical transition pathways. Research policy, 36(3), 399-417.*
- *Van Gennep, A. (1909). The rites of passage. University of Chicago Press.*
- *Giddens, A., (1984). The constitution of society: Outline of the theory of structuration. Univ of California Press.*
- *Grin, J., Rotmans, J., & Schot, J. (2010). Transitions to sustainable development: new directions in the study of long term transformative change. Routledge.*
- *De Haan, F. J., & Rotmans, J. (2018). A proposed theoretical framework for actors in transformative change. Technological Forecasting and Social Change, 128, 275-286.*
- *Hajer, M. A. (1995). The politics of environmental discourse: ecological modernization and the policy process. Oxford University Press.*
- *Hajer, M. (2003). Policy without polity? Policy analysis and the institutional void. Policy sciences, 36(2), 175-195.*
- *Hengelaar, G.A. The Proactive Incumbent: Holy Grail or Hidden Gem?: Investigating Whether the Dutch Electricity Sector Can Overcome the Incumbent's Curse and Lead The Sustainability Transition (No. EPS-2016-ERIM Series 438-ORG); ERIM Ph.D. Series Research in Management; Erasmus University Rotterdam: Rotterdam, The Netherlands, 2017; Available online: http://hdl.handle.net/1765/102953 (accessed on 5 January 2018).*
- *Hoffman, J., & Loeber, A. (2016). Exploring the micro-politics in transitions from a practice perspective: The case of greenhouse innovation in the Netherlands. Journal of Environmental Policy & Planning, 18(5), 692-711.*
- *Johnstone, P., & Stirling, A. (2015). Comparing nuclear power trajectories in Germany and the UK: from'regimes' to'democracies' in sociotechnical transitions and discontinuities.*

- *Johnstone, P., & Kivimaa, P. (2018). Multiple dimensions of disruption, energy transitions and industrial policy. Energy Research & Social Science, 37, 260-265.*
- *Johnstone, P., Rogge, K. S., Kivimaa, P., Fratini, C. F., Primmer, E., & Stirling, A. (2020). Waves of disruption in clean energy transitions: Sociotechnical dimensions of system disruption in Germany and the United Kingdom. Energy Research & Social Science, 59, 101287.*
- *Karltorp, K., & Sandén, B. A. (2012). Explaining regime destabilisation in the pulp and paper industry. Environmental Innovation and Societal Transitions, 2, 66-81.*
- *Kemp, R., Schot, J., & Hoogma, R. (1998). Regime shifts to sustainability through processes of niche formation: the approach of strategic niche management. Technology analysis & strategic management, 10(2), 175-198.*
- *Kern, F. (2010) The politics of governing 'system innovations' towards sustainable electricity systems. Doctoral thesis (DPhil), University of Sussex.*
- *Kimberly, J. R. (1981). Managerial innovation. Handbook of organizational design, 1(84), 104.*
- *Kivimaa, P., & Kern, F. (2016). Creative destruction or mere niche support? Innovation policy mixes for sustainability transitions. Research Policy, 45(1), 205-217.*
- *Kivimaa, P., Hyysalo, S., Boon, W., Klerkx, L., Martiskainen, M., & Schot, J. (2019). Passing the baton: How intermediaries advance sustainability transitions in different phases. Environmental Innovation and Societal Transitions, 31, 110-125.*
- *Köhler, J., Geels, F. W., Kern, F., Markard, J., Onsongo, E., Wieczorek, A., ... & Wells, P. (2019). An agenda for sustainability transitions research: State of the art and future directions. Environmental Innovation and Societal Transitions, 31, 1-32.*
- *Kungl, G., & Geels, F. W. (2018). Sequence and alignment of external pressures in industry destabilisation: Understanding the downfall of incumbent utilities in the German energy transition (1998–2015). Environmental innovation and societal transitions, 26, 78-100.*
- *Leipprand, A., & Flachsland, C. (2018). Regime destabilization in energy transitions: The German debate on the future of coal. Energy Research & Social Science, 40, 190-204.*
- *Leitner, K. H. (2012). 7 Weak Signals for Opting Out of the Innovation Race. Challenging the Innovation Paradigm, 9, 143.*
- *Levain, A., Joly, P. B., Barbier, M., Cardon, V., Dedieu, F., & Pellissier, F. (2015, August). Continuous discontinuation–The DDT Ban revisited. In 6. International Sustainability Transitions Conference" Sustainability transitions and wider transformative change, historical roots and future pathways" (p. np).*
- *Loorbach, D. (2014) To Transition! Governance Panarchy in the new Transformation. Inaugural address of prof. dr. Loorbach at the Erasmus University Rotterdam. Available online: https://drift.eur.nl/publications/transition-governance-panarchy-new-transformation/ [accessed 09-12-2021]*
- *Loorbach, D., Frantzeskaki, N., & Avelino, F. (2017). Sustainability transitions research: transforming science and practice for societal change. Annual Review of Environment and Resources, 42.*
- *Maguire, S., & Hardy, C. (2009). Discourse and deinstitutionalization: The decline of DDT. Academy of management journal, 52(1), 148-178.*
- *van Mossel, A., van Rijnsoever, F. J., & Hekkert, M. P. (2018). Navigators through the storm: A review of organization theories and the behavior of incumbent firms during transitions. Environmental innovation and societal transitions, 26, 44-63.*
- *Mühlemeier, S. (2019). Dinosaurs in transition? A conceptual exploration of local incumbents in the swiss and German energy transition. Environmental Innovation and Societal Transitions, 31, 126-143.*
- *Normann, H. E. (2019). Conditions for the deliberate destabilisation of established industries: Lessons from US tobacco control policy and the closure of Dutch coal mines. Environmental Innovation and Societal Transitions, 33, 102-114.*
- *Ockwell, D., & Rydin, Y. (2006). Conflicting discourses of knowledge: Understanding the policy adoption of pro-burning knowledge claims in Cape York Peninsula, Australia. Environmental Politics, 15(03), 379-398.*
- *Oliver, C. (1992). The antecedents of deinstitutionalization. Organization studies, 13(4), 563-588.*
- *Paech, N. (2005). Nachhaltiges Wirtschaften jenseits von Innovationsorientierung und Wachstum: eine unternehmensbezogene Transformationstheorie (Vol. 32). Metropolis-Verlag GmbH.*
- *Reckwitz, A. (2002). Toward a theory of social practices: A development in culturalist theorizing. European journal of social theory, 5(2), 243-263.*
- *Rip, A., & Kemp, R. (1998). Technological change. Human choice and climate change, 2(2), 327-399.*
- *Roberts, J. C. D. (2017). Discursive destabilisation of socio-technical regimes: negative storylines and the discursive vulnerability of historical American railroads. Energy research & social science, 31, 86-99.*
- *Rogge, K. S., & Johnstone, P. (2017). Exploring the role of phase-out policies for low-carbon energy transitions: The case of the German Energiewende. Energy research & social science, 33, 128-137.*
- *Roman, B. R., & Asch, D. A. (2014). The Challenge of Deadopting Low-Value Care. Annals of internal medicine, 161(11), 843.*
- *Rotmans, J., Kemp, R., & Van Asselt, M. (2001). More evolution than revolution: transition management in public policy. Foresight-The journal of future studies, strategic thinking and policy, 3(1), 15-31.*
- *Rotmans, J., Loorbach, D., 2010. Towards a better understanding of transitions and governance: a systemic and reflexive approach. In: Grin, J., Rotmans, J., Schot, J. (Eds.), Transitions to Sustainable Development: New Directions in the Study of Long Term Structural Change. Routledge, New York.*
- *Scott, W. R. (1995). Institutions and organizations. Ideas and interests. SAGE.*
- *Shove, E., & Pantzar, M. (2005). Fossilisation. Ethnologia Europaea, 35(1-2), 59-63.*
- *Shove, E., & Walker, G. (2007). CAUTION! Transitions ahead: politics, practice, and sustainable transition management. Environment and planning A, 39(4), 763-770.*

- *Shove, E., & Walker, G. (2010). Governing transitions in the sustainability of everyday life. Research policy, 39(4), 471-476.*
- *Smink, M. M., Hekkert, M. P., & Negro, S. O. (2015). Keeping sustainable innovation on a leash? Exploring incumbents' institutional strategies. Business Strategy and the Environment, 24(2), 86-101.*
- *Smith, A., Voß, J. P., & Grin, J. (2010). Innovation studies and sustainability transitions: The allure of the multi-level perspective and its challenges. Research policy, 39(4), 435-448.*
- *Sovacool, B. K. (2016). How long will it take? Conceptualizing the temporal dynamics of energy transitions. Energy Research & Social Science, 13, 202-215.*
- *Stegmaier, P., Kuhlmann, S., & Visser, V. R. (2014). The discontinuation of socio-technical systems as a governance problem. In: The governance of socio-technical systems. Edward Elgar Publishing.*
- *Thomassen, B. (2015). Thinking with liminality. In: Horvath, A., Thomassen, B., & Wydra, H. (Eds.). (2015). Breaking boundaries: Varieties of liminality. Berghahn Books.*
- *Turner, V. (1969). Liminality and communitas. The ritual process: Structure and anti-structure, 94(113), 125-30.*
- *Turnheim, B., & Geels, F. W. (2012). Regime destabilisation as the flipside of energy transitions: Lessons from the history of the British coal industry (1913–1997). Energy Policy, 50, 35-49.*
- *Turnheim, B., & Geels, F. W. (2013). The destabilisation of existing regimes: Confronting a multi-dimensional framework with a case study of the British coal industry (1913–1967). Research Policy, 42(10), 1749-1767.*
- *Van der Vleuten, E., & Högselius, P. (2012). Resisting change? The transnational dynamics of European energy regimes. In: Verbong & Loorbach (Eds.) Governing the energy transition: Reality, illusion or necessity? Routlegde.*
- *Wells, P., & Nieuwenhuis, P. (2012). Transition failure: Understanding continuity in the automotive industry. Technological Forecasting and Social Change, 79(9), 1681-1692.*
- *Williams, I. (2011). Organizational readiness for innovation in health care: some lessons from the recent literature. Health Services Management Research, 24(4), 213-218.*
- *Wittmayer, J. M. (2016). Transition Management. Action Research and Actor Roles: Understanding Local Sustainability Transitions. Thesis, Erasmus University Rotterdam, Rotterdam, The Netherlands.*
- *Zietsma, C., & Lawrence, T. B. (2010). Institutional work in the transformation of an organizational field: The interplay of boundary work and practice work. Administrative science quarterly, 55(2), 189-221.*

4. *Discursive regime dynamics in the Dutch energy transition*

This Chapter first appeared as an article in the journal Environmental Innovation and Societal Transitions in 2014. Please refer as:

Bosman, R., Loorbach, D., Frantzeskaki, N., & Pistorius, T. (2014). Discursive regime dynamics in the Dutch energy transition. Environmental Innovation and Societal Transitions, 13, 45-59.

Abstract

Since its introduction in the National Environmental Policy Plan in 2001 the notion of 'energy transition' is firmly rooted in the Dutch energy debate. Despite political efforts to shift to a sustainable energy system, the Netherlands is lagging behind other European countries. Scholarly literature generally ascribes such slow developments to the dominant role of incumbents. In this Chapter we explore how prominent incumbents of the Dutch energy system discursively frame the energy transition by unravelling their existing and evolving storylines. Our results show that decarbonization in the context of a European energy market is currently seen as the dominant driver for the energy transition, linked to discursive elements on keeping the energy supply secure and affordable. We found tensions within this dominant storyline and emerging storylines with the potential to undermine the dominant one. In response, incumbents are discursively repositioning themselves, thereby restructuring coalitions – possibly indicating discursive regime destabilization.Keywords: *Destabilization, Discourse, Energy transition, Regime, The Netherlands*

4.1 Introduction

Secure, affordable and clean energy is high on the political agenda in European countries after the alarming debates around energy supply, climate change and the implications of energy production and consumption for a healthy and safe environment. These debates gained new momentum in the wake of the Fukushima nuclear disaster. In 2009, the European Parliament and Council have agreed on specific targets to increase the share of renewable energy in the total energy supply in 2020 to 20%, to increase energy efficiency and reduce emissions of greenhouse gases with 20% compared to 1990 levels (Klessmann et al., 2011). These targets are complemented with two strategy papers: a Roadmap 2050 and a Power Perspective 2030 (EC, 2011; ECF, 2011), that show the commitment of the European Union to achieve the 20–20–20 energy targets and pave the ground for an even longer-term energy transition.

In the Netherlands, the notion of an 'energy transition' is firmly rooted in the country's energy debate since its introduction in the National Environmental Policy Plan in 2001 (VROM, 2001). With that, the Dutch energy system was one of the first where transition management – a new governance approach for sustainability (Loorbach, 2007; Rotmans et al., 2001) – was applied in an integral manner (Kemp, 2010; Kern and Smith, 2008; Loorbach et al., 2008; Smith and Kern, 2009). However, despite the

policy objectives, the Dutch energy transition is considerably lagging behind other EU countries: the Netherlands managed to only slightly increase the share of renewable energy in final energy consumption from 2.6% in 2006 to 3.8% in 2010, while the average share in the EU-27 has increased from 9.0% to 12.4% (Eurostat, 2012). Recent literature focusing on the Dutch energy system concludes that the main explaining factor for this lagging behind is a strong fossil fuel regime in which incumbents play a dominant role (Kern and Smith, 2008; Van der Loo and Loorbach, 2012).

On the surface, it seems that incumbent actors and interests are thus able to dominate the pace and direction of the energy transition and mainly promote a 'greening' of the fossil-based centralized system instead of a more radical transition departing from the existing system. This observation is in line with early transition studies in which regimes have (often) been conceptualized as homogeneous entities that are generally robust to change (Fuenfschilling and Truffer, 2014; Geels and Schot, 2007, 2010; Holtz et al., 2008; Kemp et al., 1998). Accordingly, a transition is seen as the result of regimes which destabilize or open up as a consequence of external shocks, internal structural problems or bottom-up innovations (Smith and Raven, 2012; Turnheim and Geels, 2012; Verbong and Loorbach, 2012). More recent literature, however suggests that regimes can also be drivers of radical change (Stenzel and Frenzel, 2008; Van der Vleuten and Högselius, 2012). With this in mind, Loorbach and Verbong (2012, pp. 320–321) argue that: *"operationalization of the regime concept in the context of the analysis of on-going transitions calls for developing a more refined understanding of regime structures and regime actors, as well as of their interaction with emerging niches"*.

In this Chapter we address this theoretical need for a more refined understanding of regimes by conceptualizing a regime as a dynamic constellation of diverse actors characterized by shared values, expectations and understanding about the function the regime provides to meet a societal need (e.g. energy production and consumption) and its future development (Frantzeskaki and de Haan, 2009; Frantzeskaki and Loorbach, 2010; Hermans et al., 2010; van der Brugge, 2009). In this Chapter we specifically aim to analyse regime dynamics in the Dutch energy transition by investigating the language incumbents used to give meaning to the changing world around them, and ask whether changing discursive positions amongst incumbents might in fact offer opportunities for more radical societal change.

In the following sections, we first touch upon theoretical work on discourses and regimes to more specifically underpin our research question. We then introduce our method of argumentative dis-course analysis to scrutinize the Dutch energy transition from the perspective of incumbent actors. We propose that our examination reveals discursive destabilization of the Dutch energy regime through observed tensions within the dominant discourse and challenges posed to it by newly emerging developments. We do not imply that a discursive shift witnessed amongst a group of incumbent actors directly implies a following transition, but rather argue that it could be a prerequisite for any transition to take place. In that sense any discourse analysis in the broader context of a transition is limited and in no way predictive, yet it does shed light on the underlying dynamics within a particular field and regime that might be a precondition for any transition to occur.

4.2 Understanding regime dynamics through discourse

Transitions can be conceptualized as a response to persistent problems that can no longer be effectively addressed by (only) optimizing existing structures and practices within a societal (sub)system (Rotmans and Loorbach, 2010). The energy system can be defined as "all actors and artefacts that together produce the societal function of energy" (Verbong and Loorbach, 2012, p. 9). This system is in open exchange with its environment and other systems (e.g. ICT, mobility or construction), and generally develops path-dependently based on existing structures which are further developed and optimized through innovation. A transition in such a system is understood as the shift from one dominant regime to another as the result of a combination of external pressures, internal tensions following an enhanced regime lock-in and matured radical alternatives (Loorbach and Rotmans, 2010). Although regimes are conceptualized in slightly different ways in transitions literature, e.g. regimes within socio-technical systems (Rip and Kemp, 1998) or in societal systems (Rotmans, 2003), they share the following commonalities: (1) a regime consists of a long-term coalition of actors such as businesses, politicians, citizens or NGOs; (2) these coalitions share a set of formal and informal rules that guide their activities; and (3) a regime implies a shared vision for the future building on some form of collective knowledge shared by the actors involved (Hermans et al., 2010).

This collective knowledge and shared vision for the future can be empirically studied through texts, both written and spoken, using a discursive approach. Discourse can be defined as "a specific ensemble of ideas, concepts, and categorizations that are produced, reproduced and transformed in a particular set of practices and through which meaning is given to physical and social realities" (Hajer, 1995, p. 44). Discourses become apparent through the language individuals and organizations use. This language in use takes the form of storylines, narratives with which actors provide meaning to the world around them. Around these storylines discourse coalitions are formed of actors that feel attracted to a (set of) storyline(s) and by adopting these storylines they get reproduced. The storylines a discourse coalition draws upon suggest a common understanding amongst the actors involved. When a specific discourse coalition has risen to dominance over a system it has achieved discursive hegemony and thereby has become reminiscent of a regime (Hermans et al., 2010). Key actors within a discourse coalition play a decisive role in determining the issues deemed relevant for discussion. By the storylines these key actors draw upon they are able to influence or even predetermine the problem definition and direction in which potential solutions are sought (Hajer, 1995, 2006). As key actors we focus on incumbents in the Dutch energy system (Arentsen et al., 2001; Smink et al., 2013). Based on the above, we propose to analyse the storylines of the main incumbents in the Dutch energy system in order to identify the discursive hegemony within the Dutch energy regime as the first objective in this Chapter.

Since we are specifically interested in the dynamics within the regime our second objective relates to discursive change. Both discourse and transitions literature suggest that a dominant discourse coalition or regime, which can be stable for decades, will be challenged and eventually open up and break down when societal needs change and alternative constellations appear with discourses that are better adapted to these changing circumstances (Grin et al., 2010; Hajer, 1995). Accepting

the notion that the energy system is in transition (whatever this may mean exactly) implies that the existing discursive hegemony of the regime comes under increasing pressure. Therefore, our second objective is to identify developments that put pressure on the dominant discourse as put forward by these incumbents. For this we draw upon Garud et al. (2010) who recommend to focus on 'categories in the making' in their longitudinal study on the changing meaning of nuclear energy. This concept not only helps to understand how and why categories and their meanings change over time, but it also provides indicators for likely future developments. To summarize, the objective of this Chapter is to scrutinize the dominant discourse and discursive opening-up of the Dutch energy regime by focusing on key actors within the regime. In this context, we aim to illustrate how these actors give meaning to the changes they observe in the Dutch energy system and to discuss likely implications for regime dynamics in the Dutch energy transition. Therefore, the main research question is: What is the dominant discourse amongst incumbents in the Dutch energy regime regarding the future of the energy system and which developments put pressure on their discourse?

4.3 Research design

In order to empirically explore the Dutch energy regime and its recent dynamics, we used argumentative discourse analysis (ADA; Hajer, 1995). At the centre of an ADA analysis are the storylines that actors use to give meaning to their world. Storylines play a role in clustering collective knowledge, substantiating the positioning of actors, and in cementing existing coalitions amongst actors in a given domain or developing new ones. Storylines can include metaphors, analogies, historical references, clichés and appeals to collective fears or senses of guilt. To illustrate this concept we use Hajer's example of 'acid rain' as a storyline that related previously singular and unrelated events such as dying of fish, lakes, and trees and the corrosion of buildings to industrial pollution. Thereby, the acid rain storyline can change how e.g. a fisherman or forester perceives reality by providing a narrative to relate dying fish and trees to industrial smoke stacks (Hajer, 1995, p. 64).

As already stated in Section 4.2, we are interested in both uncovering the dominant storyline(s) within the Dutch energy regime as well as how regime discourse changes over time. According to Hajer change may take place "through the emergence of new storylines that re-order understandings" (Hajer, 1995, p. 56). In our research we draw upon Garud et al. (2010) to focus on 'storylines in the making' as those emerging narratives that may point towards future developments and put pressure on the dominant storyline. As can be expected, such storylines in the making are less structured and coherent than the dominant storyline, as we will show in the next section. It is important to note here that, although we are interested in discursive change, this research provides only a snapshot of existing storylines shared by incumbent actors and the developments that inform storylines in the making. Capturing discursive change over time would require a longitudinal approach tracing the dissemination and adaption of storylines in the making within the regime. Such a longitudinal approach falls outside the scope of this Chapter.

The research was carried out in three consecutive phases: (1) scoping; (2) data collection; and (3) data analysis. The main data sources were actors' official communications (e.g. annual reports, newspaper articles, associations member magazines) and expert interviews. Annex 1 provides an overview of the interviews conducted for this research. In total 19 stakeholders were interviewed by the first author of which 6 explorative and informal (telephone) interviews with intermediaries in the initial scoping phase, followed by 13 formal interviews using a semi-structured interview protocol (Baarda et al., 2000). The interviews were carried out between May and August 2012. An overview of the questions that were asked can be found in Annex 2. These formal interviews have been fully transcribed and analysed using MAXQDA qualitative data software. An elaboration of each of the three phases of the research is presented in the following paragraphs.

4.3.1 Scoping

ADA prescribes a scoping phase to get acquainted with the system under study (Hajer, 1995). As respondents in the scoping phase we approached six intermediaries with a broad overview of the energy system. During the scoping phase it became clear that Energie-Nederland, the Dutch association for energy businesses, plays an important role in voicing the viewpoints of energy incumbents. As such, we approached Energie-Nederland and its members as a nexus for the Dutch energy regime and we decided the association formed an appropriate starting point for our research.

4.3.2 Data collection

Energie-Nederland has a total of 57 members, amongst which larger and smaller energy companies, the majority of which are active in the utility (gas and/or electricity) sector. Initially, representatives of Energie-Nederland were interviewed, as well as respondents from seven of its member organizations the majority of which from large utilities. We also included a respondent from GreenChoice, a relatively new and small player. In this sample GreenChoice is atypical since it only provides "green" energy. However according to the respondents contacted in the scoping phase the company has established itself over the last decade as an important player in the energy sector "the largest of the smaller energy companies" and was therefore included in our analysis. Through snowballing professionals from government, knowledge and other advocacy groups were interviewed that engage with Energie- Nederland on a regular basis. Respondents were selected based on their strategic position within the organization, often board level or public affairs officers. Although the sample only covers a selection of actors involved in the Dutch energy system, we assume that through our selection process we have included the main incumbents that have a key role in influence and reproducing the dominant discourse. Respondents were interviewed on personal title, and personal anonymity was granted in the presentation of the results; therefore only the organizational context is mentioned. It should be stressed that the views provided are those of the respondents and not necessarily that of the organization they work for. Albeit only a snapshot, the interviews provide images the respondents have of the energy system, its future and their discursive position in it.

4.3.3. Data analysis

The interview transcripts have been cut into segments which were labelled in an open coding process using MAXQDA qualitative data analysis software. Open coding was followed by axial coding in which coded segments are related to each other in an iterative process (Boeije, 2009). We will illustrate the procedure with an example from the interview with the respondent of NUON:

> "*The main challenge is of course the* | *transition to a sustainable energy supply* | *to a CO2-neutral energy supply* | *in 2050* "

In this specific case the whole segment was coded as "*challenge*", the following two segments marked by brackets were labelled together as "*energy transition*" and separately as "*sustainable energy*" and "*CO2*", and the last segment was labelled "*time frame*". The following interpretive observations can be made based on this segment: first of all, the concept of transition is used by the respondent to describe challenges regarding the future of the energy system. Supposedly, this transition is towards a different kind of energy supply that is sustainable or CO2-neutral, which apparently are more or less interchangeable concepts for this respondent. And this transition takes a long term – up to 2050.

With the help of the MAXQDA software then all segments with similar labels could be retrieved and compared across the interviews. By analysing, interpreting and linking frequently recurring concepts and categories across the different interviews, a dominant storyline could be reconstructed which is presented in the next section. Although some elements of this storyline were more prominent with one respondent than with others, the constituting elements were encountered in some form with all respondents. Together it provides a more or less coherent picture of how incumbents perceive the functioning of the energy system and the main challenges that it faces regarding the future.

In addition to reconstructing the dominant storyline we reflected upon coded segments that point towards tensions within this dominant storyline and the emergence of new storylines in the mak-ing. We identified these through interview segments that signal confusion, insecurity, conflict and marginalization or exclusion of other storylines (in the making). An example of labelling such a signal is provided based on a segment of the interview with the respondent of Essent:

> "*Look, I would like to believe that we could supply all energy from wind turbines, when someone tells me a good story about how we can guarantee affordability, security and sustainability through wind turbines, with some magic trick or something, but that is all still long term thinking.*"

This segment was labelled as "marginalization". The respondent implies that a magic trick would be needed in order to supply all energy with wind turbines. The authors interpret this as showing disdain for those who do think that all energy can be supplied with wind energy. Thereby, this segment can be interpreted as a marginalization of storylines of discourse coalitions that support the development of wind energy. Through marginalization, respondents also acknowledge the existence of competing storylines.

A point of concern is that the original data were in Dutch and the quotes that were used needed to be translated into English. This concern has been dealt with by verifying the results with the respondents. A second point of concern relates to the pervasiveness of discourses, also those of the authors, in all written and spoken texts. Therefore, we follow Scrase and Ockwell's (2010) to invite readers to critically reflect on the discourses we draw upon and the storylines we construct in order to draw their own conclusions from our analysis.

In the next section the dominant storyline and storylines in the making that challenge the dominant one are presented and illustrated with representative quotes from the interviews. To validate the storylines and use of quotes, a concept version of the Chapter has been checked and verified with the respondents. In general, the storylines were recognizable for respondents and some minor adaptations have been made based on their feedback.

Table 4.1 Overview of dominant storyline, its constitutive elements and tensions:

Dominant storyline:				
Decarbonization in a European market, while keeping the energy supply secure and affordable				
Elements constituting dominant storyline:				
Climate change is main driver for transition	*Decarbonization is only one of three pillars of energy policy*	*Energy system should be left to market forces*	*Energy system should be governed at EU-level*	*ETS should be leading in reducing CO2*
Tensions within dominant storyline:				
Energy system should be left to the market, but the market requires additional effort to function properly		*Government should create favourable low carbon investment conditions, but it should not intervene in the market*		

4.4 Incumbents' storylines on the energy transition in the Netherlands

We identified a dominant storyline on the future of the Dutch energy system (Section 4.4.1) and found inherent tensions around understanding of the energy market and the role of the government (Section 4.4.2), as well as four storylines in the making around new developments that challenge the dominant discourse as (re)produced by incumbents in the Dutch energy system (Section 4.4.3). Table 4.1 gives an overview of the dominant storyline, its constitutive elements and the tensions within the dominant storyline that were encountered during this research.

4.4.1 Dominant storyline

Based on the empirical data, we identified a relatively coherent storyline that is shared by most interviewees: they consider tackling climate change as the main challenge for the energy system, but securing the energy supply and keeping it affordable is seen as equally important. As the incumbents of the Dutch energy system increasingly operate at a European scale, the decarbonization challenge should be taken up at European level as well. Although some respondents view specific points differently, they largely share a storyline that can be summarized as 'decarbonisation in a European market, while keeping the energy supply secure and affordable.' We elaborate on the different elements constituting this storyline in more detail below.

Societal and political concern about climate change is mentioned as the main driver of the energy transition by most respondents. Therefore reducing CO2-emissions is generally seen as the main challenge regarding the energy system. Although the respondent from VNO-NCW puts more emphasis on improving energy and resource efficiency as a key competitive concern: *"resources and energy become scarcer and more expensive, which makes it interesting to develop more efficient techniques."* Specific reduction goals were mentioned for the year 2050, e.g. the respondent of Delta states that his company *"has the ambition to be CO2-neutral by 2050"*. In his view, nuclear power can be part of that mix. In the same line, the respondent of Energie-Nederland formulates it as follows:

"In 2050 we want to realize a CO2-neutral energy supply with as much renewable energy as possible. However, because we estimate that it will not be possible to run on 100% renewable energy in 2050, we should also think about how to involve fossil energy in a CO2-neutral way. That means applying CCS[1] to coal and gas fired power plants."

While constituting the main challenge, the decarbonization goal is often displayed by respondents as conflicting with the other pillars of the 'golden triangle' of security, affordability and sustainability. According to the respondent from VEMW *"often the issue is looked at from only one side, like sus-tainability is something that can be isolated from the energy discussion."* The respondent from Essent adds:

1 *Carbon capture and storage*

"The tendency to prioritize renewable energy comes at the expense of security and affordability. [. . .] We should catch up on the renewables goal, but in a way that does not cannibalize the other two."

Most respondents, including that of GreenChoice, agree that the energy system should rely on market forces for its development and organization, therefore market based mechanisms should be leading in achieving the decarbonization goals. As the respondent from VEMW formulates it:

"We focus strongly on the market, after all we all agreed in Europe to organize our energy supply through the market. We think that that is a good idea, because in a market everyone can play a role in providing solutions for this enormous problem."

The respondent working with Essent goes a step further: *"markets provide information about the future. When you can sell your electricity ten years ahead, you can basically look into the future."* The respondent from VNO-NCW believes that market forces will organize sustainability: *"businesses see that resources and energy become scarce and therefore markets are developing in those areas internationally."*

Incumbents largely agree that without government intervention, the market will find the most cost-efficient solution. In their view, the government should not support specific technologies – picking winners – but creating the conditions for the market to work properly. Paradoxically, incumbents expect that the government does play an important role in providing long-term investment security. The absence thereof is identified as one of the main obstacles for investing in sustainable solutions. As the respondent of E.on puts it:

"We would love to invest in the Netherlands as E.on Benelux, but we have difficulties convincing our German colleagues. They make lists of the most attractive countries to invest in Europe. They basically look at two things: One is of course profitability, they do want to make some money. But two is stability 'how sure can you be that you will get your money back?' Well, the Netherlands does not show up in the top ten."

The respondent from NUON puts the ball in the court of the Ministry of Economic Affairs: *"the Dutch EL&I [Ministry of Economic Affairs] supports the idea of the market very much, taking care that the market can develop its own initiatives, but thereby it is also very dependent on those businesses."* With regard to the level at which the energy system is organized most respondents observe that while energy used to be organized at national scale, the European scale becomes increasingly important in order to make use of the comparative advantages of different countries. Therefore, they believe it should be regulated at EU-level as well. The respondent of E.on states:

"*There should be much more control from a European perspective, e.g., what happens where? We are a pure European player; we are present in many European countries. It is really inefficient when every country would be achieving its goals by itself."*

Following from the above, the European Emissions Trading scheme (ETS), a market based mecha-nism to reach the decarbonization goals at a European level, is seen as the preferred instrument to get to a more sustainable energy system. According to

the respondent of Eneco *"The ETS is one of the most important drivers for renewable energy."* The respondent from VEMW adds: *"By giving CO_2 a price, by making the right to emit CO_2 scarce, everyone will take into account the effects of sustainability when investing, next to the effects on supply security and costs."*

Based on the above, the dominant storyline can be summarized as: *"decarbonisation in a European energy market, while keeping energy supply secure and affordable"*

4.4.2 Tensions within the dominant storyline

Next to the dominant storyline that is shared by most respondents, different ways in which incum-bents views diverge from or question the dominant storyline were identified. First, while the experts agree that development of the energy system should be left to market forces, some argue that the energy market requires additional effort and time to function properly, especially concerning remov-ing barriers for new entrants. In this respect, the respondent of VEMW states that: "There are a lot of barriers in terms of regulation, access requirements for grids and the like, which makes it difficult for new parties with new solutions to access the market, and thereby have little chance that their solution or idea will contribute to solving the energy issue." Regarding the role of government, two opposing storylines emerge, which were interestingly often mentioned both by single respondents. Respondents agreed that the government should create favourable investment conditions in order to decarbonize the energy system. However, once the government does take measures towards such conditions it is criticized because such interventions could threaten the investment climate. Thus, it is argued that government intervention should be minimized. A frequently addressed example of such intervention concerns the introduction of a coal tax[2] early 2012. This coal tax was both lobbied in favour and heavily opposed by different incumbents, thereby dividing the Dutch energy regime. An unexpected coalition of companies with interests in natural gas (Dong Energy, Eneco and Shell) lob-bied together with the environmental NGO Stichting Natuur en Milieu in favour of the coal tax out of sustainability concerns, according to the press release[3]. Traditional energy companies that own coal fired power plants and were hit by the measure were not amused, as the respondent of E.on illustrates:

"What frustrates us is that the same MPs that shout that the investing climate should provide long-term stability, now do this. [. . .] So, we feel betrayed [4]. For us this is a clear example of changing the rules during the game."
Moreover, in response to introduction of the coal tax some respondents wish to separate what they refer to as 'the market' from democratic processes and even put the first above the latter. As the respondent from Essent puts it:

"You lose your faith in the market when there are too much interventions and market undermining activities."

Unexpectedly, the views expressed by the respondents from E.on and Essent are supported by the respondent from the Ministry of Economic Affairs:

"A stable investment climate is crucial. Everyone always looks at the government and says the Dutch government has had shaky renewable energy policy for years. But the [political] parties that say this are the same that suddenly introduce a coal tax. This time it is on coal, but still it is unreliable policy. That does not help for the investing climate, and that does not look good on the Netherlands."

It appears that rather than agreeing with democratically decided government policy to introduce measures to make the energy system more sustainable, the respondent of the Ministry of Economic Affairs sides with respondents from incumbent energy companies that securing a stable investment climate is more important.

4.4.3 Storylines in the making

This section covers 'storylines in the making' that were encountered throughout the research; new narratives that do not fit to the dominant storyline. Four such themes around which we found storylines in the making were brought up repeatedly and by different respondents, knowing:

1. *Germany's Energiewende;*
2. *Decentralization of the energy system;*
3. *New players entering the energy system; and*
4. *Natural gas as transition fuel.*

Since the storylines are (still) in the making, it was more difficult to pinpoint the core of the story-lines than with the dominant storyline. The storylines in the making will be discussed in more detail below.

Germany's Energiewende

Different respondents mentioned the Energiewende, often questioning its direction and swiftness and already see these developments affecting the Dutch energy system. The respondent from GDF-Suez stated:

"I was overwhelmed by what has happened in Germany the last two years that was above all expectations. So maybe a whole new paradigm is emerging".

This comment illustrates that incumbents are baffled by the rapid developments across the border in Germany. However, respondents had different ideas on what the drivers for the Energiewende are, how it will develop in future and what the effects on the Dutch energy system are, showing that a shared storyline on Germany's Energiewende and its (potential) effects on the Netherlands is currently still in the making. Germany's Energiewende storyline in the making undermines the dom-inant storyline on two points. First, it questions the centrality of a (coordinated) European approach to decarbonization. Second, since the Energiewende is not only undertaken with decarbonization in mind (Bosman, 2012) it questions this goal as main driver for the energy transition.

---

2 These taxes formed part of the Spring Agreement, which was reached in a very short period after the governing coalition stepped down on the 23rd of April 2012, in order to carry out austerity measures until new elections would take place.

3 Dong Energy, Eneco, Shell and Stichting Natuur & Milieu support coal tax: http://corporatenl.eneco.nl/nieuws en media/ Persberichten/Pages/Kolenbelasting-maakt-Nederlandse-economie-sterker-enduurzamer.aspx.

4 "We voelen ons daardoor wel wat in het pak genaaid".

Decentralization

The clearest challenge which came back in almost all interviews is that of decentralization of the energy system. The respondent from E.on comments on the disruptive potential of this development:

"I believe we realize more than anyone else that centralized electricity production is coming to an end."

Respondents had difficulties to rhyme this development with the dominant storyline on increased Europeanization of the energy market. Respondents deal with this discrepancy in different ways. While the respondent of E.on questions the continuation of centralized electricity production, the respondent from the Ministry of Economic Affairs tries to fit this new development to the dominant storyline in the following way:

"Now we see a divergence to two systems, on the one hand more and more international, with much more interconnections, even larger power plants, especially for industry, I mean Hoogovens[5] will never run on solar panels so to say. And on the other hand we see much more decentralized, small-scale."

As the decentralization trend presents a storyline in the making a lot of questions and doubts around its impact remain. Few respondents discussed the possible need for adaptation of the current market model in order to accommodate decentralized energy production, while one of them even pointed out that decentralization makes it necessary to fundamentally rethink the energy market model as it exists at this moment. Furthermore, decentralization contradicts the notion of an increasingly European energy system in the dominant storyline. It is in these points that conflicts with the dominant storyline arise.

New players entering the energy system

Connected to the decentralization storyline in the making is that of new players entering the energy system. The respondent from the Ministry of Economic Affairs welcomes this development as he believes it fosters market competition:

"You see that in the market a lot of players, a lot of initiatives originate to stimulate decentralized energy. Cooperatives develop, all kinds of small companies spring up like mushrooms, local governments that want something."

Some respondents from incumbent energy companies see this differently. The respondent of Essent for example proposes to:

"keep everything that is decentralized outside of the market. Then you at least let the market do its work. [. . .] you should not pollute the market with that."

These two comments reveal underlying disagreement over what constitutes the energy market and what should be left out. Next to the changes induced by decentralized energy initiatives, incumbents observe large players foreign to the energy system entering. The respondent from VEMW welcomes this trend: "Think about the IT-sector or companies that are very good at marketing products or reaching consumers. Why could companies like Google or Apple not play a role?"

5 *A large steel producer in the Netherlands.*

For the incumbent energy companies it can be confusing, as the respondent from Essent explains:

"Things are really changing, the market is changing, different players. IKEA is building more wind turbines than RWE worldwide, Google more solar panels than a lot of others. There are a lot different new players in the market, then what is still the sector? What connects us?"

As the statements show, these new players entering the energy system can be new companies, citizen initiatives in the form of energy co-operatives or large multinationals from other sectors with the potential to shake up the energy system. Respondents from incumbent energy companies generally see the involvement of large players from other sectors such as IKEA and Google as more disruptive than the development of small-scale energy cooperatives. We observe diverging views on whether these new players should be welcomed as an improvement of market functioning, or whether they rather 'pollute' the market. If this divergence increases it could in the longer run undermine the coherence of the dominant storyline

Natural gas as transition fuel

A prominent storyline in the making is 'natural gas at transition fuel'. This storyline was prominent around the introduction of the coal tax, which has already been mentioned in Section 4.3. Incumbents involved in natural gas are discursively repositioning themselves in the light of the transition dynam-ics they face, leading to a divide within the energy regime. The respondent from Energie-Nederland explains that:

"We had internal discussions about the coal tax. Companies that had no coal fired power plant said: 'well it doesn't really affect us, so we do not really care.' Some even said: 'well maybe it even benefits us, because our gas fired power plants are standing idle at the moment'
[. . .] so they thought it would not be so bad to introduce a coal tax."

From the other interviews it becomes clear that 'discussion' is an understatement. Incumbents, especially those operating gas fired power plants, experience difficulties in remaining profitable as the marginal costs of gas fired power plants are higher than most other power plants. Therefore, gas fired power plants are standing idle. Lobbying in favour of a coal tax is a concrete consequence of the repositioning efforts of incumbents with natural gas interests. The respondent of Delta observes:

"Natural gas is being presented as a preferable transition fuel because of the low CO2- content and the possibility for flexible application."

The natural gas as transition fuel storyline in the making undermines parts of the dominant storyline as it is at odds with a technology neutral government intervention as proposed by market adepts. Furthermore, this discursive positioning of natural gas goes at the expense of coal fired power and strengthens the discursive position of renewable energy, thereby it influences the power balance within the energy regime. We will come back to the (potential) consequences of this development in the next section.

4.5 Discussion

The need for an 'energy transition' has dominated the respective discourses at all policy levels, also in the Netherlands where incumbents in the Dutch energy system incorporate and use the transition concept to frame the dynamics and align them to their interest- and expectation-based storylines. Respondents from seven incumbent energy companies agree that the main driver for the energy transition is decarbonization and that this should be achieved in a European market, while keeping the energy supply secure and affordable. And this is supported by the other experts interviewed. This is already a change from the dominant discourse of the Dutch energy regime in the 1980s and 1990s in which decarbonization was largely absent and the energy system was organized at a national and regional scale (Verbong and Geels, 2007). Simultaneously, tensions within the currently dominant storyline were encountered relating to differing interpretations of the energy market and the role of the government in the energy transition.

Next to these tensions we uncovered storylines in the making that have the potential to undermine the dominant storyline, relating to Germany's Energiewende, decentralization of the energy system, new players entering the energy market and natural gas as transition fuel. Incumbents struggled to fit these storylines in the making to the dominant one and interpretations often diverged considerably, leading to confusion, insecurity and tensions amongst incumbents: confusion resulted from disagreement over whether new players, such as energy cooperatives, are part of the energy market or rather should be left out. Insecurity about the future was displayed by some respondents stating that it is unclear whether the traditional energy companies will still exist in 20 years from now. Tensions amongst incumbents were observed around introduction of a coal tax, which was supported by incumbents involved in the natural gas business at the expense of those operating coal fired power plants. Respondents react to these misfits in different ways: while some develop narratives that allow for combining these storylines in the making with the dominant one, others start to fundamentally question the dominant storyline. These diverging responses are expected to lead to increasing tensions within the Dutch energy regime, and thus to discursive regime destabilization.

With this overview in mind, we now address the research question and further analyse our empirical findings. What is the dominant discourse amongst incumbents in the Dutch energy regime regarding the future of the energy system and which developments put pressure on their discourse? First of all, our empirical analysis shows that the concept 'energy transition' has taken a central role in the discourse of various incumbents involved in the Dutch energy system. Incumbents use the term 'energy transition' to give meaning to the changes they observe in the energy system. What actors mean with the notion of 'energy transition' is largely influenced by their relative discursive position within the energy system, e.g. while most incumbents in this research understand it as a long-term gradual transformation towards a low-carbon energy system via natural gas as transition fuel, other actors often see it as a radical and swift change to a fully renewable based energy system (e.g. Teske et al., 2007).

It is interesting to note here that amongst respondents there is no fundamental difference of opinion over the long-term goals of an energy transition (80–95% CO2-reduction), however disagreements and conflicts emerge around more concrete concepts such as the energy market, or government intervention towards achieving the overarching goal, such as the coal tax. This has important implications for transition studies and the MLP specifically: New developments at niche level (e.g. energy cooperatives) and events at landscape level (e.g. Fukushima) can perhaps be analytically separated, but our study shows that they play a major role in the dynamics and debates within the regime. Our research proposes a way to study the interactions between the different levels through discursive regime analysis. Our analysis shows that differing interpretations by incumbents of developments at landscape and niche levels can play a role in increasing tensions within a regime. We hypothesize that the tensions that arise from this discursive interplay are manifestations of regime destabilization in face of societal change.

This study has demonstrated that the tensions within the dominant storyline and challenges to it by 'storylines in the making' signals struggle between incumbents within the energy regime, especially in the cognitive 'culture' dimension. This could imply also a growing tension with regard to the power structures that underlie dominant coalitions, institutions and infrastructures. While discursive regime destabilization signals change to the dominant discourse, it remains an open question whether changes in discourse precede changes in the structure of a system (meaning changes in institutions, economic order and/or physical infrastructure).

In this research we found evidence that storylines in the making such as 'natural gas as transition fuel' can open up venues for changes in coalitions and structures when incumbents invested in natural gas interests successfully lobbied for a coal tax in their discursive repositioning efforts at the expense of incumbents invested in coal fired power. We find empirical evidence that reactions were neither univocal nor uniform among incumbents, thereby undermining the coherence of the fossil energy regime. In the face of change pressures, those incumbents involved in business related to natural gas frame their storyline as "partner of renewable energy" and natural gas as "transition fuel" in order to retain their central position within the energy regime. In pushing this frame, some actors are willing to go so far as to advocate structural changes by lobbying for a tax on coal.

Based on the above we hypothesize that such storylines in the making are not merely innocent language, but can lead to discursive repositioning amongst incumbents with implications for the coherence of the regime. It weakens the discursive position of those with stakes in the use of coal and strengthens that of supporters of renewable energy. Furthermore, it suggests that storylines in the making can cascade and shake up long held discursive positions and coalitions that may in turn alter power relations within the regime. Additionally, it could open the door to a renewed lock-in (Unruh, 2000) into natural gas, a fuel that although cleaner than coal, is still fossil, meaning reserves are limited and CO_2 is emitted when burned.

To summarize, our empirical results reveal significant regime dynamics in the Dutch energy system: While several regime elements still exist, the discourse which provides meaning and coherence to these elements seems to fragment and weaken. The conceptualization of a uniform and static regime as often assumed in early transition literature is not adequate and should include more attention towards dynamics over time. Studying such storylines in the making and the discourse coalitions that adopt them provides valuable insights into ongoing transition dynamics.

With this we come to some critical reflections on the applied methodology and research design. Qualitative research is of explorative nature and a certain degree of subjectivity cannot be avoided, e.g. the gathered data could have shown differences even if the same questions would have been asked to the same respondents but at a different moment or by a different researcher. Thus, our results represent a snapshot of a dynamic discourse which is influenced by a large variety of factors. Being 'only' a snapshot means we cannot draw definite conclusions but only hypothesize on the discursive changes and how this affects positioning, coalitions and regime structures through time. These hypotheses require testing and validation in future research.

A second aspect that needs to be mentioned was the need to conduct the interviews anonymously except for the interviewees' organizational context. Some respondents hinted at the possibility to use this to reconstruct their identity and that consequently they would have to be cautious regarding their statements.

A third point concerns the selection of respondents, which was largely dependent on availability and willingness of actors to participate. In the end, the respondents (see Annex 1) covered a broad range of relevant institutional backgrounds, including small and large businesses, civil servants, interest groups and research institutes. However, despite being invited some actors active in the discourse refused to participate, and thus their storylines may not be adequately represented. Despite these limitations to the research design the explorative approach has allowed for unravelling the dominant storyline, some of its inherent tensions and storylines in the making that challenge the discursive hegemony. It should be seen as a starting point for a further analysis of how the discourse in this regime evolves and its implications for the energy transition.

4.6 Conclusions

What this research shows is that although different regime elements are still in place, such as coal fired power plants, network infrastructure and energy markets, the discourse with which actors connect these elements and provide meaning and coherence is under stress. This leads to confusion of how different regime elements and actors relate to each other and tensions within the dominant discourse coalition. While this research provides only a snapshot of existing and emerging storylines amongst incumbent actors, regime destabilization is a process, resulting from strings of cascading pressures. We hypothesize that discursive regime destabilization – internal regime tension in terms of conflicting (emerging) storylines – might be an indicator for regime dynamics in the acceleration phase of transitions. This hypothesis requires further and more longitudinal research to be confirmed.

Next to its analytical use in describing regime dynamics, exposing regime internal diversity, sensitivities and struggles provides leverage points to delegitimize the dominant storyline by enlarging the inherent tensions and further strengthening storylines in the making. At the same time, we should remain cautious that after initial destabilization a new storyline could be adopted around which the regime reconfigures. Based on this, instead of increasing destabilization, successful adaptation to pressures by incumbents could lead to regime restabilization resulting in a stronger energy regime. Further research on ongoing de- and restabilization pathways of energy regimes is needed to shed light on these complex dynamics.

Acknowledgements

Authors are thankful for partially funding this research to the Dutch Ministry of Infrastructure and the Environment under the research programme "Governance for sustainable infrastructures" (ARVODI-2010–2014) (ARVODI-2008-31019661), the NGI consortium under the research programme "Spontaan Samenwerken" (2012) (09.10.TPM.DRI) Netherlands Organisation for Scientific Research (NWO) under the "TRAPESES" research programme (2014–2018) (408-13-029).

An earlier version of this Chapter was presented and nominated for best paper award at the 4th International Conference on Sustainability Transitions in Zürich, 19–21 June 2013. The authors wish to thank conference participants for their valuable comments, especially Bjoern Budde, Frans Berkhout, Marco Hekkert, Frank Geels and Magda Smink. We would also like to thank Jan Rotmans, P.J. Beers, Shivant Jhagroe and three anonymous reviewers for commenting earlier versions and Jochen Markard and Jeroen van den Bergh for taking the initiative for the special issue.

References

- *Arentsen, M.J., Fabius, J.W., Künneke, R.W., Midttun, A., 2001. Dutch business strategies under regime transition. In: Midttun, A. (Ed.), European Energy Industry Business Strategies. Elsevier Science, Oxford.*
- *Baarda, D., Goede, M.P.M., Kalmijn, M., 2000. Basisboek enquêteren en gestructureerd interviewen. Educatieve Partners Neder-land, Houten.*
- *Boeije, H., 2009. Analysis in Qualitative Research. Sage Publications Ltd., London.*
- *Bosman, R., 2012. Germany's 'Energiewende': Redefining the rules of the energy game. In: Clingendael International Energy Programme Briefing s, Available from: http://www.clingendaelenergy.com/inc/upload/files/Germanys energiewende 1.pdf (accessed 15.3.2013).*
- *European Climate Foundation (ECF), 2011. Power Perspectives 2030: On the Road to a Decarbonised Power Sector, Available from: http://www.roadmap2050.eu/attachments/files/PowerPerspectives2030 FullReport.pdf (accessed 08.03.13).*
- *European Commission (EC), 2011. Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: A Roadmap for Moving to a Competitive Low Carbon Economy in 2050, Available from: http://ec.europa.eu/energy/energy2020/roadmap/doc/com 2011 8852 en.pdf (accessed 03.03.13).*
- *Eurostat, 2012. The Contribution of Renewable Energy up to 12.4% of Energy Consumption in the EU27 in 2010. Newsrelease 18/06/2012, Available from: http://epp.eurostat.ec.europa.eu/cache/ITY PUBLIC/8-18062012-AP/EN/8- 18062012-AP-EN.PDF (accessed 05.10.12).*
- *Frantzeskaki, N., de Haan, H., 2009. Transitions: two steps from theory to policy. Futures 41 (9), 593–606.*
- *Frantzeskaki, N., Loorbach, D., 2010. Towards governing infrasystem transitions: reinforcing lockin or facilitating change? Technol. Forecast. Soc. 77 (8), 1292–1301.*
- *Fuenfschilling, L., Truffer, B., 2014. The structuration of socio-technical regimes – conceptual foundations from institutional theory. Res. Policy 43 (4), 772–791.*
- *Garud, R., Gehman, J., Karnoe, P., 2010. Categorization by association: nuclear technology and emission-free electricity. In: Sine, W.D., David, R. (Eds.), Research in the Sociology of Work. Emerald Group Publishing Ltd., Bingley, UK, pp. 51–93.*
- *Geels, F.W., Schot, J., 2007. Typology of sociotechnical transition pathways. Research policy 36 (3), 399–417.*
- *Geels, F., Schot, J., 2010. The dynamics of transitions: a socio-technical perspective. In: Grin, J.,*
- *Rotmans, J., Schot, J. (Eds.), Transitions to Sustainable Development: New Directions in the Study of Long Term Structural Change. Routledge, New York.*
- *Grin, J., Rotmans, J., Schot, J., 2010. Transitions to sustainable development. In: New Directions in the Study of Long Term Tansformative Change. Routledge, New York.*
- *Hajer, M.A., 1995. The Politics of Environmental Discourse: Ecological Modernization and the Policy Process. Clarendon Press, Oxford.*
- *Hajer, M., 2006. Doing discourse analysis: coalitions, practices, meaning. In: Van den Brink, M., Metze, T. (Eds.), Words Matter in Policy and Planning: Discourse Theory and Method in the Social Sciences. Netherlands Graduate School of Urban and Regional Research, Utrecht, pp. 65–74.*
- *Hermans, F., Horlings, I., Beers, P.J., Mommaas, H., 2010. The contested redefinition of a sustainable countryside: revisiting Frouws' rurality discourses. Sociol. Rural. 50 (1), 46–63.*
- *Holtz, G., Brugnach, M., Pahl-Wostl, C., 2008. Specifying "regime" – a framework for defining and describing regimes in transition research. Technol. Forecast. Soc. 75 (5), 623–643.*
- *Kemp, R., 2010. The Dutch energy transition approach. Int. Econ. Econ. Policy 7 (2), 291–316.*
- *Kemp, R., Schot, J., Hoogma, R., 1998. Regime shifts to sustainability through processes of niche formation: the approach of strategic niche management. Technol. Anal. Strateg. Manage. 10 (2), 175–198.*
- *Kern, F., Smith, A., 2008. Restructuring energy systems for sustainability? Energy transition policy in the Netherlands. Energy Policy 36 (11), 4093–4103.*
- *Klessmann, C., Held, A., Rathmann, M., Ragwitz, M., 2011. Status and perspectives of renewable energy policy and deployment in the European Union – what is needed to reach the 2020 targets? Energy Policy 39, 7637–7657.*
- *Loorbach, D.A., (Doctoral dissertation) 2007. Transition Management: New Mode of Governance for Sustainable Development. Erasmus University Rotterdam.*
- *Loorbach, D., Van Der Brugge, R., Taanman, M., 2008. Governance in the energy transition: Practice of transition management in the Netherlands. International Journal of Environmental Technology and Management 9 (2), 294–315.*
- *Loorbach, D., Rotmans, J., 2010. Towards a better understanding of transitions and their governance: a systemic and reflexive approach. Part II. In: Grin, J., Rotmans, J., Schot, J. (Eds.), Transitions to Sustainable Development. Routledge, New York.*
- *Loorbach, D., Verbong, G., 2012. Conclusion: is governing the energy transition a reality, an illusion, or a necessity? In: Verbong, G., Loorbach, D. (Eds.), Governing the Energy Transition: Reality, Illusion or Necessity? Routledge, London.*
- *Rip, A., Kemp, R., 1998. Technological change. Battelle Press, Columbus, pp. 327–399. Rotmans, J., 2003. Transitiemanagement; sleutel voor een duurzame samenleving. Van Gorcum: Assen.*
- *Rotmans, J., Loorbach, D., 2010. Towards a better understanding of transitions and governance: a systemic and reflexive approach. In: Grin, J., Rotmans, J., Schot, J. (Eds.), Transitions to Sustainable Development: New Directions in the Study of Long Term Structural Change. Routledge, New York.*
- *Rotmans, J., Kemp, R., Van Asselt, M., 2001. More evolution than revolution: transition management in public policy. Foresight 3 (1), 15–31.*

- *Scrase, J.I., Ockwell, D.G., 2010. The role of discourse and linguistic framing effects in sustaining high carbon energy policy – an accessible introduction. Energy Policy 38 (5), 2225–2233.*
- *Smink, M.M., Hekkert, M.P., Negro, S.O., 2015. Keeping sustainable innovation on a leash? Exploring incumbents' institutional strategies. Bus. Strategy Environ.*
- *Smith, A., Kern, F., 2009. The transitions storyline in Dutch environmental policy. Environ. Polit. 18 (1), 78–98. Smith, A., Raven, R., 2012. What is protective space? Reconsidering niches in transitions to sustainability. Res. Policy 41 (6), 1025–1036.*
- *Stenzel, T., Frenzel, A., 2008. Regulating technological change – the strategic reactions of utility companies towards subsidy policies in the German, Spanish and UK electricity markets. Energy Policy 36 (7), 2645–2657.*
- *Teske, S., Zervos, A., Schäfer, O., 2007. Energy Revolution: A Sustainable World Energy Outlook. Greenpeace International and European Renewable Energy Council, Available from: http://www.greenpeace.org/international/Global/international/ planet-2/report/2007/1/energy revolution-2007.pdf (accessed 10.10.2012).*
- *Turnheim, B., Geels, F.W., 2012. Regime destabilisation as the flipside of energy transitions: lessons from the history of the British coal industry (1913–1997). Energy Policy 50, 35–49. Unruh, G.C., 2000. Understanding carbon lock-in. Energy Policy 28 (12), 817–830.*
- *Verbong, G., Geels, F., 2007. The ongoing energy transition: lessons from a socio-technical, multilevel analysis of the Dutch electricity system (1960–2004). Energy Policy 35 (2), 1025–1037.*
- *Verbong, G., Loorbach, D., 2012. Governing the Energy Transition: Reality, Illusion or Necessity? Routledge, London.*
- *van der Brugge, R., (Doctoral dissertation) 2009. Transition Dynamics in Social-Ecological Systems: The Case of Dutch Water Management. Erasmus University Rotterdam, The Netherlands.*
- *Van der Loo, F., Loorbach, D.A., 2012. The Dutch energy transition project (2000–2009). In: Verbong, G., Loorbach, D. (Eds.), Governing the Energy Transition: Reality, Illusion or Necessity? Routledge, London, p. 220.*
- *Van der Vleuten, E., Högselius, P., 2012. Resisting Change?: The Transnational Dynamics of European Energy Regimes.*
- *Ministerie van Volkshuisvesting, Ruimtelijke Ordening en Milieu (VROM), 2001. Nationaal Milieubeleidsplan 4: Een Wereld en een Wil. Werken aan duurzaamheid.*

Annex 4.1 Overview of interviews in scoping and data collection phase

Scoping phase

(Telephone) interviews with:

Date	*Position*	*Organization*
02/05/2012	Senior staff member Energy Transition	Agentschap NL
14/05/2012	Associate	McKinsey & Company
24/05/2012	Researcher	Clingendael International Energy Programme
24/05/2012	Senior Consultant	Squarewise
19/05/2012	Managing Consultant	Ecofys
07/06/2012	Manager Markets and Environment	Energie-Nederland

Data collection phase

Formal interviews with anonymous respondents from:

Date	*Organization*
08/06/2012	Eneco
12/06/2012	E.on Benelux
22/06/2012	GreenChoice
29/06/2012	Delta N.V.
29/06/2012	Energie-Nederland
05/07/2012	Ministry of Economic Affairs, Agriculture and Innovation (EL&I)
05/07/2012	Ministry of Infrastructure and the Environment (I&M)
06/07/2012	GDF-Suez
09/07/2012	VEMW
10/07/2012	NUON/Vattenfall
11/07/2012	ECN
17/08/2012	RWE/Essent

Annex 4.2 Interview questions

- How are you involved in energy business, what is your position?
- What are the three most pressing challenges the Dutch energy sector currently faces?
- How do you inform yourself about the developments in the energy sector?
- How does your organization anticipate these challenges?
- What will your organization look like 20 years from now?
- What is the influence of the energy sector on Dutch energy policy?
- If you could employ a full-time researcher, which question should he or she investigate?
- Are there any question(s) you expected that I did not ask?
- Could you recommend other people to interview regarding my research?

5. *Discursive Destabilisation: A Longitudinal Analysis of Energy Transition Discourse in the Netherlands*

Abstract

Sustainability transitions research investigates fundamental change in societal systems from one regime to another. Over time, unsustainable regimes can destabilise under pressure of a changing societal context and increasing competition from niches, creating space for transformative system change. This study contributes to understanding how such destabilisation takes place with a longitudinal discursive analysis.

We theorize that different discourse coalitions struggle for dominance of their understanding of the energy transition. While at first, a hegemonic discourse characterizes the energy regime, over time competing storylines emerge, presenting different ways to understand challenges and envisage a desired future. This discursive destabilisation undermines hegemonic discourse, giving way to transition space where fundamental reframing of transformative challenges and repositioning of supporting actors takes place.

We perform a study of news articles published in three Dutch newspapers between 1995 and 2015 using 'energy transition' as key search term. Our findings show that understanding of the energy transition has evolved from a narrow technofix storyline put forward by a relatively small group of incumbents, via system flexibility, to a power storyline, supported by a diverse mix of actors, challenging the incumbent energy regime by calling for a fundamental overhaul of the energy system.

Keywords: energy transition, Netherlands, discourse, regime destabilisation, longitudinal analysis

5.1 Introduction

In the Netherlands, the dominant discourse and policy in the energy domain have changed tremendously over the past decades. Where sustainability used to play only a marginal role, it has become central to current thinking and policy making. Although the share of renewable energy is still modest, with 5,9% in 2016 (CBS, 2017) being second-last in Europe (Eurostat, 2017), the coalition agreement of the national government installed in October 2017 proposes 49% CO_2-reduction in 2030 and designates 4 billion euros yearly to the "climate and energy transition" (Rutte et al., 2017:40). A "Law on the Progress of the Energy Transition" is in the making, including a phase out of natural gas for domestic use, which has come to be known as the heating transition (cf. RVO, 2017), and an exit from coal power, whose implementation is already halfway with closing the oldest five coal fired power plants in 2016. The newest five are to be closed until 2030 (RvS, 2017).

In the academic literature, transitions are defined as regime shifts, which involve the simultaneous build-up of new structures and break-down and/or reconfiguration of incumbent regimes (Loorbach et al., 2017). Regime shifts can come about when a changing landscape and emerging niches put pressure on the dominant regime

(Geels, 2004; Grin et al., 2010). Over the course of a transition an incumbent regime opens up or destabilises and niche-innovations work their way into a new regime. As a transition proceeds, new, more hybrid configurations of incumbents and new entrants emerge, and regime and niches become increasingly hard to distinguish (cf. Elzen et al, 2012; Hoes et al. 2016). However, how regimes destabilise, and how this is enacted, is as of yet poorly understood.

In this Chapter, we develop a discursive perspective on regime destabilisation. We draw on discourse theory to develop a longitudinal discourse analysis to study how different actors understand and give meaning to the energy system and how this changes over time. Following Hajer (1995) we hypothesise that different (coalitions of) actors struggle for dominance of their understanding of the energy transition and the embodied problem definitions and directions of search for possible solutions. As a result of this struggle, meanings and the underlying actor coalitions can change over time, potentially undermining the stability of the incumbent regime.

The main research question we aim to answer is: *what is the role of discourse in regime destabilisation?*

In order to answer this question, we have analysed 35 years of archives of three major national newspapers in the Netherlands. This analysis provides insight in which developments play a role in changing energy discourse and the associated coalitions over time. Our findings show that the Dutch energy transition has entered a stage in which the niche-regime distinction is losing its relevance. In the Discussion, we introduce "transition space" as a conceptual innovation to make sense of this stage in transitions.

In the next Section we propose our theoretical framework drawing on transitions and discourse literature. In Section 5.3 we share our methods for longitudinal discourse analysis of newspaper articles to study energy transition discourse. In Section 5.4 we present the main findings of our study, starting with a quantitative overview followed by a chronological qualitative assessment of the main events and controversies challenging and shaping storylines. In Section 5.5 we discuss and interpret our findings, showing a three-stage development in energy transition discourse. In Section 5.6 we conclude our research and discuss how discursive destabilisation might signal a new transition phase, that we conceptualise as transition space.

5.2 Discursive Destabilisation

Existing literature sees external pressures as the main drivers for regime destabilisation (cf. Arranz, 2017). However, various authors have also identified aspects of agency in regime destabilisation. Karltorp and Sanden (2012) show how diverging strategies of incumbents facing transitional pressures can lead to regime fragmentation and destabilisation. Turnheim & Geels (2013) combine these views by explaining regime destabilisation as resulting from three mutually reinforcing processes:

1 external economic and/or socio-political pressures; leading to
2 performance problems within the regime;
3 actors lose commitment to regime elements, in turn again exacerbating pressures and performance problems.

Aiming at bridging the structure agency divide (Giddens, 1984; De Haan & Rotmans, 2018), Bosman et al. (2014) draw on discourse theory to analyse how alternative 'storylines in the making' undermine the logic and coherence of the previously hegemonic incumbent discourse, and that incumbents can discursively reposition themselves, which may shake up existing actor coalitions.

Discourse can be defined as "a specific ensemble of ideas, concepts, and categorisations that are produced, reproduced and transformed in a particular set of practices and through which meaning is given to physical and social realities" (Hajer, 1995:44). Discourses become apparent through the language individuals and organisations use. This language in use takes the form of storylines: narratives with which actors provide meaning to the world around them. Around these storylines broader discourse coalitions can develop of actors that feel attracted to a (set of) storyline(s). In so doing, these actors reproduce the storylines. This suggests a common understanding amongst the actors involved (Hajer, 1995).

Turning to transitions, regime shaping and discourse are then mutually related because actors collectively make sense of the world around them through discourse. Ideas and conceptualisations colour not only how a (policy) problem is understood, but also the directions in which, and the partners with whom solutions are being sought (Hajer, 1995; Hall, 1993). Fuenfschilling & Truffer (2014) (amongst others) suggest a relation between discursive change and institutional change. They claim that areas of high discursive activity, or discursive hotspots, provide insights in "where institutions are infringed upon, criticised or defended and therefore allows the assessment of the importance of certain institutions to particular actors. Furthermore, analysing discursive hotspots allows to identify the degree of consensus between the actors and accordingly draw conclusions regarding the internal coherence of the field." Fuenfschilling & Truffer (2014: 777). Hence, a discursive perspective affords a closer look at the positioning and repositioning of actors vis-à-vis their institutional context and social relations, and may help to understand processes of regime destabilisation as transitions advance. As such, the discourse through which actors give meaning to the world, plays a central role in shaping both incumbent regimes and sustainability transitions (cf. Scrase & Ockwell, 2010; Kern & Smith, 2008; Geels & Verhees, 2011; Avelino, 2011; Hermwille, 2016; Hisschemoller & Sioziou, 2013; Moezzi et al., 2017)

Building on this work, we theorise that in the early predevelopment phase of a transition a clear and hegemonic discourse and incumbent coalition putting it forward, will be observable in a societal system, while alternative storylines are dispersed and have not yet entered the mainstream media. As a transition advances, other storylines emerge that aim to explain ongoing changes, the underlying problems and aspired directions for the future. When these storylines gain more substance and support, they start to compete with the incumbent hegemonic storyline. Furthermore, we propose that discursive change is associated with changes in actor networks

supporting certain storylines. While at first the hegemonic discourse is supported by a rather stable coalition of a relatively small number of incumbent actors, over time their discursive positions and coalitions become fragile and prone to change. At the same time 'storylines in the making' (Bosman et al., 2014) develop in substance, prominence and support. As such, this phase of transition is characterised by an increased diversity in and misalignments between storylines, associated actor coalitions and institutions that challenge and displace the hegemonic discourse and its associated incumbent coalition. If this process includes diversification and (partial) displacement of the hegemonic discourse and supporting coalition, we call it discursive destabilisation.

In this research, we focus on the different storylines that play a role in the Dutch energy system, the meanings that are ascribed to the energy transition and how these change over time. In this sense the term 'energy transition' acts as a boundary object. According to Star & Griesemer (1989:393) "[b]oundary objects are objects which are both plastic enough to adapt to local needs and the constraints of the several parties employing them, yet robust enough to maintain a common identity across sites. […] They have different meanings in different social worlds but their structure is common enough to more than one world to make them recognisable, a means of translation." Such boundary objects play a key role in enabling sensible communication between people with different backgrounds. While initially coined as playing a role in interdisciplinary academic communication (between academics involved in building up collections in natural science museums; Star & Griesemer, 1989), more recently the concept of boundary objects has also been used to study discursive interactions across science, policy and society interfaces (cf. Avelino, 2011; Metze, 2014).

In previous research we made a first step in this direction by providing a snapshot of how different incumbent actors understand the energy transition and the storylines in the making which are at odds with the hegemonic discourse at a specific point in time (Bosman et al., 2014). However, in order to trace changes in energy discourse and reveal the dynamics in actor positions and coalitions over time, a longitudinal approach is wanted. Here we present such a longitudinal study with the aim to trace the origins of fundamental changes in Dutch energy discourse.

5.3 Methods

In order to gain longitudinal insight in discursive changes in the Dutch energy system we studied 35 years of newspaper archives of three large daily national newspapers. The analysis focussed on identifying different interpretations of the energy transition and the actors (coalitions) that contribute them. The following analytical sub-questions guided our search:

- How is the 'energy transition' term used and understood in national media?
- Which actors take a discursive position in the Dutch energy transition discourse?
- Which changes in understanding can we observe over time?
- Which factors have led to changes in energy transition discourse?

5.3.1 Case: Energy Transition Discourse

The notion of 'energy transition' has come to play a central role to describe and advocate the fundamental changes needed to shift to a sustainable energy system. It was introduced at the science-policy interface in the Dutch National Environmental Policy Plan in 2001 (VROM, 2001), as a way to understand the challenges facing the contemporary energy system, in particular climate change, and to argue for structural change. Based on this study the 'Energietransitie', as the policy program was called in Dutch, started at the Ministry of Economic Affairs. As of 2007, the policy program took a central role in Dutch energy policy (Smith & Kern, 2009). However, after a new government took office in 2011, the energy transition policy program was officially abolished (van der Loo & Loorbach, 2012). Although the formal policy program was aborted, the term 'energy transition' did stick as a(n almost self-evident?) way to talk about and interpret changes that are on-going in the Dutch energy system.

The Dutch energy transition policy programme was informed by the emerging scientific field of sustainability transitions research; some of the leading scholars in the field have co-authored the National Environmental Policy Plan and advised policy makers in the development of the programme. In hindsight we observe that these early transition scholars have been effective in introducing this new notion of (energy) transition as a way to understand the changes in the energy domain in light of unfolding major challenges such as climate change. However, scholarly understandings of transitions do not neatly and linearly disseminate from science to policy and society, but get translated along the way: actors across the science-policy-society interface engage with the term, infuse it with their own understandings, informed by their specific positions and stakes in the Dutch energy system (Smith & Kern, 2009; Bosman et al, 2014).

5.3.2. Data Collection

We gathered the data through a Lexis Nexis search on three Dutch national daily newspapers: De Volkskrant (VK), NRC Handelsblad (NRC), Financieele Dagblad (FD). We chose these newspapers because they are well-read, also in policy circles, cover energy and climate issues regularly and cater to different audiences: VK targets a well-educated left of centre audience (VK, 2018), NRC targets the liberal upper-class (NRC, 2018) and FD is pre-dominantly read in business circles (FD, 2018). Using 'energietransitie'[1] as key search term covering the time frame between 1980 and 2015, yielded 271 articles in total, of which 161 in FD, 70 in NRC, and 40 in VK. First mention of the concept was in 1995 and its use becomes more widespread as of 2004. The news articles have been analysed and coded using Atlas.ti qualitative data analysis software.

1 *Energy Transition in Dutch*

5.3.3 Coding Strategy

Our coding strategy was twofold. First, we used five codes to identify different discursive positions and the actors that promote them (cf. Frouws, 1998; Hermans et al., 2010):

- Actors: who (co)promotes a discursive position?
- Ontology: references to core elements providing meaning to 'energy transition', specifically focussing on actors' problem definitions and preferred solutions;
- Agency: reference to actors' capacity to act. Reference to other actors, their position and/or actions, e.g., endorsement or marginalisation;
- Motivation: reference to reasons for position and/or activity of self or others;
- Relationships: reference to how developments, actors, positions, activities and motivations relate to each other.

Second, in order to trace the emergence of and changes in storylines chronologically, we used four additional codes:

- Conflicts: one-off outbursts of discontent, often leading to a breach between actors;
- Events: one-off, clearly delineated moments, including for example (press) conferences and (natural) disasters;
- Ideas: technological innovations or master plans that are often advocated by researchers and picked up by the media as interesting solutions;
- Reports: studies or other documents which insert new arguments or knowledge into the public debate;

These categories emerged during the coding process as conflicts, events, ideas and reports all provide actors with opportunities to express their views and, in so doing, their discursive positions become apparent. For example, actors respond, or are asked to respond, in a newspaper when a new research report is published that affects their interests.

5.3.4 Synthesis

Having coded the content of the newspaper articles this way, we took two additional steps to identify the different storylines about energy transition through time. First, we identified controversies: themes that divide actors and play out over longer periods of time. We did so by plotting the conflicts, events, ideas and reports on a timeline, and combining them with the first set of codes for discursive positions and actors. While some developments appear to be singular events, other themes would reappear over time, these are the controversies. We coded the beginning of a controversy as the first moment when, after one discursive position was identified, at a later point another (conflicting) position came to the fore. Second, for each controversy we mapped out the associated discursive positions and associated actors and changes therein over time. From this longitudinal set of discursive positions and actor coalitions we were able to synthesize three distinct storylines. The intermediate step of coding controversies was important because they unfold over longer periods of time, allowing to trace changes in discursive positions and coalitions and emergence of new actors and storylines through time. We made a timeline of controversies and events, in which we mapped the relation to these controversies and events for every storyline and the position and role of involved actors. Thereby, we specifically coded how the storylines changed (in terms of actors, ontology, agency, motivation and relationships). The result is a history of different discursive positions and their changes over time.

5.4 Findings

While our main research efforts have been qualitative, we start this section with selected quantitative insights that provide a starting point in understanding the evolution of energy transition discourse over time Figure 5.1 shows the number of articles mentioning the term 'energy transition' in the three newspapers in the years from 2004 to 2014.

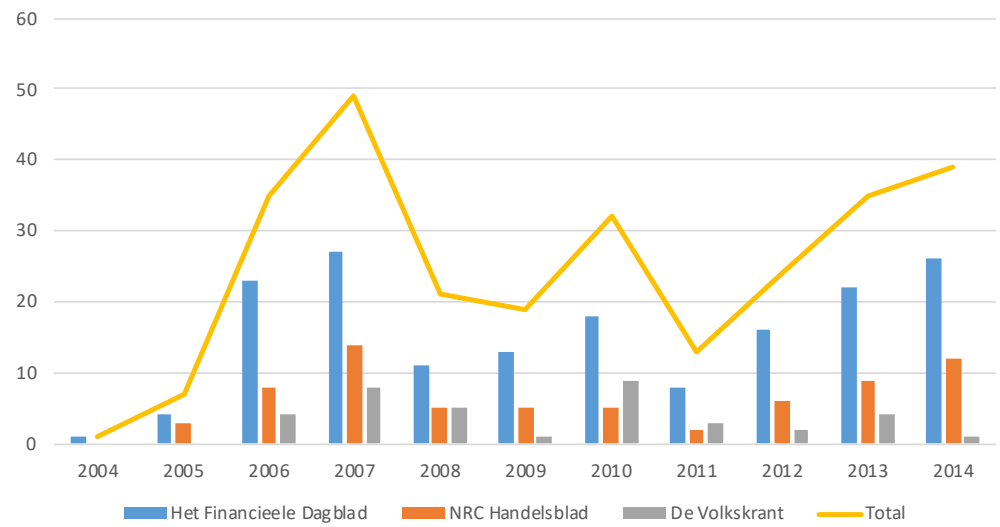
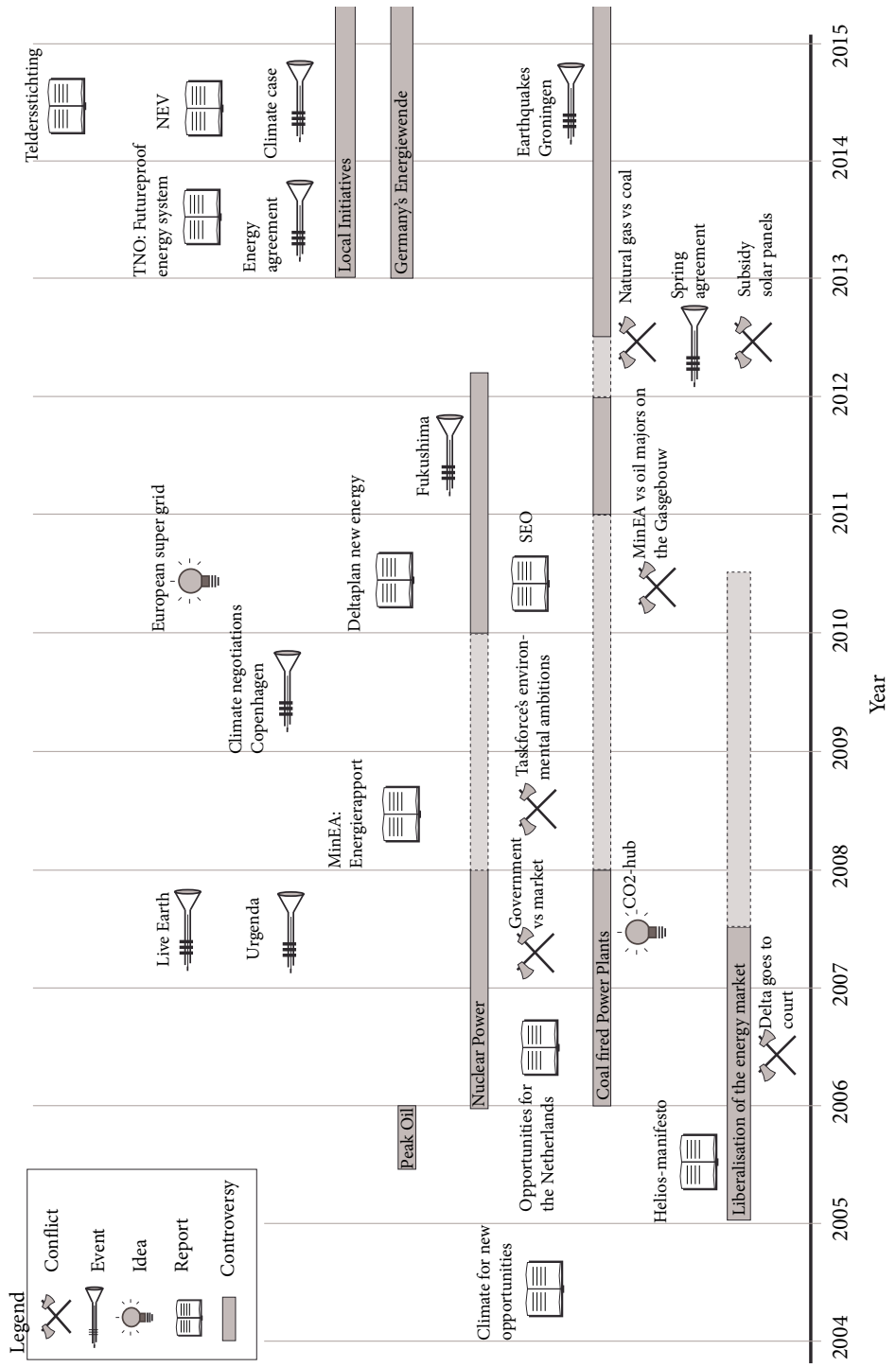


Figure 5.1 News articles mentioning 'energy transition' in three large Dutch national newspapers

We have searched back 35 years in the LexisNexis database, and the earliest mention of the term was in 1995 in a book review[2] in NRC by Lucas Reijnders. We have excluded this outlier from our graph, since the term only reappears in the FD in 2004. From 2006 use of the term really takes off, with peaks in 2007 and 2010. From the data there is no straightforward explanation for these peaks.

2 *Ronald Bailey, editor, The True State of the Planet, A Project of the Competitive Enterprise Institute, The Free Press / Simon & Schuster Inc., New York, [f] 33.30 ISBN 0-02-874010-6*

Figure 5.2 Timeline of important developments in Dutch energy transition discourse:



Emergence of Energy Transition Discourse

Energy transition discourse really appears in the media in 2004 when FD discusses the launch of a new report titled "Energy Transition: Climate for New Opportunities"[3], by the General Energy Council[4] and the Council on Housing, Spatial planning and the Environment[5], two heavy-weight advisory bodies of the Dutch government. In line with this advice the government decides to install a Taskforce Energy Transition, consisting of representatives from industry, research, NGO's, public administration and headed by Rein Willems, CEO of Shell Netherlands, the oil and gas major. The media attention that this report and the consequent installation of the Taskforce generated, mark the introduction of the concept of energy transition as a way to talk about the future of the Dutch energy system in the public debate. In so doing, the report sets the stage for the energy transition discourse: The main problems are understood to be climate change and, to a lesser extent, resource dependency. Solutions are seen to exist in climate friendly technologies. The government is in the lead and should provide incentives for the market to develop climate friendly technologies, especially R&D investments. In short, the storyline with which the Taskforce gives meaning to the emerging energy transition discourse is that climate change is the main problem, research and technology will provide solutions, if the government incentivises those through the market.

At the end of 2005 high oil prices lead to the issue of peak oil being raised in relation to the energy transition. Promotors of the peak oil storyline, including activists and researchers from outfits such as Aspo and ECN, claim that the world is running out of easy and cheap oil resources and that tapping into new oil resources becomes increasingly difficult and expensive. Therefore, governments should prepare for a future in which the availability of oil is constrained and they believe it is wise to develop alternative resources, such as renewables. Other actors such as the US Geological Survey, International Energy Agency (IEA) and international oil majors (Shell, ExxonMobil, BP, Chevron) counter that peak oil theorists are too pessimistic. In their view there are enough fossil fuels for decades to come because new technologies allow for additional resources to be tapped.

Also, in 2005 discussions on liberalisation of the energy market is related to the energy transition discourse. A group of energy experts presents the Helios-manifesto in which they criticise the liberalisation policy of the government. This manifesto again leads to several opinion articles in both FD and NRC. The government pushes through with liberalisation which forces energy utility companies to split up and sell off their grid operations, much to the chagrin of these utilities. In 2006 Delta, one of those utilities, announces in FD that they will fight the government regulation in court. In their view, Minister Brinkhorst (Economic Affairs) is making it difficult for them to play a role in the energy transition. Most outspoken against liberalisation are utilities, such as Delta and Eneco, who are to a large extent dependent on the rather steady and secure revenues from their grid operations.

---

3 In Dutch: Energietransitie: Klimaat voor Nieuwe Kansen

4 Algemene Energieraad

5 VROM-raad

Helios manifesto subscribers are also critical, but more nuanced in their view. This controversy re-emerges in our analysis over time and is still present at the time of this writing, as utilities Eneco and Delta are still fighting the split in court.

Taskforce Energy Transition

In May 2006, the Taskforce Energy Transition publishes the report "More with Energy: Opportunities for the Netherlands"[6]. This report presents the energy transition as a (business) opportunity. The report outlines 26 'transition pathways', mostly technology-oriented solutions. This framing of sustainability as an opportunity and technological solutions will figure throughout the next decade and is promoted by a host of actors, including government, business and several green NGOs. The attractiveness of this perspective is that it apparently unites previously opposing interest of environment and economic growth.

Two of the key solutions the Taskforce promotes in its report, however spark discussion. Firstly, new nuclear power plants are promoted as a CO_2-friendly option. Secondly, carbon capture and storage (CCS) for new coal fired power plants is promoted in order to provide cheap and stable low carbon energy. Green NGOs, such as Friends of the Earth Netherlands, voice their discontent since they do not see nuclear power and CCS as sustainable options. Rather they believe that the focus should be on reducing energy demand. Diederik Samsom, MP for the Dutch labour party, PvdA, says he recognises the hand of VNO-NCW, the Confederation of Netherlands Industry and Employers, in the Taskforce report.

At the end of 2006 and beginning of 2007 the Taskforce and other actors provide input for the formation of a new government, which is being picked up by the media. A conflict emerges because Stichting Natuur & Milieu, the environmental NGO represented in the Taskforce, does not feel represented by the input of the Taskforce and they force it to send a second letter that promotes stricter environmental ambitions. This suggests a conflict of underlying beliefs about the resilience of the Earth's system and the associated need for action, thus a difference in risk perception. We will come back to this issue as an example of agency within a diverse coalition of actors in the discussion section.

Halfway through 2007 a large event is organised called Live Earth, an initiative conceived by former vice-president of the US Al Gore to raise awareness about climate change across the globe. Interestingly while both NRC and Volkskrant mention the event in relation to the energy transition, FD does not report on this event mentioning the term. Also, the launch of Urgenda, an NGO with a transition agenda for the Netherlands receives attention in NRC and Volkskrant, but not in the FD. Urgenda will continue to play an important role in the energy transition discourse, promoting a sense of urgency and concrete initiatives to try to accelerate change. Another initiative that makes the media is the idea of the Netherlands as a CO_2-hub, storing its own CO_2 and that of neighbouring countries in empty gas fields, which is promoted by a working group of the Taskforce headed by Prof. Catrinus Jepma of the University of Groningen.

6 *In Dutch: Meer met energie: Kansen voor Nederland*

System Flexibility

In 2008 the Ministry of Economic Affairs publishes its Energy report[7] in which it keeps open the nuclear option. The report is commented on by Theo Walthie, the president of the new Directing Board Energy Transition[8], the successor of the Taskforce Energy Transition. In his comments on the report and subsequent interviews on the work of the Directing Board, Walthie introduces flexibility of the energy system as an important theme, claiming that with introduction of variable renewables system flexibility becomes key. This is associated with a preference for natural gas power plants that can play into renewables variability by being able to more flexibly ramp up and down their production than coal-fired and nuclear power plants. This focus on system flexibility presents a discursive change compared to its predecessor, which took a narrower focus on technologies instead of a system perspective, but did not express particular technological preferences. Given the significant natural gas interests in the Netherlands, it is no surprise that this new focus on flexibility gained support.

In 2009 Volkskrant and NRC report on the climate negotiations in Copenhagen in reference to the energy transition. While highly anticipated, the outcome of the negotiations is generally perceived as disappointing and the issue of climate change moves to the background. Parliament discusses a law that would give preference to renewable energy over other sources in the grid. And the FD reveals a conflict between the Ministry of Economic Affairs and the oil majors Shell and ExxonMobil on the 'Gasgebouw', a set of agreements on the production and supply of natural gas in the Netherlands. The Dutch government sees an opportunity to renegotiate the conditions under which revenues of natural gas production in Groningen are divided between the oil majors and the State.

In 2010 discussions on nuclear power rekindle, with a positive Christian Democratic Party, and two reports making headlines in different newspapers. The first is a study by SEO Economic Research commissioned by the Directing Board in which the costs of 80% CO_2-reduction in 2050 are compared between a large-scale centralised, coal-with-CCS and nuclear-powered system and a system based on decentralised renewable energy sources. They conclude that the latter option is cheaper, providing welcome ammunition for renewable energy supporters, as the main critique is the large cost of the transition. The other report is the Deltaplan New Energy, in which sustainability experts of most major political parties argue that the Netherlands can and should shift to 100% renewable energy in 2050. While up to this point, sustainable energy was often seen as a left-wing subject, this multi-party initiative showed that there were good grounds to move to a more sustainable energy system independent of party colour. As such, it would lay the basis for the Energy Agreement, which we come back to in 2013. The report gained media attention, not only because the authors cut across different political camps, but also because at the last moment the liberal party, VVD, distanced itself from the report, although also experts from VVD ranks had contributed to the report.

7 *In Dutch: Energierapport*

8 *In Dutch: Regieorgaan Energietransitie*

Also in 2010, ideas are raised for a European super grid that should contribute to distribute an increasing share of intermittent renewable across the continent, amongst others through the Roadmap 2050 prepared by the European Climate Foundation.

Coal Controversy

In March 2011 the Fukushima nuclear disaster strikes Japan. Only a few news articles link this disaster to the energy transition. Also, in 2011 the controversy around new coal-fired power plants re-emerges with Peter Terium, CEO of energy utility Essent defending his companies' power plant in both FD and the Volkskrant, arguing that it was the Dutch government who wanted the power plants in the first place and should now take responsibility. The utilities are in increasing financial trouble, in their view because renewable energy pushes conventional power plants, especially those running on natural gas out of the market. This controversy culminates when a tax on coal gets included in the Spring Agreement at the beginning of 2012 (also see Chapter 4). This to the chagrin of utilities operating coal-fired power plants, such as E.on, Essent and GdF-Suez. The coal tax was lobbied for, amongst others by energy utility Eneco, which operates natural gas fired and renewable power plants, but no coal-fired ones, Shell, which is an important producer of natural gas and Stichting Natuur & Milieu, an environmental NGO. As the utility companies up to now operated as a relatively unified front, this presents an interesting breach in coalitions. Less prominent was a conflict that emerged around solar power for which GroenLinks, green left party, arranged a new subsidy in the Spring Agreement. A coalition of solar entrepreneurs attacks this initiative, because the market was finally taking off without subsidies and now people would wait with buying solar panels until the subsidy scheme would be active. This conflict seems to be more of a fight over the appropriate means than one over the goals of the transition.

Two more controversies enter the discussion in 2012. Firstly, Germany's Energiewende, which is hailed by supporters of a swift energy transition as an example of how to promote rapid development of renewable energy by some, while others stress its prohibitive costs and problems. Second is the emergence of local initiatives for renewable energy. The decentralised nature of renewable energy as opposed to the more centralised fossil and nuclear power has been part of the discussion in the background for some time, however with the emergence of hundreds of local initiatives this characteristic stands out.

Shaking up the field

In 2013 the controversy on natural gas versus coal fired power drags on, but the highlight in terms of media attention is the Energy Agreement for Sustainable Growth which was negotiated between 47 societal stakeholders, including ministries, labour unions, energy, mobility, installation, ICT and construction sectors, energy intensive industry, employers' associations and NGOs, under the auspices of the Social Economic Council (SER), an important advisory body to the Dutch government. This agreement aims to provide long term consistency to energy policy, and guide the transition to a sustainable energy system. It also raises criticism from researchers that question whether breakthroughs can be negotiated when vested interests dominate the discussions. It is interesting to note that from the inception of the idea of negotiating a broadly supported agreement with different stakeholders, the name changed from Energy Transition Agreement to Energy Agreement for Sustainable Growth. In the lead up to the agreement several reports are presented, including TNO's "Towards a futureproof energy system for the Netherlands", which raises discussion because the accompanying press release stresses the country's dependency on fossil fuels, specifically the government's natural gas and tax revenues, arguing that change should proceed carefully.

Early 2014 the energy system is shaken by earthquakes in the province of Groningen where the Slochteren field, the largest onshore natural gas field in Europe, is located. Several groups and studies link the earthquakes to decades of natural gas production. The earthquakes and resulting damages to properties spur different actors to raise questions about the desirability and future of natural gas production in the Netherlands and the broader energy transition. Commentators use the earthquakes in Groningen to reinforce their call to accelerate the transition to sustainable energy. Later in the year the Teldersstichting, the scientific bureau of the liberal party VVD, publishes a report detailing its views on the future of the energy system. This report raised several eyebrows, because it questions climate science. A couple of months later Urgenda uses climate science as the basis to sue the Dutch State for not doing enough to prevent climate change and protect Dutch citizens from its consequences. The Energy Research Centre and Netherlands Environmental Assessment Agency publish their evaluation of the SER Energy Agreement and make headlines by concluding that its goals will not be met with current policies. In December German energy utility E.on makes the news by announcing to split up in a fossil and nuclear part and a part that will focus exclusively on renewable energy and its grid operations. Table 5.1 summarises the controversies that play a role in the energy transition discourse and the discursive positions that become apparent in these controversies:

Controversies	Discursive positions	
Peak oil	*activists and researchers (Aspo; ECN):* *world is running out of easy and cheap oil and tapping into new oil resources becomes increasingly difficult and expensive. Governments should prepare and it is wise to develop alternative resources, such as renewables*	*international oil majors (Shell, ExxonMobil, BP, Chevron); US Geological Survey, International Energy Agency (IEA):* *there are enough fossil fuels for decades to come because new technologies allow for additional resources to be tapped*
Liberalisation	*Government (Minister of Economic Affairs): liberalisation is needed to stimulate an energy market*	*Utilities (Eneco, Delta), energy experts: liberalisation makes it difficult for energy companies to play a role in the energy transition*
Nuclear power	*Environmental NGOs, labour party PvdA: nuclear power forms an environmental and public safety risk, it cannot be part of a sustainable future*	*Taskforce Energietransitie, Christian Democratic party CDA, liberal party VVD: nuclear provides cost-effective, reliable and low carbon electricity*
Governance	*Ministry of Infrastructure & Environment, Christian democratic party CDA, labour party PvdA:* *move faster towards sustainability and use more restrictive policies*	*Ministry of Economic Affairs, democratic party D66, liberal party VVD, Confederation of industry and employers VNO-NCW: less urgency and preference for market-based instruments such as the European emissions trading scheme (ETS).*
Coal power	*Utilities E.on, Essent, Electrabel, Nuon, Confederation of industry and employers VNO-NCW, Ministry of Economic Affairs:* *Coal power plants are needed to ensure security and affordability of electricity supply. Netherlands is a favourable location, close to sea for cooling water and coal logistics*	*ENGOs:* *Coal power does not fit climate ambitions*
		Rotterdam Climate Initiative (RCI), ENGO Stichting Natuur & Milieu (SNM), Taskforce Energietransitie: make sure new coal power plants are equipped with CCS
		Eneco, Shell, SNM, GasUnie: coal emits two times as much CO_2 as natural gas
Energiewende	*Liberal party VVD, consultancy Roland Berger, research institute TNO: Energiewende is expensive and challenges the reliability of the energy system*	*Consultancy Ecofys, solar business SollandSolar: Germany shows the transition is doable and has benefits in the form of jobs and economic growth*
Local initiatives	*Utility Esssent: energy system cannot run on local initiatives alone*	*Local initiatives, prof. Rifkin, ENGO Urgenda, federation of grid operators Netbeheer Nederland: citizens take matters in own hands and accelerate energy transition with decentralized renewables*
		Academics, Christian democratic party CDA: Making sure local residents also reap benefits from renewable energy improves support for transition

Table 5.1 Discursive positions in controversies in Dutch energy transition discourse:

5.5 Synthesis: Storylines about the Dutch Energy Transition

We identified three Dutch energy transition storylines, based on the various discursive positions regarding controversies in the energy transition: The technofix storyline, the system flexibility storyline and the power storyline. We found that newer, emerging storylines did not replace existing storylines, but rather developed alongside them, building on and/or challenging the initial technofix.

Technofix Storyline

With regard to the technofix storyline, our results show that the energy transition concept emerged in the public debate with the report "Energy Transition: Climate for New Opportunities" of the General Energy Council and Council for Housing, Spatial planning and the Environment in 2004, two heavyweight advisory bodies for the Dutch government and the consecutive installation of the Taskforce Energy Transition, as a result of the advice. The Taskforce and the report that led to its conception play an important role in the initial framing of the energy transition in the media. Climate change is posed as the main problem and therefore CO_2-reduction is the main objective, while it is important that solutions should not harm current economic interests or impede standards of living. Technology offers the solutions and large-scale centralised technologies, that fit to the existing structure of the energy system are preferred. Agency is generally attributed to the government which needs to implement the right regulations and incentives for CO_2-reduction to take effect. Within this technofix conceptualisation of the energy transition, discursive struggles revolve around questions like: What are the right technologies to fix the climate problem? And what is the role of government vis-a-vis that of the market? While some actors prefer the government to take the lead, others see the government as facilitator of market initiative. It is interesting to note that the actors that point towards the government as being in the lead are often also the ones that criticise the government when it then takes measures aimed at accelerating the energy transition, but hurting the interests of these actors.

System Flexibility Storyline

In 2008 when the Directing Board Energy Transition succeeded the Taskforce Energy Transition, also involving a change of presidents, the focus shifts from technofix solutions towards a more holistic understanding of the energy system. In order to cope with the growing share of intermittent renewables that are (to be) introduced into the system, flexibility becomes key and natural gas is proposed as a flexible partner. This storyline is supported by the Directing Board Energy Transition, the Taskforce's successor, several progressive energy companies and natural gas interests. Core concern in this system flexibility storyline is: How can we keep the system reliable and affordable while gradually introducing renewables into the system? With regards to the role of the government, this storyline is similar to the technofix storyline. However, it challenges the technofix understanding of the energy transition by broadening the scope for change from introducing new technologies to change that requires a systemic approach. Emphasising the need for flexibility in the system, plays into the natural gas interests, as this option is put forward as being able to deliver the needed flexibility, because natural gas fired power plants are able to ramp up and down their production more quickly than other electricity production units, while undermining the role of less flexible power plants such as coal and nuclear. As such, the storyline aligns interests in renewables and natural gas, while side-lining coal power plants. It is important to note that this storyline, similar to the technofix storyline focusses predominantly on the electricity system, changes in the broader energy system are not in scope (yet).

Power Storyline

Around 2010 we observe the emergence of a new storyline that challenges the technofix and system flexibility storylines by shifting attention to actors, interests and power dynamics. The 'power' storyline perceives vested actors with fossil fuel interests as the problem and identifies new actors such as renewable energy entrepreneurs and local energy initiatives as potential solutions. In this storyline, the government, instead of being in the lead, is often portrayed as part of the problem because of its central role in natural gas production. Core question in this understanding is: Who lead the energy transition and who are frustrating the process? Emergence of this storyline results in a discursive struggle between those looking for technofix solutions within the existing fossil fuelled and centralized system versus those building a new system based on decentralized renewable alternatives. The earthquakes caused by natural gas production in Groningen play a crucial role in this respect from 2012 onwards, since they further undermine the legitimacy of the technofix storyline and strengthen the conceptualisation of the energy transition as a fundamental overhaul of the existing system, including shifting power relations. In Table 5.2 these three storylines in energy transition discourse are summarized. These storylines seem to play a central role in the evolution of energy transition discourse in national Dutch media. While the power storyline seems to gain ground, elements of the technofix and system flexibility storylines can still be found in today's energy transition discourse.

Table 5.2 Storylines in Dutch energy transition discourse over time:

Storyline	Technofix	System flexibility	Power
Time of emergence	2004	2008	2010
Core actors	Taskforce Energy Transition, E.on, Nuon/Vattenfall, Electrabel/GdF-Suez, Delta, Essent/RWE	Directing Board Energy Transition, Eneco, GasUnie, Energy Academy Europe	Urgenda, De Groene Zaak, local initiatives, Greenchoice
Ontology	Problem is climate change, CO_2-reduction can be achieved by technological means	Introducing variable renewables to make the energy system more sustainable requires flexibility, natural gas is the preferred transition fuel	Vested centralized fossil fuel interests are the problem, new actors involved in decentralized renewable energy the solution
Agency	The government needs to facilitate the transition	The government needs to make long term choices for a sustainable energy system, the market invests	New actors and initiatives lead the transition, government is part of the problem
Motivation	Climate change is an important common problem for which the government is responsible. Technological innovation can solve this challenge.	Moving towards to a sustainable energy system is important. Reliability of the system needs to be warranted.	Transition is urgent, existing actors and relations hamper a swift transition
Natural relationships	Climate problem has a technofix, clear task division between market and government	The energy transition is about integrating new energy sources in the existing system. Natural gas is more flexible than other options.	Those that created the problems, cannot be the ones to solve them

5.6 Conclusions and policy implications

This research contributes to the understanding of regime destabilisation in transition studies, by introducing a longitudinal discourse analysis of the Dutch energy system. Our main research question was: what is the role of discourse in regime destabilisation? Instead of finding one dominant storyline about the energy system as one would expect from a stable and dominant energy regime, we found three co-existing and competing storylines. Over time, Dutch energy transition discourse has become more diverse: from a rather narrow technofix focus dominated by incumbents from the energy regime, via a gradually broader system flexibility storyline, supported by natural gas and renewables interests, to a power storyline conceptualising the energy transition as a struggle between vested fossil fuel interests and emerging actors which fundamentally challenges the existing fossil based and centralised energy system. Although the system flexibility and power storylines over time gain prominence at the expense of the technofix storyline, they do not fully replace it. Elements of the initial technofix storyline are still part of ongoing energy transition discourse today. Rather, with the emergence of competing storylines, the diversity within Dutch energy transition discourse and associated actor coalitions has increased.

What does this tell us about the role of discourse in regime destabilisation? First of all, we observed a co-evolution between diversifying discourse and broadening of the actor base involved in energy transition discourse. This is best illustrated by comparing the actors involved in the Taskforce Energy Transition, which introduced the energy transition concept in Dutch media in 2004, and those subscribing to the 2013 Energy Agreement for Sustainable Growth. While the former consisted of different stakeholders in the energy domain, including business, science and NGOs, it mostly focussed on the supply side of the energy system. Subscribers to the Energy Agreement also involve end users, such as mobility, housing and industry, and other sectors that recognised they have a role to play in the process, such as the ICT, installation and construction sector (cf. Hengelaar & Bosman, 2017). We conclude that the broadening of understanding of the energy transition from a supply side technofix to tackle climate impact of energy production to a fundamental overhaul of the fossil fuel energy system in the power storyline, also involves a broadening of the type of actors involved in the process. Thus – emergence of competing storylines invited a broadening actor base, whose support in turn fortified the new storyline. In other words, emergent storylines may self-reinforce through the attracting support of new entrants as well as incumbents. This forms an important insight for theorising regime destabilisation and underlines the importance transition management attaches to involving a diverse set of actors in transition processes to challenge incumbent discourse and actor coalitions (Loorbach, 2007).

Second, underlying these storylines, we have seen connections being made between different types of actors and different discursive positions, when these positions offered mutual advantages for specific combinations of interests. This held, for instance, for the system flexibility storyline, supported by a coalition of natural gas interests and environmental NGO's. Furthermore, supporting this storyline was also attractive for utilities that had already made investments in renewables. As such,

discourse plays a role in bringing together convergent beliefs and interests in a broader coalition that shares a certain societal goal. For this to happen, it was clearly not necessary for the associated actors to share the same values and interests. In sum, the emerging storylines gain support when they provide a better fit with ongoing changes in the system and offer competitive advantage for new coalitions, in which both incumbent actors and new entrants may participate, to work towards a shared goal. That a new storyline is successful in also enrolling incumbents, signals that some incumbents are indeed losing their commitment to the regime. This discursive dynamic therefore is indicative of on-going regime destabilisation. Moreover, it is indicative of the emergence of space for new actor coalitions and storylines, backed by interests that provide a better fit with an increasingly carbon constrained energy system.

Third, this observation of the emergence of a space in which different understandings of the energy transition compete for hegemony supported by new coalitions consisting of both incumbents and new entrants, and which indicates that incumbents are defecting from the regime poorly fits the more straightforward perspective of a dominant regime consisting of incumbents that are inhibiting change while being challenged by a couple of progressive niches. Observing that current transition theory lacks the vocabulary to describe such dynamics, we suggest to conceptualise this phase of transition in which an incumbent regime has become destabilised, but a new regime has not yet formed as transition space. This is characterised by a rise in reconfiguration options for some incumbent actors, and systemic opportunities for new entrants. To elaborate: we showed that growing discursive diversity in the energy system leads to increased uncertainty about the future of the system, because it becomes clear that there are multiple ways of understanding the problems at hand and multiple directions to search for solutions. For incumbents, navigating such divergence is much more challenging than a context dominated by a rather stable hegemonic discourse. At the same time the increased diversity and tensions opens up space for new entrants and their problem understandings and preferred solutions enabling courses of action and actor constellations that were unlikely before. This fragmentation of the hegemonic discourse and incumbent actor coalition further destabilises the incumbent regime, but at the same time creates opportunities for discursive repositioning and new actor constellations, for incumbents as well as newcomers. As such, discursive destabilisation is an important indicator of fundamental regime change leading to the emergence of transition space. If a regime can be defined as the dominant culture, structure and practices in a given system (Rotmans & Loorbach, 2010), then transition space is defined by diversity in and misalignments between culture, structure and practices in a system. Conceptualising this phase of transition or system state as transition space provides the opportunity to study and describe the particular dynamics taking place in a system in absence of an incumbent regime (Bosman et al., 2018).

Furthermore, our insights raise questions for policy, in particular related to the governance of transitions. It shows that discursive sense making processes are highly relevant for regime destabilisation and emergence of transition space. What we did not look into, however, is whether it is possible and desirable to influence discourse in order to accelerate the transition process. One could imagine developing interventions specifically aimed at further destabilising the hegemonic storyline and/or promoting alternative storylines. Developing competing alternative visions and narratives is one of the core goals of transition arena's (Loorbach, 2007), however often the state of the system and incumbent regime are not taken into account explicitly in transition management interventions (van Raak, 2016). Transition Management and Strategic Niche Management alike, could direct more attention to discursive tensions and opportunities in the system, as presented in this Chapter, to identify opportunities for introducing alternative visions and practices (through the media) and thus increase the impact of their interventions. In fact, some of the data analysed in this study where contributions from transition scholars taking part in the public debate through the media, mostly challenging the technofix and supporting the power storyline. This suggests that some transition scholars might already, consciously or unconsciously, be involved in discursive destabilisation.

Last but not least, our research raises several questions for further research:

- First of all, our research suggests an important but understudied role for the media in transitions. They (literally) mediate the science – policy – society interface. Which events, controversies, conflicts are newsworthy and why? Which arguments of which actors are considered relevant? Which are accepted, which rejected, which ignored? And how do media reports further public understanding of transitions?
- Second, while we have focussed on discourse as present in national media, our findings underscore other research that suggests a relation between discursive and institutional change (e.g., Fuenfschilling & Truffer, 2014). Although quite some work has already been done in this area in e.g., political science, public administration and institutional theory (e.g., Lawrence & Suddaby, 2006), this mostly concerns relatively stable policy contexts instead of systems in transition.
- Third, in this Chapter we introduce transition space to conceptualize the phase of transition in between a destabilised old regime and the formation of a new regime. We showed its presence discursively. We hypothesise however, that it is more encompassing than 'only' discursive misalignments and diversification of actor constellations, but also includes redirection of resources, institutional misalignments and changes in practice (cf. Bosman et al., 2018).

Acknowledgements

Authors are thankful for funding this research to the Netherlands Organisation for Scientific Research (NWO) under the "TRAPESES" research programme (2014–2018) (408-13-029).

Previous versions of this Chapter have been presented and discussed at the 2015 Interpretive Policy Analysis conference in Lille, France and the 2016 International Sustainability Transitions conference in Wuppertal, Germany. The authors would like to thank conference participants for their valuable input. Also, the feedback of Matthijs Hisschemöller, Antonia Proka and Michael Kriechbaum has been very helpful in improving the Chapter.

References

- Avelino, F., & Wittmayer, J. M. (2015). Shifting power relations in sustainability transitions: A multi-actor perspective. Journal of Environmental Policy & Planning, 1-22.
- Avelino, F. (2011). Power in transition: empowering discourses on sustainability transitions. (Doctoral dissertation). Retrieved from repub.eur.nl
- Avelino, F., Grin, J., Pel, B., & Jhagroe, S. (2016). The politics of sustainability transitions. Journal of Environmental Policy & Planning, 18(5), 557-567.
- Bosman, R., Loorbach, D., Frantzeskaki, N., Pistorius, T., (2014). Discursive regime dynamics in the Dutch energy transition. Environ. Innovation Soc. Transitions (2014), http://dx.doi.org/10.1016/j.eist.2014.07.003
- Bosman, R., Loorbach, D., Beers, P.J., (2018) Navigating transition space: the grid operator as proactive incumbent in the energy transition. Paper presented at 9th International Sustainability Transitions Conference, University of Manchester, United Kingdom, June 11 – 14, 2018. Available online: http://documents.manchester.ac.uk/display.aspx?DocID=37352 Accessed 05-07-2018.
- Centraal Bureau voor Statistiek (CBS) (2017) Share of Renewable Energy at 5.9% in 2016. Available online: https://www.cbs.nl/en-gb/news/2017/22/share-of-renewable-energy-at-5-9-in-2016 accessed 12-01-2018
- de Haan, F. J., & Rotmans, J. (2018). A proposed theoretical framework for actors in transformative change. Technological Forecasting and Social Change.
- De Haan, J. H., & Rotmans, J. (2011). Patterns in transitions: understanding complex chains of change. Technological Forecasting and Social Change, 78(1), 90-102.
- Elzen, B., van Mierlo, B., & Leeuwis, C. (2012). Anchoring of innovations: Assessing Dutch efforts to harvest energy from glasshouses. Environmental innovation and societal transitions, 5, 1-18.
- Eurostat (2017) Share of energy from renewable sources. Available online: http://appsso.eurostat.ec.europa.eu/nui/submitViewTableAction.do Accessed 12-01-2018
- Farla, J., Markard, J., Raven, R., & Coenen, L. (2012). Sustainability transitions in the making: A closer look at actors, strategies and resources. Technological forecasting and social change, 79(6), 991-998.
- Fischer, L. B., & Newig, J. (2016). Importance of Actors and Agency in Sustainability Transitions: A Systematic Exploration of the Literature. Sustainability, 8(5), 476.
- Frantzeskaki, N., Loorbach, D., & Meadowcroft, J. (2012). Governing societal transitions to sustainability. International Journal of Sustainable Development, 15(1-2), 19-36.
- Fuenfschilling, L., & Truffer, B. (2014). The structuration of socio-technical regimes—Conceptual foundations from institutional theory. Research Policy, 43(4), 772-791.
- Geels, F. W. (2004). From sectoral systems of innovation to socio-technical systems: Insights about dynamics and change from sociology and institutional theory. Research policy, 33(6), 897-920.
- Geels, F. W., & Verhees, B. (2011). Cultural legitimacy and framing struggles in innovation journeys: a cultural-performative perspective and a case study of Dutch nuclear energy (1945–1986). Technological Forecasting and Social Change, 78(6), 910-930.
- Giddens, A. (1984). The constitution of society: Outline of the theory of structuration. Univ of California Press.
- Grin, J., Rotmans, J., Schot, J., 2010. Transitions to sustainable development. In: New Directions in the Study of Long Term Tansformative Change. Routledge, New York.
- Hajer, M.A., 1995. The Politics of Environmental Discourse: Ecological Modernization and the Policy Process. Clarendon Press,Oxford.
- Hall, P. A. (1993). Policy paradigms, social learning, and the state: the case of economic policymaking in Britain. Comparative politics, 275-296.
- Hekkert, M. P., Suurs, R. A., Negro, S. O., Kuhlmann, S., & Smits, R. E. (2007). Functions of innovation systems: A new approach for analysing technological change. Technological forecasting and social change, 74(4), 413-432.
- Hengelaar, G.A. & Bosman, R. (2017) Wrestling with words: How incumbents shape energy transition debates and policy with reactive and proactive discourses. In: Hengelaar, G.A. (2017). The Proactive Incumbent: Holy grail or hidden gem? : Investigating whether the Dutch electricity sector can overcome the incumbent's curse and lead the sustainability transition (No. EPS-2016-ERIM Series 438-ORG). ERIM Ph.D. Series Research in Management. Erasmus University Rotterdam. Retrieved from http://hdl.handle.net/1765/102953
- Hermans, F., I. Horlings, P.J. Beers, H. Mommaas (2010) The contested redefinition of a sustainable countryside: revisiting Frouws' rurality discourses Sociol. Rural., 50 (1), pp. 46–63
- Hermwille, L. (2016). The role of narratives in socio-technical transitions—Fukushima and the energy regimes of Japan, Germany, and the United Kingdom. Energy Research & Social Science, 11, 237-246.
- Hisschemöller, M., & Sioziou, I. (2013). Boundary organisations for resource mobilisation: enhancing citizens' involvement in the Dutch energy transition. Environmental Politics, 22(5), 792-810.
- Hoes, A.-C., Beers, P. J., & Van Mierlo, B. (2016). Communicating tensions among incumbents about system innovation in the Dutch dairy sector. Environmental Innovation and Societal Transitions, 21, 113-122.
- Karltorp, K., & Sandén, B. A. (2012). Explaining regime destabilisation in the pulp and paper industry. Environmental Innovation and Societal Transitions, 2, 66-81.
- Kemp, R., Schot, J., & Hoogma, R. (1998). Regime shifts to sustainability

through processes of niche formation: the approach of strategic niche management. Technology analysis & strategic management, 10(2), 175-198.
- Kern, F., & Smith, A. (2008). Restructuring energy systems for sustainability? Energy transition policy in the Netherlands. Energy policy, 36(11), 4093-4103.
- Lawrence, T. B., & Suddaby, R. (2006). Institutions and Institutional Work. In: S.R. Clegg, C. Hardy, TB Lawrence and W. Nord (Eds.), Handbook of Organization Studies, 2nd Edition: 215 – 254. London: Sage.
- Loorbach, D. (2007). Transition management: new mode of governance for sustainable development.
- Loorbach, D., Frantzeskaki, N., & Avelino, F. (2017). Sustainability transitions research: Transforming science and practice for societal change. Annual Review of Environment and Resources, 42.
- Meadowcroft, J. (2011). Engaging with the politics of sustainability transitions. Environmental Innovation and Societal Transitions, 1(1), 70-75.
- Meadowcroft, J. (2009). What about the politics? Sustainable development, transition management, and long term energy transitions. Policy sciences, 42(4), 323.
- Metze, T. (2014): Fracking the Debate: Frame Shifts and Boundary Work in Dutch Decision Making on Shale Gas, Journal of Environmental Policy & Planning, DOI: 10.1080/1523908X.2014.941462
- Moezzi, M., Janda, K. B., & Rotmann, S. (2017). Using stories, narratives, and storytelling in energy and climate change research. Energy Research & Social Science, 31, 1-10.
- Raven, R. P. (2005). Strategic niche management for biomass (Doctoral dissertation, Technische Universiteit Eindhoven).
- Raad van State (RvS) (2017) Samenvatting advies amendementen over het sluiten van kolencentrales. Available online: https://www.raadvanstate.nl/adviezen/samenvattingen/tekst-samenvatting.html?id=464 Accessed 12-12-2017
- Rijksdienst voor ondernemend Nederland (RVO) (2017) Kader voor afwegingsprocessen: verduurzaming warmte- en koudevoorziening gebouwde omgeving. Available online: https://www.rvo.nl/sites/default/files/2017/06/Kader%20voor%20afwegingsprocessen%20warmtetransitie%20versie%20juli%202017.pdf Accessed 18-12-2017
- Rip, A., & Kemp, R. (1998). Technological change (pp. 327-399). Battelle Press.
- Rotmans, J., Kemp, R., & Van Asselt, M. (2001). More evolution than revolution: transition management in public policy. foresight, 3(1), 15-31.
- Rotmans, J., & Loorbach, D. (2010). Towards a better understanding of transitions and their governance. A systemic and reflexive approach. Transitions to sustainable development. New directions in the study of long term transformative change, 105-198.
- Rutte, M., Pechtold, A., van Haersma Buma, S., Segers, G. (2017) Regeerakkoord: Vertrouwen in de toekomst. Available online: https://www.kabinetsformatie2017.nl/documenten/publicaties/2017/10/10/regeerakkoord-vertrouwen-in-de-toekomst Accessed: 12-12-2017
- Scrase, J.I., Ockwell, D.G., 2010. The role of discourse and linguistic framing effects in sustaining high carbon energy policy – an accessible introduction. Energy Policy 38 (5), 2225–2233.
- Scrase, I., & Smith, A. (2009). The (non-) politics of managing low carbon socio-technical transitions. Environmental Politics, 18(5), 707-726.
- Smith, A., Kern, F., 2009. The transitions storyline in Dutch environmental policy. Environ. Polit. 18 (1), 78–98.
- Smith, A. (2007). Translating sustainabilities between green niches and socio-technical regimes. Technology analysis & strategic management, 19(4), 427-450.
- Star, S. L., & Griesemer, J. R. (1989). Institutional ecology, 'translations' and boundary objects: Amateurs and professionals in Berkeley's museum of vertebrate zoology, 1907–39. Social Studies of Science, 19(3), 387–420.
- Turnheim, B., & Geels, F. W. (2013). The destabilisation of existing regimes: Confronting a multi-dimensional framework with a case study of the British coal industry (1913–1967). Research Policy, 42(10), 1749-1767.
- van Raak, R. (2016). Transition Policies: connecting system dynamics, governance and instruments in an application to Dutch Healthcare (Doctoral dissertation). Retrieved from repub.eur.nl
- van der Loo, F., & Loorbach, D. (2012). The Dutch energy transition project (2000-2009). In: Verbong, G., Loorbach, D., 2012. Governing the Energy Transition: Reality, Illusion or Necessity? Routledge, London.
- Verbong, G., Loorbach, D., 2012. Governing the Energy Transition: Reality, Illusion or Necessity? Routledge, London.
- Ministerie van Volkshuisvesting, Ruimtelijke Ordening en Milieu (VROM), 2001. Nationaal Milieubeleidsplan 4: Een Wereld en een Wil. Werken aan duurzaamheid.

6. *Navigating Transition Space: the grid operator as change-minded incumbent in the energy transition*

Abstract

The energy transition has reached a new phase that current transition frameworks, in particular the multi-level perspective, have difficulty to adequately describe. As an alternative, we introduce transition space to conceptualize that part of a transition in which an old regime has destabilized and a new regime has not (yet) formed. In absence of the stabilizing and coordinating effects of a regime, transition space is characterized by instability and volatility, while at the same time providing opportunities for transformative system change. In transition space both 'old' and 'new' practices co-exist and interconnect in unprecedented ways, new actor coalitions are formed in the process, and ongoing changes in rules and regulations as well as physical (infra)structures keep changing the systemic parameters within which actors operate, while these parameters are itself again influenced by strategic decisions of the actors involved.

The aim of this Chapter is to conceptualize the space in between an old and new regime and illustrate it by studying how an incumbent grid operator navigates this transition space, how it makes strategic decisions under uncertainty and the tensions that arise internally and externally from phasing out existing practices while simultaneously developing new activities and roles.

6.1 Introduction

The academic field of sustainability transitions deals with understanding fundamental societal change processes. The field is rooted in multiple disciplines, including innovation studies, evolutionary economics, institutional theory and complexity theory, and addresses questions of societal change in the face of sustainability challenges. A transition is conceptualised as a fundamental change in regimes; the dominant structure, culture and practices in a societal (sub)system that is the result of a co-evolution of economic, technological, institutional, cultural and ecological developments at different scale levels. Transitions are long term (25–50 years), highly complex and contested and often cut across a variety of domains and stakeholders. Contemporary transitions are often related to sustainability goals in order to resolve a number of persistent problems confronting modern societies (Grin et al., 2010).

In the literature, quite some attention is directed towards experimentation and innovation in sustainable niches as drivers for transitions. The implicit assumption being that unsustainable regimes will break down or open up, as soon as convincing alternatives become available. Recently, attention is shifting towards processes of regime destabilization (Turnheim & Geels, 2012) as especially energy transitions are progressing and facing disruptive and non-linear change: and incumbent regimes are destabilising, but a new regime has not yet formed. Existing frameworks, such as multi-level perspective implicitly acknowledge the existence of such as state, but do not explicitly conceptualise it.

In order to conceptualise this stage of a transition in between an old and new regime, we introduce transition space. It is characterized by uncertainties, chaotic changes, tensions and hard choices on which elements of the incumbent regime still have a place in a future regime, and which elements become obsolete or replaced. In transition space, incumbent actors that have so far predominantly been involved in reproducing, strengthening or sustaining the regime, start repositioning in face of transitional pressures, which then accelerates transformative change. By conceptualizing this in-between situation, it is intended to more adequately describe the system and actor dynamics involved.

In this Chapter, we introduce the transition space concept and illustrate it from the point of view of a change-minded incumbent; the largest Dutch distribution grid operator Alliander. Ethnographic fieldwork at the organisation stretching out over a six months period between September 2016 and February 2017 provided deep insight in how a change-minded incumbent navigates transition space, including the uncertainties, tensions and challenges this brings. The main research question in this Chapter is:

How does a change-minded incumbent navigate transition space?

The Chapter is structured as follows: In Section 6.2 we present the theoretical underpinnings of our research. We introduce transition space and five dimensions of actor repositioning. Section 6.3 describes our ethnographic research approach. Section 6.4 presents our findings. In Section 6.5 we reflect on our findings and relate the insights and lessons learned to transitions literature.

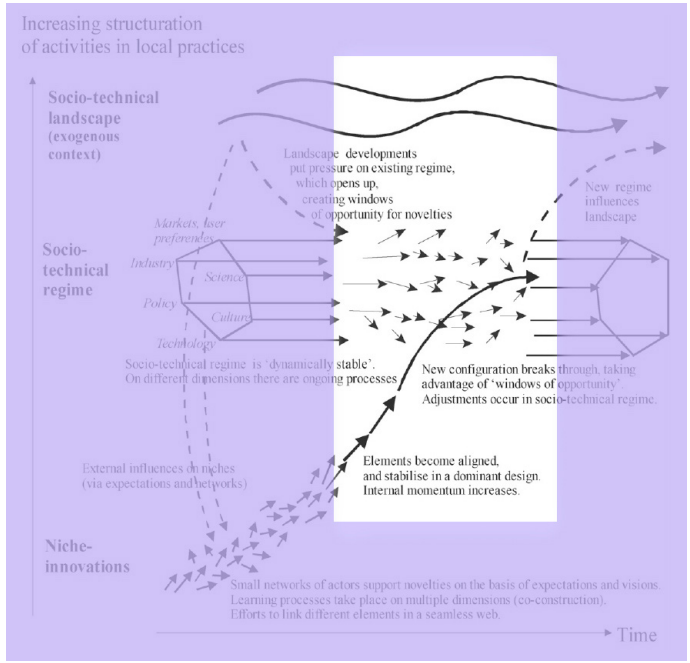


Figure 6.1 Opening of transition space over the course of a transition (adapted from Geels & Schot, 2007)

6.2 Introducing transition space

Transitions are a societal process of addressing persistent problems that can no longer be effectively addressed by (only) optimizing existing structures and practices within a societal (sub)system (Rotmans and Loorbach, 2010). Such complex societal systems are in open exchange with their environment and other systems, e.g., the energy system is embedded in the built environment and directly related to logistics and mobility; all are influenced by geopolitical, economic or demographic trends. Within such systems dominant routines, cultures and structures develop gradually to form so-called regimes. These regimes then create path-dependencies and are continuously adapted and improved through incremental innovations. A transition in such a system can be understood as a radical, structural change from one dominant regime to another that takes place when incumbent regimes are increasingly found to be problematic, and alternatives start to compete.

A regime is defined as the "dominant culture, structure and practices in a societal (sub)system" (van Raak, 2016). Transition scholars argue that in order for a transition to take place, the regime needs to open up or destabilize. Such regime destabilization can be caused by external shocks, internal structural problems and bottom-up innovations in niches (Rotmans & Loorbach, 2010). Thus, transitions are processes of simultaneous build-up of alternatives, and breaking-down of (parts of) the existing system (Loorbach et al., 2017).

6.2.1 Regime destabilisation

In times of relative stability, regimes form (more or less) coherent, self-stabilising constellations, meaning that minor perturbations will be incorporated within the regime, which remains dynamically stable over time (Berkhout et al, 2004). When a transition gains traction, a regime comes under increasing stress that might lead to regime destabilisation. Turnheim & Geels (2012; 2013), building on insights from industrial economics, evolutionary economics, neo-institutional theory, and management studies, and a historical case study of the decline of the British coal industry, understand regime destabilisation as resulting from three mutually reinforcing processes:

1. building up of external pressure, which can be both economic (i.e., shrinking or changing markets and supply problems, or competition from new technologies or players) and socio-political (e.g., changes in policy, public opinion, or protests from social movement); these pressures can lead to:
2. performance problems within the regime by undermining resource flows and legitimacy and trigger responses from actors enacting the regime; if pressures and performance problems persist:
3. actors losing commitment to regime elements, in turn exacerbating pressures and performance problems.

While the insights on regime destabilisation provide a sound starting point for our purposes here, we argue that holding on to the regime concept means it can describe such a shift up to halfway at best. New vocabulary is needed to describe the state of a system in between two regimes, i.e. in the midst of the shift from an old to a new regime. That such a system state exists is also implied in Geels & Schot's (2007) famous figure (Figure 6.1), but as of yet not explicitly conceptualised.

6.2.2 Transition space

We propose to conceptualise this phase of transition in between on old, destabilised regime and a new regime in the making as transition space. While a regime can be defined as the dominant culture, structure and practices in a societal (sub)system (Rotmans and Loorbach, 2010), in contrast transition space is defined by diversity in and misalignments between different cultures, structures and practices at the meso-level of a system. Given that current transitions literature provides few clues on this, transition space is inspired by anthropological studies into liminality (van Gennep, 1909; Turner, 1967; Thomassen, 2015) and the institutional void introduced by Hajer (2003) in institutional theory. Studies on liminality put the focus on the special character of the in-between. A situation that is neither old nor new, but in the midst of transformative change. The institutional void, while focusing on policy making, is characterized by an absence of the rules of the game. It is defined as a situation where "there are no generally accepted rules and norms according to which policy making and politics is to be conducted" (Hajer, 2003: 175).

In transition space both 'old' and 'new' practices co-exist and interconnect in unprecedented ways, new actor coalitions are formed in the process, and ongoing changes in rules and regulations as well as physical (infra)structures keep changing the systemic parameters within which actors operate, while these parameters are itself again influenced by strategic decisions of the actors involved.

The first pillar of the transition space concept is the absence of a dominant and aligned set of culture, structure and practices which makes transition space both extremely uncertain and volatile, as well as extremely fertile for transformative system change. This does not mean that all elements of the incumbent regime (suddenly) disappear, on the contrary, most of them will remain, but these elements are increasingly challenged by increasing landscape pressures and upcoming niches and become misaligned, i.e., the coherence between them dissolves, opening up the opportunity for radically different (re)combinations.

Transition space is at the same time unstructured and highly structuring, precisely because the lack of structure induces the need to build new structures. Given this lack of clear structures in transition space pushes agency to the forefront, because in such a context, the strategic decisions made by actors provide the foundations for new regime structures to emerge.

6.2.3. Incumbent agency in transition space

This coincides with a recent shift in attention in transitions literature towards the role of actors and their agency (see e.g., the special issue on this topic by Farla et al., 2012; Avelino & Wittmayer, 2016; De Haan & Rotmans, 2018). However, an ambiguous picture emerges: Smink et al (2013) and Geels (2014) find that incumbents tend to hamper change. Geels even goes so far as to claim that "regime stability is the outcome of active resistance by incumbent actors." (Geels, 2014: 23). Vleuten & Hogselius (2012) in their study of European liberalisation of energy markets challenge this view by showing that incumbent actors can also drive change. The work of Hengelaar (2017), Hengelaar & Bosman (2017) and Bosman et al. (2014) finds that actors might respond differently to transitional pressures and that these diverging strategies might lead to misalignments, or regime fragmentation (Karltorp & Sanden, 2012). Turnheim & Geels (2012; 2013) propose that in regime destabilization actors eventually lose their commitment to elements of the incumbent regime. This implies that they have been supporting the regime up to that point. Thus, albeit implicitly in Turnheim & Geels introduce a dynamic view on the position of incumbents.

This insight forms the second pillar of the transition space concept: it allows for (incumbent) actors to reposition over the course of a transition and posits that such repositioning is key to understand transformative change at the meso-level of a societal (sub)system. Destabilisation of an incumbent regime and the opening of transition space forces incumbent actors to reposition, abolishing certain activities that in light of an advancing transition are no longer worthwhile, while developing new activities that provide a better fit. This creates a positive feedback of (perceived) delegitimisation of a shared regime leading to diversifying strategies of actors within the regime that in turn add to the destabilisation and so on.

Building on existing transitions literature and socio-political theory, we introduce five dimensions by which (incumbent) actors influence and shape their context. These dimensions allow to describe the nature of agency through with actors produce, maintain or destruct cultures, structures and practices in a given system:

- *Discourse*: actors' problem orientations and expectations for the future of the system (Hajer, 1995; Bosman et al., 2014);
- *Roles and relations*: "shared conceptions of interactions and relations between actors within a particular community" (Wittmayer, 2016);
- *Institutions*: the formal and informal rules governing behaviour (Scott, 1995)
- Resources: supplies that can be mobilized by actors to achieve certain goals (Avelino, 2011), specifically we focus on time and money.
- *Practices*: the routinized daily activities carried out in the organisation (Giddens, 1984)

Mapping activities in these five dimensions allows us to describe how actors interact with a changing context, which strategic decisions they make in anticipation and how that again influences the transition. We propose that when these dimensions are aligned across different actors in a sector, the result is a stable regime. When they become misaligned, for example because actors divert resources from traditional to new technologies, or when they develop new networks outside of the incumbent ones, this might lead to opening of transition space. Thus, transition space can be described from an actor perspective as misalignments in discourse, roles & relations, resources, institutions, and practices. As such an image can be developed of how an (incumbent) organisation navigates transition space.

The aim of this research is to gain a better understanding of transition space from the view of grid operator Alliander, how Alliander deals with and navigates the volatility characteristic of transition space and how discourse, institutions, relations, resources and practices play a role in that. Furthermore, we are interested in how transition space influences internal dynamics and strategic choices of the organisation, which departments come under pressure, and where does resistance arise? Based on this we aim to gain a better understanding of how incumbent actors' agency and transition space mutually constitute and influence each other.

6.3 Methodology: organisational ethnography

This research applied ethnographical methods as developed in the field of anthropology and organizational ethnography in particular (Ybema et al., 2009). Ethnography starts from the idea that gaining a deep understanding of organizations, the people working there and their activities and sense making processes, requires being 'in the field', spending time with and working alongside the people carrying out the activities of interest. The researcher becomes a student of the world he or she visits and strives to uncover the 'native's point of view' (Hammersley and Atkinson 1995, in: van Hulst, 2008). What differentiates ethnographic research from other research strategies is being physically present in places where people carry out their daily activities and meaning making processes. This allows observing phenomena of interest first hand and from close by. As such, it might allow access to all kinds of data that are otherwise inaccessible to outsiders, including informal or embargoed documents, closed meetings and lunch and coffee machine conversations. Furthermore, ethnographic fieldwork is very suitable to study processes which are unfolding as we speak, such as the energy transition. What makes ethnographic fieldwork both challenging and interesting is that unforeseen things can happen in the field that lead to new insights and research leads to trace further. As such, it requires flexibility of the researcher and research design.

6.3.1 Methods: interviews, participant observation and coffee machine conversations

Case

This research focuses on grid operator Alliander, the largest distribution grid operator in the Netherlands, managing electricity, natural gas and (some) telecom infrastructure (see Figure 6.2). Alliander shows itself as an organisation in search of a new role in the context of the societal energy transition and its associated goals. It is therefore a good case of an incumbent that proactively plays into transition space. It is developing several new business units that play a role in shaping a sustainable energy system and at the same time it announced to phase out natural gas in the built environment. As Alliander serves about 3 million households and the use of natural gas in the built environment (heating, cooking, hot water) makes up about 30% of total Dutch energy use (RLI, 2015) this is quite a significant move. At the time of this writing, Liander, the regulated branch of Alliander responsible for its grid operations, is working towards operationalising and implementing its new strategy.

The main data gathering efforts took place during a six month research placement with the Strategy & Innovation department of Asset Management at Liander, the regulated branch of Alliander operating its grid infrastructure. Asset Management is responsible for the management and long- term planning of the electricity and gas grids. The Strategy & Innovation department forms the linking pin between the organisation's overall strategic direction which is being formed at the Alliander group strategy department, and the actual grid management for which asset management is responsible. Figure 6.3 depicts the organisation's organogram.

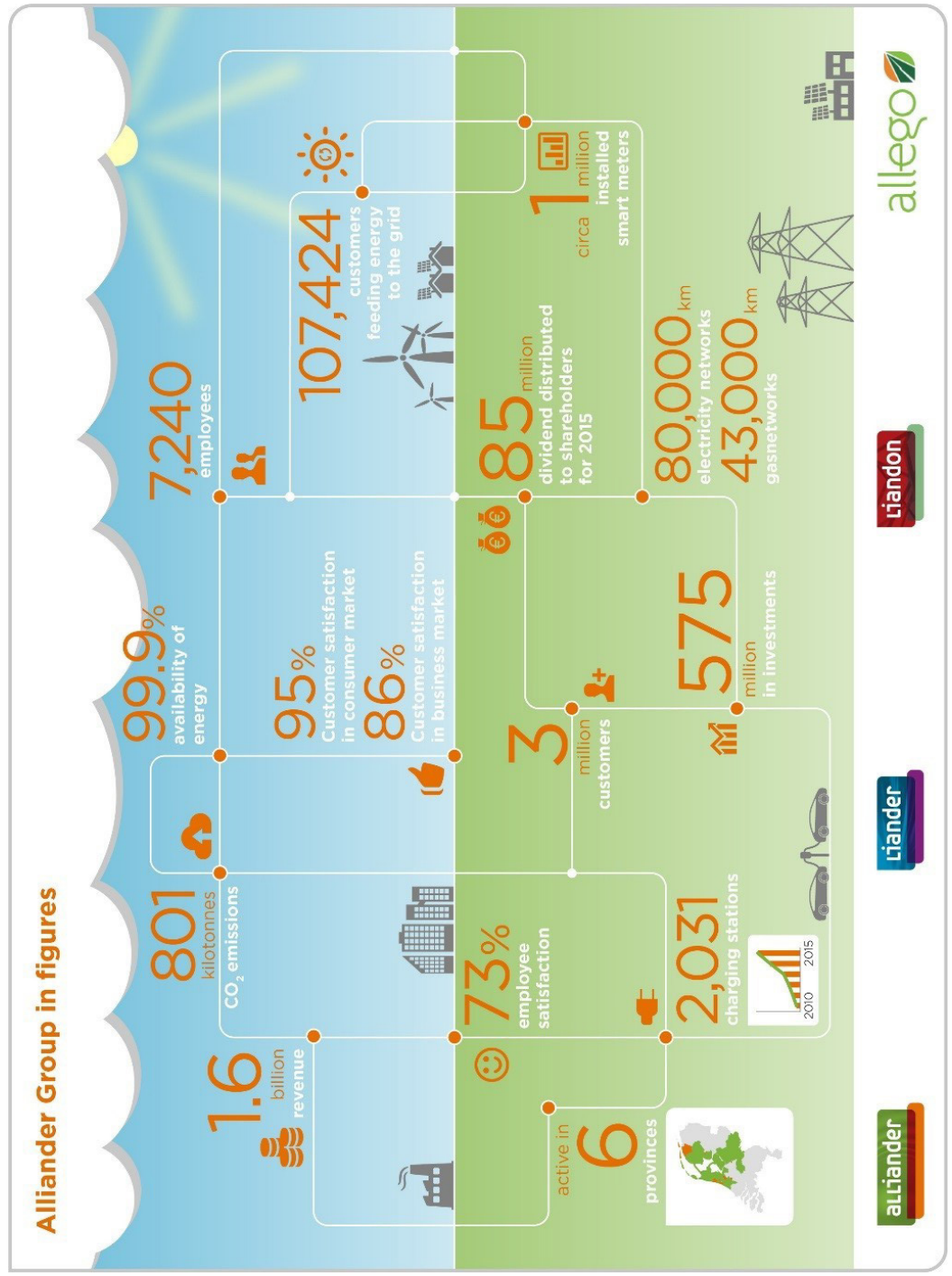


Figure 6.2 Alliander company profile (Alliander, 2016)

Figure 6.3 Alliander Organisational Chart

Access to the field

An important issue in ethnographic research is access to the field, as this influences how the researcher enters and what can or cannot be observed. In the following we detail how the first author established contact and gained access. Alliander is a partner in the TRAPESES research project of which this Chapter forms part. In May 2015 a meeting was set up between the research team and several interested Alliander employees to further explore potential cooperation. During this meeting the first author pitched his research interests in destabilisation, which sparked discussion about the future role of natural gas in the Dutch energy system. It became clear that a team within Alliander was working on how to abolish natural gas in the Dutch energy system. A telephone meeting was organised between the first author and a senior strategist responsible for the natural gas and heating strategy within Liander to explore the possibilities of a research internship. It turned out that the strategist and his team were in the midst of highly interesting developments from the theoretical perspective of the research. The strategist in turn became enthusiastic about the idea to have an outsider reflecting on the delicate process of developing and implementing the new natural gas and heating strategy.
A starting note was drafted to outline the goals, approach and practical issues concerning the research internship. As such, a research placement was agreed between September 2016 and February 2017 with the Strategy & Innovation department of Liander Asset Management.

Data generation procedure

As outlined above data generation actually already started in initial discussions with Alliander in preparing the TRAPESES research project. These discussions yielded valuable insights on how the grid operator tries to make sense of and strategize in the energy transition. As we are interested in how Alliander is repositioning in the energy transition, we focus on those departments that have decision making power and are able to influence the positioning of Alliander vis-à-vis its environment. As such, the Strategy & Innovation department formed an appropriate starting point and the core empirical work is centred around the research internship at this department. This means that the main contact person, responsible for the gas and heating strategy functions as key contact and 'gate opener' within Alliander. Through this liaison the first author came in contact with the relevant people within and outside Alliander and internal discussion groups and meetings related to the topic. Furthermore, we expected from the outset that the changes, as envisaged in the new gas and heating strategy, will not be uncontested within the organisation. As such, we made an effort to also include the counter voices and resistance and also uncover the challenges and tensions arising from navigating transition space. On the first day of the research internship, it became clear that the organisation's intranet is a valuable resource for data. It provides internal organogram's which help in navigating the quite substantial organisation (over 7000 employees) and provides a platform for employees and board members to voice their ideas and concerns. Especially identifying employees with a critical voice was done with the help of the intranet.

Data sources

In generating data, the first author aimed to collect all information he came across with relevance for Alliander's positioning vis-à-vis its changing environment, including:

- (Internal) documents, such as annual reports, strategy documents, working documents, (formal) minutes of meetings, and e-mail conversations;
- Field notes of participant observation in events and meetings attended (see Appendix 2 for an overview). This extensive note taking resulted in about 8 – 16 pages of typed text for each day in the field. Two types of notes are distinguished: 1. A factual description of observations, including notes related to the setting in which meetings take place, the agenda, people attending, the things being said and the nature of interaction. 2. Notes relating to impressions, reflections and questions that certain observations raise.
- Field notes of informal (telephone) conversations. The benefit of 'being there' is that it allows for many occasions to talk to respondents in a more informal setting; over lunch, at the coffee machine, in the hallway after a meeting or during after-work drinks. These opportunities have been engaged in as much as possible, and notes have been taken in the research diary as soon as possible after the informal chat. The same goes for telephone conversations with respondents.
- Interview notes and transcripts. The first author has interviewed 27 people throughout different departments of Alliander (see Annex 6.1 for an overview). The respondents were identified through snowballing starting from the first contact persons. The following selection criteria were used in order to have as diverse input as possible:
    - » Employees responsible or otherwise involved in development or implementation of the new heating- and gas strategy;
    - » Employees operating on the intersection of 'outside' and 'inside' the organisation, e.g., strategy and communication departments;
    - » Employees of departments that are influenced by the new strategy;
    - » Employees that question or challenge the new strategy.

These semi-structured interviews were carried out according to the interview guideline provided in Appendix 3. Where possible, interviews were recorded and relevant parts were transcribed. In few instances, I decided not to record since he judged that it would influence or inhibit the respondent to speak freely, especially regarding sensitive topics. In such situations, I recorded extensive interview notes and took some time to reflect and write down any considerations regarding the interview in the research diary directly afterwards.

Data analysis

The data were analysed both inductively, analysing which categories and developments appeared relevant after careful studying of the data, given our research question and aims and deductively, using the five dimensions of incumbent repositioning and the misalignments and tensions one can expect in transition space. Sensitising concepts from the transition space framework are uncertainties, misalignments and tensions between the studied incumbent and its environment.

Of particular interest were clashes between actors and or the government and caveats between (former) alliances and (internal) reports and presentations that outline Alliander's outlook on the future of the energy system and its role in that. The five dimensions of incumbent repositioning were used to analyse Alliander's repositioning efforts in detail. The results of the analysis are given in the following sections.

6.4 Findings

The main organisation in the Alliander group is the actual grid operator Liander, which operates in the regulated domain. Liander's main strategic goals are 'operational excellence' and the energy transition, which Liander, other than Alliander's decentralized focus, understands in terms of CO_2-reduction. Furthermore, Liander has embraced a phase out of natural gas as one of its key focus areas (see figure 6.5). In anticipating this strategic direction, it is developing partnerships with other grid operators, municipalities and local energy initiatives. The Manifesto 'Getting started with living without natural gas' which Alliander prepared with 100 societal partners and presented to the prime minister at the National Climate Summit in October 2016 provides a good example. It is also telling that the text had been changed on instigation of one of the contacts at Liander to include the 'natural' before 'gas' in the title and body of the text, thereby leaving open options for other gaseous substances and thus the existing gas grid to play a role in future heating solutions. Liander is characterized by a high level of compartmentalization, specialisation and standardization. The whole chain from initiating a plan for a new gas or electricity grid to engineering, development and construction is cut up into small pieces of clearly delineated work. For every piece a different department or team is responsible. Operational excellence in this context means foremost streamlining, optimizing, and protocolizing each step in the chain. In this way Liander operations connected a record number of new gas grid connections in 2016. The record was set mostly because construction picked up again after the recession and Liander was obliged by law until the end of 2017 to connect every request (interview 21).

In its vision Alliander outlines the changes in the energy system facing the organisation and the strategic directions it pursues in response (see Figure 6.4). What is striking is the rather decentralized future Alliander sees for the energy system. This is reflected in the new role it sees for itself as 'developing and optimising local energy systems'. The characteristics of Liander's operation are increasingly experienced as problematic in the energy transition, because it presents challenges and changes at every step in the operating chain. Actually, the whole chain comes into question, when energy systems will be organised at area / neighbourhood level in an integrated way, as envisaged by the new Alliander strategy, because it would require tailored solutions for every neighbourhood.

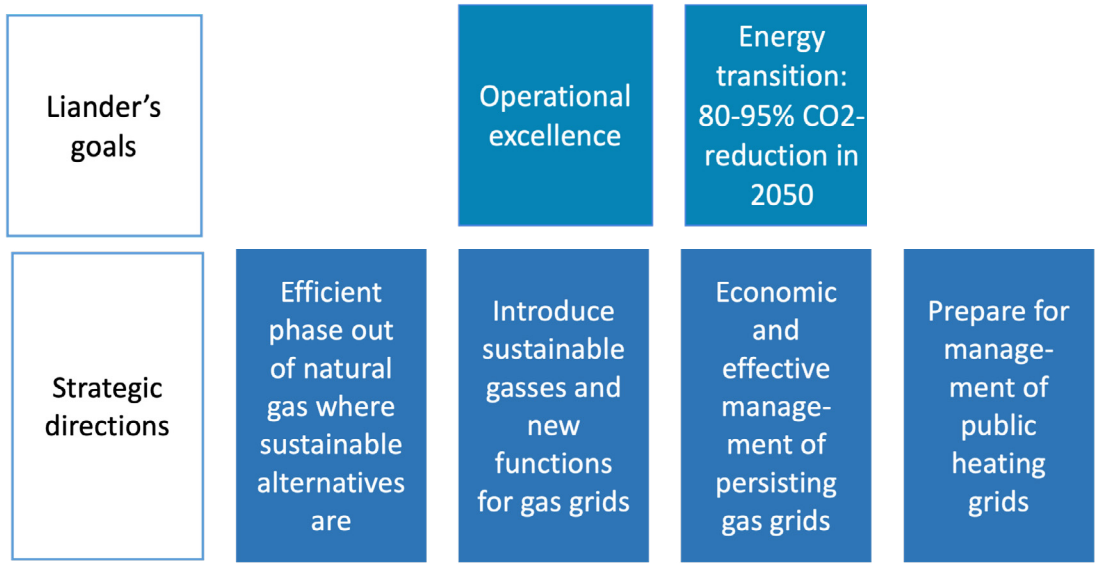


Figure 6.5 Goals and strategic directions for Liander (Liander Strategic Asset Management Plan, 2016

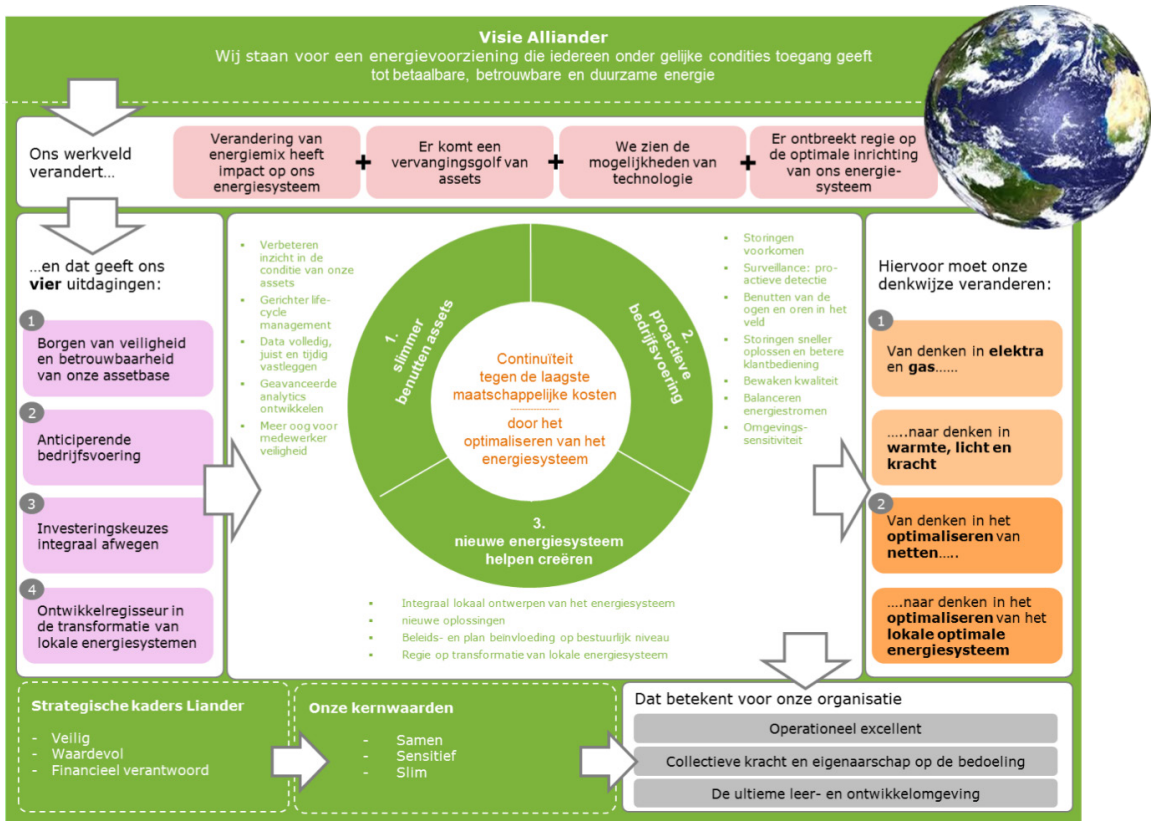


Figure 6.4 Alliander Strategic challenges, vision and mission (internal document in Dutch)

6.4.1 Organising in the context of systemic uncertainties and opportunities

An important part of Alliander's anticipation of the energy transition is its emerging business areas (EBA) strategy:

> *"Over the next ten years, our way of living, working and travelling is set to undergo major changes. Alongside our work as a network manager, we are also making targeted investments in for example electrically driven transport, sustainable spatial planning and sustainable living. By looking ahead, we can help society address both current energy challenges and adjust our networks in time to the energy needs of the future."* (Alliander, 2018a)

In 2017, seven EBAs are active, such as Alliander Sustainable Area Development (DGO), which co-creates smart energy solutions tailored to local needs and BackHoom which helps residents to make their homes more sustainable. Then there is Allego, an Electric Vehicle charging service company, which used to be an EBA, but has outgrown this status and now operates as a separate entity under the umbrella of the Alliander group (Alliander 2018b).
Alliander developed its EBA strategy in order to build up knowledge, competences and roles that it deems relevant for a future energy system. It is interesting to note that these new developments are consciously organised outside of the existing regulated business in order to avoid the bureaucracy and inertia characteristic of large organisations (interview 13).

Furthermore, with the EBA strategy Alliander challenges both itself and the broader energy market. Within Liander repeatedly some animosity and competition were observed regarding the EBAs. The clearest example is that within Liander at one point, employees of Sustainable Area Development (DGO) were branded as 'cowboys', because they tend to take a more opportunistic approach than the people within Liander. Furthermore, Liander's asset managers worry about whether their existing gas grids are represented adequately, with the appropriate write off periods, in the models DGO uses to plan new sustainable heating solutions for neighbourhoods.

6.4.2 Renegotiating the boundaries of the (regulated) energy market

With regards to the broader energy market, Alliander is fighting several battles, some even in court, with traditional energy companies over whether its EBAs intrude on the liberalised energy market. The main objection of these companies is that the EBAs pose unfair competition because they are backed by a natural monopoly on energy grid infrastructure and use its revenues to fund their commercial activities (FD, 2017). In response Alliander claims that it is developing new initiatives which are needed for the energy transition that the market is not (yet) picking up by itself. As such, it aims to catalyse the energy transition, also claiming to be willing to sell off new business as soon as they become economically viable independently. These issues also play out in drafting the 'Law Accelerating the Energy Transition', which provides the legal framework detailing the roles different actors can take in the changing Dutch energy system. It has been adopted on 30th of January 2018 after repeated delays, partly because of the dialectic between entrepreneurial grid operators and traditional energy companies.[1]

1 See also the public hearing for the Law Accelerating the Energy Transition (Wet Versnelling van de Energietransitie) on the 17th of January 2017 to which Alliander also contributed a critical position paper together with other DSOs

6.4.3 Dealing with uncertainty

The energy transition creates a great deal of uncertainty for (Al)liander, as it is unclear what the future will bring. This quote captures this uncertainty best:

> *"We just don't know. And we can substantiate that we don't know with about 500 reports that contradict each other. We wrote this down in our IT-vision. That is the toughest thing to do as a strategist, but also the most honest."* (interview 17)

There seem to be two (opposing?) trends within Liander to deal with the uncertainties that a changing energy domain bring. The first approach is to bring in data and data-analytics to get a grip on a changing future. The role of IT and data-driven grid management solutions is growing rapidly and gaining importance within the company (interview 7). Others think that this is an ill-founded approach, because it provides a false sense of security in the context of a transition (interview 1). This stream tends to put more emphasis on experimentation and learning-by-doing along the way as a strategy to deal with such fundamental uncertainty. However, this approach is a hard sell, in an organisation focussed on grid management.

6.4.2 Strategic gap

As such, the distance between the strategy departments (I found three of them: Alliander Strategy, Strategy & Innovation of Liander Asset Management, Strategy & Environment of Liander Customer & Market) and the operations seemed rather large. The most tangible evidence for the distance between strategy and operations is that starting from the Strategy & Innovation department it was rather easy to come into contact with other strategists in the organisation, but it proved quite challenging to develop contacts in operations. The only lead was a former trainee from the department now active in operations. A peculiar career move, because most jobs in operations are at vocational level, while trainees, like strategists, are often educated at university level. However, in the end for the energy transition to be implemented, fundamental changes at operations level are needed. In addition to the rather linear top-down innovation diffusion process, bottom-up deviating from standard practices within the operations department might be another way to realize innovation more directly.

During my research placement at (Al)liander I only found one such example: A young engineer team leader, also a former trainee, received a request to develop a gas grid to connect a new upper-class neighbourhood in the town of Heiloo. The developer of this 'sustainable' neighbourhood installed heat pumps for heating the houses, but promised his buyers that they could still cook on gas. Liander's engineer, with knowledge about the energy transition gained in his traineeship in mind, refused to develop a new gas grid, only for cooking purposes, thereby going against existing practice, protocols and regulations. The developer disagreed and the project was escalated to decision makers within Liander's operations and asset management. They stood by their engineer and told the developer 'no'. While the case was known to several people within the Strategy and Innovation department, they seemed to underestimate the importance of this feat. Where they organise innovation sprints to diffuse new technological innovations throughout the organisation, the new practices this engineer has developed don't receive any follow-up (interview 24). An effort could have been made to diffuse these as the new best practices within operations.

6.4.3 Lost in translation

I learned at the Groot Werkoverleg Cluster West, a meeting of engineers working in the North-West of the Netherlands, that the engineers first heard about their organisation's plans for the natural gas phase-out through the national news, in which the plans were announced. Only several weeks after, Liander's director construction explained the developments at the engineer's meeting, in his presentation stressing the external developments leading to this decision, while paying little attention to the proactive role Alliander itself played in coming to this decision.

The announced plans immediately led to uncertainty and questions about the gas engineers' jobs. Will they still be needed when Alliander phases out natural gas? An example is a young engineer I encountered at the 'Groot Werkoverleg Cluster West' meeting. He started at Liander as a mechanic and moved up to an engineering position. Currently, he is following a training programme in gas technology that he finds quite challenging and puts in a lot of effort. After today's announcements that his organisation is phasing out natural gas, he doubts whether he should continue this education. Other engineers at the meeting are less worried, they think the phase out will take quite some time, and that they will get different work in the meantime, as an example they refer to a biogas upgrade unit they recently built in Purmerend. Other than some engineers, most strategists think that developing the alternatives to natural gas require much more work, so rather than people losing jobs, they would actually need much more people.

Communication about the transition strategy comes across as fragmented and ad-hoc, without a clear idea on whether and how to involve the employees in the organisation on these quite fundamental challenges. This view is confirmed in several interviews. For example, a team leader of engineers compares Alliander's strategy to moving houses: "The boxes were arranged, a moving truck, new furniture, but nobody thought about how this move will impact the people and how they feel about it. The same thing is now happening with the energy transition" (Interview 26). A consistent narrative about how the transition unfolds and what it means for the organisation is lacking so far. This poses especially challenging for middle management that has to deal with real fears of those they are responsible for (interview 15).

A similar pattern can be observed with regards to Human Resources. The Director of Human Resources explains that as of yet there is no idea of the kind of skills that are necessary for the energy transition and no education plan to make sure that employees develop the necessary new skills. He explains that 95% of efforts are directed at the existing energy system, the energy transition plays only a marginal although growing role (interview 22).

6.4.4 Converts

In the field, I encountered several self-proclaimed 'gasmen' who went through a kind of conversion. The converted gasmen have worked in natural gas all their life but have over time come to believe that the end of natural gas is inevitable. Different insights have contributed to their 'conversion'. Climate change and the earthquakes resulting from natural gas production in the Northern Province of Groningen are cited as playing a role. One of them reckons that a workshop series in which they had to envisage a neighbourhood without natural gas heating was crucial. While at first the general attitude of the participants in the workshop was: *"why should we? That is unrealistic"*, over the course of the workshop series their views changed (interview 1).

A close colleague, also a long timer in gas, reflects over lunch that his 'turning point' was devastating feedback from Alliander's CEO on a position paper on the role of natural gas and the gas grid that he prepared together with another colleague in 2014. The CEO told them they were looking at the energy transition from the point of view of natural gas. If they wanted to fairly assess its role, they should take more distance.

Their conversion puts these gasmen in a challenging and interesting position at the same time. This became particularly clear to me at a meeting of the International Gas Union in The Hague, which Alliander co-hosted. Foreign colleagues found it hard to fathom what is happening in the Netherlands with regards to the phase out of natural gas. They marvel at the country's great gas infrastructure that delivers 'cheap and clean' natural gas to 98% of Dutch households and powers a large part of industrial activities. At the same time, these converted 'gasmen' are respected members of the natural gas community. As such, their conversion might play an important role in the transition. It makes quite a difference whether Greenpeace says we need to phase out natural gas, or whether it is a 'gasman' who has worked in gas all his life bringing this message.

6.4.5 Resistance

Next to the converts, I encountered a number of employees working in gas that are annoyed by the new strategy. One of them has written a blogpost on the companies' intranet as the 'Gasgeus'[2], detailing his grievances with his organisation's new direction. His post sparked quite some discussion and is seen as representative for a broader sentiment within the organisation. Interviewing this 'Gasgeus' yields a picture of a very passionate and involved employee. He runs an under the radar gaslab where several tests and innovations have been developed, including a new biogas upgrading station (GOS). He agrees with the need for an energy transition, but still sees a role for gaseous substances in a different future. In general, he feels set aside by higher echelons within the organisation who tend the disregard or even attack the role of (natural) gas (interview 19).

More broadly 'gaspeople' within the organisation sometimes feel neglected or at a disadvantage compared to their colleagues working on electricity. At some point, a historical dimension to this animosity was discovered when we went for lunch in a luxurious old building on the Arnhem energy campus. When the first author marvelled at the detailed ornaments in the building, one of the companions explained that this used to be the headquarters for the electricity gentleman and that the people working with gas, also known as the gas farmers, were tucked away in a remote part of the campus. Historically, those working with electricity were the better educated and better paid within the grid operations. One can study electrical engineering at university level, but there is no university equivalent of gas technology. In general gas technology is simpler and less high tech and therefore also more reliable and robust, than electrical technology. Current emphasis on all-electric solutions and disregard of gaseous solutions in the energy transition might echo this historical distinction between electricity gentleman vs gas farmers.

---

2 Geus is a reference to a historical Dutch resistance movement (cf. https://en.wikipedia.org/wiki/Geuzen)

6.5 Synthesis and reflections

The main research question underlying this study was:

How does a change-minded incumbent navigate transition space?

In order to answer this question, in this section we synthesise what transition space looks like from the perspective of Alliander and how the organisation is repositioning in order to try to navigate this volatile context.

6.5.1 Alliander into transition space

Transition space is characterized by uncertainty, volatility, tensions and misalignments between actors and their environment. Such, misalignments in relation to Alliander's environment were found in particular in two domains. First of all, the discursive understanding of the energy transition, where Alliander is promoting a radically different energy future based on local solutions and involvement of stakeholders, while other stakeholders, in particular the TSOs and traditional energy companies portray a more centralized vision for a sustainable future in which for example offshore wind and large international interconnections play an important role. This also means that Alliander is increasingly partnering and aligning with other stakeholders outside of the traditional energy domain, including local energy initiatives and housing corporations. This clash in visions for the future energy system becomes increasingly tangible in relation to institutions and institutional work Alliander engages in to help materialize its vision for the future.

Another misalignment, which runs both within the organisation as well as outside it, is the discussion whether the problem is the gas grid, or whether it is the fuel natural gas. Whereas the general understanding of natural gas phase out, includes a phase out of the gas grid, more nuanced voices within the organisation make a distinction between the fuel and the infrastructure. Focussing on the fuel as the problem, instead of the grid as a whole, leaves open several options to reuse or adapt the grid for other fuels or purposes. A case in point is the (successful) lobby by Liander to change the wording in the Manifesto from 'gas' to 'natural gas'. This rather subtle change might have large implications, because it leaves open options for other gaseous substances to be used instead of natural gas, and thus for existing infrastructure to remain in place and be used differently.

An interesting finding is that transition space runs also right through the organisation itself, where parts are still clinging to their institutionalized role where other parts are proactively embracing change. The most striking tensions I found within the organisation were between discourse at the strategic level and daily practice in the operations department. While the strategic discourse proposes to exit from natural gas, operations in 2016 set a record of new gas grid connections of the last 5 years. This tension increasingly led to frictions within the organisation, lobby for adaptation of existing regulations and the emergence of alternative practices within operations to bridge this gap.

Furthermore, I observed misalignments between existing more traditional discourse, roles and practices and new ones emerging in the organisation. The traditional understanding of Liander as a grid operator, with its role in managing energy infrastructure and the very detailed, differentiated and specialized practice of developing and managing grids seems to be increasingly at odds with the new understanding of Alliander as a sustainable area developer, managing the transition towards sustainable energy solutions at neighbourhood level in co-creation with local stakeholders. Within the organisation, it is slowly being realized that such a new role requires fundamentally different skills than the more traditional role. Alliander seeks to develop these skills partly through its EBAs, outside of the traditional regulated domain, and partly Liander is attracting new people with different skillsets, such as the so-called 'gebiedsregisseurs' (area directors). At the same time, this results in tensions between Liander and some of the EBAs. Also, if the EBAs explore Liander's future, one would expect to come across efforts to learn from their experiences. However, few deliberate learning feedbacks were observed between Liander and the EBAs.

6.5.2 Alliander's repositioning

Discourse

In terms of discourse, we found two developments of interest. First, we observed differences in discourse on the substance of the energy transition and its preferred direction. The more traditional storyline frames the transition predominantly in terms of the climate problem and sees reducing CO_2-emissions as the main challenge. The other and newer storyline focusses on co-creating sustainable energy solutions with local stakeholders. Also, in terms of sense of urgency of the energy transition striking differences were found. One group of respondents shows a high degree of urgency claiming that the transition should happen pretty much yesterday, while others hold the view that (Al)liander is moving in the right direction but that such changes take time. One would expect such discursive diversity in transition space, but now I also find it within Alliander.

Institutions

With regard to formal institutions, we again highlight two developments of interest. The first relates to the misalignments arising between (Al)liander's changing direction and existing rules and regulations, such as the obligation to connect customers to the gas grid and the decreed writing off periods of 40 years for these grids. Furthermore, we observe that (Al)liander is not passively undergoing changes in regulations, but itself lobbies actively. Two lobbying activities stand out: (Al)liander played a pivotal role in changing the 'obligation to connect' to the gas grid into a 'right to heat' in Dutch energy law.
This change was important to Alliander in order to have regulatory backing when it refuses to connect customers to the natural gas grid; Alliander lobbies to become preferred operator of heating grids, which are currently predominantly operated by private energy companies. The fact that the lobby to change the energy law was successful could be read as an indicator for the institutional flexibility one would expect in transition space.

Relations & roles

An important observation emerging from the strategy documents of Alliander is the shift in role from a 'pipeline factory' as one of the respondents put it (interview 5), to sustainable area developer in co-creation with local stakeholders. Such a fundamental change in roles goes together with changes in relations with other stakeholders in the energy domain. It becomes clear that Alliander, next to its existing relations with shareholders (municipalities) and customers (energy users), is actively building new alliances with community energy initiatives, sustainable NGOs and building owners, such as housing corporations.

Furthermore, Alliander's repositioning also leads to increasing tensions with traditional energy companies over the boundaries of the regulated domain. A public hearing around the new energy law, as discussed in Section 6.3.2, makes this tangible. Alliander, and especially its EBAs, are testing these boundaries in several cases, with developing charging stations for electric vehicles for example. Energy companies claim that such activities belong to the 'free' market domain, and not to the regulated domain, therefore Alliander should not engage in such activities. Furthermore, the public hearing also shows a gap opening between the DSOs (distribution system operators, such as Alliander) and the TSOs (transmission system operators, TenneT and GasUnie). Where the TSOs take a more centralized take on the energy transition, seeing a large role for international interconnections, the DSOs emphasise local solutions and engagement.

Such forging of new and unexpected alliances and the increasing strain in old partnerships is what one would expect in transition space.

Resources

In terms of how resources are directed in the organisation, in particular human and financial resources, we observe that this dimension has not fleshed out yet. The HR Director explains that, although they are increasingly preparing their employees for the energy transition, currently approximately 95% of jobs are directed at running the existing system (business as usual), while only 5% are directed at exploring and preparing for a new role. Furthermore, we observed a gap in understanding the potential impact of the energy transition between operational personnel on the one hand, who are afraid they will lose their jobs when Alliander exits from natural gas, and strategists on the other, who expect much more work needs to be done in developing new energy infrastructure, such as heating grids.

In terms of financial resources, figure 6.6 gives an overview of how investments are directed. A clear upward trend is visible with regards to investments aimed at radical innovation for the energy transition. This underlines the expectation that in transition space additional resources become available for sustainable niche-technologies and practices.

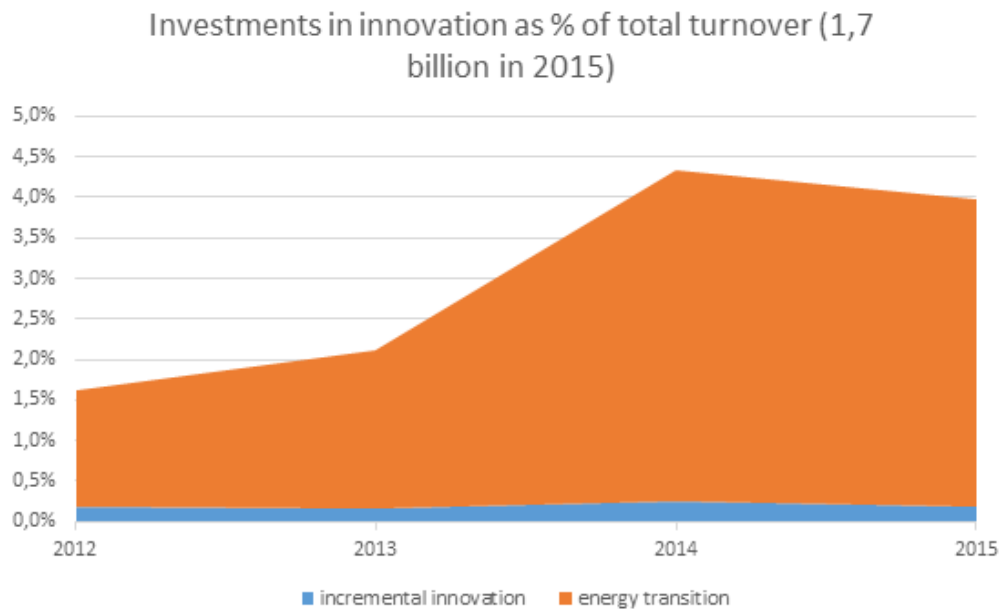


Figure 6.6 Investments in innovation (Based on internal document)

Practices

In terms of practices, we observed that there is a clear division of tasks within Alliander, where the new practices are developed mostly in the Emerging Business Areas (EBAs). These new businesses have deliberately been put at arm's length from the traditional regulated operations. Within the regulated grid operator Liander, different departments are working on developing a neighbourhood approach, to help neighbourhoods change their energy systems from natural gas dominated to other energy sources. These approaches are still in experimental form, they have not yet led to routinized practices within the grid operator. In the operations department, focus on efficiency in its traditional role dominates. We did come across one instance of experimentation with changing practices, such as the new Oostzaan neighbourhood in Heiloo. The Liander engineer responsible for this project refused to put in a gas grid, because this was not in line with his understanding of the energy transition. Although this went against existing regulations and practices within Liander, it was accepted by the project developer after some discussion. There were no plans or initiatives within Alliander to standardize this deviating practice for all engineers, however.

6.6 Conclusions and directions for further research

In this Chapter we introduced the transition space framework to conceptualize the space in between an 'old' destabilised regime and new regime in the making. We illustrate our framework from the perspective of grid operator Alliander that is currently navigating this highly volatile context. While our analysis is still ongoing at the moment of writing, our ethnographic research suggests that although Alliander is a regime player in the sense that its grid infrastructure forms a central part of the traditional energy system, its activities and strategic decisions do not conform to the active resistance to change that current transition's literature supposes for actors operating within a regime context. While indeed a large part of the organisation is still directed at managing existing infrastructure, it is also actively developing new activities directed at anticipating and accelerating the energy transition, as well as preparing a phase out of part of its business which it has come to consider unsustainable.

Reflecting on Alliander's repositioning efforts using the transition space framework, several findings stand out:

- Navigating transition space opens up opportunities for institutional change and new relations and roles vis a vis niches, as well as friction with existing discourse, roles, relations and practices both within the organisation and in relation to its environment;
- Diversity and misalignments could be found in all five dimensions, most notably between discourse at strategic level and operation's practice;
- Parting from existing activities seems to start discursively "exit from natural gas in 2050", actual phase out of practices follows later on. This suggests an ordering in changes in the repositioning dimensions over time: Discourse --> relations --> institutions --> resources --> practices

Our previous research has indicated that the transition space concept is useful to capture current volatility of the Dutch energy system from an analytical point of view. In the present study, we again have recognised transition space, but now from the perspective of an incumbent in the midst of a process of repositioning. The five dimensions that we used to characterise Alliander's relations to the system helped us recognise elements of transition space in Alliander's organisation, resource allocation, relational networks, institutional efforts, and internal discursive strive. Describing transition space from the perspective of grid operator Alliander, proves a fruitful way of better understanding the nature of transition space and the tensions, challenges and opportunities that navigating this space presents to a change-minded incumbent. At the same time, it becomes clear that the challenges that navigating transition space brings, run right through the organisation.
As such, the volatility and ambiguity characteristic of transition space became clear in internal tensions, challenges and opportunities within Alliander.

Furthermore, the research seems to indicate that the transition space concept and in particular the five dimensions of incumbent repositioning allows for a more nuanced description of the role of incumbents in absence of the stabilising effects of a regime. While in MLP-inspired studies actors and their activities are often abstract, here the focus is on an in-depth case study of an actor repositioning under transitional pressures. Using the five dimensions of incumbent repositioning a detailed analysis

could be made of its efforts to navigate transition space and the tensions and challenges and opportunities that brings.

While we also explore transition space discursively through a newspaper analysis elsewhere (Bosman et al., forthcoming), we argue that taking an actor perspective to explore this concept is sensible, since the diversity in and misalignments of structures characterizing transition space, puts agency at the forefront. While one can expect that some activities related to fossil fuels might cease to exist over the course of the energy transition, existing grids are generally perceived as still playing a role in a future energy system, as such grid operators play an interesting role in this phase of the energy transition. The strategic decisions such actors are currently taking are pivotal, because they decide on the phase out of certain elements of the old regime, which impacts activities of actors throughout the system[3], while simultaneously contributing to the foundations of a new regime in the making. As such, more research is needed in order to validate the transition space concept. And, while our research took an ethnographic approach, observing the phenomena of interest unfolding, further research might shed light on whether the transition space concept might also be used to support (incumbent) actors to navigate a highly volatile context in line with the goals of transition management.

3 e.g. if Alliander, serving 3 million households, decides not to distribute natural gas anymore, this influences that business model and possibilities of other actors as well

Acknowledgements

We are thankful for funding this research to the Netherlands Organisation for Scientific Research (NWO) under the "TRAPESES" research programme (2014–2018) (408-13-029). Furthermore, we are thankful to Alliander for making the research internship possible. A special thanks goes to Elbert Huijzer and Martijn Bongaerts. An earlier version of this Chapter has been presented at the 3rd Network of Early Career Researchers in Sustainability Transition (NEST) conference at Utrecht University 15 and 16 of March 2018 and the International Sustainability Transitions (IST) conference at Manchester University 11 to 14th of June 2018. We'd like to thank participants for their valuable comments, in particular Mara van Welie, Michael Kriegbaum, Tyson Weaver and Frank Geels.

References

- Alliander (2016) Company profile. Available online: https://www.alliander.com/en/about-alliander/company-profile accessed 22-09-2016
- Alliander (2018a) New Markets. Available online: https://www.alliander.com/en/our-activities/new-markets accessed 04-05-2018
- Alliander (2018b) Allego. Available online: https://www.alliander.com/en/our-activities/start-ups/allego accessed 02-05-2018
- Avelino, F. (2011). Power in transition: empowering discourses on sustainability transitions (Doctoral dissertation, Faculty of Social Sciences, Erasmus University Rotterdam).
- Avelino, F., & Wittmayer, J. M. (2016). Shifting power relations in sustainability transitions: a multi-actor perspective. Journal of Environmental Policy & Planning, 18(5), 628-649.
- Berkhout, F., Smith, A., & Stirling, A. (2004). Socio-technological regimes and transition contexts. System innovation and the transition to sustainability: theory, evidence and policy. Edward Elgar, Cheltenham, 48-75.
- Bosman, R., Loorbach, D., Frantzeskaki, N., Pistorius, T., (2014). Discursive regime dynamics in the Dutch energy transition. Environ. Innovation Soc. Transitions (2014), http://dx.doi.org/10.1016/j.eist.2014.07.003
- Bosman, R., Loorbach, D., Beers, PJ (forthcoming) Discursive destabilization: A Longitudinal Analysis of Energy Transition Discourse in the Netherlands. Paper submitted to Environmental Politics on 25th of April 2018.
- De Haan, F. J., & Rotmans, J. (2018). A proposed theoretical framework for actors in transformative change. Technological Forecasting and Social Change.
- Farla, J., Markard, J., Raven, R., & Coenen, L. (2012). Sustainability transitions in the making: A closer look at actors, strategies and resources.Technological forecasting and social change, 79(6), 991-998.
- Financieele Dagblad (2017) Essent en Nuon vechten ACM besluit Alliander aan. Available online: https://fd.nl/ondernemen/1205372/essent-en-nuon-vechten-acm-besluit-alliander-aan accessed 03-05-2018
- Geels, F. W. (2002). Technological transitions as evolutionary reconfiguration processes: a multi-level perspective and a case-study. Research policy, 31(8), 1257-1274.
- Geels, F. W. (2014). Regime resistance against low-carbon transitions: Introducing politics and power into the multi-level perspective. Theory, Culture & Society, 0263276414531627.
- Geels, F. W., & Schot, J. (2007). Typology of sociotechnical transition pathways. Research policy, 36(3), 399-417.
- Giddens, A. (1984). The constitution of society: Outline of the theory of structuration. Univ of California Press.
- Grin, J., Rotmans, J., Schot, J., (2010). Transitions to sustainable development. In: New Directions in the Study of Long Term Tansformative Change. Routledge, New York.
- Hajer, M.A., 1995. The Politics of Environmental Discourse: Ecological Modernization and the Policy Process. Clarendon Press, Oxford.
- Hajer, M. (2003). Policy without polity? Policy analysis and the institutional void. Policy sciences, 36(2), 175-195.
- Hengelaar, G.A. (2017). The Proactive Incumbent: Holy grail or hidden gem? : Investigating whether the Dutch electricity sector can overcome the incumbent's curse and lead the sustainability transition (No. EPS-2016-ERIM Series 438-ORG). ERIM Ph.D. Series Research in Management. Erasmus University Rotterdam. Retrieved from http://hdl.handle.net/1765/102953
- Hengelaar, G.A. & Bosman, R. (2017) Wrestling with words: How incumbents shape energy transition debates and policy with reactive and proactive discourses. In: Hengelaar, G.A. (2017). The Proactive Incumbent: Holy grail or hidden gem? : Investigating whether the Dutch electricity sector can overcome the incumbent's curse and lead the sustainability transition (No. EPS-2016-ERIM Series 438-ORG). ERIM Ph.D. Series Research in Management. Erasmus University Rotterdam. Retrieved from http://hdl.handle.net/1765/102953
- Van Hulst, M. (2008). Town hall tales. Culture as Storytelling in Local Government. PhD-thesis Erasmus University, Rotterdam.
- Karltorp, K., & Sandén, B. A. (2012). Explaining regime destabilisation in the pulp and paper industry. Environmental Innovation and Societal Transitions, 2, 66-81.
- Lawrence, T. B., & Suddaby, R. (2006). 1.6 Institutions and Institutional Work. The SAGE Handbook of Organization Studies, 215.
- Loorbach, D., Frantzeskaki, N., & Avelino, F. (2017). Sustainability transitions research: Transforming science and practice for societal change. Annual Review of Environment and Resources, 42.
- Loorbach, D., & Rotmans, J. (2010). The practice of transition management: Examples and lessons from four distinct cases. Futures, 42(3), 237-246.
- Raad voor de leefomgeving en infrastructuur (RLI) (2015) Rijk zonder CO2: naar een duurzame energievoorziening in 2050. Available online: http://www.rli.nl/sites/default/files/advies_rijk_zonder_co2_interactief_voor_website_1.pdf accessed 31-04-2016
- Rotmans, J., & Loorbach, D. (2010). Towards a better understanding of transitions and their governance. A systemic and reflexive approach. Transitions to sustainable development–new directions in the study of long term transformation change. Routledge, New York, 105-220.
- Rotmans, J., Kemp, R., & Van Asselt, M. (2001). More evolution than revolution: transition management in public policy. Foresight, 3(1), 15-31.

- Scott, W. R. (2001). Institutions and organizations. Thousand Oaks: Sage.
- Smink, M. M., Hekkert, M. P., & Negro, S. O. (2013). Keeping sustainable innovation on a leash? Exploring incumbents' institutional strategies. Business Strategy and the Environment.
- Thomassen, B. (2015). Thinking with liminality. In: Horvath, A., Thomassen, B., & Wydra, H. (Eds.). (2015). Breaking boundaries: Varieties of liminality. Berghahn Books.
- Turner, V., (1969). Liminality and communitas. The ritual process: Structure and anti-structure, 94, 130.
- Turnheim, B., Geels, F.W., (2012). Regime destabilisation as the flipside of energy transitions: lessons from the history of theBritish coal industry (1913–1997). Energy Policy 50, 35–49.
- Turnheim, B., & Geels, F. W. (2013). The destabilisation of existing regimes: Confronting a multi-dimensional framework with a case study of the British coal industry (1913–1967). Research Policy, 42(10), 1749-1767.
- Van Gennep (1909) The Rites of Passage. Trans. Monika B. Vizedom and Gabrielle L. Caffee. (1960) Chicago: U of Chicago P.
- Van der Vleuten, E., & Högselius, P. (2012). Resisting change? The transnational dynamics of european energy regimes. In G. Verbong, & D. Loorbach (Eds.), Governing the energy transition: Reality, illusion or necessity? (pp. 75). London: Routledge.
- Van Raak, R. (2016). Transition Policies; connecting system dynamics, governance and instruments in an application to Dutch Healthcare.
- Wittmayer, J. (2016). Transition management, action research and actor roles: understanding local sustainability transitions. PhD-thesis Erasmus University Rotterdam
- Ybema, S., Yanow, D., Wels, H., & Kamsteeg, F. H. (Eds.). (2009). Organizational ethnography: Studying the complexities of everyday life. Sage.

Annex 6.1 Overview of respondents

1 Sr. Strategist, Liander Asset Management
2 Manager Strategy & Innovation, Liander Asset Management
3 Manager external relations, Liander Asset Management
4 Strategy & Innovation consultant, Liander Asset Management
5 Innovation Manager Energy Transition, Liander Asset Management
6 Innovation manager, Liander Asset Management
7 Consultant datadriven grid mangement, Liander Asset Management
8 Consultant Energy Transition, Liander Klant & Markt
9 Sr. Business Market Analyst, Liander Klant & Markt
10 Sr. Marketeer Strategic Partnerships, Liander Klant & Markt
11 Strategist, Alliander Strategy
12 Manager Alliance Management, Alliander Strategy
13 Director Hoom, New Business
14 General Manager DGO, New Business
15 Manager Energy Transition, Liandon
16 Consultant, Liandon
17 Consultant Strategie & Architectuur, IT
18 Consultant Innovation and realisation, Alliander Advisory group
19 Consultant gas, Liandon
20 Director Regulatory Affairs, Alliander
21 Manager Grid planning, Liander Asset Management
22 Director HR, Liander
23 Technical Trainee Construction, Liander operations
24 Teammanager Construction, Liander operations
25 Senior Communications consultant, Alliander
26 Teammanager Gas, Liander operations
27 Management Trainee, Alliander

Annex 6.2 Overview of attended meetings

Alliander internally

- Weekly teammeeting, Strategy & Innovation Department
- Three weekly gas- and heating meeting, Strategy & Innovation Department
- Moving forward together in the heating transition, Alliander Sustainable Area Development and Regulatory affairs Department, 10th of November 2016
- Groot werkoverleg cluster West, medewerkers aanleg gas, 14th of December 2016
- Creative session 'Neighbourhood approach', Realisation & Innovation Department, 15th of December 2016
- Development Area-oriented Approach, Realistion & Innovation Department, 20th of December 2016 & 19th of January 2017

External meetings

- International Gas Union, 12 – 13 October 2016
- Regional Energy strategies, RVO/VNG, 1st of November 2016
- Accelerating the Energy Transition, Ministry of Infrastructure & Environment, 24th of January 2017

Organized meetings

- Governing the energy transition, TRAPESES-project, 19th of January 2017

Annex 6.3 Interview guideline (In Dutch)

Introductie:

- Doel van het onderzoeksproject / interview:
  - » Onderzoeksstage
  - » Verkennen van de rol van de netbeheerder in de energietransitie, met name als het gaat om afscheid nemen van aardgas;
- Verwerking interview: vertrouwelijkheid, anonimiteit, gebruiken quotes

Vragen:

- Kunt u iets vertellen over uw rol met betrekking tot de strategie van Liander?
- Hoe kijkt u aan tegen de energietransitie? Wat drijft de energietransitie volgens u? Welke onderliggende problemen lost het op? Welke nieuwe uitdagingen creëert het?
- Wat betekent dit voor de rol van Liander? Hoe verandert die in de energietransitie?
- Een van de speerpunten van de nieuwe gas- en warmtestrategie is "het efficiënt uitfaseren van aardgas daar waar duurzame alternatieven zijn." Hoe kijkt u tegen dit speerpunt aan? In hoeverre is dit een gevolg van de energietransitie? En hoe zou het verwezenlijken van het speerpunt de transitie beïnvloeden?
- Wat betekent de energietransitie in termen van relaties? Hoe reageren relaties binnen en buiten de organisatie? Ervaart u enthousiasme of juist weerstand en uit welke hoek? Zijn er bestaande relaties die verdwijnen als gevolg, bv met bepaalde leveranciers, of klanten etc.?
- Wat betekent de energietransitie in termen van allocatie van middelen (tijd en geld) binnen de organisatie? Welke activiteiten worden gedivesteerd? Zijn er afdelingen waar wordt bezuinigd of die worden gesloten? Hoe gaat u hiermee om?
- Zijn er nog mensen binnen of buiten Liander die ik verder zou moeten spreken met betrekking tot dit onderwerp, of zijn er bepaalde bijeenkomsten die wellicht relevant zijn om te bezoeken?

7. Carbon lock-out: Leading the fossil Port of Rotterdam into transition

This Chapter first appeared as an article in the journal Sustainability in 2018. Please refer as:

Bosman, R., Loorbach, D., Rotmans, J., & Van Raak, R. (2018). Carbon lock-out: Leading the fossil port of Rotterdam into transition. Sustainability, 10(7), 2558.

Abstract

The port of Rotterdam is a global leader in the fossil fuel economy, with a 50% market share for fossil fuel products in North-Western Europe. Although it is one of the most efficient and innovative ports globally, over the last decade it has seen a gradual increase of pressures on its activities and the need to develop alternative low-carbon strategies.

This Chapter describes how a turbulent energy context, growing societal pressure and a change in leadership of the Port Authority opened up space for a transition management process. The process impacted the business strategy and the discourse amongst its leaders and contributed to the set-up of a transition unit and a change in investments. It subsequently led to an externally-oriented transition arena process with incumbent actors in the port area and actors from outside around the transition pathway to a circular and biobased economy.

By exploring how transition management could support repositioning of incumbent actors in the energy transition, the research contributes to discussions in the transitions literature on regime destabilisation, the role of (incumbent) actors in transitions and large-scale energy intensive industries as the next frontier in the energy transition.

Keywords:

Port of Rotterdam, fossil fuels, destabilisation, transition management

7.1 Introduction

Global concerns over climate change, resources and global economic changes combined with technological disruptions and geopolitical tensions have brought the energy transition to the centre of global debate. After decades of debates around the need for and potential benefits of such an energy transition, the Paris Agreement (UNFCCC, 2015) has now also secured political commitment to energy transition as the way to address climate change at the global level. Forecasting studies however show that the current pace of innovation and (policy) change is not sufficient to bring the 1.5 to 2 degrees warming target within reach, rather the world is on track for 4 – 6 degrees warming by the end of this century (GCP, 2017).

It is clear beyond reasonable doubt now that the main causes for climate change are manmade greenhouse gas emissions, most prominently carbon dioxide from burning fossil fuels (Pauchari et al., 2014). Recent research finds that if global warming is to remain well below 2°C (and preferably 1.5 degrees) as has been agreed upon in Paris, 82% of currently known coal, 50% of gas, and 33% of oil reserves cannot be burned unabated (McGlade & Ekins, 2015). Thus, a shift towards renewable and sustainable energy sources and away from unsustainable fossil fuels is necessary in order to tackle climate change. Since the use of fossil fuels is deeply embedded in modern lives and societies, such a shift away from fossil fuels requires tremendous societal change across a wide range of domains and activities.

The academic field of sustainability transitions deals with understanding such fundamental societal change processes. It is rooted in multiple disciplines, including innovation studies, evolutionary economics, institutional theory and complexity theory. A transition is conceptualised as a fundamental change in a regime, the dominant structure, culture and practices in a societal (sub)system that is the result of a co-evolution of economic, technological, institutional, cultural and ecological developments at different scale levels. Such transitions often cut across a variety of domains and stakeholders and are thus long term (25–50 years), highly complex and contested. Contemporary transitions are often related to sustainability goals in order to resolve a number of persistent problems confronting modern societies (Grin et al., 2010). The growing societal efforts to move away from fossil fuels and resources towards renewable resources, as subsumed under the 'energy transition' (Verbong & Loorbach, 2012), fit neatly to the conceptualisation of a sustainability transition as outlined above.

Transition management has been developed as a new mode of governance for sustainable development (Rotmans et al., 2001; Loorbach, 2007; Loorbach, 2010). While transition research and transition management direct quite some attention towards experimentation and innovation in sustainable niches, to date there is little experience of how decline or break down of existing practices, industries and regimes proceeds and whether transition management can be applied to support change-minded incumbents operating in the context of a destabilising regime. As such, our research question is: What is the role of incumbents in regime destabilization and how can they be supported using and adapting the transition management approach?

Our research is based on a transition management process in the Port of Rotterdam stretching out from early 2015 to mid 2017. The Port of Rotterdam is one of the largest fossil fuel hubs in the world: half of total throughput is related to fossil fuel products, 21% of refining capacity in the Hamburg-Le Havre range is located in the Port and it supplies 50% of North-Western Europe's demand for fossil fuels (TNO, 2016). It had been developing sustainability strategies for years, but increasing societal and economic pressures and a change in leadership of the Port Authority opened up space for a transition management process. At this time, mid 2015, the Paris Agreement had not yet been agreed upon and even though climate concerns and sustainability goals were discussed, the Port Authority did not have any strategy including potential phase-out of fossil fuels. The process was commissioned by and carried out in close engagement with the Port Authority, a semi-public organisation responsible for the Port.

Working intensively with and within the Port Authority allowed us to gain a deep understanding of how incumbent actors perceive transitional changes in their context and their role in anticipating this. It also offered an opportunity to develop and test strategies to help incumbent actors navigate such a highly challenging context. The described action research process applied and adapted transition management to this context. At the same time the process helped to gain a deeper understanding of regime destabilisation, the role of (incumbent) actors in transitions and large scale energy intensive industries as the next frontier in the energy transition.

The article is structured as follows: In section two we present the theoretical underpinnings of our research, building on recent insights in regime destabilisation, we introduce transition management and the adaptations we made to apply it in a destabilising regime context in close cooperation with an incumbent. In section 3 we describe the transition management (TM) process including the considerations of applying TM in this context. In section 4 we discuss the effects and implications to which the process contributed. In section 5 we reflect on our findings and relate the insights and lessons learned to transitions literature.

7.2 Regime destabilisation, agency and transition management

A transition is defined as a radical, structural change of a societal (sub)system that is the result of co-evolution of economic, cultural, technological, ecological, and institutional developments at different scale levels (Rotmans et al., 2001). It comes about through the simultaneous build-up of sustainable alternatives and break-down of existing unsustainable practices (Loorbach et al., 2017). A core concept in transitions research is the regime. While it is defined in several ways (Geels, 2002; 2004; Geels, 2014; Smith et al., 2010), the different definitions have in common that regimes provide coordination and stability to societal systems that provide a particular societal function. We adopt the following regime definition: the dominant culture, structure and practices within a societal system (De Haan, 2010; Rotmans & Loorbach, 2010; van Raak, 2016). As a transition is a structural change of an existing regime into another, it thus implies destabilisation and (partial) reconfiguration of regimes. Such regime destabilization can be caused by external shocks, internal structural problems and bottom up innovations in niches (Grin et al., 2010).

7.2.1 Regime destabilisation

Based on an elaborate review of historical transition cases Arranz (2017) shows that different kinds of landscape pressures play a crucial role in regime destabilisation. Building on insights from industrial economics, evolutionary economics, neo-institutional theory, and management studies, and a historical case study of the decline of the British coal industry, Turnheim & Geels (2012; 2013) understand regime destabilisation as resulting from three mutually reinforcing processes:

1 building up of economic and socio-political pressures;
2 performance problems within the regime by undermining resource flows and legitimacy;
3 actors lose commitment to elements of the regime, in turn exacerbating pressures and performance problems.

Karltorp and Sanden (2012) show how diverging actor strategies in the face of transitional pressures can lead to regime fragmentation and destabilization. Bosman et al. (2014) add to this understanding of destabilization and actors losing commitment to the regime from a discursive perspective, analysing how alternative 'storylines in the making' undermine the logic and coherence of the previously hegemonic incumbent discourse. Their study suggests that when incumbents' explanations no longer keep up with new developments, it impairs their legitimacy and provides thrust to alternative storylines supported by actors new or foreign to the incumbent regime.

To our knowledge the first comprehensive venture towards informing destabilisation interventions is by Kivimaa and Kern (2016). According to them the concept of regimes implies "rules, technologies and actor-networks as the main components that can enforce stability or, when they change, create instability of the regime." As such, they propose four regime destabilising functions that policy makers could enact for destabilisation directed at these components:

1. control policies
2. significant changes in regime rules
3. reduced support for dominant regime technologies
4. changes in social networks, replacement of key actors

From a transition governance perspective, however, it is not evident that policy makers will deliberately pursue regime destabilisation nor are they automatically in a position to pursue actions towards that end, especially when the government is on the receiving end or even part of the incumbent regime (cf. Oxenaar & Bosman, 2020). A key question is therefore what factors or interventions could help to create the context within which such policies can emerge or be implemented, which will be addressed in this Chapter.

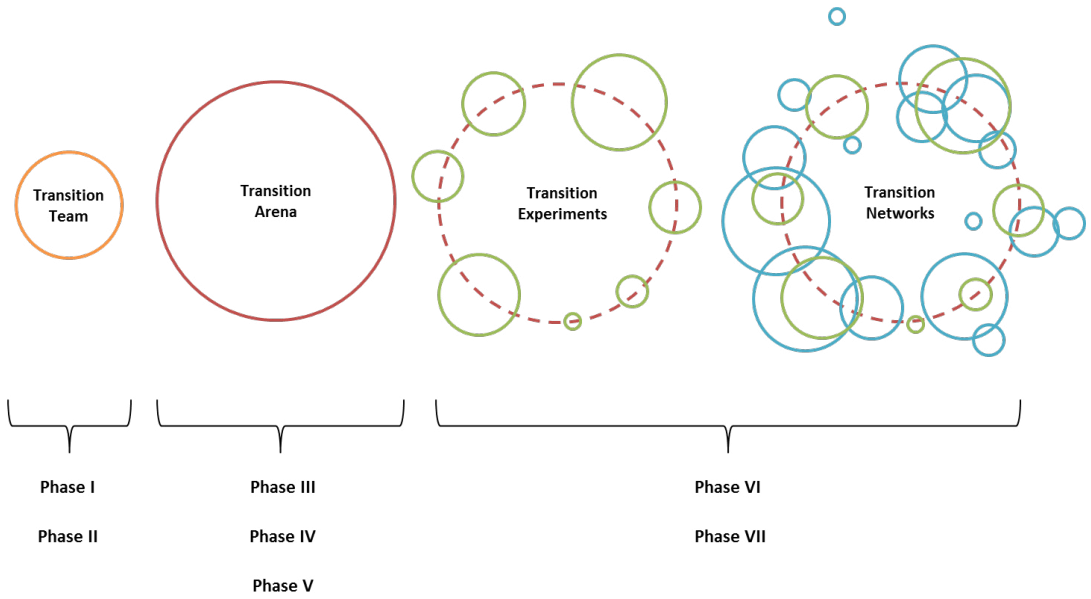
7.2.2 The role of incumbents in transitions

Recently, attention in transitions literature is shifting from a focus on systems and external shocks as drivers for destabilisation and transitions, towards developing an understanding of the way actors and their agency and power advances or impedes transitions (see e.g. [Farla et al., 2012; Meadowcroft, 2009; Avelino & Rotmans, 2009; Avelino & Wittmayer, 2016; De Haan & Rotmans, 2018). An ambiguous picture emerges: Smink et al. (2015) find that incumbents tend to hamper change. Geels (2014) even goes so far as to claim that "regime stability is the outcome of active resistance by incumbent actors". Vleuten & Hogselius (2012) in their study of European liberalisation of energy markets provide a different view, by showing that incumbent actors can also drive change. The work of Hengelaar (2017), Hengelaar & Bosman (2017), Bosman et al. (2014) and Karltorp & Sanden (2012) provides a more differentiated view showing that incumbent actors can respond differently to transitional pressures and that these diverging strategies might lead to misalignments in the regime. Turnheim & Geels (2012; 2013) propose that in regime destabilization actors eventually lose their commitment to elements of the regime. Thus, although it stays implicit in their conceptualisation, Turnheim & Geels (2012) introduce a dynamic view on the position of incumbents: initially their efforts are geared towards maintaining the status quo, while over time they may shift their attention and contribute to accelerating a transition.

7.2.3 Transition management in context of a destabilising regime

Transition management is a prescriptive and experimental governance approach focused on mobilising and connecting transformative agency to help guide and accelerate sustainability transitions. Transition management asserts that transitions cannot be controlled but aims to stimulate transitions by offering actors insight into transition dynamics, developing guiding and mobilising visions, transition agendas and –experiments. It is based upon the following principles (Loorbach & Rotmans, 2010):

- long-term thinking (at least 25 years) in order to inform short-term action and policies.
- creating space for niches with a focus on frontrunners to promote radical innovation
- (social) learning about different actor perspectives and a variety of options (requiring a wide playing field) as a necessary precondition for change.
- selective participatory decision-making and interaction between stakeholders in order to develop support for policies and to engage actors in reframing problems and solutions through social learning.



	Phase	Process steps
I II	Setting the scene for Transition Management Exploring dynamics in your system	The Transition Team is formed to drive the TM process and start to explore the project dynamics (takes about 3-6 months)
III IV V	Framing the transition challenge Envisioning a sustainable system Reconnecting long term & short term	The Transition Arena group is formed and engages in a series of meetings to jointly structure the transition challenge, draft visionary images and develop transition paths and a transition agenda. (takes about 6-12 months)
VI VII	Getting into action Engaging & anchoring	Effort is put into disseminating the vision and transition agenda; initiating actions in line with the vision (transition experiments); and engaging more actors and networks.

Figure 7.1 Outline transition arena process (adapted from Roorda et al., 2014)

An important framework is the Transition Management cycle, whose components are: 1. structure the problem in question and establish and organize the transition arena; 2. develop a transition agenda, images of sustainability and derive the necessary transition paths; 3. establish and carry out transition experiments and mobilize the resulting transition networks; 4. monitor, evaluate and learn lessons from the transition experiments and, based on these, make adjustments in the vision, agenda and coalitions. A central instrument to implement transition management is the transition arena, a temporary innovation network consisting of a diverse set of frontrunners and change-minded regime players. In a sequence of several sessions, such an arena is "used to develop new substance (ideas, agendas visions); to support a process (of network/coalition building, learning); and to subtly influence existing regimes" (Loorbach & Rotmans, 2010). While the main process steps are prescribed in the transition arena methodology (see Figure 7.1), it leaves room for adaptation to the particular context in which it is applied (Loorbach, 2007; Loorbach & Rotmans, 2010).

Transition management has originally been developed to support frontrunners to more strategically develop their alternatives to incumbent regimes through experimentation and envisioning (Frantzeskaki et al., 2018). Over time it has been applied in many different contexts and at different levels of scale, but not directly within the context of a regime (organisation). In this research, however, we experimented with applying transition management in an incumbent organisation operating in the context of a destabilising regime. As such, the aim of the TM process was to develop a challenging narrative with a group of potentially influential change agents. This draws upon ideas also formulated by Avelino on informal power and its potential role in transitions (Avelino, 2017). Instead of seeking to destabilise a regime by mobilising niches, we experimented with implementing transition management to contribute to destabilisation from within the regime in order to accelerate the energy transition. Although elements of TM, such as backcasting (cf. Holmberg & Robert, 2000; Natrass & Altomare, 1999; Quist, 2007), have been used to guide businesses confronted with impending transitions, to our knowledge the current effort is the first example of a full-fledged TM process applied with an incumbent in the context of a destabilising regime. The adaptations we made to apply transition management in this particular context are discussed in Section 7.3 and we will reflect on them more elaborately in the concluding Section 7.5.

7.3 Transition Management in practice

Action research is central to transition management. While more traditional research efforts take pride in keeping analytical distance to the issues under study, action research holds that the best way to understand how things work, is to directly engage and try to change them. Action research is distinguished from more traditional research, in the sense that action researchers do more than just observing, reporting, analyzing, or evaluating. Action research means that we are involved in preparing and organizing meetings and engage in normative debates on sustainability. Constantly reflecting on the action-reaction dialectic, especially when done together with others that have an interest in the system under study, provides deep understanding and insights that would not have been attainable by staying at a distance. Furthermore, action research allowed us to design the research in such a way that it not only furthers scientific knowledge development, but was also helpful for the participants. For a more specific treatment of action research methodology and the demands it places on researchers, we refer to (Greenwood & Levin, 1998; Greenwood & Levin, 2006; Wittmayer & Schapke, 2014; Wittmayer, 2016).

Concretely, our action research activities revolved around strategy work commissioned by and in cooperation with the Port of Rotterdam Authority, taking place between January 2015 and March 2017. This cooperation came about after several years of rather dialectic relationship between the authors and the Port of Rotterdam: we have repeatedly and publicly criticized the port for its weak sustainability performance (see e.g. (RTV Rijnmond, 2013; Trouw, 2013), to the annoyance of some within the Port Authority, including the former CEO. Growing societal scrutiny of the Port's performance together with a change in leadership at the Port Authority opened up space to involve us directly and as such they invite their critics in house. Several meetings took place in advance of the actual transition management process with both the CEO of the Port Authority and the transition team, consisting of the authors and two representatives of the Port Authority's strategy department. These meetings focused on developing the aims and content of the process as well as building mutual trust that this process could contribute to the port's sustainability objectives.

The action research efforts provided access to specific documents, interviewees and organizing strategy sessions with employees and relevant contacts within and outside the Port area. As such, data sources include:

- Public documents, including annual reports and studies;
- Internal documents, including strategy documents, working documents and studies under progress, minutes of meetings and e-mail conversations;
- Field notes of participant observation in arena meetings;
- Field notes of informal (telephone) conversations;
- Semi-structured interviews with:
    - » respondents at strategic positions within the Port Authority;
    - » other organisations in the Port of Rotterdam, which are also involved in the energy transition; and
    - » organisations outside of the Port, which were identified as interesting sparring partners in the circular and biobased transitions.

With the help of the Port of Rotterdam Authority, potential respondents and participants have been identified. A list of interviews is provided in annex 1. Respondents and participants were selected based on their strategic position within the organization, mostly board level, or from strategy or public affairs departments. Respondents are interviewed on personal title, and personal anonymity is granted in the presentation of results; therefore, when using quotes only the organizational context is mentioned. It should be stressed though that the views provided are those of the respondents and not necessarily that of the organization they work for. Processing and analysing of data is a deliberative effort that has taken place throughout the project. Insights from the interviews, desk research, meetings and sessions are constantly discussed, analysed and synthesised within the transition team, with the counterparts at the Port Authority and with the arena participants. The final results have been reviewed by our counterparts at the Port Authority upon which minor factual changes have been made.

7.3.1 Transition Management in the Port of Rotterdam

From January to March 2015 the transition management process has been prepared in close cooperation with the strategy department of the Port Authority. Figure 7.2 provides a timeline of the main steps in the transition management process. In cooperation with the Port Authority a long list with respondents and potential arena participants was developed. Interviews with these respondents have been used to select participants and as input for the preparatory system's analysis, which formed the basis for the arena kick-off. In this section we present a concise reconstruction of the process and its main results. Because of sensitivity of the material, the results are anonymised. Furthermore, sensitivity and readability concerns forced us to be selective in reporting results. More details on specific parts of the process, can be shared upon request.

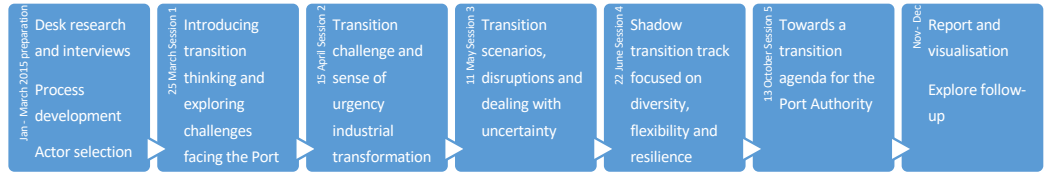


Figure 7.2 Timeline Port Authority internal transition arena

7.4 System's analysis

The fossil-based energy regime in the port of Rotterdam is characterised by its focus on scale and volume and consequent cluster synergies (D'Haese, 2015). The success of the port is measured in the megatonnes transshipped (Port of Rotterdam Authority, 2018a). Through its focus on volume, scale and developing the accompanying infrastructure requirements the port has been able to attract large scale bulk petrochemical production, becoming a transshipment hub for high volumes of crude petroleum and derivative products, while developing into a large user of fossil fuels itself. Investments in R&D are relatively low compared to the Dutch average (Nijdam, 2010). This is partly explained by the fact that the petrochemical cluster and energy production is constituted by large multinationals whose headquarters and R&D departments are located elsewhere. The decision to invest and innovate in their assets in Rotterdam is part of a strategic consideration also taking into account their operations in other countries and comparing the respective competences and benefits. Furthermore, petrochemical operations are highly capital and infrastructure intensive, involving large investment sums, long depreciation periods and the accompanying risk averse behaviour. On top of that, a large share of activities, such as plant maintenance, have been standardized and outsourced to SMEs over time. These SMEs then tend to focus on optimizing those standardized activities (interview 12). Added up, these elements lead to investment behaviour that is relatively conservative and risk averse. The strengths of scale and cluster benefits which have developed over time form the premises for new investments along similar lines, resulting in a path dependent development (D'Haese, 2015).

7.4.1 Landscape pressures

The context of this fossil energy regime in the port of Rotterdam is changing; after several decades of continuing economic growth of international trade the outlook for the coming decades is much more uncertain. Five landscape developments have been identified that in particular put pressure on the port of Rotterdam (Meijknecht et al., 2012; VNCI, 2012; VNCI, 2013):

1. Demand from Europe is stabilizing, because its market is mature and its population stable and ageing;
2. Refining increasingly takes place closer to the source, for example in the Middle East;
3. The shale gas revolution in the United States provides cheap feedstock and energy which increases the competitive position of petrochemical industry across the Atlantic;

4 Increasing geopolitical concerns regarding fossil fuel dependencies, for example on Russia, challenge fossil fuel industries;

5 Increasing environmental concerns, in particular climate change, challenge the future of fossil-based industries.

7.4.2 Niche pressures

In response to these landscape trends, niches develop in and outside the port of Rotterdam which might over time challenge and provide an alternative to the existing regime. The most relevant niche developments are gathered under the umbrellas of the Bio Port initiative (Port of Rotterdam Authority, 2016) and the Rotterdam Climate Initiative (RCI, 2013).

Bio Port

The port of Rotterdam harbours several activities related to the biobased economy. Especially in the production of first-generation biofuels the port already plays a leading role. The main players in this area are Alco Energy, Neste, which operates the world's two largest biorefineries, one of which is located in Rotterdam, and Biopetrol. The port of Rotterdam is attractive for these producers because of the proximity to customers, mostly traditional fossil fuel producers which are required to blend biofuels into their petrol and diesel according to the EU fuel directive, and because of the available infrastructure and logistical channels (interview 11). The global biodiesel market totalled about 10 megaton in 2013 (UN, 2015), of which 1.45 megaton is produced in the port of Rotterdam (Port of Rotterdam Authority, 2010). However, this is still only a fraction of the 60 megaton fossil fuel refining capacity in the port.

Rotterdam Climate Initiative (RCI) / Energy Port

The RCI, a joint initiative between the municipality and the Port authority, started in 2007 with the goal to halve the CO_2-emissions of Rotterdam (city and port area) by 2025 compared to 1990 levels. In 2013, RCI presented its energy action plan consisting of seven focus areas of which five relate to the fossil cluster in the port, including the Bio Port already mentioned above. The other four are:

- Deltaplan energy infrastructure, focussing on developing infrastructure to transport and reuse heat, steam and CO_2;
- Setting up of an expert centre for energy efficiency, in which the test facilities for sustainable process technology PlantOne located in the port play an important role;
- Stimulating the use of liquified natural gas (LNG) in water and road transport, reducing its CO_2-footprint compared to traditional fuels;
- CO_2 capture and storage (CCS) from new coal-fired power plants.

However, 10 years into the RCI, we have to conclude that instead of a decrease of CO_2-emissions, the Port of Rotterdam is rather on track towards a 50% increase in 2025, because carbon capture and storage (CCS) which had a large role in the RCI did not materialize.

In addition to the developments gathered under the RCI, the port of Rotterdam boasts several initiatives focussed on developing and attracting wind industry, both on- and offshore and on co-firing biomass in coal-fired plants (Port of Rotterdam Authority, 2012). Next to these alternatives developed within the port, the rise of hybrid and electric vehicles impacts demand for the port's main petrochemical products (Hill et al., 2013). Table 7.1 summarizes the landscape and niche-induced pressures on the fossil energy regime in the port of Rotterdam.

Landscape pressures	Niche developments
Stabilizing demand in Europe	*Bioport*
Increased refining at source	*Rotterdam Climate Initiative*
U.S. shale gas revolution	*Renewable energy*
Geopolitical concerns	*Electric mobility*
Environmental concerns	

Table 7.1 Pressures on the fossil energy regime in the port of Rotterdam

7.4.3 Role of the Port of Rotterdam Authority

The Port of Rotterdam Authority is a semi-public organisation that is responsible for the smooth operation of the Port. It takes care of the development, construction, management and operation of the Port industrial complex as well as ensuring the effective, safe and efficient handling of shipping and the offshore approaches to the port. Its objective is to enhance the port's competitive position as a logistics hub and world-class industrial complex (Port of Rotterdam Authority, 2018b). Shareholders are the municipality of Rotterdam (70%) and the Dutch government (30%). It had 1150 employees and a turnover of €712 million in 2017 (Port of Rotterdam Authority, 2018a). The key revenues come from rental income and port dues. Furthermore, the Port of Rotterdam Authority lets port sites, primarily to storage and transshipment companies and to the chemical and petrochemical industries and energy producers. It imposes port dues on ships that make use of the port. It invests in public infrastructure, such as roads in the port area, in customer-specific infrastructure, such as quay walls and jetties, and in the development of new port sites. In order to handle shipping as effectively as possible, it also invests in a traffic management system, patrol vessels and emergency control (Port of Rotterdam Authority, 2018b).

From the preparatory interviews at the start of the transition management process a picture emerges of a responsible caretaker. Metaphors of a landlord and shopping mall manager are used to describe its role. The Port Authority takes care of shared infrastructure and a sound investment climate for the industries in the port. It generally does not have an opinion on the organisations and activities that set up shop in the port. Also, respondents are critical of the influence their organisation could exercise in the transition:

"Politics should decide the direction, the Port Authority will follow." (…) "We should focus on what we are good at, business case driven, not ideological." (interview 7)

"We can't get too far ahead of the pack, we need to take them along." (…)

"We could stimulate a bit with harbour dues, but the factories are not ours, so we should not overestimate our influence" (…) Also, it is difficult to say: 'this ship can't come in', because then it will go elsewhere. What we can say is: 'the most sustainable ship receives a discount'." (interview 9)

7.5 Port of Rotterdam Transition Arena

The Port of Rotterdam Transition Arena consisted of a series of five workshops spread out over about a year, with 15 participants from different departments within the organization, from strategy to pilotage, and finance to environmental compliance. The participants were selected based upon their interest in transitions, their specific positions within their departments and a representation of the different specialties within the organisation.

The first session focused on introducing transition thinking and exploring the developments in the environment of the Port, using the multi-level perspective as lens. Based on the preparatory system's analysis we discussed the relevant landscape and niche developments facing the Port and the regime characteristics. This led to insights in the transitional pressures facing the Port and questions about the role of the Port Authority: is it merely a manager, or should it also take a more directive role aimed at a desired future for the port?

The outcomes of the session have been used to sharpen the system's analysis and reflecting on the discussions within the group made us realize that the sense of urgency for transformative change was quite low. It was challenging for the group to think in terms of disruptive change and to envisage a radically different port. With this in mind, we chose to deepen the problem structuring further in the second session.

In the second meeting we translated the outcomes of the first session into a transition challenge for the Port. We confronted the group with an exploration of how other industrial areas, such as the car and steel industry in the United States, the mining industry in the South of the Netherlands and imaging company Kodak have transformed or declined in the past. Figure 7.3 provides a schematic overview of different possible transformation pathways. From this discussion it became clear that there is a real chance that parts of the port of Rotterdam might turn into an industrial wasteland. This resulted in a larger sense of urgency to search for and work on alternatives within the group.

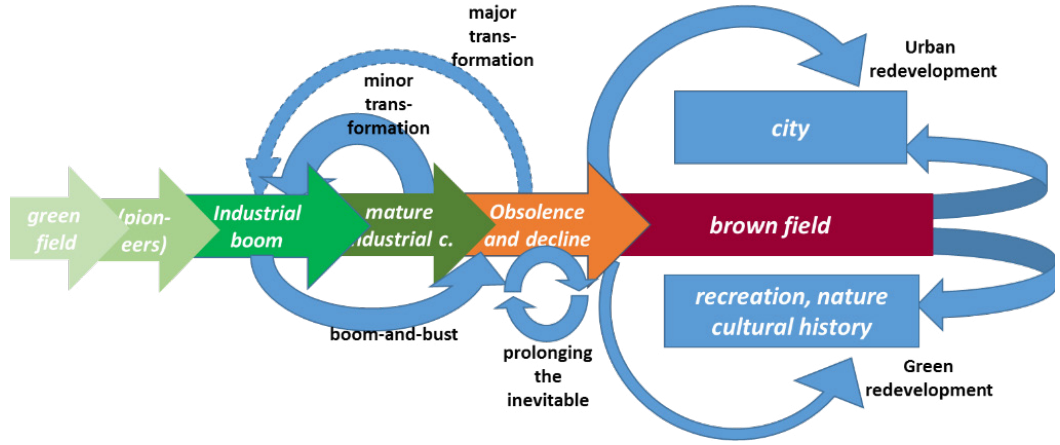


Figure 7.3 Industrial transformation pathways over time

Based on discussions between the transition researchers and the participants, the transition challenge was formulated as follows:

how to transform from a linear to a circular port economy, from fossil to biobased and from a monoculture based on three isolated pillars (logistics, maritime industry, energy & chemistry) to a diverse and flexible industrial ecosystem?

Reflecting on the first and second sessions within the transition team, it was time to think about futures for the port. Realizing that it proved difficult to think in radically different alternatives and disruptions, we decided to use the existing energy scenarios of the Port Authority which are familiar to participants and test these scenarios against disruptions and unexpected events.

7.5.1 Future visions

As such, the third session focused on transition scenarios, disruptions and dealing with uncertainties. We introduced scenarios as a thinking exercise to explore different futures and to see whether the port is prepared for such a future. In a workshop setting we confronted the Port's own scenarios with several disruptions, such as hyper-inflation, a food crisis, a trade boycott with Russia and China, a global climate agreement (this was before Paris!) and the emergence of methane-hydrates as a new energy source, with the question, what do these disruptions mean for the Port? And in which of the existing scenarios are you best prepared to deal with this disruption? Initially, the exercise led to some confusion. The primary responses were that these disruptions were imaginary and unrealistic. But the only relevant question was: imagine something like this happens, are you prepared to deal with it? Once this became clear, intense discussions and creativity emerged. One of the striking findings was that the group could more easily imagine a trade boycott with Russia than a binding global climate agreement. The experiences from the workshop were then used to have a discussion on different types of disruptions and uncertainties, and how to deal with these.

7.5.2 Revised transition challenge

In the fourth session, we consolidated the findings from the previous sessions. Over the course of the workshop series, it became clear to participants that the port is facing existential pressures in all of its traditional pillars. Together we translated this into a more elaborate transition challenge:

The Port of Rotterdam forms a fossil monoculture focussing predominantly on mass, volume, scale and technological solutions. Considering a rapidly changing environment, this presents existential risks for the future of the Port. The Port Authority has only a partial and fragmented answer to these challenges. Therefore, a transition track is needed to build a coherent alternative shielded from the direct influence of the regime. Diversity, flexibility and resilience should be leading principles in this shadow track and focus shifts to the added economic, social and ecologic value of the activities in the Port.

7.5.3 Transition pathways

Then, we moved on to potential directions to deal with these challenges and the role the port Authority could take in that. Here we again encountered an ambivalent stance: Is the Port Authority a playing ball of these global developments, or is it possible or even necessary to take a more pro-active role? The conclusion was that the Port Authority has no control over those developments, but does have possibilities to create the conditions that enable and accelerate desirable activities or discourage unwanted ones.

We confronted participants with several dilemmas, revolving around the issues floated in previous sessions, to flesh out where the real pain is or might be. These dilemmas made the issues of volume growth vs added value, strengthening the existing monoculture vs promoting diversity and technological vs social innovation tangible and forced participants to take position. Reflecting with the participants on these dilemmas, it became clear that they were broadly recognized, but that most participants tended to choose familiar options with which they reproduce the traditional focus on mass and volume, scaling and technological solutions. The dilemma exercise helped in making these often implicit preferences explicit to the group.

To conclude the session these insights have then been translated into a transition 'shadow-track' for the Port Authority, with new guiding principles diversity, flexibility and resilience, as opposed to those of mass, volume and scale. Furthermore, the idea emerged to develop a transition unit, consisting of a team of pioneers that would coordinate and further develop this transition track for the Port.

7.5.4 Transition agenda

The fifth and last session in the first stage of the trajectory focussed on further developing the transition agenda for which the foundations were laid in the previous session. This time with a particular focus on the role of the Port Authority. From the discussions it became clear that the Port Authority is a rather traditional, hierarchical organisation. Whereas a diverse, agile and resilient company that is able to nurture the creativity and innovation is needed to lead the transition. This forms a huge challenge, because the Port Authority itself mirrors the port in terms of a culture that is focussed on volume, growth and optimisation of the existing system, through technological innovation. Given the increased pressure and disruptions facing the port, it is increasingly risky to work on the assumption of an orderly world in which a solid business case for an all-encompassing 'plan A' can be made, based on expected volume growth and scaling. Participants concluded that they collectively had a 'mental vacuum' with regards to imagining futures that were structurally different from how the Port is organized today. In other words: they could envisage biofuels developing to the scale of fossil fuels over decades, but not a future with much less fuels and completely different or a much higher diversity of activities. The complete narrative that was developed during the TM process was visualized (see figure 7.4) in order to summarize it, as well as to help participants to communicate it outside of the arena group.
The visualisation included the key elements of the transition narrative:

- Destabilisation of the current fossil regime
- The systemically different future in terms of structures, resources and organisation
- The mental vacuum with regards to the transition pathway
- The need to experiment based on guiding principles
- The need to 'cut loose' such experimentation to make it transformative

Figure 7.4 Visualisation of the Transition agenda 'Towards a diverse, flexible and resilient Port of Rotterdam' (in cooperation with InkStrategy)

The transition arena subsequently agreed a shadow track should support the internal transition within the Port Authority, as well as the transformation of the whole port of Rotterdam (see table 7.2). Within this track, experimentation can take place on a small scale, to find answers to the challenge laid out above. In the last session, together with the participants we have developed a long list of actions for the Port Authority, categorized in an internal and external broadening agenda and a deepening agenda, and in what is already happening and what needs to happen in future.

In developing this shadow track, with its short-term actions, transition governance returns to the idea of 'evolutionary revolutions' (Rotmans et al., 2001): the transition arena process provided a new radical future orientation to guide short-term, often incremental and manageable actions. As transitions are unpredictable and impossible to manage top-down, especially on a very long time-horizon, transition management is all about strategic experimentation and reflexivity based on a radical ambition to work towards systemic change.

7.6 Effects on the Port Authority's strategy and practice

In this section we reflect on the repositioning of the Port Authority over the course of the transition management process. Where initially employees of the Port Authority saw few possibilities for their organization to influence the transition, after completion of the process we see several indications that it is taking a more proactive role in the energy transition. While it is difficult to establish whether this repositioning is caused directly by the transition management process, we will indicate where and how the process had its impact.

7.6.1 Transition narrative and strategy

After the transition arena, the Port Authority started taking on a much more proactive narrative of "transforming the old and creating space for the new" which has been adopted publicly by the CEO as "the direction of the inevitable transition" (FD, 2016). It is advocating this narrative through different media and at high-level meetings and conferences, including the National Climate Summit, organised by the Dutch government to translate the goals of the Paris agreement to the Netherlands (Rijksoverheid, 2016).

Recently, the narrative has become even tougher, with the CEO of the Port Authority saying "who does not want to join, should leave the Port." (NRC, 2017), leading to tensions with existing fossil- based industries in the Port (FD, 2018). Also, the Port Authority has started its own series of conferences to put the issue on the (political) agenda; the Energy in Transition Summit (2018).

7.6.2 Organisational structure and investments

Next to changing its narrative, the Port Authority decided to invest heavily in terms of personal and financial means. It has developed a transition unit of 50 FTE to pursue businesses and activities that could contribute to making the transition. The team will "offer support with attractive accommodation conditions, connecting infrastructure, support with permit applications and finding financing, etc." (Port of Rotterdam Authority, 2016).

Leading principles	Baseline	Direction of solution	Transition track
Diversity	*Industrial activities are very dependent on fossil resources*	*Multiple tracks for industrial activities*	*Develop and advocate vision for a long term green industrial complex*
	Little (cultural, social, professional) diversity of people in the Port	*Diversity in employees, languages and cultures*	*Diverse, multi-cultural transition teams*
	Clusters dominated by a handful of large multinationals	*Industrial ecosystems of small, medium and large businesses*	*Five transition 'playgrounds' in which change-minded incumbents cooperate with innovative newcomers to show sustainable innovation*
	Closed shop (benefitting existing players)	*Attract new entrants and connect to sustainability challenges of existing industries*	*Flying brigade pro-actively scouting new leads in foreign (to the Port) sectors*
	Focus on a small number of large flows	*Focus on multiple streams and active development and use of side/waste flows*	*Make (waste)flows transparent to outsiders*
	Port and city have grown apart	*Use ports close to city to restore links and exchanges*	*Work on attractiveness and strategic use of city ports*
Flexibility	*Developing infrastructure for very long term and for single customer*	*Phased development of infrastructure aimed at multiple users and uses*	*Transition backbone for heat, resources, data, electricity and mobility*
	Every company has its own machinery, which stands idle for most time	*Strategic sharing of hardware*	*Develop sharing platform for assets including insurance*
	Slow and rigid decision making laid out in contracts	*Space for flexible contracts and creative use of greater environmental freedom*	*Substantive vision for the future of the Port guides priorities and leads*
	Port Authority is organised in silos	*Matrix structure*	*Flat organisation with flexible thematic clusters*
Resilience	*Betting everything on one horse*	*Having a back-up plan, focused on a broad portfolio of robust solutions*	*Transition strategy with room for failure and learning; asking clients for their plan B*
	'Anything goes' in the Port	*Commit and dare to choose*	*Port Authority has an opinion on activities based on a substantive vision for the future*
	Short term profit maximisation	*Investing in what is needed for the future*	*5% of budgets to transition track, without a target for returns to be made*
	Narrow focus on volume and growth	*Broad focus on added economic, ecologic and social value*	*Develop transition indicators which are taken into account when investing, e.g.: not fossil; local solidarity; societal value*

Table 7.2 Transition shadow track towards a diverse, flexible and resilient Port of Rotterdam

While most resources had so far been invested in logistical and industrial infrastructure, such as quays and pipelines, more recently it is increasingly focused on opportunities to incentivize social and institutional innovation, including funding for start-up hubs and maker spaces. "When it comes to crucial investments to realise the energy transition, the Port Authority is also prepared to make its own risk-bearing investments or to participate in companies" (Port of Rotterdam Authority, 2016). Furthermore, specific developments are incentivized with other than monetary means, such as setting aside specific locations for biobased developments and providing infrastructure in a 'plug and play' manner.

7.6.3 Partnerships and Practices

Where traditionally the existing industries and businesses in the Port were the natural partners, anticipating a transition requires different ways of interacting with stakeholders and engaging new partners. Part of changing the narrative is to position the Port Authority for new partnerships with actors that pursue a similar agenda and to reassess its ongoing cooperations. A concrete example of the new ways in which the Port Authority is interacting with its existing and new stakeholders is the Biobased Port Transition Arena that has been executed as a follow-up from the internal Transition Arena with the same transition team complemented with the Director Energy & Industry of the Port Authority. This transition arena process focussed on co-creating a vision and transition-agenda towards a biobased and circular Port of Rotterdam with actors from within the port and frontrunners from outside of the port [66]. As such, it constituted a mutual searching and learning process to explore alternative futures for the Port, for which the internal arena process laid the foundations.

However, while the changes set out above seem promising, recent developments around coal logistics in the Port show the limits of current ambitions: A research journalist unearthed the fact that a permit for the largest coal transshipment company in Europe, Europees Massagoed Overslag bv (EMO) will expire in the summer of 2018 and that it would like the permit to be renewed (Joosten, 2017). This led to discussions amongst citizens and the municipality, the majority owner of the Port Authority, took on a resolution to phase out coal in the Port. In response, the Port Authority has claimed that it is unable to do anything about renewal of the permit.

In conclusion, we observe that the Port Authority is slowly changing its role, but it is still split between two orientations: it is increasingly stimulating the new economy, diversifying its organisation and setting up a transition team and data department, but has not yet quit supporting the old economy. In the transition arena we positioned the transition strategy in terms of AND / AND, meaning a focus on break-down of the old economy and build-up of new circular and biobased alternatives. Break-down of the old economy in line with the Paris agreement would entail: closing all coal fired power plants and related logistics, halt investments in new refineries or fundamental refurbishing of existing ones and a repurposing of related infrastructure and storage facilities for the bioeconomy. Build-up of a circular and biobased port would entail: large scale investments in system innovations, such as anaerobic fermentation for biobased chemistry, hydrogen production and infrastructure and reuse of CO_2. The Port Authority has translated this break-down and build-up strategy foremost into an AND old economy AND new economy strategy. On top of that, the focus seems to be predominantly on system optimisation, for example through carbon capture and storage, instead of on system innovation for sustainable low-carbon production. Also, the leadership is ambiguous, detailing strong ambitions, but when it comes to execution, unavoidable pain is postponed rather than confronted, as in the case of EMO.

7.7 Reflections and conclusions

In this Chapter we present the results of a transition management process with the Port of Rotterdam. It is the first time transition management has been applied in close cooperation with an incumbent organisation operating in the context of a regime that is increasingly under pressure and destabilizing. Applying transition management in this context shows that transitions thinking and transition management also has something to offer in such a context. Introducing thinking in terms of disruptions and uncertainties has helped the Port Authority to think in alternative futures and disruptions for the Port of Rotterdam and to diversify its actor networks. Furthermore, where the Port Authority initially saw little potential for influencing the energy transition, applying transition management, together with other trajectories running at the Port Authority, has contributed to a change in attitude and diversifying its strategy by opening up new avenues of influence.

Furthermore, while it is not an explicit aim, applying TM with incumbents operating in a regime context draws attention to destabilisation dynamics. It contributed to challenging the existing dominant culture, structure and practices in the Port through:

- bringing in view the transformative challenges facing the Port through co-creating a system's analysis;
- sensitizing participants to potential disruptions and uncertainties facing the Port, through confronting them with wildcard developments, dilemma's, other actors with alternative perspectives and exploring alternative futures;
- explicating underlying assumptions about the raison d'être of the Port (volume and mass) and the role of the Port Authority, enabling discussion of the applicability of these assumptions in a changing context;
- highlighting relevant niche-developments within and outside the Port to sensitise participants to sustainable alternatives that are already available;
- diversifying existing actor networks and changing its interactions with stakeholders, by inviting actors from other domains and niches to collectively explore alternative futures;
- creating space for open discussion, challenging each other's ideas and assumptions, showing vulnerability and doubt.

Challenging ingrained views and assumptions proved necessary and instrumental in order to allow for more systemic experimentation with sustainable alternatives in a context of decreasing certainties. As such, transition management has contributed to destabilising the fossil fuel regime in the Port of Rotterdam, while at the same time supporting the Port Authority to take a more pro-active role in the transition. We observe a change in culture and understanding of its role within the Port Authority, that is more pro-actively oriented towards the new economy. Within the Port Authority increasingly there is the perception of two streams, one focussed on the 'old economy' and one on the new, of which the latter gains increasing importance, especially amongst the younger employees.

Furthermore, our action-research in the Port of Rotterdam has contributed to understanding of the inner workings of regimes and the role of agency in their destabilisation. Since this has been an explorative Chapter based on a single case study, we formulate our insights as propositions that should be verified and further developed in subsequent research:

1. While existing research puts the emphasis on external factors causing regime destabilisation (e.g. Arranz, 2017; Turnheim & Geels, 2013), our research shows that incumbent repositioning is another important driving force, in which external factors play a role, but also internal ones, such as changes in leadership, cultural change and the influx of a more diverse workforce, including younger people and more women. Further research could investigate the effects of incumbent repositioning on the integrity of the regime, e.g. how does repositioning affect regime stability? And which factors enable or constrain such repositioning?;
2. In response to landscape tensions and niche pressures some incumbent actors are able to change their position vis-a-vis the regime through changing discourse, roles, networks, redirecting of resources and developing new practices. Further research could verify whether this repositioning repertoire is exhaustive or whether other types of repositioning play a role;
3. In this repositioning, focusing on build-up is easier or more attractive than on break-down. From a transitions perspective, however, break down is also necessary and effective, as a combined focus on build-up and break-down could lead to faster results. Further research could shed light on whether build-up is indeed more attractive than break-down and the reasons why this is the case;
4. Changes in discourse precede those in networks, resources and particularly practices. Further research could verify whether this order in changes is particular to the Port Authority or whether this pattern is more widespread in incumbent repositioning;
5. Incumbent repositioning leads to tensions in existing relations and institutions. And, given that the Port of Rotterdam is still very fossil heavy, the biggest tensions are yet to come.

Furthermore, in order to verify these propositions, our work could be compared to other experimental interventions aimed at supporting incumbents to reposition in face of transitional pressures, such as Energy Futures Labs in Canada and backcasting at Electrolux and IKEA, amongst others (Holmberg & Robert, 2000; Nattrass & Altomare, 1999; Quist, 2007).

In sum, we conclude that the Port Authority is indeed taking a more proactive role supported by the transition management process and that this intervention indeed led to a number of significant structural, discursive and practical changes that help guide and accelerate a possible transition. But we also conclude that the dominant strategy still is to combine business as usual with the transition 'shadow track'. It is obviously impossible to shift overnight from business-as-usual to a completely fossil free port, but its current development and over-all strategy is still not in line with the Paris climate agreement.

Acronyms

CCS	Carbon Capture and Storage
CEO	Chief Executive Officer
CO_2	Carbon dioxide
EMO	Europees Massagoed Overslag bv
LNG	Liquified Natural Gas
NWO	Netherlands Organisation for Scientific Research
R&D	Research & development
RCI	Rotterdam Climate Initiative
TM	Transition management

Acknowledgements

We are thankful for funding this research to the Netherlands Organisation for Scientific Research (NWO) under the "TRAPESES" research programme (2014–2018) (408-13-029) and the Port of Rotterdam Authority for funding the transition management intervention. While the Port Authority and Ruud Melieste, Victor Schoenmakers and Nico van Dooren in particular have played a crucial role in co-creating the transition management process, the results as presented in this Chapter are the sole responsibility of the authors.

This Chapter has been partly based on the reports "Transitie-arena Havenbedrijf Rotterdam: Naar een flexibele, diverse en veerkrachtige haven" (van Raak et al., 2016) and "Transitie-agenda biobased en circulaire haven Rotterdam" (Rotmans et al., 2017) authored by the same authors as this Chapter, based on discussions with the participants. The authors wish to thank the respondents who have taken time to answer our questions, and the participants in the two transition arenas who have accompanied us on this research journey and from whom we've learned an immense deal about the port industrial complex and biobased and circularity in practice. Furthermore, we would like to thank InkStrategy for visualizing the transition narrative.

Earlier versions of this Chapter have been presented at the 8th ETH PhD-Academy on Sustainability and Technology in Switzerland 4 – 9 June 2015, the 7th International Conference on Sustainability Transitions (IST) in Brighton, United Kingdom 25 – 28 of August 2015, a research seminar at the Centre for Technology, Innovation and Culture (TIK) of the University of Oslo on 11th of January 2016 and the 9th International Conference on Sustainability Transitions (IST) in Manchester, United Kingdom 11 – 14 June 2018. The authors wish to thank participants in these workshops for their valuable comments, especially Charlene Zietsma, Laura Diaz Anadon, Cherelle Eid, Volker Hoffmann and Joern Hoppmann at the ETH PhD-Academy; Gijs Diercks, Bruno Turnheim and Steve Williams at the IST conferences and Håkon Endresen Normann and Olav Wicken at the TIK seminar. Furthermore, we would like to thank Gerbert Hengelaar and three anonymous reviewers for commenting earlier versions of the Chapter.

References

- United Nations Framework Convention on Climate Change (UNFCCC) (2015) COP21 Adoption of the Paris agreement. Available online: http://unfccc.int/resource/docs/2015/cop21/eng/l09.pdf accessed 21/01/2016
- Global Carbon Project (GCP) (2017) Carbon budget and trends 2017. Available online: www.globalcarbonproject.org/carbonbudget Accessed 2018-05-10
- Pachauri, R. K., Allen, M. R., Barros, V. R., Broome, J., Cramer, W., Christ, R., ... & Dubash, N. K. (2014). Climate change 2014: synthesis report. Contribution of Working Groups I, II and III to the fifth assessment report of the Intergovernmental Panel on Climate Change (p. 151). IPCC.
- McGlade, C., & Ekins, P. (2015). The geographical distribution of fossil fuels unused when limiting global warming to 2 [deg] C. Nature, 517(7533), 187-190.
- Grin, J., Rotmans, J., Schot, J., (2010). Transitions to sustainable development. In: New Directions in the Study of Long Term Tansformative Change. Routledge, New York.
- Verbong, G., & Loorbach, D., (2012). Governing the Energy Transition: Reality, Illusion or Necessity? Routledge, London.
- Rotmans, J., Kemp, R., & Van Asselt, M. (2001). More evolution than revolution: transition management in public policy. foresight, 3(1), 15-31.
- Loorbach, D. (2007). Transition management: new mode of governance for sustainable development. Erasmus University Rotterdam: Thesis
- Loorbach, D. (2010). Transition management for sustainable development: a prescriptive, complexity-based governance framework. Governance, 23(1), 161-183.
- TNO (2016) Het fossiele dilemma van Rotterdam. Available online: https://hcss.nl/sites/default/files/files/reports/het_fossiele_dilemma_van_rotterdam-tno_paper_maart_2016.pdf Accessed 05-05-2016
- Loorbach, D., Frantzeskaki, N., & Avelino, F. (2017). Sustainability transitions research: Transforming science and practice for societal change. Annual Review of Environment and Resources, 42.
- Geels, F. W. (2002). Technological transitions as evolutionary reconfiguration processes: a multi-level perspective and a case-study. Research policy, 31(8), 1257-1274.
- Geels, F. W. (2004). From sectoral systems of innovation to socio-technical systems: Insights about dynamics and change from sociology and institutional theory. Research policy, 33(6), 897-920.
- Geels, F. W. (2014). Regime resistance against low-carbon transitions: Introducing politics and power into the multi-level perspective. Theory, Culture & Society, 0263276414531627.
- Smith, A., Voß, J. P., & Grin, J. (2010). Innovation studies and sustainability transitions: The allure of the multi-level perspective and its challenges. Research policy, 39(4), 435-448.
- De Haan, H. (2010). Towards transition theory. Erasmus University Rotterdam: Thesis.

- Rotmans, J., & Loorbach, D. (2010). Towards a better understanding of transitions and their governance. A systemic and reflexive approach. Transitions to sustainable development–new directions in the study of long term transformation change. Routledge, New York, 105-220.
- Van Raak, R. (2016). Transition Policies; connecting system dynamics, governance and instruments in an application to Dutch Healthcare. Erasmus University Rotterdam: Thesis.
- Arranz, A. M. (2017). Lessons from the past for sustainability transitions? A meta-analysis of socio-technical studies. Global environmental change, 44, 125-143.
- Turnheim, B., Geels, F.W., (2012). Regime destabilisation as the flipside of energy transitions: lessons from the history of theBritish coal industry (1913–1997). Energy Policy 50, 35–49.
- Turnheim, B., & Geels, F. W. (2013). The destabilisation of existing regimes: Confronting a multi-dimensional framework with a case study of the British coal industry (1913–1967). Research Policy, 42(10), 1749-1767.
- Karltorp, K., & Sandén, B. A. (2012). Explaining regime destabilisation in the pulp and paper industry. Environmental Innovation and Societal Transitions, 2, 66-81.
- Bosman, R., Loorbach, D., Frantzeskaki, N., Pistorius, T., (2014). Discursive regime dynamics in the Dutch energy transition. Environ. Innovation Soc. Transitions (2014), http://dx.doi.org/10.1016/j.eist.2014.07.003
- Bosman, R., Loorbach, D., Beers, PJ (forthcoming) Discursive destabilization: A Longitudinal Analysis of Energy Transition Discourse in the Netherlands.
- Kivimaa, P., & Kern, F. (2016). Creative destruction or mere niche support? Innovation policy mixes for sustainability transitions. Research Policy, 45(1), 205-217.
- Oxenaar, S., & Bosman, R. (2020). Managing the decline of fossil fuels in a fossil fuel intensive economy: The case of The Netherlands. In The Palgrave Handbook of Managing Fossil Fuels and Energy Transitions (pp. 139-165). Palgrave Macmillan, Cham.
- Farla, J., Markard, J., Raven, R., & Coenen, L. (2012). Sustainability transitions in the making: A closer look at actors, strategies and resources.Technological forecasting and social change, 79(6), 991-998.
- Meadowcroft, J. (2009). What about the politics? Sustainable development, transition management, and long term energy transitions. Policy sciences, 42(4), 323.
- Avelino, F., & Rotmans, J. (2009). Power in transition: an interdisciplinary framework to study power in relation to structural change. European journal of social theory, 12(4), 543-569.
- Avelino, F., & Wittmayer, J. M. (2016). Shifting power relations in sustainability transitions: a multi-actor perspective. Journal of Environmental Policy & Planning, 18(5), 628-649.
- de Haan, F. J., & Rotmans, J. (2018). A proposed theoretical framework for actors in transformative change. Technological Forecasting and Social Change, 128, 275-286.

- Smink, M. M., Hekkert, M. P., & Negro, S. O. (2015). Keeping sustainable innovation on a leash? Exploring incumbents' institutional strategies. Business Strategy and the Environment, 24(2), 86-101.
- Van der Vleuten, E., & Högselius, P. (2012). Resisting change? The transnational dynamics of european energy regimes. In G. Verbong, & D. Loorbach (Eds.), Governing the energy transition: Reality, illusion or necessity? (pp. 75). London: Routledge.
- Hengelaar, G.A. (2017). The Proactive Incumbent: Holy grail or hidden gem? : Investigating whether the Dutch electricity sector can overcome the incumbent's curse and lead the sustainability transition (No. EPS-2016-ERIM Series 438-ORG). ERIM Ph.D. Series Research in Management. Erasmus University Rotterdam. Retrieved from http://hdl.handle.net/1765/102953
- Hengelaar, G.A. & Bosman, R. (2017) Wrestling with words: How incumbents shape energy transition debates and policy with reactive and proactive discourses. In: Hengelaar, G.A. (2017). The Proactive Incumbent: Holy grail or hidden gem? : Investigating whether the Dutch electricity sector can overcome the incumbent's curse and lead the sustainability transition (No. EPS-2016-ERIM Series 438-ORG). ERIM Ph.D. Series Research in Management. Erasmus University Rotterdam. Retrieved from http://hdl.handle.net/1765/102953
- Loorbach, D., & Rotmans, J. (2010). The practice of transition management: Examples and lessons from four distinct cases. Futures, 42(3), 237-246.
- Roorda, C., Wittmayer, J., Henneman, P., van Steenbergen, F., Frantzeskaki, N., & Loorbach, D. (2014). Transition management in the urban context. Guidance manual. DRIFT, Erasmus University Rotterdam, Rotterdam.
- Frantzeskaki, N., Hölscher, K., Wittmayer, J. M., Avelino, F., & Bach, M. (2018). Transition Management in and for Cities: Introducing a New Governance Approach to Address Urban Challenges. In: Frantzeskaki, N., Hölscher, K., Bach, M., and Avelino, F. (Eds.) (2018). Co-creating sustainable urban futures – A primer on Transition Management in Cities, Springer.
- Avelino, F. (2017). Power in Sustainability Transitions: Analysing power and (dis) empowerment in transformative change towards sustainability. Environmental Policy and Governance, 27(6), 505-520.
- Holmberg, J., & Robèrt, K. H. (2000). Backcasting—A framework for strategic planning. International Journal of Sustainable Development & World Ecology, 7(4), 291-308.
- Nattrass, B., & Altomare, M. (1999). The Natural Step for Business. New Society, Canada.
- Quist, J. (2007). Backcasting for a sustainable future: the impact after 10 years. Eburon Uitgeverij BV.
- Greenwood, D. J., & Levin, M. (1998). Action research, science, and the co-optation of social research. Studies in cultures, organizations and societies, 4(2), 237-261.
- Greenwood, D. J., & Levin, M. (2006). Introduction to action research: Social research for social change. SAGE publications.

- Wittmayer, J. M., & Schäpke, N. (2014). Action, research and participation: roles of researchers in sustainability transitions. Sustainability science, 9(4), 483-496.
- Wittmayer, J. (2016). Transition management, action research and actor roles: understanding local sustainability transitions. Erasmus University Rotterdam: Thesis
- RTV Rijnmond (2013) Climate Initiative Rotterdam faalt. Available online: https://www.rijnmond.nl/nieuws/101929/Climate-Initiative-Rotterdam-faalt Accessed 12-06-2015.
- Trouw (2013) Rotterdam gaat meer in plaats van minder CO2 uitstoten. Available online: https://www.trouw.nl/groen/rotterdam-gaat-meer-in-plaats-van-minder-co2-uitstoten~a8631999/ Accessed 13-06-2015
- D'Haese, N. (2015) De transitie naar een bio-economie in Nederland en Vlaanderen vanuit havenregionaal perspectief. Erasmus Universiteit Rotterdam: Thesis
- Port of Rotterdam Authority (2018a) Jaarverslag 2017. Available online: https://jaarverslag2017.portofrotterdam.com/download_pdf Accessed 02-02-2018
- Nijdam, M. (2010). Leader firms: The value of companies for the competitiveness of the Rotterdam seaport cluster (No. EPS-2010-216-ORG). Erasmus Research Institute of Management (ERIM).
- Meijknecht, J., Correljé, A. F., & Van Holk, B. (2012). A cinderella story?: Restructuring of the European refining sector. Clingendael International Energy Programme.
- Vereniging Nederlandse Chemische Industrie (VNCI) (2012) The chemical industry in the Netherlands: world leading today and in 2030-2050. Available online: https://www.vnci.nl/Content/Files/file/Toekomst%20van%20de%20chemie%20in%20Nederland/VNCI_visie_2030-2050.pdf
- Vereniging Nederlandse Chemische Industrie (VNCI) (2013) The shale gas revolution and its impact on the chemical industry in the Netherlands. Available online: https://www.vnci.nl/Content/Files/file/Toekomst%20van%20de%20chemie%20in%20Nederland/Rapport_VNCI_Deloitte_Schaliegas_31-10-2013.pdf Accessed 12/05/2015.
- Port of Rotterdam Authority (2016) Port of Rotterdam aims to take the lead in the energy transition. Available online: https://www.portofrotterdam.com/en/news-and-press-releases/port-of-rotterdam-aims-to-take-the-lead-in-the-energy-transition accessed 05-02-2018
- RCI (2013) RCI Actieplan Energie: Rotterdamse uitwerking van het nationale Energieakkoord voor duurzame groei. Available online: http://www.rotterdam.nl/Clusters/Stadsontwikkeling/Document%202013/010Duurzaam/20131212%20RCI%20Actieplan%20Energie-Akkoord%20-%20DEF.pdf Accessed 14/05/2015
- United Nations (UN) (2015). UN Comtrade Database. Available online: http://comtrade.un.org/ accessed 20/04/2015.
- Port of Rotterdam Authority (2010) Facts & Figures: Rotterdam Energy Port and Petrochemical Cluster. Available online: http://www.portofrotterdam.com/nl/Brochures/Facts-Figures-Rotterdam-Energy-Port-and-Petrochemical-Cluster-Eng.pdf
- Port of Rotterdam Authority (2012) Energy Port. Available online: http://www.portofrotterdam.com/en/Brochures/Rotterdam-Energy-Port.pdf Accessed 14/05/2015
- Hill, N., Kollamthodi, S., Varma, A., Cesbron, S., Wells, P., Slater, S., Cluzel, C., Summerton, P., Pollitt, H., Billington, S., Ward, T. (2013) Fuelling Europe's Future: How auto-innovation leads to EU jobs. Available online: http://www.eurobat.org/sites/default/files/51cfcb6d4d573d59c7852a06e9782d1f.pdf accessed 02-12-2015.
- Port of Rotterdam Authority (2018b) About the Port Authority. Available online: https://www.portofrotterdam.com/en/port-authority/about-the-port-authority Accessed 14-03-2018
- Financieele Dagblad (FD) (2016) Rotterdamse haven wil geld in bedrijven stoppen voor versnelling energie-omslag. Available online: https://fd.nl/ondernemen/1178264/rotterdamse-haven-wil-geld-in-bedrijven-stoppen-voor-versnelling-energie-omslag# Accessed 2016-12-12
- Rijksoverheid (2016) Nationale Klimaattop. Available online: https://www.rijksoverheid.nl/actueel/nieuws/2016/10/26/nationale-klimaattop-2016-leidt-tot-grote-co2-reductie Accessed 30-10-2017
- NRC Handelsblad (2017) Wie niet mee wil doen moet weg uit de Rotterdamse haven. Available online: https://www.nrc.nl/nieuws/2017/03/22/wie-niet-mee-wil-doen-moet-weg-uit-de-haven-7514920-a1551461 Accessed 30-03-2017
- Financieele Dagblad (FD) (2018) Rotterdamse havenondernemers bijten terug in discussie over vergroening. Available online: https://fd.nl/economie-politiek/1236626/rotterdamse-havenondernemers-bijten-terug-in-discussie-over-vergroening# Accessed 2018-04-23
- Rotmans, J., Bosman, R., Loorbach, D., van Raak, R. (2017) Transitie-agenda Biobased haven Rotterdam. Available online: https://drift.eur.nl/wp-content/uploads/2018/02/Transitie-agenda-Biobased-Haven-Rotterdam.pdf
- Joosten, T., (2017) Blijft Rotterdam tot minimaal 2043 een steenkoolhaven? Available online: https://www.ftm.nl/artikelen/blijft-rotterdam-tot-minimaal-2043-een-steenkoolhaven?share=1 Accessed 2018-10-20
- Van Raak, R. Bosman, R., Rotmans, J. (2016) Transitie-arena havenbedrijf Rotterdam: naar een diverse, flexibele en veerkrachtige haven. DRIFT-verslag, januari 2016. [commissioned by Port of Rotterdam Authority Rotterdam]

Annex 7.1 Overview interviews

Stage 1: 12 interviews

	Position	Organisation	Date
1	*Director Public Affairs & Communication*	*ExxonMobil Benelux*	*28/04/2015 (telephone)*
2	*Manager Energy Transitions*	*Shell*	*15/06/2015*
3	*Head Government Affairs*	*BP Netherlands*	*17/06/2015*
4	*Director Energy*	*Akzo Nobel*	*27/05/2015 (telephone)*
5	*Managing Director*	*Neste Oil Netherlands*	*19/06/2015 (telephone)*
6	*Manager Corporate Strategy & Responsibility*	*E.on Benelux*	*26/05/2015*
7	*Senior Project Leader PorInt*	*Port of Rotterdam Authority*	*19/03/2015*
8	*General Manager Port Development & Management*	*Port of Rotterdam Authority*	*18/03/2015*
9	*Innovation Manager*	*Port of Rotterdam Authority*	*18/03/2015*
10	*Treasurer*	*Port of Rotterdam Authority*	*19/03/2015*
11	*Business Manager Chemical and Biobased Industry*	*Port of Rotterdam Authority*	*17/04/2015 (telephone)*
12	*Director*	*iTanks foundation*	*30/04/2015*

Stage 2: 21 interviews

	Position	Organisation	Date
13	*General Counsel*	*Deltalinqs*	*31/03/2016*
14	*Public Affairs Manager Energy Transition*	*Gasunie*	*22/03/2016*
15	*Director*	*Clean Tech Delta*	*17/03/2016*
16	*Programme Manager Biobased Economy*	*Ministry of Economic Affairs*	*28/04/2016*
17	*Project manager Strategy & scenarios at Shell*	*Shell*	*10/05/2016*
18	*Director Bio-Industrial Segment*	*Cargill*	*21/04/2016*
19	*CEO*	*ICO Nitrogen*	*29/03/2016*
20	*General Manager*	*North Seaweed*	*24/03/2016*
21	*Programme Manager Bio-Economy*	*ZLTO*	*03/05/2016*
22	*Senior Strategy & innovation adviser*	*Rabobank Rotterdam*	*16/03/2016*
23	*VP Biobased Innovations*	*Corbion*	*04/05/2016*
24	*Managing Director*	*Neste Oil Netherlands*	*31/03/2016*
25	*Founder & CEO*	*The Better Future Factory*	*09/03/2016*
26	*Director (VP) R&D*	*Suikerunie*	*15/04/2016*
27	*Managing Director*	*Europees Massagoed Overslag*	*14/04/2016*
28	*Managing Director*	*Eneco Business*	*14/04/2016*
29	*Innovation Manager Food & Biobased Research*	*Wageningen University*	*16/03/2016*
30	*President*	*Vopak Nederland*	*22/03/2016*
31	*Vice President Fuels*	*Lyondell Basel*	*20/04/2016*
32	*Distinguished Professor Biobased Economy*	*TU Delft*	*10/03/2016*

Epilogue to Chapter 7: Transition arena biobased and circular Port of Rotterdam

Over the course of 2016 stage 2 of the transition management intervention in the Port of Rotterdam took place. In stage 2 a new group of actors was selected, including actors from industries within the Port, in particular the chemical industry, and actors outside of the Port that already have some experience in the biobased and circular economy. I'd like to share the process and outcomes, because they provide an interesting insight in how the transition arena process takes shape and how it can be used to guide actors through transition space. In the process we've co-created pathways for potential future directions for the Port that are more in line with the challenges as identified in the first stage. Furthermore, discussion of the results gives an impression of the tangible outcomes such a process can deliver.

Stage 2 was initiated for two reasons: first, it became clear that from the initial stage a clear vision of where the port was heading was lacking. Thus, it was necessary to flesh out this vision more in a follow up process. Second, from our experience in other arena trajectories, we gathered that it would be beneficial to co-create such a process with change-minded actors from within the Port area and innovative players from outside the Port.

This second stage was again prepared in close cooperation with the strategy department as well as the director energy & industry of the Port Authority, over the months January to April 2016, and the actual arena sessions took place from April to October 2016 (see figure Epilogue 1.1). A longlist of potential participants from organisations within the Port was drafted as well as a 'wish list' with potential innovative participants from outside the port. Based on interviews with the people identified and desk research and snowballing from there, the final actor selection took place. The workshop format was similar to the first arena, with some adaptations, since participants would not be familiar with each other from the outset and there is more diversity in perspectives because of the different backgrounds.

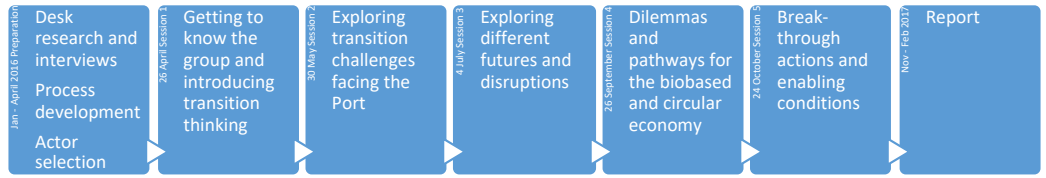


Figure Epilogue 1.1 Timeline transition arena biobased and circular Port of Rotterdam

The first session focused on getting to know each other, and participants' relation to the biobased and circular economy, and/or to the port of Rotterdam. Although perspectives differed quite clearly, shared commitment to a prosperous future for the Port emerged as the common denominator for the group. Also, the ambition of the Port Authority with this trajectory was spelled out clearly at the start:

"Some people see the Port of Rotterdam as the 'last man standing' in the fossil age. That is the last thing I want, that we play chess on a board on which no one is playing on anymore, that we miss the boat. (…) The goal for this arena is to develop a clear and shared vision on how we can land the biobased and circular economy in the Port of Rotterdam." (corporate strategist Port of Rotterdam Authority)

Transitions thinking was introduced, including a sketch of the Port's history with its previous transitions and participants were informed about the previous internal transition arena and the outcomes of that process. Insights from the preparatory interviews were shared and discussed with the participants, based on which the following three perspectives were prepared:

1. futuristic / high tech perspective, which is characterized by being knowledge intense, high- quality materials and resources, mild conditions, and radically innovative and high-tech.
2. perspective from existing petrochemical cluster, which is characterized by being located close to existing fossil clusters, large scale production, extreme conditions, low and medium value fractioning, fuels & resources and conventional high-tech.
3. perspective from existing agriculture, which is characterized by being located close to the source, with medium sized production, under mild conditions, low and medium valued cascade, (fuel and) resources and being conventional / medium tech.

These three perspectives were synthesised from the interviews and desk research. After discussing these perspectives, we reflected on the urgency and obstacles for the transition, in which again the focus on mass and volume that is core to culture in the port was addressed as an important barrier.

The second session focused on the transition challenge facing the Port, which can be summarized as:

- Growth is stagnant in Port of Rotterdam;
- Existing pillars are increasingly under pressure;
- On current measures of success (volume, mass, scale), Rotterdam is quickly losing out to other (Chinese) ports;
- Historically Rotterdam has successfully anticipated new developments (often against conventional wisdom of the time);
- A clear picture of potential alternatives futures lacks;
- Biobased and circular port as potential directions.

Participants involved in the biobased economy explain that there is a window of opportunity of about 5 years in which the foundations for the future biobased economy will be laid. Right now, business active in the field are choosing their preferred locations and it is likely that once these have materialized these form nuclei from which the next steps will follow. One of the participants takes their biobased activities in Thailand as an example. They build their first small plant in Thailand. *"This then becomes a logical place for follow-up investments."* (VP Biobased Innovations, Corbion)

The third session focused on scenarios and disruptions. Based on the discussions in the previous sessions, we prepared the following graph (figure Epilogue 1.2) and asked participants to position themselves in it. This formed quite a breakthrough in the group, because up to then, discussions had been quite dialectic on biobased vs fossil fuel industry. The way the graph is structured, however, allowed that they could both fail or co-exist. Discussions on this made clear that the group does not expect growth for the Port of Rotterdam to come from the fossil fuel industry, so that exploring biobased options would be a good exercise anyway, also for the fossil fuel industry.

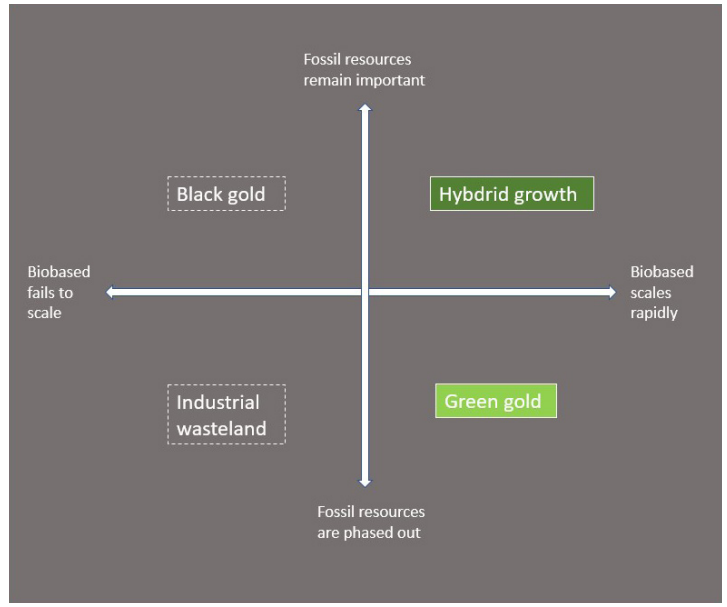


Figure Epilogue 1.2 Four ideal-type scenarios for the Port of Rotterdam

Then, the two scenarios that participants deemed most likely and desirable, 'hybrid growth' and 'green gold' have been explored using a wildcard technique, similar to the disruptions used in the first stage of the project, but then adapted to include disruptions to the circular and biobased economy, as well as to the fossil fuel industry. Again, this exercise brought out a lot of creativity and it helped participants to explore each other's assumptions about drivers and barriers of change.

The fourth session focused on dilemmas and pathways for the biobased and circular economy. We started with a discussion on the phase the biobased and circular transition is in and which strategies fit to different transition phases, see table Epilogue 1.1.

Predevelopment	Break-through
Doing 'something' is already a start	*Creating momentum or missing the boat*
Learning on experimental scale	*Learning and scaling up*
Working around institutional barriers	*Making institutional space*
Keeping options open	*Choosing and providing direction*
Experiments and start-ups	*Break-through and iconic projects*

Table Epilogue 1.1 Different transition phases require different strategies.

Based on the preparatory analysis and the input from previous sessions, five pathways we're identified of which 1 and 2 lead to the 'hybrid growth' scenario and 4 and 5 contribute to the 'green gold' scenario. The 3rd pathway connects the two scenarios:

1 *Biomass and biofuels in existing cluster*: this pathway is already partly under development through co-firing of biomass in coal fired power plants, biodiesel, bio-(m)ethanol and biopropane production. This basis can be build-out further to make other fuel flows, such as kerosene and bunker fuels, more sustainable. The pathway is tightly integrated with the existing petrochemical complex and leads to large scale flows and production in Rotterdam that have a neat fit with the strengths of the existing cluster.

2 *Cascading existing biobased flows*: This pathway focuses on creating more added value from existing biobased flows, by moving these flows up the biomass value pyramid, for example by not directly burning wood pellets but first extracting valuable substances from it, such as glucose for the chemical industry. Other valuable flows in this pathway are existing food and feed flows. Also, from these, increased value could be extracted by cascading. Particularly feed flows seem interesting, because current volumes are comparable to those in the chemical industry.

3 *Agro meets chemistry*: Through its geography and connectedness, Rotterdam is well positioned to link local agriculture chains and international flows. Combining local and international flows could result in stable feedstock and prices. Important conditions for the chemical industry. A good example is organising regional sugar beet economy connected to international sugar flows as input for the biochemical industry.

4 *Circular resources roundabout*: Favourable logistic position makes Rotterdam an interesting place to connect different resource flows, processing steps and recycling. Step-wise and over time a (biobased) resources roundabout could develop, where the scale would enable processing of sidestreams that would go to waste elsewhere.

5 *New nuclei and black swans*: Transitions involve surprises and disruptions. This means that unexpected developments and 'black swans' should be anticipated. This pathway puts in central focus developments that are currently in their infancy but have large potential in future. This requires identifying, attracting and investing in new flows and activities that could form nuclei for new industrial ecosystems. The take-off of developments in polylactic acid (PLA) over the last 5 years provides an example. Another development that is currently marginal but provides potential is packaging based on fungi. A third example are ideas for power based chemistry. The problem with this pathway is that it is very difficult to assess at the outset which development will actually take-off. Therefore, it is essential to continuously develop and monitor a broad portfolio of experimental activities.

These pathways have been developed further in different working groups, particularly focussed on developing breakthrough actions. It proved difficult for participants to think beyond existing institutions and arrangements. Most of the times when we challenged them to think about an alternative future, barriers in the present were invoked to explain why a different future was not possible. Once we managed to get the group into the thinking mode 'if these are the relevant pathways, how could we bring them further, the group did have a lot of input on concrete actions to further develop the pathways. These break-through actions and enabling conditions have been further developed and prioritised in the fifth session:

Break-through 1: Anaerobic fermentation

Anaerobic fermentation processes are a crucial step towards biobased (bulk)chemicals. As such, this break-through fits both the hybrid growth as well as the green gold future. It connects to three transition pathways: in producing biofuels, upcycling existing bio-flows and agro-meets-chemistry anaerobic fermentation can play an important role. The biobased economy differentiates several generations of feedstock, where the 1st generation are crops that could also be used for food, while 2nd (wood and agricultural or other organic waste streams) and 3rd generation (algae) do not compete. Biobased activities currently taking root in Rotterdam predominantly work with 2nd generation feedstock. Also, quite some attention is directed to extracting chemical building blocks from wood chips and pellets currently co-fired in coal plants and the technologies to do so are currently in development. Anaerobic fermentation forms the linking-pin between different generations of feedstock and the Port of Rotterdam could benefit from attracting and further development of (actors with) anaerobic fermentation knowledge and technology.

Follow-up:

- Tailored acquisition for businesses that could bring anaerobic fermentation to Rotterdam;
- Organising knowledge exchange and network development between chemical industry and knowledge partners in the area of anaerobic fermentation.

Break-through 2: Sharing of infrastructure

Sharing of infrastructure, like a shared pre-treatment facility or water sanitation, the availability of resources for production, such as fresh water and exchange possibilities through pipelines, but also making available of existing plants and installations amongst businesses in the Port, is crucial to come to promising business cases for biobased processes at this phase in the transition. Readily available installations could prove advantageous for the attraction of new business in comparison to other locations without such facilities. Also, it might be possible to reuse or extend the lifetime of existing installations, providing incumbent businesses in the Port new opportunities in the transition from fossil to biobased. Already some experimentation is taking place with some of these ideas in the plug and play concept of area E on the Maasvlakte.

Follow-up:

- Mapping the availability of existing infrastructure amongst Port businesses and the possibility to share these with others;
- Develop a platform (cf. Floow2) to enable sharing of existing infrastructure;
- Mapping the need for new shared infrastructure and exploring the possibilities for pre-financing and managing such infrastructure.

Break-through 3: Deepening strategy for (international) biobased chains

A biobased economy consists of supply chains and industrial ecosystems. Sometimes a business case can be developed by identifying and introducing one missing link to the port industrial ecosystem. In many cases, however, an approach is needed covering whole supply chains: a supply chain business case. Since such chains are often international, it might be beneficial for Rotterdam and its partners to become active at other places in the world, to develop supply chains that can move through Rotterdam and as such create added value here. Thus, Rotterdam could play a frontrunner role in a number of selected cases based on healthy self-interest.

Previously we found that in addition to a robust strategy, also some measure of selectivity is needed: don't follow hypes, but chase options that are literally sustainable and attractive in the long run. This helps to make choices between all possible developments. The options which are pursued in all pathways, need to have depth, meaning: Developing an international supply chain, or really connecting different industries and research takes time, resources and support. For this, a new, much more intensive multi-disciplinary form of business development is needed, that can work with ample manpower and financial resources for longer time on developing a select number of promising (international) biobased chains. In that, it is necessary to also direct attention to feedstock and volumes in which the Port is not already strong. Indeed, sensitivity for new potential markets and customers is crucial. Since these lie outside of existing customers and port businesses, this requires extra effort.

First steps:

- Setting up of interdisciplinary supply chain business development team;
- Carrying out sanity checks on the break-throughs and pathways presented in this transition-agenda;
- Identifying promising markets, chains, missing links and opportunities for Rotterdam;
- Organising support for long term investments in the three most promising supply chains, knowing that it can easily take 10 years for these chains to be up-and-running and profitable.

Precondition 1: Tradability of biobased resources, intermediates and products

If Rotterdam wants to become a biobased hub, tradability of biobased resources, intermediates and products is crucial. To ensure adequate tradability standardization and homogenization and the development of indexes and listings for resources and intermediates are needed. At the moment, there is still several candidates that could take the role of standardized 'platform' in biobased chemistry: wood pellets, sugar (water), lignine-derivatives, ethanol and syngas. Developments in the coming years are pivotal to gauge which platform or platforms will take precedence. Rotterdam could take a central role in influencing this standardization process by developing indexes for standardized resources and intermediates of prescribed quality (e.g. the Rotterdam Sugar Crude Index) and as such claim a central place in global biobased trade and processing.

First steps:

- Explore biobased platforms for which Rotterdam could offer added value;
- Take an active role in developing standards and norms for these platforms, through standardization organisations NEN and CEN;
- Develop a Rotterdam index for these platforms.

Precondition 2: Unlocking knowledge for the biobased economy

The biobased economy develops at the intersection of chemistry, energy, transport, agri- and horticulture, food and feed and pharmaceutics and cosmetics. The Netherlands is well positioned regarding knowledge in these fields, but knowledge exchange across the boundaries of these domains and (scientific) disciplines proves challenging. That this knowledge subsequently finds its way into the Port of Rotterdam is even trickier. R&D-consortia around specific promising resources, platforms or process steps, across the boundaries of different sectors and disciplines and access to attractive financing mechanisms to enable risky pilots and scaling initiatives are in dire need. Best practices are available, including PlantOne test facility and the BE-Basic consortium. Such initiatives do not develop without a hitch and require perseverance.

Follow-up:

- Start activities specifically focused on bringing together people from different backgrounds that are relevant for the bioeconomy, around specific challenges or projects, such as:
- Develop and engage research consortia consisting of industry partners and knowledge institutes, e.g. around promising supply chains (see break through 3), and preventing to bet everything on one horse early on (such as wood);
- Set up a competition for biobased solutions for interdisciplinary teams.

Precondition 3: Minimising regulatory risks

A lot of developments in the biobased and circular economy are relatively new. This brings along uncertainty, not just regarding financing, but also in terms of regulation. Developing smart mechanisms, such as rule poor or free zones for pilot facilities, but also quick and customer friendly permitting processes can be crucial for scaling. An example might be the approach used to develop offshore wind parks, for which the government took care of studies and environmental permits before tendering specific locations, instead of having each interested party invest in this themselves. This eliminates the risk of plans stalling in environmental procedures, including the costs and delays involved for initiators.

First steps:

- Exploring possibilities of rule poor or free zones for biobased industry in the Port of Rotterdam;
- Support for easing permitting procedures for the biobased industry

Precondition 4: Lobby for SBE+ for biobased feedstock

An important factor in the scaling up of the biobased economy is the difficult competitive position with respect to fossil raw materials (especially with current oil prices). In the electricity sector, a similar problem was tackled with the SDE+ subsidy, which finances the difference between cost and market price, making renewable energy more attractive. A 'coalition of the willing' of biobased-minded parties from within and outside the port of Rotterdam is in a strong position to lobby for a Stimulating Biobased Economy (SBE+) scheme in The Hague. This may well give rise to resistance from parties that, for the time being, benefit from low fossil oil and feedstock prices.

First steps:

- Organize a 'coalition of the willing' of parties (inside and outside the port) who want to jointly lobby in order to stimulate the biobased economy;
- Develop a plan with joint lobby topics, including an SBE+ incentive scheme.

Precondition 5: New role and competences port authority

The port authority has a leading role to facilitate the transition to a circular and biobased port. This means an internal transition to a pro-active supply chain manager, who fills in missing links in new biobased supply chains. And even an organisation that stimulates new, international supply chains. Considering the relatively short time span for action of a maximum of 5 years from now, means a considerable challenge for the port authority to achieve its own internal transition.

Reflections

The main breakthrough from this transition arena process was that it became clear amongst the actors involved, both from incumbent industries in the port and innovative actors outside of the port, that the fossil industry is no longer a growth market in Europe, and in fact its future is probably quite bleak. Hence, if actors want a bourgeoning future for the Port, other pathways should be explored. As such, a shared sense of urgency was established in order to venture onto exploring different potential futures.

Furthermore, it became clear that the chemical industry in the Port of Rotterdam is not a uniform cluster. Rather, it consists of a chain of different processes with varying actors responsible for different steps in the process. Discussing potential different futures, it also became clear that a transition towards a biobased and circular chemical industry presents different challenges and opportunities depending on the place in the chemical chain: the closer an actor is to the current feedstock (fossil resources) the more difficult it is to transition, and the higher up the chain, the easier it is to work with different inputs. For example, if liquid sugar would be used as a 'new crude' feedstock, given its molecular structure, it would land about halfway in the existing chemical chain. Which means that it would render the first half of the chain, closest to the fossil feedstock, obsolete. As such, the transition to a biobased and circular economy might lead to tensions and friction within the existing chemical industrial complex.

This insight provides important lessons for transition governance in transition space: it is very important to understand the opportunities for transformative change for different actors involved in the industry under pressure, because often the potential for such change varies across the industry, where some actors, due to their position in the field, have other options than other actors in a different position. As such, it becomes possible distinguish between actors' and involve those incumbent actors that have the most transformative potential in a transition (arena) process.

8. *Is it possible to deliberately destabilise the fossil fuel regime? Evidence from the fossilfree divestment movement in the Netherlands*

8.1 Introduction

Over the course of this thesis, the opportunity arose to get involved in a destabilising intervention myself. I made use of my role and position as researcher to support a team of action-researchers and activists to deliberately influence the financial sector to revise its ties with the fossil fuel industry. Based on the transition space framework the societal context was assessed as supportive for such a destabilising effort. Furthermore, the transition space framework suggests that transformative change comes from niches in cooperation with peripheral incumbents rather than the more central incumbents. This insight was mobilized to focus efforts on an institutional investor rather than a fossil fuel producer. Although institutional investors are key to a functioning regime, they are not themselves at the centre of the fossil fuel energy regime, i.e. they are not active in producing and supplying fossil fuels themselves. In this Chapter, I explore whether it is possible and effective to put external pressure on a peripheral incumbent in order to weaken its commitment to the fossil fuel regime.

While this intervention is more activist than academic, it has been sparked by my interest in transition space, destabilisation and incumbent agency. As such, it also provides interesting insights to enrich the framework and to explore new types of interventions to accelerate the energy transition. Furthermore, the findings presented in this Chapter run up to February 2020, when the campaign was still in full swing. Therefore, ABP's decision, taken in October 2021, to indeed heed our demands and fully divest from the fossil fuel industry, falls outside the scope of this Chapter. The decision, however, only underlines the findings presented in this Chapter and indeed shows the effectiveness of such activist interventions at this stage in the energy transition.

8.2 Context: Fossil fuel divestment movement

I engaged with the fossil fuel divestment movement, which aims to persuade investors to divest their funds from the fossil fuel industry in face of growing threats from climate change. The roots of the fossil fuel divestment movement lie in the US. In 2008 the non-governmental organisation 350.org was founded by a group of university friends and author Bill McKibben to create a movement that reflected the scale of the environmental crisis, resulting in the fossil free divestment movement (350.org, 2015). This is "an international network of campaigns working together toward fossil fuel divestment in our communities" (Fossil Free, 2015a). This divestment from fossil fuel movement is based on the South African divestment campaign. This campaign was set up to address the issue of South African Apartheid. By the mid-1980s, the result was 155 campuses, 26 state governments, 22 countries, and 90 cities had divested from companies doing business in South Africa (Fossil Free, 2015b). This campaign helped to make an end to the Apartheid. According to the movement, the fossil free campaign is set up to help break the hold that the fossil fuel industry has on the economy and governments (Fossil Free, 2015b).

The fossil fuel divestment movement claims that investing in fossil fuels has an environmental and financial risk that needs to be taken into consideration. This financial argument has come to be known as the 'Carbon Bubble'. The Carbon Bubble is a financial concept introduced by the Carbon Tracker Initiative, a not-for-profit financial think tank "aimed at enabling a climate secure global energy market by aligning capital market actions with climate reality" (Carbon Tracker Initiative, 2015). Its report "Unburnable Carbon – Are the world's financial markets carrying a carbon bubble?" was the first to claim that already in 2011 the world has used over a third of its 50-year carbon budget. Furthermore, the report claimed that the reserves known by then were equivalent to 2,795 Gt CO_2, which is almost five times more than the still burnable carbon budget (565 Gt CO_2). So they concluded that in order to meet the 2°C target, as agreed in the climate negotiations in Cancun, almost 80% of all fossil fuel reserves would need to stay unburned (Carbon Tracker Initiative, 2011).

In the Netherlands, the Fossilfree movement started in October 2013, with a speech by Bill McKibben at the VU University in Amsterdam. In order to develop the Dutch presence of the movement, in the beginning 350.org financed one employee, the rest of the movement works on volunteer basis. Since its inception in 2013, the movement has grown to amount to the following campaign groups:

- Universities and Colleges:
  - DivestVU – Amsterdam
  - FossilFree UVA/HVA – Amsterdam
  - TU/e Fossil Free – Eindhoven
  - Fossil Free UU – Utrecht
  - Fossil Free WUR – Wageningen
  - Gofossilfree VHL – Leeuwarden
  - Fossil Free Leiden University – Leiden
  - EURFossilFree – Rotterdam
  - Others: AHK in Amsterdam, RU in Nijmegen, De Has in Den Bosch, and the HKU in Utrecht
- Municipalities:
  - Amsterdam Fossielvrij
  - Boxtel
  - Fossielvrij Utrecht
  - Roermond
  - Velsen
  - Weert
  - Groningen
  - Den Haag
- Pension funds:
  - ABP Fossielvrij – fossilfree pension fund for government employees
  - Zorg en Welzijn Fossielvrij – fossilfree health care pension fund
  - Pensioenfonds Horeca en Catering fossielvrij – fossilfree hopitalty pension fund
- Fossilfree culture
- Fossielvrij onderwijs – fossilfree education
- Reclame fossielvrij – fossilfree advertisement

When the Fossilfree movement first came to the Netherlands at the end of 2013 it initially copied the US strategy of raising members amongst university students and supporting them in developing campus campaigns. This is still an important part of the Dutch fossilfree movement, as can be seen from the list of campaigns above. However, the big difference with the US is that Dutch universities are publicly funded, instead of privately and don't have the kind of investment funds that US institutions tend to manage, based on tuition fees by students. As such, a group of six campaigners, including myself, over the course of a few months beginning of 2014 developed a strategy to identify potential targets for a successful divestment campaign in the Netherlands. Pension funds became top of the list, because of the immense investments these funds make and because in essence the money belongs to ordinary people which might be willing to call on their pension funds to green their portfolios. As some of the initial campaign group, including myself, were employed at universities, we were members of the ABP pension fund, which is the pension fund for all Dutch (semi-)government employees. This includes for example civil servants working in Ministeries and municipalities, the police, but also professors working at public universities and teachers in primary and secondary schools, which are also public in the Netherlands. At that moment in time, a fortunate opportunity arose with the upcoming election of the ABP accountability board, which came to be start of the ABP fossilfree campaign on which this Chapter focusses. I have been part of this campaign in the following ways: Together with the initial group of six campaigners, I laid the basis for the ABP fossilfree campaign, by co-authoring a sustainable voting guide and organising strategy meetings, developing campaign materials, and drafting press releases. While I kept following the campaign as it evolved, my involvement fluctuated over the years. I have been closely involved from the start in 2014 to about January 2016 and again from January 2020 to May 2020, when the campaign strategy was evaluated and efforts towards ABP were intensified.

8.3 Findings: Timeline of ABP-fossilfree campaign

The timeline is divided in three parts, each pertaining to a different source of developments that influenced the campaign. The bottom segment shows developments from ABP, which formed input for the ABP fossilfree campaign, most notably its responsible and sustainable investing report. The middle segment forms developments originating from the ABP-fossilfree campaign. The top segment refers to television coverage of the campaign.

8.3.1 External pressure, performance problems and weakening commitment of actors

Build-up of external pressure

We have identified activities by the Fossilfree campaign resulting in build-up of pressure on the fossil fuel regime in two ways, directly by activities focussing on ABP and indirectly by media reporting on the campaign. In several cases reporting by the media was induced by campaigners sending out press releases to their journalist contacts. We will discuss both direct and indirect effects in more detail below.

ABP-fossilfree campaign directly focussed at ABP: reports, petition, letters

In hindsight it becomes clear that the ABP-fossilfree campaign started informally with the 'sustainable voting guide' for the ABP accountability body overseeing the decisions of the board of ABP. In co-creation a core group of six activist developed a 'sustainable voting guide' for the ABP accountability body, a body that oversees and checks the decisions of the ABP board, which ABP members could vote for. In order to prepare this voting guide, the campaigners dug into ABPs investments and found out that about 10% of its investment portfolio was related to high carbon industries. The aim of the sustainable voting guide was to help ABP members vote for candidates that find sustainability important. In order to develop the voting guide, candidates for the accountability body were asked their opinion on several questions related to sustainability on a four- point scale.

The carbon bubble featured prominently in this questionnaire, with questions such as:

- To what extent do you think ABPs investments in fossil fuel companies are a financial risk?
- To what extent do you find ABPs current sustainability criteria adequate concerning climate issues?

Based on the questionnaire, five candidates were recommended as sustainable. Eventually, three out of these five 'sustainable' candidates were elected in the accountability body. As such, the voting guide resulted in the first contacts within ABP and marked the start of ABP as an important target of the Dutch Fossilfree campaign.

Figure 8.1 Timeline of ABP-fossilfree campaign up to February 2020.
Sources: ABP-fossielvrij website newsfeed and Fossielvrij NL annual report

The voting guide was followed by a letter addressed to the board of ABP, initiated by Fossilfree and further signed by 17 NGOs together amounting to 1 million members. The letter contained an urgent request to the board of ABP to divest from fossil fuels and was handed over to the board in person (see below).

ABP bestuur
Beukenhorst
Coriovallumstraat 46
6411 CD Heerlen

cc. Pensioenfederatie

Betreft: Risico's Carbon Bubble

1 september 2014

Geachte Bestuursleden van het ABP,

Pensioenfonds ABP is de grootste Nederlandse vermogensbeheerder met een totaal beheerd vermogen van 300 miljard euro, namens 2,8 miljoen werknemers in de sectoren overheid en onderwijs. Daarmee vervult het ABP een grote en essentiële maatschappelijke rol in de Nederlandse samenleving. Met deze brief willen wij onze toenemende zorgen over klimaatverandering en de daarmee gepaard gaande financiële 'Carbon Bubble' uiten en het ABP oproepen om hierin haar verantwoordelijkheid te nemen.

Aangezien sparen voor je pensioen een investering in de toekomst is, zijn steeds meer pensioendeelnemers van mening dat hun premie duurzaam moet worden belegd [1]. Zij hebben groeiende twijfel bij beleggingen in fossiele energiebedrijven als Shell, Chevron, Exxon Mobil en BP. Zowel vanwege de morele vragen die in toenemende mate gepaard gaan met de fossiele industrie, maar ook vanwege de financiële risico's die door berekeningen van recent onderzoek de winbaarheid van de fossiele reserves in twijfel brengen.

Momenteel belegt het ABP ongeveer 10 miljard Euro in CO_2-intensieve aandelen. Dit zijn aandelen in de fossiele energie industrie, zoals Shell, Exxon Mobil, Total, Chevron en Petróleo Brasileiro. Berekeningen van het Carbon Tracker Initiative [2] laten zien dat 60-80% van de bewezen fossiele reserves van deze fossiele bedrijven in de grond moeten blijven zitten om opwarming van de aarde te beperken tot 2°Celsius. Dit betekent dat de aandelen van de genoemde fossiele bedrijven sterk overgewaardeerd zijn, en een grote kans hebben om 'stranded assets' te worden. Deze overwaardering van fossiele reserves wordt ook wel de 'Carbon Bubble', ofwel koolstofbubbel, genoemd. Voor deelnemers van het ABP-pensioenfonds is dit een groot risico.

Steeds meer beleggers [3], financiële instellingen [4] en politici maken zich zorgen over deze koolstofbubbel. President Obama gaf 14 juni j.l. een interview waarin hij erkende dat de meerderheid van de fossiele voorraden waarschijnlijk nooit gebruikt zullen worden. 'Science is science', zei hij. 'We are not going to be able to burn it all' [5]. Minister van Financiën Jeroen Dijsselbloem, heeft op 20 mei j.l. in de Tweede Kamer toegezegd dat de Nederlandse Bank haar visie geeft op de risico's van de koolstofbubbel voor pensioenfondsen, banken en verzekeraars. Volgens een Europees onderzoek naar de koolstofbubbel en het Europese financiële stelsel, blijkt dat vooral pensioenfondsen kwetsbaar zijn voor de risico's. Samen met nog 3 andere Nederlandse pensioenfondsen wordt het ABP hierin ook expliciet genoemd [6]. Ook het adviesrapport van HIP-investors [7] raadt pensioenfondsen aan het komende jaar 50% van de assets in fossiele energiebedrijven te verkopen en de komende drie jaar de rest. In plaats daarvan raden ze aan te herinvesteren in clean energy en andere fossiel-vrije fondsen. Er zijn steeds meer 'fossilfree indexen' zoals de in mei 2014 gelanceerde index van Blackrock, FTSE Group en The Natural Resources Defense Council [8]. Daarnaast zijn er steeds meer instellingen die hun geld terugtrekken uit fossiele energiebedrijven. Niet alleen de Noorse [9] en Zweedse pensioenfondsen [10], maar ook de 'British Medical Assciation' [11] en de Wereldraad van Kerken [12] hebben onlangs dit besluit genomen.

Wij raden u aan zo snel mogelijk kennis te nemen van deze ontwikkelingen en de verschillende aanbevelingen die reeds zijn gedaan voor institutionele beleggers als het ABP om de financiële risico's van de koolstofbubbel te minimaliseren en actief bij te dragen aan een beter, toekomstbestendig klimaat in zowel ecologisch als financieel opzicht.

Wij roepen hierbij het bestuur van het ABP op, om de investeringen in kolen-, gas- en oliebedrijven op basis van deze bovenstaande redenen en rapporten serieus te heroverwegen en zo snel mogelijk de financiële middelen hieruit te divesteren [13].

Graag ontvangen wij een inhoudelijke schriftelijke reactie op het bovenstaande vóór 19 september aanstaande en zouden wij graag zo snel mogelijk met u hierover in gesprek gaan.

Hoogachtend,

Farah Karimi, Directeur Oxfam Novib
Sylvia Borren, Directeur GreenPeace Nederland
Edwin Huizing, Algemeen Directeur Hivos
Hans Berkhuizen, Directeur MilieuDefensie
Marjan Minnesma, Directeur Urgenda
Jelle de Jong, Directeur IVN
Daniëlle Hirsch, Directeur Both ENDS
Peer de Rijk, Directeur WISE
René Toet, Algemeen Directeur Climate Neutral Group
IJmert Muilwijk, Voorzitter Organisatie Duurzame Energie
Mart Lubben, Voorzitter Studenten voor Morgen
Paul Hendriksen, Voorzitter Stichting Transition Towns Nederland
Ko van Huissteden, Voorzitter Stichting Schaliegasvrij Nederland
Jan Rotmans, Professor Duurzame transities, Oprichter DRIFT
Pier Vellinga, Hoogleraar Klimaatverandering, Voorzitter Urgenda
Egbert Tellegen, Professor dr. Sociologie en Milieudeskundige
Peter van de Wiel, Wethouder Milieu & Duurzaamheid Gemeente Boxtel
Bouwe de Boer, Energiecoördinator Gemeente Leeuwarden
Tom Vellinga, Coördinator Netwerk Duurzame Dorpen
Corinne de Jonge van Ellemeet, Netwerkdirecteur De Natuur en Milieufederaties
Liset Meddens, Nationale Coördinator Fossielvrij NL bij 350.org

Bijlage: onderbouwing 'Noodzaak aanpassing ABP beleggingsportefeuille'

[1] http://www.natuurenmilieu.nl/nieuws/perscentrum/20120501-klimaatvriendelijk-beleggen-staat-bij-pensioenfondsen-nog-in-de-kinderschoenen/

Figure 8.2 Letter to ABP board. Source: Fossielvrij.nl, 2014.

With the letter the involved NGOs sent out a press release to their media contacts. National newspaper De Volkskrant (2014) reported on the letter. ABP responded to this by scheduling a meeting with the founders of the ABP Fossilfree campaign. In the meantime, work started on a petition to rally ABP members to call on their pension fund to divest from fossil fuels. The main demands of the petition were:

"We call on the board of ABP to gradually, responsibly and as soon as possible phase out investments in fossil fuels, while in the meantime we demand that ABP:

- *Doesn't engage in new investments in companies involved in exploration, exploitation and sales of fossil fuels;*
- *Completely divests within two years from companies that are active in the most detrimental and risky fossil fuels (coal, tar sands & shale gas);*
- *Within six months publishes research on the financial risks of investments in the fossil fuel industry and the influence of divestment on my pension;*
- *Is transparent about investments in the fossil fuel industry and the losses already incurred in investments in hard coal over the last three years."* (Fossilfree, 2014)

By March 2015 the petition was signed by over 10.000 people and a public event was organized at Pakhuis de Zwijger, a popular cultural meeting place in Amsterdam, where the petition was handed over to ABPs vice-president Jose Meijer. The event was attended by approximately 150 people and included several talks from professors in sustainable finance and ethics and a discussion panel including leading (sustainable) investors. Involving respected scholars and investors contributed to giving the event and the petition the necessary weight.

During the event, Jose Meijer thanked the signatories to the petition for their efforts in keeping ABP sharp, but explained that ABP is not planning to divest from fossil fuels anytime soon. Still, she vowed that ABP would answer any questions and concerns on this issue. In response, the next step in the campaign was to have campaigners send as much letters as possible to ABP to voice concerns about the ecological and financial risks involved in fossil fuel investments.

In October 2015 ABP presented a new sustainable investment policy, which included:

1. Stricter sustainability criteria for its investment portfolio;
2. Review of all 4.000 companies in its investment portfolio;
3. Active engagement with companies that don't yet meet the criteria but are willing to work on that, and shedding of investments in companies that don't show improvement;
4. Measurable goals for the year 2020, reducing the CO_2-footprint of its investment portfolio with 25% and doubling its investment in sustainable companies to € 58 billion;
5. More input from the members and beneficiaries of ABP on its investment decisions.

Although it is unclear to what extent the ABP Fossilfree campaign influenced this new policy, it seems to have played a role, as the petition was timed in order to be included in preparation of the policy. Also, journalists make this link in discussing ABP's new sustainability policy.

8.3.2 Indirect effects: media reporting, diffusion of carbon bubble narrative

Besides the direct actions focussed at ABP, external pressure also built-up by media reporting on the campaign. A news article by on De Correspondent (2014), an online news outfit, was one of the first to describe the carbon bubble in Dutch media, mentioning the fossilfree movement. In the following six months multiple articles were written in (opinion sections of) national newspapers. On the 16th of March, a day before handing over the petition, "De Volkskrant" (2015a) published an article co-authored by myself, a fossilfree campaigner and two professors titled "Your pension forms a threat for the future". A day later, on the morning of the petition event, APG, responsible for managing ABPs investment portfolio made the front page of De Volkskrant (2015b) with a statement that they will start investing 100 million in offshore wind energy. A contact within ABP confirmed that this announcement was partly driven by the pressure of the fossilfree petition. This gives the impression that ABP was sensitive to the petition and wanted to create positive publicity. After handing over the petition, multiple news items were published and broadcasted on both ABP fossilfree, and the carbon bubble, including international media such as The Guardian (2015).

Furthermore, in June 2015 another national newspaper, Trouw, focussed on the issue for a whole week, starting with a big article on the front page for which they held a poll under pension fund members whether they would like their pension funds to divest from coal, oil and natural gas in order to reduce its climate impact. The poll found that 64% of the people would like their pension fund to divest, even if that would result in lower pension allowances (Trouw, 2015). During the week every day different news articles on the matter were published, including an interview with ABPs president on the issue.

In October 2015, different media reported when ABP announced its new sustainability policy. In this reporting several times the link to the ABP Fossilfree campaign is made. Furthermore, the campaign made it into prime time national tv-shows several times, including national evening news, a large item on Nieuwsuur, which provides deepening of news items, in which ABPs president was interviewed and critically questioned on her investment decisions. Furthermore, a one-hour documentary on Tegenlicht, a popular documentary show on public television, was devoted to the ABP fossilfree campaign and aired just before the climate negotiations in Paris. This documentary included a round table discussion between campaigners and members of ABPs board. As such the media coverage resulting from the campaign has been quite significant, introducing the carbon bubble narrative and link between pension funds and climate change in the public debate and forcing ABP to develop their strategy concerning the carbon bubble.

8.3.3 Growing performance problems within the regime

Assessing the growing performance problems within the fossil fuel regime as a result of the campaign proves tricky, since the energy system is so complex with so many different dynamics influencing the fossil fuel industry at the same time that it is difficult to say with certainty which moves from the campaign resulted in which impacts on and responses from ABP. A prominent example is the role of the oil price. Over the course of the campaign the oil price fell tremendously, which slashed the margins of fossil fuel producers. As such, I constrain my reflections to developments that put pressure on the fossil fuel regime and can directly be linked to the fossilfree campaign and the actors the campaign targets. Following Turnheim & Geels (2012), I structure my discussion in three parts 1. legitimacy of the fossil fuel industry; 2. financial problems in the industry; 3. weakening commitment of actors.

Legitimacy of the fossil fuel industry

The increasing public pressure of the divestment movement affects the legitimacy of the fossil fuel industry. What we observe is that every investor who announces to divest from fossil fuels dents the image of the industry. A prominent example is that descendants of John D. Rockefeller, who laid the foundations for the US oil industry, announced to divest their wealth from fossil fuels. They draw on carbon bubble discourse to argue that "[t]here is no sane rationale for companies to continue to explore for new sources of hydrocarbons" (The Guardian, 2016). Also, we observe that over the time span of our research, the carbon bubble and stranded assets narrative has become increasingly prominent in the global debate about energy and climate change, with authorative backers such as the Bank of England, IMF, IEA and the Dutch national bank. In response, fossil fuel majors such as Shell respond that "fears for a carbon bubble are unfounded" and "when investors divest, others will take their place. That will probably mean less churches and universities and more hedge funds." (De Volkskrant, 2015c). While Shell generally has the policy that it doesn't react to social movements, this statement might indicate that something is going on. Furthermore, such a view might underestimate the role of public legitimacy in keeping a social license to operate. Increasingly vocal institutional investors underline this. At 2015's AGM of Royal Dutch Shell, APG, the asset manager of ABP, for example asked critical questions about Shell's plans to drill in the arctic (NOS, 2015). By having a public active engagement approach ABP shows it is getting more critical towards the fossil fuel industry. When Shell eventually decides to refrain from their Artic drilling plans, ABPs president claims to have had an influence: "That happened partly because of us" (FD, 2015).

Financial problems for the fossil fuel industry

As pointed out before, the fossil fuel industry is not faring so well over the course of the studied period in financial terms. It is compelling to claim this is part of the success of the campaign, but there seem to be more likely candidates, including a low oil price and reduced demand for coal. What can be linked to the campaign, however is that the decreased margins on fossil fuels have decreased the value of most fossil fuel holdings. Several financial analysts have used this as an argument to underline the financial risk of fossil fuel assets. Analysis by Changerism (2015) showed that ABPs investments in high carbon assets decreased by 5.3 billion comparing Q3 2014 to Q3 2015. Over this time span, ABP had completely divested from several coal companies and greatly reduced its holdings in oil and gas companies. Only half of this decrease could be explained by the falling value of company stocks, the other half was because ABP reduced its positions in these stocks. When ABP was confronted with this analysis, they responded that it was largely correct, but that it should not be interpreted as divestment. "We are not massively selling fossil fuel stocks. Rather the drop in value of the investments is caused by significant decreases in resource prices over the last two years." […] Our intended shift from fossil to renewable energy investments does play a role, but this is only a very minor part of the explanation." (FD, 2015)

From this we conclude that there are links between the carbon bubble narrative as enacted by the divestment movement and current financial problems of the fossil fuel industry, but that the link is reported as minor. The least we can conclude is that pressure from the movement doesn't help an industry that is already under pressure from other developments.

(Weakening?) commitment of actors

When we analyse the commitment of actors we come back to several findings of the previous paragraphs. First of all, it becomes clear that next to the divestment movement, there is a growing number of (international) organisations, adopting and reproducing carbon bubble discourse, including financial analysts and authoritative (financial) institutions such as the IMF and national banks. This can be interpreted as a weakening commitment of these actors to the fossil fuel industry. Also ABPs increasingly strict sustainability policy and growing vocality at shareholder meetings of the fossil fuel industry can be interpreted as signs of weakening commitment of this institutional investor to the fossil fuel industry. Moreover, the decrease in high carbon investment of € 5.3 billion is a clear sign of weakening financial commitment, although it is unclear whether this is a temporary effect because of low fossil resource prices, or whether it will be a lasting divestment.

Probably less surprising, fossil fuel industry engages in defensive activities, such as the CEO of Shell claiming that other investors will take the place of churches and universities, showing it still has a strong commitment to their core business of producing and supplying fossil fuels.

8.4 Discussion

I observed effects of the activities of the fossil fuel divestment movement in terms of changes in discourse, institutions, relations, resources and practices:

Discourse

The fossil fuel divestment movement introduces and enacts a new storyline – the carbon bubble – into the climate change discourse, making a link between the fossil energy and financial sectors, challenging not only the fossil fuel industry's business model with regards to its effects on climate change, but also investors that by investing in the industry support it. As such, it engages in creative work, introducing a new storyline, with which it aims to undermine the acceptance of fossil fuel production and use in society. Furthermore, we observe that such new discourse requires active enactment in order to be taken up and spread. Every time, the fossilfree campaign makes the news, or an investor announces to divest from fossil fuels, the carbon bubble narrative gets attention and becomes reproduced. Moreover, what makes the campaign and the carbon bubble narrative powerful is that it was taken up and endorsed not only by green activists, but also by financial experts. This rather unfamiliar coalition makes it very difficult to denounce the carbon bubble narrative as environmental extremism that should not be taken seriously.

Institutions

While the aim of the divestment movement is to change investment practices and thereby undermining the power of the fossil fuel industry, it is changing institutions along the way. At ABP, the divestment campaign challenges the rationale that institutional investor's main concern is making returns on investments. This is a highly institutionalised view of investors and changing this rationale raises eyebrows in the investment community. However, under pressure of the divestment campaign ABP's investment policy has been sharpened several times, citing sustainability concerns as important driver.

Relations

In terms of actor relations and networks, we observe that in destabilisation of the fossil fuel regime a host of actors are involved, which are outside the usual scope of studies adopting a multilevel perspective. Often these focus on state vs market relations or incumbents vs new entrants, which is central to innovation studies inspired transitions literature. We observe that social movements play a key role, as well as the media, research institutes, financial analysts and central banks.

In terms of relations between actors, it is interesting to note that the fossilfree divestment campaign does not focus directly on the fossil fuel industry, but on those actors that through their investments support the industry and thus contribute to making fossil fuel exploitation possible.

It aims at untying (institutional) investors from the fossil fuel industry. As such, it doesn't focus on the central incumbents (as most MLP informed studies tend to do), but rather on the links between the more peripheral financial institutions with the fossil fuel industry. ABP taking a more vocal and activist investor role with Shell underlines this finding.

Resources

In terms of resources flowing to the fossil fuel industry, the results of the fossil fuel divestment campaign are ambiguous. We have found that ABP reduced its investments in high carbon assets with € 5.3 billion euros, of which only half could be explained by loss of value of fossil fuel stocks. The other half, ABP claims is only to a very minor extent explained by its shift towards more sustainable investments. As such, we conclude that the activities of the fossil fuel divestment movement should be valued mostly in terms of its undermining of legitimacy of the fossil fuel industry.

Practices

Over the course of the campaign changes in investment practices could be observed with ABP. It changed from an investor aimed at highest return, to one that sees itself as contributing to societal goals. And this new understanding of its role is also implemented in practice, by phasing-out investments in fossil fuel industry by 2023 (ABP, 2021).

8.5 Conclusion

The findings shows that actors, especially social movements, but also the media, researchers, financial analysts and institutional investors play an active role in regime destabilisation. Not only through their weakening commitment to elements of the regime, but also in actively building up pressure and interpreting performance problems within the regime, thereby aiming at and succeeding in untying previously supportive actors from the fossil fuel industry.

Our findings show that the divestment campaign directed at the ABP pension fund in the Netherlands has gained prominence and contributes to destabilizing the fossil fuel regime in the following ways:

1 A build-up of external pressures on the fossil fuel regime through a growing divestment movement. The number of fossilfree campaigners, campaigns and adoption of their carbon bubble narrative in the media has grown steadily over the studied period;

2 Growing performance problems within the regime. Share prices of businesses in fossil fuel industry have dropped, which financial analysts claim can at least partly be explained by the carbon bubble theory;

3 Weakening commitment of actors. We observe a growing number of actors that divest from the fossil fuel industry under pressures of the divestment movement, including ABP pension fund, which has updated its sustainability policy and has lowered its investments in fossil fuel industry since September 2014.

Furthermore, I observed changes in all five dimensions of incumbent repositioning. In sum, I found evidence that the divestment movement contributes to destabilization of the fossil fuel regime in the Netherlands, however it proves difficult to conclude with certainty the exact impact of the movement, since there are numerous other factors influencing the stability of the fossil fuel regime, including for example market prices for fossil fuels.

For transitions literature, our study draws attention to the work actors engage in to undermine or maintain a regime. Also, it shows that a host of actors are involved in regime destabilization, outside the traditional scope of state vs market and incumbents vs new entrants that is central to multilevel perspective inspired transitions literature. This study shows that important actors to include in the analysis of regime destabilisation are social movements, institutional investors, and the media. Furthermore, it draws attention to fault lines within the regime, in this case developing between institutional investors and fossil fuel industry and a social movement which skillfully lays bare and exploits this emerging fault line, by untying previously supportive investors from the fossil fuel industry. The findings suggest that more peripheral actors seem to have more room to manoeuvre than the actors at the core of the fossil fuel energy regime, because ABP can decide to shift its investments to other sectors, while if your core business is drilling for and exploiting fossil fuels, it is more difficult to change business. As such, I argue that identifying such 'fault lines' within the regime and focussing on untying previously supportive peripheral actors from the core incumbents in regimes might be a fruitful destabilisation strategy. More research is needed whether this holds for other peripheral actors as well.

Acknowledgements

I would like to thank Adriaan van der Tang for his input on an earlier version of this Chapter and Julia Wittmayer and Chris Roorda for helpful feedback. Furthermore, I am thankful to Liset Meddens for hosting me at the Fossielvrij NL office.

References

- ABP (2021) ABP stopt met beleggen in fossiele brandstoffen. Available online: https://www.abp.nl/over-abp/actueel/nieuws/abp-stopt-met-beleggen-in-fossiele-brandstoffen.aspx
- Carbon Tracker Initiative. (2011). Unburnable Carbon - Are the world's financial markets carrying a carbon bubble? Carbon Tracker Initiative.
- Carbon Tracker Initiative (2013) Unburnable carbon: Wasted capital and stranded assets. Available online: http://www.carbontracker.org/wp-content/uploads/2014/09/Unburnable-Carbon-Full-rev2-1.pdf
- Carbon Tracker Initiative. (2015). Home: What is Carbon Tracker? Retrieved June 10, 2015, from http://www.carbontracker.org
- Changerism (2015) Analyse: fossiele beleggingen ABP. Available online: https://changerism.com/portfolio/analyse-fossiele-beleggingen-abp/
- De Correspondent (2014) Na de bankenbubbel dreig nu: de koolstofbubbel. Available online: https://decorrespondent.nl/1000/na-de-bankenbubbel-dreigt-nu-de-koolstofbubbel/7417322000-b7d2cc34
- De Volkskrant (2014) ABP moet niet beleggen in fossiele brandstoffen. Available online: https://www.volkskrant.nl/economie/abp-moet-niet-beleggen-in-fossiele-brandstoffen~b2195a78/
- De Volkskrant (2015a) Uw pensioen vormt ongewild een gevaar voor de toekomst. Available online: https://www.volkskrant.nl/columns-opinie/uw-pensioen-vormt-ongewild-een-gevaar-voor-de-toekomst~b2000245/
- De Volkskrant (2015b) Pensioenbeheerder steekt toch miljoenen in windpark op zee. Available online: https://www.volkskrant.nl/economie/pensioenbeheerder-steekt-toch-miljoenen-in-windpark-op-zee~b69ea7f8c/
- De Volkskrant (2015c) Rem op olie en gas is niet realistisch. Available online: https://www.volkskrant.nl/economie/rem-op-olie-en-gas-is-niet-realistisch~b87e7dfb/
- Financieele Dagblad (FD) (2015) ABP tegen boringen Shell in poolgebied. Available online: https://fd.nl/ondernemen/1104453/pensioenfonds-tegen-boringen-van-shell-in-noordpoolgebied
- Fossielvrij Nederland. Fossielvrij.nl. Initiatieven: http://gofossilfree.org/nl/
- Nieuwsuur (2015) Steeds meer actie tegen fossiele brandstoffen. Available online: https://nos.nl/nieuwsuur/artikel/2036931-steeds-meer-actie-tegen-fossiele-brandstoffen
- NOS (2015) Shell aandeelhouder ABP tegen boren Alaska. Available online: https://nos.nl/artikel/2036483-shell-aandeelhouder-abp-tegen-boren-alaska
- Tegenlicht (2015) Fossielvrij. Available online: https://www.vpro.nl/programmas/tegenlicht/kijk/afleveringen/2015-2016/fossielvrij.html
- The Guardian (2015) More than 10,000 people call on Dutch pension fund to divest from fossil fuels. Available online: https://www.theguardian.com/environment/2015/mar/18/more-than-10000-people-call-on-dutch-pension-fund-to-divest-from-fossil-fuels

- The Guardian (2016) Rockefeller family charity to withdraw all investments in fossil fuel companies. Available online: https://www.theguardian.com/environment/2016/mar/23/rockefeller-fund-divestment-fossil-fuel-companies-oil-coal-climate-change
- Turnheim, B., Geels, F.W., 2012. Regime destabilisation as the flipside of energy transitions: lessons from the history of theBritish coal industry (1913–1997). Energy Policy 50, 35–49.
- Trouw (2015) Wegwezen voor de koolstofbubbel barst. Available online: https://www.trouw.nl/nieuws/wegwezen-voor-de-koolstofbubbel-barst~bd619091/?referrer=https%3A%2F%2Fwww.google.com%2F

9. Conclusions and Reflections

By now, everywhere in the energy domain signs of destabilisation can be observed. Where there used to be a stable and coherent energy regime, such stability and coherence are now gradually dissolving: Coal fired power plants that have opened as recently as 2015, are now being decommissioned again. Court cases have been won against the government for not doing enough to protect its citizens against the threats of climate change and against oil company Royal Dutch Shell, to limit its greenhouse gas emissions. Participants are successfully putting pressure on their pension funds to divest from the fossil fuel industry. Energy companies have lost up to 80% of their market value over the last decade and some of them are splitting up into a fossil fuel branch and a renewable branch and some of them are completely reinventing themselves into sustainable energy companies.

Resulting from these observations, the main research question underlying this thesis was: How can we understand transition dynamics in between two equilibria, where an incumbent regime has destabilised, but a new regime has not yet formed? And, what are the implications for actors that used to operate within a regime context and how can they navigate such a regime vacuum?

And the hypotheses were:

1. In accelerating transitions, tensions and misalignments will emerge at meso-level of the system;
2. These can be recognized in terms of clashes in different cultures, misalignments in structures and competing deviating practices;
3. Formerly well-aligned incumbents will start to reposition vis-a-vis their rapidly changing environment;
4. There will be a sequence in repositioning for incumbents, based on their position in the system, where the more peripheral incumbents will experience more degrees of freedom earlier on, while the more central incumbents will pre-dominantly aim to defend their position;
5. Change-minded incumbents can be supported to navigate this turbulent phase and develop more sustainable strategies and practices.

9.1 Destabilisation

In this thesis, ongoing destabilisation was first established from a discursive perspective in the Dutch electricity system (Chapter 4) and broader energy system (Chapter 5). Instead of finding one dominant storyline about the energy system as one would expect from a stable and dominant energy regime, I found three co-existing and competing storylines with which actors give meaning to the energy transition. From a rather narrow technofix focus dominated by incumbents from the energy regime, it has become more diverse, via a gradually broader system flexibility storyline, supported by natural gas and renewables interests, to a power storyline in which the energy transition is a struggle between vested fossil fuel interests and emerging sustainable actors, which fundamentally challenges the existing fossil based and centralised energy system.

With the emergence of competing storylines, the diversity within Dutch energy transition discourse and associated actor coalitions has increased.

Furthermore, a co-evolution between diversifying discourse and broadening of the actor base involved in energy transition discourse could be observed. Comparing the actors involved in the Taskforce Energy Transition, which introduced the term energy transition in Dutch media in 2004, and those subscribing to the 2013 Energy Agreement for Sustainable Growth, shows that while the former consisted of different stakeholders in the energy domain, including business, science and NGOs, it mostly focussed on the supply side of the energy system. Subscribers to the Energy Agreement also involve end users, such as mobility, housing and industry, and other sectors that recognised they have a role to play in the process, such as the ICT, installation and construction sectors (see Chapter 5). From this, I conclude that the broadening of understanding of the energy transition from a supply side technofix to tackle climate impact of energy production to a fundamental overhaul of the fossil fuel energy system in the power storyline, also involves a broadening of the type of actors involved in the process. Thus, emergence of competing storylines invited a broadening actor base, whose support in turn fortified the new storyline. In other words, emergent storylines may self-reinforce through attracting the support of new entrants as well as incumbents.

In Chapter 5, I also showed that growing discursive diversity in the energy system leads to increased uncertainty about the future of the system, because it becomes clear that there are multiple ways of understanding the problems at hand and multiple directions to search for solutions. For incumbents, navigating such divergence is much more challenging than a context dominated by a rather stable hegemonic discourse. At the same time the increased diversity and tensions opens up space for new entrants and their problem understandings and preferred solutions enabling courses of action and actor constellations that were unlikely before. This fragmentation of the hegemonic discourse and incumbent actor coalition further destabilises the incumbent regime, but at the same time creates opportunities for discursive repositioning and new actor constellations, for incumbents as well as newcomers. As such, destabilisation is the context in which historically stable societal conditions erode. For actors who are used to operating in a relatively stable and coherent regime context, destabilisation is the gradual and self-reinforcing dissolution of such stability, predictability and coherence of their operating environment.

The findings in Chapter 4 and 5 of this thesis confirm hypothesis 1: In accelerating transitions, tensions and misalignments will emerge at meso-level of the system.

9.2 Transition space

The central concept that emerged over the course of this PhD-research is transition space, in order to conceptualize transition dynamics in between two equilibria, where an incumbent regime has destabilised, but a new regime has not yet formed. Transition space is defined as the absence of stability, predictability and coherence between actors and their environment resulting from the destabilisation of an incumbent regime. Transition space is characterized by both build-up and break-down dynamics. In transition space new institutions and routines have to be developed while facing systemic uncertainties, diverging political and economic interests and polarizing public debates. Increasing tensions and misalignments were found between incumbents, where different storylines on what the energy transition encompasses are increasingly competing for dominance. Existing coalitions are breaking up and new ones are being formed. Furthermore, there are increasing tensions between new practices and existing institutions and new resources become available for niche developments through the active involvement of change-minded incumbents.

For incumbent actors, that have since long relied on stable market positions and political relations, this context creates challenges. On the one hand these actors have to reposition in order to maintain control, while on the other hand they are facing disruptive changes that require adaptation, perhaps beyond what they can cope with. In this thesis, next to exploring transition space discursively (Chapter 5) it was described from the perspective of three different change-minded incumbents:

- Distribution grid operator Alliander is operating an environment in which concerns about climate change and earth quakes caused by natural gas extraction in the North of the Netherlands, while decentralised and renewable energy systems are rapidly emerging. These developments are mounting pressure to radically alter the energy system and thus Alliander's business model. In response Alliander has announced an exit from natural gas, together with other actors active in the built environment and is in the process of working out what this means for the organisation and its role and position (Chapter 6).
- Port of Rotterdam Authority is operating the largest port in Europe, which is a heavily fossilised transport hub. Climate change, but also geopolitical concerns and receding demand for its products, due to the rise of electric transport and biobased and circular alternatives, is challenging historically developed modes of thinking and doing. It realizes that relying heavily on volume and scale and producing and transshipping bulk fossil goods is increasingly at odds with the societal drive for sustainability (Chapter 7).
- Institutional investor ABP, the largest pension fund in the Netherlands, is under increasing scrutiny by its participants, a social movement and the media, for its investments in the fossil fuel industry. Citing concerns about climate change, these groups claim that the lion's share of fossil fuels needs to stay in the ground and that, given this carbon bubble, the fossil fuel industry is an increasingly risky investment. This pressure challenges the, until then dominant rationale, that pension funds should mainly focus on returns, and that the fossil fuel industry is a highly profitable and secure investment (Chapter 8).

The findings in the empirical Chapters 6, 7 and 8 confirm hypothesis 2: tensions and misalignments at meso-level of the system can be recognized in terms of clashes in different cultures, misalignments in structures and competing deviating practices.

In addition, the empirical studies show that as a result of the clashes, misalignments and competition, it becomes increasingly unclear for actors that were used to operating within a stable regime context, what they can rely on, what they can expect and how they should relate to their environment. In different words, the relative stability, predictability and coherence of their environment dissolves, as a result of which they start repositioning, which might again contribute to the further destabilisation of the incumbent regime. In this way, a self-reinforcing process develops, that in the literature is often referred to as 'acceleration', which in the practice of actors that are used to operating in a stable regime context actually forms an increase in dynamics and insecurity. As such, transition space is characterised by a rise in reconfiguration options for some incumbent actors, and systemic opportunities for new entrants. For incumbents, navigating such divergence is much more challenging than a context dominated by a rather stable regime. At the same time the increased diversity and tensions opens up space for new entrants and their problem understandings and preferred solutions, enabling courses of action and actor constellations that were unlikely before. Introducing the concept of transition space, as has been done in this thesis, provides the opportunity to study and describe the particular dynamics taking place in a system in absence of an incumbent regime.

9.3 Repositioning of incumbents

Regarding the role of actors and their agency, I show that a host of actors is involved in and affected by transition space, outside the traditional scope of state vs market and incumbents vs new entrants that is central to multilevel perspective inspired sustainability transitions literature (cf. Geels, 2014). This study suggests that important actors to include in the analysis are social movements, the media, but also peripheral and change-minded incumbents. An important actor dynamic in transition space is the repositioning of such change-minded incumbents in an attempt to navigate this highly chaotic and volatile environment. In order to better relate structure and agency, with this thesis, I make a second conceptual contribution to the sustainability transitions literature by introducing five dimensions of incumbent actor repositioning: discourse, institutions, relations & roles, resources and practices.

Discourse

Discourse is the way actors provide meaning to the world around them. In transition space, discourse diversifies and becomes more plural and dynamic as compared to the hegemonic and rather stable discourse that characterises a regime context. In terms of discourse, within Alliander two storylines could be reconstructed: The more traditional storyline frames the energy transition in terms of the climate problem and sees reducing CO_2-emissions as the main challenge. The other and newer storyline focusses on co-creating sustainable energy solutions with local stakeholders. Within the Port Authority, the discourse became more proactive and agressive over the course of the research, the CEO of the Port Authority frames the transition as "transforming the old and creating space for the new" as "the direction of the inevitable transition" (FD, 2016), and "who does not want to join, should leave the Port." (NRC, 2017).

ABP is confronted with a new carbon bubble storyline, making a link between the fossil energy and financial sectors, challenging not only the fossil fuel industry's business model with regards to its effects on climate change, but also investors that support the industry by investing in it.

Institutions

Institutions are the formal and informal regulations that guide actor behaviour. While institutions a rather stable and coherent in a regime context, in transition space, tensions and clashes over institutions abound. In terms of institutions, the clearest changes could be observed in the Alliander case. The first regards the obligation to connect customers to the gas grid, which has been changed in a 'right to heating' allowing for other heating solutions than gas fired. Furthermore, it could be observed that (Al)liander is not passively undergoing changes in regulations, but itself lobbies actively for them. In the Port of Rotterdam, although the discourse becomes tougher, existing institutions are still firmly in place. While the municipality, the majority owner of the Port Authority, took on a resolution to phase out coal in the Port, coming close to the experiment date of a permit for a large coal transshipper, the Port Authority stated that it was unable to do anything about it and the permit was renewed. At ABP, the divestment campaign challenges the rationale that institutional investor's main concern is making returns on investments. In response, ABP's investment policy has been sharpened several times.

Relations & roles

Relations and roles refer to the understandings actors have of how they relate to other actors and their position in the field. In a regime context, such relations and roles are rather clear and stable, while transition space, is characterised by dynamically shifting of relations and the development of unexpected alliances, while (incumbent) actors are redefining their role. Alliander, for example, is redefining its role from a 'pipeline factory' to a sustainable area developer in co-creation with local stakeholders. Such a fundamental change in roles goes together with changes in relations with other stakeholders in the energy domain. Some existing relations become more intensive such as existing relations with shareholders and customers, new relations are developed, with community energy initiatives, sustainable NGOs and building owners. And, existing relations become severed, as can be observed in the public hearing around the new 'Wet VET': Alliander, and especially its EBAs, are testing and shifting the boundaries of the regulated energy domain in several cases, with developing charging stations for electric vehicles for example. Energy companies claim that such activities belong to the 'free' market domain, and not to the regulated domain, therefore Alliander should not engage in such activities. Furthermore, the public hearing also shows a gap opening between the DSOs (distribution system operators, such as Alliander) and the TSOs (transmission system operators, TenneT and GasUnie). Where the TSOs have a more centralized take on the energy transition, seeing a large role for international interconnections, the DSOs emphasise local, decentralized solutions and engagement. At the Port of Rotterdam Authority, I observed that over the course of the transition management process, it took on a more pro-active role in shaping the future of the Port:

from a rather passive housekeeper role, it shifted to a pro-active mindset with more self-consciousness about its influence on shaping potential futures. This goes together with a tougher narrative on the fossil fuel interests in the port, although this does not yet materialize in permitting practices. Concerning ABP, it can be observed that it is shifting its role from an investor that seeks the highest returns on its investments, to a realization of the societal responsibility that comes with investing large amounts of money. Also, where it comes to its relations with companies it invests in, a shift can be observed from engagement, where ABP tried to talk fossil fuel companies onto a more sustainable path, to divestment, where ABP exits from companies that engage in fossil fuel extraction.

Resources

In transition space, shifts in resources take place from strongly ingrained technologies and activities, towards new practices, products and services. Incumbent organisations re-evaluate and re-allocate how time and money are spent on in the organisation. At Alliander a shift in financial resources can be observed, where an increasing share is invested in the energy transition. In terms of personnel a more conservative picture emerged: at the time of writing, approximately 95% of jobs were directed at business as usual, while only 5% is geared towards exploring and preparing for a new role. The Port of Rotterdam Authority decided to invest heavily in terms of personal and financial means. It has developed a transition unit of 50 FTE to pursue businesses and activities that could contribute to making the transition. Furthermore, while most resources had so far been invested in logistical and industrial infrastructure, such as quays and pipelines, it is increasingly focused at opportunities to incentivize social and institutional innovation, including funding for start-up hubs and maker spaces. Moreover, specific developments are incentivized with other than monetary means, such as setting aside specific locations for biobased developments and providing infrastructure in a 'plug and play' manner. Pension fund ABP is gradually increasing its investments in sustainable alternatives, while phasing out fossil fuel investments. In October 2021, ABP announced to fully divest from the fossil fuel industry by 2023.

Practices

Practices are the routinized daily activities. While these are stable and coherent in a regime context, in transition space, new practices develop, and old ones are unlearned. Also, competition between such old and new practices arises. In terms of practices, Alliander has a clear task division, where new practices are developed mostly in the Emerging Business Areas (EBAs). These new businesses have deliberately been put at arm's length from the traditional regulated operations, in order to operate outside of the constraints of the regulated energy domain. Within the regulated grid operator Liander, different departments are working on developing a neighbourhood approach, to help neighbourhoods change their energy systems from natural gas dominated to other energy sources. However, these approaches are still in experimental form: they have not yet led to routinized practices within the grid operator and focus on efficiency in its traditional role remains dominant. At the Port of Rotterdam Authority, a large transition team is working in new ways to attract new businesses that fit to a more sustainable future. However, existing practices still remain in place, as is shown by the example of EMO, the largest coal transshipment company in Europe, whose permit was to expire in the summer of 2018. While EMO would like the permit to be renewed, this led to discussions amongst citizens, and the municipality, the majority owner of the Port Authority, took on a resolution to phase out coal in the Port. In response, the Port Authority claimed that it was unable to do anything about renewal of the permit. With ABP changes in practices could be observed, from an investor aimed at highest return, to contributing to societal goals. And this new direction is implemented in practice, by phasing-out investments in fossil fuel industry by 2023.

To summarize this section:

- Grid operator Alliander is challenging the market and itself by organising an innovative ecosystem of energy transition start-ups and scale-ups around its regulated core. In doing this, it is challenging and shifting the boundaries of the regulated and liberalized energy markets, leading to court cases with energy companies over its operating space. Also, it is actively influencing government regulation to allow new and sustainable heating solutions, while gradually exiting from natural gas.
- The Port of Rotterdam, which is currently dominated by the fossil fuel industry, is making plans to reinvent itself as a biobased and circular port, leading to increasing tensions with the existing industry base in the port. The Port Authority operates a careful balancing act between proactively repositioning in face of transitional pressures, while at the same time trying keep current industries on board as much as possible.
- Pension fund ABP has announced to begin phasing-out its investments in the fossil fuel industry, which should be completed by 2023, following years of pressure by participants and societal groups.

The findings on the role of incumbents and their repositioning in Chapters 6, 7 and 8 confirm hypotheses 3: Formerly well-aligned incumbents will start to reposition vis-a-vis their rapidly changing environment.

The findings in this thesis suggest confirmation of hypothesis 4: There will be a sequence in repositioning for incumbents, based on their position in the system, where the more peripheral incumbents will experience more degrees of freedom earlier on, while the more central incumbents will pre-dominantly aim to defend their position. However, the evidence could be developed further in follow-up research, for example by comparing the repositioning efforts of peripheral incumbents with more central incumbents, e.g. a grid operator and an (state) oil company. As such, we conclude that this hypothesis was partly confirmed in this thesis.

9.4 Guiding change-minded incumbents through transition space

For incumbents operating in transition space, dynamics of break-down and letting go become increasingly prominent, but are so far little understood, let alone deliberately provoked. As such, few thoughts in transitions literature have been put into developing instruments, tools and interventions aimed at deliberate destabilisation with the aim to accelerate the energy transition (Kivimaa & Kern, 2016; Holscher, 2019). In this thesis two such interventions were explored. The first building on and adapting the Transition Arena approach (Loorbach, 2007) developed within the TM-framework to the Port of Rotterdam (Bosman et al., 2018, Chapter 7 of this thesis), and one novel intervention aimed at further destabilising the fossil energy regime, by questioning its financial ties (Chapter 8).

The transition arena trajectories in the Port of Rotterdam contributed to further destabilising existing cultures, structures and practices in the Port and guiding the Port Authority and other change-minded incumbents in the Port to navigate an increasingly volatile context, through:

- bringing in view the transformative challenges facing the Port by co-creating a system's analysis;
- sensitizing participants to potential disruptions and uncertainties facing the Port, by confronting them with wildcard developments, dilemma's, other actors with alternative perspectives and exploring alternative futures;
- explicating underlying assumptions about the raison d'être of the Port (volume and mass) and the role of the Port Authority, enabling discussions of the applicability of these assumptions in a changing context;
- highlighting relevant niche-developments within and outside the Port to sensitise participants to sustainable alternatives that are already available;
- diversifying existing actor networks and changing its interactions with stakeholders, by inviting actors from other domains and niches to collectively explore alternative futures;
- creating space for open discussion, challenging each other's ideas and assumptions, showing vulnerability and doubt.

Challenging ingrained views and assumptions proved necessary and instrumental in order to allow for more systemic experimentation with sustainable alternatives in a context of decreasing certainties. As such, transition management has contributed to destabilising the fossil fuel regime in the Port of Rotterdam, while at the same time supporting the Port Authority and other change-minded incumbents in the port area to take a more pro-active role in the transition. A change in culture and understanding of its role within the Port Authority can be observed, that is more pro-actively oriented towards the new economy.

Our findings from engaging with the divestment movement in the Netherlands show that the divestment campaign directed at the ABP pension fund has gained prominence and contributes to destabilizing the fossil fuel regime and pushing ABP into transition space in the following ways:

1. A build-up of external pressures on the fossil fuel regime through a growing divestment movement. The number of fossilfree campaigners, campaigns and adoption of the carbon bubble narrative in the media has grown steadily over the period of engagement;
2. Growing performance problems within the regime. Share prices of businesses in fossil fuel industry have dropped over the studied period, which financial analysts claim can at least partly be explained by the carbon bubble theory;
3. Weakening commitment of actors. A growing number of actors divest from the fossil fuel industry under pressure from the divestment movement, including ABP pension fund, which has updated its sustainability policy and has lowered its investments in the fossil fuel industry since September 2014 and in 2021 committed to fully divest from the fossil fuel industry by 2023.

Action research with the ABP-fossilfree movement shows, that in this turbulent phase of the energy transition, it is possible to deliberately undermine existing ties between incumbent actors and to, as it were, push a change-minded incumbent into transition space. As such, the findings in this thesis, in particular Chapter 7 and 8, confirm hypothesis 5: Change-minded incumbents can be supported to navigate this turbulent phase and develop more sustainable strategies and practices.

It is important to note, however, that the contributions in this thesis towards formulating deliberate destabilisation interventions and helping incumbents to navigate transition space are highly tentative and should be seen as an invitation to join the search, rather than to develop a full-fledged transition space governance approach. The experience from this thesis underlines that the nature of fundamental societal change happening in transition space is so complex, involving an immense range of actors, thus providing an equally immense range of opportunities for transition governance. Instead, based on the experimentation proposed in this thesis, often in interaction with several practitioners, the insights developed could inform future interventions aimed at deliberate destabilisation and navigating transition space in order to accelerate sustainability transitions.

9.5 Synthesis of the main scientific contributions

9.5.1 Transition space

Transition space is the absence of stability, predictability and coherence between incumbent actors and their environment. It is characterized by tensions and clashes caused by misaligning cultures, deviating structures and competing practices. The environment in which actors operate is changing so rapidly and chaotically that grip dissolves, knowledge on what works becomes obsolete and ingrained practices stall, forcing incumbent actors to reposition. From the empirical Chapters I could develop the following indicators for the opening of transition space in a societal system:

- Societal unrest, demonstrations, protests and sustained media attention;
- Tensions and clashes involving incumbents, e.g. court cases, breaking up of alliances;
- Scientific basis problematizing part(s) of the incumbent regime;
- Shared sense of urgency for the desired direction of sustainability transition, by change-minded incumbents, scaling niches and policy makers;
- Scaling up of sustainable alternatives.

9.5.2 Agency dynamics

In this thesis, I introduce five dimensions of incumbent actor repositioning, in order to better connect agency and structure. These five dimensions are the discourse, with which actors give meaning to their environment; the institutions, the formal and informal rules guiding actor behaviour; relations and roles, actors' understanding of their reason of existence and how they relate to others in their ecosystem; resources, the means that actors mobilize achieve certain goals, in particular time and money, and the practices, the daily routinized operations. Using these five dimensions, it is possible to assess whether and how an incumbent actor is repositioning in relation to its environment.

The findings in this thesis suggest that in transition space there is a sequence in the repositioning efforts of incumbent actors, where they start with developing new discourse on what is changing in the environment, which rules need to change in order for them to form a better fit with the changing requirements, in redefining its role vis-a-vis this turbulently changing environment, existing relationships with formerly allied actors become severed and new relations with other, often new actors, are developed, which then implies a reallocation of resources within the organisation, where certain practices are broadened and scaled-up, while others become obsolete and are gradually phased-out. Letting go of such routinized and strongly ingrained practices is the hardest part.

Furthermore, the findings in this thesis also suggest a sequence in repositioning for incumbents, based on their position in the system, where the more peripheral incumbents experience more degrees of freedom earlier on, than the more central incumbents, which are more constrained by regime pressures even further on in the transition. In this repositioning, focusing on build-up proves easier or more attractive than on break-down and phase-out. Analysis of Alliander's intended exit from natural gas, the Port Authority's tougher stance on fossil fuel industries and ABP's shifts in investments suggests that actual phase-out only happens under extreme pressure.

9.5.3 Governance strategy

For this thesis, I experimented with governance interventions, that indicate that it is possible to deliberately further destabilise a regime that is already under pressure and to guide change-minded incumbent actors to navigate transition space and. Adapting the transition arena instrument to the Port of Rotterdam, it was possible to gain a sharper view of what is actually changing, co-create new understandings that better fit this rapidly changing environment and how that influences existing roles and relations, while creating the opportunity to develop new ties with other actors that might have more knowledge and experience on what strategies work in this new reality. Furthermore, it helped to shift resources within the organisation to be geared towards developing new and more sustainable practices.

Mobilizing participants of the ABP pension fund around the carbon bubble narrative and starting a divestment campaign, resulted in an increased awareness of problems with current investment practices, enforced a review of existing relations between investors and the fossil fuel industry and questioned the logic of continued support for increasingly problematic parts of the economy. It showed that under certain circumstances, it is possible to deliberately provoke further destabilisation, to force incumbent actors to let go of previously held assumptions of a stable and guiding regime, and rather to move into transition space.

Furthermore, due to destabilisation, room opens up between formerly tightly connected actors, such as investors and fossil fuel industry, or grid operators and natural gas suppliers, or port authorities and fossil fuel industry. Such opening up offers opportunities to further identify, problematize and breaking of such ties. This untying could undermine further support for elements of the incumbent regime that require phase out. Transition governance for transition space could make use of this insight to further isolate certain unneeded elements of the incumbent regime. Through isolating these elements, they become increasingly prone to phase out, as their societal support is fading. Figure 8.1 provides a visual representation of such 'untying' of the incumbent regime actor network.

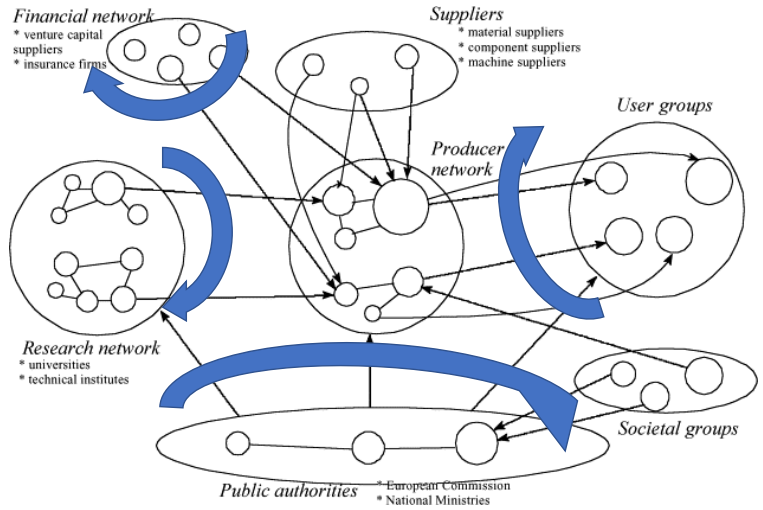


Figure 8.1 Untying the regime actor network (adapted from Geels, 2002: 1260)

9.6 Reflections

Reflecting on the findings, several issues and questions stand out:

- *How can the transition space concept be used?*

In this thesis, the transition space concept has been used to describe the phase of transition in which an incumbent regime is absent. As such, it was possible to conceptualise this phase, and several dynamics of interest. Also, it is used to guide incumbent actors to better understand and navigate this highly turbulent phase of transition. It helps them to understand why their context is changing so rapidly and chaotically and to develop strategies to mediate these pressures and embrace a more sustainable course.

- *What is the relevance of the transition space concept?*

The transition space concept is positioned at the heart of the sustainability transitions literature, in the sense that it describes the phase of transition in which a regime is absent and the actual regime shift takes place. It can be observed that at a certain point in a transition absence of a regime is implied in the literature, but up to now it had not been explicitly conceptualised. By conceptualising this phase from the perspective of incumbents operating transition space, a deep understanding is gained of how transition space works out in lived experience. As such, transition space as introduced in this thesis, although new, provides a perspective that is deeply rooted in practice.

- *How can the five dimensions of incumbent repositioning be used?*

Categorizing their activities in the five dimensions of incumbent repositioning, can help to identify the ways in which they give meaning to and shape their environment. As such, these dimensions help to explicate their (potential for) agency. In this thesis, it has been used as an analytical tool to categorize ongoing activities, however it could also be used as a prescriptive tool, by analyzing together with actors what activities they undertake in these different dimensions and whether these activities then contribute to defending incumbent regime structures, or whether they can be geared more towards embracing transformative change.

- *What does transition space mean for governance?*

As the regime dissolves, actors experience and increased need for new direction and sign posts. Break-down is a necessary pre-condition for transformative change, as such interventions could be developed aimed at deliberate destabilisation (and have been experimented with in this thesis). The initial experiences in this thesis suggest that it is best to combine destabilisation interventions with interventions aimed at build-up, since if you ask actors to leave their comfort zone and jump to somewhere new, it requires some faith in that the new is as good or better than the old. Furthermore, transition space suggests that the contours of a shared image of how this new regime could look like are present, but that this requires translation into concrete business models, new coalitions, decisions about the application of resources and operational practices. As such, the challenge is to operationalize this vision into concrete business propositions, new institutions and governance arrangements, while leaving room to adjust the vision to new insights and learning experiences along the way. As such, transition management and this thesis provide input for new transition governance strategies, but a clear institutional need is observed for policies and strategies that contribute to destabilisation and navigating transition space. In absence of such policies the default option with policy makers and companies is trying to restabilise the incumbent regime and gaining back control, instead of using the momentum to embrace transformative change and navigate transition space to collectively co-create the most desired alternative future.

- *For whom are the transition space concept and the five dimensions of incumbent repositioning?*

Transition space is a useful concept for actors to start reflecting upon their transformational challenges vis-à-vis their environment, including other actors navigating the same transition context. Especially because each type of actor will have different and specific challenges when transition space opens up:

- Incumbents: The transition space concept helps understanding why the environment is changing so rapidly and apparently uncontrollable. It shows dimensions along which they can reposition vis-à-vis this rapidly changing environment. And it can help to identify opportunities to make use of their current strengths and to identify which elements of the existing organization might become obsolete or need phase out. A clear distinction needs to be made between conservative incumbents, that stubbornly remain defending an increasingly outdated part of the incumbent regime, and change-minded incumbents that proactively embrace the emergent direction for sustainability transition.
- Niche-actors: It furthers understanding why they are taking off, where the increased interest for their initiatives comes from (while up to then, they have often been fighting an uphill battle). At the same time, it requires professionalisation and taking responsibility for shaping a new regime. The transition space concept can help them to identify opportunities for agency, new alliances and available resources.
- Sustainability transition scholars and practitioners: Transition space draws attention to both build-up and break-down dynamics in a system. It provides a framework to understand and interpret the misalignments arising at systems' level. Furthermore, it highlights the need and opportunities for sharper connections between mature niches and change-minded incumbents, in order to build coalitions of the willing to navigate transition space and develop new institutions that could form a new and more sustainable regime.
- Policy makers: identifying mismatches between new practices and existing institutions. Developing new governance arrangements tailored to the new dynamics and phenomena. The challenge for policy makers is that they are often geared towards restabilising an incumbent regime, while in a transition, instability is inevitable. Steering away from instability could therefore actually delay a desired transition. Rather, policy makers could use transition space and the five dimensions of incumbent repositioning to guide actors through the volatility and chaos of transition space.

- Activists: The misalignments arising in a system giving rise to transition space form fruitful material for activists to shape new storylines and interventions aimed at tansformative systemic change. The transition space framework can help identify these 'fault lines' in a given system, and opportunities for further untying the incumbent regime network. Thus, it helps to identify opportunities for activist interventions aimed at accelerating sustainability transitions.
- Media: Given its potential for transformative system change, transition space transcends the policy – science – society boundaries. The media are by definition those actors that mediate these boundaries. Increased interest by the media can be expected when systemic misalignments arise in a system and an increased need to interpret ongoing changes is being felt. Making sure that the media, next to that of the incumbents, which are generally well connected, also has access to niche-storylines, problem framings and preferred solutions, might prove a worthwhile intervention.

9.7 Future challenges

9.7.1 Society

Transition space suggests a highly chaotic, turbulent and tense societal system that is undergoing transformative change. Important decisions are being made about which parts of the system have a future and which need to be phased-out. This goes together with societal turmoil, existing battles intensify, ties between former allies are broken and sometimes fought out in court. Questions of justice arise, of what is fair for whom (McCauley & Heffron, 2018; Wang & Lo, 2021)? Who can reap the benefits of new activities? And who should pay the price of discarding obsolete elements?

Furthermore, transition space is a highly insecure environment for a lot of people. Of course, for those working in the vulnerable sectors of the economy. But also, for people at the user end of a formerly stable regime. In the energy domain, for example we currently see heavily spiking natural gas prices, because of increased uncertainties in the system, making sustainable alternatives more attractive, while at the same time increasing revenues for the fossil fuel incumbency. With increased uncertainty, the system becomes more vulnerable to crises. Shocks, that might have had little effect earlier on, might now cascade into perfect storms. With this, every crisis forms an opportunity to shift the system in a more sustainable direction, but there is also a lot of thrust towards restabilizing an incumbent regime. The challenge is to optimally make use of the transformative opportunities of this phase through developing a collective sense of direction and attraction for a new, more sustainable regime, while fairly compensating the 'losers' of the transition and equally distributing the opportunities provided by the new.

9.7.2 Research

Transition space is a new concept, which use has been showed in this thesis. Whether its need and usefulness are felt in the wider sustainability transitions community, needs to be proven in the coming years. Several opportunities around the concept remain: For now, the focus in transition space has been on the agency and repositioning of incumbent actors but defined as a phase in the transition in absence of a regime, other dynamics of build-up and break-down can also be expected to be taking place in transition space. In what ways does the framework need to be expanded and adapted in order to delve deeper into such dynamics?
A useful starting point would be to cross-analyse transition space with the typology of transition pathways that Geels & Schot (2007) identified. Furthermore, in this thesis, transition space is conceptualized from the perspective of change-minded incumbents. It is interesting to delve deeper into what it means for other actors, such as the incumbents that keep holding on to dated business models. In this thesis, I hypothesize that the more peripheral incumbents have more room for manoeuvre in transition space than the more central ones, as these experience more constraints to their behaviour. This distinction could be developed further: what type of incumbents identify as peripheral and what as central? Or what about scaling niches? Transition space suggests that for them new opportunities open up, as there is an increased societal and policy interest for alternative sustainable solutions that might rapidly scale. New resources are mobilized for these niches, and new relations could be developed with change-minded and well-positioned incumbents.

Furthermore, transition space raises interesting challenges for transitions in multiple systems (Rosenbloom, 2020). In this thesis, the energy system has been in central focus, while also showing interactions between the energy system and different (sub) systems such as electricity, the built environment, logistics and the petrochemical industry and finance. It shows that when transition space opens, a transition has developed so far, that system boundaries start to shift and blur, and that interactions with other systems become inevitable. It raises intriguing questions, such as:
What happens when a system where transition space is present, interacts with a system where a dominant and stable regime is present? Or two systems with partly overlapping transition spaces?

9.7.3 Governance

In this thesis, experimentation has taken place with adapting the transition arena instrument (Loorbach, 2007), towards destabilisation and navigating transition space. Also, an experiment has taken place with new interventions aimed at untying formerly well-connected incumbents. Which new interventions could be developed to help actors navigate transition space? How can build-up and break-down policies be further developed and effectively combined (Kivimaa & Kern, 2016)? In what way can phase-out policies be devised in order to effectively deal with the 'losers' of transition and provide them with new perspective? How can such transformative capacities (Holscher et al, 2019) be developed and strengthened? The challenge here is that policy makers are often part of the incumbent regime (Oxenaar & Bosman, 2020), raising the question of who is in a position to apply transition governance. Who has the oversight and detachment to strategize towards an alternative and more sustainable future regime, which inevitably means letting go of previously ingrained assumptions, positions and practices?

References

- Geels, F. W. (2014). Regime resistance against low-carbon transitions: introducing politics and power into the multi-level perspective. Theory, culture & society, 31(5), 21-40.
- Geels, F. W., & Schot, J. (2007). Typology of sociotechnical transition pathways. Research policy, 36(3), 399-417.
- Hölscher, K., Frantzeskaki, N., McPhearson, T., & Loorbach, D. (2019). Tales of transforming cities: Transformative climate governance capacities in New York City, US and Rotterdam, Netherlands. Journal of environmental management, 231, 843-857.
- Kivimaa, P., & Kern, F. (2016). Creative destruction or mere niche support? Innovation policy mixes for sustainability transitions. Research Policy, 45(1), 205-217.
- Loorbach, D. (2007). Transition management: new mode of governance for sustainable development. Erasmus University Rotterdam: Thesis
- McCauley, D., & Heffron, R. (2018). Just transition: Integrating climate, energy and environmental justice. Energy Policy, 119, 1-7.
- Oxenaar, S., & Bosman, R. (2020). Managing the decline of fossil fuels in a fossil fuel intensive economy: The case of The Netherlands. In The Palgrave Handbook of Managing Fossil Fuels and Energy Transitions (pp. 139-165). Palgrave Macmillan, Cham.
- Rosenbloom, D. (2020). Engaging with multi-system interactions in sustainability transitions: a comment on the transitions research agenda. Environmental Innovation and Societal Transitions, 34, 336-340.
- Wang, X., & Lo, K. (2021). Just transition: A conceptual review. Energy Research & Social Science, 82, 102291.

Research portfolio

Peer-reviewed academic articles

- Bosman, R., Loorbach, D., Frantzeskaki, N., & Pistorius, T. (2014). Discursive regime dynamics in the Dutch energy transition. Environmental Innovation and Societal Transitions, 13, 45-59.
- Scholten, D., & Bosman, R. (2016). The geopolitics of renewables; exploring the political implications of renewable energy systems. Technological Forecasting and Social Change, 103, 273-283.
- Bosman, R., & Rotmans, J. (2016). Transition governance towards a bioeconomy: a comparison of Finland and the Netherlands. Sustainability, 8(10), 1017.
- Bosman, R., Loorbach, D., Rotmans, J., van Raak, R. (2018) Carbon lock-out: Leading the fossil Port of Rotterdam into transition. Sustainability, 10(7), 1-20

Book Chapters

- Oxenaar, S., & Bosman, R. (2020). Managing the Decline of Fossil Fuels in a Fossil Fuel Intensive Economy: The Case of The Netherlands. In: Wood, G. & Baker, K. (eds) The Palgrave Handbook of Managing Fossil Fuels and Energy Transitions (pp. 139-165). Palgrave Macmillan, Cham.
- Hengelaar, G., & Bosman, R. (2017) Wrestling with words: how incumbents shape energy transition debates and policy with reactive and proactive discourses. In: Hengelaar, G., The Proactive Incumbent: Holy grail or hidden gem?: Investigating whether the Dutch electricity sector can overcome the incumbent's curse and lead the sustainability transition (No. EPS-2016-ERIM Series 438-ORG). PhD-Thesis, Erasmus University Rotterdam, the Netherlands.
- Scholten, D., & Bosman, R. (2018). The Strategic Realities of the Emerging Energy Game—Conclusion and Reflection. In: Scholten, D. (ed), The Geopolitics of Renewables (pp. 307-328). Springer, Cham.

Awards

- Finalist Best Paper Award International Conference on Sustainability Transitions 2013 with the paper: Bosman, R., Loorbach, D., Frantzeskaki, N., Pistorius, T. (2013) Regime dynamics in the Dutch energy transition.

Reviewed for

- Energy Research and Social Sciences
- Environmental Innovations and Sustainability Transitions
- Environmental Policy and Planning
- Sustainability
- Technological Forecasting and Social Change

Conference papers

- Bosman, R., Loorbach, D., Rotmans, J., van Raak, R. (2018) Carbon lock-out: Leading the fossil Port of Rotterdam into transition. Paper presented at 9th International Sustainability Transitions Conference, University of Manchester, United Kingdom, June 11 – 14, 2018.
- Bosman, R., Loorbach, D., Beers, P.J., (2018) Navigating transition space: the grid operator as proactive incumbent in the energy transition. Paper presented at 9th International Sustainability Transitions Conference, University of Manchester, United Kingdom, June 11 – 14, 2018.
- Bosman, R., Loorbach, D., Beers, P.J., (2016). The Dutch energy transition – a decade of discursive struggles. Paper presented at 7th International Sustainability Transitions Conference, Wuppertal Institute, Wuppertal, Germany, September 6 – 9, 2016.
- Bosman, R., Beers, PJ, Loorbach, D., Rotmans, J. (2015) Destabilization of the fossil energy regime in the Port of Rotterdam – introducing a framework for regime (in)stability. Paper presented at the 6th International Sustainability Transitions conference in Brighton 25-28th of August 2015
- Bosman, R., Beers, PJ, Loorbach, D. (2015) The Dutch energy transition – a decade of discursive struggles. Paper presented at 10th International Conference on Interpretive Policy Analysis, 8 – 10 July, Lille, France.
- Bosman, R., Beers, PJ, Loorbach, D., Rotmans, J. (2015) Fossil regime destabilization in the Port of Rotterdam. Paper presented at ETH PhD-Academy on Sustainability and Technology: Energy Innovation and Climate Change – The Role of Technologies, Firms and Institutions, 4 – 9 June 2015, Zurich, Switzerland.
- Bosman, R., Loorbach, D., Hisschemoller, M., Scholten, D., Proka, A. (2014) Transition Patterns Enabling Smart Energy Systems (TRAPESES) Research Agenda 2014-2018. Paper presented at the International Sustainability Transitions conference in Utrecht 25-28th of August 2014
- Bosman, R. (2014) Regime dynamics in the transition towards smart energy systems. Paper presented at EIS PhD Summer School Energy Innovations Systems and their Dynamics, 19 – 23 of May 2014, Aalborg, Denmark.
- Avelino, F., Frantzeskaki, N., Bosman, R. (2013) A Complex Transition Perspective on Community Energy: Exploring the Dynamics of Community Energy from a Complex Transition Perspective. Paper presented at SCORAI Europe Workshop Proceedings, InContext Scientific Workshop 7 - 8 October 2013
- Bosman, R., Loorbach, D., Frantzeskaki, N., Pistorius, T. (2013) Regime dynamics in the Dutch energy transition. Paper presented and nominated for best paper award at International Sustainability Transitions conference in Zurich 19-21st of June 2013.
- Scholten, D.J. & Bosman, R. (2013) The Geopolitics of Renewable Energy; a Mere Shift or Landslide in Energy Dependencies? Paper presented at: Politicologenetmaal, Ghent, 30-31st May 2013

Reports

- Rotmans, J. Bosman, R. Bosman, Loorbach, D., van Raak, R. (2017) Transitie-agenda Biobased Haven Rotterdam. DRIFT-verslag, maart 2017. [commissioned by Port Authority Rotterdam]
- Van Raak, R., Bosman, R., Rotmans, J. (2016) Transitie-arena havenbedrijf Rotterdam: naar een diverse, flexibele en veerkrachtige haven. DRIFT-verslag, January 2016. [commissioned by Port Authority Rotterdam]
- Bosman, R. & Rotmans, J. (2015) Benchmarking Finnish and Dutch bioeconomy transition governance. [commisioned by TEKES, the Finnish Funding Agency for Innovation]
- Pijlman, J. & Bosman, R. i.s.m. van Dommelen, P., van der Ploeg, P., Vissinga, L. en Groen, A. (2014) Nieuwe Energie voor de Stedendriehoek: Routekaart naar een energieneutrale regio Stedendriehoek in 2030. [commissioned by Regio Stedendriehoek, Provincies Overijssel en Gelderland]
- Bosman, R., Van Raak, R., Rotmans, J., i.s.m. Langezaal, J., Vermeulen, M., Van der Waal, J., Weij, E., Van Steekelenburg, M., Groeneveld, R., Sijmons, D., Dijk, H., Bosschaert, T. Wijn, I., Witkamp, M., Joubert, M., De Loor, J., Miguel, M., Bahon, C., Frijters, E., Dietz, N., Veul, J., Driessen, B., Simpson, C. (2013) Zuid-Holland op St(r)oom: ruimte voor de energietransitie. [commissioned by Provincie Zuid-Holland]
- Bosman, R., Loorbach, D., Van Raak, R., Wijsman, K. i.s.m. Bor, A. & Van Leenders, C. (2013) Bedrijven en Biodiversiteit: Transitie-perspectief vanuit de Community of Practice Bedrijven en Biodiversiteit. [commissioned by Agentschap NL]

Popular publications

- Oxenaar, S. & Bosman, R. (2018) De Nederlandse overheid en de olie- en gasindustrie: zoek de verschillen. De Correspondent, 15 January 2018
- Bosman, R. (2016) Over dit olie- en gasbedrijf hebben we het veel te weinig. De Correspondent, 7 March 2016.
- Bosman, R. (2015) Energietransitie eist eerste slachtoffer. Energiepodium, 28 November 2015.
- Bosman, R. & Loorbach, D. (2015) De energietransitie wordt een slagveld. Energiepodium, 16 September 2015
- Bosman, R. & Loorbach, D. (2015) De energietransitie wordt een slagveld. De Idee, Juli 2015.
- Rotmans, J., Loorbach, D., Bosman, R., Roorda, C. (2015) Uw pensioen vormt ongewild een gevaar voor de toekomst. De Volkskrant, 16th of March 2015
- Bosman, R. & Loorbach, D. (2015) Hoe een heftig schommelende olieprijs fossiele energie langzaam overbodig maakt. De Correspondent, 2nd of February 2015
- Bosman, R. & Loorbach, D. (2015) What is the ideal oil price for the energy transition? Energy Post, 5th of January 2015
- Bosman, R. (2015) Ideale olieprijs voor de energietransitie? Energie+, January 2015

- Bosman, R. (2014) Balanceeract voor netwerkbedrijven. Energie+, September 2014
- Avelino, F., Bosman, R., Frantzeskaki, N., Akerboom, S., Boontje, P., Hoffman, J., Paradies, G., Pel, B. Scholten, D., and Wittmayer, J. (2014) The (Self-)Governance of Community Energy: Challenges & Prospects. DRIFT PRACTICE BRIEF nr. E 2014.01, Rotterdam: DRIFT
- Bosman, R. (2014) Smart grid te veel top-down. Energie+, maart 2014
- Bosman, R. (2013) Streetwise Smart Grid: De vierde fase in de evolutie van het 'smart grid' debat. DRIFT ESSAY nr. E 2013.03, Rotterdam: DRIFT
- Bosman, R., Avelino, F., Jhagroe, S., Loorbach, D., Diercks, G., Verschuur, G., van der Heijden, J. i.s.m. Bontenbal, H., van de Groep, J., Stijkel, A., Schwencke, A., Hoogwijk, M. (2013) Energielente op komst? De (on)macht van bottom-up en top-down in de energietransitie. DRIFT ESSAY nr. E 2013.02, Rotterdam: DRIFT
- Bosman, R. (2013) De paradox van radicale verandering. Energie+, 10th of December 2013
- Bosman, R. (2013) No transition without conflict. In: Transition: Core of the Century, Special Report, European Energy Review. Volume #001 – 2013
- Bosman, R. & Scholten, D.J. (2013) Renewable Energy: Shifting Sources of Power. Government Gazette, October 2013. This article was reposted as 'How renewables will transform commercial and (geo)political relations' on Energy Post and as 'How renewables will shift the balance of power' on ReNewEconomy.
- Bosman, R. & Lijnis Huffenreuter, R. (2013), Boekbespreking: De Mythe van de Groene Economie – Valstrik, Verzet, Alternatieven, Anneleen Kenis & Mathias Lievens (Aut.), Internationale Spectator, Vol. 67, Nr. 7/8, pp. 81-82. De PDF van dit artikel is met toestemming van de redactie overgenomen uit de Internationale Spectator, Clingendael Magazine voor Internationale Betrekkingen, uitgegeven door de Koninklijke Van Gorcum, te Assen namens het Nederlands Instituut voor Internationale Betrekkingen 'Clingendael' te Den Haag.
- Bosman, R. & Diercks, G. (2013) Lessen uit Duitsland. Energie+, 1st of April 2013
- Bosman, R. (2013) SER energieakkoord voor duurzame groei: Polderen zoals Lely ooit bedoeld heeft. BODE, April 2013
- Baan, C. & Bosman, R. (2013) Energieakkoord: doorbraak in de energietransitie?. Energie+, 20th of February 2013
- Bosman, R. (2013) Energy transition in the Netherlands: Big ambitions, little action. Renewables international, 17th of April,2013.
- Bosman, R. (2012) How Germany's powerful renewables advocacy coalition is transforming the German (and European) energy market. European Energy Review, 27th of February 2012.
- Bosman, R. (2012) De financiële logica van decentrale energie. Financieele Dagblad, 26th of September 2012.
- Bosman, R. (2012) Time to re-appraise the IEA's energy statistics. European Energy Review, 30th of August 2012

- Bosman, R. (2012) Germany's Energiewende: Redefining the rules of the energy game. Clingendael International Energy Programme Briefing Paper. The Hague, Netherlands.
- Bosman, R. (2011) Renewables 2011 Global Status Report: Strong Growth and Increased Geographical Distribution. European Energy Review, 12th of July 2011.
- Bosman, R. & Gillijamse, J. (2010) Duitsland: Koploper en Aanjager. In: TWA Special Clean Energy. p. 47 – 52. Agentschap NL, Ministerie van Economische Zaken.
- Bosman, R. & Gillijamse, J. (2010) Duitse Offshore Windsector – Een sprong in het diepe. In: TWA Special Clean Energy. p. 42 – 46. Agentschap NL, Ministerie van Economische Zaken.
- Bosman, R. & Gillijamse, J. (2010) Wat is er voor nieuws onder de Duitse zon? In: TWA Special Clean Energy. p. 53 – 58. Agentschap NL, Ministerie van Economische Zaken.
- Bosman, R. & Gillijamse, J. (2010) Van spiegel naar stroom. In: TWA Special Clean Energy. p. 59 – 62. Agentschap NL, Ministerie van Economische Zaken.
- Bosman, R. & Gillijamse, J. (2010) Duitse innovaties in zonnethermie. In: TWA Special Clean Energy. p. 63 – 67. Agentschap NL, Ministerie van Economische Zaken.
- Bosman, R. & Dieperink, C. (2010) Verdient Duits voorbeeld navolging? Milieu, 2010 2 jaargang 16

Selection of Presentations & Invited Lectures

- Bosman, R. (2020) Navigating Transition Space: The role of proactive incumbents in the energy transition. Next2Company team day. 9th of June 2020.
- Bosman, R. (2018) Navigating Transition Space: The role of proactive incumbents in the energy transition. Groningen Energy Summer School. Energy Academy Europe, Groningen, 16th of July 2018.
- Bosman, R. (2018) Geopolitics of Renewables. DG Energy, European Commission, Brussels, Belgium, 14th of June 2018.
- Bosman, R. (2016) Energy in a Post-fossil world. Universiteit van Amsterdam, Amsterdam, 28th of June, 2016.
- Bosman, R. (2016) Paden naar een fossielvrije samenleving. Pakhuis de Zwijger, Amsterdam, 9th of February 2016.
- Bosman, R. (2016) Transition governance for the bioeconomy: comparing Finland and the Netherlands. Research Seminar Norwegian Institute for Innovation, Research and Education (NIFU), 12th of January 2016.
- Bosman, R. (2016) Challenges and opportunities of fossil intense economies in the energy transition. Research Seminar University of Oslo, Centre for Technology, Innovation and Culture, 11th of January 2016.
- Bosman, R. (2015) FD Energiedebat: De financiële kant van de energietransitie. ABN AMRO, Amsterdam, 27th of January 2015.
- Bosman, R. (2014) The role of community energy in the energy transition. Pakhuis de Zwijger, Amsterdam, 15th of September 2014.
- Bosman, R. (2014) Making sense of the energy transition. Guest lecture for the

Master Programme Future Energy Systems at the Technical University Delft, Netherlands, 11th of June 2014.

- Bosman, R. (2014) Transition Management in the Energy Transition. Guest lecture for the Master Programme Renewable Energy Management at the Albert-Ludwig University in Freiburg, Germany, 12th of February 2014.
- Bosman, R. (2013) Regime dynamics in the Dutch energy transition. Presented at research seminar at TU Eindhoven, 12th of December 2013.
- Bosman, R. (2013) Dutch energy transition in EU context. Presented at MIT and Imperial College alumni event, Amsterdam, 9th of November 2013.
- Bosman, R. (2013) Energiewende: lokale dynamiek met internationale gevolgen. Expert contribution to Energiewende roundtable of the permanent Economic Affairs committee of the Dutch parliament, The Hague, 4th of April 2013.
- Bosman, R. (2013) FD Energiedebat: Energy Port Rotterdam, RDM-campus, Rotterdam, 23rd of March 2013.
- Bosman, R. (2013) Doorbraken in de energietransitie. Presented at Greenpeace, Amsterdam, 20th of February 2013.
- Bosman, R. (2013) De energietransitie is een slagveld. Presented at the conference 'De Energieke samenleving op weg naar 2050' of the Social Economic Council (SER) Energy agreement for sustainable growth, The Hague, 28th of January 2013.

(Co-)Organized Panels & Sessions

- Rick Bosman (organizer) and Derk Loorbach/Julia Wittmayer (chair) "Regime dynamics in transition: resistance, destabilisation and adaptation", special session at: 4th International Conference on Sustainability Transitions, Zurich, 19 – 21st of June 2013

PhD-courses and summer schools

- Interpretive Policy Analysis. The Netherlands Institute of Government, University of Twente. Course instructors: Dr. Tamara Metze, Dr. Merlijn van Hulst, 0.8 ECTS.
- Great Thinkers of the 20th Century. Erasmus School of Social and Behavioural Sciences, Erasmus University Rotterdam. Course instructor: Dr. Gijs van Oenen, 5 ECTS.
- EIS PhD Summer School, Energy Innovation Systems and they Dynamics – Complementary developments, competence clusters and the establishment of new energy technologies. Technical Univeristy of Denmark. Faculty: Dr. Mads Borup, Dr. Poul Houman Andersen, 4 ECTS.
- ETH PhD Academy on Sustainability and Technology, Energy Innovation and Climate Change – The Role of Technologies, Firms and Institutions. ETH Zurich. Faculty: Dr. Laura Diaz Anadon, Dr. Charlene Zietsma, Dr. Johann P. Murmann, Dr. Volker Hoffmann, 3 ECTS.

Media appearances

- Al Jazeera (2015) Can the world rely on renewable energy? https://www.aljazeera.com/program/inside-story/2015/9/22/can-the-world-rely-on-renewable-energy

Curriculum Vitae Rick Bosman

I'm a creative sustainability strategist, passionate about realising lasting impact. With curiosity, humor and empathy, I challenge people to develop bold and tangible solutions. In my experience, the most daring developments emerge from unexpected connections between inspired people and organizations that, each in their own way, work towards positive impact. I combine an entrepreneurial mentality, hands-on approach and deep understanding of the complexity of our energy system, to mobilize a broad network of people that work on out-of-the-box change for a sustainable society.