

STRN Newsletter



N°33 | October 2019

Newsletter 33 – October 2019

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About

The STRN newsletter is published four times a year. The next issue will appear in December 2019.

Cover: Greta Thunberg, climate activist (picture by Anders Hellberg); Autumn Peltier, water activist; climate protests (pictures by UN Photo)

Editorial



by Lea Fuenfschilling, Lund University
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Inspired by Greta Thunberg, this September we experienced a wave of youth-led climate strikes all over the world. The global climate strike website estimates that 7.6 million people took to the streets to demand climate action. They call it ‘the biggest climate mobilization in history’. So far so good – having critical mass is essential for any type of transition and I am happy to see that these issues become somewhat mainstreamed. But I also see some fundamental questions associated with these activities: From whom are the protesters demanding action? Politicians? International organizations? Firms? Consumers? And what types of actions are they requesting?

I think these strikes illustrate very well the inherently complex and uncertain nature of sustainability. The mismatch between wanting change on the one hand, and being paralyzed due to the systemic interdependencies that cause a lack of agency and accountability on the other. A topic that we have been discussing in transition research for a long time. So, we know very well that change of this magnitude is a non-linear and very time and energy consuming process that unfolds in different phases, sometimes faster, sometimes slower, taking two steps forward, and one step back. But it is nice to see that we are on it, that sustainability arguments gain legitimacy in their own right, and that we are in the process of institutionalizing a new set of rules for the game.

In this newsletter we have, among other things, a set of reflections on the policy impact of sustainability transitions research. This is timely, given that many climate protesters seem to demand action from policy makers. While some might argue that climate policy, and sustainability policy more generally, is just a matter of directionality and willingness, our research shows that it might be a bit more complicated than that. Fundamentally changing the dominant rules of the game often entails the development of a whole new mindset and rationality. It requires deep structural changes that also include new ways of governing.

In recent years, due to my role as coordinator of the Swedish Transformative Innovation Policy Platform, I have been working with a range of policy makers, trying to understand how they approach sustainability issues as well as promoting a transition-theory-based understanding of sustainable development.

I organized seminars and workshops, participated in various meetings and had a plethora of informal face-to-face interactions. I was impressed to see that there is indeed a lot of willingness to become active, to find solutions, to make changes. But there may also be a certain state of despair for not having an answer, being caught up in impossible decisions and serious trade-offs, or being overwhelmed by the magnitude of the challenge. Meetings often started hopeful, with the expectation that we – as transition researchers – have the solution and ended sometimes in slight disappointment when realizing that there is no quick fix. Translating our research into policy action is not easy. There is a big difference between theory and practice, and just because the theory has an elegant internal logic does not mean that it is useful to steer the very processes it describes so eloquently. There is no blueprint for us researchers on how to best engage with policy makers or practitioners and how to best convey our knowledge.

In my experience, one of the main obstacles for generating policy impact is time. Changing ways of thinking and translating new thinking into practice is very time consuming and often not instantly rewarding or creditable on an academic CV. It necessitates the triangulation of activities, methods and approaches. It requires trust building and the development of a common language. It requires dedication and patience. Progress is often slow, sometimes it can seem futile. But constant dripping wears away the stone. Our interventions all over the community are starting to show effect and it seems as if they are currently reinforcing each other. New policy documents and upcoming programs promote transformation and mission-orientation. Problem and solution framings are based on a systemic understanding of change and innovation. Evaluations of policy programs are increasingly guided by qualitative analyses using transition concepts.

I sincerely hope that our activities and these new developments will contribute to speeding up transition processes. We need to acknowledge, however, that this impact is not only based on scientific articles and reports, but first and foremost on the efforts to translate our perspectives to policy, practice and education more broadly. So, if you want to donate something to the cause, consider donating time to these efforts.

Volume 32 (September 2019) has just been published. It contains a special issue

“How History Matters for the Governance of Sociotechnical Transitions”

edited by Stathis Arapostathis and Peter J.G. Pearson, which includes 12 articles:

- How History Matters for the Governance of Sociotechnical Transitions: An introduction to the special issue, by S. Arapostathis and P.J.G. Pearson
- Deep transitions: Theorizing the long-term patterns of socio-technical change, by L. Kanger and J. Schot
- Radical change and deep transitions: Lessons from Europe’s infrastructure transition 1815–2015, by E. van der Vleuten
- Understanding successive industrial revolutions: A “development block” approach, by A. Nuvolari
- The First World War and the Latin American transition from coal to petroleum, by M.d.M. Rubio-Varas
- Grand visions and pragmatic integration: Exploring the evolution of Europe’s electricity regime, by R. Bolton, V. Lagendijk and A. Silvast
- Branching points and transition pathways in the Greek Natural Gas Regime, 1966–2016, by Y. Fotopoulos, S. Arapostathis and P.J.G. Pearson
- Governed by tensions: The introduction of renewable energies and their integration in the Bulgarian energy system (2006–2016), by M.J. Ivanov
- The Bulgarian nuclear sector in transition: Adopted Russian technology, state sovereignty and accession to the EU, by I. Tchalakov and I. Hristov
- Steering the ‘C-Day’: Insights from the rapid, planned transition of the UK’s natural gas conversion programme, by S. Arapostathis, S. Laczay and P.J.G. Pearson
- Governance of interactions between infrastructure sectors: The making of smart grids in

the UK, by R. Hiteva and J. Watson

- Origin of car enthusiasm and alternative paths in history, by M. Bladh

As always, we look forward to receive your submissions and comments. Please don’t forget to read, and if relevant cite, EIST.

Jeroen van den Bergh, Editor-in-Chief

STRN Events

Upcoming Events

5th NEST conference, Zurich, May 7-8, 2020

NEST, the network of early career researchers in sustainability transitions, is proud to announce the next NEST conference. The event is jointly hosted by the Swiss Federal Institute of Technology in Zurich ([ETH Zurich](#)) and the Swiss Federal Institute of Aquatic Science and Technology ([Eawag](#)), with a team of organizers from both institutions and beyond.

The 2020 NEST conference will be the fifth one organized by the junior branch of STRN and aims at consolidating the success of previous editions. The event aspires to bring together early-career scholars (i.e. Ph.D. students and post-docs) from a variety of disciplinary backgrounds but with a common focus on the study of sustainability transitions. Participants will be able to present their work, gather feedback from peers and senior researchers, and create bonds with like-minded people in a unique atmosphere that has become the distinct feature of NEST events.

Share the event with your colleagues and make sure to note the NEST 2020 conference key dates.

- Call for abstracts: 16 October 2019
- Submission deadline: 1 December 2019
- Conference: 7-8 May 2019

For further inquiries, please contact the organizing team at transitions.nest@gmail.com

Alejandro, Aline, Andri, Claudia, Evan, Gesa, Jonas, Marius, and Séverine



TIP Conference and Engagement week, Valencia, November 4-7, 2019

This event is organised by the Transformative Innovation Policy Consortium (TIPC) and co-funded by Eu-SPRI, targeting policymakers, transition researchers and practitioners. The first two days of the week is the conference which brings together representations from four research communities – STRN, Eu-SPRI, Globelics and TIPC.

With participants representing over 60 different research projects from Europe, Asia, Australia, Africa and Latin America, the conference is envisaged as a unique space for mutual learning and co-creation of knowledge in a truly international setting. The keynote is given by Kirsten Dunlop (CEO Climate KIC).

The facilitated interactive sessions are expected to produce multiple research blogs, which alongside posters for each research project will be exhibited at www.tipconsortium.net allowing the wider community of scholars and practitioners to participate virtually. Follow the debate on Twitter at @TIPConsortium #TIPConf2019.

Other News

Upcoming Events

SCORAI Conference, Boston, June 10-12, 2020

The 4th International **SCORAI** conference on “Sustainable Consumption and Social Justice in an

Urbanizing World” will be hosted by the School of Public Policy and Urban Affairs at Northeastern University in Boston from June 10th to 12th 2020. This conference brings together a diversity of researchers and practitioners focused on innovative and transformative ideas related to consumption and social justice.

Questions regarding SCORAI 2020 should be directed to scorai2020@northeastern.edu

Jennie Stephens

Eu-SPRI Conference, Utrecht, June 3-5, 2020

The annual Eu-SPRI conference is the leading event in science, technology and innovation policy in Europe, with a broad attendance of scientists as well as policymakers.

Until **Nov-15, 2019** we invite proposals for sessions (~500 words) to be held at the conference. Research sessions can be proposed by (at least) two organizers, who prepare a text for the Call for Research Papers, support the local organizers and scientific committee in reviewing the papers, and chair the sessions. If a sufficient number of papers is accepted, a research session can be extended to a multi-session track.

Gaston Heimeriks, Koen Frenken, Koen Beumer, Wouter Boon, Iris Wanzenböck

Contact: euspri2020@uu.nl

New projects

New research center on sustainability and industrial transformation

Innovation Policy for Industrial Transformation, Sustainability and Digitalization (**INTRANSIT**) is a new 8-year research center hosted by TIK Center in University of Oslo, and partnered by Institute of Informatics in University of Oslo, SINTEF Digital, and Copernicus Institute of Sustainable Development in Utrecht University. The research center is funded by Research Council of Norway, and will run from 2019 to 2026.

INTRANSIT has the mission to understand how industrial transformation towards a more sustainable and smarter Norwegian economy can be fostered. There are four central research themes. These include 1) the study of industrial transformations in key incumbent industries in Norway, 2) firm-level strategies and behavior of incumbent and niche companies, 3) the impact of digitalization on sustainability transitions, and 4) policy mixes and policy experimentations addressing industrial transformations.

The theories, concepts and analytical frameworks in the sustainability transitions literature have a central role in informing our work.

A central idea in INTRANSIT is to closely collaborate with public and private actors, as well as the scientific community. Therefore, if you are interested to find out more, please visit our website, or make contact.

Taran Thune (Center Director) and Tuukka Mäkitie (Researcher)

Postdoc Academy for Transformational Leadership

Twenty Postdocs from eleven countries dealing with Scaling Sustainability attended their first seminar at the Humboldt-Universität in Berlin from in September 2019.

The [Postdoc Academy for Transformational Leadership](#) is designed to train the next generation of leaders in sustainability and transformation research. It provides an intensive high-end training with four seminars in two years that broaden the research competencies of postdocs and promote their qualifications towards transdisciplinary leadership. The program also offers seed funding (e.g. for stakeholder meetings or proposal writing activities) to small groups of participants, who plan to initiate research collaborations. An active network of current and former participants of the program will be established.

The Postdoc Academy is a joint project of the Robert Bosch Stiftung and the four academic centres Humboldt-Universität Berlin, Leuphana University Lüneburg, the Stockholm Resilience

Centre and the Dutch Research Institute for Transitions (DRIFT) in Rotterdam.

The next call for applications will be out on 15th December 2019 on “Sustainability and Mobilities”.

Kathrin Klementz

Energy-SHIFTS Policy Fellowship

The [Energy-SHIFTS](#) Policy Fellowship is designed to provide policymakers and civil society actors working on energy policy with direct access to researchers from across the social sciences and humanities (SSH). From January 2020, the scheme will connect 20 selected policy workers to cutting-edge research that will allow them to better tackle the strategic questions they are facing in their day-to-day work.

The aim is to facilitate face-to-face (and virtual) meetings between policyworkers and researchers on strategic policy areas, tailored to the policy fellow’s needs and interests. Prospective applicants should identify key energy policy issues they wish to focus on and a key question they hope to explore, e.g. around energy poverty, adoption of smart meters, changing modes of transportation.

We are looking for highly-motivated energy-focused ‘policy workers’, i.e. individuals who are active in making, applying, influencing or understanding energy policy. This can include elected officials and individuals on their teams, civil servants, European Commission staff and civil society actors (think tanks, NGOs, trade associations and advocacy organisations). The open call is intended for a range of levels from senior to early-career policy professionals. Applicants must be based in the EU or a Horizon 2020-eligible country.

Deadline for applications to the open call 31st October 2019.

Policy Impact

«Sustainability transitions: policy and practice»

The [new report](#) by the **European Environment Agency** was launched in September. It was written by a team of experts from the STRN community, with Frank Geels, Bruno Turnheim, Mike Asquith, Florian Kern and Paula Kivimaa as lead authors. It also benefited significantly from interactions with EEA partners in multiple policy areas. The assessment goes beyond theoretical discussions to explore the practical implications of transitions research – highlighting the growing links to EU policy frameworks and the ways that transitions thinking is being operationalised at different scales across Europe.

Hans Bruyninckx (HB), Executive Director of the [EEA](#), speaks about the new report with Jochen Markard (JM), Chair of the STRN network.

JM: How did you come up with the initiative for this report and why is it needed?

HB: The new report is the latest in a series of EEA assessments that have explored transitions concepts and their implications in Europe. It was clear to us in 2015 that we needed to reorient the EEA's work towards producing more solutions-oriented knowledge. So we started by developing links with relevant research communities, in particular STRN, and exploring different analytical perspectives on systemic change. More recently, we've shifted the focus towards understanding the implications of transitions research for policy, especially at the EU level.

In part, this work has been building towards our next five-yearly assessment of Europe's environment, 'SOER 2020', which comes out in December. But it's also proving extremely relevant and timely in the context of growing awareness about the scale and urgency of the climate, biodiversity and resource crises and the need for transitions. People are taking to the streets to demand action. This creates opportunities for governments to be much more ambitious.

JM: How can transition perspectives help to address the ongoing crises?

HB: Many of the problems we face are very demanding and complex. Take climate change for example. It cuts across many economic sectors – energy, transport, industry, agriculture – and calls for changes in technologies, policies, business models, investment decisions, even lifestyles. This is where transition thinking is important because it seeks to connect all these different aspects and points to the systemic nature of the challenges we face.

JM: What role does transition thinking play at the level of the European Union?

HB: We've seen a clear shift in EU policy during the last five years, with ideas from transitions research increasingly shaping the policy discourse. Today, there's a growing recognition that achieving Europe's sustainability goals will require systemic change, enabled through the combined actions of citizens, communities, businesses and public authorities. We see this in the EU's growing body of transformative policy frameworks – addressing energy, mobility, the circular economy, etc. The message also comes through strongly in the 'Political guidelines for the new European Commission', recently presented by President-elect Ursula von der Leyen. This discursive shift is important but, of course, it's just a start. The challenge now is to translate this into action.

JM: We see numerous reports every year aimed at all levels of policymaking, including the EU. How do you expect this one to be different?

HB: There's certainly no shortage of reports out there. Actually, the challenge for policymakers is often how to make sense of the ever-growing mass of information. This is exactly where the EEA has a role to play – gathering and translating data or research into a form that can be used by decision-makers.

The emergence of the transitions discourse in EU policy creates a real challenge for governments. It requires them to think very differently about how societal change happens and the role of public policies and institutions. It also forces them to question their internal governance – how to break out of silos, or what kinds of new skills and knowledge are needed. Faced with these uncertainties, policymakers in the EU and elsewhere are hungry for robust evidence about how to proceed.

This new report aims to respond to this knowledge need – providing a framework for navigating the diverse insights from transitions research and related fields, linking it to the political realities of our key audiences, and identifying 10 messages for policy. It also tries to make things concrete by using examples from Europe’s food, energy and mobility systems to illustrate challenges and responses. Collectively, I think that this adds up to something genuinely novel, with the potential to provide a valuable bridge between research and policy.

JM: You are talking about new ways of thinking. Transition scholars typically highlight complexity and uncertainty in transitions. Do you see a conflict between what policymakers want and what we can offer?

HB: Of course, transitions research has no final answers or solutions to the challenges we face. What’s important is shifting how we think about future policymaking – about how governments and other actors across society can work together to find solutions. We don’t have ‘simple problems’ that can be tackled with ‘classic’ policy approaches. Europe isn’t going to achieve its long-term sustainability goals just by promoting growth and using environmental and social policy tools to clear up the mess. We face grand challenges and these necessitate new styles of governance. This will mean thinking in terms of long-term transition pathways, continuous policy learning, a mix of policy instruments for different purposes and transition phases, creating strong coalitions of actors in support of transitions and so on.



JM: Do you already have first reactions of how the report was received?

HB: We launched the report at a high-level event in Brussels, where the key messages were very well received by colleagues from all parts of the European Commission. There really seems to be a broadly shared understanding that delivering a European ‘green deal’ and achieving the SDGs is going to require coherent and far-reaching action from across policy domains and levels of governance.

JM: What are the next steps? Will EEA continue to work with transition perspectives and policies?

HB: Making sense of the implications of transitions thinking for public policies and institutions is a huge task. The new EEA report provides a very useful framework for thinking about this but it’s really just the beginning.

There would be real value in following up with more focused bits of work looking at particular themes and systems. For example, the food system is becoming a major focus for policy and there’s lots of work to be done there. We also need to do some really rigorous thinking about what kind of knowledge system we need to enable sustainability transitions and how the EEA can best contribute. This is partly about what and how we research but it’s also about building infrastructures and developing skills that enable actors across society to generate, share and access diverse forms of information. That’s obviously something that will require a new level of interaction between public institutions, research, communities, businesses and so on.

JM: Thank you for your time and for sharing your insights!

‘[Sustainability transitions: policy and practice](#)’ was authored by Frank Geels, Bruno Turnheim, Mike Asquith, Florian Kern and Paula Kivimaa, with contributions from Cristian Matti, Sylvia Veenhoff, Niki Fratzeskaki and Julia Wittmayer.

Policy impact of Utrecht University research on transitions

Most know that researchers at the Copernicus Institute of Sustainable Development at Utrecht University (UU) are active members of the STRN community. A lot of research effort has been devoted to the development of the Technological Innovation Systems (TIS) framework. What may be less well known is that the knowledge developed at UU has had a large impact on Dutch national policy. Marko Hekkert shares some of his experiences.

In 2008, we were approached by government officials to support the Dutch Energy Innovation Agenda through a series of TIS analyses. One for each promising energy technology. The policy program focused on overcoming systemic weaknesses. In this way, TIS research influenced the spending of 1.5 billion euro's in the Dutch energy transition. This put the TIS framework on the radar of Dutch policy

Since then all projects that are financed through transition related policy initiatives in the Netherlands are stored in a database that is structured according to the TIS model. Progress is monitored using this database by a government agency. UU colleagues assisted in the design of the database. Typical interventions based on these insights are market formation programs and strengthening of networks in innovation systems.

Somewhat later, we started training for policy makers in the area of innovation and transition. Meanwhile, 250 civil servants have been trained and they are now familiar with transition theories and frameworks. A selected group of civil servants is offered an intensive additional course to become a 'TIS coach'. They can now explain TIS theory and methodology to colleagues. We have also written a TIS manual in a co-creation process with civil servants.

Since 2015 climate change is a high priority topic in Dutch policy. We are frequently asked to give lectures on sustainable innovation and transitions for large groups of civil servants at the departments for economic affairs and environment & water management. As a result of our training programs and talks, civil servants at the ministry of economic

affairs started to program energy, circular economy and agriculture related innovation and transition policy, applying insights from TIS studies. The impact of UU is greatly strengthened by former PhD students who now have influential positions in the Dutch knowledge and policy landscape.

Recently we successfully supported the Dutch government to adopt a mission-oriented innovation policy approach through public invited lectures at ministries, by writing highly visible and easily accessible essays ([link to article](#)). We were also invited to chair an influential government advisory committee. We used insights from transition theory that strong policy guidance is highly needed to create sustainable transformation. Also, we suggested a 'monitoring unit' that continuously monitors progress in the energy transition based on transition theory and insights. As it seems now, this unit will actually be erected. This is a fine achievement as it will have a lasting effect on policy decisions.

While we are very happy with the results, it is important to note that this is the result of 10 years of investments in often free-of-charge activities. Very often the impact of these activities is not clearly visible. Strong neoclassical views that aim for technology neutral policies often dominate the debate. However, over time, reputation builds up and frameworks start to stick. When that finally happens, nothing is more rewarding.



Action Research for Sustainability Transitions at DRIFT

Researchers at [DRIFT](#), the Dutch Research Institute For Transitions at the Erasmus University Rotterdam, are pioneering action research for sustainability transitions. Here, Derk Loorbach and Julia Wittmayer reflect on their approach.

At DRIFT, we use the conceptual lenses of sustainability transition research to engage with practice. In our work, we take an action oriented, transdisciplinary and applied approaches such as transition management as a starting point. The aim is twofold: exploring how transitions can be guided and accelerated into 'desired' directions, and systematically harvesting insights to further develop existing frameworks. Our applied work for communities, business and policy serves as experimental action research. We use our projects based on research funding (such as PROSEU, URBANA, Energy-Shifts and ConnectingNature) also to validate, deepen and scientifically anchor our insights.

We are regularly approached by policy-makers, NGO's or business actors that are looking for ways to move beyond business-as-usual. Each new question for us represents a possibility to enter a next context, find new interesting questions, and test new ideas. Most of our work is on regional or sectoral transitions, but an interesting recent illustration of our approach is our work for with UN convention on Biological Diversity ([CBD](#)). An initial presentation of transition thinking turned into a series of '[Bogis-Bossey](#)' workshops to develop a shared narrative about what transformative change is needed and how it could be achieved by reorienting the 'biodiversity regime' to mobilize global support for local and regional sustainability transitions. This process included a selection of high level, open minded change agents from conservation organizations, political bodies, NGO's, impact investment and business.

Our role was to challenge the dominant approach in biodiversity as symptom (biodiversity loss) oriented, incremental and reactive. Using conceptual frameworks such as the transition X-curve, we facilitated co-creation workshops to identify a shared transition agenda for *build-up*, *transform* and *phase-out* towards an economy for nature. In the process, participants started to translate this

narrative into their own daily contexts, for example stepping up work on positive futures in the scenario group of [IPBES](#), engaging coalitions of the willing in business communities, and subtly supporting the policy process to bring in the need for [transformative change](#). It resulted in one of the most radical [policy documents](#) arguing for a transformative change of the global economy, backed by the IPBES assessment with a plea for transitions and transition governance.

At DRIFT, we take position against unsustainability and engage to explore potential and desirable future transitions without selecting solutions upfront. We do this by continuously challenging business-as-usual, developing and empowering transformative networks and supporting reflexive capacities. For example, in the mobility transition, this implies taking a very critical stance towards the emerging shift to electric cars ([link to paper](#)): we question individual use of cars and its impact on public space (spatial justice) and economy (mobility poverty).

Our transition research agenda is therefore about exploring pathways to zero emission and shared mobility as the norm by engaging with and supporting practices, technologies, policies and platforms that already work to this end. We see a lot of such niches emerging in cities, and we experimentally develop urban transition governance that focuses on adapting structures and institutions as transition strategy. Such '*institutional acupuncture*' in the form of reducing speed, creating zero emission lanes, phasing out street parking, developing shared mobility platforms and cooperatives is our current approach for transition management.



Publications

PhD theses

Burnett, A. (2019)

Planning for Transitions? A case study of Frome, Somerset (UK)

University of Reading

This thesis explored the role of planning and political 'regimes' in cultivating 'New Economy' ideas and low-carbon development in the market town of Frome (Somerset, UK), which is gaining popularity for 'grass-roots' political and environmental innovation. The research focused particularly on the role of Sustainable Frome (the local Transition Initiative) in instigating or influencing such ideas and the role of an independent political group in control of Frome Town Council (the Independents for Frome) and the national policy of localism in shaping these outcomes. The findings reveal autonomy and independence as crucial frames used to justify an orchestration of transition governance, with both emergent and strategic foundations. Pre-existing ties and reciprocity helped to express and advance 'relocalised' place-based artefacts using the structures of the state to weave in institutionalised forms of alternative governance to support local placemaking initiatives. Multiple praxes of the niche and planning and party-political 'regimes' were invoked, rendering the terms more fluid than is typically understood within *intersecting regimes of transition*. The findings highlight a need for greater attention to the cultural qualities of placemaking and scale as a basis for social ties that support inclusive and emergent governance. Cycles of transition and the intergenerational phases between old and new were key drivers in transition processes for individuals and organisations. The notion of *placemaking transitions* is offered to explore how the politics of place influences sustainability transition arenas.

Gosh, B. (2019)

Transformation beyond experimentation: sustainability transitions in megacities

University of Sussex

[link](#)

World's megacities are facing acute sustainability challenges. Persistent problems such as urban pollution, resource depletion, climate change, poverty and social inequalities are shaping unsustainable futures for some of the world's most populated regions. How can these challenges be tackled? Focusing on the urban mobility regimes that contribute to the acute challenges, this thesis investigates if they can transition toward sustainability. According to sustainability transitions studies, experimentation is vital for making such a transition,

through replacing existing unsustainable socio-technical regimes such as fossil fuel-based automobility. Besides niche experimentation, existing regimes can also undergo transformation towards sustainability, being enabled by regime actors. Both experimentation and regime transformation are explored in five studies covering cities like Kolkata, New Delhi and Ahmedabad in India and Bangkok and Chiang Mai in Thailand. However, the majority of the thesis has a strong focus on Kolkata.

These five studies, tied together, offer a critical understanding of sociotechnical transitions in megacities, by carrying out sustainability appraisals of experiments and developing theoretical frameworks and practical tools for understanding regime dynamics. This way, the thesis offers new conceptual and methodological insights for sustainability transitions, by emphasizing transformations beyond experimentation. These new insights are intended as contribution to shaping sustainable futures in megacities.

Hölscher, K. (2019)

Transforming urban climate governance: Capacities for transformative climate governance.

Erasmus University Rotterdam

[link](#)

This thesis contributes to explaining and evaluating how urban climate governance is being developed and advanced, whether these efforts manifest in capacities for transformative (climate) governance in cities and how such capacities can be strengthened vis-à-vis existing urban governance regimes. I argue that enabling transformative climate governance requires the development, and better understanding, of new governance capacities so as to create institutional space for and facilitate those actions that can purposefully contribute to the transformation required for dealing with climate change and unsustainability in cities. The contribution of this thesis is both theoretical and empirical: a framework of capacities for transformative climate governance and empirical evidence to compare whether, how and by whom such capacities have been created in Rotterdam, the Netherlands, and New York City, USA.

Papers

Schmitt, R.J.P., Kittner, N., Kondolf, G.M., Kammen, D.M. (2019)

Deploy diverse renewables to save tropical rivers.

Nature. 569, 330-332

[link](#)

Continued reliance on hydropower could put vulnerable tropical river ecosystems—and the communities that rely on them—at unnecessary risk. Looking to invest in clean energy, many developing nations in Africa, South America, and Southeast Asia are planning to increase hydropower through the development of new dams. But many of the ambitious dam-building plans are holdovers from the mid- and late-twentieth century, when solar and wind alternatives were in their infancy and expensive. With the costs of solar and wind dropping precipitously, investing in a mix of wind, solar, and storage technologies can be more sustainable and less costly than building mega-dams on tropical waterways. The commentary arrives at a moment when progress in renewable energy research and energy storage has never been faster. And yet human-induced climate change continues to threaten ecosystems, biodiversity, and the cultural survival of indigenous communities across the globe.

Fratini, C.F., Georg, S., Jørgensen, M.S. (2019)

Exploring circular economy imaginaries in European cities: A research agenda for the governance of urban sustainability transitions

Journal of Cleaner Production. 228 974-989

[link](#)

This paper builds on the following research questions: 1) How is circular economy imagined in the academic literature in support of sustainability transitions in European cities? 2) How do European cities imagine circular economy as a knowable object of governance? 3) How can the circular economy imaginary be an opportunity for socially inclusive and environmentally desirable urban transitions? We engaged in a three-fold research endeavour to address these questions. Firstly, we conducted an in-depth literature review, mapping the emergence and developments of the circular economy concept in time and space with a specific focus on urban studies. Secondly, we analysed documented translations of the circular economy imaginary in three European metropolitan cities (Amsterdam, Paris and London) to explore the discourses, institutions, representations and social identities underpinning their respective translations, and reflect on how they diverge from each other and how they have the potential to deliver sustainable outcomes. Thirdly, these results were used to outline a research agenda that explores the

relationship between the political and the epistemic domain of existing urban translations of circular economy across scales and places, to support future empirical investigations of whether and how circular economy imaginaries can support transformative pathways for socially inclusive and environmentally desirable value creation in cities. In so doing, this paper fosters reflexivity for both theory and practice in order to better understand how theorisations and the application of circular economy could be advanced in support of urban sustainability transitions.

Lowes, R., Woodman, B., Fitch-Roy, O. (2019)
Policy change, power and the development of Great Britain's Renewable Heat Incentive.

Energy Policy, 131, 410 - 421

[link](#)

The role of socio-political power is central to the development of policy, but systematic analyses of power associated with the development of energy policy are rare. Power is also an important yet somewhat under-researched aspect of socio-technical transitions research. The Renewable Heat Incentive (RHI) policy aims to increase deployment of low-carbon heat in Great Britain and begin a transformation to a low carbon GB heat system. This article analyses the socio-political power associated with the development of the RHI policy based on Lukes' 'dimensions of power' approach using a methodology based on triangulation. We identify a number of policy change episodes during the development of the RHI and describe the influence of key actors on the policy. Despite the common assumption of the power of incumbents, we show that those actors with niche technological expertise, close relationships with Government actors and actors within the administration have been the most powerful drivers of policy development and change. Niche actors sped up the introduction of the RHI scheme and have also had some success in increasing relative support for biomethane injection. The power of a civil servant to slow the introduction of the domestic element of the RHI has also been identified.

Gürtler, K., Postpischil, R., Quitzow, R. (2019)

The dismantling of renewable energy policies: The cases of Spain and the Czech Republic.

Energy Policy, 133, 110881

[link](#)

Despite their increasing cost competitiveness, the continued expansion of renewable energy remains dependent on policy support. Moreover, the dismantling of renewable energy policies in a number of former pioneer countries indicates that continued policy support is not a foregone conclusion. Yet, in light of the accelerating expansion of renewable energy, the dismantling of renewable energy policies has captured

comparatively less attention than the rapid spread of support schemes. This article seeks to fill this important knowledge gap by developing and testing a framework for the analysis of policy dismantling processes in the renewable energy sector. It applies the framework to conduct a comparative analysis of policy dismantling in Spain and the Czech Republic. Both countries represent European pioneers of renewable energy support who subsequently dismantled their policies. The paper finds that the inter-relationship between policy design and the broader configuration of the political economy in the energy sector are key for understanding dismantling processes. It offers a number of conclusions for the design of more robust renewable energy support policies.

Heyen, D.A., Wolff, F. (2019)

Drivers and barriers of sustainability transformations: A comparison of the “Energiewende” and the attempted transformation to organic agriculture in Germany

GAIA 28/S1, 226 – 232

Why has the German energy transformation been more successful than the attempted transformation to organic agriculture? Through an analysis of the drivers and barriers of both processes, this article identifies key factors that explain the difference in outcome. It becomes clear: transformation strategies should aim to create regulatory frameworks that make it attractive to invest in sustainable alternatives. This article compares the drivers and barriers of two sustainability transformations in Germany: the energy transformation (“Energiewende”) and the attempted transformation towards organic agriculture which has, so far, been less successful. It is based on two case studies rooted in transformation research. While there is rapidly growing literature on energy, there are far fewer analyses of agricultural transformations. Moreover, single case studies dominate. The cross-case comparison presented in this article is a step towards filling this gap. Particularly in their initial stages, the two transformation processes shared similarities: both systems had been coming under pressure due to environmental crises, grassroots movements and niche developments of sustainable alternatives. However, changes to the regulatory system framework made investments in renewable energy more attractive than in organic agriculture, where the profitability of the transformation is still reduced by significant subsidies for conventional agriculture. Moreover, the energy transformation has benefitted from technological improvements and falling costs, an early coalition of supporters, including business actors, and more recently from a broader societal and political consensus.

Goggins, G., Fahy, F., Jensen, C. L. (2019)
Sustainable transitions in residential energy use: Characteristics and governance of urban-based initiatives across Europe.

Journal of Cleaner Production, 237, 117776

[link](#)

Reducing domestic energy use in cities has become a key focus in achieving sustainability goals. Recent and on-going efforts to address excessive residential energy use have taken various forms and have been initiated by a range of different actors. This paper presents evidence from the analysis of a database of 249 recent sustainable energy initiatives that have been implemented at various scales in and across urban areas in Europe. The paper examines common trends and characteristics in the type of initiatives that are promoted, including the problem definition, general approach, and implementation method. A second focus of enquiry centers on the governance mechanisms that underpin these initiatives. Here, attention turns to the main actors responsible for driving initiatives, the frequency and various forms of implementing partnerships, and the funding source through which the selected initiatives are financed. Two major themes emerged from reviewing the data, namely stratification and integration. Stratification or integration was evident across five key areas including problem framing, general approach, engagement mechanisms, governance, and evaluation frameworks. A corresponding typology of initiatives is presented under four categories: Enhancing; Directional; Experimental; and Responsive. Applying the typology to the dataset shows that enhancing initiatives aimed at optimizing technology or individual behavior are most prevalent (56%). Experimental initiatives that deliberate with new ways of living (16%) or responsive initiatives that consider contextual-needs (14%) are less prevalent and are more likely to occur at a smaller scale. Overall, we argue that integration across key areas can increase the success of initiatives that aim to achieve long-term sustainable transformation in household energy use.

Jensen, C. L., Goggins, G., Røpke, I., & Fahy, F. (2019)

Achieving sustainability transitions in residential energy use across Europe: The importance of problem framings.

Energy Policy, 133, 110927

[link](#)

Reducing greenhouse gas emissions in the residential sector is central to European energy policy. However, the speed and scale of sustainable energy transitions need to accelerate. There is a growing consensus that meeting energy targets is highly dependent on interrelated socio-material and cultural aspects of energy use. New ways of framing energy demand that go beyond dominant efficiency- and behavior models are needed.

Recognizing these concerns, this paper reports on a review of 1067 Sustainable Energy Consumption Initiatives (SECIs) that aim to reduce residential energy use across 30 European countries. The initiatives are categorized and a corresponding Problem Framing Typology (PFT) is developed, highlighting important aspects of different types of problem framings. The typology contains four categories including 1) Changes in technology; 2) Changes in individual behavior; 3) Changes in everyday life situations; 4) and Changes in complex interactions. Applying the PFT to the 1067 SECIs shows that the vast majority (75%) of SECIs are positioned within category 1 and 2, indicating a lingering bias towards technocratic consumer behavioral strategies. The limitations of such approaches are discussed, and it is argued that systematically addressing interactions between technology, businesses, culture and everyday-life is more likely to lead to long-term transformation.

Abel, D. (2019)

The diffusion of climate policies among German municipalities.

Journal of Public Policy

[link](#)

The German government established a funding scheme for local climate policy in 2008. The translation of this programme into climate action varies between municipalities. This article studies the drivers and barriers for the diffusion of the programme among German municipalities. A major aim is to disentangle the diffusion effects across different steps within the policy cycle by employing Event History Analysis and spatial panel autoregressive models. Geographical proximity, party channels and transnational city networks are predictors of the diffusion process. Differences in diffusion effects between policy adoption and substantial policy output indicate that emulation as well as learning influence policy activity. Furthermore, increasing deployment of solar photovoltaic systems in neighbouring municipalities is associated with an intensification of climate policy in the focal municipality. The absence of similar effects for other renewable energy technologies hints at the “conditional nature” of policy learning with respect to the policy-makers’ vote- and policy-seeking behaviour.

Schmid, N., Sewerin, S., Schmidt, T.S. (2019)

Explaining Advocacy Coalition Change with Policy Feedback.

Policy Studies Journal

[link](#)

Despite the prominence of exogenous factors in theories of policy change, the precise mechanisms that link such factors to policy change remain elusive: The effects of exogenous factors on the politics underlying policy

change are not sufficiently conceptualized and empirically analyzed. To address this gap, we propose to distinguish between truly exogenous factors and policy outcomes to better understand policy change. Specifically, we combine the Advocacy Coalition Framework with policy feedback theory to conceptualize a complete feedback loop among policy, policy outcomes, and subsequent politics. Aiming at theory-building, we use policy feedback mechanisms to explain why advocacy coalitions change over time. Empirically, we conduct a longitudinal single case study on policy-induced technological change in the German energy subsystem, an extreme case of policy outcomes, from 1983 to 2013. First, using discourse network analysis, we identify four patterns of actor movements, explaining coalition decline and growth. Second, using process tracing, we detect four policy feedback mechanisms explaining these four actor movements. With this inductive mixed-methods approach, we build a conceptual framework in which policy outcomes affect subsequent politics through feedback mechanisms. We develop propositions on how coalition change and feedback mechanisms explain four ideal-typical trajectories of policy change.

Lempiälä, T., Apajalahti, E.-L., Haukkala, T. Lovio, R. (2019)

Socio-cultural framing during the emergence of a technological field: Creating cultural resonance for solar technology.

Research Policy, 48, 9, 103830

[link](#)

This paper depicts how cultural resonance for novel technologies is constructed as a gradual, interactive process. We adopt a cultural framing perspective and strive to understand how actors assign meaning to the novel technology and determine its appropriateness for the local context. Existing research has largely focused on the strategic and political aspects of field framing processes through depicting conscious framing struggles between protagonist and antagonist actors. In addition to such strategic framing activities, we examine how other socio-cultural factors, such as changes in actor positions, interaction between framing activities, and the cultural “repertoire” of frames interact in producing cultural resonance. For our empirical case study, we followed the emerging technological field of solar energy during an intensive period of change. Our study contributes to the growing number of studies that draw attention to the creation of cultural resonance as an interactive multi-actor process by offering in-depth understanding of the multifaceted interactions that constitute the meaning-making process for an emerging field.

Kronsell, A., Khan, J., Hildingsson, R. (2019)
Actor Relations in Climate Policy Making: Governing decarbonisation in a corporatist green state.

Environmental Policy and Governance, 1-10

[link](#)

This article focuses on the role of actor relations in advancing climate policymaking and argues that attempts to understand decisions to decarbonise in a green state should explore the institutional conditions for policymaking. The article explores the climate policy model in Sweden in terms of the societal actors included in the policy process, the nature of this inclusion, and its relevance for the prospects of decarbonisation. It uses three perspectives in the analysis: corporatism, sustainable transition studies, and ecological democracy. The findings largely support existing research that states characterised by corporatist policymaking are suited for environmental governance and for climate policymaking. However, as a model of governance of actor relations, the Swedish climate policymaking model has both its merits and demerits. Although it has potential to reach decarbonisation objectives, it does this in the context of including mainly established economic interests, that is, incumbents. This stands in contrast with what is argued in sustainable transition studies that incumbents obstruct change, in the Swedish case they are viewed as potential change agents. Finally, although the character of the actor relations is deliberative, it is a top-down exclusive kind of deliberation that remains far from ideals of ecological democracy.

Hildingsson, R., Kronsell, A. and Khan, J (2019)

The Green State and Industrial Decarbonisation

Environmental Politics, 28, 5, 909-928

[link](#)

The large share of carbon emitted by energy-intensive industries in the extraction and processing of basic materials must be limited to decarbonise society and the economy. Ways in which the state can govern industrial decarbonisation and contribute to green state theory are explored by addressing a largely ignored issue: the green state's industrial relations and its role in industrial governance. With insights from a Swedish case study, the tension between the state's economic imperative and ecological concerns in greening industry are shown to persist. However, as the energy-intensive industry's previously privileged position in the economy is weakening, industry is opened to decarbonisation strategies. While the case exposes a number of governance challenges, it also suggests potential areas where the state can pursue decarbonisation in energy-intensive industry and points the way to an active role of the green state in governing industrial decarbonisation and greening industry.

Kushnir, D., Hansen, T., Vogl, V., Åhman, M. (2019)
Adopting hydrogen direct reduction for the Swedish steel industry: A technological innovation system (TIS) study.

Journal of Cleaner Production, 242, 118185

[link](#)

The Swedish steel industry stands before a potential transition to drastically lower its CO₂ emissions using direct hydrogen reduction instead of continuing with coke-based blast furnaces. Previous studies have identified hydrogen direct reduction as a promising option. We build upon earlier efforts by performing a technological innovation system study to systematically examine the barriers to a transition to hydrogen direct reduction and by providing deepened quantitative empirics to support the analysis. We also add extended paper and patent analysis methodology which is particularly useful for identifying actors and their interactions in a technological system. We conclude that while the innovation system is currently focused on such a transition, notable barriers remain, particularly in coordination of the surrounding technical infrastructure and the issue of maintaining legitimacy for such a transition in the likely event that policies to address cost pressures will be required to support this development.

Clements, A., Wheeler, S., Mohr, A., McCulloch, M. (2019)

The Service Value Method for Design of Energy Access Systems in the Global South.

Proceedings of the IEEE, 107, 9, 1941-1966

[link](#)

This paper presents the service value method (SVM) as a novel means to gather and interpret end-user needs, aspirations, and contextual factors to improve engineering design practice of energy access systems for the Global South. The method adopts a service-oriented approach and consists of a rapid and effective field exercise to gather qualitative and quantitative data from end users in focus groups. This exercise is suitable for enabling end-user participation in Global South contexts. The data are interpreted as service maps that capture end-user preferences to inform tradeoffs of different design criteria, guiding the preliminary design of the energy system. The method ensures end-user needs and contexts are integrated into the design process early on. A case study is presented, where the SVM was used to design solar nanogrids in Kenya and Bangladesh.

Hess, D.J. (2019)

Cooler coalitions for a warmer planet: A review of political strategies for accelerating energy transitions.

Energy Research and Social Science, 57, 101246

[link](#)

The lack of progress on greenhouse-gas reduction at the global level has drawn attention to the need to strengthen support for energy-transition policies. One crucial component of such support is a better understanding of the political strategy of coalitions that support such policies. Based on a comprehensive review of research in the energy and social science field, this study covers three main units of political strategy: the targets of action (government, public opinion, and businesses), the repertoires of action (both institutional and extra institutional), and the agents of action (coalition building and composition). The review articulates political strategy as an area of theoretical and empirical research with results that are relevant for political actors. For example, coalition building includes policy sequencing, modifications to accommodate incumbents, goals that enroll low- and middle-income organizations, the recruitment of countervailing industrial power, and policy selection for conservatives. Future research topics are also identified.

Wyse, S. M., and C. E. Hoicka. (2019)

By and For Local People': Assessing the connection between Local Energy Plans and Community Energy.

Local Environment, 24,9, 883–900

[link](#)

“Community energy” (CE) is argued to be an opportunity to transition to low-carbon energy systems while creating additional benefits for local communities. CE is defined as energy initiatives that place a high degree of emphasis on participation of local community members through ownership and control, where through doing so, benefits are created for the community. The trend has seen considerable growth in many countries over the last decade. Occurring simultaneously is a trend for local communities (e.g. municipalities) to create their own Local Energy Plans (LEPs) – a planning process that articulates energy-related actions (i.e. expected outcomes). While CE and LEPs both address energy activities in a local context, any further connection between these trends remains unclear. This research develops a framework, based on CE and LEP literature, to assess LEPs for their relevance to CE. The research analyses 77 LEPs from across Canada for the ways in which they address the three components that define CE: community participation, community ownership, and community capacity. The main findings are that LEPs have emerged as a process that is both relevant to CE and capable of strategically addressing its components. Despite this, LEPs do not appear to reveal a radically different approach to the “closed and institutional” models of traditional community involvement practices. The investigation suggests that for CE advocates, LEPs may be considered to be an important avenue to pursue CE ambitions. LEPs could increase their relevance to CE by improving the processes and actions related to all three CE components.

Schiller, K., Godek, W., Klerkx, L., Poortvliet, P.M. (2019)

Nicaragua's agroecological transition: Transformation or reconfiguration of the agri-food regime?

Agroecology and Sustainable Food Systems, 2168-3573

[link](#)

Agroecology started to amplify agroecology in Nicaragua in the 1980s and was translated into national policy in 2011. Using the Multi-Level Perspective on sustainability transitions (MLP), this paper explores whether the rise of agroecology has fundamentally transformed Nicaragua's agri-food system. Drawing on the findings of a qualitative study including a range of agroecological actors and organizations, we create a rich innovation history timeline of Nicaragua's agroecology development at different levels - the agroecological niche (space in which heterogenous actors nurture innovations) and the regime (dominant agri-food system paradigm). MLP analysis is used to explore the extent to which agroecology's growth has transformed the national agri-food regime. We find that although the term 'agroecology' is used widely by government, incentives for transitions to agroecology are only weakly implemented. This stems partly from the co-optation of the agroecological niche's discourse by regime actors. Currently, it seems the transition process is not a reconfiguration of the agri-food system, but rather that agroecology has been added to the regime without deeper changes.

van den Bergh, J., Savin, I., Drews, S. (2019)

Evolution of opinions in the growth-vs-environment debate: Extended replicator dynamics.

Futures 109, 84-100

The evolution of opinions in the long-standing debate on growth-versus-environment may affect support for important sustainability policies, in areas such as biodiversity loss, climate change, deforestation and freshwater scarcity. In order to understand this evolution, we develop a model describing the dynamics of four distinct opinions as identified in recent surveys, namely growth at-all-cost, green growth, agrowth and degrowth. The model is based on modifying standard replicator dynamics to match a multi-group structure. Individuals are influenced by local or global interactions with others, based on adjacent opinion groups and exposure to information about environmental change. Psychological resistance to opinion change is also accounted for. The model is calibrated with recent survey data. Numerical analysis shows which opinions survive under particular conditions. We find, among others, that under local interactions, ultimate outcomes are characterized by lack of consensus, i.e. survival of multiple opinions. In addition, equal impacts of environmental change on opinions do not always translate in joint survival of

associated opinions. Under worsening environmental conditions while continuing economic growth, opinions shift from green growth to agrowth and degrowth. Fostering global interactions among individuals, causing them to be influenced by a broad spectrum of opinions, makes consensus more likely. We also consider model dynamics if feedback from opinions to policy to environmental change and back is included. This confirms robustness of the results. It should be noted that the model is not meant to predict but to explore the consequences of combinations of assumptions about social networks, psychological mechanisms, environmental dynamics, and connections between opinion distribution and environmental policy. The study represents the first analysis of opinion dynamics in the growth-vs-environment debate and suggests a number of routes for further investigation.

Siskova, M., van den Bergh, J. (2019)
Optimal urban form for global and local emissions under electric vehicle and renewable energy scenarios.
Urban Climate 29, 100472

We determine which urban form generates minimal global and local emissions. To this end, we develop a spatial accounting model of a circular city consisting of six zones. Activities comprise low and high density housing, offices and industry. Spatial interactions among activities give rise to freight and passenger transport. We assess global emissions of greenhouse gases due to the direct and indirect use of coal, oil and gas by economic activities and transport. In addition, we calculate local emissions which are zone-specific. Distribution and health effects of such emissions are also taken into account. The model analyses each urban form for various scenarios of distinct shares of electric vehicles in transport and of renewable energy in electricity production. Numerical exercises allow establishing a relationship between optimal urban form and shares of electric vehicles and renewable energy. We also derive transition paths to the most desirable urban form considering minimal transition effort. This may help urban planners to design a feasible time strategy for improving urban form in terms of emissions.

Maestre-Andrés, S., S. Drews, S., van den Bergh, J. (2019)
Perceived fairness and public acceptability of carbon pricing: A review of the literature.
Climate Policy, 19,9, 1186-1204

While carbon pricing is widely seen as a crucial element of climate policy and has been implemented in many countries, it also has met with strong resistance. We provide a comprehensive overview of public perceptions of the fairness of carbon pricing and how these affect

policy acceptability. To this end, we review evidence from empirical studies on how individuals judge personal, distributional and procedural aspects of carbon taxes and cap-and-trade. In addition, we examine preferences for particular redistributive and other uses of revenues generated by carbon pricing and their role in instrument acceptability. Our results indicate a high concern over distributional effects, particularly in relation to policy impacts on poor people, in turn reducing policy acceptability. In addition, people show little trust in the capacities of governments to put the revenues of carbon pricing to good use. Somewhat surprisingly, most studies do not indicate clear public preferences for using revenues to ensure fairer policy outcomes, notably by reducing its regressive effects. Instead, many people prefer using revenues for 'environmental projects' of various kinds. We end by providing recommendations for improving public acceptability of carbon pricing. One suggestion to increase policy acceptability is combining the redistribution of revenue to vulnerable groups with the funding for environmental projects, such as on renewable energy.

Braungardt, S., van den Bergh, J. Dunlop, T. (2019)
Fossil fuel divestment and climate change: Reviewing contested arguments.
Energy Research and Social Science, 50, 191-200

The strategy of fossil fuel divestment has attracted considerable attention in recent years, particularly in the press and social media. Spearheaded as a movement based on ethical principles, divestment has been suggested to play a potential role in shaping public opinion and policymaking on climate change. The growing size of the movement has prompted debate about the extent of its impact on fossil fuel companies and climate change mitigation efforts. This article investigates the potential effectiveness of the divestment movement according to the end goal of climate campaigners – to bring about a complete break from fossil fuels. We collect and qualify the key arguments as found mainly in the informal debate, and to a lesser extent in the academic literature. This will help readers to make an informed judgement that can contribute to a constructive debate about the effectiveness of divestment. We organize the literature into arguments for and against divestment, and explain how these relate to each other. In addition, we derive suggestions for further research on divestment.

King, L., van den Bergh, J. (2019)
Normalisation of Paris Agreement NDCs to enhance transparency and ambition.
Environmental Research Letters, 14, 084008

The Paris Agreement takes a bottom-up approach to tackling climate change with parties submitting pledges

in the form of nationally determined contributions (NDCs). Studies show that the sum of these national pledges falls short of meeting the agreement's 2 °C target. To explore this discrepancy, we analyse individual pledges and classify them into four categories. By doing so, a lack of consistency and transparency is highlighted, which we correct for by performing a normalisation that makes pledges directly comparable. This involves calculating changes in emissions by 2030, using data for the most recent base year of 2015. We find that pledges framed in terms of absolute emission reductions against historical base years generally produce the greatest ambition, with average emission reductions of 16% by 2030. Pledges defined as GDP intensity targets perform the worst with average emission increases of 61% by 2030. We propose that a normalisation procedure of the type as we develop becomes part of the NDC process. It will allow to not only increase the transparency of pledges for policymakers and wider society, but also promote more effective NDCs upon revision as is foreseen to happen every 5 years under the 'ratcheting mechanism' of the agreement.

Tuukka, M. (2019)

Corporate entrepreneurship and sustainability transitions: resource redeployment of oil and gas industry firms in floating wind power.

Technology Analysis & Strategic Management

[link](#)

It has been recently argued that the vast resources of established firms can potentially accelerate sustainability transitions. This paper contributes to the study of such possibilities by investigating the resource redeployment of three Norwegian oil and gas industry firms in corporate ventures in floating wind power technologies. Using interview and document data, the findings show that the opportunity to use existing firm resources was a key motivation for established firms to engage in entrepreneurship in such technologies. The firms could redeploy their specialised and general-purpose resources in these entrepreneurial ventures, and develop new technologies on the basis of their existing resources. However, also challenges and controversies were observed. This paper thus suggests that the process of resource redeployment can help to explain why, and describe how, established firms may engage in cleantech innovation through corporate entrepreneurship.

Wittmayer, J.M., Backhaus, J., Avelino, F., Pel, B., Strasser, T., Kunze, T., Zuijderwijk L. (2019)

Narratives of change and the construction of alternative futures.

Futures, 112, 102433

[link](#)

Alongside current policy discourses on the transformative potentials of social innovation, social innovation initiatives also construct their own accounts

of how society can be transformed and by whom. Building on state-of-the-art futures studies and narrative research and their linkages, this article unfolds these narratives of change (NoC) by social innovation initiatives. A tripartite framework is used to analyse and discuss the content, construction and role of the NoC of four initiatives: Ashoka, the Global Ecovillage Network, RIPESS and Shareable. The analysis shows that all NoC suggest alternative economic arrangements that challenge the current neoliberal, capitalist system, including the dominant policy narrative of (social) innovation for economic growth. It further highlights the pivotal role of NoC in the construction of individual and social identities and the efforts dedicated to the development and communication of collectively shared worldviews. Differences in NoC are identified regarding the more deliberative or rather hierarchical ways of narrative construction. Concluding reflections highlight how NoC reveal the failings of current systems and suggest alternatives, that their construction mirrors and thereby tests the model of change advocated by social innovation initiatives and that NoC may lure actors into enrolment by offering opportunities to engage in meaning-making.

Grillitsch, M., Hansen, T. (2019)

Green industry development in different types of regions.

European Planning Studies, 27,11, 2163-2183

[link](#)

At the regional level, the imperative of sustainable development often manifests itself in an emphasis on developing green industries. However, regions vary in their preconditions for achieving this. In this paper we link regional preconditions to various pathways for green industry development. This provides the foundation for identifying place-based policy implications for growing green industries in different types of regions, grounded in the emerging perspective in innovation studies on transformative innovation policy. The paper thereby helps to understand the pathways for greening the economy in different regional contexts and how such green pathways can be promoted through policy.

Sareen, S., Rommetveit, K. (2019)

Smart gridlock? Challenging hegemonic framings of mitigation solutions and scalability.

Environmental Research Letters, 14, 075004

[link](#)

Urban energy transitions are key components of urgently requisite climate change mitigation. Promissory discourse accords smart grids pride of place within them. We employ a living lab to study smart grids as a solution geared towards upscaling and systematisation, investigate their limits as a climate change mitigation solution, and assess them rigorously as urban energy

transitions. Our 18 month living lab simulates a household energy management platform in Bergen. Norway's mitigation focus promotes smart meter roll-out as reducing carbon emissions, by (i) unlocking efficiency gains, and (ii) increasing awareness for demand-side management. We problematise this discourse. Raising awareness encounters intractable challenges for smart grid scalability. Scattered efficiency gains constitute modest increments rather than the substantial change requisite for rapid mitigation. Whereas promissory smart grid discourse overlooks these ground-truthed limits, our findings caution against misplaced expectations concerning mitigation. We contest discursive enthusiasm on smart grids and argue for aligning local and systemic concerns before upscaling to avoid obscuring risks. Scaling up requires understanding and addressing interdependencies and trade-offs across scales. Focus group discussions and surveys with living lab participants who used sub-meter monitors to track real-time household electricity consumption data over an extended period show that technical issues and energy behaviour, as well as political economic and policy structures and factors, pose significant limits to smart grids. Urban strategies for climate change mitigation must be informed by this recognition. Our results indicate that upscaling relies on bottom-up popular acceptance of the salient technical, organisational and standardisation measures, but that measures to improve the democratic legitimacy of and participation in energy transitions remain weak. We highlight limits to smart grids as a standalone urban mitigation solution and call for a sharper focus on accompanying thrust areas for systematisation and scalability, such as renewable energy integration and grid coordination.

Sareen, S., Grandin, J. (2019)

European green capitals: branding, spatial dislocation or catalysts for change?

Geografiska Annaler: Series B, Human Geography
[link](#)

The European Green Capital (EGC) award has become a familiar feature in a polycentric sustainability governance landscape increasingly characterized by fragmentation and voluntary initiatives. Unclear accountability for translocal connections renders these initiatives at risk of locking unsustainable practices into transitions. Seeking clarity, this paper examines accountability through the lenses of material dislocation and discursive construction in an assessment of Oslo's (2019) and Lisbon's (2020) winning EGC entries. How can the EGC distinction better enable substantive urban sustainability, situating claims within wider energy transitions in these capital regions? Within the award's circumscribed focus on urban centres, do cities account for cognitive and material dislocation through their discursive emphases and telecoupling respectively? Does the EGC catalyse change, brand the capture of low-hanging fruit, or

spatially dislocate rather than reduce emissions? We argue that it propagates a focus on optimizing local sustainability effects, while rarely accounting for larger translocal or cross-scalar repercussions. Hence, urban sustainability strategies risk spatially dislocating socio-ecologically unsustainable practices rather than decreasing emissions systemically. Cities need to institute accountability mechanisms that reshape the geographies of responsibility for the systemic and translocal impacts of urban sustainability initiatives, which the EGC could promote by, e.g. including emission indicators for consumption and aviation.

Bhamidipati, P.L., James Haselip, J., Hansen, U.E. (2019)

How do energy policies accelerate sustainable transitions? Unpacking the policy transfer process in the case of GETFIT Uganda.

Energy Policy, 123, 1320-1332

[link](#)

Energy policies play an important role in accelerating 'sustainable transitions' by enabling and incentivizing investment in electricity generation from renewable sources. Key policies such as feed-in tariffs, tradable permits and auctions were pioneered in OECD nations, notably within the European Union, and in recent years have been the subject of donor-funded projects to transfer such policies to lower-income countries. However, within the wider transition studies literature, there is a lack of detailed understanding regarding the process of *how* this policy transfer takes place in the renewable energy sector. Our research addresses this gap by analyzing the micro-politics and actor-strategies by which the GETFIT program was implemented in Uganda. In particular, we focus on the interplay of transnational and national actors in pursuit of specific policy objectives. Informed by case study method and qualitative research, we employ theoretical perspectives, archival data sources and semi-structured interviews to adapt the policy transfer framework to the agency perspective of policy translation. We find that transnational influences, resource flows, local embeddedness, and institutional resilience are all necessary prerequisites for a coherent policy outcome. Moreover, this study opens up an avenue of research into co-creation processes and relational perspectives in sustainability transitions.

Kanger, L., Schot, J. (2019)

Deep transitions: Theorizing the long-term patterns of socio-technical change.

Environmental Innovation and Social Transitions, 32, 7-21

[link](#)

The contemporary world is confronted by a double challenge: environmental degradation and social

inequality. This challenge is linked to the dynamics of the First Deep Transition (Schot, 2016): the creation and expansion of a wide range of socio-technical systems in a similar direction over the past 200–250 years. Extending the theoretical framework of Schot and Kanger (2018), this paper proposes that the First Deep Transition has been built up through successive Great Surges of Development (Perez, 2002), leading to the emergence of a macro-level selection environment called industrial modernity. This has resulted in the formation of a portfolio of directionality, characterized by dominant and durable directions and occasional discontinuous shifts in addition to a continuous variety of alternatives sustained in niches or single systems. This historically-informed view on the co-evolution of single socio-technical systems, complexes of systems and industrial modernity has distinctive implications for policy-making targeted at resolving the current challenges.

Ossenbrink, J., Hoppmann, J., & Hoffmann, V. H. (2018)

Hybrid Ambidexterity: How the environment shapes incumbents' use of structural and contextual approaches.

Organization Science

[link](#)

According to the literature on ambidexterity, organizations can use structural or contextual approaches to simultaneously explore novel opportunities and exploit existing ones. So far, however, we know very little about what induces organizations to focus on structural vs. contextual ambidexterity, or how they combine the two approaches to maximize organizational learning. To shed more light on these questions, we investigate how the environment shapes a firm's use of structural and contextual ambidexterity. Drawing on a comparative, longitudinal case study of the four largest electric utility companies in Germany, we show that firms focused on structural ambidexterity whenever they perceived emerging opportunities in the environment as requiring organizational culture and capabilities fundamentally different from their own. Contextual ambidexterity, on the other hand, became particularly important when opportunities in the environment were both numerous and uncertain, requiring the organization to leverage the distributed attention and expertise of its frontline employees. We show that environments characterized by opportunities that are numerous/uncertain and require novel culture and capabilities lead organizations to invest in initiatives that combine elements of both structural and contextual ambidexterity—an approach we label hybrid ambidexterity. Our theory framework synthesizes and complements existing work that has started to investigate the antecedents of structural vs. contextual ambidexterity. We challenge the prevailing

Geels, F.W., (2019)

Socio-technical transitions to sustainability: A review of criticisms and elaborations of the Multi-Level Perspective.

Current Opinion in Environmental Sustainability, in press

[link](#)

This article discusses the socio-technical transition literature, particularly the Multi-Level Perspective, which investigates the fundamental changes in (energy, transport, housing, agro-food) systems that are needed to address persistent sustainability problems. The article positions the MLP within the wider academic debate on sustainability transformations, and reviews criticisms and seven recent elaborations of the MLP with regard to: (1) politics and power, (2) cultural discourse and framing struggles, (3) grassroots innovation, (4) multiple transition pathways, (5) incumbent firm resistance and reorientation, (6) destabilization and decline, (7) policy analysis. Mobilizing insights from the wider social sciences, these elaborations have nuanced and differentiated the understanding of socio-technical transitions to sustainability and made the MLP the central pillar of a multi-faceted, cumulative research programme with a broad empirical evidence base.

Matsuo, T., Schmidt T.S. (2019)

Managing tradeoffs in green industrial policies: The role of renewable energy policy design.

World Development, 122, 11–26

[link](#)

Green industrial policies around renewable energy (RE) are growing increasingly prevalent in emerging economy contexts as a means to foster low-carbon industrialization pathways. However, policymakers often face a tradeoff in their policy designs. In this paper, we focus on the tradeoff between minimizing the cost of low-carbon energy generation to fuel traditional input-intensive industrialization strategies, and implementing potentially costly measures to build local industries around low-carbon energy technologies. Specifically, we utilize the cases of Mexico and South Africa to investigate how each country's distinct prioritization of these two objectives led to a divergence of their RE auction designs and outcomes. Specifically, using data on the involvement of local and foreign actors in Mexican and South African RE projects, policy documents, and interviews with public and private stakeholders in the two countries, we show how each country's policy design shaped RE market and bid price developments, and the formation of local RE value chains. We find that the prioritization of low-cost RE generation can result in a greater reliance on existing foreign value chains and capital, without building the local capabilities that could result in greater long-term benefits for the market. We further discuss the implications of our results for policymakers, focusing on providing recommendations

for RE industrial policy design in general, and the calibration of local content incentives in particular.

Matsuo, T. (2019)

Fostering grid-connected solar energy in emerging markets: The role of learning spillovers.

Energy Research & Social Science, 57, 101227

[link](#)

Growing energy demands and rapid urbanization alongside an increasing urgency for climate change mitigation and resiliency make grid-connected distributed photovoltaics (PV) a critical solution in many emerging economies. However, adoption of distributed PV in these contexts has been slow due to its high upfront cost. As policies to kick-start the distributed PV market directly are often costly, this paper shows how a policy that first supports cheaper utility-scale PV deployment can create spillovers that lead to complementary cost reductions in distributed PV. Specifically, through interviews with experts in the PV industry, this paper finds that strong utility-scale deployment helps build local PV competencies and ecosystems, thereby facilitating the networks, scale, and value chains needed for distributed PV markets to develop. Harnessing these spillover effects can also reduce the upfront cost of distributed PV significantly and cost-effectively. Results of a dynamic bottom-up techno-economic model based on spillovers across PV components indicate that, in the presence of application spillovers, public financing used to initially support utility-scale PV deployment can leverage significant distributed PV cost reductions. By accelerating the profitability of distributed PV, application spillovers also enable more widespread and equitable distributed PV adoption. The paper concludes with recommendations to policymakers wishing to support more widespread distributed PV adoption in emerging and developing country contexts, with a particular focus on strategies for fostering application spillovers.

Malhotra, A., Schmidt, T. S., Huenteler, J. (2019).

The role of inter-sectoral learning in knowledge development and diffusion: Case studies on three clean energy technologies.

Technological Forecasting and Social Change 146, 464-487

[link](#)

Studies in technological innovation systems (TIS) have made significant progress in explaining the dynamics of industry formation for emerging technologies, recognizing that learning is an interactive process. Recent literature suggests that knowledge development and diffusion among different sectors can play a role in the establishment of a TIS. However, we lack an understanding of how the characteristics of different

sectors involved in a TIS influence inter-sectoral learning, i.e. purposive learning-by-interacting between different sectors involved in a TIS. To address this gap, we examine how patterns of inter-sectoral learning vary across three TISs – solar photovoltaic systems, wind turbines, and lithium-ion batteries. Using concepts from the literature on sectoral systems of innovation, we show that the characteristics of the different sectors involved in the TIS influence patterns of inter-sectoral learning. Thus, we provide a systematic way of explaining differences in the importance of learning-by-interacting between different technologies observed in the empirical literature, helping policymakers anticipate potential failures in inter-sectoral learning, and we suggest measures to address them. We also demonstrate the value of explicitly analyzing the sectoral configuration in future TIS analyses, and hence contribute to more closely integrating the literatures on TIS and sectoral systems of innovation.

Schmidt TS, Steffen B, Egli F, Pahle M, Tietjen O, Edenhofer O (2019).

Adverse effects of rising interest rates on sustainable energy transitions.

Nature Sustainability, 2, 879–885

[link](#)

Increasing the use of renewable energy (RE) is a key enabler of sustainable energy transitions. While the costs of RE have substantially declined in the past, here we show that rising interest rates (IRs) can reverse the trend of decreasing RE costs, particularly in Europe with its historically low IRs. In Germany, IRs recovering to pre-financial crisis levels in 5 years could add 11% and 25% to the levelized cost of electricity for solar photovoltaics and onshore wind, respectively, with financing costs accounting for about one-third of total levelized cost of electricity. As fossil-fuel-based electricity costs are much less and potentially even negatively affected by rising IRs, the viability of RE investments would be markedly deteriorated. On the basis of these findings, we argue that rising IRs could jeopardize the sustainable energy transition and we propose a self-adjusting thermostatic policy strategy to safeguard against rising IRs.