

STRN Newsletter



Newsletter 32 – July 2019

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About

The STRN newsletter is
published four times a year in
March, June/July, September &
December

Cover: Pictures from the IST
2019 conference

Editorial



by Rob Raven, Monash University, Melbourne
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About three weeks ago, our community met for the 10th time in a row for its anniversary conference in lovely Ottawa. I am happy to repeat here what I told the organizers in person: I believe this was the best IST conference so far! The conference was extremely well organized, the quality and complementarity of keynotes was outstanding, and I enjoyed the broadening of the network and insights due to a larger than usual participation from Northern American scholars in particular. For me, the conference is another signal that STRN continues to be a vibrant community of scholars that continues to evolve into new directions without losing identity.

For the first time the conference was organized outside of Europe. This was not an uncontroversial decision. Flying long-distance comes with carbon-costs, and as a community that is concerned with sustainable development, we feel responsible to reduce our negative impact on the climate. At the same, reconnecting with international peers and making new connections continues to be relevant to a vibrant academic community. As a community and as individuals we should reflect on alternatives. I agree with Johan Schot who articulated the need to experiment with new ways of conference organization with lower impacts on the climate. Working with 'regional chapters' that co-host distributed STRN conferences in parallel and share keynotes and sessions online could be one example.

I have been part of STRN from its inception, first a steering group member, then a board member, and now back as a steering group member. Over the years the field has expanded and professionalized, establishing critical community elements such as the conference series, an online presence, a newsletter with almost 2'000 registrations, the highly successful journal *Environmental Innovation and Societal Transitions*, and the recurring efforts over the years to collectively develop research agendas. Intellectually the field has become more diverse, with interdisciplinary engagements on topics such as geographies or the politics of transitions. In other areas as a community we should continue to work on further opening up and diversifying, such as a strong representation of global south scholars, or in terms of our methodological repertoire.

In the end, what matters is the extent at which we can make a difference in the world. Work from STRN scholars increasingly finds its way into policy and practice. Educating and training future leaders is another important way in which we influence the future. But transitions in unsustainable socio-technical systems need to accelerate. We only have 11 STRN conferences (or three PhD cycles) left to make sure the world accomplishes the 17 Sustainable Development Goals. Transdisciplinary approaches to co-create knowledge with business, communities and policy actors and working directly with knowledge users and stakeholders is an important way to fast-track these ambitions.

Our impact and relevance will have to be situated in broader trends not necessarily related to sustainable development ambitions. How can we accelerate sustainability transitions in the context of conservative or populist political environments? How can sustainability transitions be reconciled with rapidly progressing trends in artificial intelligence, machine learning, data sciences and digitization? What will be the influence of a global trade war? Such developments will be highly relevant for accomplishing the SDGs or the 1.5 degree climate target, but do we engage with them sufficiently within our community?

Last year I moved to Melbourne to join the Monash Sustainable Development Institute, part of Monash University. Monash University has committed itself to net-zero carbon emissions by 2030 – a bold move to reduce its own climate impact and share its experiences with others. It makes me proud to be part and contribute to such a progressive organization and its continued efforts to invest in sustainable development as a strategic focus area. I am looking forward to continue to contribute to developing the transitions community as a steering group member globally, and work with colleagues to progress a regional transitions chapter down under.

Volume 31 (June 2019) has just been published. It contains more articles than usual since Elsevier will move EIST into their scheme of direct article-based publishing.

The first article is:

- An agenda for sustainability transitions research: State of the art and future directions.
by Jonathan Köhler, Frank W. Geels, Florian Kern, Jochen Markard, ... and Peter Wells

Currently, 12 viewpoints that respond to the research agenda have been selected from 28 submissions (responding to an open call). These will be published in a forthcoming special issue.

The other articles in the issue are:

- An agent-based model of climate-energy policies to promote wind propulsion technology in shipping.
by Richard Karslen, George Papachristos and Nishatabbas Rehmatulla
- An organizational view on transport transitions involving new mobility concepts and changing customer behaviour.
by Laura Lang and Alwine Mohnen
- The diffusion of environmental product and service innovations: Driving and inhibiting factors.
by Jens Clausen and Klaus Fichter
- Virtual user communities contributing to upscaling innovations in transitions: The case of electric vehicles.
by Toon Meelen, Bernhard Truffer and Tim Schwanen
- Passing the baton: How intermediaries advance sustainability transitions in different phases.
by Paula Kivimaa, Sampsa Hyysalo, Wouter Boon, Laurens Klerkx, ... and Johan Schot
- Dinosaurs in transition? A conceptual exploration of local incumbents in the swiss and German energy transition.
by Susan Mühlemeier
- Justice in energy transitions.
by Stephen Williams and Andréanne Doyon

- Conspicuous diffusion: Theorizing how status drives innovation in electric mobility.
by Lance Noel, Benjamin K. Sovacool, Johannes Kester, and Gerardo Zarazua de Rubens
- Contested visions and sociotechnical expectations of electric mobility and vehicle-to-grid innovation in five Nordic countries.
by Benjamin K. Sovacool, Johannes Kester, Lance Noel, and Gerardo Zarazua de Rubens
- Enabling a transformation to a bioeconomy in New Zealand.
by Anita Wreford, Karen Bayne, Peter Edwards, and Alan Renwick
- Comparing energy transitions in Germany and Spain using a political economy perspective.
by Tobias Haas
- Seedbeds, harbours, and battlegrounds: On the origins of favourable environments for urban experimentation with sustainability.
by Jonas Torrens, Johan Schot, Rob Raven and Phil Johnstone
- Rage against the regime: Niche-regime interactions in the societal embedding of plant-based milk.
by Josephine Mylan, Carol Morris, Emma Beech and Frank W. Geels
- System dynamics modelling and simulation for sociotechnical transitions research.
by George Papachristos
- Public policy strategies for next-generation vehicle technologies: An overview of leading markets, Annika Bose Styczynski, Llewelyn Hughes, Renewable energy and transition-periphery dynamics in Scotland.
by Fiona Robertson Munro

Note that the impact factor of EIST has just been updated to a value of 7.514.

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

Past Events

4th NEST conference, Lisbon, April 4-5, 2019

The 4th NEST Conference with the theme, “Transitions to where? Shared values and visions for sustainability transitions” was one of the most fulfilling and enriching experiences that we as the four conference organizers could have asked for.

After spending a year organizing the event, we can proudly say it was a great success. Following a record number of applications, 82 delegates from 14 countries and 4 continents presented their research in the field of sustainability transitions, participated in three methods and visioning workshops and engaged in 3 high-level keynote lectures by Paula Antunes (Cense, FCT, NOVA University of Lisbon), Jorge Gonçalves (Minga Integral Cooperative) and Jochen Markard (ETH Zürich) & Nuno Bento (ISCTE-IUL). We are excited to pass the torch to ETH Zurich, Switzerland, for #5NEST2020!

Check out the:

- #4THNEST [Conference Report](#)
- #4THNEST [Book of Abstracts](#)

The 4th NEST Organizing Committee

Participants of NEST conference in Lisbon



IST 2019 Conference, Ottawa, 23-26 June

This year’s IST conference was a great experience and we would like to thank the organizers for their outstanding commitment. In particular, we would like to thank James Meadowcroft (chair), Daniel Rosenbloom (co-chair), and Alexandra Mallett. We have asked three conference participants to share their impressions (see below).

Note that the [conference website](#) is still live and that slides (from the NEST introductory session) and video recordings (from the plenary sessions) have been or will be added shortly.

Impressions by Anton Sentic

In its tenth year, the IST conference moved beyond the boundaries of Europe to Canada, hosted by Carleton University in Ottawa. As a European researcher, I was both happy and intrigued by this move – having the chance to meet North American peers, but also to learn about sustainable transitions in different geo-political and social contexts.

My curiosity was soon satisfied, as both keynote speakers and session presenters explored pathways and approaches to accelerating transitions using different but complementary perspectives. Presentations by speakers from the political and civil society arenas provided a much-needed reminder on the necessity for pragmatic action and consensus-based solutions when transferring academic knowledge into practice. This included a broad range of topics: less-than-supportive environments, reflections on non-normative approaches,

potentially unpopular solutions and the realities of politics and power relations.

Another thing that caught my attention was the increased activity of thematic groups, for example on the Global South or Urban Transitions, with dialogue sessions and member meetings. My only regret was that I could not attend all of them. Leaving the event with a very positive impression of this new step for STRN, I hope we will continue to connect to other regions with growing Transitions communities!

Impressions by **Marie-Claire Brisbois**

As a relative newcomer to the transitions field (this was my second conference), one of the most exciting parts of the conference for me was a very diverse and interesting slate of keynote speakers. In particular, I very much appreciated Jennie Stephens' keynote on feminism, justice and equity. These types of issues are fundamentally tied up in the questions of power and politics that transitions research is continually working to integrate. Moreover, successfully transitioning any system under current social conditions will require deeper consideration of these sometimes difficult, yet essential, perspectives.

Second, I participated in a dialogue session organised by Flor Avelino on «Power, politics and paradoxes in sustainability transitions». The content of the session was excellent but it was the format that bumped it up into my highlights. Of six speakers, three presented remotely. At three different points, the audience broke up into groups to discuss ideas and contribute to a collective google doc. There were also a number of remote audience participants who were able to engage and contribute. Flor invited contributions to the online document for two weeks following the conference and the panel will work to produce a report and resource document over the course of the summer. In an era when many of us are trying to limit our academic travel miles, this type of experimentation with traditional conference formats is necessary.

Third, holding the conference in Canada provided the first real opportunity for “local” transitions researchers to meet and begin consolidating a coherent research community. The nascent Canadian Sustainability Transitions Research Network (CASTOR - the French word for beaver)



held its first meeting. A Canadian perspective on transitions introduces new ideas. Participants highlighted, among other issues, the role of Canada's Indigenous peoples, the nation's dispersed geography, and its history as a resource-based or “staples” economy. This network will be meeting again virtually over the summer to pick up the themes established during its first meeting. Anyone who missed the meeting but would like to be involved should contact [Marie-Claire Brisbois](#).

Finally, a recommendation for next year: I heard numerous comments from newcomers that they were seeing the same people on multiple panels and that it would be helpful to diversify perspectives. Other major conferences often limit participation to a single paper presentation and a discrete number of panels. To encourage the ongoing growth of ideas and membership in STRN, it may be time to implement something similar for what promises to be another exciting conference in Vienna, 2020.

Impressions by **Martin Boucher**

Over 350 people descended on my nation's capital city in Ottawa for the 10th IST conference. Scholars met to discuss ways to tackle challenging environmental and sustainability problems. Well acquainted with the transitions literature, I was excited to attend my first IST conference — which also happened to be the first time this meeting was held in my vicinity. Theories like strategic niche management, technological innovation systems, transition management, and the multi-level perspective motivated me to pursue my Ph.D. and consider their relevance in the North American context.

The conference exceeded my expectations and brought a needed North American flare to the transitions world. Particularly impressive was the programming which was able to balance a clear research direction while including a diverse range of topics on governance, power, politics, methodologies, ethical considerations, future technologies, and of course, sustainability transition theories.

Uniquely North American perspectives that stood out were Sarah Burch's talk on the role of small business as enablers of sustainability; Jennie Stephens' presentation on her vision for addressing environmental sustainability as an opportunity for a more socially inclusive transition; and John Robinson's encouraging advice on using the tools of behavioural science to normalize and reframe transitions to motivate the public and its decision-makers into action. There were also breakout dialogues on resistance and Indigenous peoples, transitions and post-colonial contexts, transitions in the North, and more. From a Canadian perspective, I would have liked to see more on Indigenous issues, or multi-level governance in the context of federal constitutional systems.

Like many others attending the conference, I flew into Ottawa. It was not lost on me that many of us have travelled long distances by plane, thus adding to the problem we are trying to avoid—climate change. This behaviour might seem hypocritical, but it does not have to be. I see this as a call to action for us, as sustainability transitions scholars, to ensure that we bring relevance to the work that we do. Bridging research and practice between Europe and North America, and beyond, will allow us to facilitate the lessons needed to move us all forward. Let us use the momentum and insights gathered from this conference to promote on-the-ground transition initiatives.

STRN News

IST 2020 Conference

The next IST conference will take place in Vienna, from **August 18-21, 2020**.

It will be organized by Klaus Kubeczko and Matthias Weber from the [Austrian Institute of Technology](#).

STRN Steering Group: Election 2019

This year, four new members were elected into the STRN steering group. We welcome Christian Binz (Eawag), Marie-Claire Brisbois (SPRU), Bipashyee Gosh (SPRU) and Anton Sentic (University of Fribourg). Jonathan Köhler (Fraunhofer ISI) and Rob Raven (Monash University) were re-elected.

We also welcome Verena Hermelingmeier (University of Wuppertal) who, together with Adriaan van der Loos (Utrecht University), will represent the NEST network.

We are equally happy that Klaus Kubeczko (Austrian Institute of Technology) joined the steering group as the organizer of next year's IST conference in Vienna.

The new STRN board consists of Lea Fünfschilling, Daniel Rosenbloom and Jochen Markard.

We very much thank the leaving members: Floor Alkemade, Anna Bergek, Frank Geels, and Anna Wiczorek for their contributions and commitment.

The complete list of present and past SG members is available on the [STRN website](#)



STRN Steering group members

IST 2019 Awards

We congratulate our 2019 award winners!

Best paper award

Mara van Welie, Bernhard Truffer and Xiao-Shan Yap: «Towards sustainable urban basic services in low-income countries: A TIS analysis of sanitation value chains in Nairobi»

The provision of basic services suffers from a multitude of sustainability challenges in many cities of low-income countries. Sanitation in particular has proven to be riddled with environmental contamination, high costs, and large inequalities between urban residents. In recent years, an increasing number of innovations in on-site systems have been developed, which have not yet developed into fully functional alternatives to the existing regimes.

We study three prominent recent on-site sanitation initiatives in informal settlements in Nairobi, Kenya that aimed at developing entire “sanitation value chains”, which we conceptualize as an emerging Technological Innovation System (TIS). The analysis leads us to propose alternative governance modes of the TIS to overcome system failures like capability, coordination and institutional barriers. Conceptually, the paper provides an extension from conventional TIS analyses towards entire value chains, which enables addressing a wide range of transition processes also beyond informal settlements and low-income countries.

Best poster award

Elisabeth Marie Cassidy Svennevik: «Crossing pathways: Personal urban mobility analysis»

This paper provides a new tool for studying the directions and dynamics of transitions by suggesting a personal urban mobility analysis (PUMA). It focuses on the diffusion of the use of car sharing in Oslo and uses concepts from the transition pathways literature. It is an empirical study of the regime of personal urban mobility. The study uses methods of qualitative data from household interviews and quantitative data from a survey. The results show how the transition pathway of the personal urban mobility regime consist of regime interactions with energy and ICT.

The contribution of this study is twofold. For literature on transition pathways, the paper has a novel contribution of showing how the transition pathway of one regime consist of multiple regime interactions. For empirical relevance, the study shows how public policies and new technologies are affecting the urban mobility scene. This is relevant for smart cities issues and Mobility-as-a-service (MAAS) notions.

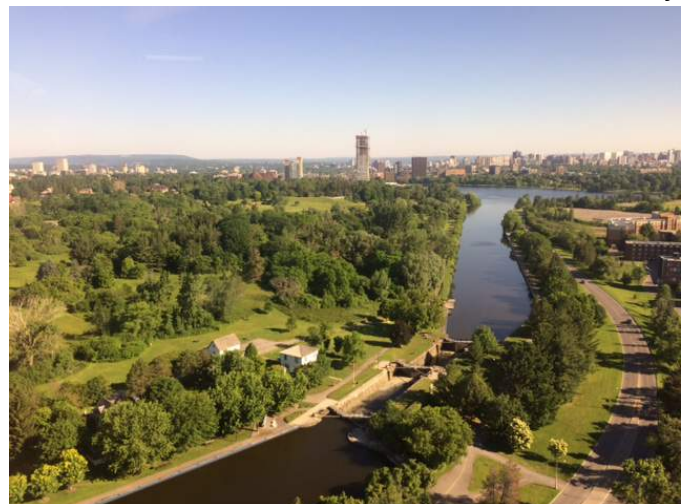
Other News

Briefing for Canadian government officials

A briefing session for Canadian government officials was held in Ottawa in June following IST 2019. The meeting was sponsored by Natural Resources Canada, but included executive level participants from across the federal government. The focus was on energy transitions and what transitions scholarship can bring to decision makers.

Frank Geels, Florian Kern, Jochen Markard and Paula Kivimaa offered overviews of transition research and illustrated how policy challenges appear different from a transitions perspective. The session was facilitated by James Meadowcroft. This initiative is part of a broader effort of the transitions community to forge closer linkages with practitioners and policy makers.

Ottawa, view from Carleton University



Establishment of Transition Accelerator

A new organization dedicated to advancing sustainability transitions, has recently been established in Canada. The Transition Accelerator is a national not-for-profit group that draws together researchers and societal stakeholders to co-develop and build out transformative visions and pathways.

The Accelerator draws insights from transition scholarship and inspiration from international efforts to link transitions research with practical efforts for change. Its approach connects the climate issue to broader movements for societal improvement, and highlights the importance of harnessing disruptive forces currently transforming major systems of societal provisioning. The Accelerator methodology emphasizes understanding systems, co-development of innovative visions and pathways, quantitative modelling and assessment, the development of inspiring narratives, and the movement from critical analysis to practical action. Because the political economies of Canada's provinces are diverse, the Accelerator emphasize building regional and sectoral pathways.

The organization is currently funded by a number of charitable foundations. Its interim [website](#) is up and running. For additional information please contact [James Meadowcroft](#).

A Learning Journey into Transformative Innovation Policy

In May 2019, delegates from the Transformative Innovation Policy Consortium (TIPC) member countries Finland, Sweden, Norway, South Africa, and Colombia arrived at the University of Sussex, UK, for three day's residential training. The training formed part of a wider "Transformative Innovation Learning Journey" organised by TIPC in collaboration with [EIT Climate KIC](#).

The Transformative innovation learning journey is a significant step towards the building of a global constituency of transformative innovation policy makers and researchers. The core focus of the journey has been a "transformative challenge"- a project or programme with transformative potential selected by each member country to serve as a practice-based project. The structure of the course

was not a typical training of lectures; the focus instead was on co-creation and peer to peer learning, with the aim to foster a global dialogue on Transformative Innovation Policy.

To engage with some of the learning materials, including resources on experimentation, evaluation and sustainability transitions, please visit our [training resources page](#).

Advancing TIP Research agenda

Collaborative workshops, organised by the Transformative Innovation Policy Consortium, at Utrecht University and at the IST Conference in Ottawa are advancing the research agenda for Transformative Innovation Policy (TIP).

Key points to emerge have been:

- There is an important demand from policy makers for approaches, tools and instruments to address TIP, but even some of the front-runner countries are grappling with how to implement these new rationales (experimental governance, mission orientation).
- Sustainability transitions research has dealt with many of the key themes (directionality, experimentation, building constituencies for change) which emerge in discussions about TIP, but the interface with other communities and with policy makers is still limited.
- Transition scholars were particularly interested in the connections between innovation and sectoral policy, and whether it is the case that science, technology and innovation agencies have sufficient scope to address societal transitions. The discussion showed that this depends on particular country contexts and the mandate afforded to different agencies.

Upcoming Events

Calls open for TIPC Conference 2019

The next crucial arena for TIP debate, discourse and development is at the TIPC Conference taking place at Ingenio CSIC-UPV, **Valencia, Spain on 4-5th November**. Calls to participate are now open. The full conference programme will be developed in September 2019.

Please send us a brief outline (max. 1000 words) of

your funded project which you would like to discuss at the conference. For more information please visit the [TIPC website](#). Proposals should be sent to TIPC@Sussex.ac.uk with the title 'Response to call for projects TIPC Conference 2019'.

If you have any questions please contact TIPC Research Fellow, [Bipashyee Ghosh](#)

UrbanA - co-creatively distilling actionable solutions for city-makers

Many researchers and innovators have focused on understanding urban social inequality and ecological unsustainability and have identified numerous ways of making cities more just and sustainable. This knowledge and experience need to be further consolidated and effectively communicated. Urban Arenas for Sustainable and Just Cities takes up this challenge. As part of UrbanA four co-creative spaces, known as Arena events, will bring together city-thinkers and city-makers from across Europe. They will be invited to connect with one another, to reflect on previous research, to exchange expertise and ideas, and to generate promising approaches to creating sustainable, inclusive and thriving cities. Each Arena event takes place in a different city and focuses on a specific theme.

The first Arena event takes place in Rotterdam, 28-29 November 2019. It offers policy makers, activists, entrepreneurs, intellectuals or engaged citizens the opportunity to connect and reflect with other city makers, to help distil best practices and, most importantly, to contribute to a sustainable and just future.

To find out more visit [UrbanA](#)

Publications

PhD theses

Rosenbloom, D. (2019)

The politics of decarbonization pathways: Responses, conflicts, and the transition to a low-carbon energy future.

Carleton University, School of Public Policy and Administration

[link](#)

This thesis explores the politics of decarbonization pathways, with a particular focus on the responses to and conflicts surrounding the transition to a low-carbon energy future. As part of this, the dissertation: (1) scrutinizes how the concept of “pathways” is understood within climate-energy policy and analysis; and (2) attends to the struggles involved. Drawing on transition and discursive perspectives, three published studies form the core contributions of this dissertation. The first article elucidates the way in which diverse actors construct meaning around the concept of “pathways” in the context of the low-carbon transition. The second article uncovers ideational conflicts surrounding a historical episode of low-carbon change: the phase-out of coal-fired power in Ontario. The third article reveals tensions and alignments around an unfolding episode of low-carbon change: how different energy systems (electricity, transport, and heating) and their affiliated actors are interacting around expanded societal electrification and electricity trade. Broadly, the three papers developed here underscore that ideas matter in transitions. These ideas relate not only to the concepts and categories used to frame the climate challenge but also to the narratives linked to alternative innovations and institutional arrangements.

Haukkala, T. (2019)

The wicked problem of a low carbon energy transition - Structure, agency and framing in the multi-actor process of solar PV deployment in Finland.

Aalto University School of Business

[link](#)

Renewable energy that produces fewer or no greenhouse gas emissions meets with resistance, and a higher deployment of solar PV in Finland has not been easy to implement. The thesis addresses the wicked problem of a low carbon energy transition in Finland by examining the multi-actor process of solar PV deployment in Finland from the perspective of the classic social science triangle of structure, agency and framing. The findings show that barriers related to policy,

business and consumers exist with regard to solar PV deployment. The most significant of these involve the lack of political will and a support policy, vested interests towards the current energy regime, the low competitiveness of solar PV, and general attitudes. These can be overcome with new policies, regulation and behaviour.

Simon R. Sinsel (2019)
Analyzing Technical Change in Complementary Technologies: Evidence from the Energy Transition.

ETH Zurich, Group for Sustainability and Technology
[contact](#)

This thesis explores this relationship by asking how the development of clean technologies affects technical change in complementary technologies. To answer this question, this dissertation focuses on technologies that are complementary to variable renewable energy technologies, such as like solar photovoltaics and wind power. The results of this thesis are based on a range of qualitative and quantitative archival data sources as well as data from 38 expert interviews. I analyze this data using a mix of both qualitative and quantitative methods, namely text analysis, descriptive analysis, case studies and techno-economic modelling. The thesis consists of four individual papers, with individual research questions covering central aspects of the overarching research question and investigating the phenomenon either on a firm level or on a system level.

Books

Klitkou, A., Fevolden, A. M., Capasso, M. (2019)
From Waste to Value: Valorisation Pathways for Organic Waste Streams in Circular Bioeconomies.

London, New York, Routledge

[link](#)

This book investigates how streams of organic waste and residues can be transformed into valuable products, to foster a transition towards a sustainable and circular bioeconomy. The studies are carried out within a cross-disciplinary framework, drawing on a diverse set of theoretical approaches and defining different valorisation pathways. Developing this sustainable bioeconomy is considered to be critical for several reasons: the need for the sustainable use of resources, the growing demand for food, materials and energy, and the need to decouple economic growth from environmental degradation. This book addresses the challenges related to the transition to a sustainable bioeconomy through a holistic approach: (1) analyses of value chains crossing the established sector boundaries, (2) analyses of policy

and governance perspectives on the transition process and (3) interdisciplinary studies of the bioeconomy.

Papers

Mäkitie, T., Normann, H.E., Thune, T.M., Gonzalez, J.S. (2019)

The green flings: Norwegian oil and gas industry's engagement in offshore wind power.

Energy Policy, 127, 269-279

[link](#)

Reorientation of fossil fuel industries towards renewable energy, and the role of changes in organizational environment underlying such processes, have not featured strongly in the study of sustainable energy transitions. We contribute to this important policy issue with a case study of the Norwegian oil and gas industry and its engagement in offshore wind power. We study how the engagement has changed during the period 2007–2016, and whether these changes correspond with developments in the industry's task and institutional environments. Our study reveals that despite relatively stable institutional environment and continuous growth in offshore wind market over the last decade, the oil and gas industry's engagement has fluctuated over time. These fluctuations – green flings – took place during two market downturns in the oil and gas market, while during an oil and gas boom the industry reoriented back to this core market. Our results draw attention to the potential importance of market changes for reorientation of fossil fuel industries towards renewable energy. We conclude by discussing the implications of our study for policies seeking to support sustainable energy transitions.

David, M., Gross, M. (2019)

Futurizing politics and the sustainability of real-world experiments: What role for innovation and exnovation in the German energy transition?

Sustainability Science, 14, 4, 991–1000

[link](#)

The German energy transition towards more sustainable forms of energy production has been characterized as a large-scale or real-world experiment. Whereas experiments are open-ended processes set up explicitly to allow (or even generate) surprises, by contrast sustainability implies the pursuit of clearly defined, normative ends. Whereas much of the literature on system transformation builds on the concept of innovation, our hypothesis is that focusing on the “natural” flipside of innovation—called here “exnovation,” i.e., departing from unsustainable pathways—should also be seen as a valuable conceptual strategy for coping with the tension between the unavoidable indeterminacy resulting from unknown risks and the necessary amendment and redefinition of goals and

rules. In this paper the German energy transition (Energiewende) is used to exemplify the recursive processes of experimentation that make it possible to accommodate surprise, and, thus, to conceptualize the unavoidable tension between innovation and the maintenance of older, unsustainable structures.

Skeete, J.-P. (2019)

Concentration of power: A UK case study examining the dominance of incumbent auto-makers and suppliers in automotive socio-technical transitions.

Global Transitions. 1, 93–103

[link](#)

Sustainable transition scholarship has recently challenged the stereotypical characterisation of socio-technical transitions, by revisiting the concept of creative destruction. The central counterargument is that new paradigms do not destroy old ones, but rather extend and complement them. Based on a case study of the UK's automotive industry, this article argues that established firms lead the industry in technological innovation, in large part due to regional regulatory frameworks and preferential state accumulation projects. That article then goes on to examine the 'power flows' surrounding incumbent firms as the primary agents of creative accumulation within global production networks. By exploring revealing linkages between evolving government-industry relations, the motorsport sub-sector, and component suppliers, this article renders a more nuanced understanding of incumbent firms as empowered, multi-level agents of innovation. Finally, this article evaluates the UK's incremental, 'zero-carbon' pathway and raises some concerns about the regime's current sociotechnical configuration, and its fitness to achieve its stated goals.

Miremadi, I., Saboohi, Y., Arasti, M., (2019)

The influence of public R&D and knowledge spillovers on the development of renewable energy sources: The case of the Nordic countries.

Technological Forecasting & Social Change, in press

[link](#)

Energy innovation is a key requirement to limit global warming and tackle climate change in the years to come. A better understanding of the public R&D mechanism is likely to improve allocation of resources for energy innovation. Thus, the present paper evaluates the impacts of public R&D and knowledge spillovers on the development of renewable energy sources. To achieve this goal, knowledge flow has been modeled as a function of public R&D expenditures, cumulative knowledge stocks and knowledge spillovers. To show the application of the model, the Nordic countries as one of the pioneers in renewable technologies have been chosen. Results show the cumulative knowledge stock

will increase to 2.4 billion USD until 2030, by focusing on biofuels, solar and wind energy. Results also indicate that the knowledge spillovers reduce the domestic R&D investment and may strengthen the knowledge stock. These impacts of knowledge spillovers are more effective when the absorptive capacity of the country becomes greater. The model helps policy makers to design effective policies for creating a balance between domestic R&D expenditures and knowledge spillovers. Finally, some important policy insights and some recommendations for further research are concluded.

Kanda, W., del Río, P., Hjelm, O., Bienkowska, D. (2019)

A technological innovation systems approach to analyse the roles of intermediaries in eco-innovation.

Journal of Cleaner Production, 227, 1136-1148

[link](#)

The literature on intermediaries faces challenges regarding how to conceptualise and empirically demonstrate the system-level impact of intermediaries. Thus, researchers and policy analysts may experience difficulties in grasping the potential contributions of intermediaries beyond individual projects and firms to aggregate levels of an innovation system. This article combines innovation intermediary and technological innovation systems literature to develop fundamentals of an approach for analysing how organisations acting as intermediaries support firms in eco-innovation and potentially contribute to technological innovation system functions. The operationalisation of the analytical approach is illustrated using case studies on a total of eight support organisations acting as intermediaries in the region of Scania, Sweden and North Rhine Westphalia, Germany. For researchers and policy analysts, the analytical approach presented in this article offers the opportunity for a step-by-step, comprehensive and transparent analysis of different types of intermediaries, their roles, and potential contributions to innovation system functions.

Bugge, M. M., Fevolden, A. M., Klitkou, A. (2019)

Governance for system optimization and system change: The case of urban waste.

Research Policy, 48, 4, 1076-1090

[link](#)

This paper analyses urban waste systems to explore how local authorities can resolve challenges related to climate change, urbanization and resource depletion. The paper investigates how different public governance regimes affect local authorities' ability to move upwards in the waste hierarchy. It identifies three different governance regimes – traditional bureaucracy, new public management and networked governance – and uses the insights from innovation in urban waste in three Norwegian city regions – Oslo, Drammen and Bergen – to illuminate how these regimes possess both strengths

and weaknesses in how they affect system optimization and system change. The observed working practices signal that the issue of urban waste systems is perceived as a challenge of system optimization rather than system change. Viewing this as a challenge requiring system change would probably have ensured a stronger directionality and a broader anchoring of actors. Such an approach is likely to have arrived at a waste prevention mode earlier than the step-by-step-solutions implemented so far. The paper concludes that there is not one best governance regime, but a need to acknowledge their co-existence and carefully consider the characteristics of the respective regimes in order to arrange urban waste systems for long-term dynamic and sustainable city regions.

Capasso, M., Hansen, T., Heiberg, J., Klitkou, A., Steen, M. (2019)

Green growth – A synthesis of scientific findings.

Technological Forecasting and Social Change, 146, 390-402

[link](#)

Governments in countries across the world increasingly adopt the “green growth” discourse to underline their ambition for the greening of their economies. The central tenet of this narrative is the economic opportunities rather than challenges arising from the pursuit of environmental sustainability. Our paper synthesises insights from 113 recent scientific articles, dealing with both environmental issues and economic growth, as well as innovation. Our ambition is exploratory in attempting to take stock of heterogeneous contributions across the spectrum of social science. The articles have been reviewed with a focus on six themes, derived from current discussions in economic geography and transition studies: skills, technology, physical resources, markets, institutions and policies. Four major implications emerge from the review. First, green growth requires competences that allow for handling complex, non-routine situations – in both the private and the public sector. Second, technological progress should be directed towards greener technologies, to avoid investments funds being channelled to brown technologies for short-term returns. Third, our knowledge of the opportunities for achieving green growth must base upon a joint assessment of market failures, structural system failures and transformational system failures. Finally, greater attention should be devoted to the geography of green growth processes at different scales.

Capasso, M., Iversen, E. J., Klitkou, A., Sandven, T. (2019)

Which region to choose for an industrial policy? A research path to highlight restructuring opportunities.

European Planning Studies, 27, 8, 1461-1482

[link](#)

This study explores research avenues that can help policymakers to assess regional capabilities for “green” economic restructuring. After reviewing the relevant literature, and envisioning research paths which consider both market transactions and externalities, we propose possible ways to translate past research findings into novel statistical tools. Our point of departure is the “skill relatedness” among economic sectors in Norway, as inferred from intersectoral labour flows (years 2008-2014). Then, on the basis of the industrial composition in each of the 161 Norwegian labour market areas, candidate regions that could benefit the most from a “green” restructuring policy, aimed at photovoltaics in our empirical example, are brought forward.

Scordato, L., Klitkou, A., Tartiu, V. E., Coenen, L. (2018)

Policy mixes for the sustainability transition of the pulp and paper industry in Sweden.

Journal of Cleaner Production, 183, 1216-1227

[link](#)

The need to view innovation policy through the lens of policy mixes has gained momentum given the growing complexity, the dynamics of real-world policy and the wide array of difficulties to address the current great societal challenges, notably the increasing pressure on the ecosystems that support our society. One of the main challenges concerning the transition towards bioeconomy, is to gain a more in-depth understanding of the policy mix to stimulate innovation in sustainability transitions. Our paper aims at enriching the portfolio of empirical case studies on policy mixes for innovation and sustainable transitions, by investigating the development of the policy mix underpinning the sustainability transition of the pulp and paper industry in Sweden. We apply a case study approach which draws on event history analysis, semi-structured interviews with industry and policy makers, literature reviews, a participative workshop with stakeholders from the pulp and paper industry, as well as on the IEA databases on climate change and energy efficiency policies and measures. Our analysis emphasises coordination, timing and scale in policy mixes as important elements to understand how instruments interact to accelerate sustainability transitions. The mapping of the policy mix shows that destabilising policies were crucial for accelerating the transition process of the industry. Prior to novelty creation policies, destabilising policies (e.g. environmental policies) were needed for “innovation policy instruments” to be effective. More specific instruments (e.g. carbon tax), targeting particular functions of the innovation systems, require “on-the-ground” policy intelligence and benefit from close interaction with industry.

Stalmokaitė, I., Yliskylä-Peuralahti, J. (2019)

Sustainability Transitions in Baltic Sea Shipping: Exploring the Responses of Firms to Regulatory Changes.

Sustainability, 11,7, 1-23

[link](#)

This study investigates how the introduction of more stringent environmental regulation regarding sulphur and nitrogen emission control areas induced shipping companies to react to a new situation and opened up a window of opportunity for build-up of niches for alternative vessel energy sources. By drawing on a multi-level perspective from the socio-technical transition literature, the study provides empirical evidence for how realignments in the environmental regulatory regime alter incumbent actors' positions and produce varying environmental innovation responses to reduce air-borne pollution from shipping. The study illustrates that the stringency of a regional command-and-control regulation in combination with evolving pressures in the external landscape environment and shipping companies' task environments are essential components shaping the adoption of environmental innovations. Although incremental innovations seem to dominate in a fossil fuel-based maritime transportation socio-technical system, our results demonstrate the role of regulations and the behaviour of frontrunners in the context of regime fragmentation and sustainability transition processes.

Schmidt, T.S., Schmid, N., Sewerin, S. (2019)
Policy goals, partisanship and paradigmatic change in energy policy – analyzing parliamentary discourse in Germany over 30 years.

Climate Policy, 19, 6, 771-786

[link](#)

The successful implementation of the Paris Agreement requires substantial energy policy change on the national level. In national energy policy-making, climate change mitigation goals have to be balanced with arguments on other national energy policy goals, namely limiting cost and increasing energy security. Thus far, very little is known about the relative importance of these goals and how they are related to political partisanship. In order to address this gap, we focus on parliamentary discourse around low-carbon energy futures in Germany over the past three decades and analyze the relative importance of, and partisanship around, energy policy goals. We find that the political discourse revolves around four, rather than three, goals as conventionally assumed; improving the competitiveness of the national energy technology industry is not only an additional energy policy goal, it is also highly important in the political discourse. In general, the relative importance of these goals is rather stable over time and partisanship around them is limited. Yet, a sub-analysis of the discourse on renewable energy technologies reveals a high level of partisanship, albeit decreasing over time.

Particularly, the energy industry goal's importance increases while its partisanship vanishes. We discuss how these findings can inform future energy policy research and provide a potential inroad for more ambitious national energy policies.

Smith, T.S.J. (2019)
Policy, polycentrism, and practice: Governance imaginaries in sustainability transitions

AREA, in press

[link](#)

This paper foregrounds the under-theorised figure of the policy maker in the environmental social sciences. To do so, it focuses on the case of "social practice theory" (SPT), a school of thought which has gained prominence in human geography and further afield in recent years. The paper outlines the context of environmental policy literatures and identifies a tension in many treatments of the topic by practice-oriented scholars: while it focuses on emergent social change, the traditional policy imaginary which has circulated in this literature often portrays benign, top-down policy makers who, given adequate information, are amenable to conducting the right policy "intervention." A "governance on the inside" approach is proposed as an alternative imaginary, drawing from prominent work on polycentric governance and community economies in geographical and economic scholarship, as well as more recent work in SPT itself. Opportunities for a geographical mapping of policy difference and reflexive engagement are highlighted, hinting at rich future possibilities.

Jorgenson, S.N., Stephens, J.C., White, B. (2019)
Environmental education in transition: A critical review of recent research on climate change and energy education.

The Journal of Environmental Education

[link](#)

The transition from centralized energy systems based on fossil fuels to renewable-based systems is a macro-level societal shift necessitated by climate change. This review of recent environmental education (EE) research identifies gaps and opportunities for promoting environmental action in this new context. We found that environmental educators and researchers are currently focused on researching and promoting energy conservation behavior with an emphasis on children and youth. We also found an emerging research focus on energy transitions at the regional and national levels. We recommend that environmental educators and researchers adopt a vision and strategy for climate change and energy education that more explicitly addresses the role of collective action, multi-actor networks, and sociotechnical innovation in shaping energy transition processes.

Matschoss, K., Repo, P., Timonen, P. (2019)
Embedding European citizen visions in

sustainability transition: Comparative analysis across 30 European countries.

Futures, in press

[link](#)

Co-production of knowledge with international publics can reveal novel insights into sustainability concerns across countries. However, generalizable studies on how place-specificity corresponds to sustainability transition are lacking, although there is an emerging body of literature on the geography of sustainability transition. This article contributes to that aim by examining 1) how citizen perspectives on sustainability are distributed across countries and groups of countries, and 2) what sustainability directions the citizens in their respective countries are likely to support. Empirical analysis of citizen visions of sustainable and desirable futures from 30 European countries identifies distinct topics through modelling and categorises groups of countries according to similarities. The study finds an overarching, education-related European citizen approach to sustainability. However, there are other topical differences across groups of countries, which implies that there is not one European but several optional policy directions for successful sustainability transition. Our study has identified five such topics and connected them to literature on sustainability transition. Acknowledging that there are nationally-embedded values that contribute to alternative sustainability transition pathways helps to argue for varying sets of policies across countries and groups of countries.

Mahzouni, A. (2019)

The role of institutional entrepreneurship in emerging energy communities: The town of St. Peter in Germany.

Renewable and Sustainable Energy Reviews, 107, 297–308.

[link](#)

This paper provides insights from the extant literature on institutional entrepreneurship in emerging fields which could enable us to understand how the innovative idea of 'energy community' arose, became new practices, and has been institutionalized over time. In August 2008, the people of St. Peter, a Black Forest rural town in Germany, decided to build their own energy co-operative for the operation of the biomass District Heating Plant (DHP). The key driving forces for this comprised a wide range of sustainability-related discourses, such as climate protection, energy supply security, and regional economic development. The biomass DHP, as an environmentally-friendly heating system, has become a taken-for-granted practice and has been presented as an 'inspirational' example to other communities in the region. The main contribution of this study is to develop and use a multi-level analytical framework to elucidate the process of legitimation and sense-making of the notion of the energy community St. Peter. The key conclusions are that institutional entrepreneurs are

dispersed across space, social status, sector, and governance levels; their agency is distributed among multiple levels of action and multiple stages of development; and they use a range of social skills to justify their action for institutional change. Therefore, community-based initiatives should draw on multiple discourses that address both individual interests (stable prices and supply security) and collective concerns (environmental protection). In this way, wide public support for transforming existing energy practices into more renewable ones can be achieved.

Calvert, K., Greer, K., Maddison-MacFadyen, M. (2019)

Theorizing energy landscapes for energy transition management: Insights from a socioecological history of energy transitions in Bermuda

Geoforum, 102, 191-201

[link](#)

Energy production systems all over the world are in the early stages of a structural shift from below ground fossil fuels toward above ground energy flows – i.e., solar, wind, biomass, and other forms of renewable energy. In other words, the energy transition implies a profound landscape transformation. Theories and practices in energy transition management are currently underpinned by 'society-technology' or sociotechnical perspectives drawn from sustainability transition studies, which foreground political-economic rhythms and institutions that contribute to infrastructure lock-in and path dependence. The significance of these dominant views notwithstanding, they are inattentive to the challenges of landscape transformation and often relegate geographic space to a backdrop upon which sociotechnical transitions take place. The purpose of this paper is to foreground a 'society-environment' or socioecological perspective of energy transition and, in so doing, begin to take seriously its spatial dimensions. Our approach brings the energy landscape concept into dialogue with ideas about the production of space and materiality in order to conceptualize the ways in which an energy transition is intertwined with material landscapes (e.g., landscape aesthetics and land-use patterns), territorial structures acting upon landscapes (e.g., land-use planning policy), and social values drawn from and embedded in those landscapes (e.g., emotional attachments and livelihood strategies). We apply this approach to an analysis of energy transitions on the British overseas territory of Bermuda from circa 1819 to present day. The research highlights the broader landscape transformations throughout the island's efforts to establish itself as a British Royal Navy coaling station and then as a tourist destination, and links these histories to the contemporary political ecological factors shaping renewable energy deployment on the island. Conceptually, the paper attends to the influence of society-environment relations in shaping the articulation of technological transitions in

particular places and times. More specifically, the research identifies how land-use systems and landscape values contribute to 'lock-in' and 'path dependency' that must be destabilized in order to facilitate energy transitions. Practically, the paper highlights the need to integrate energy planning with collaborative land-use planning as part of energy transition management.

Turnheim, B., Geels, F.W., (2019)

Incumbent actors, guided search paths, and landmark projects in infra-system transitions: Rethinking Strategic Niche Management with a case study of French tramway diffusion (1971-2016)

Research Policy, 48, 6, 1412-1428

[link](#)

This paper concerns the emergence and diffusion of radical innovations in the context of sustainability transitions. We confront the typical understanding in the Strategic Niche Management framework with an in-depth longitudinal case study of French modern tramways (1971–2016), which represents a particular technology class: local infrastructure systems. The case confirms the relevance of existing SNM-concepts, but also points to three pattern deviations: 1) incumbent actors from neighbouring regimes can play a leading role in the development of radical alternatives, 2) the early formulation of highly specific visions can effectively guide search paths (as opposed to a usual prescription about more open-ended approaches to foster innovative variety creation), and 3) particularly influential projects (which we call 'landmark projects') can decisively accelerate innovation developments. Exploring a greater variety of diffusion and transition patterns (based on temporal interactions of causal mechanisms and varying roles played by different actors) is a fruitful way forward for sustainability transitions research.

Turnheim, B., Nykvist, B. (2019)

Opening up the feasibility of sustainability transitions pathways (STPs): Representations, potentials, and conditions.

Research Policy, 48, 775–788

[link](#)

Addressing sustainability and low carbon objectives calls for radical departures from existing socio-technical trajectories. The substantial implementation gap between sustainability objectives and current unsustainable paths justifies a continued search for more ambitious system transformations and clarity as to how they can be realised. The aim of this article is to unpack the feasibility of such sustainability transitions pathways (STPs), by identifying the analytical dimensions that need to be considered to address challenges for transitions governance and specifying how they can inform comprehensive evaluation efforts. We aim to offer practical examples of how multiple forms of knowledge can be mobilised to support strategic

decision-making, and so complement traditional modelling-based scenario tools. We base our evaluation of STPs on a broad understanding of feasibility and elaborate a frame to mobilise what we see as three 'facets' of STPs: representations for exploring sustainability transitions potentials, as well as the conditions under which STPs may have greater chances of becoming realised. The resulting evaluation frame allow us to generate specific prescriptions about STPs feasibility that can focus interdisciplinary research on the relevance of mobilising a plurality of forms of knowledge in evaluation efforts, a more detailed understanding of the potential of a given solution or pathway, and more detailed assessment of different key dimensions. We end by discussing how the notion of STPs feasibility can help open up decision-making processes and what tangible types of interventions are relevant.

Briguglio, M., Brown, M. (2018)

Civil society perspectives on green jobs in sustainable energy: The case of European Malta.

Energy & Environment, in press

[link](#)

The objective of this paper is to analyse the perspectives of civil society actors in Malta about the country's sustainable energy policy and its impact on green jobs. Perspectives of 11 civil society actors comprising employers, trade unions and non-governmental organisations are analysed to provide a broad reflexive analysis of the policy process in question. Findings illuminate a broad consensus within civil society that the policymaking process in the field of sustainable energy should incorporate different voices from civil society – such as employers, trade unions and environmental non-governmental organisations – apart from experts in energy, economics and other areas. Indeed, this study's findings include civil society's reviews on how commercial viability, workers' rights, environmental protection and sustainability interact with and within the sustainable energy sector and related green jobs. Nonetheless, this study signals that within Maltese civil society, sharing of knowledge and good practice and effort coordination lack. Different interests and sectarianism testify to inconsistently interacting and competing human local networks. This broadens the discourse on effective sustainable energy policy and creation of related green jobs, also making it more complex. Indeed, the direction of such discourse bears potential for sporadic development. Whilst challenging vertical trajectories, institutionally centred and technical transitions in the area of environmental sustainability, the primary data gained from this study highlight need for policy to address the identified challenges through projects, funding and incentives that foster coordination between different types of civil society organisations.

Deleye, M., Van Poeck, K., Block, T. (2019).

Lock-ins and opportunities for sustainability

transition : a multi-level analysis of the Flemish higher education system.

International Journal of Sustainability in Higher Education, in press

[link](#)

This study aims to provide an overview of sustainability in Flemish higher education (HE) by using the multi-level perspective (MLP) on sustainability transitions for a comprehensive empirical analysis of how sustainability is embedded in Flemish HE. MLP was used as analytical framework to study the case and allows a focus on the interplay between innovative experiments in niche-practices, the characteristics of the prevailing regime and macro-trends at the landscape level. The data were collected through document analyses, surveys, in-depth interviews and a focus group. The empirical analysis was complemented with an extensive literature study. In all, 9 landscape trends, 21 regime characteristics and 5 types of niches are identified. Furthermore, the multi-level analysis revealed 5 important lock-ins in the dominant regime that impede the upscaling of sustainable niches, 5 internal contradictions that destabilise the regime and can thus create windows of opportunity for niches to become viable alternatives and 16 opportunities for further embedding sustainability in HE. The paper gives an original insight into the complexities of integrating sustainability in HE, highlights the important role of policy entrepreneurs to grasp emerging opportunities and offers them insight into how to create momentum and identify and fruitfully address windows of opportunity for a sustainability transition. It shows the potential and limits of the MLP for research on HE and outlines prospects for future research.

Jewell, J., Vinichenko, V., Nacke, L., Cherp, A. (2019)

Prospects for powering past coal.

Nature Climate Change, in press

[link](#)

To keep global warming within 1.5 °C of pre-industrial levels, there needs to be a substantial decline in the use of coal power by 2030(1,2) and in most scenarios, complete cessation by 2050(1,3). The members of the Powering Past Coal Alliance (PPCA), launched in 2017 at the UNFCCC Conference of the Parties, are committed to “phasing out existing unabated coal power generation and a moratorium on new coal power generation without operational carbon capture and storage”(4). The alliance has been hailed as a ‘political watershed’(5) and a new ‘anti-fossil fuel norm’(6). Here we estimate that the premature retirement of power plants pledged by PPCA members would cut emissions by 1.6 GtCO₂, which is 150 times less than globally committed emissions from existing coal power plants. We also investigated the prospect of major coal consumers joining the PPCA by systematically comparing members to non-members. PPCA members extract and use less coal and have older power plants,

but this alone does not fully explain their pledges to phase out coal power. The members of the alliance are also wealthier and have more transparent and independent governments. Thus, what sets them aside from major coal consumers, such as China and India, are both lower costs of coal phase-out and a higher capacity to bear these costs.

Lazarevic, D., Kivimaa, P., Lukkarinen, J., Kangas, H-L. (2019)

Understanding integrated-solution innovations in sustainability transitions: Reconfigurative building-energy services in Finland.

Energy Research & Social Science, 56, 101209

[link](#)

This paper investigates the potential role of energy services in the transition to nearly zero-energy buildings, by mobilising the concepts of product service systems, integrated-solutions and business ecosystems; so far, largely disconnected from the transitions literature. Using primary data from semi-structured interviews and publically available data from company websites, we present two critical case studies analysing the emergence of business ecosystems around companies offering integrated-solutions at the intersection of building and energy regimes in Finland. We analyse the business ecosystems developing around two building energy service companies that have broad claims of regime reconfiguration, whilst having stimulated value co-creation and built actor networks. Such collaborative value co-creation is of importance to sustainability transitions that require actors to cooperate toward the common goal of reconfiguring incumbent regimes. Furthermore, we demonstrate the potential role of integrated-solutions in sustainability transitions, and the use of the business ecosystem concept as an appropriate approach to analyse value co-creation in integrated-solution delivery.

van der Weele, C., Feindt, P., van der Goot, A. J., van Mierlo, B., van Boekel, M. (2019)

Meat alternatives: an integrative comparison.

Trends in Food Science & Technology, 88, 505-512

[link](#)

Meat, an important source of protein and other nutrients in human diets, is one of the major drivers of global environmental change in terms of greenhouse gas emissions, land and water use, animal welfare, human health and directions of breeding. Novel alternatives, including novel meat proxies (cultured meat, plant-based meat alternatives), insects and novel protein sources (like algae) receive increasing attention. But plausible socio-technological pathways for their further development have not yet been compared in an integrative, interdisciplinary perspective. This paper applies an integrated conceptual framework – the Reflexive Integrative Comparative Heuristic (RICH) – to comparatively assess the nutritional implications,

potential sustainability gains and required technological and social-institutional change of five meat alternatives. We formulate plausible pathways for each alternative and identify their pre-conditions and implications. High levels of transformation and processing limit the environmental sustainability gains of cultured meat, highly processed plant-based meat alternatives, algae- and insect-based food. At the same time, a high degree of societal coordination is needed to enable the potentially disruptive level of technological, organisational and institutional innovations necessary to make these novel alternatives viable. Widespread expectations that solutions require break-through novelties or high-tech alternatives imply a neglect of existing and viable alternatives. Our integrative analysis suggests that the priority given to meat alternatives with limited sustainability potential does not just raise questions of technological optimization of production systems, but is also a second-order problem of the framing of search directions.

Zolfagharian, M., Walrave, B., Raven, R.P.J.M., Romme, S., (2019)

Studying transitions: past, present and future. Research Policy, in press

[link](#)

The domain of transition studies has been drawing more and more scholarly attention and, as a result, its body of knowledge is rapidly growing. This raises new challenges as well as opportunities, not the least regarding the methodological and philosophical underpinnings of research in this domain. In this respect, transition research, as a relatively young field of inquiry, has been little concerned with methodological investigation and reflection. We propose a framework that enables this reflection: the so-called 'transition research onion'. Subsequently, we utilize this framework to systematically assess 217 peer-reviewed papers in the field of transition studies, to distill key methodological patterns and trends of the field. The findings suggest that the methodology of transition studies, in terms of depth and diversity, is underdeveloped. These insights serve to guide future research on transition processes.

Svennevik, E. (2019)

The existing and the emerging: car ownership and car sharing on the road towards sustainable mobility

International Journal of Automotive Technology and Management, in press

[link](#)

The use of car sharing has experienced rapid growth in recent years, but user-numbers are still low, and privately owned cars dominate. This paper studies how the use of car sharing contributes to altering the car system in urban areas. The study employs data from semi-structured interviews with 39 households in Oslo that are members of car-sharing arrangements. How

does the current use of car sharing in Oslo relate to and influence the established use of privately owned cars? Are these relations elements in a transition towards sustainable mobility? The study finds that car sharing acts help to promote reduced car-ownership, changing and reducing the overall use of cars. However, there are limits to its contribution to environmental sustainability because of the continued use of fossil fuel cars and the continued dependence on privately used cars.

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

Exploring barriers to the agroecological transition in Nicaragua: A Technological Innovation Systems approach.

Agroecology and Sustainable Food Systems, in press

[link](#)

Latin America has historically been a vanguard of agroecology. In Nicaragua, an agroecological transition is occurring, with three decades of building a groundswell based on the farmer-to-farmer movement and the recent institutionalization of agroecology in national law. Yet, problems remain with agroecology's diffusion. We introduce the Technological Innovation Systems approach to examine systemic barriers to the agroecological transition and cycles of blockages caused by barriers' interactions. Based on qualitative data from north-central Nicaragua, we find the main barriers hindering the agroecological transition include weak guidance of the search for agroecology, insufficient capacities and quantities of resources, and lacking market development. Beyond the Nicaragua case, the analysis points at the importance of using socio-technical systems analysis to better understand and address the root causes behind issues blocking national agroecological transitions.

Avelino, F., Dumitru, A., Cipolla, C., Kunze, I. Wittmayer, J. (2019)

Translocal empowerment in transformative social innovation networks

European Planning Studies, in press

[link](#)

This paper contributes to public and academic discussions on empowerment and social innovation by conceptualizing the mechanisms of empowerment from a social psychology perspective, and empirically exploring how people are empowered through both local and transnational linkages, i.e. translocal networks. Section 2 conceptualizes empowerment as the process through which actors gain the capacity to mobilize resources to achieve a goal, building on different power theories in relation to social change, combined with self-determination theory and intrinsic motivation research. Based on that conceptualization, empirical questions are formulated to be asked about cases under study. Section 3 then provides an empirical analysis of

translocal networks that work with social innovation both at the global and local level. A total of five networks are analyzed: FEBEA, DESIS, the Global Ecovillage Network, Impact Hub and Slow Food. The embedded cases-study approach allows an exploration of how people are empowered through the transnational networking while also zooming in on the dynamics in local initiatives. In the final section, conceptual and empirical insights are synthesized into a characterization of the mechanisms of translocal empowerment, and challenges for future research are formulated.

Schwarz, M., Ossenbrink, J., Knoeri, C., Hoffmann, V.H. (2019)

Addressing integration challenges of high shares of residential solar photovoltaics with battery storage and smart policy designs

Environmental Research Letters (14), 7

[link](#)

In many countries, the integration of growing shares of residential solar photovoltaics is beginning to challenge existing electricity systems. First, residential solar photovoltaics aggravates sharp system-wide load changes and, in turn, increases the need for fast-ramping generation capacity. Second, it reduces the demand for electricity provision from the grid, causing an increase in electricity prices as grid costs are recovered over smaller volumes of electricity. Battery storage (BS) mitigates the first integration challenge by flattening the system-wide load, but elevates the second by increasing self-consumption behind-the-meter. In face of this dilemma, the integration of high shares of residential solar photovoltaics requires policymakers to re-design public support policies. In this article, we develop an agent-based model to simulate California's residential 'solar-plus-storage' market between 2005 and 2030 in four different policy scenarios. By applying a multi-technology, multi-policy approach, we quantify the complex interplay between the diffusion of individual technologies, several interacting policies and systemic challenges. Our results show that California's policy status quo initiated a BS uptake and, in turn, a flattening of the system, but, in the long run, will increase the electricity prices. To avoid this, we outline a policy reorientation—including a gradual phase-out of the prevailing feed-in remuneration and an introduction of fixed charges for owners of solar photovoltaic systems. Our results imply that the policy debate should be re-focused away from a single-technology single-policy perspective towards a system integration perspective.

Sinsel, S.R., Riemke, R.L., & Hoffmann, V.H. (2019)

Challenges and solution technologies for the integration of variable renewable energy sources—a review.

Renewable Energy, in press.

[link](#)

Variable renewables such as solar photovoltaics and wind power are key technologies for achieving the decarbonization of the power sector. However, they differ significantly from conventional power generation sources. As the share of variable renewables increases, these differences lead to numerous challenges in power systems. Failure to deal with these challenges may jeopardize power system reliability or the achievement of decarbonization targets. Various solution technologies are available to mitigate these challenges. The extant literature, however, lacks clarity on the scope of the challenges and the solution technologies to address them. This study provides a comprehensive overview of challenges and solution technologies among all domains of the power system. The interrelation matrix of challenges and solution technologies developed in this study provides important insights: First, solution technologies vary significantly in their potential to solve certain challenges. The solution potential of different technologies can therefore help prioritize solution technologies in addition to focusing on cost-effective options. Second, it is possible to identify groups of solution technologies that can help mitigate certain challenge groups. The categorization developed in this paper helps to better specify the need for specific solution technologies and enhances transparency of the complex process of renewable energy integration.