

## Newsletter 22: December 2016

This is the 22nd newsletter from the steering group of the Sustainability Transitions Research Network. The newsletter is divided into the following sections:

- Words from the Chairman
- Environmental Innovation and Societal Transitions
- Network news
- Event announcement
- New research projects
- Publications

The STRN steering group

## Words from the Chairman

Dear transition research colleagues,

The three institutional pillars of STRN continue to develop strongly. 1) The journal EIST (Environmental Innovation and Societal Journal) continues to publish interesting articles, which has been rewarded with a CiteScore of 2.69 (which is the Scopus version of an impact factor). This bodes well for a future impact factor from Thomson Reuters. 2) Preparations for the 8th transition conference in Chalmers are in full swing, and the organizers have enrolled some high-profile keynote speakers (see <http://ist2017.org/>), 3) The network itself continues to grow as more people join, supported by a newsletter, mailing list and working groups. A working group on 'research agenda renewal' (led by Jonathan Köhler) has reviewed the topic suggestions from STRN-members (many thanks for these!) and is currently working on a synthesis document. Future newsletters will report more on this.

As the international visibility of transition research increases, STRN members are also starting the 'march through the institutions'. Two STRN-members (Fred Steward and myself) have recently been appointed to the Scientific Committee of the European Environment Agency. The EEA is gearing up to dedicate a substantial part of its 2020 State of the Environment Outlook to sustainability transitions, intending to make assessments of: a) long-term mega-trends, b) lock-ins of energy, mobility, land, food, water systems, and c) green innovations (visions, policy mixes, learning processes, networks). So, transitions thinking is likely to deeply inform the 2020 SOER, which itself informs the European Parliament, Commission and national environment ministries. Additionally, several STRN members have been nominated as Lead Authors for the IPCC Special Report (on 1.5°C Climate Change) and/or the 6<sup>th</sup> IPCC Assessment Report. If they are selected (which we know in January), transitions thinking may also begin to permeate important global networks.

As you can see in the 'network news' section, the number of articles on sustainability and citations also continued to increase in 2016. The new publications section shows in more detail which articles, books and PhD theses have been published in the last 3 months. The sections on event reviews and new projects also show vitality, guaranteeing continued research on interesting topics in the years ahead. I hope you will enjoy reading this newsletter and I wish you all a very good festive break.

**Frank Geels**, Chairman of STRN ([frank.geels@manchester.ac.uk](mailto:frank.geels@manchester.ac.uk)).

## Environmental Innovation and Societal Transitions

Volume 21 of *Environmental Innovation and Societal Transitions* has just been published. It contains ten original research papers:

- Australia's sustainable energy transition: The disjointed politics of decarbonisation - *Bevan Warren, Peter Christoff, Donna Green*
- Sustainability that backfires: the case of biogas in Emilia Romagna - *Bianca Cavicchi*
- Explaining variance in national electric vehicle policies - *Joeri H. Wesseling*
- The behavioural aspect of green technology investments: A general positive model in the context of heterogeneous agents - *Florian Knobloch, Jean-Francois Mercure*
- Non-disruptive regime changes—The case of competing energy efficient lighting trajectories - *Simone Franceschini, Floortje Alkemade*
- Environmental and health aspects of mobile phone production and use: Suggestions for innovation and policy - *Senthil velmurugan Manivannan*
- Assessing the impact of environmental innovation in the airline industry: An empirical study of emerging market economies - *Wei Yan, Zhijian Cui, María José Álvarez Gil*
- Measuring the duration of formative phases for energy technologies - *Nuno Bento, Charlie Wilson*
- Communicating tensions among incumbents about system innovation in the Dutch dairy sector - *Anne-Charlotte Hoes, Pieter Jelle Beers, Barbara van Mierlo*
- Systems-dynamic analysis of employment and inequality impacts of low-carbon investments - *Giovanni Bernardo, Simone D'Alessandro*

As always, we look forward to receive your submissions. Don't forget to read, and if relevant cite, EIST. **Jeroen van den Bergh, Editor-in-Chief [jeroen.bergh@uab.es]**

## Network News

*Any news related to ongoing activities of STRN*

### **Sustainability Transitions: Publications, journals and topics**

2015 and 2016 have been another two productive years for research on sustainability transitions. This is an update of the publication figures presented more than a year ago in the 17<sup>th</sup> newsletter.<sup>1</sup> Currently we see about 250 new papers every year and the total is getting close to 2'000 - so keep on reading! Compared to last year, there are some changes in the prominence of journals when we look into the number of articles published. *Journal of Cleaner Production* (JCP) has passed *Environmental Innovation and Societal Transitions* (EIST), *Renewable and Sustainable Energy Reviews* (RSER) has jumped up two places, and *Energy Research and Social Science* (ERSS) is new in the list pushing out Futures. But this is just one indicator, of course. Looking at citations, *Research Policy* (RP) is still way ahead all other journals, with a factor 3 above average (36 cites/paper). The new Journals EIST, RSER and ERSS are obviously still below average but have all been catching up compared to last year's figures.

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<sup>1</sup> The analysis is based on those Scopus listed articles that cite at least one of 20 core papers on transitions and have certain keywords (e.g. sustainability and transitions) in their title, keywords or abstract. For details on how the search was conducted see: Markard, J., Raven, R., Truffer, B., 2012. Sustainability Transitions: An emerging field of research and its prospects. *Research Policy* 41, 955-967.

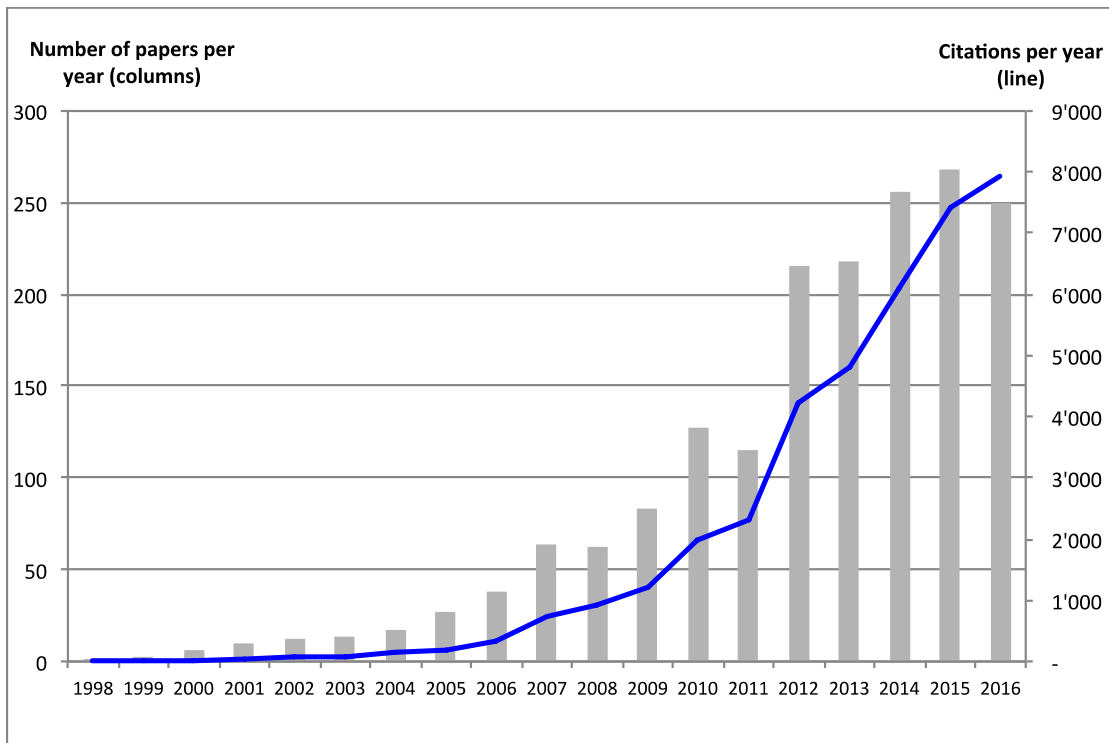


Figure 1: Articles on sustainability transitions and citations (Source: Scopus, Dec. 16, 2016)

Looking at the empirical areas, in which transition scholars are active, there are virtually no changes. Energy is still leading (42% of all papers), followed by transport (13%), food and water (both 10%), and waste (5%). Note that these categories are not exclusive.

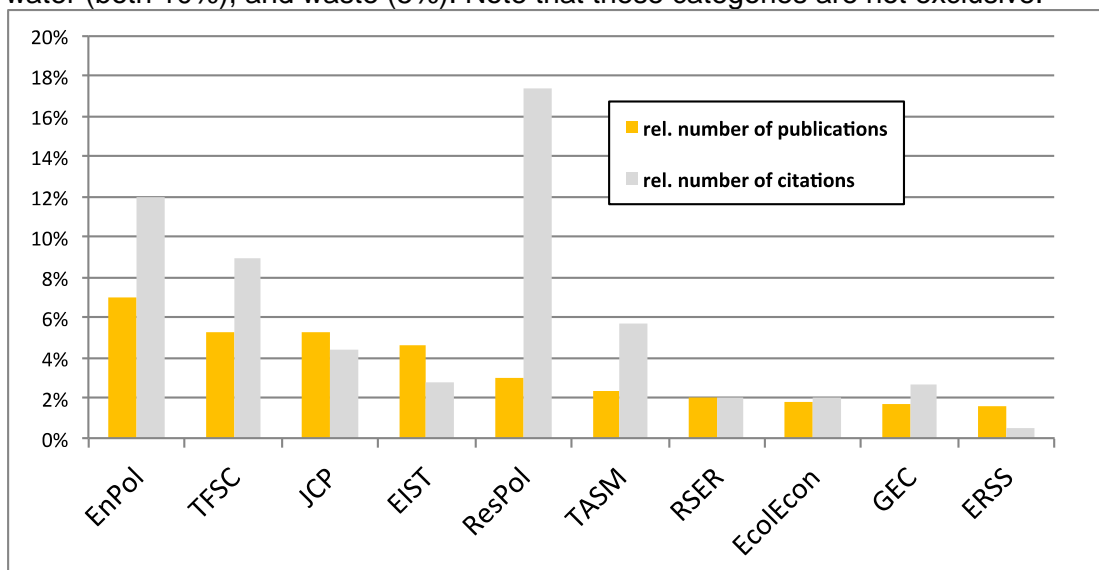


Figure 2: Key journals in the field – relative number of citations and publications

As a new element, I also made an attempt to distinguish sub-fields in transition studies (Figure 3). The distinction was inspired by the topics of the STRN research agenda. The picture shows that there is a broad variety of sub-topics and a critical mass of activity in each of these fields. Again, the categories are not exclusive and the results depend very much on the selection of search terms. This is why it should not be over-interpreted (e.g. the more the better). On the contrary, sub-fields with fewer publications might offer more chances to discover interesting research gaps and write innovative papers! And this might be even more true for cross-overs between these sub-fields or topics that are not yet on this list.

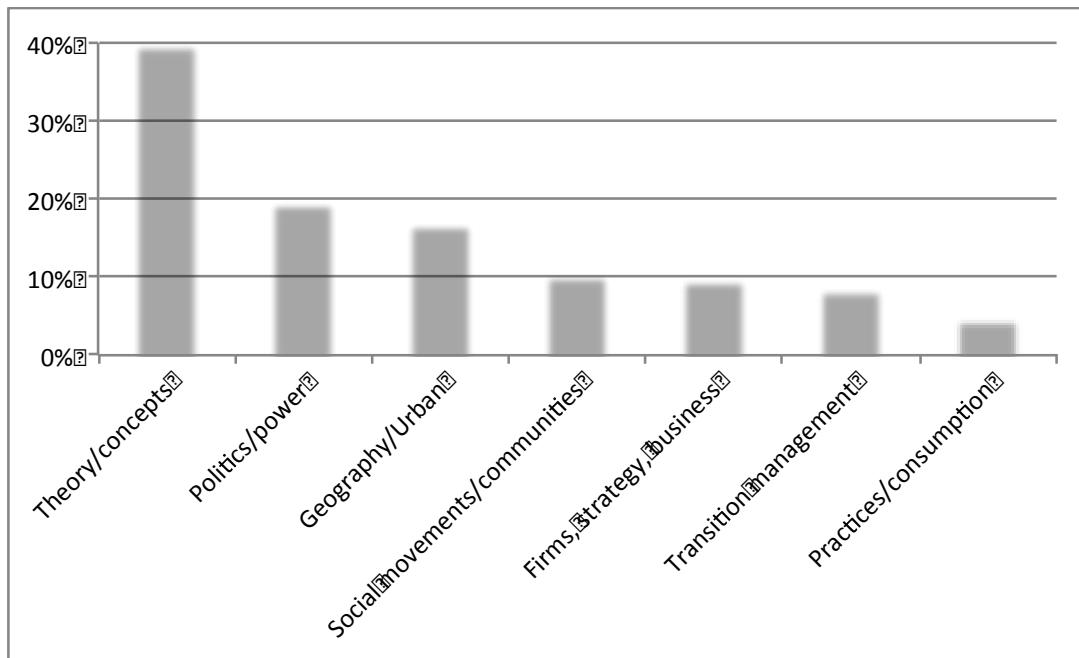


Figure 3: Share of papers in different sub-fields of sustainability transitions

Jochen Markard (jmarkard@ethz.ch)

## Event announcements

*Calls for upcoming relevant events such as workshops and conferences*

### **EGOS colloquium on 'Organizations in sustainability transitions', July 6-8, 2017**

With the intention to strengthen ties between transition studies and management research, we invite you to participate in a Sub-theme on "Organizations in sustainability transitions" at the 2017 EGOS colloquium in Copenhagen, July 6-8. EGOS is the European Group for Organizational Studies and EGOS sub-themes are in-conference session streams that facilitate close interaction of typically 20-30 participants/presenters over several sessions. To participate you will have to submit a short paper of 3'000 words until January 9, 2017.

[Call for Papers EGOS conference website](#)

We are looking forward to meeting you in Copenhagen!

Raghu Garud, Joel Gehman, Jochen Markard

### **PhD workshop on 'Theories of Sustainable Transitions', 17-19 May 2017**

The Center for Design, Innovation and Sustainable Transitions DIST, from the University of Aalborg in Copenhagen offers the PhD Course 'Theories of Sustainable Transitions' between 17-19 May 2017. This PhD course is intended for students conducting research related to analysis, design and innovation processes for the needed transformations to achieve sustainability goals. The teachers of the course will offer advanced discussion in theories of transitions and will illustrate their theoretical work through case studies conducted in various places including Denmark, the United Kingdom, Holland, Colombia, India and other countries. These case studies range from local community based initiatives, to city projects to country and regional programs for sustainability. International collaboration efforts will also be discussed. The teaching team includes Professors Rob Raven, Ulrik Jørgensen and Inge Røpke, and Assistant Professors Jens Stissing Jensen and Andrés Valderrama.

For more information please contact Andrés Valderrama at [afvp@plan.aau.dk](mailto:afvp@plan.aau.dk)

## Event Reviews

*Review of events interesting to the STRN community*

### **Transformative Sustainability Governance – an Earth System Governance Project workshop hosted by the University of Waterloo, Canada (November 22<sup>nd</sup>-23<sup>rd</sup>, 2016)**

Organized by Dr. Sarah Burch and colleagues the workshop brought together scholars from Asia, Australia, Europe, and North America. The objective was to facilitate an interdisciplinary knowledge exchange regarding the intersection of sustainability transformations and earth system governance scholarship. Over the course of two days, the participants discussed how to move from incrementalism to a system-wide transition towards resilient, low carbon patterns of development. Facilitated through small roundtable discussions, the workshop allowed for deep conversations and reflection about the tradeoffs and benefits of transformative sustainability and potential conflicts with current political or economic priorities. Participants considered the role of researchers in this transition and identified how other actors might be most effectively engaged. As an output of this workshop, a special issue of a peer-reviewed journal will be published. For further information, contact Dr. Sarah Burch, email: [sarah.burch@uwaterloo.ca](mailto:sarah.burch@uwaterloo.ca).

## New research projects

*Information about ongoing research activities such as the start of new research projects*

### **Realising Innovation in Transitions for Decarbonisation (REINVENT)**

The research project REINVENT analyses decarbonisation in four sectors where low carbon transitions are still relatively unexplored: steel, plastics, paper, and meat and dairy, and their value chains. REINVENT starts from within these sectors to build a deeper understanding of viable pathways, rather than from an outside climate policy framework. This perspective is necessary for supporting the innovations and system-wide transformations that decarbonisation requires. REINVENT explores and assesses future decarbonisation pathways in a wider systemic innovation context, by mapping decarbonisation innovations and analysing selected cases through creating innovation biographies. The analytical perspective includes attention to co-evolution with ongoing changes in energy supply and integration with renewable energy systems and a more resource efficient circular economy. REINVENT develops generic knowledge through assessments of macro-economic implications and integrated analysis of economic, environmental and social impacts at the EU and global levels. Models (IMAGE and WISEE) are used for cross-sectorial analysis of economy-wide technological transitions, consistent with decarbonisation pathways and economic development. An evidence-based framework for future EU policy and transition governance will be developed. Our webpage should be up and running early 2017. REINVENT is funded by EU Horizon 2020 through the call “Greening the Economy” and includes Lund University, Utrecht University, Durham University, PBL, and Wuppertal Institute. For further information please contact Lars J. Nilsson, Environmental and Energy Systems Studies, Lund University: [lars\\_j.nilsson@miljo.lth.se](mailto:lars_j.nilsson@miljo.lth.se)

### **Sustainable Plastics and Transition Pathways (STEPS)**

STEPS is a research programme with a vision of a future society in which plastics are sustainably developed, produced, used and recycled in a circular economy. STEPS aims to play a key role in instigating and accelerating this sustainability transition by strengthening the knowledge and research base for industrial biotechnology, technology- and product development and innovation, developing and assessing key niche products with industrial partners, and analysing the sustainability, institutional and policy implications of potential transition pathways. STEPS is divided into three work packages – two which focuses on natural science and engineering research, and one specifically on transitions:

- Production of building blocks from renewable feedstocks (WP1)

- Preparation, characterization and application of biobased plastics (WP2)
- Governing the transition towards a sustainable plastic system (WP3)

The latter of these work packages will assess the environmental and economic viability of products and processes for the objective of supporting early deployment, as well as analyse potential transition pathways to develop research-based advice on policy and industrial strategies for sustainability in the longer term. This WP also addresses the broader governance implications for a circular plastics economy, including social dimensions and the role of citizens and consumers. STEPS is funded by The Swedish Foundation for Strategic Environmental Research (MISTRA). STEPS is hosted at Lund University and involves collaboration with the Swedish University of Agricultural Sciences, Swerea IVF and a range of non-academic partners. For further information on WP3 please contact Teis Hansen, Department of Human Geography, Lund University: Teis.Hansen@keg.lu.se

### **New research group on Bioeconomy in Transition**

The *Bioeconomy in Transition* research group at IdEA, Unitelma-Sapienza University of Rome is involved in research concerning the emergence of a circular and bio-based economy relying on the utilisation of renewable resources for the production of novel products for various applications. Core areas of investigation pursued at BiT-RG include:

- economic and sustainability assessments, within the sustainability transition and multi level perspective framework;
- innovation studies and social network analysis;
- policy and regulation analysis through agent-based modelling.

Most of these areas of enquiry aim at supporting decision makers in developing innovation strategies as well as specific strategies to maximise the social impact and minimize the environmental footprint of economic activities and boost the transition to a bio-based economy. For more contact see <http://www.bioeconomy-in-transition.eu> or contact Piergiuseppe Morone (p.morone@gmail.com).

### **New research network on Sustainability Transitions in the Coastal Zone**

Coastal zones represent the front line in the battle for sustainability, as coastal communities face unprecedented economic challenges while coastal ecosystems are subject to overuse, loss of resilience and increased vulnerability. It is the aim of this research network to interrogate sustainability challenges in the coastal zone from the perspective of the emerging field of socio-technical transitions (SST) research with an analysis of food, energy and transportation transitions and their embeddedness in relevant governance frameworks.

For more information and related activities visit CoastalTransitions.org or contact:

Catherine Chambers, University Centre of the Westfjords, Iceland

John Morrissey, Liverpool John Moores University

C. Patrick Heidkamp, Southern Connecticut State University (heidkampc1@southernct.edu)

## **Publications**

*Announcement of new publications such as article, PhD theses and books*

### **PhD Thesis: Hume, T. (2016), *Higher Education and the Transition to a Sustainable Future: A Comparative Study of Factors Shaping Response*, Queen's University Belfast**

This thesis examines the patterns of forces both shaping the response, and ability to respond of Higher Education Institutions on the island of Ireland to the complex societal challenge of sustainability. It does this via a comparative case study, exposing factors shaping and inhibiting trajectories of change towards a more 'sustainable' configuration in two Northern Ireland and Republic of Ireland HEIs over the time period of the United Nations Decade of Education for Sustainable Development (2005-2014). A framework, adopting and building on insights from a number of strands of socio-technical transition theory is used to

drive data gathering and qualitatively analyse and compare the two cases, thus eliciting patterns of inter-related forces at different levels driving, shaping, inhibiting and blocking response. This framework also incorporates an analysis of the broader contextual landscape in which these two cases are embedded, in order to identify how landscape forces translate to policy and organisational levels. This analysis incorporates consideration of higher education and sustainability discourses, in particular noting the effect of global higher education discourses in influencing policy and organisational strategy, thus circumscribing a more holistic response.

**PhD Thesis: Wittmayer, J.M. (2016) *Transition management, action research and actor roles: Understanding local sustainability transitions*. Erasmus University Rotterdam.**

This thesis is about the local scale of urban neighbourhoods, towns and cities and its interaction with global problems and sustainability questions. At this scale, we most notably interact with these problems and thereby question current role understandings, actor relations and activities that come with them. One of these role understandings is that of the researcher: what are suitable approaches and methods for studying and supporting sustainability transitions at that local scale. Set in the context of a Dutch neighbourhood (Rotterdam-Carnisse) and the issues it is facing as well as based on transition thinking and inspired by action-oriented research, this thesis addresses the following question: How can we increase our understanding of sustainability transitions and their governance at the local scale, the changing role of actors therein, and in particular, the role of research and researchers?. The main contributions can be summarized as follows: 1) It contributes to sustainability transition research by clarifying the concept of actor roles in local sustainability transitions; 2) It contextualise transition management as a governance approach for the local context as well as for addressing socio-economic dynamics, and 3) contributes to the development of action-oriented and transformative research approaches in sustainability transition research.

**PhD thesis: Jhagroe, S.S. (2016). *Urban Transition Politics: How struggles for sustainability are (re) making urban spaces*. Dutch Research Institute For Transitions**

This thesis examines the politics of sustainable urban space-making. It focusses on the struggles associated with the ways in which urban spaces are becoming more green, clean and inclusive. Even though cities are increasingly considered as sites that can make societies sustainable, there is a lack of understanding how long-term struggles shape sustainable urban livelihoods. Conceptually, a transition analytics of urban spaces is developed, drawing on transition research, critical urban studies and governmentality research. Informed by archival records, policy documents, interviews and participatory observations, two in-depth cases of the practice of urban transition politics are examined. The first case presents a shift from traditional port activities to a cleaner and urbanised waterfront of Rotterdam. The second case presents the shift from techno-capitalist cities to greener and communitarian livelihoods, created by a grassroots movement called Transition Towns. Both cases represent how different urban histories and political rationalities shape sustainable spaces, such as community gardens, local economies and floating houses. The research argues that even though urban transition politics can be democratic, it does not 'automatically' lead to more sustainable and just cities. Importantly, transition research needs to develop more critical perspectives and methods. Additionally, the study proposes a transition ethics that could enable researchers and professionals to engage with urban eco-spaces more democratically.

**Book: Genus, A. (Ed.), 2016, *Sustainable Consumption: Design, Innovation and Practice* (Cham-Heidelberg - New York - Dordrecht - London: Springer**

The book originates from the work of contributors to initiatives and global networks promoting and pursuing lines of enquiry that recognise and probe relationships among sustainable consumption, design and production, and the implications of these for new economic activity and the way we live and govern ourselves. The book features contributions

from social scientists (e.g. from innovation studies, marketing, social psychology, sustainable design, and sociology) and practitioners to generate a short-list of research perspectives and topics around which future research and actions in practice should be orientated. There are eight contributory chapters plus an Introduction and Conclusion (on policy, research and practical implications). Chapters cover: perspectives/methodological insights; empirical work integrating consumption and production; site-specific case studies; and reflections on initiatives in practice. This book offers a: holistic treatment of sustainable consumption and production (and thus leads to better appreciation of the range of issues to be confronted in properly understanding and achieving sustainable economies and societies); presents new perspectives on the issues (helps readers to think about sustainable consumption/production in novel ways); and unusually spans theory, empirical research, action initiatives and policy implications.

**Book: Brauch, H.G., Spring, U.S., Bennett, J., Oswald, S.E.S. (Eds.), 2017, *Addressing Global Environmental Challenges from a Peace Ecology Perspective* Springer-Verlag**  
*Addressing Global Environmental Challenges from a Peace Ecology Perspective* offers peer-reviewed texts that build on *Expanding Peace Ecology* and applies this concept to *global environmental challenges* in the Anthropocene. Hans Gunter Brauch (Germany) offers a typology of time and turning points in the 20<sup>th</sup> century; *Juliet Bennett* (Australia) discusses the global ecological crisis as resulting from a “tyranny of small decisions”. *Katharina Bitzker* (Canada) debates “The Emotional Dimensions of Ecological Peacebuilding” by loving nature. *Henri Myrntinen* (UK) analyses “Preliminary findings on gender, peacebuilding and climate change in Honduras”. *Úrsula Oswald Spring* (Mexico) offers a critical review of the policy and scientific nexus debate on “The Water, Energy, Food and Biodiversity Nexus” reflecting on the case of security in Mexico. In closing, *Brauch* discusses whether strategies of sustainability transition may enhance the prospects for achieving sustainable peace in the Anthropocene. The book addresses global environmental challenges, focuses on the nexus among biodiversity, water, food, energy and waste, deals with structural violence, the tyranny of small decisions and emotional dimensions of ecological peacebuilding and offers perspectives on sustainable peace by moving towards sustainability transition.

**Book: Hopkins, D. and Higham, J.E.S. (eds.), 2016, *Low Carbon Mobility Transitions*. GoodFellow Publishers, Oxford**

Presented in three sections, people and place, structures in transition, and industry and innovation, *Low Carbon Mobility Transitions* presents twenty-one theoretically-informed and empirical chapters and case studies that comprehensively address the prospects for global and regional transitions to low-carbon mobility. Bringing together the work of leading researchers from 26 universities, research centres and consultancies, spanning six continents, it critically explores the wide-ranging and diverse regional contexts in which a low-carbon transition has, is being, or can be achieved. In doing so, it highlights the place-specific, geopolitical and cultural sensitivities of low-carbon transitions at national, regional and local (urban) scales. The mutually-informing and overlapping roles of technological innovation, behaviour change and policy frameworks are critically examined in this book, providing timely insights into the prospects for the low-carbon mobility transitions that the Paris Climate Agreement demands.

**Meadowcroft, J., 2016, Let's get this transition moving!, *Canadian Public Policy* 42(S1),S10-S17**

This paper makes four basic points about movement toward a low carbon economy in Canada: first, that it is important for political leaders, policy analysts, and researchers to approach the issue in terms of a transition to a carbon-emission-free society; second, that in Canada the development of regional pathways to a low-carbon economy is crucial; third, that we need “green development strategies” if we are to maximize the opportunities presented by this transition; and finally, that we should think about low-carbon politics as well as low-carbon economics.



**Bui, S., Cardona, A., Lamine, C. and Cerf, M., 2016, Sustainability transitions: Insights on processes of niche-regime interaction and regime reconfiguration in agri-food systems, *Journal of Rural Studies*, 48, 92-103**

Changing farming practices is a major issue for sustainability. Such change is difficult to bring about because of strong lock-in effects within the agri-food system. Scholars have mobilized diverse approaches to address the issue of changes in agriculture, including the multi-level perspective (MLP). However, the mechanisms through which “niches” can contribute to regime reconfiguration are still unclear. In this article, we combine the diachronic and systemic approach from the MLP with insights from French pragmatic sociology and from the Alternative Food Networks literature. We analyse the trajectories of four initiatives, which can be considered as niches, as they associate various actors and develop radical innovations. Comparing their trajectories allows us to identify a generic pattern in niche development and niche-regime interactions. We identify regime reconfiguration mechanisms common to all four case studies. Niche activities and the enrolment of new actors lead to a gradual reconfiguration of the regime: first, through the construction of shared visions of agri-food issues and of the associated network of relevant actors; second, through their embedding in local policies and public action.

**Mylan, J., 2017, The business of ‘behaviour change’: Analysing the consumer-oriented corporate sustainability journey of low-temperature laundry, *Organization & Environment*, in press**

This article contributes to the literature on corporate sustainability management by investigating a corporate-led consumer “behaviour change” initiative designed to promote sustainable consumption. This is done through an in-depth longitudinal case study of Procter & Gamble’s low-temperature laundry initiative as it unfolded over a 10-year period to become an industrywide campaign with broad societal acceptance and institutional support by 2013. The analysis is guided by insights from three prominent organizational theories used in the study of corporate sustainability (stakeholder theory, institutional theory, and the resource-based view of the firm). The case demonstrates that a successful behaviour change initiative involves far more than providing information or incentive for consumers, entailing changes in regulation, technology, organizational identity, mental models, and legitimacy. Procter & Gamble’s management strategy can be viewed as an emergent and open-ended innovation journey that took time, required resources, and involved adjustments in goals as mental models evolved.

**Hopkins, D., 2016, Destabilising automobility? The emergent mobilities of generation Y, *Ambio*, in press**

This paper uses empirical material gathered with young adults in New Zealand to examine a potential sustainability transition-in-practice. It draws from two frameworks; the actor-centred Energy Cultures Framework to explore mobility behaviours, and the multi-level perspective (MLP) to situate behaviour change within the socio-technical transitions literature. The MLP has traditionally been used to analyse historical transitions (e.g. from the horse and cart to the motor vehicle), but in this paper, it is used to explore an on-going change trend; the emergent mobilities of young adults who appear to be aspiring for different types of mobility. A series of mobility trends are described, which emerged from a programme of qualitative interviews ( $n = 51$ ). The material culture, norms and practices that constitute these trends are articulated. These are then considered through the lens of the MLP. The evidence points to emergent trends of multimodality that, if leveraged upon and supported, could contribute to a systemic sustainability transition.

**Hynes, M., 2016, Developing (tele)work? A multi-level sociotechnical perspective of telework in Ireland, *Research in Transportation Economics*, in press**

The ubiquitous nature and use of technology in contemporary societies continues to transform lives and work environments. At the same time, transport continues to be a major

source of harmful emissions. Telework has been suggested as a means to reduce unnecessary work-related travel, including the daily commute. Telework occurs when Information Communication Technologies (ICTs) are applied to enable work be accomplished at a distance from the location where results are needed. However, despite its promising nature and early optimistic predictions, telework has largely failed to capture management and workers' attention and imagination. Using a multi-level perspective (MLP) on sociotechnical transitions approach, this study reveals why telework continues to remain a 'niche' practice dominated by a small set of industries, managers and workers. The paper builds on MLP thinking with a view to highlighting behavioural, cultural, and political aspects of socio-technical transitions and their interactions, which are frequently limited in classical MLP thinking. The failure to enrol additional niche-actors, the dominance of traditional forms of working and automobility, and the absence of policy and lack of legitimacy, all act negatively to keep telework from emerging from the niche to the regime level and becoming established as a more mainstream practice.

**Kanger, L. and Schot, J. 2016. User-made immobilities: A transitions perspective, *Mobilities*, 11(4), 598-613**

In this paper we aim to conceptualize the role of users in creating, expanding and stabilizing the automobility system. Drawing on transition studies we offer a typology of user roles including user-producers, user-legitimizers, user-intermediaries, user-citizens and user-consumers, and explore it on the historical transition to the automobile regime in the USA. We find that users play an important role during the entire transition process, but some roles are more salient than others in particular phases. Another finding is that the success of the transition depends on the stabilization of the emerging regime that will trigger upscaling in terms of the numbers of adopters. The findings are used to reflect on potential crossovers between transitions and mobilities research.

**Sengers, F., Wieczorek, A.J., and Raven, R., 2016, Experimenting for sustainability transitions: A systematic literature review, *Technological Forecasting and Social Change*, in press**

This review paper systematically queries the Sustainability Transitions literature to unpack the concept of 'experimentation'. We define an experiment as an inclusive, practice-based and challenge-led initiative, which is designed to promote system innovation through social learning under conditions of uncertainty and ambiguity. A distinction is made between various terms (niche experiments, bounded socio-technical experiments, transition experiments, sustainability experiments and grassroots experiments), each with their own theoretical backgrounds and discursive and empirical focal points. Observed patterns and trends in the literature are discussed, as well as promising lines of enquiry for further exploration of- and a reflection on experimenting for sustainability transitions in the context of the welfare state.

**Cowells, R., Ellis, G., Sherry-Brennan, F., Strachan, P.A. and Toke, D., 2016, Energy transitions, sub-national government and regime flexibility: How has devolution in the United Kingdom affected renewable energy development?, *Energy Research & Social Science*, in press**

Amidst growing analytical interest in the spatial dimensions of sustainable energy transitions, relatively little attention has been given to the role of sub-national government, or the ways in which dominant socio-technical regimes for energy navigate diverse contexts. This paper addresses these two concerns by assessing the impacts of devolution within the UK on renewable energy development. It draws principally on policy networks analysis as the basis of a comparative assessment, examining how far the governments of Northern Ireland, Scotland and Wales have translated their formal powers in the energy sphere into renewable energy outcomes. Scotland's relative success in facilitating rapid expansion of on-shore wind is attributed to a more enduring and cohesive policy community around renewable energy growth than in Northern Ireland and Wales, but this success has been adversely affected by

fragmenting policy networks around renewables at national (UK) level. The analysis highlights especially the role of planning and consenting, as mechanisms by which devolved governments have worked to contain the potentially disruptive effects of opposition to major infrastructure investments, thereby enhancing regime reproduction.

**Ward, S. and Butler, D., 2016, Rainwater harvesting and social networks: Visualising interactions for niche governance, resilience and sustainability, *Water*, 8(11), 526**

Visualising interactions across urban water systems to explore transition and change processes requires the development of methods and models at different scales. This paper contributes a model representing the network interactions of rainwater harvesting (RWH) infrastructure innovators and other organisations in the UK RWH niche to identify how resilience and sustainability feature within niche governance in practice. The RWH network interaction model was constructed using a modified participatory social network analysis (SNA). The SNA was further analysed through the application of a two-part analytical framework based on niche management and the safe, resilient and sustainable ('Safe and SuRe') framework. Weak interactions between some RWH infrastructure innovators and other organisations highlighted reliance on a limited number of persuaders to influence the regime and landscape, which were underrepresented. Features from niche creation and management were exhibited by the RWH network interaction model, though some observed characteristics were not represented. Additional Safe and SuRe features were identified covering diverse innovation, responsivity, no protection, unconverged expectations, primary influencers, polycentric or adaptive governance and multiple learning-types. These features enable RWH infrastructure innovators and other organisations to reflect on improving resilience and sustainability, though further research in other sectors would be useful to verify and validate observation of the seven features.

**Cherp, A., Vinichenko, V., Jewell, J., Suzuki, M., Antal, M., 2017, Comparing electricity transitions: A historical analysis of nuclear, wind and solar power in Germany and Japan, *Energy Policy*, in press**

This paper contributes to understanding national variations in using low-carbon electricity sources by comparing the evolution of nuclear, wind and solar power in Germany and Japan. It develops and applies a framework for analyzing low-carbon electricity transitions based on interplay of techno-economic, political and socio-technical processes. We explain why in the 1970s–1980s, the energy paths of the two countries were remarkably similar, but since the 1990s Germany has become a leader in renewables while phasing out nuclear energy, whereas Japan has deployed less renewables while becoming a leader in nuclear power. We link these differences to the faster growth of electricity demand and energy insecurity in Japan, the easier diffusion of onshore wind power technology and the weakening of the nuclear power regime induced by stagnation and competition from coal and renewables in Germany. We show how these changes involve the interplay of five distinct mechanisms which may also play a role in other energy transitions.

**Borghei, B. and Magnusson, T., 2016, Niche experiments with alternative powertrain technologies: the case of electric city-buses in Europe, *Int. J. Automotive Technology and Management*, 16(3), 274–300.**

Using sociotechnical transitions literature, this paper analyses the early market introduction of electric city-buses in Europe. It identifies the role of bus manufacturers and their corresponding choices of alternative powertrain and charging technologies. The study results contrast the traditional dichotomy of incumbents versus niche actors and questions the perceived role of incumbents as a homogenous group of actors. The paper proposes an alternative to the typical perception of industry incumbents as the guardians of existing sociotechnical regimes, suggesting that a strong position in the established regime may actually facilitate introduction of radical technological solutions in return. The paper invites transition scholars to make more detailed analyses of actors' constellations and it further

suggests that policy makers need to pay attention to the diversity of individual actors' strategies.

**Mundaca, L., Neij, L., Markandya, A., Ya, J., 2016, Towards a green energy economy? Assessing policy choices, strategies and transitional pathways, *Applied Energy*, 179:1283-1292**

The term 'Green Energy Economy' (GEE) received increasing policy and scientific attention following the 2008–2009 global financial crisis, leading to the implementation of numerous 'Green Growth' economic stimulus packages that targeted low-carbon energy technologies. These initiatives were portrayed as key elements in the transition to a green economy, in which low-carbon energy systems would play a vital role. However, and setting aside conceptual variations, uncertainties and fragmented knowledge remain in the interplay between a green economy, low-carbon energy systems and governance. This research area raises various questions regarding the performance, implications and complexities of policies and strategies addressing GEE transitional pathways. In addition, achieving a GEE compatible with climate, social and economic goals is an enormous challenge for society, and goes beyond the technological domain. This special issue provides a series of articles that critically investigate these concerns from an interdisciplinary point of view, and provide relevant policy insights using a variety of analytical approaches. Overall, they call for strong leadership, ambitious policy instruments, rigorous assessments, effective multi-level governance, inter/national cooperation, institutional capacity development, and the immediate alignment of the financial system with the energy sector on numerous challenges associated with the GEE transition. It is concluded that not only from an environmental point of view, but also due to economic and social reasons, the GEE transition needs to be accelerated and that a radical transformation is required.

**Arranz, A.M., 2016, Hype among low-carbon technologies: Carbon capture and storage in comparison, *Global Environmental Change*, 41, 124–141**

Carbon dioxide capture and storage (CCS) technology has become a crucial part of climate change mitigation strategies around the world; yet its progress has been slow. Some have criticised CCS as a distracting hype, even as mainstream support continues. This article adapts the literature on technological hypes to develop a framework suitable for technologies with limited media/public exposure, such as CCS. It provides a qualitative context and analyses seven quantitative indicators of hype that are largely internal to the CCS technology regime. Throughout, the article contrasts results for CCS with those of comparable technologies. The main findings, which support the view that CCS has been hyped, are as follows. "Expectations" mounted rapidly in the form of project announcements for electricity applications of CCS and deployment forecasts in influential reports. However, announcements soon plummeted. "Commitments" remained high, nonetheless, judging by allocations in public budgets and number of peer-reviewed publications. Meanwhile, "outcomes"—in terms of patents, prototypes and estimated costs—reveal few if any improvements for CCS. Considering these findings and the characteristics of CCS, its development is likely to be more difficult than initially expected. Accordingly, this article calls for decisively prioritising CCS for industrial and, potentially, bioenergy uses. Coal- and gas-fired power plants may be replaced by non-CCS technologies, so power CCS development is far less pressing.

**Dijk, M., 2016, Electric revenge after 100 years? Comparing car market patterns around 1900 and 2000, *International Journal of Automotive Technology and Management*, 16(2), 147-168**

During the closing years of the nineteenth century electric vehicles (EV) outsold every other type of vehicle. Yet within ten years the electric automobile was no more and the internal combustion engine car predominated. Could EVs have succeeded or was the technology – in particular the batteries – simply not good enough? As EVs make a comeback in the early 21st century some of the same problems persist. Only one manufacturer (Tesla) has built an

electric automobile capable of approaching the range of an internal combustion engine vehicle. Most modern EVs have a range of approximately 160 kilometres, which decreases their usability in longer trips. This paper compares the introduction of electric vehicles in the USA in the late 19th century with the early 21st century from a socio-technical transition perspective. It discusses similarities and differences in market innovation patterns and concludes on the chances for a successful reversion today.

**Moallemi, E.A., de Haan, F.J., Webb, J.M., George, B.A. and Aye, L., 2016, Transition dynamics in state-influenced niche empowerments: Experiences from India's electricity sector, *Technological Forecasting and Social Change*, in press**

India experiences transitional changes in its electricity sector from fossil fuels towards renewable sources. An electricity sector with 0% wind and solar (of 16 GW total installed capacity) in 1974 has been transformed and reached a status with 11% wind and solar (of 302 GW total installed capacity) in 2016. The observed changes have complex dynamics, shaped by the decisions of public and private actors in a semi-liberalised market condition, while profoundly influenced by government's supporting policies. It is called a state-influenced empowerment of the renewable niches in the electricity sector. This paper presents an empirically-underpinned theoretical framework to explain the specific dynamics of this context. Understanding of the dynamics provides strategic insights on how government's policies have driven the niche empowerment to date and what should be done to further promote this transition in future. The core concepts of the framework are developed through an iterative process between theoretical deduction from the existing theories in the sustainability transitions field and empirical grounding in the Indian on-grid solar electricity as a case study. Four strategic insights for the further empowerment of solar electricity in future are identified based on the implementation of the framework in the case study.

**Luederitz, C., Abson, D. J., Audet, R. and Lang, D. J., 2016, Many pathways toward sustainability: not conflict but co-learning between transition narratives, *Sustainability Science*. doi: 10.1007/s11625-016-0414-0.**

Sustainability transitions aim to comprehensively address key challenges of today's societies through harmonizing ecological integrity and social viability. During the last decades, increasing attention has focused on the conceptual development and identification of trajectories that navigate societies toward sustainability. While a broad agreement exists with regard to the need for mainstreaming sustainability into the core of decision-making and everyday practices, different transition pathway narratives are advocated to foster urgently needed structural and societal changes. In this article, we describe four archetypes of present transition narratives, examining the system properties (from underpinning intent to mechanistic parameters) that each narrative seeks to transform. We review the articulated critiques of, and provide exemplary case studies for, each narrative. The four transition narratives are (1) the green economy, (2) low-carbon transformation, (3) eco-topian solutions and (4) transition movements. Based on our analysis, we argue that despite the assumption that these narratives represent competing pathways, there is considerable complementarity between them regarding where in a given system they seek to intervene. An integrative approach could potentially help bridge these intervention types and connect fragmented actors at multiple levels and across multiple phases of transition processes. Effectively mainstreaming sustainability will ultimately require sustainability scientists to navigate between, and learn from, multiple transition narratives.

**Bento, N., 2016, Calling for change? Innovation, diffusion, and the energy impacts of global mobile telephony, *Energy Research & Social Science*, 21, 84-100**

Few technologies in history diffused as intensively and fast as mobile phones, to the point where they have become the most democratic technology. The article analyzes historical patterns of mobile phone growth and their effects in energy needs. Through an empirical analysis employing diffusion models on data for 227 countries between 1980 and 2010, it is

concluded that global demand may saturate at around one subscription per person and the diffusion of mobile-broadband connection has contributed to sustain growth. Demand has already showed signs of saturation in developed countries, while there is still potential for growth in developing countries. Impacts on energy consumption are assessed with the help of a field trial. Even though the energy consumed in phone charging was not very significant (6–8 TWh) in 2010, it becomes substantially higher when infrastructural needs are included (93 TWh). The actual trends suggest that mobile communication might have a sizeable direct effect on energy consumption—although the net impact on energy demand is more difficult to estimate. This can become an issue in developing countries, where the adoption of mobile phones is catching-up rapidly with the world average, in a context of generalized increasing electricity demand.

**Saikku, L., Tainio, P., Hilden, M., Antikainen, R., Leskinen, P. and Koskela, S., 2016, Diffusion of solar electricity in the network of private actors as a strategic experiment to mitigate climate change, *Journal of Cleaner Production*, in press**

Low-carbon experiments offer interesting opportunities for climate change mitigation. They can be seen as niche activities that eventually challenge the existing regime of energy production and consumption. The role of actors in these potential transitions has not been extensively studied. This study bridges this gap by analysing ten cases of joint procurement experiments of on-grid solar photovoltaic energy in Finland. The study deepens the understanding of how such experimenting can contribute to climate change mitigation in an area that in many countries is still a largely untapped source of change. The study shows that the expansion of solar PV can be enhanced through joint procurement experiments which thereby become strategic. The joint procurement lowered several barriers of adoption and can therefore accelerate diffusion of solar PV significantly, even when there is a lack of explicit political support in the form of a subsidy system. Joint procurements help to overcome one of the most important barriers of solar panel purchase – the price, but the joint procurement experiments also offer important social support to the peers. The positive image of solar electricity greatly empowers consumers and increases acceptance of large investment costs. Further mainstreaming of the experiments towards a regime shift would benefit from institutional support that eases the laborious process of joint procurement and that strengthens the small scale producers' negotiating position relative to the utilities and power network operators in trading surplus electricity.

**Clark, L., Gleeson, C. and Winch, C., 2016, What kind of expertise is needed for low energy construction?, *Construction Management and Economics*,**

The construction industry is responsible for 40% of European Union (EU) end-use emissions but addressing this is problematic, as evident from the performance gap between design intention and on-site energy performance. There is a lack of the expertise needed for low energy construction (LEC) in the UK as the complex work processes involved require 'energy literacy' of all construction occupations, high qualification levels, broad occupational profiles, integrated teamworking, and good communication. This research identifies the obstacles to meeting these requirements, the nature of the expertise needed to break down occupational divisions and bridge those interfaces where the main heat losses occur, and the transition pathway implied. Obstacles include a decline in the level, breadth and quality of construction vocational education and training (VET), the lack of a learning infrastructure on sites, and a fragmented employment structure. To overcome these and develop enhanced understanding of LEC requires a transformation of the existing structure of VET provision and construction employment and a new curriculum based on a broader concept of agency and backed by rigorous enforcement of standards. This can be achieved through a radical transition pathway rather than market-based solutions to a low carbon future for the construction sector.

**Fevolden, A.M. and Klitkou, A., 2016, A fuel too far? Technology, innovation, and transition in failed biofuel development in Norway, *Energy Research & Social Science*, in press**

This article explores whether old, incumbent industries can prevent new, green industries from emerging by studying the rise and fall of the Norwegian advanced biofuel sector. It investigates three competing explanations that have been proposed to account for why Norway failed to develop a vibrant industry within this field: (i) the petroleum industry acquired all available risk capital, (ii) the petroleum industry captured all relevant technological expertise and (iii) the government failed to provide adequate incentives and support measures. The article applies a qualitative event-history analysis to chart the development of the most important Norwegian advanced biofuel companies – Borregaard (bioethanol), Cambi (biogas), Weyland (bioethanol) and Xynergo (biodiesel) – and uses their success and eventual failure as a key indicator of the condition of the emerging technological innovation system within this field. The article finds that the advanced biofuel companies were hampered mostly by inconsistent and unpredictable government incentives, and concludes that the third explanation best accounts for Norway's limited success in advanced biofuels.

**Bornemann, B., Schmidt, S. and Schubert, S., 2016, Governing uncertainties in sustainable energy transitions: Insights from local heat supply in Switzerland, *Urban Planning*, 1(3), 38-54**

The governance of sustainable energy transitions (SET) is facing multiple technological, economic, societal and political uncertainties. In practice, these energy-related uncertainties play a role not only at the level of "major politics," but also in the policymaking of local decision makers and planners. This paper seeks to attain a more differentiated understanding of how uncertainties concerning the energy transition play out and are dealt with in policymaking and planning "on the ground." To do so, the paper combines conceptual reflections with an explorative empirical study on local heat supply policy in Switzerland. In conceptual regards, it proposes some distinctions of types of uncertainties related to energy transitions, and a typology of strategic decision options for dealing with uncertainty. On this basis, the paper reveals similarities and differences regarding the perception of uncertainties and ways of dealing with them in a number of Swiss cities. These insights evoke further questions about the causes and effects of different sensitivities to uncertainty and ways of dealing with them.

**Ceschin, F., and Gaziulusoy, I., 2016, Evolution of design for sustainability: From product design to design for system innovations and transitions. *Design Studies*, 47, 118-163.**

The paper explores the evolution of Design for Sustainability (DfS). Following a quasi-chronological pattern, our exploration provides an overview of the DfS field, categorising the design approaches developed in the past decades under four innovation levels: Product, Product-Service System, Spatio-Social and Socio-Technical System. As a result, we propose an evolutionary framework and map the reviewed DfS approaches onto this framework. The proposed framework synthesizes the evolution of the DfS field, showing how it has progressively expanded from a technical and product-centric focus towards large scale system level changes in which sustainability is understood as a socio-technical challenge. The framework also shows how the various DfS approaches contribute to particular sustainability aspects and visualises linkages, overlaps and complementarities between these approaches.

**Rosenschöld, J.M. and Wolf, S.A., Toward projectified environmental governance?, *Environment and Planning A*, in press**

Projects are often praised for their efficiency, responsiveness to local context, and capacity to spur innovation, especially in comparison to more permanent organizations. Projects – cross-cutting organizational forms chartered to advance well-defined objectives during a

specified period of time – have been a staple organizational form in the private sector, but only recently have scholars started to evaluate their relevance to governance within developed economies. In this paper, we explore *projectification* – i.e. expanded reliance on temporally bounded organizations – as a conceptual frame to advance understanding of environmental governance and as an empirical vehicle to incorporate temporal scales into a literature that has largely been focused on questions of spatial scale and levels of social organization. Through a case study of the United States Department of Agriculture’s recently created Regional Conservation Partnership Program, we critically assess the concept of projectification. Based on interviews with key policy analysts and administrators and a review of policy documents, we critically evaluate prospects for project forms to empower local actors, produce new knowledge, and disrupt the policy field.

**Magnusson, D., 2016, Who brings the heat? – From municipal to diversified ownership in the Swedish district heating market post-liberalization, *Energy Research & Social Science*, 22, 198–209**

District heating in Sweden has undergone changes in recent decades. Parallel with transition towards sustainability, a considerable ownership restructuring has occurred, due to liberalization of energy markets. The aim of this paper is to describe and analyze trends of mergers and acquisitions in the Swedish district heating market. A systematic review of ownership in 290 municipalities has been performed through annual reports, press releases, websites, municipal minutes, newspaper articles and personal contacts. The paper shows a transformation from municipal to diverse ownership, decreased municipal ownership and increased internationalization. The window of opportunity provided by liberalization was used especially by the “big three” (E.ON, Fortum and Vattenfall) in order to strengthen market position early in the wave of acquisitions. The time period 1996–2005 was especially hectic, showing strategies of cherry picking hot spots for acquisitions, with the “big three” being responsible for a large proportion of these. The period after 2006 showed trends of companies selling several district heating businesses at once, through large-scale disinvestment. The paper shows a transformation of the district heating regime, first as a reaction to changes on the electricity market and later in its own right, raising concerns regarding the weak position of customers.

**Pitt, H. and Jones, M., 2016, Scaling up and out as a pathway for food system transitions, *Sustainability*, 8(10), 1025**

This paper contributes to the understanding of sustainability transitions by analysing processes of scaling up and out as change pathway. It defines scaling up and out as a distinct form of policy transfer focused on programme implementation, with continuity of actors across jurisdictions. We detail how scaling up and out occurs, introducing a new mechanism to policy transfer frameworks. This is explicated through the case study of Food for Life (FFL), a civil society innovation programme promoting sustainable healthy food in public settings. We highlight why FFL was scaled up and out, how this was achieved, by whom, and the results and success factors. The case study demonstrates the importance of interrogating motivations for transferring policies, and how these influence whether successful outcomes are achieved. This requires a revised framework for analysing policy transfer, with greater attention to the links between motives and outcomes, and a less binary understanding of agents’ roles. Where scaling is the mode of policy transfer, we suggest that continuous involvement of at least one transfer agent across the process is significant to success. We conclude by highlighting implications for future research into policy transfer and food system transitions.

**Ansell, C.K. and Bartenberger, M., 2016, Varieties of experimentalism, *Ecological Economics*, 130, 64-73**

Across a range of disciplines and issues, experimentalism has emerged as a prominent approach for addressing environmental problems. Yet the meaning of “experiment” varies markedly across these domains. We survey the diversity of experimentation, identifying



three distinct experimental logics—controlled, Darwinian, and generative. Building on Pragmatist philosophy, we argue that each of these logics has different strengths and weaknesses, but taken together they offer a valuable experimentalist approach to environmental problem-solving. However, from a transdisciplinary perspective, it is important to recognize the different values, purposes, and stances toward knowledge that they entail. Controlled experiments primarily aim to isolate causality, while Darwinian experimentation endeavors to enhance systemic innovation and generative experimentation seeks to generate new solution concepts. Appreciating these differences allows us to be more reflexive about an experimentalist agenda, illuminating the appropriate role of these logics and suggesting possibilities for fruitfully combining them. To advance this reflexive agenda, we also distinguish between epistemic and political learning and argue that experimental approaches to environmental problem-solving may benefit from being more sensitive to this distinction.

**Loorbach, D., F. Avelino, A. Haxeltine, J. M. Wittmayer, T. O'Riordan, P. Weaver, and R. Kemp. 2016. The economic crisis as a game changer? Exploring the role of social construction in sustainability transitions. *Ecology and Society* 21(4):15.**

Continuing economic turbulence has fuelled debates about social and political reform as much as it has stimulated actions and initiatives aimed at a more fundamental transition of dominant economic systems. This paper takes a transition perspective to explore, from a Western European viewpoint, how the economic crisis is actually viewed through a variety of interpretations and responded to through a range of practices. We argue that framing societal phenomena such as the economic crisis as "symptoms of transition" through alternative narratives and actions can give rise to the potential for (seemingly) short-term pressures to become game changers. Game changers are then defined as the combination of: specific events, the subsequent or parallel framing of events in systemic terms by engaged societal actors, and (eventually) the emergence of (diverse) alternative narratives and practices (in response to the systemic framing of events). Game changers, when understood in these terms, help to orient, legitimize, guide, and accelerate deep changes in society. We conclude that such dynamics in which game changers gain momentum might also come to play a critical role in transitions. Therefore, we argue for developing a better understanding of and methodologies to further study the coevolutionary dynamics associated with game changers, as well as exploring the implications for governance.

**Hansen, T. and Coenen, L., 2016, Unpacking resource mobilisation by incumbents for biorefineries: the role of micro-level factors for technological innovation system weaknesses, *Technology Analysis & Strategic Management*, in press**

This paper unpacks resource mobilisation for biorefineries by studying investment decisions of incumbent pulp and paper firms in Sweden and Finland. The analysis highlights that the limited adoption of biorefinery technologies can be attributed to both insufficient abilities (lack of needed competencies and partnerships) and interests (preference for improving existing technologies) by pulp and paper incumbents. Drawing on the technological innovation system perspective complemented with insights from the management literature on the role of incumbents in technological change, four issues are empirically identified as important for improving resource mobilisation for biorefinery technologies: establishing loosely coupled divisions in pulp and paper firms; creating internal markets for new bioproducts aimed at further technological development; entering purchasing agreements with downstream actors; and investing in new managerial competencies.

**Boschma, R., Coenen, L., Frenken, K., Truffer, B., 2016, Towards a theory of regional diversification: Combining insights from Evolutionary Economic Geography and Transition Studies, *Regional Studies*, in press**

This paper develops a theoretical framework of regional diversification by combining insights from Evolutionary Economic Geography and Transition Studies. It argues that a theory of

regional diversification should not only build on the current understanding of related diversification but also account for processes of unrelated diversification by looking at the role of agency in processes of institutional entrepreneurship, and at enabling and constraining factors at various spatial scales. This paper proposes a typology of four regional diversification trajectories by cross-tabulating related versus unrelated diversification with niche creation versus regime adoption, and it develops a number of propositions.

**Kostakis, V., Latoufis, K., Liarokapis, M. and Bauwens, M., The convergence of digital commons with local manufacturing from a degrowth perspective: Two illustrative cases, *Journal of Cleaner Production*, in press**

The emerging discussion about the sustainability potential of distributed production is the starting point for this paper. The focus is on the “design global, manufacture local” model. This model builds on the conjunction of the digital commons of knowledge and design with desktop and benchtop manufacturing technologies (from three-dimensional printers and laser cutters to low-tech tools and crafts). Two case studies are presented to illustrate three interlocked practices of this model for degrowth. It is argued that a “design global, manufacture local” model, as exemplified by these case studies, seems to arise in a significantly different political economy from that of the conventional industrial model of mass production. “Design global, manufacture local” may be seen as a platform to bridge digital and knowledge commons with existing physical infrastructures and degrowth communities, in order to achieve distributed modes of collaborative production.

**Gössling, S., Cohen, S.A., and Hares, A., 2016, Inside the black box: EU policy officers' perspectives on transport and climate change mitigation, *Journal of Transport Geography*, 57, 83-93**

Transport is a significant and growing contributor to climate change. To stay within ‘safe’ global warming guardrails requires substantial cuts in greenhouse gas emissions. This represents a global political consensus, but there is evidence that current legislation in the transport sector is not significant enough to achieve medium- and longer-term reduction goals. In focusing on the European Union, this paper investigates the perspectives of twelve policy officers in three Directorates-General (MOVE, CLIMA, ENV) of the European Commission with regard to their understanding of mitigation goals and timelines, responsibilities for policy development and implementation, and perceived efficiencies of these policies to achieve climate objectives in the transport sector. Results indicate diverging and common views on climate policy goals and political responsibilities, as well as barriers to policy-making, including lack of political leadership on climate change mitigation, resistance from member states, the favoring of economic growth over cuts in greenhouse gas emissions, pressure from industry and lobby groups, preferential treatment of aero- and automobility over more sustainable transport modes, policy implementation delays, insufficient forecasting and monitoring tools, and an overreliance on technologies to contribute to emission reductions. In offering a view inside the ‘black box’ of transport policy-making, the paper reveals fundamental institutional (structural) and individual (agency-based) barriers that will have to be overcome if significant emission cuts in the transport sector are to be achieved.

**Audet, R., 2016, Transition as discourse, *International Journal of Sustainable Development*, 19(4), 365-382**

The word 'transition' has come to occupy a considerable place both in theories of sustainable change and in environmental discourse. This paper primarily aims at identifying and categorising the emerging discursive patterns of the transition discourse, and secondarily at clarifying the relationship between 'transition as discourse' and the sustainability transitions research field. The analysis shows that transition discourses can be sorted in two broad categories - localism and technocentrism - that both subdivide in more specific discourses: 'grassroots' and 'policy change' in localism, and 'economic' and

'institutional' in technocentrism. The paper then turns to the implications of transition as discourse on the dynamics and outcomes of transitions, and their analysis in the field of sustainability transitions.

**Dahlmann, F., Kolk, A. and Lindeque, J., 2016, Emerging energy geographies: Scaling and spatial divergence in European electricity generation capacity, *European Urban and Regional Studies*, in press**

This paper presents an evaluation of the impact of the related EU internal energy market and renewable energy policies by exploring the (sustainable) energy transition in the European electricity sector and drawing on the emerging literatures on energy geographies. We use evidence aggregated from plant-level data on installed electricity generation capacity in the European electric utilities sector over the period 1990–2013 to demonstrate how the unintended interaction between EU policies on energy market liberalization and climate change have led to new renewable energy entrants and more widely dispersed ownership of total generation capacity. Our empirical results suggest that six energy geography concepts enable deeper insights into the spatiality of the European energy transition. Specifically, we find that territoriality and scaling are key lenses for interpreting the differentiated change processes occurring at European, subregional and national levels. The European energy transition is unlikely to converge onto a single trajectory any time soon, but particularly subregional approaches are argued to offer policy-makers with more spatially cognizant and effective levers.

**Feola, G., Him, M.R. 2016. The diffusion of the Transition Network in four European countries. *Environment and Planning A*, 48(11):2112-2115.**

The Transition Network exemplifies the potential of social movements to create spaces of possibility for alternatives to emerge in the interstices of mainstream, neoliberal economies. Yet, little work has been carried out so far on the Transition Network or other grassroots innovations for sustainability in a way that reveals their actual patterns of diffusion. This graphic of the diffusion of the Transition Network visualises its spatial structure and compare diffusion patterns across Italy, France, Great Britain and Germany. The graphics show that the number of transition initiatives in the four countries has steadily increased over the past eight years, but the rate of increase has slowed down in all countries. The maps clearly show that in all four countries the diffusion of the Transition Network has not been spatially even. The graphic suggests that in each country transition initiatives are more likely to emerge in some geographical areas (hotspots) than in others (cold spots). While the existence of a spatial structure of the Transition Network may result from the combination of place-specific factors and diffusion mechanisms, these graphics illustrate the importance of better comprehending where grassroots innovations emerge.

**Nicolosi, E., Feola, G. 2016. Transition in place: Dynamics, possibilities, and constraints. *Geoforum*, 76:153-163.**

The Transition Movement is a translocal phenomenon circulated through transnational grassroots networks. This study explores the geographies of the Transition Movement with a theoretical framework that perceives it as both a social movement and a grassroots innovation. Participant-observation of Transition Salt Lake (TSL), located in the suburban metropolis of Salt Lake City, Utah, was conducted, as the United States remains a largely understudied country in regards to this particular movement. In this pursuit, we asked: (i) how and what this transition initiative draws from geographically extensive and intensive relations, (ii) how it combines place-specific elements and generalized models (embeddedness), and (iii) how this impacts the success of the transition initiative and how these impacts (positive or negative) are generated. Place, space, and scale played a large role in defining the nature, dynamics, possibilities, and constraints of this transition initiative. Specifically, geographically intensive and extensive relations were critical for the mobilization of complementary resources. The Transition model was found to be flexible, allowing for the initiative to adopt those elements that worked in place and to focus on locally relevant topics.

TSL faced many challenges identified by previous researchers regarding finances, participation, diversity, and intragroup competition. While networking with other similar groups, TSL demonstrated that fertile environments of activism are incubatory pools for grassroots innovations and social movements, and a trade-off was found with competition for resources between local groups.

**Hoppmann, J., 2016, The role of interfirm knowledge spillovers for innovation in mass-produced environmental technologies: Evidence from the solar photovoltaic industry, *Organization & Environment*, in press.**

Knowledge spillovers play a potentially important role for innovation and competitive dynamics in mass-produced environmental technologies. Currently, however, we lack research that studies knowledge spillovers in such technologies at the firm level. To address this shortcoming, in this article we investigate the drivers of technological innovation in the solar photovoltaic industry. We find clear evidence for the existence of interfirm knowledge spillovers and show that besides investments in R&D, investments in manufacturing equipment have served as a channel of knowledge absorption. Our findings shed new light on the narrative linking environmental innovation and competitive advantage. Moreover, by pointing to the role of process technology as a means of assimilating and exploiting external knowledge, we highlight an important but frequently neglected channel of absorptive capacity.

**Fastenrath, S. and Braun, B., 2016, Sustainability transition pathways in the building sector: Energy-efficient building in Freiburg (Germany), *Applied Geography*,**

This paper examines the urban contextualisation of sustainability transitions in the building sector by analysing the interplay of building practices, actors and policy regulation. The 'Green City' of Freiburg (Germany) is used as a case study to illustrate how the transitions pathways of energy-efficient building and construction are distinct results of local innovative practice-driven 'bottom-up' and policy-driven 'top-down' processes. Since the early 1990s, the Freiburg low-energy building standard for new residential buildings played a key role as a catalyst for 'learning by doing' processes and a broader adoption of green building practices. How these changes in policy and practice developed over time is highlighted and discussed. The paper looks beyond success factors by identifying challenges, veto actors and vested interests in the context of urban sustainability transitions. Our findings clearly show that 'learning by doing' and 'learning by using' need to be more thoroughly considered in urban sustainability transitions research and local policy actions.

**Meijer, A. and Thaens, M., 2016, Urban technological innovation: Developing and testing a sociotechnical framework for studying smart city projects, *Urban Affairs Review*, in press**

Urban technological innovation—the innovative use of technologies to tackle urban problems—has become increasingly popular under the label *smart city*. Our understanding of this sociotechnical process is limited, and therefore, this article develops a framework on the basis of the literature on social and technological innovation. This framework identifies four perspectives—a technological, an instrumental, a collaborative, and a symbolic perspective—to generate a comprehensive account of urban technological innovation. The value of the framework is tested by using it to analyze the Living Lab Stratumseind in Eindhoven (the Netherlands). The case highlights the value of the framework and demonstrates the interactions between the social and technological dimensions. The case study suggests that, for successful urban technological innovation, it is crucial to link initial enthusiasm based on technological and symbolic value to the long-term dynamics of institutionalized collaboration and instrumental value.

**Maru, Y., Sparrow, A., Stirzaker, R. And Davies, J., 2016, Integrated agricultural research for development (IAR4D) from a theory of change perspective, *Agricultural Systems*, in press**

It is now more than a decade since integrated agricultural research for development (IAR4D) was proposed as a “new approach” or “set of good practices” for organising research to address complex problems of agricultural development, food security and poverty in sub-Saharan Africa. Since then, there have been efforts to investigate its impact in comparison to traditional research and development approaches. Although a growing number of publications are testifying to positive impacts of IAR4D and related agricultural research for development (AR4D) approaches, there has been limited explicit attention on its underpinning Theories of Change – the mechanisms or pathways by which it brings about impact. With the aim of contributing to a more robust grounding of the theory of change of IAR4D, this paper uses a comprehensive review of literature on IAR4D and related work experience of the authors in East and West Africa to critically engage with the implicit and explicit explanations and pathways for how and why IAR4D helps to achieve impact. This paper finds four emerging impact pathways focused on (1) market linkage, (2) social capital, (3) institutional change or (4) innovation capacity as critical mediating factors. Acknowledging articulation of each of these mediating pathways as encouraging progress, the article suggests putting these together in an integrated theory of change that also draws on established theories such as Multi-Level Perspective (Geels, 2005) and theory of adaptive change (Holling et al., 2002) to provide clear guidance and tools for designing and implementing effective AR4D interventions.

**Rocholl, N. and Bolton, R., 2016, Berlin’s electricity distribution grid: An urban energy transition in a national regulatory context, *Technology Analysis & Strategic Management*, 28(10), 1182-1194**

Germany has set ambitious targets to transform its energy system from being based on fossil fuels and nuclear to renewable energies, requiring electricity grids to be upgraded. As a result there is significant public pressure in some German cities to exert greater local control over electricity distribution infrastructure. A case study approach was used to investigate contestations around ownership and governance of Berlin’s electricity distribution grid. Actors at the local level perceive the national institutional framework supporting liberalised energy markets as not designed to adapt electricity distribution grids to the challenges of the *Energiewende* (energy turn) and to be instead hampering investment, innovation and the involvement of local actors. By analysing politics of grid ownership and governance, and emerging tensions between a national regulatory framework and more locally bounded energy system visions, our study contributes to the emerging academic debate on urban energy transitions.

**Ceschin, F. and Gaziolusy, I., 2016, Evolution of design for sustainability: From product design to design for system innovations and transitions, *Design Studies*, in press**

The paper explores the evolution of Design for Sustainability (DfS). Following a quasi-chronological pattern, our exploration provides an overview of the DfS field, categorising the design approaches developed in the past decades under four innovation levels: Product, Product-Service System, Spatio-Social and Socio-Technical System. As a result, we propose an evolutionary framework and map the reviewed DfS approaches onto this framework. The proposed framework synthesizes the evolution of the DfS field, showing how it has progressively expanded from a technical and product-centric focus towards large scale system level changes in which sustainability is understood as a socio-technical challenge. The framework also shows how the various DfS approaches contribute to particular sustainability aspects and visualises linkages, overlaps and complementarities between these approaches.

**Creutzig, F, Fernandez, B., Haberl, H., Khosla, R., Mulugetta, Y., and Seto, K.C., 2016, Beyond technology: Demand-side solutions for climate change mitigation, *Annual Review of Environment and Resources*, Vol. 41: 173-198**

The assessment literature on climate change solutions to date has emphasized technologies and options based on cost-effectiveness analysis. However, many solutions to climate change mitigation misalign with such analytical frameworks. Here, we examine demand-side solutions, a crucial class of mitigation options that go beyond technological specification and cost-benefit analysis. To do so, we synthesize demand-side mitigation options in the urban, building, transport, and agricultural sectors. We also highlight the specific nature of demand-side solutions in the context of development. We then discuss key analytical considerations to integrate demand-side options into overarching assessments on mitigation. Such a framework would include infrastructure solutions that interact with endogenous preference formation. Both hard infrastructures, such as the built environment, and soft infrastructures, such as habits and norms, shape behavior and as a consequence offer significant potential for reducing overall energy demand and greenhouse gas emissions. We conclude that systemic infrastructural and behavioral change will likely be a necessary component of a transition to a low-carbon society.

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