STRN Newsletter

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Sustainability Transitions Research Network.

Newsletter 40 – June 2021

Content

About

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

Cover picture: Shutterstock, Sculpture outside La Spezia Railway Station

Editorial

by Leonard Frank, Machteld Simoens, and Abe Hendriks

During the Q&A session after James Meadowcroft's keynote lecture at the recent 6th NEST conference, there seemed to be a common drive behind most of the questions asked. James had talked about the central role of the state in the politics of sustainability transitions. People in the audience wanted to know "what to do?": about the conditions of dedicated governmental action, but also about the roots and mechanisms of persistent unsustainability, from corporate power to constant struggles over the definition of the common good. The early career researchers present, coming from a broad range of disciplines and countries, were apparently centrally interested in not just studying, but also fostering change.

Of course, this has been a central tenet of our field from the beginning: Transitions to sustainability are not just an object of study, but a normative orientation, and the implications and pitfalls associated with this are commonly known. It made us think: Why do we as early career researchers engage with STR? How can we contribute to the development of the field? And what is our role in the community?

Building on our experiences and interactions with other members of the community, we observe two major pull factors that make us want to engage with sustainability transitions research. First, we are driven to the field as it promises an engagement with the pressing questions of our time. It also allows for research that hopefully contributes to making the changes we want to see in the world. This focus on the study of change in all its forms - from historic processes of regime shifts to action research - and the systemic perspective that provides tools to grasp the complexity of changing societies makes STR an inspiring and attractive academic field.

Second, STR comes with an N. We ourselves struggled to find a space in our disciplinary communities, but found an academic home in transitions research, where our differing research interests and common feelings of purpose meet. NEST gave us a warm welcome and provides a remarkably low threshold to enter and be active in the community. seniors who have gone through similar struggles in earlier days.

As webinars organizers, we realized that the same holds true for the wider STRN - which surprises us each time with its open and horizontal communications and the incredible support NEST activities receive. The networks allow us to easily exchange with both early career peers and seniors who have gone through similar struggles in earlier days. This community atmosphere is bearing fruits: at each NEST event, be it the methodology school, webinars, general and conference meetings we see new faces that are eager to become engaged and contribute to STR. Being part of the STRN and NEST communities is becoming a thing, it seems.

So how do we see the role of early career researchers in the future developments of the field? First, there clearly is a lot to be learned from. As newcomers, we need to learn and relate ourselves to the established frameworks and approaches STR. For better or for worse, the field now has standard ways of doing things, including the way questions are commonly asked and the types of answers that are given. From that, we can develop the field by questioning, challenging and refining existing approaches, while exploring different research questions, new methods or theoretical insights from other disciplines and broader geographies.

We already see this happening in the expansion of our community of early career researchers. It is brimming with energy to build bridges to other scientific disciplines, and to broaden our geographical horizons. This expansion comes with tensions as bringing in new perspectives also risks reducing the compatibility between different theoretical and methodological approaches. At the same time, we see colleagues struggling with the question whether they can and want to stay within academia, and to what extent STR as a field without a clear disciplinary grounding allows that - also outside of a handful of core institutions. Yet, with this in mind, it is worth reconsidering what is at the core of sustainability transitions research, and which came to the fore at the NEST conference again: engaging ourselves with what type of change we see and which contribution we can make to the change we need.

EIST Journal

Volume 39 (June 2021) is now complete and can be found here. It contains two surveys and 11 research articles.

Volume 40 (September 2021) is in progress.

The online list of special issues has just been updated:
It contains now all 19 special issues and sections that have appeared in EIST. Lots of interesting topics – go and check it out!

This is my last contribution about EIST to the newsletter. End of July I will step down as editor-in-chief. You can soon read about my experiences and final ideas in a "goodbye editorial".

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
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STRN Events

Upcoming Events

12th IST conference, October 5-8, 2021

It is planned as a hybrid event with people meeting online and in person (subject to change according to the pandemic situation). The conference will be hosted by the Fraunhofer Institute for Systems and Innovation Research ISI in Karlsruhe.

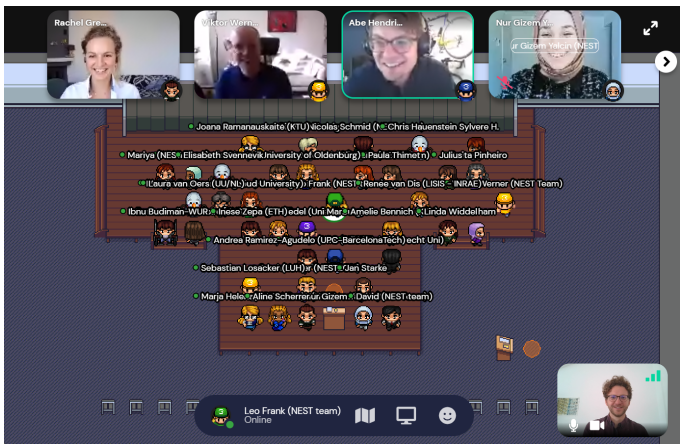
For more details and the call for papers, please visit the conference website.
Please direct any questions to
ist2021@isi.fraunhofer.de.

Next steps towards #IST2021:

- Presenters have to register for the conference by July 1st.
- By August 1st, full papers must be uploaded to the system. This is also the deadline for Global South scholarship applications and Best Paper Award nominations.
- September 10th is the regular registration deadline.

The local organizing committee is very much looking forward to welcoming you at #IST2021 !

Past Events



Report from the 6th NEST conference, Sofia, Bulgaria, 8-9 April 2021

Leonard Frank and Sarah Hafner, co-organisers of the 6th NEST conference

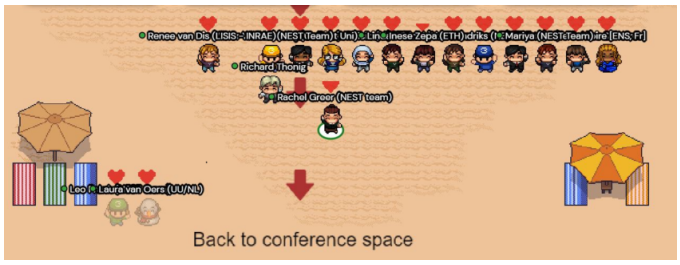
The 6th NEST conference had an agenda of diversification. After 5 conferences in Western Europe, the sixth iteration was hosted by the University of Sofia, Bulgaria, and invited contributions on the diversity of transition pathways, geographical foci and methodological approaches in studying sustainability transitions.

Just over 100 early career researchers attended the two conference days, and their presentations gave an impressive snapshot of the research being conducted under the sustainability transitions rubric. While key themes such as energy transitions were discussed in a number of finely distinct parallel sessions, the topics covered included circular economy, mobility, agri-food transitions, civil society but also regional transitions and transition governance. As has become common, a dedicated session on transitions in the global south indicated that despite more diverse case studies, a clear geographical focus continues to lie on Europe and a small number of industrialised countries.

Two keynote presentations by Prof. Dr. James Meadowcroft (Carleton University) and Dr. Ralitsa Hiteva (University of Sussex) were at the heart of the conference programme. James' presentation on

sustainability transition pathways and the politics of transitions centred on the role of the state and the impediments to fundamental change, ending on a report from practical engagement with frontrunners and policymakers in several Canadian projects. In her keynote, Ralitsa followed entangled issues relating to energy, food, water and urban development using the recurring example of preserved vegetables in Sofia, Bulgaria. Her fascinating account from extensive fieldwork opened up a justice perspective on transitions in the urban nexus. Both keynotes can be watched on the NEST Youtube channel. A number of practice-oriented workshops, as well as a fireside chat session with senior transition scholars made the programme round.

While last year's edition switched to an online format on short notice, the 6th NEST conference was planned as a digital event. Using the gather.town platform, the conference took place in a private digital venue resembling a conference hotel. Incorporating a digital avatar, one could not only participate in the sessions, but also strike off a spontaneous conversation and stay for a chat and drinks after the official programme. While we certainly missed the opportunity for the NEST community to connect offline, this digital format greatly contributed to an engaging atmosphere. Much more importantly, however, it allowed early career researchers from outside of Europe to participate without travel emissions and cost. Last but certainly not least, this may have been the first NEST conference to end with a dance on the beach.



The NEST conference was a great success and an inspiring opportunity for the growing community to come together and exchange ideas and research insights. With the 6th iteration behind us, the committee for the next one is already forming. We are looking forward to next year!

STRN News

STRN Steering group elections

This June, four seats in the steering group were up for election. Also, the NEST representatives were 'renewed'.

We are happy to announce that Xiao-Shan Yap (Eawag, Dübendorf & Utrecht University) and Paticience Mguni (University of Copenhagen) were elected as new members and Anton Sentic (ZHAW Winterthur) was re-elected. Adriaan van der Loos (Utrecht University) was a NEST representative last term and was now elected as a junior member. The NEST network will now be represented by Aline Scherrer (Fraunhofer ISI, Karlsruhe) and Abe Hendricks (University of Groningen).

Rob Raven, Jonathan Köhler, Christian Binz, Marie-Claire Brisbois and Klaus Kubeczko will leave the steering group. While it is sad to see long-term, highly committed members go, it is part of the continuous renewal process we subscribe to. We thank all leaving scholars for their support of STRN.

Other Events

Eu-SPRI Early Career Researchers Conference

We are pleased to announce that the **2021 Eu-SPRI Early Career Conference** (European Forum for Studies of Policies for Research and Innovation) will take place in **Paris, France, on 21-23 of October**. We invite PhD candidates, post-doctoral and early career researchers to share and discuss their scientific contributions to Science, Technology and Innovation (STI) policies for forward-looking transformations. The conference will consist of keynote talks, paper presentations, policy-practitioner panels, and a workshop on 'science-to-policy'.

This ECC event is organized by the Austrian Institute of Technology (AIT), Center for Innovation Systems & Policy; the Université Gustave Eiffel (UGE), Laboratoire Interdisciplinaire Sciences, Innovations, Sociétés (LISIS), in collaboration with University of Vienna, Department of Geography and Regional Research and the Urban Europe Research Alliance (UERA). The ECC is free for EU-SPRI members (more information on EU-SPRI can be found here) and a number of UERA grants

for researchers from widening countries is available on request.

Submissions are welcome via the EasyChair System no later than **25th June 2021**. For more information please visit the conference website or contact the local organizing team.

New Projects

TIPC Open Learning Series

Science, Technology and Innovation (STI) funders, policy practitioners and researchers are increasingly working as agents of transition, facilitating change in an integrated way towards global goals. TIPC's Open Learning Series provides spaces for those working on transformative innovation policy (TIP) approaches in sustainability transitions around the world to refresh their knowledge, connect and learn from one another, with the aim of shifting the narrative for STI policy towards a focus on transformations. All sessions will take place online using Zoom, and can be broadly categorised as:

- *Theoretical foundations*, to introduce key TIP concepts and theory
- *Exploration*, to reflect in a participatory way on TIP concepts, test tools and methods or contribute to cooperative enquiry and learning
- *Insights*, to share fresh knowledge, insights or learnings related to TIP

To sign-up follow this link.

Energy Transition Lab (ETLab)

The TPM Energy Transition Lab (ETLab) is a new initiative at Delft University of Technology at the faculty of Technology, Policy, and Management (TPM). It has the objective to facilitate, design, and execute interdisciplinary, boundary-crossing research to better understand the energy transition. The ETLab aims to provide energy researchers with a safe environment and sufficient resources for interdisciplinary and risky research related to behaviour and design in the energy transition. Researchers from philosophy, economics, psychology and engineering are collaborating within the ETLab. The lab seeks to combine qualitative and quantitative research applied to a multi-actor and omnilevel frame. Thus, all relevant stakeholders are considered and the combination of the individual with higher order organizational levels are crucial to our approach. Furthermore, we are conducting human experiments and simulations to study specific transition challenges that provide policy relevant insights for the energy transition. Reach out via EnergyTransitionLab-TPM@tudelft.nl

PATHFNDR: Pathways to an efficient future energy system through flexibility and sector coupling

PATHFNDR is a research project sponsored by the Swiss Federal Office of Energy's "SWEET" programme (Call 1-2020) and hosted by ETH Zurich. The project consortium includes seven research partners – ETH Zurich, Empa, PSI, ZHAW, HSLU, UNIGE, and EPFL – and 25 cooperation partners from industry and practice. The project aims to develop and analyze transition pathways for renewable energy integration in Switzerland. The project will explore feasible pathways, provide planning and operation tools, develop pilot and demonstration projects, identify new business opportunities, and analyze policies.

For more information, visit https://sweet-pathfndr.ch/.
or contact Annegret Stephan or Jochen Markard.

New project LIFE (October 2020 – September 2024)

UnitelmaSapienza is member of the new LIFE EBP (Ecofriendly multipurpose Biobased Products from municipal biowaste) project, which addresses environmental problems in municipal biowaste (MBW) management, agriculture and chemical industry by proving feasible production and use of new biobased products (BPs) obtained from MBW. As partner of the project, UnitelmaSapienza will conduct a market assessment and social life cycle assessment related to new processes and products developed within the project.

ENVISION - Accelerating Environmental Assessments towards Sustainable Cities and Regions

The ENVISION project aims to examine the effects of Environmental Assessment (EA) in urban systems and to explore opportunities to enhance sustainability. It will address challenges related to the need for the mitigation of environmental impacts, the promotion of inclusive and reflective societies, and enhanced participation of citizens and organizations representing the society in processes of public decision on the transformation of the city and regions. Overall, the project will advance the knowledge in the field by re-conceptualising EA role in the sustainability paradigm shift and play an essential

part in shaping debates on environmental and sustainability sciences, urban planning and development, and urban transformation studies in the coming years.

This 3-year project is led by GOVCOPP, University of Aveiro and funded by the Portuguese Foundation for Science and Technology (FCT/MCTES), exclusively through national funds. For more information see the ENVISION website or contact Alexandra Polido.

Gemini Centre Sustainability Transitions

The Gemini collaboration represents a model for strategic research coordination between parallel research groups at SINTEF, NTNU and the University of Oslo in Norway. The Department of Technology Management at SINTEF, together with the TIK Centre for Technology, Innovation and Culture at UiO and the Department of Interdisciplinary Studies of Culture, have recently launched a centre dedicated to sustainability transitions research. The centre has two main aims. The first aim is to contribute to developing the sustainability transitions research field in Norway and internationally. More specifically, we aim to develop joint research grant applications, including to the EU research funding programmes. The second aim is to strengthen research training and education within sustainability transitions research in Norway, through courses and/or summer schools. The Gemini centre has been established for the period 2021-2024.

For more information visit the centre website or contact: Markus Steen (SINTEF), Marianne Ryghaug (NTNU), Taran Mari Thune (University in Oslo).

Massive Urban Missions (MUM): Advancing and Delivering Climate Neutral Cities

Inspired by the "mission to the moon", the European research and innovation missions aim to deliver solutions to some of the most significant challenges facing our world. A key mission is to achieve 100 climate neutral cities in Europe by 2030. The overall purpose of this project is to investigate and critically reflect upon how to deliver climate neutral cities in Sweden through the combination of smart integrated infrastructure and mission-oriented governance. The challenge of climate neutrality demands an urban metabolism approach and new forms of collaboration between social and technical studies to work towards transforming socio-technical systems. Listen to our podcast or recent blogpost or check out our webpage on Massive Urban Missions.

City Futures Academy

We are an online learning community on cities, sustainability, governance and innovation bringing together teachers and organisations from around the world to share knowledge and understanding on urban transformations. The City Futures Academy offers vibrant Massive Open Online Courses (MOOCs) that combine a diversity of films, podcasts, interactive forums, practical assignments, peer review, key readings and course compendiums. We bring together teachers and organisations from around the world to share knowledge and understanding on urban transformations. The MOOCs are available for free to everyone and everywhere. So far, the MOOCs have attracted 100,000 participants and have reached a global audience across 200 countries.

Comparing and combining regional and sustainability transitions approaches to analyze the emergence of clusters of renewable and low-carbon innovations

Christina Hoicka, University of Victoria, Marcello Graziano, Southern Connecticut State University, Yuxu Zhao, York University, funded by the Smart Prosperity Institute

Canada's new climate action report outlines details for the electrification of transportation and transport corridors, massive expansion of a clean electricity system, $964 million over four years to "advance smart renewable energy and grid modernization projects to enable the clean grid of the future", and commitment to the economy, equity, inclusion, communities, and the workforce. One important pathway to these goals is implementing clusters of renewable and low-carbon innovations, also called renewable energies industrial clusters, that can dramatically speed up the transition towards renewable energies.

The objective of this project is to connect the fields of sustainability transitions, energy geography, and regional sciences, in order to answer real world policy questions of "how do renewable energies industrial clusters emerge, in what form, and how do they impact the renewable energy transition in different types of locations?" The analytical framework will identify important concepts and influences, will identify the range of factors that affect the emergence and form of renewable energies industrial clusters spatially that inform policy decisions, advance each field, and inform future analyses about renewable energy transitions. This analysis will provide practical insights into a resilient recovery and the equitable and inclusive aspects of a transition to a clean, low carbon economy; and help inform the selection, prioritization and financing of clean innovation strategies across sectors, sector specific pathways, and distributional impacts of existing or proposed low carbon and/or resilient recovery policies and programs.

Publications

PhD theses

Boulestreau, Y. (2021)
Université d'Avignon, Avignon. INRAE
A co-design approach for innovating from the cropping to the agrifood system – Application to the agroecological management of soil-borne pests and diseases in Provençal vegetable production systems. Agronomy.
link

A rapid and far-reaching change toward farming practices that contribute to the protection of the environment and human health is needed. In many cases, these alternative practices exist but are not implemented due to interconnected barriers at the plot, farm, territory, value chain and/or global level. My work consisted in analyzing this *lock-in* on a specific case study and co-designing solutions to overcome it together with the actors influencing farming practice choices. For doing so, I developed an original body of analytical and participatory design methodologies. I focused on the case of soil-borne pest and disease management in sheltered vegetable farming systems in Provence (France). I focused specifically on the most harmful vegetable pests locally, the root-knot nematodes, since their management is mainly based on non-selective nematicides with detrimental health effects, whereas effective alternatives already exist. First, I carried out a sociotechnical analysis showing that most of the Provençal agri-food system was locked around the use of "radical soil disinfection" techniques, thus excluding the implementation of alternative agroecological techniques. Following this analysis, I characterized forty existing coupled innovations that I grouped into five clusters. For each of them, I analyzed the combinations of sociotechnical levers mobilized and the way they were implemented. Then, as part of the workshops, I developed an original serious game that enabled (i) a rapid understanding of the sociotechnical analysis outcomes for the participants and (ii) initiating the design of solutions with a creative and collaborative mindset. Finally, during four successive co-design workshops, we co-designed fifty increasingly elaborate solutions with a high potential to foster the change in practices.

Dorst, H.M. (2021)
Utrecht University.
Mainstreaming urban nature. Uncovering structural conditions for urban nature-based solutions.
link

Nature-based solutions (NBS), such as green roofs, community gardens or bioswales, present a promising approach to urban sustainability, primarily because of their capacity to address environmental, social, and economic sustainability challenges simultaneously. Yet despite high expectations, mainstreaming urban NBS remains challenging. Challenges in mainstreaming NBS may arise from path dependencies in urban development. Structural conditions in urban infrastructure regimes - such as policy and funding frameworks, social networks or existing physical infrastructures - shape and stabilize the development and use of urban infrastructures. In doing so, they can hinder the development of divergent, innovative approaches to urban infrastructure development such as NBS. In this thesis I provide theoretical and empirical insights into the structural mechanisms that hinder or enable NBS mainstreaming. First, the research provides more clarity about the NBS concept in relation to sustainable urban development. In addition, I use two perspectives on embedding sustainable innovation in broader social structures, a socio-spatial and a sociotechnical perspective, and apply these in a quantitative database analysis and in qualitative case studies. The research shows the nuances, interactions, interdependencies and hierarchies in how structural conditions influence the mainstreaming of NBS, as well as the context-specific characteristics of these conditions. Recognizing these system dynamics can prevent overly simplistic and one-size-fits-all attempts at NBS mainstreaming. A conceptualization of urban infrastructure regimes as heterogeneous - multi-domain and multi-dimensional - structures supports an improved and more context-sensitive understanding of the persistence of barriers to NBS mainstreaming and opportunities to accelerate urban sustainability.

Lindberg, M. B. (2020)
University of Oslo.
Currents of change - Actors, policies and market design in an advancing energy transition.
link

Which types of policies are important in advancing sustainability transitions? Why and how do the preferences of some actors change? The thesis investigates the role of politics, policies and electricity market design(s) in the unfolding European energy transition in the period 2013-2018. Through systemic assessments of existing policies, market configurations and the policy preferences of key actors, it analyzes how the relationship between policies and markets changes during a transition. In four individual papers, the thesis shows that advancing transitions embody competing pathways. The European energy transition is characterized by the tension between increasing decentralization of the energy system versus

(continued) centralization of production, infrastructure, and system operation. In the current phase of the transition, there is more disagreement about the direction of the transition, than whether it should take place at all. Finally, the thesis provides new insights about the role of electricity market design. A key finding is that market design can simplify the integration of renewable energy by increasing flexibility and bringing system costs down.

Poulter, H. (2021)
University of Exeter, United Kingdom
Adaptive Governance for Energy System Decentralisation: A case study of the National Electricity Market in Eastern Australia.
link

This thesis seeks to further the discussion on the use of an adaptive governance framework from social-ecological transition (SET) theory to meet energy decarbonisation targets. I argue that as energy systems begin to include more distributed assets, an adaptation of an SET framework may be applicable to the current challenges being seen in energy system transitions (e.g. overcoming lock-in, enabling transformation).
To assess the practicalities of SET for energy systems, the principles of adaptive governance are adopted from SET and considered alongside lessons from a case study of the National Electricity Market (NEM) in eastern Australia. The results of the case study informed a framework for adaptive governance for energy system decarbonisation which includes enabling a participatory decision-making process; empowering local areas which creates spaces of innovation; and coordinating DER and innovation through knowledge brokering, adaptive regulation and the creation of new institutions, including markets, to meet a national decarbonisation agenda.
This has lessons for GB, in particular, because GB has set a target for net-zero emissions by 2050. Reaching this target requires increasing the use of distributed energy resources (DER). Enabling decentralisation to work in conjunction with the traditional centralised system requires new rules, new regulations, new markets and new institutions. Taking lessons learnt from an energy system that has already undergone this type of change, an alternative approach for GB policymakers is suggested that may assist with the challenge of enabling decentralisation in the GB energy system.
The dissertation addresses these opportunities by pulling together a research program guided by the conceptualization of governance arrangements supportive of urban sustainability transitions. More specifically this research demonstrates how multi-actor governance for green infrastructure is mediated by direct implementation of interventions and the construction of experiments for a range of actors to navigate installation and future development opportunities. Through empirical research, qualitative content analysis is used to construct and interpret interviews with local government representatives, businesses, business networks, and civil society organizations. Three empirical chapters are included detailing the role of private actors directing the development of green infrastructure; the role of action-oriented development to support system change for green infrastructure development; and the strategic delivery of green infrastructure experiments for improved processes and outcomes.

Waes, A. (2021)
Utrecht University
Platform innovation in urban mobility transitions. The case of deckles bike sharing.
link

Platform innovation has emerged as a potential accelerator for urban mobility transitions. This book explores the opportunities and challenges of platform innovation by investigating the rise and fall of dockless bike sharing: a story of a seemingly promising urban mobility innovation, disruptive global growth and also undesirable outcomes. Drawing on scientific scrutiny and real-life experimentation, this book brings together insights from the global cycling capital Amsterdam and the bike sharing capital Shanghai. This new phenomenon demonstrates how platform innovation gives rise to new business models, challenging regulations and prevalent practices. Platform innovation has brought major technology companies to the centre of urban mobility transitions, conflicting with public interests beyond sustainable urban mobility. To navigate challenges of platform innovation in urban mobility transitions, this book provides business and governance strategies.

Books

Echegaray, F., Brachya, V, Vergragt, P. and Zhang, L. (2021)
Sustainable Lifestyles after Covid-19.
Routledge, ISBN 9780367754099
link

This book takes an in-depth look at Covid-19-generated societal trends and develops scenarios for possible future directions of urban lifestyles.
Drawing on examples from Brazil, China, and Israel, and with a particular focus on cities, this book explores the short and long-term changes in individual consumers and citizen behavior as a result of the Covid-19 pandemic. On the basis of extensive market and opinion research data, aggregate data, observational evidence, and news reports, the authors provide a detailed account of the transformations that have

occurred as a result of a triple shock of public health emergency, economic shutdown, and social isolation. They also examine which of these behavioral changes are likely to become permanent and consider whether this may ultimately promote or restrain sustainable lifestyle choices.

del Río, P., Kiefer, C.P., Carrillo-Hermosilla, J. and Könnölä, T. (2021)
The Circular Economy: Economic, Managerial and Policy Implications.
Springer International Publishing
link

This book provides an in-depth analysis of the concept of the Circular Economy (CE), as well as an assessment of the drivers and barriers for circular practices by firms, and its implications for managers in firms and public policy makers. It includes proposals for policy frameworks and instruments that will encourage the uptake of CE practices. The book is presented in three linked parts. The first part of the book provides a broad view of the topic, put into the wider context of sustainability. In the second part, the drivers of and barriers to the uptake of the CE are analysed, with a special focus on the micro-level not seen often in the previous studies on the CE. This book is of interest to researchers, policy makers and post-graduate students in areas such as environmental management and economics.

Papers

Bobrova, Y., Papachristos, G. and Chiu, L. F. (2021)
Homeowner low carbon retrofits: Implications for future UK policy.
Energy Policy, 155, 112344
link

The promotion of low-carbon home retrofit among UK homeowners is widely recognised as an important strategy to reduce operational energy use in dwellings and mitigate climate change. The related predominant UK policy approach is to address various market failures and develop the market for low-carbon retrofit and innovation.
The current low uptake rate of low-carbon home retrofit suggests that a complementary policy approach is necessary to increase it and support households in their change towards low-carbon living. This paper uses an innovation framework to analyse retrofit as an innovation-decision process of several stages. Low-carbon technology is conceptualised at three nested levels: product, design option and technological system. A multiple-case study approach is used to analyse eight home retrofit cases from the SuperHomes network, that achieved significant carbon emission reductions through retrofit activities. Case analysis shows that: (i) homeowners collect information for each technology level through different communication channels, which are not interchangeable; (ii) homeowners develop a certain capacity to transform their environmental concerns into substantial retrofit activities; (iii) the positive retrofit experience of homeowners is crucial to develop such capacity and to convince others to retrofit their homes. These findings have important implications for energy policy on retrofit uptake in UK to support household transition to low-carbon living.

Bohnsack, R., Ciulli, F. and Kolk, A. (2021)
The role of business models in firm internationalization: An exploration of European electricity firms in the context of the energy transition.
Journal of International Business Studies, 1-29
link

This article ties in directly with recently intensified interest in business models in international business (IB), using the energy transition as empirical context to explore their relevance in firm internationalization. The global energy transition presents a challenge for almost all industries, but some face specific difficulties particularly important from an IB perspective. We study a set of European firms that used to operate in a highly regulated context with (partial) state ownership, until government-directed market liberalization started to allow further competition and internationalization. Existing firms were prompted to adapt their business models to these changes, with new ventures entering the market to reap opportunities with novel energy-related technologies and business models. Linking insights from strategic management to the IB literature, we conceptualize business model-related specific advantages (BMSAs), and explore the role of BMSAs in the internationalization of the firms in our sample. We also uncover barriers to BMSA recombination in (potential) host countries, consider BMSA location-boundedness, and discuss implications for firms' international expansion by presenting a new framework. Consequences for the energy transition and the actors already involved and (in)directly confronted with it are explicated, while outlining promising areas for further research, building on the insights and limitations of our study.

Boons, F., Doherty, B., Köhler, J., Papachristos, G. and Wells, P. (2021)
Disrupting transitions: qualitatively modelling the impact of Covid-19 on UK food and mobility provision.
EIST, 40

link

The 2020 Covid-19 pandemic provides an empirical testing ground for assessing the impact of critical events on societal transitions. Such events are typically seen as exogenous to the transition process, an assumption which is investigated in this paper. Using a qualitative system dynamics modelling approach we conceptualize transition pathways as sets of interacting sequences of events. This enables the analysis of event sequences that constitute the evolving pandemic as impacting on those pathways. We apply this approach to the provision of (auto)mobility and food in the UK. This shows the way in which the pandemic has had a differential effect on ongoing transitions in both systems, sometimes slowing them down, and sometimes accelerating them. In addition, it reveals how it has established new transition pathways. The empirical work further shows how qualitative modelling with system dynamics facilitates an explicit and systematic comparative analysis of transition case studies.

Boulestreau, Y., Casagrande, M. and Navarrete, M. (2021)
Analyzing barriers and levers for practice change: a new framework applied to vegetables' soil pest management.
Agron. Sustain. Dev.
link

Western agricultural practices for crop protection are still heavily dependent on pesticides, even though they cause major human health and environmental hazards. In this study, we hypothesized that a systemic analysis of the determinants of current farming practices could serve to characterize (i) the impediments to change in farming practices; (ii) the resources supporting the change; (iii) the underpinning sociotechnical processes; (iv) the stakeholders' involvement; and (v) levers to facilitate agroecological transition. We therefore designed the first analytical framework that supports a systemic, multi-level (field, farm, territorial, and supra-territorial), multi-actor (including private actors and policymakers), and transformation-oriented analysis of the determinants of farming practices. We applied this analytical framework to the management of root-knot nematodes in sheltered vegetable systems in south-eastern France. We show that strongly interconnected determinants of farming practices fostered drastic soil disinfection and locked out agroecological soil health technology (e.g., product quality and economic constraints from marketing firms and from regulations; lack of knowledge). However, this sociotechnical lock-in was being undermined by societal pressures and increasing actions of the stakeholders in favor of the agroecology paradigm. On the other hand, the conventionalization process of the organic regime was simultaneously threatening the further development of agroecological practices. Finally, this analysis revealed levers that could be used to support innovation design and enable changes in farming practices toward agroecology (e.g., facilitate access to agroecological inputs, develop multi-stakeholder platforms). The framework, successfully applied to the Provençal vegetable sector, could be used in other production and territorial contexts.

Brauers, H., Braunger, I. and Jewell, J. (2021)
Liquefied Natural Gas Expansion Plans in Germany: The Risk of Gas Lock-in under Energy Transitions'.
Energy Research & Social Science 76: 102059
link

The German energy transition has been hailed as a role model for climate action. However, plans for the construction of three large-scale Liquefied Natural Gas (LNG) import terminals are receiving strong state support. This is inconsistent with Germany's climate targets, which require a reduction rather than expansion of natural gas consumption. In our paper, we aim to unpack the connection between the risk of natural gas lock-in and the energy transition. We analyse the co-evolution of the techno-economic, socio-technical and political realms of the German natural gas sector and influence of actors within that process. We use a combination of energy system and interview data, and introduce a new approach to triangulate material and actor analysis. We show that four natural gas lock-in mechanisms cause the support for LNG in Germany: (A) the geopolitical influence from the United States, combined with (B) security of supply concerns due to the planned coal and nuclear phase-out, (C) pressure from a wide variety of state and private sector actors, and (D) sunk investments in existing gas infrastructure. Two additional mechanisms supporting the strong position of natural gas are (E) the strength of the emerging synthetic gas niche, and (F) weak opposition against LNG and natural gas. We highlight the severely overlooked lock-in potential and related emissions, which could complicate and decelerate energy transitions as more countries reach a more advanced phase of the energy transition.

Carmon, O. and Fischhendler, I. (2021)
A Friction Perspective for Negotiating Renewable Energy Targets: The Israeli Case.
Policy Sciences, 54(3)
link

Policy design studies have addressed the role of political and institutional limitations in formulating effective climate policies including renewable energy targets (RETs). However, it is still not entirely clear how

and why these limitations result in policy designs that are incapable of staying on track to meet the overall goals of the Paris Agreement on climate change. In order to deepen our understanding, this study introduces a friction perspective—one of the core components of the punctuated equilibrium theory used in policy change literature—and adopts it to the policy design process of energy transitions. This study argues that in cases where governments struggle to design stringent RETs, the level of friction between the elastic sub-coalitions (comprising bureaucrats and politicians) can shed light on policy design choices. By using a causal mechanism approach, the study developed several friction mechanisms to test how friction has been built and often dissolved, resulting in inadequate policy outcomes. The design process for setting Israel's national RETs negotiated between 2015 and 2017 was used as a longitudinal case study to illustrate the role of friction and assess its impact. Unraveling how friction operates within policy design was found to be a good litmus test for the political feasibility of policy design choices. In other words, this study gives us a rudimentary blueprint of a "friction map" that, by tracing sequences of conflict and sequences of resolution, shows which particular design choices may generate more tension than others.

Chistov, V., Aramburu, N, and Carrillo-Hermosilla, J. (2021)
Open Eco-innovation: A Bibliometric Review of Emerging Research.
Journal of Cleaner Production
link

The growing concern about the environmental future of the Planet urges us to foster eco-innovation research and implementation in companies. Access to external knowledge, R&D collaboration, and open innovation are recognized as essential drivers of eco-innovation. Despite the growing interest, research on the topic is still scarce. The present article strives to clarify the concept of Open Eco-innovation, shows its importance, and maps existing research applying a systematic approach to a literature review, bibliometric and science mapping analysis, using citations from Web of Science and Scopus databases. The results give an overview of academic discussions that led to the topic of Open Eco-innovation, demonstrate a growing interest from the scientific community, and reveal comprehensive bibliometric data concerning leading authors, research groups, affiliations, and most notable publishers and publications. The article also proposes a new conceptual framework for the research on Open Eco-innovation, which represents the main clusters and topics of discussions distributed among macro, meso, and micro-levels of analysis.

Colasante, A., D'Adamo, I. and Morone, P. (2021)
Nudging for the increased adoption of solar energy? Evidence from a survey in Italy.
Energy Research and Social Science, 74
link

The sun is a shining star in the emerging low-carbon society, providing bright solutions to mitigate climate change. This perspective article presents the results of an online survey that investigated peoples' willingness to reshape their intraday energy use to both reduce energy consumption (especially from fossil fuel sources) and maximize green energy self-consumption. Respondents identified self-consumption as a key factor in reducing their energy bill. More generally, respondents' consumption choices appeared largely driven by economic incentives. Hence, the introduction of a bonus for self-consumed energy may enhance the development of photovoltaic systems. From the results a bonus of 4 cent€/kWh and a green premium of 10 cent€/kWh come out. These findings could assist policy makers in forging policy actions based on a mix of monetary and non-monetary incentives to support the development of decentralized energy systems.

D'Adamo, I., Falcone, P.M., Huisingh, D. and Morone, P. (2021)
A circular economy model based on biomethane: What are the opportunities for the municipality of Rome and beyond?
Renewable Energy, 163, pp. 1660-1672
link

This paper defines the roles of biomethane for a double-green transition, through the integration of an effective management of renewable energy and municipal waste. The authors perform an assessment of the potential transition of the municipality of Rome to a more sustainable transport system, based on the economic feasibility of production of biomethane as analysed with the Discounted Cash Flow methodology. The potential reduction of emissions is quantified considering biomethane, to be used as vehicle fuel instead of natural gas. The provision of subsidies is found to be an essential condition to support the development of the biomethane sector. The subsidies must be coordinated with other policies such as the construction and operation of new fuelling stations and the increase of vehicles fuelled by biomethane. Several economic indicators are used to support investors by defining the conditions in which the profitability and economic opportunities are quantified. The transformation of bio-wastes into clean energy, closes the loop and helps societies to make progress toward becoming circular economies, which can contribute to decarbonizing the transport sector. Results of these analyses are applicable in other municipalities, which are currently under-utilizing their organic wastes and by-products.

Dahlke, J., Bogner, K., Becker, M., Schlaile, M. P., Pyka, A. and Ebersberger B. (2021)
Crisis-driven innovation and fundamental human needs: A typological framework of rapid-response COVID-19 innovations.
Technological Forecasting and Social Change, 169, 120799
link

As a microcosm for future challenges, the COVID-19 pandemic exhibits increasingly transboundary dynamics, causing interconnected problems across multiple societal systems. To examine the role of innovations as a social mechanism to reconcile these arising challenges, we view the unfolding of the pandemic through the lens of a content analysis of 707 innovation projects that address the fundamental human needs of consumers and businesses. This study proposes a novel procedure to characterize large-scale innovative activities via text mining and employs a theoretical framework for identifying the pressing societal needs amidst crises. Our typology of rapid-response COVID-19 innovations exhibits a diverse set of domains ranging from technological innovations to what may be described as frugal and social innovations. We provide evidence for the growing prevalence of social needs beyond the basic notion of safety during the early months of the crisis. Our contributions show that a structural model of innovation activities and their latent drivers may help policy makers and innovators to move toward achieving a systemic reaction to such crises.

Derwort, P., Jager, N. and Newig, J. (2021)
How to Explain Major Policy Change Towards Sustainability? Bringing Together the Multiple Streams Framework and the Multilevel Perspective on Socio-Technical Transitions to Explore the German "Energiewende".
Policy Studies Journal
link

Most efforts at explaining major policy transformation apply a single lens to study specific cases. Recent contributions have called for a more plural use of theories to facilitate the production of valuable new perspectives and research agendas. The German energy transition is a good example of such a transformative change. This article takes up the call for cross-fertilization of theories, using two complementary lenses to explain the German energy transition: (i) applying the multiple streams framework (MSF) demonstrates how political factors and public opinion have opened a "policy window" for reform from a political dimension. (ii) The multilevel perspective on sustainability transitions (MLP) sheds more light on the importance technological innovation for transformation processes. Exemplified through the German energy transition, we highlight limitations of both lenses, as well as the value of using multiple lenses to analyze specific cases of major policy change. The MSF highlights the role of agency and power relations. The MLP demonstrates how niche-technologies uproot the incumbent regime. Employing both lenses together offers insights as to how major policy change goes beyond single instances of decision-making but is the product of a larger trajectory of path-dependence that emerges from the interplay of socio-technical and political dynamics.

Eitan, A. and Fischhendler, I. (2021)
The social dimension of renewable energy storage in electricity markets: The role of partnerships.
Energy Research and Social Science, 76
link

Energy storage systems play an important role in achieving the goal of 100% electricity generation from renewable energy sources by improving their efficiency and flexibility. Anecdotal evidence around the world has shown that, beyond techno-economic factors, social factors and partnerships in particular may significantly influence the promotion of these storage systems. This study therefore aims to improve the understanding of how different partnerships may support the establishment and operation of various renewable energy storage systems, which provide a range of applications in electricity markets. We begin by presenting various types of storage systems and demonstrating how partnerships are formed around these storage systems, thus enabling the delivery of diverse applications. We then go on to depict seven prominent partnerships prototypes involving different combinations of actors while matching them with the storage systems they support. This study therefore lays the theoretical foundations for understanding how varied partnerships contribute differently to the promotion of storage systems.

Fava, F., Gardossi, L., Brigidi, P., Morone, P., Carosi, D.A.R. and Lenzi, A. (2021)
The bioeconomy in Italy and the new national strategy for a more competitive and sustainable country.
New Biotechnology, vol. 61, pp. 124-136
link

Italy has the third largest bioeconomy in Europe (€330 billion annual turnover, 2 million employees), making it a core pillar of the national economy. Its sectors of excellence are food and biobased products, and it is a consistent presence in research and innovation projects

funded by the EU Horizon 2020 programme (Societal Challenges 2) and the European Public Private Partnership "Biobased industry" (BBI-JU). The bioeconomy reduces dependence on fossil fuels and finite materials, loss of biodiversity and changing land use. It contributes to environmental regeneration, spurs economic growth and supports jobs in rural, coastal and abandoned industrial areas, leveraging local contexts and traditions. In 2017 the Italian government promoted the development of a national Bioeconomy Strategy (BIT), recently updated (BIT II) to interconnect more efficiently the pillars of the national bioeconomy: production of renewable biological resources, their conversion into valuable food/feed, biobased products and bio-energy, and transformation and valorization of bio-waste streams. BIT II aims to improve coordination between Ministries and Italian regions in alignment of policies, regulations, R&I funding programmes and infrastructures investment. The goal is a 15 % increase in turnover and employment in the Italian bioeconomy by 2030. Based on Italy's strategic geopolitical position in the Mediterranean basin, BIT II also includes actions to improve sustainable productivity, social cohesion and political stability through the implementation of bioeconomy strategies in this area. This paper provides an insight into these strategies and discusses the strengths and weaknesses of the sectors involved and the measures, regulatory initiatives and monitoring actions undertaken.

Fischhendler, I. and Herman, L. (2021)
Light at the End of the Panel: The Gaza Strip and the Interplay Between Geopolitical Conflict and Renewable Energy Transition.
New Political Economy
link

Renewable energy transition is one of the keys to mitigating climate change. While attention has been given to various economic, institutional, technological, and sociocultural barriers to this transition, it is unclear how acute interstate conflict shadowed by geopolitical forces shapes the deployment of renewables. The literature is split between those who speculate that conflict conditions discourage renewable energy proliferation and their critics. This ambiguity is surprising, since renewable energy is often suggested as a panacea for many conflict and post-conflict areas with dysfunctional centralised electricity systems**.** A systematic assessment of these competing hypotheses is challenging because of the absence of reliable data in fragile states and areas. This study is the first to use remote sensing to examine the temporal and spatial diffusion of renewables in the Gaza Strip against the backdrop of conflict conditions with Israel. It finds that Gaza has become a renewable energy leader despite conflict conditions exacerbated by deep poverty. The balance between discouraging and encouraging factors rests on different variables: the impact of the conflict on the free movement of labour, goods, and fuel, the intensity of the conflict, the role of economies of scale, opportunity costs, and alternative energy production costs.

Frank, P. (2021)
A proposal of personal competencies for sustainable consumption.
International Journal of Sustainability in Higher Education, in press
link

Despite advances in Environmental and Sustainability Education (ESE) scholarship and practice, ESE has not yet contributed to mitigate the sustainability-related problems it is meant to remedy. As part of an explanation, some scholars have argued that current ESE scholarship and practice overemphasizes intellectual and neglects (intra-)personal competencies as envisaged learning outcomes of ESE learning programs and activities. To date, however, such personal competencies have not been systematically specified in terms of the challenges they are meant to respond to. This paper aims to derive personal competencies from an analysis of inner challenges individuals face when engaging with the cause of sustainable consumption. In this conceptual article, I analyze existing research on challenges individuals experience when intending to change their consumer behavior and engaging in consumption-related learning activities. On this basis, a set of personal competencies for sustainable consumption are derived from the analysis of challenges. The discussion of challenges indicates that both sustainable consumption and consumption-related learning activities can come along with a series of affective-motivational challenges. In contrast to established competency frameworks, personal competencies emphasize the importance of affective-motivational learning outcomes instead of intellectual ones. They are defined here as abilities, proficiencies, or skills related to inner states and processes that can be considered necessary to engage with the cause of sustainability. Personal competencies responding to the inner challenges of engaging with sustainable consumption include ethics, self-awareness, emotional resilience, self-care, access to and cultivation of ethical qualities and mindsets for sustainability.

Friedrich, J., Zscheischler, J. and Faust, H. (2021)
Social-ecological transformation and COVID-19: the need to revisit working-class environmentalism.
GAIA – Ecological Perspectives for Science and Society, 30(1): 18-22
link

The ongoing COVID-19 pandemic points to unequally distributed vulnerabilities in society. Unevenly distributed disadvantages are also found in processes of a social-ecological transformation. The concept of working-class environmentalism arguably presents a way out of this deficiency through incorporating and focusing on working class and precarious people in processes of social change. We develop four theses for our argumentation to revisit working-class environmentalism and conclude that this would build social resilience for coping with future crises of the whole of society.

Geels, F. W., Sareen, S., Hook, A. and Sovacool, B. K. (2021)
Navigating implementation dilemmas in technology-forcing policies: A comparative analysis of accelerated smart meter diffusion in the Netherlands, UK, Norway, and Portugal (2000-2019).
Research Policy, 50(7), 104272, pp. 1-19
link

This paper addresses the implementation of technology-forcing policies in open-ended diffusion processes that involve companies and regulators as well as consumers and civil society actors. Mobilising insights from the societal embedding of technology framework and policy steering theories, we investigate two implementation dilemmas that relate to an overarching tension between flexibility (to enable technological learning and stakeholder engagement) and coordinated push (to focus actors and drive deployment): a) early or late formulation of initial targets, and b) technocratic or emergent-adaptive implementation styles. We investigate these dilemmas with four comparative case studies of smart electricity meters between 2000 to 2019, which diffused rapidly in the Netherlands, Norway, and Portugal, but decelerated in the UK. We relate these differences to policy choices, and identify two patterns for successful implementation of technology-forcing policies: a) start with early targets and a technocratic style, but make adjustments if there are substantial protests or technical problems, and b) start with an emergent-adaptive style and formulate and enforce targets later, once technical and social stabilisation has occurred.

Godoy de, J., Otrel-Cass, K. and Høyer Toft, K. (2021)
Transformations of trust in society: A systematic review of how access to big data in energy systems challenges Scandinavian culture.
Energy and AI, 5(100079)
link

In the era of information technology and big data, the extraction, commodification, and control of personal information is redefining how people relate and interact. However, the challenges that big data collection and analytics can introduce in trust-based societies, like those of Scandinavia, are not yet understood. For instance, in the energy sector, data generated through smart appliances, like smart metering devices, can have collateral implications for the end-users. In this paper, we present a systematic review of scientific articles indexed in Scopus to identify possible relationships between the practices of collecting, processing, analysing, and using people's data and people's responses to such practices. We contextualise this by looking at research about Scandinavian societies and link this to the academic literature on big data and trust, big data and smart meters, data ethics and the energy sector, surveillance capitalism, and subsequently performing a reflexive thematic analysis. We broadly situate our understanding of culture in this context on the interactions between cognitive norms, material culture, and energy practices. Our analysis identified a number of articles discussing problems and solutions to do with the practices of surveillance capitalism. We also found that research addresses these challenges in different ways. While some research focuses on technological amendments to address users' privacy protection, only few examine the fundamental ethical questions that discuss how big data practices may change societies and increase their vulnerability. The literature suggests that even in highly trusting societies, like the ones found in Scandinavian countries, trust can be undermined and weakened.

Griver, S. and Fischhendler, I. (2021)
The Social Construction of Food Security: The Israeli Case.
Food Security
link

"Food securitization" refers to the process by which food supplies are linked to larger security issues or broader notions of human security. While this study is built on the surge of food policy studies that acknowledge the importance of discourse, rhetoric, and labeling in shaping the notion of security there is no empirical research that explicitly examine how securitization process of food policy takes place, why, when and the implications of this. The aim of the study was to examine the contextual events that triggered the securitization of food policy: the actors who used food security rhetoric, and the institutional measures they suggested for solving food insecurity. By taking a discursive approach, the study quantitatively examined how and why food was securitized during debates on Israeli food policy took place during two time periods: 1948–1950, the years of the implementation of the austerity laws; and 2008–2017, the years of global

recession, and the rise of obesity. The study found that the notion of food security was strategically used to define a variety of food-related issues. Each definition of food security was triggered by a variety of events and social contexts such as war, increases in the cost of living, the rise in obesity rates, and global warming. These frames, used throughout the debates, then influenced the actor's choice of solutions. The study shows that most Israeli actors reacted to food security frames using institutional welfare measures.

Gschwendtner, C., Sinsel, S. R. and Stephan, A. (2021)
Vehicle-to-X (V2X) implementation: An overview of predominate trial configurations and technical, social and regulatory challenges.
Renewable and Sustainable Energy Reviews, 145, 110977
link

The uptake of electric vehicles supports decarbonization and increasingly interconnects the electricity and transport system. While the integration of electric vehicles could challenge electricity grids, bidirectional power flows between vehicles and grids could support grid operations. Despite the globally increasing number of Vehicle-to-X trials, including Vehicle-to-Grid and Vehicle-to-Customer, an in-depth understanding of trial implementations and expert experiences has largely been overlooked although they are both crucial for technological development and deployment. Based on our analysis of a global Vehicle-to-X trial database and 47 interviews with experts from industry and academia, we (i) provide an overview of the implementation status of Vehicle-to-X and analyze predominate trial configurations, i.e. combinations of characteristics, (ii) identify important technical, social and regulatory challenges for the implementation of Vehicle-to-X and assess and discuss expert evaluations of these challenges and (iii) derive implications for different actors.
The most predominate trial configurations are Vehicle-to-Customer and transmission-level services provided by commercial fleets that charge at work due to current practical advantages of centralized approaches. From a technical standpoint, we find that although Vehicle-to-X can defer or even mitigate grid reinforcement at the distribution level, this potential is highly dependent on local conditions. Regarding social aspects, incentives and Vehicle-to-X operations need to be tailored to different vehicle users. Concerning regulation, it is imperative to avoid double taxation of electricity, simplify market participation for small providers, and further develop Vehicle-to-X standards. Implications for actors include the evaluation and enablement of portfolios with different flexibility assets, and stacking of services to increase revenue streams and reduce risk resulting from variations in driving patterns and charging behavior.

Huang, P., Westman, L., and Castan Broto, V. (2021)
A culture-led approach to understanding energy transitions in China: The correlative epistemology.
Transactions of the Institute of British Geographers
link

Abstract: Transformations of the energy system are unfolding in China at an unprecedented scale and pace. The dynamics of China's energy transitions impact global trends of energy decarbonisation. Transition theories within the Anglophone academic tradition have been used to examine this process, but they tend to misrepresent the social, cultural, and political structures that shape energy transitions in China. This paper proposes a move from an analysis of energy transitions "with Chinese characteristics" to alternative thinking on energy transitions truly rooted in Chinese epistemological and philosophical constructs. The correlative epistemology refers to a Chinese tradition of social studies that describes the cosmos as a structured order of relations (*guanxi*). This tradition sees *guanxi* as the fundamental constituent of Chinese society. Such a relational focus enables a culture-led reading of China's energy transitions, thus responding to calls for transition theories "from elsewhere." In particular, correlative interpretations of innovation and transition processes in China frame energy transitions within broader societal transformations, define the operation of transition governance, and reveal that pre-existing *guanxi* networks shape the activities of actors in transition processes.

Jackson, P., Rivera Ferre, M.G., Candel, J., Davies, A., Derani, C., de Vries, H., Dragović-Uzelac, V., Hoel, A.H., Holm, L., Mathijs, E., Morone, P., Penker, M., Śpiewak, R., Termeer, K. and Thøgersen, J. (2021)
Food as a commodity, human right or common good.
Nature Food, vol. 2, no. 3, pp. 132-134
link

Different framings of food may shape food policies and their impact. Despite acknowledging food systems' complexities, the European Commission's Farm to Fork Strategy still addresses food as a commodity instead of a human right or common good.

Jagustovic, R., Papachristos, G., Zougmore, R. B., Kotir, J. H., Kessler, A., Quedraogo, M., Ristema, C. J. and Dittmer, K.M. (2021)
Better before worse trajectories in food

systems? An investigation of synergies and trade-offs through climate-smart agriculture and system dynamics.
Agricultural Systems 190, 103131
link

CONTEXT: Food systems face multiple challenges simultaneously: provision to a growing population, adaptation to more extreme and frequent climate change risks, and reduction of their considerable greenhouse gas (GHG) emissions. Food system interventions and policies give rise to synergies and trade-offs that emerge over time due to the dynamic nature and interconnections of system elements. Analysis of an entire food system is necessary to identify synergies that bring simultaneous benefits and mitigate trade-offs, both short- and long-term.
OBJECTIVE: Our study aims to inform the sustainable transformation of food systems by identifying short- and long-term synergies and trade-offs in the climate-smart village (CSV) Lawra-Jirapa in northern Ghana under the current practices, technologies, policies, and trends of population growth, extreme events, and climate change impacts.

Kangas, H., Ruggiero, S., Annala, S. and Ohrling, T. (2021)
Would turkeys vote for Christmas? New entrant strategies and coopetitive tensions in the emerging demand response industry.
Energy Research & Social Science 76, 102051
link

To enter a market and scale up, entrant firms often need to cooperate with their incumbent competitors, so they are in coopetition with them. Our goal is to increase the understanding of the antecedents of coopetition and the ways in which new entrant firms navigate coopetitive tensions with incumbents. Moreover, we are interested in the impacts that coopetition has on the value creation and value appropriation of new entrant firms. So far, most literature on cooperation and coopetition in energy markets has provided the perspective of the incumbents. To study the issue empirically, we interviewed 15 demand response (DR) entrants. These firms operate in Finnish energy markets, providing automated DR services, in which Finland is a forerunner country. According to our results, collaboration between new entrant DR firms and energy incumbents was needed in order to establish the new markets. In addition, cooperation with incumbents was beneficial to DR entrants since they were able to gain new customers and increase the efficiency of their resource use due to, for example, common technological development activities. We found that the structure of energy markets was an important factor in shaping the market entry of DR entrants. According to our results, new entrants can enter electricity markets without much cooperation with the incumbents, but cooperation is necessary in natural monopoly district heating markets. As new EU regulations will enhance automated DR services, the results of this study have relevance in other EU Member States where automated DR markets have not yet been established.

Korsnes, M., and Throndsen, W. (2021)
Smart energy prosumers in Norway: Critical reflections on implications for participation and everyday life.
Journal of Cleaner Production, 306, 127273
link

As evidenced by the EU's 2016 political ambition to empower energy consumers by allowing them to become prosumers, smart energy technologies are expected to contribute to energy savings as well as healthier and more comfortable lives. Norway is a vanguard country in implementing smart energy technologies, and a growing literature of social science and humanities research has investigated how such technology impacts everyday life. Taking stock with this literature and comparing two Norwegian high-tech demonstration cases, where local production and smarter consumption is enabled through novel technologies, the research objective of this paper was to analyse the ways in which smart energy technologies affect users, and the extent to which users can influence the role of smart energy technological arrangements in their everyday lives. Results indicated that there is a divergence between the intentions and the effects of the introduced technologies. For instance, smart technologies and prosuming affected the way people organised their everyday lives by demanding more work of participants. We conclude with recommendations for practitioners relating to consumer participation and energy prosuming, advising a focus on broader implications in addition to smart technological fixes.

Krantz, D. (2021)
COP and the Cloth: Quantitatively and Normatively Assessing Religious NGO Participation at the Conference of Parties to the United Nations Framework Convention on Climate Change.
Sci 2021, 3, 24
link

How much is religion quantitatively involved in global climate politics? After assessing the role of the Conference of Parties to the United Nations Framework Convention on Climate Change from a normative perspective, this descriptive, transdisciplinary and unconventional study offers the first comprehensive

quantitative examination of religious nongovernmental organizations that formally participate in its annual meetings, the largest attempts to solve the climate crisis through global governance. This study finds that although their numbers are growing, only about 3 percent of registered nongovernmental organizations accredited to participate in the conference are overtly religious in nature—and that more than 80 percent of those faith-based groups are Christian. Additionally, this study finds that religious nongovernmental organizations that participate in the conference are mostly from the Global North. The results call for greater participation of religious institutions in the international climate negotiations in order for society to address the planetary emergency of climate change.

Libertson, F., Velkova, J. and Palm, J. (2021)
Data-center infrastructure and energy gentrification: perspectives from Sweden.
Sustainability: Science, Practice and Policy, 17(1), 153-162
link

Which societal functions should be prioritized when the electricity grid reaches its maximum capacity? By using Sweden as an example, this policy brief discusses the societal negotiations that arise around capacity deficits of the electricity grid. By introducing the term energy gentrification, we aim to highlight the potential dangers of failing to recognize that energy also constitutes a societal resource, and like any other resource of the built environment, it is exposed to the risk of exploitation if left unprotected. We propose energy gentrification as an analytical perspective, through which negotiations and potential conflicts can be studied when grid owners must prioritize who should be connected to the grid. In relation to previous research on gentrification, we identify several parallels to the Swedish case of data centers, such as the relative prioritization of global versus local capital, the competition over resources, the allusion to promises of job opportunities and regional development for justification, and the tradeoffs between common goods versus private interests. The perspective of energy gentrification offers a useful approach for inquiring into the ethical dimensions of energy policies and for highlighting the bureaucratic nature of energy policy decision-making. The policy brief concludes by proposing opportunities for future research.

Mang-Benza, C. (2021)
New Discourses on Energy Transition as an Opportunity for Reconciliation? Analyzing Indigenous and Non-Indigenous Communica–tions in Media and Policy Documents.
International Indigenous Policy Journal, 12:2
link

This article examines energy issues articulated by Indigenous and non-Indigenous people in Canada and analyzes the energy transition as a locus of reconciliation therein. Using content and discourse analysis of policy documents, white papers, and news media articles, we draw attention to reconciliation and energy discourses before and after 2015, the year that marked the release of the Truth and Reconciliation Commission of Canada (TRC) report and the Paris Agreement on climate change. We find a three-fold expansion of those discourses, which encompass issues of inclusion and exclusion, dependency, and autonomy, as well as colonial representations of Indigenous people, after 2015. We also find that non-Indigenous voices are more prominent in those conversations. We suggest that the prospects of mutual benefits could turn the energy transition into an opportunity to bring together Indigenous and non-Indigenous people in Canada.

Nordholm, A. and Sareen, S. (2021)
Scalar containment of energy justice and its democratic discontents: Solar power and energy poverty alleviation.
Frontiers in Sustainable Cities
link

The threats climate change poses require rapid and wide decarbonization efforts in the energy sector. Historically, large-scale energy operations, often instrumental for a scaled and effective approach to meet decarbonization goals, undergird energy-related injustices. Energy poverty is a multi-dimensional form of injustice, with relevance to low-carbon energy transitions. Defined as the condition of being unable to access an adequate level of household energy services, energy poverty persists despite the emergence of affordable renewable energy technologies, such as solar photovoltaics (PV). Historical injustices and the modularity of solar PV combine to offer new possibilities in ownership, production and distribution of cost-competitive, clean and collectively scalable energy. Consequently, emerging policy priorities for positive energy districts call into question the traditional large-scale modality of energy operations. We report from a case study of solar power in Lisbon, a frontrunner in urban energy transitions while also home to high energy poverty incidence. The study focuses on scalar aspects of justice in energy transitions to investigate whether and how solar PV can alleviate urban energy poverty. It features 2 months of fieldwork centered on community and expert perspectives, including semi-structured interviews and field observations. We mobilize a spatial energy justice framework to identify justice aspects of multi-scalar solar PV uptake. By showing how energy justice is shaped in diverse ways at different scales, we demonstrate ways in which scale matters for just urban energy transitions. We argue that small- and medium-

scaled approaches to electricity distribution, an integral component of positive energy districts, can address specific justice concerns. However, even as such approaches gain attention and legitimacy, they risk structurally excluding socio-economically vulnerable users, and proceed slowly relative to large-scale solar rollout.

Pinkse, J. and Bohnsack, R. (2021)
Sustainable product innovation and changing consumer behavior: Sustainability affordances as triggers of adoption and usage.
Business Strategy and the Environment
link

This conceptual paper argues that for sustainable product innovation to make a contribution to addressing sustainability issues, we need to understand not only why consumers adopt sustainable products but also what makes them use these in sustainable way. To explain how specific product features can change the ways in which consumers engage with sustainable products in the adoption and usage phase, we draw on affordance theory. Affordances refer to the potential for agentic action of users in relation to a technological object. We develop a conceptual framework that explains how sustainable product innovation can lead to the design of sustainability affordances that stimulate adoption and sustainable usage. The framework shows how three forms of agency—material, firm, and user agency—interact and together influence a product's sustainability affordances that drive adoption and a change in consumer behavior. The framework explains how trade-offs between a product's environmental features and consumer expectations regarding desired functionalities and user experience can be overcome.

Ribeiro, B. & Lewis, N. (2021)
Urban food forestry networks and Urban Living Labs articulations.
Journal of Urbanism: International Research on Placemaking and Urban Sustainability
link

This article wrestles with the theoretical complexity of fostering food sustainability transitions in metropoles. It pays attention to how urban food forestry networks cultivated in parks may represent a critical part of these transitions, by providing a mechanism for urban people to reconnect with food processes while enhancing biodiversity and ecosystem services. The work considers this crucial topic, both theoretically and empirically, in two steps. First, a brief overview of utopian models and the critical literature grounds the discussion of the proposed regenerative place-making model. Second, the work weaves considerations regarding a utopian model of urban food forestry network, by conceptualising Urban Living Labs (ULLs) as flexible nodes of articulation. The ULLs network articulates a regenerative approach to place-making, grounded in the need to reconnect urban dwellers with food processes and sustain pollinators' biodiversity (closing gaps in pollinator pathways in cities). The work concludes that the key to unlocking this model's potential for replication and transplantation to distinct localities lies as much in the multiple values entailed by the proposed intervention as it does in its flexible nodes of articulation.

Romero-Lankao, P., Wilson, A., Miller, C., Sperling, J., Sovacool, B., K., Zimny-Schmidt, D., Gearhart, C., Muratori, M., Bazilian, M., Zuend, D., Young, S., Brown, M. and Arent, D. (2021)
Of Actors, Cities and Energy Systems: Advancing the Transformative Potential of Urban Electrification.
Progress in Energy 3(3), 032002, pp. 1-15
link

The electrification of transportation and the integration of electric vehicles (EVs) with buildings connected to clean grids has been touted as one of the key solutions to the global decarbonization challenge. Cities are on the frontlines of current and future electrification, as they depend on and drive electricity generation, distribution, and use. City actors also occupy a central role in the actions to enable electrification to support energy transitions in efficient, equitable, environmentally sound, and resilient ways. Currently, however, research and development on the interactions between actors, cities and energy systems is predominantly conducted in disciplinary siloes. This topical review analyzes the transformational potential of urban electrification. It focuses on efforts to electrify transportation and integrate EVs with buildings connected to a clean grid. We find that actions in these area are driving change; they are adopted by wealthier populations and on an experimental basis by specific communities. Their larger-scale growth is constrained by institutional, behavioral, and infrastructural factors. We also find that existing siloed disciplinary approaches are often incompatible with advancing holistic research. To achieve that, divergent communities of scholars need to come together to integrate their research and create broader perspectives. Through incorporation of the social sciences, these perspectives need to consider the societal limits and potentials brought to bear by human behavior and decision making. Only then can urban electrification be understood as the empirically rich and socially complex topic that it is. And only with this understanding will innovations and smart policy actions be able to tap into the transformational potential of urban electrification.

Sareen, S. (2021)
Energy infrastructure transitions and environmental governance.
Local Environment
link

At a time of great urgency for transitions to sustainability in light of climate mitigation targets, energy infrastructure is in a state of flux. Expansions in renewable energy and the persistent grasp of fossil fuels over a historically centralised sector surface new challenges of socio-spatial and environmental justice. Where does new energy infrastructure appear, how is this decided, who benefits and who is burdened? What land uses are displaced and with what socio-ecological implications? This collection pulls together insights from environmental and land governance, ethnographic studies of situated social identities, and emerging conceptualisations of energy infrastructure to address these concerns. It features contributions focused at multiple scales – the urban, regional, national and trans-local – and informed by a variety of cognate conceptual lenses: political ecology, human geography, social anthropology, urban studies, socio-technical transitions and epistemic politics. Examining cases from three continents, both the Global South and North, the theme issue presents an array of perspectives from established and emerging scholars. It seeks to combine empirically rich and theoretically rigorous enquiry at the conjuncture of energy infrastructure transitions, changing land use and morphing social identity. The aim is thus to further interdisciplinary knowledge on socio-ecological implications of cross-sectoral transitions.

Sareen, S. and Haarstad, H. (2021)
Decision-making and scalar biases in solar photovoltaics roll-out.
Current Opinion in Environmental Sustainability
link

Rapid roll-out of solar photovoltaic (PV) energy is a key component of decarbonising energy systems. Yet clear risks are involved, including footprints from land use and infrastructure as well as socio-economic inequalities. Where are the critical decisions about solar roll-out made, by whom, and to what effect for justice? The paper reviews and synthesises emerging scholarship on solar PV roll-out, cross-sectoral aspects of this multi-scalar energy transition, and energy justice. We identify a trend of diverse scalar biases, and highlight considerable emerging research on risks of scalar injustice and the policy adjustments required to avoid them during rapid solar roll-out.

Sareen, S. and Nordholm, A. J. (2021)
Sustainable development goal interactions for a just transition: multi-scalar solar energy rollout in Portugal.
Energy Sources Part B: Economics Planning and Policy.
link

Solar energy rollout has environmental and socio-economic impacts vital for just low-carbon energy transitions. The modular characteristics of solar photovoltaics enable multi-scalar deployment. How do environmental and socio-economic impacts vary across scales? This understudied relationship impacts the socio-spatiality of solar rollout, who benefits, and how this is enabled. Our study in Portugal during 2017–2020 examines how solar energy went from subsidies to record-setting competitiveness. Most new solar capacity was large scale, with barriers for community energy that weakened in 2020. We draw on interviews with 80 experts and a small-scale questionnaire survey with solar energy cooperative members. Findings show large-scale solar rollout primarily yielded environmental benefits, whereas small scale yielded socio-economic benefits. We argue that near-future joined-up solar energy policies can facilitate synergistic interactions across three United Nations Sustainable Development Goals by integrating environmental and socio-economic impacts. This main contribution can inform Portuguese and wider energy policies for sectoral development toward sustainability.

Sareen, S., Remme, D., Wågsæther, K. and Haarstad, H. (2021)
A matter of time: Explicating temporality in science and technology studies and Bergen's car-free zone development.
Energy Research & Social Science.
link

In their article on 'sociotechnical matters', Hess and Sovacool (2020) draw on extant STS scholarship to unpack 'the black box' of sociotechnical contributions to social science studies of energy. Notably absent in their synthesis is explicit attention to temporality and to the impact of temporal dimensions on the politics of material change. We argue that temporality is a key analytical entry point to unpack how energy infrastructure changes. Using the case of transitions to low-carbon mobility in urban transport in Bergen, Norway, we highlight how attention to temporality enables us to not only understand and explain, but also engage with and influence, changes in sociotechnical matters. Empirically, we deconstruct the ongoing development of car-free zones in Bergen's suburban spaces, and show how the temporal organisation of events is a key constraint in the project. Car-free zone planning occurs within a continuously evolving context, with trade-offs between requisite time to build sufficient knowledge, fast-approaching project deadlines, and the

timing of parallel synergistic processes. An analytical appreciation of the significance of time in setting and swaying the politics of material change is, we argue, instrumental to both unpacking the black box of sociotechnical matters and to informing and impacting change.

Sareen, S. and Sagmo, J. (2021)
Getting profitable CCU off the ground: Contingent pathways and Bergen Carbon Solutions.
Frontiers in Energy Research
link

As carbon capture utilization and storage (CCUS) gains policy traction and pilot project funding, CCS usually gets the limelight, whereas CCU is often overlooked. CCU, if feasible, has two potential advantages: it obviates risks and monitoring needs associated with long-term storage, and it creates economic value to offset carbon capture costs. Yet scholarly accounts of CCU feasibility are rare. To address this lacuna, the manuscript channels in-depth knowledge of a CCU start-up in Norway into a critical analysis of the barriers and opportunities for emerging sectoral enterprises. The trajectory of Bergen Carbon Solutions (BCS) during 2016–2019 is mapped by a human geographer along with its founder. We organize enquiry along three axes: (i) access to "soft" capital (this includes knowledge and human resources), (ii) a to "hard" capital (this includes financing and technical approvals), and (iii) navigation of rapid expansion. Under (i), we present and analyze the contextual conditions and contingencies for the emergence of the core value proposition. Under (ii), we detail the networks, processes, and institutional structures through which the enterprise gained its financial basis and was able to test its CCU process. Under (iii), we complement attention to organizational management by highlighting key informal and human factors. We foreground how the emergence of CCU is a relational process that depends on how actors in a changing field interact and reconfigure themselves. This informs regulatory policies and economic instruments about overlooked contextual issues related to the modulation and feasibility of scalable, profitable CCU.
While the jury may still be out on Frontiers journals and there are some elements of their AI powered interactive system that are not to my taste, my experience with the peer review process on the last two articles listed above has been positive. I think the articles are relevant and of good quality and hope you will include these as well.
Co-editors and I are wrapping up a special issue with a Frontiers journal shortly, and I have in mind to share our experience with you. It won't be possible in time for this newsletter, but certainly for the next one. I will compile our views and share an input over the summer. Briefly, I would say that while pushy and in some ways frustrating, the approach also has some advantages and in terms of the quality of manuscripts and the review process, we have been in control of ensuring standards and maintaining academic focus, and I do not see a clear basis to categorise this publisher as predatory in terms of their (three) journals I have now had experience with.

Sareen, S. and Wolf, S. A. (2021)
Accountability and sustainability transitions.
Ecological Economics.
link

What constitutes a sustainability transition? We identify sustainability transitions as premised on shifts in accountability relations – assessments of conformance with institutional controls coupled with application of sanctions, incentives, and subsidies – which structure the selection pressures that shape future demographics, technical practices, and social and material trajectories of an economic sector or domain. Contestation and adaptation of accountability mechanisms lend themselves to empirical observation. Beyond evaluating institutional changes that might support a sustainability transition, our analytic framework positions us to identify incoherent, hollow and regressive modes of accountability that constrain sustainability transitions. To operationalize our conceptual scheme, we analyze a purported case of sustainability transitions, solar energy in Portugal during the period 2017–2020. This empirical analysis juxtaposes the promise of movement to a more equitable, low-carbon energy future with institutional and material inertia. We draw on expert interviews, field observation and secondary research to apply accountability analysis to this energy transition case. We find evidence of shifts in relations of accountability that bode well for accelerated growth of solar uptake in Portugal. More broadly, this pilot application of an analytic framework for studying relations of accountability shows significant promise for advancing environmental governance research.

Sharp, D. and Raven, R. P. J. M., (2021)
Urban planning by experiment at precinct scale: embracing complexity, ambiguity, and multiplicity.
Urban Planning, 6(1), 195-207
link

Urban living labs have emerged as spatially embedded arenas for governing urban transformation, where heterogenous actor configurations experiment with new practices, institutions, and infrastructures. This article observes a nascent shift towards experimentation at the precinct scale and responds to a need to further investigate relevant processes in urban experimentation at this scale, and identifies particular challenges for urban planning. We tentatively conceptualise precincts

as spatially bounded urban environments loosely delineated by a particular combination of social or economic activity. Our methodology involves an interpretive systematic literature review of urban experimentation and urban living labs at precinct scale, along with an empirical illustration of the Net Zero Initiative at Monash University in Melbourne, Australia, which is operationalising its main campus into a living lab focussed on precinct-scale decarbonisation. We identify four processual categories relevant to precinct-scale experimentation: embedding, framing, governing, and learning. We use the empirical illustration to discuss the relevance of these processes, refine findings from the literature review and conclude with a discussion on the implications of our article for future scholarship on urban planning by experiment at precinct scale.

Simoens, M. C. and Leipold, S. (2021)
Trading radical for incremental change: the politics of a circular economy transition in the German Packaging Sector.
Journal of Environmental Policy & Planning, 1-15
link

Understanding environmental politics is crucial for sustainability transitions. We study the transition politics of the shift to a circular economy in the German packaging sector, particularly the curious case of the 2019 German Packaging Act. While the policy was born out of the unanimous wish for radical regulatory change, all actors evaluate the outcome as incremental. Following the Discursive Agency Approach and drawing upon actor interviews and documents, we show that actors' perceived fears of radical changes are critical for transition politics. This fear created a lock-in of two narratives, proposing conflicting organizational designs of packaging waste management. While the narrative lock-in was resolved by trading radical for incremental change, it left many conflicts and challenges unresolved. Our findings suggest that actors' fears not only prevent radical regulatory change but also create incremental change that may intensify unresolved conflicts and, thus, further weaken the actors' capacities for future transition politics.

Sovacool, B. K. (2021)
Reckless or Righteous? Reviewing the Sociotechnical Benefits and Risks of Climate Change Geoengineering.
Energy Strategy Reviews, 35, 100656, pp. 1-26
link

Geoengineering options such as negative emissions technologies (NETs) or greenhouse gas removal (GGR) may need to contribute towards decarbonization, by removing CO2 from the atmosphere and storing it safely in biological or geological sinks, or reflecting sunlight back into space via solar radiation management (SRM). Despite concerns about them, GGR and SRM are increasingly discussed as crucial complements to traditional climate change mitigation. Others routinely dismiss both SRM and GGR methods as a distraction from mitigation, or even as a potential moral hazard that induces complacency in reducing emissions. Yet, if climate impacts turn out to be more sudden and severe than currently known, such strategies could provide a rapid backstop to implement deeper emissions reductions, especially with techniques that require time to scale-up. Despite their importance and controversial status, most research on GGR and SRM remains technical, rather than social, and that knowledge of their technical characteristics remains limited, even within the physical and engineering sciences. Moreover, existing GGR and SRM options are changing rapidly in terms of their technical design, cost, and performance, and therefore scalability and deployment potential. To contribute to the debate, this study reviews and summarizes a large number of geoengineering assessments published over the past decade to document prospective benefits, but also reveal potential risks. It aims to provide a comprehensive evidence base on GGR and SRM technologies that is rigorous, timely, and interdisciplinary. This article begins by briefly defining geoengineering and associated technologies, describing how various techniques work, and summarizing recent market trends up until early 2021. Then, it discusses a series of advantages and disadvantages to these options before identifying tensions, research gaps, and a critical research agenda. It concludes with implications for research, policy, and governance.

Sovacool, B. K., Hess, D. J., and Cantoni, R. (2021)
Energy transitions from the cradle to the grave: A meta-theoretical framework integrating responsible innovation, social practices, and energy justice.
Energy Research & Social Science, 75, 102027, pp. 1-16

An almost inexhaustible number of conceptual approaches has arisen in the past few decades to seek to explain the interlinked phenomena of energy transitions, low-carbon transitions, or sociotechnical change. With an eye for theoretical synthesis, this study asks: What do three particular epistemic communities—those concerning innovation, practices, and justice—say about energy transitions? What does this literature reveal about the injustices and inequalities of energy transitions? Finally, what can we learn by integrating aspects of this literature? The study answers these questions by drawing from responsible research and innovation, social practice theory, and energy justice approaches. Essentially the first is about the design of

technology, the second how it is used, the third the broader societal and global implications. Taken together, the study offers an integrative framework capable of analyzing transitions from their "cradle" of design to their "life" of use to their "grave" of aftereffects. It explores the extent to which the three perspectives can be integrated into a meta-theoretical framework. This integrative framework is then applied to four diverse case studies: French nuclear power, Greek wind energy, Papua New Guinean solar energy, and Estonian oil shale.

Sovacool, B. K., Hook, A., Sareen, S. and Geels, F., W. (2021)
Global sustainability, innovation and governance dynamics of national smart electricity meter transitions.
Global Environmental Change, 68, 102272, pp. 1-25
link

Smart electricity meters are a central feature of any future smart grid, and therefore represent a rapid and significant household energy transition, growing by our calculations from less than 23.5 million smart meters in 2010 to an estimated 729.1 million in 2019, a decadal growth rate of 3013%. What are the varying economic, governance, and energy and climate sustainability aspects associated with the diffusion of smart meters for electricity? What lessons can be learned from the ongoing rollouts of smart meters around the world? Based on an original dataset twice as comprehensive as the current state of the art, this study examines smart meter deployment across 41 national programs and 61 subnational programs that collectively target 1.49 billion installations involving 47 countries. In addition to rates of adoption and the relative influence of factors such as technology costs, we examine adoption requirements, modes of information provision, patterns of incumbency and management, behavioral changes and energy savings, emissions reductions, policies, and links to other low-carbon transitions such as energy efficiency or renewable energy. We identify numerous weak spots in the literature, notably the lack of harmonized datasets as well as inconsistent scope and quality within national cost-benefit analyses of smart meter programs. Most smart meters have a lifetime of only 20 years, leading to future challenges concerning repair, care, and waste. National-scale programs (notably China) account for a far larger number of installations than subnational ones, and national scale programs also install smart meters more affordably, i.e. with lower general costs. Finally, the transformative effect of smart meters may be oversold, and we find that smart electricity meters are a technology that is complementary, rather than disruptive or transformative, one that largely does not challenge the dominant practices and roles of electricity suppliers, firms, or network operators.

Tani, A., Lopolito, A. and Morone, P. (2021)
Spatial perspectives on niche empowerment: an agent-based model.
Regional Studies
link

This paper aims at increasing our understanding of the role of space dimensions in niche evolution dynamics. To accomplish this goal, an agent-based model is developed, locating agents in geographical space. The model is then used to show how local niches built on geographical proximity perform differently from global niches built on relative proximity, in terms of the timing of niche creation, the velocity of niche maturation, average profit, environmental uncertainty and knowledge exchange. It concludes that the spatial dimension of niches should be considered in the development of policies to promote sustainable transitions.

Van Summeren, L. F. M., Wieczorek, A. J. and Verbong, G. P. J. (2021)
The merits of becoming smart: How Flemish and Dutch energy communities mobilise digital technology to enhance their agency in the energy transition.
Energy Research & Social Science, 79, p. 102160
link

Recent developments in Information and Communication Technology (ICT) and ongoing digitalisation processes play key roles in the energy transition. It is often argued that digital technology has the potential to empower citizens and communities and thereby contribute not only to a more sustainable but also to a more democratic and fairer energy system. It is however unclear how the increasing number of frontrunner energy communities that enter the field of smart grids can benefit from these novel ICT solutions and meaningfully contribute to the sustainable energy transition. This paper explores how energy communities can mobilise ICT to enhance their agency in the energy transition. As part of a holistic multiple-case study approach, two energy communities were closely followed over a period of three years. Data were collected during project meetings and through semi-structured interviews. This paper observes that energy communities can mobilise ICT to change the way tech-nology operates, strengthen collaboration to increase collective agency and, support their efforts in creating, disrupting, or maintaining institutions. The studied energy communities adopted a 'fit and transform' strategy in which they mobilised ICT to fit in the incumbent energy system in the short term, while aiming for trans- formation in the long term. ICT

however also creates new challenges in the form of interoperability issues. This paper calls for more attention on the role of ICT when studying agency in unfolding sustainability transitions, especially in fields in which digital technology is believed to play a major role in the transformation.

Vasquez-Delsolar, M. and Merino, A. (2021)
Social enterprises towards a sustainable business system: A model of institutional dynamics.
EIST, in press
link

Despite the growing interest of sustainability transition studies on the role of business actors in shaping transitions, the institutionalized logic of the capitalist enterprise underlying such agency has been overlooked. However, such logic might be understood as a dominant regime that leads to unsustainable systems. We intend to contribute to transitions research by focusing on the agency of social enterprises as non-dominant actors searching for challenging and transforming the institutionalized logics in the business system. Therefore, we disentangle the institutional mechanisms driven by social enterprises by proposing a theoretical model built upon a literature review of sustainability transitions from institutional perspectives, offering a set of explanatory propositions to allow empirical examination. Those mechanisms and propositions operate at three levels: inside the individual, inside the niche, and at the interplay between the niche and the business regime. Finally, we include a real-world example of a social enterprise to illustrate the model.

Verdolini, E., Sovacool, B. K. and Drummond, P. (2021)
Channeling diverse innovation pressures to support European sustainability transitions.
Environmental Research Letters, 16(6), 061001, pp. 1-6
link

In light of pressing climate mitigation needs and commitments, swift and strategic action is required to reorient and accelerate technological transitions towards an economy compatible with the goals of the Paris Agreement. More generally, a consensus is emerging that innovation patterns and processes must be commensurate to our growing sustainability challenges. In this perspective, we show how technological innovation systems are being harnessed to address key decarbonization challenges in Europe. Specifically, we illustrate five recurring lessons on how technology costs and configurations, as well as actors, values and countervailing pressures, influence the development and diffusion of some of the most promising technologies for the decarbonization of agriculture, buildings, electricity, information and communication technologies (ICT), industry and transport.

Walwyn, D. R. and Kraemer-Mbula, E. (2021)
Captives of Capital? Exploring economic models as recursive and performative agents.
Energy Research & Social Science, 78 102131
link

The financial sector could play a more significant and transformative role in supporting the energy transition. Portraying techno-economic models, upon which the sector depends for the support of its investment decisions, as performative agents which serve only to entrench the hegemony of the present incumbents, undermines the potential for using such models to accelerate the energy transition. In this article, we outline the role of capital markets in the energy transition and show how techno-economic modelling has attracted a growing interest from authors within the renewable energy sector. We summarise the concerns of social scientists about economic modelling, neatly captured by its depiction as a calculative agency intent on self-replication. We argue that there is a need to align the two perspectives, especially as a means of strengthening the support of the financial sector for the energy transition, and suggest several ways in which this alignment could be achieved. Important research questions include further exploration of the recursive and performative relationship between economic models and the economy, the inclusion of externalities in modelling studies, the use of economic models as agents of change rather than recalcitrance, and finally strengthening capital markets in the Global South.

Zurbriggen, C. and Juri, S. (2021)
Designing Transition Spaces for Sustainable Futures: SARAS Transition Lab.
The Future of the Past: Paths towards Participatory Governance for Cultural Heritage. Routledge
link

The various socio-ecological crises that characterize these transitional times demand new ways of understanding, thinking and acting. In this paper, we put forward a program for the creation of a transition lab in the context of the South American Institute for Resilience and Sustainability Studies. By drawing inspiration and integrating the approaches of Transition Design, Resilience Thinking and Policy Design, we offer a model of an experimental space for transdisciplinary and trans-sector collaboration with multiple actors from academia, public and private sectors, as well as civil society.