

STRN Newsletter



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About

The STRN newsletter is
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December

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Shutterstock

Editorial

by Jochen Markard
(with inputs from
Xiao-Shan Yap & Daniel Rosenbloom)



2 minutes – That's the time of weightlessness, the four passengers on board of Richard Branson's spaceship could enjoy on July 11. In the 'billionaires space race', Branson, Bezos and Musk are seeking to establish space tourism as a new industry and stepping stone for further endeavors into space. "We need to build a road to space so that our children can build the future."- Jeff Bezos said. Really? The emerging field of space tourism creates new challenges. In terms of carbon footprint, each rocket launch results in about 150 tons of CO₂ emissions, not to speak of soot and other emissions. This makes a rocket launch equivalent to about 150-300 transatlantic flights (per passenger). A key question underlying space tourism and other new industries is what needs they create and what the associated sustainability implications are.

14.8% - That's the share of votes the German Greens won at last Sunday's election. A party which has perhaps most prominently promoted action on climate change. 14.8% - that's good news, the best result in the party's history. A share, green parties in other places can only dream of, if they exist at all. But 14.8% also seems small given that climate change is likely to become one of the biggest challenges, humankind has ever been confronted with. Perhaps too small to trigger a major shift in a policy agenda that has to transform almost every sector. A policy agenda that has to become global in its reach.

370'000 – That's the number of new(!) fossil fuel heating systems installed in Germany just in the first half of this year, 2021. Such new systems are usually in operation for 20 years or more. So, they will continue to generate emissions until close to mid-century. This takes place at a time when we are supposed to achieve net-zero and in a sector where low-carbon alternatives such as electric heat pumps (of which 76'000 were installed in the above period) are available, mature and cost-competitive. And policy solutions are already gaining traction elsewhere in the forms of bans on new fossil-fuel heating. If we are not making major progress in a sector, in which we already have viable alternatives, how are we supposed to tackle the even larger challenges in e.g., aviation, steel making or in the chemical industry?

0 – That's the number of climate measures included in the 30 billion Euro emergency aid funding the German government released after the heavy flooding events in July this year. While it is critically important that financial aid is provided to rebuild what has been destroyed, it is equally important to "build back better". Why not build back 'climate proof homes', which are better protected from flooding and other natural disasters and, at the same time, use the best available technology to have as little a carbon footprint as possible?

These examples show that much remains to be done, many different areas, in which action is needed and also where transition research can make a difference, from political dynamics, to unsustainable practices, to the perpetuation (and hopefully undoing) of lock-ins. Perhaps we can address the emergence of unsustainable practices and businesses with a new breed of precautionary transition policy? Or implement policies to specifically tackle long-lasting investments whose effects reach way into the future? Or seek to build policy systems that also include a long-term and cross-departmental orientation?

With IST 2021 just around the corner, I am very much looking forward to the new approaches, studies, ideas and visions you have been working on and will present there. Given the sustainability challenges we are facing, we need to work even harder to build knowledge on and help realize systems change. And with 130 economies and counting moving to adopt net-zero targets, there will be an increasingly critical role for transition perspectives in informing research, policy and practice in the years to come.

EIST Journal

As of 1st of August, the new and extended editorial team took office for EIST. In the next STRN newsletter, we will introduce ourselves along with the new editorial strategy and bid farewell to the former EiC Jeroen van den Bergh.

As for now, Vol 40 is completed. Please find the content with direct links to the articles below.

Bernhard Truffer,
Editor in Chief, EIST
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EIST Volume 40 – Overview of articles

Amir F.N. Abdul-Manan, book review of “How to Avoid a Climate Disaster, by Bill Gates”, [Pages 60-61](#).

Andrew Chapman, Yosuke Shigetomi, Hajime Ohno, Benjamin McLellan, Akihiko Shinozaki. Evaluating the global impact of low-carbon energy transitions on social equity, [Pages 332-347](#).

Miriam E. Hacker, Christian Binz. Navigating institutional complexity in socio-technical transitions, [Pages 367-381](#).

Jonathan Köhler, Elisabeth Dütschke, Julia Wittmayer. Introduction to “Zooming in and out: Special issue on local transition governance”. [Pages 203-206](#).

Jochen Markard, Adrian Rinscheid, Linda Widdel. Analyzing transitions through the lens of discourse networks: Coal phase-out in Germany. [Pages 315-331](#).

Freek de Haan, Ellen H.M. Moors, Arjen M. Dondorp, Wouter P.C. Boon. Market Formation in a Global Health Transition. [Pages 40-59](#).

Frank Boons, Bob Doherty, Jonathan Köhler, George Papachristos, Peter Wells. Disrupting transitions: Qualitatively modelling the impact of Covid-19 on UK food and mobility provision, [Pages 1-19](#).

Josef Taalbi. Innovation in the long run: Perspectives on technological transitions in Sweden 1908–2016, [Pages 222-248](#).

Margarida Fontes, Nuno Bento, Allan Dahl Andersen. Unleashing the industrial transformative capacity of innovations, [Pages 207-221](#).

Rob Raven, David Reynolds, Ruth Lane, Jo Lindsay, Annica Kronsell, Dharma Arunachalam. Households in sustainability transitions: a systematic review and new research avenues. [Pages 87-107](#).

Emamdeen Fohim, Suyash Jolly. What's underneath? Social skills throughout sustainability transitions, [Pages 348-366](#).

Åsa Löfgren, Johan Rootzén. Brick by brick: Governing

industry decarbonization in the face of uncertainty and risk, [Pages 189-202](#).

Laura van Oers, Giuseppe Feola, Ellen Moors, Hens Runhaar. The politics of deliberate destabilisation for sustainability transitions, [Pages 159-171](#).

Kristin Ystmark Bjerkan, Lillian Hansen, Markus Steen. Towards sustainability in the port sector: The role of intermediation in transition work, [Pages 296-314](#).

Johan Miörner, Christian Binz. Towards a multi-scalar perspective on transition trajectories, [Pages 172-188](#).

Jesse L. Reynolds. Earth system interventions as technologies of the Anthropocene, [Pages 132-146](#).

Dr Katja Müller, Prof Tom Morton. The space, the time, and the money. Wind energy politics in East Germany, [Pages 62-72](#).

R.C. Spijkerboer, C. Zuidema, T. Busscher, J. Arts. Unravelling institutional work patterns: Planning offshore wind farms in contested space, [Pages 249-261](#).

Johanna Ulmanen, Anna Bergek. Influences of technological and sectoral contexts on technological innovation systems, [Pages 20-39](#).

T.L. Lantz, G. Ioppolo, T. Yigitcanlar, R. Arbolino. Understanding the correlation between energy transition and urbanization, [Pages 73-86](#).

Güldem Özatağan, Emel Karakaya Ayalp. Sustainable futures of agro-food? İzmir's sustainable agro-food transitions in the making, [Pages 283-295](#).

Johnn Andersson, Hans Hellsmark, Björn Sandén. The outcomes of directionality: Towards a morphology of sociotechnical systems, [Pages 108-131](#).

Katherine Lovell, Timothy J. Foxon. Framing branching points for transition: Policy and pathways for UK heat decarbonisation, [Pages 147-158](#).

STRN Events



12th IST conference, October 5-8, 2021

Only a few more days to go! Download the program [here](#) (update of Sept-20).

For more details, please visit the [conference website](#). Please direct any questions to ist2021@isi.fraunhofer.de.

Other Events

Eu-SPRI Early Career Researchers Conference

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.

Workshops on transition governance and design

Can we design transitions?

Our research is more relevant than ever: transformative change is actually happening real time and policy, business and communities are engaging with it in different ways. This also means the demand for insight and support from transition scholars is increasing: what are we offering in support? One of the areas close to the societal frontiers of (sustainability) transitions is the transdisciplinary and action oriented research in which framing, envisioning, back-casting, experimentation and social learning are key elements. Two schools of thought that work with these are transition governance and management and social design. In a series of online academic workshops we aim to invite scholars from both worlds to co-create a symbiosis: development-by-design. The workshops are based on a concept note and will include an open information session and three two-hour intensive work session. The product will be a joint paper as well as a method that will be the basis for the [2022 International Architecture Biennale in Rotterdam the Netherlands](#). If you are interested to join, please sign up via [this link](#).

Other News

Chair in Organizations and Sustainability

Utrecht University is pleased to invite applications for a Chair in Organizations and Sustainability. The Chair will be appointed at the Faculty of Geosciences and its Copernicus Institute of Sustainable Development to help drive education, research, and impact creation in this area. The Chair is a full-time appointment including a management component. An executive search exercise is being undertaken by Perrett Laver to assist the recruitment committee. Applications, consisting of a covering letter explaining motivation and qualifications for the position and a full curriculum vitae can be uploaded [here](#), quoting reference 5282.

New Projects

ACES – Accelerating Energy and Sustainability Transitions in Ports: From national visions to co-constructed transition

The port sector might play a decisive role in sustainability transitioning because it joins a series of actors and domains in energy and transport systems. ACES aims to facilitate and accelerate sector-wide energy and sustainability transitions in Norwegian ports. It applies transition management to enhance the transition capability of individual ports, as well as to strengthen energy transition and port sustainability on the national political agenda, hereunder facilitating vision and strategy development. Establishing a national transition arena is particularly important to enable sector-wide transition work that captures the promise and challenge with transitioning a sector characterised by extensive intersectoral couplings and multilevel governance. ACES is funded by the Research Council of Norway, and the research is conducted by SINTEF (NOR), Norwegian University of Science and Technology (NOR), and Drift (NL). ACES also includes 13 collaboration partners from the port sector, public authorities, trade and interest organisations.

More information on the [home page](#) (Norwegian).

EcoVillages as Incubators for Sustainability Transitions (EVIST) Research Project

The research project “EcoVillages as Incubators for Sustainability Transitions” (EVIST), started on June 1st 2021 at the Center for Religion, Economy and Politics at the University of Basel, and is funded for four years by the Swiss National Science Foundation. The goal of this

project is to study how ecovillages contribute to local sustainability transitions by drawing upon a boundary work perspective. The project raises the following research question: What boundary-bridging arrangements facilitate the local diffusion of ecovillages' innovations in different settings? It will investigate ecovillages in different countries through a mixed-method approach. The project team will collaborate with practitioners and other project partners in order to better understand the conditions for the diffusion of ecovillages' practices into their local social environment.

For more information visit [this link](#) or follow us on [Research Gate](#).

EX-TRA: Experimenting with city streets to transform urban mobility

Across Europe, cities are attempting to radically reduce their reliance on car-based mobility. To support these efforts, EX-TRA will learn from transition experiments in the streets of six cities: Amsterdam, Bologna, Milan, Ghent, Munich and London. The project aims to generate insights into: (1) combinations of physical design and regulation to increase diversity and inclusivity of uses and users in city streets; (2) transport and land use conditions to enable walking and cycling accessibility in city districts; (3) complementary shared and micro-mobility and freight delivery options; and (4) strategies of change that can accelerate the transition towards a 'post-car' city.

For more information, contact the Coordinator: [Luca Bertolini](#), Universiteit van Amsterdam or Project Assistant: [Minnie Bates](#), and check out the [project website](#).

Method School – A report

Report on the 2nd STRN/NEST Methodology School

The 2nd STRN/NEST methodology school was held online over 7 weeks from 29th April to 10th June. There were around 120 applications of which 50 participants from all over the world were selected. There were more than 40 actual participants for all the sessions, which allowing for time zone differences demonstrates both the popularity of the school and the commitment of the participants. The topics included:

Introduction to Epistemology & Ontology

Qualitative Research: what is it and what are quality criteria

Epistemological and ontological foundations of transition research

Transition Research: Philosophy and Design
Introduction to quantitative methods

Transforming methodologies for pluriversal sustainability
Systematic turn? Evaluation, metrics, comparisons

Which model to use when?

Bridging models and communicating with policymakers

Large scale models and empirical modelling

Introduction to experiments in transitions

Researching paradoxes in transformative innovation and sustainability transition

Transdisciplinarity in Transitions - Workshop

We also organized a 'meet the editors' session with editors from Research Policy, EIST, TFSC and ERSS and a 'Policy Hackathon' group project, judged by programme managers from the Swedish innovation agency VINNOVA and associate professor Markus Grillitsch. An evening online social programme with pub quizzes and movie nights was also well attended.

Many thanks to the organising team:

Lea Fünfschilling, Jonathan Köhler, Machteld Simoens, Valentina Nakic, Carolina Resende Haddad, Floor Alkemade, Anton Sentic, Adriaan van der Loos, Bonno Pel and the administrative and technical support staff from TU Eindhoven. We would also like to thank all the external lecturers: Olivier Ejderyan, Frank Geels, Auke Hoekstra, Karolina Safarzynska, Mariësse van Sluisveld, Adrian Smith, Andy Stirling, Bruno Turnehim, Frances Westley, Anna Wieczorek, Julia Wittmayer, Mohammad Zolfagharian.



Impressions from participants

Emily Christley, PhD student at KTH, Sweden: Over 7 weeks almost 50 students became part of the STRN/NEST Methodology School and I count myself lucky to have been one of them. Together we gained insights into different methodologies and began to understand their implications for transitions research, with deep discussions as to its philosophical

underpinnings, lectures on quantitative modelling approaches, and a workshop on transdisciplinary methods. The School's grand challenge, the Policy Hackathon, allowed us to apply our knowledge and test our understanding. Working in groups, we developed and designed research proposals to investigate real world innovation programmes. Presenting to an expert panel, we had a taste of what it is to conduct research in a policy-facing context. The experience has been invaluable, introducing me to new ideas, and giving me an opportunity to ask questions, and a space to developing my thinking. It stands me in good stead as I continue with my PhD studies, and I am sure my fellow participants would say the same. Although the pandemic meant we could not meet in person, its online format allowed the participation of students and instructors from around the world, bringing us together, if not physically, then academically. I doubt I am alone in giving my heartfelt thanks to all those involved, so thank you to my fellow students, the engaged instructors, and, not least, to the organisers of the School for making it happen.

Tom Hawxwell, PhD Candidate, HafenCity University, Germany: The online seven-week part-time school offered diverse perspectives on these complex topics through a range of webinars focusing on epistemology and ontology, quantitative and mixed methods, qualitative research, paradoxes in sustainability transitions research, and experimentation and transdisciplinarity. Additionally, there was an opportunity to get (virtually) up-close and personal with a range of journal editors, a workshop to support us to apply a transdisciplinary lens to our own research and a policy hackathon where we could apply the lessons-learned in a real policy setting and connect with other students through group work. There was much discussion on the pros and cons of the online approach as opposed to the live format. Although it is difficult to substitute for the kind of immersion one experiences in an in-person situation, the organisers did a great job of maintaining continuity and engagement throughout the seven weeks. All sessions were characterised by high participation and rich discussion. Additionally, the access we had to great academics, who could tune-in from around the world, as well as the enabled inclusion of students from outside Europe, certainly made the online format worthwhile. It was also nice to be able to digest the dense stream of new knowledge over the seven weeks rather than have it all in a five-day period. Not to mention the saved emissions! The school really helped to map the contours of the academic landscape of the sustainability transitions research community and in turn better understand our own location in this complex terrain. I would highly recommend it to any researcher who is trying to bring their research design together or would just like to shed a critical eye on the assumptions, strengths and weaknesses that are built into their own approaches. I would like to send a big thank you to Lea Fünfschilling and Johnathan Köhler

along with all the organisers and contributors who volunteered their time for the organisation of the school!



Leandro Ferreira, PhD Candidate at Pontifical Catholic University from Minas Gerais, Brazil: The 2nd STRN Methodology School happened in a singular world context. Within the COVID-19 pandemic and following orientations from health authorities of social distance, the event was planned to be fully on-line. The on-line format allowed the participation of different researchers in Sustainability Transition from different regions of the world, such as Latin and Northern America, Southern Asia, Australia and Europe. The plurality of views of STS gave the chance for a terrific exchange of impressions over the objects, theories and methodologies. We had the opportunity to be introduced to epistemological/ontological discussions and more applied research methods in STS. Followed by some breakout and Q&A sessions, we had the chance to reflect, based on the literature and experts' expositions, on the impact of our own research projects. From qualitative to more quantitative methods, from mainstream to decolonial perspectives, some twisting dilemmas were presented to scale up our research, in a sense that it can have glocal social impact. In addition, the Hackathon session was an interesting experience to move us scholars away from our "laboratory experiments". In this context, we were able to mobilize and operationalize the content from the School on a single sustainability transition proposal. In the end and in front of a board of distinguish policy makers, presentations from every group reflected on different points of view regarding the characteristics of STS theories and methodologies to promote an actual social impact. By and large, the School contributed on the one side to the diffusion of the STS and their applicable methodologies, and on the other side to the integration and convergence of researchers from different backgrounds, in my case International Relations, that engage in interdisciplinarity with STS. The experience was really enriching. Looking forward to the next one.

Publications

PhD theses

Phirouzabadi, A. M. (2021)

Newcastle Business School, University of Newcastle

A dynamic approach to technology interaction in the era of ferment

[link](#)

It is critical to investigate the development of technologies in relation with each other, especially in sectors such as energy and transportation that struggle with grand challenges. This thesis takes a biological perspective and investigates whether technologies in the early stage of their technological life cycle, known as 'era of ferment', interact with one another in the same way that populations do in an ecology. A multimodal and multidimensional technology interaction framework is proposed using the Technological Innovation System (TIS) and the biological relationship modes. The proposed framework is applied to powertrain technologies in US automobile market through a mixed method research of narrative, quantification, and simulation between 1985 and 2050. Findings reveal that while inter-technology relationships extend beyond pure competition or symbiosis (e.g., parasitism and commensalism), they establish around both implicit and explicit dimensions (e.g., artefact, knowledge, policies, and expectations). This thesis mainly contributes to the path dependency and sustainability transition literatures by revealing that transitions processes are not only a result of path creation and path destruction, but also a result of cross-path socio-technical interactions via positive and negative externalities. Particularly, the TIS framework is made more outward oriented—first by proposing 'co-dynamics' as a complementary dynamical unit of analysis to the conventional structural couplings, and second by proposing 'motor of creative destruction' and 'motor of creative accumulation'. Policy makers are informed of when, and to what extent, they should invest in emerging technologies, divest from incumbent technologies, or pursue an intermediate solution between new and incumbent technologies, while avoiding any dead ends.

Stalmokaitė, I. (2021)

Södertörn University, Stockholm, Sweden

New Tides in Shipping: Studying incumbent firms in maritime energy transitions.

[link](#)

Although recognised as the most energy-efficient mode of transportation compared to air and land-based

transport, maritime transportation contributes significantly to air-borne emissions, alongside other types of pollutants. Hence, it is apparent that alternatives to highly polluting conventional marine fuels, i.e., crude oil or diesel, have to be found in shipping, just as in other sectors. Responding to calls for a greater attention to actors' roles in transitions, as well as for broader sectoral coverage of empirical work in the field of sustainability transition studies, this doctoral thesis explores the role of incumbents (established shipping firms) in the early stages of maritime energy transitions. By drawing on a multi-level perspective from the socio-technical transition literature, the dynamic capabilities approach from the strategic management literature, and structuration theory, this thesis contributes new knowledge on "how" and "why" frontrunner incumbent shipping firms engage with maritime niche technologies and alternative energy solutions. The findings indicate that the roles of shipping firms in the early stage of maritime energy transitions are diverse and more complex than often accounted for in sustainability transitions literature. It is demonstrated that due to increased regulatory, social and competitive pressures, firms' activities with regards to engagement in maritime niche technologies and alternative energy have shifted from reactive to a mix of strategies where a portfolio of solutions are pursued at the same time across and within individual firms. While adoption of incremental end-of-pipe technologies reinforces dependence on the fossil fuel energy system, a parallel engagement and experimentation with alternative energy solutions indicates that incumbent firms can also adopt a central role in niche development activities.

Books

Aalto, P. (Ed) (2021)

Electrification: Accelerating the Energy Transition.

1st Edition. Elsevier

[link](#)

The book offers a widely applicable framework to delineate context-sensitive pathways by which this transition can be accelerated and lists the types of processes and structures that may hinder progress towards this goal. The framework draws insights from well-established literature, ranging from technological studies to socio-technical studies of energy transitions, on to strategic niche management approaches, (international) political economy approaches, and institutionalist literatures, while also adopting wider social theoretical ideas from structuration theory. Contributors discuss a multitude of case studies drawn from global examples of electrification projects. Brief case studies and text boxes help users further

understand this domain and the technological, infrastructural and societal structures that may exercise significant powers.

Hyysalo, S. (2021)

Citizen Activities in Energy Transition: User Innovation, new communities and the Shaping of Sustainable Future

Routledge: New York, Open access

[link](#)

While climate and energy policies try to mobilize citizens into improving their heating systems and energy consumption, many people have already far exceeded the expectations. Some develop new to the world innovations in small-scale renewable energy systems in their free time. Others aide their peers in adopting and adapting new technology. Many participate in physical and digital energy communities that have come to have capacity to shape new technology and society widely. *Citizen activities in energy transition* uncovers the often overlooked contributions that citizens make in energy innovation and long-term energy transition. It is the first research monograph that addresses the rapidly changing citizen engagements in innovation, technology adoption, intermediation, market creation and legitimacy building for low-carbon solutions. It links research in innovation studies, sustainability transitions and science & technology studies and advances a new approach for the study of user contributions to innovation and sociotechnical change called biographies of artifacts and practices. The book is a useful resource for those seeking to understand the role of users in innovation, energy systems change and the import of new digital communities in present and future sociotechnical change. Academics, policy makers and managers are given an in-depth dive into the “demand side” of energy system in-depth and beyond the patterns of investment, adoption and social acceptance that have traditionally occupied their attention.

Kanerva, M. (2021)

The new meatways and sustainability: Discourses and social practices

Transcript Verlag, open access

[link](#)

Social practice theories help challenge the often hidden paradigms, worldviews and values at the basis of many unsustainable practices. However, practice theoretical research can also struggle to provide useful results for policymaking. Connected to social practices, discourses and their boundaries define what is seen as possible, what the range of issues and their solutions are. By exploring the connections between practices and

discourses - where paradigms, worldviews and values are represented through cognitive frames – this book develops, firstly, a conceptual approach to help enable purposive change in unsustainable social practices. This is done in an interdisciplinary manner integrating different literatures. Secondly, the book takes the current vastly unsustainable meat system as a central theme. Radical transformation towards new meatways, such as strong flexitarianism, is arguably necessary, yet complex psychological, ideological and power related mechanisms still inhibit change. Discourses around new solutions, such as cultivated meat, new generation plant-based meats, and insects, are explored for answers.

Papers

Ampe, K., Paredis, E., Asveld, L., Osseweijer, P., and Block, T. (2021)

Power struggles in policy feedback processes: incremental steps towards a circular economy within Dutch wastewater policy.

Policy Sciences, 54, 579–607

[link](#)

Environmental problems are usually not tackled with path-departing policies but rather with incrementally adjusted or unchanged policies. One way to address incremental change is the policy feedback approach, which initially focussed on self-reinforcing feedback and path-dependency. Today, self-undermining feedback is also increasingly being studied, centring on agency and change. However, it is unclear precisely how actors use power in policy feedback processes. Therefore, this study applied a power perspective and the policy arrangement approach to a case study of the reorientation towards a circular economy in Dutch wastewater policy between 2008 and 2018, which resulted in incremental instead of fundamental policy change. Here it was observed that self-undermining feedback was generated from 2008 onwards but the balance quickly shifted back to self-reinforcing feedback, indicating that the analysed power struggles led to incremental change. These dynamics resemble a shift from the so-called paths and forks (i.e. fork in the road) towards the boomerang pattern (i.e. returning to its original position) of policy change. The patterns are explained by focussing on powerful actors that resist change through the use of incremental reforms, the ongoing struggles of these actors in facilitating self-reinforcing feedback and the role of interpretation in using feedback as a resource. Overall, this study provides a nuanced understanding of incremental change by directing attention to the power struggles of

actors in policy feedback processes. For practitioners, the study emphasises the importance of power struggles in enabling a circular economy.

Andersson, J., Hellsmark, H. and Sandén, B.A. (2021)

The outcomes of directionality: towards a morphology of sociotechnical systems.

Environ. Innov. Soc. Transitions, 40, 108–131

[link](#)

The sustainability transitions literature departs from the idea that grand challenges such as climate change and rising inequality call for far-reaching changes in sociotechnical systems of production and consumption. This implies a dual interest in the directionality of innovation; some directions of change can be perceived as more desirable, while others may be more plausible due to the path dependent nature of sociotechnical change. The specific characteristics of the potential outcomes of directionality have, however, received little attention. Our aim is therefore to unpack and conceptualize the multidimensional space in which sociotechnical systems may adopt different shapes and configurations. We also provide three illustrative empirical examples where directionality has resulted in systems with different technical, social and spatial characteristics. The ideas put forward in this paper can be seen as a contribution to a morphology of socio-technical systems and thereby support efforts to investigate or promote specific directions of change.

Barrella, R., Linares, J. I., Romero, J. C., Arenas, E. M., Centeno, E. (2021)

Does cash money solve energy poverty? Assessing the impact of household heating allowances in Spain.

Energy Research & Social Science, 80, 102216-1 - 102216-18

[link](#)

Energy poverty could be identified as the inability of households to attain a necessitated level of domestic energy services. Since Boardman's pioneering studies, EU Member States have progressively tackled this issue through both mitigating and structural measures. Among the former are the financial aids that seek to support vulnerable households in paying their heating bills. These widespread measures usually suffer from design problems, which can affect their efficacy. That is precisely what this paper aims to provide: an analysis of the effectiveness of the Thermal Social Allowance (TSA) in one of the Member States (Spain), as well as a proposal to redefine it, i.e. the Thermal Energy Cheque (TEC), to address some of its limitations.

For that purpose, this paper proposes a bottom-up methodology to characterise Spanish households'

theoretical expenditures for heating and domestic hot water. Then, the TEC proposal integrates this methodology in the calculation of an energy cheque that would enhance the current TSA policy. Furthermore, an impact assessment is carried out to evaluate the effectiveness of the two measures in reducing winter energy poverty.

The main findings show that in 2019 the limitations in the design of the TSA led to a reduction of winter energy poverty of only 1%, whereas the implementation of the TEC would reduce it by 11%. Nevertheless, both are costly measures that do not tackle other constituent factors of energy poverty, e.g. low energy efficiency of housing, making them unsuitable as medium-long term policies.

Bjerkan, K.Y., Ryghaug, M. and Skjølsvold, T. M. (2021)

Actors in energy transitions. Transformative potentials at the intersection between Norwegian port and transport systems.

Energy Research & Social Science, 72, 101868

[link](#)

Although actors are of central importance in the progress of energy transitions, their roles and contributions have received limited attention by transition scholars. This article aims to fill this gap by taking a role-centric approach to actors and by expanding existing user role typologies to include the variety of actors involved in such transitions. This allows for a more comprehensive grasp of the potential role of actors in accelerating energy transitions. To explore how particular constellations of actor roles can shape energy transitions, we turn to an under-addressed transition site, namely ports. As nodes in transport systems, ports may shape and potentially transform the energy use and practices in the three domains that intersect in ports: the port domain, the sea transport domain, and the hinterland transport domain. We find that port actors' fulfilment of their roles differs between the three domains, which differ according to whether actors are united by an uncontroversial innovation, and whether there is a strong intermediary role. We also find that port actors are collectively more able to shape energy transitions in ports than in related transport systems. We conclude that studying the complex and context-laden realities of ports is a useful exercise for exploring the variety of role constellations that could shape energy transitions.

Bjerkan, K.Y. and Ryghaug, M. (2021)

Diverging pathways to port sustainability: How social processes shape and direct transition work.

Technological Forecasting and Social Change, 166, 120595

[link](#)

To counter climate change, societies are under pressure to transform energy and transport sectors. Considering the crucial node position of ports in the intersection between energy and transport systems and their connecting of numerous sectors, markets, and value chains, they have hitherto received surprisingly little attention as potential sites for whole system thinking and deep transition. Their heterogeneity suggests that ports are likely to follow different transition pathways. This study explores two Norwegian frontrunner ports to demonstrate how social processes are part of the fabric that constitutes transition pathways in ports. The transition pathways in the two ports diverge according to how they are shaped by deep learning, resource capacity and the collective action of their wider networks, as well as the specificity of expectations. The study complements existing research on transition pathways by focusing on social processes beyond the niche level and by suggesting inter-process and inter-level dynamics to be decisive for the direction of transition work. Contrary to earlier findings, the paper demonstrates how broad and diversified networks may also represent a challenge to the directionality of transitions work. Ports can, however, promote transition work by aligning expectations to port sustainability with expectations in specific value chains.

Bjerkan, K.Y. and Seter, H. (2021)

Policy and politics in energy transitions. A case study on shore power in Oslo.

Energy Policy, 153, 112259

[link](#)

Their position in transport systems allows ports to play a fundamental role in energy transitions. In increasingly ambitious quests to promote sustainability, ports often look to shore power to reduce emissions. To fill knowledge gaps regarding empirical experiences with shore power, this study turns to the transition to shore power in Oslo, Norway. In doing so, it demonstrates the instrumental role policy and politics can play in transitions. To explore this particular transition, we rely on document analysis and interviews with actors around the Port of Oslo and discuss their involvement with reference to the Multiple-Streams Approach. We argue that the main reason for successful implementation in this case was the environmental thrust and the lack of controversy. The transition was supported by shore power's ability to address different problems experienced by different actors, by the lack of competition from other policies and by a range of political influences which gave momentum to and aligned policy domains. Specifically, we find that the political stream was less prominent in selecting a policy, but more prominent in realizing it. Although the experiences from this particular transition are not

necessarily transferrable beyond this case, our study demonstrates the importance of policy alignment, and argues that holistic policy making could be crucial to ensure deep transitions – in which ports can be expected to be prominent.

Boyle, A. D., Leggat, G., Morikawa, L., Pappas, Y. and Stephens, J. C. (2021)

Green New Deal proposals: Comparing emerging transformational climate policies at multiple scales.

Energy Research & Social Science, 81, 102259 [link](#)

Green New Deal (GND) policy proposals that simultaneously address the climate crisis and economic inequity by prioritizing job creation have been developed for multiple different levels of government in jurisdictions around the world. The United States federal GND originally introduced to Congress by Representative Ocasio-Cortez and Senator Markey in 2019 has received the most attention. Since then, however, multiple other climate policy proposals that share the GND's integrated multi-sectoral approach have emerged. To date, there has been minimal comparative assessment of these different proposals that build from a GND framework. As cities, regions, and countries around the world plan recovery from the COVID-19 pandemic and respond to worsening economic inequities, racial injustices, and climate disruptions, the need to study policies that simultaneously address environmental, economic, and social issues with an integrated approach is stronger than ever. This paper reviews 14 GND-style policy proposals across multiple levels of government, from municipal to multi-national, comparing their structure, level of detail, and goals. We find that GND frameworks are emerging as a new, multi-faceted policy approach to confront the complex, multiple drivers of climate change with greater scope than traditional market-based and behavior-based strategies.

Brutschin, E., Cherp, A. and Jewell, J. (2021)

Failing the formative phase: The global diffusion of nuclear power is limited by national markets.

Energy Res. Soc. Sci., 80, 102221

[link](#)

Understanding the role of technology characteristics and the context in the diffusion of new energy technologies is important for assessing feasibility of climate mitigation. We examine the historical adoption of nuclear power as a case of a complex large scale energy technology. We conduct an event history analysis of grid connections of first sizable commercial nuclear power reactors in 79 countries between 1950 and 2018. We show that the introduction of nuclear power can largely be explained by contextual variables

such as the proximity of a country to a major technology supplier ('ease of diffusion'), the size of the economy, electricity demand growth, and energy import dependence ('market attractiveness'). The lack of nuclear newcomers in the early 1990s can be explained by the lack of countries with high growth in electricity demand and sufficient capacities to build their first nuclear power plant, either on their own or with international help. We also find that nuclear accidents, the pursuit of nuclear weapons, and the advances made in competing technologies played only a minor role in nuclear technology failing to be established in more countries. Our analysis improves understanding of the feasibility of introducing contested and expensive technologies in a heterogeneous world with motivations and capacities that differ across countries and by a patchwork of international relations. While countries with high state capacity or support from a major technology supplier are capable of introducing large-scale technologies quickly, technology diffusion to other regions might undergo significant delays due to lower motivations and capacities.

Busch, H., Ruggiero, S., Isakovic, A. and Hansen, T. (2021)

Policy challenges to community energy in the EU: A systematic review of the scientific literature.

Renewable and Sustainable Energy Reviews, 151, 111535

[link](#)

In response to the ongoing climate crisis, many countries have issued policies to support the uptake of renewable energy. In the same vein, the European Union (EU) has issued a revised renewable energy directive in 2018. One of the pillars of the directive is the support for community energy initiatives, i.e. sustainable energy initiatives run by or with the participation of citizens. The concept of community energy (CE) has been linked to a number of advantages, such as strengthening local democratic processes or economic development for marginalised communities. The aim of this review article is to find out how past policies helped to overcome or aggravated transition challenges towards a higher share of community energy in the EU. To answer this question, we reviewed the scientific literature on community energy from the last decade. We analysed this body through a theoretical lens that highlights four main transition challenges. These occur in relation to 1) directionality, 2) demand articulation, 3) experimentation, 4) policy learning & coordination. Our results show that visions and goals are important policy tools for providing directionality in the energy transition. Feed-in-tariffs (FiT) surface as the most important policy to support community energy projects and spark demand. We found very little indication for a link between community energy and

explicit experimentation. Nevertheless, learning does take place amongst peers. Our review underlines the important role intermediaries play in facilitating policy learning and coordination. We conclude by presenting a number of concrete policy recommendations such as strengthening intermediary organisations and providing administrative support to community energy initiatives in case of changes in the policy framework.

Cherp, A., Vinichenko, V., Tosun, J., Gordon, J. and Jewell, J. (2021)

National growth dynamics of wind and solar power compared to the growth required for global climate targets.

Nature Energy, 6, 742–754

[link](#)

Climate mitigation scenarios envision considerable growth of wind and solar power, but scholars disagree on how this growth compares with historical trends. Here we fit growth models to wind and solar trajectories to identify countries in which growth has already stabilized after the initial acceleration. National growth has followed S-curves to reach maximum annual rates of 0.8% (interquartile range of 0.6–1.1%) of the total electricity supply for onshore wind and 0.6% (0.4–0.9%) for solar. In comparison, one-half of 1.5 °C-compatible scenarios envision global growth of wind power above 1.3% and of solar power above 1.4%, while one-quarter of these scenarios envision global growth of solar above 3.3% per year. Replicating or exceeding the fastest national growth globally may be challenging because, so far, countries that introduced wind and solar power later have not achieved higher maximum growth rates, despite their generally speedier progression through the technology adoption cycle.

Coenen, L., Hansen, T., Glasmeier, A. and Hassink, R. (2021)

Regional foundations of energy transitions.

Cambridge Journal of Regions, Economy and Society, 14 (2), 219–233

[link](#)

Due to a spatial turn in the socio-technical transition literature, the geography of energy transitions has recently been taken increasingly seriously, leading to burgeoning research output on regional energy transitions since early 2010. Amidst this wealth of publications, however, it can be difficult to keep track of its diverse and constantly evolving landscape. This editorial therefore aims at developing a framework that allows for bringing multiple approaches to regional energy transitions into conversation with each other and that helps to understand and explain the complexity of these interdependencies in ways that go beyond observing regional variety in energy transitions.

Dehdarian, A. and Tucci, C. L. (2021)

A complex network approach for analyzing early evolution of smart grid innovations in Europe.

Applied Energy, 298, 117143

[link](#)

This paper investigates how the strategic decisions of innovative firms to collaborate with other firms in research and development projects shape the early evolution of smart grid technologies as an emerging technological system across Europe. The early innovations and developments in an emerging technological system are crucial for understanding further developments of the system. This early stage is highly influenced by the strategic decisions and lobbying power of the firms experimenting with different technological innovations, and the policies trying to maintain competition and steer the direction of innovative activities. Therefore, it is important to analyze how innovative firms behave in terms of collaborating with other firms and doing research on specific energy solutions, which reflect their strategic priorities. By taking a complex network approach, this paper investigates a network of smart grid R&D projects to analyze the convergence of smart grid research activities towards a stream of innovative solutions, and the variety of innovative activities branching out from these solutions. The results verify the convergence of smart grid activities towards one specific stream of innovations, and reveal the existence of four variations centered around different technological applications. The results can guide strategy development in innovative firms to take part in research collaborations or focus on specific smart energy technologies, and have implications for policy makers aiming to influence the direction of smart grid research programs, as well as for researchers in the field of smart grid innovation and technological innovation systems.

Erdoğan Öztekin, E. and Gaziulusoy, I. (2020)

Co-positioning design for sustainability transitions, practice theory and transitions theories: towards dialogue and collaboration.

J. Design Research, 18, Nos. 3/4, 196–223

[link](#)

This paper examines the integration potential of three bodies of knowledge that theorise and strategise about sustainability transitions and societal change: design for sustainability transitions (DfST), transitions theories (TTs) and practice theory (PT). After presenting an overview of their particular conceptions of change, narratives of change and foci of interventions, we comparatively assess: i) the dynamics of societal change that they highlight; ii) the scopes of change that they target and iii) the phases of change with which they actively engage. Our findings suggest that DfST, TTs

and PT undertake distinct and yet equally relevant and necessary lenses and practices to understand and steer sustainability transitions. We argue that there is a need for establishing dialogues and collaborations between these three approaches, linking their activities, processes, learnings and propositions in order to initiate the formation of an aligned sustainability transitions research.

Ford, A. and Newell, P. (2021)

Regime resistance and accommodation: Toward a neo-Gramscian perspective on energy transitions.

Energy Research & Social Science, 79, 102163

[link](#)

Transition scholars are increasingly addressing questions of power and politics in their explanations of the direction and form of sustainability transitions. Drawing on insights from neo-Gramscian scholarship to enhance the conceptualisation of power in sustainability transitions, we develop a theoretical account of how combinations of incumbent actor resistance and accommodation contribute to regime stability and change. We use this to understand how incumbent firms and their industry organisations contribute to the (re)production of a socio-technical regime by drawing on material, institutional and discursive forms of power to execute strategies of resistance and accommodation. This helps embellish understandings not only of the nature of the power of specific incumbent actors tied to a particular regime, but also of the operation of incumbency as a deeper system of power. We apply a neo-Gramscian lens to the multi-level perspective on socio-technical transitions: a lens comprised of multiple interrelated concepts, including hegemony, historical bloc, integral state, war of position, passive revolution and trasformismo, whose contributions we outline in turn.

Friedrich, J., Bunker, I., Uthes, S. and Zscheischler, J. (2021)

The Potential of Bioeconomic Innovations to Contribute to a Social-Ecological Transformation: A Case Study in the Livestock System.

J. Agric. Environ. Ethics, 34, 24

[link](#)

Environmental crises, which are consequences of resource-intensive lifestyles and are characterized to a large extent by both a changing climate and a loss of biodiversity, stress the urgent need for a global social-ecological transformation of the agro-food system. In this regard, the bioeconomy and bioeconomic innovations have frequently been seen as instrumental in addressing these grand challenges and contributing to more sustainable land use. To date, the question of

how much bioeconomic innovations contribute to sustainability objectives remains unanswered. Against this background, we study four bioeconomic innovations using the case study of animal production and manure utilization in relation to their potential contributions to a social-ecological transformation. The analysis is based on the application of analytical categories derived from the literature that assess the normativity of these innovations and their implicit cultural changes. The results show that the innovations examined manifest existing thought styles and the incumbent socio-technical regime rather than contribute to a more fundamental transition. In this respect, we stress the importance of evolving alternative ideas in innovation design, applying more integrative approaches, such as embedding innovation processes into transdisciplinary processes, and developing adaptive and reflective governance approaches. In return, bioeconomic innovations should adjust towards the design mission of a social-ecological transformation and include a multitude of actors to discuss and harmonize contesting imaginaries and ethical concerns.

Bjerkan, K. Y., Hansen, L. and Steen, M. (2021)
Towards sustainability in the port sector: The role of intermediation in transition work.

Environmental Innovation and Societal Transitions, 40, 296-314

[link](#)

Intermediation has received substantial attention from transition scholars. Intermediaries play important roles in configuring, brokering, and facilitating transition efforts and operate in different parts of socio-technical systems. Their node position between transport and energy systems makes port authorities a potentially crucial intermediary in transitioning the many different sectors that intersect in ports. Ports are increasingly orienting their environmental endeavours towards energy issues and are pressured to reduce their global emissions. This paper explores intermediation in ports and investigates how intermediation connects to transition work. Based on a quantitative survey among 96 Norwegian ports, we find that ports engage in intermediation to varying extent, and that intermediation is associated with progressive transition work. The study complements previous research on intermediaries by conceptualising and quantitatively measuring transition work, allowing us to explore in what ways ports rely on intermediation in their sustainability endeavours.

Griffiths, S, Sovacool, B. K., Kim, J., Bazilian, M. and Uratani, J. (2021)

Industrial decarbonization via hydrogen: A critical and systematic review of developments, socio-technical systems and policy options.

Energy Research & Social Science, 80, 102208, 1-

65

[link](#)

Industrial decarbonization is a daunting challenge given the relative lack of low-carbon options available for “hard to decarbonize” industries such as iron and steel, cement, and chemicals. Hydrogen, however, offers one potential solution to this dilemma given that it is an abundant and energy dense fuel capable of not just meeting industrial energy requirements, but also providing long-duration energy storage. Despite the abundance and potential of hydrogen, isolating it and utilizing it for industrial decarbonization remains logistically challenging and is, in many cases, expensive. Industrial utilization of hydrogen is currently dominated by oil refining and chemical production with nearly all of the hydrogen used in these applications coming from fossil fuels. The generation of low-carbon or zero-carbon hydrogen for industrial applications requires new modes of hydrogen production that either intrinsically produce no carbon emissions or are combined with carbon capture technologies. This review takes a sociotechnical perspective to examine the full range of industries and industrial processes for which hydrogen can support decarbonization and the technical, economic, social and political factors that will impact hydrogen adoption.

Den Hartog, H. (2021)

Shanghai’s Regenerated Industrial Waterfronts: Urban Lab for Sustainability Transitions?

Urban Planning, 6 (3), 181-196

[link](#)

In China, Shanghai often serves as a place to introduce and try out new ideas. This is certainly the case with experimental urban planning and design solutions and sustainability transitions. This article identifies and evaluates the role of pilot projects and demonstration zones along the Huangpu River. These clusters and zones are supposed to guide the urban regeneration of the former industrial waterfronts and to accelerate innovative development in Shanghai and the wider Yangtze Delta Region. The Huangpu River as a whole is considered an urban lab and a showcase of ecological civilisation policies, with a strong ‘people oriented’ focus on improving the overall quality and attractiveness of urban life. Following three decades of rapid urban expansion, Shanghai’s urban development model is shifting toward one that emphasizes densification and the reuse of existing elements. The motto of Shanghai’s latest master plan is “Striving for an Excellent Global City.” One of the pathways to realize this expectation is the creation of thematic clusters for creative industries, financial institutes, AI, and technology, media and telecommunication industries. These clusters are high-density investment projects meant to support and accelerate the transformation of Shanghai into a service economy. There are important similarities between these projects

in Shanghai and the role of urban labs in theories of sustainability transitions. Drawing on these theories and those of ecological civilization, this article examines how these so-called 'experimental' urban megaprojects along the river contribute to Shanghai's effort to take the lead in developing sustainable urban transitions.

Hirsch, S. and Ribes, D. (2021)

Innovation and legacy in energy knowledge infrastructures.

Energy Research & Social Science

[link](#)

We focus on how the concept of knowledge infrastructure can help interrogate both the novelties and continuities in energy transitions. In particular, we turn attention to research, innovation, and knowledge production capacities in renewable energy transitions. We outline the subfield of knowledge infrastructures and introduce concepts relevant to energy research. We especially illustrate the ways that knowledge infrastructures may support or adapt to change, and also the ways that they display 'legacy' properties that inhibit, slow or outright prevent transitions. To ground our investigation, we briefly examine research in Scotland's marine energy sector as the nation pursues a transition from an energy sector heavily reliant on oil and gas, to one based on renewable energy innovation and implementation. Via this case, we illustrate that a great deal of the 'old' knowledge infrastructures for energy research, rather than being wholly swept away, instead persist across energy transitions. The concept of knowledge infrastructures provides a powerful addition to energy social science because they are fundamental to our ability to research and develop renewable energy technologies, and so play an important role in defining possible energy futures.

Hughes, I., Byrne, E., Glatz-Schmallegger, M., Harris, C., Hynes, W., Keohane, K. and Gallachóir, B. Ó. (2021)

Deep Institutional Innovation for Sustainability and Human Development.

World Futures

[link](#)

The present moment of deep transition, as well as being a time of danger, presents an opportunity for positive renewal. This paper develops a model of deep institutional innovation at times of historic change such as the present and outlines a research agenda aimed at initiating a holistic assessment of the main foundational institutions in society and re-imagining them in ways that will allow them to fulfil their basic ethical and effectiveness functions. Such a fundamental critique and re-imagining, the paper argues, is essential if global challenges are to be mitigated and resolved.

Joshi, N. and Agrawal, S. (2021)

Understanding the uneven geography of urban energy transitions: insights from Edmonton, Canada.

Cambridge Journal of Regions, Economy and Society, 14, 2, 283–299

[link](#)

Cities are important partners in developing solutions towards a low-carbon pathway. However, given the variation in geography, a need exists to study urban energy transitions through a nuanced approach that addresses space- and place-based factors. Based on document analysis and interviews with municipal employees and local energy experts in Edmonton, Canada, we explore how location and availability of energy sources, political territoriality, physical urban landscapes and social embeddedness of fossil fuels influence municipal energy transition. Results illustrate that while Edmonton is shaped by its fossil fuel geography, it is actively carving out its low-carbon future through a geographically rooted transition strategy.

Kliem, D., Scheidegger, A. and Kopainsky, B. (2021)

Closing the mineral construction material cycle – An endogenous perspective on barriers in transition.

Resources, Conservation and Recycling, 175 (March), 105859

[link](#)

Construction and demolition waste (CDW) constitutes a highly voluminous urban waste stream with significant potential for circular mineral construction material usage. This paper uses participatory system dynamics modeling with relevant actors from different public policy and industry sectors to a) to identify structural barriers to the uptake of secondary resource utilization; b) design and test policies administrative (spatial planning, ownership), fiscal (extraction levy, disposal fee) and soft (lighthouse projects) policies and c) discuss the feasibility of implementing these with policies in the political and legislative context of Switzerland. We find practice relevant policy insights, such as the role of distributed control of land use policies resulting in a co-evolutionary lock-in to primary resources consumptions. Policy interventions need to establish new forms of collaboration between regional actors, as hinterland are specializing as resource suppliers for urban regions. Without coordinated interventions that address structural imbalances of material flow, arbitrage effects with other regions render policies ineffective. From a methodological perspective we find that simulation and participatory modeling improves the efficacy of transition interventions as we

provide a structural problem analysis as a tool for Stakeholder reflexivity.

Kriechbaum, M., Posch, A. and Hauswiesner, A. (2021)

Hype cycles during socio-technical transitions: The dynamics of collective expectations about renewable energy in Germany.

Research Policy, 50 (9), 104262

[link](#)

The literature on socio-technical change describes the widely acknowledged, important roles of collectively shared expectations in shaping the trajectories of novel technologies. However, in previous studies on these technological expectations, researchers have mainly emphasised early innovation stages, paying little attention to technologies that have already begun to challenge and transform the established socio-technical system. In this study, we use the example of the German energy transition to address this gap. By conducting a content analysis of nearly 12,000 newspaper articles, we examined the nature and dynamics of expectations that were circulating in Germany's wider public from 1992 to 2017 regarding wind power, solar photovoltaics, and biogas. Our findings reveal patterns of hype and disillusionment for all three technologies and illustrate the important roles of frame expectations in shaping these hype cycles. Furthermore, the findings shed new light on processes that contribute to the emergence and dynamics of widely shared expectations and indicate that the associated hype patterns are manifestations of unfolding transition dynamics rather than the result of frustrated expectations. In theoretical terms, we integrated insights from (transition) research on discourse and framing into the sociology of expectations, initiating a promising dialogue between scholars in these two fields.

Kump, B. and Fikar, C. (2021)

Challenges of maintaining and diffusing grassroots innovations in alternative food networks: A systems thinking approach.

Journal of Cleaner Production, 317, 128407

[link](#)

Sustainability transitions of food systems are at the core of several of the United Nations' Sustainable Development Goals (SDGs). In many regions, grassroots initiatives (i.e., community-led bottom-up initiatives) have emerged to experiment with alternative food networks and change the dominant food regimes. While grassroots initiatives can play a crucial role in sustainability transitions, it is known that actors usually face challenges related to (1) building and maintaining an initiative, and (2) diffusing it to the mainstream. However, the systemic mechanisms underlying these

two types of challenges in food systems are still underspecified. Building on previous empirical research, the paper uses systems thinking (qualitative causal loop diagrams) to detail (1) the systemic mechanisms underlying the emergence and maintenance of an alternative food network; and (2) the feedback loops related to organizational and logistics issues that pose limits to scaling. It explains the paradox of diffusion in alternative food networks and concludes that diffusion of alternative food networks to mainstream may be achieved through replication and translation strategies, rather than scaling-up.

Määttä, S. (2021)

Rethinking collaborative action and citizen empowerment: Characterising a Whole-of-Society approach to the energy transition.

Energy Res. Soc. Sci., 81

[link](#)

The urgent need to progress the low carbon energy transition has stimulated new forms of governance to address the multiple challenges facing policy, regulation, and implementation. This paper suggests that some countries are adopting a range of measures for the energy transition that amount to a *Whole-of-Society Approach*, formerly deployed as a response to health crises and other emergencies. Despite having a range of governance implications, the main features of the approach have not been effectively described nor critically evaluated. This paper seeks to draw out the main characteristics of the approach based on a review of literature that uses the *Whole-of-Society approach* term. This suggests that the Whole-of-Society Approach has five key components: *crisis*; *shared responsibility*; *inclusivity*; *leadership*; and *systems thinking*. This paper then explores how these components have been reflected in energy transition policy discourse in the Republic of Ireland and Scotland, by analysing key policy documents. By highlighting how the Whole-of-Society Approach is used as a wider framework for the energy transition, the paper aims to stimulate further research on the wider implications, coherence, and effectiveness of the approach in progressing the energy transition.

Nilsson, L. J., Bauer F., Åhman, M., Andersson, F.N.G., Bataille, C., de la Rue du Can, S., Ericsson, K., Hansen, T., Johansson, B., Lechtenböhmer, S., van Sluisveld, M. and Vogl, V. (2021)

An industrial policy framework for transforming energy and emissions intensive industries towards zero emissions.

Climate Policy, in press

[link](#)

The target of zero emissions sets a new standard for

industry and industrial policy. Industrial policy in the twenty-first century must aim to achieve zero emissions in the energy and emissions intensive industries. Sectors such as steel, cement, and chemicals have so far largely been sheltered from the effects of climate policy. A major shift is needed, from contemporary industrial policy that mainly protects industry to policy strategies that transform the industry. For this purpose, we draw on a wide range of literatures including engineering, economics, policy, governance, and innovation studies to propose a comprehensive industrial policy framework. The policy framework relies on six pillars: *directionality, knowledge creation and innovation, creating and reshaping markets, building capacity for governance and change, international coherence, and sensitivity to socio-economic implications of phase-outs*. Complementary solutions relying on technological, organizational, and behavioural change must be pursued in parallel and throughout whole value chains. Current policy is limited to supporting mainly some options, e.g. energy efficiency and recycling, with some regions also adopting carbon pricing, although most often exempting the energy and emissions intensive industries. An extended range of options, such as demand management, materials efficiency, and electrification, must also be pursued to reach zero emissions. New policy research and evaluation approaches are needed to support and assess progress as these industries have hitherto largely been overlooked in domestic climate policy as well as international negotiations.

Patterson, J., Wyborn, C., Westman, L., Brisbois, M.C., Milkoreit, M. and Jayaram, D. (2021)

The political effects of emergency frames in sustainability.

Nat. Sustain.

[link](#)

Emergency frames are mobilized in contemporary sustainability debates, both in response to specific events and strategically. The strategic deployment of emergency frames by proponents of sustainability action aims to stimulate collective action on issues for which it is lacking. But this is contentious due to a range of possible effects. We critically review interdisciplinary social science literature to examine the political effects of emergency frames in sustainability and develop a typology of five key dimensions of variation. This pinpoints practical areas for evaluating the utility of emergency frames and builds a shared vocabulary for analysis and decision-making.

Perlaviciute, G., Steg, L. and Sovacool, B. K. (2021)

A perspective on the human dimensions of a transition to net-zero energy systems.

Energy & Climate Change, 2, 100042, 1-11

[link](#)

Net-zero energy systems are critical for reducing global temperature change to 1.5°C. Transitioning to net-zero systems is simultaneously a technological and a social challenge. Different net-zero configurations imply different system and lifestyle changes, and strongly depend on people supporting and adopting these changes. This Perspective presents key insights from the social sciences into factors that motivate low-carbon behaviour and support for low-carbon technologies, policies, and system changes that would need to be addressed to successfully design, develop, implement, and operate net-zero systems. As there is no single net-zero solution, and configurations may differ from region to region, we discuss cultural and regional factors that can enable or inhibit the implementation of net-zero systems on a global scale.

Punt, M. B., Bauwens, T., Frenken, K. and Holstenkamp, L. (2021)

Institutional relatedness and the emergence of renewable energy cooperatives in German districts.

Regional Studies

[link](#)

This paper analyses the evolution of renewable energy cooperatives, examining all such cooperatives founded in German districts between 2006 and 2016. The rise of the cooperative form in renewable energy production is a prominent example of the strong involvement of users in market formation. We investigate the effects of 'institutional relatedness', arguing that renewable energy cooperatives can leverage the organizational knowledge and the legitimacy gained by cooperatives active in other industries in the same district. Using an organizational ecology approach, we find that the local presence of cooperatives in other industries indeed supported the founding of renewable energy cooperatives.

Punt, M. B., van Kollem, J., Hoekman, J. and Frenken, K. (2021)

Your Uber is arriving now: An analysis of platform location decisions through an institutional lens.

Strategic Organization

[link](#)

The disruptive impact of platform businesses on local economies has received much attention, but virtually none has been paid to the factors that impact platforms' decisions about where to locate their activities. The novel, disruptive nature of platforms limits the relevance of traditional theories about location decisions. We argue that local institutional conditions

and global legitimacy spillovers affect the choices of platform businesses about where to operate. We analyze the controversial case of ride-hailing platform Uber, an app-based service that matches uncertified chauffeurs with passengers. We find that Uber showed a preference for cities that promote competition and innovation. A spillover analysis shows how Uber leveraged its global pool of customers by choosing cities whose visitors were already familiar with Uber's service. Our study illuminates the key role played by the brand's mobile customer base as global carriers of legitimacy for Uber's controversial innovation.

Ribeiro, B. and Lewis, N. (2021)

Urban food forestry networks and Urban Living Labs articulations.

Journal of Urbanism: International Research on Placemaking and Urban Sustainability (Taylor & Francis Food and Urbanism special issue)

[link](#)

This article presents a heuristic framework to help respond to gaps in knowledge construction in sustainability transitions. Transition theory publications highlight concerns ranging from contentious understandings of sustainability to the need for generalisable conceptual frameworks around how place specificity matters in transitions. The heuristic presented here is a flexible framework for developing place-dependent narratives of sustainability transitions grounded in investment choices. The sustainability buckets development resulted from the abduction and retroduction methods. It was also underpinned by a praxis-oriented mechanism from business ('strategic investment buckets'), a transition theory conceptual framework ('the multi-level perspective'—MLP), and a social sciences heuristic ('sustainability cultures'). The sustainability buckets resulted from synthesising the critical literature with empirical findings drawn from two case studies in New Zealand. The heuristic proved helpful to navigate, organise, and code meanings and understandings of sustainability in the New Zealand agri-food context. It also helped facilitate dialogue with research participants from different backgrounds, such as government and business. The heuristic was designed to transform, remaining fit for purpose as transitions evolve. This article suggests the sustainability buckets could be used to enable investment opportunities for upscaling, reproducing, and transplanting transitions happening in distinct sectors and high-level systems.

Schlaile, M. P., Kask, J., Brewer, J., Bogner, K., Urmetzer, S., and de Witt, A. (2021)

Proposing a cultural evolutionary perspective for dedicated innovation systems: Bioeconomy transitions and beyond.

Journal of Innovation Economics & Management
[link](#)

While the Earth system is in overshoot mode with an imminent threat to our social, ecological, and economic systems, cultural evolutionary theory may hold the key to more successfully addressing many of our sustainability challenges. With the aim of illuminating the potential of studying the evolution of a sustainable bioeconomy through a cultural evolutionary lens, this article outlines the contours of a novel research avenue in the form of five propositions. It contributes to current conversations in the literature at the intersection of sustainability transitions, dedicated or mission-oriented innovation systems, and the bioeconomy by raising awareness of the warranted value that a cultural evolutionary perspective has in tackling these grand challenges and addressing how this yet unclaimed potential could be materialized.

Editors: Schmid, B., Smith, T. S. J. and Aiken, G. T. (2021)

Transformative Geographies of Community Initiatives.

A Special Issue in the Journal Environmental Policy and Governance

[link](#)

At a time of globally intensifying yet highly unequally felt crises, an overwhelming majority of formal governmental bodies continues to adhere to institutional frameworks in which social justice and ecological integrity are no more than secondary objectives. This collection brings together innovative contributions to the spatial and scalar theorizing of community activism, offering varied insights and interpretations of governance, scale(ability), and transformation. It adds to a growing field of research on community-led organizing and activism, which we hope will continue to thrive to counteract trajectories of socio-ecological destabilization and authoritarian governance.

Steg, L., Perlaviciute, G., Sovacool, B. K., Bonaiuto, M., Diekmann, A., Filippini, M., Hindriks, F., Bergstad, C. J., Matthies, E., Matti, S., Mulder, M., Nilsson, A., Pahl, S., Roggenkamp, M., Schuitema, G., Stern, P. C., Tavoni, M., Thøgersen, J. and Woerdman, E. (2021)

A research agenda to better understand the human dimensions of energy transitions.

Frontiers in Psychology, 12, 672776, 1-11

[link](#)

The Social Sciences and Humanities (SSH) have a key role to play in understanding which factors and policies would motivate, encourage and enable different actors to adopt a wide range of sustainable energy behaviours

and support the required system changes and policies. The SSH can provide critical insights into how consumers could be empowered to consistently engage in sustainable energy behaviour, support and adopt new technologies, and support policies and changes in energy systems. Furthermore, they can increase our understanding of how organisations such as private and public institutions, and groups and associations of people can play a key role in the sustainable energy transition. We identify key questions to be addressed that have been identified by the Platform for Energy Research in the Socio-economic Nexus (PERSON, see person.eu), including SSH scholars who have been studying energy issues for many years. We identify three main research themes. The first research theme involves understanding which factors encourage different actors to engage in sustainable energy behaviour. The second research theme focuses on understanding which interventions can be effective in encouraging sustainable energy behaviour of different actors, and which factors enhance their effects. The third research theme concerns understanding which factors affect public and policy support for energy policy and changes in energy systems, and how important public concerns can best be addressed as to reduce or prevent resistance.

Trencher, G., Truong, N., Temocin, P., Duygan, M. (2021)

Top-down sustainability transitions in action: How do incumbent actors drive electric mobility diffusion in China, Japan, and California?

Energy Research and Social Science, 79, 102184

[link](#)

In explaining how socio-technical transitions occur, prevailing theories focus on bottom-up processes driven by new entrants, diverse actors and open-ended exploration in small, protected niches. Incumbent firms are frequently portrayed as hampering change, while managerial strategies using traditional public policy instruments remain understudied. Addressing this bias, we examine strategies used by networks of incumbent state and industry actors in China, Japan and California to accelerate the production and diffusion of battery-electric or hydrogen-powered vehicles. We build a comprehensive framework that systematically marries mechanisms of industrial transformation described in developmental-state literature with theories of socio-technical change from transitions scholarship. We then use a vast dataset of secondary documents and interviews to examine the principal strategies employed in each country while identifying variations over two phases of technological diffusion. Findings reveal that the incumbent actors in each country have collectively employed multiple but similar strategies. Yet closer inspection of specific policy instruments, such as regulations and performance-based incentives, along

with ambitions to phase out vehicles with internal combustion engines, reveal differences across cases. We explain these by considering different motivations for each country's transition and influencing socio-political conditions. Our study contributes to the enrichment of future transitions research in at least two ways. Theoretically, by integrating literature on transitions and developmental states, we deepen understanding of how incumbent state and market actors can attempt to drive socio-technical change. Empirically, our analysis provides important evidence for understanding the strategies driving top-down transitions outside northern Europe, and the conditions affecting instrument choice.

Vaskelainen, T., Münzel, K., Boon, W. and Frenken, K. (2021)

Servitisation on consumer markets: entry and strategy in Dutch private lease markets.

Innovation

[link](#)

Servitisation, which occurs when products are offered with service components as product-service bundles, has increased rapidly in consumer markets during recent years because of digitalisation. Digital technologies have enabled the emergence of peer-to-peer marketplaces and made it possible for B2B lease and rental actors to push for B2C markets. Despite extensive research on servitisation, we know little of what kinds of companies can best exploit the opportunities created by it and how digitalisation affects inter-company relationships regarding these opportunities. This article addresses these research gaps by making a revelatory case study on the entry order and strategy of established B2B lease companies to enter the B2C private leasing and carsharing markets. We collect an interview-based dataset on key companies in the Dutch car lease market, that we analyse abductively. We find that knowledge of the opportunities, position in the value chain, and resources are focal elements that define which companies are pioneers, early followers, and late entrants. In contrast to former servitisation literature, manufacturing incumbent companies are not active in exploiting opportunities created by private leasing. Additionally, we discover that the leasing companies create capabilities for private leasing themselves whereas they partner to enable carsharing. We discuss the contribution of these findings to research on disruptive innovation, servitisation, and digital innovation.

Weber, G., and Cabras, I. (2021)

Environmental Justice and Just Transition in the EU's Sustainability Policies in Third Countries: The Case of Colombia.

The International Spectator, 1-19

[link](#)

The European Union (EU) is globally recognised as a sustainability leader and has implemented various climate policies such as the European Green Deal. However, it is also one of the largest importers of fossil fuel resources from developing countries, as in the case of coal from Colombia. From a political ecology and environmental justice perspective, it is possible to argue that the EU has benefited for many years from cheap Colombian coal, while the local population has suffered from the related social and environmental impacts. Colombia and Europe are connected not only through 'ecologically unequal exchanges', but also through anti-coal activist networks, which highlights the challenges ahead for the EU and its (former) suppliers of fossil fuels in terms of sustainability transitions.

Weiss, D. and Nemeczek, F. (2021)

A text-based monitoring tool for the legitimacy and guidance of technological innovation systems.

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[link](#)

Disruptive technologies have to overcome their liability of newness and transition into their growth phase by achieving compliance with existing institutions and pursuing the most promising development paths. Technological innovation system (TIS) studies examined these two issues of legitimacy and guidance of innovation activities by investigating the public discourse with manual media analyses. However, these approaches are time-consuming, prone to subjectivity biases and limited in scope. Therefore, our paper proposes an automatic text analysis methodology based on unsupervised Latent Dirichlet Allocation (LDA) topic modelling and lexicon-based sentiment analysis. By processing 3423 German newspaper articles from the Nexis Uni database, we cover the development of battery-electric vehicles (BEV) in Germany from 2009 to 2019 and identify five socio-technical aspects. Our results indicate an intact legitimacy for the TIS, with Usability, R&D, and Industry being legitimate aspects, which also exhibit strong or improving guidance. In contrast, the Infrastructure and Policy aspects have been less legitimate and weak in guidance, suggesting the need for more holistic policy measures and infrastructure expansion to establish a mass market. Our proposed methodology adds to the toolbox of methods to analyze TIS and serves as a monitoring tool to reveal contested aspects and periods in the public discourse.