STRN Newsletter

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Content

Special

About

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

Cover picture:
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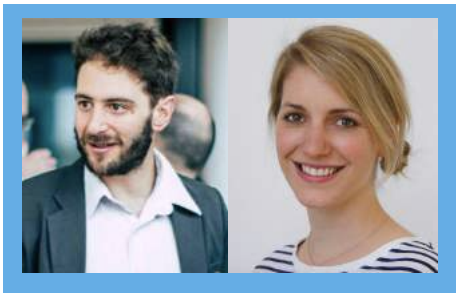
Editorial



by Verena Hermelingmeier
(Wuppertal University)
& Adriaan van der Loos
(Utrecht University)

The last newsletter was published in late March – just a few weeks into the global pandemic that has since turned our world upside down. The past three months were characterized by a global lock down on social and economic activity. We are just now on the verge of slowly restarting public life in many countries. Yet the crisis is far from over. Besides the risk of experiencing a second wave of the pandemic, the past months will affect the way we live and do business in the short- and long-term, from the way we travel to the way we work to the way we socialize.

From a sustainability transitions perspective, the crisis seems to be placing us at a crossroads: on the one hand, it has the potential to rapidly return us to business as usual, in which the old economy is being revived in the hopes of mitigating negative economic impacts. On the other hand, we are witnessing an unprecedented window of opportunity, in which claims for "building back better" and a "green recovery" are fueling local, regional, national and international discussions on linking funds for rebuilding the economy to a transformative agenda. For transition research, we see a whole new research agenda emerging from these tensions and it will be exciting to witness a wide variety of approaches to connecting the current crisis to transition research in the near future.

For the theme of this newsletter, we decided against elaborating on research-based viewpoints about the current situation and – in times of "physical distancing" - went for a more community-oriented and personal perspective: for one, we reflect on the first online transition community event – the 5th NEST Conference "Widening Sustainability Transitions" – which was a great success. The organizers of the conference share their experiences and provide valuable insights for more transition-related online events to come, most importantly the IST Conference on August 18th-21st.

Beyond this, we shift the focus to the very core of what makes NEST and STRN vibrant and enjoyable communities: the people behind them. The crisis affects each and every one of us – in our daily routines, in our thinking, in our behavior. We were interested in zooming in to some of the very individual experiences people have gone through in these challenging times – their struggles, perceived opportunities and observed changes within themselves and their close environment. We thus reached out to the NEST community and collected short "personal transition snapshots", of which we provide 10 examples in this newsletter.

We are hoping to provide some food for thought and to draw attention to the importance of the very personal aspect of sustainability transitions in times of crisis.

Enjoy reading!

EIST Journal

As discussed in the previous newsletter, Elsevier decided to apply so-called "article-based publishing" (ABP) to EIST as of 2020. The ABP system may allocate articles of special issues over different journal volumes, as they are published when ready.

Also the current Volume 35 follows this new format. It includes (aproximately) 35 articles, including two special issues, 14 regular articles, and two viewpoints. As the list becomes too long for the newsletter, we provide a weblink (also as this allows interested readers to click through).

The complete special issues associated with Volume 35 are accessible through the following links:

- Zooming in and out: special issue on local transition governance (with 4 articles), by guest editors Jonathan Köhler, Julia Wittmayer, Elizabeth Dütschke, Norman Laws
- Assessing risks and uncertainties of low-carbon transition pathways (with 17 articles), by guest editors Jenny Lieu, Susanne Hanger, Alevgul Sorman, Oscar van Vliet

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

Jeroen van den Bergh
Editor-in-Chief

STRN Events

Upcoming Events

11th IST conference, August 18-21, 2020

The 11th International Sustainability Transitions Conference will be held as an online event in the days from 18 – 21 August.

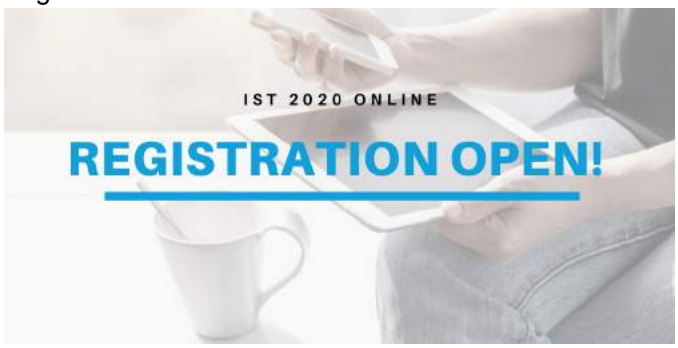
The conference will be co-hosted by AIT Austrian Institute of Technology and WU (Vienna University of Economics and Business) in association with the Sustainable Transitions Research Network (STRN).

Next to the classic session formats such as Full Paper Sessions, Speed Talks and Dialogue Sessions, new formats have been developed. One of these is the IST2020 Gallery. This format combines flexible access to contributions and the option of live discussions around

thematically grouped contributions. IST2020 Gallery contributions are prerecorded and will be accessible during the entire conference.

In addition, we have foreseen various opportunities for online networking. The program will be completed with Yoga Breaks, a musical highlight from Vienna and a cooperation with the Ganymed project, which allows us to connect with art from the Vienna History of Arts Museum.

Registration for the conference is now open. All presenters need to register before **July-15**. This is also the deadline for full paper submissions. Audience only registration closes at August-10.



Looking forward to meeting you
Klaus, Verena and Gudrun

NEST webinar series

On 26 May, the new NEST webinar series on sustainability transition studies was launched with an introduction by Jochen Markard talking about the origins, challenges and current research trends in our field.

Further talks are scheduled with:

Marko Hekkert (June 24)
Frank Geels (June 30)
Karoline Rogge (July 23)
Flor Aveline (September 29, tbc)
Niki Frantzeskaki (October, tbd)

In this webinar series, we aim to give early career researchers the opportunity to learn about core concepts

in the field, and facilitate the dialogue between them and senior researchers in the field. We also work towards creating a curated resource of our webinar recordings and other recorded lectures or presentations, which will be made available on the NEST blog as well as through a YouTube channel.

If you have recordings of lectures or talks on transition studies you would be willing to share, we would very much appreciate you getting in touch with Abe Hendriks. Invitations for future webinars will be sent through the STRN mailing list.

Global South webinar series

The global south thematic group of the STRN network happily announces its webinar series on "Sustainability transitions in the context of Covid19: Perspectives from the Global South".

The first webinar with Joyashree Roy took place on June 3rd, 2020.
Further events are planned with:

Mark Swilling, July 8, 2020
Adriana Marotti de Mello, Aug 5, 2020

We are also looking for webinar presenters.
To participate or contribute sign up here.
For more information contact Bipashyee Gosh.

STRN school on methodologies and methods in Lund, Sweden, postponed to February 2021

The STRN and NEST PhD-Network jointly invite PhD students and junior researchers to a School on "Methodologies and Methods for Sustainability Transitions Research".

The school will be hosted by Dr. Lea Fünschilling and team at Lund University, Sweden, from **February 8th – 12th, 2021**
(new date due to the COVID-19 outbreak).
For more information contact Lea Fünfschilling

Other Events

Past events

Bergen Summer Research School: Cities in Climate and Energy Transformations

As the world urbanises rapidly, and faces an imperative to accelerate climate action, cities are key actors to deliver much requisite action. This course examines what roles cities and urban regions are playing and can play in climate and energy transformations.

This free permanent course blog is based on an international online PhD course originally offered through the University of Bergen during 8-18 June 2020 (led by Siddharth Sareen and Håvard Haarstad and assisted by Devyn Remme). It comprises 8 modules with 7 lecturers. The materials and recorded lectures are freely available via the course blog and an associated video playlist.

More information can be found here.
Siddharth Sareen

How are technologies abandoned?

Report from a Virtual Workshop which took place on June 5, 2020.

This workshop was a virtual version of a session of the cancelled Eu-SPRI conference in Utrecht. The workshop was another activity within the framework of technology decline research agenda, discussed in the previous newsletter by Stephen D. McGrail.
Seven presentations and overall 17 participants, both 'veterans' and newcomers to the topic. Most participants were based in Europe. The intensive workshop was an opportune intermediary moment of exchange and cross-pollination before the big conferences IST-2020 and 4S/EASST-2020.

Participants agreed to continue to think along on this topic in the coming months.
For more information contact Zahar Koretsky

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New projects

MISTRAL-ITN: Multi-sectoral approaches to Innovative Skills Training for renewable energy and social acceptance

Europe's transition towards a low-carbon economy is built on, among others, a substantial expansion of renewable energy generating capacity. Yet due to the accelerated pace at which such capacity additions need to unfold, and the uneven distributive impacts (costs and benefits), there is a growing opposition against rewewable energy projects.
Understanding the root causes of this increasing opposition is essential for meeting ambitious climate and energy targets.

MISTRAL-ITN therefore aims to train a new generation of researchers who can critically and constructively evaluate the complexity of social acceptance issues facing the deployment of renewable energy infrastructure, and propose innovative solutions in a variety of research, government and business contexts.

Here you will find the link to the project and updates on the network's ongoing work. Feel free to contact Nick Johnson for more information.

Organising knowledge and learning for the regional energy transition (ORAKLE).

By ratifying the Paris Agreement, the Netherlands has committed to an ambitious climate policy, the implementation of which can only be achieved through a substantial reduction in GHG emissions. Key opportunities for realising such a transition are increasingly situated at the local and regional level. To seize these opportunities regional authorities, companies, and social partners in 30 regions across The Netherlands are expected to develop a so-called regional energy strategy (RES). How to practically organise such a regional energy transition however, remains a challenge. The ORAKLE project aims to support the regional energy transition by experimenting with existing and novel ways of organising knowledge and learning in the context of a Noord-Brabant living lab.

TIS group at TU Eindhoven, in collaboration with HPM group at TU/e, Enplus, University of Tilburg and HET Pon will support the provincial government of Noord-Brabant in facilitating the basic knowledge infrastructure and becoming a knowledge broker in the field. Theoretically the project will draw on sustainability transition studies, regional governance insights and applied psychology. Since this is about doing research that matters, methodologically we go for co-creation and action research! More information: Anna J. Wieczorek.

Open source-based capability building in latecomer contexts (OSCILATE)

OSCILATE is a two-year research project analysing the role of digitally available open-source hardware knowledge in technological capability building efforts in the Global South. This includes knowledge available through online discussion forums, wikis, file sharing repositories, and other resources. The project addresses the questions of whether, how, and under what conditions organisations can use such knowledge to build their capabilities. It focuses on the case of open-source wind turbines and combines a systematic literature review, semi-structured interviews, and a stakeholder workshop. The objective of the project is to develop frameworks that can help identify the key determinants for the emerging phenomenon of open-source hardware for development.

ENergy TRANsitions from Coal and carbon: Effects on Societies (ENTRANCES)

The energy transition requires major shifts in socio-technical regimes and economic structures. Stakes are particularly high in regions shaped by coal mining and fossil fuel driven industries, including risks like populist turns and rapid decline. What are the deeper social implications of this transition, and how can they be harnessed to avoid such risks and shape sustainable regional development pathways?

This H2020 project (5/2020 – 4/2023) unpacks the social (psychological, cultural, political), spatial and ecological dimensions of the energy transition to obtain thick descriptions of 13 selected regional pathways in Europe, and inform novel spatially integrated approaches for analyzing and navigating socio-technical and social-ecological system change.

For more information please contact Marc Wolfram, Leibniz Institute of Ecological Urban and Regional Development.

Other News

Transformative Innovation Policy Consortium establishes new Latin American Hub.

The Transformative Innovation Policy Consortium (TIPC), a major research project promoting sustainable transitions has established a new Latin American Hub, which brings together ten leading institutions from Colombia, Chile and Mexico. The Hub will seek to address the significant challenges facing Latin American countries, such as social inclusion by developing a new frame of science and technology policy. This will help to

improve the quality of policymaking and more effectively support processes of transformative change in the region. Over the next 18 months the Latin American Hub will set up a mobile transformation lab, engage with HUB members to conduct experimental policy engagements and produce a book to capture insights into transformative innovation policy in the Latin American context. The Latin American Hub is coordinated by the Science Policy Research Unit in the UK and the Universidad Autónoma Latinoamericana in Colombia.

More information here or contact hublayctip@unaula.edu.co.

Announcement EU Award Nominee.

The cVPProject of INTERREG NWE led by the TIS group at TU Eindhoven has been nominated fort he Citizens' Award 2020 at EU Sustainable Energy Week. cVPP has been recognised for being a socio-technical innovation at the community level that can address energy transition barriers while engaging with societal actors such as DSO's, regulators and policy makers.

More information: Anna J. Wieczorek.

Women & Inclusivity in Sustainable Energy Research – WISER Network

If you are a PhD student, post doctoral or academic researcher, professor or lecturer in sustainable energy research, please consider joining WISER Network.

Women and Inclusivity in Sustainable Energy Research Network is a global network of researchers. We are welcoming of cis and trans, racialized, Indigenous, LGBTQTS+ women and non-binary people. We have been hard at work with our first steering committee to develop a terms of reference, an internal list serv to connect the network, we will soon have a newsletter and we are in the process of updating the website.

More information here (scroll down to Google form at bottom). Direct link to the Google form.

NEST in times of Corona

5th NEST Conference, May 2020: Insights from organizing the first digital conference on sustainability transitions

Alejandro Nunez-Jiminez, Aline Scherrer

The 5th NEST Conference took place on May 7-8, 2020. The event had been planned to take place in Zurich, Switzerland, but was forced to go completely digital because of the COVID-19 pandemic. Still, over 60 participants, mainly doctoral students, from across a dozen countries joined in for two half-days packed with presentations on topics related to sustainability transitions. A hundred more tuned in for the public keynote presentations at the beginning of each day by Prof. Giuseppe Feola, from Utrecht University, Prof. Flor Avelino, from the Dutch Research Institute for Transitions, and Prof. Bernhard Truffer, from EAWAG and Utrecht University. In total, over 200 people participated in the first digital NEST conference.

Participants' feedback paints a positive picture of the 5th NEST conference: One participant "love[d] how it still [felt] like such a close community even though it [was] online" and another highlighted the "[g]ood balance of keynotes (which were great) and sessions." On the downside, participants would have liked more time for discussions during the sessions and more opportunities for social interactions - e.g., during coffee breaks. All things considered, most participants expressed their satisfaction during the closing session of the conference, and many chose to attend a NEST workshop for organizing the 6th NEST conference.

The conference organizers were a group of volunteer PhD students from ETH Zurich, Eawag, Fraunhofer ISI and CDTM, a joint institution of Ludwig-Maximilians-Universität Munich (LMU) and the Technical University of Munich (TUM). Over the last year, the organizing team regularly met online, which provided a good basis

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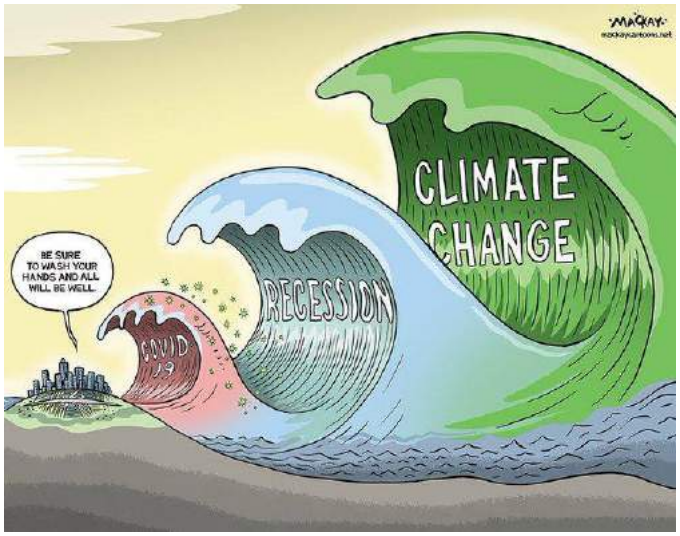
for testing digital tools once the organization re-aligned towards an online event. The decision to go online was taken in March as large gatherings were forbidden and universities closed down. With the participants' support, the event was moved online. The team considered that postponing the conference would entail too much uncertainty and possibly lead to its cancellation.

The main challenge became to determine the key organizational steps for an online event while adjusting the event's structure to ensure a satisfactory experience for participants. Among the first decisions was to shorten the event into two-half days placed in the afternoon and in the morning hours. This would not require participants to stare at their screens for too long while facilitating people in different timezones to join. Most other aspects remained unchanged (e.g., keynotes, parallel sessions) except for the social agenda, which had to be cancelled completely.

Future events can learn from the 5th NEST experience. Keeping time slots short encouraged continuous engagement by participants. Yet in-person socialising was sorely missed. Upcoming events may want to allow more room for discussions and online networking. Overall, the organizing team was impressed with how engaged all participants were and how the positive and constructive spirit of the NEST community translated into the digital event. The team thanks all contributors and participants and the institutions that supported the event financially: ETH Zurich, EAWAG, Fraunhofer ISI, and STRN.



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Personal transition snapshots

Corona-related insights from the NEST community

The Network of Early Career Researchers in Sustainability Transitions has collected short and personal insights into the world of early career researchers in times of Corona. These snapshots are about "personal transitions" in and through the crisis or transitions seen in the close environment. We have invited a number of ECRs to reflect in a creative and personal manner.

To be sure, these reflections do not aim to capture the entire lived experience surrounding the pandemic. We acknowledge that the research community is a rather privileged place to weather this storm and that many have also experienced the unfortunate passing of loved ones.

Snapshot 1: Easier than expected. No mental issues. No increased tension at home. No craving for outside dining. I have to say that the confinement gave me the opportunity to assess my personal foundations, the invisible yet concrete things which undergird my life and remain when everything else is shaken. The confinement emphasized for me that humanity is the sine qua non ingredient of academic achievement because only when I am a complete and balanced human can I aspire to produce knowledge that will advance society. Will I remain in my cave after the crisis? Of course not! However, I would like to keep the best of it, namely the ability to enjoy the small and simple things, reflect with humility, and slow down. Slow down, maybe that is all the energy transition requires.

(Carelle Mang-Benza, Department of Geography, University of Western Ontario, Canada)

Snapshot 2: Living more mindfully: During a typical week, my schedule was packed with back-to-back appointments made two weeks in advance. At a point I still can't identify, I stopped connecting to my intuition and appreciating the present moment. I observed that my life and its pace had undergone an undesirable transition, but I was already running full-speed on the hamster wheel with no foreseeable way to jump off without crashing and burning. Then Corona hit, and it shook up everything - knocking me off, and freeing me from, my hamster wheel. Suddenly I could only meet with one person at a time, so I chose wisely. Suddenly I was saving a work day's worth of time in commute each week. Suddenly my gym was closed, freeing up evenings. Finally, I recovered the mental and physical space to be present, mindful, and intentional. I was forced to re-evaluate what and whom I wanted to keep in my life – not as a result of ingrained habit, but because of a true positivity they bring – giving me back the freedom of choice I thought I had surrendered a long time ago.

(Rachel Greer DRIFT, Erasmus University Rotterdam, The Netherlands)

Snapshot 3: "Does someone from outside of Amsterdam feel like swapping houses for a while?" The message came in on a group WhatsApp some days ago. Later that day, I read about a decline of 3% in garbage in New York's Upper East side, feeding the suspicion that some of the more affluent New Yorkers chose to

hide out in their second homes elsewhere (the Hamptons?). Has the city become less attractive these days? It seems urban loft-living around the corner from Dam square is not quite so alluring anymore. People with access to a garden are the ones to envy. Here I was thinking my research on nature-based solutions for urban sustainability was turned irrelevant by a virus-related global health crisis, but a transition I observe (and root for) is a renewed appreciation for urban nature. Gardens, parks, green stretches along waterways: they have become the places to enjoy the sun, to get some exercise or just some fresh air, and even to meet up with friends or family members at a safe distance. All of us being more or less house-bound has reemphasized the urgency for accessible urban green space nearby.

(Hade Dorst Copernicus Institute of Sustainable Development, Utrecht University, The Netherlands)

Snapshot 4: Weekly pub quizzes and movie nights with friends in other cities or abroad, scheduled visits to close family with a new pizza tradition to support a local restaurant, hosting an online conference with incredibly motivated participants, knowing every street of my neighbourhood from daily walks, and cooking everyday in my own kitchen are things that I would have never expected to be a part of my everyday life in 2020. While others have had to deal with losses or much bigger stresses than me, whether in their jobs, family management or in other aspects of their life. For me the strongest impact of the Corona crisis was abrupt but quite simple: it forced me to slow down. To stop. Like a pause button. And that is how I found the new routines that I would not have been able to imagine before. I want to keep this knowledge on transitions that such an event can stay fresh in my mind after the crisis to inspire my research and bring reflection in my private life.

(Aline Scherrer, Fraunhofer ISI, Karlsruhe, Germany)

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Snapshot 5: I notice that friends of mine are having a tough time as their working behaviour has changed since they are working from home. They experience that it is hard to separate work and leisure: when does the working day start, and when does it end? How do you focus on what is now important? Also, the lack of interaction with other human beings seems to be a problem, where social isolation is a serious problem. In the meanwhile, I notice that not that much changed for me. Yes, there are small differences, as I don't go to the university anymore, but at the end of the day, it is somewhat awkward how little changed. When reflecting on it, I see that the struggles related to my PhD research are experienced by my friends in these puzzling times, not good or bad, but makes it easy to put my situation into perspective.

(Abe Hendriks University of Groningen, The Netherlands)

Snapshot 6: Quite early during the corona crisis, it struck me that this situation would require a different understanding of essential public services. When I started working from home, I thought of previous apartments I had lived in, where there was barely enough internet bandwidth for one video call. With millions working from home, how many of those who could theoretically do their job remotely had to physically go to work because they couldn't rely on video conferences? How many school children couldn't talk to their teachers the same way their classmates could? Still, a reasonably fast internet connection is still not considered a public service, and there are still too few places in Germany where you can't get it. So why don't we treat internet like we treat electricity? Digital transitions proceed in spatially differentiated ways - and in times of corona, this will certainly exacerbate existing inequalities.

(Leonard Frank, Environmental Governance, Albert-Ludwigs-Universität Freiburg, Germany)

Snapshot 7: The Covid-19 pandemic turned the world I knew upside-down for a few weeks. Borders were closed, public life was shut down and I felt exposed to an invisible threat. Organizing a PhD thesis - a challenging and time-consuming project even in normal times - became even more demanding. Important workshops were postponed or cancelled. Conferences, in my case the NEST conference 2020, had to be switched to digital formats. Work had to be organized from home. But all in all, I realised how privileged I am to live in a country that has the resources to cope with the crisis, to have a warm and private shelter with access to safe drinking water, and to have a job that I can also pursue from home. There are so many people worldwide that do not have these opportunities. Since then I am very grateful and ask myself how I can contribute to change.

(Claudia Hohmann, Fraunhofer ISI, Karlsruhe, Germany)

Snapshot 8: I live in a long-distance relationship. As the crow flies, we live about 1700 km apart. Since the lock down started in our countries, we have not seen each other. That's now about 2,5 months ago. We hope to see each other somewhat soon in Sweden, since Sweden is the only country with open borders for any European citizen. It's straining, but we will get over it. It's

interesting how this COVID-19 crisis changes my attitude. It is as if I just realized how free we are in Europe to travel wherever we want, whenever we want.

(Anonymous)

Snapshot 9: When I moved to the Netherlands a few years ago, I was impressed by how easy it was to travel from one city to another by train. The railway system in the country is highly efficient and you can find interesting deals to reduce trip costs. This has led me to spend weekends on the other side of the country, and even make medical appointments in Amsterdam or other neighboring cities. With the restrictions imposed by the spread of the COVID-19 virus in the country, I very quickly observed how much time and energy I had left that would have been otherwise spent with traveling and commuting. Why would I value so much a day on the beach in The Hague, before even exploring what the surrounding areas of my city, Utrecht, had to offer? I was lucky to have housemates that were passionate about cycling and took me on scenic rides so close to my house. At first, I felt a bit dumb for not knowing all these great nearby areas. Then, I felt even dumber for often relying on highly energy dependent transportation modes for leisure. Now I have a touring bike, but haven't cancelled my cheap train rides subscription – yet.

(Guilherme de sa Pavarini Raj, Copernicus Institute of Sustainable Development, Utrecht University, The Netherlands)

Snapshot 10: Comparing the time before Corona and my present reality, the one major transition has been related neither to my immediate environment – living in a semi-suburban Swiss village, there were actually more people visible as most stayed at home – nor to my work life, which functions quite well in "home office mode", (coincidentally also making our dog very happy) but to travelling. Having family or work ties in about half a dozen countries, I've spent a good part of the last years on the move, either for private or work purposes. With that completely stopped for the time being, I was drawn into engaging more with my immediate surroundings, discovering places I wouldn't have noticed otherwise, and innovating communication with people abroad, focusing on interactions and messages at least as much as on technologies. While life is shifting back to a semblance of normalcy, there will certainly be parts of my "corona life" that will linger, leaving a positive effect!

(Anton Sentic, University of Fribourg, Switzerland)

We thank all NESTers for their contributions.

Publications

PhD theses

Löhr, M. (2020)
University of Oldenburg
Energy transitions: An analysis of phases and actor coalitions in Denmark, Germany, and France.
link

Actors are shaping the energy transition processes taking place worldwide not least through their convictions. This thesis examines the understanding and beliefs of actors and actor coalitions of energy transitions in Denmark, Germany and France in order to analyse the cognitive dimension of change and to contribute to a better understanding of energy transition processes.
Based on 71 expert interviews coupled with document analysis, this thesis traces the development and phases of the three transition processes from the 1970s to the present day. It highlights the shared transition goals and divergent transition paths in a country comparison. In a mixed methods approach combining qualitative content and cluster analysis, two different actor coalitions per country are being analysed based on the advocacy coalition framework. Their (un)shared understanding of energy transitions nevertheless shows a growing consensus about energy transitions. Traditional coalition borders as well as former lines of conflict over renewables and fossil fuels become less important. A "transition coalition" evolves – in increasing intensity from France over Germany to Denmark.
By building bridges between political science research and transition research, this thesis analyses the cognitive dimension of change and the determinants of energy transitions. This is a basic prerequisite for the design, implementation and acceleration of energy transitions.

Bodenheimer, M. (2019)
Fraunhofer-Institute for Systems and Innovations Research ISI
Behavioral transitions to social sustainability in global production networks: case studies from the smartphone and garment sectors.
link

Global production networks (GPNs) in developing countries are often characterized by precarious working conditions, including issues of health and occupational safety, low wages, extensive overtime and the use of child and forced labor. Using case studies from the smartphone and garment sectors, this dissertation explores whether and to what degree a behavioral transition towards greater social sustainability has been taking place in these industries among both consumers

and producers since 1990. To this end, the heterodox and heuristic Model of Behavioral Transitions to Sustainability is developed and implemented using a mixed-method approach of a quantitative media coverage analysis, a qualitative systematic process analysis of relevant historical events and expert interviews based upon behavioral models for both consumers and producers. The results include key drivers and obstacles for the transition in each industry as well as insights on causal relationships and interactions between various stakeholders that have characterized the developments in each sector through the year 2016.

Kanerva, M. (2019)
University of Bremen
The role of discourses in a transformation of social practices towards sustainability: The case of meat eating related prices.
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 thesis 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 thesis takes the current meat system as a central theme. Radical transformation towards new meatways is arguably necessary, yet complex psychological, ideological and power related mechanisms currently inhibit change. Discourses are explored for answers.

Schmieder-Gaite, T. (2019)
Cardiff University
The impact of governance and low carbon finance on the built environment – two European case studies with a focus on regional domestic retrofitting and policy.
link

The EU's commitment to reducing its carbon emissions by 80% by 2050 has led to an array of climate change and energy efficiency umbrella policies, some of which focused on the energy performance of the built environment. With 28 diverse member states, these policies are transposed to the national and regional level with varying degrees of efficiency and speed. This thesis explores the financial and governance dimensions of decarbonising the European domestic building stock through the examples of two case studies in Slovenia and Germany. The study analyses qualitative data from fieldwork interviews and secondary sources. Drawing on transitions and coevolutionary theory, it employs a novel analytical framework combining Foxon's five coevolutionary systems (2011) with Geels' multi-level perspective (2005) into a versatile analytical framework. Applying this tool, the study investigates the impact of, and coevolving interactions between governance and funding on energy efficiency in the built environment. It finds that ineffective transposition of key policies, and structural differences such as the absence of an effective regional administrative level can directly impact on low-carbon investments in the built environment. The research also finds that the effective interaction between governance and funding can have a substantial impact on domestic retrofitting. The thesis fills an important gap in the literature, namely on the influence of institutional alignments and funding in relation to socio-technical regimes such as the built environment. It contributes to a growing body of literature and knowledge on the impact of institutional finance and governance on energy efficiency in the domestic building sector. Finally, the thesis derives policy recommendations from the case study findings and presents these for the UK and the EU context.

Wright, S.D. (2019)
University of Technology Sydney
A State of Innovation - The Role of Government in the Design and Orchestration of Sustainability Transitions
link

Pressing environmental issues are provoking responses from a broad range of stakeholders seeking to transition to more sustainable alternatives. The scale and complexity of these transitions are driving dramatic changes in models of collaboration, often resulting in the formation of networks of unlikely partners. Simultaneously new actors such as government are emerging.
Deploying a qualitative research method involving comparative case studies, the objective of this research is to investigate the role of government in facilitating sustainability transitions across three early stage innovation networks or 'strategic niches'. Drawing on theory from network orchestration and innovation systems, the data is gathered from 41 semi-structured interviews with a diverse range of stakeholders.
The research investigates how government shapes niche design and orchestrates innovation within the niches. The role of innovation intermediaries is also explored.
The findings provide new insights into government's role related to network management, knowledge sharing and intermediary functions fundamental to the creation and emergence of strategic niches. The research carries theoretical and practical implications for all spheres of government in terms of the formulation and deployment of innovation policy for strategic niches, as well as the

potential for non-financial support such as capacity building in a local context. At a practical level, a more nuanced view is unearthed of the roles and activities of government as a network orchestrator and intermediary, challenging the dominance of the firm as the primary source of innovation. Importantly, the findings emphasise and consolidate government's position as a critical actor in sustainability transitions.

Books

Matti, C., Martin Corvillo, J.M., Vivas Lalinde, I., Juan Agulló, B., Stamate, E., Bauer, A. and Avella, G. (2020)
Challenge-led system mapping. A knowledge management approach.
EIT Climate-KIC, Brussels
link

The Challenge-led system mapping approach responds to the need to improve the practitioner's capacity to move towards transformational system change by providing mechanisms by which to work more horizontally with challenge owners and other actors. Knowledge management as a good practice for analysis and communication responds to the increasing need to co-produce actionable knowledge and make it accessible for practitioners through participatory methods. The handbook was designed to be simple for practitioners to use as a complementary tool for participatory processes based on visual tools with the purpose of achieving a collective understanding of socio-technical systems as part of the co-design process for a portfolio of transformative activities.
This publication was developed with the support of a broad community of practitioners working on addressing system innovation within cities, regions, and countries. They have provided new insights and joined us on the journey of translating what we have learnt together into practice-based knowledge.

SI: COVID-19 as a catalyst for transitions

Cohen, M.J. (2020)
Does the COVID-19 outbreak mark the onset of a sustainable consumption transition?
Sustainability: Science, Practice and Policy, 16(1), p.1-3
link

Wells, P., Abouarghoub, W., Pettit, S., Beresford, A.
A socio-technical transitions perspective for assessing future sustainability following the COVID-19 pandemic
29-36
link

This policy brief argues that the COVID-19 pandemic exposes the fractures in the contemporary global socio-technical order and offers the prospects of several different alternative futures. The policy brief explores the pandemic through the lens of the multi-level perspective on socio-technical transitions. The pandemic is framed as a meta-transition event at the landscape level of unprecedented scale, pace, and pervasiveness such that it permeates all socio-technical regimes simultaneously. The prospects for the future are then defined on a matrix that compares the strength of civil society and that of economic structures. The result is four distinct scenarios that are linked to contemporary discourses on socio-economic futures: business as usual; managed transition; chaotic transition; and managed degrowth. The scenarios are presented as a starting point for policy discussion and the engagement of societal actors to define social and economic possibilities for the future, and the implications that the different futures would have for ecological burdens. It is concluded that the COVID 19 pandemic can act as a catalytic event in which the legitimacy and efficacy of existing economic and political structures will be challenged and reshaped, and hence is an opportunity to redefine the ecological burdens our activities create.

Goffman, E.
In the wake of COVID-19, is glocalization our sustainability future?
48-52
link

The coronavirus pandemic provides opportunities for a new kind of a glocalization, in which people live far more local lives than in recent decades but with greater global awareness through a connective world brain. The neoliberal version of globalization has spurred environmental devastation, economic inequality, and excessive global travel. A new glocalization should advance in tandem with reduced air travel, local production, smart growth, and greatly reduced automobile trips, among other measures. Adapted locally but with a globally cooperative ethic, these measures may be the best way to simultaneously alleviate the rapidly moving pandemic crisis and the slower moving environmental crisis.

Markard, J. and Rosenbloom, D.
A tale of two crises: COVID-19 and Climate
53-60
link

In response to the COVID-19 pandemic, governments around the world are mobilizing unprecedented public resources to mitigate economic collapse. However, these new programs run the risk of paying insufficient attention to the multiple sustainability crises we face. Climate change, in particular, threatens the very basis for continued human prosperity and requires an equal, if

not greater, societal mobilization. In this policy brief, we argue that the response to the coronavirus outbreak also offers an opportunity to advance the climate agenda. Indeed, given that we have scarce resources at our disposal, it is essential that we synergize such efforts. We propose that this can be accomplished in two primary ways: (1) harnessing the disruptive forces of the COVID-19 pandemic to accelerate the decline of carbon-intensive industries, technologies, and practices, and (2) leveraging responses to drive low-carbon innovation. From these two strategies, we outline five principles of "sustainability transition policy" to serve as a guide during these challenging times.

Bodenheimer, M. and Leidenberger, J.
COVID-19 as a window of opportunity for sustainability transitions? Narratives and communication strategies beyond the pandemic
61-66
link

The current COVID-19 crisis can provide a window of opportunity for promoting sustainability transitions across the globe, but this goal can only be achieved with deliberate planning and carefully designed strategic communication in the public sphere. This policy brief outlines a three-part narrative that discursively connects the COVID-19 pandemic with its potential to facilitate sustainability transitions. We seek to make clear the connection between the coronavirus outbreak and unsustainable behavior, to explain that continuing unsustainable behavior could cause further crises of a similarly debilitating scale, and to frame the current lockdown and standstill as a timely occasion to change direction and to prevent future crises. The policy brief concludes by adapting organizational crisis communication strategies to the current situation and answering questions of how, when, by whom, and at whom communication should take place.

Papers

Andersen, A.D. and Gulbrandsen, M. (2020)
The innovation and industry dynamics of technology phase-out in sustainability transitions: Insights from diversifying petroleum technology suppliers in Norway.
Energy Research & Social Science, 64 (June)
link

The urgency of a sustainability transition in the energy sector has led numerous authors to argue that it can and should be accelerated through active phase-out, disruption and destabilization of the undesirable established technologies. This paper starts out accepting the phase-out premise, but argues that a more nuanced view of 'established' technologies and incumbents is needed. Technologies often involve many different sectors, and there may be a great but underappreciated potential to realize transitions through recombinations and diversification by upstream firms providing the components and material inputs for the undesirable technology. Recombination and diversification can also dampen the possible negative effects of transitions such as loss of jobs and bankruptcy of firms that are not at the core of these technologies. By combining literature on transitions and phase-out, technological innovation systems, and diversification, we develop a framework of analysis that is used to study diversification processes in supplier firms in the Norwegian offshore petroleum technology value chain. We find that these firms face a number of diversification challenges that are mostly non-technological. These findings are used to discuss how policies can better support diversification and how theories of sustainability transitions can take this perspective into account.

Bolwig, S., Bolkesjø, T. F., Klitkou, A., Lund, P.D., Bergaentzlé, C., Olsen, O.J., Kirkerud, J.G., Gunkel, P.A., Chen, Y., Skytte, K. and Borch, K. (2020)
Climate-friendly but socially rejected energy-transition pathways: the integration of techno-economic and socio-technical approaches in the Nordic-Baltic region.
Energy Research and Social Science. In press.
link

A framework to account for social acceptance in the modelling of energy-transition pathways is outlined. The geographical focus is on the Nordic-Baltic energy region and the technological focus is on onshore wind power and power transmission, which are considered key technologies in achieving carbon-neutral energy systems in northern Europe. We combine qualitative analysis of social acceptance with quantitative assessments of scenarios using techno-economic energy-system modelling. Key factors in and consequences of social acceptance are identified, especially environmental, health, and distributional factors, as well as costs for developers and society. The energy system analysis includes four scenarios illustrating the system effects and costs of low social acceptance. The results indicate that if low social acceptance were to restrict investments in onshore wind power, costlier solar photovoltaics and offshore wind power would step in. Greater social acceptance cost for onshore wind and transmission lines favours local solutions and a more balanced renewable energy mix. There are important distributional effects: no restrictions on transmission line investments benefit power producers while raising consumer prices in the Nordic-Baltic energy region, while very low social acceptance of onshore wind power would lead to 12% higher consumer costs. The results imply that socio-technical and political

factors such as social acceptance may significantly affect transition pathway scenarios based on techno-economic variables alone. Therefore, the techno-economic, socio-technical and political layers of co-evolution of energy systems should be considered when analysing long-term energy transitions. It is important to link energy-system models with a consideration of the dynamics of socio-technical factors.

Frank, L., Klaus, J., Rainer, Q. (2020)
Transforming or tinkering at the margins? Assessing policy strategies for heating decarbonisation in Germany and the United Kingdom.
In Energy Research & Social Science 67, p. 101513
link (free download until mid-June)

Decarbonising heating supply is an important part of the global energy transition, and a vital step towards mitigating climate change. We analyse the transformative potential of German and UK heating sector decarbonisation policies. We deploy Transformative Environmental Policy [TEP], originally developed to guide policy development, as an analytical framework to discuss how and to what extent both countries' heating sector policy strategies promote the necessary radical reconfiguration of the socio-technical system of heating supply. TEP suggests a systemic approach for such reconfigurations, addressing technologies, social practices, institutions and infrastructures as well as combining experimental support of innovation with governance approaches for the phase-out of unsustainable technologies and practices. Our comparative analysis of German and UK decarbonisation strategies concludes that such elements can be identified in both strategies, although to different degrees. The analysis points to considerable deficiencies, such as a lack of phase-out policies, insufficient lowcarbon building standards and a neglect of non-technical system elements.

Hernandez, A.L.G. and Bolwig, S. (2020)
Understanding climate policy integration in the Global South through the multiple streams framework.
Climate and Development (TCLD)
link

Actions needed to mitigate and adapt to climate change have often synergies and trade-offs with sectoral and sustainable development priorities, and the recent focus on SDGs and sustainable transitions highlights the need to integrate climate action into other policy spheres. This process is known as climate policy integration (CPI) or climate mainstreaming. Enhancing its understanding as a public policy making process can provide insights for its operationalization, which becomes relevant in the context of the implementation of Nationally Determined Contributions in the global South. This paper aims to enhance the understanding of the how windows of opportunity for CPI are formed by drawing on elements from the multiple streams framework (MSF) developed by John Kingdon. This paper analyses grey literature regarding two cases of climate mainstreaming initiatives implemented by international cooperation organizations. The results show that relevant elements from the MSF, such as, attachment to other high-profile national issues, timing the integration with routine institutional procedures, and the presence of policy entrepreneurs, have been catalysing factors for CPI in the context of such initiatives. However, we can only assess the value of this analytical framework for CPI by testing it systematically through case studies in a variety of contexts.

Dijk, M., Iversen, E., Klitkou, A., Kemp, R., Bolwig, S., Borup, M. and Møllgaard, P. (2020)
Forks in the road to e-mobility: An evaluation of instrument interaction in national policy mixes in northwest Europe.
Energies 13(2), 475
link

This paper evaluates how policy shaped the emergence of electric mobility in three countries, Norway, the Netherlands and Denmark, between 2010 and 2015. Whereas previous studies have looked at the effects of separate policy instruments, this paper gives insights in the interaction effects of instruments on the diffusion of battery electric cars between five policy areas. Based on analysis of synergetic, contradictory and pre-conditional effects, we find that an effective policy mix includes: fiscal incentives that mirror the actual carbon footprint of the respective vehicles; non-fiscal demand-side incentives; centrally financed and/or coordinated charging infrastructure; clarity regarding the choice of technology that will be supported. Moreover, development of a domestic, e-mobility-related industry and a high share of renewable energy strengthens the legitimization of e-mobility support. The findings help designing policy mixes in the transition to electric mobility.

Colli, E. (2020)
Towards a mobility transition? Understanding the environmental impact of Millennials and Baby Boomers in Europe.
Travel Behaviour and Society 20, 273-289
link

The purpose of this paper is to add knowledge on the understanding of if and how the Millennial generation is contributing to a transition towards more sustainable travel behaviours, from a Europe-wide angle.
The study uses a comparative approach on a cohort and territorial basis. On one hand it analyses the differences between the Millennials, which are experiencing a general decrease in car use/ownership, and the Baby

Boomers, which are seen to be highly car-dependent – even after retirement. On the other hand, it considers the territorial differences among EU countries with aggregate analysis on a regional basis. The method includes secondary analysis of European datasets with descriptive analysis and logistic regression.
According with the results, it is confirmed that Millennials have less polluting habits than their predecessors (less car use/ownership, less probability of being car users independently from context/status). But in recent years this trend is experiencing a change of direction, with general rise in car use/ownership, with different paces and schemes among clusters of countries. This suggest that i) with the improvement of their individual status and general European economic recovery, Millennials' car use tends to rise (with Baby Boomers remaining static with their driving habits); ii) the pace and extent of this rise is highly dependent on the regional context, with a substantial impact of Eastern countries (quickly catching up with Western levels) and PIIGS countries (showing high elasticity on car use depending on the economic fluctuations) resulting in an overall rise in car use in Europe.

Hansen, U., Nygaard, I., Morris, M. and Robbins, G. (2020)
The effects of local content requirements in auction schemes for renewable energy in developing countries: A literature review.
Renewable and Sustainable Energy Reviews, 127, 109843
link
Given the increasing cost-competiveness of renewable energy (RE) technologies, competitive auction schemes have increasingly been adopted in recent years across various developed and developing countries. Local content requirements (LCRs) are frequently used as part of RE auction schemes to promote local industrial development. In this paper, we present a review of the literature on the effectiveness of LCRs in fostering local industrial development across various developing countries focusing on South Africa, Brazil, India and China. Specifically, this paper analyses the effectiveness of LCRs in promoting the establishment of local manufacturing facilities of onshore wind turbine and solar PV components in these countries. Further, the paper provides a review of the main determining factors stressed in the literature to account for variations in the effectiveness of LCRs. We have found that the literature generally ascribes importance to the role of LCRs in stimulating local component production in developing countries. However, previous research on the effectiveness of LCRs in establishing local component manufacturing differs across the technologies and the countries analysed. The variation in the effectiveness of LCRs can be explained by a framework that combines the following four determining factors: (i) market size and stability; (ii) policy design and coherence; (iii) the restrictiveness of the LCRs; and (iv) the domestic industrial base. The paper highlights a lack of systematic approaches and rigour in existing research, thus proposing the development of a common framework and set of indicators to assess the efficiency of LCRs.

Janzwood, A. (2020)
Explaining Variation in Oil Sands Pipeline Projects.
Canadian Journal of Political Science: 1-20
link

While the vast majority of oil pipeline projects in Canada have been successfully built, several mega oil sands projects within and passing through Canada have been cancelled or significantly delayed. This article explains why these delays and cancellations have occurred. A systematic cross-case analysis is used to provide insight into the changing politics of oil sands pipelines. Qualitative comparative analysis (QCA) is used to identify combinations of causal conditions that co-occur across cases of proposed new oil pipelines and pipeline expansion projects. The pipeline projects were proposed to the federal regulator—the National Energy Board—between 2006 and 2014. The QCA reveals that social mobilization and major regulatory barrier(s) are necessary conditions in explaining variation in pipeline project outcomes. The analysis of sufficiency reveals more complex configurations of conditions. This article contributes to the literature on the politics of oil sands pipelines by using a comparative approach to identify the impacts of socio-political and legal dynamics that have emerged around pipelines in the last 15 years.

Klerkx, L., Jakku, E. and Labarthe, P. (2019)
A review of social science on digital agriculture, smart farming and agriculture 4.0: New contributions and a future research agenda.
NJAS - Wageningen Journal of Life Sciences 90-91, 100315
link

While there is a lot of literature from a natural or technical sciences perspective on different forms of digitalization in agriculture (big data, internet of things, augmented reality, robotics, sensors, 3D printing, system integration, ubiquitous connectivity, artificial intelligence, digital twins, and blockchain among others), social science researchers have recently started investigating different aspects of digital agriculture in relation to farm production systems, value chains and food systems. This has led to a burgeoning but scattered social science body of literature. There is hence lack of overview of how this field of study is developing, and what are established, emerging, and new themes and topics. This is where this article aims to make a contribution.

Klerkx, L. and Rose, D. (2020)
Dealing with the game-changing technologies of Agriculture 4.0: How do we manage diversity and

responsibility in food system transition pathways?
Global Food Security 24, 100347
link

Agriculture 4.0 is comprised of different already operational or developing technologies such as robotics, nanotechnology, synthetic protein, cellular agriculture, gene editing technology, artificial intelligence, blockchain, and machine learning, which may have pervasive effects on future agriculture and food systems and major transformative potential. These technologies underpin concepts such as vertical farming, digital agriculture, bioeconomy, circular agriculture, and aquaponics. In this perspective paper, we argue that more attention is needed for the inclusion and exclusion effects of Agriculture 4.0 technologies, and for reflection on how they relate to diverse transition pathways towards sustainable agricultural and food systems driven by mission-oriented innovation systems. This would require processes of responsible innovation, anticipating the potential impacts of Agriculture 4.0 through inclusive processes, and reflecting on and being responsive to emerging effects and where needed adjusting the direction and course of transition pathways.

Gaitán-Cremaschi, D., Klerkx, L., Duncan, J., Trienekens, J.H., Huenchuleo, C., Dogliotti, S., Contesse, M.E., Benitez-Altuna, F.J. and Rossing, W.A.H. (2020)
Sustainability transition pathways through ecological intensification: an assessment of vegetable food systems in Chile.
International Journal of Agricultural Sustainability 18, 131-150
link

Ecological intensification has been proposed as a promising lever for a transition towards more sustainable food systems. Various food systems exist that are based on ecological intensification and may have potential for a sustainability transition. Little is known, however, about their diversity and about how they perform against dominant systems in terms of the multiple societal goals. The aim of this study is to contribute to knowledge about sustainability transitions in food systems through an empirical analysis of vegetable food systems in Chile. The study (i) characterizes the diversity of vegetable food systems in Chile (ii) evaluates the food systems in terms of multiple societal goals, and (iii) assesses their potential for supporting sustainability transition pathways from the perspective of ecological intensification. Results indicate that among the five vegetable food system types, the agroecological and the small organic have potential to foster a sustainability transition. Nevertheless, these systems are small and localized, and scaling them requires actions to remove barriers in the relations with the agri-food regime and among themselves. The broader relevance of this analysis is that there needs to be awareness in research on transitions about the diversity of food systems present in countries and how they interact.

Geddes, A. and Schmidt, T.S. (2020)
Integrating finance into the multi-level perspective: Technology niche-finance regime interactions and financial policy interventions.
Research Policy 49, 103985
link

Any major socio-technical transition requires a fundamental re-direction of financial capital from incumbent to new technologies and practices. While the transitions literature conceptually covers financial markets, the role of finance is marginalized and has scarcely been analysed empirically. To address this gap, here we build on the multi-level perspective (MLP), which considers financial markets as part of the existing regime. We argue that the role of finance is highly relevant for the niche-regime interaction: Redirecting finance towards new niche technologies requires that either the niche is fit for and conforms to the financial regime's expectations or the financial regime is stretched and transformed in order to accept and finance niche technologies. Based on 56 interviews, we identify factors that determine interactions between the financial regime and technology niches: these include acceptable risk and transaction size, an abundance of knowledge and heuristics in both the regime and niche, and an extensive, existing industry network. We further analyse how State Investment Bank (SIB) interventions in Germany, the UK and Australia, aimed to mobilise private finance into low-carbon project development, affect the interaction between the technology niche and financial regime, i.e. whether they resulted in fitting-and-conforming the technological niche for the financial regime or stretching-and-transforming the financial regime. Our results point to several important effects of SIB interventions, with most effects fitting the niche to the regime. However, we also detect effects that stretch and transform the financial regime – through evolutionary processes. Importantly, some effects occur as a consequence of the primary effects. Based on our findings we discuss policy implications on how to accelerate transitions through policies aiming at finance as well as theoretical insights gained through our analysis.

Geddes, A., Schmid, N., Schmidt, T.S. and Bjarne S. (2020)
The politics of climate finance: Consensus and partisanship in designing green state investment banks in the United Kingdom and Australia.
Energy Research & Social Science, Early View
link

The Paris Agreement will require national level mitigation action that takes advantage of economic and technological opportunities while redirecting finance

towards low-carbon alternatives. However, climate change has been politicized in many countries, potentially blocking the introduction of climate policies and broader green industrial policies. Publicly funded green investment banks (GIBs) are one policy instrument that mobilizes private finance into national opportunities. However very little is known about the political decisions behind the establishment and design of these banks. Taking an exploratory approach, we analyse the parliamentary discourse behind the establishment and design of the UK's Green Investment Bank and Australia's Clean Energy Finance Corporation. We find that the debate on GIB *establishment* focused on arguments related to high-level policy goals and the role of the state. The debate on GIB *design* focused on technology target sectors, tasks and tools to be implemented, and organizational aspects. We find a difference in political controversy levels with Australia's debates displaying distinct partisanship on all debate topics, whereas the UK's debates displayed clear consensus on the majority of debated topics. We also find that debate on higher-level establishment concepts, especially the role of the state, received more attention in Australia, whereas in the UK there was greater discussion of design concepts, namely organizational aspects. We derive propositions on the politics of GIBs beyond our two cases, and conclude with an agenda for future research.

Schmid, N., Haelg, L., Sewerin, S., Schmidt, T.S. and Simmen, I. (2020)
Governing complex societal problems: The impact of private on public regulation through technological change.
Regulation & Governance, Early View.
link

When addressing complex societal problems, public regulation is increasingly complemented by private regulation. Extant literature has provided valuable insights into the effectiveness of such complex governance structures, with most empirical studies focusing on how public regulation influences private regulation. Conversely, the impact of private on public regulation is less well studied. Here, we investigate this impact with a focus on technological change as possible mechanism. Based on a case study of energy efficiency in buildings in Switzerland, we find evidence of a symbiotic interaction between public and private regulation that leads to ratcheting-up of regulatory stringency. We identify technological change as the mechanism linking private and public regulation. We discuss the relevance of our findings for governance literature and regulators.

Lam, D.P.M., Martín-López, B. Wiek. A., Bennett, E.M., Frantzeskaki, N., Horcea-Milcu, A.I. and Lang, D.J. (2020)
Scaling the impact of sustainability initiatives: a typology of amplification processes.
Urban Transformations 2: 3
link

Amplifying the impact of sustainability initiatives to foster transformations in urban and rural contexts, has received increasing attention in resilience, social innovation, and sustainability transitions research. We review the literature on amplification frameworks and propose an integrative typology of eight processes, which aim to increase the impact of such initiatives. The eight amplification processes are: stabilizing, speeding up, growing, replicating, transferring, spreading, scaling up, and scaling deep. We aggregated these processes into three categories: amplifying within, amplifying out, and amplifying beyond. This integrative typology aims to stimulate the debate on impact amplification from urban and rural sustainability initiatives across research areas to support sustainability transformations. We propose going beyond an understanding of amplification, which focuses only on the increase of numbers of sustainability initiatives, by considering how these initiatives create transformative change.

Lam, D.P.M., Hinz, E., Lang, D.J., Tengö, M., von Wehrden, H., and Martín-López, B. (2020)
Indigenous and local knowledge in sustainability transformations research: a literature review.
Ecology and Society 25: art3
link

In sustainability transformations research, understand-dings of transformations are often dominated by Western scientific knowledge. Through a systematic literature review, we investigated how indigenous and local knowledge (ILK) is represented in peer-reviewed empirical scientific papers that apply ILK in contexts of transformation, transition, and change. Our results show, first, that all papers applied ILK to confirm and complement scientific knowledge in contexts of environmental, climate, social-ecological, and species change. Only four papers (5%) applied ILK to conduct research on transformations. Second, we identified four research clusters that apply ILK in contexts of transformation, transition, or change in (1) Arctic, (2) terrestrial, (3) coastal, and (4) grass and rangelands environments. These clusters are located along two axes: tropic to Arctic and marine to terrestrial. Finally, our results indicate that indigenous and local understandings of transformations are currently neglected in the scholarly transformations discourse. The reviewed papers do not focus on how indigenous peoples and local communities understand transformations, instead they focus on what changes indigenous peoples and local communities observe and describe, resulting from their daily experiences and activities. We argue that because of its in-depth local, place-based character, ILK can substantially contribute to a more plural understanding of transformations and

the assessment of transformative change. We conclude that future research needs to investigate how to gain a more plural understanding of transformations that leads potentially to more inclusive actions toward more just, equitable, and sustainable futures on a local and global level.

Magnusson, T., Anderberg, S., Dahlgren, S. and Svensson, N. (2020)
Socio-technical scenarios and local practice – Assessing the future use of fossil-free alternatives in a regional energy and transport system.
Transportation Research Interdisciplinary Perspectives, 5: 100128
link

This article presents results from a project involving local practitioners in the construction of scenarios for a regional energy and transport system. The purpose is to demonstrate how sustainability transitions research can interact with local practice by means of socio-technical scenarios. Combining quantitative data with qualitative storylines, the article presents four scenarios, which describe different ways of using biogas, biodiesel and electricity in four different applications: city buses, inter-city buses, heavy-duty trucks and industrial processes. The article compares the four scenarios in terms of realization possibilities, energy efficiency and greenhouse gas reduction. Focusing on near term realization on a commercial basis, the research findings suggest that collaborative scenario construction can be a useful strategy to manage conflicting agendas and engage key stakeholders in dialogues on transition pathways. The article concludes by presenting policy lessons for practice-oriented transition management. The lessons point to the importance of flexibility in system delineations, the critical timing of near-term scenarios, and the use of scenarios to outline local practitioners' agency.

Markard, J., Geels, F.W. and Raven, R.P.J.M. (2020)
Challenges in the acceleration of sustainability transitions.
Environmental Research Letters, in press
link

Sustainability transitions in energy, transport or agro-food systems are needed to tackle grand sustainability challenges. Due to the urgency of these challenges, transitions need to accelerate and widen in scope, which, in some cases, is already happening. This shift in gear, however, comes with a series of 'acceleration challenges', including whole systems change, multi-system interaction, decline and resistance, consumption and lifestyles, and governance. Using insights from the new research field of transition studies, this perspective paper deepens the understanding of these acceleration challenges.

Rosenbloom, D., Markard, J., Geels, F.W. and Fuenfschilling, L. (2020)
Why carbon pricing is not sufficient to mitigate climate change — and how "sustainability transition policy" can help.
Proceedings of the National Academy of Sciences 117, 8664-8668
link

Carbon pricing is often presented as the primary policy approach to address climate change. We challenge this position and offer "sustainability transition policy" (STP) as an alternative. Carbon pricing has weaknesses with regard to five central dimensions: 1) problem framing and solution orientation, 2) policy priorities, 3) innovation approach, 4) contextual considerations, and 5) politics. In order to address the urgency of climate change and to achieve deep decarbonization, climate policy responses need to move beyond market failure reasoning and focus on fundamental changes in existing sociotechnical systems such as energy, mobility, food, and industrial production. The core principles of STP can help tackle this challenge.

Rosenbloom, D. and Markard, J. (2020)
A COVID-19 recovery for climate.
Science 368, 447
link

This editorial argues for the importance of leveraging the COVID-19 recovery to advance the low-carbon transition. It offers two main strategies: (1) stimulating innovation to build the low-carbon systems of the future; and (2) harnessing disruption to break carbon lock-in.

Markard, J. and Rosenbloom, D. (2020)
Political conflict and climate policy: The European emissions trading system as a Trojan Horse for the low-carbon transition?
Climate Policy, 1-20
link

Many economists, businesses, and policymakers view carbon pricing as the single best policy approach to address climate change. Such optimism, however, tends to neglect the political conflicts surrounding climate policy and the necessity to accelerate the ongoing low-carbon energy transition. To unveil these conflicts, we analyze the responses of key actors to public consultations in 2015–16 concerning the EU emissions trading system (ETS) and the EU renewable energy directive. From this, we identify a prominent policy position contending that climate policy should focus on the ETS given its purported efficiency. Some actors who share this position use the ETS as a Trojan Horse – a strategy to divert attention from, and fend off, more ambitious climate action in the form of complementary renewable energy policies. Such political strategies do

not just undermine carbon pricing but impede the energy transition at large. However, we also find energy industry incumbents that express support for a much stronger ETS and more effective climate policy. Therefore, it seems that the 'Trojan Horse strategy' may fail and the low-carbon transition might gain increasing support from a broad range of stakeholders. Even so, we argue that any singular climate policy approach risks political capture and that a mix of policies will be necessary to accelerate the ongoing transition.

Markard, J., Bento, N., Kittner, N., and Nunez-Jimenez, A. (2020)
Destined for decline? Critically examining nuclear energy with a technological innovation systems perspective.
Energy Research & Social Science 67, 101512.
link

Technology decline is a central element of sustainability transitions. However, transition scholars have only just begun to analyze decline. This paper uses the technological innovation systems (TIS) perspective to study decline. Our case is nuclear energy, which is at a crossroads. Some view nuclear as a key technology to address climate change, while others see an industry in decline. We examine a broad range of empirical indicators at the global scale to assess whether or not nuclear energy is in decline. We find that an eroding actor base, shrinking opportunities in liberalized electricity markets, the break-up of existing networks, loss of legitimacy, increasing cost and time overruns, and abandoned projects are clear indications of decline. Also, increasingly fierce competition from natural gas, solar PV, wind, and energy-storage technologies speaks against nuclear in the electricity sector. We conclude that, while there might be a future for nuclear in state-controlled 'niches' such as Russia or China, new nuclear power plants do not seem likely to become a core element in the struggle against climate change. Our conceptual contribution is twofold. First, we show how the TIS framework can be mobilized to study technology decline. Second, we explore a range of indicators to cover the multiple dimensions of decline, including actors, institutions, technology, and context.

Mishra, K., Neesham, C., Coghill, K. and Stubbs, W. (2020)
A multilevel analysis of climate change inaction: case study of an Australian electricity company.
Australasian Journal of Environmental Management 2020, 173-199
link

Climate change is a key societal and economic challenge. Despite widespread recognition for the need for urgent action on climate change, transformation to a zero carbon economy is still elusive. While there are detailed accounts of organisational responses to climate change impacts, little is known about climate change *inaction*. We adopt the theoretical framework of resilience in social-ecological systems to explore the change processes needed to overcome climate change inaction. Through an in-depth case study of an Australian energy company, we identify the impediments to climate change action due to rigidity and scarcity traps at three levels: micro (organisation), meso (industry), and macro (government). These traps inhibit transformation from a fossil fuel regime to a renewable energy regime. Our study contributes to a multi-level theory of organisational inaction on climate change by identifying specific causal factors that erode systemic adaptive capacity, increasing the probability of rigidity and scarcity traps. We find that different inaction occurs at all three levels, and is closely interconnected (across levels) within a social-ecological system, due to dynamic antecedents (e.g. changing individual attitudes, business practices, and government policies). Competencies, resources, and cultural changes can help organisations traverse rigidity and scarcity traps to overcome climate change inaction.

Pel, B. and Kemp, R. (2020)
Between innovation and restoration; A critical-historicizing typology of social innovation niches.
Technology Analysis & Strategic Management
link

Social innovation (SI) is gaining attention as an innovation category. However, the SI concept proves vulnerable to stereotypical understandings. Next to the radically novel, diffusion-oriented and thereby manifestly innovative social 'niches', it is important to also acknowledge the rather latent SI phenomena of restoration and shielding. This paper therefore develops a critical-historicizing perspective that highlights the social construction of innovations in social relations. Building on scholarship in Strategic Niche Management, grassroots innovation and critical innovation studies, four 'shapes of social innovation' are distinguished. Substantiating and deepening this conceptual classification through empirical evidence on 20 SI initiatives, the analysis highlights how social innovations may take on several of the theorised appearances throughout their existence in society (shapeshifting). Disclosing overlooked SI phenomena, this critical-historicizing understanding informs more comprehensive and balanced SI research and practice.

Kohler, J., Raven, R.P.J.M. and Walrave, B. (2020)
Advancing the analysis of technological innovation system dynamics: introduction to the special issue.
Technological Forecasting and Social Change. In press.
link

This introduction reviews analysis of the dynamics of Technological Innovation Systems and introduces four papers that extend the analysis of dynamic processes in

TIS. All four papers employ a system analysis for explaining TIS dynamics: Walrave & Raven and Markard consider the dynamics of the whole TIS. Musiolik et al. and Kieft et al. consider interventions intended to strengthen TIS dynamics. Overall, these papers show that the TIS framework can be extended to include an explicit consideration of how complex dynamic cessses of a TIS generate system changes. Methods for the measurement of the TIS functions and empirical assessment of their interactions remain limited. The relationships of TIS functions to actor networks could be explored in greater depth. Research synthesizing insights into TIS dynamics across case studies is still limited.

Dahlmann, F., Stubbs, W., Raven, R. and Porto de Albuquerque, J. (2020)
The 'purpose ecosystem': emerging private sector actors in earth system governance.
Earth System Governance. In press.
link

The private sector arguably plays a critical role in addressing the challenges of the Anthropocene and providing potential solutions to achieve the United Nations Sustainable Development Goals. Recently, a myriad of new actors in the form of intermediaries, initiatives and organisations have started driving wider systems change by advocating and advising companies to reconsider and broaden their fundamental 'raison d'être'. In this Perspective we argue that the emergence of this 'purpose ecosystem' could play an important function within earth system governance, specifically by endorsing and accelerating action aligned with achieving the UN SDGs; yet we also highlight a number of risks, barriers and critical considerations for its overall assessment and propose important questions for further research.

Polsky, M. (2020)
Leverage Points Meets Sustainable Transformation: Speeding Up Sustainability Progress and 101 Mindset Barriers to It.
OIDA International Journal of Sustainable Development
link

Big societal changes are necessary - and fast. But there are no methods or Theories of Change to reliably guide us. As part of exploratory Ph.D research, the author attended conferences in two academic fields. They were: "Leverage Points for Sustainability Transformation," Leuphana University; and "The 10th Annual International Sustainable Transitions Conference," Carlton University. These fields believed large changes must take decades—but it is risky to assume we have that. The first conference inserted a Meadows' classic framework into the Sustainable Transformations field. It explored whether the leverage points metaphor and some of the characteristics of Meadows' 12-level hierarchical model could fit within this field, offering increasing systems level-impact in exchange for relatively low levels of effort. This conference was largely successful in re-discovering some of the potential of that framework, a major accomplishment that could be vital. The ideas presented there must be extended. Some mindset barriers were shown at this conference, but were partially overcome at the second. Many mindset barriers are also discussed based on the author's experiences as a change-agent. Given their quantity and range, the author hypothesized they are an unexpected obstacle to big societal change. Since mindset barriers were shown even at a conference aiming for big societal changes, this is evidence that mindset barriers are pervasive and possibly correctable. It was realized that problematic mindsets are actually an interpretation of the second highest-ranking leverage point, which indicates their importance. Whereas, trying to address them is consistent with the highest one: challenging the paradigm/mindset.

Sareen, S. (2020)
Metrics for an accountable energy transition? Legitimating the governance of solar uptake.
Geoforum 114: 30-39
link

For recent techno-economic advances in solar energy to enable sustainable energy transformation, society must address institutional inertia and entrenched resistance by powerful stakeholders. Legitimation of power and specific metrics produces institutional authority to govern energy transitions, by reconfiguring accountability relations between situated actors. This article studies how metrics are legitimated and thus analyzes solar energy governance in Portugal. It identifies accountability relations by tracking four practices of legitimation – discursive, bureaucratic, technocratic and financial – in relation to metrics that help perform expertise and authority within changing topographies of power during sectoral transition. The approach unpacks both (i) how metrics modulate the dynamics of shifts and resistance, and (ii) how their insufficient specification privileges a reductive structural understanding of energy sectors. Drawing on expert interviews, desk-based and field observations, the study explicates how up to 2018, solar energy governance in Portugal limited disruptive change, validated incremental change, and left transformative potential untapped.

DellaValle, N. and Sareen, S. (2020)
Nudging and boosting for equity? Towards a behavioural economics of energy justice.
Energy Research and Social Science 68: 101589
link

With climate mitigation and energy transition impacts on vulnerable individuals becoming increasingly evident, justice considerations take on heightened relevance for

energy governance. Yet, energy justice remains underinvestigated in relation to the potential of behavioural economics. Behavioural economics provides evidence that individuals exhibit systematic and predictable patterns of decision-making that depart from the assumptions of rational choice theory, thus giving policy-makers a richer model of human behaviour. Adopting such a model will impact energy justice outcomes, hence understanding potential dynamics is timely. How can policy-makers complement traditional energy poverty alleviation measures with behaviourally informed ones to enhance vulnerable individuals' cognitive capacity? What implications does this carry for energy justice? Supportive choice architecture for individuals exposed to higher risks related to energy access and use must improve their outcomes, without shifting the responsibility for vulnerability to them, neglecting their intrinsic capabilities, or obscuring structural injustice. This article analytically illustrates whether and how behavioural economics can support individual behaviour and promote collective action, in combination with a policy shift to substantive claim-making processes, to address the unfair distribution of energy use burdens. Using nudging and boosting as tools for energy poverty alleviation, it discusses how behavioural economics can enhance energy justice.

Smith, S.R., Christie, I. and Willis, R. (2020)
Social tipping intervention strategies for rapid decarbonization need to consider how change happens.
PNAS, May 19, 2020 117 (20) 10629-10630
link

Otto et al.'s evaluation of "social tipping interventions" (STIs) for accelerating a global transformation to carbon neutrality by 2050 is an important sociopolitical contribution to a debate that is all-too-often techno-centric in focus. Otto et al.'s expert panel identified six social tipping elements—within energy production/ storage, human settlement, financial markets, norms and value systems, education, and information feedback—as candidates with the greatest potential to overcome incumbent interests and other "self-stabilizing mechanisms" (p. 2356) and trigger nonlinear carbon reductions. However, in considering how this "defining task for humanity" (p. 2354) is to be achieved, a deeper analysis of social change processes and social movement theory would be beneficial.
We therefore suggest that future evaluations of social tipping dynamics for climate stability should consider the process of social transformation as well as more complex patterns of contagion. The starting points might then identify STIs focusing on, for example: how to mobilize and maintain broad coalitions for rapid change; how to communicate compelling narratives that appeal to diverse constituencies; and how to foster experimental "laboratories" of community action whose successes may be easily learned and replicated.

Sovacool, B.K., Turnheim, B., Martiskainen, M., Brown, D. and Kivimaa, P. (2020)
Guides or gatekeepers? Incumbent-oriented transition intermediaries in a low-carbon era.
Energy Research & Social Science 66 (August, 2020), 101490, pp. 1-17
link

Transitions intermediaries—agents who connect diverse groups of actors involved in transitions processes and their skills, resources and expectations—are becoming more prominent in research on low-carbon transitions. Most work, however, has focused on their ability to push innovations or emerging technologies forward, emphasising their involvement in disrupting incumbent regimes or firms. However, in focusing on new entrants, often at the grassroots level, such literature runs the risk of overlooking the potentially positive role that *incumbent transition intermediaries*—those oriented to work with or centrally consider the interests of dominant government, market or civic stakeholders—can play in meeting sustainable energy and transport goals. In this paper, we focus specifically on five different incumbent transition intermediaries—Smart Energy GB in the United Kingdom, Energiesprong in the Netherlands, SULPU in Finland, CERTU in France, and the Norwegian Electric Vehicle Association —and explain their efforts to meet socially desirable goals of accelerating innovation or decarbonizing energy or transport systems. We ask: Why were these intermediaries created, and what problems do they respond to? How do they function? What are their longer-term strategies and aspirations? In what ways do they reflect, reinforce, or otherwise shape incumbency? In answering these questions via a comparative case study approach, the paper aims to make contributions to the study of incumbency and intermediation in the context of transitions, to identifying different types of incumbent intermediaries (market, governmental, civic), and to informing debates over energy and climate policy and politics.

Stanković, J., Dijk, M., Hommels, A. (2020)
Upscaling, Obduracy, and Underground Parking in Maastricht (1965-Present): Is There a Way Out?
Journal of Urban History, 1-26
link

This article reconstructs the history of underground parking in the Dutch city of Maastricht by connecting the model of obduracy (i.e., "resistance to change") with the concept of upscaling, which offers new insights in historic urban transitions. We discuss how the decision-making process about the building of the first underground parking garage (Vrijthof) in the late 1960s was a starting point of a growing obduracy of the urban practice of car use and parking in the inner city of Maastricht. We argue that this obduracy can be

explained by the growing interconnections between the cultural meanings of historic squares and urban car use, expertise of urban planners, traffic experts and parking operators, parking and traffic policies and regulations, and underground parking infrastructures. Ironically, the expansion of underground parking in Maastricht can be seen as a pivotal part of the successful upscaling and increasing obduracy of car mobility in this town, but at the same time significantly affects the upscaling of local sustainable mobility innovations forty years later and beyond.

Strambach, S. and Pflitsch, G. (2020)
Transition topology: Capturing institutional dynamics in regional development paths to sustainability.
Research Policy 49, 104006
link

A key challenge in sustainability transitions research is to better understand the huge variety and spatial unevenness of transitions paths. Institutions and institutional change have been identified as critical issues, as regional institutional settings significantly influence the pace and scope of sustainability transitions. However, the complex institutional dynamics underpinning 'Regional Transition Paths to Sustainability' (RTPS) are not well understood. Underexplored is in particular the link between short time gradual changes on the micro-level and long-term transformative change on the system level. In order to add to a more profound understanding of these processes, a focus on organizational change is valuable. The basic argument made in this article is that the emergence of new temporary and more permanent forms of organization has the potential to enable de-institutionalization and new institutionalization processes simultaneously. As we will show, new organizational forms also serve as a means to make institutional dynamics visible. The contribution of this paper is thus twofold: By combining insights from sustainability transition theory, evolutionary economic geography and neoinstitutional organization theory, we develop an original conceptual framework. By developing and applying the methodological approach of a 'transition topology', the potential of this framework for comparative research on actors and processes in different regional transition path to sustainability is revealed.

Uhde, H. and Malima, G.C. (2020)
Experimenting with local electricity markets in China – multilevel drivers and barriers in the sociotechnical regime.
Energy Research and Social Science, 69 (2020), 101577
link

As part of its market reforms in the energy sector, the Chinese central government introduced local electricity market pilots in 2019. Through the integration of renewable resources and the possibility for consumers to participate, local electricity markets not only support the centralized electricity grid, but also form a new alternative for electricity distribution. Based on the socio-technical transition theory, this paper aims to present a multi-level perspective on local electricity markets in China and to identify drivers and barriers to their implementation. The Chinese government's “experimental governance” strategy is identified as niche management for local electricity markets and therefore as an important driver for the market development. However, the current state of the socio-technical regime with its is characterized by rigid structures has created some barriers that can only be partially overcome by new opportunities that arise in the niches.

Wilkinson, S., Hojckova, K., Eon, C., Morrison, G. M. and Sandén, B. (2020)
Is peer-to-peer electricity trading empowering users? Evidence on motivations and roles in a prosumer business model trial in Australia.
Energy Research & Social Science, 66, 101500
link

Peer-to-peer (P2P) electricity markets have attracted significant attention as a promising model enabling the integration of distributed energy sources by creating consumer-based electricity markets. Despite the significance of users in this model, knowledge is still lacking as to who the users interested in P2P electricity markets are and what role they can play in building them. We aim to fill this knowledge gap by providing evidence from the first real-world trial of a P2P electricity market facilitated by blockchain technology across a regulated electricity network. We apply sustainability transition and innovation thinking to analyse the trial participants as users shaping the P2P-related innovation process. Supported by our empirical results, we found that users joined the P2P market trial to learn and co-create the future of prosumer-centred electricity markets. We also found that if P2P is to enter the mainstream market, the assistance of other actors (e.g., intermediaries and activists) is important in order to cross the chasm to reach the majority of users and move from a learning and probing phase to breakthrough and wide diffusion.

Wilson, C., Grubler, A., Bento, N., Healey, S., De Stercke, S. and Zimm, C. (2020)
Granular Energy Technologies for Accelerating Low-Carbon Transformation.
Science 368, 6486, 3 April 2020
link

Of the 45 energy technologies deemed critical by the International Energy Agency for meeting global climate targets, 38 need to improve substantially in cost and performance while accelerating deployment over the

next decades (1). Low-carbon technological solutions vary in scale from solar panels, e-bikes, and smart thermostats to carbon capture and storage, light rail transit, and whole-building retrofits. We make three contributions to long-standing debates on the appropriate scale of technological responses in the energy system (2, 3). First, we focus on the specific needs of accelerated low-carbon transformation: rapid technology deployment, escaping lock-in, and social legitimacy. Second, we synthesize evidence on energy end-use technologies in homes, transport, and industry, as well as electricity generation and energy supply. Third, we go beyond technical and economic considerations to include innovation, investment, deployment, social, and equity criteria for assessing the relative advantage of alternative technologies as a function of their scale. We suggest numerous potential advantages of more-granular energy technologies for accelerating progress toward climate targets, as well as the conditions on which such progress depends.

Zalengera, C., To, L.S., Sieff, R., Mohr, A., Eales, A., Cloke, J., Buckland, H., Brown, E., Blanchard, R. and Batchelor, S. (2020)
Decentralisation: the key to mass access to solar energy services in sub-Saharan Africa?
Journal of Environmental Studies and Sciences
link

The decentralization of governance is increasingly considered crucial for delivering development and is being widely adopted in sub-Saharan countries. At the same time, distributed (decentralized) energy systems are increasingly recognized for their role in achieving universal access to energy and are being promoted in sub-Saharan countries. However, little attention has been paid by governments and energy practitioners to the dynamic interrelationships between national and local government and the role of governance decentralization in transitioning to distributed energy systems. This paper traces the complex relationships between accelerated delivery of distributed energy and decentralized local governance systems. The argument is grounded in an exploration of two different approaches to decentralized energy systems governance in Kenya and Malawi. For Kenya, analysis focuses on the energy sector since the adoption of the new decentralized constitution in 2010. In Malawi, it focuses on the involvement of the authors in piloting Local Authority Energy Officers in districts under the decentralization of Malawian energy policy. Our analysis shows that accelerating the speed and scale of implementation for distributed energy systems and enhancing their sustainability and socio-economic impacts is directly linked to the quality of local and national governance structures and their interrelationships. The paper extends existing work in energy and evidence literacy for policy actors by developing an analytical framework, to enable more effective local governance within energy access initiatives in the Global South.