

Project Title

Final Report

Enabling Societal Transformation in the Face of Climate Change (SOLSTICE)

1. Identification of the project

Project full title: Responsive Organising for Low Emission Societies

Project acronym: ROLES

Starting date: 01.12.2020

End date: 30.11.2023

Project duration (months): 36

Reporting period of this report: 01.12.2020-31.11.2023

Project website: <http://roles.w.uib.no>

Lead Project Investigator (name, title and affiliation): Siddharth Sareen, Professor, University of Stavanger and Professor II, University of Bergen

Project partners: University of Bergen, University of Stavanger, University of Sussex, EURAC Research

2. Objectives of the Project (max. 1 page)

ROLES' objective was to identify how European city-regions can accelerate the diffusion of Digitalisation for Deep Decarbonisation (DDD) pathways. It developed (i) an analytic strategy for multi-stakeholder co-creation of pathways to digitalise energy systems for deep decarbonisation in any mid-sized European city-region, and (ii) customised pathways to accelerate digitalisation of specific energy infrastructures in three such city-regions with 100,000-300,000 population sizes.

The three cases concern three key digitalising energy infrastructures in three different contexts. They capture a range of policy mixes to digitalise for decarbonisation, and diverse modes of citizen engagement with digitalisation. ROLES co-produced knowledge on DDD pathways with multi-stakeholders. It then employed a social science tool for public deliberation to articulate political economic power dynamics, to co-produce concrete DDD pathways that account for enabling environments for implementation.

The key objectives of the project were achieved, with substantial conceptual and practical progress.

3. Scientific activities and intermediate results (max. 1 page)

We have now completed Phases I, II and III of the project. We have achieved the targeted scientific activities and technical results within all three phases.

Phase I: Each team implemented semi-structured interviews on policy mixes for digitalisation, modes of citizen engagement and coping strategies, then identified DDD pathways. This enabled us to co-produce knowledge with multi-stakeholders to identify DDD pathways in three case studies: smart electric mobility systems in Bergen, smart local energy systems including solar in Brighton, and smart

electric meters in Trento. Results have been published in the form of several international journal articles on the Bergen case and one on the Brighton case, with some more manuscripts in review.

Phase II: Each team discussed the DDD pathways with multi-stakeholders using power cube analysis to co-create comparable analysis on institutional enablements, constraints and power dynamics for each pathway. We completed the last of these workshops to wrap up Phase II across all three case study sites. Power cube analysis of DDD pathways in these cases yielded public deliberation and insights on socially just energy digitalisation. This gave us a basis for Phase III where we undertook analysis across case studies as planned, for synthesis project outputs. A workshop was organised in collaboration with the Energy Anthropology Network co-sponsored by ROLES and led to an edited volume which was published open access in late 2022, entitled 'Digitisation and low-carbon energy transitions'. A special issue on 'Making low-carbon places' was published in 2023, with the LPI serving as lead editor, based on a collaboration co-funded by the Positive Energy Districts European Network which sponsored a workshop in March 2022 towards this special issue. Several conference talks and at least five invited keynote and plenary talks were delivered to share ROLES activities and results. In addition to the list of published outputs which achieves multiple times the commitments from the project plan, further manuscripts on key results of and across the case studies are at various stages of the publication process. A third edited collection, based on a workshop co-sponsored by ROLES and hosted at the University of Stavanger in June 2023 along with co-organisers based in France and Poland, is in review with seven articles submitted to the Norwegian Journal of Geography.

Overall, we have met or significantly exceeded initial ambitions in terms of the extent of fieldwork undertaken (in the Norway case, a second city Stavanger was added as a comparative case to the Bergen one with similar additional scope of fieldwork), proactively cross-fertilised our research insights within diverse epistemic communities locally and globally, and implemented a no-fly consortium meeting where 10 project team members convened in Groningen in October 2022 to ensure streamlined comparative methodology and conceptual synthesis. The first synthesis article with ten co-authors was published in 2023 during the project, with a second in review with the leading journal Research Policy at project end.

Publications

- Sareen, S., Smith, A., Gantioler, S., Balest, J., Brisbois, M.C., Tomasi, S., Sovacool, B., Contreras, G.T., DellaValle, N. and Haarstad, H., 2023. Social implications of energy infrastructure digitalisation and decarbonisation. *Buildings and Cities*, 4(1), 612-628. <https://doi.org/10.5334/bc.292>
- Responsive Organising Toolkit and Comic Book. <https://www.sussex.ac.uk/business-school/research/centres-projects/roles>
- Brisbois, M.C., Torres Contreras, G.A., Loe, M.R., Balest, J., Smith, A., Sareen, S., Haarstad, H., Pellegrini, C., Voltolini, F., Tomasi, S., Gantioler, S., Sovacool, B., (under review with *Research Policy*). Spaces, forms, and levels engagement: Using the Powercube to explore social inclusion in digital energy and mobility systems.
- Sareen, S., Girard, B., Lindkvist, M., Sveinsdóttir, A., Kristiansen, S., Laterza, V., Aguilar-Støen, M. and Langhelle, O., 2023. Enabling a just energy transition through solidarity in research. *Energy Research & Social Science*, 101, 103143. <https://doi.org/10.1016/j.erss.2023.103143>

- Lacey-Barnacle, Max, Smith, A. and Foxon, T. J., 2023. 'Community wealth building in an age of just transitions: Exploring civil society approaches to net zero and future research synergies', *Energy Policy*, 172, 113277. <http://doi.org/10.1016/j.enpol.2022.113277>
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- Smith, A., Torres Contreras, G.A., Brisbois, M.C., Lacey-Barnacle, M. and B. Sovacool. 2023. Inclusive innovation in just transitions: the case of smart (and fair?) local energy systems in the UK. *Environmental Innovation and Societal Transitions*, 47, 100719. <https://doi.org/10.1016/j.eist.2023.100719>
- Tråsavik, H., Loe, M.R., King, K., and Sareen, S. (forthcoming 2024). Mobility and leisure: Situating emotional geographies of "friluftsliv" in urban mobility transitions. *Emotion, Space and Society*.
- King, K., Tråsavik, H., and Sareen, S. (under review with Norwegian Journal of Geography). Take a hike: Spatializing allemannsretten and transportation accessibility for outdoor recreation in the Greater Stavanger Region.
- Sareen, S., Meelen, T., Biswas, S., and Haarstad, H. (manuscript for peer review) Dynamic evaluation of mission-oriented transport measures: Stavanger's free public transport U-turn.
- Sareen, S. 2023. Realising urban imaginaries of Eden: Green transport access in Stavanger. In (ed. J. M. Carey) *Eden and Everything After*. Stavanger: Archeological Museum.
- Gantioler, S., Balest, J., Tomasi, S., Voltolini, F. and DellaValle, N., 2023. Transformative disruptiveness or transition? Revealing digitalization and deep decarbonization pathways in the Italian smart electricity meter roll-out. *Energy Research & Social Science*, 106, 103309. <https://doi.org/10.1016/j.erss.2023.103309>
- Tomasi, S. 2023. Justice Implications of the Digitalization of Energy Infrastructure: Distributional Effects of Electricity Smart Meters on Italian Households. *Working Paper of the PhD thesis on 'Citizens at the Core: Impact Evaluation and Justice Implications of Energy Transition Policies'*. Faculty of Economics and Management. Free University of Bolzano. <https://bia.unibz.it/esploro/outputs/doctoral/Citizens-at-the-Core-Impact-Evaluation/991006558098001241>
- Balest, J., DellaValle, N., Gantioler, S., Pellegrini, C., and Sareen, S. (manuscript for peer review) Digitalizing household electricity end-use in Trento: Lessons from smart electric grid rollout.
- Lippert, I. and Sareen, S., 2023. Alleviation of energy poverty through transitions to low-carbon energy infrastructure. *Energy Research & Social Science*, 100, 103087. <https://doi.org/10.1016/j.erss.2023.103087>
- Sareen, S., Fisker, J.K., Shokrgozar, S. and Sattich, T., 2023. Making low-carbon places. *Norsk Geografisk Tidsskrift-Norwegian Journal of Geography*, 77(3), pp.133-142. <https://doi.org/10.1080/00291951.2023.2233967>
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4. Communication and dissemination activities (max. 1 page)

EURAC Research hosted a major conference on Smart and Sustainable Planning for Cities and Regions in July 2022 where project team members from all ROLES countries contributed to a panel on the topic of the project. ROLES work across cases was similarly featured during a session of the biannual workshop of the Energy Anthropology Network hosted by the University of Stavanger in August 2021. An innovative dissemination form included a co-produced art exhibition as part of this workshop in collaboration with Rjukan Solarpunk Academy and the Norwegian Petroleum Museum, with two art installations within the museum during Autumn 2021 on low-carbon mobility transitions. These were documented in an edited volume in December 2022. The Norway team also founded the Just Mobility Transitions Network at the national level, and members founded a formal registered organisation entitled the Bus Users' Association. The LPI also acquired a follow-up dissemination grant for 2024 funded by UH-nett Vest with Norway team members. A Master thesis by a project team member at the University of Bergen, Devyn Remme, jointly supervised by two other ROLES team members, won the national award for most innovative human geography thesis in Norway in 2021, which gave the candidate a chance to highlight the topic during the annual national gathering of human geographers in Oslo, March 2022. In November 2022, University of Sussex team member Marie Claire Brisbois chaired a panel with contributions from all three ROLES case studies at the prestigious International Sustainability Transitions annual conference in an online format.

During the no-fly visit to Groningen, the ROLES consortium included a study tour of regional and local energy transitions in this relevant European (Dutch) mid-sized city. Two professors Carina Wiekens and Marten van der Laan shared insights and led site visits on digitalisation and energy transitions work underway at Hanze University of Applied Sciences, with attention to social inclusion. ROLES team members learned and reflected upon these comparative insights, which was useful as we transition to Phase III of the project, where cross-case analysis and synthesis conceptualisation is important towards informing our further communication and dissemination activities. ROLES also had a switch in communications lead, as Ed Dearnley was replaced by Richard Flockemann at University of Sussex, and the latter was briefed on relevant updates during the October monthly consortium meeting. The third online newsletter was released in late 2022, to report on publications and exciting updates from the completed case workshops and Phase II fieldwork. At the end of Phase III, project members wrote a joint Responsive Organising Toolkit, launched online and at several in-person events in Stavanger. This was promoted using a video produced by Richard Flockemann, and both featured at CoP 28 in Dubai in collaboration with the JUSTNORTH project. The LPI presented the video and project closing results in person in Brussels to JPI Climate, the Research Council of Norway, and other funders, after the project concluded, upon invitation to the BELSPO office. Project members featured ROLES results at more than five invited keynote and plenary talks (e.g. in Graz, Groningen, Bergen, Oslo, Lisbon), and further profiled the project outputs in various broader thematic outreach activities.

Activities

- ROLES project closing presentation. Siddharth Sareen. JPI Climate secretariat, BELSPO. December 2023.
- Plenary session and project film and toolkit launch. Siddharth Sareen. Smart city symposium and energy communities workshop, Stavanger. November 2023.
- Keynote session. Featuring Marie Claire Brisbois (discussant) and Siddharth Sareen (chair). Beyond Oil conference, Bergen, October 2023.
- Opening keynote. Siddharth Sareen. SHIFT annual conference, Graz. September 2023.
- Invited R&D seminar. Siddharth Sareen. Indian Institute of Technology Madras, Chennai, August 2023.
- Masterclass on energy flexibility, Global Challenge Lab 2023. Siddharth Sareen. Online/Global, Futurize, June 2023.
- Invited keynote. Marie Claire Brisbois. Annual energy conference, Groningen, June 2023.
- Plenary talk. Siddharth Sareen. PED-EU-NET annual conference, Lisbon, June 2023.
- Invited keynote. Siddharth Sareen. Annual geographers' winter seminar. Oslo, March 2023.
- Inclusive innovation in smart local energy systems. Adrian Smith. Presentation to an International Workshop: Unlocking Flexibility: A research, policy, and practice workshop, University of Newcastle, UK. 16-17 May 2022
- Gaventa's Powercube: a methodological approach for researching and understanding power in transitions. Marie-Claire Brisbois and ROLES Team. Session for the 13th International Sustainability Transitions Conference. Online. 22 November 2022
- Inclusive innovation in local systems transitions. Adrian Smith. Presentation to the UK Innovation Districts Group. 16th November 2021
- The bricolage lens to investigate the digitalisation process of energy systems. A focus on smart electricity meters. J. Balest (with contribution of N. DellaValle, S. Gantioler, S. Tomasi, F. Voltolini). Presentation at third International Conference on Energy Research & Social Science, Manchester. UK. 20th -23rd June 2022.
- The evolving energy-data-spatial justice nexus: The digitalization of energy infrastructure and electricity smart meter roll-out in the decarbonization and place-making of the city of Trento. S. Tomasi (with the contribution of S. Gantioler, F. Voltolini, N. DellaValle, J. Balest). Presentation at third International Conference on Energy Research & Social Science, Manchester. UK. 20th -23rd June 2022.
- Digitalization of Energy Infrastructure from an Energy Justice Perspective: The Case of Smart Electricity Meters in Italy. S. Tomasi. Poster at third International Conference on Energy Research & Social Science, Manchester. UK. 20th -23rd June 2022.
- ROLES and the Trento case study. Towards transformation disruptiveness of what and how? Revealing (digitalisation for) deep decarbonisation pathways in the Italian smart electricity meter roll-out. S. Gantioler (with contribution of J. Balest, S. Tomasi, N. DellaValle, F. Voltolini). Special session at the Smart and Sustainable Cities and Regions conference, Bolzano. IT. 19th – 22nd July 2022.

- ‘Visualising’ digitalization for deep decarbonization (DDD) pathways | Multi-stakeholder involvement & power analysis Insights from the project ROLES. S. Gantioler. Presentation at the 5th Energy & Society conference, Trento. IT. 10th – 12th February 2021.
- Engaging action: Electricity smart meter roll-out in Italy/Trento - An evolving energy-data-spatial justice nexus. S. Gantioler (with contribution of J. Balest, S. Tomasi, F. Voltolini, N. DellaValle). Presentation at the concluding panel of Energy Anthropology Network workshop, online. 24th August 2021.
- Justice Implications of the Digitalization of Energy Infrastructure: Distributional Effects of Electricity Smart Meters on Italian Households. S. Tomasi. Presentation at ENERGYA 2nd scientific workshop Frontiers in climate change adaptation. Ca’ Foscari University of Venice, San Giobbe Campus, Department of Economics.
- Energy Anthropology Network biannual workshop, 22-24 August 2021, Norwegian Petroleum Museum and University of Stavanger, Stavanger, Norway (host Siddharth Sareen).
- Art exhibition at Norwegian Petroleum Museum, co-produced by ROLES project (Siddharth Sareen, Devyn Remme) and the Rjukan Solarpunk Academy (Margrethe Brekke, Martin Andersen), exhibited at the Norwegian Petroleum Museum, August-November 2021.
- Invited seminar about digitalisation and low-carbon mobility transitions, Siddharth Sareen, Centre for Digital Transformation, University of Agder, Kristiansand, Norway, January 2022.
- Just Mobility Transitions public seminar, 50 participants, Bergen, 2020.
- Just Mobility Transitions webinar, ‘Inclusive digitalisation of urban mobility transitions in Norway?’, Stavanger/online, 26 April 2021.
- Invited talk at Energy Transitions Week on digitalisation and transition metrics, Siddharth Sareen, NTNU, Trondheim, Norway, March 2022.
- Human geography annual seminar, Håvard Haarstad, Devyn Remme, Siddharth Sareen, University of Oslo, Oslo, Norway, March 2022.
- Invited hands-on workshop on just urban mobility, Siddharth Sareen, Nordic environmental justice Green Transitions workshop, University of Stavanger, Norway, November 2022.

5. Comparison of the project progress with the original work plan (*max. 1 page*)

Project progress was completed on track with the original work plan despite challenges such as fieldwork during prolonged pandemic circumstances. The no-fly consortium meeting was postponed from April 2022 to October 2022, but conducted successfully over two days in Groningen (with two additional days’ travel time from team members’ home bases in Norway, the UK and Italy). In terms of outputs, the project has been far more productive than planned, due to the rich and timely nature of thematic fieldwork and analysis, which has enabled synergies with other activities in our networks.

6. Social Sciences and Humanities (*max. 0.5 page*)

All consortium members had core competence in SSH related to energy transitions in a broad sense. There was some turnover of early-career participants as some went on to other promoted positions and others joined the project; we also hosted two PhD projects, ten Master students, four interns, and numerous research assistants. This enabled epistemic diversity in shared enquiry. A good example is a paper published in Energy Policy which included two ROLES team members but also roped in three

other senior researchers with expertise on similar themes in other cities, resulting in a paper on a key theme of ROLES but with far greater scope of empirical analysis and conclusions. The mix of SSH interests in the consortium led to deeper engagement with a variety of concepts, such as inclusive innovation, market formation, institutional bricolage, and the central fuzzy concept of ‘responsive organising’ in the project title. This was very much along intended lines from the project proposal stage, as ROLES followed an abductive approach where a general orientation and approach were defined while we remained adaptive in our particular modes of implementation and agile in terms of collective empirics-driven theorisation.

7. Pathways to impact *(max. 1 page)*

ROLES outputs have already contributed to key outcomes in terms of informing thinking on digitalisation and social inclusion during the deep decarbonisation of urban-scaled energy systems. Our publications on sectoral transitions and coupling due to the twin transition with an emphasis on societal impact have attracted a good number of early citations during 2021-2023 (at least eight articles with over 10 citations, and 5 in the range of 30-45 citations within 1-2 years of being published), indicating that this is a growing area of scholarly enquiry where some ROLES work has become key to shaping thinking. We engaged heavily with diverse local stakeholders, from everyday users of energy systems (smart electric meters, forms of transport, solar panels and energy flexibility devices like batteries) to experts within sectors like transport, electricity generation, distribution and consumption, primarily at the local and urban but also in some cases at the national level. These exchanges, which took multiple forms (semi-structured interviews, focus group discussions, public and closed-doors seminars, webinars, hands-on workshops), were themselves a highly effective form of exchange of information and co-produced perspectives. Thus, ROLES was closely engaged in the case studies, to the extent that one direct impact of the project was a family-focused electric bicycle subsidy scheme from Bergen being transferred to Stavanger, a direct impact through policy mobility. This scheme in its variants has since unlocked over €500,000 in funding to low-carbon urban transport!

Within the project period, we completed our final Phase III activities and outcomes. We combined evidence from cases to co-design a toolkit on responsive organising for socially inclusive digitalisation and decarbonisation of energy systems in mid-sized cities, and shared our derived insights to accelerate their diffusion and advance ‘power-aware’ perspectives. This work was successfully synthesised and concluded after our final city workshops. This is a key outcome to accelerate inclusive diffusion of digitalisation of energy systems in European city-regions, informing decision-makers and practitioners on effective ways to do this, and promoting future interest in our range of ROLES outputs.

8. Collaboration with non-academic stakeholders *(max. 1 page)*

Our multi-sited approach to fieldwork and co-production of empirical insights involved non-academic stakeholders at various points throughout Phases I-III, including in targeted dissemination in the final phase. Their insights were key in shaping our analysis and understanding of how digitalisation for deep decarbonisation can follow socially inclusive pathways, which users are vulnerable to exclusion, and what forms this takes. Mainly, we were aware through this iterative and reflexive process that the challenge of transforming our energy system in this deep manner requires substantial shifts in both infrastructure and societal practices, and that many leverage points can be identified relationally yet mindful of existing (and evolving) institutional structures. In this approach to engaging as academics who are part of society and who facilitate engagement among and across stakeholders while offering common space for reflection, we found a fertile space to work towards societal transformation that can mitigate both climate change and its societal impact (and the societal impact of climate mitigation, so to speak). Yet we were mindful of being one research project, and proactively sought meaningful

collaborations, which helped to amplify our reach and effectiveness at informing action through our insights. Our results also show that despite the urgency of challenges, there are few immediate solutions commensurate to the scale of the problems that can be implemented for adequate societal impact within a project timescale, so part of our hope lay in situating relevant knowledge with key actors in the contexts where this can be actionable and help steer the course towards a better future.

In this last regard, ROLES led to further funding acquisition, contributing to acquiring the RESCHOOL project funded with €6.1 million through Horizon Europe with 17 partners (started January 2023, running until 2026), and the ENERGY4ALL project funded with €1.7 million through Driving Urban Transitions with 14 partners including private and public sector Norwegian partners (starting January 2024, running through to December 2026). The ROLES LPI leads work packages in both these projects, and several ROLES consortium members are cooperating to apply to a Horizon Europe call with a deadline in February 2024 that includes transdisciplinary cooperation for research and innovation and if successful will provide scope for future synergistic collaborations to build on the ROLES legacy.

9. Availability of new results (max. 1 page)

We closely monitored developments related to our city- and sector-specific case studies. To the extent that urban and energy plans continued to evolve with new policies, we took note of these emerging plans and ‘results’. Yet this was anticipated in our approach to empirical analysis, and did not affect project implementation, other than to enrich our findings and provide a robust basis for continued conceptualisation and translation between the linked worlds of research and practice. This has led to numerous additional publications in 2023, with several more manuscripts in review going into 2024.

10. Outlook (max. 1 page)

ROLES reflected engagement with the lenses of the SOLSTICE call, most with deliberative norms, then with a systemic approach, and least directly but no less importantly also with operational upscaling.

The deliberative norms lens was embedded in our approach to local- and urban-scale fieldwork, where we engaged over time and reflexively with diverse sectoral stakeholders in each case study. It was reflected in our use of methods, in our methodological approaches and application of concepts.

The systemic approach lens was reflected in the project setup, where we analysed developments in three different yet related sectors in three comparable cities, cognisant of how digitalisation will lead to increased sectoral coupling where social inclusion becomes a characteristic of the energy system as a whole rather than a property limited to one or other particular sector within a digitalised and decarbonised system. This also meant consistently applying a comparative approach, which we coordinated through monthly online meetings and occasional bilateral meetings, and by keeping abreast of the methods and findings employed per team, cross-fertilising these to ensure commensurability despite substantial customisation for each case study.

Finally, the operational upscaling lens came into play primarily in Phase III, as we abstracted out from and across our case studies, and translated these insights into an actionable stakeholder toolkit. Here we recognised the need for practically applicable inputs targeted at a variety of key stakeholders, including ordinary people who use urban energy systems. Our approach to this operational upscaling was informed by an appreciation of political legitimacy as the fundament of policies that can enact effective change over time, for desirable societal impact. This is a key principle in research on societal transformation in the face of climate change – to maintain consistency in our understanding of the sociotechnical nature of infrastructural shifts that are governed in society even as society itself changes practices and institutions in entanglement with these evolving infrastructures.