



RESEARCH AREA 2 ACCELERATING THE TRANSITION



WHAT IS THIS RESEARCH AREA ABOUT?

Start-up, acceleration and stabilization are the three phases in which change often takes place. Central to the first phase is the establishment and preparation of new niche technologies.

The second phase is characterized by upscaling and massive diffusion of these core technologies. For example, around energy transitions and renewable energy technology that contribute to achieving important environmental goals such as decarbonisation.

In the third phase, a new, socio-technical configuration stabilizes. Most countries and sectors are still in the early stages. The international academic research has so far also focused on these early phases.

WINNING SLOWLY IS LOSING ...

“We must really gear up the tempo to meet the Paris agreement goal of 1,5 degrees of future climate warming. Or it will probably be above 2 degrees instead.”



Allan Dahl Andersen, TIK-UiO (Photo: Silje Nørstad/NTRANS)

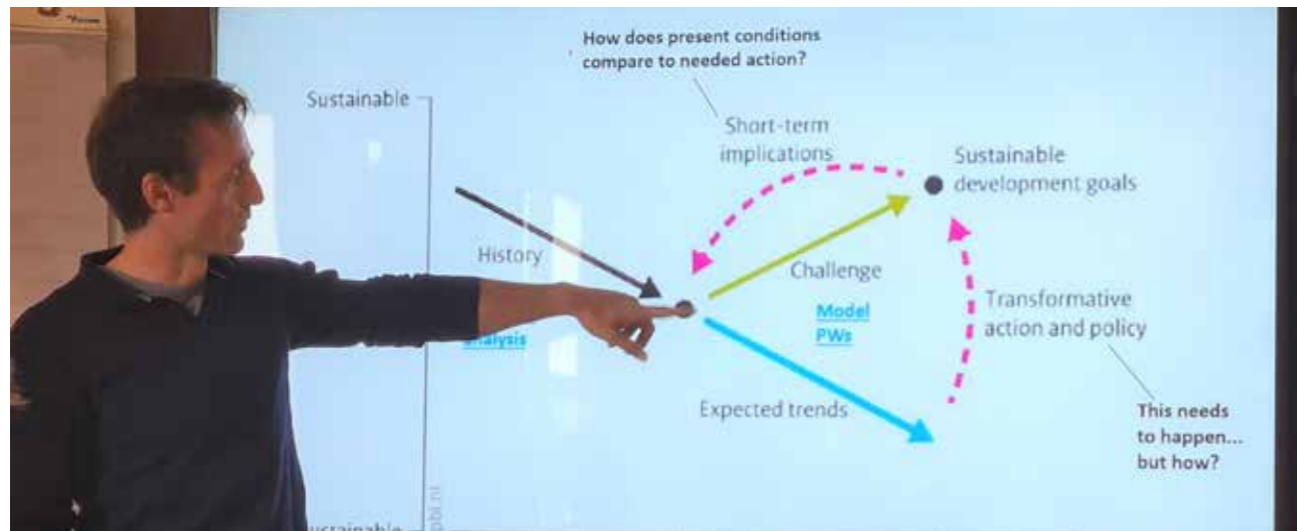
Unlike other grand challenges confronting our societies, the nature and scope of the climate crisis constantly worsens for each year of passivity, due to cumulative emissions and possible tipping points. At the same time, the decarbonization goals set by climate science imply that the scale of the challenge grows every year as we get closer to 2030 and 2050.

“The urgency of climate action places temporality and radically accelerated sociotechnical change at the heart of the net-zero 2050 challenge,” says NTRANS researcher

Allan Dahl Andersen (TIK-UiO) who is heading research area 2, which is about speeding up the transition.

URGENCY, CROSS-SECTORAL STRATEGIES, AND POLICY SILOS

“One implication of urgency is that we cannot look at one sector like energy, farming or aviation separately. We must think across all sectors at once. Better coordination of this is vital for harnessing synergies across sectors and reaching the net-zero goal. Urgency also means that



Allan Dahl Andersen is presenting to his research colleagues in NTRANS autumn 2021 on the topic of integrating sociotechnical perspectives with techno-economic energy systems models. (Photo: Vibeke Ann Pettersen/NTRANS)

there is limited time for learning by experimenting, by testing and by failing now. Instead, cross-sectoral knowledge sharing can help. Decisionmakers must also think about trade-offs between speed of deployment and optimal solutions. In other words: become clearer about what the value of time is in decarbonization. The industry and the public sector must coordinate and cooperate. Politics and regulations are separated into silos for each area, and it's difficult to coordinate across sectors, but it's not impossible!" says the researcher.

THE PORTS – MULTISECTORAL GORDIAN KNOTS

"Ports are good examples of sites where several sectors meet, and the challenges are also very obvious in the ports. The diverse energy sectors are often all present there: electricity, gas, oil, and hydrogen. Complexity in the ports is very high, and it's interesting to look into. The research shows that there are possible solutions to this "gordian knot". The ports are important actors, and they must also change, according to other sectors, systems and technologies that are provided.

SOCIAL-TECHNICAL TENSIONS IN RAPID ELECTRIFICATION

Transport and energy sectors are the two main contributors in the run for less carbon emissions. Researchers and the industry are working together on understanding the acceleration issues in their sectors. "We have been looking into rapid electrification during 2021, especially for ferries. The changes needed are complicated and slow to do, and we don't have time for this! The grid companies are not always prepared to adapt their systems. Maybe it's even necessary to bypass democratic processes in some cases." Andersen and Postdoc Jakoba Sraml Gonzalez at the TIK centre talked about this new research at the NTRANS annual conference in December. "Electrification of new user sectors is complicated enough. But when adding the factor of speed... This "double novelty" is really tricky!

NEW KNOWLEDGE NEEDED!

"Our recent perspective paper [Increasing the speed, scope, and level of decarbonization for meeting the Net-zero 2050 challenge](#) showed us that there's not yet much research on the topic of urgency and the time factor in transitions," says Andersen. The goal for coming years is to contribute in this area.



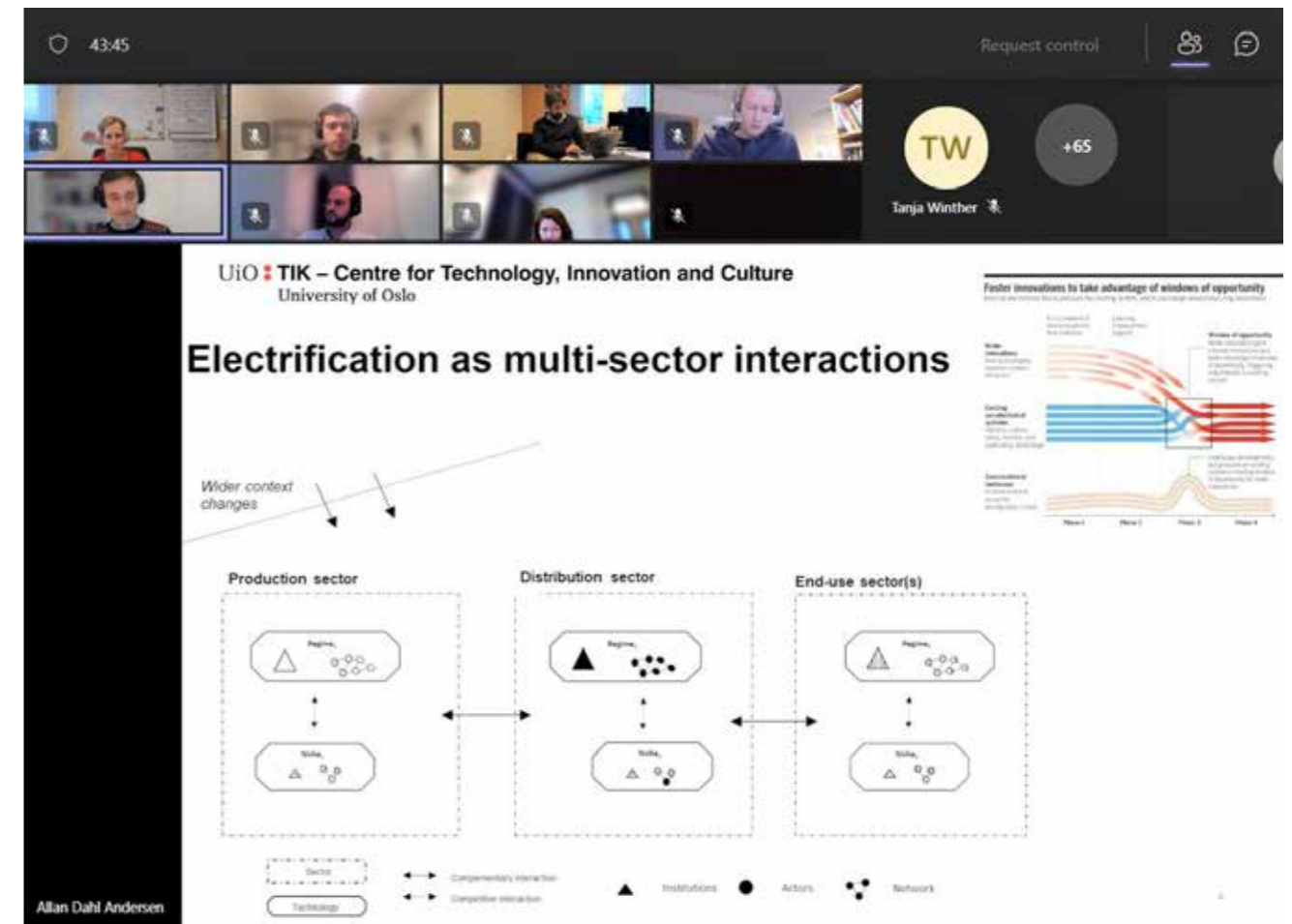
Frank Geels, Professor of System Innovation and Sustainability at University of Manchester.

The well-known researcher from The University of Manchester, Professor Frank Geels, has been hired part time, because he has an outstanding expertise in this field.

"He is assisting us in understanding the nature of these cross-sectoral challenges and the temporality of transitions" says Andersen. Also, new Postdoctoral candidate, Kejia Yang, will focus her project on these issues.

THREE WORK PACKAGES IN RESEARCH AREA 2

- **Workpackage 1:** The rate of innovation: how to overcome barriers to upscaling and diffusion of key innovations to accelerate energy transitions. Lead by Øyvind Bjørgum, NTNU-IØT
- **Workpackage 2:** Resource mobilization: how to increase the scale of resources allocated to energy transition? Lead by Tuukka Mäkitie, SINTEF Digital
- **Workpackage 3:** Transformative innovation policy: how to govern increasingly complex, urgent and contested energy transition? Lead by Allan Dahl Andersen, UiO-TIK



NTRANS annual conference 2021: Allan Dahl Andersen & Jakoba Sraml Gonzalez, (TiK-UiO) held a presentation on Social-technical tensions in rapid electrification.

THE RESEARCH PERSPECTIVE: WORKING PAPER



This viewpoint identifies three interrelated transition imperatives to achieve net-zero emissions by 2050 – increasing the speed, scope and level of decarbonization. First, the urgency of climate action places temporality and radically accelerated sociotechnical change at the heart of the net-zero 2050 challenge. Second, this challenge implies a broadening of decarbonisation efforts from the usual focus on electricity and transport to all sectors of the economy, and a need for thinking across multiple sectors. Third, increasing levels of decarbonization necessitates widespread and rapid diffusion of low-carbon solutions with limited time for experimentation and deliberation. Interactions between these imperatives create research challenges related to time frame tensions, tipping points, sector couplings, multi-sector technologies and massive upscaling.

[See the working paper here](#)