

# The future transport system

March 2

Trondheim, NORWAY

This is the third in a series of workshops on Energy Transition arranged in Trondheim in the last week of February, 2018. The purpose of the workshops and the Energy Transition conference is to identify key insights on Energy Transition in the interface between academia, industry and government, and to define a research agenda addressing the main challenges in the transition towards a sustainable energy system.

This workshop addresses the role of the transport system in reducing GHG emissions and explores pathways towards zero emission transport systems. The purpose is to identify central research challenges and to shape a number of new research projects. Some questions of interest to drive the discussion are:

- What would be the effects of the transition if other countries would follow Norway's example on transport sector policy, both in terms of GHG reductions, welfare and development of global commodity markets
- What would be the most efficient ways for the rest of the world to implement policies towards the 2-degree target, and in particular what role would the transport sector play in different pathways
- What is the role of batteries, hydrogen, biofuels in the transition. Are they competitors or do they complement each other.
- Deep interventions for a low-carbon future: going beyond technological solutions
- The future of the car, shared mobility, practice changes and the role of users in the transition to future transport systems
- The mobility transition in China

We would like to involve the participants to identify and discuss the central research questions. The outcome of the workshop will be a draft for a natural gas research agenda that can lay the fundament for one or several multi-national projects on

We have designed the workshop agenda to encourage discussion among the participants. We have incorporated a number of different roles for participants, but first, and foremost we view all participants as equal contributors for each session. The workshop will include for each session 2-3 introductions (10-15 minutes long), some prepared initial comments (3-4 minutes without slides), and the most important part, plenary discussion. A chair will help focus on what we can do to inform the process.

## Friday March 2, 2018

8:00	<b>Bus Transport from Hotel to NTNU</b>
8:30	<p>Session 1: Climate Change Mitigation in the Transport Sector – The big picture</p> <p><i>Chair: Anders Hammer Strømman - NTNU</i></p> <p><i>Welcome (5 min)</i></p> <ul style="list-style-type: none"> <li>• Round around the table (10 min)</li> <li>• Setting the stage: <i>Anders Hammer Strømman – NTNU (5 min)</i></li> </ul> <p><i>Introductions (45 min)</i></p> <ul style="list-style-type: none"> <li>• Transport and Mitigation over the past decades – <i>Jae Edmonds (10 min)</i></li> <li>• Technology choice and climate mitigation effects, <i>Andreas Schäfer, UCL, (10min)</i></li> <li>• Global Mobility Scenarios, <i>Sonia Yeh, (10 min)</i></li> <li>• The relevance of Short Lived Climate Forces on Mitigation in the Transport Sector, <i>Helene Muri, NTNU (5 min)</i></li> <li>• The land nexus: Climate, Biofuels, Food and Biodiversity, <i>Francesco Cherubini, NTNU (5 min)</i></li> </ul> <p><b><i>Initial comments (10min; ~5 min each)</i></b></p> <ul style="list-style-type: none"> <li>• Rosetta Steeneveldt, Statoil</li> <li>• Onur Özgün, DNV GL</li> </ul> <p><b><i>Discussion (40 min)</i></b></p>
10.30	<b>Break</b>
10.40	<p>Session 2: Key Technologies - Status and Prospects (60 min)</p> <p><i>This session focuses on the impact that technology choice will have on sustainable transition and on climate mitigation. Hydrogen, battery electric vehicles and bipfuels have different technological characteristics and different emission footprints. Technology choices also has other sustainability impacts beyond emissions. Here we</i></p>

	<p><i>focus mainly on the role different technologies can play in the transition and other effects like the land nexus addressing effects on climate, biofuels, food and biodiversity.</i></p> <p><i>We also address the role of maritime transportation and aviation. The central question is what roles technologies will play in different scenarios and what policy would be needed to support transition. Will there be a mix of technologies playing together, and if so how should that affect transition strategies and policy measures.</i></p> <p><b>Chair: Fride Vullum-Bruer, NTNU</b></p> <p><b>Introductions (10 min each)</b></p> <ul style="list-style-type: none"> <li>• Hydrogen, Øystein Ulleberg (10 min)</li> <li>• Batteri, Brent Perry (10 min)</li> <li>• Tom Nørbech, Statens vegvesen (10 min)</li> </ul> <p><b>Initial comment (5 min)</b></p> <ul style="list-style-type: none"> <li>• Research for TRAN Committee - Lifecycle GHG emissions of battery-powered electric vehicles, Linda Ager-Wick Ellingsen, NTNU</li> </ul> <p><b>Open Discussion (30 min)</b></p>
11:40	<b>Lunch</b>
12:40	<p>Session 3: Mobility transitions: Practice change, the role of users and innovations in urban transport</p> <p><i>Deep interventions for a low-carbon future requires going beyond technological solutions. This session focuses on radical changes and low carbon transition by looking at the overlapping roles of technological innovation, practice change and policy frameworks in the transport sector. Sharing, electrification and autonomous driving are set to reshape the way people and goods move over the coming decades, raising issues such as the future of the car and implications for the world's commodity markets providing fuel for cars. But, none of the outcomes are guaranteed, and nor is the speed of progress.</i></p> <p><i>In this session we aim to conceptualize further how to accelerate the low carbon mobility transition and analyze different actors and processes that will have to be aligned in order for it to happen. We highlighting the place-specific, geopolitical and cultural sensitivities of low carbon transitions at national, regional and local scales. Thus, relevant questions are, but not limited to:</i></p> <ul style="list-style-type: none"> <li>• <i>What is the role of users in the energy and mobility transition? Who will benefit from innovation in urban transport?</i></li> </ul>

	<ul style="list-style-type: none"> <li>• <i>What is the role of transnationally complex knowledge and finance flows? What are the reasons for geographic variation in disruption processes currently underway? The role of China in fostering low carbon change in the transport sector?</i></li> <li>• <i>How can governments, industry and researchers collaborate to develop competitive opportunities and foster innovations and change? What is the role of incumbents in such a system transformation?</i></li> <li>• <i>What measures needs to be taken to speed up the transition and how can we imagine the futures of sustainable transport to evolve?</i></li> </ul> <p><i>Chair: Marianne Ryghaug, NTNU</i></p> <p><b>Introductions (30 min)</b></p> <ul style="list-style-type: none"> <li>• <i>Beyond technology: Deep interventions for a low-carbon future, Debbie Hopskins, Oxford University</i></li> <li>• <i>The role of users in a transition perspective, Laur Kanger, Sussex University</i></li> <li>• <i>Urban mobility transitions in China (Via Skype), David Tyfield, Lancaster University</i></li> </ul> <p><b>Initial Comments (15 min, ~5 min each)</b></p> <ul style="list-style-type: none"> <li>• <i>Andreas Enge, ATB</i></li> <li>• <i>Erik Figenbaum, TØI</i></li> </ul> <p><b>Open Discussion (40 min)</b></p>
14:10	<b>Break</b>
14:40	<p><a href="#">Session 4: Research Needs and Future Directions</a>  <i>This asks the question, what are the most urgent research needs to ensure yy can play a positive role in climate mitigation and the transition to a sustainable energy system.</i></p> <p><i>Chair: Asgeir Tomasgard</i></p> <p><b>What Research Needs Have We Identified? (30 min)</b></p> <ul style="list-style-type: none"> <li>• <b>Intervention</b>— Capabilities and technology research needs, TBA industry</li> <li>• <b>Intervention</b>—Policy, regulation and new services needs—TBA</li> <li>• <b>Intervention</b>— The role of the consumer, TBA</li> </ul> <p><b>Reflections (45 min)</b>  <i>Discussion of key findings from workshop and the most important research questions going forward. Each participant gets up to 1 minutes for remarks.</i></p> <p><b>Future Directions (10 min)</b></p>

	<i>Chair: Asgeir Tomasgard</i> <b>Intervention/observation</b> <ul style="list-style-type: none"><li>• Markus Steen, SINTEF Teknologi og samfunn</li></ul>
16:00	Dinner
18.00	Bus to hotel