

Briefing Note

Session 6: Transforming Transport: innovative renewable-based solutions in road freight, shipping and aviation

7 October 2020 • 16:00-20:00 CEST • Virtual

Background

Transport plays a vital role in the world's economy. It facilitates the movement of people and goods across the globe and enables modern life as we know it. This comes at a cost however, as the transport sector is also a major source of emissions given its current heavy reliance on fossil fuels. With the global demand for transportation services expected to increase in future years there is an urgent need to identify ways to reduce emissions and advance towards the complete decarbonisation of the transport sector.

The transport sector accounts for about a quarter of the world's energy-related CO₂ emissions. And while the pathway towards zero emissions is relatively clear for passenger road transport and rail through direct electrification, that is not the case for the remaining sectors (i.e. road freight transport, shipping and aviation) which account for over half of the transport sector's emissions.

Objective of the session

This session co-organised with the International Transport Forum, will showcase renewable-based solutions to achieve net-zero emissions in road freight transport, shipping and aviation. Experts will discuss about key innovations that can help decarbonise these sub-sectors, highlight key priorities and explore what is needed to sufficiently accelerate innovation across different dimensions (e.g. technical, political, regulatory, commercial) to accomplish the goal of decarbonizing transport by mid-century.

Session Agenda

Transforming Transport: innovative renewable-based solutions in road freight, shipping and aviation

Wednesday, 7 October 2020

Opening and Scene-setting presentations

16:00 – 16:20

Scene-setting presentations

Roland Roesch, Deputy Director, IRENA Innovation and Technology Centre, IRENA

Jari Kauppila, Head of Quantitative Policy Analysis and Foresight, International Transport Forum

Panel 1 – Decarbonising Shipping with Renewables

16:20 – 17:05

A diverse panel of experts will discuss the most promising and innovative technological pathways, as well as regulatory and market solutions to achieve zero emissions in the shipping sector, including electrification, biofuels, green hydrogen, synthetic fuels and others. Panellists will evaluate the decarbonisation potential of different options, identify their deployment challenges, weigh their pros and cons, and close with their vision on what solution is more likely to succeed.

Moderator: Roland Roesch, Deputy Director, IRENA Innovation and Technology Centre, IRENA

- **Tue Johannessen**, Senior Innovation Portfolio Manager, Maersk
- **Bart Hellings**, COO, Goodfuels
- **Tristan Smith**, Lecturer, University College London
- **Jakob Steffensen**, Head of Innovation and Technology, DFDS
- **Anne Sophie Vinther Hansen**, Investment Manager, Vækstfonden

17:05 – 17:15 Digital Break

Panel 2 – Decarbonising Aviation with Renewables

17:15 – 18:00

A diverse panel of experts will discuss the most promising and innovative technological pathways, as well as regulatory and market solutions to achieve zero emissions in the aviation sector, including electrification, biofuels, green hydrogen, synthetic fuels and others. Panellists will evaluate the decarbonisation potential of different options, identify their deployment challenges, weigh their pros and cons, and close with their vision on what solution is more likely to succeed.

Moderator: **Jagoda Egeland**, Advisor to the Secretary-General, International Transport Forum

- **Valentin Batteiger**, Lead Alternative Fuels, Bauhaus Luftfahrt
- **Hassan El-Houjeri**, Climate and Sustainability Technology Strategist, Aramco
- **Glenn Llewellyn**, Vice President - Zero Emission Technologies, Airbus
- **Oskar Meijerink**, Project Lead - Future Fuels, SkyNRG
- **Jack Saddler**, Professor, University of British Columbia

18:00 – 18:10 Digital Break

Panel 3 – Decarbonising Road Freight Transport with Renewables

18:10 – 18:55

A diverse panel of experts will discuss the most promising and innovative technological pathways, as well as regulatory and market solutions to achieve zero emissions in the road freight transport sector, including electrification, biofuels, green hydrogen, synthetic fuels and others. Panellists will evaluate the decarbonisation potential of different options, identify their deployment challenges, weigh their pros and cons, and close with their vision on what solution is more likely to succeed.

Moderator: **Francisco Boshell**, Analyst, IRENA Innovation and Technology Centre, IRENA

- **Henrik Engdahl**, Chief Engineer Charging, Volvo
- **Angie Farrag-Thibault**, Project Lead for Clean Trucking, World Economic Forum
- **Elisabeth Fretheim**, Head of Business Development, Nikola Motor
- **Steven Nadel**, Executive Director, American Council for an Energy Efficient Economy

18:55 – 19:05 Digital Break

Panel 4 – Identifying Cross-sectorial Synergies in Shipping, Aviation and Road Freight Transport

19:05 – 19:50

A panel of experts from different transport sub-sectors will bring their own perspectives to discuss the necessary actions to enable the deployment of key renewable-based solutions in road freight, aviation and shipping and reach zero carbon emissions by mid-century. Among others, speakers from these sectors will explore and discuss options including innovative policy, technology, regulatory and market measures, as well as the potential of cross-sectorial cooperation as a means to build synergies, economies of scale and enable the complete decarbonisation of the transport.

Moderator: **Pierpaolo Cazzola**, Advisor on Energy, Technology and Environmental Sustainability, International Transport Forum

- **Mariette van Empel**, Director Sustainable Mobility, Ministry of Infrastructure and Water management of the Netherlands
- **Jane Hupe**, Deputy Director, Environment, Air Transport Bureau, ICAO (Pre-recorded)
- **Randall Krantz**, Senior Project Advisor, Getting to Zero Coalition, Global Maritime Forum (GMF)
- **Axel Volkery**, Team Leader Clean Transport, European Commission (DG MOVE)
- **Christoph Wolff**, Head of Mobility, World Economic Forum

Closing

19:50 – 20:00

Pierpaolo Cazzola, Advisor on Energy, Technology and Environmental Sustainability, International Transport Forum

Speaker biographies

Scene-setting Presenters and Moderators

Roland Roesch, Deputy Director, IRENA Innovation and Technology Center	
	<i>Roland Roesch is the Deputy Director of the IRENA Innovation and Technology Centre in Bonn and brings 25 years of experience in energy markets, energy economics and energy sector transformation strategies, renewable integration management, energy project development and project financing. Before joining IRENA he worked in the Oil & Gas and Utilities Industry and as an Energy Market Consultant for Lahmeyer International and as researcher for renewable energies.</i>
Jari Kauppila, Head of Quantitative Policy Analysis and Foresight, International Transport Forum	
	<i>Dr. Jari Kauppila is Head of ITF Secretary-General's Office and Head of Quantitative Policy Analysis and Foresight Division at the International Transport Forum at the OECD. His team works on wide range of transport policy issues and is responsible for the ITF's flagship publication, Transport Outlook, quantitative model development and related analysis, including ITF studies on Shared Mobility. Since joining the ITF in 2007, Jari has also coordinated several international research projects on topics such as shared mobility, logistics, transport reliability, decarbonisation, road safety and infrastructure investment.</i> <i>Prior joining the ITF in 2007, Jari spent nearly ten years as a lead economist with the Ministry of Transport and Communications Finland. Besides his duties at the ITF, Jari is an Adjunct Professor in Transport Economics at the Department of Operations and Supply Chain Management at Turku School of Economics in Finland.</i>
Jagoda Egeland, Advisor to the Secretary-General, International Transport Forum	
	<i>Jagoda Egeland joined the Organisation for Economic Co-operation and Development (OECD) in 2011. She currently serves as an Advisor in the Office of ITF Secretary-General and leads aviation projects at the International Transport Forum (ITF) at the OECD. Prior to taking up her role at the ITF, she was in charge of managing strategy and relationships with airlines at the UK Airports Commission, a body set up by the Prime Minister to examine the long-term airport capacity needs in the UK. During her time at the Commission, Ms. Egeland led UK Government's work in the fields of aviation connectivity, airline competition, scenario-based forecasting, hub economics, and the future of global route networks.</i> <i>Ms. Egeland also worked as a consultant on public policy issues in the private sector, the UN International Labour Organization, and at the London School of Economics where she was also a class teacher. Ms Egeland holds an MSc in Public Policy from Maastricht University and a BSc in Mathematics and Economics from the London School of Economics. She is a British and Polish national.</i>
Francisco Boshell, Analyst, RE Technology Standards and Markets, IRENA	
	<i>Mr. Boshell leads the work on Innovation for RE Technologies at IRENA. He focuses primarily on providing policy advice to countries regarding technology innovation, quality control and standardisation programmes for the successful deployment of RETs. During his 18-year professional career, he has also: developed technical standards for quantifying GHG emission reductions and supported the climate change negotiations at UNFCCC; provided consultancy services for the development of RE and EE projects at DNV GL; and designed and implemented infrastructure and energy related projects in the automotive manufacturing sector at General Motors.</i>



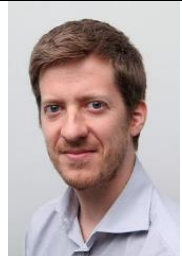
Pierpaolo Cazzola, Advisor on Energy, Technology and Environmental Sustainability, ITF






Pierpaolo Cazzola is Advisor on energy, technology and environmental sustainability in the International Transport Forum (ITF) at the Organisation for Economic Cooperation and Development (OECD) since 2019. His work has focused on strengthening the ITF capacity to analyse energy-related aspects and projects related to ITF's Decarbonizing Transport Initiative. Prior to joining the ITF, he spent almost 20 years working at the intersection of transport, energy and environmental sustainability. He was transport lead in the Energy Technology Policy Division of the International Energy Agency (IEA) from 2014 to 2019, Secretary of the Working Group on Pollution and Energy of the World Forum for the Harmonization of Vehicle Regulations (WP.29) of the United Nations from 2011 to 2014 and researcher at the Institute of Prospective Technological Studies (IPTS) of the Joint Research Centre of the European Commission in 2011. Pierpaolo worked in 2011 on material flow analysis at the Environment Directorate of the Organisation for Economic Cooperation and Development (OECD). From 2005 to 2010 he was the main developer of the Mobility Model of the IEA. He started his career in the IEA's Energy Statistics Division in 2000.

Pierpaolo holds a Master degree in Aerospace engineering from the Politecnico di Torino (Italy), a Bachelor of Engineering in Aeronautics from the University of Glasgow (United Kingdom) and a Master degree in Energy economics from the Ecole Nationale Supérieure du Pétrole et des Moteurs (ENSPM)/Institut Français du Pétrole et Energies Nouvelles (IFPEN) (France).

Panel 1: Decarbonising Shipping with Renewables

Tue Johannessen, Senior Innovation Portfolio Manager, Maersk	
	<i>Until 2005, Dr. Johannessen was Assoc. Prof. in Chem. Eng. at TU of Denmark where he co-founded Amminex and then served as CTO in the CleanTech spin-out during the development and launch of an award-winning automotive NOx reduction technology. In 2019 he made a transition from automotive to shipping – starting at A.P. Moller-Maersk where he is now dedicated to an acceleration of carbon-neutral shipping through the recently announced Mærsk Mc-Kinney Møller Center for Zero Carbon Shipping.</i>
Bart Hellings, COO, GoodFuels	
	<i>Bart is COO/CTO of GoodFuels. He is responsible for the daily operations and development and testing of new biofuels for the marine market and related service and business models. Before joining GoodFuels he worked as a management consultant on corporate sustainability and innovation and he pioneered on the development of sustainable biofuels from tropical crops.</i>
Tristan Smith, Lecturer, University College London	
	<i>Tristan is a Reader at the UCL Energy Institute and is the director of the Research Council UK funded project Shipping in Changing Climates, a multi-university and industry research project and leads the modelling work on supply and demand interaction and evolution. He is the lead author of the Third IMO GHG Study – 2014. He has previously been the coordinator of the Low Carbon Shipping – A System Approach project. He has a number of years’ experience as a naval architect in the UK Ministry of Defence, and has won an international award for his work on ship safety.</i>
Jakob Steffensen, Head of Innovation and Partnerships, DFDS	
	<i>Jakob Steffensen is Head of Innovation and Partnerships at DFDS. He manages the portfolio of initiatives around DFDS’s way of using data, artificial intelligence, machine learning and the internet of things for better decision making and automation. His department is also responsible for the preparation of the company's roadmaps for autonomous vessels, vehicles and terminals, and in general facilitate the innovation process. Among other things, through partnerships with universities and others.</i>
Anne Sophie Vinther Hansen, Investment Manager, Vækstfonden	
	<i>Anne Sophie Vinther Hansen is an Investment Manager at Vækstfonden, the Sovereign Danish Fund. She has over 10 years of experience working with R&D intense companies in the fields of shipping and alternative fuels.</i>

Panel 2: Decarbonising Aviation with Renewables




<p>Valentin Batteiger, Lead Alternative Fuels, Bauhaus Luftfahrt</p>	
	<p><i>Dr. Batteiger leads the research focus area on alternative fuels at Bauhaus Luftfahrt. His main research interest is on various alternative fuel pathways that potentially enable large-scale renewable fuel supply for aviation. Dr. Batteiger has been involved in the first solar-thermochemical synthesis of kerosene within the EU projects SOLAR-JET and SUN-to-LIQUID. He is responsible for the system analysis work of Bauhaus Luftfahrt within the German national project PowerFuel. He also coordinates the EU project HyFlexFuel, which develops the technologies to convert a broad variety of organic feedstocks into upgraded fuel products via a hydrothermal liquefaction pathway.</i></p>
<p>Hassan El-Houjeiri, Climate and Sustainability Technology Strategist, Aramco</p>	
	<p><i>Dr. El-Houjeiri is the lead scientist of Saudi Aramco for strategic climate and sustainability research and analysis.</i></p> <p><i>Before joining Aramco, he developed regulatory mechanisms and platforms for state regulators in the United States for crude oil carbon intensity regulations. Dr. El-Houjeiri is a fellow from Stanford University who built crude production greenhouse gas (GHG) models that are used by major regulators worldwide for crude oil carbon intensity assessment. He also has extensive experience at Shell assessing the GHG emissions of oil and gas developments and shaping the CO2 strategy. Dr. El-Houjeiri holds a PhD in Engineering Science from Oxford University and a Master of Science (with Distinction) in Business Management from Warwick University, UK.</i></p>
<p>Glenn Llewellyn, Vice President - Zero Emission Technologies, Airbus</p>	
	<p><i>Glenn Llewellyn is responsible for Airbus plans and activities to achieve our ambition to be the first major manufacturer to bring a zero-emission commercial aircraft to market. Prior to this appointment, Glenn was responsible for the research & technology portfolio focused on reducing Airbus product climate impact. This portfolio included demonstrators such as Vahana and City Airbus e-VTOLs as well as the E-FAN X hybrid-electric demonstrator. Before that, Glenn was the engineering and then program lead for several systems on the A350XWB, working as part of the overall aircraft design team on the aircraft concept, leading engineering trades, and ultimately leading the contracting and industrialisation of the different systems and equipment.</i></p>
<p>Oskar Meijerink, Project Lead - Future Fuels, SkyNRG</p>	
	<p><i>Oskar Meijerink leads SkyNRG's efforts in multiple pre-commercial supply chain development projects. Oskar leads SkyNRG's efforts on the synthetic fuels pathway, in which CO₂ and sustainable electricity is used for SAF production. Sky NRG work together with its technology partners to commercialize sustainable aviation fuels. In the pre-commercial supply chain development projects we work together with partners from across the supply chain to take the next step, e.g. build a pilot or demonstration scale facility. Oskar studied Energy Science at Utrecht University and specialized in sustainable aviation fuels. More specifically, he studied investments in the SAF supply chain at Imperial College London.</i></p>

Jack Saddler, Professor, University of British Columbia



John (Jack) Saddler is the endowed Professor of Forest Products Biotechnology/Bioenergy (originally an NSERC Industry Chair) and Dean Emeritus, Faculty of Forestry at the University of British Columbia. He is a Fellow of the Royal Society of Canada. He is a regular reviewer/advisor for agencies such as the US Dept. of Energy, USDA, NSERC, World Bank, etc. He is the Co-Task Leader of the Liquid Biofuels network of IEA Bioenergy and was recently on sabbatical at the International Energy Agency (IEA) in Paris where he was based in the Renewable Energy Division. He is also a member of the Markus Wallenberg Prize selection committee, the forest sectors Nobel Prize.




Panel 3: Decarbonising Road Freight Transport with Renewables

Henrik Engdahl, Chief Engineer Charging, Volvo Group	
	<i>With a MSc in Electronics from the University of Linköping and more than a decade of professional participation in product development of electrified powertrains Henrik have extensive knowledge and experience of all the aspects of bringing such technologies to the market. Having identified the interaction between two previously unrelated realms, the electric energy supply and transportation sector, to be crucial to reach our sustainability goals he is now engaged in the endeavor to make these worlds successfully meet. By utilizing the vast amounts of data available within the Volvo Group he is looking for the global optimum of this transformation which minimize the ecological cost and maximize the return for society.</i>
Angie Farrag-Thibault, Project Lead for Clean Trucking, World Economic Forum	
	<i>Angie Farrag-Thibault is a Project Lead and the World Economic Forum, responsible for driving Road Freight Zero - a new high-ambition, cross-value chain, multi-stakeholder initiative designed to accelerate the deployment of zero emission fleets and long-haul infrastructure by 2030. This work is housed in the Forum's long-standing Shaping the Future of Mobility Platform and enjoys the support of the Forum's Mission Possible Platform - a coalition working on creating tipping points across the hard-to-abate sectors to set industry on a net-zero pathway through public-private collaboration, innovation partnerships, and, industry alliances. Angie's global sustainability experience advising companies and designing powerful collaborations for change spans over 20years with previous roles at BSR, where she was the Director of Transport & Logistics and Collaborations, and at Deloitte & Touche as a Manager, Sustainability Advisory and Assurance Services. She has Masters in Energy Management from BI Oslo / ESCP Paris, and Environmental Development from SOAS, UCL; and a bachelors in Environmental Sciences from Southampton University, UK.</i>
Elisabeth Fretheim, Head of Business Development, Nikola Motor	
	<i>Elisabeth Fretheim is the Head of Business Development for Nikola Motor Company where she develops strategic transition plans to help fleet customers evolve to a zero-emission future with hydrogen fuel-cell and battery-electric vehicles. Prior to Nikola, Fretheim served as Senior Director of Sustainability for Walmart and was responsible for the sustainability efforts of the supply chain division, which represented over 200 distribution centers and was the third largest private trucking fleet in the United States. Her experience spans the spectrum of operational sustainability including alternative energy, efficiency, autonomous vehicles, building design and technologies, packaging, water, waste and recycling, and supplier engagement.</i>
Steven Nadel, Executive Director, American Council for an Energy Efficient Economy	



Steven Nadel is the Executive Director of the American Council for an Energy-Efficient Economy (ACEEE), a non-profit research organization that works on programs and policies to advance energy-efficient technologies and services. Steve has worked in the energy efficiency field for 40 years and has over 200 publications on energy-efficiency subjects.

Panel 4: Identifying Cross-sectorial Synergies in the Shipping, Aviation and Road Freight Transport Sectors

<p>Mariette van Empel, Director Sustainable Mobility, Ministry of Infrastructure and Water management of the Netherlands</p>	
	<p><i>Mariette van Empel is director Sustainable Mobility at the Dutch Ministry of Infrastructure and Watermanagement. Her main focus is on stimulating transport decarbonisation, like electric passenger cars, zero-emission public transport and logistics, biofuels, and off course cycling and walking as part of the mobility mix. Previously Mariette was Chair of de Dutch Hydrogen2Mobility Platform and deputy director-general on Climate Change. She also served as a advisor at the Dutch Prime Minister Cabinet’s Office for several years. Mariette has a master’s degree in Business Administration from the Rotterdam School of Management. The Minister for the Environment Stientje van Veldhoven is currently Chair of the Transport Decarbonisation Alliance, Mariette is acting as her Sherpa for this.</i></p>
<p>Jane Hupe, Deputy Director, Environment, Air Transport Bureau, ICAO</p>	
	<p><i>Jane Hupe is responsible for the environmental programme of the Organization. Ms. Hupe has been at the forefront of ICAO’s efforts to define and promote policies and standards for an environmentally sustainable aviation which encompasses aircraft noise and aircraft engine emissions, local air quality and climate change, sustainable energy and market-based measures. Her responsibilities include directing ICAO environmental activities, and serving as the Secretary of the ICAO Council’s Committee on Aviation Environmental Protection (CAEP). Ms. Hupe coordinates aviation and the environment activities with other International Organizations. Working with the IPCC on aviation-related issues, she received a certificate acknowledging her contribution to the IPCC’s award of the 2007 Nobel Peace Prize. Prior to joining ICAO, Ms. Hupe served as advisor on environmental matters to the Brazilian Aviation Authorities for 15 years.</i></p>
<p>Randall Krantz, Senior Advisor on Shipping Decarbonisation, Global Maritime Forum (GMF)</p>	
	<p><i>Randall Krantz, Senior Advisor on Shipping Decarbonization, Global Maritime Forum - Randall leads the Getting to Zero Coalition to accelerate the development of commercially-viable zero-emissions vessels with the Global Maritime Forum. He is an expert on process design and multi-stakeholder engagement for sustainability. Following a decade in the power sector, Randall has spent 15 years brokering and building partnerships with business, government and civil society in a range of environment and industry domains. His work designing and building the Getting to Zero Coalition has brought together more than 150 organizations in the largest public-private partnership on shipping decarbonization.</i></p>
<p>Axel Volkery, Team Leader Clean Transport, European Commission (DG MOVE)</p>	



Dr. Axel Volkery is the team leader for clean transport in the Sustainable & Intelligent Transport Unit, Directorate-General for Mobility and Transport of the European Commission. The team is in charge of the Alternative Fuels Infrastructure Directive and the Clean Vehicles Directive as well as standardisation of alternative fuels and infrastructure.

Christoph Wolff, Head of Mobility, World Economic Forum



Dr. Christoph Wolff is the Global Head of Mobility and Member of the Executive Committee at the World Economic Forum since June 2018. He oversees the Forum's work with Partners from the Automotive, Supply Chain, Aerospace and Aviation, Travel and Tourism sectors. He is leading the Forum's System Initiative on "Shaping the Future of Mobility" which strives to achieve mobility of goods and people that is safe, clean and inclusive, and includes projects on the transition to "Autonomous, Shared and Electric Mobility," "Drones and Tomorrow's Airspace" and "Security in Travel." Prior to his role at the Forum, Christoph served as Managing Director of the European Climate Foundation, delivering policy solutions for EU and Member State Governments in decarbonizing the energy, transport, cities and energy-intensive industries.