

Circularity in the Clean Energy Transition

Webinar organised under the auspices of the
Experts' Group on R&D Priority-setting and Evaluation (EGRD) under the IEA

26 April 2021
13:00-16:00 (CET)

Hosted by Nordic Energy Research and Austrian Mission Innovation Week



The circular economy has gained increasing prominence as a tool which presents solutions to global sustainable development challenges. By addressing root causes of waste and pollution, the circular economy aims at keeping products and materials in use, and regenerating natural systems. It is defined as a regenerative system in which resource input and waste, emission, and energy leakage are minimised by slowing, closing, and narrowing material and energy loops. This can be achieved through long-lasting design, maintenance, repair, reuse, remanufacturing, refurbishing, and recycling.¹

Renewable energy technologies such as wind turbines, solar panels and batteries are all key to combat climate change and contribute to the low-carbon energy future. However, they also rely on the production and use of composite and critical materials that have negative impacts on the environment and society during extraction and manufacturing. From a whole system perspective, it is important to optimise resource use of components and materials of renewable energy technologies. They should be designed for durability, reuse and remanufacturing, rather than committing them to sub-optimal waste management and energy recovery pathways.²

This webinar will look at the circularity of the clean energy transition from different angles: Challenges related to sourcing materials for renewable energy infrastructure, circularity in manufacturing processes and their durability and eventually disposal or reuse. These challenges will be exemplified by a closer look at wind turbines and batteries. Each session will start with presentations from three leading experts followed by a Q&A session.

Expected outcomes

The webinar will result in a summary report identifying the challenges and opportunities of addressing the circular economy and will present perspectives for R&D planners and strategists. In addition, an executive summary will be presented to IEA's Committee on Energy Research and Technology (CERT).

Registration:

<https://nachhaltigwirtschaften.at/en/iea/events/2021/20210426-circularity-clean-energy-transition.php>

¹ Greissdoerfer et al, 2020, The Circular Economy – A new sustainability paradigm? Journal of Cleaner Production, Vol. 143, 2017, p.757-768

² Jensen, P.D. et al, Highlighting the need to embed circular economy in low carbon infrastructure decommissioning: The case of offshore wind. Journal of Sustainable Production and Consumption, 24 (2020), 266-280.

Introduction: Opening and scene-setting remarks	
13:00-13:10	Welcome by Karl Kienzl, Federal Ministry for Climate Action, Austria by Klaus Skytte, CEO, Nordic Energy Research by Birte Holst Jørgensen, Chair EGRD
Session I: Introduction to circularity and energy Moderator: Herbert Greisberger, CEO, Lower Austrian Energy and Environment Agency This session focuses on lessons learned from policies designed to promote sustainable sourcing of raw materials, decommissioning and reuse of materials and energy-related infrastructure.	
13:10-13:25	Circular Economy – why it is a must in a clean energy transition. Harald Friedl, Global Circular Economy Ambassador; COP 26 - Circular Economy Lead
13:25-13:40	Circularity and Energy. Dr. Anne Velenturf, University of Leeds, UK
13:40-13:55	CIRCit – systems to promote circular manufacturing in the Nordics. Professor Tim McAloone, Technical University of Denmark
13.55-14.05	Discussion
Session II: Improving the lifecycle and recyclability of wind energy infrastructure Moderator: Johannes Tambornino, Vice Chair EGRD Presently, wind turbines have a lifetime of 25-30 years. 85-90 percent of the infrastructure can be recycled. Components such as the gearbox, generator, foundation and tower are all recyclable. However, turbine blades represent a significant challenge. Composite materials, glass fibre, and carbon fibers are extremely difficult to recycle. An estimated 2.5 million tonnes of composite material are in use in this sector. In the coming five years, 15,000 wind turbine blades are due to be decommissioned. Making turbines 100% recyclable is therefore increasingly important.	
14.05-14.20	IEA Wind TCP – global perspectives on sustainability in the wind energy sector Task 42 Wind Turbine lifetime extension. Operating Agent Anand Natarajan, Head of Section, DTU Wind Task 45 Recycling. Justine Beauson. Development Engineer, DTU Wind
14.20-14.35	High Impact Innovation Pathways for a Wind Circular Economy. Richard Tusing, Senior Advisor, US Department of Energy, NREL
14.35-14.50	100% recycle wind turbines by 2040? Allan K. Poulsen, Head of Advanced Structures and Sustainability, Vestas Denmark
14.50-15.00	Discussion

Session III: Batteries – raw materials -production – use and re-use

Moderator: Atsushi Kurosawa, Vice Chair EGRD

Batteries are powering our cars, ferries and mobile phones and provide backup electricity to our electricity grids. The growth in use and reduced cost of batteries put pressure on how we source the raw materials, especially rare earth metals. Some mining practices are unsustainable and jeopardize the health of adults and children. Re-use of batteries and recycling of key materials are therefore becoming increasingly important. New battery chemistries may reduce this challenge. What are the future prospects of closing the loop for batteries?

15.00-15.15	Juan Felipe Cerdas, Group leader »Life Cycle Engineering«, Institute of Machine Tools and Production Technology, Technical University of Braunschweig
15.15-15.30	Building the world's greenest batteries. Emma Nehrenheim, Chief Environmental Officer Northvolt, Sweden
15.30-15.45	End of life treatment of batteries. Mr. Makoto Yoshida, Deputy General Manager / Global Government Affairs Department General Manager / External and Government Affairs Department Nissan Motor Corporation
15.45-15.55	Discussion
15.55-16.00	Concluding remarks by Birte Holst Jørgensen, Chair EGRD, and Svend Søyland, Senior Adviser Nordic Energy Research

Nordic Energy Research

Nordic Energy Research is the platform for cooperative energy research and policy development under the auspices of the Nordic Council of Ministers. We have a staff of 15 and are based in Oslo together with our sister organisations Nordforsk and Nordic Innovation. Nordic cooperation in energy research started 1975, leading to common pot research funding since 1985 and the establishment of Nordic Energy Research as an institution under the Nordic Council of Ministers in 1999. The Board comprises representatives from the authorities and ministries responsible for energy research funding in the five Nordic countries, who contribute the majority of the organisation's funding.

The Nordic region has ambitious goals to reduce carbon emissions and its dependence of fossil fuels, and at the same time create new growth industries based on green technology. Nordic Energy Research funds research of joint Nordic interest that supports these ambitions by expanding knowledge on sustainable energy and contributing to the development of new, competitive energy solutions.

Nordic Energy Research has a unique strength in that our governance structure is closely connected to both the national political systems of the five Nordic countries as well as the intergovernmental Nordic system. Our board and other committees and project steering groups consist not only of representatives from national funding agencies, but also from national energy authorities, ministries and the Nordic Council of Ministers secretariat. We manage a number of projects and facilitate Ministerial working groups that provide input to energy technology policymaking in the Nordic region.

Mission Innovation Austria Week

The Mission Innovation Austria Week (MIA), established by the Austrian Federal Ministry for Climate Action and the Austrian Climate and Energy Fund in 2019, provides a platform for all, who work on the development and implementation of technologies and solutions transforming today's energy system.

Bringing together leading people from a wide range of disciplines, sectors and industries is made possible by close collaborations with international and European networks as well as key domestic companies and institutions. Together, they work on questions and solutions, point out needs and demands, share knowledge and experiences, present successful pilots and projects, and network and exchange ideas.




The MIA week is an important part of the Mission Innovation Austria initiative – Austria's contribution to the global research alliance Mission Innovation (MI) founded in 2015. Today, it comprises 24 states and the European Union, aiming to promote the development of clean energy technologies through private and public investments. Austria's participation in international research co-operations enables the promotion of the development and implementation of energy innovations with the Austrian and international market in mind. With their technologies and solutions, local players are actively involved in international co-operations. They are supported by the Federal Ministry for Climate Action, positioning Austria internationally among the top performers. <https://missioninnovationaustriaweek.at/>




IEA's Committee on Energy Research and Technology (CERT) and EGRD

The International Energy Agency's Committee on Energy Research and Technology (CERT) co-ordinates and promotes the development, demonstration and deployment of technologies to meet challenges in the energy sector. The CERT has established four working parties: the Working Party on Fossil Energy; the Working Party on Renewable Energy Technologies; the Working Party on Energy End-Use Technologies;

and the Fusion Power Co-ordinating Committee. Experts' groups such as the EGRD are also created under the CERT. EGRD is an informal advisory group under CERT with the role of supporting CERT delegates with advice on R&D priority-setting and the linkage to governmental policy objectives, methods and approaches for evaluation of R&D activities, and understanding of emerging and systematic R&D topics. Recent topics include: The [role of «behavioural aspects» for reaching net zero emissions by 2050 \(2021\)](#), Energy infrastructures: public acceptance (2020), Energy Islands: Developing Renewable Energy Hubs (2020) and Energy Communities (2020). Workshop summaries are available here: <https://userstcp.org/iea-egrd>

Speakers

<p>Harald Friedl graduated from Columbia University with a master's degree in political science. Since then, his career has spanned a variety of sectors; he has also worked at not-for-profit organizations. Friedl spent five years in South-East Asia, during which he worked as managing director of renewable energy company Andritz Hydro and founded the innovation lab Social Impact Myanmar. From 2017-2020 Friedl was CEO of Circle Economy. Today, Friedl is a "circular activator", consulting the World Economic Forum and a COP26 High Level Climate Action Champion.</p>	
<p>Dr Anne Velenturf is a Research Impact Fellow in Circular Economy and Offshore Wind at the University of Leeds, UK. She is a circular economy expert working on the interface of research and practice, and is actively involved in implementing a sustainable circular economy throughout the UK. Since 2017 she has been investigating circular economy approaches for low carbon infrastructure such as wind and solar power. Anne currently delivers an EPSRC project co-funded by the Offshore Renewable Energy Catapult, Department for International Trade and the University of Leeds, to start embedding circular economy into the design, operation and end of use management of offshore wind infrastructure. Anne is also part of various international collaborations such as via the IEA</p>	
<p>Tim McAlloone is Professor of Sustainable Product/Service-Systems at the Technical University of Denmark, where he researches, teaches and consults in areas of sustainable design, product/service-systems (PSS) and circular economy. He holds a number of responsibilities in the area of design research, such as President of the Design Society, and is the principal investigator of numerous research projects with the field of circular economy and sustainable design.</p>	

<p>Anand Natarajan</p>	
<p>Justine Beauson is a development engineer specialized in polymer composite materials with a research interest in wind turbine blade recycling and biobased and sustainable composite materials. From 2021, she will be co-leading the international IEA Wind TCP Task 45 on the recycling of wind turbine blades. Justine is also a member of the Danish MegaVind strategic committee dedicated to sustainability.</p>	
<p>Richard F. Tusing has 40 years in varied executive, consultancy and advisory service positions. He is currently a senior advisor to the U.S Department of Energy – Office of Energy Efficiency and Renewable Energy, with primary focus supporting the Wind Energy Technologies Office. In this role since 2009, he has led a wide array of strategic energy initiatives and analysis, including the lead author and manager for the U.S. DOE Wind Vision, co-lead for the U.S. DOE Hydropower Vision, and core member for several Wind Office multi-year strategic program plans. Richard Tusing also owned and operated a consultancy service which created intellectual property planning, Business Plan development and raised investment funds for early-stage technology companies. He has previously served in multiple industry executive positions, including regional CFO, Director of Mergers and Acquisitions, and Director of Information Technology; additionally, he started multiple new companies in the telecom arena.</p>	
<p>Allan K. Poulsen holds a Master Degree in Chemical Engineering and a PhD in Physical Chemistry. He is a part of Vestas Innovation&Concepts department and is Head of Advanced Structures and Sustainability. Focus is on development of new materials, concepts and components for Vestas future product portfolio. Sustainability is a recurring motif in his work within development of new materials and technologies. He is a part of the core group working across the full Vestas value chain with development and implementation of Vestas global sustainability strategy.</p>	

Felipe Cerdas is a mechanical and environmental engineer and has obtained a PhD in mechanical engineering. He currently leads the research department on Life Cycle Engineering at the Chair of Sustainable Production & Life Cycle Engineering at the Institute of Machine Tools and Production. Additionally, he is in parallel Chief Scientist for the field of sustainability and Life Cycle Engineering at the department of Process Technology and Production Engineering for Sustainable Energy Storage Systems at the Fraunhofer Institute of Surface Engineering and Thin Films since 2020. Felipe Cerdas has been involved in and managed numerous high-profile research projects in the field of battery manufacturing and recycling. His research is focused on the development of computer aided tools and methodologies to support engineers in the development of more sustainable products and in particular energy storage systems for mobility applications.



Emma Nehrenheim

A mechanical engineer by training and having been involved in electric vehicles over a decade, **Makoto Dave YOSHIDA** brings to table his expertise in Zero Emission Vehicle (ZEV) technology and Vehicle Safety including especially dedicated to ZEV safety as well in the technical standardization and legislation fields.

Makoto Dave YOSHIDA has joined Nissan Motor Co., Ltd. as mechanical engineer in 1989. In 2001, he was assigned to the CEO/Alliance Office of Nissan when Mr. Carlos Ghosn took office as CEO. Having spent 4 years in Brussels (Technical Centre Europe) and 4 years in the U.S.A. (Chief of Office, Washington D.C. Office of Nissan North America), Mr. Yoshida is now General Manager of External and Government Affairs Department at Nissan, while taking on a variety of external roles, not only representing his company and its organization such as Secretary General of CHAdEMO Association and Vice Chair of EV International Standardization Subcommittee at JAMA (Japan Automobile Manufacturers Association), he also sometimes representing his country, Japan, including APEC Automotive Dialog, APEC Sub-Committee on Standards and Conformance, AMEICC Auto Industry Committee, Japan-China bi-lateral charging Workshop, Japan-German Future Charging infrastructure Dialog, and Secretary of EV Safety GTR Informal Working Group Committee at United Nations ECE WP29 on behalf of Ministry of Land, Infrastructure, Transport, and Tourism and Ministry of Economy, Trade, and Industry

