Energy Infrastructure:
Public Acceptance

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

Tuesday 24 November 2020
14:00-15:30 (CET)

Hosted by the Swiss Federal Office of Energy

The transition to a sustainable, clean energy system requires a restructuring of the existing energy system, with radical changes in how we produce, transmit and consume energy. This will only succeed with public engagement. However, public engagement goes both ways. Nuclear power has met widespread public opposition and led to plants being closed in, for example, Germany (*Energiewende*). Large-scale wind power and its transmission also face local opposition, while the new smart grid is also subject to concerns about security, privacy and the potential health impacts. Understanding public perceptions of and responses to new energy technologies can help policy-makers communicate better with stakeholders and anticipate potential public reactions to new technologies and associated accidents and other events.[1]

A wide range of factors shape public perceptions of and responses to new energy technologies. They can be categorized into technology, people, place and process, as illustrated in the figure below.

Technology comes with both risks and benefits which are perceived differently by engineers/professionals and the general public. Among the issues connected with large-scale energy infrastructure are safety, aesthetics, the environment and habitat, but also potential benefits such as job creation, tax revenues and services. For household technologies such as solar panels, electric vehicles or smart appliances, the perceived advantages and disadvantages compared to standard technologies shape consumer readiness to adopt them.

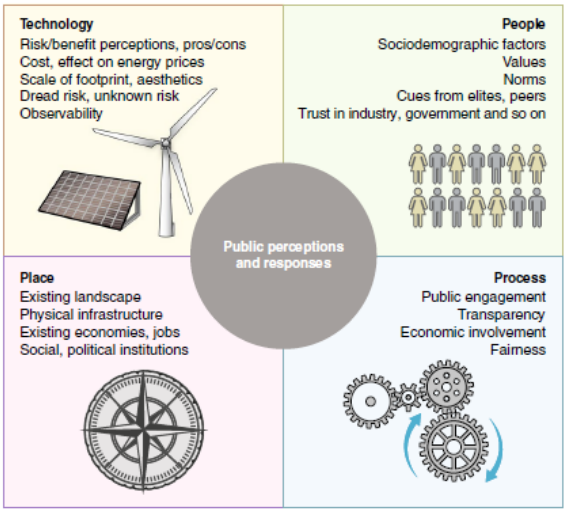


Fig. 1 | Factors affecting public perceptions of and responses to new energy technologies.

People and sociodemographic factors such as age, gender, ethnicity, income and education all influence attitudes towards energy technologies. Young people and women are more likely to oppose fossil-fuel sources of energy, and younger people more likely to accept demand response programmes than older people. Early adopters of high-cost innovations such as EVs often have higher levels of income and education, something that does not seem to be so consistently the case when it comes to large-scale energy infrastructure.

[1] This builds on Hilary S. Boudet, 'Public perceptions of and responses to new energy technologies', *Nature Energy* Vol. 4, June 2019, 446-455.

Place matters, as location offers different resources (hydro, solar, wind), technical potential and different regulatory and political contexts that influence behavior.

Process is key to shaping public perceptions where the decision-making is characterized by transparency, consultation and collaboration. Public engagement can be defined in political terms with reference to, for example, consultation, as well as in economic terms such as ownership, compensation etc. Participation may also build trust in institutions and educate the public.

The presentations and discussion will focus on the following questions:

- What influences public perceptions of and responses to new energy technologies?
- How does the provision of information influence people's attitudes towards different technologies?
- What are the knowledge gaps in our understanding of public perceptions of energy infrastructure in general and of new energy technologies and systems in particular?
- What can public RD&D programmes do to improve knowledge creation and diffusion related to public perceptions?

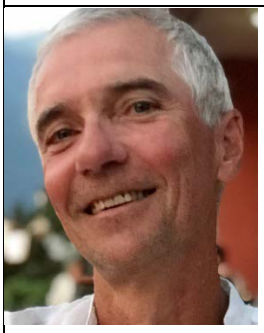
Expected outcomes

The webinar will result in a summary report identifying the challenges and opportunities of addressing public perceptions of and responses to energy infrastructure and will present perspectives for R&D planners and strategists. In addition, an executive summary will be presented to CERT.

Registration: https://register.gotowebinar.com/register/5622177197562673931

Public Perceptions of and Responses to Energy Technologies	
14:00-14:10	Welcome and introduction by Dr. Rolf Schmitz, Swiss Federal Office of Energy by Dr. Birte Holst Jørgensen, Chair of EGRD
14:10-14:25	IEA Wind TCP Annex 28 Social Acceptance by Prof. Dr. Gundula Hübner, Martin-Luther Universität Halle Wittenberg
14:25-14:40	Energyscapes: recommendations for landscape development through renewable energy infrastructures in Switzerland by Dr. Ulrike Wissen Hayek, ETH Zürich
14:40-14:55	Transmission system expansion on site: the role of municipalities as dialogue bridges between national planning and local by Dr. Maik Bohne, die Gesprächspartner
14:55-15:10	Social Acceptance of New Energy Technology in Japan: CCUS and Hydrogen Energy, Prof. Dr. Kenshi Itaoka, Kyushu University
15:10-15:25	Discussion
15:25-15:30	Concluding remarks by Dr. Atsushi Kurosawa, Vice Chair of EGRD

About the speakers

	**Dr. Birte Holst Jørgensen**, Technical University of Denmark, is Chair of the IEA EGRD. She is an experienced researcher and practitioner in the field of new energy technologies and systems, where she has specialized in energy R&D strategies and technology policies at the national, European and international levels. She is responsible for scientific advice at DTU Wind Energy, including technical assistance to the Danish Energy Agency's Global Cooperation programme for offshore wind. She is also Principal Coordinator in sustainable energy at the Sino-Danish Centre for Research and Education. Birte holds a PhD in Political Science (University of Copenhagen) and an MSc in Business Economics (Copenhagen Business School).
	Since 2008, **Dr. Rolf Schmitz** has led the Energy Research programme at the Swiss Federal Office of Energy (SFOE). With its research programmes, the SFOE promotes energy research in the fields of energy efficiency, renewable energy, socio-economics and dam safety. In addition, Rolf's unit runs funding programmes for pilot and demonstration projects, as well as for inter- and transdisciplinary research consortia. Rolf represents Switzerland in CERT and members of his unit in the various IEA working parties and working groups, as well as in 22 TCP. He holds a PhD in the field of electrical grids and an MSc in power engineering, both from ETHZ Zurich.
	**Dr. Gundula Hübner** is Professor of Social Psychology the MSH Medical School Hamburg and leads the research group of Health and Environmental psychology at the Institute of Psychology, Martin-Luther-University Halle-Wittenberg. Her research is focused on the social acceptance of renewable energies, biomass, solar and wind energy, as well as the stress impact of wind turbines on residents. Besides surveys her research is based on experimental settings analysing the impact of communication and visualisations techniques on the social acceptance of on- and offshore wind energy projects. In her inter- and transdisciplinary research projects she collaborates with several international teams. Gundula holds a PhD in Psychology from the University of Kiel. Supporting the German Federal Ministry for Economic Affairs and Energy, she is member of the IEA Wind TCP Task 28 - Social Acceptance of Wind energy.
	**Dr. Ulrike Wissen** is Executive Scientific Collaborator (Oberassistentin) at the Chair Planning of Landscape and Urban Systems (PLUS) at the ETH Zurich. She holds a PhD in Spatial and Landscape Planning of the ETH Zurich and is director of the interdepartemental Landscape Visualization and Modelling Lab (LVML). Since 18 years, she is focusing on generating and implementing GIS-based 3D landscape visualizations for participatory planning in urban as well as in rural landscapes. In her recent research she used 3D point cloud based simulations to investigate how people perceive and judge scenarios of different combinations of wind energy and photovoltaic systems in the context of seven landscapes of Switzerland. The findings and recommendations can help to better incorporate the views of the population into landscape development with renewable energy infrastructures.

	**Dr. Dr. Maik Bohne** is a political scientist. His work for think tanks and research institutions centers on the future of democracy and new forms of public dialogue. Maik is the founder and CEO of Die Gesprächspartner, a German public dialogue consultancy that advises critical infrastructure projects (in areas such as renewable energy, port and river development and mobility).
	**Dr. Kenshi Itaoka** is Professor of Multiscale Science and Engineering for Energy and the Environment Trust in the International Institute of Carbon Neutral Energy Research (I2CNER), Kyushu University. He is responsible for drawing up visions and configurations of the future energy society to which I2CNER should contribute through the energy transition. He is an expert on the technological assessment of various energy systems from both the engineering and socio-economic perspectives. In respect of the social aspects of technology, he has conducted extensive research on social acceptance and economic efficiency, particularly on energy systems involving CO_2 capture and storage technology (CCUS), and hydrogen and fuel-cell technologies. He holds a PhD in Engineering (University of Tokyo) and an MSc in Urban & Regional Planning (University of Wisconsin-Madison).
	**Dr. Atsushi Kurosawa** is Vice Chair of IEA EGRD. He is Director of the Global Environmental Programme, Research and Development Division, Institute of Applied Energy (IAE). His research focuses on integrated assessments of global climate change and energy R&D strategies through the integrated assessment model GRAPE and the TIMES Japan model. He has held visiting and fellowship positions at many universities and institutes, including Stanford University, the Research Institute of Innovative Technology for the Earth, Kyushu University, the Japan Science and Technology Agency, the New Energy and Industrial Technology Development Organization and the University of Tokyo. He holds a PhD in Electrical Engineering (University of Tokyo), an MSc in Nuclear Engineering (Tokyo Institute of Technology) and a BSc in Nuclear Engineering (Nagoya University).

International Energy Agency (IEA)

The IEA is an autonomous agency established in November 1974 with a twofold mandate : to promote energy security amongst its member countries through collective responses to physical disruptions in oil supply; and to advise member countries on sound energy policy. The IEA carries out a comprehensive programme of energy co-operation in thirty advanced economies. The Agency aims to:

- Secure member countries' access to reliable and ample supplies of all forms of energy, in particular, by maintaining effective emergency response capabilities in case of disruptions to oil supplies.
- Promote sustainable energy policies that spur economic growth and environmental protection in a global context, particularly in reducing greenhouse-gas emissions that contribute to climate change.
- Improve the transparency of international markets through the collection and analysis of energy data.
- Support global collaboration on energy technologies to secure future energy supplies and mitigate their environmental impact, including through improved energy efficiency and development, and the deployment of low-carbon technologies.
- Find solutions to global energy challenges through engagement and dialogue with non-member countries, industry, international organizations and other stakeholders.

Since the 1980s, the IEA has continued to build good working relationships with countries beyond its membership, in particular major energy-consuming, energy-producing and transit countries. Co-operation with partner countries covers a wide range of activities, from joint workshops to in-depth surveys of specific energy sectors or data exchange. Combined, the IEA co-operates with more than 69 countries worldwide.

IEA Energy Technology Network

The IEA Energy Technology Network is an ever-expanding, co-operative group of more than 6,000 experts that supports and encourages global technology collaboration. At the head of this vast network is the Committee on Energy Research and Technology (CERT).

Committee on Energy Research and Technology

Comprised of senior experts from IEA member governments, CERT studies effective energy technologies and policies to improve energy security, encourage environmental protection and maintain economic growth. Under the guidance of the IEA Governing Board, CERT oversees technology forecasting, analyses, and the research, development, demonstration and deployment strategies of the IEA Secretariat, notably through its flagship publication, *Energy Technology Perspectives*, and its series of energy technology road maps. CERT also provides guidance to its working parties and expert' groups to examine topics that address current energy technology and technology policy issues.

Experts' Group on R&D Priority-Setting and Evaluation (EGRD)

The EGRD examines analytical approaches to energy technologies, policies, and RD&D on targeted, timely topics. Its results and recommendations support CERT, feed into IEA analysis and enable a broad perspective on energy technology issues. Recent topics analysed include Energy Communities (2020), Green Fuels (2019), System Resiliency and Flexibility (2019) and Future Energy Marked Design (2018). Workshop summaries are available here: https://userstcp.org/iea-egrd