

Joint IIASA-RITE International Workshop: Towards Improved Understanding, Concepts, Policies and Models of Energy Demand

**11-13 November 2019
IIASA, Scholssplatz 1, Laxenburg, Austria**

Meeting Summary

The second in a series of joint IIASA-RITE international workshops exploring the potential for reducing energy demand to mitigate the impacts of climate change in the context of sustainable development was held at IIASA in Laxenburg, Austria on 11-13 November 2019. The inaugural meeting was held in Nara, Japan, 25-27 September 2018.

The meeting at IIASA was attended by 57 participants from 19 countries and comprised individuals from a range of disciplines including modelers, social scientists, economists, engineers, and practitioners across different sectors including transport, buildings, energy, and climate (see list of participants). A particular strength of the meeting was the number of young researchers present.

The objectives of the workshop included both scientific exchange and to provide a forum for discussing demand-side research and policy issues, as well as to promote community building to expand the research, policy dimensions, and impacts of demand side approaches to climate mitigation and the Sustainable Development Goals (SDGs).

The topics discussed covered a wide range of energy demand themes including (see Agenda):

- Energy demand – an evolving landscape
- Energy demand and digitalization
- Demand research needs
- Demand, lifestyles, social aspects of mitigation in the IPCC 6th Assessment Report
- Transport demand, new business models, and modeling
- Energy access, efficiency and resource demands for sustainable development

Important advances in both modeling and demonstration projects of low energy demand solutions were presented including deep retrofit solutions for office buildings lowering energy demand to such levels that buildings become net energy producers, new city-level simulations of shared mobility solutions as well as integrated assessment model quantification of global impacts of shared mobility solutions, and novel approaches to rural electrification via microgrids for furthering productive uses of electricity. At the same time, participants repeatedly emphasized the slow uptake of low demand concepts in the scientific and policy communities, requiring a renewed effort to improve communication and outreach.

A major point of discussion during the meeting was that increasingly energy demand is being investigated through a services lens, which is also a novel perspective taken up in the IPCC 6th Assessment Report currently under development. Energy services and demands are also increasingly seen as more than just part of the climate mitigation agenda but considered more broadly in the context of sustainable development and the SDGs, in particular in the context of decent living standards for all. Mitigating the impacts of climate change will not simply be achieved by electrification of the energy system with concomitant decarbonization of the electricity sector, but rather must be accompanied by dramatic reductions in energy demand

through both increasing energy efficiencies across all sectors and reducing energy demand of both individuals, through personal choices, and industry and commerce through new business models, incentives, or regulatory approaches. However such approaches may be difficult in the developing world where energy demand is projected to increase as increasingly more people gain access to clean energy forms and electricity to meet basic human needs and wellbeing.

Much of the discussions focussed on potentials for demand reductions in the transport and buildings sectors. The increased use of electric vehicles (including autonomous vehicles), ride sharing, and decarbonized mass public transport has considerable potential to reduce overall energy demand for passenger travel through reductions in use of conventional fossil fuel powered vehicles, but may, at the same time, displace other means of low impact transport such as walking and cycling. It is important to understand personal motivations in transport choices to maximize the underlying potential with novel empirical survey data presented at the workshop. While considerable progress is being made in modeling low demand options in the passenger transport sector there has been little attention paid to the freight sector which accounts for a significant proportion of energy use and emissions. Similarly, the adoption of energy neutral buildings (either new or through retrofitting) may reduce energy demand dramatically although with considerable upfront capital costs. Undoubtedly digitalization in its many guises may also reduce energy demand through for example, substitution, but also has the potential to increase consumerism, and therefore demand, not to mention the significant energy demands associated with processing and maintaining data services.

Although it was agreed that progress is being made in some sectors to reduce energy demand and that there is significant untapped potential to achieve more with the right policies, regulation and incentives, the pace of change is too slow if the world is to achieve its climate and SDG aspirations by 2030 and 2050. Continued incrementalism will not achieve the targets and there was an increased sense of urgency to develop radical transformational solutions. Although there was a call for more research to be undertaken it was generally agreed that much more can be done already with existing knowledge, technologies and best practices. The research community needs to better engage with policy and decision makers to find ways to accelerate the implementation of already well understood solutions and to provide input into the development of more radical scenarios for achieving the necessary energy demand reductions.

In addition to the formal and informal discussions the meeting also featured a poster session for young researchers to showcase and discuss new and novel approaches to investigating energy demand. A total of 14 posters were presented with awards being presented to the five best posters (see list of posters and awards).

A more detailed report of the meeting will be made available early in 2020.

List of Participants

Keigo Akimoto

The Research Institute of Innovative
Technology for the Earth (RITE)
Japan

Geoff Clarke

International Institute for Applied Systems
Analysis (IIASA)
Australia

Talita Borges Cruz

Instituto Alberto Luiz Coimbra de Pós-
Graduação e Pesquisa de Engenharia
(COPPE) at Universidade Federal do Rio de
Janeiro
Brazil

Simone Fobi Nsutezo (remote)

Columbia University
United States

Keii Gi

The Research Institute of Innovative
Technology for the Earth (RITE)
Japan

Chioke Harris

National Renewable Energy Laboratory
(NREL)
United States

Kejun Jiang (remote)

National Development and
Reform Commission, China
China

Jaewan Kim

Yonsei University
Korea

Osamu Kimura

Central Research Institute of Electric Power
Industry (CRIEPI)
Japan

Abhishek Kumar

Population Council, India
India

Benigna Boza-Kiss

International Institute for Applied Systems
Analysis (IIASA)
Hungary

Felix Creutzig

Mercator Research Institute on Global
Commons and Climate Change (MCC)
Germany

Simon De Stercke

Imperial College London
Belgium

Atsuko Fushimi

The Research Institute of Innovative
Technology for the Earth (RITE)
Japan

Arnulf Grubler

International Institute for Applied Systems
Analysis (IIASA)
Austria

Kinga Horváth

EnergoSys
Hungary

Miho Kamei

Institute for Global Environmental Strategies
(IGES)
Japan

Yong Gun Kim

Korea Environmental Institute
South Korea

Paul Kishimoto

International Institute for Applied Systems
Analysis (IIASA)
Canada

Benjamin Leibowicz

University of Texas at Austin
United States

Tieju Ma

East China University of Science and Technology (ECUST) and International Institute for Applied Systems Analysis (IIASA)
China

Eric Masanet

Northwestern University
United States

David McCollum

Electric Power Research Institute (EPRI)
United States

Shusuke Mori

JST Center for Low Carbon Society Strategy
Japan

Sumie Nakayama

J-Power
Japan

Leila Niamir

Mercator Research Institute on Global Commons and Climate Change (MCC)
Germany

Shonali Pachauri

International Institute for Applied Systems Analysis (IIASA)
Austria

Keywan Riahi

International Institute for Applied Systems Analysis (IIASA)
Austria

Joyashree Roy (remote)

Asian Institute of Technology (AIT)
Thailand

Rami Shabaneh

King Abdullah Petroleum Studies and Research Center (KAPSARC)
Saudi Arabia

Bianka Shoai

RTE-France (DSO Regulator)France

Luis Martinez

International Transport Forum at Organisation for Economic Co-operation and Development (OECD)
France

Alessio Mastrucci

International Institute for Applied Systems Analysis (IIASA)
Italy

Sergi Moles-Grueso

Central European University
Hungary

Takahiro Nagata

The Research Institute of Innovative Technology for the Earth (RITE)
Japan

Nebojsa Nakicenovic

International Institute for Applied Systems Analysis (IIASA)
Austria

Yannick Oswald

University of Leeds
United Kingdom

Narasimha Rao (remote)

School of Forestry and Environmental Studies, Yale University
United States

Michaela Rossini

International Institute for Applied Systems Analysis (IIASA)
Austria

Alessandro Sanches

Instituto 17
Brazil

Yoshiyuki Shimoda

Osaka University
Japan

Linda Steg

University Groningen
Netherlands

Julia Steinberger (remote)

University of Leeds
United Kingdom

Erich Streissnig

International Insitute for Applied Systems
Analysis (IIASA)
Austria

Bin Su

National University of Singapore(NUS)
Singapore

Masa Sugiyama

Tokyo University
Japan

Jay Taneja (remote)

University of Massachusetts
United States

Fei Teng

Tsinghua University
China

Diana Urge-Vorsatz

Central European University
Hungary

Bas van Ruijven

International Insitute for Applied Systems
Analysis (IIASA)
Netherlands

Jefim Vogel

Univeristy of Leeds
United Kingdom

Pat Wagner

International Insitute for Applied Systems
Analysis (IIASA)
Austria

Charlie Wilson

Tyndall Centre for Climate Change Research
and International Institut for Applied Systems
Analysis
United Kingdom

Kenji Yamaji

The Research Institute of Innovative
Technology for the Earth
Japan

Ju Yiyi

University of Tokyo
Japan

Xingrong Zhao

East China University of Science and
Technology (ECUST)
China

Caroline Zimm

International Insitute for Applied Systems
Analysis (IIASA)
Austria

Meeting Agenda

with links to formal presentation slides

Monday, 11 November

- | | |
|----------------|--|
| 11:30 | <i>Mondial Shuttlebus Transportation leaves from Vienna meeting place (see Logistics Note) to IIASA (Schlossplatz 1, Laxenburg)</i> |
| 12:00 | <i>Arrival at IIASA and Registration (Conference Secretariat next to the Wodak Room)</i>
<i>Sandwich lunch</i> |
| 13:00-13:30 | Opening Session
Welcome, and Framing Introduction to Workshop
<i>Arnulf Grubler (IIASA, 5 min) and Keigo Akimoto (RITE, 15 min)</i>
Short greeting address
<i>Kenji Yamaji (RITE)</i> |
| 13:30-15:30 | Plenary Session I: Energy Demand - An Evolving Landscape (30 mins each incl. Q/A)
Chair: <i>Kenji Yamaji (RITE)</i> <ul style="list-style-type: none">• Outcomes of the RITE-IIASA ‘Rethinking Energy Demand’ 2018 International Workshop
<i>Charlie Wilson (University of East Anglia, Tyndall Center and IIASA)</i>• The World in 2050 Initiative: Disruptive Digital Revolution
<i>Nebojsa Nakicenovic (IIASA)</i>• Demand, efficiency, lifestyles: Perspective from the Global South (via WebEx**) <i>Joyashree Roy (Asian Institute of Technology)</i>• ‘Revolutions’ shaping energy demand ... and implications for modeling
<i>David McCollum (Electric Power Research Institute)</i> |
| 15:30-16:00 | <i>Coffee Break</i> |
| 16:00-17:30 | Parallel Sessions: |
| Gvishiani Room | Parallel Session I: Break-out group on “What do we know and what we need to know” (demand research needs)
Moderator: <i>Charlie Wilson (University of East Anglia, Tyndall Center and IIASA)</i> |
| Wodak Room | Parallel Session II: Break-out group on Digitalization
Moderator: <i>Nebojsa Nakicenovic (IIASA)</i> |
| 17:45 | <i>Adjourn - Mondial Shuttlebus Transportation leaves from IIASA to dinner</i> |
| 18:00-20:30 | <i>Social Event at Klostergasthaus Thallern (Thallern 2, 2352 Gumpoldskirchen)</i> |
| ca. 20.30 | <i>Mondial Shuttlebus Transportation from Klostergasthaus Thallern to Vienna</i> |

Tuesday, 12 November

08:30 *Mondial Shuttlebus Transportation leaves from Vienna meeting place (see Logistics Note) to IIASA (Schlossplatz 1, Laxenburg)*

9:00-9:30 *Morning coffee and snacks*

09:30-11:00 **Plenary Session II: Demand, Lifestyles, Social Aspects of Mitigation in AR6 (20 min each)**

Chair: Keigo Akimoto (RITE)

- Overview of IPCC AR6 Chapter 5
Felix Creutzig (Mercator Research Institute on Global Commons and Climate Change)

- [Human dimension of energy systems](#)

Linda Steg (University of Groningen)

- [Assessing mitigation potentials in the IPCC](#)

Diana Urge-Vorsatz (Central European University)

11:00-12:00 **Round Table Discussions, Kick-off Statements**

Moderator: Keywan Riahi (IIASA)

(5-minutes statements per intervention, followed by general discussion)

12:00 *Walk over to the IIASA Schloss Restaurant*

12:00-13:30 *Lunch – Oval Room - Schloss Restaurant*

13.30-14.00 *Coffee break*

14:00-16:00 **Plenary Session III: Young Demand Researchers Poster Session**

Wodak Room **(5 minutes-presentation by “next generation” researchers)**

Chair: Arnulf Grubler (IIASA)

16:00-17:30 **[Poster visits and discussions](#)**

Gvishiani Room

18:00 *Walk over to the IIASA Restaurant*

18:00-20:30 *Social Event / Reception – IIASA Schloss Restaurant – Oval Room*

20:30 *Mondial Shuttlebus Transportation from IIASA to Vienna*

Wednesday, 13 November

08:30 *Mondial Shuttlebus Transportation leaves from Vienna meeting place (see Logistics Note) to IIASA (Schlossplatz 1, Laxenburg)*

9:00-9:30 *Morning coffee and snacks*

09:30-11:00 **Plenary Session IV: Transport Demand, New Business Models, and Modeling (25 min. each)**

Chair: Paul Kishimoto (IIASA)

- [Shared mobility: concepts and modeling](#)

Luis Martinez (OECD)

- [Modeling diffusion of EVs with DCM and ABM – the case of Shanghai](#)
Tieju Ma (School of Business, East China University of Science and Technology)
- [Preliminary Modeling Analyses on Global Impacts of Sharing Mobility Beyond Transportation Sector](#)
Keii Gi (RITE)

11:00-12:30 **Round Table Discussions, Kick-off Statements**

Moderator: *David McCollum (Electric Power Research Institute)*

(5-minutes statements per intervention, followed by general discussion)

12:30 *Walk over to the IIASA Schloss Restaurant*

12:00-13:50 *Lunch – Oval Room*

14:00-15:30 **Plenary Session V: Energy Access, Efficiency, and Demand for Sustainable Development (20 mins each)**

Chair: *Linda Steg (University of Groningen)*

- [Energy access and demand for productive purposes \(businesses and agricultural activities\)](#) (via WebEx**)

Jay Taneja (University of Massachusetts)
- [Energy Demand and ‘Decent Living’ Future Directions in Modeling](#) (via WebEx**)

Narasimha Rao (IIASA and Yale University)
- [Direct household energy access and demand](#)

Shonali Pachauri (IIASA)

15:30-16:00 *Coffee break*

16:00-17:00 **Round Table Discussions, Kick-off Statements**

Moderator: *Shonali Pachauri (IIASA)*

(5-minutes statements per intervention, followed by general discussion)

17.00 **Closing Remarks & Outlook:** *Arnulf Grubler (IIASA) and Keigo Akimoto (RITE)*

17.15 **End of Workshop**

(Upon request – transfers to hotel or airport will be arranged)

17:30 *Mondial Shuttlebus Transportation from IIASA to Vienna*

18:30 *Optional private dinner or evening event (TBD)*

List of Posters (with embedded links)

Poster Awards

Best Poster With Distinction

Simone Fobi, Quadracci Sustainable Engineering Lab, Columbia University, USA. [Using remote sensed data to predict residential electricity demand in Kenya.](#)

Citation: The research presented is an ingenious combination of using empirical data and remote sensing information to study the electricity demand response after gaining access in Kenya. The clearly structured poster was complemented by an excellent presentation.

Leila Niamir, Mercator Research Institute on Global Commons and Climate Change, Germany. [Behavioral climate change mitigation from individual energy choices to demand-side potential.](#)

Citation: The research presented is original and highly relevant to understanding service demands. The work is both conceptually and analytically interesting, integrating bottom-up heterogeneous agent-level processes with the macro-effects of climate change, employing a highly appropriate methodological approach. The research was presented in a very clear presentation.

Best Poster

Yannick Oswald, Sustainability Research Institute, University of Leeds, UK. [International inequality in energy footprints.](#)

Citation: The research presented is of high quality and highly relevant to energy demand services in comparing energy footprints across countries. The work looks at embedded energy related to the production of goods and services, which is an important topic that is often still overlooked in studies. The results show that inequality differs across different types of services. The poster and presentation were very clear.

Simon De Sterke, Department of Civil and Environmental Engineering, Imperial College London, UK. [Modeling the dynamics of the water-energy nexuses of London and Mumbai from an end-use perspective.](#)

Citation: The research presented is novel and highly relevant to understanding service demands in connecting different service sectors and comprehensively investigating feedbacks of different sectors at an urban scale, including resource flow connections between the city and its hinterland. The animated presentation provided a novel experience, telling a real story.

Xingrong Zhao, East China University of Science and Technology, China. [Are transport users willing to share? Stated preference study on shared mobility in Shanghai.](#)

Citation: The research presented is interesting and relevant to energy service demands both in content and methods. The work investigated shared mobility in Shanghai using survey data to understand heterogeneous human preferences, actions, rebound effects, and related energy demand. The presentation was clear and well-structured.

Other Posters

Talita Cruz, Energy Planning Program, COPPE/UFRJ, Brazil. [Modeling social heterogeneity: How does a better representation of income inequality affect energy choices in Brazil?](#)

Kinga Horváth, EnergoSys Inc., Hungary. [Improving indoor comfort while being energy efficient.](#)

Miho Kamei, Institute for Global Environmental Strategies, Japan. [Urbanization, carbon neutrality, and gross national happiness: Sustainable development pathways for Bhutan.](#)

Jaewan Kim, Yonsei University, South Korea. [Multilevel analysis on effectiveness of energy transition policy in Seoul: the Seoul Eco-mileage program.](#)

Abhishek Kumar, Population Council, New Delhi, India. [Understanding contribution of women's education on marriage age and use of maternal healthcare services in India, 2005-2016.](#)

Benjamin Leibovitz, Operations Research and Industrial Engineering, University of Texas, USA. [Urban land use and transportation planning for climate change mitigation: A theoretical framework.](#)

Sergi Moles-Gruoso, Department of Environmental Sciences and Policy, Central European University, Hungary. [Harnessing the exemplary role of the public sector: Conceptual and epistemological issues.](#)

Jefim Vogel, Sustainability Research Institute, University of Leeds, UK. [Gatekeepers of low-energy wellbeing: Provisioning systems as intermediaries between energy use and basic needs satisfaction.](#)

Ju Yiyi, Institute of Future Initiative, University of Tokyo, Japan. [Optimal technology combination under national mitigation and energy service demand scenarios: the cement industry in Japan and China.](#)