

# IRENA INNOVATION WEEK 2018

solutions for a renewable-powered future

5-7 September 2018 • Kameha Grand Hotel • Bonn, Germany

## EVENT PROGRAMME

*As of 2 September 2018*



## INNOVATION WEEK 2018 - PROGRAMME

### Tuesday, 4 September 2018

Site visits in co-operation with the EnergyAgency.NRW	
Visit A: Powering with solar, breakthroughs in hydrogen production and energy storage	Visit B: Electromobility and testing latest inventions and developments in wind energy

### Wednesday, 5 September 2018

TIME	DIGITALISATION & DECENTRALISATION Grand Event Room	ELECTRIFICATION Green Spirit Room
09:15-10:15	Welcoming address - Event overview Introduction to digitalisation & decentralisation	Welcoming address - Event overview Introduction to the electrification of transport, buildings and heating
10:15-10:30	Comfort Break	
10:30-12:15	Digital applications for the energy transition: blockchain	Electrification of heat
12:15-13:30	Lunch & Networking	12:30-13:30 Side event: International partnership working to accelerate innovation (lunch provided)
13:30-15:00	Digital applications for the energy transition: Artificial intelligence and big data	Electrification of transport
15:00-15:15	Introduction to Global Innovation Showcase	Introduction to Global Innovation Showcase
15:15-16:00	Networking Break	
16:00-17:30	Global Innovation Showcase	Global Innovation Showcase
18:00-19:15	Boat trip to Old Town Hall Reception	
19:15-20:20	Drinks reception for all attendees - Old Town Hall, Bonn	

### Thursday, 6 September 2018

TIME	MARKETS & CITIZENS Kameha Universal Room	DIGITALISATION & DECENTRALISATION Grand Event Room	ELECTRIFICATION Green Spirit Room
08:00-09:00	Side event: Transformation of urban energy systems (breakfast provided)		
09:15-10:30	Future Grids: Getting bigger and smaller - Kameha Universal Room		
10:30-11:00	Networking Break		
11:00-12:30	Market design for an integrated renewable-based based energy system	The new consumer in the digital world	Electricity Storage
12:30-14:00	Lunch & Networking	12:45-14:00 - Side event: Implications of innovation for long-term planning (lunch provided)	
14:00-15:45	Empowering citizens: Value, challenges and implications	Broadening energy access through innovation	Electrification of fuels: Hydrogen
15:45-16:15	Networking Break		
16:15-18:00	Plenary Session: Developing and deploying solutions for a renewable-powered future - Kameha Universal Room		
19:00-21:00	Dinner for all attendees - Kameha Dome		

### Friday, 7 September 2018

TIME	KAMEHA UNIVERSAL ROOM
07:45-08:45	Breakfast briefing: Plenary Presenters and Roundtable Participants. By invitation only.
09:00-10:15	Plenary Session: Perspectives on the transformative impacts of innovation - Kameha Universal Room
10:15-10:45	Networking Break
10:45-12:30	Senior-level roundtable discussion: The transformative impacts of innovation
12:30-13:00	Closing remarks
13:00-14:00	Lunch & Networking

# IRENA INNOVATION WEEK 2018 OVERVIEW

In the two years since IRENA's first Innovation Week, we have seen further remarkable cost reductions in renewable energy, to the extent that many commercially available renewable power generation technologies will be competitive with conventional fuels by 2020.

In parallel, we are witnessing transformative changes in the way energy systems are operated, driven by trends such as the growing digitalisation, the increased decentralisation of electricity supply, the need for system flexibility, and the electrification of end-use sectors.

While the transformation of the power sector is well underway, the challenge now is to build on the potential of low-cost renewables and ensure all countries can reliably integrate high shares in their power systems.

IRENA Innovation Week 2018 is a solutions-focused gathering of leading companies, innovators and policy makers from across IRENA's diverse global membership, convened to explore how innovations in enabling technologies, business models, system operations and sector coupling can accelerate the renewable power transition.

Presenters will highlight the diversity of solutions that are already being trialled and adopted in many systems around the world and will discuss how these solutions are helping create more flexible, integrated energy systems.

The sessions are organised in three topical tracks on Wednesday and Thursday: Digitalisation and decentralisation; Electrification; and Markets and citizens. Site visits to local innovative projects will take place on Tuesday. A Showcase event highlighting examples of innovative approaches will take place on Wednesday. Plenary sessions and a senior level roundtable discussion will take place on Thursday and Friday.





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# DIGITALISATION AND DECENTRALISATION

**Wednesday, 5 September 2018 • 09:15–10:15 • Grand Event Room**

## **Welcoming address and introduction to digitalisation and decentralisation**

The increasing availability and use of digital monitoring and control technologies to dynamically manage generation, distribution and demand is providing new, more efficient and flexible ways to operate power systems.

Meanwhile, increasingly distributed and localised generation and consumption of energy is allowing consumers and communities to become more active participants. Together, these trends – digitalisation and decentralisation – will have a profound effect on the energy system.

This session will introduce delegates to the objectives and format of IRENA Innovation Week; highlight key insights from IRENA's work on this topic; provide an overview of digitalisation and decentralisation that will explain their relevance to the global transformation; and introduce more detailed forthcoming discussions in subsequent sessions.

### **Welcoming address**

**Adnan Z. Amin, Director-General IRENA**

### **An overview of IRENA and of IRENA Innovation Week**

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

### **Introduction to digitalisation and decentralisation**

**Stephen Woodhouse, Chief Digital Officer, Pöyry**

### **The innovation landscape for power sector transformation**

**Arina Anisie, IRENA Innovation and Technology Centre**

Wednesday, 5 September 2018 • 10:30–12:15 • Grand Event Room

## Digital applications for the energy transition: Blockchain

How can blockchain contribute to the energy transition and what can policy makers and regulators do to enable this? This session features a roundtable discussion involving a variety of experts on distributed ledger technologies who will discuss the role of blockchain in promoting a sustainable future, based on renewable energy.

The roundtable discussion aims to cut through the hype and explore promising uses for blockchain technology, including: P2P power trade; managing flexibility at the grid edge; payments; renewable certificate issuance and trading; project financing; and others. The downsides and risks of distributed ledger technology will also be examined.

**Moderator:** [Colleen Metelitsa, Grid Edge Analyst, GTM Research](#)

### **Using blockchain tech to decarbonise, digitise, and decentralise electric grids worldwide**

[Doug Miller, Energy Web Foundation](#)

A high-level overview of blockchain technology and how it can be applied in the energy sector.

### **Unlocking grid flexibility: The use of blockchain at TenneT**

[Jan Vorrink, Manager, National and Regional Control Centres of TenneT TSO BV](#)

A breakdown of two pilot projects through which TenneT is testing blockchain applications to increase grid flexibility: Vandebrom in the Netherlands (EVs batteries), and Sonnen eServices in Germany (residential batteries).

### **State of the Market: A snapshot of blockchain investment and global project deployment**

[Colleen Metelitsa, GTM Research](#)

An overview of the investment in blockchain in power companies to date and grid edge projects happening globally.

### **Roundtable discussants**

- [Arash Azami, Chairman, Universal Right](#)
- [Doug Miller, Manager, Energy Web Foundation \(EWF\)](#)
- [Jan Vorrink, Manager, National and Regional Control Centres of TenneT TSO BV](#)
- [Mark van Stiphout, Deputy Head of Unit in DG Energy, European Commission](#)
- [Morwesi Ramonyai, Managing Director, The Sun Exchange](#)
- [Paul Massara, CEO, Electron](#)
- [Tomas Baeza, Industrial Development Manager, Comité Solar](#)

Wednesday, 5 September 2018 • 13:30–15:00 • Grand Event Room

## Digital applications for the energy transition: Artificial intelligence and big data

How can artificial intelligence (AI), paired with big data, accelerate the ongoing energy transition? This session features a roundtable discussion with energy sector digitalisation experts who will discuss the role of AI in increasing shares of renewable energy and improving energy efficiency.

The roundtable discussion aims to explore various uses for AI including: generation and demand forecasting; system operation; generation flexibility; and infrastructure management. The risks associated with increased digitalisation – including cyber-security – as well as the resultant policy and regulatory requirements will also be discussed.

**Moderator:** [Maher Chebbo, Chief Innovation Officer, GE Power Digital](#)

### **Digital energy: An introduction to AI, machine learning, and big data and their impacts on the energy sector**

[Marc Peters, CTO Energy, Environment & Utilities Europe, IBM](#)

A high-level overview of the digitalisation currently taking place in the energy sector and what to expect in the coming decade.

### **Unlocking the 'fifth fuel': Increased energy efficiency with machine learning and big data**

[Manon Dirand, Head of Sales, BeeBryte](#)

Optimising consumer energy usage using artificial intelligence and big data analytics.

### **AI-powered system operation: A view to the future**

[Stephen Marland, VP Innovation, National Grid UK](#)

The shifting roles of electricity system operators in the face of decentralisation and increased renewables.

### **Roundtable discussants**

- [Dongxia Zhang, Senior Engineer, China Electric Power Research Institute](#)
- [Doris Gemeinhardt-Brenk, Head of Unit Digitisation and Interconnectivity; Internet Platforms, Bundesnetzagentur](#)
- [Manon Dirand, Head of Sales, BeeBryte](#)
- [Marc Peters, CTO Energy, Environment & Utilities Europe, IBM](#)
- [Markus Wolf, Regional Manager, EPRI International](#)
- [Stephen Marland, VP Innovation, National Grid UK](#)
- [Stephen Woodhouse, Chief Digital Officer, Pöyry](#)

Thursday, 6 September 2018 • 11:00–12:30 • Grand Event Room

## The new consumer in the digital world

The growth of distributed electricity generation and storage technologies along with the widespread availability of 'smart' devices have created new opportunities for consumers to engage with and become more active players in the energy transition. New business models are emerging, offering new services that may define the future role of 'prosumers' in the power sector.

This session will provide first-hand insights into leading innovations, of which consumers are at the centre. On-the-ground case studies will be presented and discussed, and their potential impact on future systems will be explored. The panel discussion will revolve around the new role of the consumer and its potential to drive the energy transition.

**Moderator:** [Michele Governatori, President of European Energy Retailers](#)

### **Smart Metering as an enabler of customer empowerment – Case Finland**

[Ina Lehto, Senior Adviser, Finnish Energy](#)

An unbroken chain from the wholesale market to the individual electricity consumer enables an active customer and new services (access to consumption data, dynamic pricing models, demand response).

### **Next Kraftwerke: Virtual Power Plant & Power Trading**

[Jan Aengenvoort, Next Kraftwerke](#)

A virtual power plant that connects thousands of small power producers and consumers to valorise their power and flexibility in different markets.

### **SonnenFlat & SonnenCommunity**

[Benjamin Schott, Sonnen GmbH](#)

SonnenFlat enables consumers to assist in the stabilisation of grids using their batteries; SonnenCommunity is a nationwide, cloud-based, virtual power plant for peer to peer trading.

### **Trying to move consumers from analogical to digital mode in an emerging economy: the Brazilian experience**

[Luiz Augusto Barroso, Former CEO, Energy Research Office EPE](#)

This presentation will discuss the ongoing advances in Brazil - a large emerging economy with a fast-growing market and a hydro-dominated power system - to achieve a liberalised retail market. The many challenges in this process will be discussed, such as how to find a suitable market design that reconciles retail choice with the new generation capacity.

### **Roundtable discussants**

- [Ina Lehto, Senior Adviser, Finnish Energy](#)
- [Jan Aengenvoort, Chief Communications Officer, Next Kraftwerke](#)
- [Benjamin Schott, Director Business Innovation, Sonnen GmbH](#)
- [James Watson, CEO, Solar Power Europe](#)
- [Luiz Augusto Barroso, Former CEO, Energy Research Office EPE](#)
- [Peter Stratmann, Head of Renewable Energy Unit, Federal Network Agency of Germany](#)
- [Junyan Liu, Professor-Level Senior Engineer, State Grid Corporation of China](#)

Thursday, 6 September 2018 • 14:00–15:45 • Grand Event Room

## Broadening energy access through innovation

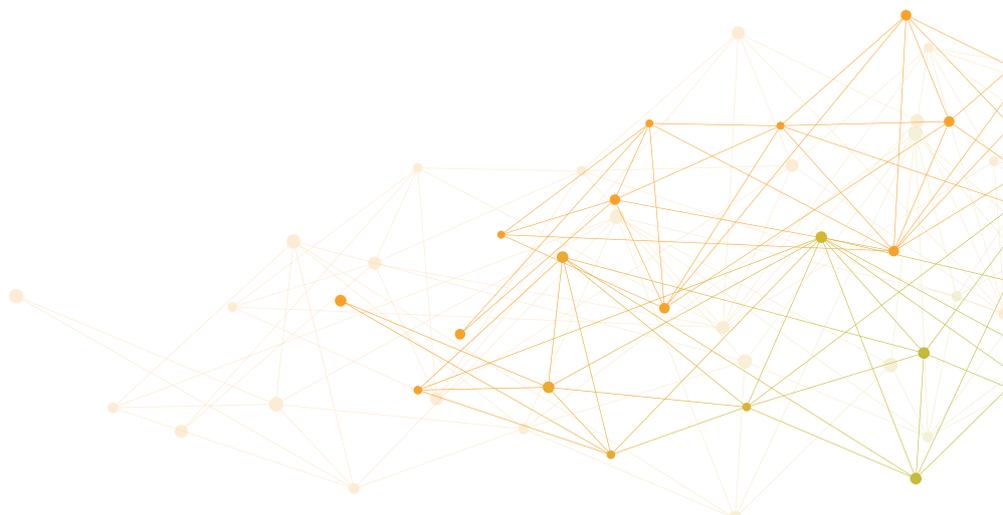
In the pursuit of universal access to energy, the emergence of major digital and physical innovations, technological advancements and market-driven financing instruments is disrupting energy access markets. In many countries, decentralised power options offer lower costs than extending the grid into remote locations, which influences long-term energy planning scenarios. Following the advent of the industrial internet that merges big data and cloud-based analytics with brick-and-mortar equipment, pioneering players are developing low-cost energy systems at household or community scale with business models that include product, process and distribution innovations. To broaden energy access through innovation and provide the right mix of private capital, technology and expertise, scaled-up partnerships between public and private players need to offer both a stable policy environment and a combination of relevant market-driven incentives.

This session will discuss how to support the development, deployment and dissemination of a broad range of innovative energy access solutions, and evaluate their relevance in the context of the global energy transformation.

**Moderator:** [Vimal Mahendru, IEC Ambassador, International Electrotechnical Commission](#)

### Roundtable discussants

- [Habiba Ali, Founder and CEO, SOSAI Renewable Energies](#)
- [Julie Cammell, Programme Manager for Policy and Regulatory Environment, GOGLA](#)
- [Jan Cloin, Project Manager, Get-Invest](#)
- [Bubacar Diallo, Founder and CEO, Benoo Energies](#)
- [Thomas Dubeau, Chief Strategy Officer, Mobisol](#)
- [Martin Healy, Senior Energy Advisor, United States Department of State](#)
- [Matthieu Mounier, Head of Microgrid, Schneider Electric](#)
- ~~[Thomas Samuel, Co-founder and President, Sunna Design](#)~~
- [Minoru Takada, Team Leader, United Nations](#)
- [Shelmith Theuri, Investment Officer, Sunfunder](#)
- [Marcus Wiemann, Executive Director, Alliance for Rural Electrification](#)





# ELECTRIFICATION

**Wednesday, 5 September 2018 • 09:15–10:15 • Green Spirit Room**

## **Welcoming address and introduction to the electrification of transport, buildings and heating**

The end-use sectors of transport, buildings and industry account for 63% of current CO<sub>2</sub> emissions. Significant increases in the use of renewable electricity in these sectors will be required to reduce carbon emissions. At the same time, the coupling of these sectors with the power system will create new opportunities for flexibility that may help to integrate higher shares of variable renewable energy.

This session will: introduce delegates to the objectives and format of IRENA Innovation Week; highlight key insights from IRENA's work on this topic; provide an overview of electrification of transport, buildings and heating that will explain its relevance to the global transformation; and introduce more detailed forthcoming discussions in subsequent sessions.

### **An overview of IRENA and Innovation Week**

**Dolf Gielen, Director Innovation and Technology Centre, IRENA**

### **Introduction to electrification**

**Kristian Ruby, Secretary-General, Eurelectric**

### **The innovation landscape for power sector transformation**

**Francisco Boshell, IRENA Innovation and Technology Centre**

### **Welcoming address**

**Adnan Z. Amin, Director-General IRENA**

Wednesday, 5 September 2018 • 10:30–12:15 • Green Spirit Room

## Electrification of heat

The flexible coupling of power and heat sectors can contribute to both renewable energy integration and decarbonisation. The potentially lower costs of generating heat from electricity and of heat storage make the interlinkage of the power and heat sectors a promising solution when compared to other flexibility options and sector coupling strategies. Electricity from renewable energy sources offers the potential for an effective decarbonisation of heating applications, by means of heat pumps and other efficient electro-heating technologies.

This session features a panel discussion on the role that power-to-heat technologies can play in enabling the integration of high shares of renewables in power systems. Experts will highlight real-world examples of the deployment of power-to-heat technologies and discuss what is still needed to improve technology and increase market penetration.

**Moderator:** **Thomas Nowak, Secretary-General, European Heat Pump Association**

### **Power-to-heat for renewable energy integration: Technology potentials**

**Wolfram Sparber, Head, Institute for Renewable Energy at Eurac Research**

Exploring the potentials of power-to-heat technologies for renewable energy integration.

### **Vapor Compression Systems as Flexibility Enablers**

**Torben Funder-Kristensen, Head of Public and Industry Affairs, Danfoss**

Concrete examples of how renewables can be beneficial to all stakeholders in the energy system by adding storage and demand response capability, and utilising compressor capacities for heat pump purposes.

### **Fostering sustainable heat in industry: Key challenges and opportunities for solar process steam**

**Martin Haagen, Business Development MENA, Industrial Solar GmbH**

Key challenges for fostering sustainable heat in industry – i.e. market barriers (missing targets, missing information, financing challenges, etc.) with some concrete examples of projects.

### **Heat storage solutions**

**Avi Brenmiller, Chairman and CEO, Brenmiller energy**

Showcasing examples of solar and storage solutions, especially for long duration storage.

### **Roundtable discussants**

- **Guy Verkemans, Strategy Manager Sustainable Energy, VITO**
- **Monica Axell, Head of Energy and Circular Economy, Research Institutes of Sweden (RISE)**
- **Deger Saygin, Director, SHURA Energy Transition Centre**
- **Wei Lingxiao, Vice Director, Ministry of Science and technology of the State Grid Beijing Electric Power Company**
- **Wolfram Sparber, Head, Institute for Renewable Energy at Eurac Research**
- **Torben Funder-Kristensen, Head of Public and Industry Affairs, Danfoss**
- **Martin Haagen, Business Development MENA, Industrial Solar GmbH**
- **Avi Brenmiller, Chairman and CEO, Brenmiller energy**

## Electrification of transport

The synergies between electricity demand in transport and variable renewable power is increasingly becoming clear. The smart co-ordination of electric vehicle (EV) charging demand can potentially create a paradigm shift for both the transport and power sector, and could support variable renewable power growth and integration as well as reduce levels of air pollution and carbon emissions in transport. Although the transport sector currently has a very low share of renewable energy, it is undergoing a fundamental change, particularly in the passengers' road vehicle segment where EVs are an emerging solution.

This session will explore the links between the electrification of the transport sector and the integration of high shares of renewables in power systems. It will highlight how the synergy between the two can help the world meet international climate goals. Progress and innovations in transport sector technologies will be discussed, namely EVs, vehicle-to-grid and smart-charging, which can transform the electricity system and play a key role in the integration of variable renewable energy sources into the grid.

**Moderator:** Mark McGranaghan, Vice President Integrated Grid, Electric Power Research Institute (EPRI)

### The role of transport sector electrification in enabling higher variable renewable power shares

Mark McGranaghan, Vice President Integrated Grid, Electric Power Research Institute (EPRI)

Available technologies and how these can gain rapid acceptance in the market/trends.

### Integration of electric vehicles into distribution grids

Claas Matrose, Asset Strategy engineer, Westnetz GmbH

Specific challenges from the integration of electric vehicles into DSO grids and electric systems.

### ~~Market integration and infrastructure development: Industry expertise in smart grid solutions/smart charging~~

~~Sergey Kisely, Vice President Europe, ENEL~~

~~Industry experience in providing smart charging and smart grid solutions as well as energy services that adapt to regional energy systems and customers' needs.~~

### Chinese experiences in Wireless Power Transmission serving the electric vehicles

Haiyan Zheng, Professor-level senior engineer, State Grid Jiangsu Electric Power CO., Ltd

Chinese experiences and practices in Wireless Power Transmission and photovoltaic.

### Roundtable discussants

- Ulf Schulte, Chief Operating Officer, Allego
- Monica Araya, Founder, Costa Rica Limpia
- Mark McGranaghan, Vice President Integrated Grid, Electric Power Research Institute (EPRI)
- Claas Matrose, Asset Strategy engineer, Westnetz GmbH
- Sergey  elv, Vice President Europe, ENEL
- Haiyan Zheng, Professor-level senior engineer, State Grid Jiangsu Electric Power CO., Ltd

**Thursday, 6 September 2018 • 11:00–12:30 • Green Spirit Room**

## **Electricity storage**

Electricity Storage will be vital to accelerating renewable energy deployment. Although pumped hydro storage dominates total electricity storage capacity today, battery electricity storage systems are developing rapidly. Decreasing costs and improving performance will pave the way for Battery Electricity Storage (BES) systems to be used economically, facilitating an increasing share of renewable energy as well as providing several services for grid management and operation.

This session aims to provide decision makers with a better understanding of the complexities of the next state of the energy transition and its implications for policy, regulation and investment. The roundtable discussion involving a variety of experts on electricity storage technologies will discuss the role of storage as well as the current state of BES deployment and use in various applications.

**Moderator:** **Emma Gibson, Director of Operations, Highview Power**

### **Roundtable discussants**

- **Vlad Dobuvijs, Senior Engineer, GE Power**
- **Gauthier Dupont, Director, Power Business Batteries, NGK Europe GmbH**
- **Emma Gibson, Director of Operations, Highview Power**
- **Mark Higgins, Chief Operating Officer, Strategen**
- **Dong Hui, Chief Expert, China Electric Power Research Institute (CEPRI)**
- **Dr. Kátrín Schweren, Head of Regulatory and Public Affairs, Tiko**
- **Takashi Yano, Deputy General Manager Energy Systems Division, Sumitomo Electric Industries, Ltd**
- **Rachid Bayed, Head of Implementation, Masen**

Thursday, 6 September 2018 • 14:00–15:45 • Green Spirit Room

## Electrification of fuels: Hydrogen

Hydrogen has an important role to play in the decarbonisation of the energy sector. Where direct electrification is not practical or economical, renewable fuels will be necessary. Hydrogen and bioenergy are among the few options in this space.

As far as industry is concerned, certain processes require hydrogen as a key feedstock: while today this is produced mostly from natural gas, there is a clear opportunity to shift to hydrogen production from renewables. At the same time, hydrogen from renewable electricity can represent a source of flexibility for the power system, as well as a means for seasonal storage of electricity from variable renewable energy in the gas grid.

The session will discuss challenges and opportunities for the power sector linked to the need for producing large amounts of hydrogen from renewable electricity and showcase some of the projects that are exploring today the viability of key applications for hydrogen in the transformation of the energy system.

**Moderator: Tim Karlsson, Executive Director at International Partnership for Hydrogen and Fuel Cells in the Economy (IPHE)**

### Introductory presentation

**Emanuele Taibi, Power Sector Transformation Strategies, IRENA**

Key insight for policy makers from H2 tech brief:

- Hydrogen could be the “missing link” in the energy transition: Power-to-Gas (P2G) can supply large amounts of renewable energy to sectors that are otherwise difficult to decarbonise
- P2G could facilitate the integration of large quantities of variable renewable energy (VRE) in the energy system
- Key hydrogen technologies are technology-ready (not market-ready as they are too expensive). Scale-up can yield the needed technology cost reductions.
- A stable policy framework to encourage the appropriate private investments is critical

### Roundtable discussants

- **Dan Sadler, Programme Director of the H21 project**
- **Rudolf Zauner, Head of Hydrogen Center at VERBUND Solutions**
- **Bart Biebuyck, Executive Director, FCH JU – Fuel Cells and Hydrogen Joint Undertaking**
- **Tomas Baeza Jeria, Innovation and Entrepreneurship Manager, Government of Chile**
- **Rene Peters, Director Gas Technology, TNO**
- **Geert Tjarks, Programme Manager Power-Based Fuels, NOW-GmbH**
- **Akiyoshi Hashimoto, Director-General, Commerce Industry & Labour Department, Fukushima Prefectural Government, Japan**
- **Ferry Franz, Director, Toyota Motor Europe**



# MARKETS AND CITIZENS

**Thursday, 6 September 2018 • 11:00–12:30 • Kameha Universal Room**

## **Market design for an integrated renewable-based energy system**

Current power system set ups, both in market and non-market contexts, are not fit for supporting a renewable-based energy system. They were developed for the different power sector paradigm from the fossil fuel-era, and as renewable integration progresses towards the renewable energy-era, the current power system set up fails to fulfil its role of supporting and efficiently structuring the interactions between the different system components, generating inefficient dynamics that increase transition barriers.

This session explores the origins of the current mismatches between the power system setup and the energy system the transition is aiming for, providing insight on the new paradigm requirements and discussing the characteristics of innovative market designs fit for supporting a renewable-based and integrated energy system and the transition towards it.

**Moderator:** **Salvatore Vinci, Head, Partnerships and Technical Advisory Services, IRENA**

### **Introductory remarks**

**Xavier Casals, KPFC, IRENA**

### **Renewable energy deployment, disrupting power system setups and energy system integration implications**

**Donna Peng, Research Associate, Oxford Institute for Energy Studies; Associate, Aurora Energy Research**

### **Value-based auctions**

**Cajeme Villarreal, SENER/CENACE**

### **Market design for renewable-based systems**

**David Nelson, Executive Director, Climate Policy Initiative**

Thursday, 6 September 2018 • 14:00–15:45 • Kameha Universal Room

## Empowering citizens: Value, challenges and implications

Citizens' empowerment is an important element for a far-reaching transition: Institutional and corporate transition drivers and capabilities may not be sufficient to align the transition with the existing challenges, and effectively involving citizens in the transition requires their empowerment to become active actors.

The current organisational set-ups of the power and energy system deal with citizens as passive elements, reducing their participation to consumption along the predefined channels of a hierarchical and unidirectional system guided either by corporations or central planning with very limited effective involvement from society.

This structure has led to huge impacts being externalised (climate change, local pollution, environmental degradation, resources depletion...) from the power and energy system, leaving little time for action. The corporate or central planned structures have not been capable of tackling some of the current challenges, and poor social involvement has been one of the limiting factors.

Empowering citizens is the logical action required to enhance social involvement, increasing the smartness of power and energy systems, and this action holds a huge transformative potential for realising the high transition rates that are needed.

Different citizen's empowerment initiatives are ongoing in the global North and global South, with different scopes and goals. However, important links and common ground exist between these initiatives, with 'fair transition' considerations weaving them together.

This session will facilitate a structured debate about the 'whats', 'whys' and 'hows' of citizen empowerment between different stakeholders in the power system.

**Moderator:** Michael Renner, KPFC, IRENA.

### Introductory remarks

Michael Renner, KPFC, IRENA

### Setting the context for empowerment: Opportunities, fronts and challenges

Sara Pizzinato, Greenpeace Spain

### Community owned renewable energy generation

Josep Puig i Boix, Co-founder of Ecotècnia S.C.C.L. and Ecoserveis; Vice-president of EUROSOLAR; Leader of the 'Living from the Air of the Sky' project

### Aggregator: Focussing on citizen empowerment

Katerina Valalaki, FLEXCOOP Hypertech

### Mini-grid from SHS and P2P trading

Aziza Sultana, Director Operations, Solshare

### Energy access and informal sector empowering

H.R.H. Princess Abze Djigma, Founder and CEO, AbzeSolar S.A.; Initiator and Leader of Initiative MAMA-LIGHT for Sustainable Energy; Chair of the H.R.H. Princess Abze Djigma Foundation

### Collaborative access to sustainable energy

Ayu Abdullah, Regional Director for Southeast Asia, Energy Action Partners

# INNOVATION SHOWCASE AND PLENARY SESSIONS

Wednesday, 5 September 2018 • 16:00–17:30 • Green Spirit Room and Grand Event Room

## Global innovation showcase

### The International Renewable Energy Agency (IRENA) showcases key solutions to create a renewable-powered future

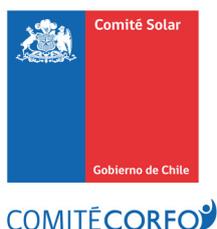
IRENA's Global Innovation Showcase highlights solutions that are helping to create more integrated, flexible power systems. These inspiring examples are moving the world closer to a sustainable, renewable-powered future.

The solutions featured during IRENA Innovation Week's Showcase, and the innovative companies behind them, have been selected to represent a broad cross-section of the hundreds of forward-thinking approaches being developed around the world. Each one of the solutions featured has been specifically commended for their ingenuity and potential impact through national, regional or global awards programmes.

Particular thanks are due to the awards programmes highlighted below. The solutions selected for the Global Innovation Showcase are only a few examples of the many innovations these programmes have identified and rewarded, and many more examples of solutions that are creating a better, more sustainable world can be found on their websites.

During the 90-minute Showcase session, participants will have time to meet with some of the innovators for small, interactive group discussions. Each of these innovators will describe the problem their solution addresses; explain the efficacy of those solutions; relate their experiences in applying them; and review any remaining barriers to their uptake.

After each innovator's brief presentation there will be time for a few questions and a short discussion.



Initiate!



Thursday, 6 September 2018 • 09:15–10:30 • Kameha Universal Room

## Plenary session: Future grids – getting bigger and smaller

The planning of electricity grids today is to some extent driven by the need to assure security of supply and allow a wide energy market coverage. Therefore, interconnections between national systems have been given priority to allow a better exchange of power. Distributed renewable energy sources located at longer distance from consumption have motivated increased innovation in DC high voltage connections and the increase in decentralised generation is accompanied by new solutions for micro-grids and autonomous power systems.

The objective of this session is to discuss how grids are evolving in order to increase the share of renewable energy in the energy system. Solutions on different scales are discussed, from a global super grid over regional connections to micro grid solutions. The roundtable discussion aims at underlining the factors influencing the development of bigger or smaller grids and their repercussion towards deployment of renewable energy and the necessary actions that need to be taken for the different concepts to co-exist.

**Moderator:** [Konstantin Staschus](#), Chief Innovation Officer, ENTSO-E and Director, Ecofys/Navigant

### Roundtable discussants

- [Prof. Xiangzhang Lei](#), Global Energy Interconnection Development and Cooperation Organization (GEIDCO)
- [Martin Keller](#), Laboratory Director, National Renewable Energy Laboratory (NREL)
- [Vimal Mahendru](#), Mini-Grids Ambassador, International Electrotechnical Commission (IEC) India

Thursday, 6 September 2018 • 16:15–18:00 • Kameha Universal Room

## Plenary Session: Developing and deploying solutions for a renewable-powered future

This session will bring together the three Innovation Week themes from the preceding two days. Senior speakers will provide their perspectives on key emerging innovations, the impacts they are making and what is needed to accelerate and broaden their uptake. Rapporteurs will report back on highlights and key insight from the discussions in the three events tracks of Digitalisation & Decentralisation, Electrification and Markets & Citizens.

**Moderator:** [Felicia Jackson](#)

### Speakers

- [Simon Perraud, Deputy Director, CEA Liten](#)  
A research organisation's perspective on the emerging innovative solutions that are increasing system flexibility and supporting the uptake of renewable energy and their potential impact.
- [Philippe Dauphin, Director-General, Canmet Materials Laboratory, Natural Resources Canada](#)  
A government perspective on actions to foster innovation and supporting the increased utilisation of renewable energy.
- Rapporteurs will report back on the expert discussions on Wednesday and Thursday and summarise key insights:
  - [Konstantin Staschus, Chief Innovation Officer for ENTSO-E](#)  
Digitalisation & Decentralisation Track Rapporteur
  - [Ruud Kempener, European Commission](#)  
Electrification Track Rapporteur
  - [Her Royal Highness Princess Abze Djigma, Special Envoy of the President of Burkina Faso, Initiator and Leader of Initiative MAMA-LIGHT for Sustainable Energy](#)  
Markets and Citizens Track Rapporteur
- [Auke Lont, CEO, Statnett, Norway](#)  
A system operator's perspective on how innovations in technologies, system operation and market design can help national energy systems work closely with neighbours to create more flexible systems.
- [Ernesto Ciorra, Chief Innovability Officer, ENEL](#)  
An industry perspective on the disruptive impacts of innovation – the changes taking place around the world and why their impact will be felt far quicker than we might expect.

Friday, 7 September 2018 • 09:00–10:15 • Kameha Universal Room

## Plenary session: Perspectives on the transformative impacts of innovation

Senior representatives from governments and major companies will provide their perspectives on the role of innovation in transforming their national energy systems. This session will assist attendees in understanding associated challenges and opportunities by hearing from speakers who are trialling and adopting innovative approaches. Presenters will highlight examples of innovative approaches and projects, challenges they have faced, insights gained, the future potential for innovation and the actions needed to accelerate their adoption.

**Chair:** [Adnan Z. Amin, IRENA Director-General](#)

### Speakers

- [Bertrand Piccard, Chief Executive Officer, Solar Impulse Foundation](#)
- [Chen Guoping, special representative of the Chairman of State Grid Corporation of China \(SGCC\) and Chief Engineer of SGCC](#)
- [Yasuhiro Matsuyama, Director-General, Energy Conservation and Renewable Energy Department, Ministry of Economy, Trade and Industry \(METI\) Japan](#)
- [Mahama Kappiah, Executive Director of the ECOWAS Centre for Renewable Energy and Energy Efficiency \(ECREEE\)](#)
- [Patrick Child, Deputy Director-General, Directorate-General for Research & Innovation, European Commission](#)

Friday, 7 September 2018 • 10:45–12:30 • Kameha Universal Room

## Senior-level roundtable discussion: The transformative impacts of innovation

Senior representatives from public, private and research sectors will provide diverse perspectives on the role of innovation in transforming energy systems.

This session will build on previous presentations and feedback from the previous two days of discussions. Key insights emerging will provide input to the 2018 IRENA Council discussions and Ministerial Roundtable at the 2019 IRENA Assembly. Insights will also help inform IRENA projects.

The roundtable participants will discuss how innovations in digitalisation, decentralisation and electrification are disrupting established models of power system operation, how energy system actors can adapt and how further innovation can be encouraged and its uptake accelerated and broadened.

**Moderator:** [Felicia Jackson](#)

### Roundtable discussants

- [Chen Guoping](#), Chief Engineer, State Grid Corporation of China (SGCC)
- [Philippe Dauphin](#), Director-General, Canmet Materials Laboratory, Natural Resources Canada
- [Yasuhiro Matsuyama](#), Director-General, Energy Conservation and Renewable Energy Department, Ministry of Economy, Trade and Industry (METI) Japan
- [Tobias Dünow](#), Heads of unit for the Digitization of the Energy Transition, Federal Minister of Germany for Economic Affairs and Energy (BMWi)
- [Paula Abreu Marques](#), Head of unit for Renewables and CCS policy, Directorate-General for Energy, European Commission
- [Michael Ahimbisibwe](#), Executive Director, East African Centre for Renewable Energy and Energy Efficiency (EACREEE)
- [Her Royal Highness Princess Abze Djigma](#), Special Envoy of the President of Burkina Faso, Initiator and Leader of Initiative MAMA-LIGHT for Sustainable Energy
- [Ernesto Ciorra](#), Chief Innovability Officer, ENEL
- [Bertrand Piccard](#), Chief Executive Officer, Solar Impulse Foundation
- [Bader Al Lamki](#), Executive Director, Clean Energy, Masdar
- [Maher Chebbo](#), ETIP-SNET Vice Chair, Chief Business Innovation Officer, GE
- [Auke Lont](#), CEO Statnett, Norway
- [Boris Schucht](#), Chief Executive Officer, 50Hertz Transmission GmbH
- [Andreas Kuhlmann](#), Chief Executive, German Energy Agency (DENA)
- [Adel El Gammal](#), Secretary-General, European Energy Research Alliance (EERA)

Friday, 7 September 2018 • 12:30-13:00 • Kameha Universal Room

## Closing Remarks

**Dolf Gielen, Director IRENA Innovation and Technology Centre**

A recap of key insights from IRENA **Innovations** Week and conclusions drawn from the event.

**Adnan Z. Amin, IRENA Director-General**

Perspectives on the direction of the global energy transformation, the role of innovations such as those we have been discussing, and how IRENA's work can accelerate the key trends.



# SITE VISITS AND SIDE EVENTS

## Site visits in co-operation with the EnergyAgency.NRW

The EnergyAgency.NRW, which is commissioned by the NRW Ministry of Economic Affairs, has worked with IRENA to organise two site visits for the international guests of the “Innovation Week 2018” IRENA conference.

The participants of the IRENA Innovation Week 2018 will be able to select between two different itineraries and join the site visits occurring on Tuesday, 4 September. The departure point is at the entrance of Hotel Kameha Grand Bonn at 9:30 am, at the same location where the IRENA Innovation Week 2018 will take place. The site visits will include transportation to the sites, lunch and a short cultural visit, to familiarise and admire the city's Heritage.

**Tuesday, 4 September 2018 • 9:30 • Meeting point: Kameha Grand Entrance**

### Site visit A: Powering with solar, breakthroughs in hydrogen production and energy storage

#### 1. German Aerospace Center (DLR)

- Jülich Solar Tower: this solar heliostat field trials new power plant parts and tests technical improvements.
- Synlight: is the largest artificial sun in the world, research is being conducted to produce CO<sub>2</sub>-free hydrogen.

2. **Jülich Research Centre:** carries out groundbreaking research in batteries, fuel cells and hydrogen.

3. **Cultural Visit to Zitadelle Jülich:** one of the best preserved fortresses in the bastion system in Germany.

**Tuesday, 4 September 2018 • 9:30 • Meeting point: Kameha Grand Entrance**

### Site visit B: Electromobility and testing latest inventions and developments in wind energy

1. **E-go:** start up in electromobility developing cars and mini buses that can be powered by renewable energy.

2. **Cultural Visit to Aachen Cathedral:** one of the oldest cathedrals in Europe.

3. **Wind test field for innovations Grevenbroich:** Innovative wind turbines and components are tested for industrial and scientific purposes. There are only a few testing sites in the world that offer these possibilities.

## Side events

Unless specified below, side events are open to all Innovation Week attendees; however, they are limited to a maximum of 40 people.

All side meetings will take place in the YU Private restaurant on the 5th Floor of the Kameha Grand. To find the room please take the lifts to the right of the hotel reception to the 5th floor and then follow the IRENA signage. A buffet breakfast or lunch will be provided as appropriate.



Wednesday, 5 September 2018 • 12:30–13:30 • YU Private, 5th Floor, Kameha Grand

## Lunchtime Discussion: International partnerships to accelerate innovation

What's being done and what more can be done? Perspectives from the International Renewable Energy Agency, Mission Innovation, the International Energy Agency, and the World Economic Forum.

Exploring how international partnerships between governments and between the public and the private sector are helping accelerate innovation. Representatives from key global partnerships working to accelerate clean energy innovation will briefly describe their work, its impact and their perspectives on how collaborative efforts to accelerate innovation can be further strengthened.

**Moderator: Philippe Dauphin, Director-General, Canmet Materials Laboratory, Natural Resources Canada. Representing the chair of the Mission Innovation Steering Committee**

### Speakers

- **Philippe Dauphin, Director-General, Canmet Materials Laboratory, Natural Resources Canada. Representing the chair of the Mission Innovation Steering Committee**  
An introduction to Mission Innovation, its objectives, impact to date and future plans (including the 4th Mission Innovation Ministerial).
- **Paul Durrant, Head of Innovation Strategy and Engagement, IRENA**  
An overview of IRENA's work to strengthen partnerships on renewable energy innovation and perspectives on priorities for additional action.
- **Simone Landolina, Head, International Partnerships and Initiatives at International Energy Agency (IEA)**  
An overview of IEA's Technology Collaboration Programmes (TCPs) and their impact. IEA's perspectives on the need and priorities for increased efforts (including latest figures) and on opportunities to improve co-ordination and synergies across multi-lateral initiatives.
- **Nelson Mojarro, EU representative for Energy Funds from the Secretariat of Energy, Mexico. Co-lead of Mission Innovation's Business and Investors Working Group**  
Mission Innovation's work to strengthen public-private collaboration on clean energy innovation and perspectives on how to boost public-private partnerships.
- **Luciano Martini, Transmission and Distribution Technologies Department, Ricerca sul Sistema Energetico - RSE S.p.A. & co-lead of Mission Innovation's Innovation Challenge 1: Smart Grids**  
An overview of both ISGAN and IC1's work to strengthen international collaboration on Smart Grids and perspectives on priorities for further action.
- **Thekla von Bülow, Manager, Deal Advisory KPMG, seconded to the World Economic Forum.**  
An overview of WEF's work Partnering to Accelerate Sustainable Energy Innovation project and some of the 'bold ideas' that could significantly strengthen global energy innovation.

Thursday, 6 September 2018 • 08:00–09:00 • YU Private, 5th Floor, Kameha Grand

## Breakfast discussion: Transformation of urban energy systems

Cities must play a central role in global climate change mitigation, not only because of their high contribution to the global carbon emissions today, but more importantly because of their great potential to mitigate emissions of all kinds by 2050, when they must accommodate two-thirds of the world population in a low-carbon/carbon-free and clean, as well as convenient, environment. To realise such potential, transformative action is needed today. With the rapidly declining renewable energy costs and innovative enabling technologies, renewable-based distributed energy generation, solar PV in particular, is widespread in cities – a vitally important move towards the future of low-carbon climate-resilient cities.

In recognition of the complexity of settings and limitations cities have, IRENA will, benefiting from its innovation studies and with the support of the German Federal Ministry of the Environment, Nature Conservation and Nuclear Safety (BMU) through the International Climate Initiative (IKI), develop a methodology for assessing the technical options for renewable energy applications for cities. The scope will cover heating, cooling and electric power for buildings and cities in general, while also discussing advanced energy management systems and systemic innovation that could facilitate the acceleration of renewable energy deployment in cities.

Against this backdrop, a brainstorming breakfast session will be organised during the Innovation Week with the aim to highlight emerging energy-related challenges that cities face and the role of technological and business innovation in scaling up renewable energy in cities, with a special focus on the innovations that foster the synergies between: i) cities becoming a hub of demand flexibility for variable renewable energy integration in electricity systems, while ii) making cities more sustainable and resilient, and iii) exploring the common interest and potential partnership for future endeavours.



Thursday, 6 September 2018 • 12:45–14:00 • YU Private, 5th Floor, Kameha Grand

## Lunch discussion: Implications of innovation for long-term planning

The world's energy system is facing profound changes. Innovations in the way energy is generated, distributed and used, as well as the ways in which energy systems operate and link with wider infrastructure, are paving the way for completely new landscapes around the world. In this complex and uncertain environment, decision makers who are responsible for policy and investments are looking to minimise the risk of poor choices and take full advantage of disruptive technologies. Long-term scenario analysis is an invaluable tool in this process, but are today's long-term energy scenarios up to the task of capturing transformational change?

As part of IRENA's new Clean Energy Ministerial Campaign on "Long-term Energy Scenarios for the Clean Energy Transition", this side event will aim to answer that question. Drawing on the expertise of scenario modellers, government planners, and especially private industry attendees at Innovation Week, the event will explore: which innovations in technology or business models should be reflected in long-term scenarios of clean energy transitions to 2030-2050, to what extent those innovations are currently reflected in scenarios, and how long-term scenarios in general can be made more relevant to business planning and policy making under large innovation-related uncertainties.

After brief expert panel presentations, attendees will be invited to share their thoughts on the topics above in an open and dynamic discussion.





