

Briefing Note Session 2
Smart Electrification of End-Use Sectors:
Implications for the Power System
5 October 2020 • 5 - 8 pm (CEST) • Virtual

Session co-organised by EPRI and IRENA



Background

Electrification of end-use sectors with renewables will be a major component of plans to **decarbonize industry and transport**. At the same time, electrifying with renewables is an emerging **strategy to maintain value and avoid curtailment** of abundant and low-cost variable renewable electricity, like solar photovoltaic and wind. The session will explore the **implications for the power system** of massive electrification of the transport, buildings and industry sectors, and which smart strategies are key to harness the benefits of coupling these sectors.

Objective of the Session

The rapid and drastic **cost reduction of renewable electricity** recorded in the past decade is making electricity an attractive option to decarbonize other end-use sectors. An electrification of end-use sectors with no consideration of its impact on electricity systems, may result in significant additional costs and constrains for the power sector.

However, **smart electrification strategies with renewables**, considering the needs and implications for both power and other end-use sectors, can result in important benefits for the whole energy system. Such strategies would help to maintain the value of abundant and low-cost variable renewable electricity, while enabling the desired decarbonization of other sectors.

The session will explore the **implications for the power sector** of massive electrification with renewables of the transport, buildings and industry sectors, and which smart strategies are key to harness the benefits of coupling various end-use sectors by integrating the underlying energy systems.

The session will start with a **global perspective** on the electrification initiatives, progress and challenges in different regions. The electrification discussion will be split over two sessions, differentiating between applications connected at **DSO level** (such as electric vehicles, heat pumps) and applications connected at **TSO level** (such as large-scale electrolysers, industrial consumers) and their impact on the respective system operators. The final session will bring together the power sector actors, concluding with a discussion around the changing dynamics in power sector in the view of smart electrification strategies, including generation and operation avenues to meet and manage the new demand.

Agenda

Smart Electrification of End-Use Sectors: Implications for the Power System

Monday, 5 October 2020 (17:00 – 20:00 CEST)

Introduction and Scene-setting presentation

- 17:00 – 17:05
- Introduction to the electrification trend and highlights the importance of smart electrification strategies.
- Scene-setting presentation
- **Francisco Boshell**, Energy Analyst, IRENA Innovation and Technology Centre, IRENA

Panel 1 – Global Experience

- 17:05 – 17:30
- This panel touches upon electrification perspectives and initiatives, current progress and challenges in different regions: US, Europe and Asia (represented by Japan).
- Moderator:** **Francisco Boshell**, Energy Analyst, IRENA Innovation and Technology Centre, IRENA
- **Robert Chapman**, Vice President of Electrification & Sustainable Energy Strategy, Electrical Power Research Institute (EPRI)
 - **Kristian Ruby**, Secretary General, EURELECTRIC
 - **Dr Koshichi Nemoto**, Vice President, Central Research Institute of Elec. Power Industry (CIEPRI)

Panel 2 – Smart Electrification at DSO Level

- 17:30 – 18:20
- This panel will discuss the impact of electrification application on the low- and medium voltage grid. Distribution System Operators (DSOs) in Germany and US will share their experience with increased electrification, while demand-side applications (such as electric vehicles and heat pumps) will present their challenges and successes related to grid integration.
- Moderator:** **Kristian Ruby**, Secretary General, EURELECTRIC
- **Bastian Pfarrherr**, Head of Innovation Management, Stromnetz Hamburg
 - **Katie Sloan**, Director of eMobility and Building Electrification, Southern California Edison
 - **Gregory Poilasne**, Co-Founder and CEO, Nuvve
 - **Sandra Trittin**, Tiko Energy Solutions

18:20 – 18:35

Digital Break

Panel 3 – Smart Electrification at TSO Level

- 18:35 – 19:25
- This panel will discuss the impact of electrification application on the high voltage grid. The Transmission System Operator (TSOs) in Denmark and Vertically Integrated Utility in Uruguay will share their experience and plans in regards to increased electrification, while demand-side applications (such as industry demand and green hydrogen production) will present their challenges and successes in supporting the grid and providing flexibility for higher shares of renewable integration.
- Moderator:** **Norela Constantinescu**, Manager Research & Innovation, European Network of Transmission System Operators for Electricity (ENTSO-E)
- **Anders Bavnhøj Hansen**, Chief Engineer, Energinet (TSO, Denmark)
 - **Pablo Mosto**, Planning & Environment Manager, UTE National Electric Utility of Uruguay (vertically integrated utility, Uruguay)
 - **Christopher Greiner**, Chief Technology Officer, EnergyNest
 - **Adele Lidderdale**, Hydrogen Project Manager, EMEC & Big Hit project

Panel 4 – New Power Sector Dynamics with Smart Electrification

19:25 – 19:55

In this panel will bring together all power sector actors, DSOs and TSOs, to discuss how the increased electrification changes the dynamics in the power system, on how regulation needs to adapt to increasingly renewable-based, decentralised systems. Also, TSO-DSO cooperation will be explored, together with a debate on how to share flexibility resources most efficiently.

Moderator: **Robert Chapman**, Vice President of Electrification & Sustainable Energy Strategy, Electrical Power Research Institute (EPRI)

- **Anders Bavnhøj Hansen**, Chief Engineer, Energinet
- **Pablo Mosto**, Planning & Environment Manager, UTE National Electric Utility of Uruguay
- **Katie Sloan**, Director of eMobility & Building Electrification, Southern California Edison
- **Bastian Pfarrherr**, Head of Innovation Management, Stromnetz Hamburg

Closing

19:55 – 20:00

Key messages and summary on smart electrification strategies will conclude the session.

Closing Remarks

- **Robert Chapman**, Vice President of Electrification & Sustainable Energy Strategy, Electrical Power Research Institute (EPRI)

Biographies

Francisco Boshell, Renewable Energy Markets and Standards Analyst, IRENA



Mr. Francisco Boshell leads the work on Innovation for Renewable Energy Technologies at the International Renewable Energy Agency (IRENA). He focuses primarily on providing policy advice and guidance to countries regarding technology innovation, quality control and standardisation programmes for a successful deployment of renewables. Mr Boshell analyse technology development strategies for a wider deployment of renewables in energy systems; and has co-authored reports on energy transition and technologies including integration of variable renewables in power systems, offshore wind, advanced biofuels, electric vehicles and mini-grids. During his 18 years professional career, Mr. Boshell has also: developed technical standards for quantifying GHG emission reductions from CDM projects and supported the climate change negotiations under UNFCCC; provided consultancy services for the development of renewable energy and energy efficiency projects at DNV GL, formerly KEMA Consulting; and designed and implemented infrastructure and energy related projects in the automotive manufacturing sector at General Motors. His background is in Mechanical Engineering and he holds a MSc. in Sustainable Energy Technology from the Eindhoven University of Technology, in the Netherlands.

Robert Chapman, Vice President of Electrification & Sustainable Energy Strategy, EPRI



Rob Chapman is Vice President of Electrification & Sustainable Energy Strategy at the Electric Power Research Institute (EPRI). In this role, Chapman also serves as EPRI's executive sponsor for the institute's Efficient Electrification Initiative and as EPRI's Chief Sustainability Officer, focusing on broadening industry collaboration, including international and government engagement. As Vice President of Electrification & Sustainable Energy Strategy at EPRI, Chapman guided a research portfolio of analysis, environmental science, and technology research. The research provided tools, technology, analysis, and guidance for environmentally sound planning and safe operation of existing generation, transmission, and distribution utility assets while delivering research and development addressing rapidly changing conditions in the electricity sector. In leading these areas, Chapman emphasized that the electricity sector can enable economy-wide emissions reductions, develop a more dynamic and flexible grid while driving the adoption of end-use electrification technologies. Prior to joining EPRI, Chapman worked for Pacific Gas & Electric Energy Services Company (PG&E) from 1995 to 1999. He was the director of the western region responsible for leading a team of engineers in establishing integrated energy services for commercial and industrial customers. Chapman also worked for PG&E in a variety of roles, including major account management. Chapman earned a Bachelor of Science in mechanical engineering from California Polytechnic State University in San Luis Obispo, California.

Kristian Ruby, Secretary General, EURELECTRIC



Kristian Ruby is a widely recognised expert with a strong communication profile and extensive experience in political affairs. He joined Eurelectric from Wind Europe, where he served as Chief Policy Officer and was in charge of development and implementation of the political strategy. Prior to this, Ruby worked as a journalist and served seven years as a public servant in the Danish Ministries of Environment, and Climate and Energy and in the European Commission in the cabinet of the former Climate Action chief, Connie Hedegaard. Kristian holds a master degree in history and international development.

Dr Koshichi Nemoto, Vice President, CRIEPI



Dr. Koshichi Nemoto received a Bachelor's degree in electric engineering from The University of Tokyo in 1982, and a Master's degree in 1984 and also completed his Doctorates. He began his career in 1984 with CRIEPI, Central Research Institute of Electric Power Industry, as a researcher in discharge laboratory of transmission and transformation department. From 2016 to 2020, he served as the director of ENIC, ENergy Innovation Center, in CRIEPI. Currently, he is the Vice President at CRIEPI.
 His major is Electrical Engineering.

Bastian Pfarrherr, Head of Innovation Management, Stromnetz Hamburg



Bastian Pfarrherr has been Head of Innovation Management at Stromnetz Hamburg GmbH (SNH) since January 2017. Innovation Management bundles SNH's activities in the area of electromobility as well as innovative network concepts and digitalization. Among others, a focus is on the grid-compatible integration of the charging infrastructure into the electrical power distribution grid in Hamburg. Mr. Pfarrherr studied electrical engineering. Since 2005 he has been working for SNH and its predecessor companies. Among other duties, he has led infrastructure projects in the high-voltage grid and a strategic asset management department.

Katie Sloan, Director of eMobility and Building Electrification, Southern California Edison



Katie Sloan is director of eMobility and Building Electrification at SCE, one of the nation's largest electric utilities. Katie is responsible for SCE's vehicle and building electrification programs and services, with a planned budget of over \$1 Billion. The team's mission is to help California get 7 million EVs on the road and convert one-third of space and water heating in buildings by 2030. Her team includes three groups: strategy & program development, business development & partnerships, & operations.
 Previously, Katie held roles of increasing responsibility at SCE & Edison International focusing on clean energy policy, strategy, and analysis. She has also worked at First Solar, a large solar panel manufacturer, developing global public policy. Katie was named one of "40 under 40" people to watch by Pasadena Magazine and a Woman of Achievement by the San Gabriel Valley YWCA for her work at SCE and non-profits. Katie currently serves on the board of CALSTART, with the mission to build a high-tech clean-transportation industry that creates jobs, cuts air pollution and oil imports and curbs climate change. She also serves on the board of Beyond the Block, a non-profit focused on expanding global awareness and increasing intellectual curiosity of at-risk youth. Katie holds a master's degree in regulatory economics and bachelor's degree in business administration from New Mexico State University.

Gregory Poilasne, Co-Founder and CEO, Nuvve



Gregory Poilasne is Co-Founder, Director, Chairman, and CEO of Nuvve, overseeing the strategic direction of the company. He is also a board member of DREEV, a joint venture between EDF and Nuvve.
 Gregory has more than 20 years of telecommunications experience, spanning technology development, marketing, sales, and customer support as well as business operations. Previously, he served as CEO of DockOn, a company dedicated to delivering an Always On wire-free world through a series of patented products and technologies. Gregory was also a founder of Ethertronics, an antenna pioneer that was acquired by AVX, and has also held positions at Rayspan Corp. and Kyocera Wireless.
 Gregory has an MBA from Wharton School of Business at the University of Pennsylvania and a Ph.D. in Electronic Engineering from the University of Rennes, France.

Sandra Trittin, Co-Founder and CSO, tiko Energy Solutions AG



Sandra began her career at a management consultancy working in projects of process optimisation/ restructuring and supply chain management in the automotive, food processing and telecommunications industry. She joined Swisscom in 2002 to increase process efficiency for the service delivery and network construction. Afterwards she was leading teams in software design/development for the construction of IP based communication services. While later working in the strategy team of Swisscom she co-founded tiko Energy Solutions and is today Head of Business Dev.& Sales. Sandra has studied business administration and holds an MBA of the Business Schools of Mannheim, Copenhagen and Warwick.

Norela Constantinescu, Manager Research & Innovation, ENTSO-E



Norela has been a Manager for Research & Innovation at the European Network of Transmission System Operators for Electricity (ENTSO-E) since 2014, where she has been working on R&I strategy and projects. She is member of the Governing Board of European Technology and Innovation Platform Smart Networks for Energy Transition (ETIP SNET) and cochair of ETIP SNET Working Group Digital and Customer Integration. Previously she has worked with the European Commission DG Energy for 6 years leading on the Strategic Energy Technology Plan activities on low carbon technologies and smart cities and communities. She has a long experience both, private and public, in the energy sector, nationally and internationally.

Anders Bavnhøj Hansen, Chief Engineer, Energinet



Anders Bavnhøj Hansen is Chief engineer at Energinet (TSO for power and gas in Denmark). Fields of expertise are strategic planning and R&D strategy for power systems and integrated energy systems. He has been working at Energinet for more than 10 years and before that been working with energy system analysis at the Danish Energy Agency and with power-system analysis at ABB Corporate Research in Sweden.

Pablo Mosto, Planning & Environment Manager, National Electric Utility of Uruguay (UTE)



Mr. Mosto serves as Manager of the Planning and Environment Division of the National Administration of Electric Transmission and Power Plants- UTE, www.ute.com.uy-, the national electric utility of Uruguay. He has worked for the company since 1985, including activities related with Transmission expansion and with the planning of new sources for energy supply for the country.

Currently is Co-Director of a technical group that is developing a project on Battery Energy Storage in the medium voltage grid and appointed as Co-Coordinator of the Smart Grids Project of the company.

He has worked also for the Energy Ministry of Uruguay, at its National Directorate of Energy, between 2005 and 2009.

Mr Mosto holds an Electrical Engineering degree from the Universidad de la República at Montevideo- Uruguay, a postgraduate diploma in Energy Economics and Planning from the Energy Economics Institute at Bariloche- Argentina. He is part and was Coordinator for the Iberoamerican Renewables Energy Experts Network, managed by CIEMAT-CEDDET, Madrid- Spain.

Dr. Christopher Greiner, CTO, EnergyNest



As Chief Technology Officer at EnergyNest, Christopher has the overall responsibility for all technical activities in the company, spanning from basic research in materials to engineering thermal energy storage system design, integration and operation in commercial projects. He has a PhD in electric power systems engineering and my professional interests span renewable energy, energy storage and how to design and operate our future sustainable energy systems. He was hired as the first employee in EnergyNest in June 2012, before that he was a Senior Researcher at DNV-GL, Research & Innovation for 3 years.

Adele Lidderdale, EMEC/ Big Hit project



Adele manages EMEC's portfolio of hydrogen projects, ensuring they are delivered on time, within budget and to the highest standards. Adele also manages key project partners and contributes to the EMEC hydrogen business plan, furthering our expertise in hydrogen demonstration and testing.