GSGF
Global Smart Grid Federation

NEWSLETTER

March 2019

Strengthening the Tie: ISGAN and GSGF

17th ISGAN ExCo-Meeting was held in Sweden from 1st - 5th April, 2019 in which GSGF (Global Smart Grid Federation) and ISGAN (International Smart Grid Action Network) members met in order to strengthen future collaboration, aiming at membership expansion, joint activities and to explore opportunities for potential cooperation that will help pave the way to boost acceleration in implementation of smart grid technologies across the globe.

ISGAN in collaboration with the Swedish Energy Agency and the Swedish Smart Grid Forum organized a public workshop on "**The future of electricity markets in a low carbon economy**" held on **2nd April, 2019**. Swedish Minister for Energy and Digital Development **Mr Anders Ygeman** gave a Keynote Address in this workshop and spoke on the climate change and the need for accelerating in the energy transition. Mr Reji Kumar Pillai, Chairman GSGF gave a presentation on "**New market opportunities enabled by digitalization of the power sector**" which focused on Peer-to-peer applications such as blockchain in new market design, IoT enabler for flexibility and AI applied to solutions to secure system operation.

On behalf of GSGF **Mr Thomas Bibette** from DC Brain and Think Smartgrids, France gave a presentation on Artificial intelligence and Machine Learning for Electric Utilities and **Ms. Ana Trbovich**, a Blockchain Expert from Energy Web Foundation, presented Blockchain for Electric Utilities.

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https://www.nst.com.my/business/2019/02/460976/government-opens-tenders-rm2bil-large-solar-projects

Global Stories on Smart Grid

New Illinois bill targets 100 percent renewable

The Clean Energy Jobs Act (SB 2132/HB 3624), backed by 45 mostly Democratic state lawmakers, calls for transitioning Illinois to 100 percent renewable energy by 2050. The bill specifically states that utility procurement plans shall include cost effective renewable energy resources equal to a minimum percentage of each utility's load for all retail customers i.e. 25 percent by June 2025, 45 percent by June 2030, 90 percent by June 2045 and 100 percent by June 2050. It also sets an interim target of 100 percent carbon free electricity in 2030

Read More: https://bit.ly/2FGo9qj

Norway to install wireless electric chargers for taxi fleet

Oslo, Norway is poised to become the first city in the world to use wireless fast charging infrastructure for its taxi fleet, in part of an effort to deploy only electric taxis by the year 2023. Charging plates, which use induction technology to deliver a charge of up to 75 kW, will be installed under taxi parking space and these plates will start automatically when a taxi drives over them. This will help the drivers to save time as they will not be required to go out of their way to places where charging stations are installed and wait their till the car is charged.

Read More: https://bit.ly/2Yn1EPB

Europe to adopt new electricity market design

The adoption of the market design rules by the European Parliament marks the finalisation of negotiations on the Clean Energy for All Europeans package. The new electricity market design rules make the energy market fit for the future and place the consumer at the centre of the clean energy transition. The new rules are designed to empower energy consumers to play an active role in driving the energy transition and to fully benefit from a less centralised, and more digitalised and sustainable energy system. The new rules enable the active participation of consumers whilst putting in place a strong framework for consumer protection

Read More: https://bit.ly/2WoKkYB

Solar energy corridor for West African countries

Economic Community of West African States (ECOWAS) has taken the initiative to create a West Africa Clean Energy Corridor (WACEC) to increase the share of renewable energy in the energy mix of the region. The primary objective of WACEC is to support the development of utility-scale renewable energy-based power, to promote the integration of renewable energy sources into the West African power systems and to create a market for trans-border regional power trade.

Read More: https://bit.ly/2TH2Mhn

Fortum introduces new 'Black mass' lithium ion battery recycling process

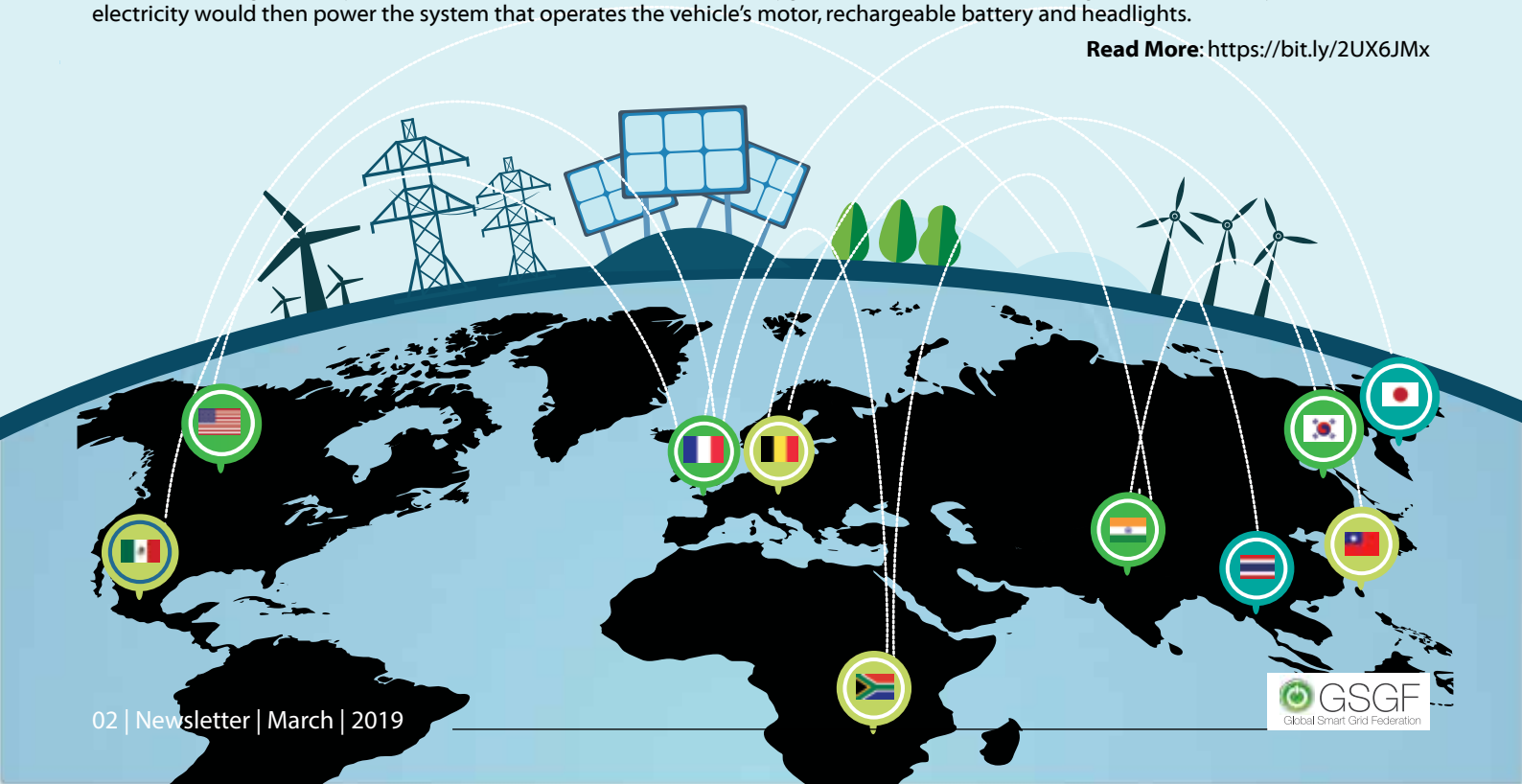
Using a hydrometallurgical process Fortum claims it is able to recycle up to 80% of a device, with its efforts focussed primarily on high energy density NMC batteries of the type used in electric vehicles (EVs). After removing plastics, copper and aluminium to be recycled by more conventional methods, a sludgy mixture of lithium, manganese and cobalt is left behind in what is known as a 'black mass'. Fortum claimed it has developed a unique process for recovering these precious materials, which it has already implemented "on an industrial scale" at a facility in Harjavalta, Finland. Start-up Crisolteq developed the technology for Fortum.

Read More: https://bit.ly/2FunacA

Catalytic H2 technology developed for powering electric vehicles

A team of University of Massachusetts Lowell (UMass Lowell) researchers have pioneered a new way to power electric vehicles. The new technology uses water, carbon dioxide and the metal cobalt to produce hydrogen gas on demand at a relatively low temperature and pressure. The innovation, developed by Chemistry Department Chairman Professor David Ryan and a group of UMass Lowell students, will enable electric vehicles to run longer while maintaining zero emissions. In an electric vehicle, the hydrogen created by the team's method would go directly to a fuel cell, where it would mix with oxygen from the atmosphere to generate electricity and water. The electricity would then power the system that operates the vehicle's motor, rechargeable battery and headlights.

Read More: https://bit.ly/2UX6JMx



Global Stories on Smart Grid

Malaysian state seeks greater investment in GreenTech

With the commissioning of the 50-megawatt solar power station in December 2018, which is the largest in the north of the Malaysia, and capable of generating electricity for 30,000 households, while reducing carbon emissions by 21,000 tonnes annually, the Malaysian state of Kedah recently announced that it is inviting investors to develop more green technology-based projects in the state, especially those relating to solar power. This is in line with the Malaysian government's (more specifically, The Energy, Science, Technology, Environment and Climate Change Ministry) aims to have 18% of the country's electricity be generated from renewable sources by 2030, an increase from 2% currently.

Read More : https://bit.ly/2UMTOQw

Evolving DSO models in Europe : Perspectives on trends driving distribution operator models have been identified by E.DSO's high level Stakeholders and Innovation Council

While the energy transition is impacting on all participants, suppliers and users alike, arguably the biggest challenges – and the greatest changes – are being faced at the distribution level with the new demands that are emerging as the focus moves to the grid edge with the growth of prosumers with distributed resources and decarbonisation across all sectors.

To meet these demands, distribution system operators (DSOs) must evolve their business models towards a service approach. However, while the end goal is conceptually clear, the evolutionary path is layered with complexities. In order to assist European DSOs, the stakeholder association E.DSO (Distribution System Operators' Association for Smart Grids) has formed a high level Stakeholders and Innovation Council comprised of eight energy sector experts to bring outside perspectives.

Read more: https://bit.ly/2HSKkfK

Zero carbon heat – lessons from Denmark : Progress on decarbonising heat has been slow but technology, policy and finance options are available to accelerate developments

According to the IEA, globally heating and cooling account for almost half of the total energy consumption, split equally between heat for use in buildings and heat for industrial processes, and over a quarter of the CO2 emissions. Likewise in Europe, where household heating and hot water reach almost 80% of final energy use, but the majority of the heating and cooling is generated from fossil fuels and only about one-sixth is from renewable energies.

As an example of a country that has largely decarbonised its heat, particularly in the cities, Denmark has done some remarkable things and now has a system that is flexible enough to decarbonise buildings that are connected to the district heating network. At that time, with its reliance on increasingly expensive oil, particularly for space heating, a concerted effort was started to reduce fuel usage and switch to alternative fuels. This resulted in a drive away from oil boilers primarily to district heating but also gas. As a result, almost two-thirds of buildings are connected to district heating, primarily in the cities – in Copenhagen it is 98% – but also in smaller towns and villages.

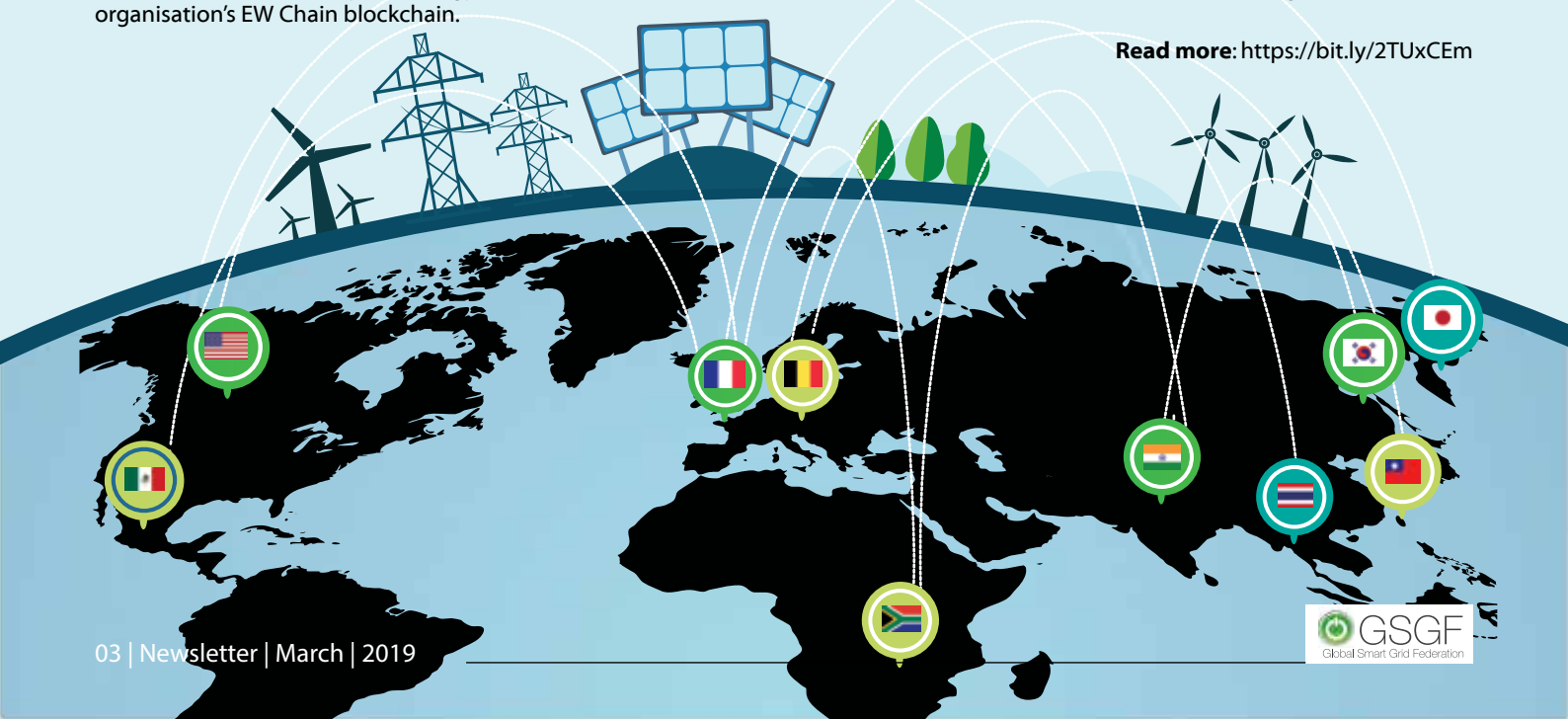
Read more: https://bit.ly/2uqSdRl

Blockchain in the Energy Sector – A Progress Update : The Energy Web Foundation is developing blockchain resources for the energy sector alongside its EW chain

How can blockchain play a role in the energy sector? Consider one use case, the tracking of renewable energies for the provision of guarantees of origin. In some cases, such awards are made on the basis of forecasts but in Europe their issue is on the basis of the electricity provided and specifically the legislation stipulates that "disclosure is made only once" and double counting and double disclosure should be avoided. Blockchain, with its use of smart contracts and prevention of double spending, can cut through the complexity by utilising real-time generation data to make awards in real-time, potentially reducing the need for central verification agencies and enabling public administration agencies to cut their costs.

While this is one out of the large number of use cases of blockchain being introduced into the energy sector, it was selected for its "transformative power" by the Energy Web Foundation (EWF) for the development of a reference application – EW Origin – to run on the organisation's EW Chain blockchain.

Read more: https://bit.ly/2TUxCEm



Member Updates

Korea Smart Grid Association Member LSIS completes construction of 18MW Hanamizuki Mega Solar Power Plant in Japan

LSIS completed the construction of its third solar power plant in Japan, the electrical equipment manufacturing arm of LS Group said Wednesday.

The firm said it had an opening ceremony of Hanamizuki Solar Power Plant in Ishikawa Prefecture, western Japan. LSIS won a 46 billion won solar power plant order in 2017.

LSIS signed a turnkey contract, which means the company is responsible for not only design and construction but also operation of the facility, after contracting with Ishikawa Hanamizuki 1 Joint Company.

The new solar power plant has an 18 megawatt (MW) capacity on a land area of 300,000 square meters. The solar power plant will supply electric power, which can be used by some 5,000 households every year, to local electric power company Hokuriku Electric Power for 20 years at 36 yen per kilowatt hour.

"Since we entered the solar power plant market in Japan (for the first time among Korean companies in 2009,) we have been constantly increasing the market share based on our technological reliability because we have succeeded in constructing a series of solar power plant projects," an official from LSIS said.

The Hanamizuki plant is LSIS' third solar power plant following the Mito Solar Power Plant in Ibaraki Prefecture and the Chitose Solar Power Plant inottn Hokkaido..

Events Supported by GSGF

ICSG Istanbul 2019
April 25-26, 2019, Turkey

For participation in the above events

please write to info@globalsmartgridfederation.org

Report on GSGF Face to Face Meeting in Stockholm, Sweden on April 01, 2019

GSGF held its First Face to Face Board meeting of the year 2019 on 1st April, 2019. The Board Meeting had been very productive with discussions on progress of work plan, new working groups, prospective new members, GSGF Reports and presentations by invited speakers. A detailed discussion was made on the Smart Grid Road Map Work Plan by Oscar Miranda, Vice Chair, GSGF.

It was also decided to promote the members of the country member associations. The draft of the Graphical User Interface (GUI) and its format was discussed during the GSGF Face to Face meeting. A link will be updated soon on the GSGF portal with more details.

Mr. Bo Normark, Senior Policy Advisor, Renewable Energy Institute gave a talk on new initiatives in Renewable Energy and programs for the benefit of GSGF Members.

Expert Comments – Developments in Energy Storage India Smart Utility Week, 2019

By

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"Ambassador for the Americas", Global Smart Grid Federation, USA

Executive Chairman, Biosirus Inc., Canada

The last decade of my involvement in Smart Grid innovation and R&D (Canadian utility/external global consulting), has seen a rapid cost reduction in energy storage technologies – particularly LiON electrochemical battery energy storage systems (BESS).

I had the privilege to Chair/Moderate a plenary session titled "**Energy Storage and Energy Storage Roadmap for India**", as well as, partake in conducting a Master Class on "**Enabling Technologies in the Modern Grid** ", (which included Energy Storage) at the India Smart Utility Week (ISUW 2019), held March 12-16, 2019 in New Delhi, India (http://www.isuw.in). This large international conference was organized by the India Smart Grid Forum and had representation from 41 countries, 1800 attendees and 288 speakers.

While many global experiences were shared, a few stood out as, "shout-outs" by a few leading experts in this area. These are highlighted below:

1. **The cost of battery energy storage systems (BESS) is expected to fall to $100/kwh by 2020 and $63 by 2025 (I believe gathered from a recent Bloomberg Report)**: Most feel this is achievable from the current prices (around $240/Kwh) and this reduction is possible due to larger production volumes and automated production lines. However, high "C" charge/discharge requirement (seen lately), will increase BMS costs and cooling requirements. The overall BESS system cost trend will be lower.
2. **The lifecycle limit of 1,500 cycles (100%-to-zero-DOD) for the LiON (LFP/MNC) technology has remained unchanged in the last 10 years**: While this 1,500-cycle limit holds true from a materials and chemistry perspective, manufacturers have created their own higher "practical cycle-limits" to 3,000 cycles (and some even 6,000 cycles), by using differing operating limits such as (1) discharging 100%-to 30% DOD; (2) charging 30%-to-85% SOC; and/or (3) building-in a 10-15% additional capacity. In other words, it is hoped (through monitoring and control) the application world may never experience a true 100% DOD and hence lower 1,500 life-cycles. The LiTO chemistry offers much higher lifecycle (i.e. approaching 10,000 cycles), however, its lower cell voltage, heaviness and lower energy density remain a drag on its mass adoption.

3. **LiON (LFP, MNC) batteries may still be the preferred option 10 years from now, despite efforts in new chemistries**: While new anode and cathode chemistries are being tried that could yield higher cell voltages and higher energy densities (wh/kg), there are many challenges in the materials and cell-fabrication areas that will need to be overcome for mass production. In view of this, the current LFP and MNC variants may still be the dominant commercial production even 10 years from now. Despite the LiTO chemistry offering niche high charge/discharge features, its lower cell voltage and lower energy density (both by volume and weight) will remain a drag on its mass adoption.

4. **While LFP provides thermal stability (better than MNC variants), its lack of nano-structure uniformity in mass production is less attractive than MNC variants**: LFP chemistries has lower energy densities than the MNC variants and hence nano-materials are required. However, it is very difficult to manufacture LFP nano materials with great uniformity (particle size) and hence, the performance variations in the modules/ESS could be higher than the MNC ESS across brands. On the other hand, in higher operating/ambient temperatures, the parasitic cooling requirements of MNC variants will yield a lower overall energy output than LFP for the same name-plate rating.

5. **It could take up to 10 years for India to develop domestic capabilities in ESS battery chemistry cell technology and manufacturing**: India has very recently announced a very ambitious target of approx. 200 GWh scale ESS deployment by 2020 (and more by 2025). This will also compliment the very aggressive 175 GW solar PV mission. However, (as with Solar PV cells), India has just recently embarked on a commercial battery cell development and production. Many view this cell-production area as very capital intensive with complex materials science and R&D requirements. Both these areas take time to develop world-class expertise with time horizons of upwards of 10 years.

6. **On a very large scale, storing solar PV outputs (to be used 24/7) can only be achieved using hydrogen storage**: If one assumes (due to falling solar PV costs), PV energy tariffs will trend much lower, there is a business argument to install large solar PV plants only to store this day-time energy for use in the evening/nights (when the demand is higher). The question is whether BESS would be that storing agent on a very large Twh scale. Currently, the high cost of hydrogen production is the Achilles heel to an otherwise mature (PEM and SOFC) fuel cell industry. Despite this, some felt hydrogen production breakthrough using hydrocarbon-steam reformation, may be more viable and sustainable in the long run than deploying Twh scale BESS systems.

7. **Energy storage and smart inverters will be required for MV/LV connected solar PV**: For a country like India (near 300 GW generation capacity), a near-term target of 175 GW solar PV (of which 40 GW is Rooftop), would mean substantial installations (in the Commercial/Industrial segment) on the MV system and Residential installations on the LV system. As these PV contributions rise, relative to their local loads and then begin to back-feed, power quality issues in terms of voltage fluctuations and/or poor power factor, would become a dominant problem. Utilities would need to think mitigative measures in specifying smart inverter devices that can perform VAR, pf and even autonomous nodal voltage control (even behind the meter) to address this. The LV system will be even more critically affected than MV.

8. **Fair regulatory treatment for energy storage systems is required**: The world over tends to "bucket" energy storage within their current regulatory framework, as both generators (discharging to grid) and load (charging from grid) licensees (as electrons are being stored and resold). This "dual-class" recognition poses challenges and disadvantageous to the large scale ESS owner/operators. A few limiting examples include (1) charge at utility retail rates and sell at wholesale market rates; (2) be limited to behind the meter "load displacement" applications; (3) be limited to R.E. charging to claim a higher green energy tariff on discharge; (4) not enough premium over traditional peaking plants for faster ESS ancillary services; and (5) difficult utility rate-based usage due to dispersed benefits outside the wires domain. It was felt, not recognizing what ESS technology can offer in a modern grid, was a severe limitation.

In my frequent travels to Asia and Middle East, I see a need for many aspects of the above being understood and resolved. The utility best understands the supply-demand interplay and should lead T&D innovation. Otherwise the high capex nature of the ESS business will pose a stranded asset risk!

GSGF at a glance

Charter Members

Think Smart Grids

India Smart Grid Forum

Japan Smart Community Alliance

Korea Smart Grid Association

Smart Grid Mexico

Prakarsa Jaringan Cerdas Indonesia (PJCI)

GridWise Alliance

Utility Members

Electricity Generating Authority of Thailand (EGAT)

Electricity Supply Commission of South Africa (ESKOM)

EDM Mozambique

Tenaga Nasional Berhad Malaysia

Associate Members

Green Business Certification Inc.

Florence School of Regulation (FSR)

Energy Block Chain Consortium

Current Working Groups

- **Smart Grid Roadmaps:** Chair-Smart Grid Mexico
- **Smart Grids for EVs:** Chair - Think Smartgrids, France

Working Groups in Pipeline

- Blockchain for Utilities
- AI and Advanced Analytics for Utilities
- Robotic Process Automation for Utilities

Contact us for more information.

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