GSGF
Global Smart Grid Federation

NEWSLETTER

December 2019

Grid Wise Alliance USA and Ernst & Young LLP launched a new report that maps the future of the US Distribution System

The "**In an accelerated energy transition, can US utilities fast-track transformation**?" report was coproduced by GridWise Alliance and Ernst & Young LLP (EY US). The observations made in this report are supplemented by face-to-face interviews with C-suite executives from some of the largest distribution operators in the US, as well as output from an industry workshop hosted by GridWise Alliance and EY US in Denver, Colorado, in July 2019. It examines the changing state of the electric utility industry in the US and explores distribution system solutions fit for a digitized, decentralized and decarbonized electric future.

The US report follows a "January 2019 report" by EY and European Union industry body, Eurelectric, which considered the future responsibilities of distribution system operators and the ongoing role of the electricity grid in Europe.

Creating a fit-for-purpose distribution system

The report outlines that the US distribution utility of the future will need to manage a flexible resources platform – one that allows distributed energy resource (DER) owners and aggregators to participate and trade in a streamlined energy market in which power reliability is optimized across the entire system.

As DER technologies become more efficient, they are expected to experience tremendous growth, while at the same time decarbonization initiatives will drive the electrification of transportation, buildings, heating and industry. The existing grid is unable to respond to the challenges and opportunities this presents, creating pressure on utilities to embrace increased responsibilities that ensure power reliability and tap into new, sustainable, long-term revenue opportunities.

The report suggests distribution utilities are well positioned to take a leadership role, working with key stakeholders to transform the system into one that is flexible and agile enough to cope with the complexities of managing customer-centric loads and resources.

Read More: https://gridwise.org/gridconnext-2019-convenes-grid-innovators-to-explore-tech-policy-utility-breakthroughs-2/

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Global Stories on Smart Grid

Waves Blockchain used to track Russian Energy Consumption

Russian power grid company is piloting a blockchain-based system that'll automate electricity metering. Those behind the pilot, so far implemented in 400 homes in the Kaliningrad and Sverdlovsk regions, are planning on expanding the pilot to serve the regions' combined population of 5.3 million early next year, before rolling out the system nationwide.

Under the system, information about how much electricity a household consumes is logged on a decentralized ledger, then displayed in an app that consumers can use to monitor electricity usage. The app also analyzes electricity habits, and can provide suggestions to a consumer about how to switch to a more cost-efficient plan. A smart contract then divides the payment between sales and grid companies.

Read more : http://www.indiasmartgrid.org/viewnews.php?id=4262

U.S. Department of Energy (DOE) Announces $15 Million for Development of Artificial Intelligence and Machine Learning Tools

U.S. Department of Energy's (DOE's) Advanced Research Projects Agency-Energy (ARPA-E) announced $15 million in funding for 23 projects to accelerate the incorporation of machine learning and artificial intelligence into the energy technology and product design processes as part of the Design Intelligence Fostering Formidable Energy Reduction (and) Enabling Novel Totally Impactful Advanced Technology Enhancements (DIFFERENTIATE) program.

Launched in April of this year, the DIFFERENTIATE program aims to develop streamlined solutions to next-generation energy challenges. The program identified three general mathematical optimization problems that are common to many design processes. The selected projects then conceptualized machine learning and artificial intelligence-based solutions to help engineers execute and solve these problems in a manner that dramatically accelerates the pace of energy innovation.

Read more : http://www.indiasmartgrid.org/viewnews.php?id=4259

The First Harmonized Approach to Smart Meter Safety Certification Was Formally Certified in Europe

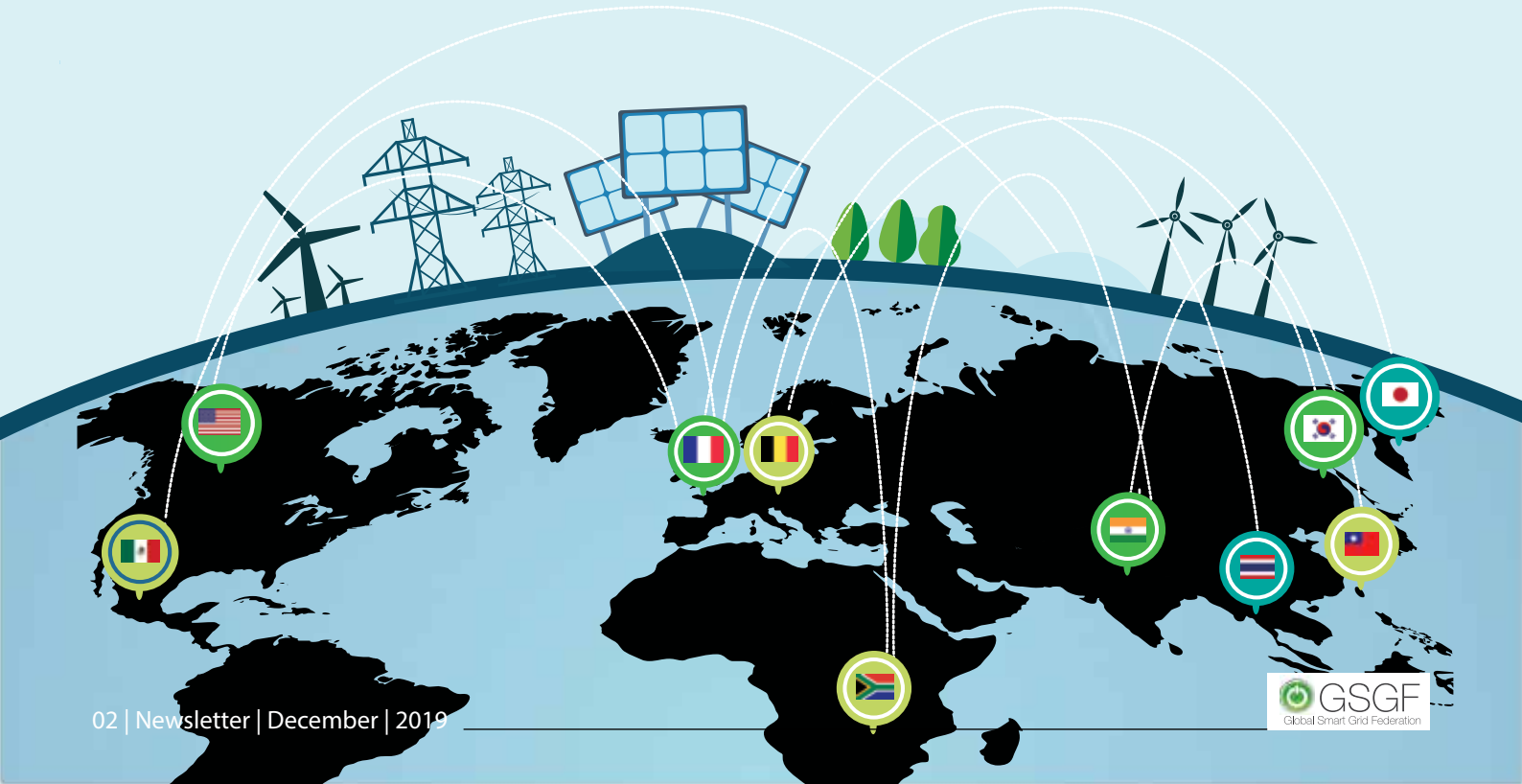
Smart meter certification performed using this protection profile by any of the certification bodies members of the SOG-IS agreement will be recognized across the 17 European countries that have signed that agreement. The development of smart energy grids is dramatically changing the grid and traditional energy services and markets are undergoing a significant transformation. Internet of Things (IoT) communication networks are already in use and enable modern energy services provided by grid operators and energy service companies. With this increasingly connected environment comes the risk of vulnerabilities, which could affect the reliability of the energy system and the trust of consumers. Therefore, securing the smart grid and the related communications systems is essential for a successful energy transition.

Read More: https://bit.ly/2P1sTLP

Saudi Electricity Co. Awards $2.6 billion Smart Metering Project

Saudi Electricity Co. (SEC) has awarded a Smart Metering project at a cost of 9.56 billion Saudi riyals ($2.55 billion), the company announced on 15 December 2019. The project will start on 19 December 2019 and entails installing and commissioning 10 million smart meters for consumers across Saudi Arabia. A consortium of Etihad Etisalat Co. (Mobily) and Al- Fanar Construction will implement the project in central and Eastern areas, while a branch of China Electric Power Equipment and Techn. Square General Contracting Company (SGCC) will implement it in Western and Southern areas. The project will be funded through SEC's internal resources as well as external financing, the company said in a statement to Tadawul, adding that 3.5 million meters will be purchased from local manufacturers. The project is expected to be completed on March 30, 2023, and a positive impact is expected on the company's results starting to 2021, according to the statement on Tadawul.

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



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India, Canada Announced 10 Joint Science & Tech Projects: Smart Cities, Renewable Energy and more

Ten new joint projects on Cyber Physical Systems to support Green Buildings in Smart Cities and also in biotechnology related areas have been announced between the Indian Ministry of Science & Technology, and Canada at the India-Canada Science & Technology Innovation Dialogue organized on 9 December 2019.

The projects span areas like carbon capture, renewable energy, hydrogen technology, new materials, earthquake resistance and so on for smart cities. The key areas identified for possible India-Canada collaborations are food security, water management, energy security and affordable healthcare. New initiatives of the DST that were open for international collaboration were highlighted, including supercomputing, big data analysis, and quantum computing integrated water management.

Read More: https://bit.ly/2Eksz63

Commission approves 3.2 million Euro Public Support for Research and Innovation Projects

The European Commission has approved under EU State aid rules an Important Project of Common European interest ("IPCEI") jointly notified by Belgium, Finland, France, Germany, Italy, Poland and Sweden to support research and innovation in the common European priority area of batteries. The seven Member States will provide in the coming years up to approximately 3.2 billion euro in funding for this project, which is expected to unlock an additional 5 billion euro in private investments. The completion of the overall project is planned for 2031. The project will involve 17 direct participants, mostly industrial actors, including small and medium-sized enterprises (SMEs), some of which with activities in more than one Member State.

Read More: https://bit.ly/2F7xUOp

Madagascar receives 100 million USD in support for Sahofika Hydropower

The Board of Directors of the African Development Bank has approved a Partial Risk Guarantee (PRG) of 100 million USD to support the Sahofika hydro-power project in Madagascar, which will add 205 MW of renewable energy generation capacity to the national grid, benefitting over 2 million people. The Bank's support will include risk mitigation to the project developers and the debt providers by supporting the payment obligations of JIRAMA, the state-owned off-taker. The project will enable Madagascar to displace up to 90% of thermal energy generation, to unlock its great hydro-power potential, and to expand its energy mix to more renewable sources.

Read More: https://bit.ly/2tg79o2

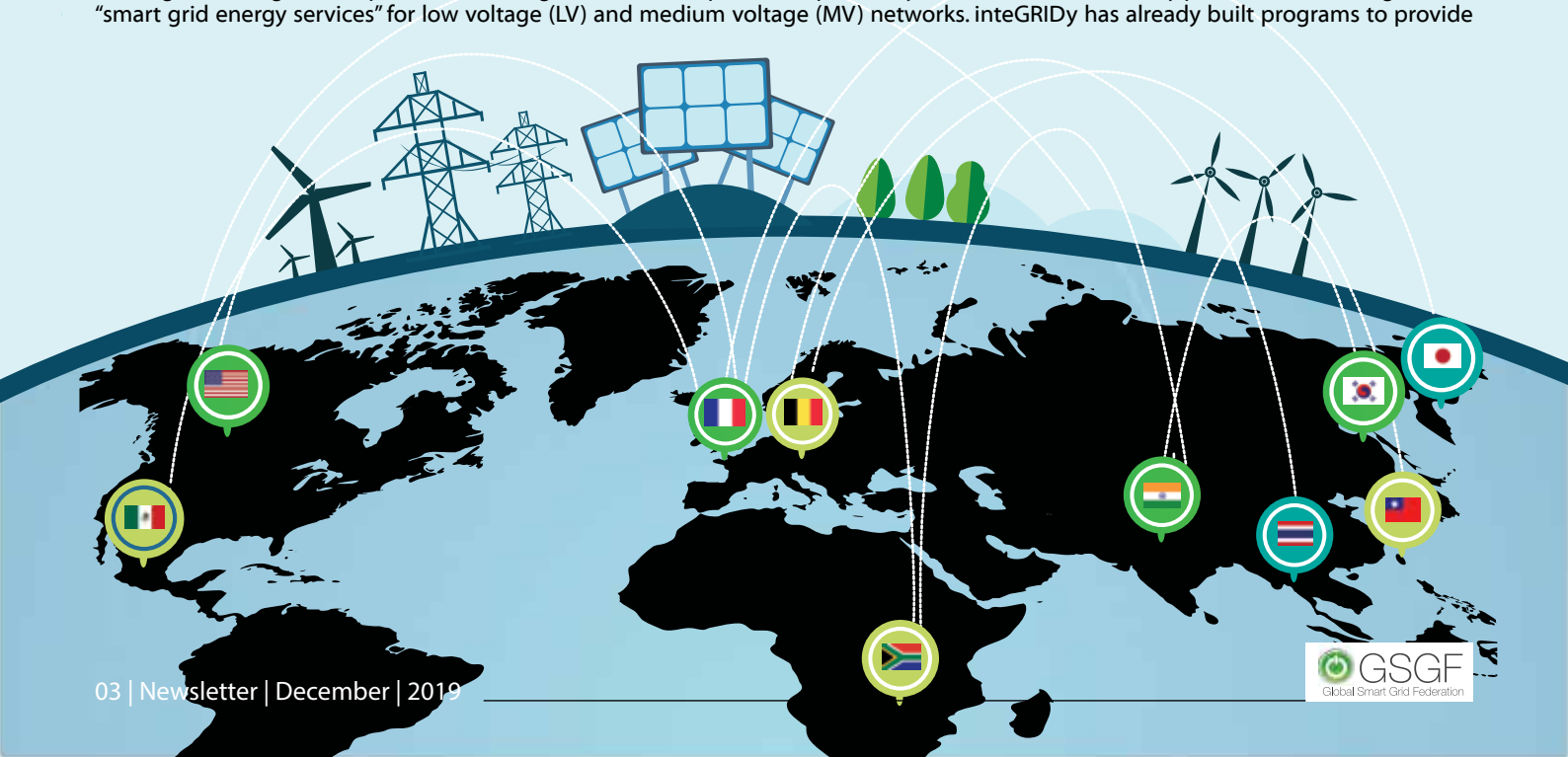
Spain's First Grid-Scale Lithium-Ion Battery Storage System Unveiled

The energy storage system is located in Caravaca de la Cruz in Murcian. The 3MWh plant will help the utility to improve energy supply in Cañada de la Cruz, Inazares, Moralejo, Barranda, El Moral and Los Royos. The plant will be used to store energy generated from solar facilities and provide up to five hours to the main grid. The energy storage system can operate in isolation and comprises an intelligent platform that estimates both the consumption and the potential renewable generation power of the solar plants. The project is expected to reduce supply interruption times during emergencies as well as ensure the stability of the main grid during peak demands period. The project has eliminated the construction of 22km of overhead power lines. The project is part of plans by Iberdrola to invest in smart grid technologies and low-carbon energy resources to address climate change.

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

inteGRIDy's Push for Energy Self-Sufficiency: EU Horizon 2020 Cyprus Pilot

inteGRIDy is an EU Horizon 2020 Project that investigates how electric grids of the future could work by analysing the results of 10 energy pilot schemes running in countries across the European Union. The pilot schemes are based on the project's four main pillars: demand response, smartening the distribution grid, energy storage and smart integration of transport-focused grid users. inteGRIDy aims to develop what it calls "integrated Smart GRID Cross-Functional Solutions for Optimized Synergetic Energy Distribution, Utilization Storage Technologies." Even with a total budget of EU15.8 million, inteGRIDy has some ambitious goals. inteGRIDy starts with a focus on integrating existing technologies to implement a smart grid distribution platform. Specifically, the network of inteGRIDy partners are working to offer "smart grid energy services" for low voltage (LV) and medium voltage (MV) networks. inteGRIDy has already built programs to provide



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solutions for business-to-business (B2B), business-to-consumer (B2C) and business-to-business-to-consumer (B2B2C) market contexts. inteGRIDy is funded by the EU in order to support demonstrations of smart grid, storage and system integration technologies, all with an eye towards an increasing share of renewables.

Read more: https://bit.ly/35fYIr0

Singapore's SP Group Created the Global Benchmarking Framework to Guide Smart Grid Development

The SGI (Smart Grid Index) assessment is designed to be simple and quantifiable. It balances precision and simplicity. Using publicly available information, the SGI addresses proxies of each dimension and diagnoses strengths and weaknesses of a utility's smart grid development. Utilities can leverage the index to gain stakeholder buy-in and justify their business plans for smart grid development. Best practices from peer utilities also can be identified from the benchmarking results, promoting sharing of best practices through utility engagements.

Read More: https://bit.ly/2tN2fiF

Smart Grid Events

January 13th – 16th, 2020: World Future Energy Summit, Abu Dhabi, https://www.worldfutureenergysummit.com

January 28th - 30th, 2020: DistribuTECH 2020, San Antonio, TX, USA, http://www.distributech.com

March 3rd - 7th, 2020: India Smart Utility Week, New Delhi, India http://www.isgw.in/isuw-2020/

April 08th – 09th, 2020: 8th International Istanbul Smart Grid & Smart Cities Congress and Fair 2020, Turkey, https://www.icsgistanbul.com/en/#

April 20th – 23rd 2020, IEEE PES T&D 2020, Chicago, Illinois, United States, https://www.ieeet-d.org/

May 12th -14th, 2020: African Utility Week, Cape Town, South Africa, https://www.african-utility-week.com/

May 13th -14th, 2020: Innogrid 2020+ Brussels, Belgium https://www.innogrid2020.eu/

June 04th - 05th, 2020: CIRED Berlin 2020 Workshop, Berlin http://www.cired2020-workshop.org/

June 16th- 19th, 2020: Asia Clean Energy Forum at Manila https://www.asiacleanenergyforum.org/

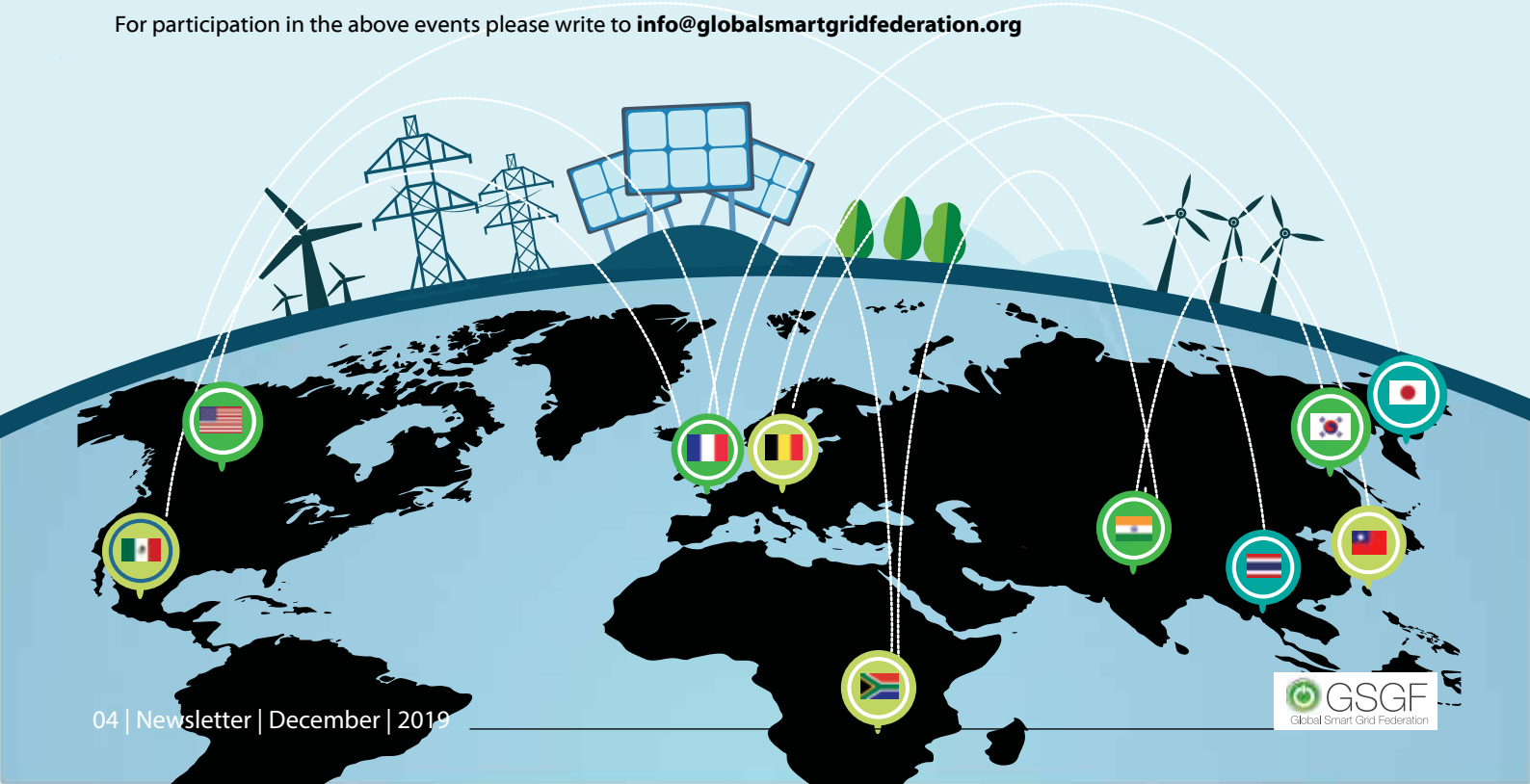
August 19th -20th, 2020: Australian Utility Week - Melbourne, Australia, https://www.powerandutilitiesaustralia.com/

August 23rd -28th, 2020: Cigre Session in Paris, https://www.cigre.org/GB/events/cigre-session-2020

Disclaimer: This information is from the public domain. GSGF does not hold any responsibility for the information provided in this section.

Events Supported by GSGF

For participation in the above events please write to **info@globalsmartgridfederation.org**



JSCA organizes a Seminar on Offshore Wind Power

SEP vessel attaching blades

Offshore wind construction plan in Akita Prefecture, Japan

The Japan Smart Community Alliance (JSCA) offers a variety of seminars for its members to provide information on the latest smart community trends and encourage member-to-member interaction. One of its recent seminars was held in Tokyo on 25th October, 2019 with a focus on offshore wind power. Participants from public and private sectors exchanged opinions vigorously.

Japan's offshore wind power market is expected to grow rapidly with the enforcement of the Act of Promoting Utilization of Sea Areas in Development of Power Generation Facilities Using Maritime Renewable Energy Resources (the Offshore Renewable Energy Act) in April 2019. Many Japanese companies and local governments are accelerating offshore wind related projects and initiatives.

One major topic of the JSCA seminar was Shimizu Corporation's new project for building a highly efficient self-propelled self-elevating platform (SEP) vessel. The vessel is to be completed in October 2022, which will have the world's largest transporting and crane capacity and be capable of installing ultra-large-scale offshore wind turbines. Shimizu expects that the \50 billion projects will bring in orders for offshore windfarm construction, a market forecasted at \5 trillion, and thereby allow the company to increase its competitiveness in the renewable energy sector and further expand its engineering business.

According to Shimizu, the Self -Elevating Platform (SEP) vessel will be 142 m long, 50 m wide, and have a gross tonnage of 28,000 t. It will be equipped with a crane having a maximum lifting capacity of 2,500 t and a maximum lifting height of 158 m which will deliver world-class operational performance. The ship will be operational in depths ranging from 10 to 65 m and is designed to ensure wave-resistant stable operation by extending its four legs onto the ocean floor and jacking itself up above the water surface.

The other major topic of the seminar was Akita Prefectural Government's Renewable Energy Power generation projects. Located in Northern Japan, Akita Prefecture is blessed with abundant natural energy resources. The Government aims to utilize them to develop a distinctive industry in the region, hoping that the projects will stimulate the local economy through construction investment in their early stages and grow into a dependable regional industry later.

Akita is actively conducting renewable energy efforts including offshore wind, geothermal, and hydrogen from a long-term perspective. It is working hard to add more renewables to the grid (and attract more investment in plant construction), to maximize the regional economic benefits of energy related industries such as plant operation, construction, maintenance, and components supply, and to promote technology development. Putting particular focus on wind, the prefecture has become Japan's second-largest producer of electricity from wind power with 460 kW of installed capacity.

Akita is planning new offshore wind projects in two ports selected through a public solicitation (namely the Port of Akita and the Port of Noshiro) to increase the use of wind power. They will produce a total capacity of 140 kW, which is scheduled to come online in 2022. Furthermore, Akita has had all its four candidate wind sites in general waters (that is, outside of ports and harbors) designated by relevant Japanese ministries as "promising areas" for development under the provisions of the Offshore Renewable Energy Act. The four candidate sites were chosen by the prefectural government from its selection of potential locations for bottom-mounted offshore wind farms, which were identified in 2014. Based on the environmental impact assessments conducted prior to the enforcement of the Act, the wind farms planned in the four areas are estimated to have a total maximum output of 1,973 kW, and part of them will start operation in FY2023.

Flexible Grid – Towards Customer Enablement

By
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"Ambassador for the Americas", Global Smart Grid Federation, USA
Executive Chairman, Biosirus Inc., Canada

I have been asked to Chair a WG within GSGF, titled "*Flexible Grid – Towards Customer Enablement*". To better understand this, one needs to trace the origins/thoughts that led to coining of the term "Flexible Grid" in the first place. The many "avatars" in this thought process, include the transformation and the ability of the utilities (particularly in the last-mile MV and LV systems) to accommodate a wider variety of policy and social objectives. These include (in chronological order):

1. Control of DERs (wind, solar, biomass, energy storage, CDM, DR, VPP)
2. Microgrid "fracture and re-join" (optimization of captive energy costs, resiliency)
3. Prosumer self-generation and/or load displacement (renewables, storage, other)
4. Electric Vehicle (EV) charging and V2G (cleaner transportation and import fuel substitution)
5. Climate change resiliency (managing and recovery from disasters)
6. Physical power trading at the last-mile (commodity exchange directly amongst retail consumers)
7. Last-mile direct retail settlement systems (e.g. financial buy/sell, using blockchain)

Firstly, the above is a huge transformational task for the utility sector as a whole, in making such technical and operational changes, while it keeps the lights on. Of particular note is that, many utilities are far behind and still in the process of accommodating DERs and figuring out feeder hosting capacities.

Secondly, the definition and priorities of many of the above terms have not been well defined in terms of their (1) requirements; (2) limits and (3) staging. Most are still in nascent stages of national/ policy/ regulatory discussions or simply "nice to have" dialogs.

Thirdly, the need for cheap and proliferate telecom (particularly wireless communications) with high bandwidth and low latency becomes even more paramount, if the power-quality and stability of the grid needs to be maintained. *It is worthy to note that more decentral and discrete the power elements on the grid, the more the need for "cluster" or "group" control of such assets and hence the need for reliable and cheap telecom connectivity.*

Lastly, most utilities have not recovered their costs for "yesterday's investments", let alone planning for "tomorrow's architecture". This could very well mean stranded assets. *Yet, fast-paced technology development (improvement and/or new) in discrete and digital power systems is warranting the above changes be accommodated, as though it were "plug-and-play".*

All of the above transformational objectives (outlined above) from a pure technical architecture, points to a concerted control shift towards the last-mile. However, the policy objectives are quite scattered (and in disarray) as to its priority and who should invest in these changes. For example, (1) EV charging infrastructure build is being touted as an entrepreneurial investment, while such investment and their long-term O&M may be more suited for a regulated utility; and (2) climate change resiliency may need new guidelines for consumer life-style changes (some being restrictive, for the "larger good").

So, notwithstanding the above issues, the timing of the WG and its efforts may indeed be worthwhile and beneficial from a technical blueprint. Please wish us well! Contributors are welcome!

GSGF at a glance

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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
- **Flexible Grid-Towards Customer Enablement**
  Chair- Ambassador, Americas

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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