GSGF
Global Smart Grid Federation

NEWSLETTER

May 2020

Blockchain, Digital Twins and AI: The Energy Transition Calls For The Development of New Technologies

The Think Smartgrids Data and Digital Transformation Working Group looked at the opportunities offered by new technologies based on artificial intelligence to improve the efficiency and sustainability of energy networks. A growing number of pioneering projects are already being deployed in France and these technologies seem very promising, provided that cybersecurity issues are not overlooked.

Digital twinning, Automatic or Deep Learning, Reinforced Learning, or Blockchain: those technologies have experienced tremendous growth in recent years and are accompanying the deployment of smart grids. They were described in a study published last November by the Think Smartgrids Data and Digital Transformation working group, led by Cosmo Tech and DCbrain.

Thanks to learning techniques, a machine can become capable of acting autonomously on its environment or become a valuable decision support tool. Several examples of the use of machine learning and deep learning technologies for the energy sector have been successfully implemented: thanks to these technologies, it is possible to adapt the network to consumer demand based on the analysis of a certain number of parameters (weather data, the history of peaks and troughs in hourly consumption, storage capacities, etc.), it also becomes possible to detect new energy resources, or even to optimise energy consumption.

Among the pioneering projects deployed in France, we can mention a project runned by RTE (Réseau de Transport d'Electricité, the French transmission system operator) with digital twins: JUMP (JUMeauxnumériquesPostes – or digital twins of electric substations).

JUMP aims to provide a common technical base and processes for the 3D modelling of assets, with a collaborative use that can meet the priority needs of RTE's various business lines.

Thanks to the digital twins that the transmission operator plans to deploy on an industrial scale from 2023 onwards, RTE can equip its network with modern modelling and visualisation tools that will be used to simulate worksites to train upstream for delicate interventions on high-risk sites, to share technical and asset data, or to anticipate the ageing of substations, or even of the entire network via interoperable twins, in order to optimise the maintenance of its assets.

Read More: https://www.thinksmartgrids.fr/en/actualites/blockchain-digital-twins-and-ai-the-energy-transition-calls-for-the-development-of-new-technologies

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Global Stories on Smart Grid

China to Introduce Wireless Charging for Electric Vehicles, Ties with MIT Startup WiTricity

China is planning to introduce standard wireless charging for Electric Vehicles (EV). Notably, on 6th of May 2020 China Electricity Council (CEC), along with China Automotive Technology and Research Center (CATARC), has introduced a set of national standards for electric vehicle wireless charging. For wireless EV charging, CEC is deploying Massachusetts-based company WiTricity's magnetic resonance technology. WiTricity is an MIT spin-off, focused on both consumer appliances as well as electric vehicle wireless charging. WiTricity has been actively involved in the Chinese EV wireless charging standardization process through its work with China Electric Power Research Institute (CEPRI), CATARC and the CEC. With a global IP portfolio of over 1400 issued and pending patents, WiTricity has declared twenty Chinese patents as standards essential to systems implementing the GB standard, a Chinese national standard issued by the Standardization Administration of China (SAC).

Read More: https://bit.ly/36bqndS

European Grid Operators Launch Flexible Blockchain Platform

In an important step forward for the energy transition, some of Europe's biggest Transmission System Operators (TSOs) are collaborating on a new blockchain-based platform, enabling the integration of small and distributed consumer-based units into the electricity-balancing process. Owners of consumer devices, electric vehicles for example, can earn money making "flexible" their interaction with the electric grid via an aggregator, affording them an active role in grid-balancing and with that in the entire energy transition. The new platform, Equigy, will set a new European standard and allow three of Europe's national TSOs - the entities tasked with transporting energy and balancing supply and demand to work together to enhance and improve the integration of renewables, providing more flexibility to mitigate their aleatory effect on grid.

Read More: https://bit.ly/36ehPTE

Hitachi to Bankroll UK Chain of Solar-Powered Supercharging Stations

Hitachi Capital is scaling up its financial support for a network of electric vehicle superchargers in the U.K. in partnership with Gridserve. Gridserve's model is to develop subsidy-free solar-plus-storage plants alongside a network of EV infrastructure. The first such solar site was connected to the grid in December 2019, a 34.7-megawatt solar system paired with a 30 megawatt-hour Samsung battery that is being operated. The first of its "Electric Forecourt" filling stations is currently under construction and expected to open in the coming months. Gridserve is targeting 100 charging sites across the country by 2025 and is also developing its next two solar farms. Hitachi has already backed U.K.-based Gridserve to the tune of £5.6 million ($6.9 million). Gridserve's first EV charging station in the southeast of England will have space for 24 vehicles to refill at the same time at speeds of up to 350 kilowatts.

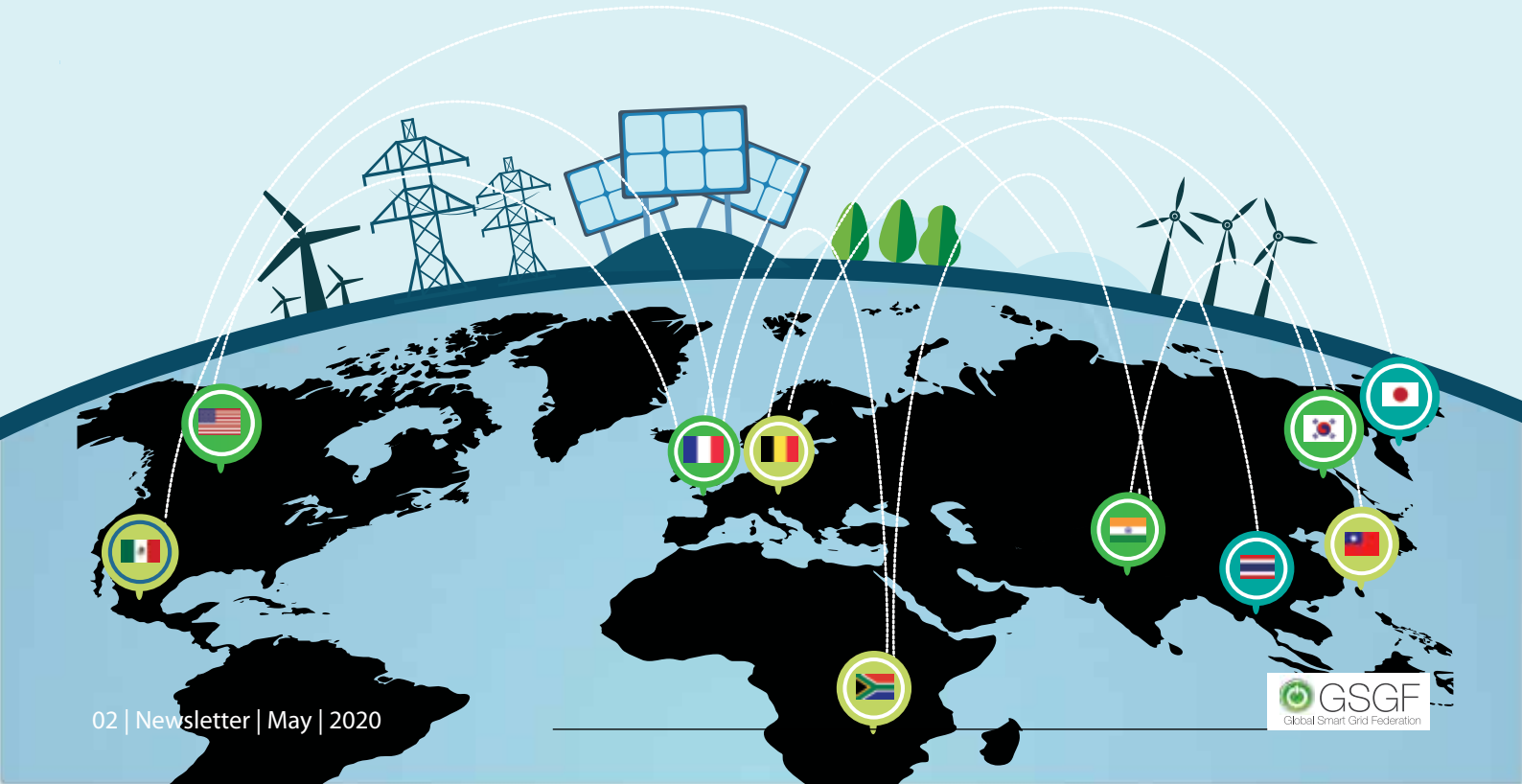
Read More: https://bit.ly/2ZfyRzd

Power Grid Operators in Europe Launch Blockchain for Home and Car Batteries

European electricity grid operators TenneT, Swissgrid and Terna have launched a cross-border blockchain platform to help stabilise the grid while allowing households to earn "a few hundred euros per year" from their home and car batteries.

The Equigy Platform, launched on April 2020, is a software that uses blockchain technology to "register and validate" tens of thousands of individual "energy transactions" between batteries and the grid. This will allow households to be paid for those transactions depending on the time of day, and the price of electricity that applies. For instance, discharging a car or a home battery would be worth money when too little electricity is being produced to meet demand, while charging would be cheap during times of excess power production. The open-source software will be made available free of charge but relies on "aggregators" and smart meters installed in people's homes.

Read more: https://bit.ly/2Xc4yXL



Global Stories on Smart Grid

NREL, USA Researchers Evaluating Blockchain for Transactive Energy Applications

Researchers at the National Renewable Energy Laboratory (NREL) are evaluating the use of blockchain for transactive energy using hardware in the laboratory's Energy Systems Integration Facility (ESIF). Blockchain serves as a distributed digital record of actions agreed and performed by multiple parties. Potential opportunities abound for the use of blockchain in the energy sector. The Congressional Research Service last year noted increasing interest among producers of distributed energy resources (DERs)—such as rooftop solar—to sell electricity to neighbors. Congress' public policy research arm predicted that if this approach proves "practical and economical, blockchain technology could alter the manner in which electricity customers and producers interact."

NREL researchers conducted experiments to learn what could happen when two homes were connected via a blockchain with the ability for one to sell excess solar power to another. This required two blockchain transactions: a secure transmission of data about the amount of energy generated, and a payment to the seller. Central to this research is an NREL-developed software solution called foresee. As a secure home automation system, foresee coordinates the operation of connected appliances, home batteries, and rooftop solar, satisfying homeowner values and preferences along with utility grid needs.

Read more: https://bit.ly/2XhtSM9

Tasmania Heads Towards 200% Renewable Energy Target

Announcing its vision to implement a number of actions towards improved renewable energy generation, the Tasmanian Government is shifting its focus towards the field for the next two decades. In its outline, they noted that there has never been a more critical time to streamline the move to renewables, especially as the economy looks for ways to recover from COVID-19's impact. The state is currently on track to become fully self-sufficient through renewables by the year 2022. This will make it the first state in the country with a generation rate that's 100% based off of renewables alone. But beyond this, Tasmania is also well-positioned to achieve a double in renewable production by the year 2040, which would significantly contribute to Australia reducing its emissions. Even globally, this kind of ambitious goal is unheard of and would mean Tasmania increases its output by up to 10,500GWh per year (if current 2022 goals stand correct). A temporary target of 15,750 of GWh has also been placed alongside a 150% objective by 2030.

Read More: https://bit.ly/2zOQ1Jm

Homegrid Forum Showcased Further Advances in the Smart Grid Sector with the Latest G.Hn Applications at IEEE ISPLC

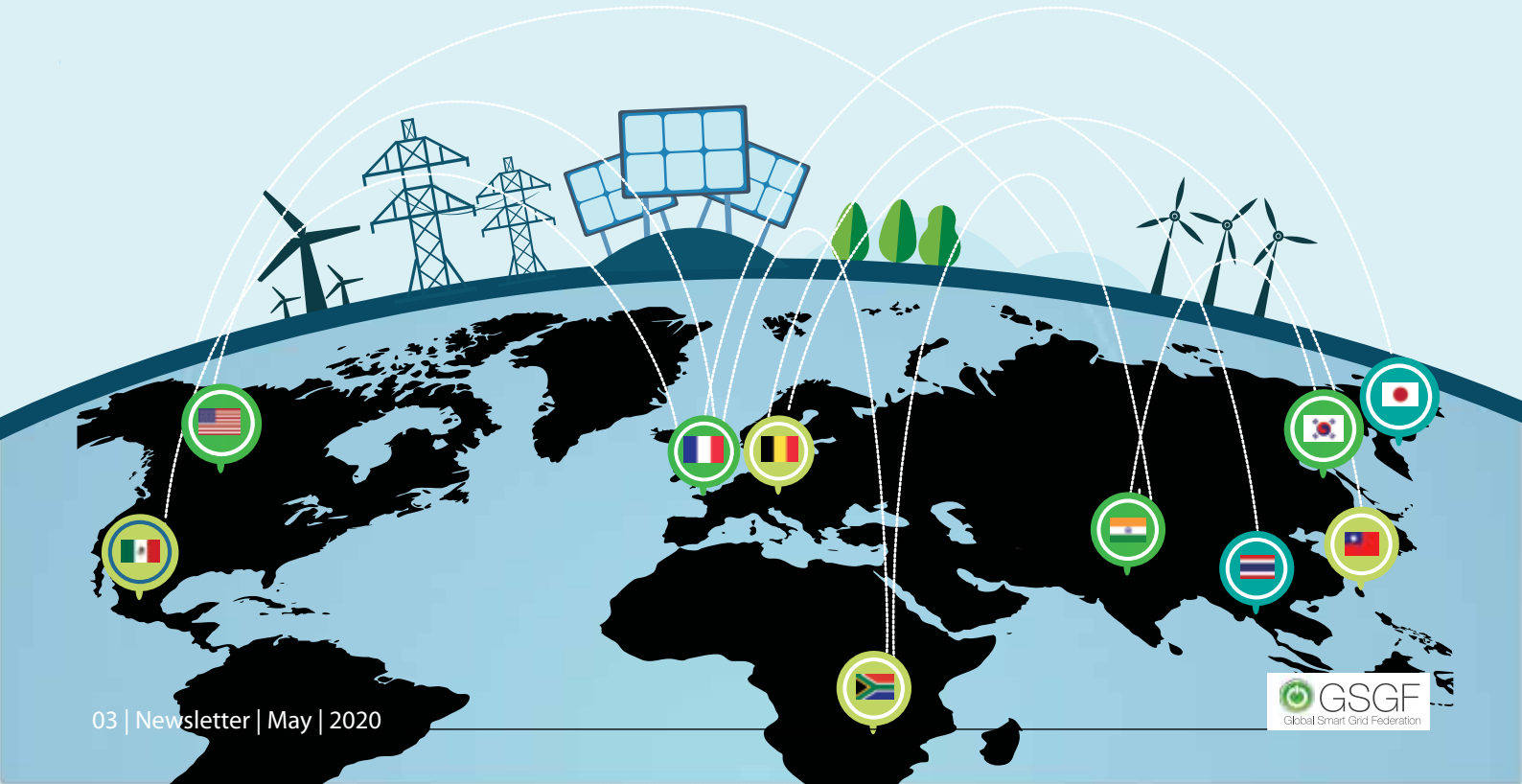
HomeGrid Forum is continuing to drive forward developments of G.hn technology that will revolutionize the future of Smart Cities. At the virtual 24th IEEE International Symposium on Power Line Communications (ISPLC), HomeGrid Forum's Marcos Martinez, Chair of the Contributions Working Group, unveiled the Forum's latest work on advancing G.hn for Industrial and Smart Grid applications around the world. HomeGrid Forum's participation in the virtual event followed the recent addition of major energy provider E.ON as the latest member to join HGF – strengthening its position within the Smart Energy and Smart City sectors.

Read More: https://bit.ly/3c257IW

With $164 Million, Global Battery Storage VC Funding in Q1 2020 Increased 20% YoY in India

Battery storage, smart grid, and energy efficiency companies received $252 million in venture capital (VC) funding in the first quarter (Q1) of 2020, a 20% increase from the $210 million raised in Q1 2019,. The global battery storage sector attracted corporate funding (including VC, debt, and public market financing) worth $244 million in nine deals in Q1 2020 compared to $130 million raised from nine deals in Q1 2019, an 88% increase. VC funding (including private equity and corporate venture capital) raised by battery storage companies in Q1 2020 increased to $164 million from six deals compared to the $78 million raised in seven deals in Q1 2019.

Read More: https://bit.ly/2M7IDMp



Global Stories on Smart Grid

Georgian Parliament Adopts Energy Efficiency Legislation

The Georgian parliament has adopted legislation on energy efficiency and energy performance of buildings, bringing the country closer to EU standards. The legislation aims to reduce emissions and pollution, improve the energy efficiency of buildings, as well as decrease energy imports and bolster the country's energy security. Welcoming the adoption of the legislation on May 21, Economy Minister NatiaTurnava said Georgia has been carrying out rapid reforms to turn its energy sector into a European-styled 'green energy sector

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

ADB Grants ₹346 Million Loan Towards Rural Electrification in Maharashtra

The Asian Development Bank (ADB) announced that it had approved a $346 million (~₹26.92 billion) loan to India to help provide efficient and reliable power to rural agriculture customers in Maharashtra. The loan would support the state government's high voltage distribution system (HVDS) program for new grid-connected rural agricultural customers across the state. This loan is ADB's first such sanction under the RBL modality in South Asia's energy sector and will help with the construction and installation of metered HVDS through the installation of 46,800 km of 11 kV grid extension lines, and the construction and upgrading of 121 33/11 kW distribution substations. The program also aims to expand the institutional capacity of the Maharashtra State Electricity Distribution Company Limited (MSEDCL).

Read More: https://bit.ly/3e47dcN

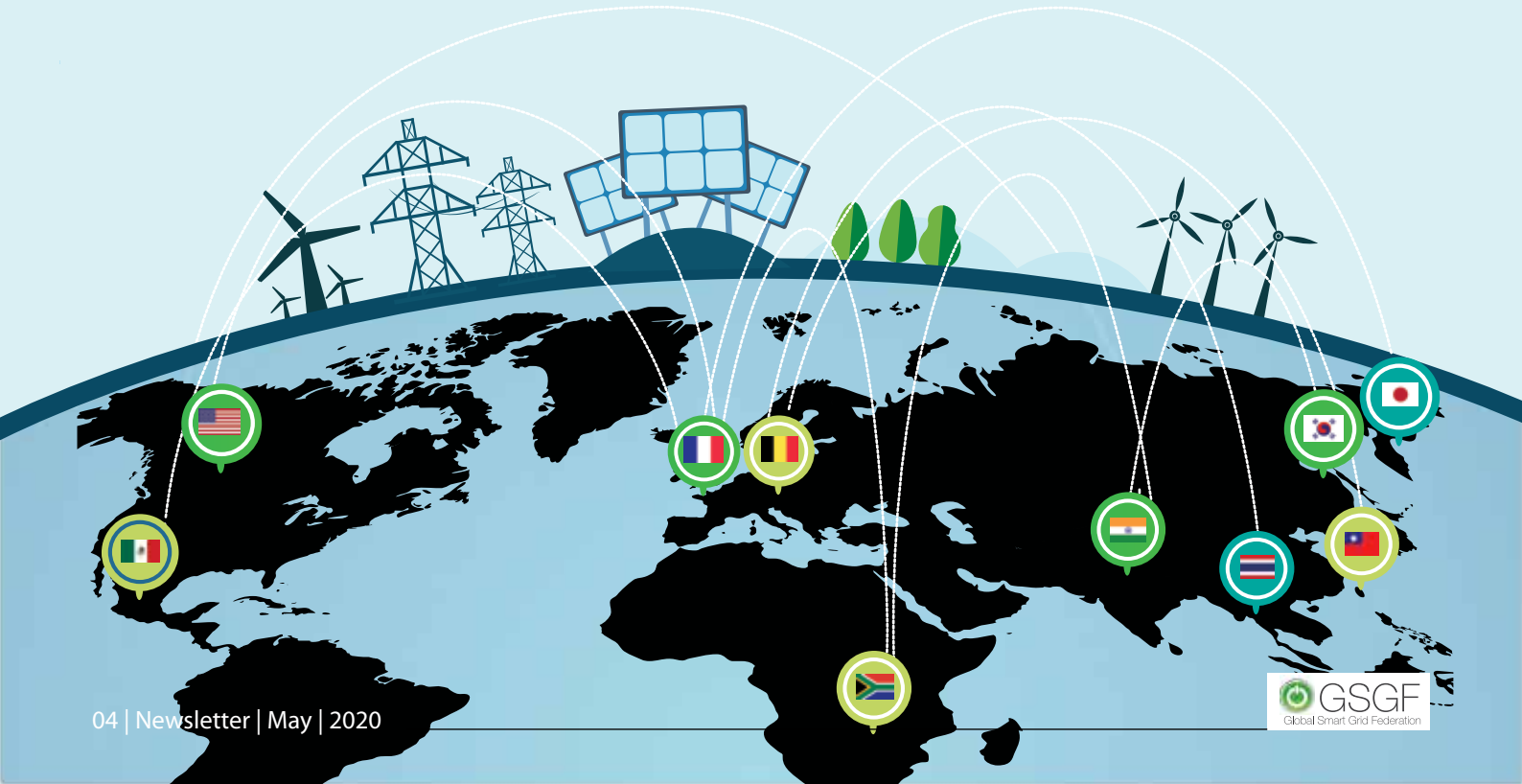
Events Supported by GSGF

Enlit Asia

23 - 25 March 2021 | ICE, Jakarta, Indonesia

Formerly POWERGEN Asia and Asian Utility Week

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



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Member Updates

The world's largest-class hydrogen production, Fukushima Hydrogen Energy Research Field (FH2R) is now complete at Namie town in Fukushima.

The New Energy and Industrial Technology Development Organization (NEDO), Toshiba Energy Systems & Solutions Corporation (Toshiba ESS), Tohoku Electric Power Co., Inc., and Iwatani Corporation announced the completion of Fukushima Hydrogen Energy Research Field (FH2R), which had been under construction in Namie town, Fukushima Prefecture since 2018.The FH2R has been constructed with a renewable energy-powered 10MW-class hydrogen production unit, the largest-class in the world, at the end of February.

FH2R can produce as much as 1,200 Nm3 of hydrogen per hour (rated power operation) using renewable energy. Renewable energy output is subject to large fluctuations, so FH2R will adjust to supply and demand in the power grid in order to maximize utilization of this energy while establishing low-cost, Green hydrogen production technology.

Hydrogen produced at FH2R will also be used to power stationary hydrogen fuel cell systems and to provide for the mobility devices, fuel cell cars and buses, and more.

Read more: https://www.nedo.go.jp/english/news/AA5en_100422.html

Advancing Clean Energy & Sustainable Energy Infrastructure through PEER

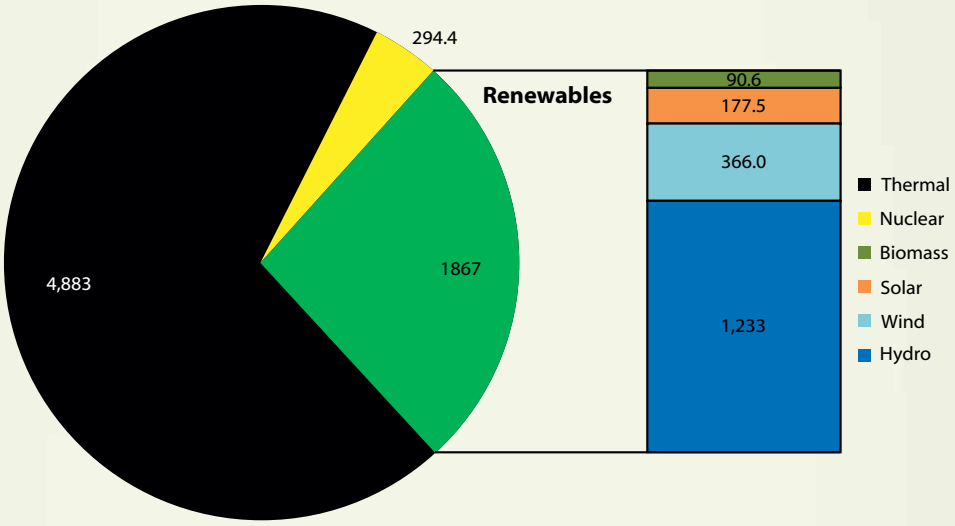
A BRIEF ON CHINA'S ENERGY INITIATIVES

By Green Business Certification Institute

BACKGROUND

China's power sector services 1.1 billion consumers, supplying 6,994 TWh from more than 1.91 TW of installed capacity. Coal is the primary source of electricity generation in China. The total installed capacity of renewable energy (including hydro power) in China is more than728 GW. At the end of 2018, China's power sector continued to be dominated by large state-owned companies.

Electricity Mix 2018 (TWh)



Source: China Energy Portal

China's power sector services 1.1 billion consumers, supplying 6,994 TWh from more than 1.91 TW of installed capacity. Coal is the primary source of electricity generation in China. The total installed capacity of renewable energy (including hydro power) in China is more than 728 GW. At the end of 2018, China's power sector continued tobe dominated by large state-owned companies.

The country's grid is owned and operated primarily by the state-owned State Grid Corporation of China (which supplies power to 88 percent of the country), while China Southern Grid, also state-owned, accounts for most of the remainder. A handful of large state-owned power generation companies are responsible for generating most electricity, including the so-called "big five" – China Datang Corporation, China Guodian Corporation, China Huadian Group, China Huaneng Group, and China Power Investment Corporation – that account for 47 percent of power capacity.

In 2016, the 13th Five-Year Plan targeted 2,000 GW of capacity to be installed by 2020 – a nearly 20 percent increasefrom the current capacity – and a 15 percent increase in the share of non-fossilfuel energy. Based on this five-year plan, China aims to achieve 6.5 percent annual average growth in their GDP from 2016- 2020 and also plan to reduce emissions per unit of GDP by 40 to 45 percent by 2020 compared to 2005 levels.

The world's biggest energy consumer is aiming for renewables to account for at least 35 percent of electricity consumption by 2030, according to a revised draft plan from the National Development & Reform Commission (NDRC).

Source: www.bloomberg.com

Post COVID-19: Hybrid Remote Utility Workforce

By
Ravi Seethapathy P.Eng., MBA, FCAE
"Ambassador for the Americas", Global Smart Grid Federation, USA

Old Normal, Modified Normal, New Normal.Que Sera, Sera (what will be, will be).In the last newsletter, I wrote about the potential lifestyle changes for us in a post COVID-19 world (work, home, other). A few calls have come in as to what this means for large businesses and utilities (justadded a behavioral specialist to our team).However, this article is restricted to utilities.

Remote interaction is not new to a utility. Thirty years ago, we would walk into a customer center to pay our bills, till it disappeared into direct banking. The (remnant) customer care service at those centers then disappeared into remote call-centers. Twenty years ago, a meter reader would come to our homes to read the meter, till that too disappeared into AMR and then AMI. Fifteen years ago, internal field staff interactions went remote, under a new asset management model, which saw field districts/circles relegated to a just a "ticketed maintenance service" from a more responsible "assetmaintainer/operator" role. The (remnant) network operations was centralized into single grid control center for the entire utility.

It is not clear how quickly the post COVID-19 work environment would return to the "old normal". Many are estimating2 years (several resurgence cycles, herd immunity builds and effective vaccines). Others are speculating that we may never return to the old ways, but will settle on a "new normal" with revised social distancing, people-people interactions, less travel, and a redefined work structure. New technologies could become a catalyst for such changes. For sure, peoplebehavior will be the final determinant of the new work structure. In some areas, this transformation could be radical.

Not knowing where the chips will fall, utilitiesshould have contingency plans for such a re-defined hybrid remote workforce.It is better to be ahead of the curve and understand what/whom/how will these changes impact and which work segmentsare likely to see major changes.Utilities also bear unique policy/regulated service mandates and therefore their strengths/weaknesses (people/processes) cannot be easily compared (apples-apples) with other large business organizations.

In a utility today (despite past reorganizations/clustering), most teamwork is performed in physical proximity. In-house training and close supervision are still central in all its three verticals (Asset Management, Field Servicesand Customer Care). They all have acommon emphasis towards (a) worker/public safety, (b) asset preservationand (c) good customer relations.However, each utilityworkforce is trained "culturally" different due to its local service territory focus (language, customs).Utilities serving larger geographies, may have several such workforce cultures. This cultural aspect needs understanding.

Mandated social distancing will need a hybrid team structure (local/remote).The remote team members may themselves be remote from each other (e.g. work from home). While such remote work is not new in many ITindustries, their effectiveness model is built on work cultures, staff qualities and tools (people/process/systems)that makes such remote working productive. In other words, the team selection is picked around this trust (confidence) that each worker is capable of doing his/her job satisfactorilyalone and with remote supervision.This aspect conflicts with utilities whose staff have been picked/trained to work in close proximity, close supervision and now need to be "re-purposed" for remote work/supervision.

For a utility, the question is, how can this hybrid model be planned and executed "in-flight" with existing staff?Can supervision and culture training be re-programmed for remote work?This is not a simple task as soft skills, behaviorand aptitude of each candidate needs to be assessed (for such remote work) and selections made accordingly. Not all staff can (or are suited) to work independently with remote supervision. A second issue is, how can work quality be assessed from remote?This transition to hybrid remote work with existing staff is extremely difficult.Utilities do not have the luxury of starting afresh.

So, in designing this transformation, a new set of people/attitude/aptitude requirements (for remote work trustworthiness) needs to be created through critical behavior tools and formal staff assessment. This would include (a) creation of soft skills criteria, remote supervision requirements and aptitude assessment; (b) mapping of current work, tools, specializationand supervisioninto this new remote requirement; and (c) identifying gaps, mitigation measures and new training methods.Each of the three organizational verticals (and their hierarchy)will need such new criteria.In doing so, tough questions will need to be asked as to (a) how will staff motivation be assessed (what tools) to retrain; (b) elements of remote supervision success metrics (team trust); (c) training process andcontent; (d) rollout across verticals (with ongoing work); and (e) changeover timelines

In my view, one needs to undertake a careful pareto analysis based on divisional/departmental/section /locationwork content, team interactions and schedules. A good change management team will need to be created. The following rollout phases may be considered:

1. First would be Customer Care (billing, collections, call center). They are the most congestedin seating, highly computerized, repetitive transactions and have a good scripted customer response withwell-established escalation process. However, they are the most closely supervised group due to lower education requirements and ensuring good customer experiences. Models could be adapted from travel, telecom, and other services industry, where first levels operate from home.

2. Second would be Asset Management/Planning. They are head office centric, congested seating, highly computerized, use technical tools (albeit not so repetitive) and have a good engineering rule book with an established escalation process. However, despite their higher levels of education, they are closely supervised due to the complexity of technical work and high cost of mistakes. The tools used by them are expensive, so arrangements for remote access would need to be enabled. Models could be adapted from the EPC and Project Management industry where such teams operate in clusters. Due to content complexity,work from home may not be possible, so small team clusters may need to be set up off-site with periodic visits to headquarters.

3. Last would be Field Services. Their trades-oriented team structures and close work supervisionpose challenges for remote unsupervised work. However, this has been accomplished in developed countries where systemstraining levels are high,such as in metering/relaying/telecom functions, but not in core trades (mechanical, civil, electrical). A benefit could be that if they are spread across many dispersed field centers, social distancing could be achieved through task scheduling (office and at job sites). Small urban utilities may have some issues here. Models could be adapted from multinational O&M and renewable energy service companies.

The hybrid remote workforce model will vary by a utility's staff size and service territory. There are no stock methods to success, but transforming work cultures with existing staff is very difficult universally. So, if the "new normal" is to hold true, then utilities have no choice but to be better prepared.

GSGF at a glance

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Energy Block Chain Consortium

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- **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

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