GSGF
Global Smart Grid Federation

NEWSLETTER

August 2020

Mini grids and electrification. The case of Benin, a laboratory of innovative projects

Targeting universal access to electricity by 2030 in developing countries, requires a combination of grid expansion and off-grid technologies, such as mini-grids and stand-alone PV systems, which plays a vital role in providing electricity especially in rural areas.

Benin, a small country of 11 million inhabitants on the western coast of Africa, had a large deficit in electrical energy, importing, via the CEB, from neighbouring countries, Togo, Ghana, Nigeria. Today more than 3.5 million Beninese still do not have access to electricity service. In 10 years and regardless of the network extensions carried out, there will still be 2.3 million people "off the network".

The challenge of a new energy policy in Benin is to provide quality off-grid electricity service to these populations in the short term on a major investment program to move towards energy autonomy, and general access to energy for the populations, and the Millennium Challenge Account Benin II (MCA-Benin II) is supporting several large projects, focusing on the development of electric power.

MCA-Benin II has selected of eleven companies of the OCEF (Off-Grid Clean Energy Facility) second Call for Proposals. These mini-grids will be used to provide electricity to households, businesses, and industries. They will be built over the next twenty-four months and operated for 25 years under a concession agreement to be signed with the Beninese State through the ABERME (Conceding Authority) after receiving the opinion of the Electricity Regulatory Authority (ARE). Together, these various initiatives will increase the energy production capacity by 13.4 MW and provide reliable and quality energy to 128 localities through mini-solar grids and 39 localities through solar home systems.

With these initiatives in partnership with private investors and operators, Benin will become a sort of laboratory of innovative projects. Henri Boyé is consultant in energy, working on electrification projects in Africa, and in Benin for solar projects with MCA Benin II.

Henri also works with Algorus Consulting. List of the 11 selected companies of the MCA Benin II OCEF Second Call for Proposals and their objectives :

http://smartgrid.over-blog.com/2020/08/mini-grids-and-electrification.html

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Global Stories on Smart Grid

ABB to Deliver 250 Rapid Charging Stations to Japan

Key Highlights: The Terra 184 is basically compatible with CCS, CHAdeMO and type 2 for AC charging. The maximum charging capacity of the Terra 184 is 180 kW.

The Japanese company e-Mobility Power (eMP) has ordered 250 units of the recently introduced Terra 184 rapid-charging stations. eMP is a joint venture between the Tokyo Electric Power Company (Tepco) and Chubu Electric Power, two of Japan's largest utilities. ABB states that the Terra 184 will be used to modernize the charging infrastructure and the new charging stations are to be installed at roadside shops, on motorways and in public places. The Terra 184 is basically compatible with CCS, CHAdeMO and type 2 for AC charging. The maximum charging capacity of the Terra 184 is 180 kW.

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

Pilot-Project for Peer-To-Peer Energy Trading Launches in Singapore

Electrify, a Singaporean energy innovation company, has launched a pilot-project for peer-to-peer (P2P) energy trading in the city-state. The project will allow consumers to purchase renewable electricity produced by private solar panel owners via an online marketplace from across the city. The pilot project is built upon Electrify's proprietary P2P energy trading platform, Synergy, and builds upon a successful technical trial conducted in Singapore in February 2019. The pilot is conducted in collaboration with energy company Senoko Energy and is sponsored by Engie Factory, the venture arm of French multinational electric utility company. Electrify has forecasted US$60m worth of solar energy to be transacted across major Southeast Asian markets by 2023, a significant increase from US$2.6m next year.

Read More: https://bit.ly/2FQ0Ga1

Egypt to Transform its National Electricity Grid into a Smart Grid

The national government of the Arab Republic of Egypt through the state-owned Egyptian Electricity Holding Company (EEHC), is set to transform its electricity grid into a smart grid with the help of the French industrial group Schneider Electric. The two entities have already signed a US$ 287.5M contract for the implementation of the project. The scope of the work includes the construction of four control centers that will use Schneider Electric's Advanced Distribution Management System (ADMS) to monitor, control, and reconfigure the grid, using "big data" and artificial intelligence. These devices will help improve the availability of electricity by detecting network faults as soon as they occur and then reconfiguring the network to ensure stability. This project is the first of its kind in the region and it is expected to increase the efficiency and sustainability of the national electricity grid owing to the deployed smart technologies.

Read More: https://bit.ly/34h5sHr

World's Largest Battery Storage Project Unveiled in San Diego

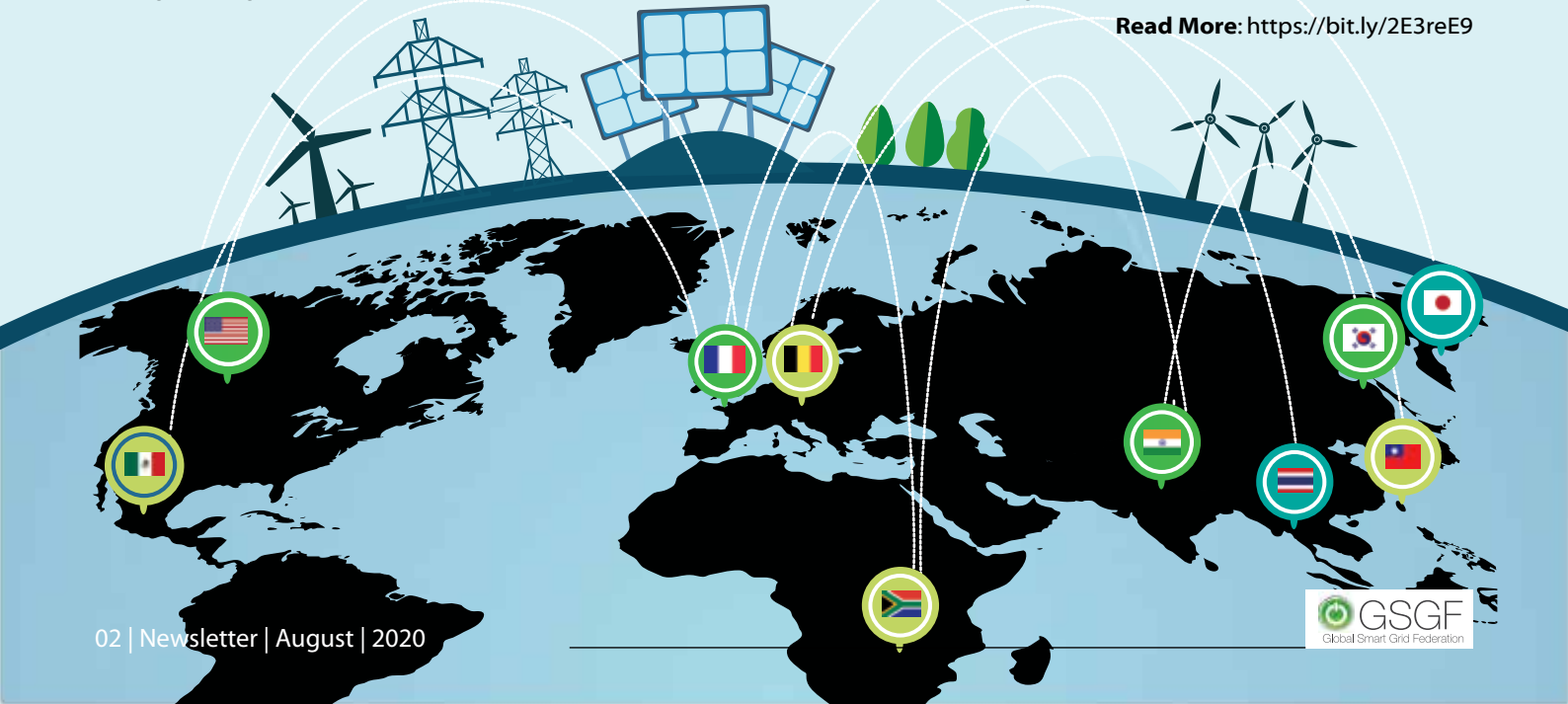
The 250 megawatt (MW) Gateway project, located in the East Otay Mesa community in San Diego County, California, enhances grid reliability and reduces customer energy costs. In doing so, Gateway provides a valuable resource for energy consumers, utilities, and other load servers across California. Gateway Energy Storage, constructed by LS Power, currently at 230 MW and on track to reach 250 MW by the end of the month, follows another LS Power battery project, Vista Energy Storage in Vista, California, which has been operating since 2018 and was previously the largest battery storage project in the United States at 40 MW.

Read More: https://bit.ly/2FKtUa8

Okos Smart Homes and Gaz Métro Plus Launches a New Smart Home Pilot Project

Okos Smart Homes and Gaz Métro Plus, an Energir company, are proud to launch an innovative pilot program in Quebec helping natural gas customers save energy with smart home technology. Okos Smart Homes is a Canadian CleanTech company part of the solution to help utilities reduce greenhouse gas emissions and reach their conservation goals. This new pilot, set to start deliveries in October, will be a first for Quebec's natural gas industry, reducing energy demand and GHG emissions. This innovative approach to energy conservation efforts eases adoption and increases participation rates while offering attractive devices to customers. On average, savings of 3,000kWh per year, per household, can be achieved without affecting homeowners' comfort levels.

Read More: https://bit.ly/2E3reE9



Global Stories on Smart Grid

Utilities Companies Adopt Cost-Effective 5G and 4G IoT Connectivity for Smart Meters

To connect their smart meters, utility companies are moving away from what they've traditionally used, mesh technology such as Wi-SUN® with distributed access points, toward 3GPP standardized 4G and 5G cellular. This is because the price of 4G LTE modules and chipsets have dropped significantly now that LTE networks are universally available and volume pricing has come into play. While Wi-SUN technology may have been the best option for connecting utility meters in the past, today the advantages of cellular have upended this paradigm. It introduced a new economic environment in which cellular has become the better choice to connect smart utility meters: better in cost, scale, and efficiency. Read More: https://bit.ly/3jdoinp

World's First Carbon-Negative Hydrogen Project gets Green Light

Hazer's commercial pilot in Western Australia will convert biogas into hydrogen and graphite, a solid form of carbon.

Australian technology company Hazer will convert biogas derived from sewage at a wastewater treatment plant in Western Australia into hydrogen and graphite using its proprietary Hazer process. By splitting the biogas (mainly CH4) into hydrogen (H2) and graphite (C) using an iron-ore catalyst, carbon that would otherwise be emitted as CO2 as the sewage decomposed is stored in the form of solid graphite, making it a carbon-negative process. The graphite can be sold to industry for a profit, effectively offsetting the cost of the hydrogen to the point where it becomes cheaper than other forms of clean H2. The Hazer process is also far more energy efficient than water electrolysis, requiring only 15-30kWh per kilogram of hydrogen, compared to the latter's 65kWh — producing 2-4 times as much H2 for the same energy, further reducing the relative cost of the Hazer hydrogen compared to traditional green H2. The $17m pilot at the Woodman Point Wastewater Treatment Plant, known as Commercial Demonstration Project (CDP), will produce 100 tonnes of hydrogen and 380 tonnes of graphite per year. Some of the hydrogen produced will be converted to electricity via a fuel cell, allowing the project to produce its own renewable power. Woodman Point already produces biogas at its facility inside large tanks known as anaerobic digesters.

Read more: https://bit.ly/311A65A

First Grid-Scale Battery Storage Project in Alberta, Canada, Comes Online

The first grid-scale battery energy storage project in the Canadian province of Alberta is on-track to go into operation this month, while TransAlta, the company behind the project, has expedited plans to retire a coal plant citing future market conditions. TransAlta Corporation, which generates and is engaged in wholesale marketing of electricity, is building the WindCharger 10MW / 20MWh lithium-ion battery storage project in the municipal district of Pincher Creek, through its subsidiary Western Sustainable Power Corporation. As the name implies, the project is being built at the site of a wind farm, also operated by TransAlta. The company said it had been investigating the viability of battery storage at its various wind farm locations before selecting the Summerview Wind Farm in Alberta. Approval was granted for WindCharger to be built at the wind farm's substation in November 2019 by the Alberta Utilities Commission and construction began at the end of March this year. While it had originally been expected to be completed in June or July, TransAlta announced in its second quarter 2020 results reporting on 31 July that the project is to be completed during August.

Read more: https://bit.ly/2FnVE42

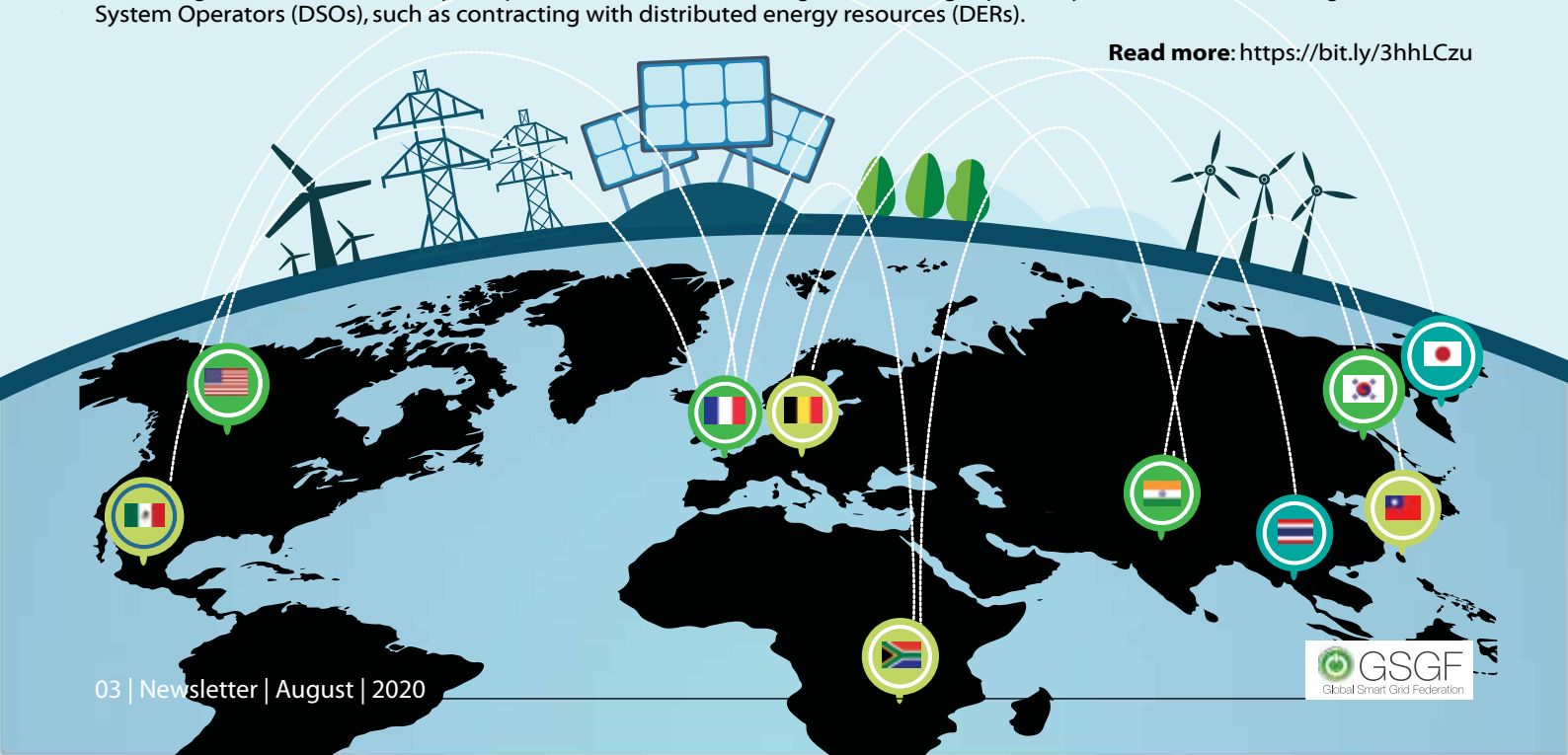
Blockchain demonstrator helps energy companies explore the potential of distributed ledger technologies

A tool developed by Frazer-Nash Consultancy demonstrates the way distributed ledger technology could be used to help shape the UK energy distribution network

Systems, engineering and technology consultancy, Frazer-Nash, has been working with the Energy Innovation Centre and three of the distribution network operators (DNOs): SP Energy Networks, Scottish and Southern Electricity Networks, and UK Power Networks, as well as Cardiff University, to imagine the future of the distribution network.

The company has developed a demonstrator tool that is helping the DNOs to explore Blockchain and Distributed Ledger Technologies (DLTs) more broadly, as a potential solution for solving new challenges posed by their transition to being Distribution System Operators (DSOs), such as contracting with distributed energy resources (DERs).

Read more: https://bit.ly/3hhLCzu



Global Stories on Smart Grid

AWS and New Zealand electricity and gas distribution company Vector launched IoT-connected energy platform

The New Energy Platform aims to change how energy is managed, delivered, and consumed across Australia and New Zealand

Amazon Web Services (AWS) has partnered with New Zealand electricity and gas distribution company Vector to develop an Internet of Things (IoT) and analytics solution, targeted at the energy sector. Under the multi-year "strategic alliance", the companies will jointly develop the New Energy Platform (NEP) in hopes of delivering consumers more affordable, reliable, and cleaner energy options across Australia and New Zealand. The NEP is powered by AWS and its initial focus would be to "rapidly" collect and analyse data from more than 1.6 million IoT-connected Vector advanced meters that gather information on energy consumption and network performance across the two countries.

The NEP will leverage AWS IoT Analytics, which is a fully-managed service helping to run and operationalise sophisticated analytics on massive volumes of data. It is expected the service would provide Vector and other energy and utilities companies with insights on network performance to help plan energy networks, drive smarter investment decisions, and increase reliability for consumers.

Read more: https://zd.net/34gsOwR

Events Supported by GSGF

Enlit Asia

23 - 25 March 2021 | ICE, Jakarta, Indonesia
Formerly POWERGEN Asia and Asian Utility Week

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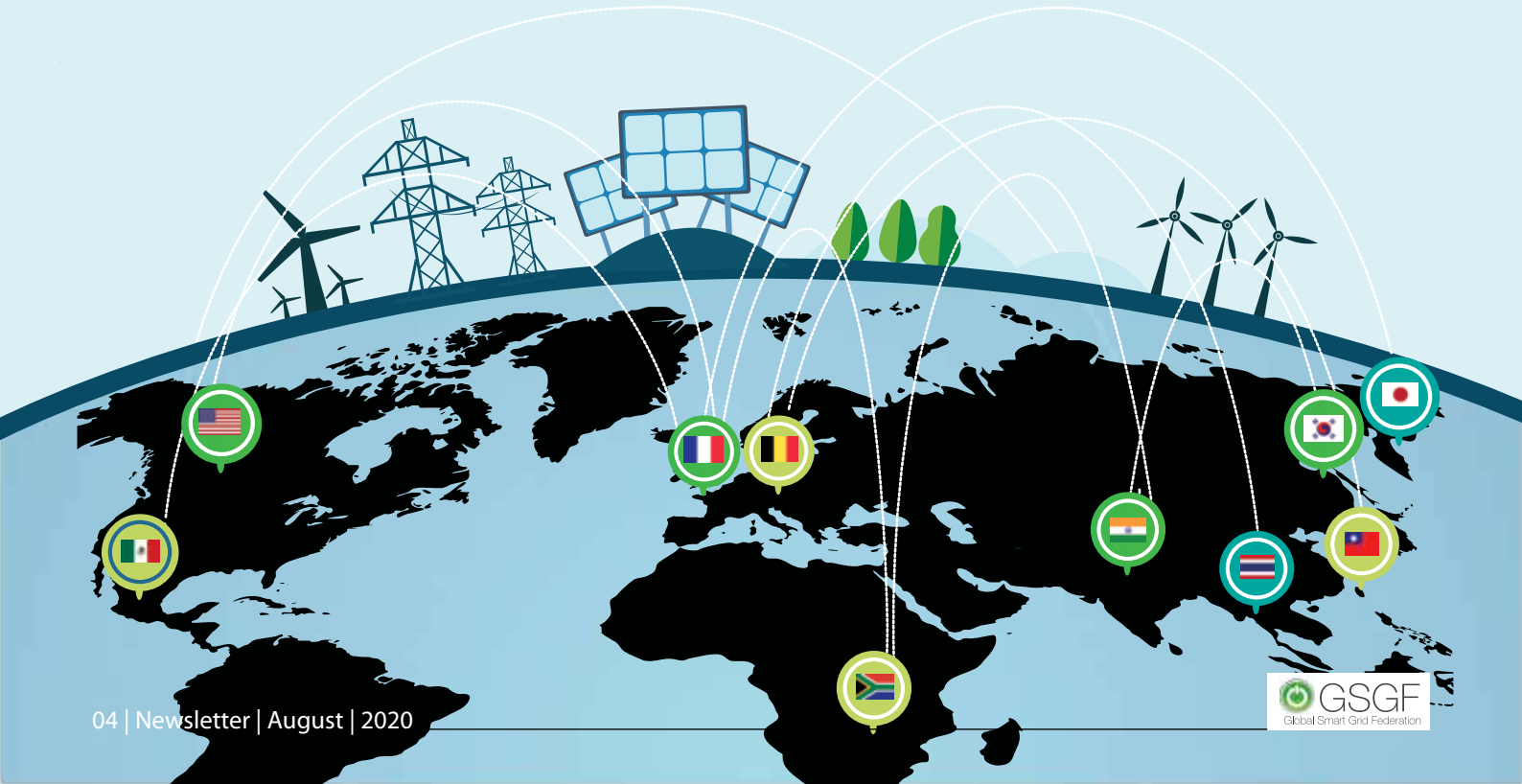

Member Updates

Precertification Options for PEER V2 Design and Under Construction Phase Projects

PEER is the first ever rating system that drives market transformation in the power and energy sectors. Through certification, PEER recognizes industry leaders for improving efficiency, day-to-day reliability and overall resiliency when it comes to severe events, such as flooding and hurricanes. PEER is for all power systems and includes guidance for cities, utilities, campuses and transit.

GBCI is now offering PEER Precertification as an optional step in the certification process for all PEER project types. PEER Precertification recognizes projects which have implemented the fundamental actions and policies needed to effectively design a reliable, resilient and efficient power system, which can demonstrate the commitment to achieve PEER Certification.

PEER Precertification is available to all project types that include campuses, cities & utilities and transits (for definitions visit - http://peer.gbci.org/). Consultants and project teams who would like to develop a smart grid/micro grid can use this precertification as a starting tool in mapping their requirements and set performance goals even before designing or while in the middle of the construction phase.

Precertification helps project owners to:

- Design and deliver a smart, reliable and resilient grid system,
- Create visibility, transparency and build momentum for the project team,
- Increased opportunity to access infrastructure funds by drawing a roadmap on sustainable electricity,
- Demonstrate their commitment on reliable power supply to their consumers, and
- Achieve a global certification.

Learn more about the precertification process by reviewing the PEER Precertification Guidance which outlines details about the process. Also, projects can access the precertification worksheets here: Campuses, Cities & Utilities, and Transits, which is one of the first step to kickstart a project's journey towards precertification.

Once a project has successfully completed the precertification review, GBCI will provide formal recognition of the team's efforts. PEER Precertified projects can market themselves to attract potential investors and financial agencies who recognize the benefits of reliability and resilience.

To get started projects should:

- Register the project,
- Complete prerequisites provide commitment or estimation for the credits and complete the process, and
- Submit for review.

We look forward to engaging with all of you wherever you are in your journey to build an efficient and sustainable power system! Get in touch with us for any further questions/clarifications on PEER Precertification - peer@gbci.org

Insight - TNB looks to the future

"TNB remains prepared for demand volatility although peak demand had recovered to 17,484MW on June 11, the highest since the start of the MCO on March 18, " said TNB chief strategy and regulatory officer Datuk Fazlur Rahman Zainuddin.

DEMAND for electricity may have improved but the impact of the full Movement Control Order (MCO) period and the challenges in collection will hit Tenaga Nasional Bhd's (TNB) earnings for the first half of the year. Recovery in earnings in the second half will depend on the control over Covid-19 and the speed of the revival of the economy.

While the pandemic has affected the group's efforts to reduce its exposure in Turkey and India, its assets in Britain are insulated by a long-term subsidy scheme.

With TNB leveraging on its existing assets in Britain, and its market experience, it aims to build up a sizeable renewable energy portfolio by 2021 through acquisitions of operating assets and development of greenfield projects.

With its aim to help develop a global solar manufacturing hub, TNB will speed up the execution of its investment in 1,400MW of large-scale solar farms and 75MW of distributed solar generation.

To support economic recovery in the medium term, TNB has identified six areas that can potentially contribute RM120bil to growth, and create almost a million jobs.

Since the MCO, demand for electricity has dropped by 25%, caused mainly by a slowdown in the industrial and commercial sectors. For the rest of this year, this demand is expected to drop by between 7% and 15%.

"TNB remains prepared for demand volatility although peak demand had recovered to 17,484MW on June 11, the highest since the start of the MCO on March 18, " said TNB chief strategy and regulatory officer Datuk Fazlur Rahman Zainuddin.

The pandemic is impacting the group's restructuring and turnaround exercise as well as sale of investment especially in its 30%-owned companies in GAMA (Turkey) and GMR (India).

But in Britain, TNB's wind farm assets through GVO Wind and Boomerang Capital, have performed well; these two companies have the largest Feed-in Tariff (FiT) wind portfolio in Britain, with 53 operational onshore medium wind turbines with a total combined capacity of 26.1MW.

FiT is a payment made for the generation of electricity using renewable energy sources. Last year, these two companies under Tenaga Wind Ventures UK (TWV), contributed RM76mil in earnings before interest, taxes, depreciation and amortisation.

TWV sees its revenue remaining insulated from low wholesale prices due to the FiT subsidy scheme and early locked in power purchasing agreement prices.

Read More: https://bit.ly/32FFg6X

Article contributed by:

Dr. Ir. Cheong Kam Hoong

GSGF Ambassador (Asia Pacific Region)

5 Aug, 2020

The Upcoming Cooling Crunch

By

Ravi Seethapathy P.Eng., MBA, FCAE "Ambassador for the Americas", Global Smart Grid Federation, USA Executive Chairman, Biosirus Inc., Canada

The July 2020 issue of the IEEE Spectrum Magazine had a very interesting article by Prof. Vaclav Smil, a Canadian well known for his climate impact projections. I have met him a few times at the International Cool Earth Forum (ICEF) in Tokyo (on whose Board he sits). His passion for climate change is by offering stark scientific projections straight into everyday human lives. Amongst various observations in the above IEEE article he notes, *"if air-conditioning were to be provided to the more than 200 million inhabitants of Uttar Pradesh, a single state in India whose average summer temperature is far higher than that in Florida, this would require at least twice as much electricity as the cooling demand in the United States, with its 330 million people"*.

To extend his point, I would add, that if the major populations in the other Indian states (all equally hot and muggy) were to adopt air-conditioning (A/C, then the electricity rise to meet cooling use alone in India would likely be double its current national capacity. One can continue this extrapolation by adding rest of Asia, Africa and Latin America as their own populations increase and their per-capita incomes rise. All in all, a staggering load growth to meet cooling demand.

The above scenario is wake-up call not just for climate change reasons, but also for the electricity infrastructure sector as well (particularly the last mile where it serves loads). It would be a huge challenge to expand this last-mile electric infrastructure just for meeting cooling demand (seasonal or continuous). A few large North Indian cities (like New Delhi) are already witnessing larger distribution transformer capacity build (and its "asset under-utilization" in lean periods). In most developing countries, feeder overload trips due to large use of air-conditioners, is denying others of their minimum right to electricity for lighting, computers, fridges, etc. The above IEEE article has the International Energy Agency (IEA) projecting about 5.5 billion A/C units being deployed worldwide by 2050, with the highest demand coming from the Middle East, China and India. It also projects that the for these three, the current cooling demand (2016 baseline) at 15%, 15% and 10% respectively will rise to 18%, 32% and 45% respectively by 2050. It notes that even with efficient cooling technologies, the 2050 scenario tempers the cooling demand to 12%, 12% and 19% respectively. The USA with its largest cooling deployment (90% penetration) projects at 28% (2016), 32% (2050) and 22% (2050 with energy efficient units). The IEEE article concludes, "*Rising temperatures, rising incomes and growing populations make the rapid growth in air-conditioning unstoppable. All we can do is moderate this growth through planning, smarter buildings and strict enforcement of energy efficiency standards for new A/C units*".

While I fully agree with this conclusion, there is an important part that seems to have been overlooked. One needs to examine how an A/C unit meanders through its useful life. As a part of its life-cycle value chain, a new A/C unit typically serves its first owners for 10-12 years (thereafter replaced by a new unit), upon which "just removed" unit undergoes refurbishment and is sold in the aftermarket for a cheaper cost (as a refurbished unit). This phase lasts another 5-7 years after which it is yet again refurbished and sold/leased in cost conscious/poorer segments at throw-away prices (poor, rural, shops, construction sites). *Thus, an A/C unit effectively serves for a good 25 years before being scrapped. Therefore, adopting high efficiency standards for new A/C units alone does little to mitigate this life-cycle problem*. In Canada (under an earlier Energy Efficiency program about 12 years ago), customers possessing old units were "incentivized" to have it disposed to their respective utilities for pick-up (via a rebate program) and then destroyed, thus preventing its 15-year refurbished after-life. A second parallel path adopted was to incentivize easy retrofit gadgets that reduced the energy consumption by up to 25% (compressor/cooling cycle optimization). This was additionally supported by a rebate program towards purchase of new high efficiency units. For C&I customers, it was up to $400/KW of demand reduced (cheapest new generation being about $800/KW)

Power system engineers, Governments, Regulators, and the air-conditioner (HVAC) manufacturers, must act now to tackle this explosive market/load growth. The status at present in most jurisdictions is as follows:

1. While the OEMs have made big strides in manufacturing low-power consuming units (heat pump and DC technologies), the cost of these units are high (longer ROI)
2. Current tariff subsidies coupled with cheap after-market A/C units, exacerbates this problem even more.
3. In jurisdictions where the cooling requirement is seasonal, the "idle" capacity in the cooler months still needs to be capitalized and paid for by all (poor asset utilization).
4. Governments are making efforts in energy efficiency standards (energy star ratings), but no incentives are provided for purchasing such higher cost A/C units, nor incentives for the secured scrap disposal of the older units (to prevent it from being refurbished).
5. Regulators have not even begun to address this upcoming A/C load growth phenomenon to arrive at potential options i.e. (i) Time-of-Use (or dynamic) rates; and/or (ii) Demand Response (Peak Load Management); and/or (iii) incentives for an Energy Efficiency program to be administered through its regulated utilities. In many developed countries, electricity generation has seen their peak production move away from the winter to the summer months.

In many hot areas of South/Southeast USA, incoming branch circuits to individual homes, had to be increased to 200 Amps (some even 400 amps) due to air-conditioning loads. This is also the case today in the Middle East and is seeing a huge increase in cooling requirements due to demographic and life-style choices. In large urban cities in Asia, air-conditioning loads are causing overloads at night. Many utilities (particularly in Asia, Latin America and the Middle East) have not drawn up last-mile distribution plans to deliver such increases in cooling demand either via upgraded feeders/distribution transformer or through the strategic use of energy storage systems on secondary LT circuits during overload periods.

Countries need to wake up and rise to meet this huge cooling-load demand growth challenge. It will take a combination of all available tools (technology, tariffs, incentives/penalties, load control), as well as enforced standards, to address this. In addition, an effective persuasive communication outreach campaign needs to be sustained to educate the public in making right choices. Another business model would be to create District Cooling utilities and/or Cooling as a Service (CaaS) entities. *Till then, I am afraid, feeder overload trips due to large use of air-conditioners, will deny others of their minimum right to electricity (lighting, computers, fridges, etc.)*

The cooling crunch in indeed coming.

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

GSGF at a glance

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- **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.

Global Smart Grid Federation (GSGF)
1800 M Street, NW, Suite #400S, Washington, DC 20036
@ info@globalsmartgridfederation.org
www.globalsmartgridfederation.org

Newsletter Team
Aashima Chaney | Bindeshwary Rai | Sudhasatta Kundu | Balasubramanyam Karnam
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