



Global Smart Energy Federation  
Formerly known as Global Smart Grid Federation

# NEWSLETTER

September 2020

## GSEF releases White Paper on “Electromobility in Smart Grids: State of the Art and Challenging issues Worldwide”

GSEF conducted a very successful webinar on 8th September, 2020 where the White Paper on “**Electromobility in Smart Grids: State of the Art and Challenging Issues Worldwide**” was released.



The objective of the Webinar was to launch and release GSEF’s much-awaited report on “**Electromobility in Smart Grids: State of the Art and Challenging Issues Worldwide**” which describes the state-of-the-art technologies and challenges globally faced with charging of electric vehicles (EV) and its impact on the electric grids.

Mr. Reji Kumar Pillai, Chairman GSEF, welcomed the audience and announced the name change of Global Smart Grid Federation (GSGF) as Global Smart Energy Federation (GSEF).

Prof. Marc Petit, the Lead author of the report and Professor at Centrale Supélec, France presented the report.

Prof Willett Kempton, Professor, University of Delaware gave a Special Address on “**Grid Integrated Vehicles (GIV) Technology and Policy Implications**”. He shared very interesting and insightful concepts of grid integrated vehicle system and the economic benefits of electric vehicles in participating in the power market and providing ancillary services.

Valerie-Anne Lencznar, Vice-Chair, GSEF thanked the eminent speakers for the excellent work and productive and informative presentations.

The aim of this report is to present the policies for public charging in an evolving power market and required changes in power transmission and distribution network to integrate electric vehicles into the power system under transformation. This report will further expand the mission of GSEF to develop and create smarter, cleaner electrical infrastructure for public transport around the world.

We hope the ideas presented in the report will be an inspiration for our colleagues working in grids across the world to innovate in electromobility, the cornerstone of decarbonized energy networks.

**Link to download the GSEF report:**

<http://globalsmartgridfederation.org/report/category/21>

**Link to access the recording of the Webinar:** <https://youtu.be/LDDqKWCHNOs>

### Table of Contents

Page	News topic
1	<b>Cover story:</b> GSEF releases White Paper on “Electromobility in Smart Grids: State of the Art and Challenging issues Worldwide”
2-4	<b>Stories across the globe on Smart Grids:</b> <b>Special:</b> California to Add 38,000 Electric Vehicle Charging Stations Stefanini Group Launches Smart Cities Efficiency Technology
5-6	<b>Member Updates</b> <b>Special:</b> Smart Metering: Benefits for Electrical Networks and Feedback from Recent Projects. Tenaga Nasional Berhad takes control of UK’s Vortex Solareedback from recent projects.
7-9	<b>GSEF Smart Grid Editorials</b> <b>Special:</b> Smart Grids are the cornerstone of the Energy Transition in Portugal Article by Pedro Godinho Matos. Pedro Godinho Matos is the head of Business Development-Associate Director of Strategy and Regulation at EDP Distribuição  Hydrogen: Colourless to Colourful Ravi Seethapathy, “Ambassador for the Americas”, Global Smart Grid Federation, USA Executive Chairman, Biosirus Inc., Canada
10	<b>GSEF at a Glance</b>



# Global Stories on Smart Grid

## FERC Issues Landmark Order on Distributed Energy Resources

The Federal Energy Regulatory Commission (“FERC” or “Commission”) issued a landmark final rule, Order No. 2222, at its open meeting that aims to remove barriers for distributed energy resources (“DER”) to participate in wholesale markets regulated by FERC through aggregators. As defined by FERC, DER is “any resource located on the distribution system, any subsystem thereof or behind a customer meter.” DER, thus, refers to resources that provide electricity near the point of use as opposed to centralized generation sources from utility-scale power plants that are often interconnected directly to the transmission system.

**Read More:** <https://indiasmartgrid.org/viewnews.php?id=4724>

## California to Add 38,000 Electric Vehicle Charging Stations

California will get 38,000 more electric vehicle charging stations after the Public Utilities Commission voted for Southern California Edison's Charge Ready 2 program. The power utility's program involves \$442 million in investments, of which the bulk would go towards building charging infrastructure. The program is part of California's stated goal to reduce emissions by 40 percent from 1990 levels by 2030, and by 80 percent by 2050. California is the largest EV market in the United States, with EV sales accounting for as much as 46.8 percent of the total in 2018. The state has a target of as many as 5 million electric cars by 2030, but if it to reach it, it would need to put a lot more effort into encouraging EV buying to date, there are some 5,37,000 EVs on the roads in California.

**Read More:** <https://bit.ly/2QZsQRT>

## Stefanini Group Launches Smart Cities Efficiency Technology

The Stefanini Group, a \$1 billion global technology company specializing in digital solutions with locations in 41 countries across the Americas, Europe, Australia and Asia, has launched its Smart Cities solution to make city operations more efficient. The solution increases sustainability and optimization while utilizing new technologies and digital solutions for various challenges cities face today. The Smart Cities solution unites technology and infrastructure to enhance citizens' interactions with the urban environment and improve their quality of life. Using the Internet of Things, Stefanini's Smart Cities solution can identify opportunities and challenges in real-time, reducing costs by pinpointing issues prior to their emergence and allocating resources more accurately to maximize impact.

**Read More:** <https://bit.ly/3iaijQ0>

## ICT Solutions in Smart City Projects Must Be Coherent, Standardised: TRAI, India

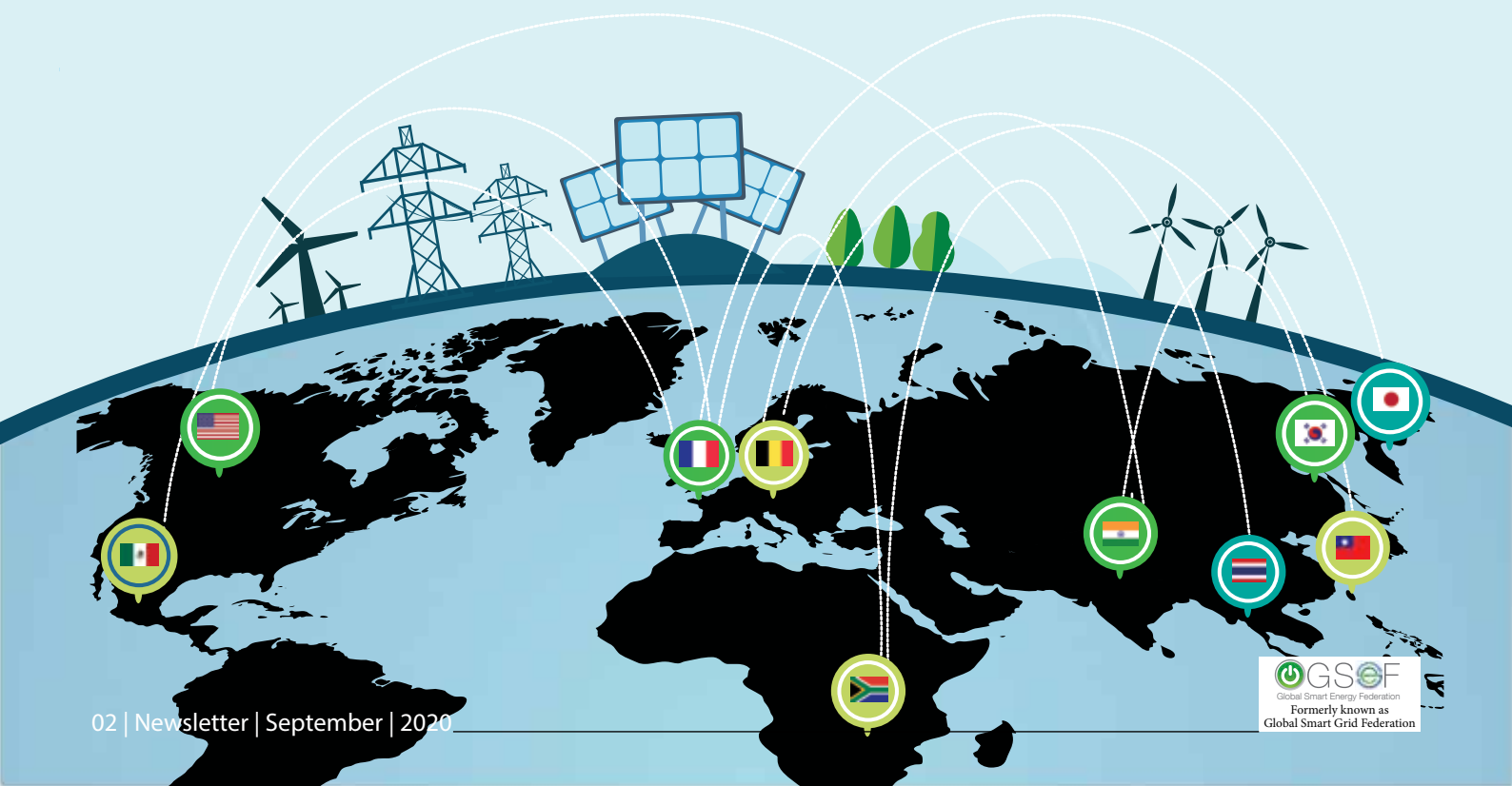
Non-standardised and non-interoperable information, communication and technology (ICT) solutions suffer from constraints and will pose a risk to smart city projects, Telecom Regulatory Authority of India (TRAI) said on Tuesday. Constraints include proprietary solutions with vendor lock-in; upgradation and scalability will also be proprietary and, hence, costly; replicability in other areas will be a challenge; and in disaster situations, it will be difficult to have integrated relief operations. TRAI said these in a white paper titled “Smart Cities in India: Framework for ICT Infrastructure”.

**Read More:** <https://indiasmartgrid.org/viewnews.php?id=4726>

## New White Paper Sees Growing Market for Utility Smart Home Solutions

SmartEnergy IP™, a leading research and advisory firm focused on customer experience in energy and utilities, announced today the release of its industry white paper entitled “Customer Preferences Dictate the Future of Smart Home Business Models: Exploring the Role of Smart Home in the Utility of Future Business Model”. The paper was published following a series of customer surveys beginning in November 2019 and ending in August 2020 that focused on identifying key drivers for smart home investment.

**Read More:** <https://indiasmartgrid.org/viewnews.php?id=4727>



# Global Stories on Smart Grid

## Australian Gold Mine Goes 50% Renewable-Powered with Addition of Battery Storage

A lithium-ion battery energy storage system (BESS) supplied by French manufacturer and system integrator Saft has enabled a gold mine in Australia to meet more than 50% of its energy demand with renewable energy. Power station operating company EDL has implemented what is already thought to be Australia's biggest microgrid operating on hybrid renewable sources - combining wind and solar - along with gas / diesel engines for backup. The system has a combined capacity of 56MW including 13MW of battery storage and is at Agnew Gold Mine, Western Australia, owned and operated by mining company Gold Fields.

The 13 MW / 4 MWh battery storage system, based on six containerised Saft Intensium Max+ 20M megawatt-scale battery storage units allows EDL's microgrid to integrate variable renewable energy including 4MW of solar and 18MW of wind while maintaining power quality. It is also thought to be the first Australian mine microgrid to incorporate wind power. It also uses a 21 MW thermal power engine.

**Read more:** <https://bit.ly/2Z2CCY6>

## Irish Utility to Deploy 2.4 Million Smart Meters using EIB Funding

Irish utility ESB Networks has secured a £150 million (\$179.5 million) loan from the European Investment Bank (EIB) to fund its smart meters project. The smart meters will be deployed in phases with up to 2.4 million units set to be installed by 2024. The smart meters will be deployed as part of the National Smart Metering Programme which is a key part of the Irish government's National Climate Action Plan. The 15-year loan will ensure the completion of meter rollout in Cork, Laois and Kildare counties which was started in Autumn 2019. Up to 200k units are expected to be installed by the end of 2020 and 500k to be deployed per annum.

**Read more:** <https://bit.ly/3hWV9MN>

## Prototype Gravity-Based Energy Storage System Begins Construction

Scottish company called Gravitricity has now broken ground on a demonstrator facility for a creative new system that stores energy in the form of gravity by lifting and dropping huge weights. If you coil a spring, you're loading it with potential energy, which is released when you let it go. Gravitricity works on the same basic principle, except in this case the springs are 500- to 5,000-tonne weights. Gravitricity says that these units could have peak power outputs of between 1 and 20 MW, and function for up to 50 years with no loss of performance. Able to go from zero to full power in under a second, the system can quickly release its power payload in as little as 15 minutes or slow it down to last up to eight hours. To recharge this giant mechanical battery, electricity from renewable sources power the winches to lift the weights back to the top. In all, the system has an efficiency of between 80 and 90 percent.

Gravitricity is now in the early stages of constructing a demonstrator facility to test out the concept next year. The tower will stand 16 m (52.5 ft) tall, lifting and dropping two 25-tonne weights in order to generate 250 kW. Testing of this facility is due to begin in (northern hemisphere) spring 2021, and a full-scale 4-MW project will begin later that year.

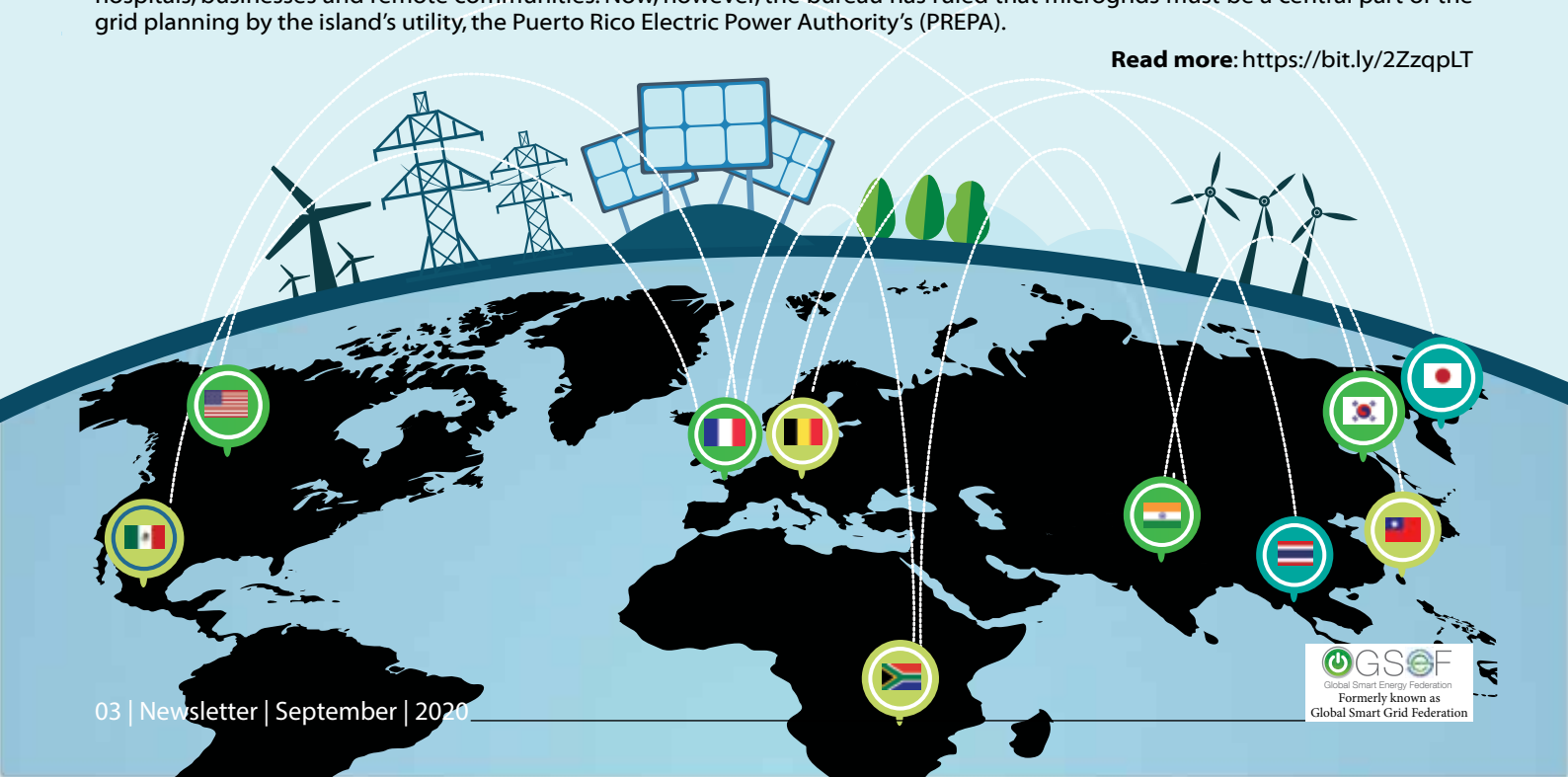
**Read more:** <https://bit.ly/3gXsfl8>

## Puerto Rico Approves Utility Plan with Microgrid Mandate

After two years of debate and planning, Puerto Rico finally appears positioned to re-create its electric grid with microgrids and renewable energy, mandated in a new utility integrated resource plan (IRP). The mandate came from the Puerto Rico Energy Bureau, the island's chief energy regulator, in late August. Utility IRPs are guiding documents produced by US utilities to determine the least-cost way to manage gaps between existing resources and future needs. PREPA has been working on this version of its IRP since March 2018.

Microgrids became a big part of island reconstruction after its entire grid failed from the onslaught of Hurricane Maria in September 2017. But much of the microgrid development has been piecemeal, done by private, federal or non-profit sources to help schools, hospitals, businesses and remote communities. Now, however, the bureau has ruled that microgrids must be a central part of the grid planning by the island's utility, the Puerto Rico Electric Power Authority's (PREPA).

**Read more:** <https://bit.ly/2ZzqplT>



# Global Stories on Smart Grid

## New Jersey takes early steps toward new utility business model

**PSE&G's program is the first approved under the new framework developed by the New Jersey Board of Public Utilities (BPU)**

Public Service Electric & Gas Co. (PSE&G) received approval for its \$1 billion energy efficiency program, New Jersey's first efficiency plan to incorporate new rules intended to move electric utilities toward a service-based model. The efficiency program represents a shift in the utility business model for New Jersey because the profits PSE&G can gain from the program will come from performing efficiency work rather than selling electricity. The program is part of the state's larger regulatory push to significantly reduce carbon dioxide emissions as laid out by the 2018 Clean Energy Act.

**Read More:** <https://bit.ly/33scjNs>

## Events Supported by GSEF



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

For participation in the above events please write to [info@globalsmartenergy.org](mailto:info@globalsmartenergy.org)

**Supported By** **Organizing Partner**

  
MINISTRY OF POWER  
GOVERNMENT OF INDIA

**ISGF**  
India Smart Grid Forum

**Host Utilities**

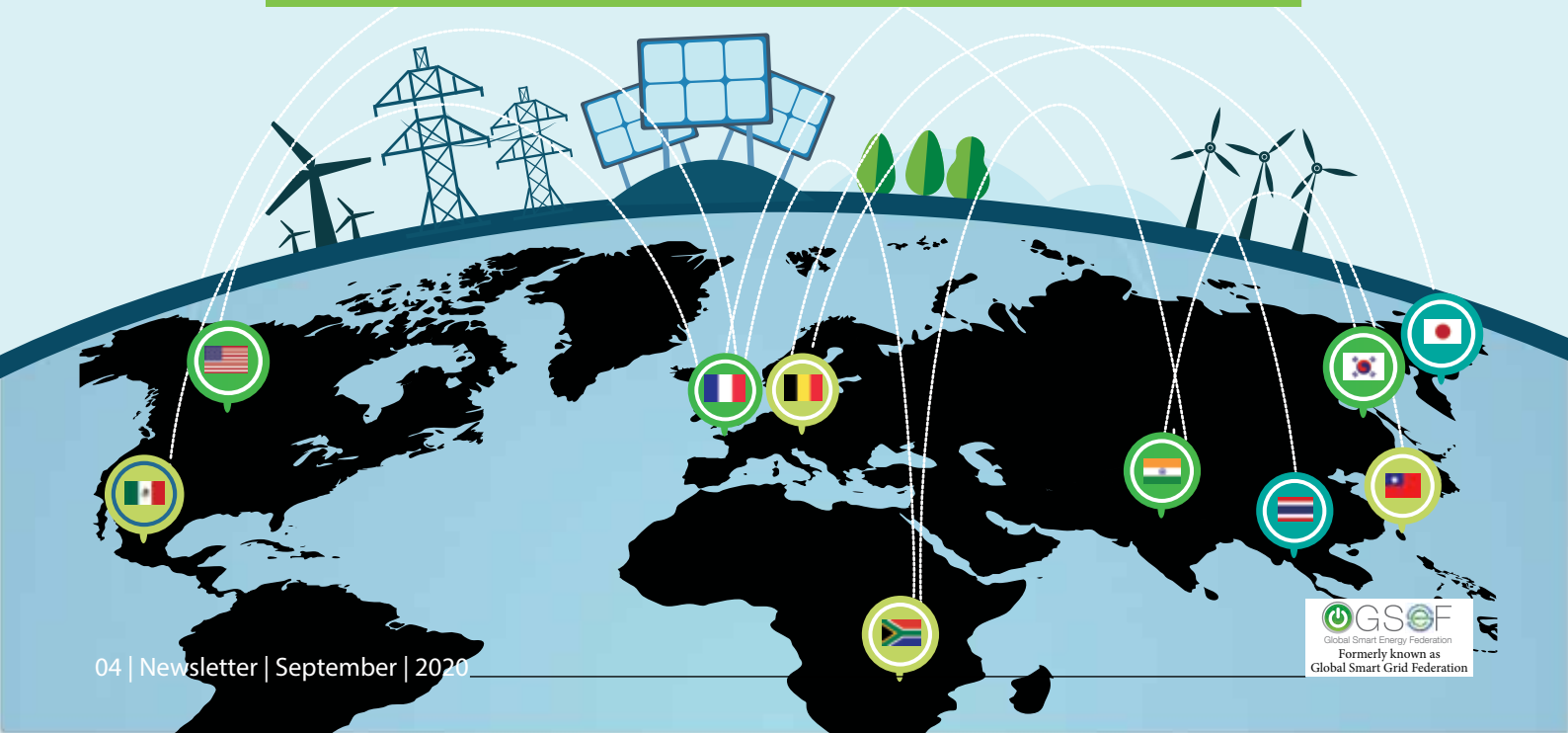
  

**Knowledge Partners**

**DISTRIBUTION UTILITY MEET DUM 2020**  
Fourth Annual Conference of Power Distribution Utilities for Collaborative Growth  
27 - 28 November 2020  
ON DIGITAL PLATFORM

[dum@indiasmartgrid.org](mailto:dum@indiasmartgrid.org) | [www.dumindia.in](http://www.dumindia.in)



# Member Updates

## Smart Metering: Benefits for Electrical Networks and Feedback from Recent Projects.

At the occasion of the CIGRE e-session, Think Smartgrids organized in partnership with the French Development Agency (AFD) a webinar to present the latest innovations for smart metering systems and the lessons learnt from recent projects.

Hervé Champenois, Director of the “Linky Program” and member of the Enedis Board of Directors, reported on the feedback from the main French DSO on the deployment of 35 million “Linky” smart meters in France (30,000 meters installed every day). The deployment of smart meters leads to the development of a new communication infrastructure that allows remote operations and new services to be offered to consumers. Mr. Champenois detailed Enedis’ initial feedback regarding the customer experience with Linky, from basic services to new tariff



offers and home device management. The deployment of the Linky meter has also had an impact on Enedis’ operations; the experience of the French Distribution System Operators (DSO) shows that any smart meter project must be adapted to the stakes of the utility.

The deployment of smart meters also concerns many countries in the southern hemisphere, where they can contribute both to making the network more reliable and to providing universal access to carbon-free energy. Jean-Pierre Barral, Director of the Energy and Digital Transition Department at AFD, presented the French agency’s energy transition strategy, with a focus on supporting smart energy projects and access to energy for all in developing countries. The development of smart metering projects can indeed present many benefits for a utility like (reduction of technical and commercial losses, improvement of the quality of service, integration of renewable energies and Demand side management). Mr. Barral illustrated his remarks with the presentation of a smart grid and smart metering project developed in partnership with STEG, the Tunisian DSO.

Nabil Sahri, Vice President and International business development Director at Sagemcom, provided feedback from a vendor perspective, detailing the key success factors of a smart metering project (learning from others, interoperability, scalability...). Smart meters have many applications, and meter manufacturers can offer a wide variety of services: automatic billing, dynamic pricing, load profile, alarm detection, Customer “Smart Info”, Supply Automation, Home Energy Management / Demand side management, outage event management, etc.

Cheikh Ahmad Tidjani KEBE, Head of the Commercial, Smartgrid and Energy Storage Projects Unit at Senelec, presented the Smart metering and Smart Grid program of Senegal’s national electricity company. Senelec decided to modernize its Metering System to efficiently reduce both technical and non-technical losses, which were very high in the country. The main expectations are to optimize the performance of electricity distribution and improve Senelec’s operational efficiency, to secure Senelec’s income and reduce operating costs, to monitor the performance and the state of the network in real time, to reduce undistributed energy and facilitate troubleshooting management. This smart metering project is part of a broader program to reinforce and modernize Senegal’s electricity grid, led in partnership with AFD.

Smart metering is a key step in the deployment of a smart grid and to support the decarbonization of our electrical systems. It allows to effectively reduce non-technical losses, as well as operating and maintenance costs, thanks to improved data collection and remote operations, and also to respond to new challenges, such as the massive integration of renewable energies, and the development of new uses such as the electric vehicle and self-consumption, which are essential to the success of the energy transition.

**Article By:** Think Smart Grids.



## Tenaga Nasional Berhad takes control of UK's Vortex Solar

TENAGA Nasional Berhad (TNB) has gained the majority control of UK's Vortex Solar Investments Sarl by completing the acquisition of a 5% controlling equity in the company for £11 million (RM59.07 million).

The acquisition — done via its wholly-owned subsidiary, TNB International Sdn Bhd — will increase TNB's equity interest in Vortex Solar to 55%.

TNB president and CEO Datuk Seri Amir Hamzah Azizan said the acquisition is a key milestone in the group's commitment to reduce its carbon footprint and grow its international Renewable Energy (RE) business portfolio, in line with its energy transition aspiration of becoming the leading provider of sustainable energy solutions both domestically and internationally.

"With the acquisition, TNB now has majority control of Vortex Solar, thereby further strengthening the group's international European RE business footprint where TNB already wholly owns Tenaga Wind Ventures UK Ltd (TWV), the largest Feed-in-Tariff wind portfolio in the UK.

"This acquisition forms part of TNB's new strategy of growing our RE businesses in the UK and Europe and is a deliberate move to take control of our high performing RE assets, beginning with the acquisition of 100% in TWV earlier this year," said the President.

By leveraging on TNB's existing capabilities and its control of TWV and Vortex Solar, Amir Hamzah said TNB will continue to expand in the region in line with its international RE growth strategy through the restructuring of Vortex Solar and TWV into a Renewable Asset Company aimed at owning, operating and managing a portfolio of RE assets in the UK and Europe.

The utility company first acquired a 50% equity stake of Vortex Solar in 2017 for £86 million. The portfolio has performed positively contributing £39.1 million Ebitda in 2019.

It has also shown growth from 80% Ebitda margin in 2018 to 84% Ebitda margin in 2019.

In March, TNB via TWV has fully acquired two UK-based RE companies in a bid to grow the utility company's RE business. It bought the balance of 20% interest in GVO Wind Ltd and Bluemerang Capital Ltd for £18.6 million cash.

With the acquisition, TNB now holds 100% asset ownership and control over the two companies and their respective assets via TWV.

Amir Hamzah also added that the initial purchase of 80% interest in the firms has contributed positively to TNB's financials and strategic objectives.

The assets performed positively, contributing RM76 million in Ebitda in 2019, and growing from a 62% Ebitda margin at acquisition to a 74% Ebitda margin in 2019.

In March 2018, TNB said it had purchased an 80% stake in GVO Wind and Bluemerang Capital for an enterprise value of approximately £171 million.

TNB's earnings are expected to rebound in the second half of 2020 after the utility group posted a 41.5% drop in the second quarter (2Q) net profit due to higher tax expenses and weaker electricity sales.

TNB recorded a net profit of RM653.3 million in the 2Q ended June 30, 2020, versus RM1.12 billion last year.

Revenue slid 15.5% to RM10.89 billion from RM12.88 billion the year before, as business activities slowed amid Malaysia's pandemic containment measures.

The counter closed four sen or 0.36% higher to RM11.04 yesterday, with a market capitalization of RM62.98 billion.

Article contributed by:

Dr. Ir. Cheong Kam Hoong

GSGF Ambassador (Asia Pacific Region) 18 Sep, 2020

[URL Link: https://themalaysianreserve.com/2020/09/18/tnb-takes-control-of-uks-vortex-solar/](https://themalaysianreserve.com/2020/09/18/tnb-takes-control-of-uks-vortex-solar/)



## Smart Grids are the cornerstone of the Energy Transition in Portugal



As the energy transition unfolds across Europe, **Smart Grids play an increasingly central role** in keeping the electric system running smoothly. Being the connecting link between production and consumption in a growing decentralized and digitalized world, smart grids are critical in providing seamless integration of renewable generation, electric vehicles or storage facilities in the electricity network, decisively contributing to the decarbonized planet that we want to build.

The main Portuguese distribution system operator, **EDP Distribuição, started its smart grids' journey more than 10 years ago**, when it launched the Inovgrid project in 2007. Looking back at that time, when 2020 was still a blurred destination and Europe was committed to set ambitious energy targets through its 3rd energy package, there were many uncertainties on the right path to achieve the needed change. Nevertheless, EDP Distribuição had a clear vision that electricity grids had to be smart and thus Inovgrid was born.

**Starting as a city scale pilot in Évora, covering 100% of the municipality population with 50 thousand inhabitants, the Inovgrid project was a pioneering project** that brought new capabilities to the company, new benefits to the consumers and new insights to the electricity ecosystem. The recognized and awarded Inovgrid project quickly scaled up and expanded throughout the country, supporting EU institutions' analysis and policies, being selected in the process as the single case study for an EU-wide Smart Grids cost benefit analysis.

Today, Inovgrid and smart grids are interchangeable names for the Portuguese future electricity network infrastructure. The more than 3 million smart meters already deployed are just the most visible part of a comprehensive and complex ecosystem, that also encompasses **advanced hardware in substations, robust data processing systems, innovative operational procedures, more skilful company staff and ultimately, the awareness of the 10 million consumers that are served by the grid.**

On the technical side, having a running smart grid infrastructure allows EDP Distribuição to **increase the low voltage grid predictability, visibility and control.** Adding a real-time data communication between the network elements and the controlling systems enables a **myriad of new and advanced functionalities**, empowering the planning and operations teams, that benefit from the integration of medium and low voltage assets data, to have a combined overview and management of the network, creating in this way synergies that increase the efficiency, quality and security of the service that the consumer obtains.

For the future, EDP Distribuição has already established its **technology development plan for 2030**, which is carved in the Inovgrid 20-30 Roadmap, having at its core the purpose "Innovate to accelerate the energy transition". This roadmap has the ambition to guide the company efforts to achieve both business and foundational goals, exploiting the capabilities in diversified domains, such as **customer service, market facilitation, network planning and operations, among others, supported on a robust and enabling digital platform.** Additionally, this roadmap also has the ambition to challenge smart grid players to foster innovation in business models and customer-centric solutions unleashing all the smart grid potential.

Having the right direction set is fundamental, so that when we look back at 2020, ten years from now, we will be able to see the change that occurred, and feel proud, because we have given our **contribution to establish a sustainable energy system that powers the future of new generations.**

**Article by** Pedro Godinho Matos. Pedro Godinho Matos is the head of Business Development-Associate Director of Strategy and Regulation at EDP Distribuição. He is also collaborating with Marc Boillot, GSEF Ambassador, Europe



## Hydrogen: Colourless to Colourful

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



Most know of hydrogen as a colourless and odourless gas, but today, hydrogen has taken on several colour attributes - green, blue, grey and brown – based on commonly accepted production definitions (below):

- *Green hydrogen* – produced from low carbon threshold (like water electrolysis) using non-GHG power sources (hydro, nuclear, solar, wind)
- *Blue hydrogen* – produced from natural gas using steam reformation with CO2 emissions being market-offset or sequestered using abatement technologies (i.e. almost carbon-neutral).
- *Grey hydrogen* – produced from fossil fuels like oil and gas, with CO2 emissions let into the air
- *Brown hydrogen* – produced specifically from coal, with CO2 emissions let into the air

Global hydrogen production today, is almost exclusively (99.6%) from hydrocarbons (grey/brown hydrogen). The World Hydrogen Congress 2020 notes that investment in clean hydrogen (green/blue?) will likely be £430 billion in the coming decade, with the impetus being led by EU, followed by Asia and North America.

A Wood Mackenzie Report titled “Hydrogen Production Costs to 2040: Is a Tipping Point on the Horizon?,” projects that, production costs of green hydrogen will fall by up to 64% by 2040 from today’s levels. It continues, that global demand for hydrogen has grown by 28% in the past decade (peaking in 2020) and is still relatively small compared to other technologies. Also, that 10 countries will account for about 70% of global hydrogen demand with China and USA each at 21% and 19% respectively.

The Achilles heel to attaining a hydrogen world, is not so much in its storage or utilization technologies (heat, electrical, mobility), but rather its current inefficient and high-cost production (poor yield). The electrolytic splitting of water molecules into hydrogen and oxygen, with all its technological advancement now using alkaline chemistry (low thermodynamic energy process), is expensive with poor yields (albeit no CO2 emissions). On the other hand, the reformation process (high energy/temperature) to split hydro carbon fuels, while still expensive, yields better production levels, but emits substantial CO2 (in both heating and splitting processes).

The big commercial bet has a few decision forks in the production pathway, i.e. (a) using the ever falling costs of renewable energy (solar/wind) to electrolyze water and produce green hydrogen; (b) using steam from small modular nuclear power (SMR) to produce blue hydrogen at a much lower emission than natural gas heating (and hopefully easier carbon offset); and (c) splitting ammonia molecules (a better carrier of hydrogen in its NH3 form), although this hydrogen was steam-reformed (with CO2 emissions) and nitrogen to create ammonia in the first place.

Some argue that even grey/brown hydrogen is good for the environment, as it lowers CO2 emissions in (a) heavy industries (cement/steel); (b) bulk transport (rail/trucks); and (c) off grid power (remote communities/ mining), essentially avoiding the use of coking-coal, thermal-coal, heavy oils and diesel fuels. Others say that mixing grey/brown hydrogen in small percentage (less than 10%) in gas pipelines allows for a better capacity utilization of gas pipeline assets (power-to-gas) leveraging cheap electricity when available.

A third discussion centers around transportation cost of hydrogen. Geography plays an important part when sourcing hydrogen. If it is transported from far away, the supply cost increases due to “inefficient” transportation. For example, hydrogen being a light molecule, a full tube trailer will likely carry only 350 Kg of compressed hydrogen. If it were to be transported in its cryogenic form (i.e. liquid-H2), there would “venting losses” (boil off due to temperature difference). Currently about 150 tons of liquid hydrogen is



# GSEF Smart Grid Editorials

shipped every day in the USA. So, the industry consensus is to produce hydrogen locally at its utilization point (heavy industries, mines, remote communities, etc.). While this would be doable for blue/grey hydrogen (if natural gas is available locally), it poses a challenge for green hydrogen production to locally source clean feedwater for the electrolysis process. So, research is being done to explore if "dirty water" and/or "salt water" can be used.

It is interesting to observe that solar PV industry's emphasis to produce green hydrogen continues its momentum. At the recent "World Solar Technology Summit" in Sept. 2020 (26,000 participants from over 149 countries), a vision was provided as to how cheap green hydrogen is possible leveraging game-changing cheaper and more efficient solar cell technology on the horizon. The following forecasts were made:

1. Solar PV energy costs dropping 50% from its current 2 cents/kwh before 2030.
2. Plummeting levelized cost of energy (LCOE) due to PV modules doubling their longevity with no loss of efficiency over decades.
3. Breakthroughs in the perovskite solar cell (PSC) will reshape the solar PV industry fundamentally.

On the investment front, the Wood Mackenzie Report points to a pipeline commitment of 3.2 GW in electrolyzer capacity, with Germany, Netherlands, Norway Portugal and Spain each releasing their own country strategies. The private sector too (BP Shell, Thyssenkrupp, Orsted and Repsol) are making their own investments. Several projects have emerged in Europe, (a) Siemens Viking Link project, in UK deploying grey hydrogen for off-grid construction site, using containerized fuel-cells as CHP (diesel displacement); and (b) JCB in UK making hydrogen fuel cell excavators (model 19C-1E), weighing over 20 metric tons for remote sites.

In my view, the pathway to a hydrogen future (green, blue, grey or brown) is strewn with challenges, but herein lies the opportunity. Several strategic questions come to mind:

1. Need for a third new hydrogen infrastructure beyond expanding electricity and gas.
2. How to leverage the falling costs of renewable power.
3. Use of SMRs for high-temperature steam electrolysis (HTSE) instead of natural gas reformation.
4. Potential for 85% cost reduction in 20 years (\$12/kg to under \$2/kg) if produced locally (no transportation).
5. How to leverage initial high-value niche projects and moving to new mid-market industrial segments as the cost of hydrogen production falls with market volume.

*The colourless/odourless hydrogen, is indeed becoming brighter and more colourful and may add the full VIBGYOR complement in the future!*

**ISGF**  
India Smart Grid Forum

**JOIN ISGF ONLINE TRAINING PROGRAMS**  
SELF-PACED ONLINE LEARNING

Supported By: Ministry of Power, National Smart Grid Research Institute

Knowledge Partners: Cyber Security for Power Systems

Knowledge Partners: Electric Mobility and Charging Infrastructure, Artificial Intelligence and Robotics for Utilities and Smart Cities

Supported By: Ministry of Power, National Smart Grid Research Institute

Register Now At: <https://indiasmartgrid.org/onlinetrainingprogram/>  
For Queries, please write to: [ronkini.shome@indiasmartgrid.org](mailto:ronkini.shome@indiasmartgrid.org)

**Advanced Metering Infrastructure 2020**  
13 - 15 October | Virtual Conference

Providing the roadmap for achieving 100% smart meter coverage, fostering standardisation in the industry and scaling up your AMI related data analytics

**3-Day Online Conference, Exhibition & Networking Forum**

For participation in the above events please write to [info@globalsmartenergy.org](mailto:info@globalsmartenergy.org)

# GSEF at a glance

## Charter Members



Think Smart Grids



India Smart Grid Forum



Korea Smart Grid Association



Prakarsa Jaringan Cerdas Indonesia (PJCI)



GridWise Alliance

## Regular Members



Smart Grid Mexico



Japan Smart Community 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

- **Flexible Grid-Towards Customer Enablement** Chair- Ambassador, Americas
- Blockchain for Utilities
- Regulatory Changes or Regulatory Reforms for the post Covid Digital Utility

## Working Groups in Pipeline

- AI and Advanced Analytics for Utilities

## Contact us for more information.

Global Smart Energy Federation (GSEF)

1800 M Street, NW, Suite #400S, Washington, DC 20036

@ info@globalsmartenergy.org

www.globalsmartenergy.org

## Newsletter Team

Aashima Chaney | Bindeshwary Rai | Sudhasatta Kundu | Balasubramanyam Karnam  
Parul Shribatham | Shuvam Sarkar Roy | Ravi Seethpathy | Marc Boillot | Dr Cheong Kaam Hoong