GSGF
Global Smart Grid Federation

NEWSLETTER

OCTOBER 2018

GSGF – ISGAN Meeting in Vienna, Austria

A 90-minute interactive luncheon meeting was organized between Global Smart Grid Federation (GSGF) and International Smart Grid Action Network (ISGAN) Executive Committee on 15th October, 2018 in Vienna, Austria to discuss mutual collaboration and joint activities.

GSGF's Memorandum of Understanding (MoU) with ISGAN was also renewed and the new MoU is now valid till 2021 for joint activities.

The meeting started with a welcome address by Ms. Karin Widergren, Chairperson of ISGAN. This was followed by a detailed presentation by GSGF Chairman, Mr. Reji Kumar Pillai on GSGF's present structure, activities and focus areas which were well received by ISGA ExCo Members. Participants discussed the need for making ISGAN and GSGF relationship stronger and how GSGF can attract ISGAN member countries who are not part of GSGF.

Both ISGAN Exco Members and GSGF Board Members agreed that jointly GSGF and ISGAN can promote the cause of smart grids around the world more effectively. It has been decided to have frequent meetings and exchange of ideas between both organizations.

ISGAN Award of Excellence: For the fourth Annual ISGAN Award of Excellence competition, eminent experts from GSGF have been nominated as juries. The winning projects will be selected by the international jury of smart grid experts, led by Reji Kumar Pillai. The jury will select the winning projects based on the following four criteria: potential impact, economic rationale, potential for replication and adaptation, innovation and other benefits.

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Global Stories on Smart Grid

Nissan, EDF Energy to test second-life EV batteries in demand response applications

Nissan and EDF Energy announced they have partnered on a project that will combine used electric vehicle (EV) batteries from the car manufacturer with demand response capabilities and the agreement also includes provisions for future collaboration on smart charging, distributed resources and grid integration.The push to experiment with second-life storage uses comes as the electric sector prepares for a stream of used EV batteries that can have a decade of life left in them, and up to 70% of their capacity.

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

US DOE and industry partner to improve lead-acid batteries for power grid, EVs

The US Department of Energy's Argonne National Laboratory signed an agreement with 14 members of the Advanced Lead Acid Battery Consortium to use advanced X-ray technology for increasing the potential of lead batteries. The lead sulfation issue limits lead battery performance to less than half its potential and tapping a portion of that unused potential would result in even better low-cost, recyclable batteries for mobile and stationary market applications.

Read More: https://bit.ly/2AgV5UY

Arensis and Schneider Electric launch smart microgrid partnership

Arensis, a leading international provider of decentralized energy systems, and Schneider Electric, a leader in microgrid development with integrated efficiency solutions combining energy, automation and software announced the joint development of its smart microgrid pilot program. As part of the pilot, Arensis and Schneider Electric will develop a blockchain Application Programming Interface (API) platform for ENTRADE IO, a newly-formed company on off grid project financing and the sale of renewable energy in remote areas around the world. Joint development of the smart microgrid systems, combining waste-to-energy, solar and storage, will launch in North America with plans for growth on a global scale. The pilot will explore integrated renewable energy solutions using resources to develop, monitor and operate the systems through augmented reality.

Read More: https://bit.ly/2EzHM68

Megawatt-scale energy storage project proposed for Siberia

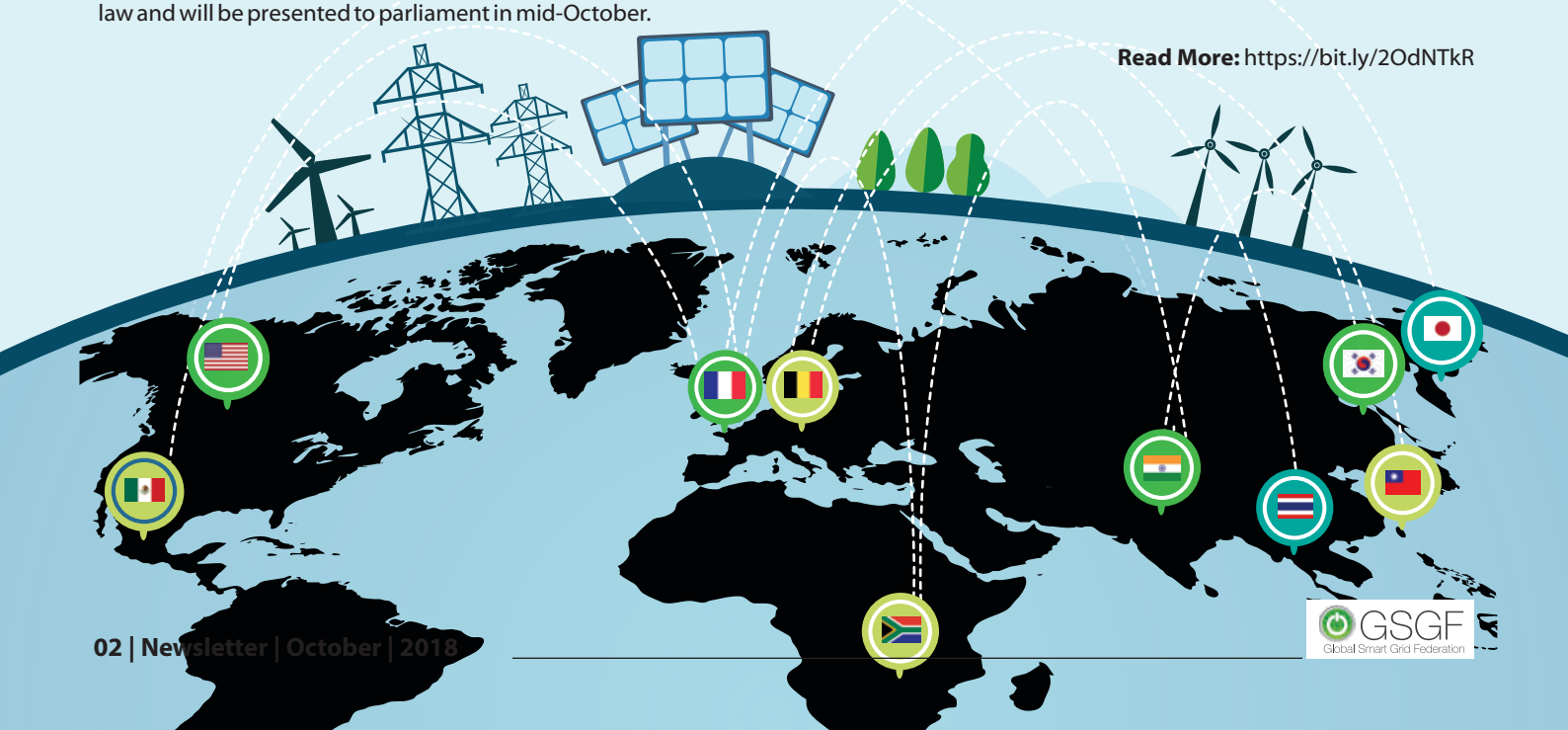
Saft and Hevel Group, Russia's largest solar module manufacturer and PV project developer, have signed an agreement to pioneer megawatt-scale energy storage systems (ESS) for solar power plants in the Altai Republic, a remote region in southern Siberia. Integrating Saft's lithium-ion (Li-ion) energy storage technology with the solar plants will ensure a reliable and predictable supply of electricity as well as providing a range of ancillary services to maintain the stability of the local power grids. To demonstrate the capabilities of ESS technology a pilot project is being carried out to install a Saft Intensium Max containerized lithium-ion (Li-ion) system at the existing 10 MW Kosh-Agach solar plant. This is one of the sunniest places in Russia, with over 300 cloudless days per year. Depending on the results of the pilot, the next stage will be to move to commercial implementation, with several ESS units with a total power in excess of 20 MW, mainly in off-grid locations, to be installed between 2020 to 2022.

Read More: https://bit.ly/2Rnleb7

Denmark proposes ban on petrol and diesel cars to support EV revolution

Denmark has propounded a ban on the sale of new petrol and diesel cars from 2030 and hybrid from 2035, joining international efforts to promote electric-only vehicles to reduce air pollution and combat climate change.The plan is subject to parliamentary approval to become law and will be presented to parliament in mid-October.

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



Global Stories on Smart Grid

German scientists conduct research on pumped heat thermal electricity storage

The German Aerospace Center (DLR), the University of Stuttgart and the Karlsruhe Institute of Technology (KIT) will jointly build a research facility for energy storage called NADINE (national demonstrator for isentropic energy storages). The NADINE project at the research sites in the German cities of Stuttgart and Karlsruhe focuses on so called "Pumped Heat Thermal Electricity Storages (PTES)". These systems convert electrical energy into heat or other forms of energy such as mechanical or chemical energy. NADINE is intended to demonstrate that PTES can store electricity with an efficiency of up to 70 percent.

Read More: https://bit.ly/2Pxjo5S

Engie to construct the world's largest microgrid in Republic of Palau

The Republic of Palau announced it has signed a power purchase agreement (PPA) with Engie EPS, which will be completing a 100 MW microgrid, the largest in the world, consisting of solar, energy storage, and diesel, marking a crucial step on the road to accomplishing the renewable energy target the country set in the wake of the Paris Climate Agreement.

Read More: https://bit.ly/2Al2ORX

High-yield recycling of PV modules demonstrated by EU team

A consortium formed by 11 companies and five research institutes from nine EU countries has published the results of the Horizon 2020 CABRISS project that demonstrates the end-of-life management and recycling of PV modules is highly economical. In the project, launched in July 2015, the consortium's researchers demonstrated three main techniques can be used to extract "high-value, high-yield" reusable materials from recycled panels: a process for delaminating and recovering high-value materials including silver, indium, silicon and high-purity glass from PV end-of-life thin film and Si-based PV modules; a technique for the recovery of solid waste from solar manufacturing – a mix of broken Si wafers and cells; and a kerf process to dry silicon powder PV production waste from material lost during the cutting process.

Read More: https://bit.ly/2P3l9eh

Chernobyl begins new life as solar power park

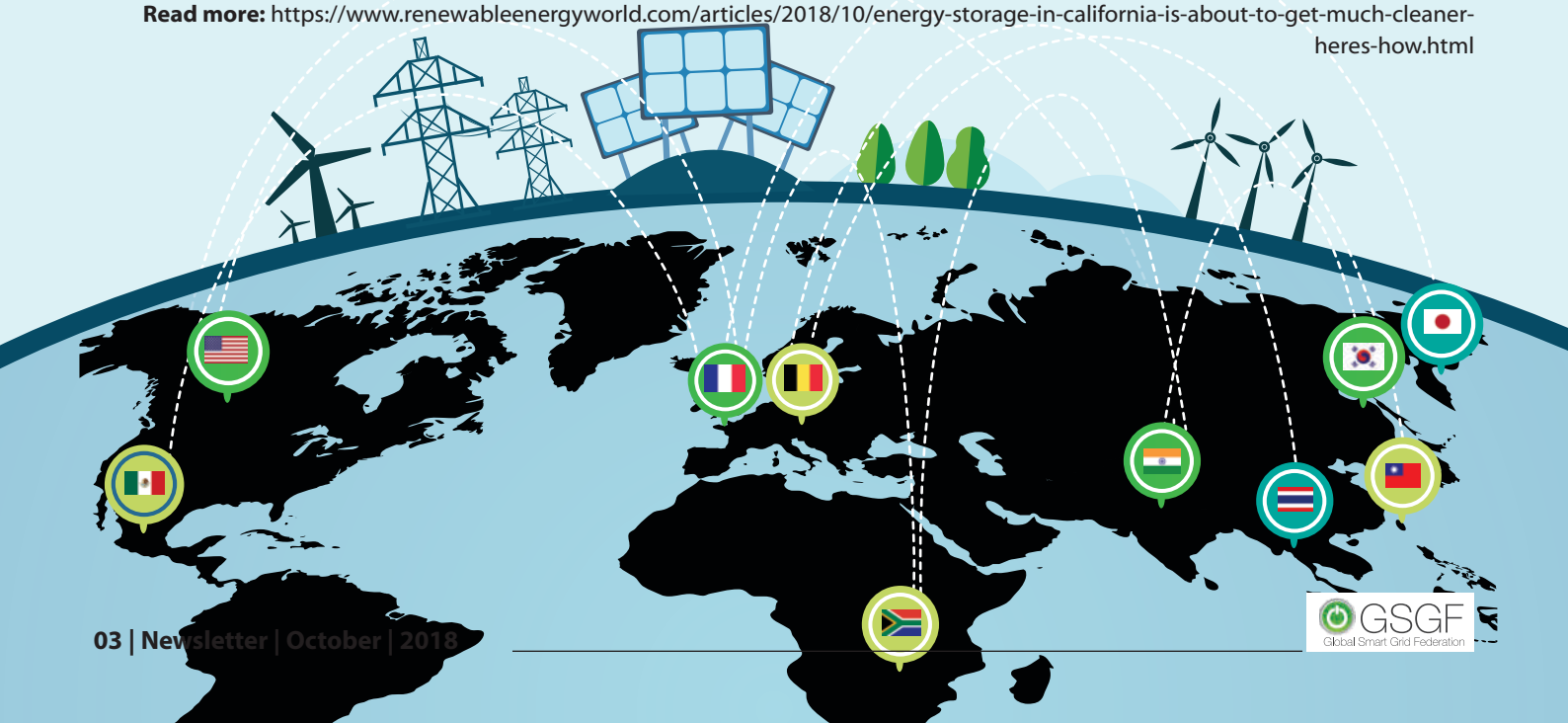
Ukraine launched a park of photovoltaic panels at the former Chernobyl power plant on 5th October, 2018 as the country seeks to use solar power to give the scene of the world's worst nuclear disaster a new lease on life. The 1 million-euro (USD 1.2-million), one-megawatt plant is located just a hundred metres (yards) from a giant metal dome sealing the remains of the nuclear power plant which suffered a catastrophic meltdown in 1986. The facility, which is installed across an area of 1.6 hectares (4 acres), can power a medium-sized village, or about 2,000 households. Plans are to eventually produce 100 megawatts at the site, which due to contamination from radiation cannot be used for farming.

Read more: https://energy.economictimes.indiatimes.com/news/renewable/chernobyl-begins-new-life-as-solar-power-park/66094026

California sets an ambitious 100 percent carbon-free electricity target

California recently joined other leading states, provinces, cities, and corporations around the world by setting an ambitious 100 percent carbon-free electricity target. It's a landmark, not because California was the first, but because it is the biggest. The state ranks as the fifth-largest economy in the world. Achieving 100 percent carbon-free electricity means lots of wind and solar. Alongside more-flexible demand, balancing such renewable energy will involve bringing more energy storage onto California's grid, to store surplus clean generation, which is where the state's Self-Generation Incentive Program (SGIP) comes in.

Read more: https://www.renewableenergyworld.com/articles/2018/10/energy-storage-in-california-is-about-to-get-much-cleaner-heres-how.html



Member Updates

Korea Smart Grid Association successfully hosts 9th Edition of Korea Smart Grid Week

The 9th Korea Smart Grid Week (KSGW), the only smart grid conference and exhibition in Korea overseen by Korea Smart Grid Association (KSGA) and hosted by the Ministry of Trade, Industry and Energy (MOTIE), was held from October 10 to October 12 at COEX, Seoul. At the conference, smart grid experts from overseas, including Germany Trade&Invest (GTAI), Forschungszentrum Juelich GmbH, ADB, Malaysia, Indonesia and Electricity Generating Authority of Thailand (EGAT), gave speeches and presentations regarding the present and future of investments in global smart-grid markets. This year's event especially focused on the convergence of blockchain and energy industries, major electric vehicle charger technologies of today, the current level of ESS technologies and strategies for overseas expansion, drawing a lot of attention from professionals in the smart grid industry.

On the last day of the event (Oct. 12), speakers from overseas including Thailand, Malaysia and Indonesia, and energy experts from Egypt, Saudi Arabia and Japan who participated in the conference as buyers, visited Seoul National University (SNU) to see its campus microgrid. The purpose of the visit was to demonstrate Korea's smart grid technology and provide the participants with an opportunity to learn and experience the current landscape of the industry. SNU is conducting an empirical research with the following objectives: development of Microgrid of Microgrid Center (MoMC), islanded operation of microgrids for 4 hours and reduction of energy/peak load by 20% using the university's own operation model. The project is scheduled to be completed by 2019. "Electricity can be supplied to Premium Cell buildings independently for 4 hours without electricity supply from KEPCO. And for Normal Cell buildings, we'll be able to cut the electricity bill by about 20%," said a person in charge of campus microgrid installation and empirical research.

Meanwhile, the 2018 Korea Smart Grid Expo was composed of several smart grid companies' exhibition. Major smart grid corporations such as LSIS and KEPCO showed their products and technologies and 24,533 participants visited the expo. The event featured various special exhibition rooms, including KT Energy Alliance for win-win cooperation between SMEs and large corporations and Smart Grid Hall, in which Korea Smart Grid Institute and companies that had taken part in the smart grid expansion project participated.

The 2019 KSGW will be held from October 16 to October 18 at COEX, Seoul. We welcome active participation of GSGF members and smart grid experts from across the globe so that the event could be a venue where smart grid companies and institutes share technologies and latest trends of the industry with having such as a workshop of smart grid companies and institutes in Asian countries.

Events Supported by GSGF

India Smart Utility Week 2019
March 12 - 16/ 2019
Manekshaw Center, New Delhi, india

ICSG Istanbul 2019
April 25-26, 2019, Turkey

European Utility Week
6 - 8 November 2018, Vienna, Austria

AIREC WEEK
22 - 25 Octubre 2018 - BUENOS AIRES

Australian Utility Week The Digital Utility Expo
21 - 22 November 2018

BIREC

MIRECWEEK

POWERING Andhra Pradesh ENERGY INNOVATION SUMMIT 2018

SMART GRID Energy Intrusion Detection 2019

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

GSGF Global Smart Grid Federation

GSGF welcomes: Tenaga Nasional Berhad, Malaysia as Utility Member and Energy Block Chain Consortium as Associate Member

Tenaga Nasional Berhad-As the country's largest and leading electricity company in Malaysia TNB's core business is to provide electricity to the country's businesses, homes and industries and a key contributor to Nation building. They have also embarked on the sustainability agenda through efforts such as Renewable Energy and other environmental and social initiatives. TNB believes in empowering the community, greening the Nation, nurturing a vibrant workplace as well as setting standards in the marketplace.

Energy Block Chain Consortium: It mission is to identify and solve the most compelling problems and opportunities in the energy industry using the Block chain technology and to diffuse these solutions throughout the industry in order to create profound and lasting economical and societal impact. EBC comprises of Executives, Block chain Experts, companies and innovators from across the globe have come together to form the Block chain Consortium.

GSGF welcomes Tenaga Nasional Berhad and Energy Block Chain Consortium as valued Members of GSGF!

Report on GSGF Face to Face Meeting in Vienna, Austria on October 15, 2018

Global Smart Grid Federation held its 2nd Face to Face Board meeting of the year 2018 in Vienna, Austria on 15th October, 2018. The Board Meeting had been very productive with discussions on progress of work by new Working Groups and presentations by invited speakers.

The elections for the positions of Chairman and Vice-Chairman were also conducted during this board meeting. Mr. Reji Kumar Pillai was declared elected to serve second term as chairman of Global Smart Grid Federation. The Board also approved the nomination of Mr. Oscar Miranda from SmartGrid Mexico as the Vice Chairman. The Chairman and Vice Chairman are elected for the next two years until October 2020. Mr. Steve Hauser from GridWise Alliance, USA will continue as the Treasurer of the Federation.

A detailed presentation was made by Mr. Toni Giroti, Founder and Chairman, Energy Blockchain Consortium (EBC) on Blockchain technology for Utilities.

Another interesting presentation was made by Dr. Angela Berger, Managing Director, Smart Grid Austria on Technology Platforms, Project IES- Integrating the Energy System.

Mr. Herfied Harreiter, Expert with Verbund Hydro Power Division, Austria, made a presentation on Pumped Storage Plant on the Alpine Mountain offering reliable flexibility for power systems.

Understanding Value Streams of Energy Storage Technologies Unique Canadian Approach

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

I remember giving a talk at the Renewable Energy World Conference & Expo, in Austin, Texas, USA, back in 2009 on Energy Storage (ESS) technologies and their potential value streams for the Grid. There were many blank stares (perhaps, it was too early). In my talks globally since then, I see general belief, but little conviction. The critics are not wrong. The value streams depend on the application, costs, regulatory acceptance to capture values "beyond wires" and the investment time horizon.

Canada has been an "eager beaver" in ESS (with many pilots and start-ups) across the whole technology spectrum since 2010. Most pilots were supported by the technical/financial prowess of the larger utilities with support from their Regulators. Yet, the climb continues to be "uphill".

Improvements in ESS technology (particularly in the last 5 years), has made great strides in that many such systems are now almost investment grade. Even private players (often with shorter investment horizons) are now de-risking these technologies, offering new business models and merchant services. It may take a few more years, but we are there now.

In my recent visits to Mexico, Japan, India and recently Whitehorse, Yukon, Canada, I have been asked repeatedly, whether the time for ESS has arrived. My answer is an unequivocal, yes. North America is gathering valuable use-cases through its grid-scale applications. But something unique is happening here in Ontario, Canada

Ontario through its Independent Electricity System Operator (IESO), has embarked on several initiatives, that (I think) is far superior to the investments in just battery installations in other NA jurisdictions. What began in 2012 in a first of its kind in Canada, (a 6MW regulation services procurement consisting of 2MW-flywheel and 4MW-battery), has now expanded to include a full spectrum understanding of a faster acting ancillary services market on the both the load and generation side using various ESS technologies.

In 2014, the IESO initiated a competitive procurement in two phases, targeting 50 MW[1] of ancillary services in three categories[2][3]

- **Type 1** – Energy storage technologies that are capable of withdrawing electrical energy (electricity) from the grid, storing such energy for a period of time and then re-injecting this energy back into the grid (minus reasonable losses). Examples include, but are not limited to, flywheels, batteries, compressed air and pumped hydroelectric[4].
- **Type 2** – Energy storage technologies that withdraw electricity from the grid and store the energy for a period of time. However, instead of injecting it back into the grid, they use the stored energy to displace electricity consumption (demand) of their host facility at a later time. Examples include, but are not limited to, heat storage or ice production for space heating or cooling.
- **Type 3** – Energy storage technologies that only withdraw electricity from the grid like other loads but convert it into a storable form of energy or fuel that is subsequently used in an industrial, commercial or residential process or to displace a secondary form of energy. They're generally integrated with a host process that uses that secondary form of energy directly or are connected to a transmission or distribution network for their secondary form of energy (e.g., natural gas, steam or coolant). Examples include, but are not limited to, fuel production (hydrogen or methane), steam production and electric vehicles.

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[1] Incremental to the 100 MW of regulations typically scheduled (Potential target for 2020 is about 250-300 MW). Minimum ramp rate is about 50 MW per minute

[2] IESO Report: Energy Storage, March 2016

[3] This study did not assess whether or not energy storage was the most economic option for providing these services. However, based on recent procurement experience, it is expected that energy storage might be able to provide regulation services at a cost that is comparable to the cost of traditional providers (e.g. hydroelectric generators).

[4] Ontario currently has about 170 MW of pumped storage in the Niagara area that pumps water during off peak energy (cheap) to generate during peak demand hours.

[5] IESO Report: Energy Storage, March 2016

Phase 1(2014)[6] 30-month startup, 3yr. contract

Proponent	Ancillary Service	Number of Projects	Technology	MW
Canadian Solar Solutions Inc.	RSVC	1	Battery	4.0
Convergent Energy and Power LLC	RSVC & Regulation	2	Battery and Flywheel	12.0
Dimplex North America LTD	Regulation	1	Thermal	0.74
Hecate Energy	RSVC	7	Battery	14.8
Hydrogenics Corp.	Regulation	1	Hydrogen	2.0
Total		12		33.54

Phase 2 (2015)[7] 30-month startup, 10 yr.

Proponent	Technology	Capacity (MW)
Ameresco Canada Inc.	Battery – Solid	2.0
Ameresco Canada Inc.	Battery – Solid	2.0
SunEdison Canada Origination LP.	Battery – Flow	2.0
SunEdison Canada Origination LP.	Battery – Flow	1.0
SunEdison Canada Origination LP.	Battery – Flow	2.0
NextEra Canada Development & Acquisitions, Inc.	Battery – Solid	2.0
NextEra Canada Development & Acquisitions, Inc.	Battery – Solid	2.0
NRStor Inc.	Compressed Air	1.75
Baseload Power Corp. (formerly 2443453 Ontario Inc.)	Battery – Flow	2.0
Total		**16.75**

The potential objectives for this trial (ongoing) was to study the following:

1. Opportunities for energy time-shift
2. Opportunities to store and convert to other forms of fuels
3. Opportunities to provide fast Regulation Services to meet "Variable Generation" (wind/solar)
4. Opportunities for Ramping and load-following
5. Relieve transmission congestions and defer transmission upgrades

The following were the procurements:

The Phase I Grid Energy Storage procurement was designed to specifically investigate the capabilities of energy storage facilities, featuring diverse technologies, to offer either or both of the following reliability services: (a) regulation, (b)reactive support and (c) voltage control (RSVC).

In Phase II of the Grid Energy Storage procurement, the IESO selected the remaining quantity of the total 50 MW grid energy storage target through a program that was focused on the capacity value of grid energy storage, along with understanding the approach to achieving arbitrage value. Phase II provides the opportunity for the grid energy storage operators to demonstrate how they, as the operator, will direct the operation of their own facilities, based on Ontario's market signals.

Early Lessons Learned (Still Ongoing)[8]:

1. Procurements that target specific services generally return better value (technical performance and diversity) when compared to procurements that target specific technologies. This is because service-based procurements enable a variety of technologies to compete in providing the target service(s). On the other hand, technology-based procurements target a specific group of technologies to provide the desired service(s), which may limit competition. Technology-based procurements have the disadvantage that a clear definition is required for the targeted technologies, which prevents other technologies capable of providing the services from competing. For example, although the procurement targeted alternative technologies for providing regulation service, it did not specify the type of technology. As a result, three different types of projects were successful: a load aggregator, a battery and a flywheel.
2. Most energy storage technologies are subject to losses when converting energy from one form to another. Some energy storage technologies are also subject to energy losses from storage (e.g., leakage, diffusion). Both types of losses have to be considered when selecting energy storage technologies for providing specific services. For example, technologies with relatively higher conversion losses could be helpful in managing surplus baseload generation (SBG), while they may be potentially wasteful when providing regulation.
3. Energy storage technologies that withdraw surplus electrical energy from the grid and later re-inject that energy back into the grid can be used to manage some surplus baseload generation (SBG). However, there would be limited benefit in using energy storage technologies that store energy for only a short time period (i.e. days). There are greater opportunities for energy storage technologies that are capable of storing energy for longer periods of time (i.e., months).

[6] From over 400 submissions received

[7] 37 submissions with over 133 MW received

[8] IESO Report: Energy Storage, March 2016

4. In this same timeframe, energy storage technologies that only withdraw electricity from the grid, like other loads, but store it for use in an industrial, commercial or residential process or to displace a secondary form of energy (e.g. electric vehicles) would be more effective at managing SBG conditions.

5. Properly sized and located fast-acting energy storage technologies can effectively provide regulation, as long as they complement a portfolio that includes traditional regulation technologies that are not energy limited.

Demand Response Pilot:

In 2015, the IESO initiated a Demand Response (DR) Pilot and procured 70 Mw of DR from three companies (one consumer, one aggregator and one energy center) representing 10 projects ranging from 1MW to 35 MW, each with unique technical characteristics and constraints. The selected pilots are required to vary their consumption (in response to dispatch instructions) for at least 100 hours per contract year with a unit commitment to load curtailment day-ahead or four-hours ahead of real time in return for certain guarantees.

In Closing:

More important learnings will evolve over the coming years, particularly in the areas of (1) autonomous behavior of embedded DERs (controllable loads, generators and storage) not subjected to IESO dispatch and (2) weather related uncertainty in forecast due to a higher penetration of variable generation (wind/solar).

In 2017, the IESO announced the results of its competitive proposals for Incremental Regulation Capacity (IRC) awarding 55 MW to Hecate Energy Ontario Storage (30 MW) and Saturn Power (25 MW) from over 350 MW of proposals to perform an important grid-balancing function that corrects for short-term changes in electricity use that might affect the reliability of the power system. These successful projects also represent one of the largest reductions in per-unit regulation costs since Ontario's electricity market opened.

As of June 25, 2018, an Energy Storage Advisory group represented by 57 companies has been formed at the IESO to help this important area move along faster and better.

California may have the world's biggest grid-scale energy storage mandate, but Ontario Canada (perhaps) has the world's most varied one.

GSGF at a glance

Chartered Members

Think Smart Grids

India Smart Grid Forum

Japan Smart Community Alliance

Korea Smart Grid Association

Smart Grid Mexico

Prakarsa Jaringan Cerdas Indonesia (PJCI)

GridWise Alliance

Utility Members

Electricity Generating Authority of Thailand (EGAT)

Electricity Supply Commission of South Africa (ESKOM)

EDM Mozambique

Tenaga Nasional Berhad

Associate Members

Green Business Certification Inc.

Florence School of Regulation (FSR)

Energy Block Chain Consortium

Current Working Groups

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

Working Groups in Pipeline

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

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