APRIL–JUNE 2020 | ISSUE 01

INNOVATIONS @ ENERGY

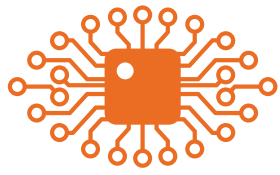
Dear Members,

Welcome to the first issue of **Innovation@Energy**– our new initiative focussing on energy technology innovations.

Innovation@Energy would feature regular updates on our near-term as well as the long-term vision of the technology innovations for the energy marketplace including product, and process related developments, which will benefit our members and clients. Besides, it would also feature industry developments in Indian and global context and how these developments will shape the future.

IEX TECHNOLOGY VISION

We envision a state-of-the art, intuitive, secure and efficient energy marketplace with customer centricity at the core of our every feature. Our technology and product initiatives are focussed on launching new products, which can enable greater liquidity and provide optimised trading options. With customer centricity as the primary tenet, we are actively working on various markets such as real-time market, longer duration contracts, cross border trade in electricity, green market etc., Over the last two months, we also organised multiple stakeholder workshops across various states to get feedback to improvise existing market products and discuss scheduled commencement of the new products. We really appreciate the collaborative approach and thank all our members for participating and sharing quality feedback with us. We are working towards integrating all 'asks' in a phased manner in the upcoming releases. Our 'Product and Technology' team is a vibrant, inquisitive, motivated, progressive, action oriented and customer centric. Keeping the futuristic architecture in mind, we are reviewing all processes with an objective to enhance efficiency. We remain committed to deliver the state-of-the-art, intuitive, secure and efficient energy marketplace to all the market participants.



RECENT IEX TECH RELEASES

Term-ahead Market

- The Term-ahead Market last tradable day has been relaxed to T+10 with Any-Day Any-Time Period contract. Besides the hourly contracts, a 15-min product has also been introduced.

New Bid-order Types

- In keeping with our vision, we are progressing fast to soon introduce two new bid-order types within this month. The Minimum Quantity Block bid will help the market participants optimise the selection of bids and thereby reduce chances of rejection. The user would be able to define minimum quantity in a block bid.
- The second new bid-order, we would introduce soon is Profile bids which would help renewable energy generators optimise selection of varying generation profile. The profile bids would feature provision to enter same or different quantity for each period at the time of block bid request. More details will be available as we release these features.

Real Time Market

- The Real Time Market (RTM) would commence from June , 2020 as per CERC orders, and our tech preparation is in-place and we have started the mock trials. We are working on UX-like colour differentiation for this market segment to major ones like Integration APIs.

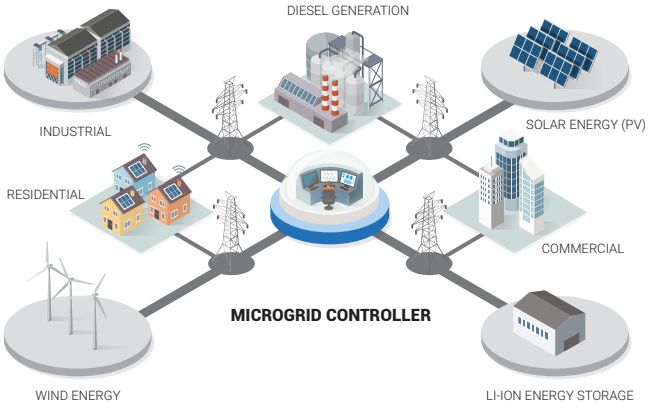
MICROGRIDS: TECHNOLOGY-LED DISRUPTION & HYBRIDISATION TO LEAD TO CONSUMERISATION AND NEW MARKET MODELS

Introduction

The energy sector is witnessing unprecedented transformation in energy production & consumption, driven by the 4Ds - De-carbonisation, De-centralisation, Democratisation and Digitalisation. The impact of climate change on energy sector is not only limited to harnessing cleaner energy but it is further churning the energy-mix with ongoing electrification of automobiles. According to BP Energy Outlook 2019, around three-quarters of the increase in primary energy demand shall be met by power sector. One such renewable led, technology driven, and energy storage supported innovative model transforming the energy sector is Microgrids.

Understanding Microgrids

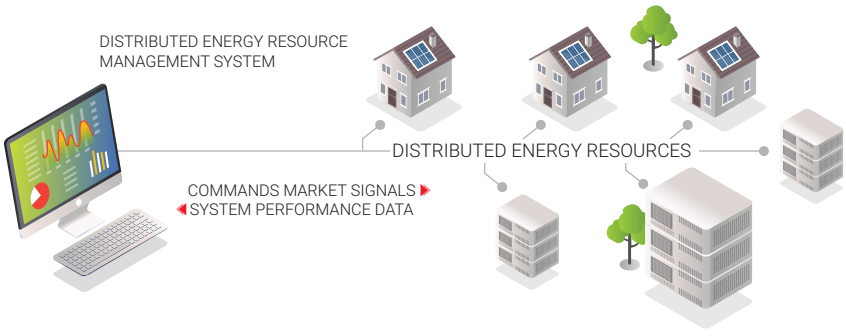
Unlike the conventional power system with large centralised generation system interacting with a centralised distribution load through a transmission network, Microgrid is a small isolated system consisting of distributed RE generations in and around the load centre (consumers) itself. Microgrids are leading example of decentralisation of power system by integrating the distributed micro-generation units with the nearby demand minimising the requirement of transmission & distribution network. The Microgrids can be grid interactive and off-grid (island mode) depending upon capacity of micro-generation units, local demand pattern & grid dependency.



Microgrids can be grid connected or off-grid

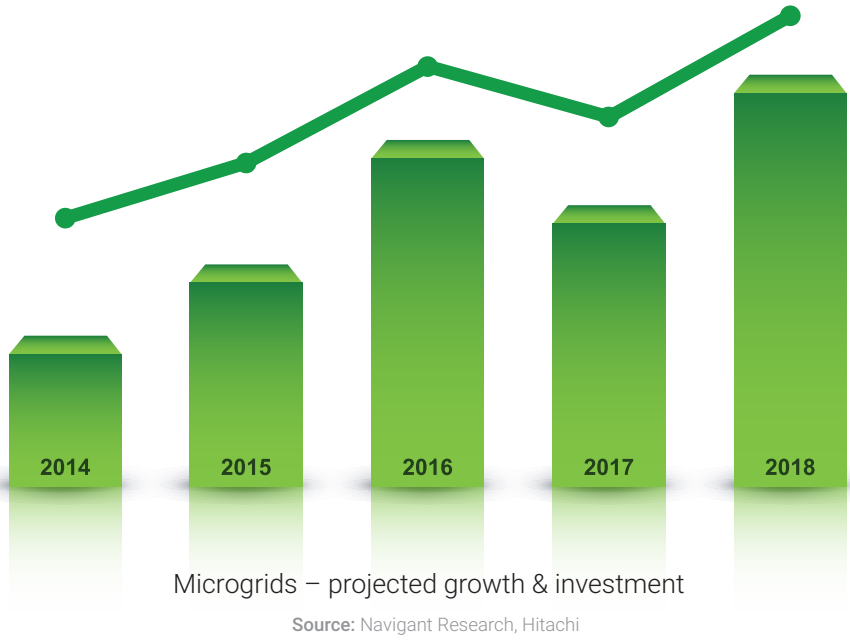
Smart Microgrids

Distributed RE generation in grid interactive Microgrids is connected at Low/Medium voltage level in distribution system. A Microgrid becomes “smart” when it can intelligently integrate, interact on real time and manage the actions of all the users connected to it – generators, consumers & prosumers by use of system integrated IT & communication system.



Global Developments

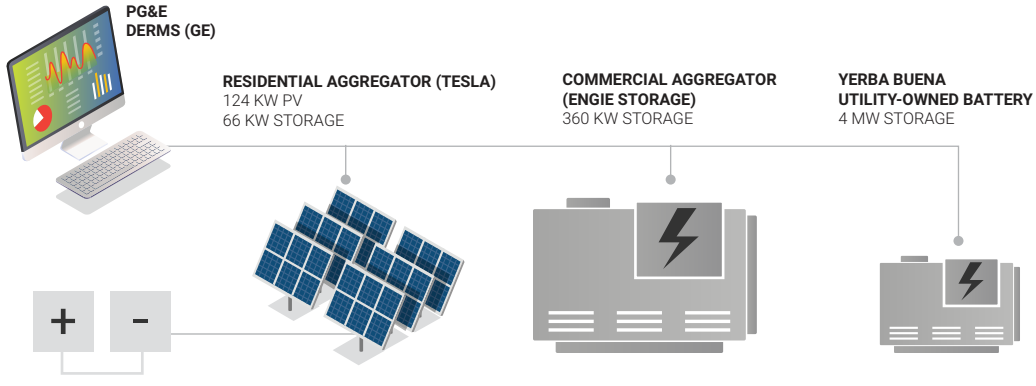
Globally Microgrids are emerging as a second layer of energy provider for grid connected customers & primary source of energy in transmission averse topography. Microgrids are global phenomenon wherein Asia Pacific is expected to be a dominant shareholder of 41.3% of total installed capacity followed by North America with 32.5%.



Microgrids – projected growth & investment

Source: Navigant Research, Hitachi

In terms of technology, various discoveries in smart IT & communication system facilitating real time integration & management of Smart Microgrids, have accelerated acceptability of Microgrids. One such technology developed by GE Grid Solutions and Pacific Gas & Electric called Distributed Energy Resources Management System (DERMS) is a centralised software with smart integration options for distributed solar & energy storage.



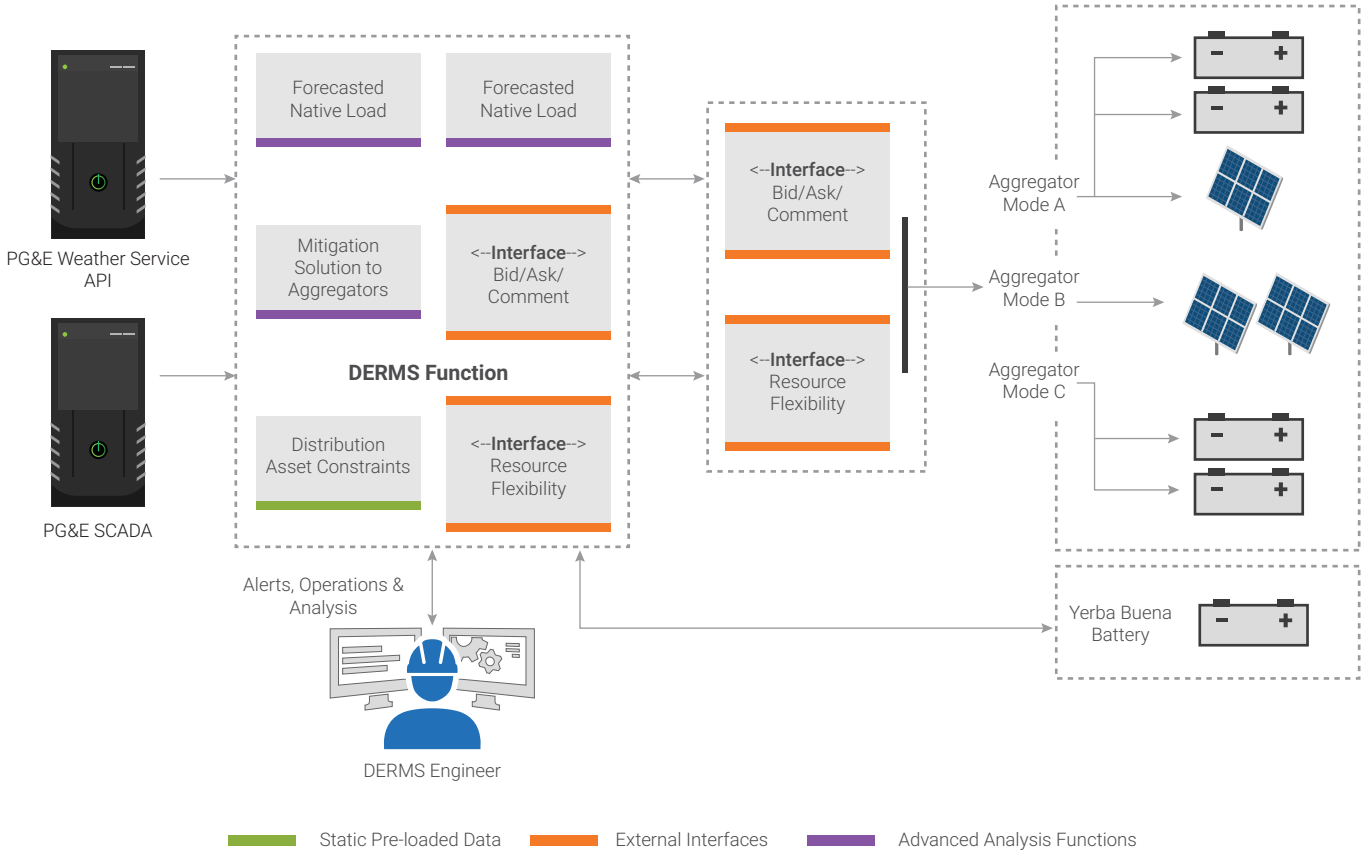
Such technology platform multiplies value offering of Smart Grids by a range of DER benefits such as deferral of generation, transmission, and distribution capacity investments; voltage control or VAR (reactive power) supply, ancillary services, environmental emissions benefits, reduction in system losses, energy production savings, enhanced reliability, power quality improvement, combined heat and power, demand reduction, and standby generation.

The DERMS is well designed to interact with the DERs on a real time basis and facilitates range of innovative energy services options such as facilitating DERs to participate in Power Exchanges and offer grid support services: Vehicle to Grid & Grid to Vehicle and energy storage devices. The projected decline in ESS cost shall further accelerate growth of Smart Microgrids. Therefore, Smart Microgrids are emerging as a secondary layer of power distribution complementing & supporting the DISCOMs and grid operations, thereby facilitating transition towards 4D's.

Aggregator of Smart Microgrids

Moving beyond the stand-alone smart microgrids, the recent advancements in the technology facilitates smart integration & aggregation of Smart Microgrids through a centralised DERMS. The concept of aggregator is evolving faster than ever with two major offerings: Distributed Resources Aggregation & Demand Response.

Aggregation of DERs creates larger resources for negotiation, optimises scheduling options to aggregators to accrue maximum value for DERs by scheduling in line with grid conditions. The aggregation of Smart Microgrids further improves demand response/grid support services such as Vehicle to Grid, Grid to Vehicle, Optimisation of charging & discharging pattern of energy storage systems.



Aggregation of Smart Microgrids

Relevance of Microgrids in Indian context

Benefits of Smart Microgrids

- Facilitates consumerisation of electricity
- Aligns with Government's policy of solarisation of Agriculture (KUSUM)
- Reduce dependence on transmission & distribution network resulting in cheaper power
- Helps Discoms to smoothen the load curve & reduce peak power procurement cost
- Helps Discoms in frequency & voltage regulation and improves the islanding capacity of the utilities

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