

Preparing for tomorrow's energy landscape with distributed intelligence

In order to prepare for the challenges ahead, Michael Somersmith, director of product management, Itron, recommends that utilities evaluate the role consumers and the latest technologies play in making a greener, more balanced, grid a reality

Managing the UK's National Grid has never been more complex than today. In recent months, we've seen the UK's wholesale electricity market soar to historic highs, and expensive coal power plants called on to make up for the dent left in renewable energy generation due to low winds. Other times, strong gales have resulted in wind farms being paid to shut off in order not to overload the system. And yet, this volatile energy is our future.

As we continue to integrate more renewable energy sources on the road to reaching net-zero by 2050, keeping the grid operating at its required 50Hz frequency will require a constant balancing act.

THREE CONSUMER-LED POWER GENERATION TRENDS

Consumers, however, are beginning to play an active role in not only using energy but also generating it. In fact, one in six utilities use customer-generated power as part of their integrated resource strategies, with solar PV the most common use case. The International Energy Agency forecasts annual global solar PV expansion to reach a record 162 GW in 2022 – making up over half of all renewable energy expansion. Realising this, the UK government has begun subsidising the use of solar PV through the Smart Export Guarantee scheme, paying households to effectively 'export' solar energy back into the National Grid.

Battery energy storage systems pose a similar benefit, both promoting renewable energy generation and providing grid services by mitigating surges and feeding excess energy back when generation is low. I expect the need for these

services will increase exponentially, since balancing the grid will require 43GW of electricity storage in 2050, compared to 3.5GW today.

Following a record number of applications for battery storage in 2021, experts say the UK's battery storage capacity (currently 1.3GW) will more than triple (to 4.5GW) by the end of 2022.

Finally, electric vehicles (EVs), which are mostly seen as a challenge for the grid due to demand surges, will increasingly deliver opportunities for energy generation. And not just in the far future! A recent UK Smart Metering Innovation for Load flexibility (SMILY) field trial demonstrated that today's metering solutions can work effectively with EV chargers to balance the grid. Using Itron's SMETS2 smart electricity meters, we incentivised customers to charge at the most efficient time from the broader energy system's perspective. Although, initially, only around 40% were comfortable with their energy supplier taking control of their charging schedule, this rose to 76% by the end of the trial.

ENTER DISTRIBUTED INTELLIGENCE

Thankfully, consumer thinking and attitudes are shifting alongside the proliferation of these distributed energy resources. As monitoring, metering and analytics capabilities also evolve, command and control of the electric grid will have to become more decentralised and more capable at the service point and at the distributed generation plants. This realisation has created a real sense of urgency in the sector to reimagine business models and introduce the next generation of monitoring and metering technologies to make distributed energy management live up to its full potential – in the form of distributed intelligence.

In a reformed model, edge computing and distributed intelligence will be the framework for data-rich and performance-based incentives.

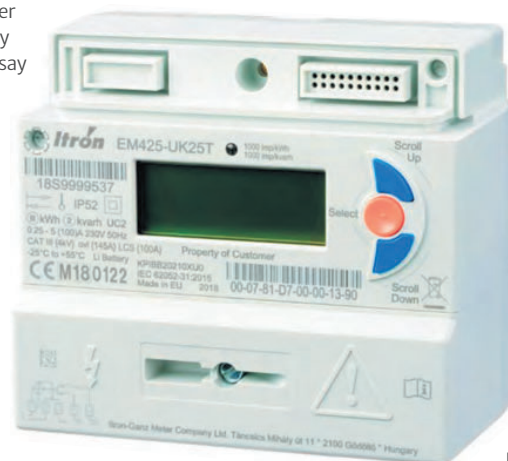
Distributed intelligence applies analysis, decision making and action where it's best utilised for the most valuable outcome. With higher analytics power available at the edge of the network, utilities will be able to create, access, control, analyse and deliver locally-generated power, resulting in improved consumer-level resiliency, lower system losses, reduced demand charges and an overall more balanced grid.

What's more, a distributed intelligence model will also transform consumer relationships by enabling utilities to give consumers granular insight into demand-generation hotspots – even their mobile phone chargers – and add value to their experience, be that through outage notification or management, or by proactively identifying electrical issues with meters.

THE OPPORTUNITY TODAY

If the past 20 years in the energy sector have taught me anything, it's that data is where all the value lies, for consumers and utilities alike. Now, the chance to enhance communication and collaboration between these groups is here for the taking.

As we continue to innovate in this direction, distributed intelligence will not only stabilise the grid in the face of near-term challenges, it will also create exciting new opportunities to develop advanced solutions that meet the needs of smart cities 15-20 years from now.



Michael Somersmith