Utilities

Energy demand management / Smart grids

Manufacturing plants and individuals alike are increasingly no longer just energy consumers, but also active participants in the energy market. They are acting on opportunities for power generation (e.g. combined heat and power plants, solar collectors), for active control of their own energy demand and increasingly looking at opportunities to feed into the public energy network. This raises the question of how to effectively manage the balance between the supply and demand of energy throughout a distributed power network. How would one go about building a smart grid able to deliver an optimised solution in real-time?

An effective solution is to combine Industrial Internet of Things technology with a cooperative distributed control strategy. Electrical generators and consumers can make considerable savings by using the Industrial Internet of Things to balance load demand on a network with the available generated power. The dynamics of the power network as a whole are the result of interactions between the individual components; the generators produce power that is injected into the network on the one side, while the loads consume power from the network on the other. If we consider each power plant, load, and station as a subsystem, it is a typical distributed system, whose subsystems interact with each other and whose control can be coordinated and optimised through the Industrial Internet of Things.

> "To thrive in a prosumer*-centric energy market, providers [utilities and power providers] must make digitalization and analytics core competencies. Thrivers will use analytics and digital platforms to improve visibility into customer usage and forecasting, provide end customers with tools to control their usage, know when customers will send power onto the grid and how to balance it."
> – GE quote from 2017 Top Digital Trends for the Electricity Value Network
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> * Prosumer: a consumer of energy who also produces energy.

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