

# **Integrating renewable sources into a reliable power ecosystem**

**Ratingen, Germany, May 21<sup>st</sup> 2019**

**Balancing different sources of power, including renewables represents the most efficient and sustainable approach to meeting the energy needs we have now, and those of the next generation. Efficient control hardware combined with the management and optimization offered by virtual power plants provides an opportunity to meet that challenge today.**

*Mitsubishi Electric's Morteza Seraj, Director of Process Automation for Factory Automation EMEA provides a practical overview of how virtual power plants can provide the answer.*

The evolution of control software and electrical hardware solutions for renewable and distributed power generation are two major drivers for potential improvement in energy efficiency in the power industry.

Combined solutions such as Virtual Power Plants move the concept on further again: they can be used to support the transition from traditional energy generation to renewables by offsetting some of the constraints and variability experienced with green power sources.

Given recent trends in the power generation sector and our corporate philosophy of contributing to a greener tomorrow, we have intentionally focused on control and electrical solutions for renewable and distributed power generation. These are two major drivers for improved generating and operational energy efficiency in the power sector. Over recent decades, we have engineered successful products and projects for energy from waste (EfW), combined heat and power (CHP) as well as

combined cold, heat and power plants; helping them become the most efficient sources of energy generation and transformation they can be.

The other aspect of our contribution towards energy efficiency lies in how our solutions help end users and small generators to operate more efficiently. Whereas one category of customer includes energy producers, the other also contains energy consumers. With our integrated automation and electrical solutions, we aim to enable both categories to operate with the highest levels of energy efficiency. We set out to help power producers and consumers to optimize their internal consumption by offering them more efficient and reliable process control options, as well as electrical balance of plant, solutions.

### **Are virtual power plants part of Industry 4.0?**

The [Virtual Power Plant](#) (VPP) concept wasn't consciously developed as an Industry 4.0 solution. It is more, one of many evolutions in the automation and data processing path which coincides with within the arena of Industry 4.0. That said, energy management and monitoring, and Industry 4.0 should not be judged as occupying two mutually exclusive spaces.

There has been and will always be the need for energy management and monitoring. The quality and capabilities of that functionality however are subject to continuous enhancement with further developments in data sensing, measuring, transmitting and processing technologies. The pace of this development has been exponential in the last few years preparing the ground to create more value-added solutions like Virtual Power Plants. The catch word for this last phase of development is Industry 4.0 these days.

### **The transition to renewables**

We believe Virtual Power Plants can to a great extent support the transition from traditional energy generation to renewables. Renewable energies, despite all their indisputable advantages do also come with

considerable disadvantages, limiting the net benefit for some end users. For most users, individual renewable energy sources are quite inflexible, you have power when there is sun shining or the wind blowing, but your energy consumption patterns do not necessarily follow the sun or wind. Secondly, their availability is not fully predictable - just imagine the situation when you have a blanket dust storm in a desert where you have installed hundreds of Megawatts of solar power.

Renewable energies are of course the most environmentally friendly sources of power and are becoming cheaper to produce as well. But every professional in the power industry knows, when it comes to power, reliability of supply comes first. This was for a while where conventional power had a dominant position, flexibility. Our Virtual Power Control however makes a combination of renewable energies flexible too and therefore makes them a secure source of power supply. This is done by coordinating the most economical and available energy generation and storage sources to meet a certain load at any point of time. This remove a major barrier to maximizing renewable integration on the grid.

### **Is blockchain technology relevant?**

Block Chain technology is a current hot topic and does have the potential to contribute tremendously to a transition by the power sector from a conventional centrally controlled system to a distributed and yet secure power matrix.

Since in a block chain there is no central data storage and processing location, there are no copies, there is one single entity of any specific block of data which is distributed between different participating nodes. This unique feature can increase the robustness of the control and data processing system to outside cyber threats as one needs to copy the entire distributed system to be able to manipulate it.

So, Block Chain technology can potentially be used to address the biggest concern of policy makers and regulators with respect to vulnerability of the power systems of the future to cyber-attacks. However, I must also issue a word of caution and say we are at the early stages of exploring how Block Chain can be used in our industry. We should take the time and test solutions before speculating too much about the outcomes.

### **Taking the next step**

The combination of currently available technology has the potential to make far reaching improvements to overall energy efficiency, both from a generation capacity and distribution point of view. The application of the latest automation controllers, power management equipment and software solutions, including combination systems such as Virtual Power Plants, can be used to integrate diverse power sources and optimize our power landscape.

**Photo caption:**



**Photo 1:** Morteza Seraj, Director Process Automation, Factory Automation EMEA, Mitsubishi Electric Europe B.V.

[Source: Mitsubishi Electric Europe B.V.]



**Photo 2- 3:** Balancing different sources of power, including renewables represents the most efficient and sustainable approach to meeting the

energy needs we have now, and those of the next generation.

[Source: Mitsubishi Electric Europe B.V.]

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**Note to Editor:** if you would like the text in another language please contact Philip Howe at DMA Europa – [philip@dmaeuropa.com](mailto:philip@dmaeuropa.com).

## **About Mitsubishi Electric**

With nearly 100 years of experience in providing reliable, high-quality products, Mitsubishi Electric Corporation (TOKYO: 6503) is a recognised world leader in the manufacture, marketing and sales of electrical and electronic equipment used in information processing and communications, space development and satellite communications, consumer electronics, industrial technology, as well as in products for the energy sector, transportation and building equipment.

With around 145,817 employees the company recorded consolidated group sales of approximately 40.7 billion dollars\* in the fiscal year that ended on March 31, 2019.

Our sales offices, research & development centres and manufacturing plants are located in over 30 countries.

## **Factory Automation EMEA**

Mitsubishi Electric Europe B.V., Factory Automation EMEA has its European headquarters in Ratingen near Dusseldorf, Germany. It is a part of Mitsubishi Electric Europe B.V., a wholly owned subsidiary of Mitsubishi Electric Corporation, Japan.

The role of Factory Automation EMEA is to manage sales, service and support across its network of local branches and distributors throughout the EMEA region.

\*Exchange rate 111 Yen = 1 US Dollars, last updated 31.03.2019 (Source: Tokyo Foreign Exchange Market)

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