



FUTURE OF
UTILITIES

vmware® | intel.

Smarter substations key to the smart grid of the future



Against the backdrop of a cost-of-living crisis, public outrage at polluted waterways and the pressure to meet sustainability targets, utility companies are rethinking not only their hardware but also the software that links everything together. To learn more about how the latest computing innovations can help energy companies meet not only their sustainability goals but also overcome key business challenges, MarketforceLIVE brought together two technology giants, Intel and VMware, in conversation for delegates at the flagship Future of Utilities 2023 conference

Nicolas Robin, Director, Energy Center of Excellence at Intel, said a key challenge for companies seeking to reach Net Zero by 2050 was that they don't start from scratch. "Day to day, they have to deal with and operate legacy energy infrastructure which were designed and built decades ago, on quite centralised energy generation and one way energy flow down to the consumer model," he said.

"There is no energy transition without decentralization which generates huge stresses and pressures on the legacy infrastructure. The solution starts at the Edge of the grid."

Nicolas Robin Intel

This infrastructure is now feeling the strain as it must accommodate the rise of distributed edge-of-the-grid renewables, mass electrification of industry and mobility and manage bi-directional energy flows as consumers also become producers. "This transition generates huge stresses and pressures on the legacy infrastructure," said Nicolas.

Utilities in Europe and Asia Pacific use secondary substations at the edge of the grid to manage electricity distribution to customers. There are more than 28 million secondary substations in service worldwide with a varying level operational technologies (OT) for connectivity, monitoring, and automation, and with a large fraction having no OT at all. This legacy network is not fit for the

purposes of a decentralized energy system, which will instead require a flexible, scalable, and intelligent architecture at the edge that can be managed and upgraded over time to meet the changing needs of the grid.

An ecosystem of innovation

Recognising that adaptive smart grid control is a critical component to enable operators to manage demand for power and reliability, Intel began a conversation with European energy utilities in 2017 to better understand the problem statement they were encountering, said Nicolas Robin. The challenge was too complex to be addressed by one organization; therefore, Intel contributed to convene an ecosystem of partners which could then build new industry standards that would be secure, open and inter-operable. This led to the creation of the Edge for Smart Secondary Substations (E4S) Alliance which counts 21 members as of today.

“It’s about virtualizing all the functions and to move from a quite closed hardware, proprietary system to an open, secure, inter-operable software defined platform, on which the utility companies can build their own use cases on top of,” he said.

“The transition to the cloud is not an option, it’s a must”

Alexandra Baleta **VMware**

Alexandra Baleta, Senior Director, EMEA Industry, Europe, Middle East, Africa at VMware, likened the process to peeling back the layers of an onion. “We all know there are legacy estates out there,” she said. “The transition to the cloud is not an option, it’s a must to give us the flexibility and scalability we need. Yet as we come to peel the onion, we have to optimise as much of the legacy infrastructure as possible to de-risk the operations.”

The alliance is working with ABB and DELL, among others, to take away hardware estate and then using virtualisation to manage the grid from a software perspective. She said this enables utilities companies to “turn data into something more intelligent” so infrastructure can be better managed, operations optimised and consumers have increased opportunity to engage with green software.

It’s not just that modernised substations will be key to the energy transition. It will also help utility companies reduce both OpEx and CapEx costs, making it easier to deploy and scale new applications, improve security through better device monitoring while automated troubleshooting and load management will replace manual processes. Labor-intensive maintenance and upgrades will largely be replaced by remote management and maintenance. Virtualization will also reduce the amount of hardware needed in a substation and provide a more economical and scalable solution. This is all going to be put to the test in H2 2023, when the E4S Alliance plans to test its new SSP technology in energy utilities partners’ substations, i.e., Iberdrola, and ENEDIS.

Alexandra Baleta of VMware stressed how important this ecosystem approach is to delivering the energy transition by drawing parallels with the automotive industry. “The manufacturers want to get electric vehicles out but if there’s no charging infrastructure that’s comfortable for consumers then it’s not going to work,” she said. “There’s this whole ecosystem that needs to come together and there’s certainly existing technology we can use to optimise what we have.”

She highlighted an example from Italy where there’s work underway on establishing an optimised electric vehicle charging grid. “Once you dock your car you transmit data and while there are GDPR restrictions on that, there are still things you can do with that data to help local communities better establish relationships with drivers to manage the peaks and troughs around charging vehicles.”

Secure, reliable and essential

Inevitably, increased digitisation of key national infrastructure gives rise to questions of security. Responding to questions about the vulnerability of the smart grid to malicious hackers, Alexandra Baleta of VMware said there's intrinsic security built into every part of the technology, both on the back office and the edge. "The edge is the broad base of attack because it's distributed and quite complex," she acknowledged. "But this technology is a tool and enabler and will accelerate the energy transition."

"We need to deliver an enhanced energy system which is reliable, secure and sustainable because without it we won't meet the Net Zero emissions target on time, so there won't be any viable economy and liveable society"

Nicolas Robin **Intel**

Nicolas Robin of Intel said ultimately the rise of the adaptive smart grid is inevitable. "We are not selling technology for the sake of it," he said. "We need to understand the challenge and deliver an enhanced energy system which is reliable, secure and sustainable because without it we won't meet the Net Zero emissions target on time, so there won't be any viable economy and liveable society."

It was a fascinating discussion between two experts, highlighting the scale and complexity of the energy transition. Because while electric cars, smart meters and solar panels grab the headlines, it's the behind the scenes work to reinvent the humble secondary substation that may prove just as critical to the race to Net Zero.



Through our series of digital content and events, including webinars, reports, roundtables and conferences, we deliver the necessary thought leadership, shared experiences and networking opportunities to prepare for, and determine, the future of utilities.

For more information, please visit: marketforcelive.com/future-of-utilities



VMware and Intel provide IT organizations a path to digital transformation, delivering consistent infrastructure and consistent operations across data centers and public clouds to accelerate application speed and agility for business innovation and growth



FUTURE OF
UTILITIES

