How to stabilize TSO grid with building assets

Smart buildings connected to smart grids

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Businesses

Digital Industries
Smart Infrastructure
Gas and Power

	Siemens Osakeyhtiö	Siemens AG
Revenue	€217M	€87bn
Employees	510	385,000
Founded	1898	1847
Operations in	Finland, Estonia, Latvia, Lithuania	200 countries

The “new” Siemens AG

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Two options for balancing power

Through power generation

in back-up power plants

Traditional way

- Fossil power not to drive environmental goals
- Expensive for a society to maintain
- Replacements of old power plants unprofitable

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Through flexible consumption

Demand response through virtual power plants

- Development of demand response models
- Digitalization as an enabler
- Disruption of the traditional energy markets

New way

Sello Shopping Center

The project was a door opener to the new market

- The largest shopping mall in Finland
- 100.000 m2 of shopping space
- 26 Million visitors per year
- 170 Shops
- LEED Platinium

- Energy efficiency
- Optimization of peak loads
- Own electricity production
- Totally new income from reserve markets

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Sello is already connected to the energy market

- Contributing to the carbon neutral society
- Benefiting from the compensation from reserve markets
- Solutions for automatic purchase and selling of electricity as well as controlling of consumption.
- Diversified know-how: building automation, microgrids, connectivity, platforms, digital solutions, energy storages, smart metering, local production, financing

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Virtual power plant in action – **Sello Shopping Mall**

Benefits

- Earnings from Fingrid reserve markets €483.000 /a
- Earnings from the solar system €57.500 €/a
- Energy efficiency €78.200 /a
- Savings from the maintenance costs €40.000 €/a

- Reduced maintenance back log investments €650.000 /a
- Own energy production 640 MWh/a
- Emission reduction 281 tkg/co2/a

- New business opportunities enabled by new technologies
- Positive impact of energy efficiency to the tenants
- Improved image
- Improved ROI

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A new earning model as a part of the smart energy system
Buildings' small loads combined and provided to the market

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El Spot
Electricity market

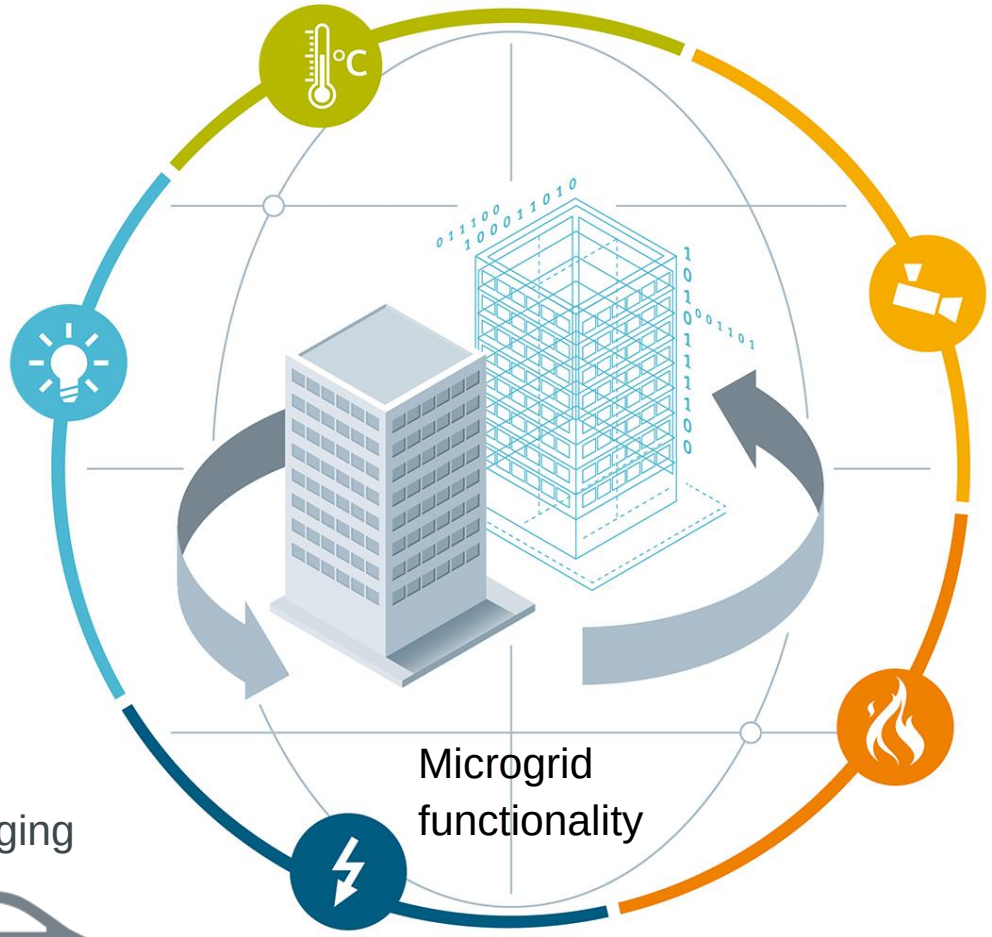
nordpool spot

Demand response market

FINGRID

Trade

Cloud based Smart Energy Platform



Microgrid functionality

eCar charging

Solar Panels
750 kWp

Battery storage
2 MW / 2,1 MWh

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Building technology components in the microgrid
Load to be provided from Sello to the reserve market

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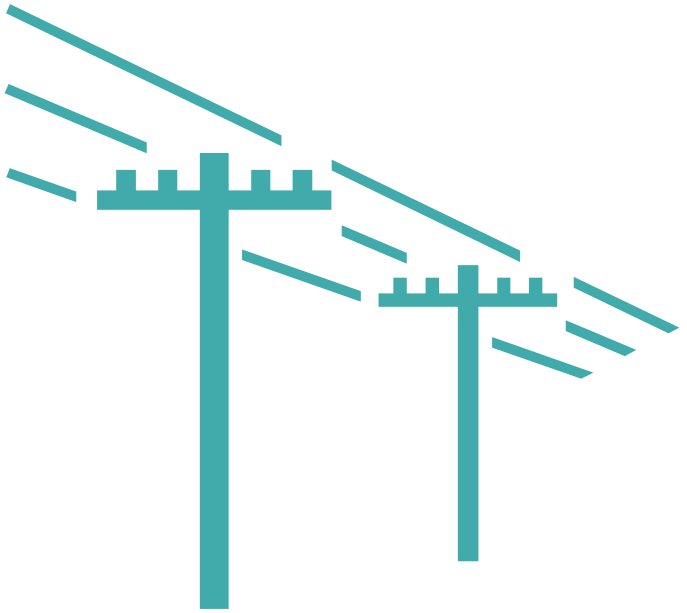
- Battery SieStorage (2 MW, 2,1 MWh)
- LED lighting dali control (3000 pcs)
- Fans (0-848 kW scale)
- Ground heater electric (0-390 kW scale)
- Ground heater pump (0-35 kW scale)
- Generators (1330 kW)
- Solar power (0-750 kW scale)
- EV charging (0-300 kW scale)

Next steps, Cooling 3 MW
Other assets 1 MW



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Briefly control of building loads
Sello shopping center

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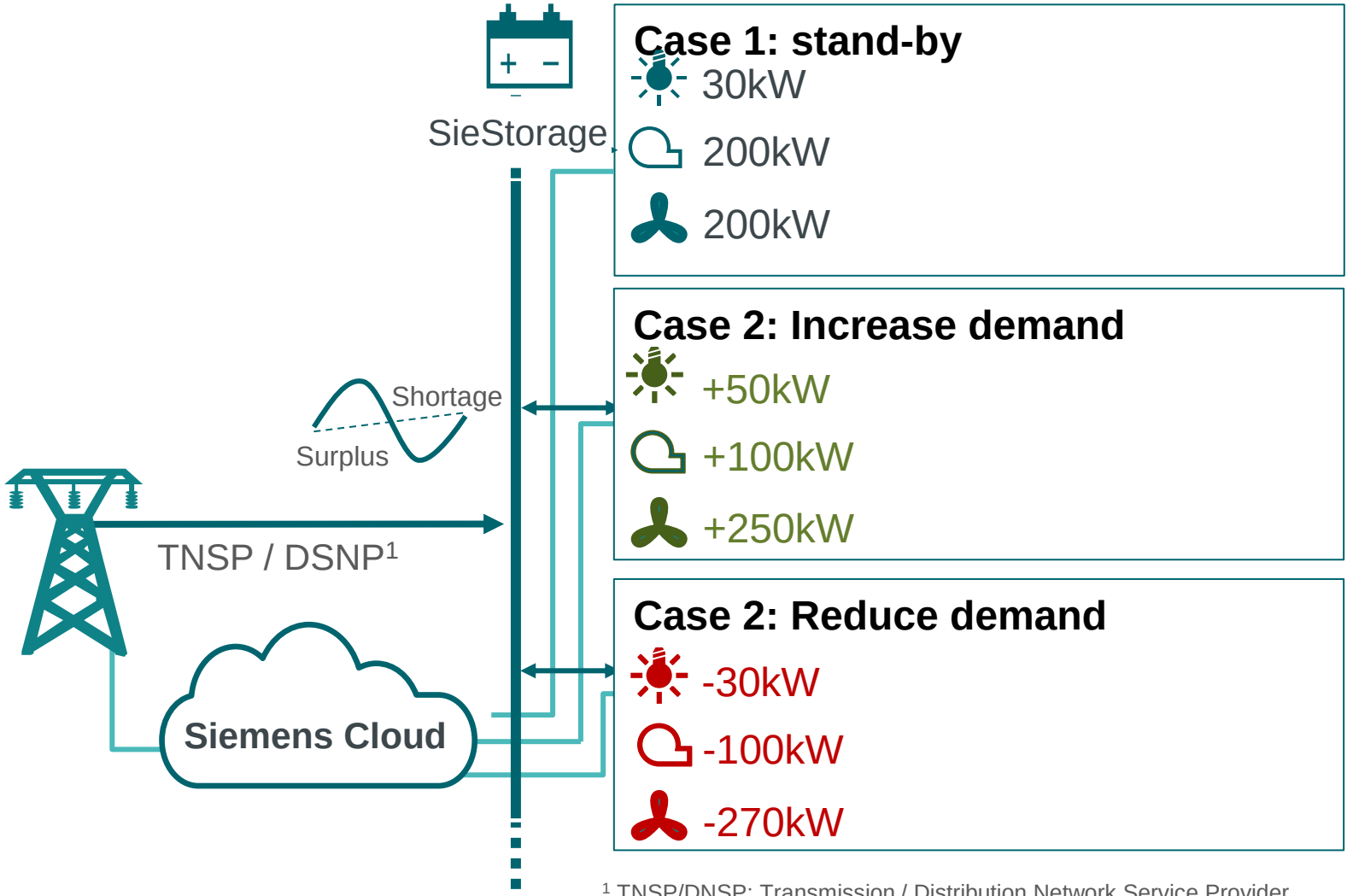

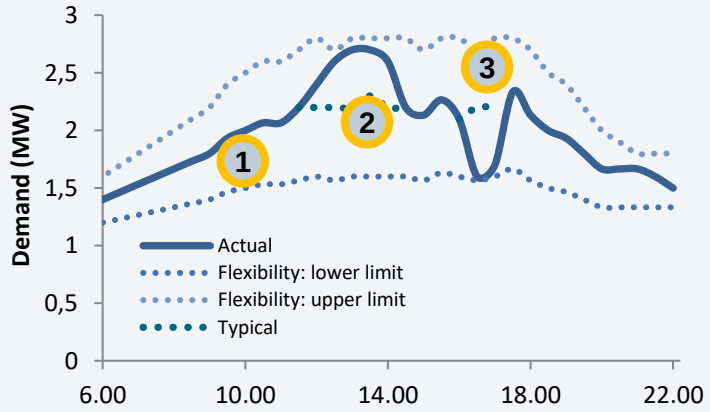

[1] TNSP/DNSP: Transmission / Distribution Network Service Provider

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El Spot
Electricity market

Demand response market

Solar Panels 132 kWp

Battery storage 1 MW / 1 MWh

VIBECO
Virtual Buildings Ecosystem Oy

Microgrid functionality

Microgrid functions

Smart building automation

Electric systems for the demand response use and microgrid functions

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Pyramid layout

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VIBECO provides virtual power plant service by combining energy system and building know-how

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VIBECO is a platform company providing digital services for buildings. Its first virtual power plant service is a totally new approach to create sustainable society and to generate new measurable value to building owners.

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Sello Shopping Center

VR Group

City of Lappeenranta

Ski resort, Levi

Finnish University buildings


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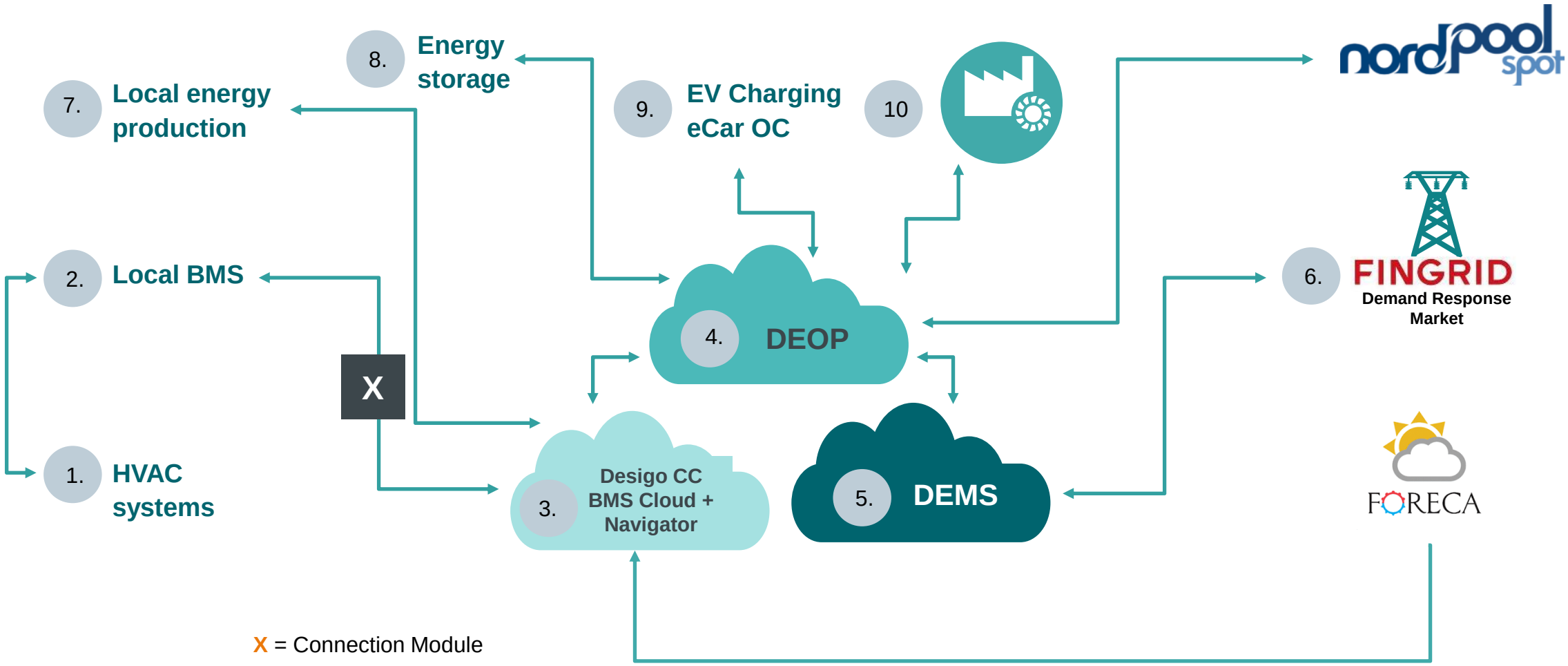
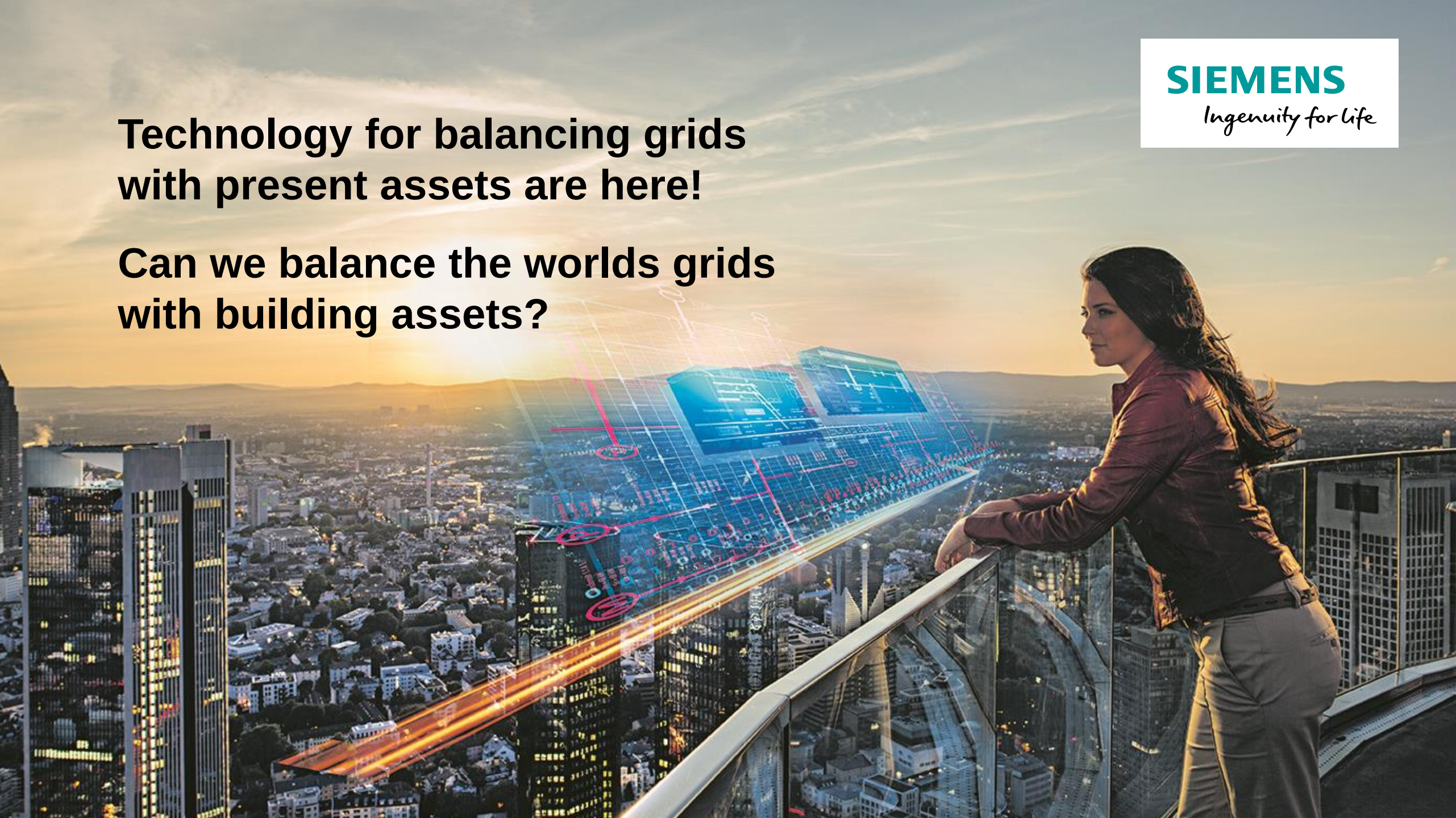
Virtual power plant – Software landscape

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Technology for balancing grids with present assets are here!
Can we balance the worlds grids with building assets?

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Thank you.