



Why Secondary Substations matter

A smart grid story

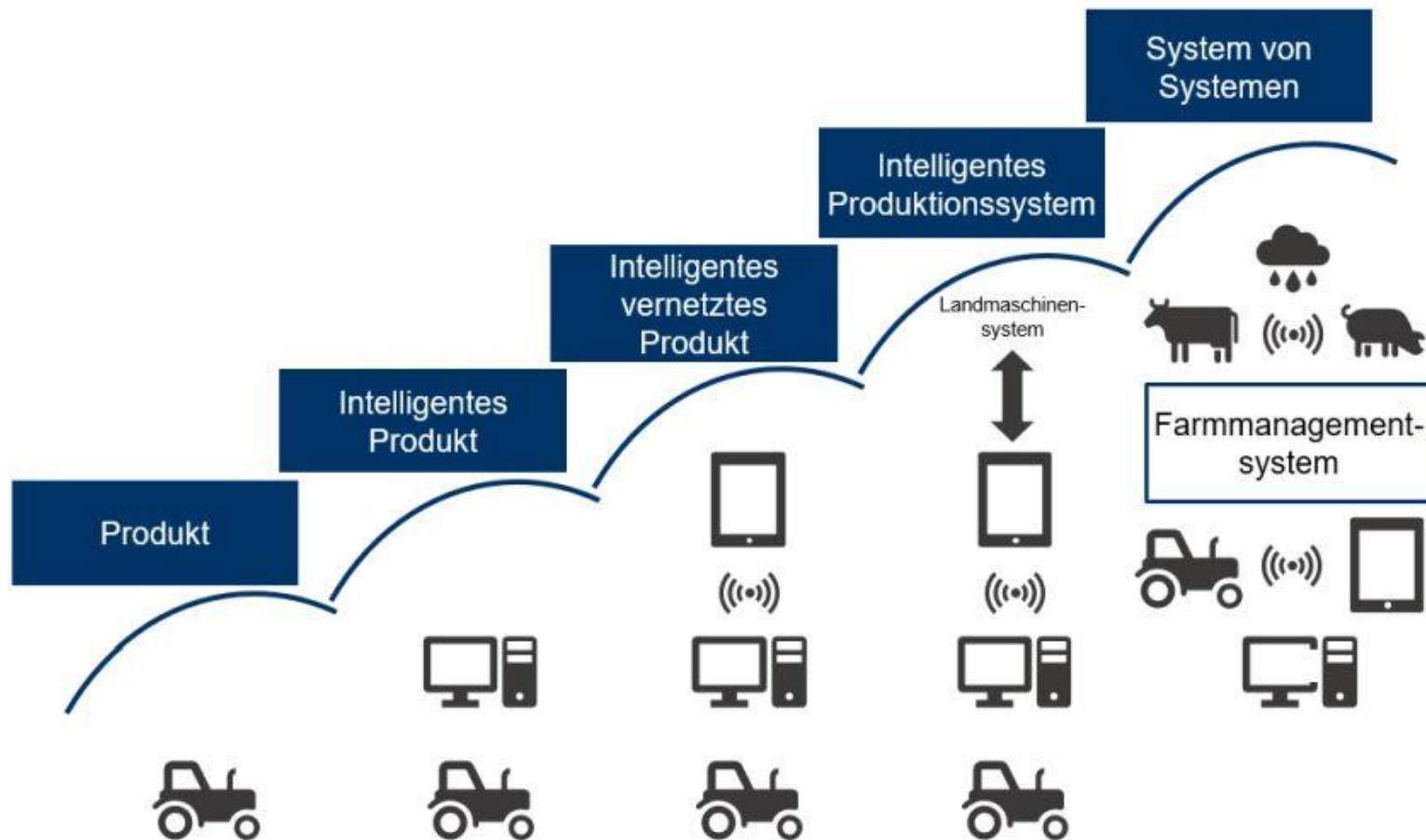
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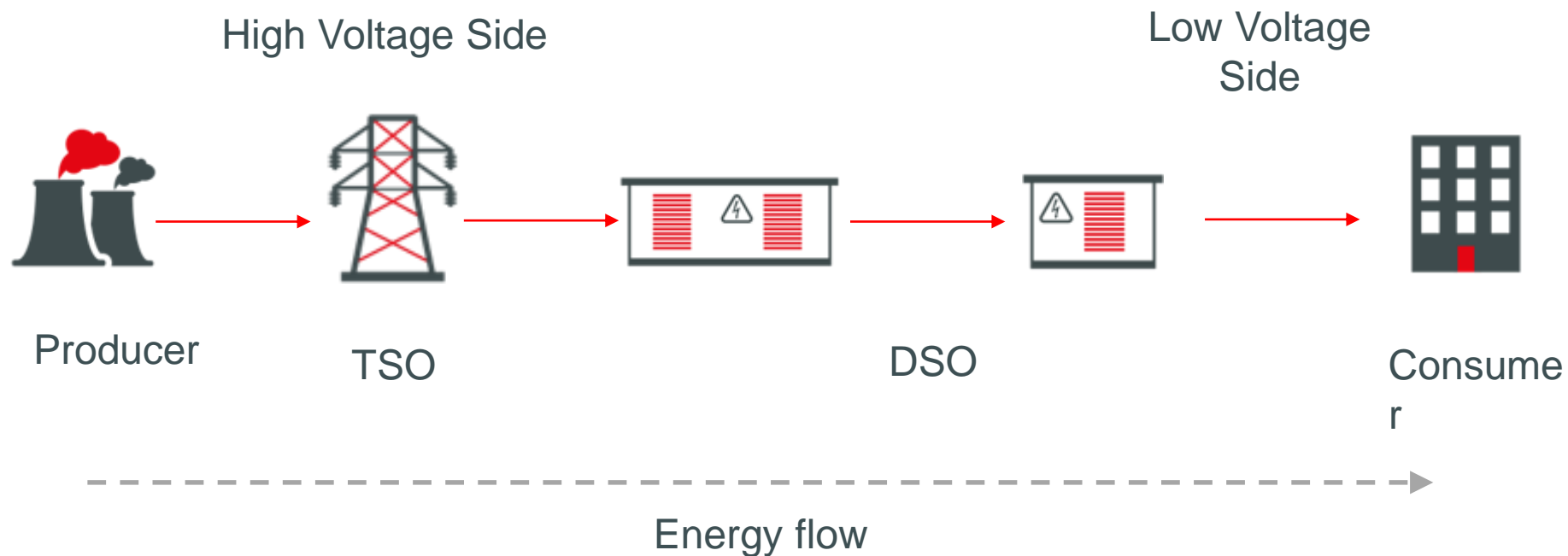
The secondary substation

Analogy from Farming



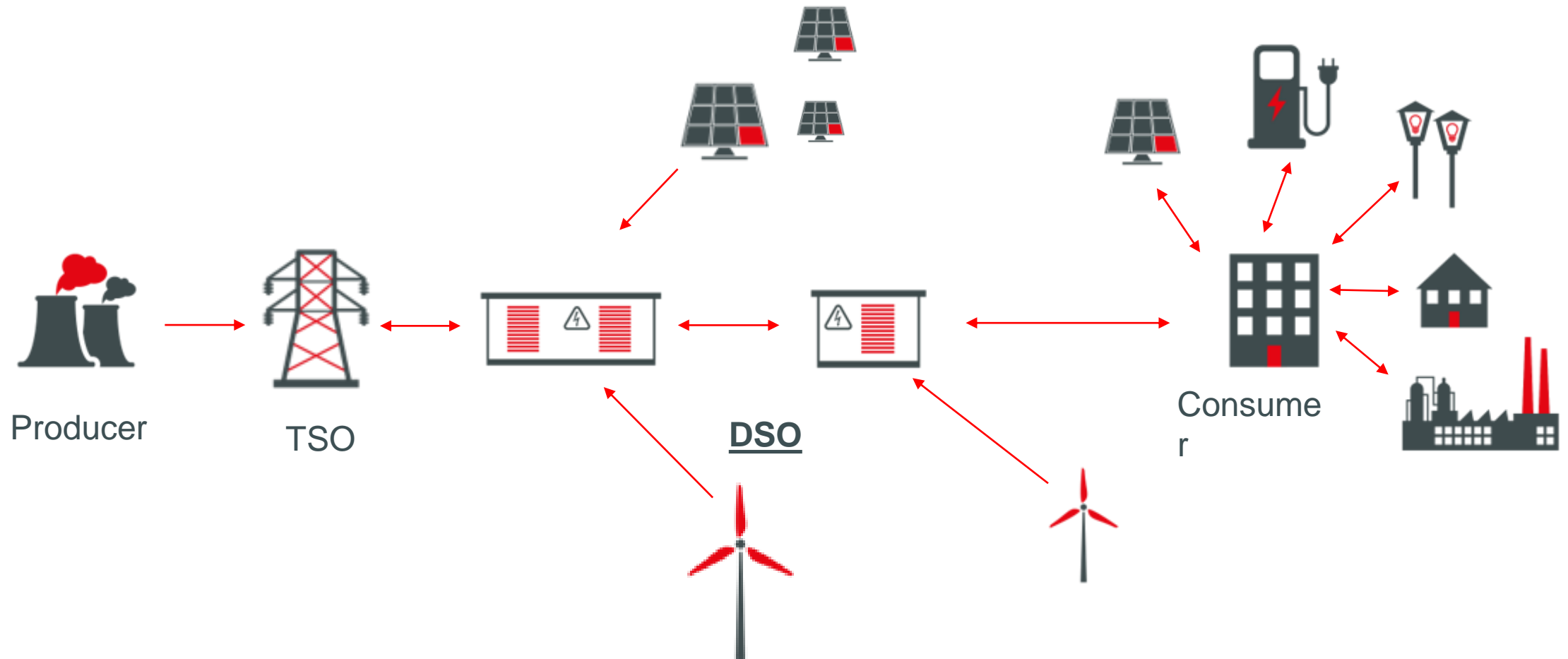
The traditional grid

Ensuring high quality of service and high operational efficiency
(CAPEX / OPEX)



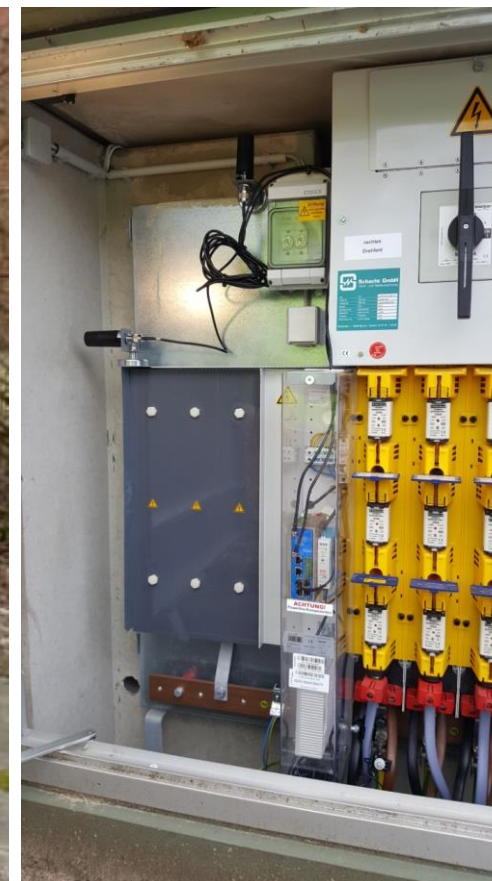
The new grid

Distributed energy resources (DER) integration.



The secondary substation

More than 600.000 units manage the power supply in Germany.
Spain about 200,000 – Austria about 50.000



Electrification as Sustainable Enabler

Not only an Energy Transition but a Disruption.

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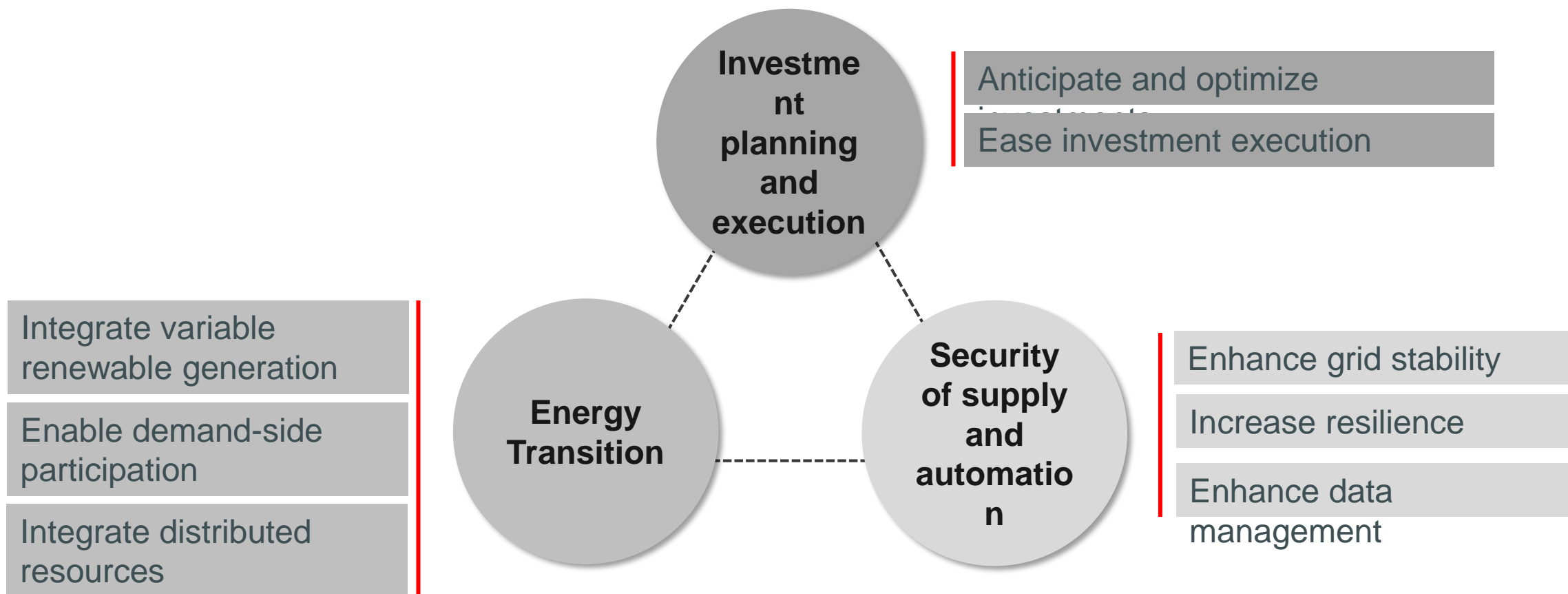
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- We are moving to an **all-electric world**
- **Demand for electricity** will rise much faster than any other energy source.
- **Major Challenges for the grid** - distribution grid and private household.
- The core of this disruption is the **Secondary Substation**



Challenges for DSO's

Investments, security of supply and automation and the energy transition.



Responsibilities of DSO's **GWP**

The regulated Business.



Reliable grid operation at low cost

- Ensure that the distribution grid operates within the limits to provide reliable electricity to the consumers.
- Coordinate with Transmission grid operators (TSO's) and support the optimization of the system.

Investment planning for the grid

- Identify options for capacity management including digital alternatives.



The Business Challenge of the DSO

How to keep balance between demand and supply?

Very important

- Electricity demand must be the same as electricity supply at any time and any place in the grid.
- DSO has to pay for the positive and negative delta – this is usually a large amount.
- If the delta becomes too large they risk a blackout.



Key role of the Secondary Substation

In the Secondary Substation

- **Collect** key variables from customers and power distribution grids (voltage, frequency)
- **Connect** customers (households and e-charging), suppliers (renewable energies, energy storage)
- **Protect** information against cyberattacks (e.g. malware protection, safety communication protocols)

At the central side

- **Data validation** to ensure accuracy in real-time
- **Information storage** to ensure transparency with key players (e.g. customers, regulator, TSOs)
- **Data processing** to optimize usage and investments (e.g. increase flexibility)

Why Welotec and GWP? Make secondary substations software defined and connect them to the outside world!

How does a Grid become a Smart Grid

Create a digital twin of the secondary substations and of the distribution grid.

The **existing SCADA system**, the heart of each DSO, needs to be extended to the lower voltage level and monitor a **100x more stations** in real-time and take decisions based on this.

In average 15 sensors need to be installed at around 150.000 substations to measure current and voltage.



Combining the digital twin with information and process the data

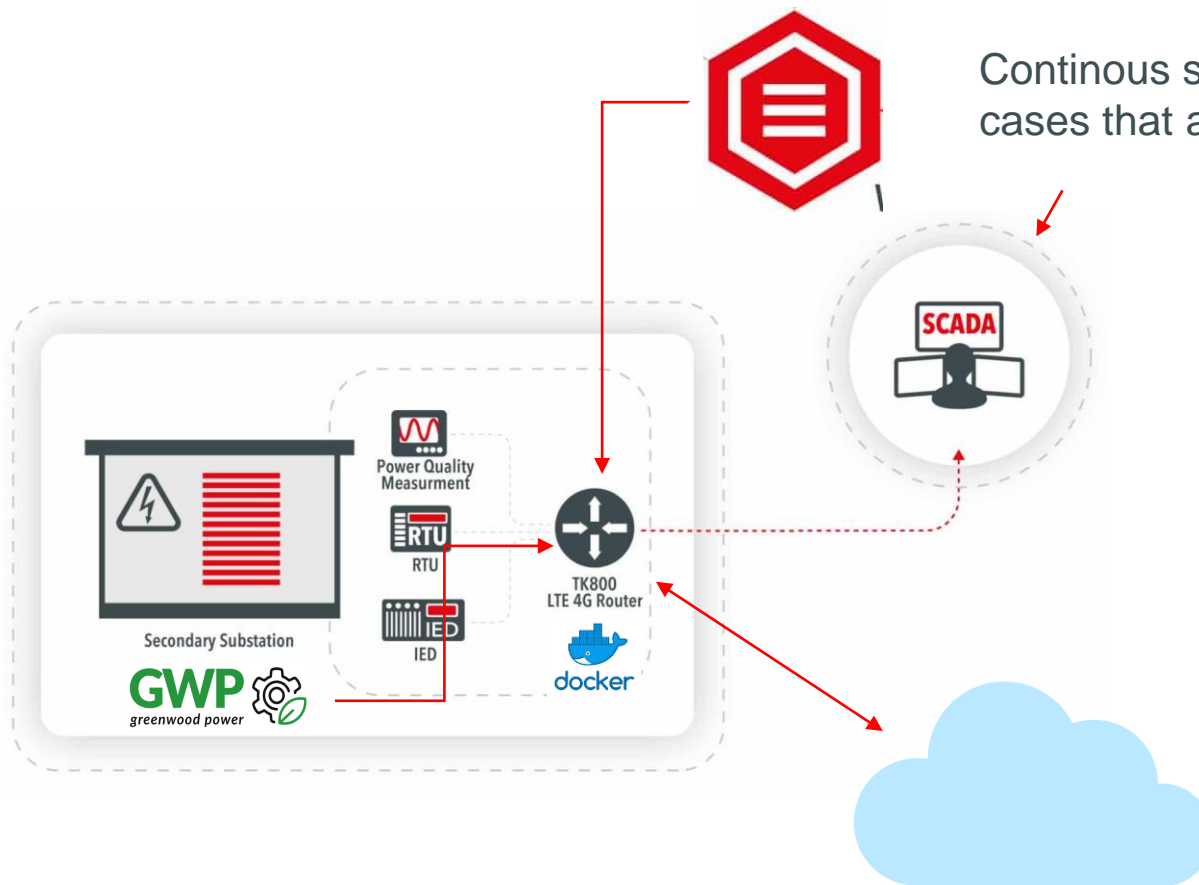
Real-time weather data needs to be used to predict Solar, Wind, E-Mobility, and outages.

Asset health monitoring and outage management to ensure the availability of production and grid needs to be included.



ADMS (Advanced Distribution Management System) or Cloud based SCADA instead of traditional SCADA

Secondary Substation: Infrastructure for Data Access



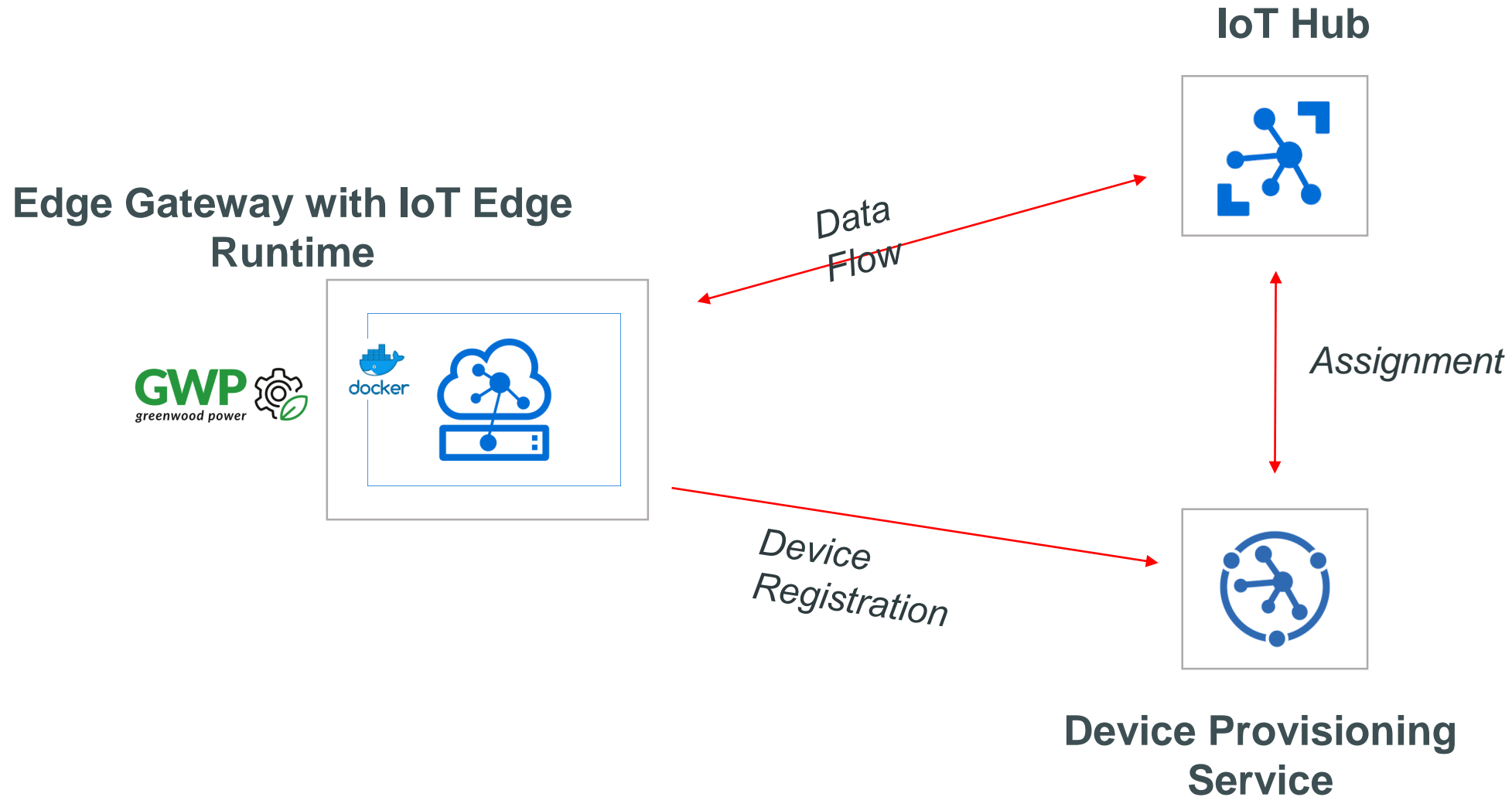
Continuous software deployment for new use cases that are not coming from the cloud.

Disruptive approach to deploy software instead of installing new hardware boxes for every use case. Create a software defined secondary substation with cloud integration.

Deployment of applications from Azure.

Future prove infrastructure

Software defined secondary substation.





Business Success through Data Access

- Stable grid
- Prevention of failure and downtimes
- Improved predictions
- Access to insights for business decisions
- CAPX and OPEX reduction
- Adding intelligence of Azure Cloud
- Future proved solution – software defined grid vs. retrofit
- Ressource-saving and sustainable solution

Any questions?

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Microsoft
Azure
Certified




Windows
Server



 Windows 10 IoT 

Thank you for your attention!



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