Energy Aware UPS can transform stored energy into a green asset

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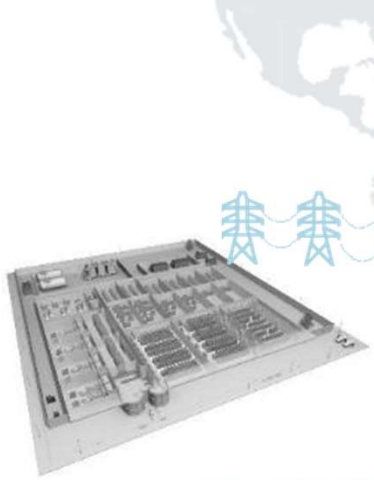
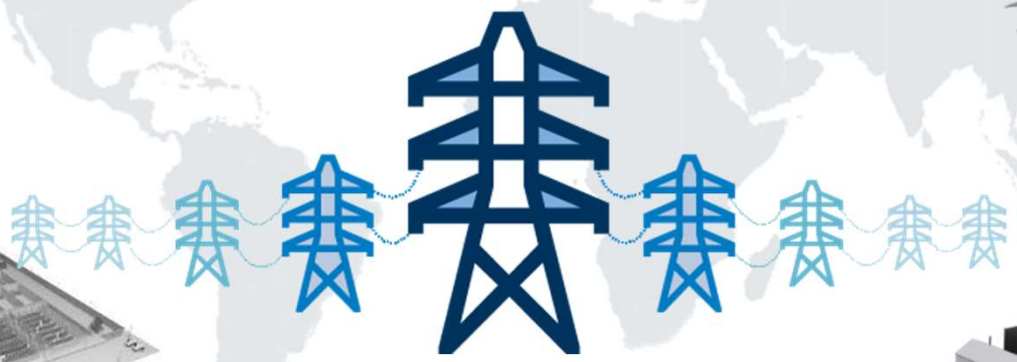
Data centres – energy usage

Data centres use 2 – 3 % of electricity





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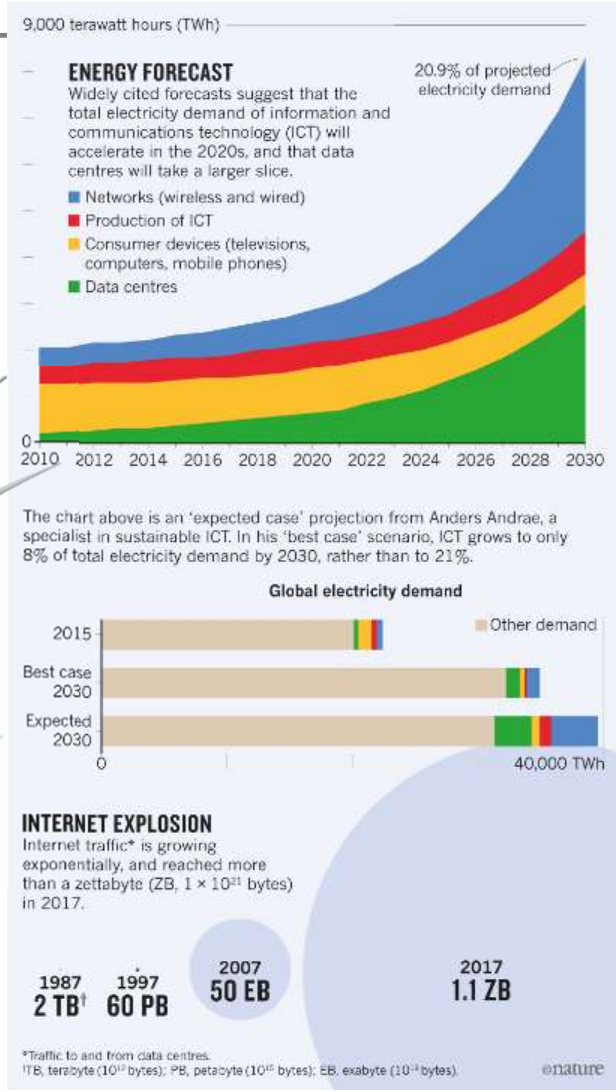
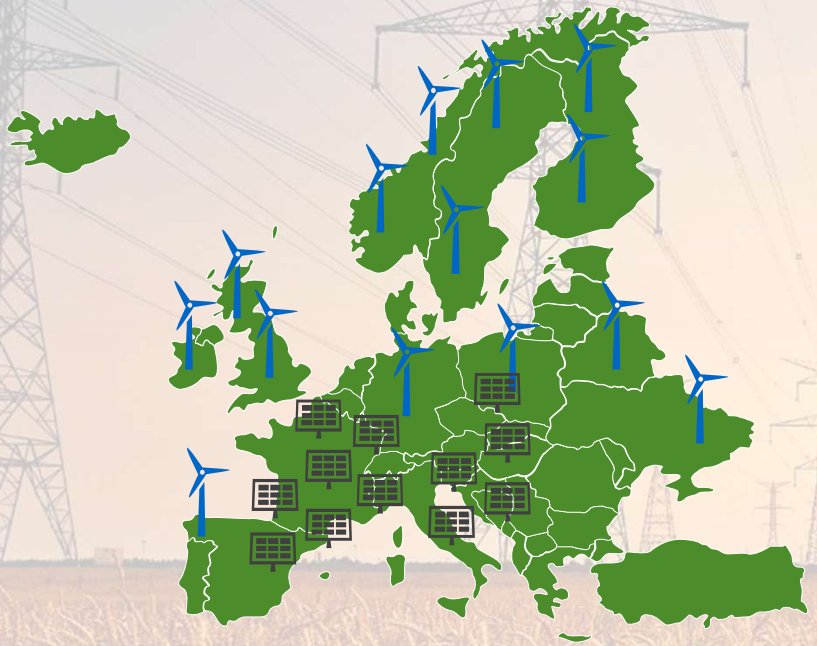


Transformation of energy system

EU renewables target: **32%** by 2030



Challenges:

- Variations in power generation from renewable sources
- Peak demand in Grids (Congestion)
- Reduced intertia making power system less reliable

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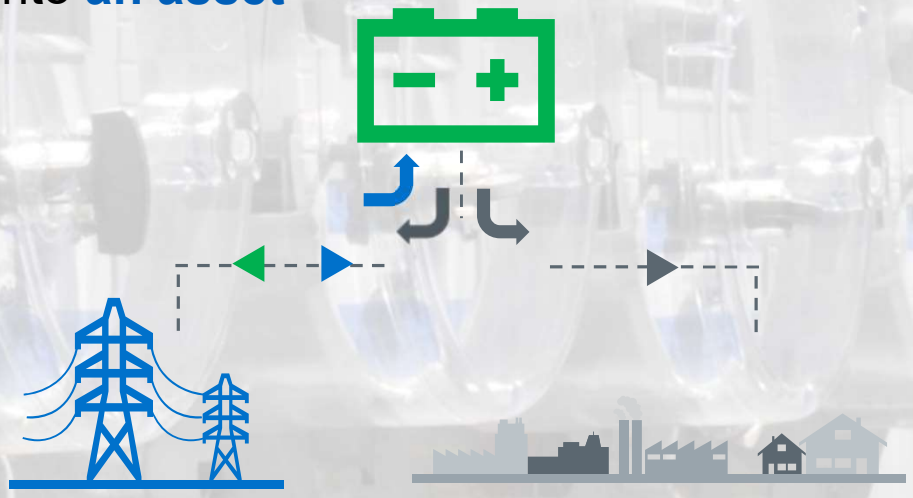
Stored Energy

The past:

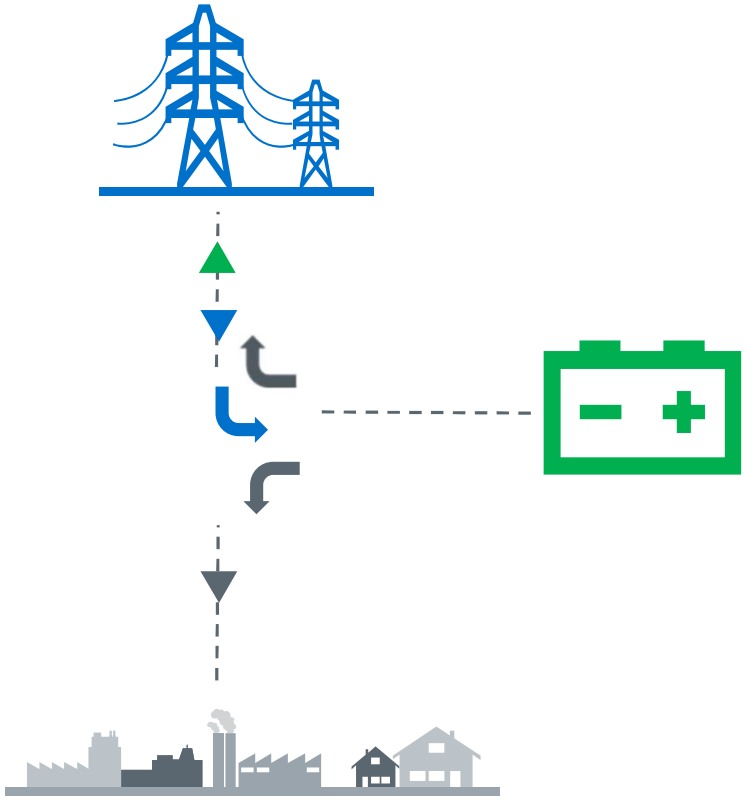
Energy has been threaten as a **commodity** and produced for consumption

Now:

Storing energy and using when it gives biggest value, can turn energy into **an asset**

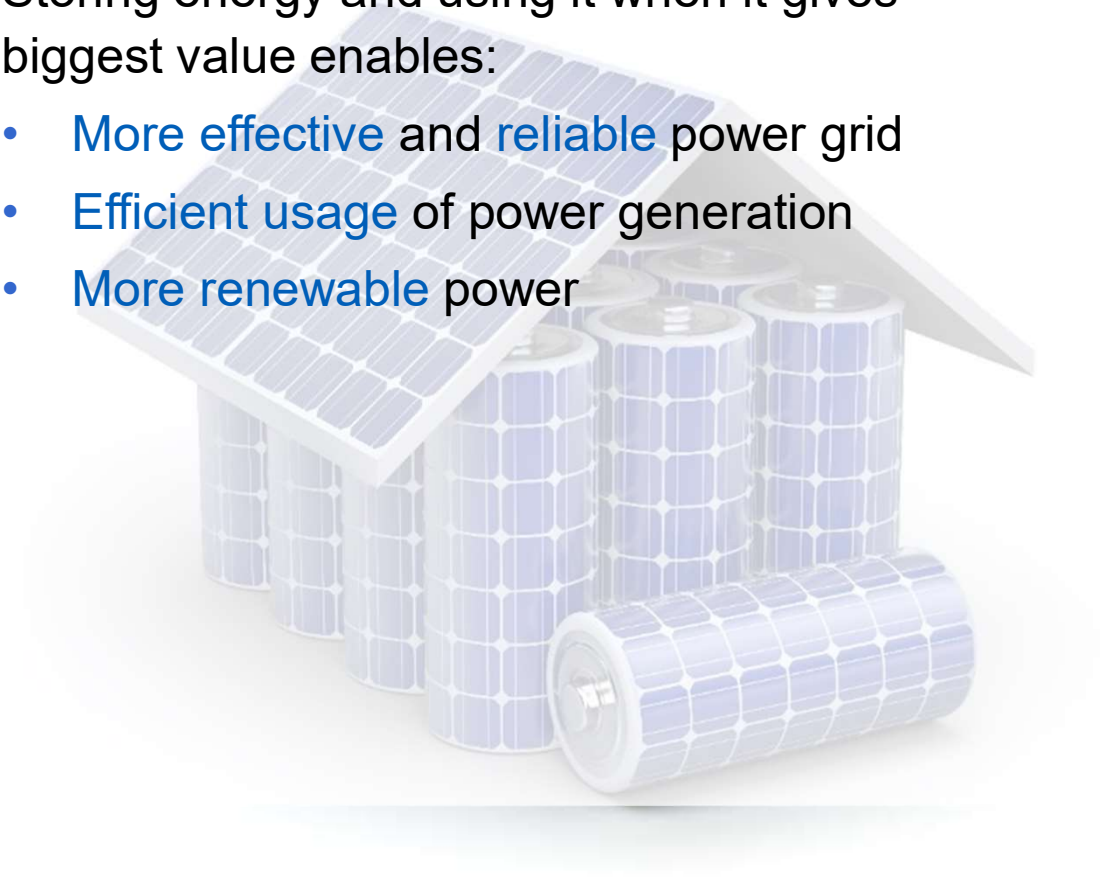


Stored Energy is an asset



Storing energy and using it when it gives biggest value enables:

- More effective and reliable power grid
- Efficient usage of power generation
- More renewable power



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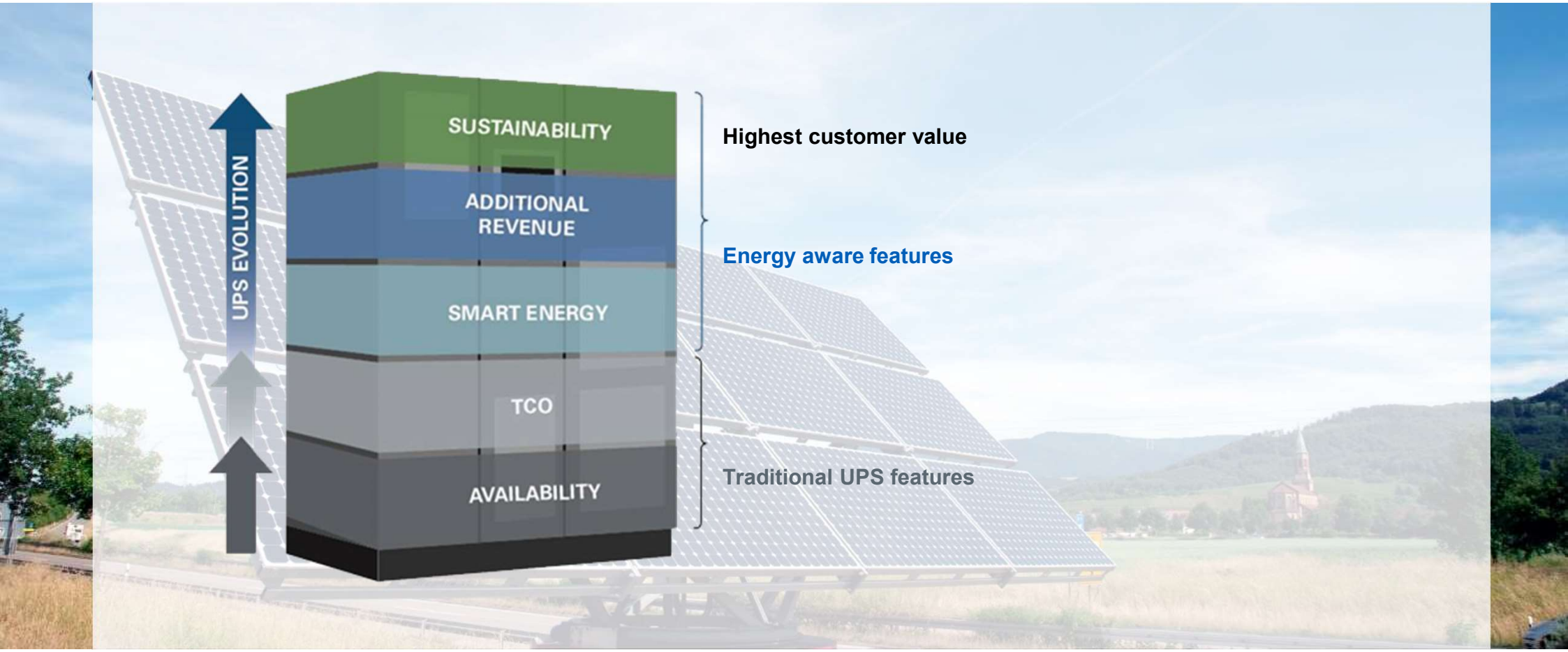
Evolution or Revolution in UPS design?



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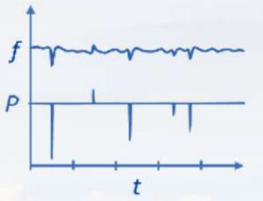
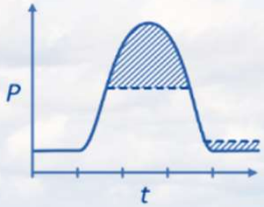
Energy Aware UPS

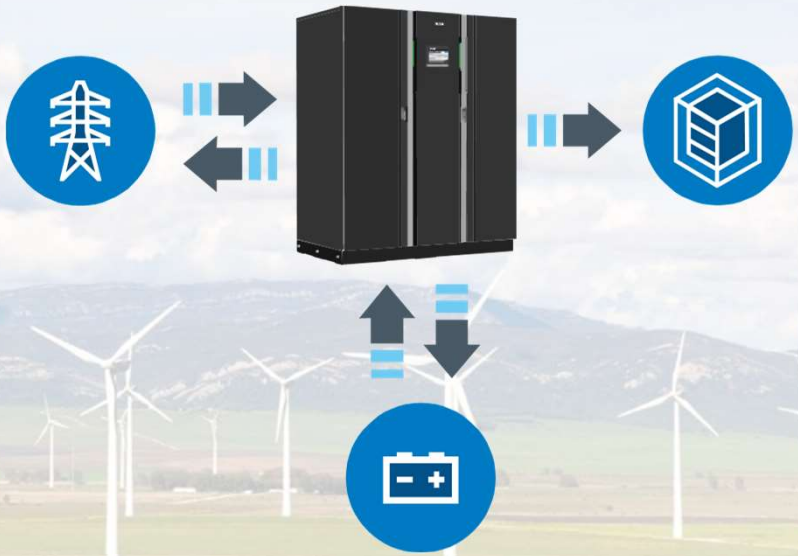


Frequency containment

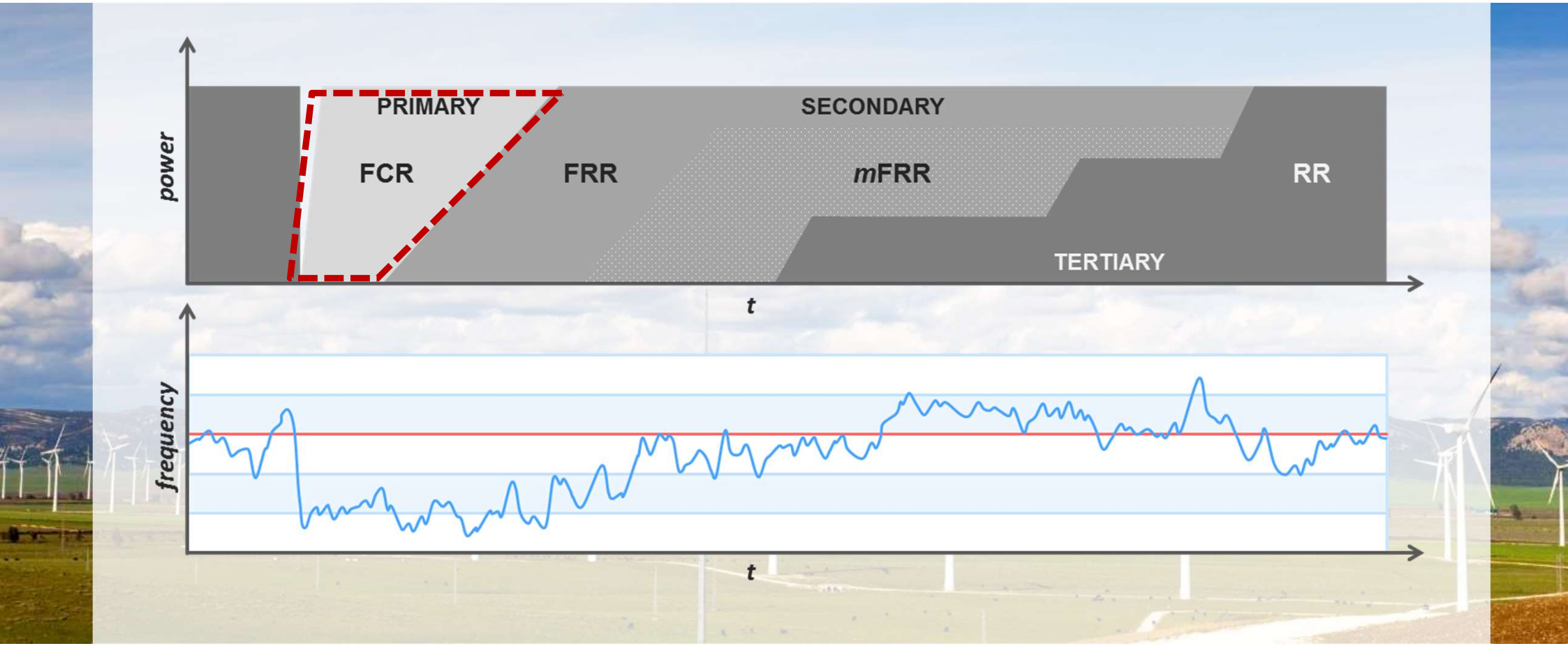


Peak shaving

Time of use



Energy Aware UPS in Frequency containment



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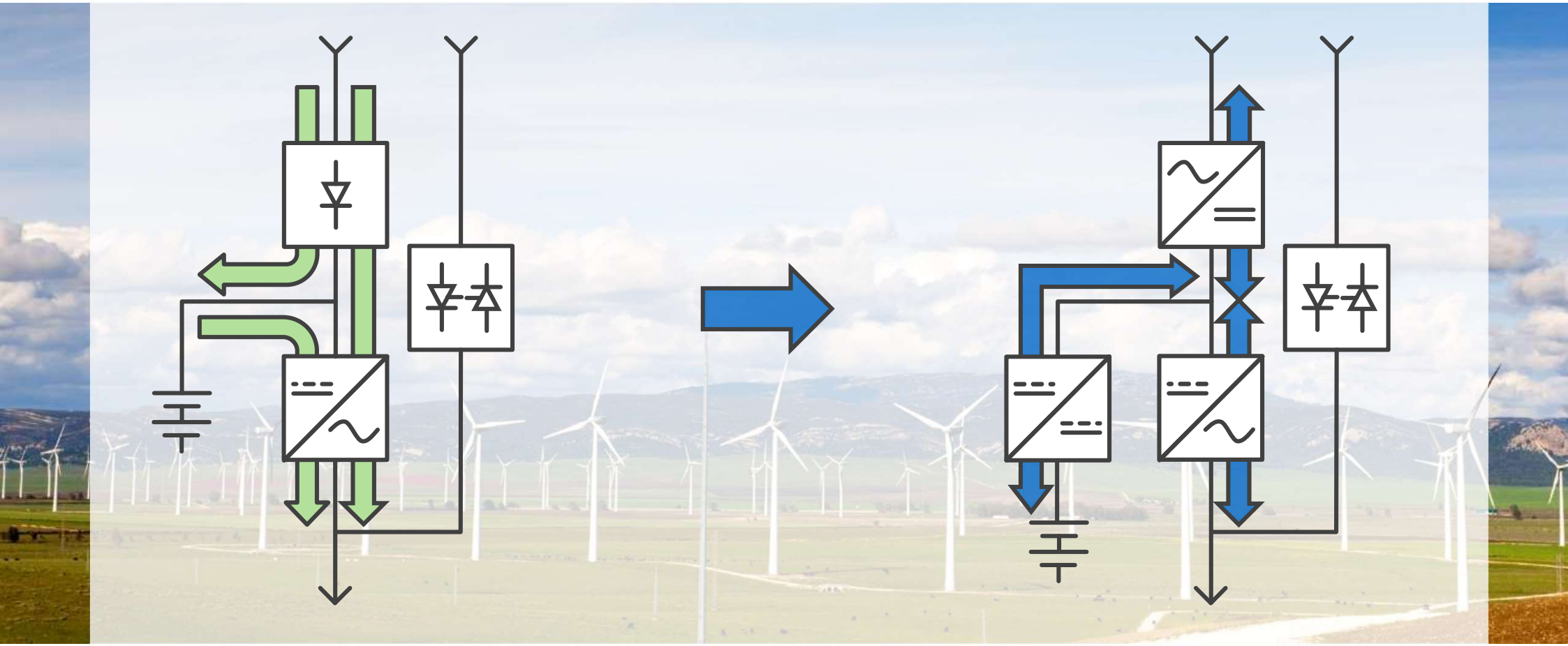
Energy Aware UPS



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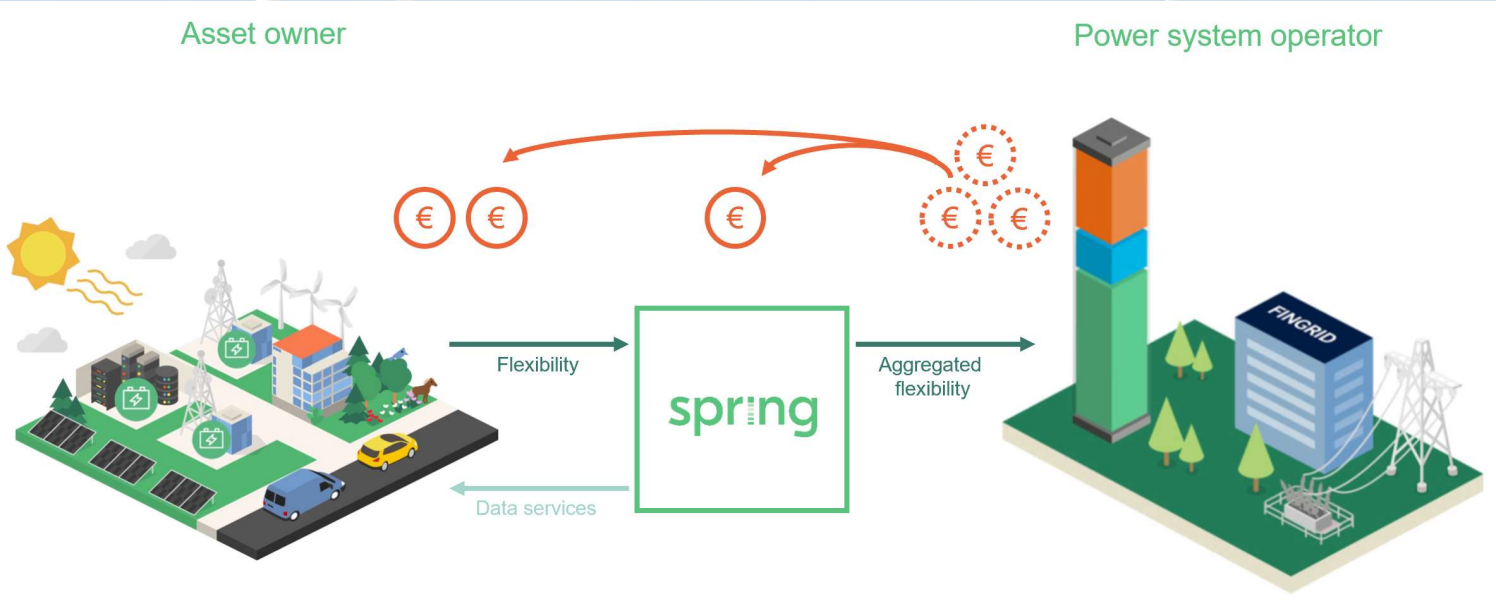
Virtual Power plant – Fortum Spring

Fortum Spring is an aggregator that enables participation of flexible assets, such as data center UPSs to different markets hosted by the power system operators



Energy Aware UPS - pilots and commercial applications

Ireland:

- Eaton HQ: 150 kW UPS, lead acid
- DS3 market ~70 – 100 k€/MW/a

Sweden:

- Bahnhof: 750 kW UPS, lead acid
- NDA: 1,2 MW system, Li-ion
- FCR-D market ~50k€/MW/a
- FCR-D pilot with Svenska Kraftnät

Finland:

- NDA: 400kW system, Li-ion
- FCR-N market ~135 k€/MW/a
- FCR-D market ~40 k€/MW/a

Norway:

- Basefarm DC: 2 x 400 kW and 550 kW UPS, lead acid
- FFR pilot with Statnett (TSO)

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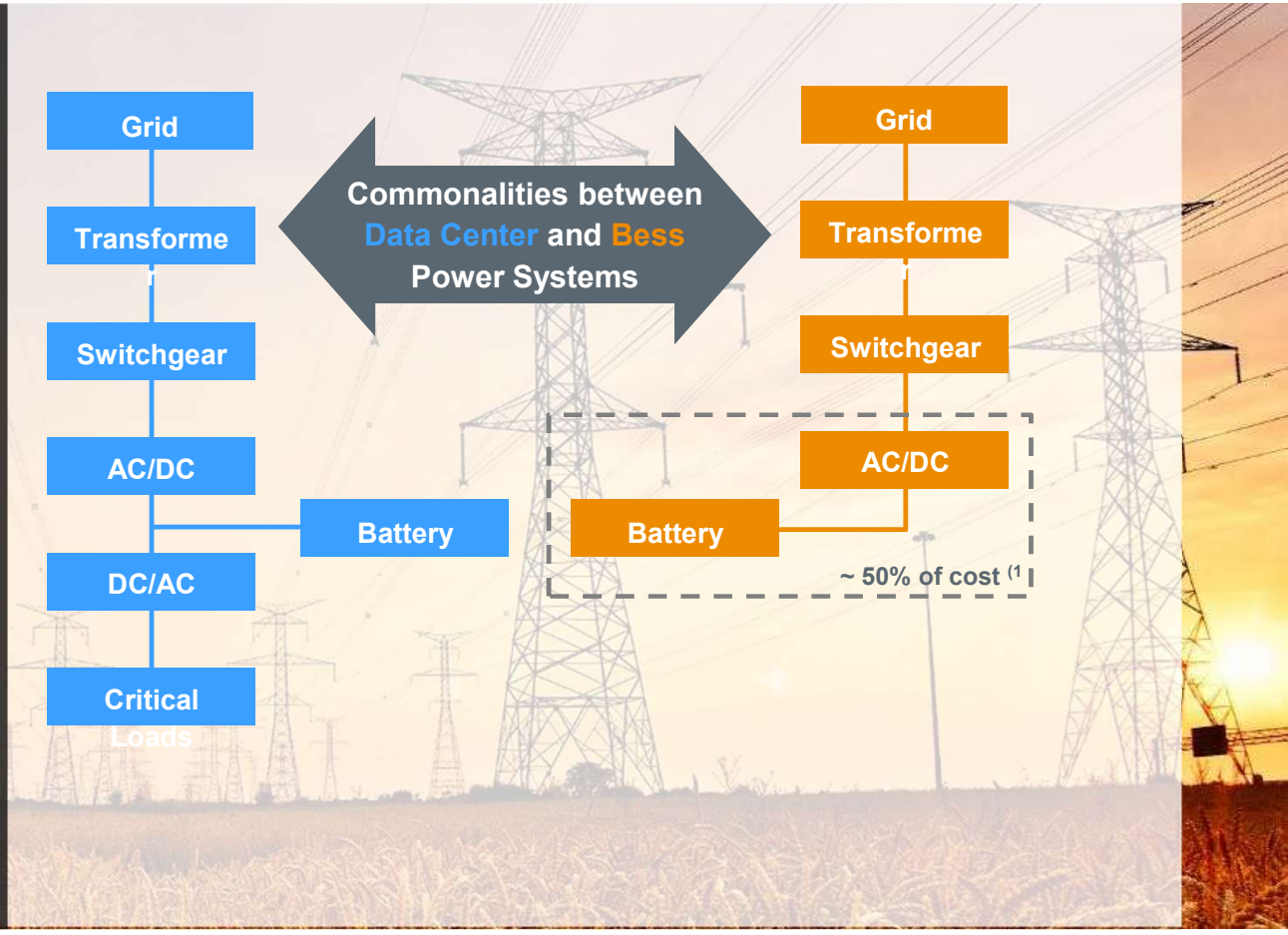
Energy Aware Datacenters can help the Power Grid

Commonalities between battery energy storage system and data centre power infrastructure are opening new opportunities and business models

≈ 1200 MW

≈ 200 MWh



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Benefits in utilizing UPS batteries for Grid support

Green

Support grids to adapt renewable power by green reserves

Money

Revenue from a necessary investment

Increased competitiveness

Faster deployment for new customers

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Aurora – The most Energy Aware DC in Nordics

AURORA DATACENTERS

Finnish datacenter connected to national grid & global clouds – including the future Arctic Connect fiber route to the far east !

The first datacenter to procure **100% green energy** and **support renewables into** to power grid by using its own battery assets.

2 x 93PM-200kW with Eaton/Nissan Li-ion batteries for 60 minutes

- Participation to **FCR-N** market through UPSaaR feature (Regulating frequency up and down)

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Opportunities are here, right technology is here

- Future power grids need **fast, flexible** and **cost efficient** reserves
- Maintaining **lower energy price** and **reliable** power grid requires **common efforts**
- Energy Aware UPS allow Dacenters to help:
  - **Replace** reserves based on fossil fuels
  - Supporting higher penetration of **renewables**
- Smarter use of assets and **new earning models**
- Can be **flexible** and **secure** – it's the details that matter

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