

The Grid of the Future

Hitachi Energy

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A Global challenge for Grid operators & Energy stakeholders



Weakness of the grid



Decentralization
of the grid

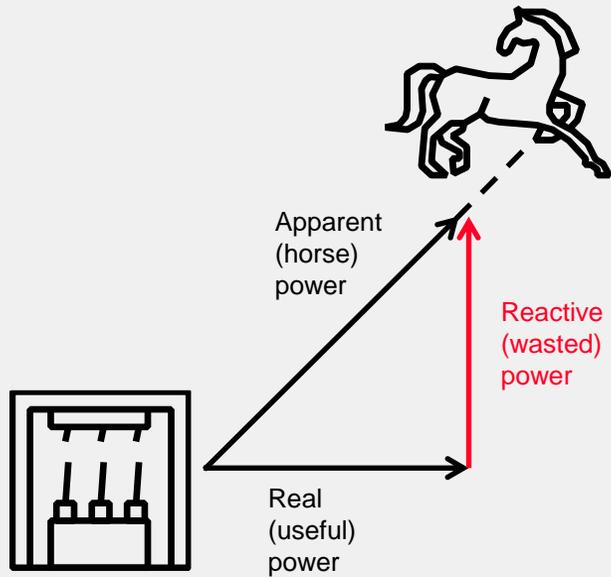


Lack of resilience and
stability of the grid





Active vs Reactive Power



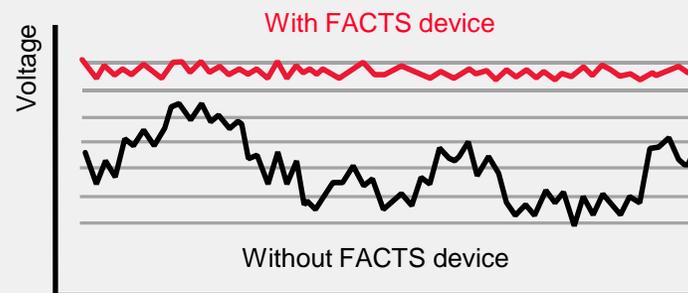
$$\text{Power factor} = \frac{\text{Active power}}{\text{Apparent power}}$$



STATCOM

- Compensate reactive power
- Improve power factor
- Stabilize voltage

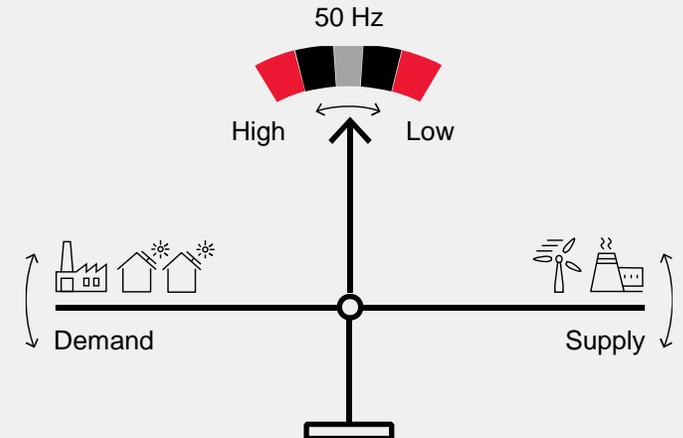
Voltage profile



Enhanced STATCOM

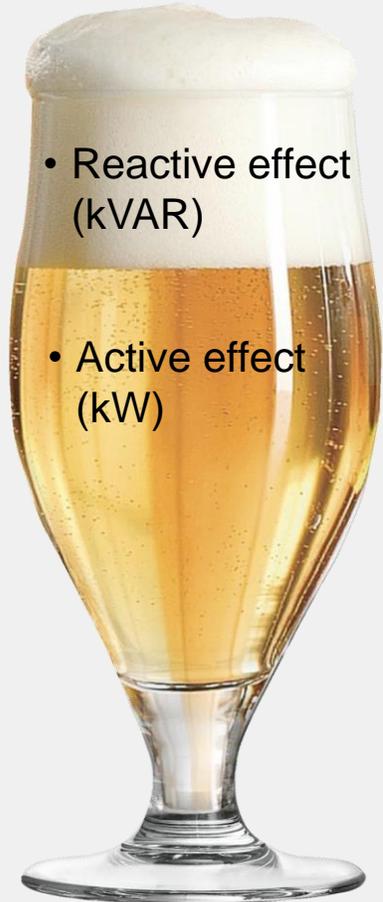
- Do everything a STATCOM can
- Inject/Absorb active power to provide inertia

System frequency





Active vs Reactive Power



- Reactive effect (kVAR)

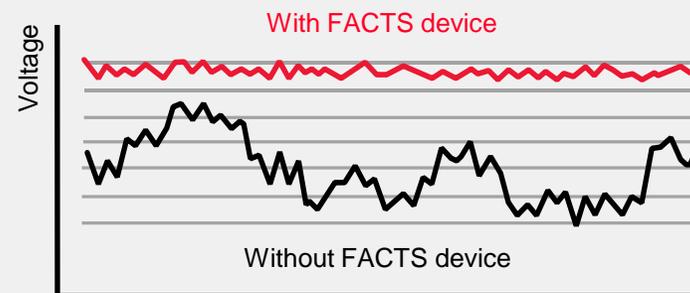
- Active effect (kW)



STATCOM

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- Stabilize voltage

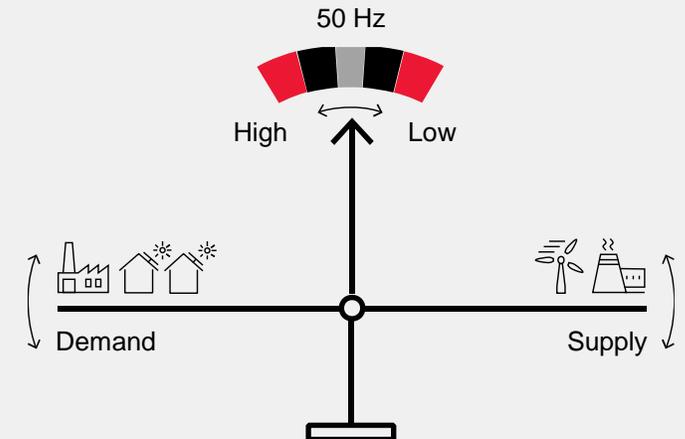
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Enhanced STATCOM

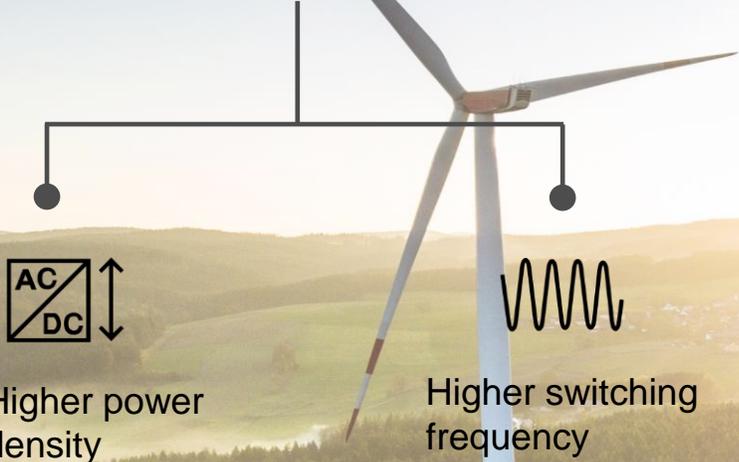
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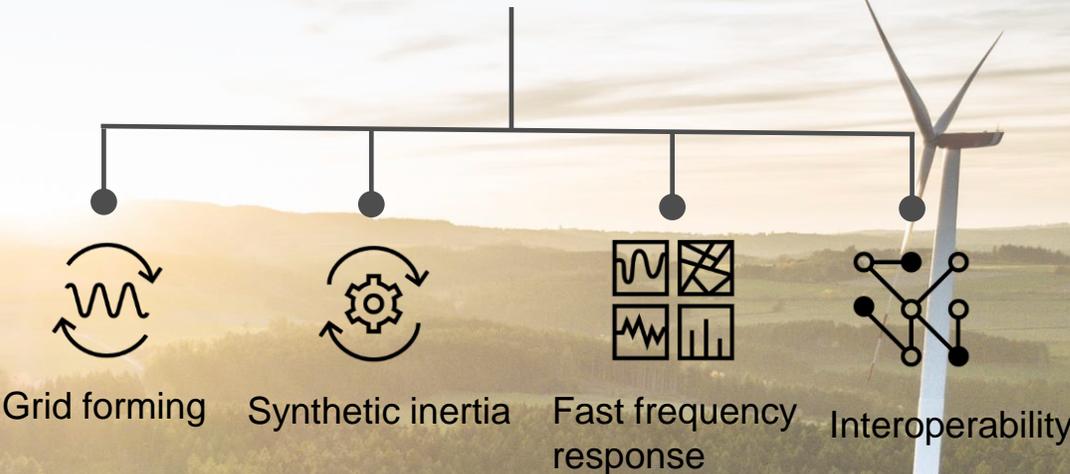


Power Electronics as an enabler towards the Grid challenges

Power Electronics



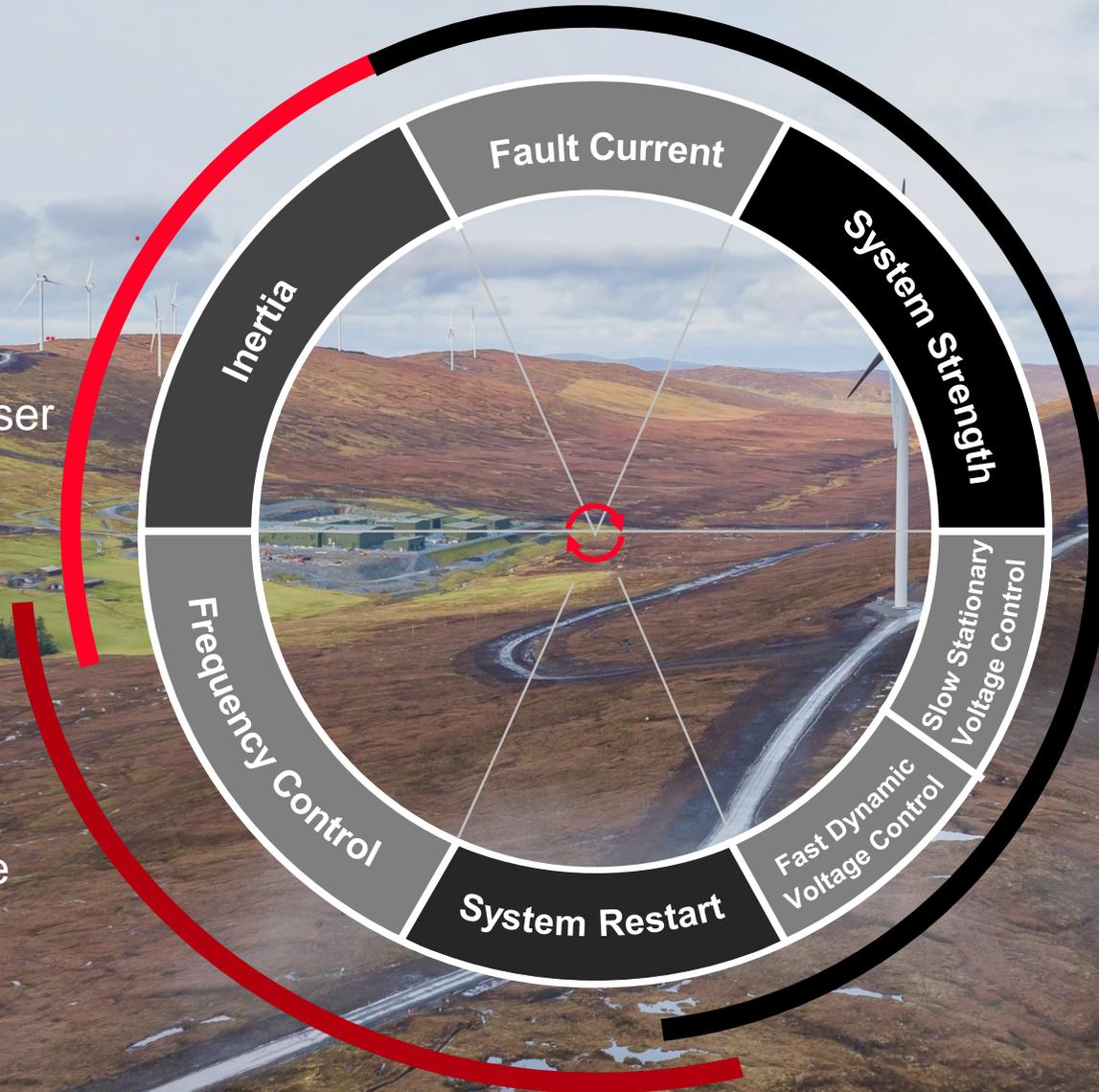
Advanced Control Systems



What services are required to operate a stable and secure grid?

- Enhanced STATCOM
- Synchronous condenser

- BESS
- Fuel cells
- Gas turbine
- Demand Flexibility



- STATCOM
- Synchronous condenser



Today, we can already face the challenges of the future energy system and make it more sustainable, flexible, reliable and secure.



HITACHI
Inspire the Next 