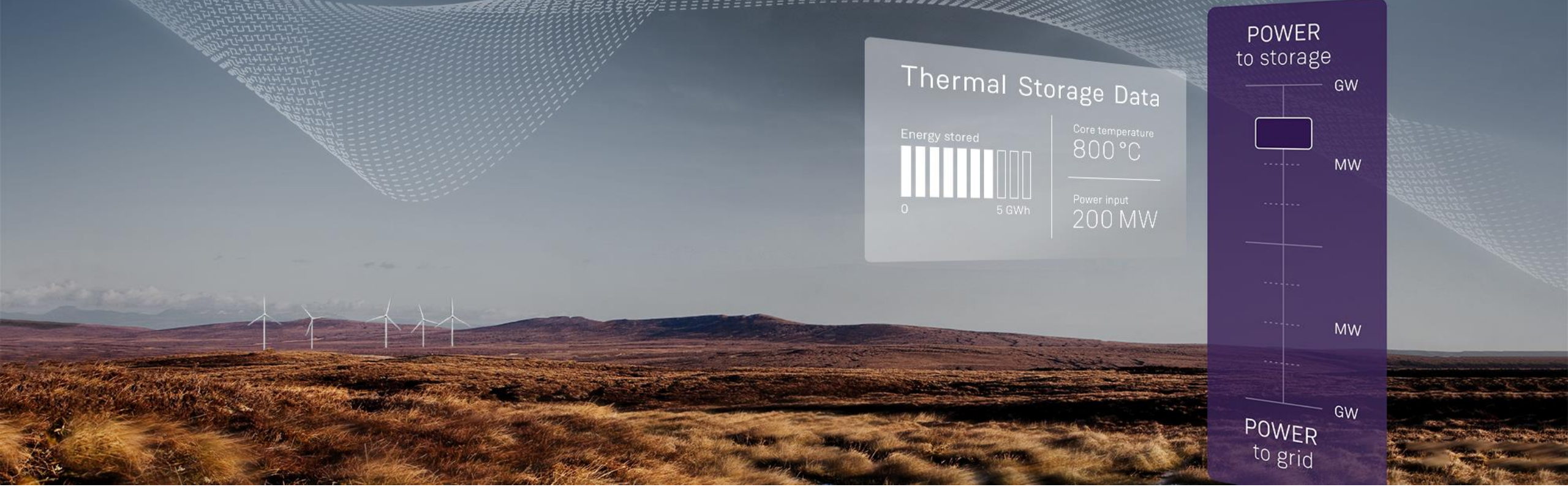

ETES: Electric Thermal Energy Storage

How thermal power plants can benefit from the energy transition

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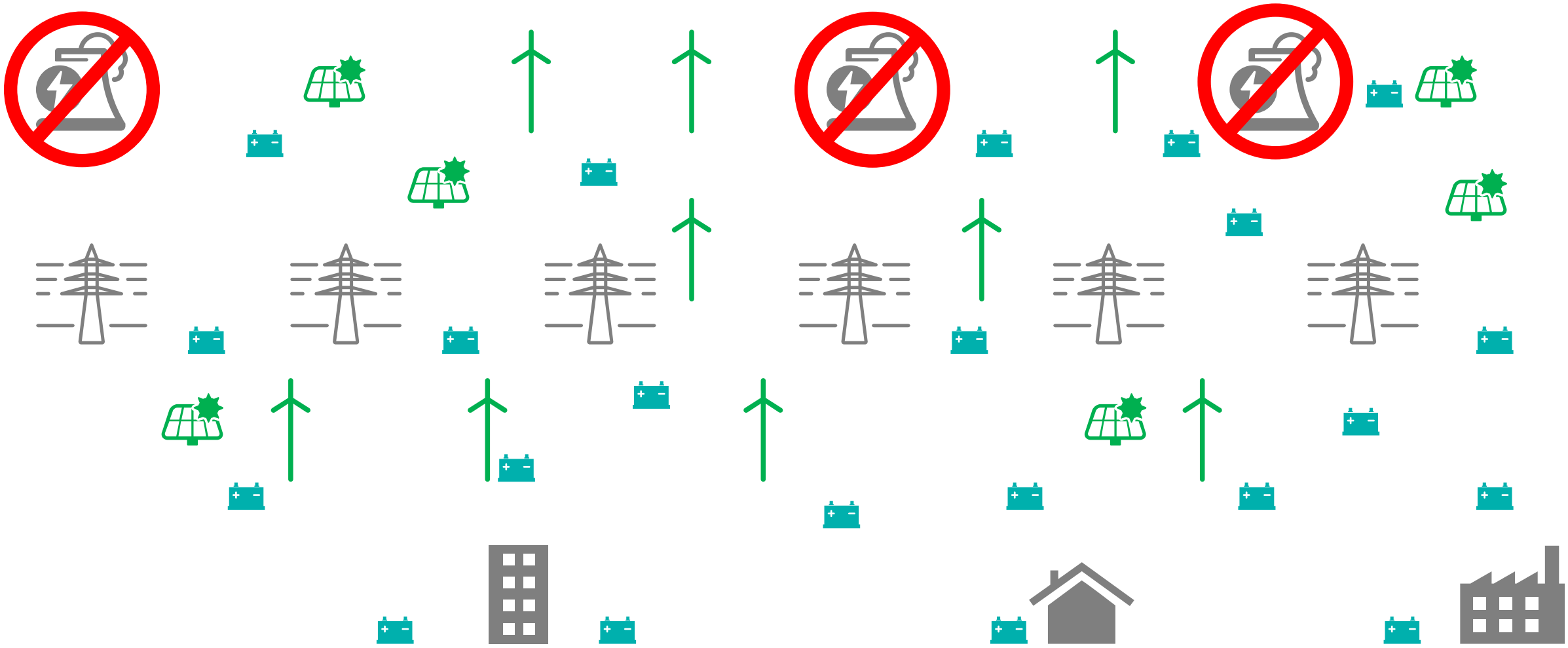
Changing Energy World:

more and more renewables and storage lead to phase out of conventional power plants



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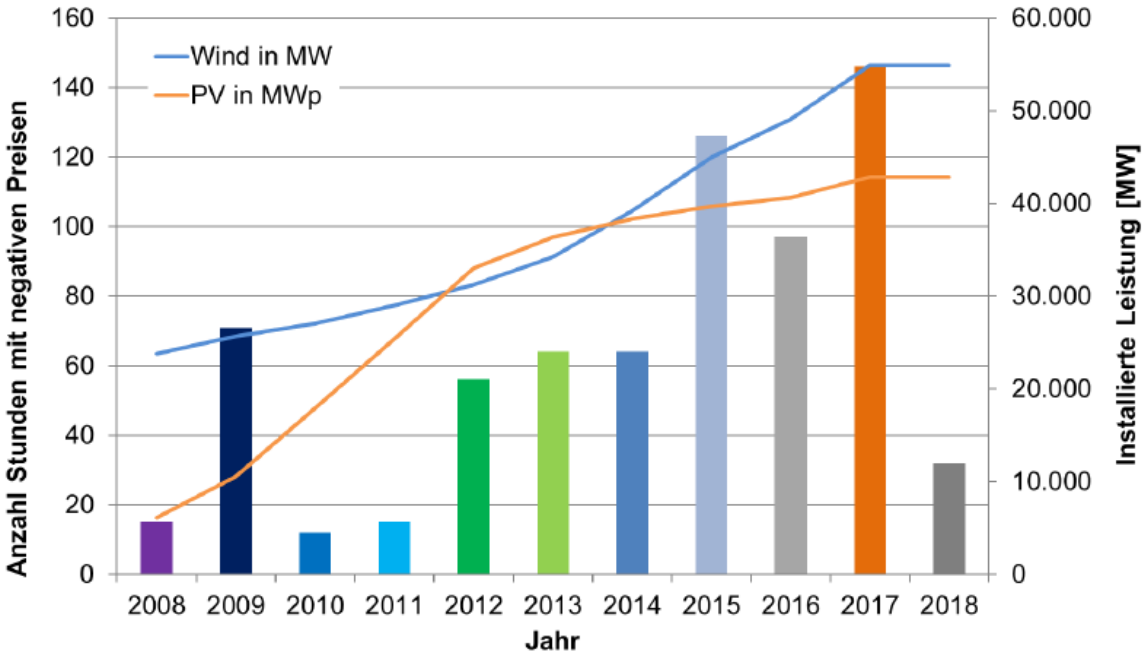
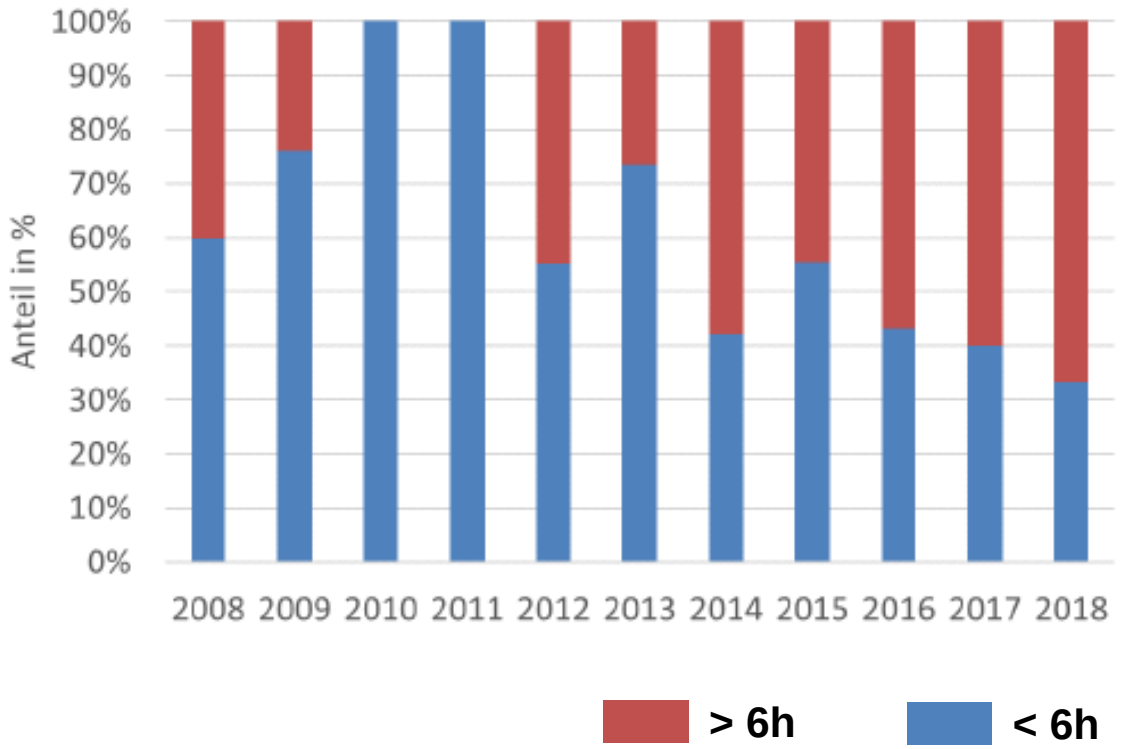
Negative Day-Ahead Prices

Number of hours with negative prices



Periods above 6h with negative prices



 Source: BMWi Monitoring der Direktvermarktung Quartalsbericht (12/2017)

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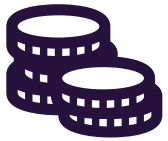
Thermal power plants converted to emission-free storage facilities could be the enabler of the energy transition

Second life for power plants

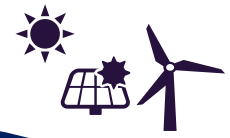
Gain more flexibility



New revenue streams

Maintain economy of regions

New job opportunities



Active participation on energy transition

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ETES

Electric Thermal Energy Storage

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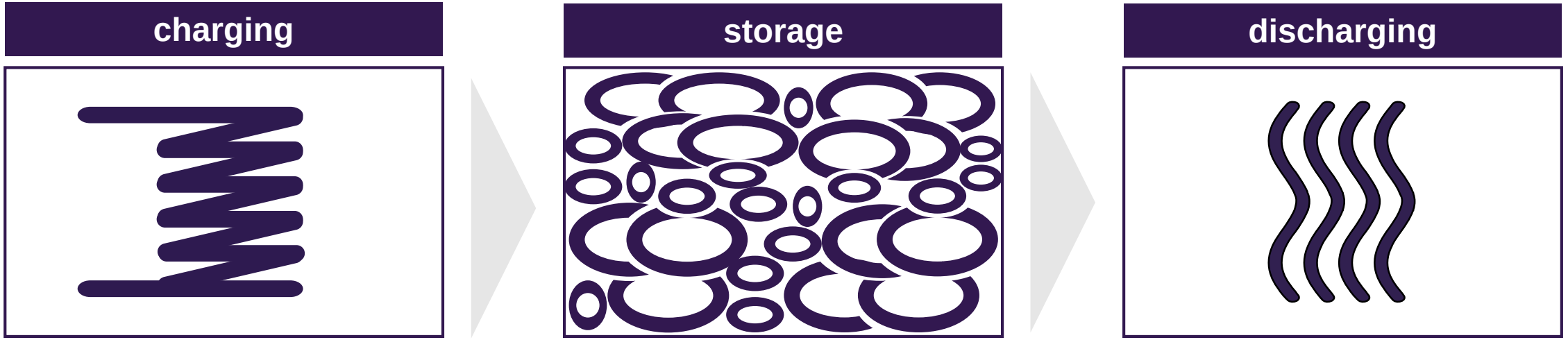
ETES technology:

proven, cost-efficient and reliable



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ETES: Proven and reliable technology with 80% off-the-shelf components

Test Site

5 MWh
since 2014

Demonstrator

130 MWh
since June 2019

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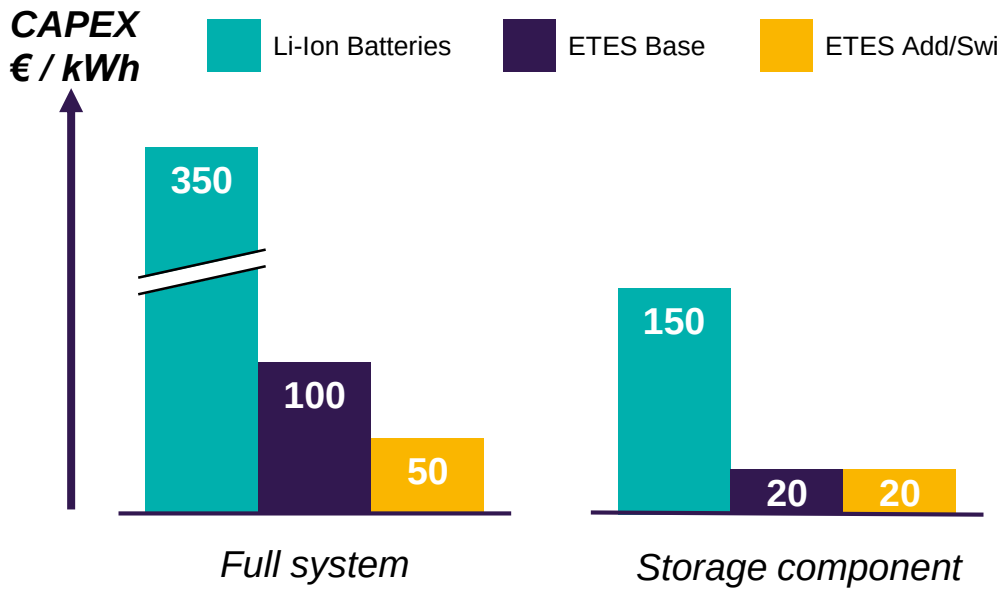
Significant cost advantages compared to li-ion battery systems

The ETES technology enables significant **economies of scale**, since a doubling of capacity only requires double the storage volume – and not double the cost, as with li-ion storage.

The use of **low-cost** and **globally available** volcanic rocks as the **storage material** provides further cost advantages.

80% off-the-shelf components are readily available and enable fast technical scalability



An ETES Prototype is already cost-competitive compared to li-ion battery storage systems

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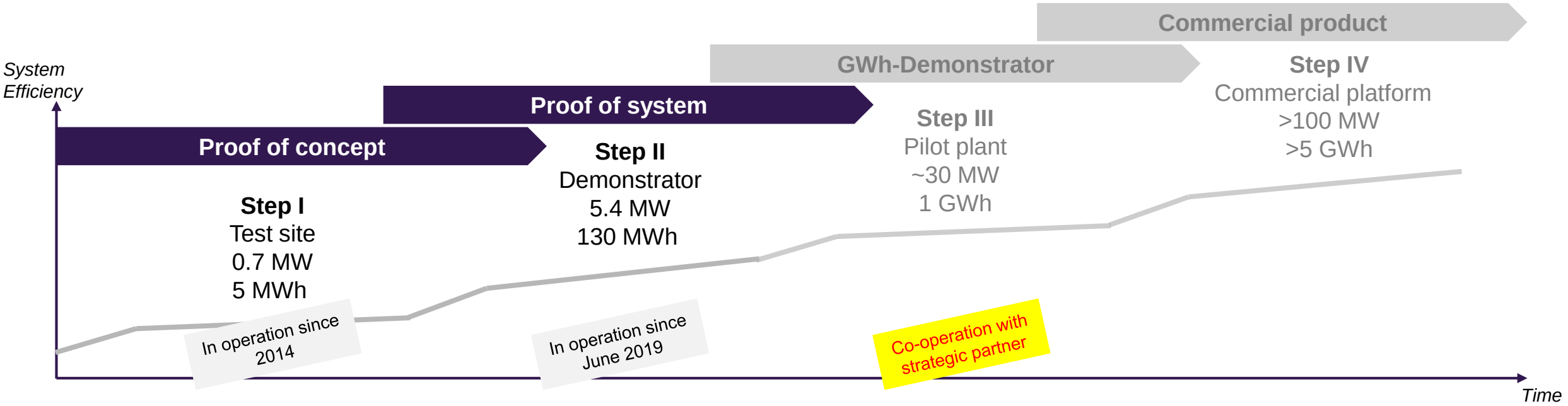
Four steps towards commercialization of ETES technology



Proof of concept

R&D on:

- storage medium
- storage geometry
- charging-discharging

Proof of system

R&D on:

- system set-up
- interface behaviour

Commercial application

- optimization of scaling effects
- elaboration of various business cases

Rollout of proven solution

- continuous O&M optimization

achieved step future step

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