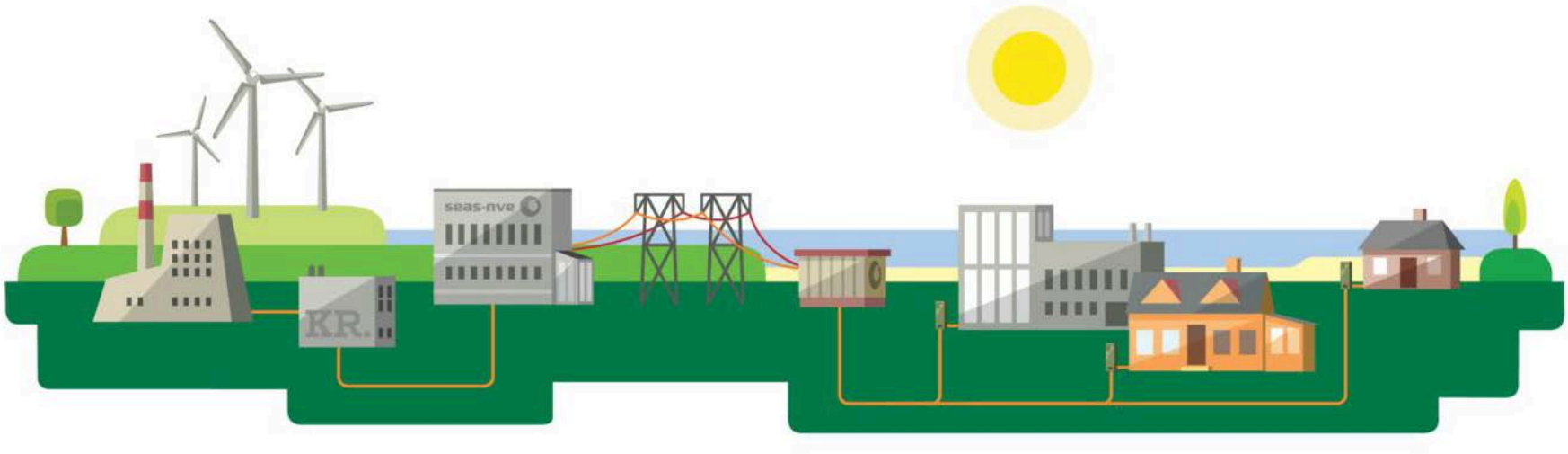
Instalment of High Temperature, Thermal Storage

About interconnection of energy systems

By Eva Sass Lauritsen



EUDP
Energiteknologisk udvikling og demonstration

seas-nve

The high penetration of variable wind power will require balancing through a combination of flexible supply, demand response, storage and electricity trade.

(Nordic Energy Technology Perspectives 2016 EIA)

SEAS-NVE believes that there will be many different types of storage,

...because storage must meet many different needs.

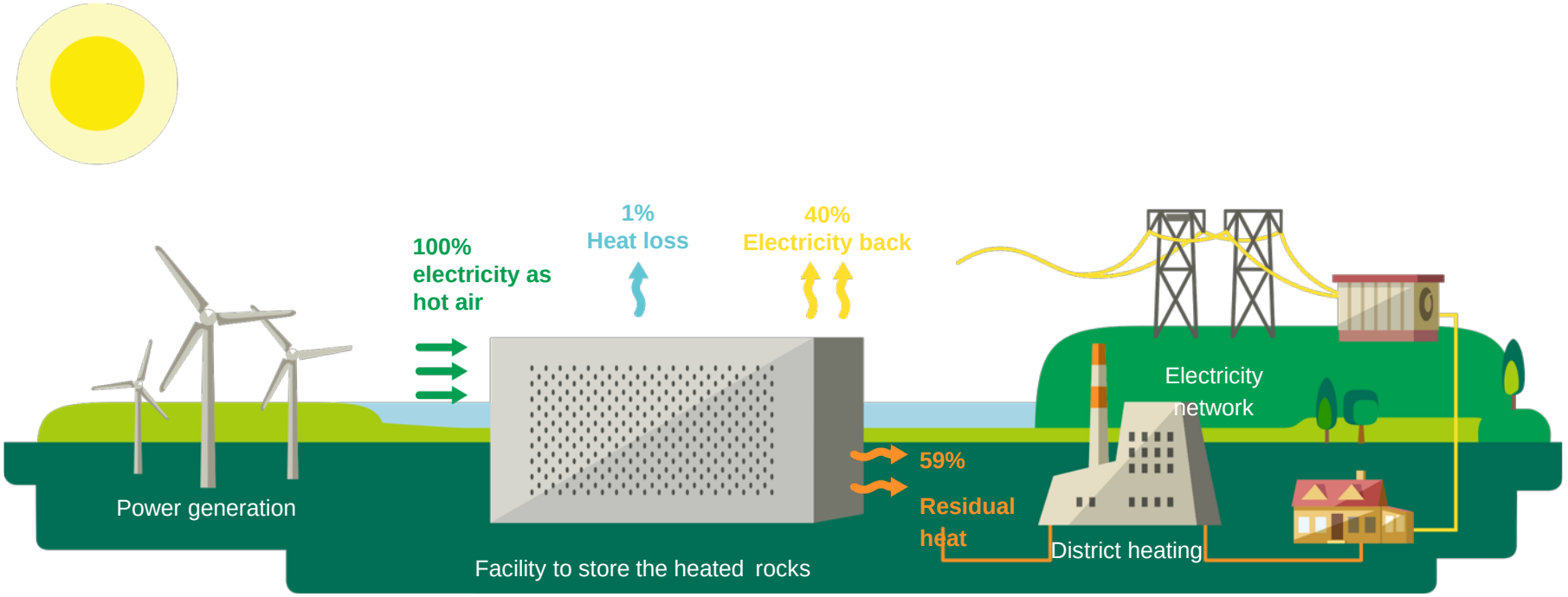
3 major types of energy storage

- Chemical
  - Batteries
- Mechanical
  - Hydropower
- Thermal
  - Heat and compression

The philosophy behind the project

- Use of known charging and discharging systems
- Eco-friendly, abundant and cheap materials for storage
- Integration of energy systems that support the DK Energy Strategy
- Can be combined with existing power plants, district heating or compressed air (CAES) technologies

Principle behind the storage



Simulations from DTU Mechanical Engineering 2016 demonstrate the storage solution's theoretical 40% efficiency, and indications that it may provide long term savings.

(The feasibility study with the Balmorel scenario for electricity trading in 2035)

Future theoretical storage needs

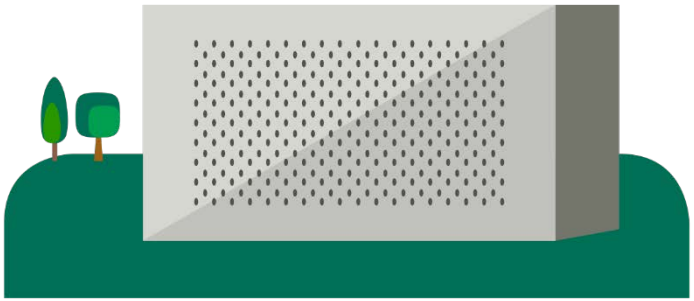
- DTU has identified future storage needs of 10% of 1.4 GW in 2035.
- 830 hours per year at full capacity.
- Storage requirements are equivalent to 1 storage solution of 1.227 million m3.
- The storage solution may be designated as a nature reserve

HT-TES as a possible flexible device

Heat sources

- Electricity generation
- CSP - Concentrated Solar Power plant
- Residual heat from production
- Residual heat from the compressed air storage

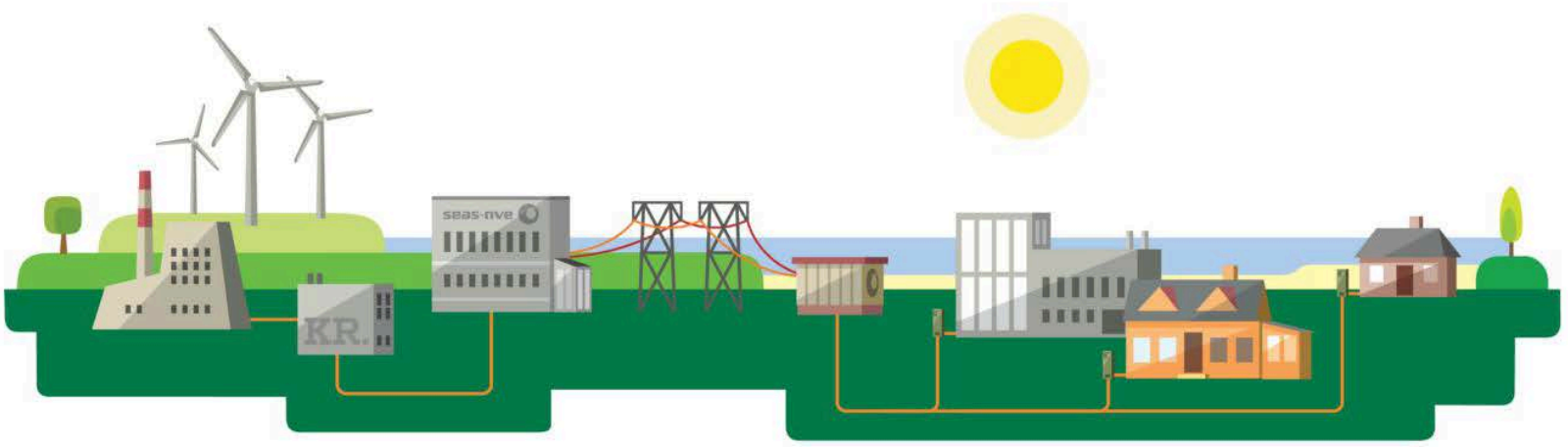
Rocks or waste from the local area



Heat users

- Electricity
- District heating
- High temperature heating for processes

Storage can take place at many places in the supply chain. This storage is done centrally



The 2017-19 EUDP strategy regarding industrial potential and Danish positions of strength
- The project affects many of the positions of strength

✓ ✓ ✓ ✓

WIND ENERGY

DISTRICT HEATING

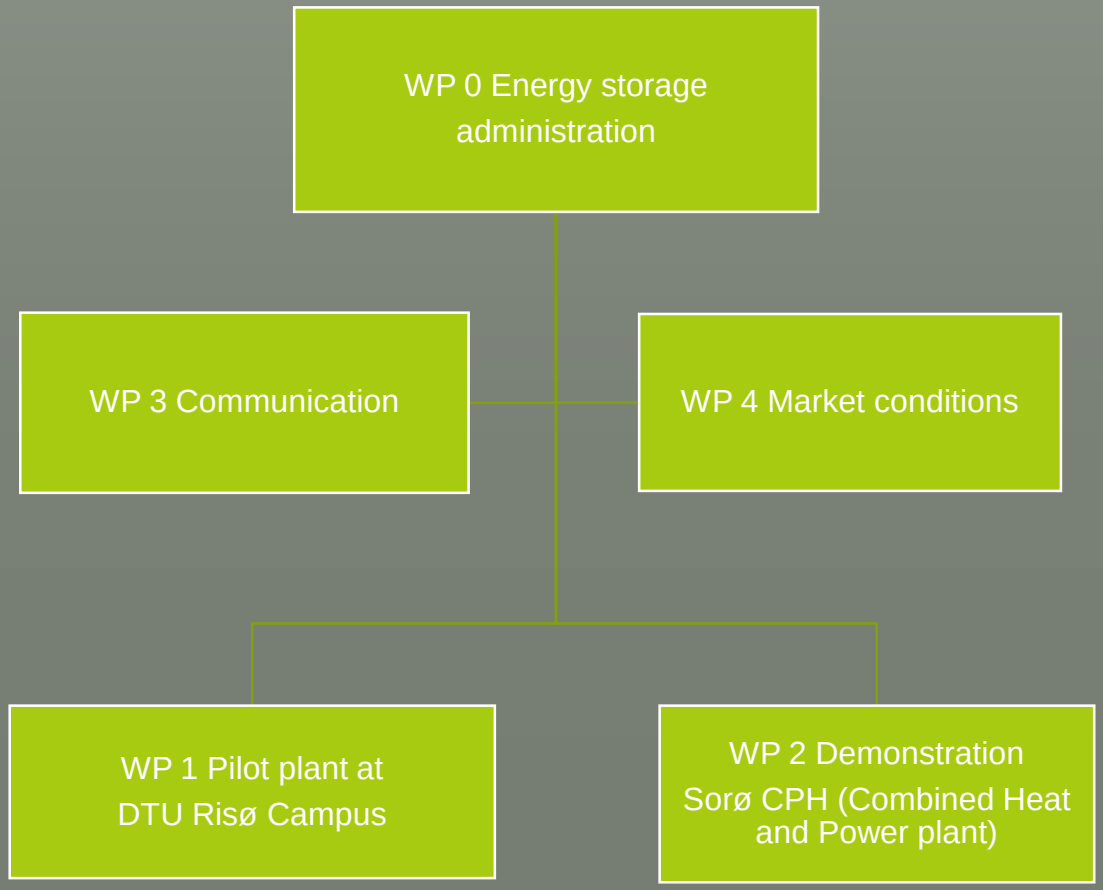
EFFECTIVE ENERGY USAGE

BIO ENERGY

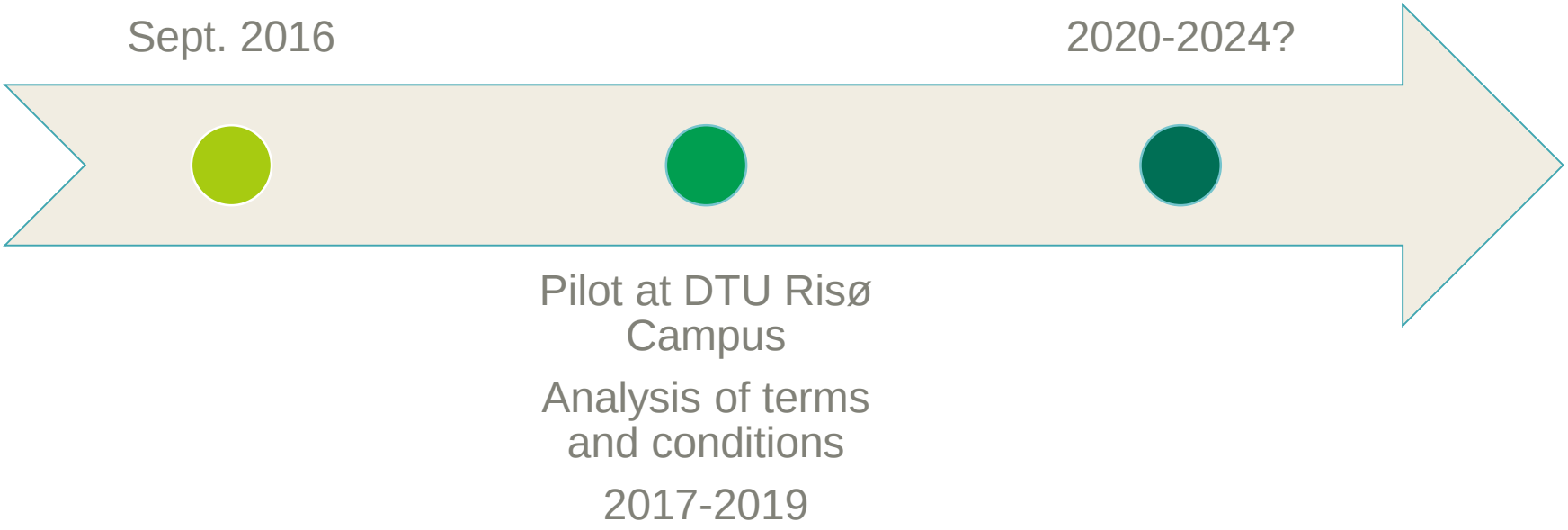
SMART ENERGY AND SYSTEM INTEGRATION

OIL AND GAS

Work packages



Schedule


Approval of the project
Sept. 2016
Demonstration at Sorø CPH
2020-2024?
Pilot at DTU Risø Campus
Analysis of terms and conditions
2017-2019

Partners

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ROCKWOOL
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