About ECES TCP

Mission and scope

The TCP-ECES mission is to contribute in the energy transition toward a renewable energy based energy system by:

- Joint R&D + pre-standardisation work.
- Scope:
  - heating, cooling & electricity;
  - Central & Decentralised
About ECES TCP

- Current high-priority themes for energy storage in ECES
  - **Thermal energy** (for cooling & heating):
    - Underground energy storage
    - Compact thermal storage
  - **Electrical energy**:
    - integration aspects in grids,
    - Storage in buildings and electric mobility
  - **Modelling**:
    - improve position of energy storage in models
The transition of our energy system

- **Smart Grids**: remote operation, DSM, Variable rates and tariffs, gamification
- **Central Renewable Energy Production**: Wind, Hydro, Large Solar, Bio-energy
- **Data Management & Control**: “Prosumerification”
- **Energy Storage**: Local energy consumption and renewable production connected
- **Energy Management**: Heat/Cold and Electricity (electrical vehicles)

“Old model”
The transition of our energy system

- Abundant (variable) renewable energy production

- (Changing) variable load profiles
Focus on storage and flexibility

- **Development**

  - Historical focus mainly on production and energy savings for heating, cooling and electricity consumption
  - New domain: matching variable production and variable load profiles (+increased cooling demand and EV)
  - Sector coupling required for comprehensive approach (P2C, P2H, P2P, P2M2P, etc)

  → Position of Energy Storage and Flexibility:

  (Variable) renewable Production \[\rightarrow\] Storage & Flexibility \[\leftrightarrow\] Load / demand profiles
Storage and Cooling

- Developments Cold Storage
  - Decentralised options:
    - mainly for office buildings
    - proven technology
  - Example: Japan
    Abeno HARUKAS Buld. (OSAKA)
Storage and Cooling

- **Developments Cold Storage**
  - Centralised options:
    - Mainly district cooling
    - Using UTES (Underground storage) / Aquifers
    - Proven technology
  - Example: Netherlands
    - Greenhouses and office districts
Storage and Cooling

- Value ($/€) and economics:
  - Value for storage determined by:
    - Cooling load / (additional) electricity cost for infrastructure
    - High dependency on day/night rates electricity
  - Economics require:
    - Dynamic pricing
    - Long term stability in pricing structure
Challenge #7: affordable heating and cooling

Increased international effort to address need for decarbonisation of fast growing heating and cooling demand.

- Priority areas like:
  - Energy storage (TES- heating / cooling)
  - Heatpumps
  - Cooling / heat rejection
  - Predictive maintenance

- Work plan under development
Technology Collaboration Programmes

Thank you

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