energy storage

IEA Technology Collaboration Programme

COUNTRY REPORT
Austria

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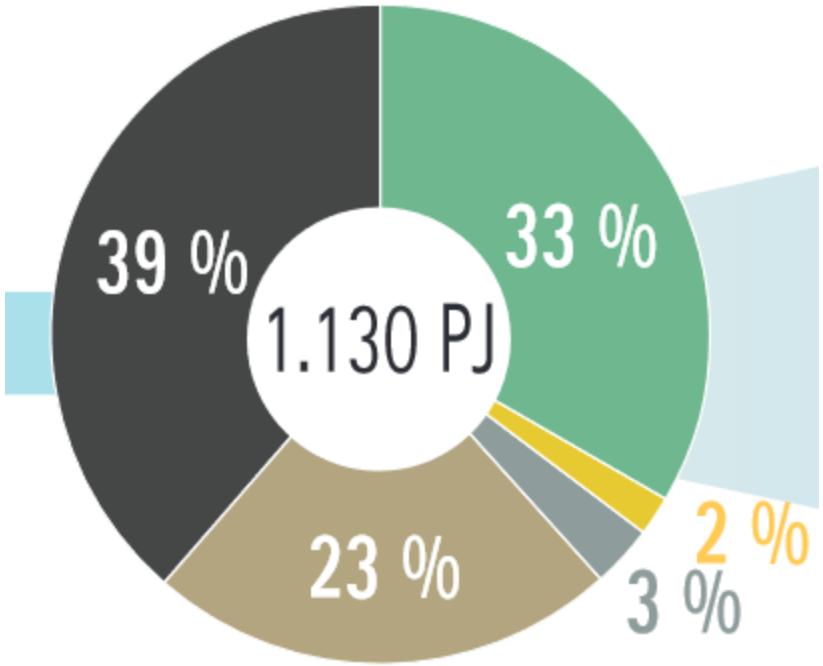
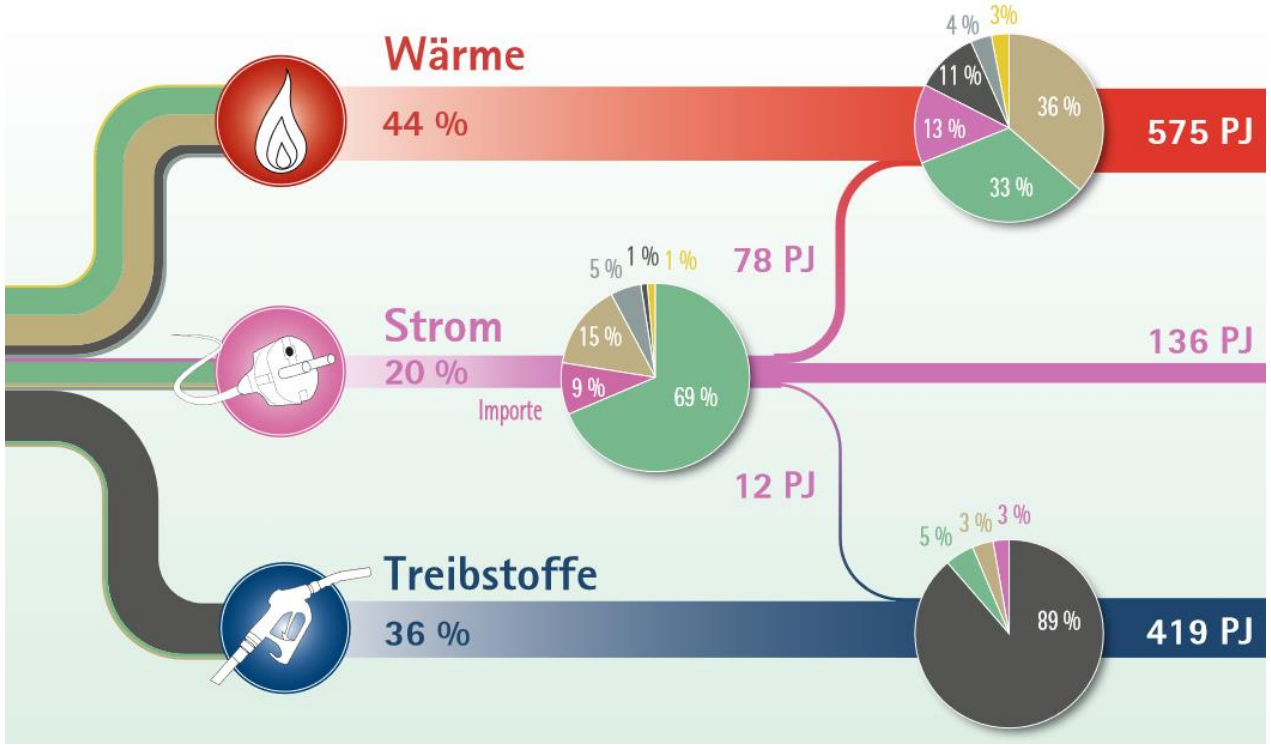
Country Specific Information

- 8,9 Mio inhabitants, GDP approx. 380 billion €, GDP/capita approx. € 42,500
- Final energy consumption: 1,130 PJ (2017)
- 33% covered by renewable energy



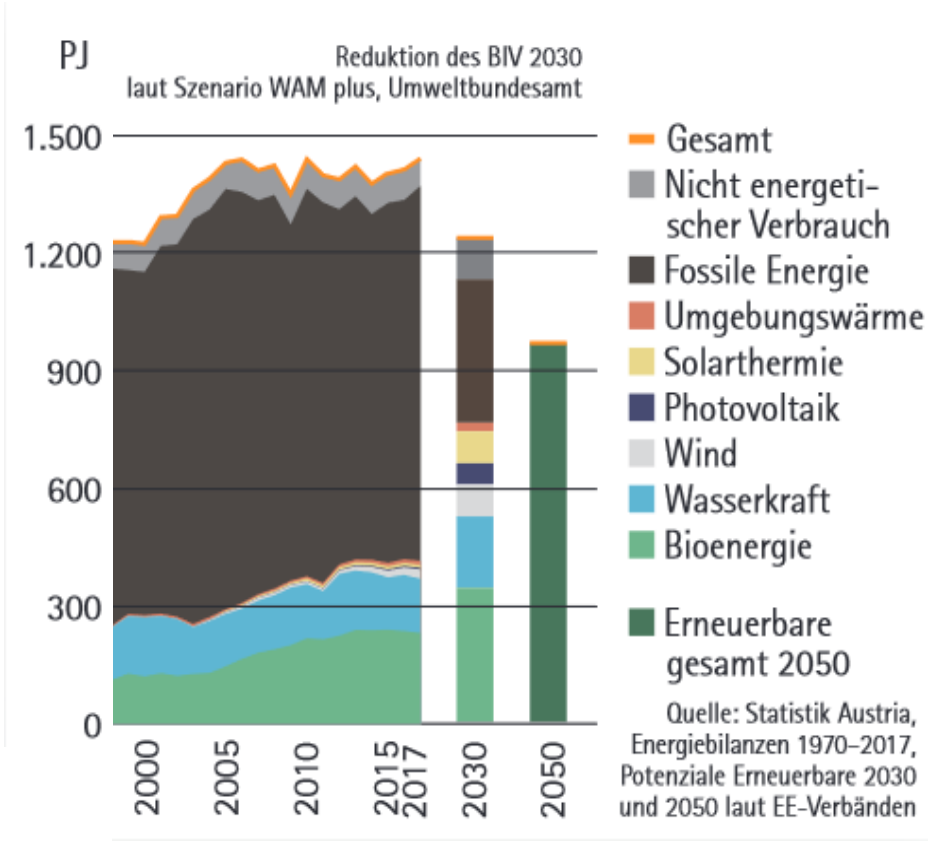
Source: Basisdaten Bioenergie 2019



Country Specific Information

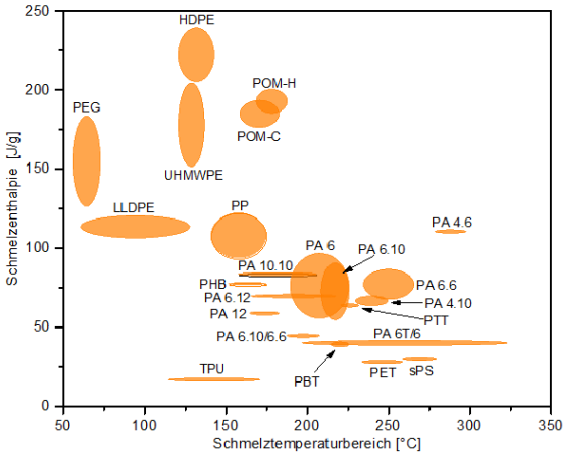
- **Decarbonisation strategies of varying ambition**
- **Timeline 2050**
- **Current government:**
  - 100% climate-neutral energy supply in 2040
  - 100% renewable electricity supply in 2030 (at least over the annual balance)

Gross inland consumption



RDD Information

- **Heat Storages**
  - Large-scale storages for district heat – pit, tank, borehole, geothermal, old oil fields (up to 130 °C)
  - High temperature storages for industrial applications (150 – 900 °C)
    - PCM storages (polymers, sugar alcohols, melting salts, melting metals),
    - chemical storages (metal oxides)
    - sorption storages (Zeolites, fly ash)



Source: AIT

- **PCM and Sorption Storages for building applications (up to 100 °C); sorption materials are zeolite, silica gel, potassium carbonate, composites, etc.)**
- **Undeep geothermal as a heat source for heat pumps in cold district heating networks (up to 30 °C)**
- **Thermal activation of building structures like ceilings and walls (up to 30 °C)**

Source: AEE INTEC

RDD Information

- **Electricity Storages**
- **Pumped Hydro Power, Flywheels**
- **Batteries development**
  - Optimizing of Lithium-ion batteries for use in e-mobility (high energy density, fast-charging capability, long cycle life, availability of resources, ageing behavior, safety technology, testing and characterization, etc.)
  - Lithium-Oxygen Batteries
  - Redox Flow Batteries (e.g., based on Lignin as Electrolyte)
  - Saltwater battery
  - Second life batteries
  - Battery system integration, e.g.
    - Large batteries for peak load reduction in the power grid
    - Bidirectional use of batteries in electric cars

Source: Stock.adobe.com

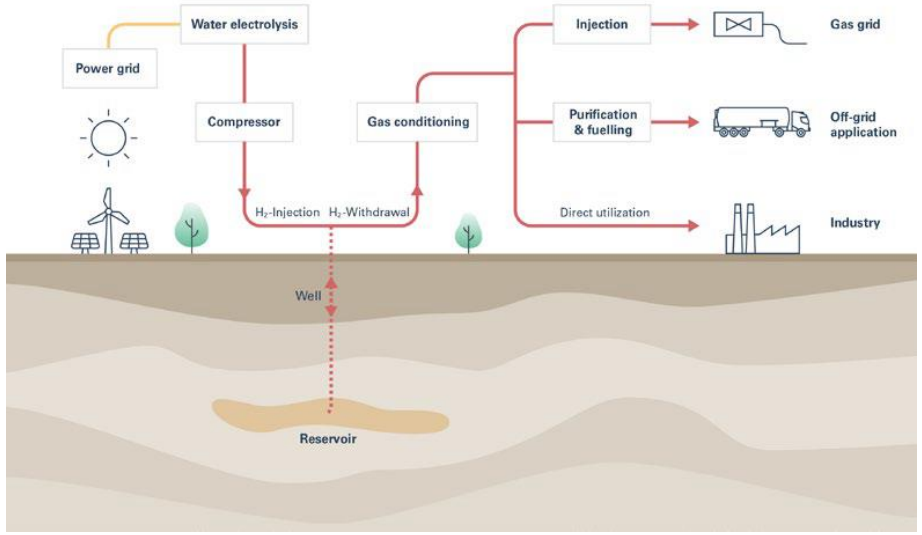
Source: Saubermacher Dienstleistungs AG

Source: Lunghammer, TU Graz

RDD Information

Gas Storages

- Storage of hydrogen in large scale natural gas storage facilities
- Natural conversion and storage of CH_4 by injection of H_2 and CO_2 in large scale natural gas storage facilities
- Storage of hydrogen in pressurized gas cylinders
- Metal hydride storage
- Biogas storage (e.g. foil gas storage)
- System integration



Source: RAG Austria

RDD Information

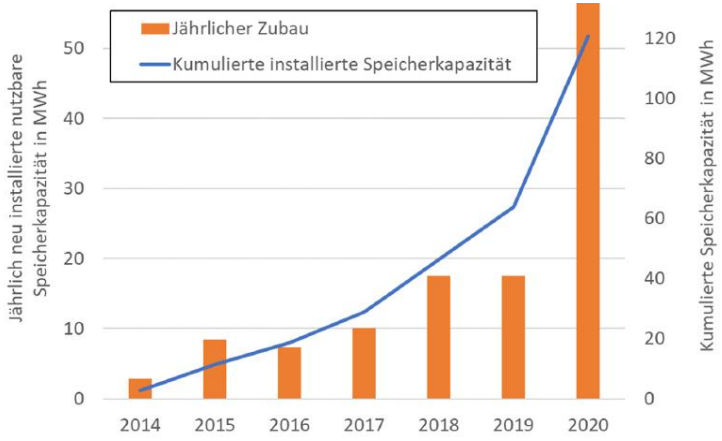
- **Research Funding Programs**
  - Program “Energy Research”
  - Program “Flagship Region Energy”
  - Program “City of Tomorrow”
  - IEA Research Cooperation
- **Investment Support Programs**
  - Several funding programs with funding quotas between 20 and 50%
- **Information Activities from Ministry of Climate Action**
  - Information Platform: https://www.nachhaltigwirtschaften.at/en/
  - Conferences and Events: e.g., “Highlights of Energy Research”
  - Energy Innovation Austria: https://www.energy-innovation-austria.at/

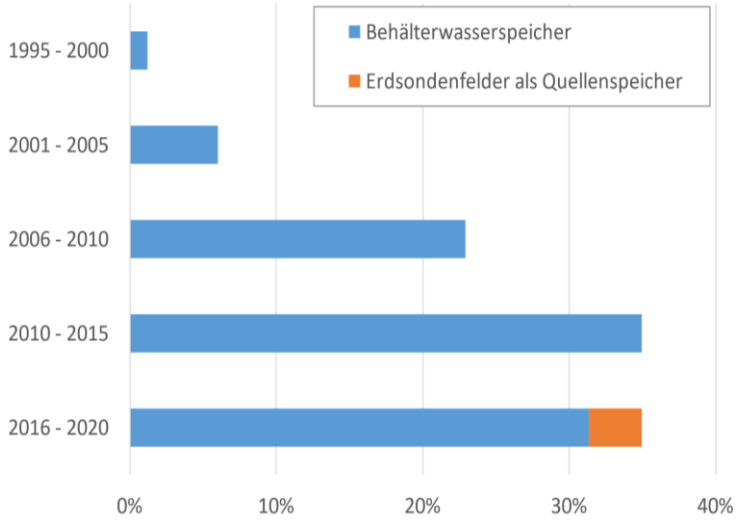
Energy Storage Landscape

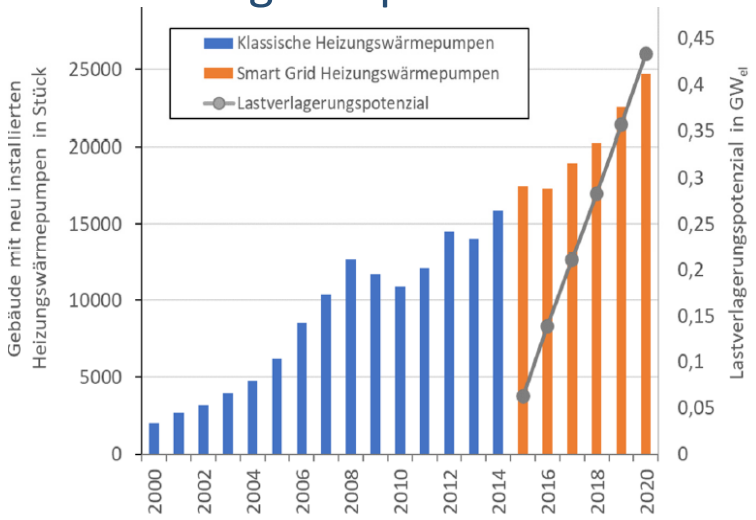
- **Heat Storages**
  - Research: AEE INTEC, AIT, TU Graz IWT, FH OÖ, TU Vienna, UIBK, JKU-IPMT, Montanuniversität Leoben, Universität für Bodenkultur, Geologische Bundesanstalt, etc.
  - Industry: Austria Email, Bilfinger, Pink Behältertechnik, Forstner Speichertechnik, Link3, Enovations Consulting, AGRU, Porr Construction, Beyond Carbon Energy, Wien Energie, etc.
- **Battery Storages**
  - Research: AIT, TU Graz, TU Vienna, Montanuniversität Leoben, Universität für Bodenkultur, Grazer Energieagentur, Salzburg Research, etc.
  - Industry: Kreisel Electric, Banner, Samsung SDI Battery Systems, BlueSkyEnergy, Fronius, Saubermacher, etc.
- **Gas Storages**
  - Research: Montanuniversität Leoben, Universität für Bodenkultur, Geologische Bundesanstalt, HyCentA Research, etc.
  - Industry: RAG, Verbund, OMV, Axiom, Wien Energie, Elements Energy, etc.

Policies & Market

- **Energy storage strategy development and ongoing adaptation within the framework of the "Austrian Storage Initiative“**
- **First market survey in 2020 concerning the technologies:**
  - 122 MWh Battery capacity installed with PV
  - 7.8 GWh Heat storage capacity installed in regional and district heating networks
  - 0.45 GW Load shifting potential through heat pumps and mass activation of building components







Top 3 cases/projects

- Grid-connected battery storage “Prottes, Lower Austria” with a nominal power of 2.5 MW and 2.2 MWh capacity
- Used for grid stabilization and primary control next to a wind park

Source: NNÖ

- Borehole field of 36.8 km borehole length as heat source in the cold district heating network “Viertel 2, Vienna” with 80,000 m² heated area
- Field regeneration with waste cooling heat

Source: Beyond Carbon Energy

- Thermal activation of concrete ceilings in more than 50 residential, office and production facilities
- Flexibility for local renewables, renewable electricity surpluses, LM in heating networks, etc.

Source: AEE INTEC

The Energy Storage TCP

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