

Workshop on the energy storage technologies

ATES Vienna Aquifer thermal energy storage



Wien Energie at a glance



We provide electricity, natural gas, heating and cooling for 2 million people

Biggest producer of solar energy in Austria

Stabilizing the grid with power plants—up to 240 times per year

31 citizens power plants

Austrias leading energy provider

District heating for 420.000 households

2.167 employees

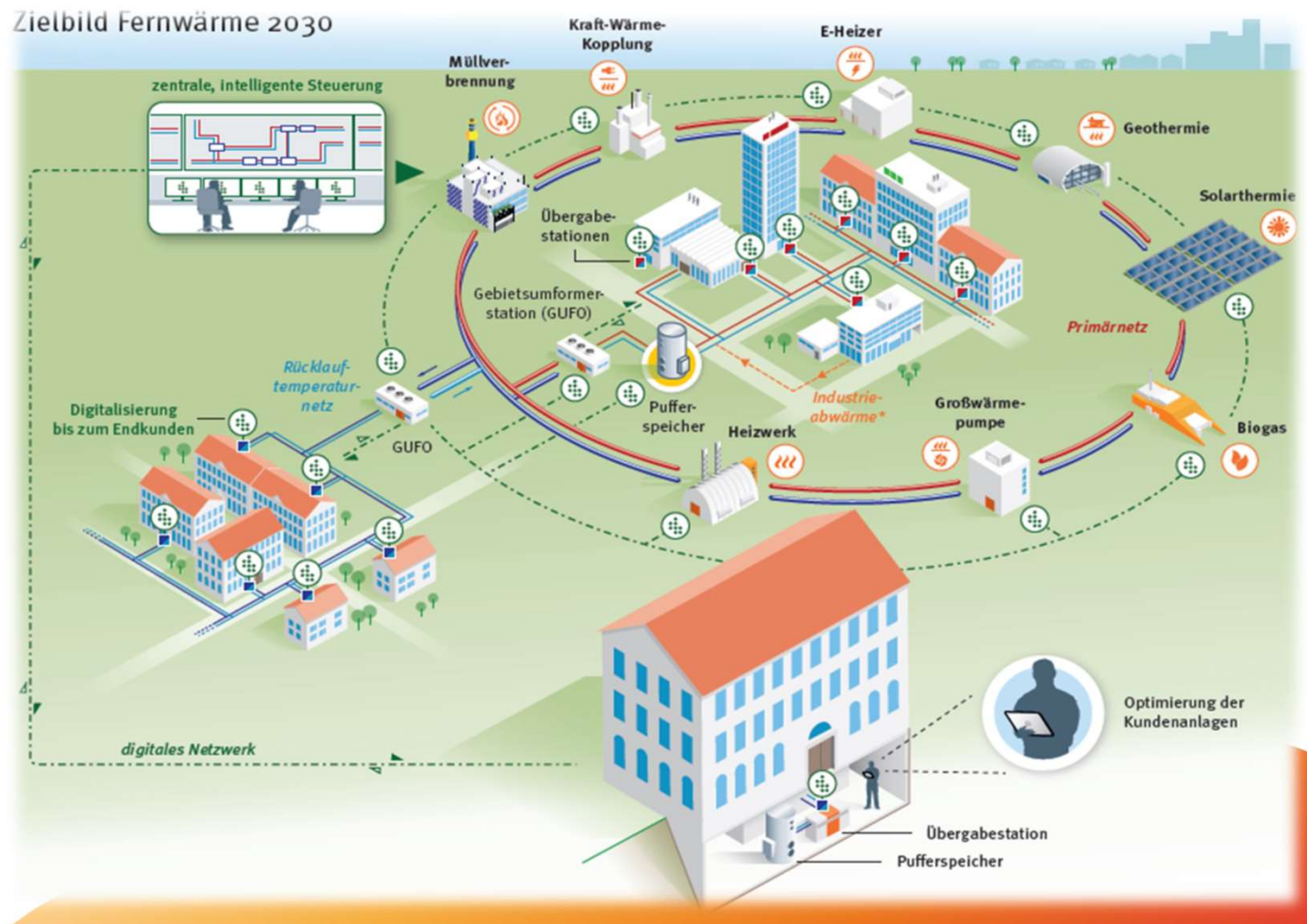
900.000 tons of waste transformed to energy

Every week a new solar power plant

District heating system in Vienna

Energy efficiency, diversification and digitalization are principles getting DH-systems decarbonised in urban areas

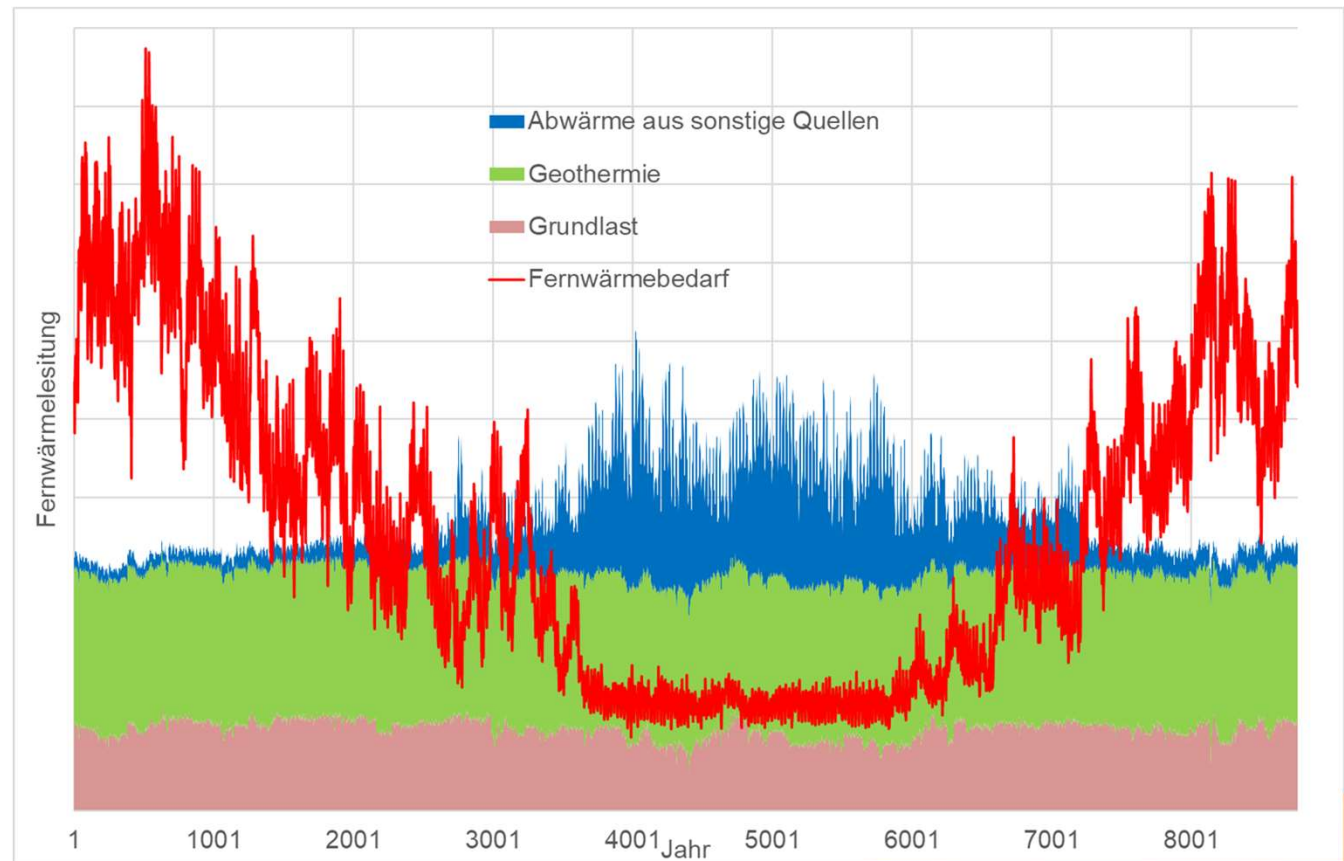
- **Diversification of generation**
 - Utilization of waste and ambient heat
 - Deep geothermal energy
 - Seasonal heat storage
- **Digitalisation of grid components at all levels for an efficient operation of the district heating system**
- **Effective Optimization of the consumer level (e.g. temperature level)**



Heat storage

Seasonal storage will make a significant contribution to decarbonization!

- Storage system is reasonable due to excess heat in summer
- Decarbonization of district heating can be achieved with the integration of seasonal storage technologies!





ATES Vienna: Project overview

HT-ATES (High temperature aquifer thermal energy storage)

- **Project partner:**



- **Project duration:** 2021 – 2024

- **Project costs:** 952.305 EUR (492.379 EUR Funding)

The **ATES Vienna** project addresses the **integration of aquifer thermal energy storages into district heating networks** with the aim of designing the first pilot ATES project in Austria. In addition, an identification and characterization of existing resources, their economic evaluation and the development of adequate regulatory framework conditions will be carried out.

ATES: functional principle

The research project aims to determine the basic parameters

Consists of one or more production and injection wells

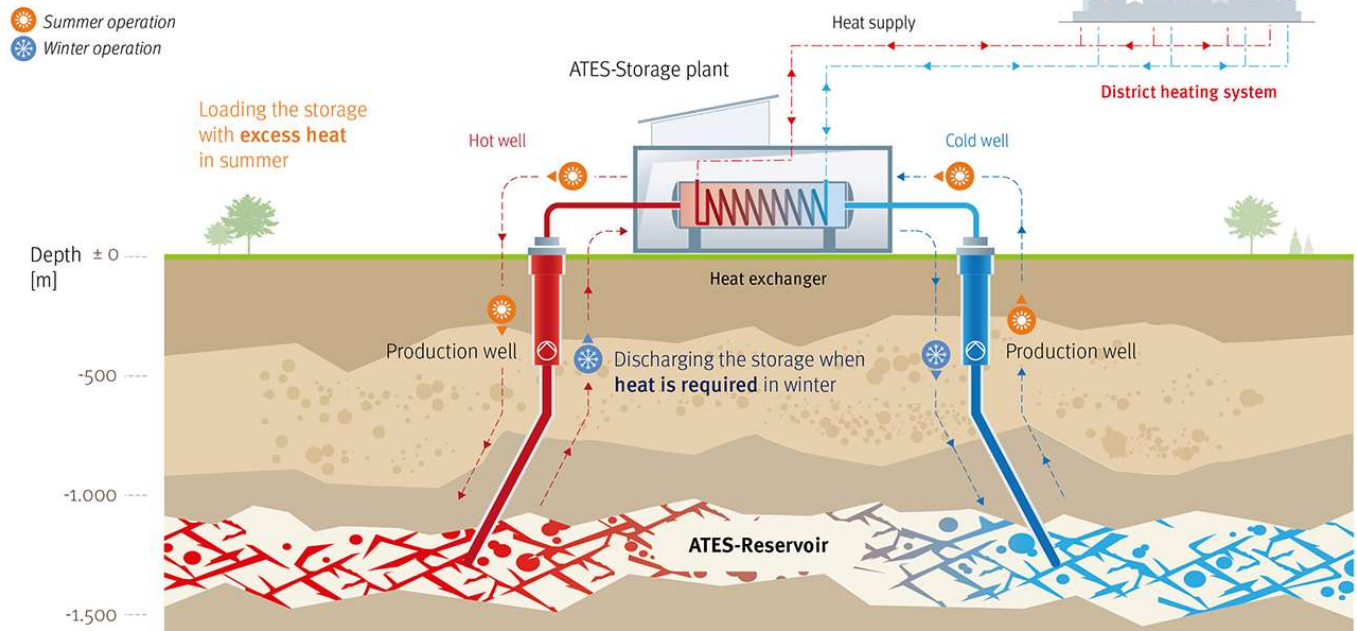
Summer:

- Thermal water is extracted and heated with excess heat via heat exchanger.
- Heated thermal water is stored underground via the second borehole

Winter:

- Reversing the flow direction
- Hot thermal water is pumped to the surface and used for heat supply

How does Aquifer thermal energy storage work (ATES)?



Source: Wien Energie

APA-GRAFIK ON DEMAND

Overview HT-ATES projects

HT-ATES overview	Existing				Planned	
	Neubrandenburg	Berlin-Reichstag	Middenmeer	Neuruppin	Hamburg	TU-Delft
Storage Temp. (°C)	90	70	85		80	73
Depth (m)	1250	300	380	1700	200	400
Thickness (m)	35	29	23	54	70	50
Heat production per season (MWh)	8600	2050	20000		25000	
No. of boreholes	2	12	2	2		7 (3 hot)
Flowrate per well (l/s)	27	27	41	14		50 (per hot well)
				Different concept (flow direction does not change)		
Reservoir Temp. (°C)	55	19	23	64	18	24
Difference in Temp. (°C)	35	51	61		62	49

Thank you!