„District heating & cooling in tension between transition of the energy system and climate protection”

“The Vienna Model as best practice”

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Facts & Figures

- **Group structure**
  Wien Energie Fernwärme ⇨ Wien Energie
  ⇨ Wiener Stadtwerke Holding AG ⇨ Stadt Wien

- **Mission**
  Urban district heating and disposal of municipal waste

- **Milestones**
  1969: „Heizbetriebe Wien GmbH“ formed by the Vienna City Council
  1989: After a major fire in 1986 the rebuilt Spittelau plant reopens with design makeover by artist Friedensreich Hundertwasser
  2005: District heating grid passes 1,000 km mark
  2006: New division „District Cooling” established
  2010: 300,000th domestic customer connected
  2012: Opening Wien Energie Customer Care Center in the Spittelau

Facts & Figures

Key performance indicators

	FY 2010/11
Turnover	EUR 466.9m
Investment	EUR 103.7m
District heating (sales)	5,552 GWh
District cooling (operational capacity)	28.1 MW
Grid length	1,153 km
Waste disposal and recycling	944,211 t
Employees (ave.)	1,188

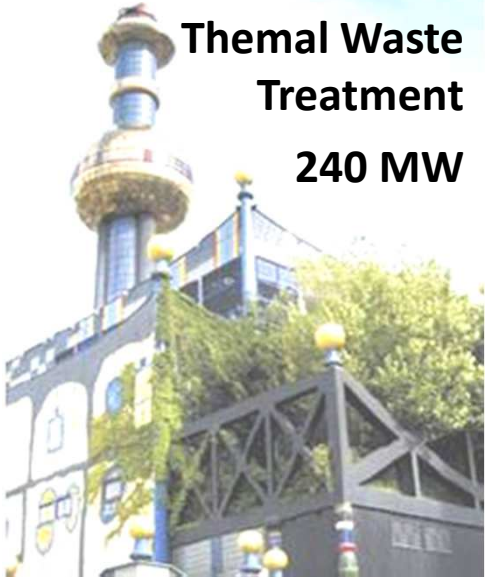
The Vienna Model of District Heating and Cooling!

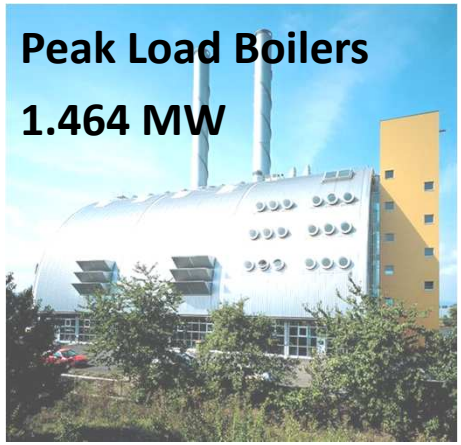
Electricity

Heating

Cooling

More than 80%
Energy Efficiency!





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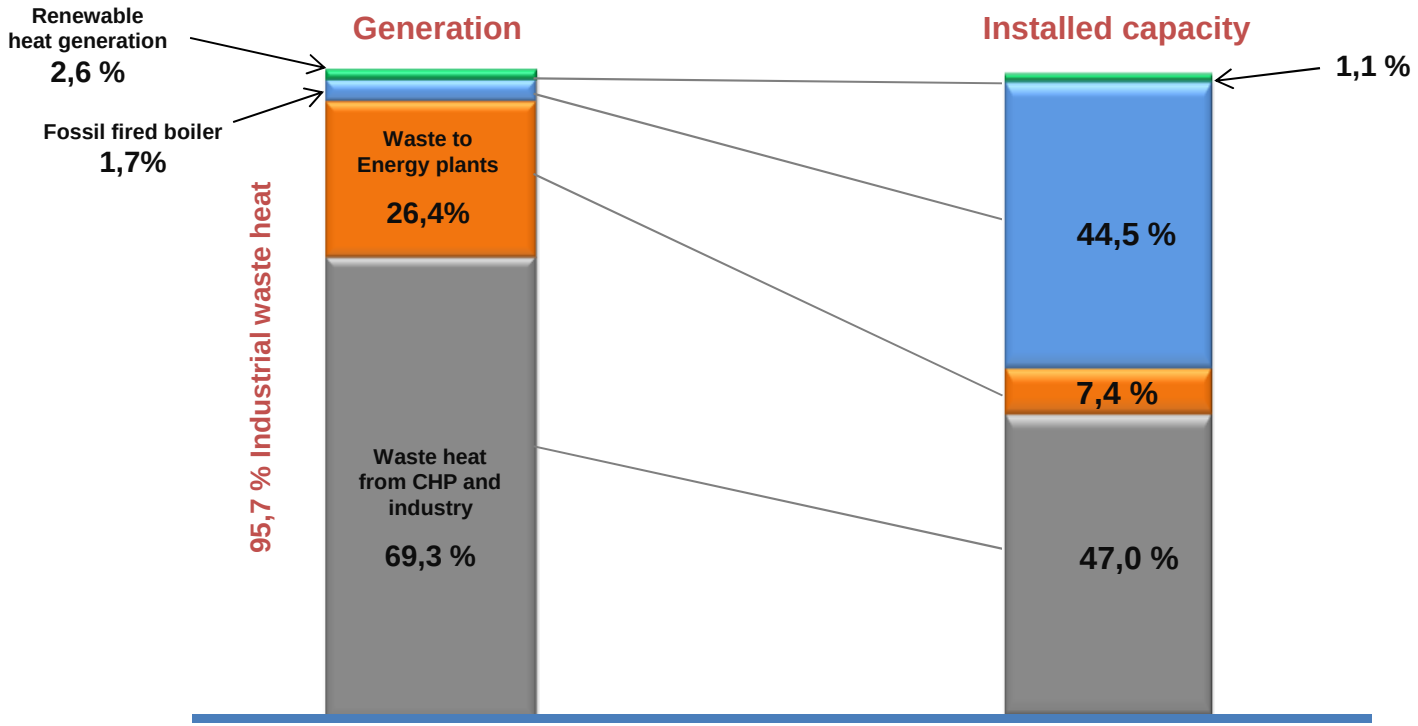
District Heating

Breakdown of generation and installed capacity (FY 2010/11)

Heat generation → 6,052 GWh

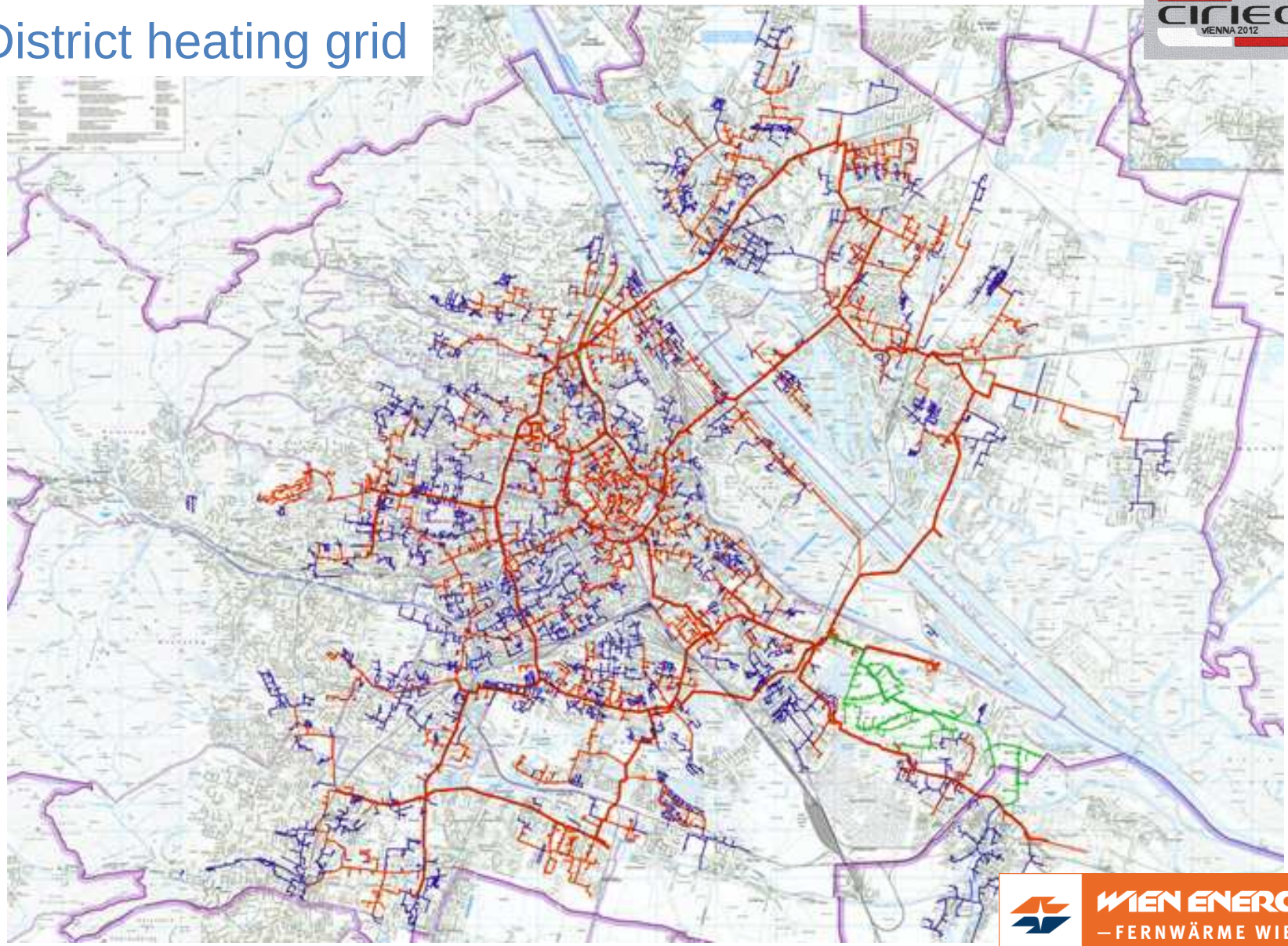


→**Share of Renewables over 18 %**

→**96 % Industrial waste heat**

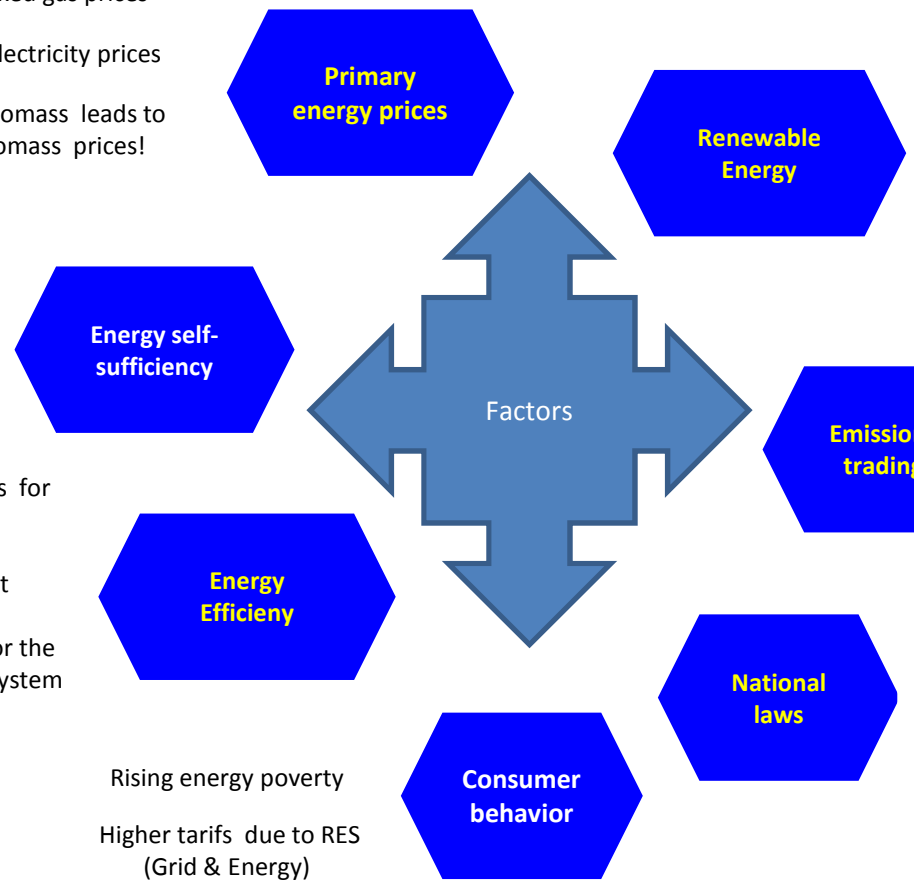
→**CO2 saving: 1.9m t/year**

District heating grid



The transition of the energy system

Challenges for public utilities



High oil price-linked gas prices

Low wholesales electricity prices

Fuel switch into biomass leads to sharply rising biomass prices!

80 % RES in Europe till 2050!

Priority grid access for wind and solar energy power by EU law

–> disadvantage for CHP (dilemma to EED!)

Grid connection N to S?

Biomass vs. competition for land & food & feed

Feasibility?
Costs?

Decarbonisation of the energy sector

No free allowances after 2013 for the electricity sector

Higher ETS-prices due to phase out of nuclear power?
Renaissance of lignite?

<u>EU & national:</u>
1,5 % p.a. energy savings for utilities till 2020

Using any waste heat

CHP as key technology for the transition of the energy system

Smart „Europe“

Climate protection law

Clean air act

Subsidies for DHC & CHP

Rising energy poverty

Higher tarifs due to RES (Grid & Energy)

„Smart consumer“

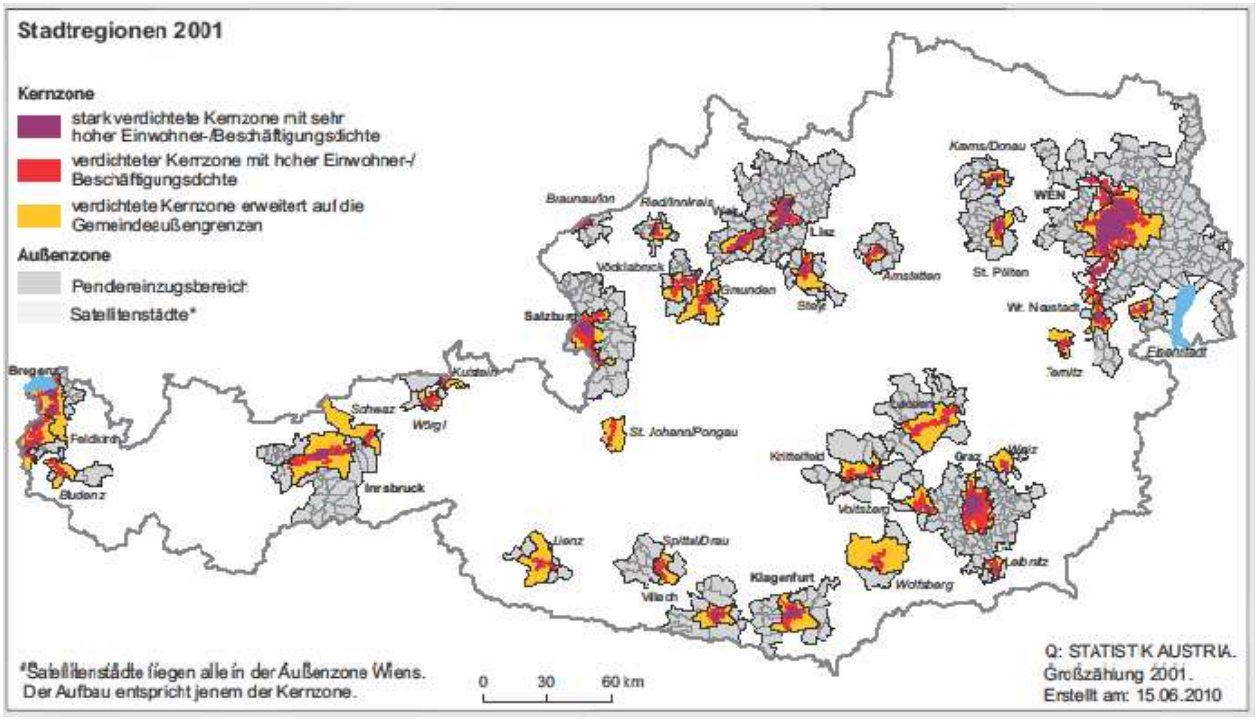
The transition of the energy system

The role of district heating & cooling

Enormous potential at the heating and cooling market

→75 % of global emissions are produced in large cities and metropolitan areas*

→42 % of the Austrian population lives in high density areas

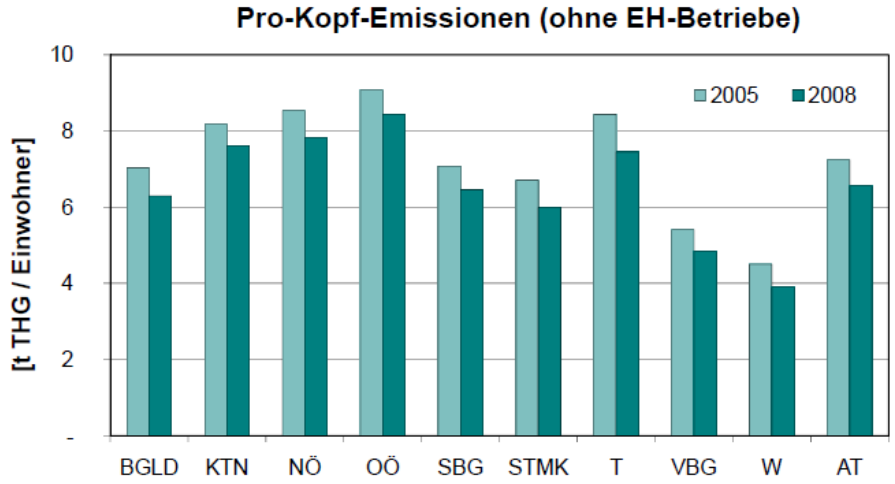


Source: Federal Environment Agency

* Source: IEA – International Energy Agency

The transition of the energy system

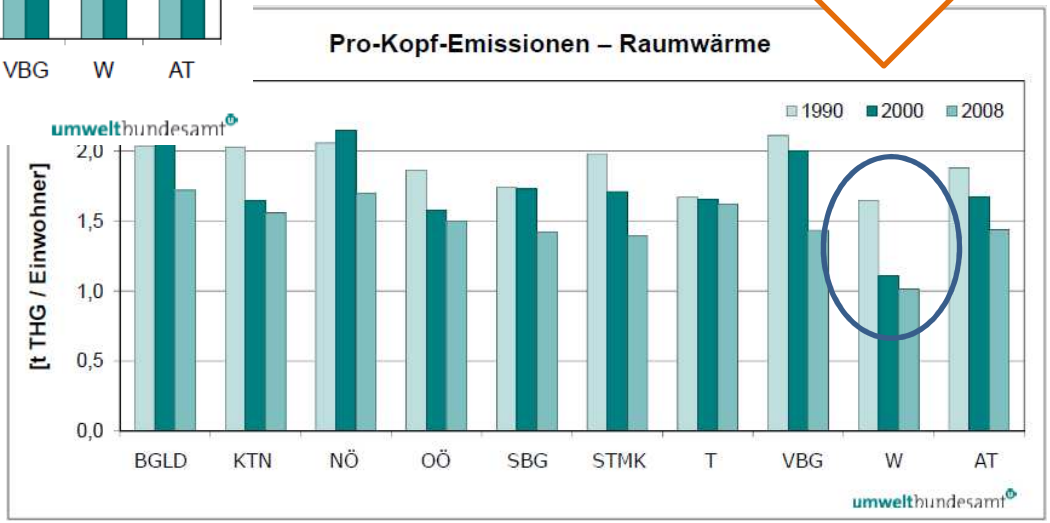
Per-capita Greenhouse Gas Emissions in Austria & Vienna



Vienna as an urban metropolitan area has the lowest per-capita GHG emissions of all states in Austria!

These low per-capita GHG emissions are due to the high share of district heating in the Viennese heating market!

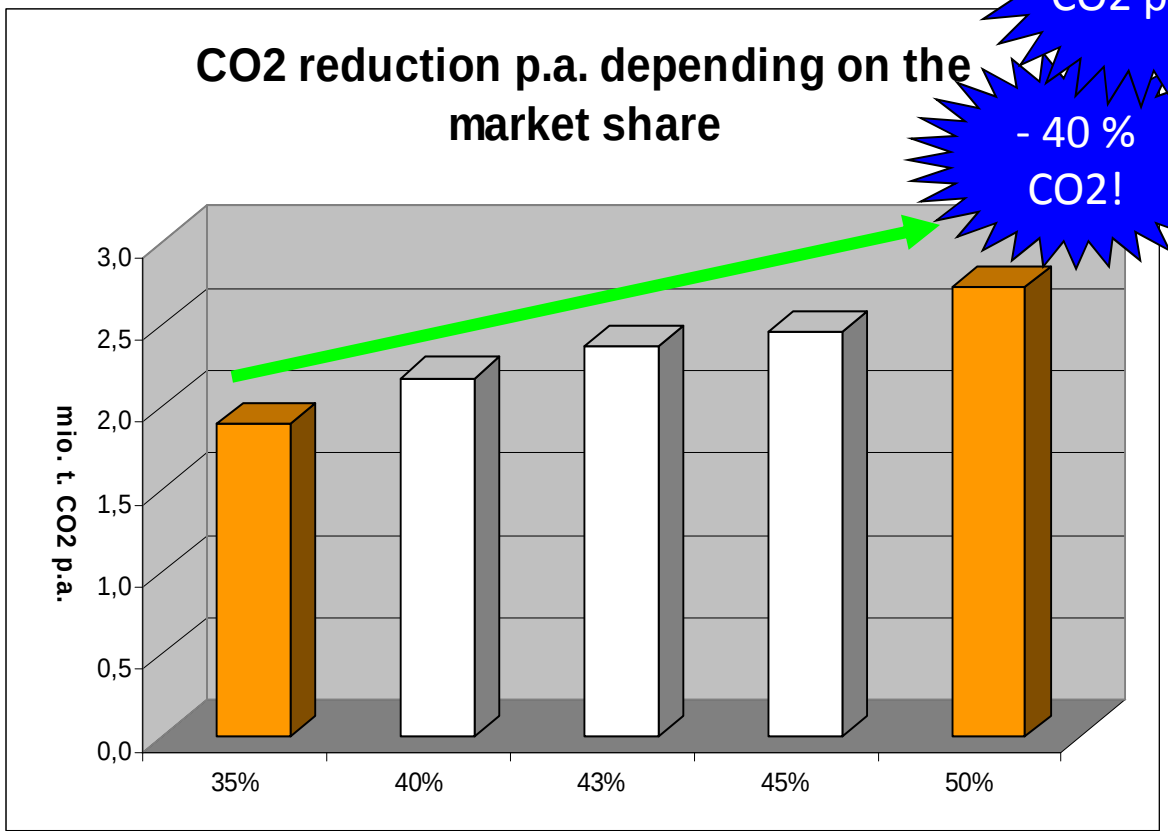
Significant decrease since 1990!



Source: Federal Environment Agency

The transition of the energy system

What means 50 % market share in Vienna?

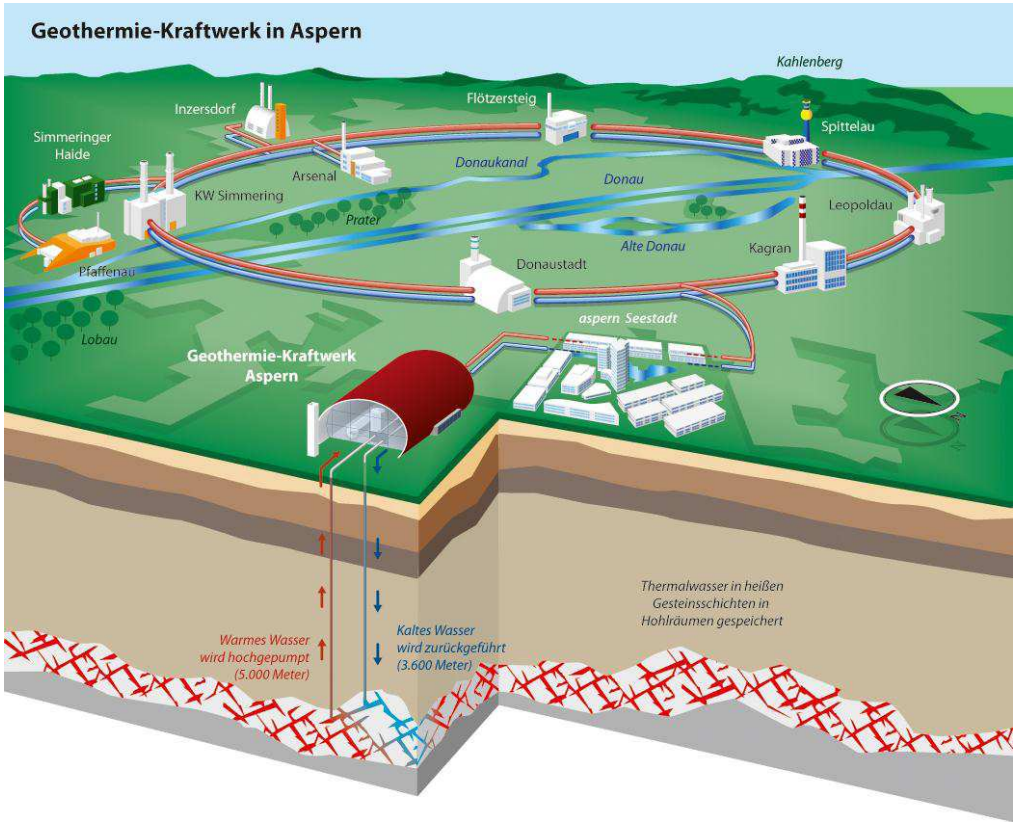


- → Climate protection programme „KliP“ adopted by the Vienna City Council.
- → 50 % market share in the domestic district heating market.
- → 200 MW installed capacity in the district cooling market.
- → Today – 36 % market share → 1.9 mio. CO_2 reduction p.a.
- → 2.7 mio. t. CO_2 reduction p.a.

The transition of the energy system

Including new technologies for district heating

- Geothermal energy in Aspern
  Capacity: 40 MW_{th}
  Temperature: 150°C
  TVD: 5000m/3600m
- Solar thermal energy
- Biomass CHP
- Small CHP plants
- Heat pumps



⇨ Including new technologies and Renewables means a transition of the energy system for all our customers

Summary

District heating & cooling in Vienna

"Vienna Model" ensures that the heat delivered has

- a very low primary energy factor of 0,16
- very low of greenhouse gas emissions
- reaching a market share of 50 percent CO2 savings will be 2.7 million tons of greenhouse gas emissions every year
- nearly zero fine dust emissions
- the highest level of energy efficiency
  - more than 95 % industrial waste heat
  - surplus heat in summer times is used for district cooling
- capability for the integration of new technologies and Renewables
- highest level of security of supply due to the fuel mix