

Comparison of energy systems in Czech Republic and Austria

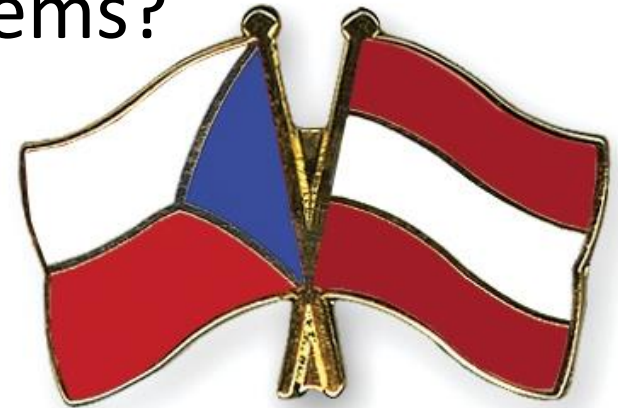
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Czech-Austrian Winter and
Summer School
15.5.2013

Outline

- Research question
- Introduction to the Czech Republican and Austrian energy system
- Description of centralisation/decentralisation
- Status quo and potentials for both countries
- Conclusion

Research question

What are the differences between Czech and Austrian energy system and what kind of role plays centralisation/decentralisation in development of energy systems?

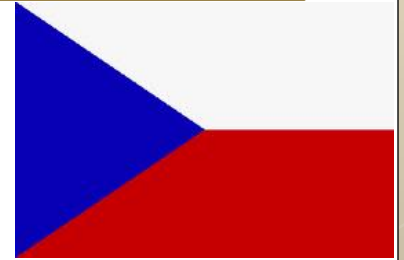


Czech republic

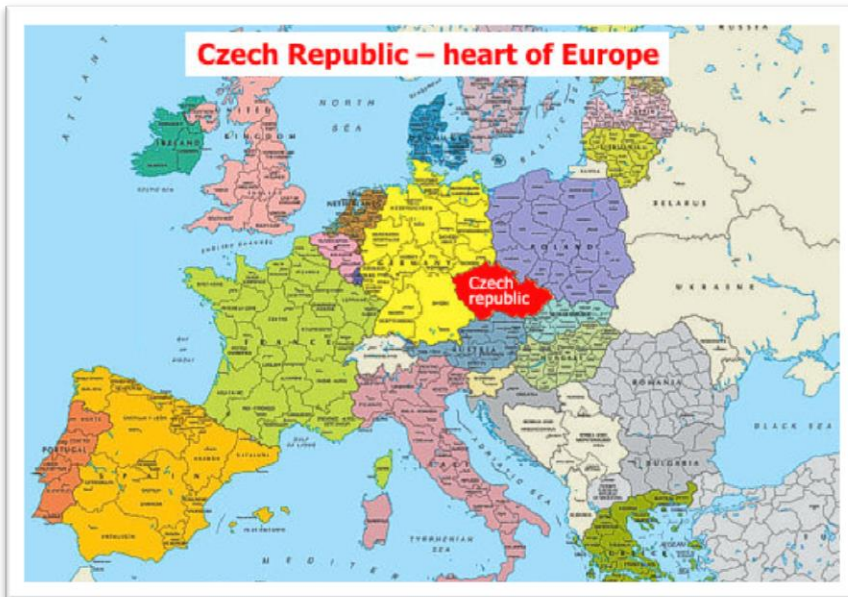


- Mountains on the border, not very high
- Continental weather
- **Small diversity in landscape and climate**

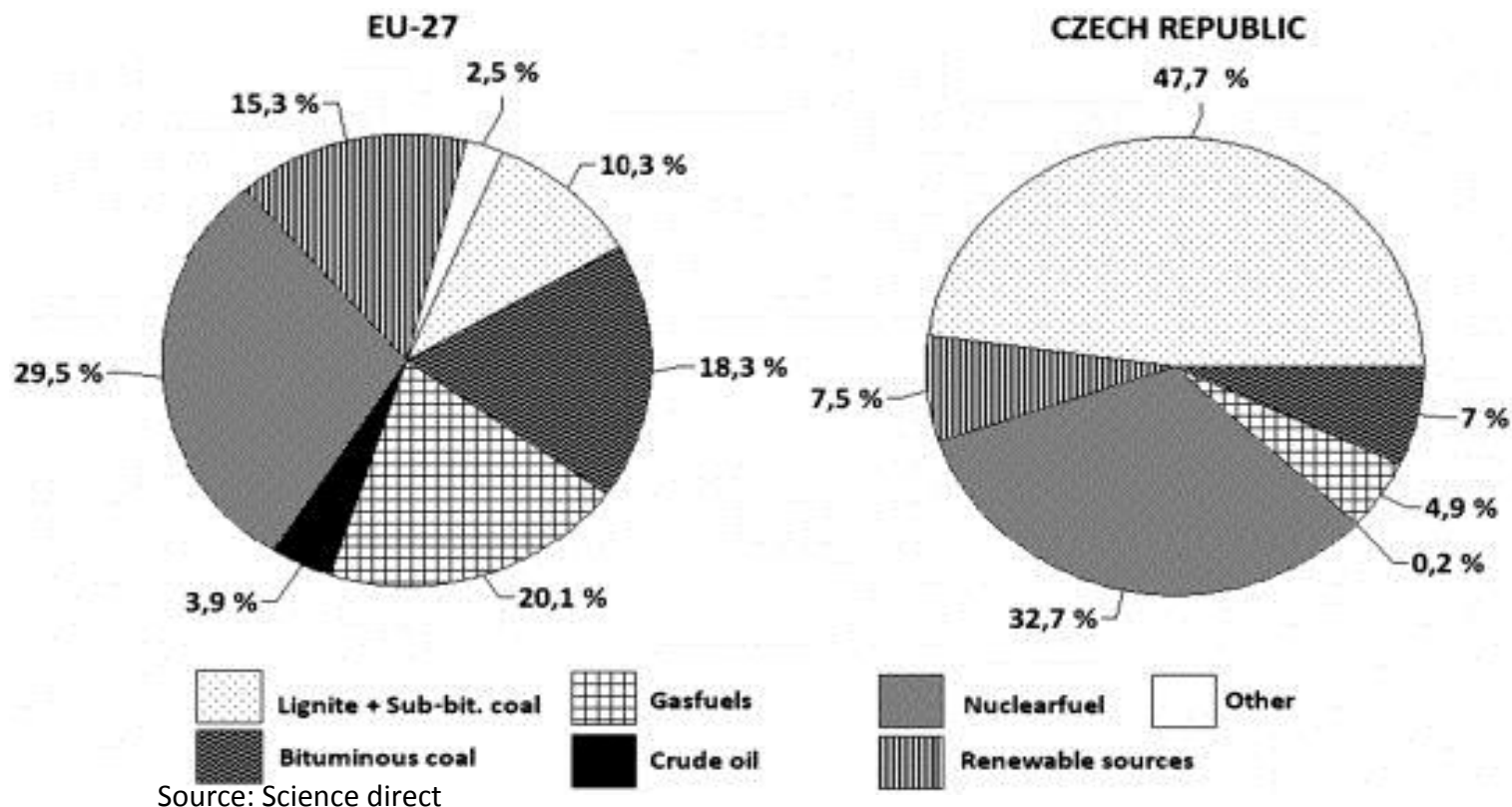
Czech energy system history



- Czech lands – strategic part of Europe
- Coal, timber, lignite, uranium, magnesite
- Long tradition of industry, one of the most industrialized economies
- 19th century – centre of production
- Independence after the dissolution of the Austro-Hungarian empire in 1918
- Act on the availability of electricity
- 1948 – the nationalisation



Structure of electricity production



- Coal - 50 000 Gwh/Nuclear – 30 000 GWh/Gasfuels – 4000 GWh

Czech power system

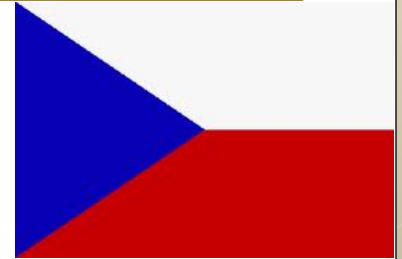
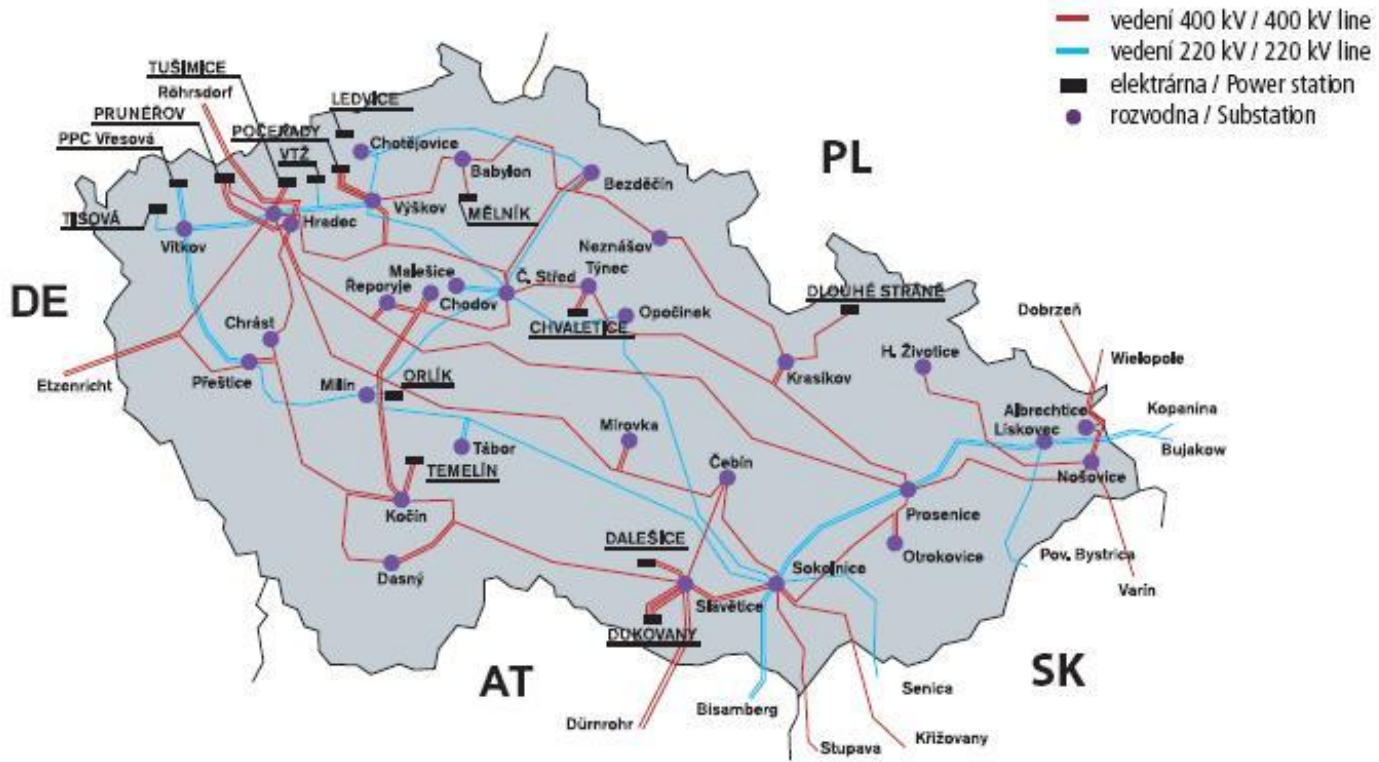


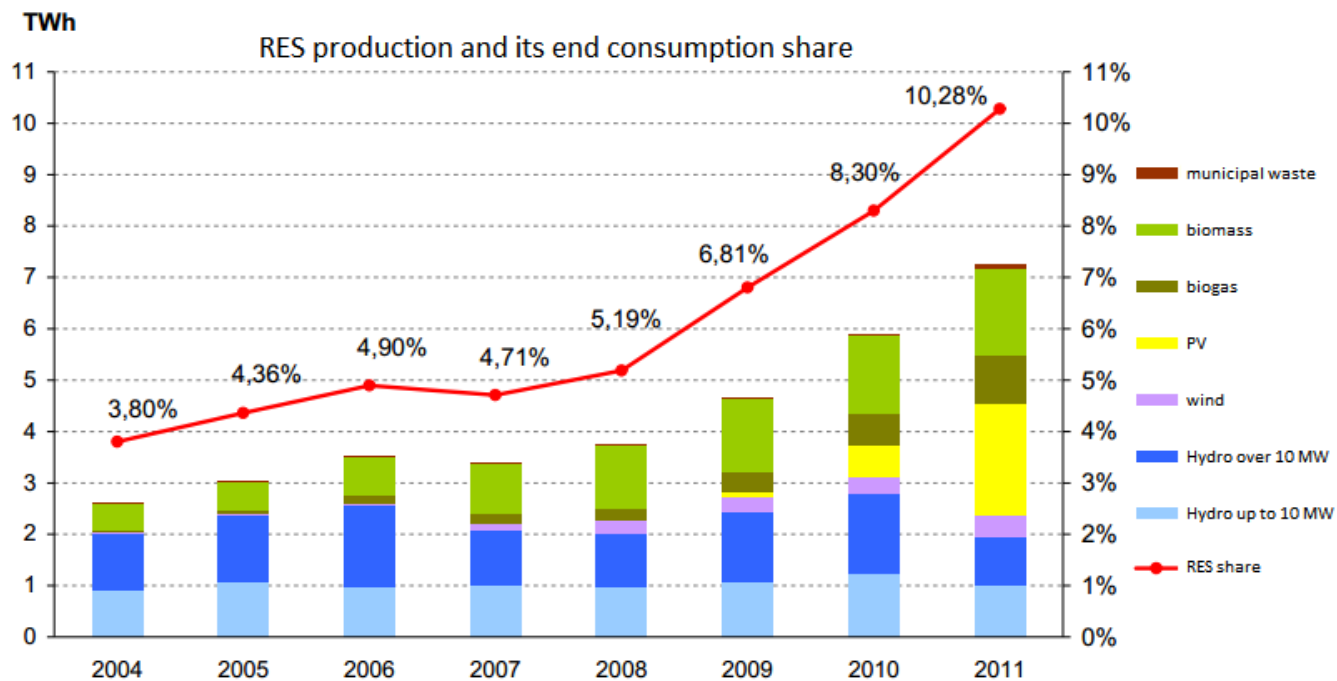
Schéma sítí 400 a 220 kV

Map of Interconnected Network - 400 and 220 kV



Source: ČEPS, ceps.cz

RES in Czech Republic



Source: [alternivni-zdroje.cz](http://alternativni-zdroje.cz)

Austrias energy system - geography



- Located in Central Europe
47 20 N, 13 20E
- Mountainous regions in west and south, flat or gently sloping in north and east
- Climate: influenced by Gulf Stream and continental conditions
- **High diversity in landscape and climate**

Austrias energy system - history 1/2

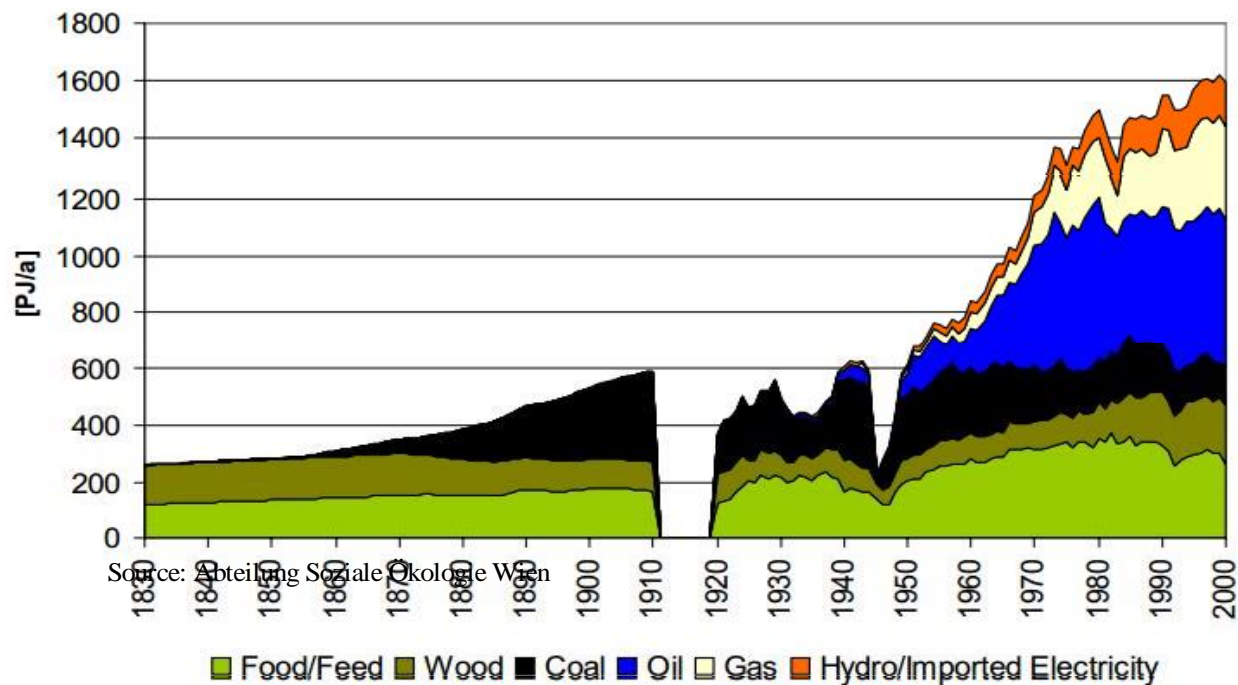


- Energy input:
- Hunters and gatherers – 10-20GJ/cap.year
- Agrarien society - about 65 GJ/cap.year
- Industrialised society – about 250 GJ/cap.year
- Till 1850: solar energy system – decentralised (biomass, wind, water)
- Since 1850: fossil fuels (coal, oil, natural gas), hydropower

Austrias energy system – history 2/2



Austrias Energy turnover from 1830 to 2000



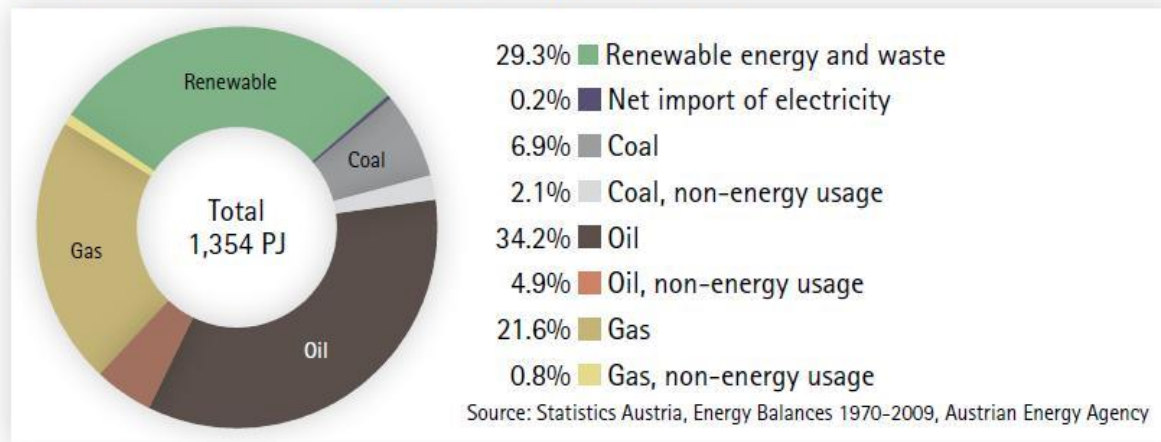
Source: Abteilung Soziale Ökologie Wien

Austrias energy system - Energy facts



- Gross domestic energy consumption 2009:
- 1,354 PJ
- Domestic final energy consumption 2009:
- 1,057 PJ

Gross Domestic Energy Consumption 2009

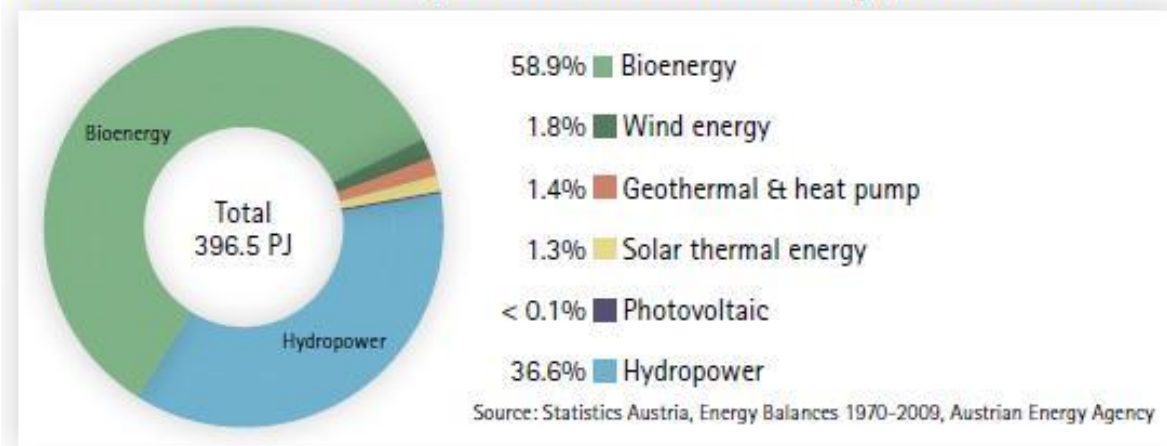


Austrias energy system - Energy facts



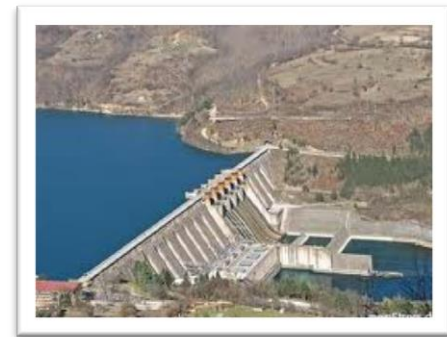
- Renewable energy: 396,5 PJ

Gross Domestic Consumption of Renewable Energy Sources 2009



Centralisation vs. Decentralisation

- Definition necessary – decentralisation as:
- medium or low voltage distribution grids
- near to consumers and self supply
- Therefore: renewable energy systems not automatically decentralised



Centralisation

- Concentration of property structures
- Most of the sales revenues go to the production countries
- Dependency on delivering countries
- Market power
- Information asymmetries



Decentralisation

- Spatially divided energy generation and consumption
- Consideration of local and regional conditions
- Problem of unequal distribution
- Splitted power
- Lower dependency
- Energy management necessary



Decentralisation in Austria

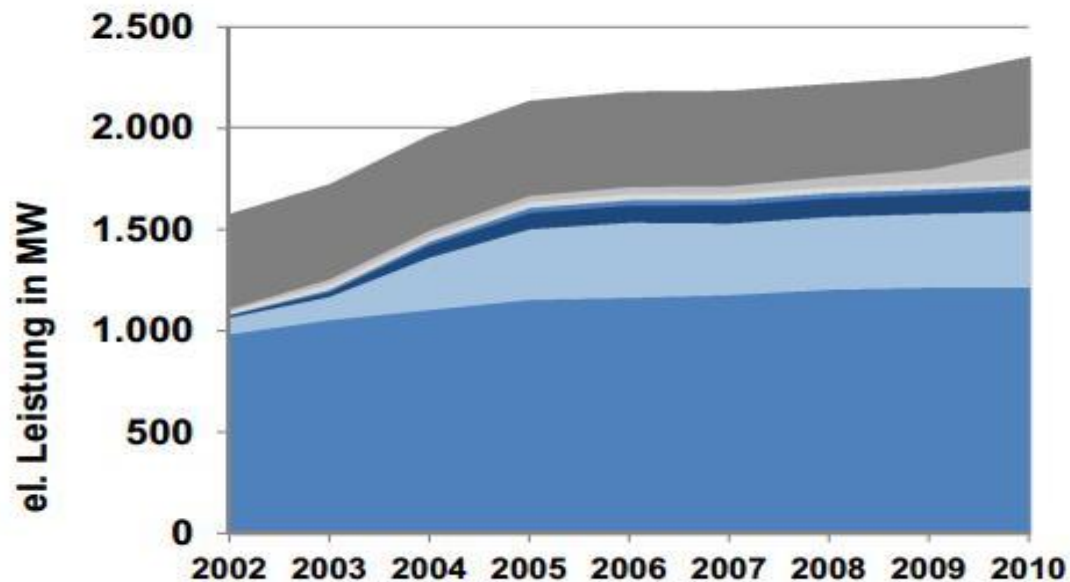


- 16 % of total electricity production
- 75 % of these renewable
- Biggest part is small hydropower
- Followed by biomass, biogas and PV

Decentralisation in Austria



Entwicklung DEA-Leistung in Österreich



- Fossile Wärmekraftwerke
- Deponie- und Klärgas
- Biogas
- Kleinwasserkraft
- Photovoltaik
- Biomasse, flüssig
- Biomasse, fest

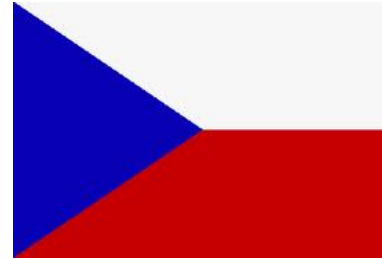
Decentralisation in Czech Republic



- Structure of energy system - conclusion
 - Dense grid
 - Large sources
- High power – inefficient
- Low power (due to increasing prices)
- Small PV solar panels
- Heat pumps
- Electromobility
- Need of storage facilities
- Off – peak needs energy



Conclusion



- Not so easy to say, what centralisation/decentralisation exactly means
- Fossil and renewable structures possible
- Useful to reduce energy dependancy, to improve supply security and to change the system to a sustainable system
- Challenges for energy management due to production fluctuations
- PV and cogeneration units not so dependent on geographical conditions
- Subsidy policy necessary
- In Austria: 16 % decentralised – higher than in Czech Republic, but there are also potentials to improve (PV, cogeneration units,...)
- Sustainability of the different forms of energy generation has to be proven

Thank you for your attention

