



A Glance at the Energy Sources – Nuclear Energy

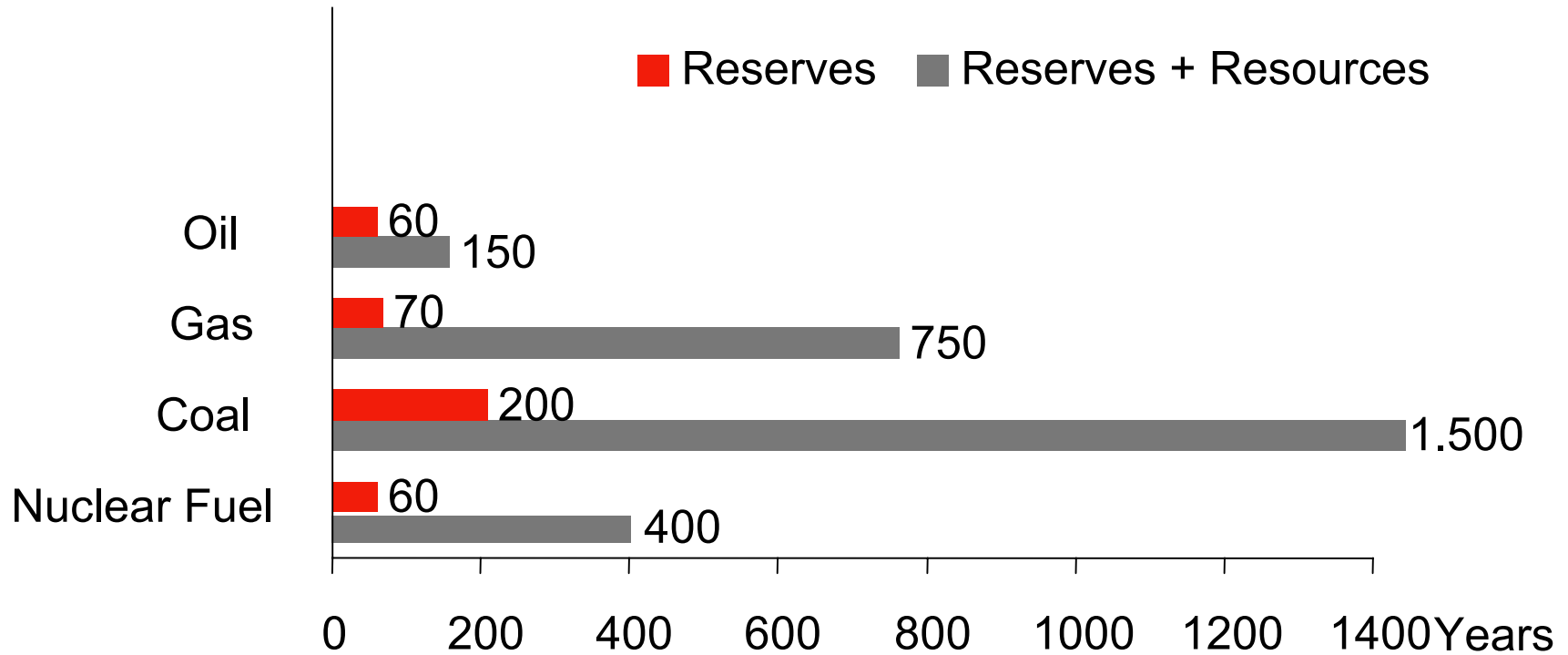
Bernhard Fischer, Member of the Board of E.ON Energie AG

Conference of Academia Engelberg 09 Oktober 2006

Agenda

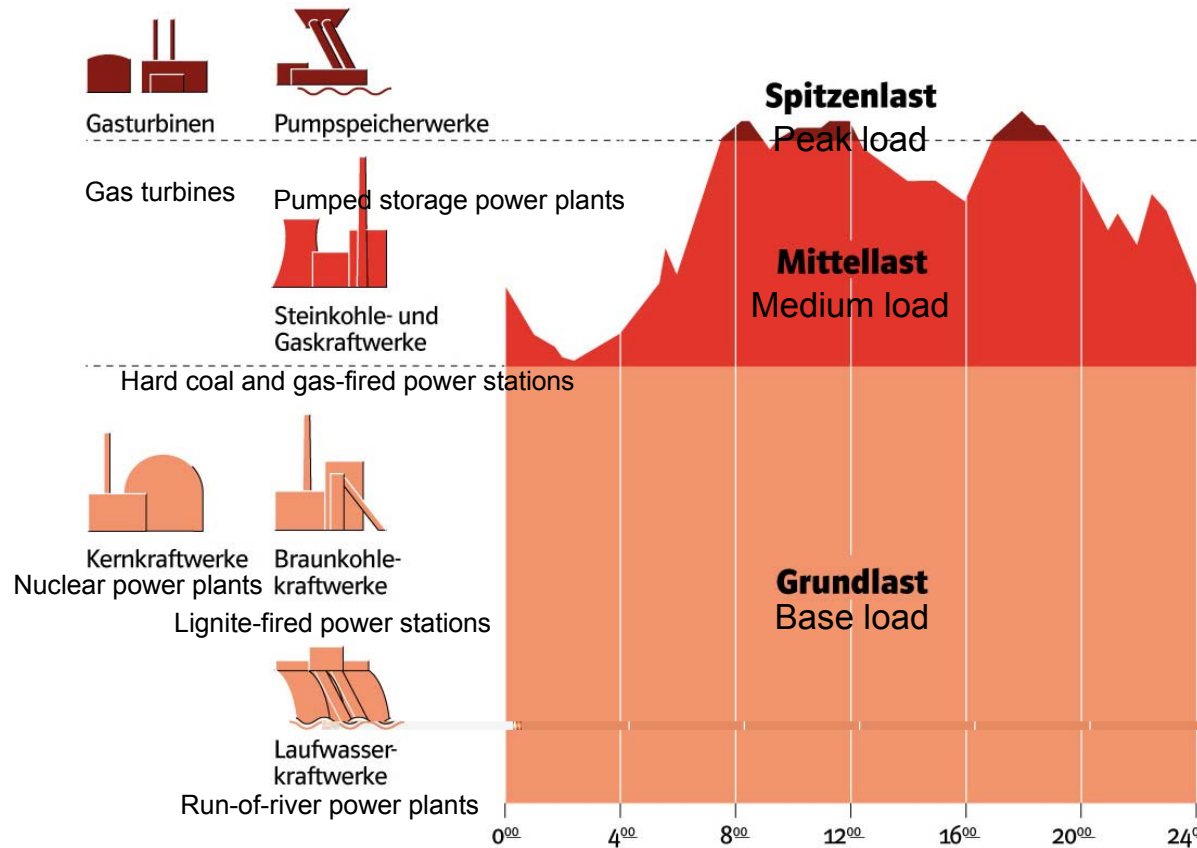
- I. Security of Supply and Climate Protection by means of Nuclear Energy
- II. Nuclear Energy worldwide
- III. Nuclear Energy and the Situation in Germany
- IV. Open questions and the way to find an answer

Range of Non-Renewable Energy



Supply Security with Nuclear Power

- ➔ Peak load—via gas turbines or pumped storage power plants
- ➔ Medium load—via hard coal or gas-fired power stations
- ➔ Base load—via **nuclear power plants**, lignite-fired power stations and hydropower



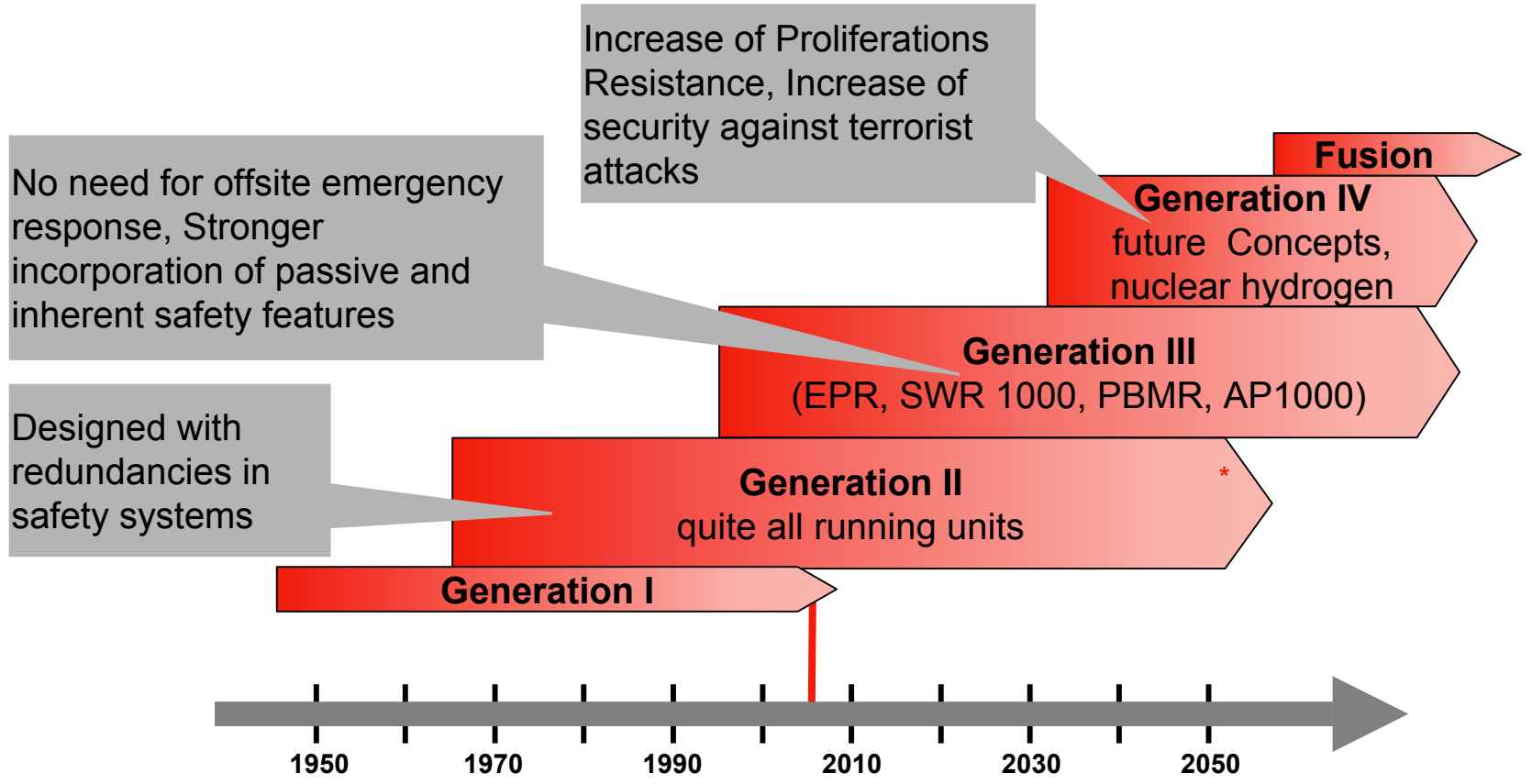
Nuclear Power Contributes to Global Climate Protection

- 2005 worldwide energy production with nuclear power plants saved the atmosphere from about 2,8 billion tons of CO₂ emissions (which is roughly 10% of the global CO₂ emission)
- German nuclear power plants protect the atmosphere from about 150 million tons of CO₂ emissions. (which corresponds with the annual emission of CO₂ from German road traffic)



Development of Nuclear Technology is an Ongoing Process

Roadmap for Generation IV and Fusion



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Nuclear's Role in the European Energy Mix

In 18 European countries, a total of

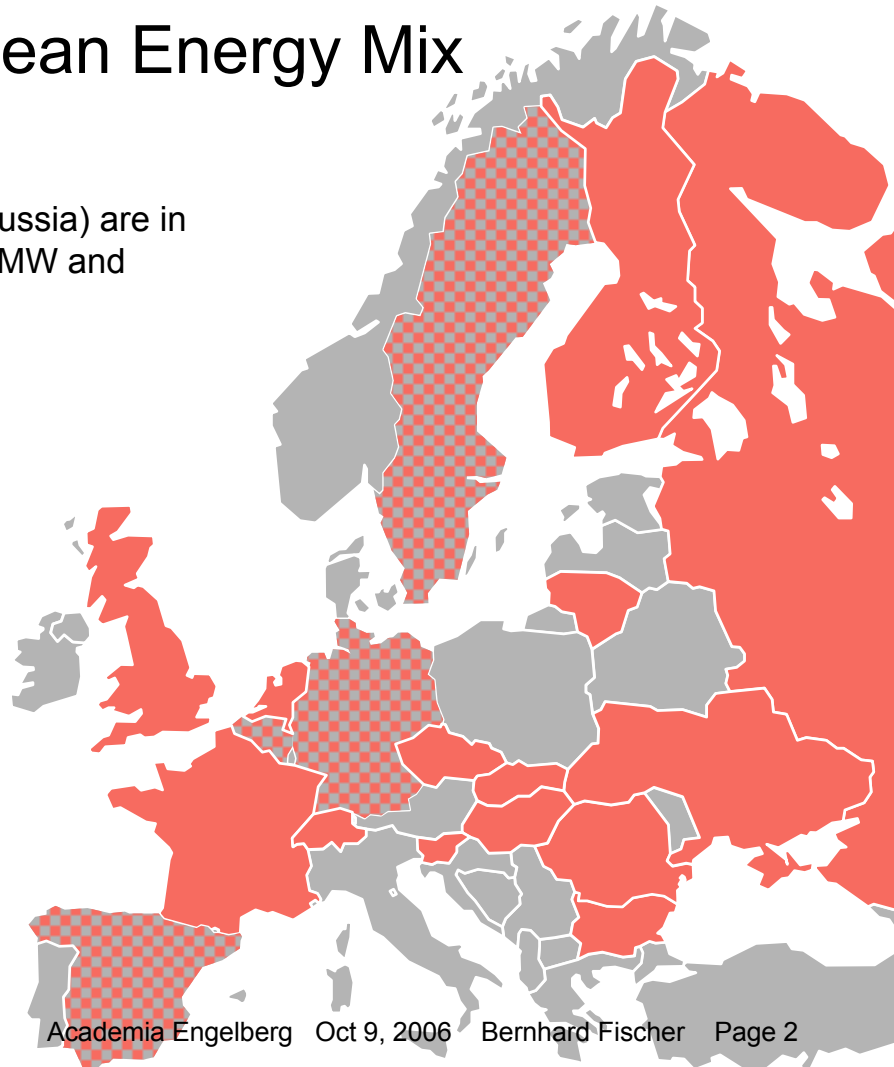
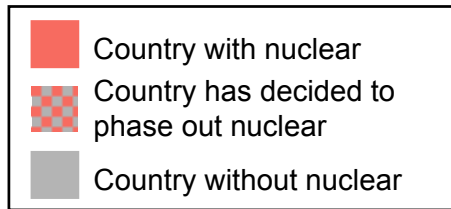
204 nuclear power plant blocks (31 of which are in Russia) are in operation, with a net installed capacity of 171,997 MW and

≈ 8 countries are building or have plans to build power stations.¹

4 countries (GER, SWE, SPA, BEL) have decided to phase out nuclear

Nuclear's share of electricity generated (in 2003)

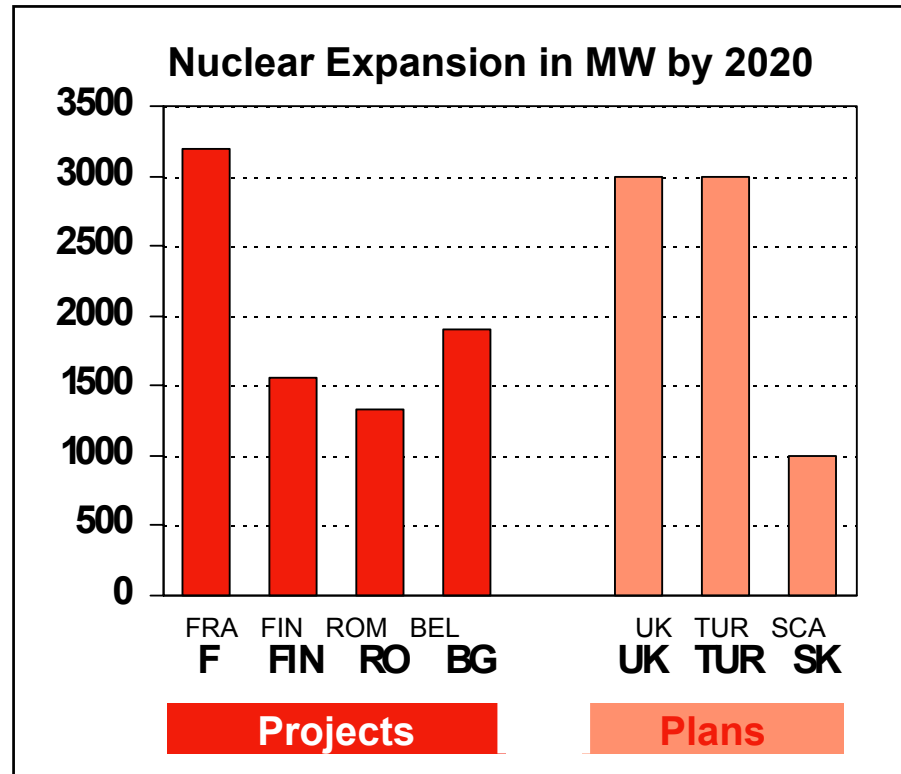
FRA	78%	∅ EU-15	35%
UK	20%	GER	32%
CZE	31%		
SWE	55%		



¹ Projects: FIN, ROM, RUS, UKR, FRA, BEL; Plans: UK, CZE
 Sources: Informationskreis Kernenergie (As of 10/2004).

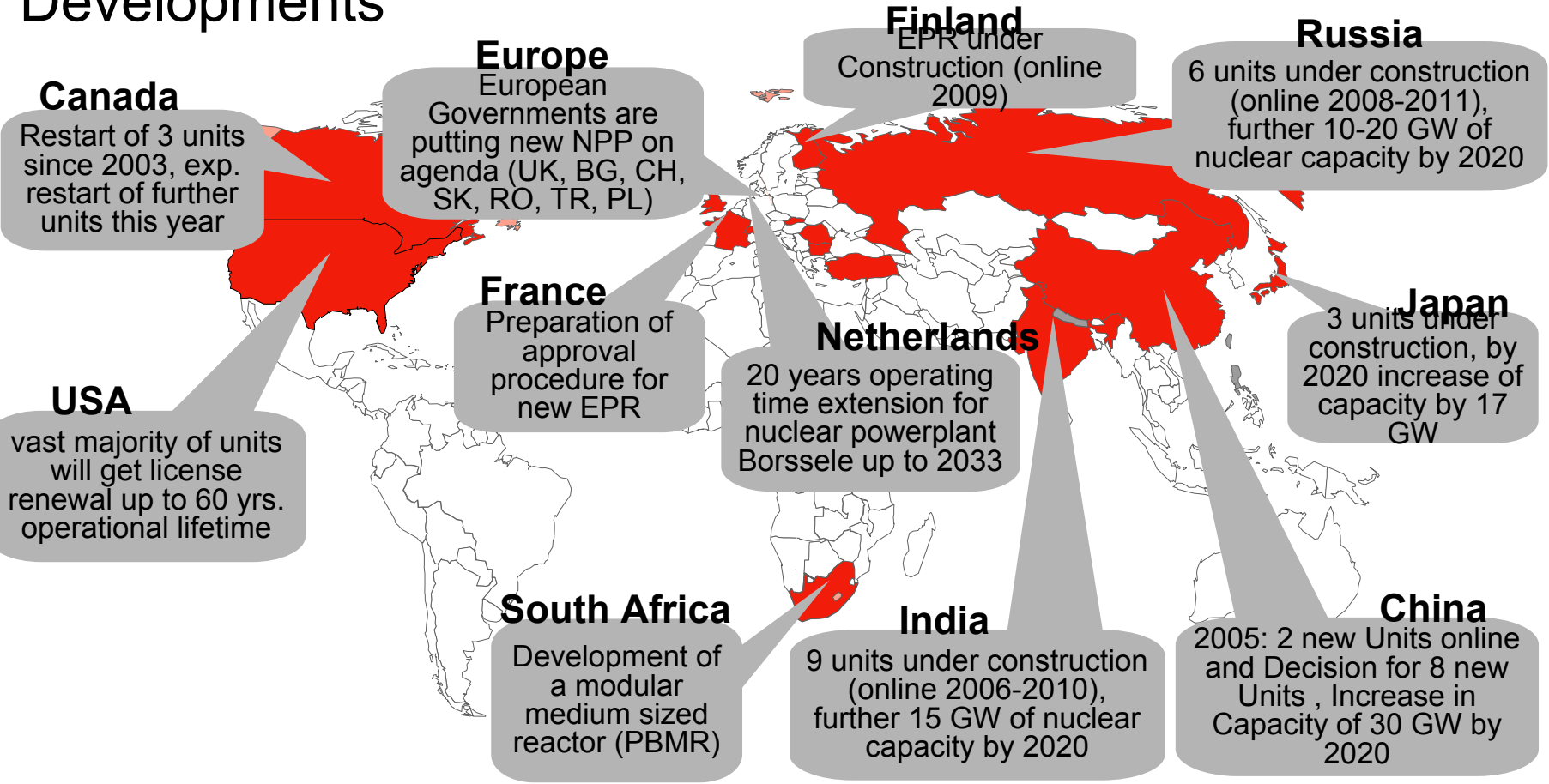
Significant Expansion of Nuclear Capacity in Europe Expected by 2020

- Difficult to forecast expansion in Turkey
- UK: Substantial decrease in capacity expected through 2020 as power stations age
- Concrete projects currently in place in FRA, FIN, ROM & BEL



A total of 20 GW of nuclear capacity could be added in Europe by 2020.

Nuclear Power Remains Key in Recent International Developments



Nuclear Power Back in Public Discussion

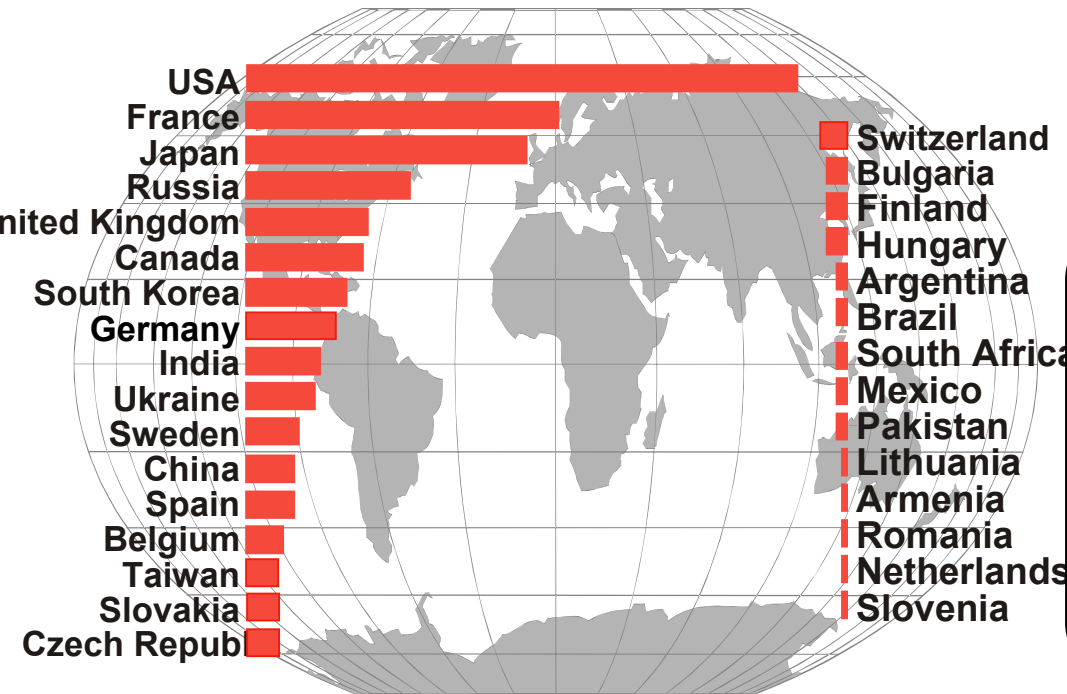
Will Germany come back to nuke earlier than expected?

Nuclear power

British dreams

Atome für den Frieden

Amerika debattiert über die Vorteile der Kernenergie - wie vor fünfzig Jahren



the high price of

NUCLEAR PHASEOUT

Sweden's plans to phase out nuclear power have ignited controversy

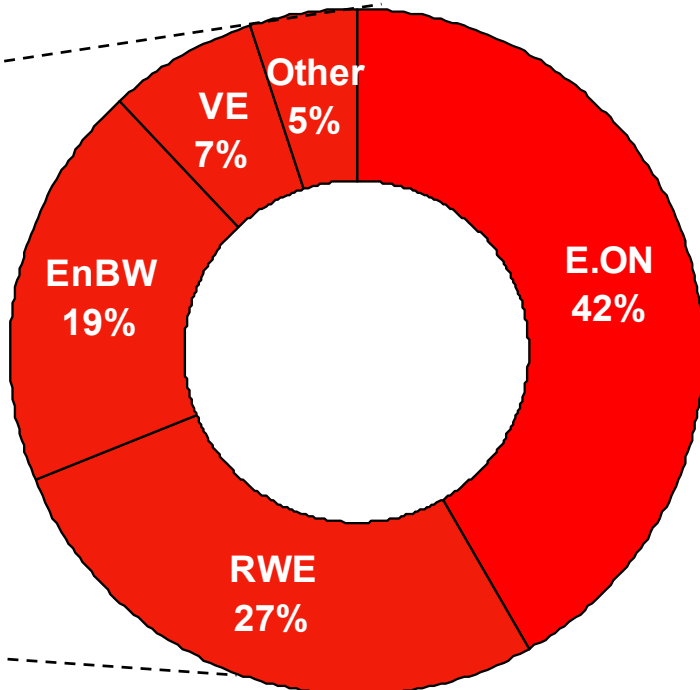
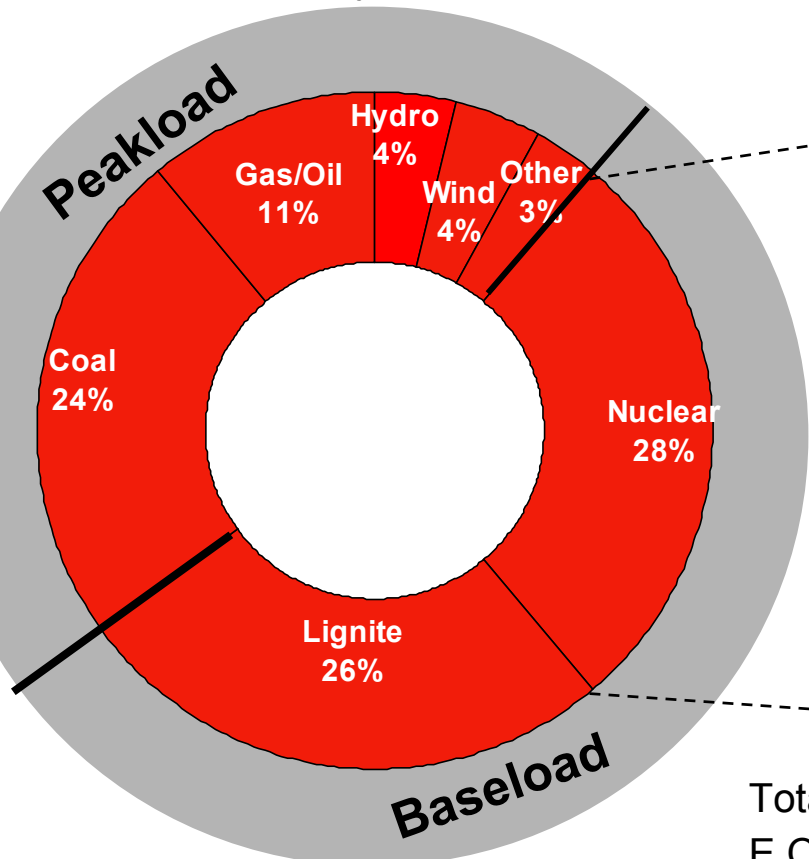
- 439 Reactors in 31 countries
- 1/6 of global power generation
- 11.000 reactor years experience
- +13% Unit Capability Factor since 1990 (2004 = 87,1%)

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E.ON makes up more than 40% of German nuclear capacity

Share of Electricity Generation

Share of Nuclear Capacity



Total: 17 nuclear reactors, 20.3 GW

E.ON: shares in 11 reactors, 6 managed by E.ON



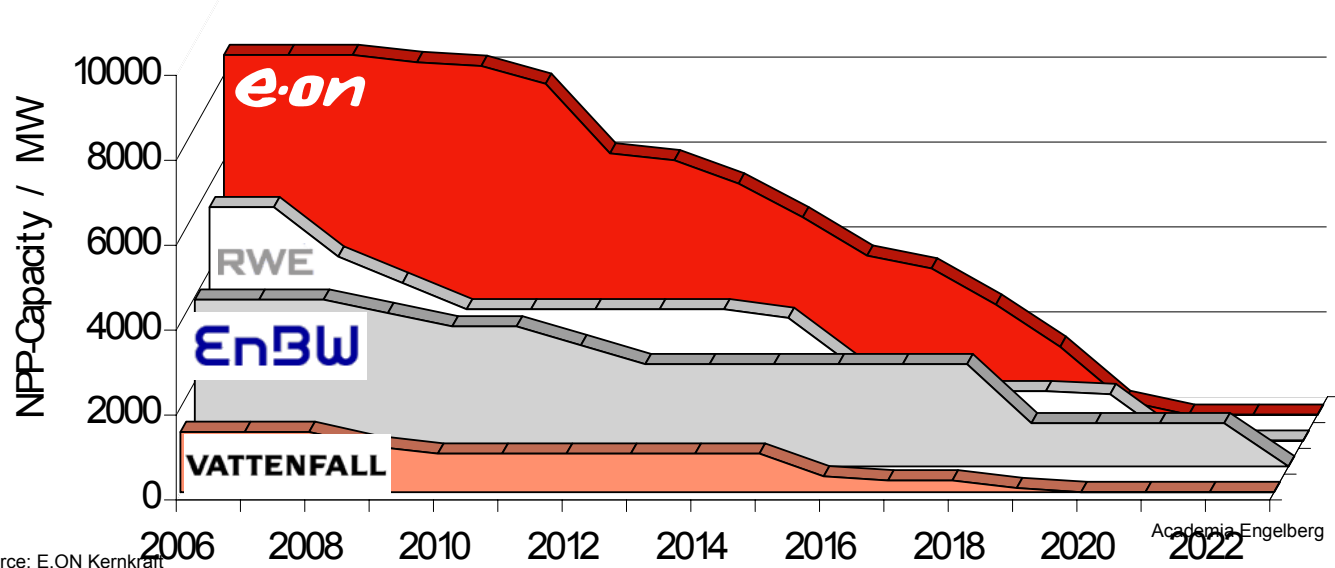
Gross production 2004: 596 TWh (total)

Source: E.ON Kernkraft

The German Consensus

- Ban on new nuclear plants
- Ban on reprocessing after June 2005
- Remaining generation equals 32 years lifetime
- Quantities can be transferred (primarily from old to new units)
- Moratorium for final disposal for high-active waste (Gorleben)

BUT E.ON isn't affected before 2012



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Final disposal is a political rather than a technical problem

	USA	Finland	Sweden	Germany
Low/medium active waste (90% of volume, 1% of radioactivity)	In operation	In operation	In operation	Interrupted by politics (invest of € 1.8 bn with 64,4% NPP)
High active waste (10% of volume, 99% of radioactivity)	Site approved by congress	Site approved by parliament	examination of two competing sites	Interrupted by politics (invest of € 3.3 bn with 96,5% NPP)

„ ... the technology is available and could be put into practice quickly. (...) Unfortunately, Member States have so far failed to use this technology by lack of political decision.“ Andris Piebalgs , Member of European Commission, responsible for Energy, Brussels, 28th

Final Storage Prospecting*—Global Comparison

- **USA**

Final storage site selected in Nevada desert in 2002; commissioning scheduled for 2017 (tuff).

- **Finland**

Olkiluoto final storage site confirmed in 2000; underground prospecting through 2014 (granite).

- **Sweden**

Surface prospecting at 2 nuclear power plant sites through 2008 (granite).

- **France**

Goal: set up a final storage facility by 2017 (clay).

- **Switzerland**

Final storage feasibility study completed, still pending site selection, no underground prospecting until 2020 (clay).

Public acceptance – a changing mainstream?

- 24% of the people are believing in the nuclear phase out
- 50% of the people are supporting the prolongation of lifetime
- 71% of the people are considering the waste storage as the most important issue

This is a clear political mission – it is impossible to neglect it



Thank you for listening