



Federal Ministry for the
Environment, Nature Conservation
and Nuclear Safety

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Power Gap in Germany? The Role of Renewables

personal views from

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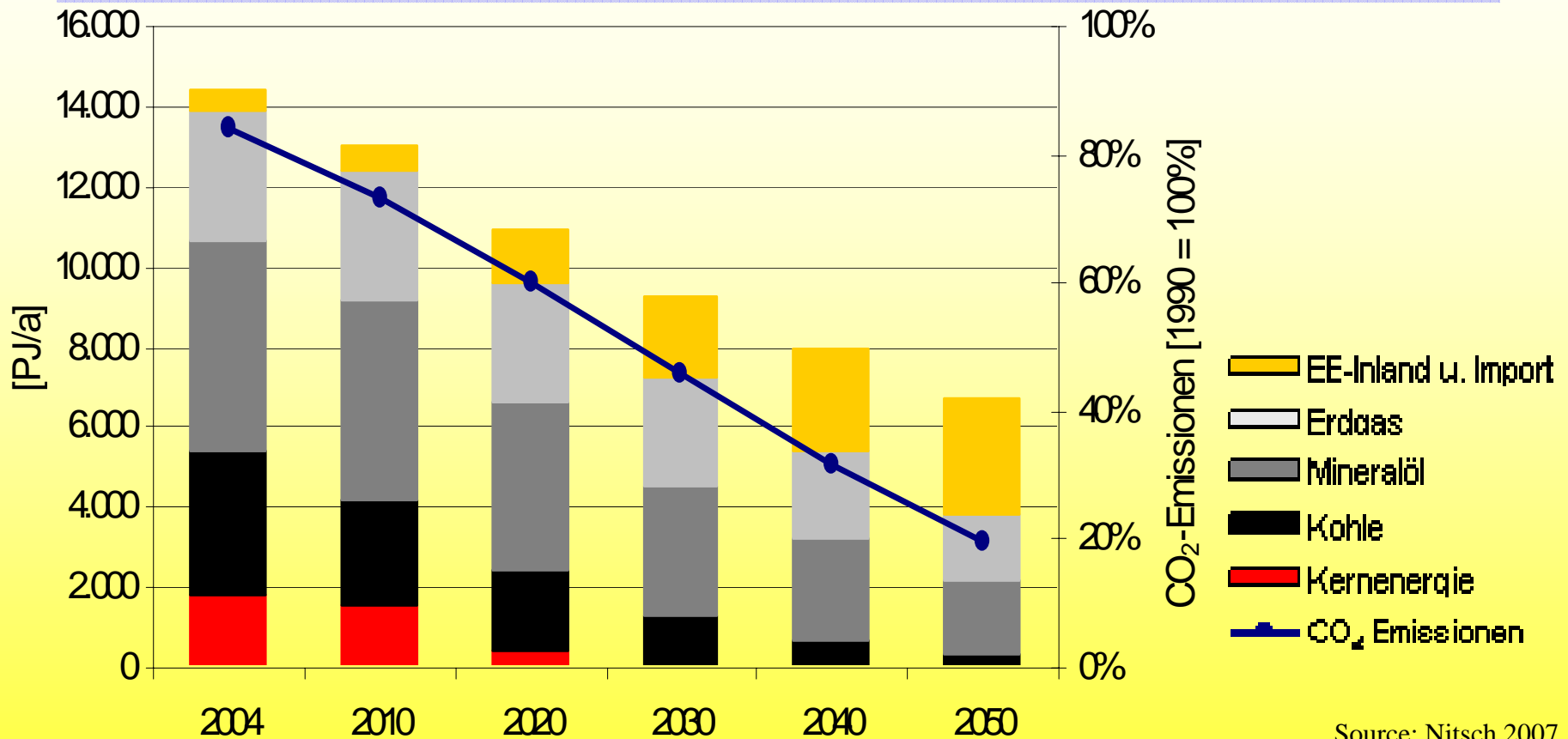
Outline of the Presentation

- I. The „Power-Gap-Discussion“ in Germany
- II. RES-E in Germany: past and future
- III. Risk of a power-gap?
New approach needed!
- IV. Summary



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Primary Energy Scenario to 2050, Germany



Source: Nitsch 2007



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The „Power-Gap-Discussion“ in Germany

Phase-out of nuclear power plants due to contract between Government and energy companies from 2000 and decision of the Bundestag from 2002.

→ 17 GW until 2023

Fossil power plants will be taken out of operation.

→ 2-33 GW until 2020

Sources: UBA 2008, Matthes/Ziesing 2008



The „Power-Gap-Discussion“ in Germany

Strong interest of operators to reverse the phase-out of nuclear power.



The „Power-Gap-Discussion“ in Germany

Set up of new fossil capacities

11,5 GW power plants are in the building process

23 GW additional power plans are in the planning process

➔ only 2.4 GW natural gas, few CHP

Acceptable for CO₂ reduction of 36% until 2020

~ 30 GW new fossil power plants, including

16 – 20 GW natural gas power plants

10 - 13 GW coal power plants

8 – 12 GW combined heat and power plants

Sources: Matthes/Ziesing 2008, Nitsch 2007



The „Power-Gap-Discussion“ in Germany

Net-export of power

1999 - 2002 ~ 2 GWh/a

2003 – 2005 8–10 GWh/a

2006 – 2007 19-20 GWh/a

Source: Matthes/Ziesing 2008

2 nuclear power plants have not been running in 2007 at all, 2 more only partly!

But: Power gap is more about capacity!



The „Power-Gap-Discussion“ in Germany

Uncertainties

Electricity demand and maximum load in 2020

(szenarios see between 550 and over 600 TWh/a)

Number of power plants taken out of operation

(economic and technical question)

Growth of RES-E in Germany and the EU



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RES-E in Germany past and future

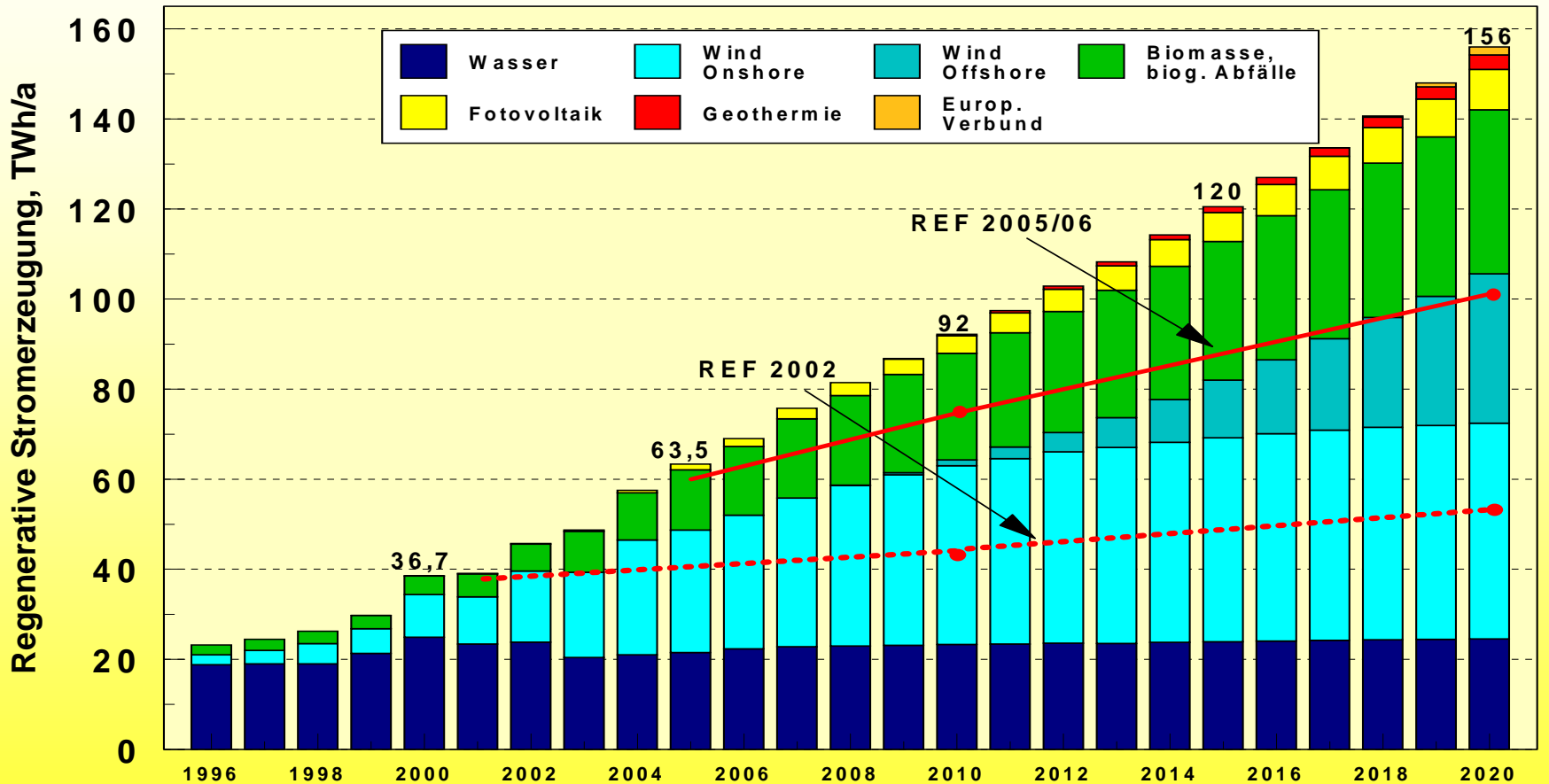
Share of RES-E at gross electricity production (GEP) in Germany

1990	3.5 %
2007	14.2 %
2020	at least 30 %
2030	about 50 %
2050	about 80 %

Source: Nitsch 2007



RES-E in Germany past and future



BMU/aktual/str2020; 23.1.07

Source: Nitsch 2007



RES-E in Germany past and future

1990	100%	hydro power
2007	43%	hydro power, biomass, geothermal
	57%	wind and solar (8% of GEP)
2020	42%	hydro power, biomass, geothermal
	58%	wind, solar (17% of GEP)
2030	29%	hydro power, biomass, geothermal
	58%	wind, solar (29% of GEP)
	13%	RES-E import

Source: Nitsch 2007



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Risk of a power-gap? New approach needed!

Traditional approach

**Secure installed capacity of
(conventional) power plants** $>$ **Maximum demand
multiplied by 1.1**

The entire capacity has to be located in the same country!



Risk of a power-gap? New approach needed!

Take into account all qualities of RE

Different RE and demand complement each other by stochastics

In summer, there is less wind then in winter – but more sun

There is less wind and sun at night – but also less demand

There is less demand on weekends – hydro power plants can refill their ponds

→ Defining a „secure capacity“ for RES-E-installations is a difficult issue – a new approach is needed

→ Time periods with too little RES-E-capacity might appear – how to deal with them?



Risk of a power-gap? New approach needed!

Take into account all qualities of RE

Controllable RE can complement fluctuating RE

Biomass and hydro power plants can produce electricity at times with little wind and sun

Demand side management (DSM) can be used to complement RES-E surplus and shortfall

Energy storage capacities can supplement RE and DSM

→ RE-based virtual power plants can provide quality of conventional power plants



Risk of a power-gap? New approach needed!

Take into account internal market

Through upgraded grids and interconnectors

- regional distributed RE partly complement each other
 - conventional power plants from abroad can be used when needed (including hydro power from Scandinavia and the Alp region)
 - in the long run, controllable solar thermal power plants from southern Europe and northern Africa can deliver electricity
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Summary

- In the coming 15 years, many nuclear and fossil power plants will be taken out of operation
- It is unclear how many new fossil power plants will be built in these years
- Too many fossil power plants make climate protection targets unachievable
- A new approach to provide security of power supply is needed
- Such new approach might change perspectives and the discussion of the possible existence of a power gap



Thank you for your attention!

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