

Germany: Energy Policies and Economic Tools

Prof. Dr. Karen Pittel



Germany: Energy Policies and Economic Tools

1. **German Energy Policy and the “Energiewende”**
2. **Policy and Economics of the “Energiewende”**
3. **The Role of Natural Gas and Fracking?**

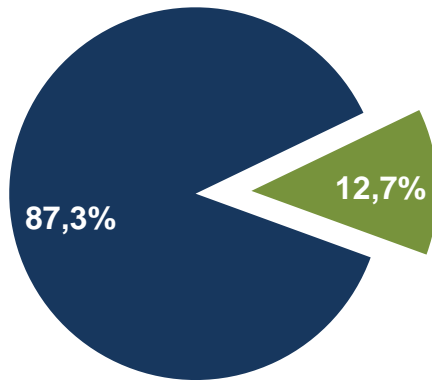
1. German Energy Policy and the “Energiewende”

Goals of the “Energiewende”

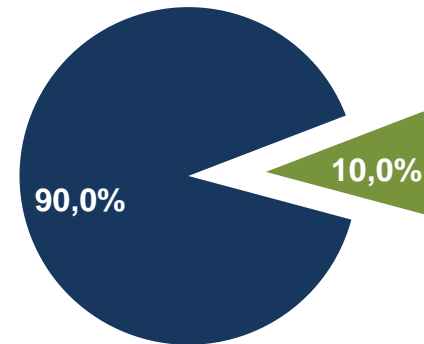
Goals			2012
Reduction of Greenhouse Gas Emissions	2020:	-40%	-25,5%
	2050:	-80-95%	
Share of renewables in energy consumption	2020:	18%	12,7%
	2050:	60%	
...in electricity production	2020:	35%	23,6%
	2050:	80%	
Energy efficiency	2020:	x 2	x 1,41
Nuclear power	2022:	0%	

2012: Share of Renewables in...

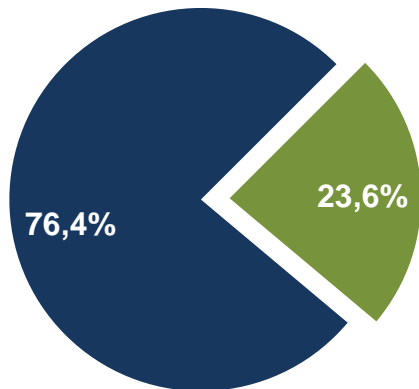
...Final Energy



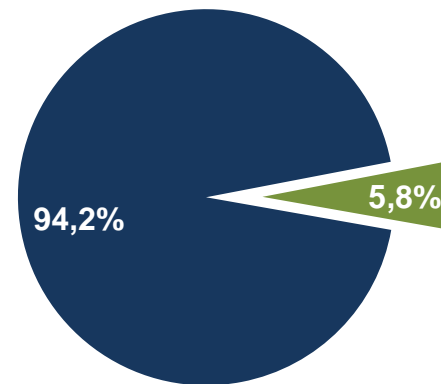
...Heat



...Electricity



...Fuel



Renewables in the Electricity Sector

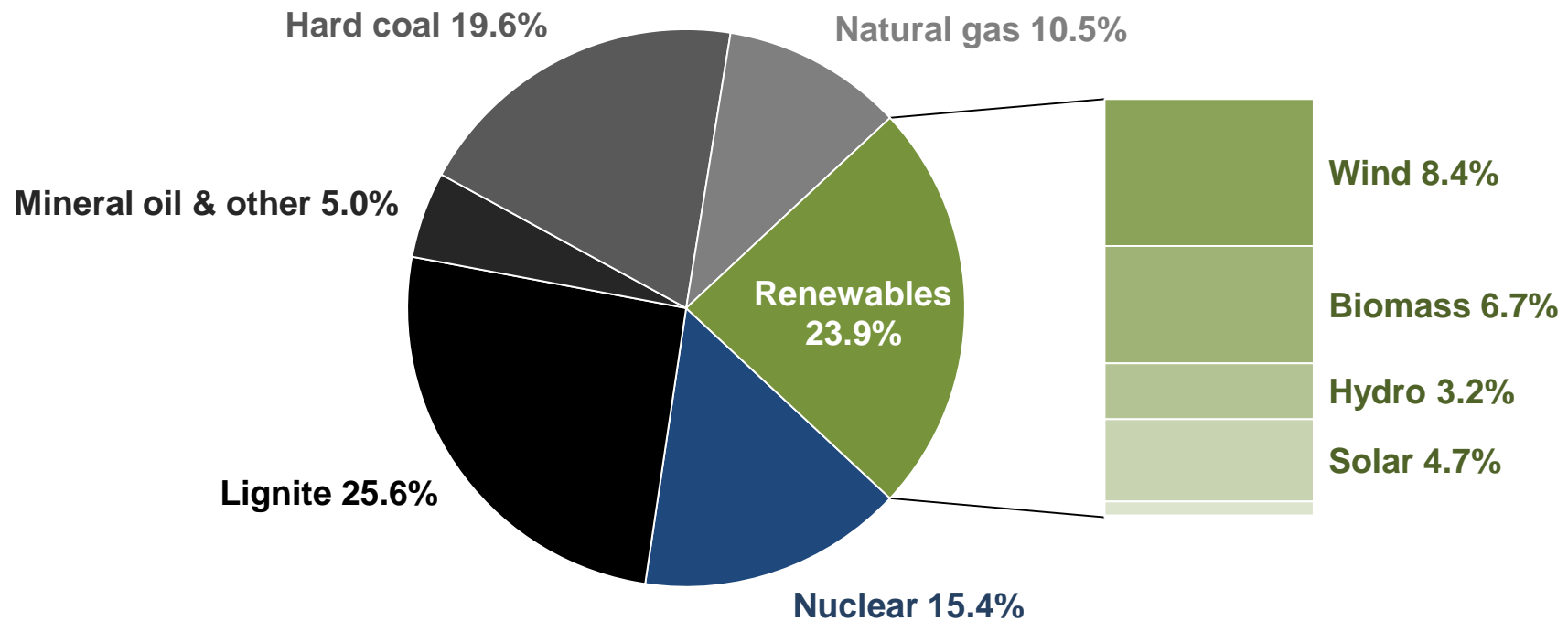
Problem:

**99% of the electricity sector part of the
European Emission Trading System**

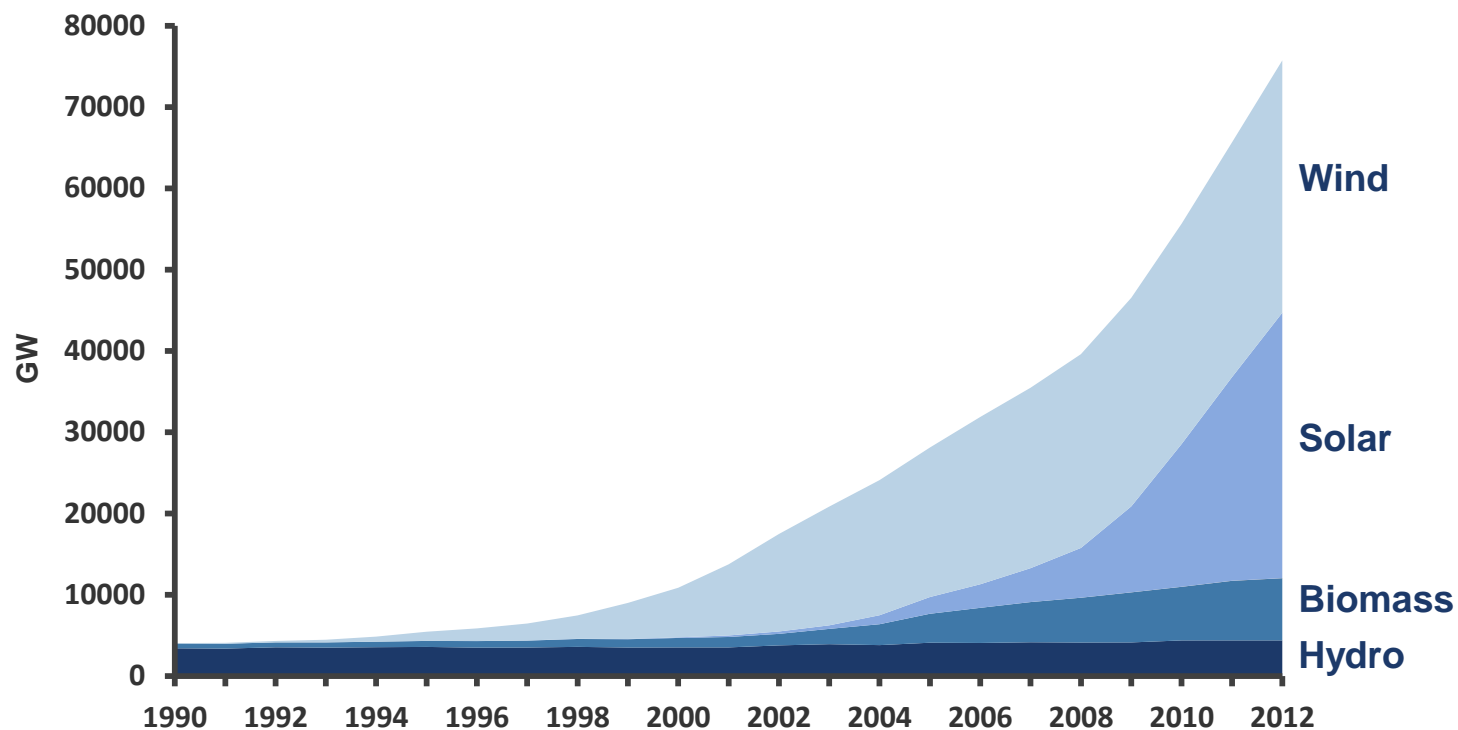
Consequence:

- **Reallocation not reduction of emissions**
- **falling certificate prices**
- **CO2-intensive sectors profit most**

Gross Electricity Generation by Energy Sources 2013



Installed Capacity of Renewables



2. Policy and Economics of the Energiewende

Energy Policy Instruments: Electricity

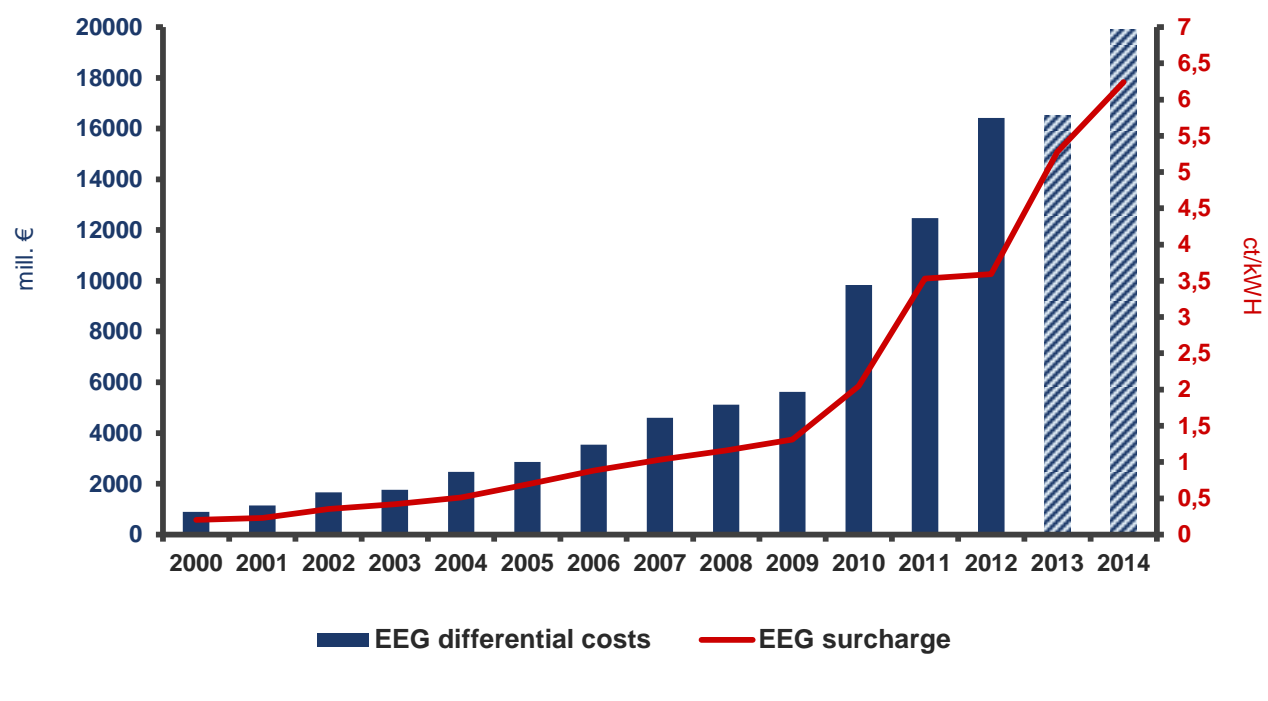
Price instruments

- Differentiated Feed-in Tariffs (2000: Renewable energy act (EEG))
Market Premium (2012: EEG reform)
- Financing: EEG surcharge

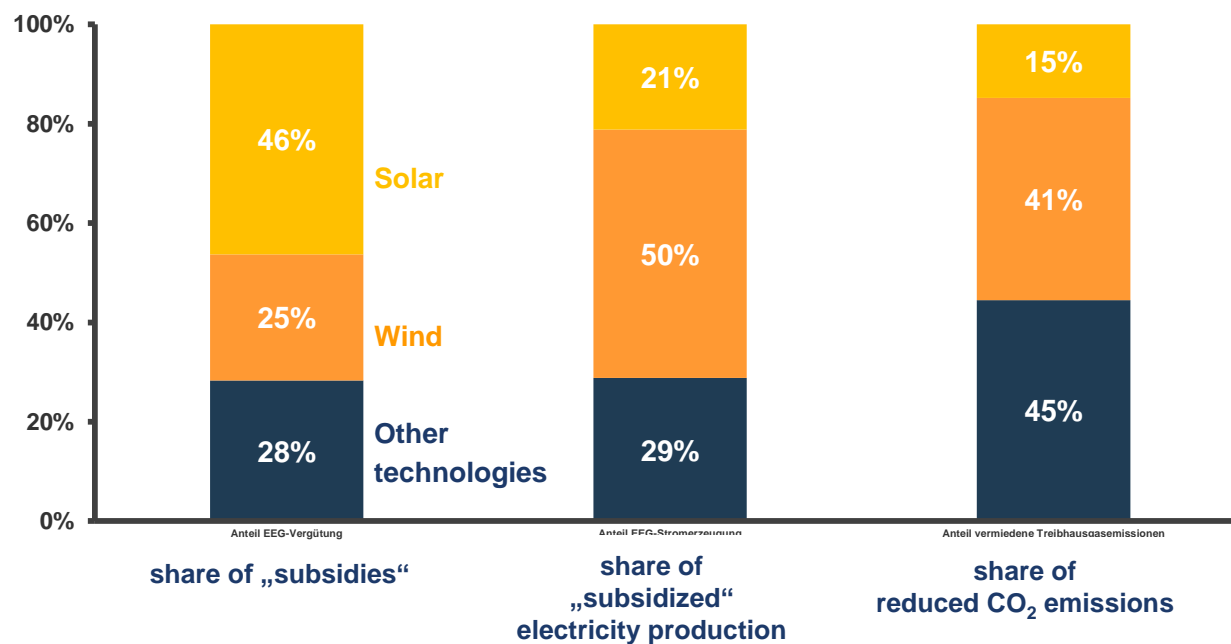
Quantity regulation

- Limits to yearly expansion of solar (since 2012)
- Instrument: increased degression of Feed-in Tariff

Energy Policy Instruments: Electricity



Energy Policy Instruments: Electricity



Feed-In versus Quota System

Criteria

- **Compatibility with quantitative expansion goals**
- **Technology neutral support („Survival of the Fittest“)**
- **Renumeration of renewable energy follows demand and supply (wrt to electricity price and renewability)**
- **Automatic response of remuneration to cost depression**
- **Investment risk**

Feed-In versus Quota System

Differentiated Feed-In Tariffs

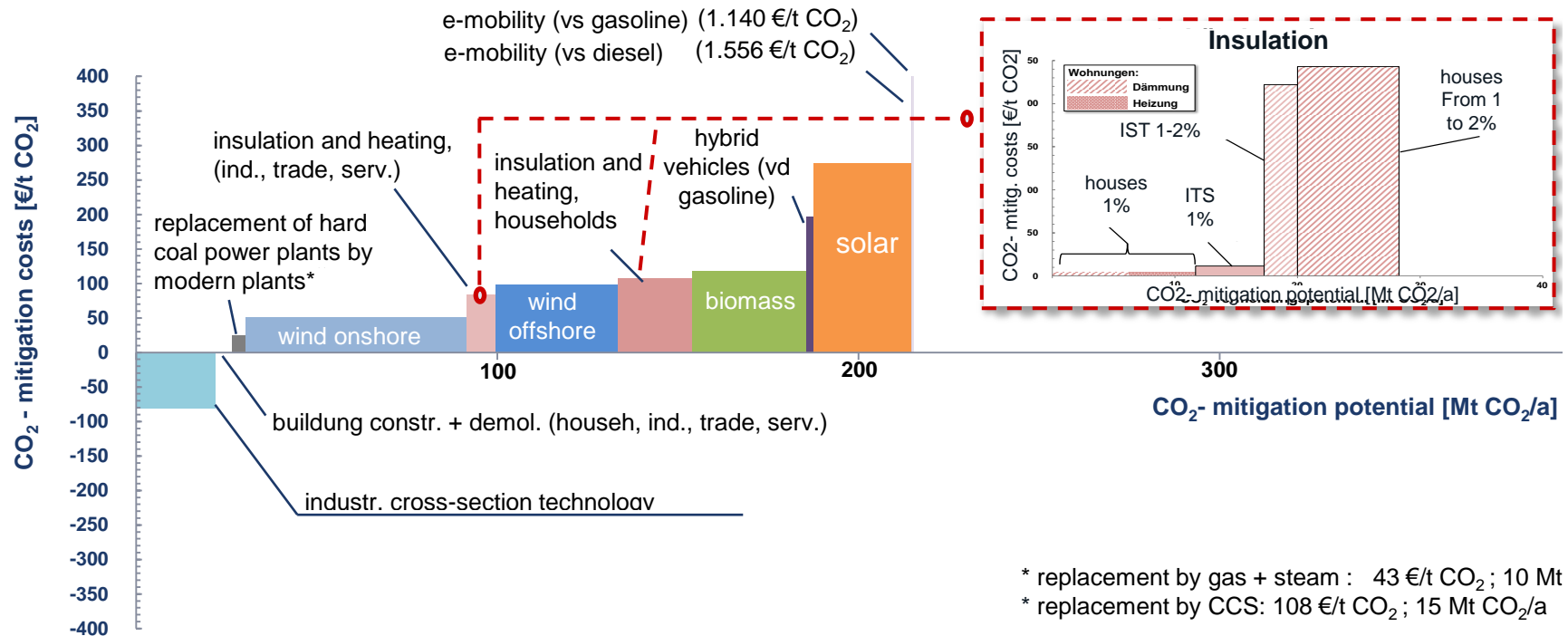
- **Compatibility with quantitative expansion goals**
- **Technology neutral support („Survival of the Fittest“)**
- **Renumeration of renewable energy follows demand and supply (wrt to electricity price and renewability)**
- **Automatic response of remuneration to cost depression**
- **Investment risk**

Feed-In versus Quota System

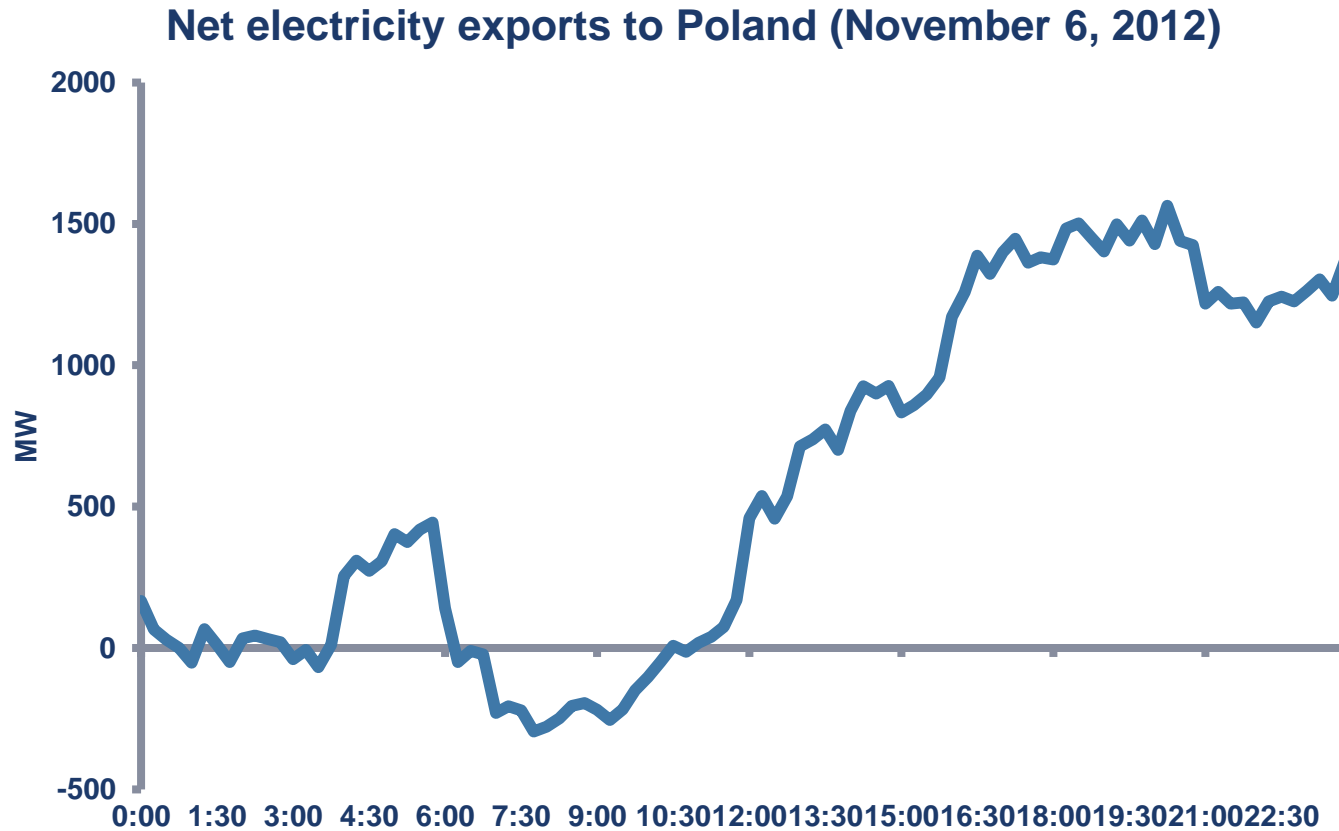
Quota with Green Certificates

- Compatibility with quantitative expansion goals
- Technology neutral support („Survival of the Fittest“)
- Renumeration of renewable energy follows demand and supply (wrt to electricity price and renewability)
- Automatic response of remuneration to cost depression
- Investment risk

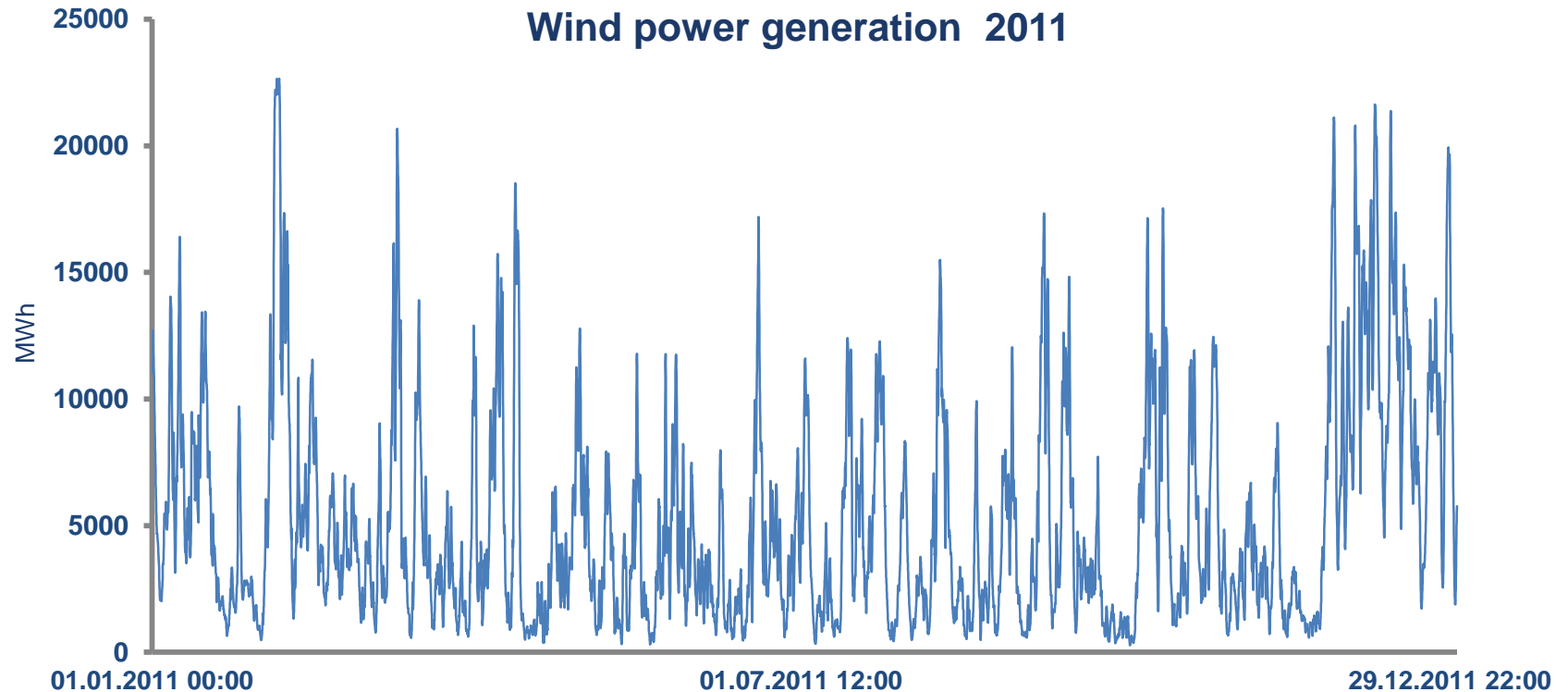
CO₂ Mitigation Costs (2020)



The European Dimension



Security of Supply – Technical Dimension



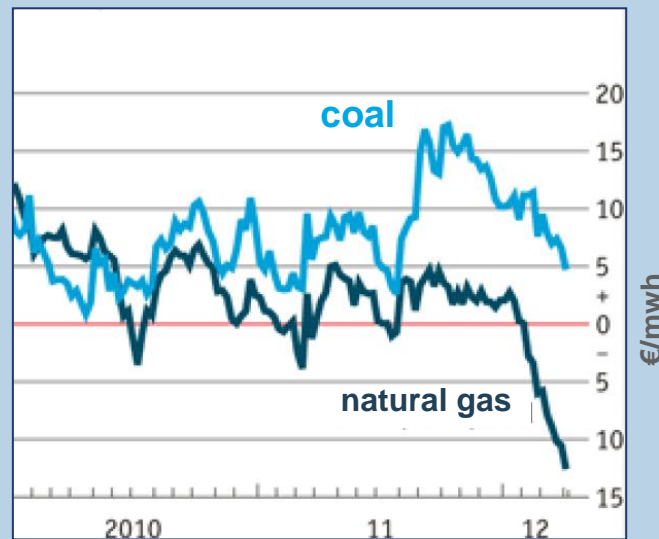
3. The Role of Natural Gas and Fracking?

Natural Gas in the Energiewende

- Gas power plants as flexible back-ups for intermittent renewables
- Problem 1: Competitiveness

Gross margin for Coal and Gas Power Plants

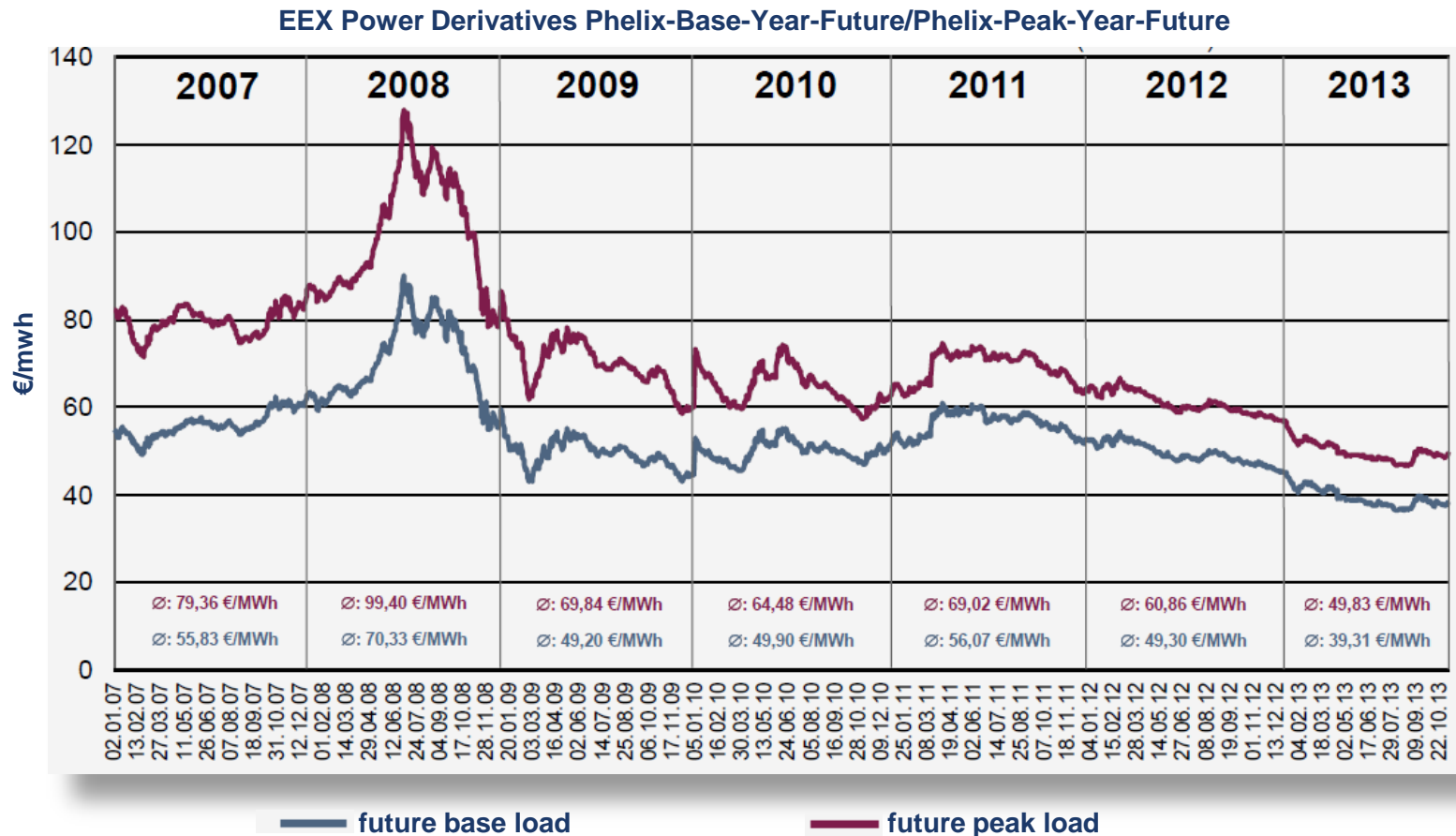
Difference between electricity price and fuel costs (incl. co2 certificates)



The Economist 2012

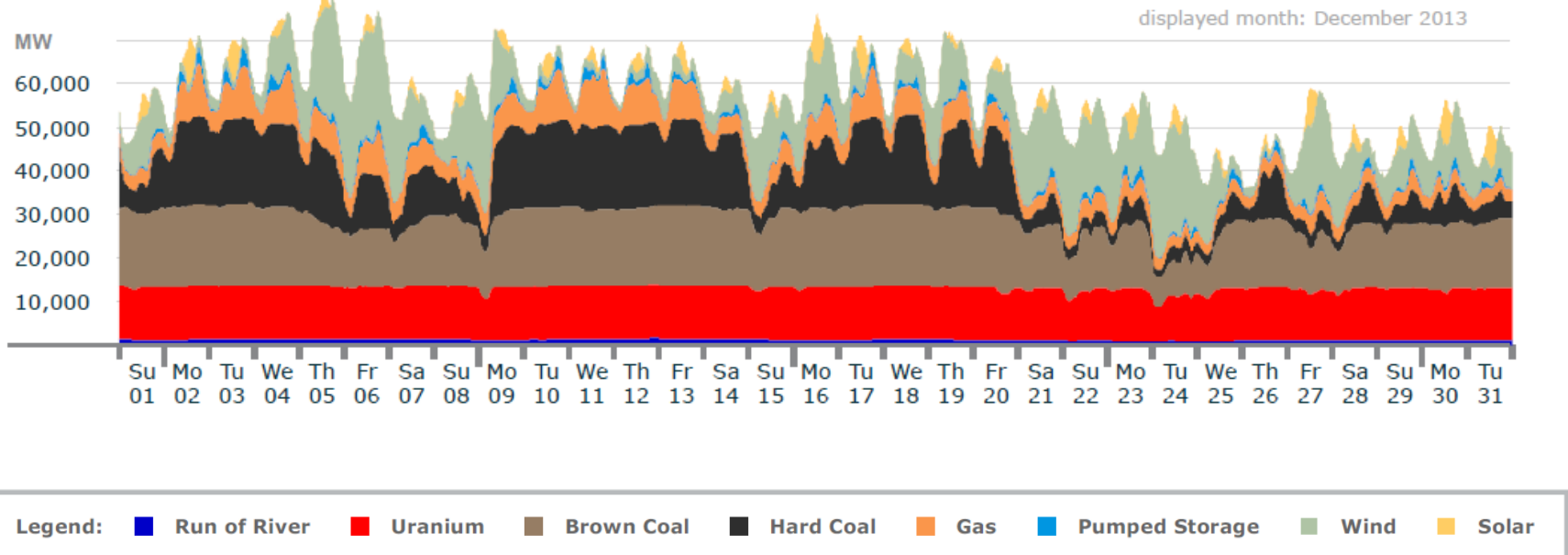
Natural Gas in the Energiewende

Problem 1: Falling electricity price



Natural Gas in the Energiewende

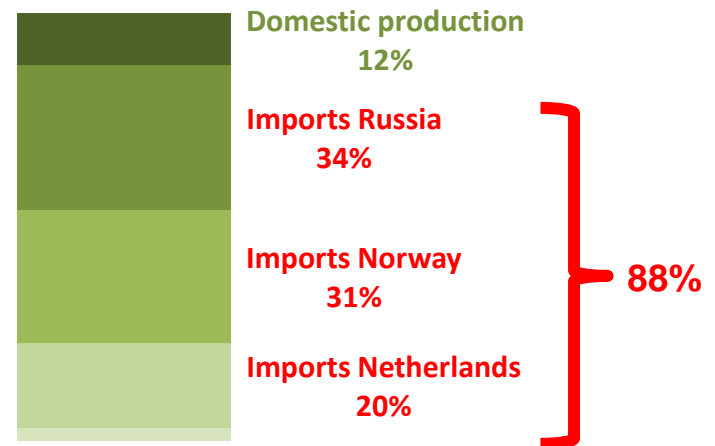
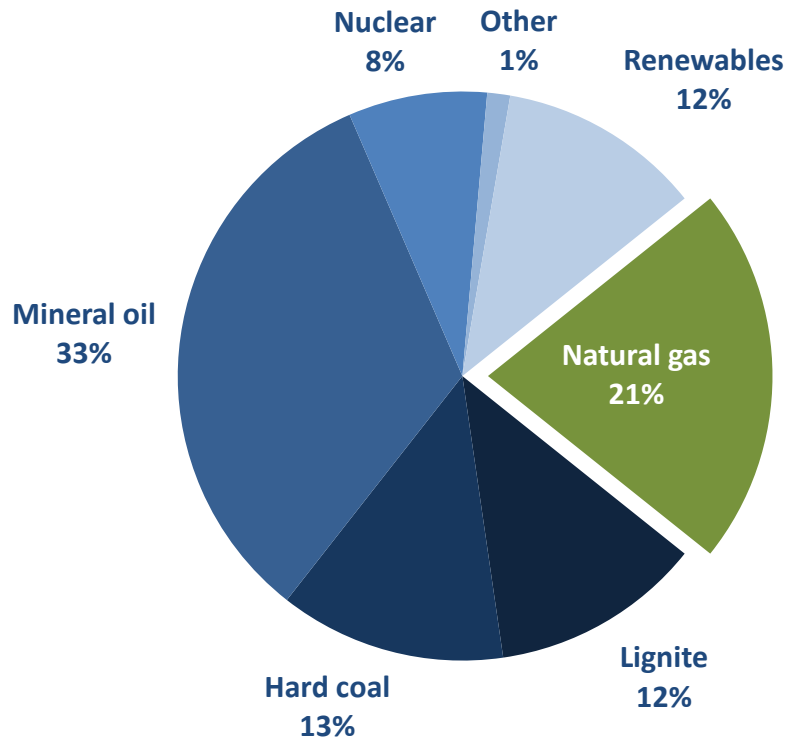
Problem 2: Falling Utilization



Capacity mechanism required?

Why Fracking?

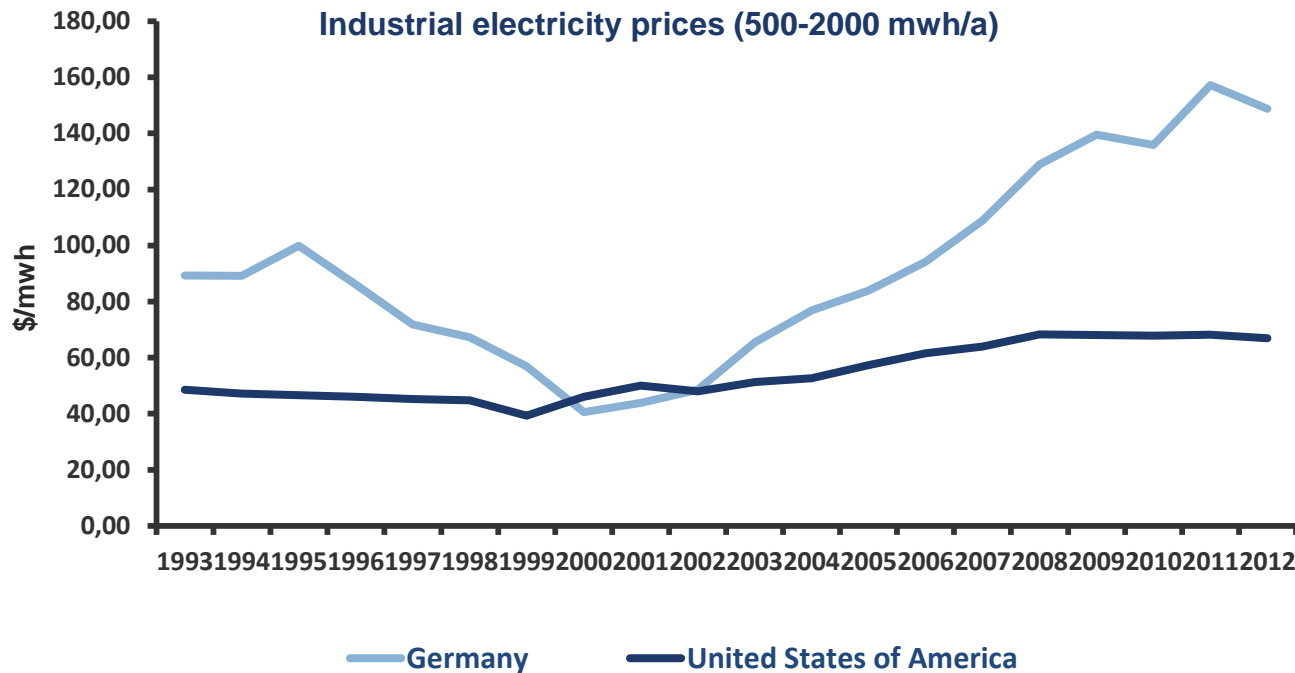
Hope 1: Raising the Security of Supply



German End Energy Mix 2012

Why Fracking?

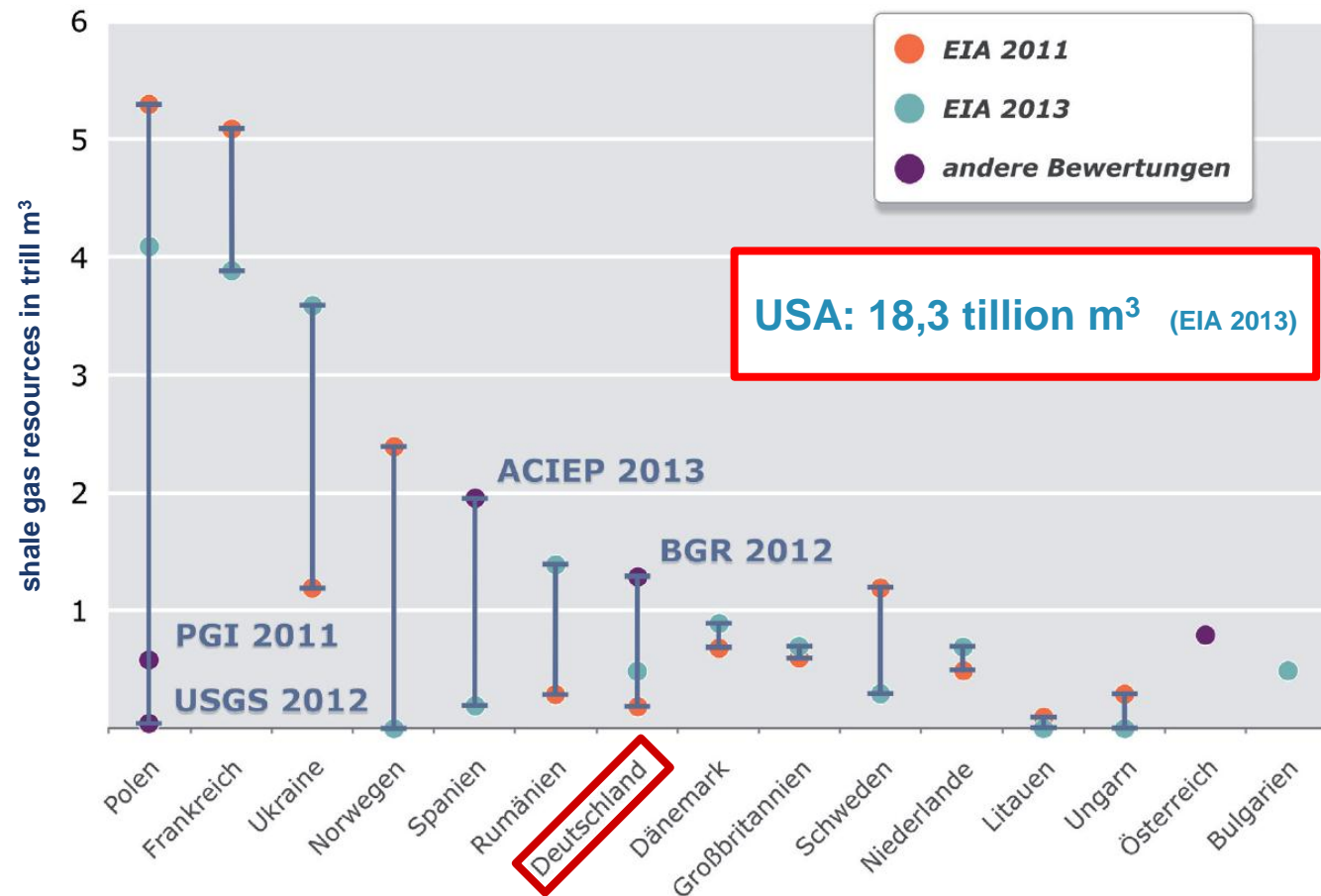
Hope 2: Lowering Gas and Electricity Prices



Data: OECD 2013

Fracking Potential

Technically Recoverable Shale Gas Resources (Europe)



Fracking in Germany?

Limited potential

- BGR estimate: resources enough to cover total (current) demand for 13 years)

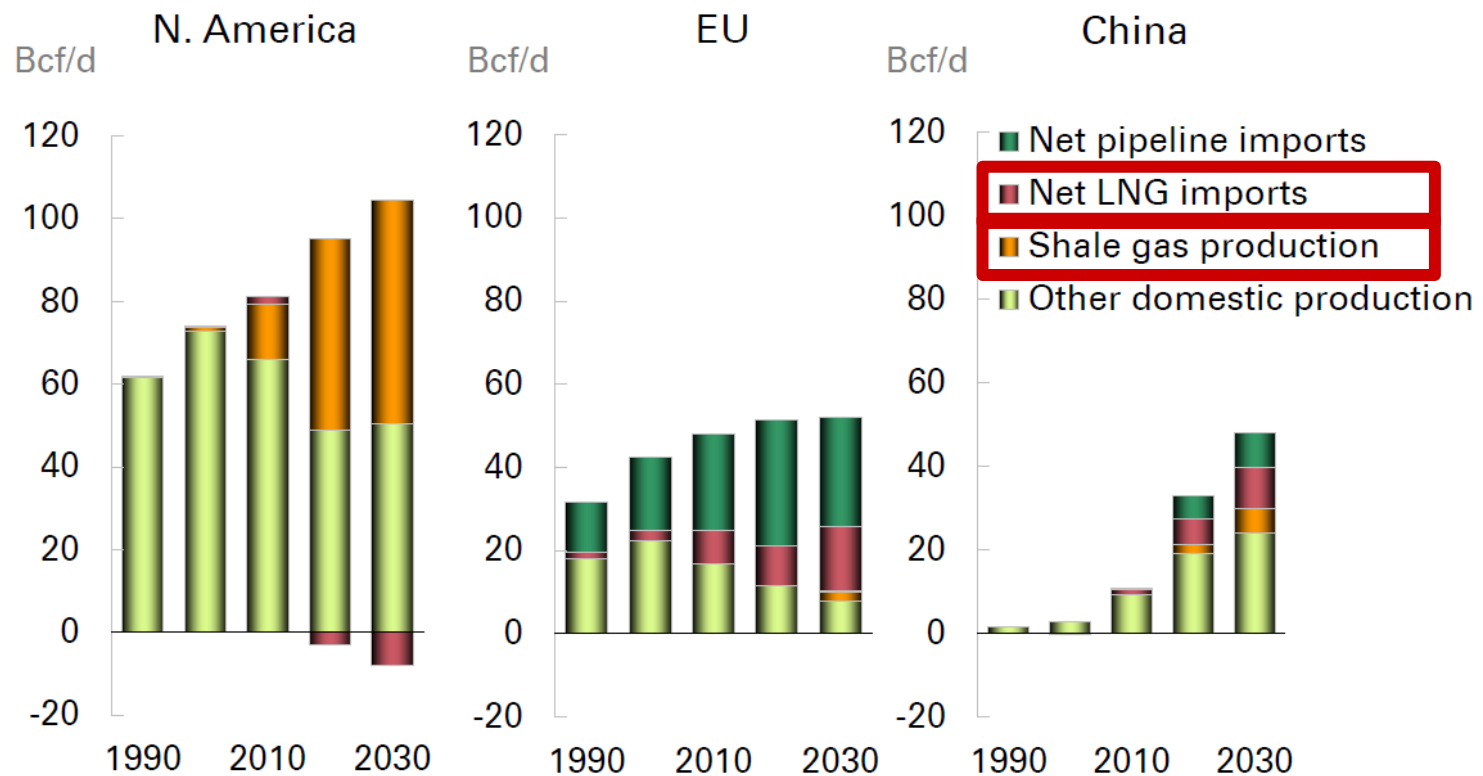
Costs

- Highly uncertain (estimation of break even prices: 20 - 60€/mwh) (Geny 2010, ZEW 2013)

Fracking as Security of Supply Policy?

- IEA (2007): important component of supply risk on gas markets: pipe dependence
⇒ 2 options to reduce supply risk:
 - home production
 - diversification of supply

Forecast: Sources of Gas Supply by Region



Conclusions?

Conclusions: Room for Reform?

- **Refocussing** of the Energiewende on its initial goal (climate policy)
- **Reinterpretation** of energy policy
 - reorientation from renewables' primacy to technology neutral mitigation goals
- Strengthening **market principles**
 - especially: revitalization of the European Emission Trading System
- In the long run: integration of **European energy policy**