

Germany's nuclear phase-out



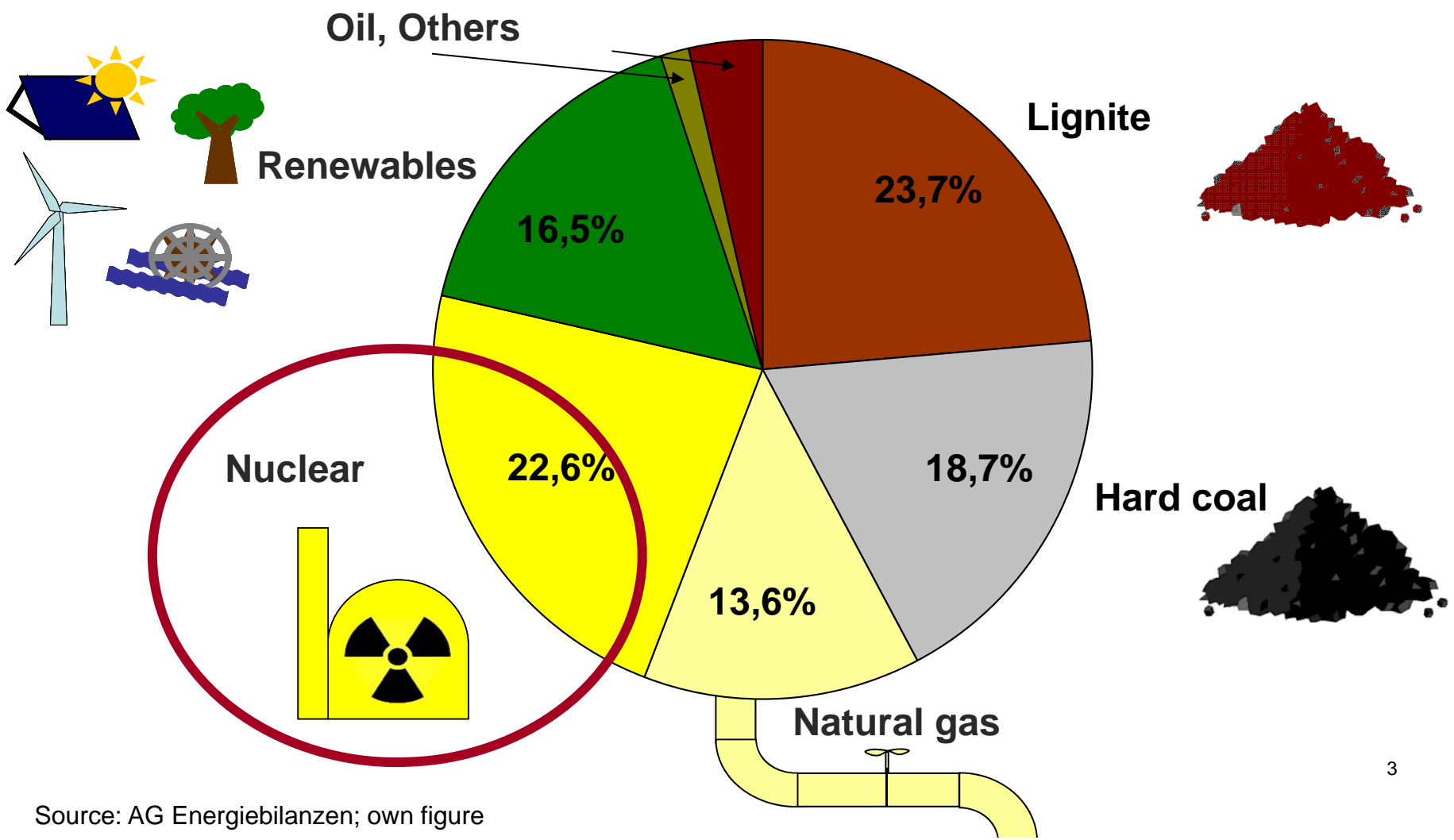
Charlotte Loreck

**Energy and Climate Division
Öko-Institut e.V.
Berlin**


- **The German Power System**
- **History of phase-out decisions**
- **Electricity Prices**
- **Import Export Effects**

Gross electricity production in Germany

2010: 621 TWh **Consumption: 604 TWh**
Export: 17 TWh

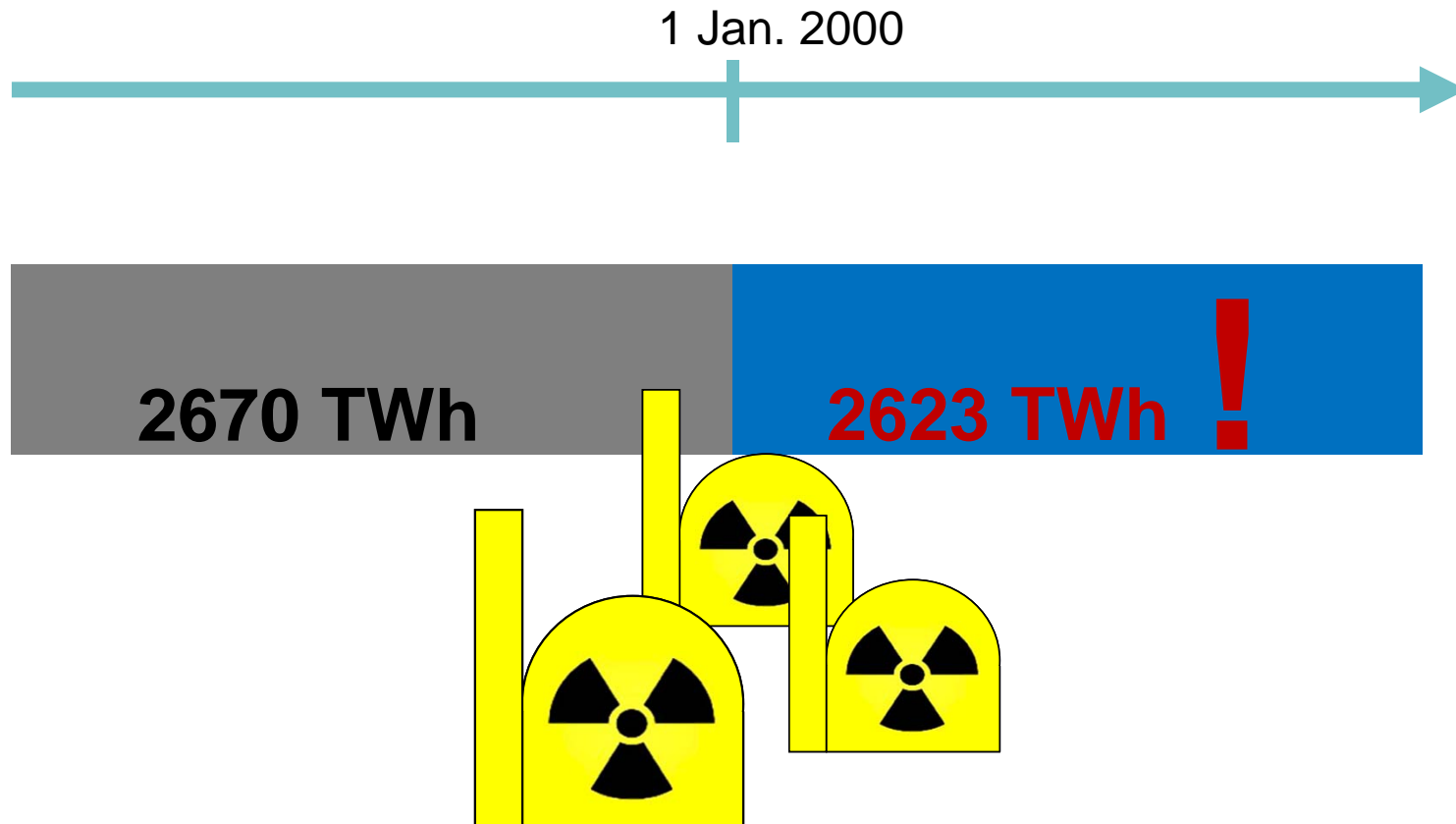


History of nuclear phase-out

- 
- 1998 Elections & change of government (Social Democrats & Green)
 - 2000 First phase-out deal
 - 2002 Atomic Energy Act

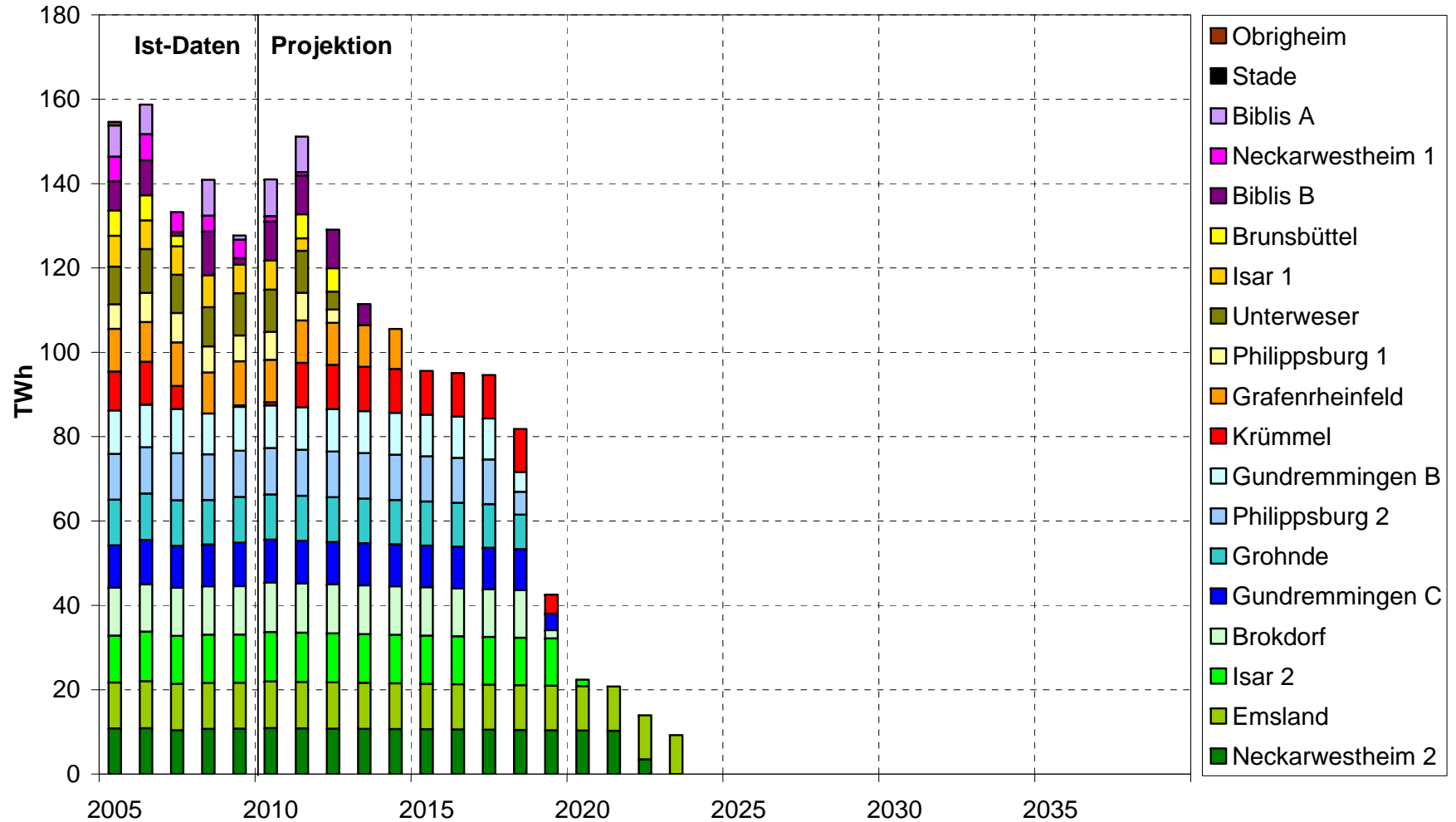
History of nuclear phase-out

phase-out deal (15 June 2000)



History of nuclear phase-out

Electricity from nuclear power plants - Atomic Energy Act 2002

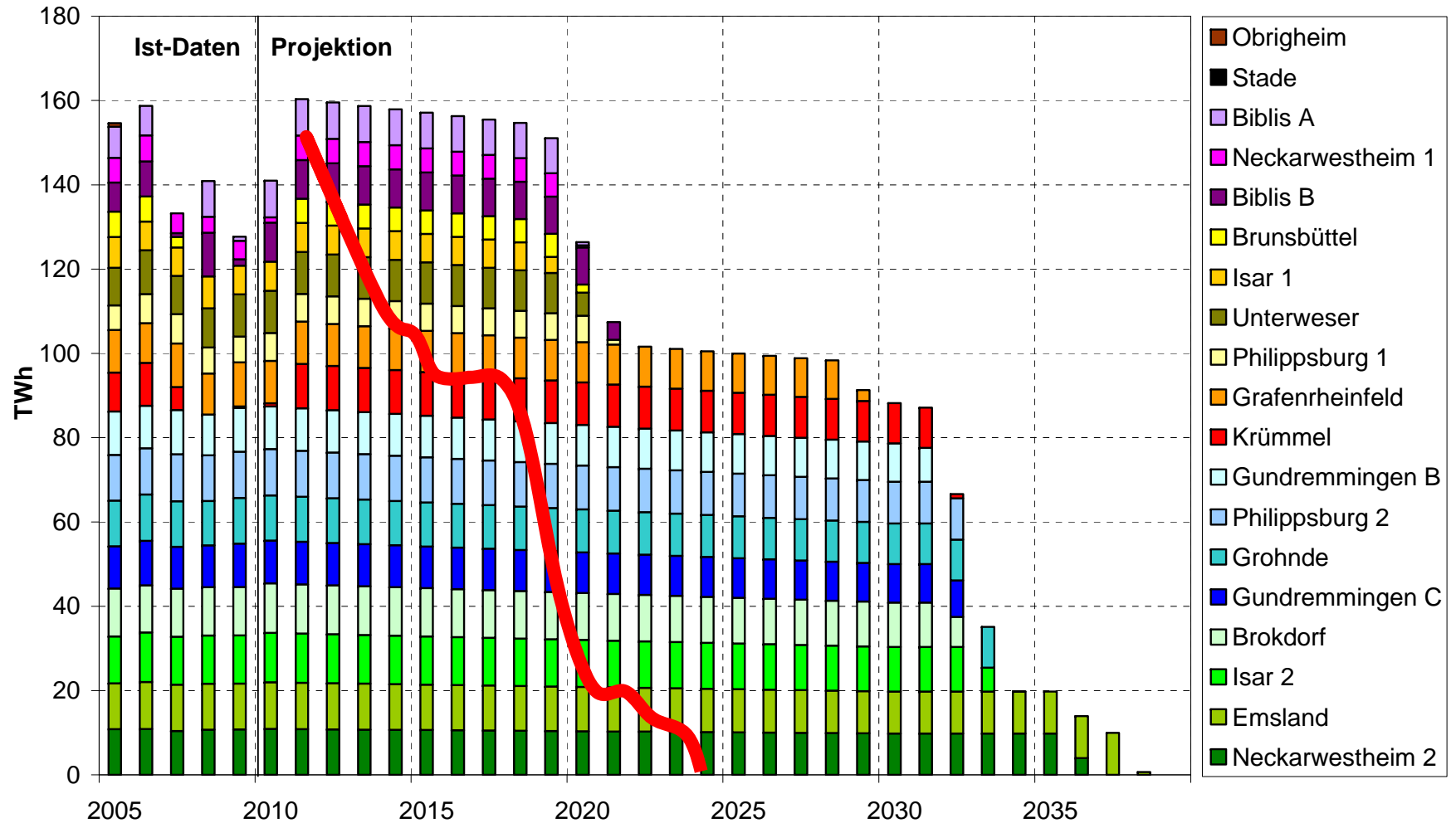


History of nuclear phase-out




History of nuclear phase-out

Electricity from nuclear power plants - Atomic Energy Act 2010 with life time extension



History of nuclear phase-out

- 
- 1998 Elections & change of government (Social Democrats & Green)
 - 2000 **First phase-out deal**
 - 2002 **Atomic Energy Act**
 - 2005 Elections & change of government (Conservative & Social Democrats)
 - 2009 Elections & change of government (Conservative & Liberal)
 - Oct. 2010 **Atomic Energy Act: lifetime extention**
 - Mar. 2011 **Moratorium:
8 nuclear power plants shut down immediately for 3 months**
 - Jun. 2011 **Atomic Energy Act: phase-out**

History of nuclear phase-out



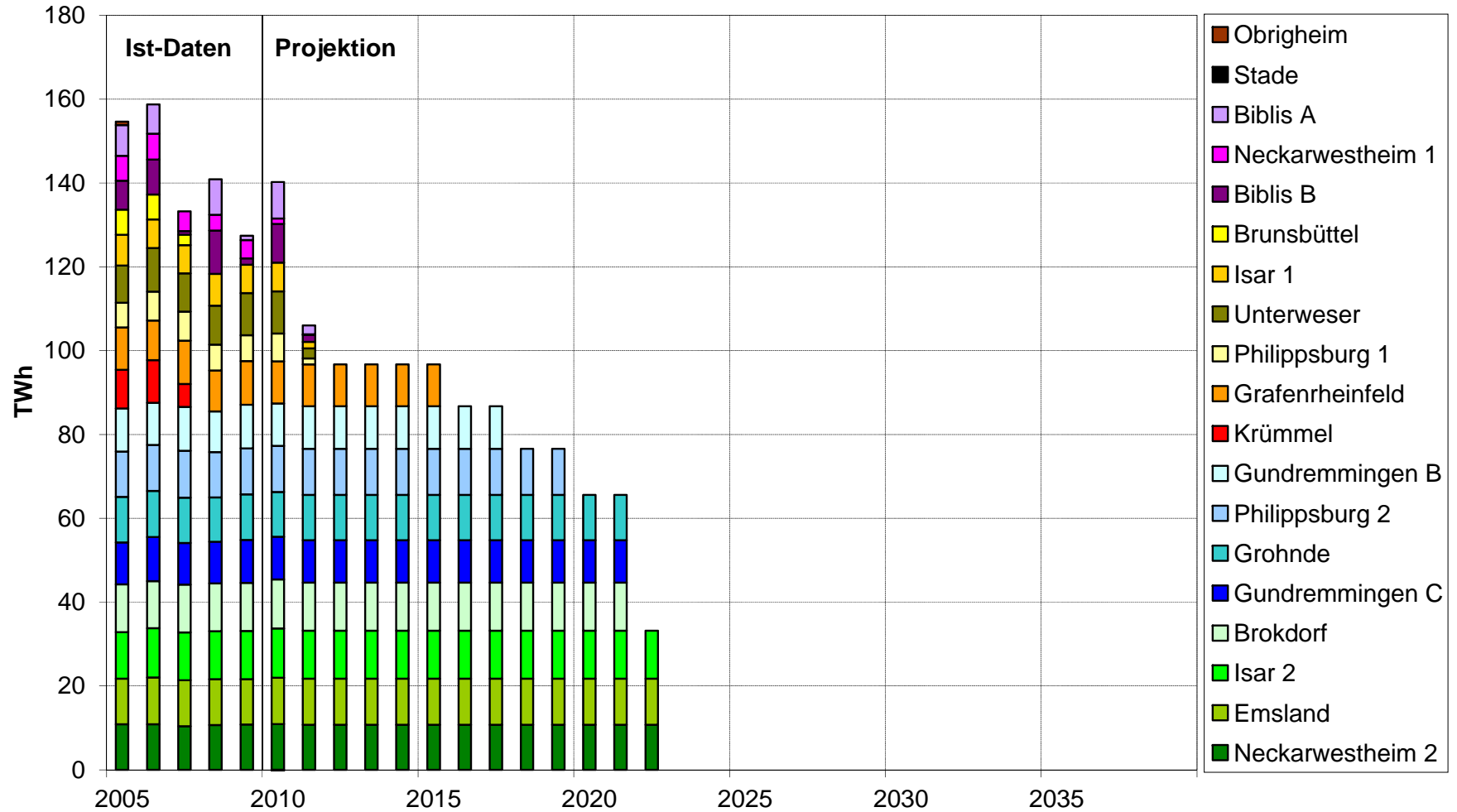
Atomic Energy Act 2011:

8 plants stay off,

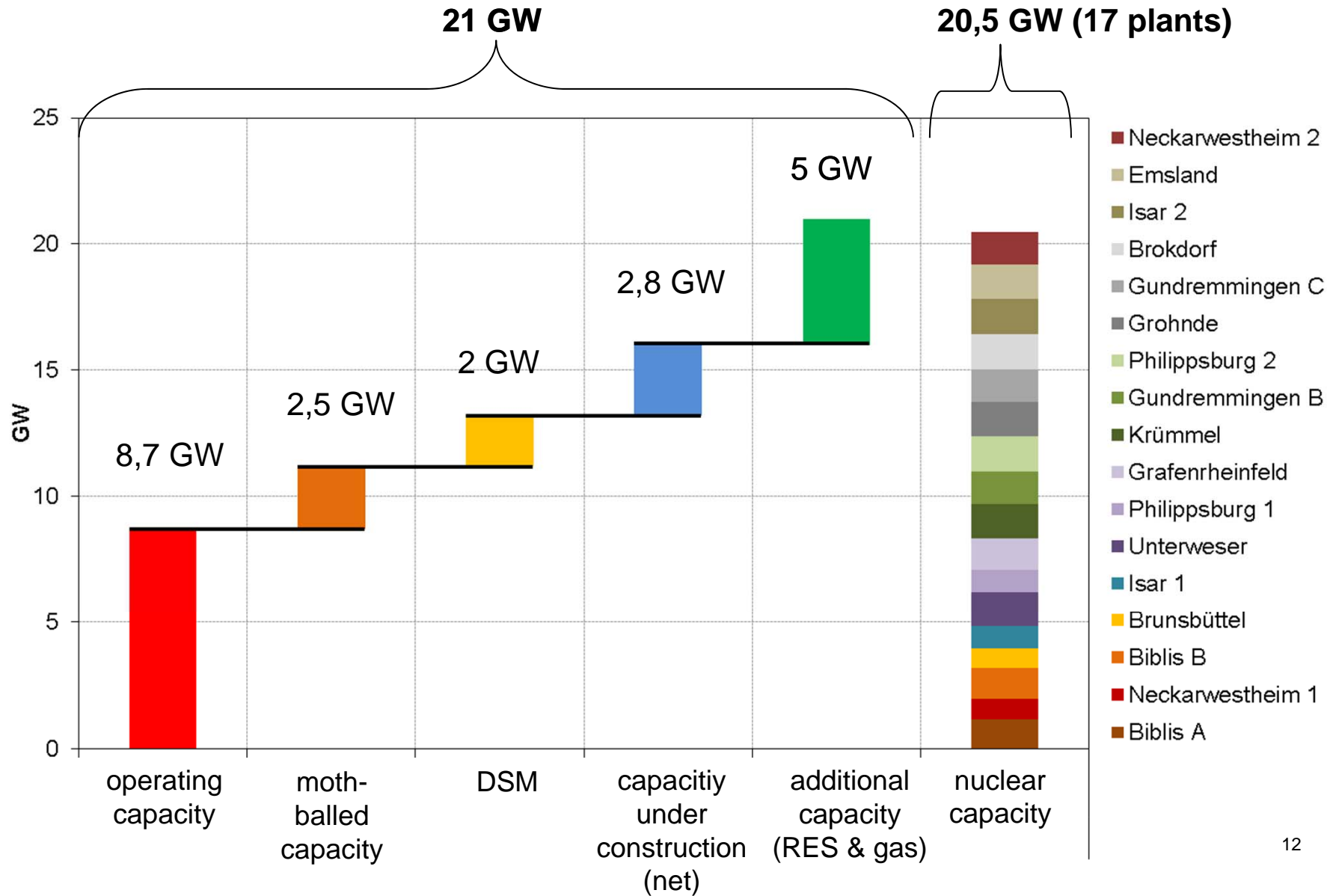
9 running until 2015 - 2022

History of nuclear phase-out

Electricity from nuclear power plants - Atomic Energy Act 2011



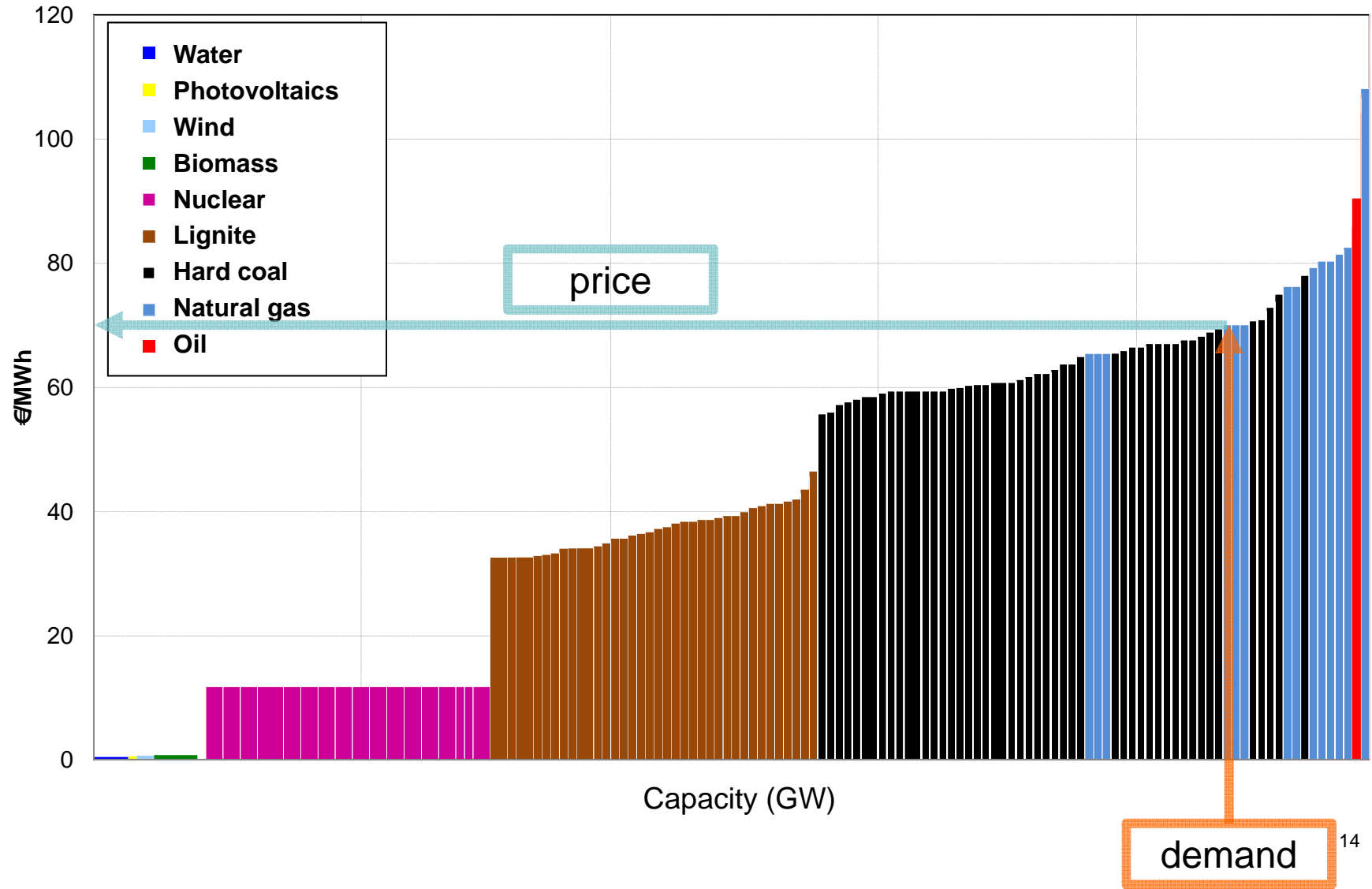
Possible quick substitutions for nuclear power plants



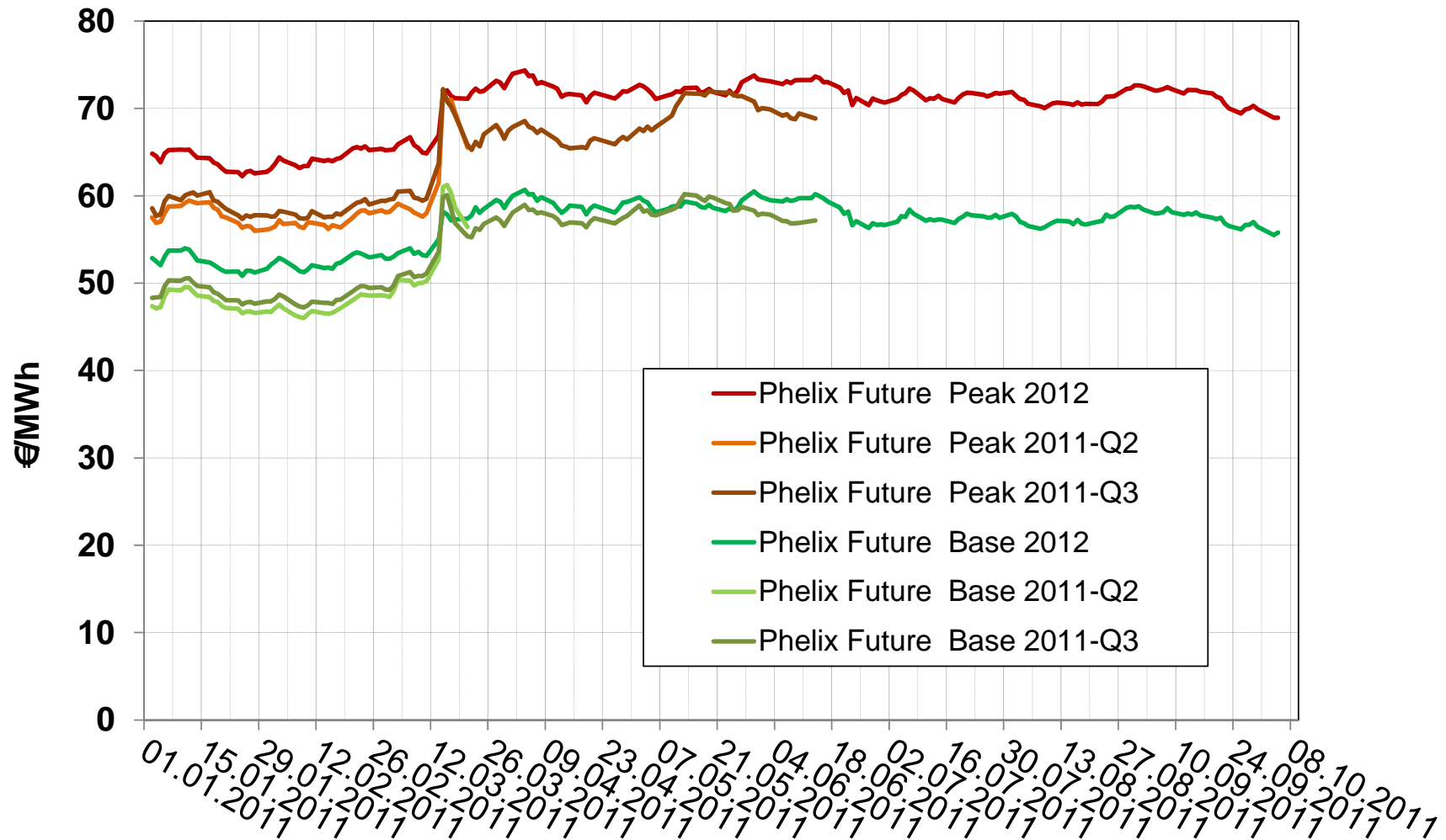


Effect on electricity prices

Merit order



Observed effects on electricity prices - short term



Data: EEX; own figure

Observed effects on electricity prices - long term

Phelix Futures | Preise und Handelsvolumen | Phelix Baseload Year Futures (Cal-12) | 06.10.2011 | EEX
Power Derivatives

Übersicht | Chart | **Tabelle** | **Kontrakt-Informationen**

Einstellungen

-- -- Phelix anzeigen Phelix Month anzeigen

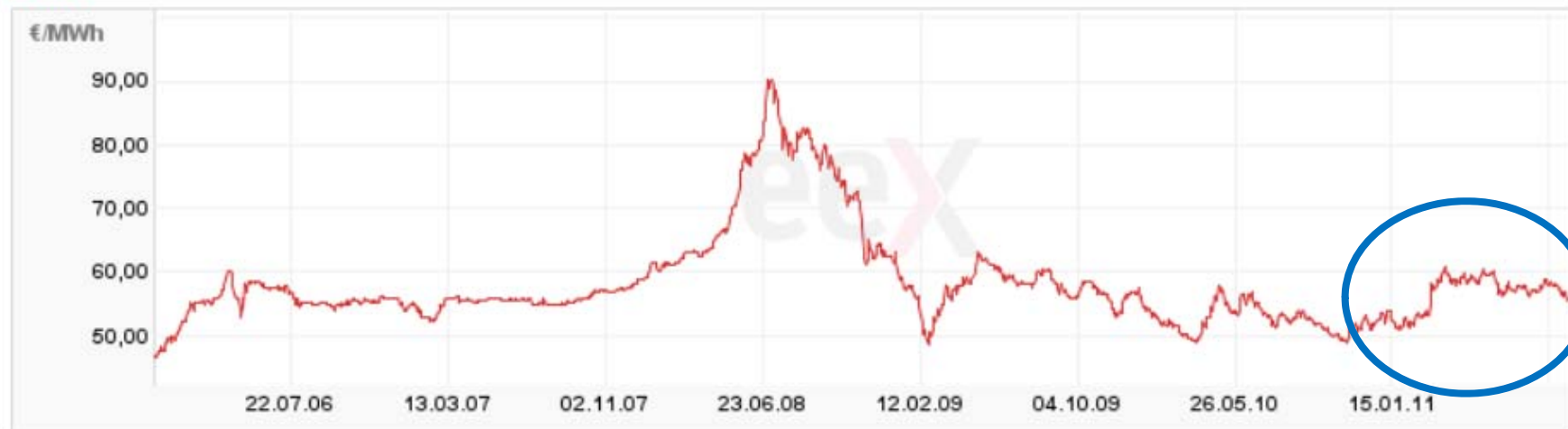
Vergleichen mit Durchschnitt

Skala: Intraday Woche Monat Quartal Jahr Gesamt

2011-10-06

 [Marktdaten als RSS-Feed](#)

Preis

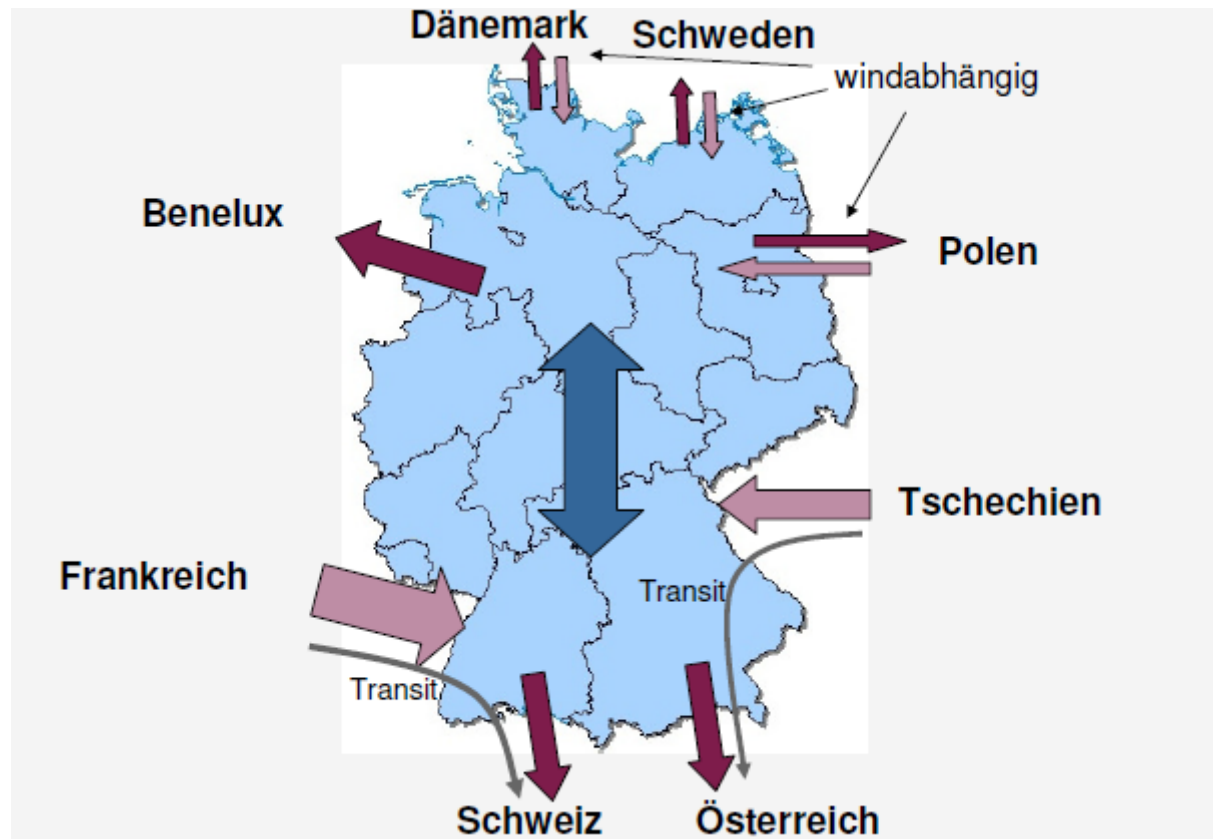


Source: EEX

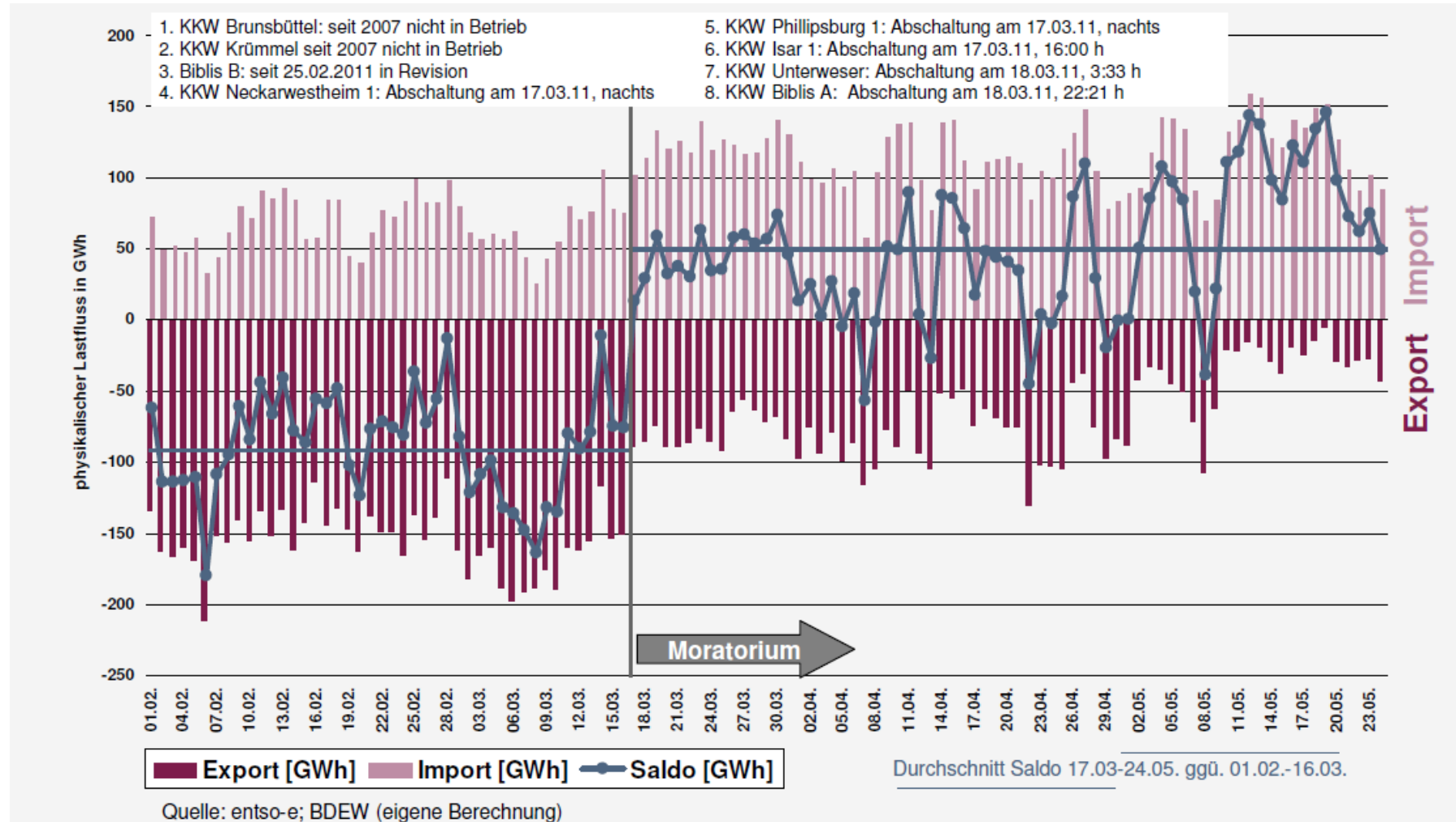


(Nuclear) imports?

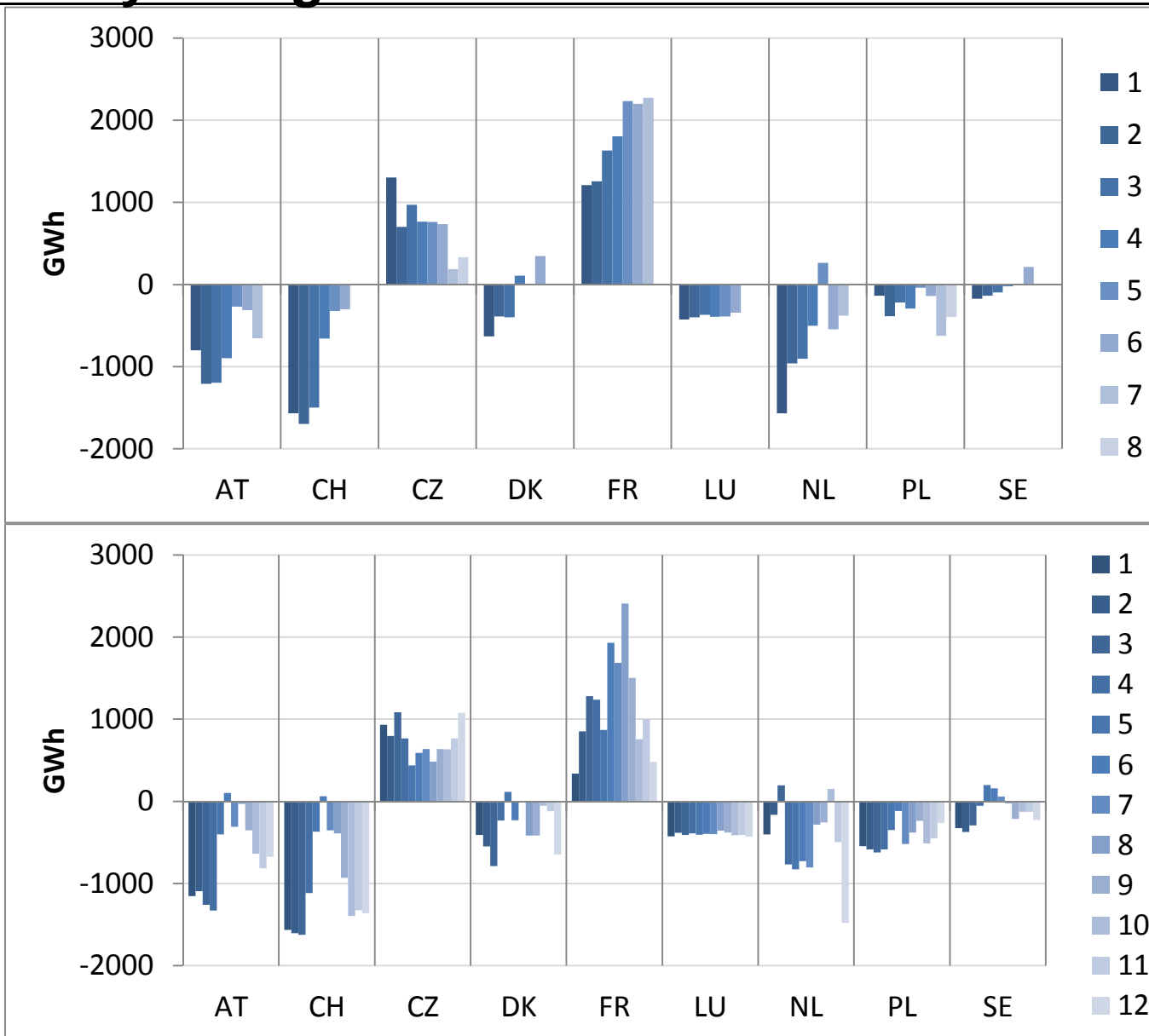
Typical load flow situation



Daily net physical load flows Germany – neighbours Spring 2011

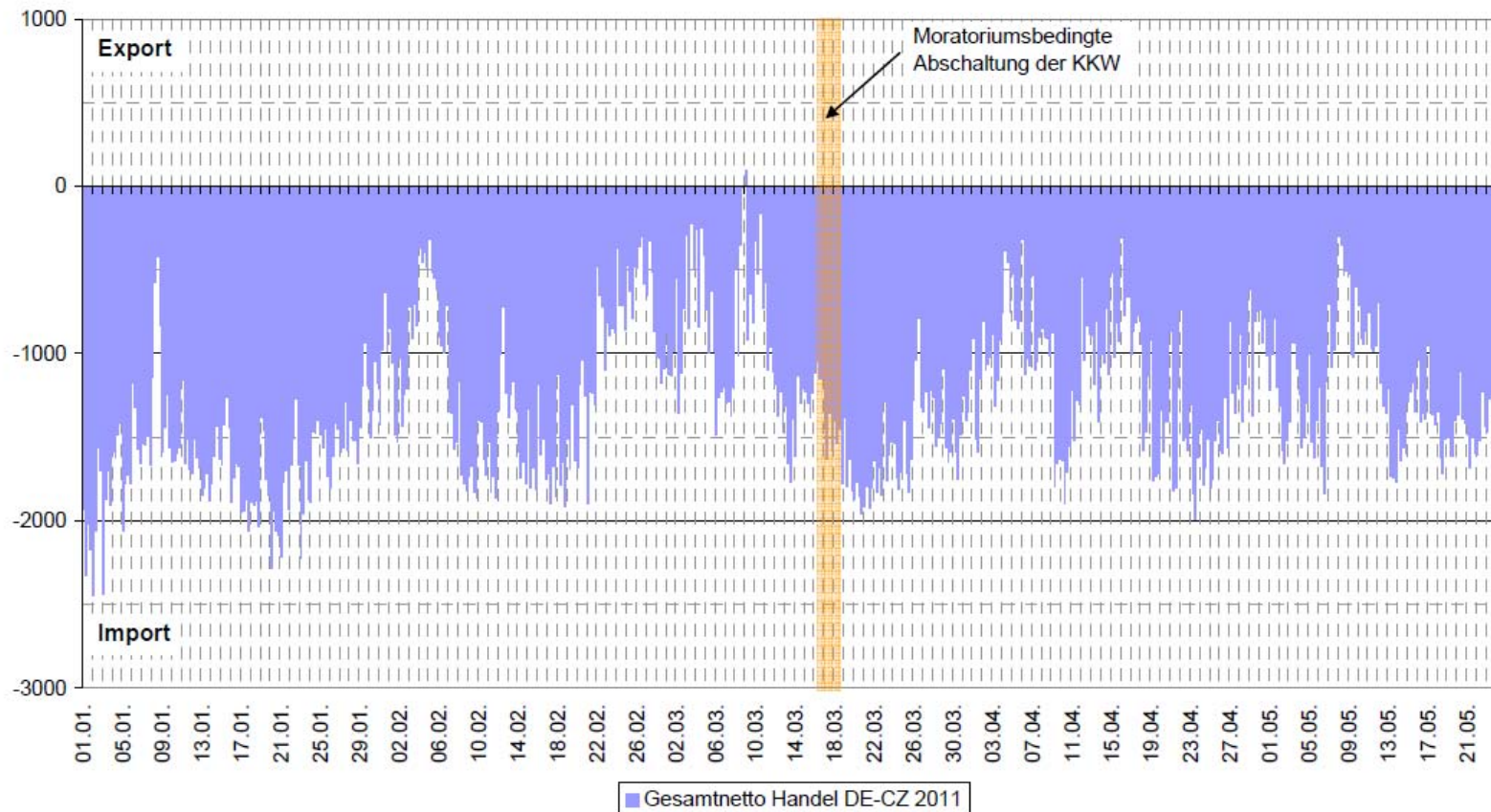


Monthly net physical load flows Germany – neighbours



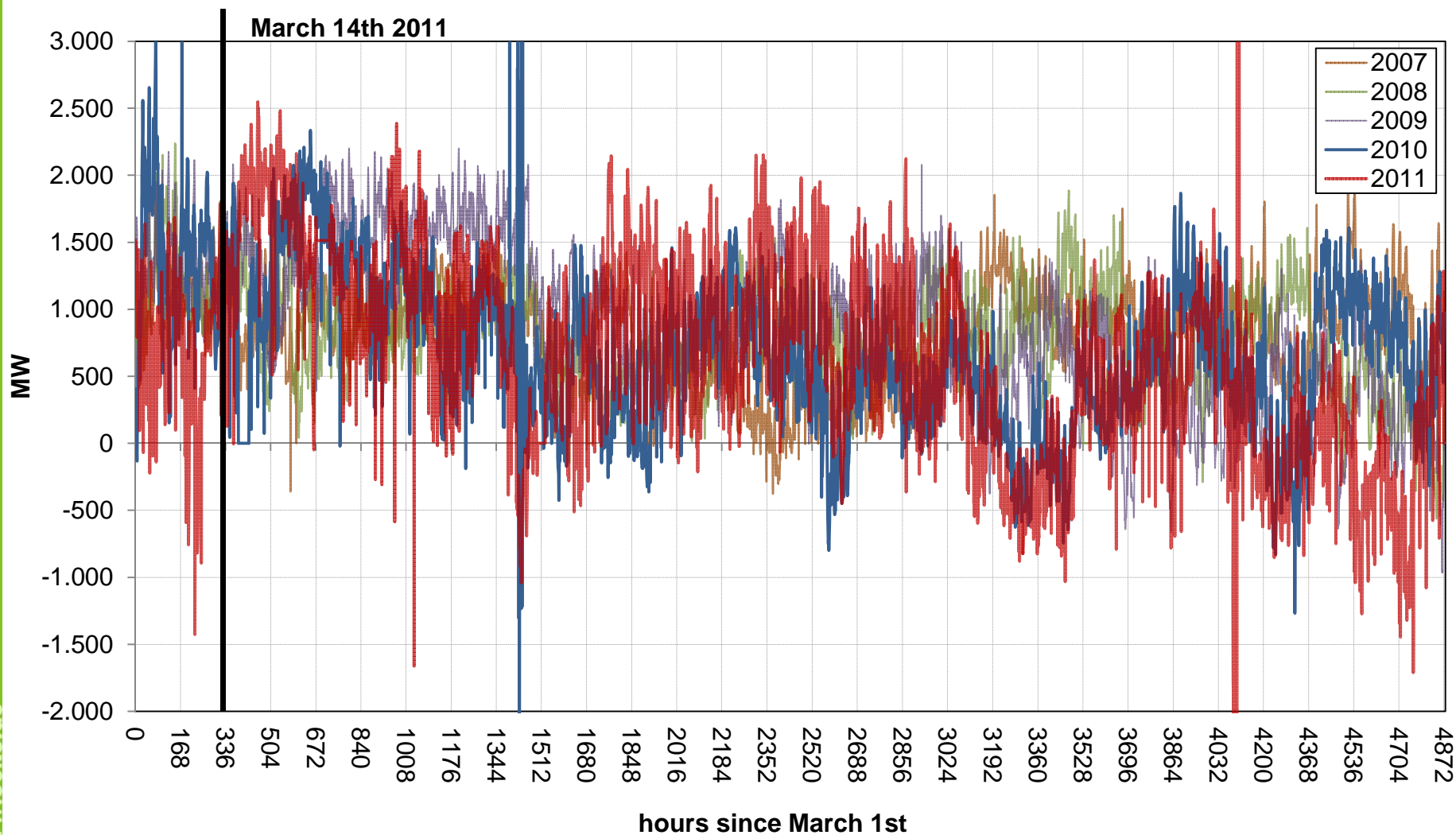
Traded flows Czech Republic - Germany

Abbildung 8: Deutsch - Tschechischer Stromtausch, 01.01. – 24.05.11.
(4 Mittelwerte pro Tag)



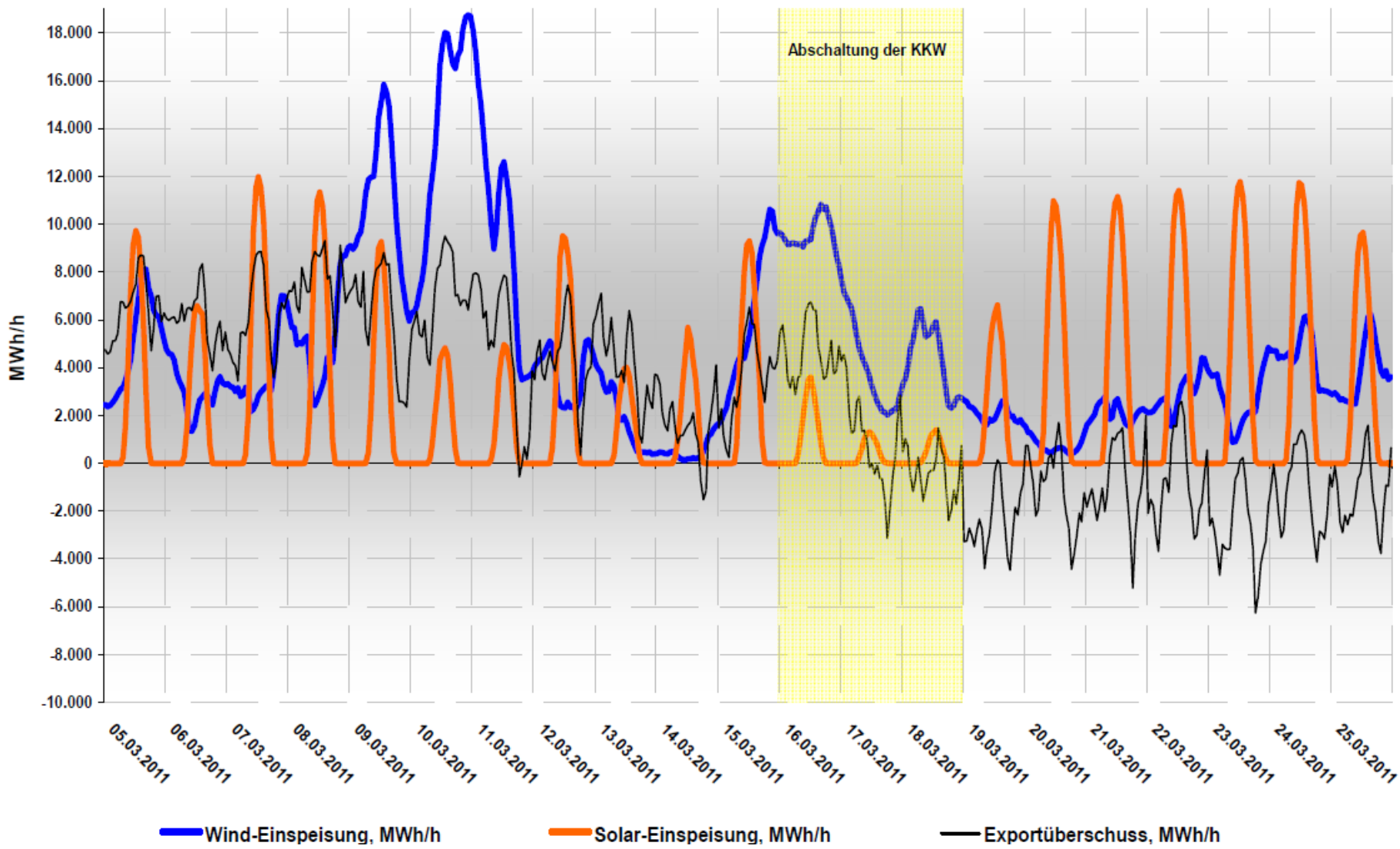
Daten: ENTSO-E, Grafik: BNetzA

Net physical load flows Czech Republic - Germany



Data: Entso-e, own figure

Wind, Solar, Import - Export



- **Nuclear phase-out plans were legally in force for the past 10 years except between Oct 2010 - March 2011**
- **Security of supply: enough replacement options**
- **Small effects on electricity prices**
- **No nuclear imports**
- **Future electricity system: renewable**

Thank you!

www.oeko.de

c.loreck@oeko.de