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For sustainable energy.

7th SEE Forum

Thessaloniki, 19-20 June

Renewables for Electricity: Bottlenecks & Prospects

Promoting sustainable energy for the greatest benefit of all

Emerging economies steer energy markets

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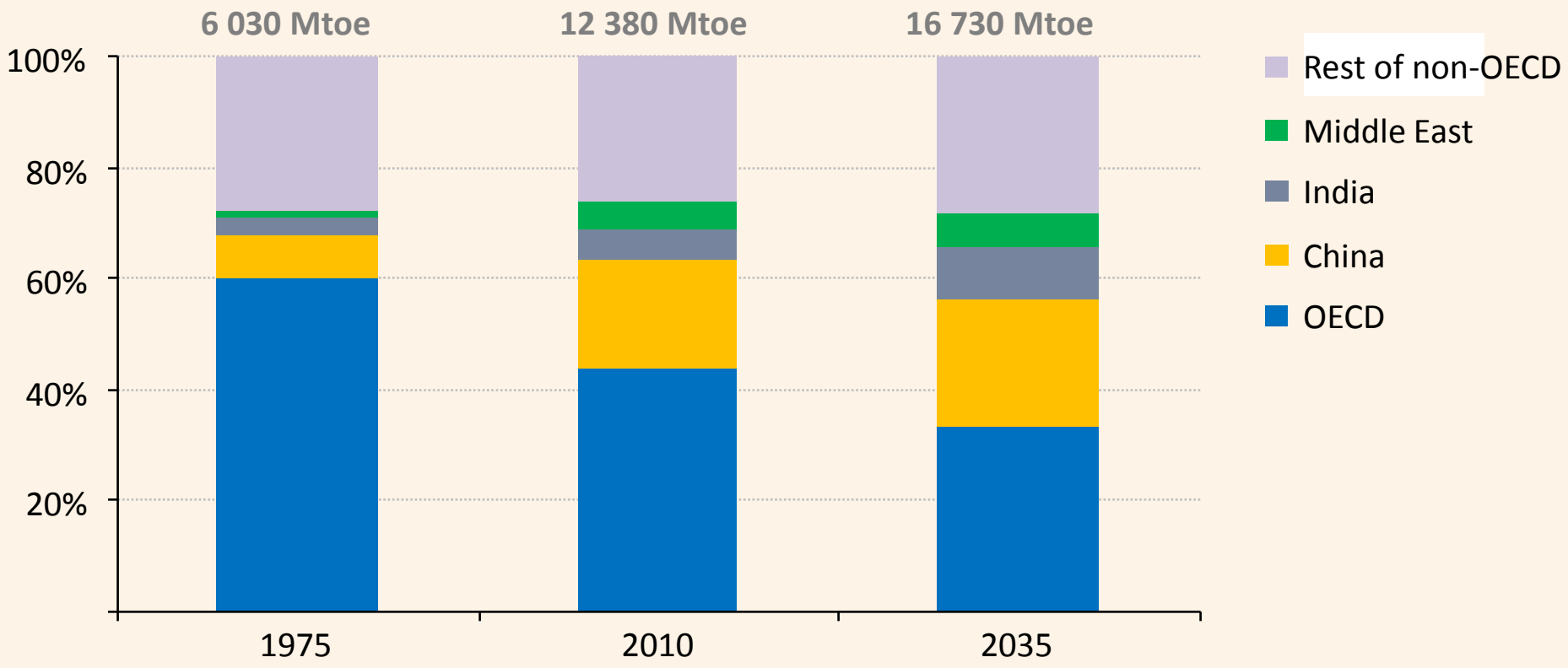
Share of global energy demand



Global energy demand rises by over one-third in the period to 2035, underpinned by rising living standards in China, India & the Middle East

Natural gas & renewables become increasingly important

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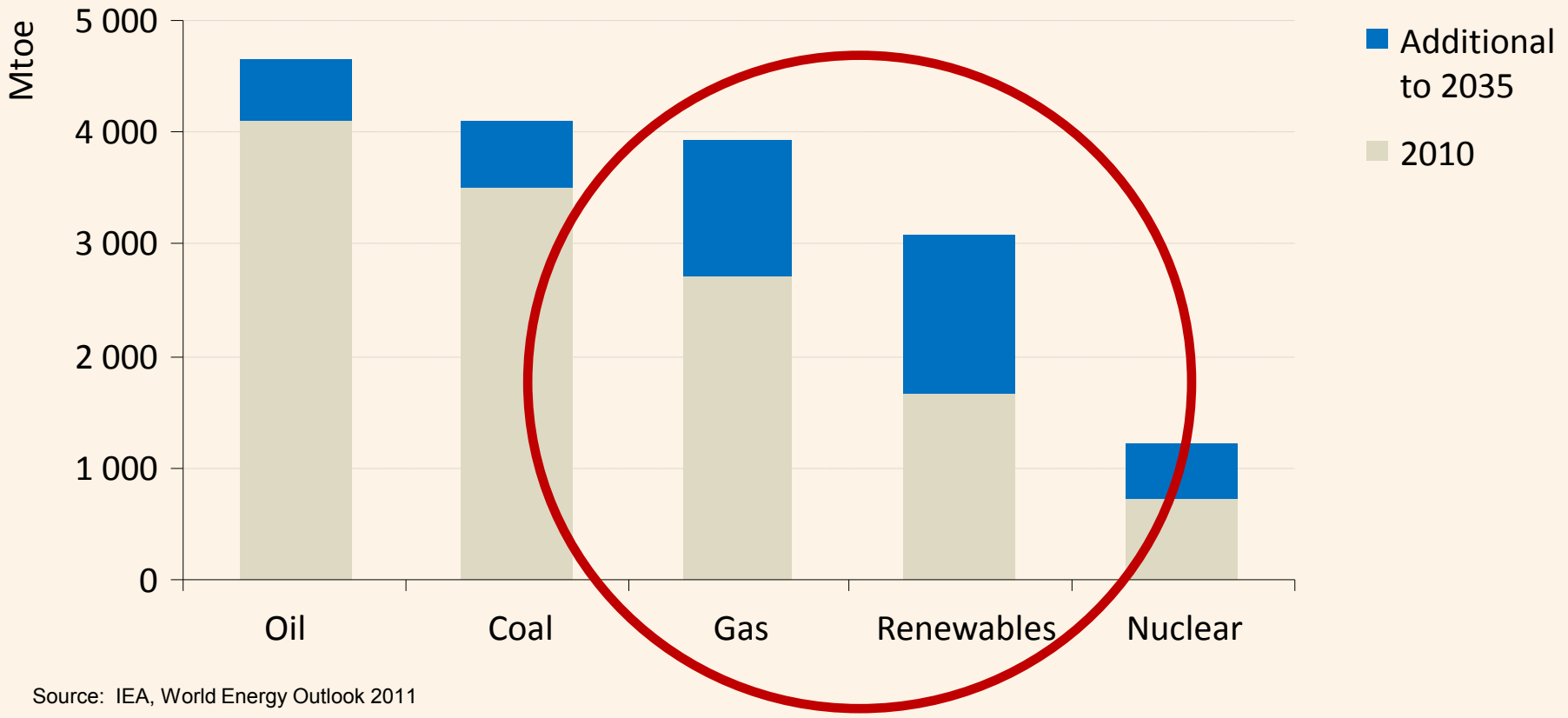
World primary energy demand



Source: IEA, World Energy Outlook 2011

Renewables & natural gas collectively meet almost two-thirds of incremental energy demand in 2010-2035

SOME RENEWABLES INDICATORS

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CURRENT WORLD ENERGY PRODUCTION MIX %

Fossil fuels - 79, 7%; Hydro- 15, 3%; Other RES (non hydro)-5%;

RES –POWER CAPACITIES, in GW (total hydro not included)

2009: 250GW; 2010: 315GW 2011: 390 GW

INVESTMENTS IN NEW RES CAPACITIES

2009: 161 BUSD; 2010: 220 BUSD; 2011: 257 BUSD

COUNTRIES WITH POLICY TARGETS

2009: 89 2010: 109 2011: 118

TOP FIVE LEADING COUNTRIES

China, USA, Germany, Italy, India

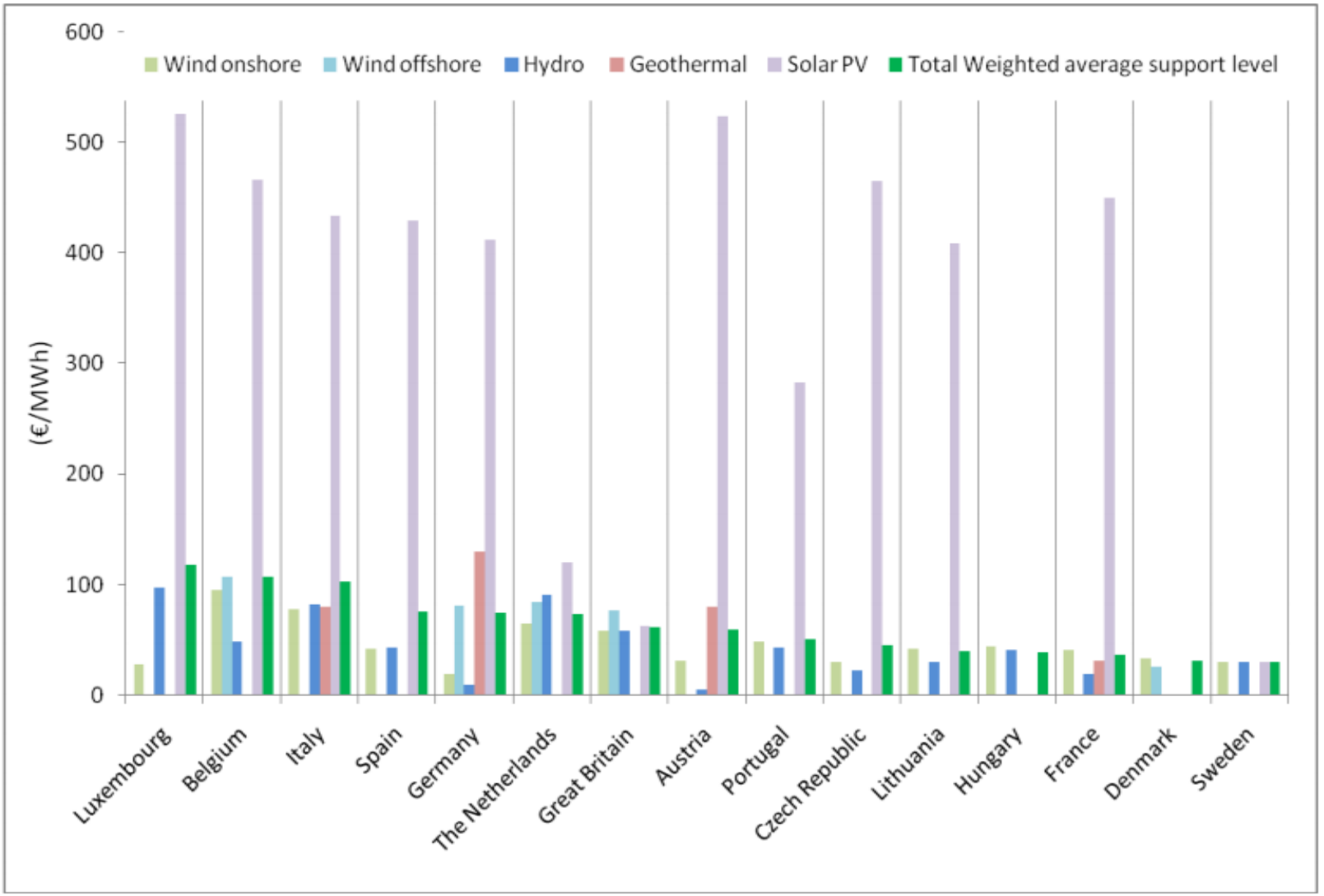

Figure 2: Level of support (in Euro) provided in selected Member States, 2009. Source: CEER

Implications of Non-Harmonised Renewable Support Schemes
11/10/2011
Council of European Energy Regulators

Share of renewables in power supply and financial support paid by electricity consumers

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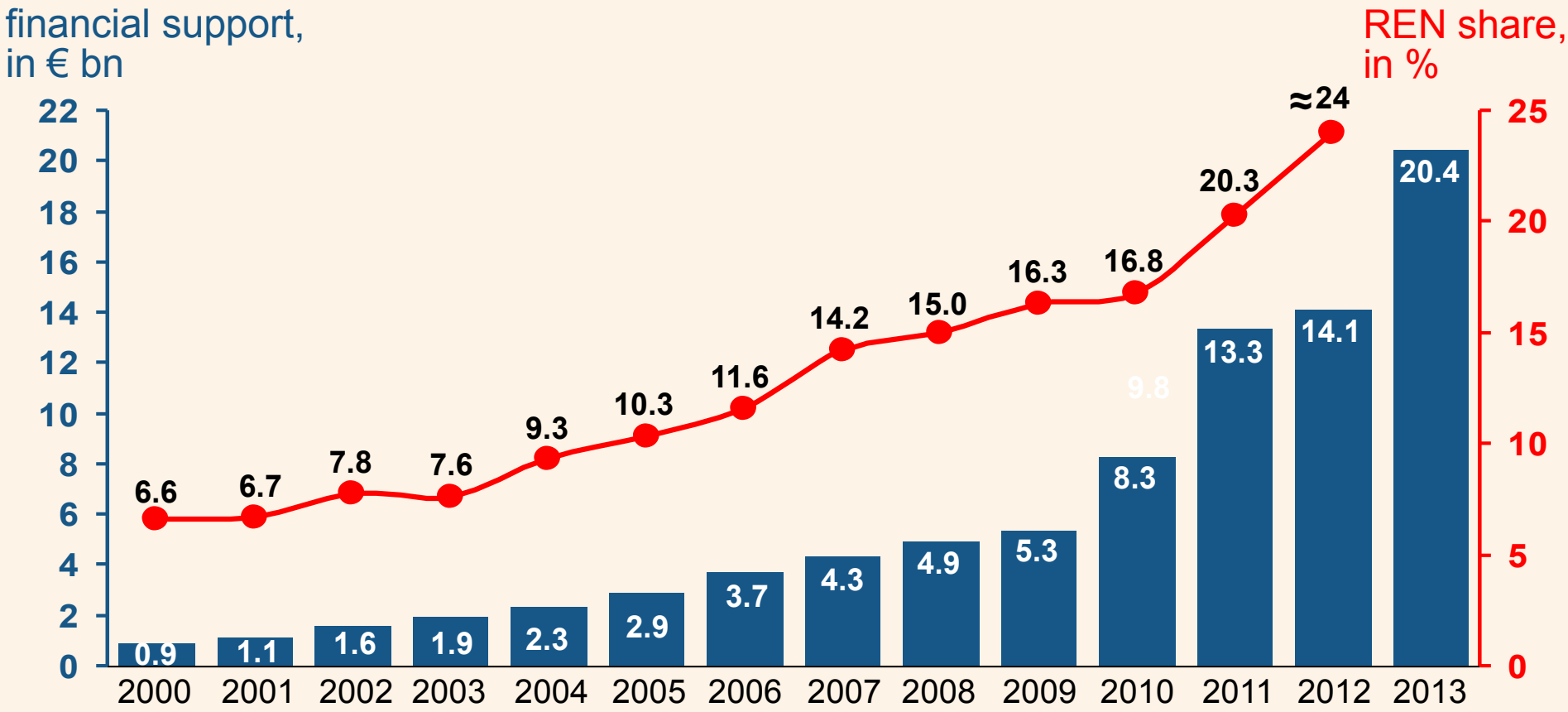
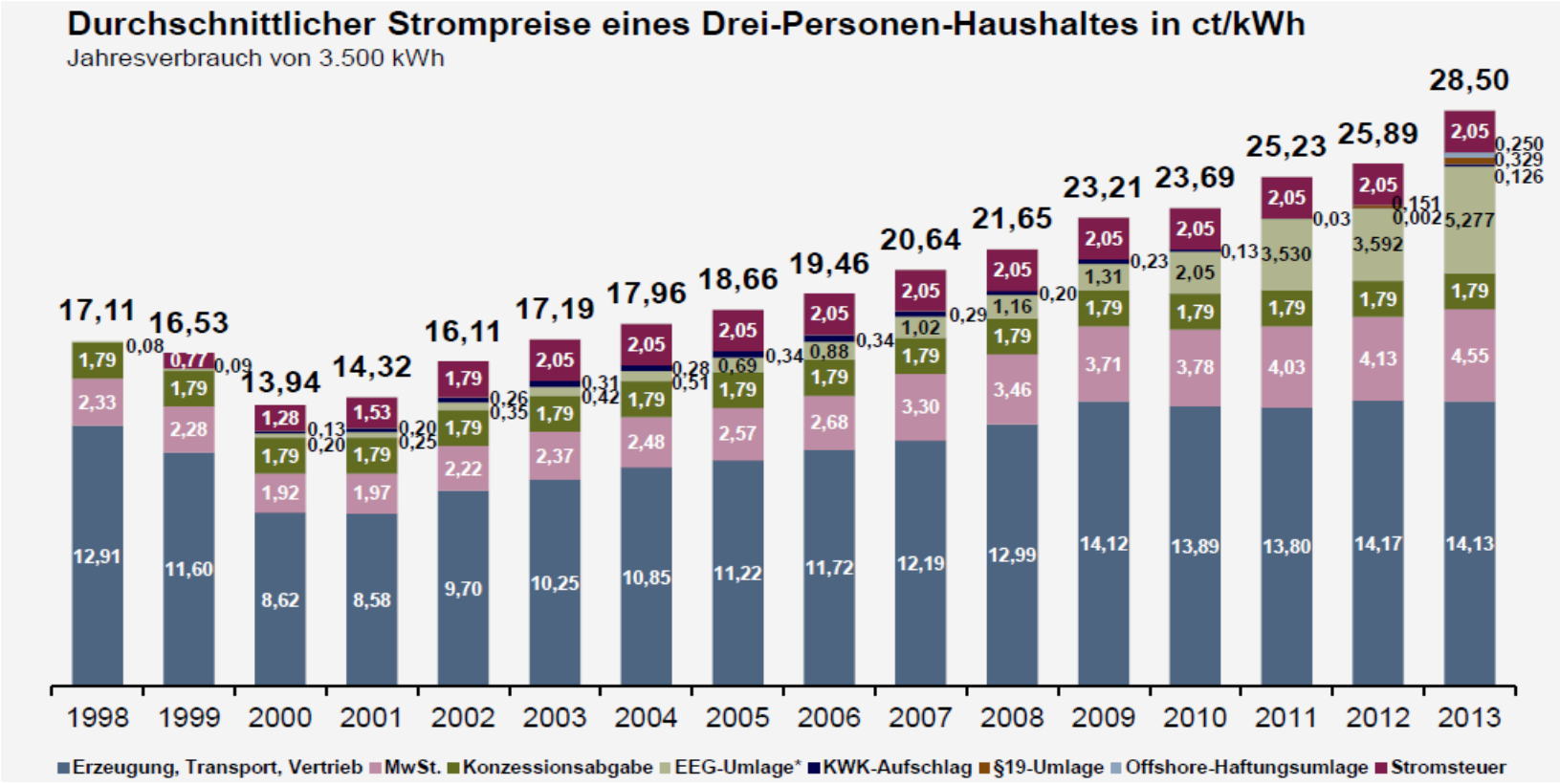


Expansion by some 18 percentage points compared with 1999 – financial support paid for this by the electricity consumers from 2000 to 2012: ≈ €65bn.

Strompreis für Haushalte

Energie. Wasser. Leben.



Household prices for a three-person-family (3.500 kWh/a):

2013: "**Generation, Transport, Sales**'"decreased slightly, but

Generation, Transport, Sales	14,13 ct/kWh (14,17)
Value added tax	4,55 ct/kWh (4,13)
Concession fee	1,79 ct/kWh (1,79)
Feed-in payment (RES.E)	5,277 ct/kWh (3,592)
Electricity tax	2,05 ct/kWh (2,05)

Technical challenges first to solve

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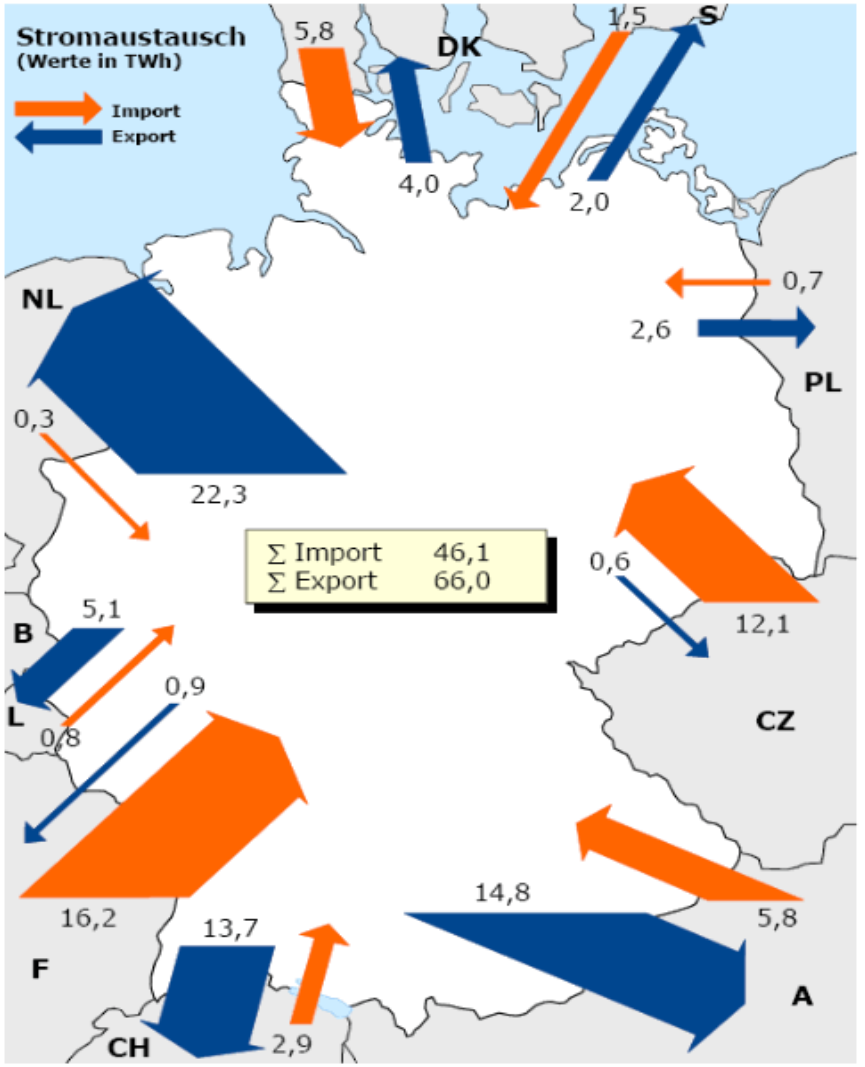
- RES-E need a **European-wide grid** and coupling neighbouring el. markets; **WHY**
- Reducing operational impact on volatile RES by ensuring reliable back up;
- Impact of hourly RES-E export on the neighbouring countries;
- German experience;
- The role of capacity mechanisms.

Germany: Export and Import in TWh

Year	Import	Export	Balance
1990	31,8	30,6	+1,2
1991	30,4	31,0	-0,6
1992	28,4	33,7	-5,3
1993	33,6	32,7	-0,9
1994	35,7	33,5	+2,2
1995	39,5	34,8	+4,7
1996	37,2	42,6	-5,4
1997	37,8	40,2	-2,4
1998	38,1	38,7	-0,6
1999	40,4	39,4	+1,0
2000	45,0	41,9	+3,1
2001	43,5	44,8	-1,3
2002	46,2	45,5	+0,7
2003	45,8	53,8	-8,0
2004	44,2	51,5	-7,3
2005	53,4	61,9	-8,5
2006	46,1	66,0	-19,9
2007	44,3	63,4	-19.1
2008	40,2	62,7	-22,5
2009	40,6	54,9	-14,3
2010	42,0	59,0	-17,0
2011	49,7	56,0	-6,3
2012 (-Q3)	33,9	47,8	-13,8



Physikalischer Stromaustausch Deutschlands mit den Nachbarländern 2006

Quelle: bdew

Since its launch on 10.11.2010, the market-coupling regime has created a unitary market region for electricity in Central Western Europe.

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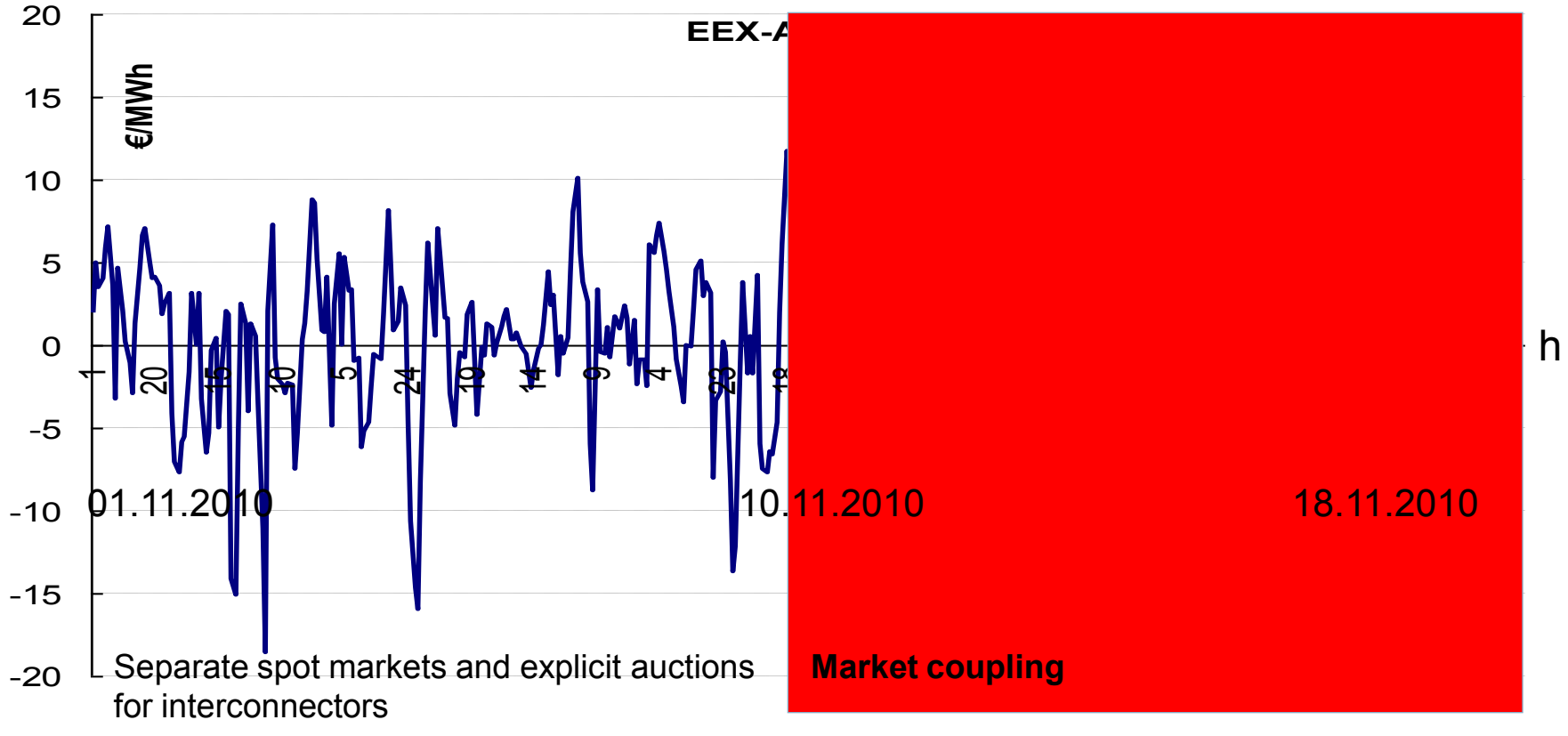
Hourly price differences between Germany and The Netherlands shortly before and shortly after the launch of market coupling



In times of peak demand and low renewable generation, up to 75,000MW has to be covered by conventional power plants

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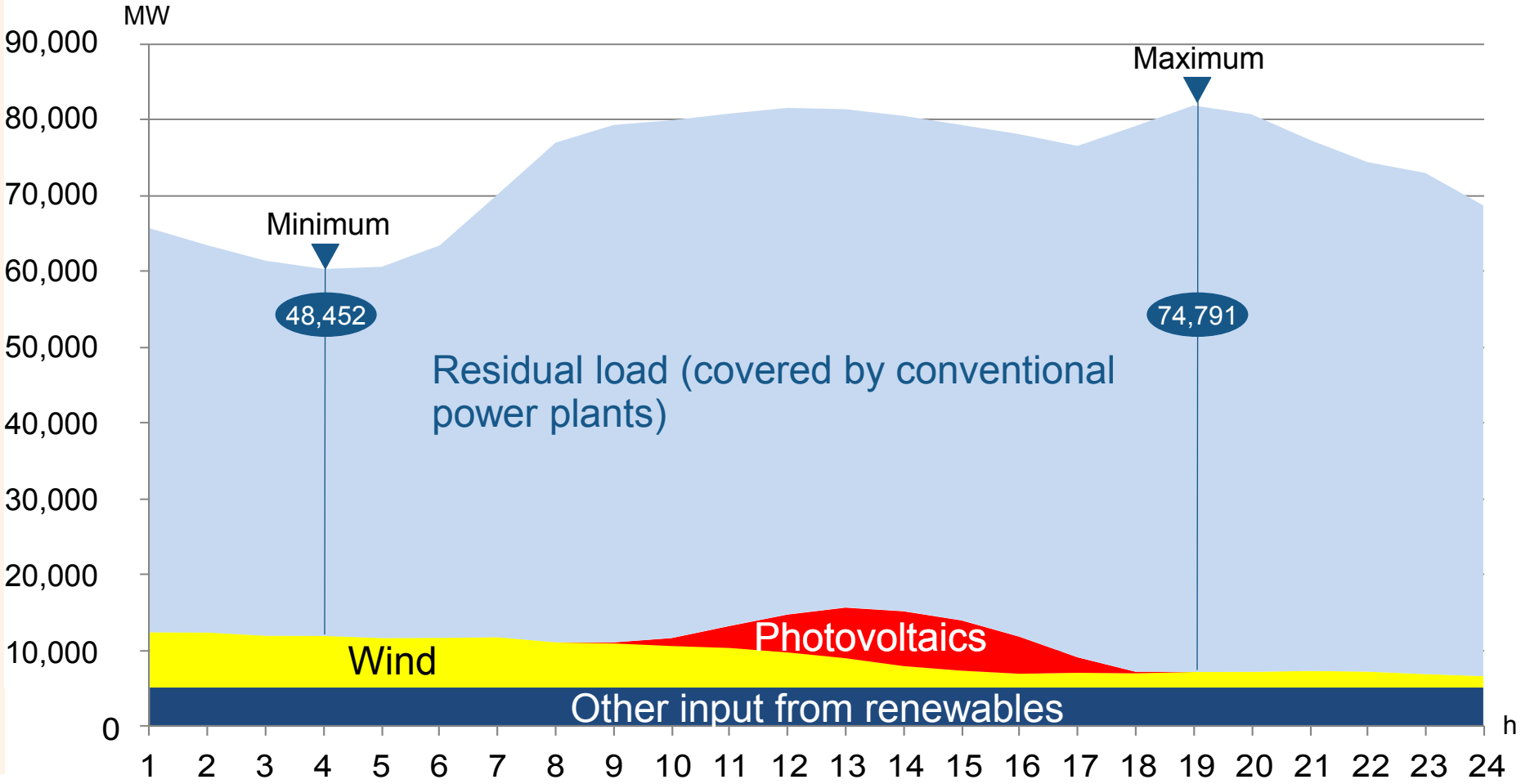
Load curve and load coverage on 8 February 2012



In times of weak demand and high renewable generation, the minimum residual load to be covered is reduced to 17,000MW

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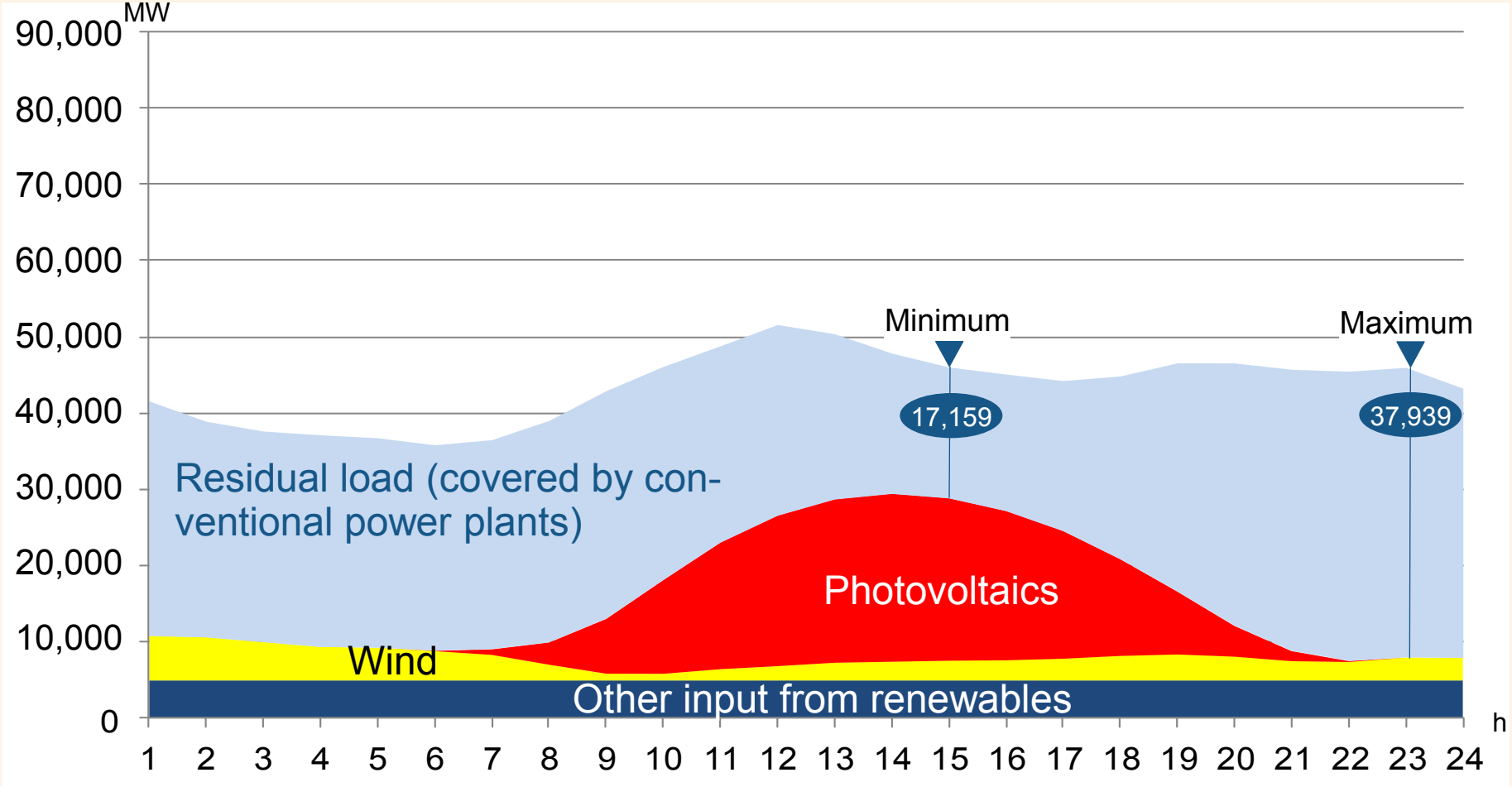
Load curve and load coverage on 27 May 2012 (Whit Sunday)



Photovoltaics from Germany crucially impacts peak-load electricity prices in Europe

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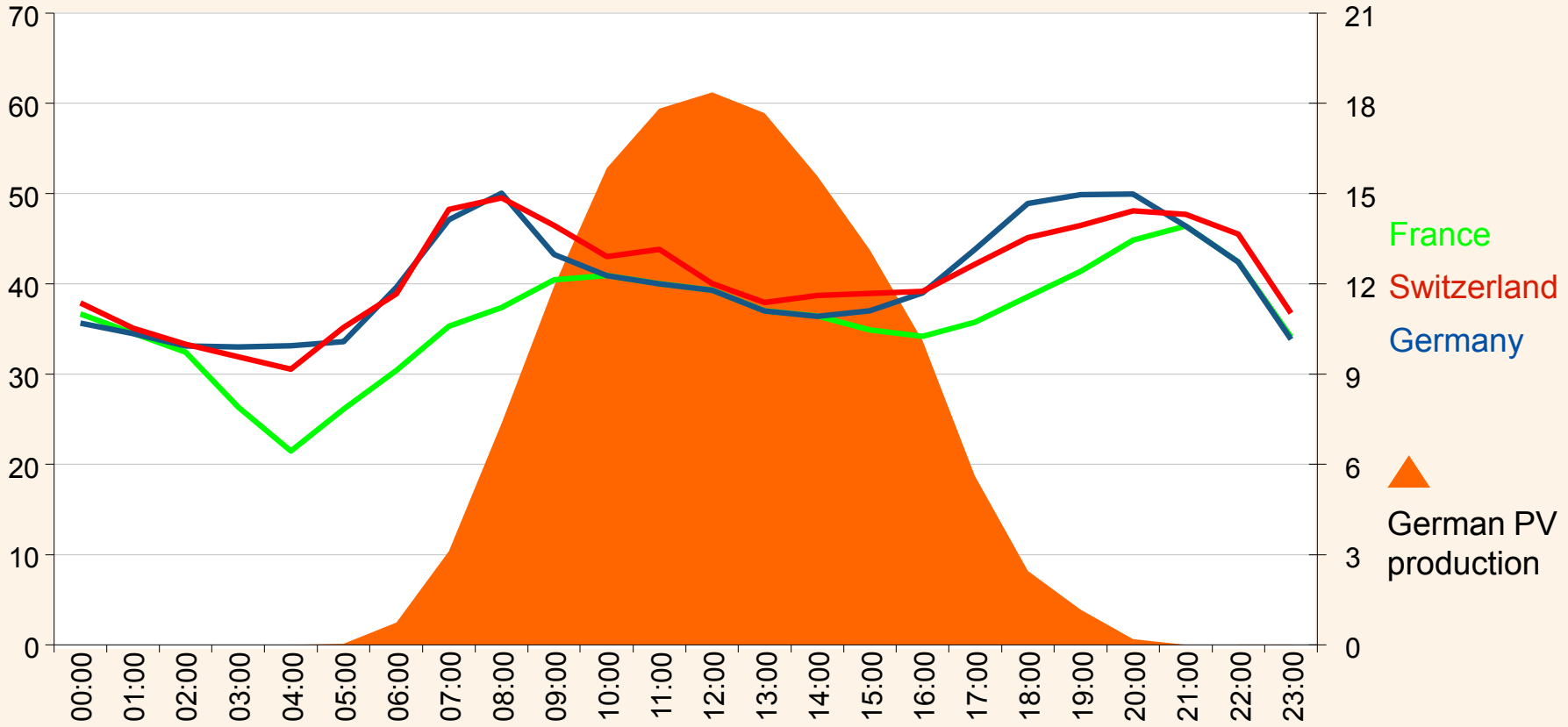
Electricity prices for hourly contracts at European energy exchanges (in €/MWh (left-hand axis)) and German PV power production (in GW (right-hand axis)); 8 May 2012*



* Source: EEX; RWE Supply&Trading

Conclusions
Design of the future electricity market (EU-2030 Package)

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- Europe's CO_2 emissions trading must **remain the backbone for** its energy supply decarbonised model; and it **MUST BE** market- based;
- Therefore, one common EU-**target for CO2 emission**s can be enough;
- The tools for current subsidizing of renewables must be compatible with the domestic market and harmonised at European level. Subsidies gradually face out, **fully removed** beyond 2020;
- Maintaining sufficient **conventional power capacity** is the most important pillar in guaranteeing security of supply in the long term;
- Capacity mechanisms must not **distort the market p**rice and must be compatible with the domestic market.

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Thank you!

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