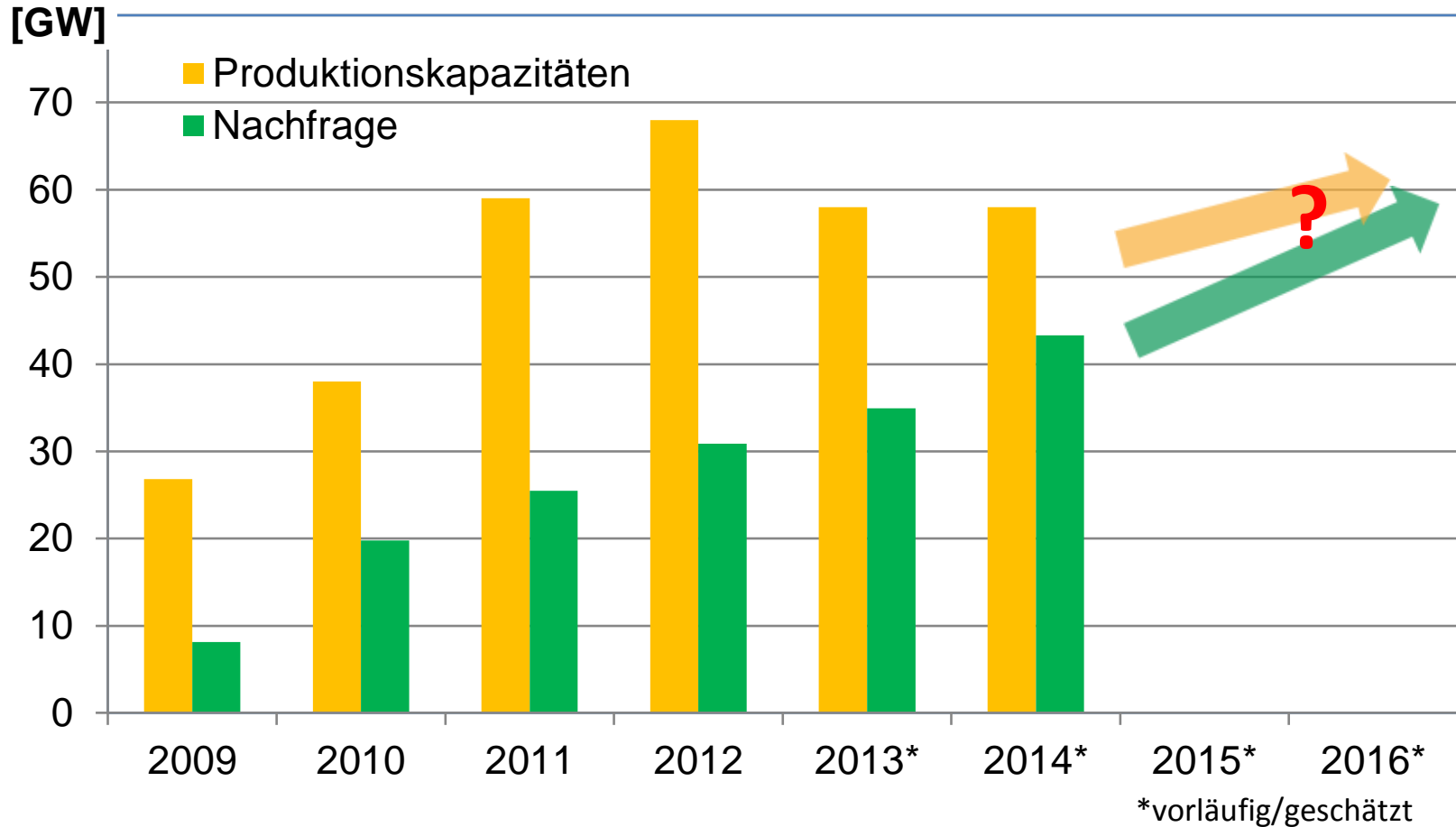


The Gap between global PV Production Capacity and Sales is Closing!



- **Non-competitive PV fabrication lines are closing worldwide**
- **Demand > 50 GW 2015 might result in shortage of PV modules!**

Slide courtesy Tobias Kelm, ZSW; data from EPIA, Mercom, iSupply, BNEF, IEA, Photon, SW&W, Bloomberg, Solarbuzz, and own estimates



2014 Outlook: Let the Second Gold Rush Begin

Demand Could Surprise to the Upside

While we have been generally constructive on the global demand outlook, we are raising our 2014 and 2015 demand expectations to ~46GW and ~56GW respectively. We believe upside demand surprises from the US, Japanese and Chinese markets could continue in 2014. We expect streamlined incentive programs in China, additional subsidy cut signals in end 2014, and decreasing financing constraints to act as catalysts for upside. Similar to the '05-07 capacity rush, we expect another gold rush by downstream installers to add recurring MW ahead of policy changes over the next 2-3 years. Moreover, we expect grid and financing constraints to improve from 2014.

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ISE Model of a future German Energy System

Combining Electricity, Gas and Heat *

Near-100% 24/7/365 reliable renewable energy from wind, sun, hydro & biomass at minimum total cost!

PV:	220 GW,	214 TWh
Wind:	253 GW,	596 TWh
Hydro	5 GW,	21 TWh
Biomass:		50 TWh

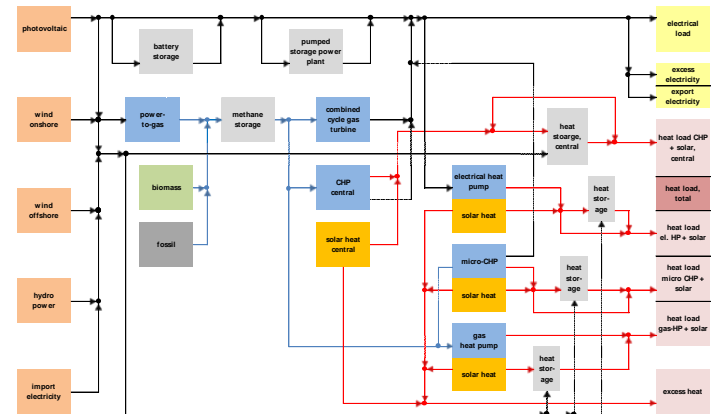
Energy Efficiency of Buildings: - 50%

Maximum Demand: 132 GW

Maximum Generation: 321 GW – Storage!

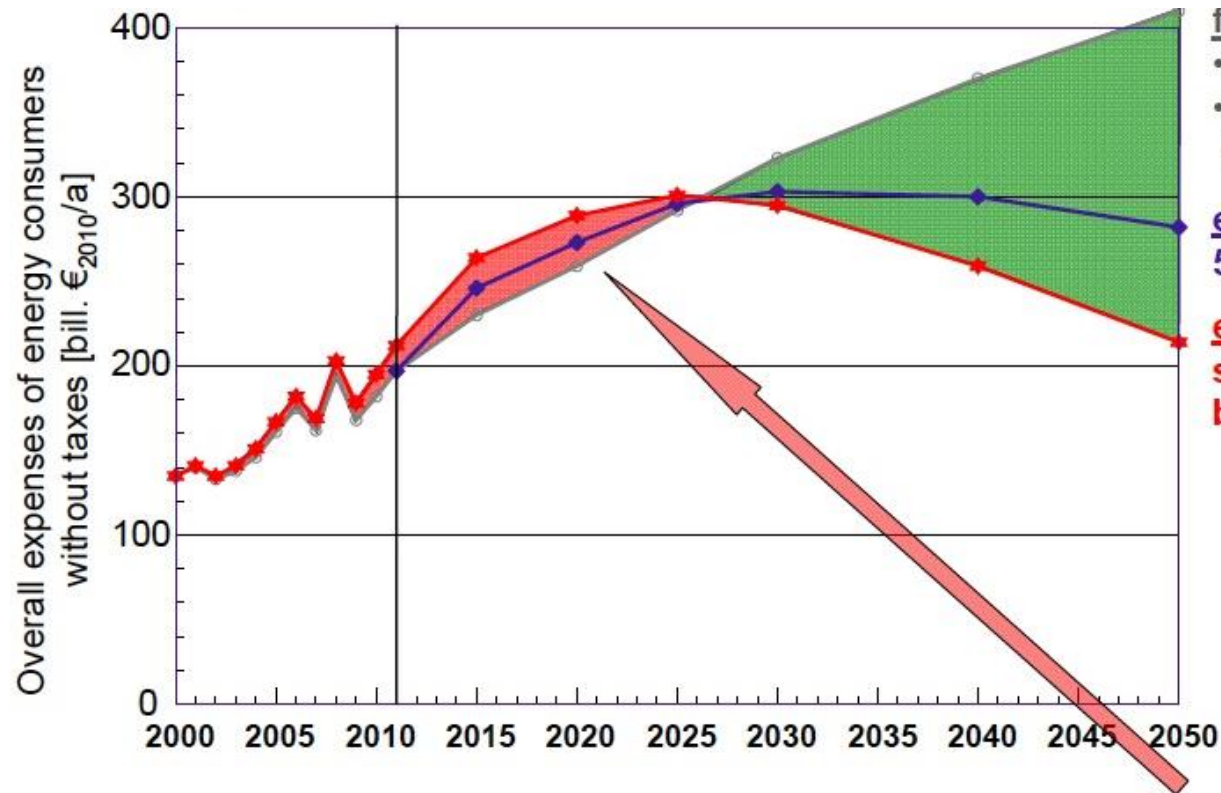
Total Cost: same as 2012!

Source: H. Henning, A. Palzer, Fraunhofer ISE 2012



*Without Transport, Import-Export!

Example Germany: The Cost of the Energy Transformation



forward projection of status quo:
•constant energy consumption
•no additional investment for energy efficiency and renewable energy

energy transition, part 1
50% reduction of energy consumption

energy transition, part 2
substitution of fossil energy carriers by renewable energy

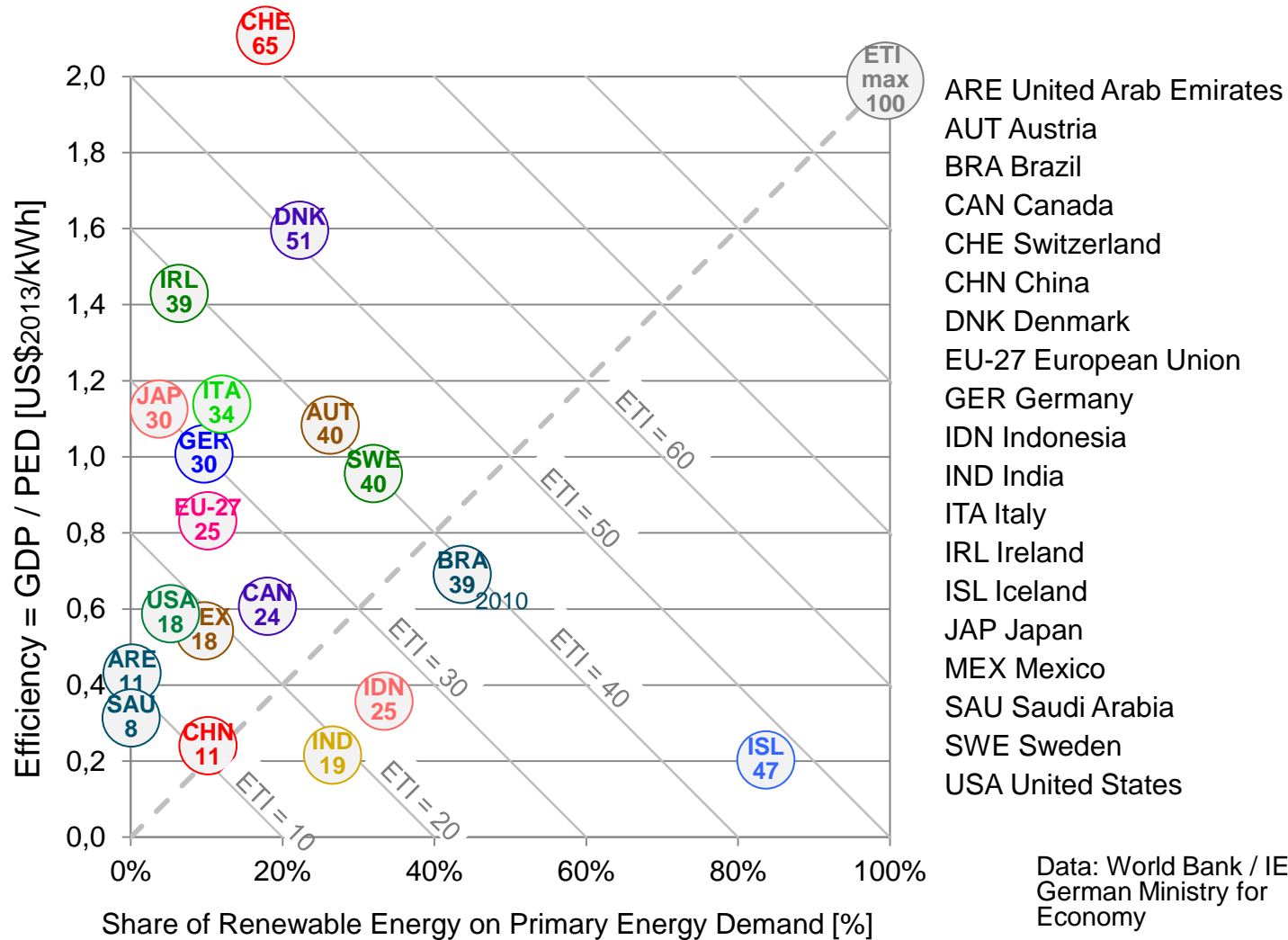
→ The extra cost for the energy transition is in the range of 5% to max. 8% of total energy expenses and will be needed until about 2025 (total: about 300 bill. €).

→ In the longterm this is profitable against a forward projection of the status quo.

Slide courtesy F. Staiss 2013, based on data from BMU

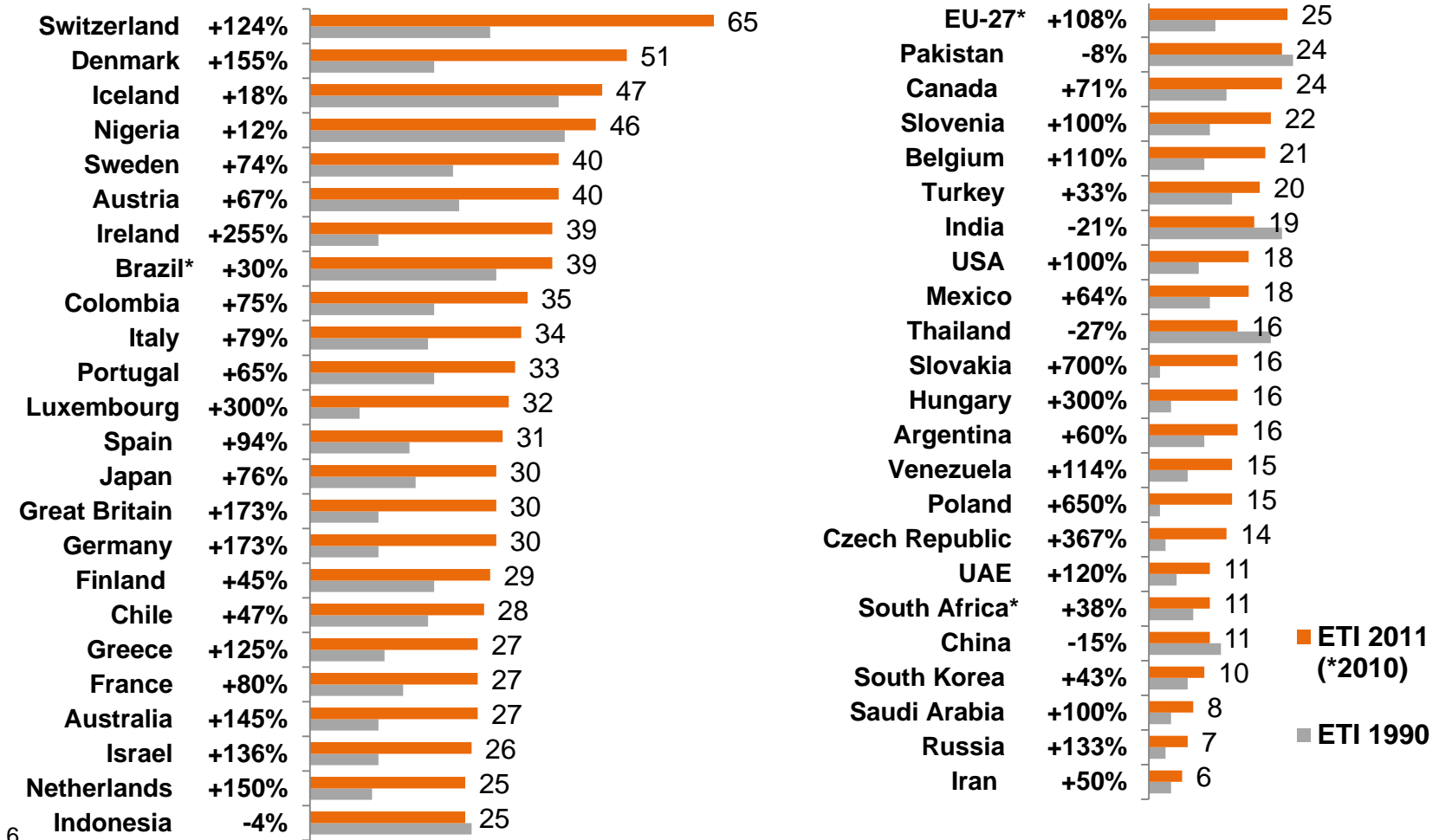


Energy Transformation Index ETI for different countries



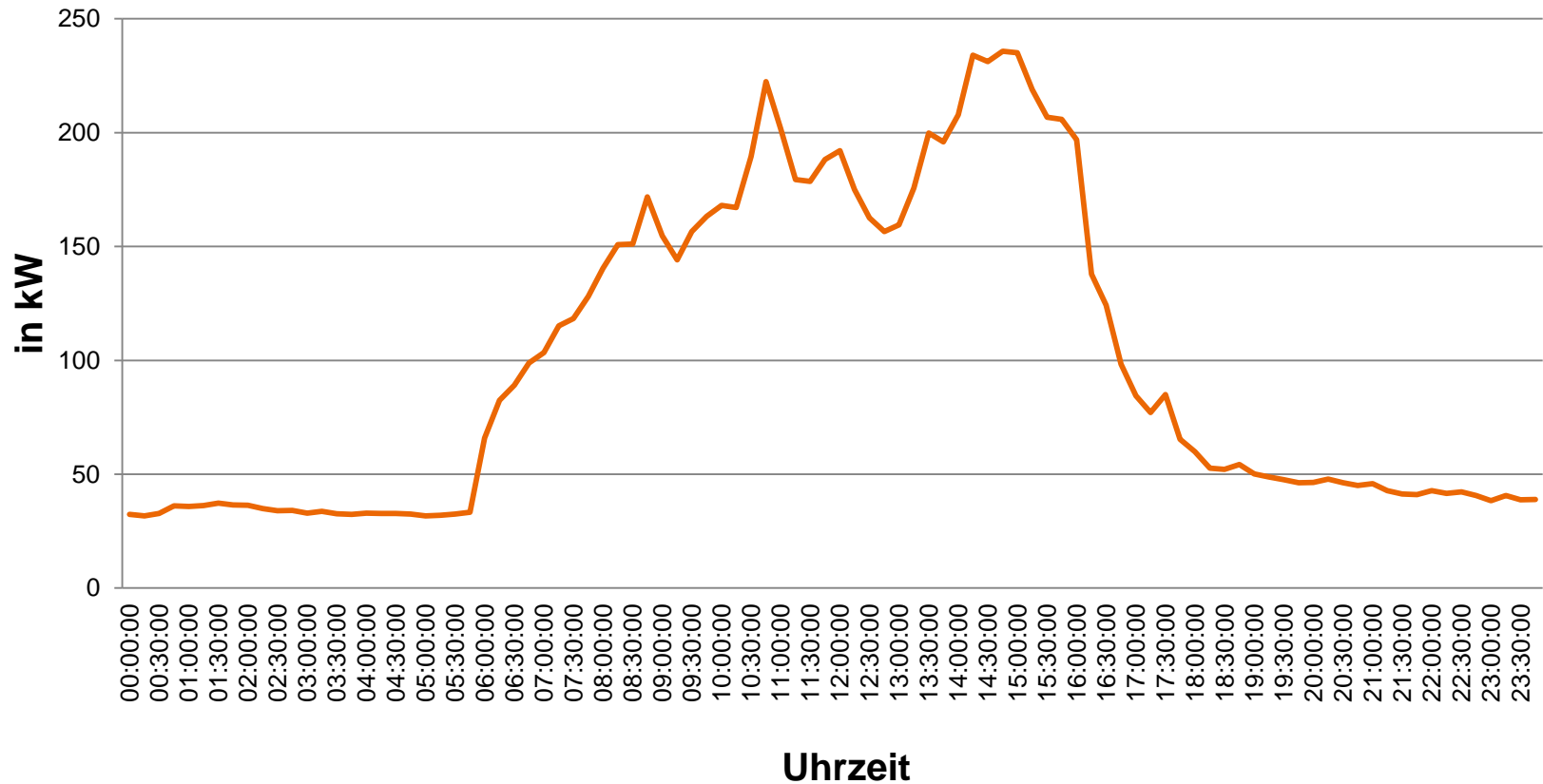
ETI-Ranking for 47 countries

and growth between 1990 and 2011 (percentage)



6

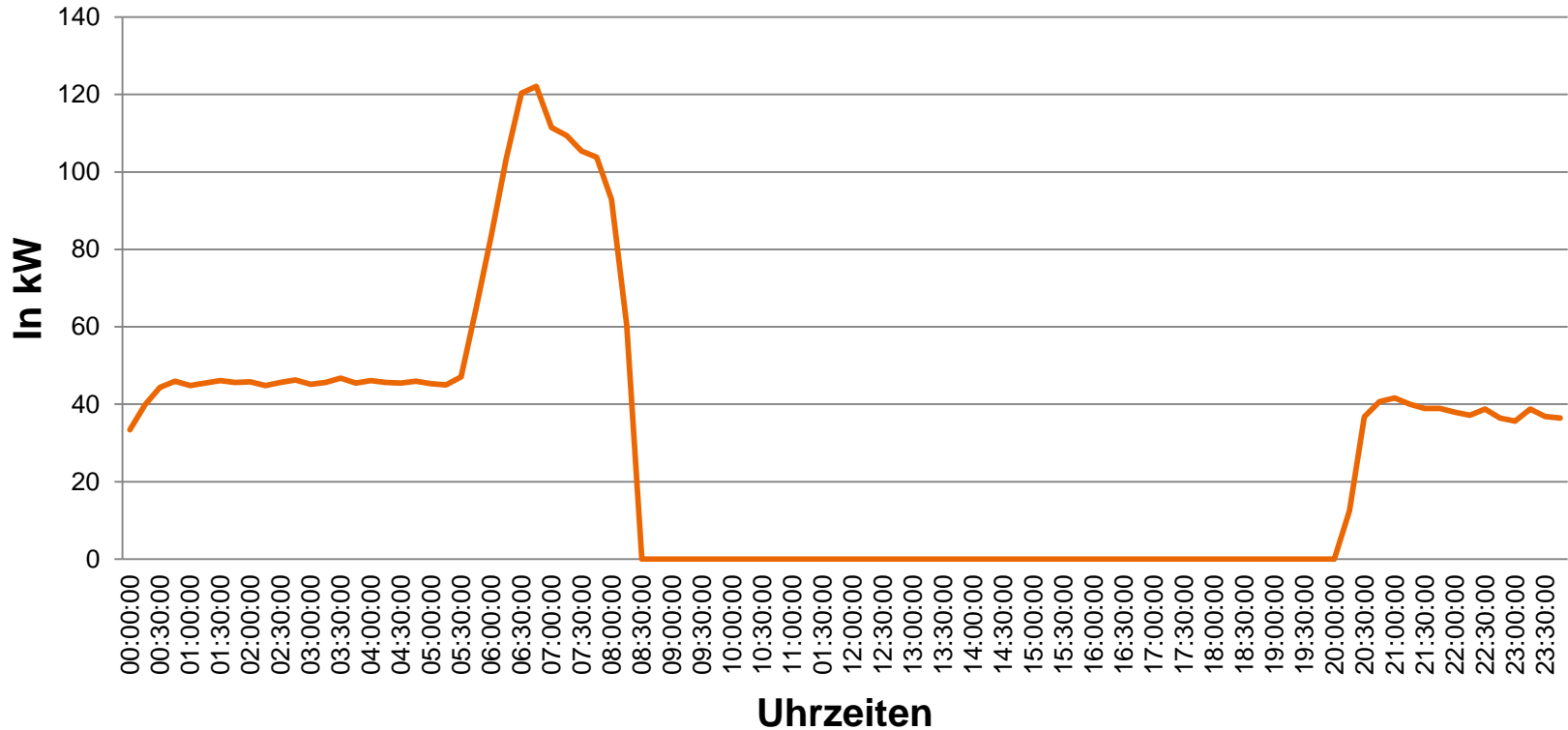
Dienstag, den 16.07.2013



Graph Courtesy Ralf Hofmann, KACO

Daily Electricity Consumption – August Fab 5 K A C O with 2 MW PV System

Dienstag, den 20.08.2013



Graph Courtesy Ralf Hofmann, KACO