

EL Summer University

July 9- 12 2015 Litomerice

Basics of Climate change - distributions matters

Josef Baum

www.josefbaum.at

josef.baum@univie.ac.at

University of Vienna - Department for East Asian Studies

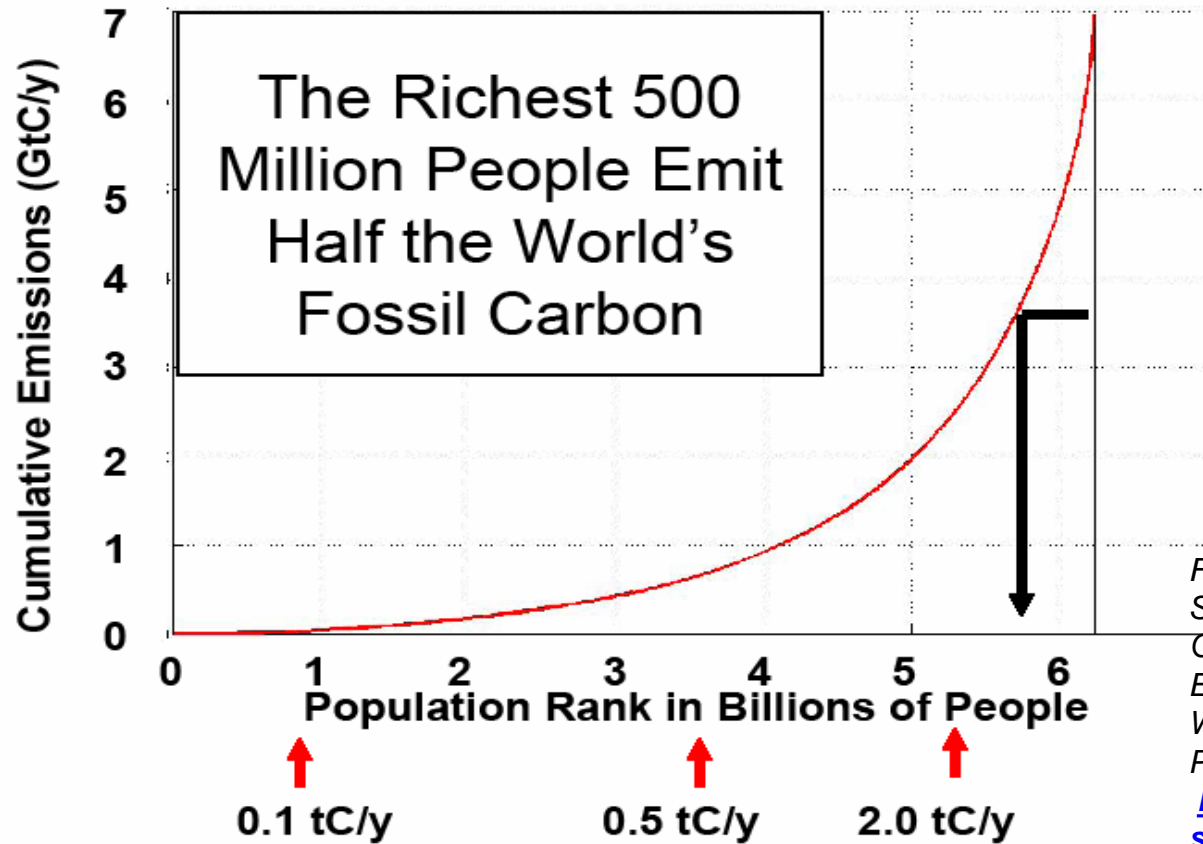
Altes AKH, Spitalgasse 2-4, Hof 2, 1090 Wien, M: +43 664 1142298

Josef BAUM: Basics of climate change -
distributions matter! Litomerice July 2015

Starting point

- Currently high and increasing GHG-emissions
- **weak awareness in the global north**
 - for development issues of the south
 - for the distributional core of the problem
 - for the historical dimension of the problem

Climate **crisis** and global distribution



From: Pacala S.W.: *Equitable Solutions to Greenhouse Warming: On the Distribution of Wealth, Emissions and Responsibility Within and Between Nations*. Princeton, at IIASA, November 2007
<http://www.iiasa.ac.at/iiasa35/docs/speakers/speech/ppts/pacala.pdf>

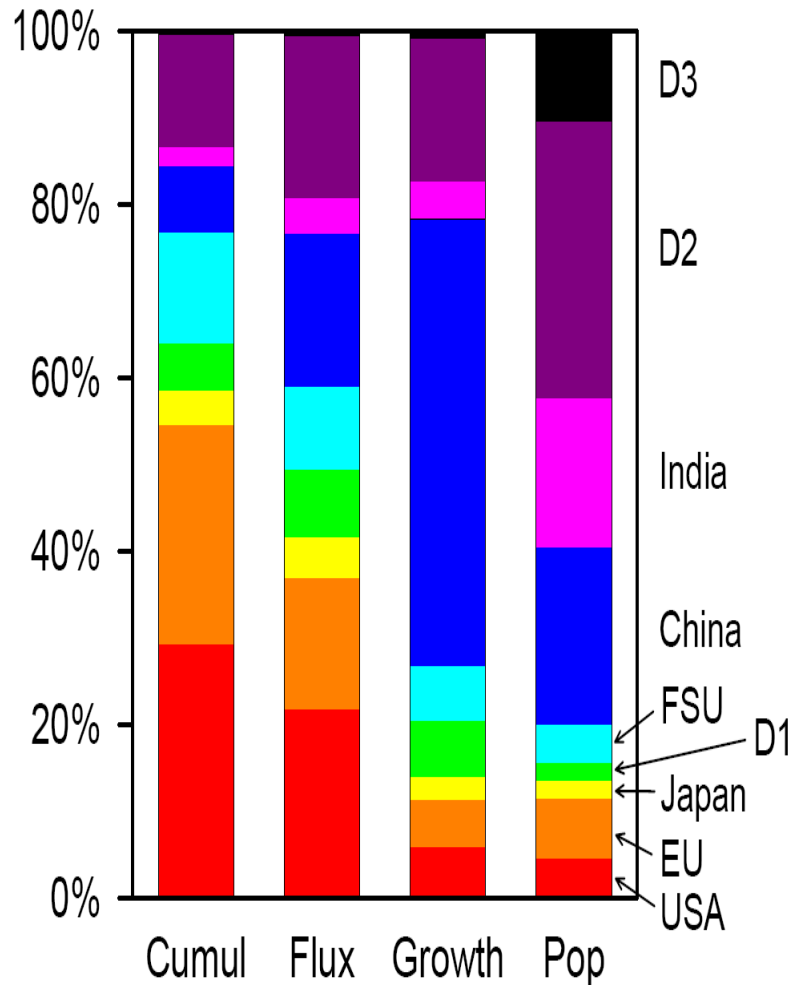
Correlation between income and emissions

- Socially differentiated emissions per capita
- Empiric correlation of stratification along income for consumption and emissions per capita

Evidence of differentiated emissions/consumption of the traffic services a day for Austria: 4 quartiles (income):

1st quartile	20 km
2nd quartile	40 km
3rd quartile	53 km
4th quartile	80 km

(see: Steininger K., Gobiet W. (2005): *Technologien und Wirkungen von Pkw-Road Pricing im Vergleich*, Wegener Center Graz, Bericht 1/2005, p 20f



Different basic views on foundations for solutions (GHG): [columns]

1. Cumulative historical causation
2. Current flux
3. Probable growth potential
4. in relation to population

PARIS CONFERENCE DECEMBER 2015

Could not be overestimated in its significance for mankind

but obviously the dominating forces **do not want a binding treaty** like KYOTO

but the agreement unfortunately will be the sum of **voluntary** goals without a relevant distribution setting which would be required to come to efficient mitigation

This would a **setback behind Rio 1992** and Rio 2012, where the principle of “common but differentiated responsibility” (CBDR) was acknowledged

PARIS CONFERENCE DECEMBER 2015

But there are signs that such regression could be avoided by pressure of people's movement

Positive signs e.g.:

- New York **climate demonstration with 500 000** participants
- Pope Francis prepared a **papal encyclical** on climate change
- Recent developments in costs of renewable energy

Fundamentally new: the "deadline" can enforce "simultaneous" solutions

- complex patterns of many losers and only few winners of climate change
- probably the "poor" are hit relatively stronger climate change also will significantly strike the "rich"
- In proportion to the huge challenge there is not much time: a window of opportunity of about 10 years to keep any drastic change in the framework of "known territory"
- The solution to the climate issue can only be global, requires the involvement of almost all countries
- The poorer countries can and will only join on the basis of fairness and equality

Fundamentally New: the "deadline" can enforce "simultaneous" solutions

- Fairness and equality put questions for the historic responsibility of the accumulation of greenhouse gases.
- This question brings capitalist north's past back in an rather unexpected way. For the first time strong trump cards belong to the south in the central question of burden sharing; because climate change hits also the "rich" strongly and they only hardly can escape
- There will be only comprehensive large or no relevant solutions
- A fair solution for costs of climate change mitigation and adaptation can bring the foundation for the development of the South by redistribution, and thus global convergence and cohesion
- But perhaps only after several attempts

Basics of climate policy

2°C target
Copenhagen
accord

because of irreversibility and uncontrollable implications when $> 2^{\circ}\text{C}$

→ fixed volume of remaining GHG emissions

How to allocate this volume of remaining GHG emissions? = Which **distribution** among countries and persons?

Missing link of climate policy

2°C target
Copenhagen
accord

+

h

basic distribution principle

CBDR (Rio 1992
and Rio+20)

(Common but differentiated responsibility

=X (but which concrete implementation?)

The equation for the missing link of climate policy

2°C target
Copenhagen
accord

+

CBDR (Rio 1992
and Rio+20)

+

X

= climate stabilization

Shortly:

2°C target + CBDR + X = climate stabilization

The missing link of climate policy:

Equal rights

2°C target
Copenhagen
accord

CBDR (Rio 1992
and Rio+20)

**Equal
rights**

+

+

=climate stabilization



Josef BAUM: Basics of climate change - distributions matter! Litomeric July 2015

Energy as central factor for political economy and political ecology

- **Energy connects climate change via emissions of CO2 of fossil energy**
- **Energy has been decisive for productivity of labour**

→ Energy issues can be seen as pivot:

E.g. food prices are highly correlated to energy prices, because in food there is incorporated much fossil fuel

“Energy union”- proposals for the EU energy policy concentrating on

- "markets" (but oligopolies in reality)
- (imperialist) power policy.
- fossil lock-in

Alternatives focussing on

- renewable energy
- energy efficiency
- energy democracy – democratic control
- cutting all fossil (and nuclear) subsidies
- improved cooperation with neighbour regions

Sir Stern (Stern Report, updates currently): a new strong narrative of capitalism

- On the one hand Stern has a very **realistic analysis** of BAU (business as usual) in climate change scenarios – good rationale for massive and quick actions
- Climate change is “**biggest market failure**” in history
- **But** only capitalism has the creative potential to handle the challenges (Schumpeter!?) – stressing current developments in PV-industry

But what about

the **rebound effect** (more energy efficiency but also more demand to energy) because of capital accumulation implications?

Lock-in in fossil technologies because strong oligopolies can prevent devaluation of capital invested in fossil technologies

(Shifting to) **short term rents and profits** (determined also by the financial sector) – profit rates as “discount factors” devalutate future

Lacking compass: No or small integration of social and environmental costs in prices

Photovoltaics is achieving grid parity!!

Grid parity := the point at which the cost of photovoltaic electricity is equal to or cheaper than the price of grid power; dependent of concrete circumstances

(Somehow surprising) cost development in solar energy - photovoltaics over the last decade

Global modul price since 2007: ~ minus 75%!!!!

→20 % of the level of 2007



Break-through in cost of renewable energies

PV-cost minus ~75 % - current level is 25 % of level of 10 years ago

- Without fundamental new technologies, but by scale and learning effects

Open issues: grid integration, storage

Fossil mobility?

Nuclear energy- also economically hardly competitive; if costs of waste storage included → completely out

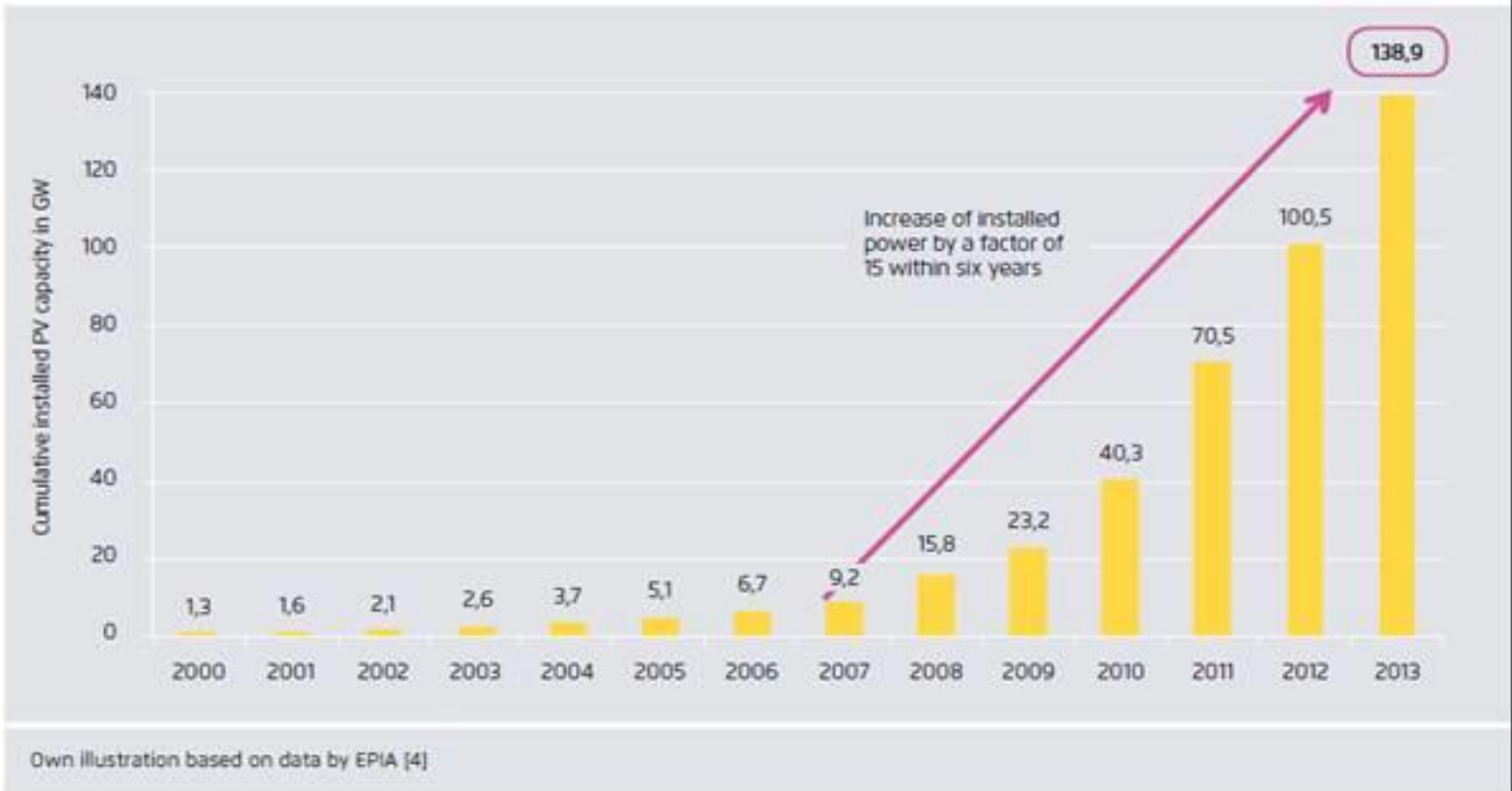
Currently also cost revolutions at storage of solar energy

Do not overestimate negative effects of lower prices of fossil energy

- Because of break-through in costs of renewable energies – in the range of competitiveness
- Will limit investments in fossil fuels with very negative effects (deep sea drilling, Arctic, tar sands, fracking...)
- Sun does hardly compete with Oil - Oil mainly is for cars; PV is for electricity.

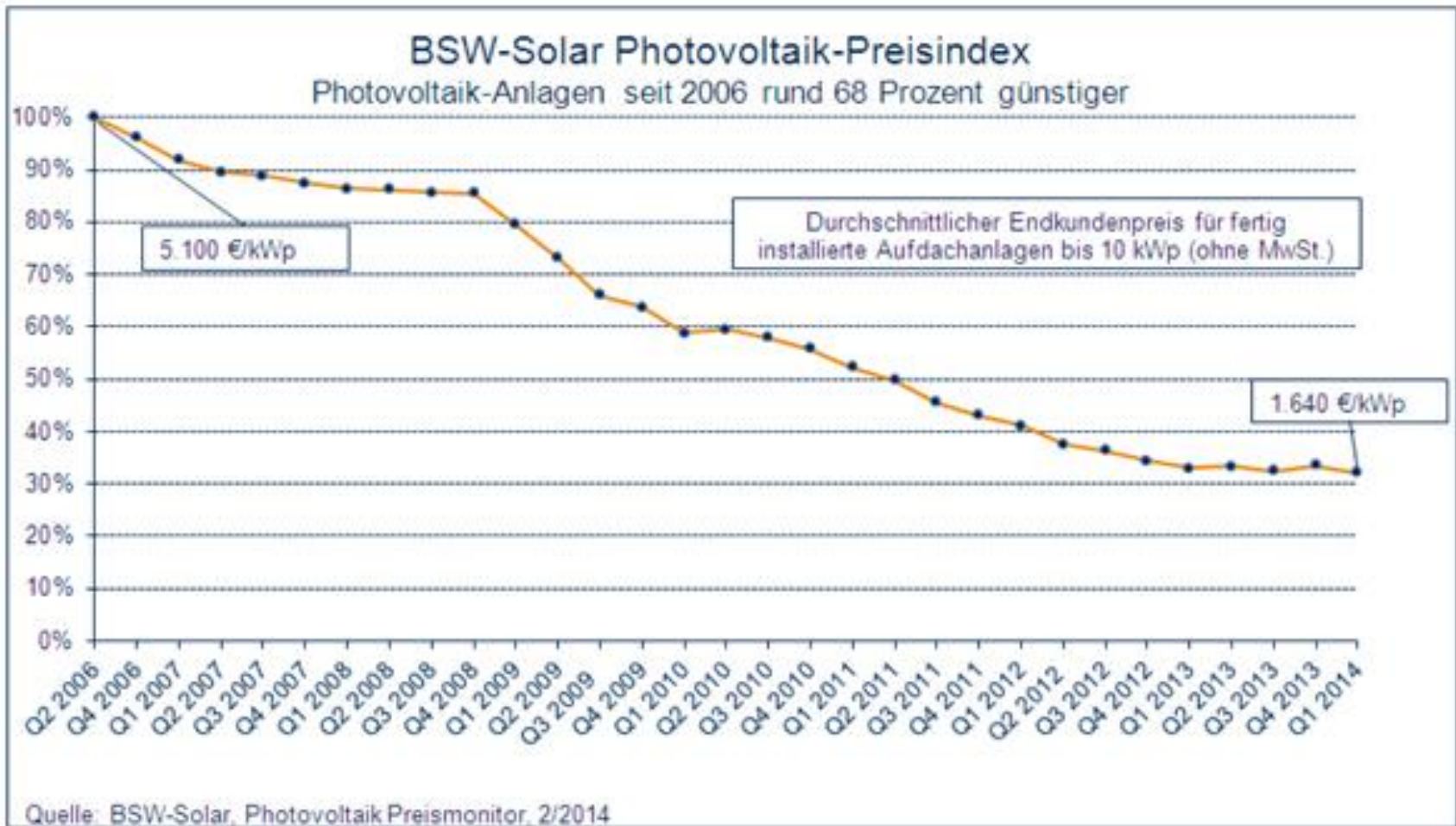
Historical development of installed PV capacity worldwide

Figure 3



Fraunhofer-Institute for Solar Energy Systems (ISE)(Feb 2015): Current and Future Cost of Photovoltaics. P. 19





Significant drop of prices **2008-2010**, reaction to chinese anti-crisis programme



“Solar photovoltaics is already today a low-cost renewable energy technology.

Cost of power from large scale photovoltaic installations in Germany fell **from over 40 ct/kWh in 2005 to 9 ct/kWh in 2014**. Even lower prices have been reported in sunnier regions of the world, since a major share of cost components is traded on global markets.

Solar power will soon be the cheapest form of electricity in many regions of the world.

Even in conservative scenarios and assuming no major technological breakthroughs, an end to cost reduction is not in sight. Depending on annual sunshine, power cost of 4-6 ct/kWh are expected by 2025, reaching 2-4 ct/kWh by 2050 (conservative estimate)”.

Fraunhofer-Institute for Solar Energy Systems (ISE)(Feb 2015): Current and Future Cost of Photovoltaics. P. 1 (Accentuation J.B.)

“Financial and regulatory environments will be key to reducing cost in the future.

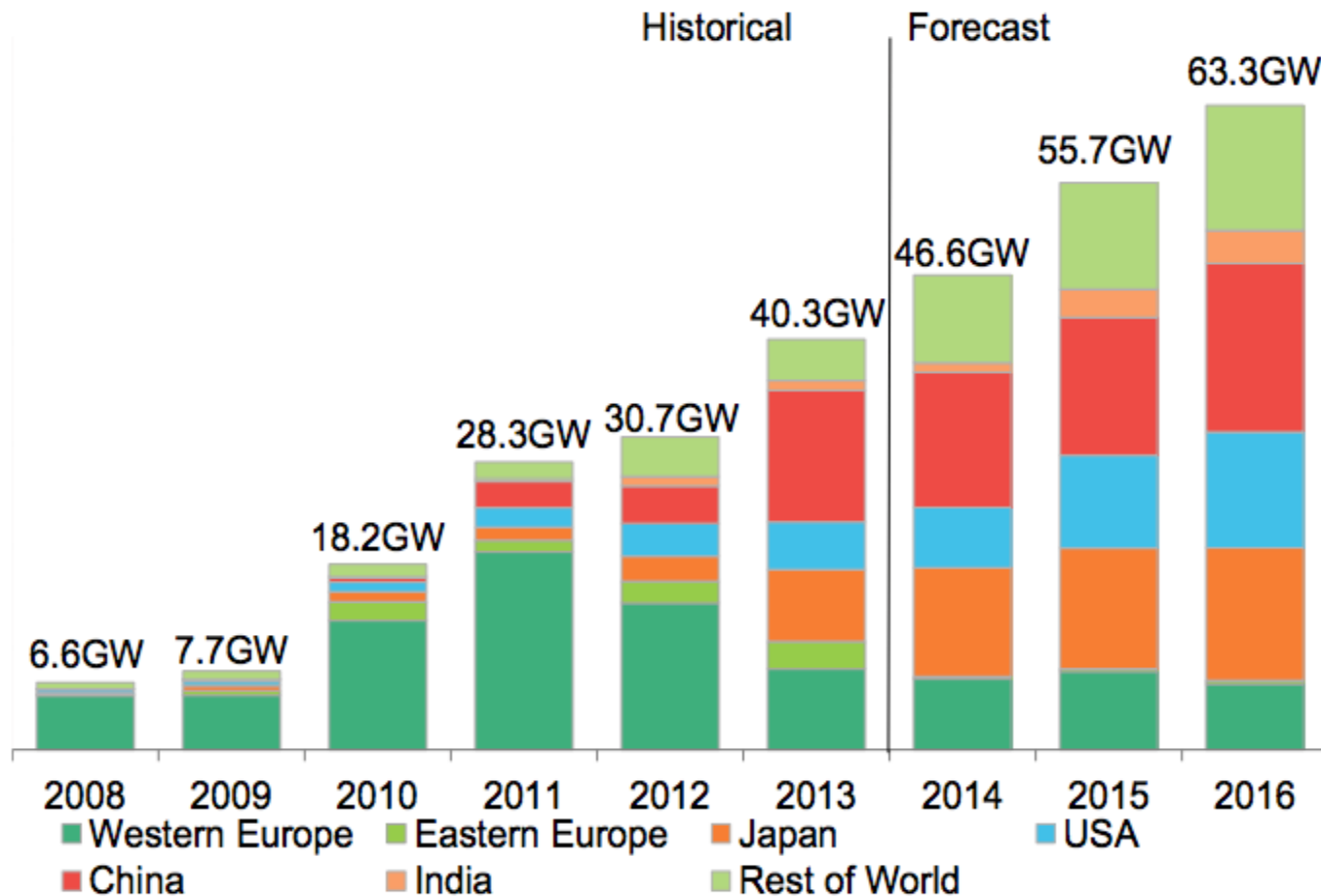
Cost of hardware sourced from global markets will decrease irrespective of local conditions. However, inadequate regulatory regimes may increase cost of power by up to 50 percent through higher cost of finance. This may even overcompensate the effect of better local solar resources.

Most scenarios fundamentally underestimate the role of solar power in future energy systems.

Based on outdated cost estimates, most scenarios modeling future domestic, regional or global power systems foresee only a small contribution of solar power. The results of our analysis indicate that a fundamental review of cost-optimal power system pathways is necessary”.

Fraunhofer-Institute for Solar Energy Systems (ISE)(Feb 2015): Current and Future Cost of Photovoltaics. P. 1 (Accentuation J.B.)

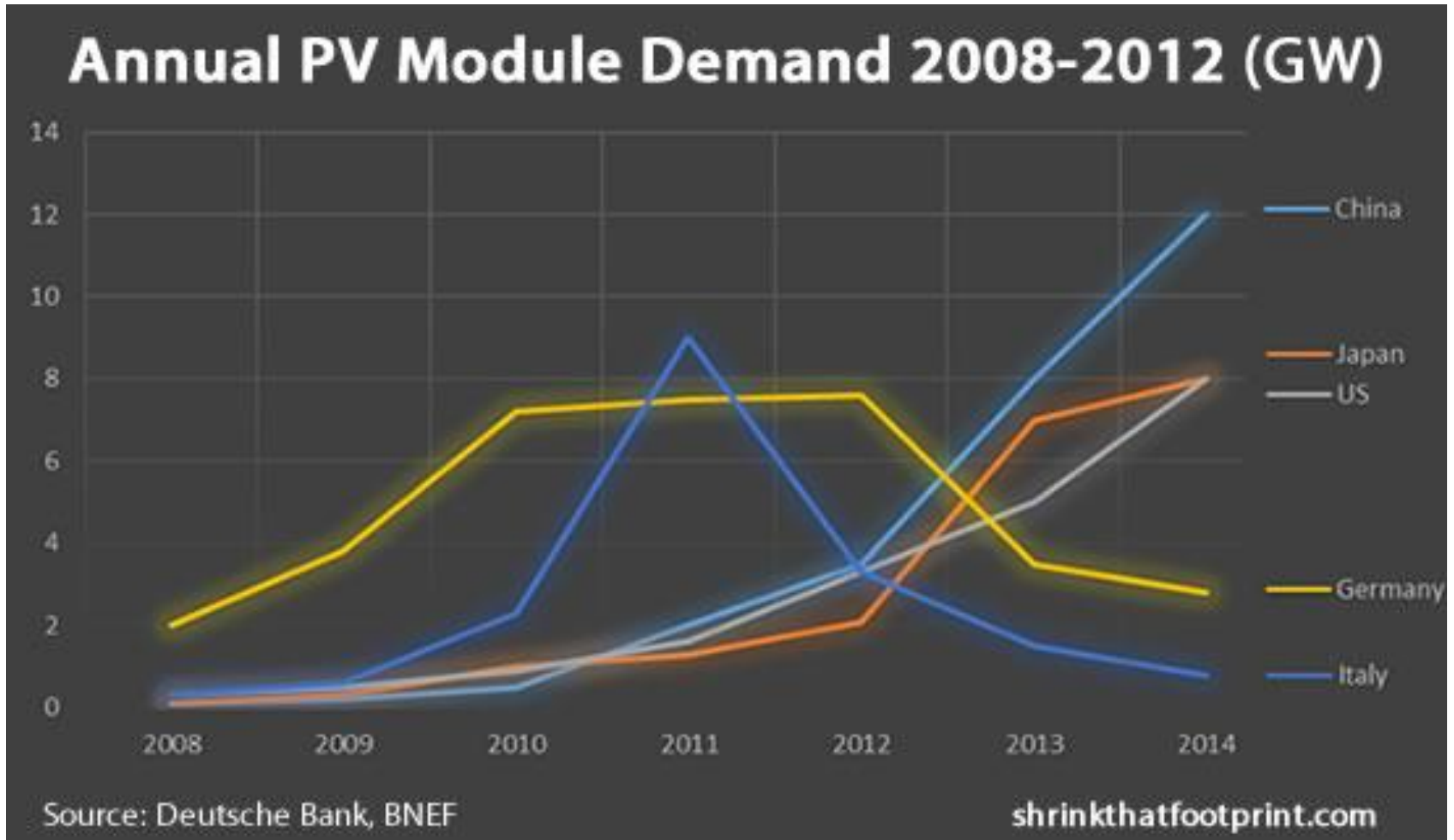
Europe is tremendously loosing global shares in renewable energy - capacity additions in clean Energy



Source: Bloomberg New Energy Finance
("clean energy" including nuclear)

/ Josef BAUM: Basics of climate change -
distributions matter! Litomerice July 2015

Europe is tremendously loosing global shares in renewable energy



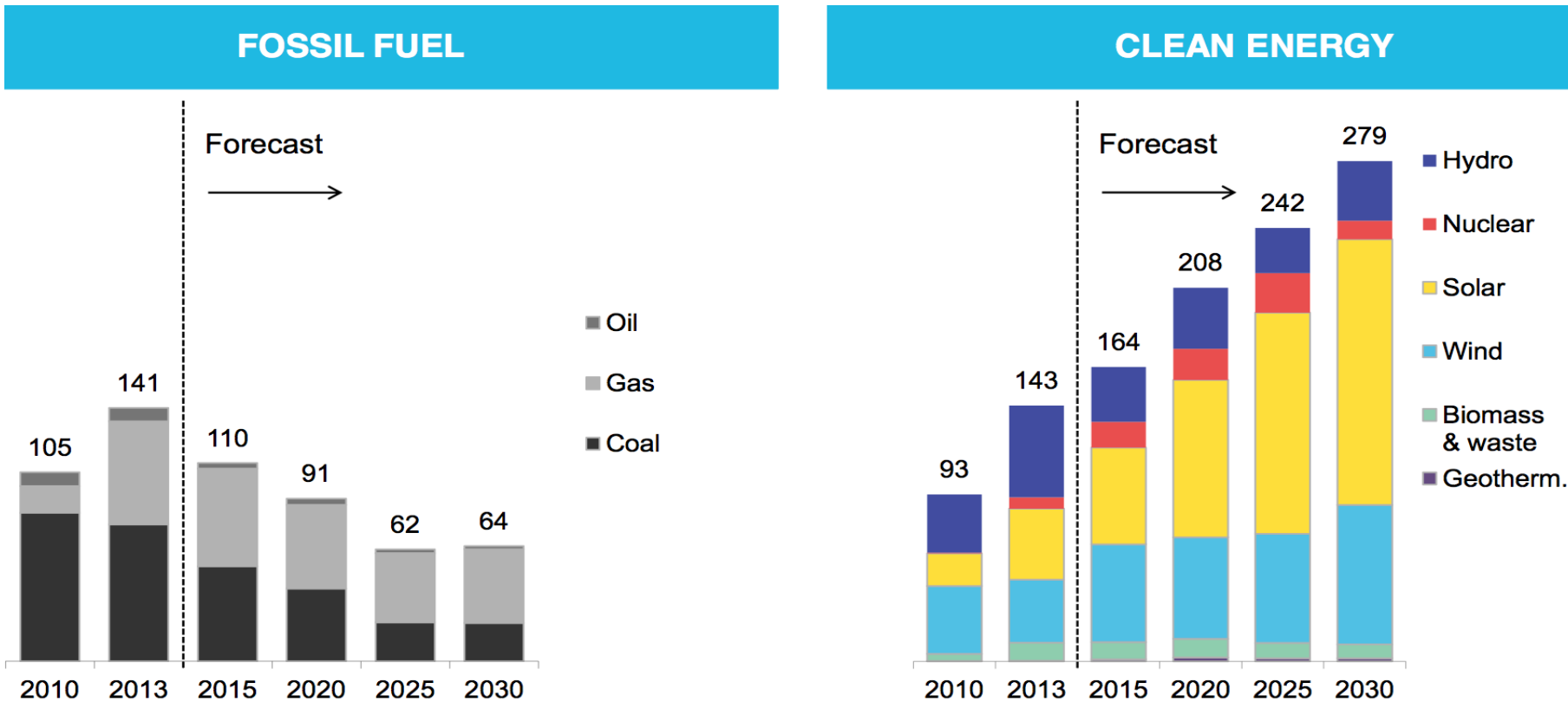
<http://cleantechnica.com/2014/05/16/europe/>

Josef BAUM: Basics of climate change -
distributions matter! Litomerice July 2015

The Beginning of the End of Fossil Fuel: Power generation capacity additions (GW)

Solar (PV) makes up less than 1 % of electricity today but will be the biggest single source by 2050, according to the Intern. Energy Agency.

Global investment in clean energy is increasing (in fossil energy decreasing)



USA

- Unconventional fossil resources impede US to come out of **fossil lock-in**; will impede higher energy efficiency and impede innovation generally.
- **Higher energy prices in EU** should/will be **incentives** for EU-industry to invest in energy efficiency, so to **innovate**, come to new technology and **have lower energy bills not by lower energy prices but by lower quantities of energy** by better energy efficiency

Fossil-fuel subsidies outpace renewable-energy subsidies by a factor 6:1

(Bloomberg, IEA- World Energy Outlook 2011)

State spending to cut retail prices of gasoline, coal and natural gas rose 36 percent to **\$409 billion** as global energy costs increased. Aid for biofuels, wind power and solar energy, rose 10 percent to **\$66 billion**.

- The OECD estimated its member countries gave oil, coal and natural gas producers between \$45 billion and \$75 billion a year in support for production from 2005 through 2010.

<http://www.bloomberg.com/news/articles/2011-11-09/fossil-fuels-got-more-aid-than-clean-energy-iea>

Fossil-fuel subsidies outpace renewable-energy subsidies by a factor 6:1

(IEA, Bloomberg)

While governments argue that fossil fuel subsidies are designed to help the poorest members of society, they generally fail to meet that goal, the IEA said. **Just 8 percent of aid reached the poorest** 20 percent of each country's population

<http://www.bloomberg.com/news/articles/2011-11-09/fossil-fuels-got-more-aid-than-clean-energy-iea>

Containment of effects of climate change needs a radical turn

- Basic results (Stern-report and others:) the sooner effective climate policy starts the „cheaper“ and less sacrifices“
- To converge to the level of 550 ppm CO₂ in the atmosphere at the end of the century the sum of CO₂-emissions would have to get at least roughly 80 % below the actual level
- In the north: fair global solutions at least minus 90 %
- G77-paper in Bali: north minus 95 %

What is unrealistic?

A radical turn just now seems rather unrealistic

But further business as usual even more seems to be an “utopian fantasy”*

Foster Bellamy (2009): The ecological revolution – making peace with the planet. P.259 (citing Raskin)

There are "deadlines" for solving the climate issue, now an existential question of humanity

Irreversible tipping points

change the rules of the game

See the book of NAOMI KLEIN: “THIS CHANGES EVERYTHING. Capitalism vs. climate”