



The Global co-benefit agenda

Chandra Bhushan



Centre for Science and
Environment



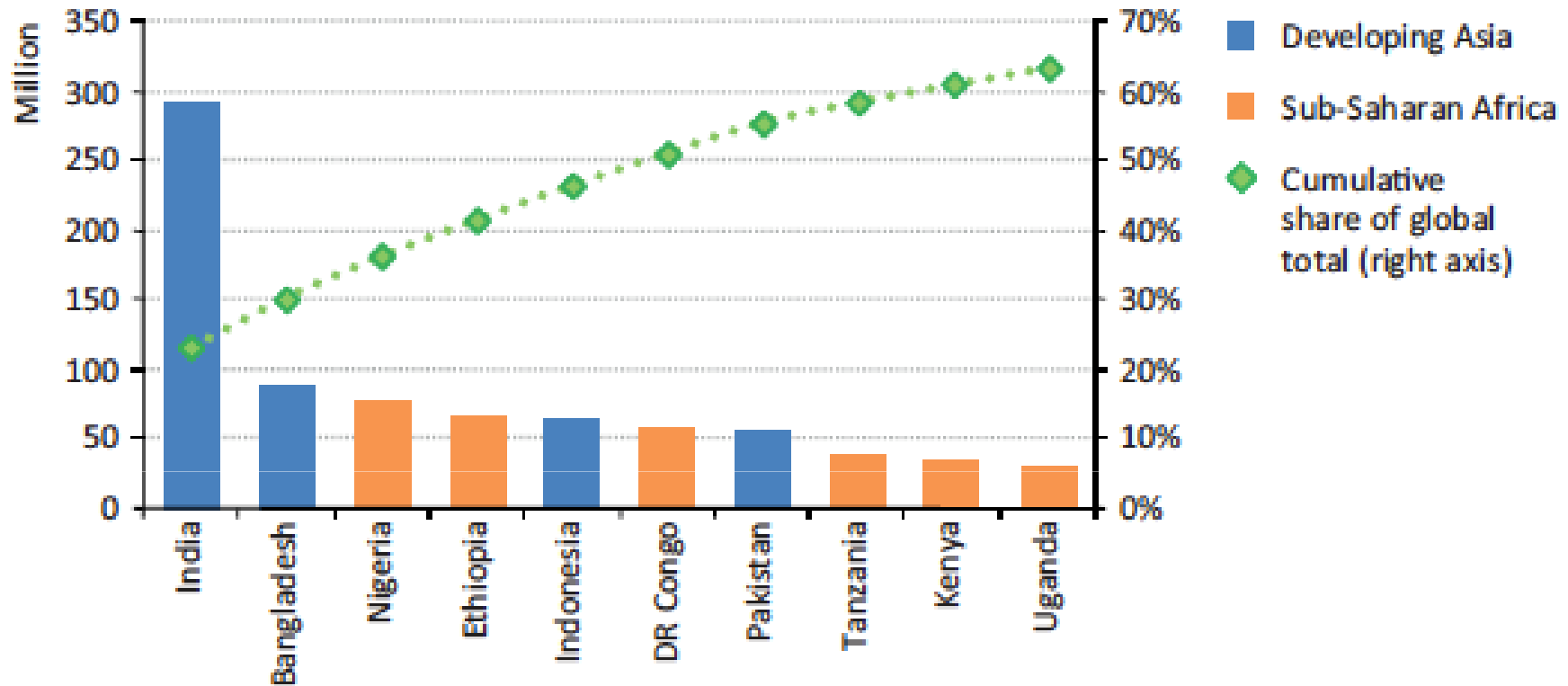
Status: 1992-2012

In 20 years since 1992:

- Global CO₂ emissions increased by 50% and reached 32 billion tonnes in 2012.
- CO₂ concentration in the atmosphere increased from 356 ppm in 1992 to 400 ppm.
- Number of people without access to electricity remained more or less the same: 1.5 billion in 1992 to 1.3 billion in 2012.



Access to electricity

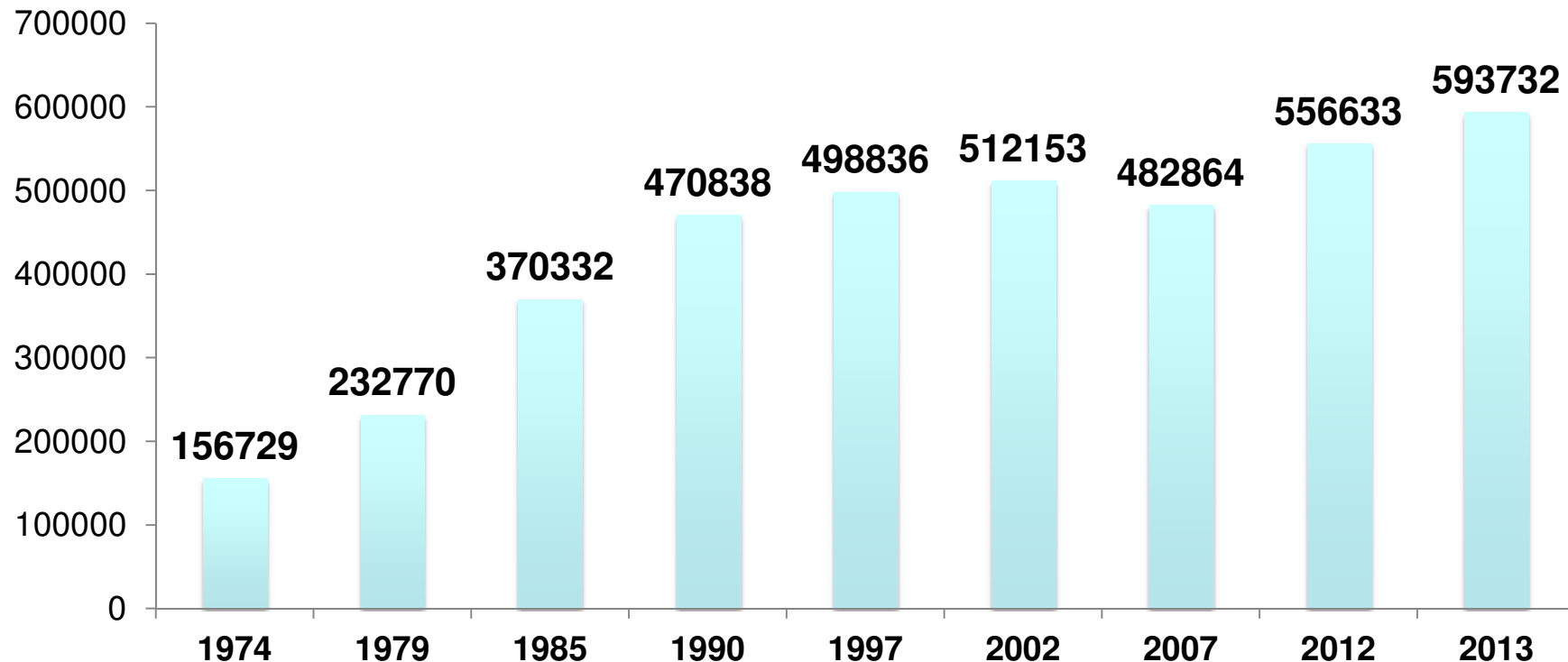


- In 2012, nearly 1.3 billion people did not have access to electricity; two-thirds of which are in 10 countries.



Access to electricity - India

Number of villages electrified



- A village is declared electrified if 10% of households have electricity connection; no benchmarks for hours of supply
- More than 90% villages connected to the grid

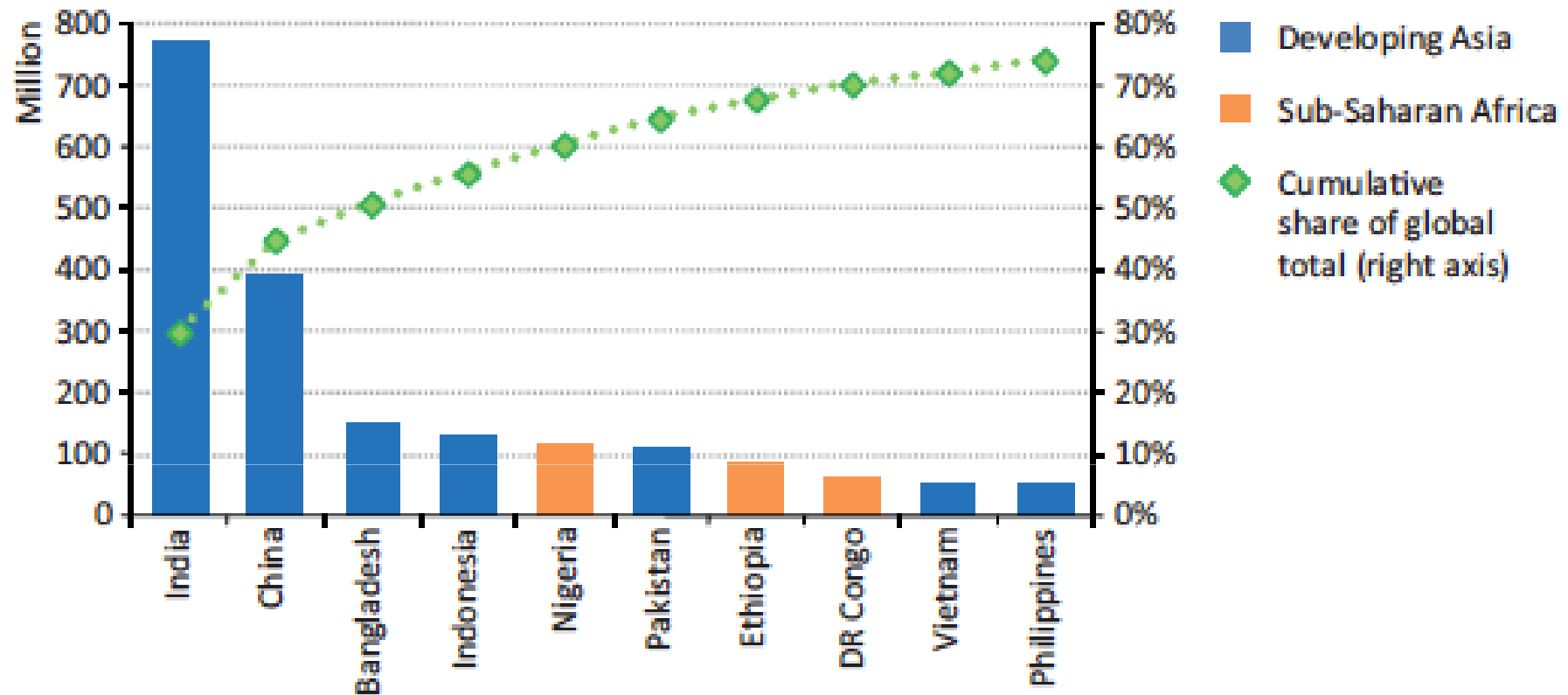


Census 2011: Energy poor in India

- 55.3% households connected to the grid
 - But, electricity supply continues to remain poor; 75% connected households (about 90 million) get less than 6 hours supply.
 - Per capita consumption is about 10 kWh per month
 - **170 million households with no electricity or less than 6 hrs supply – 700 million people**



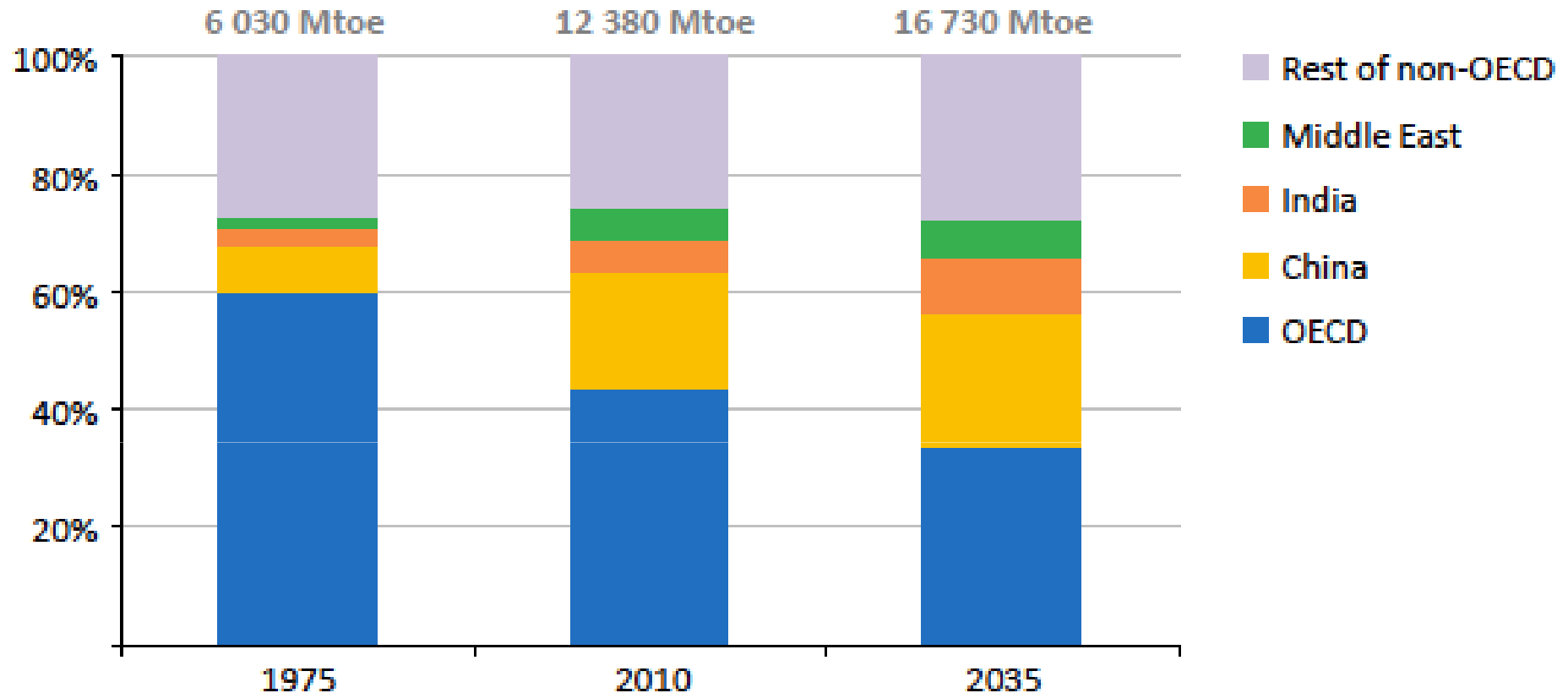
Access to clean cooking fuel



- In 2010, around 2.6 billion people relied on traditional biomass for cooking.
- Nearly two-thirds of India's and 80% Sub-Saharan Africa's population remains without clean cooking facilities.



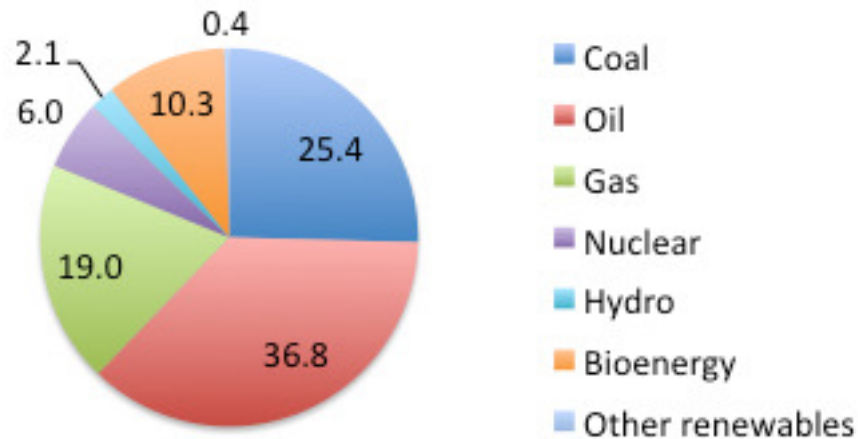
Global energy demand: IEA



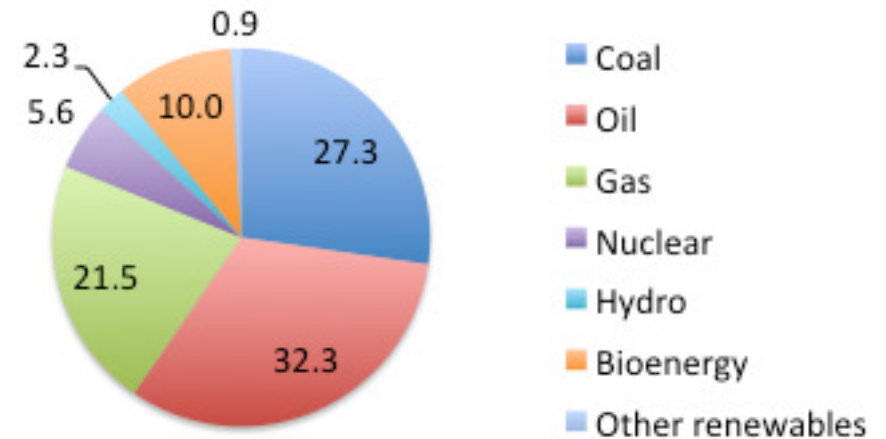
- Global energy demand grows by more than one-third by 2035 @ 1% pa. China (2% pa), India (3% pa) and the Middle East (2% pa) accounting for 60% of the increase.
- But demand increase in high consuming OECD countries as well at 0.1-0.2% pa.



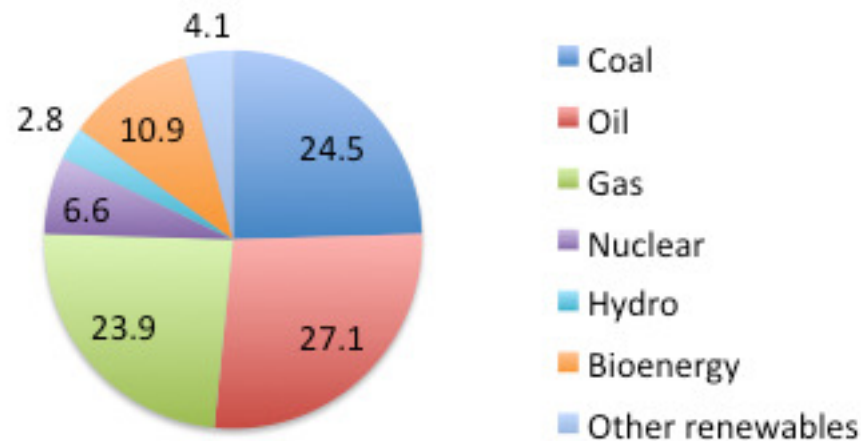
Global energy mix: IEA



1990



2010



2035

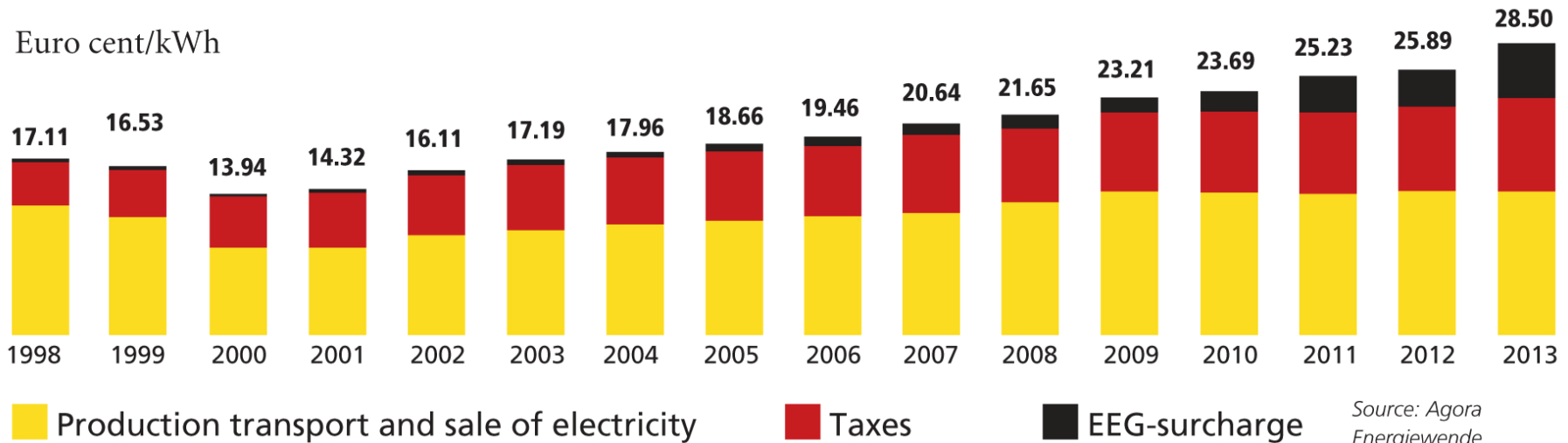


Affordability

- Which kind of energy the poor countries will go for? **Affordable energy**
- Energy affordability:
 - US\$ 0.10-0.50/ kWh: Developed countries
 - US\$ 0.05-0.10/kWh: Emerging economies
 - US\$ 0.02-0.05/kWh: Least developing countries
- For most developing countries, **indigenous hydropower, coal and gas** can only provide electricity at US\$ 0.05-0.10/kWh



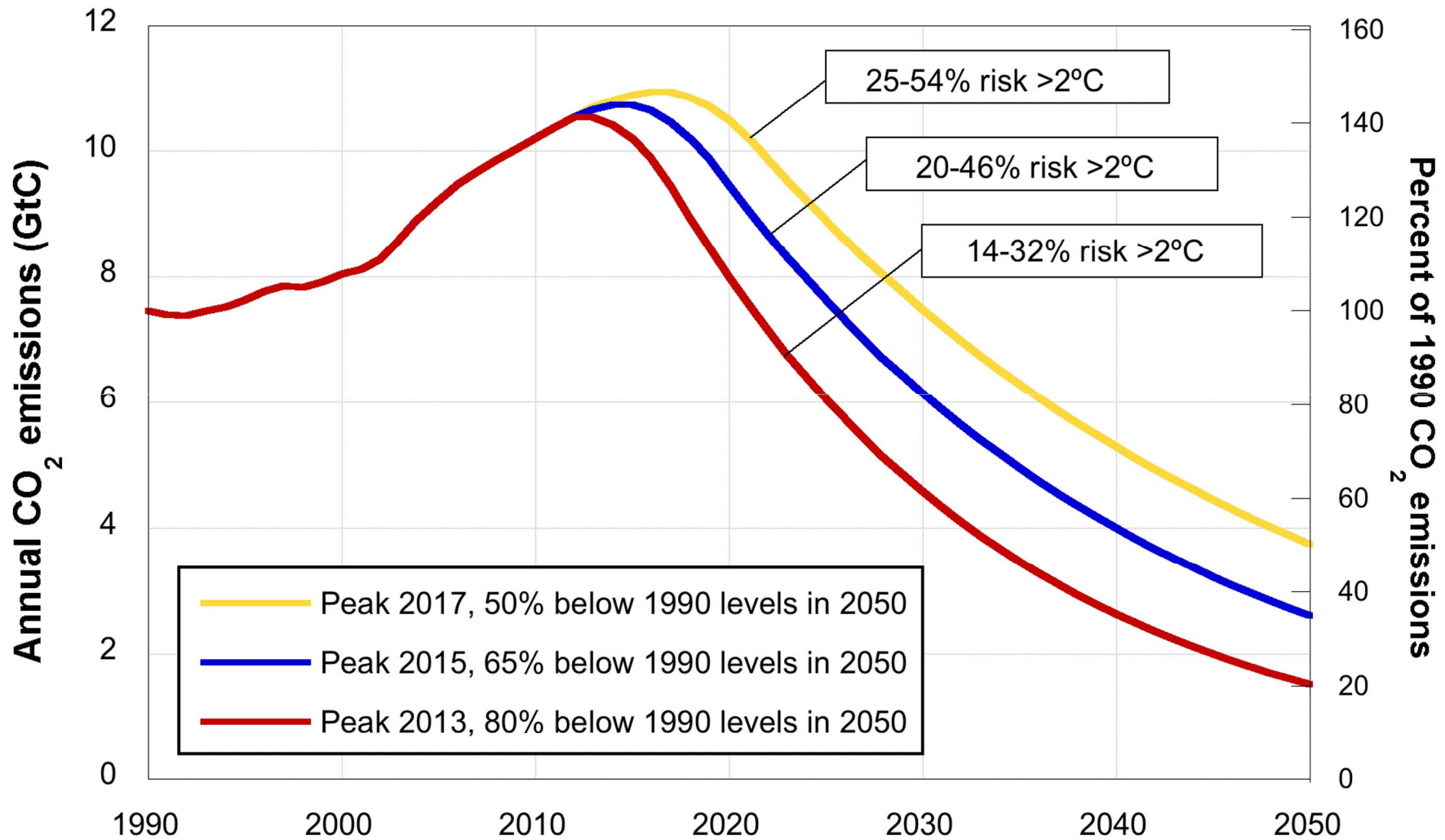
What an average Indian can afford at Germany's electricity prices?



- At US\$ 1000 per capita income, if an average Indian spends 10% income on electricity, he can afford less than 0.5 kWh/ day at Germany's prices.
- Most developing countries cannot afford large-scale renewable energy at current prices.
- Shifting to high cost alternatives would mean excluding large population from energy access or huge subsidy – **both unaffordable**



Global 2°C emissions pathways



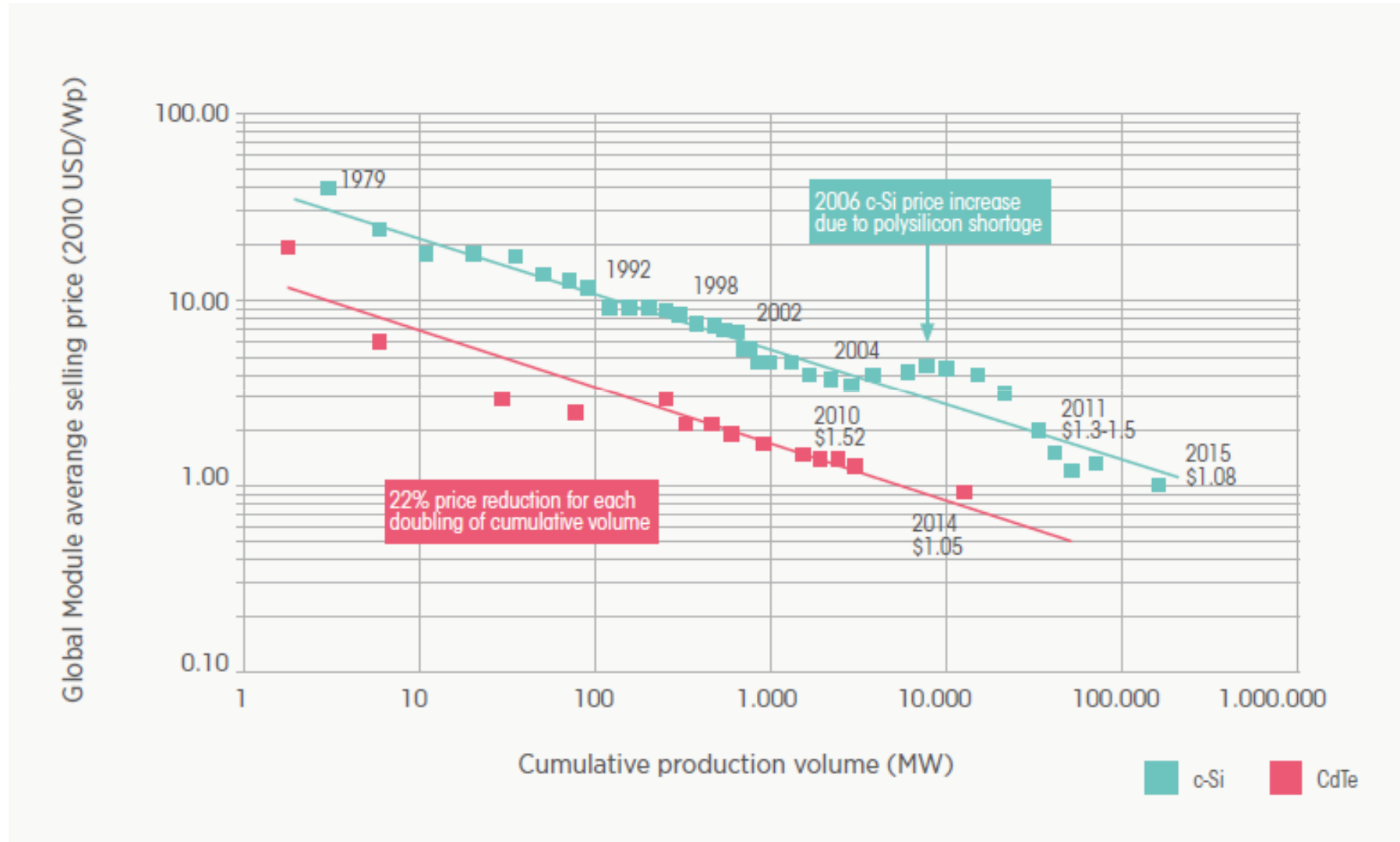


Climate-Energy Challenge

- Can't continue with fossil fuel – must move to renewable energy to meet large part of energy requirement
- But how can developing countries move with their huge energy access challenge and low affordability?
- The only way the world, especially developing countries, will move to renewables if it is affordable to all and provides high level of energy services



Global PV price learning curve





Public investment as driver

- Research show that the **pooled price of 24x7 renewable energy** must be brought down to **US\$ 0.10/ kWh** to make it affordable to all.
- An additional installation of 1,000 GW of renewable energy and massive funding in storage and grid technology.
- No individual country can do this. **We need a global deal**



Global deal

- Climate negotiations not moving ahead because of “Zero-sum game”.
- We need to convert “zero-sum” to “positive sum”
- “Positive sum” is if we expand energy budget but reduce carbon space – **cheap renewable energy**
- **National programmes supported by Global pot of money and technology to invest in expanding renewable capacity, storage and grid technology.**



Global feed-in-tariff

- **Global renewable energy support programme to install 1,000 GW renewable energy in developing countries in next 15 years**
- **Global community will pay incremental cost (difference between renewable price and the pooled grid price) – reduce year after year as conventional power price increases.**
- **Countries will get installation share based on number of people without access to energy**
- **Estimated cost: US\$ 1.5 trillion – US\$ 100 billion/ year**



Global feed-in-tariff: Can the world afford?

- **US\$ 100 bilion/ year = 0.8% of the tax base of developed countries = 0.2% of their GDP**
- **Every country will contribute based on “responsibility-capability index”**
- **It will provide clean energy to 2 billion energy poor people**
- **Will bring down the cost of renewables make it mainstream**
- **Will go a long way in solving climate change**