

Doubling the global share of renewables by 2030

Dolf Gielen, Director IRENA Innovation and Technology Centre

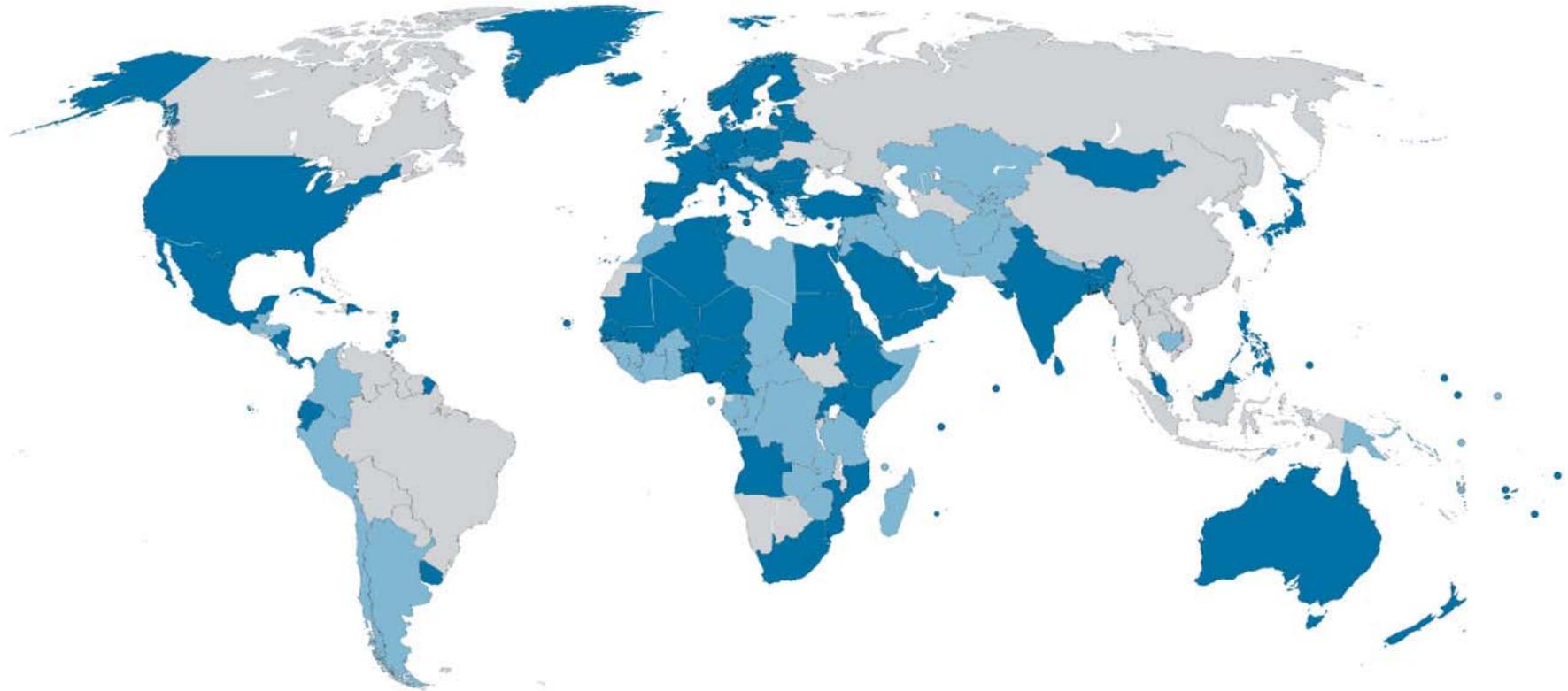
About IRENA



International Renewable Energy Agency
Established April 2011
The intergovernmental RE agency

Mission: Accelerate deployment of renewable energy
Scope: Hub, voice and source of objective information for renewable energy
Members: 159 countries are engaged; 104 ratified member countries
Mandate: Sustainable deployment of the six RE resources (Biomass, Geothermal, Hydro, Ocean, Solar, Wind)
Location: Headquarters in Abu Dhabi, United Arab Emirates
Innovation and Technology Centre IITC, Bonn, Germany
Director-General: Adnan Amin

IRENA Membership



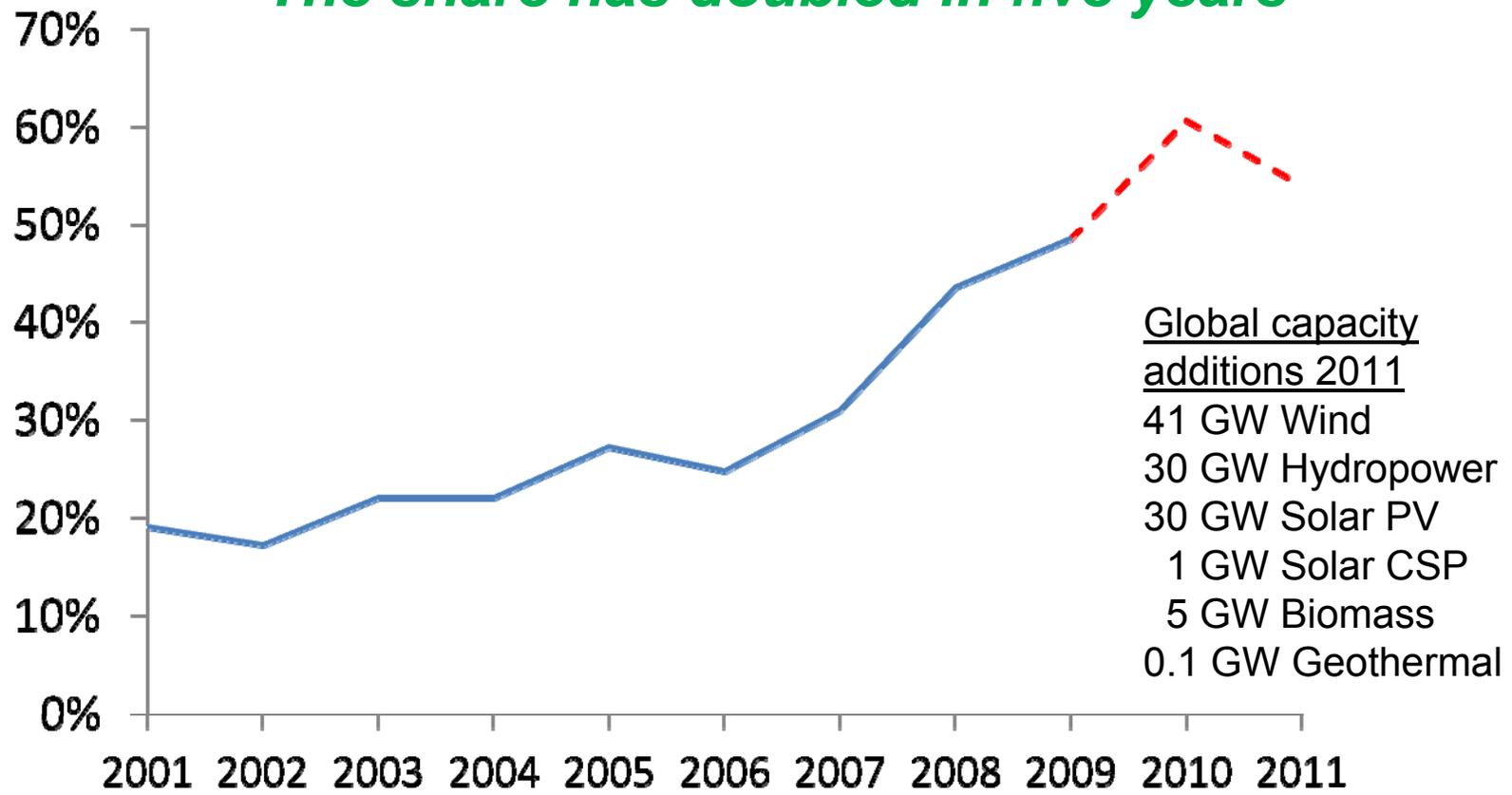
-  Members of the Agency
-  Signatories/applicants for membership

1

RE MARKET TRENDS

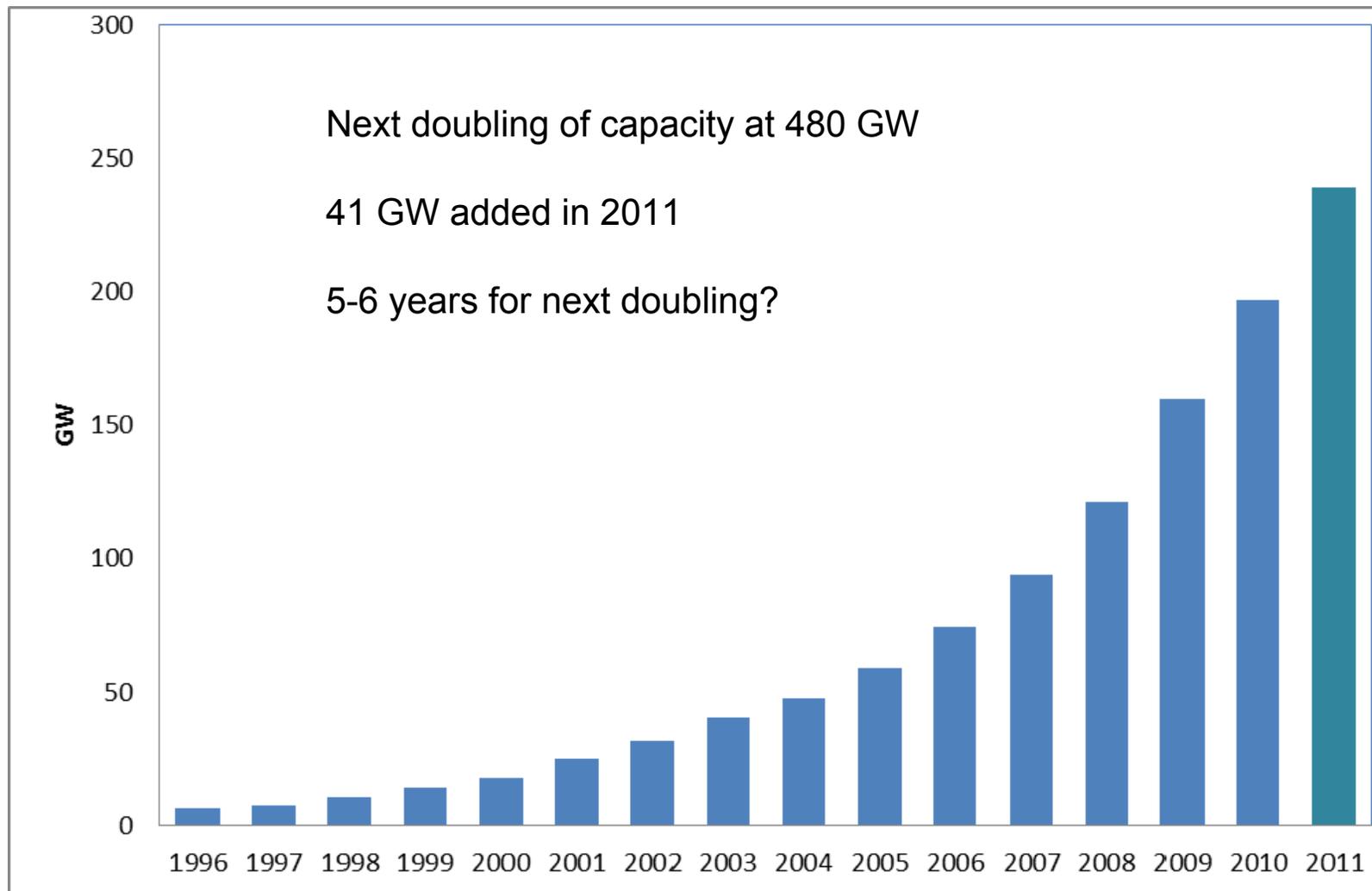
About half of the new electricity generation capacity worldwide is based on renewable energy

The share has doubled in five years



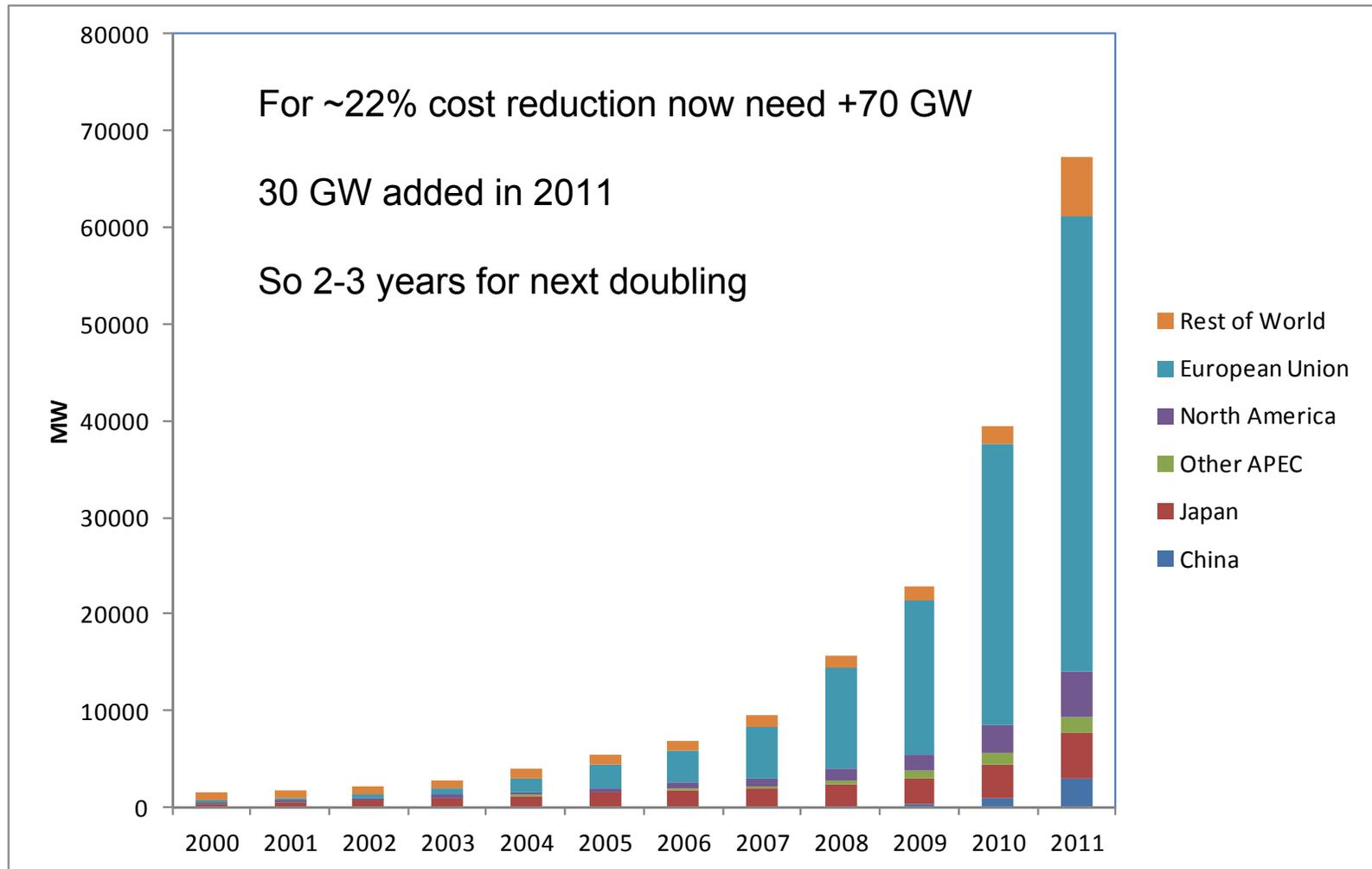
Source: IRENA

Cumulative installed wind capacity



Source: GWEC, 2011 and WWEA, 2012.

Cumulative installed PV capacity



Source: EPIA

Outlook

- In 2012 market stabilization at high level
- Grid parity – in Spain 30 GW PV proposed by developers - without feed-in tariff !
- Today 5 000 GW installed capacity, about 8 000 – 9 000 GW in 2030
- Stable or declining coal use
- Limited nuclear growth – no renaissance any time soon
- Low cost gas can complement variable renewables
- Likely outcome more than half of all capacity will be renewable in 2030 – *in a business as usual scenario, more is possible*
 - 1500 GW + of hydro
 - 1000 GW + of wind
 - 1000 GW + of solar PV (may be much more)
 - 200 GW + of biomass (biogas, co-combustion, steam boilers, gasification)
 - Plus CSP, geothermal, marine 100 GW +

2

RE COSTS TRENDS

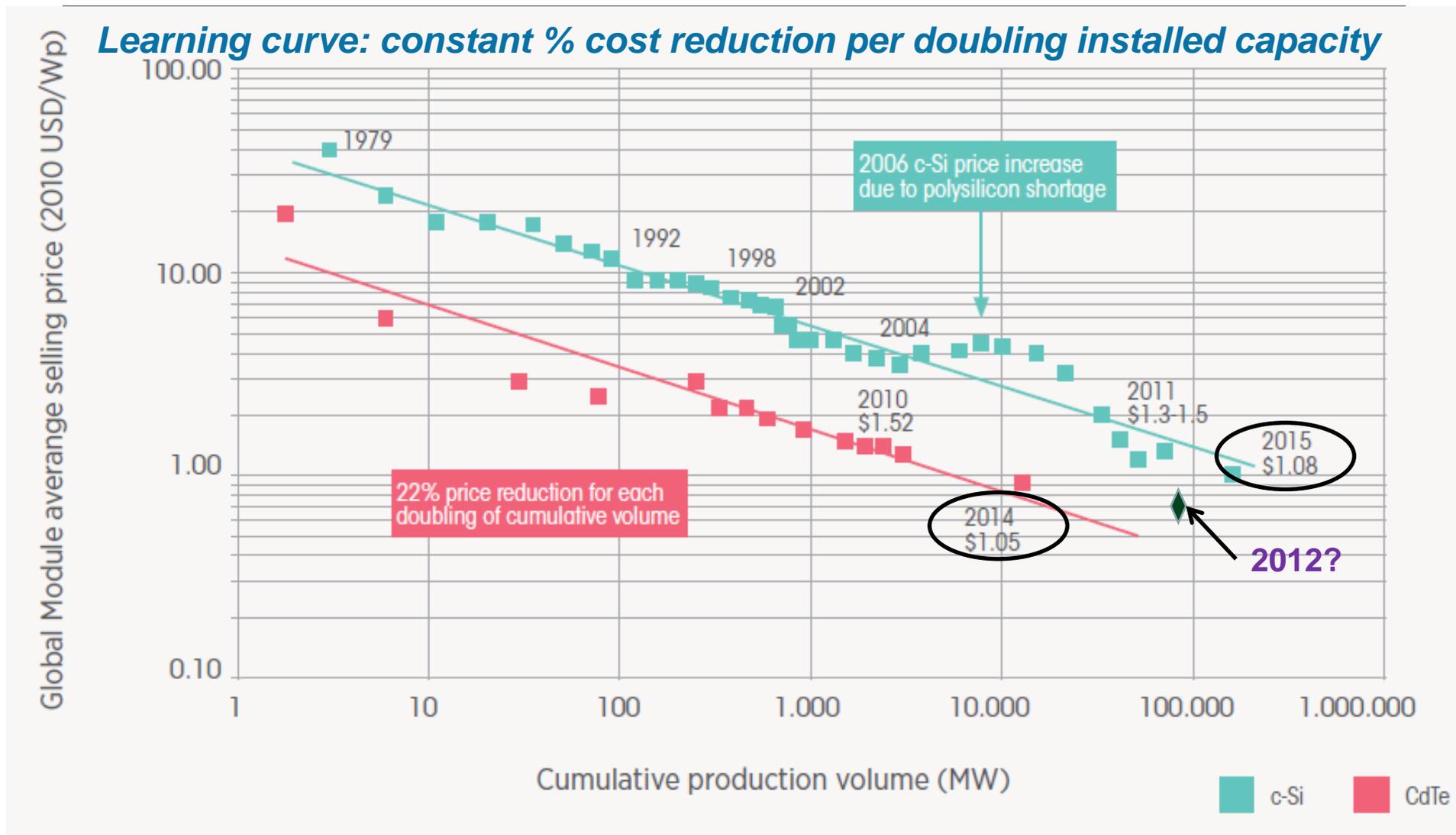
Key findings

- Cost are key drivers for investment decisions
- Dramatic cost reductions for RE technologies across the board
 - Especially solar PV, onshore wind
- Competitiveness varies and can be measured in different ways
- Market trends vary by region and depend on fossil fuel pricing and RE support policies
- Cost of development projects and commercial projects vary widely
 - Project scope and goal varies

Key Cost Determinants

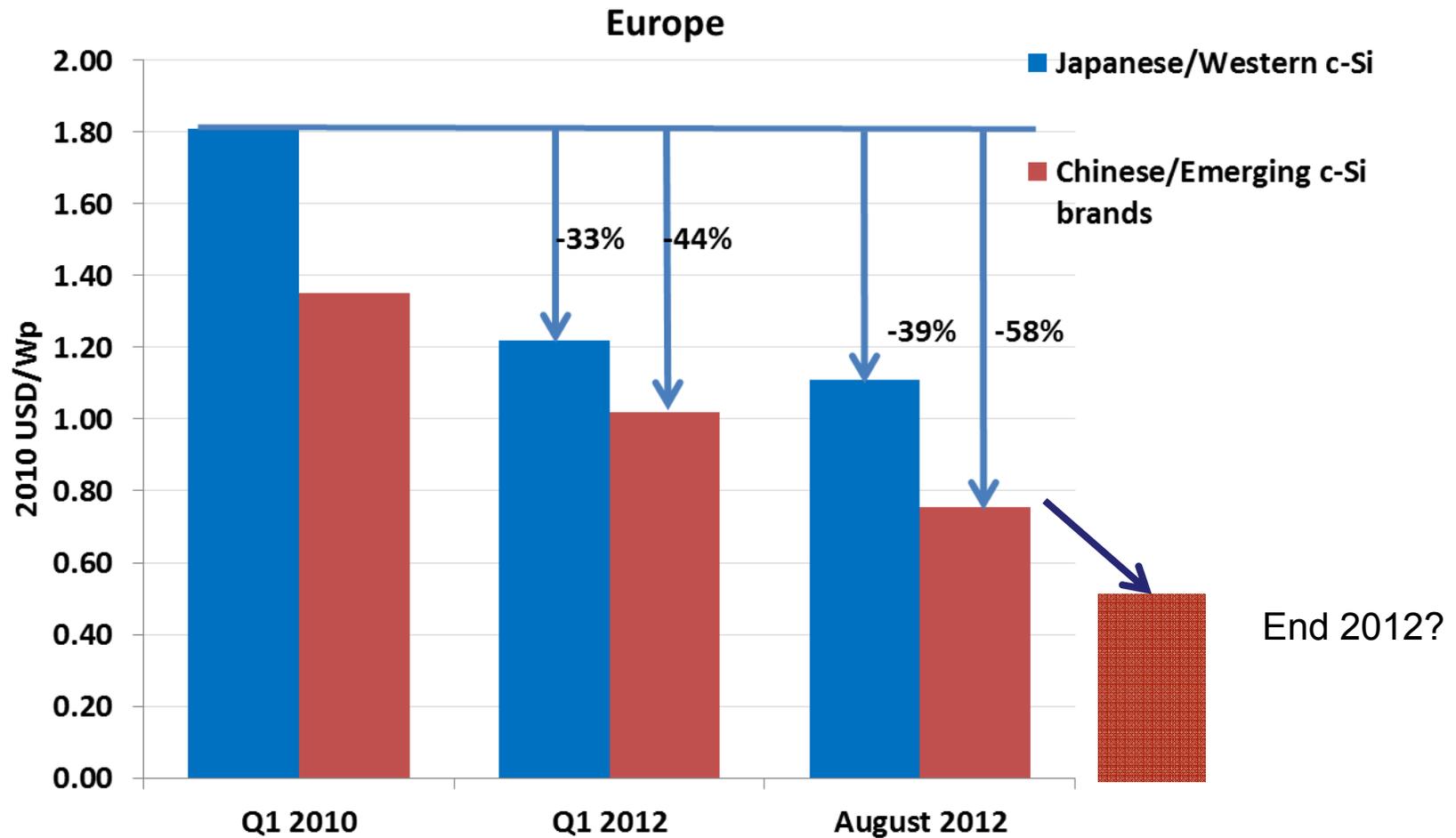
- Cost of capital
- Resource quality/capacity factor
- Project scope, location and infrastructure needs (e.g. roads, transmission lines, distance from port, etc.)
- Project size (economies of scale, but starting at low levels)
- *Competitiveness* depends also on other factors
 - Fossil fuel prices (gas US USD 4/GJ, Europe USD 10/GJ, Japan USD 17/GJ)
 - Subsidies for fossil fuels and electricity six times higher than for RE (on average 10% subsidy on FF & ELE)

Learning curves – rationale for feed-in tariffs



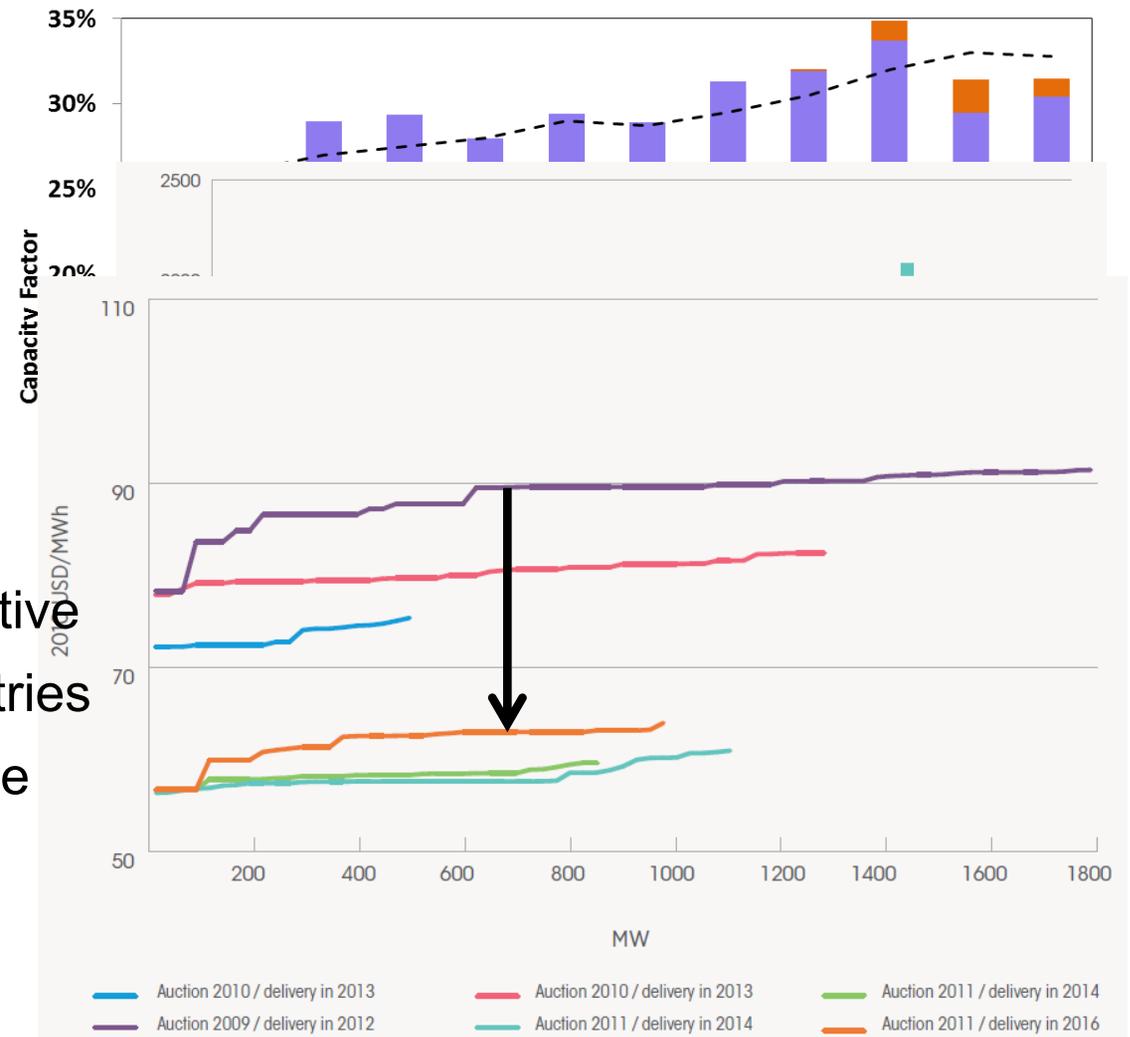
Source: Mints, Navigant, Bloomberg NEF, First Solar, NREL PV cost Model

PV modules prices

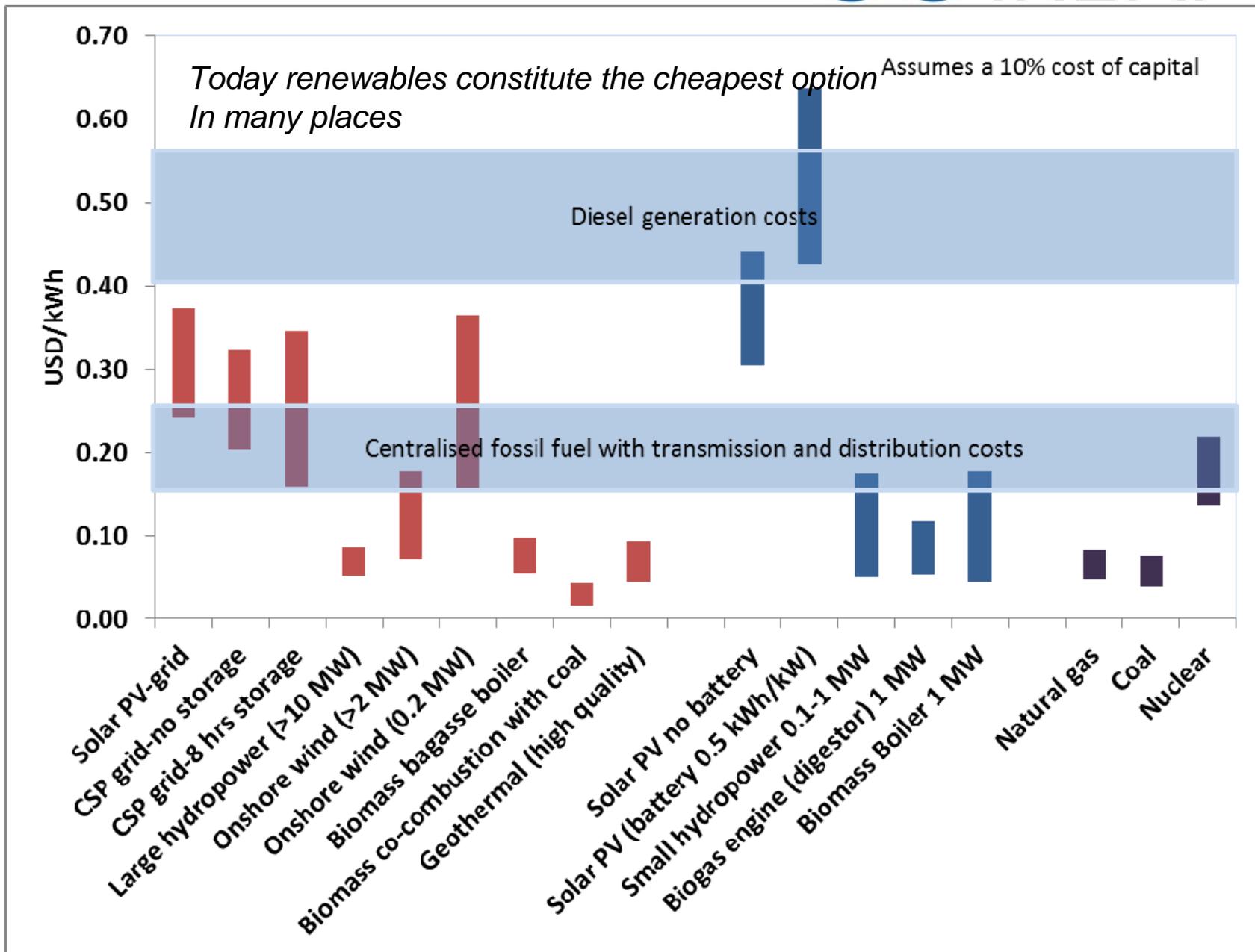


Wind

- Capacity factors are increasing (US example)
- Wind turbine prices declining (US example)
- The LCOE is coming down (Brazilian Auctions)
- Onshore wind is now competitive with fossil fuels in many countries
- Offshore wind is still expensive



Levelised cost of electricity Africa case



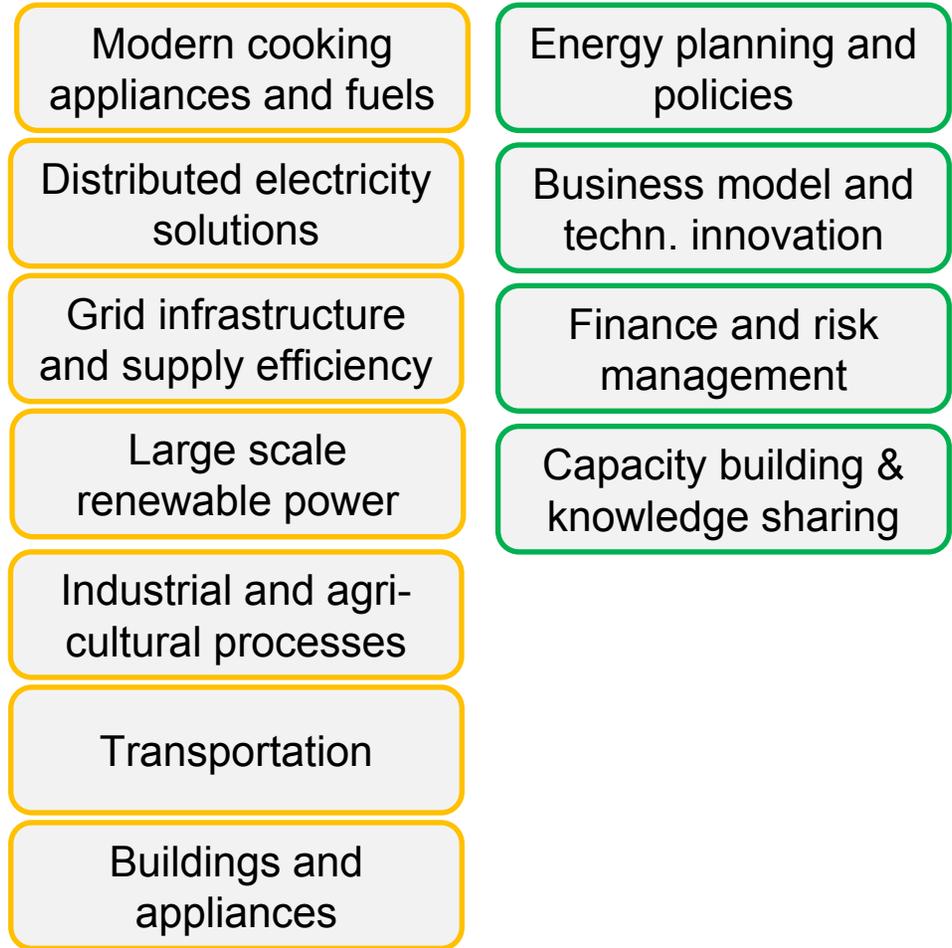
3

SE4ALL AND REMAP 2030

IRENA role in Sustainable Energy for All

- 2012 Year of Sustainable Energy for All
- An initiative of the United Nations Secretary General
 - Public-Private Partnership
- A High Level group advises the Secretary General
 - CEOs, heads of international agencies etc.
 - IRENA DG Adnan Amin is a member of the high level group
- Three objectives
 - Universal access modern energy services
 - Doubling the rate of energy efficiency improvements
 - Doubling the share of renewables
- IRENA has supported High Level group
 - Provided input on different renewable energy technology options
 - Technical expertise and quantitative analysis for targets
 - Active role of IRENA in the SE4ALL roll-out in Rio

SE4ALL structure



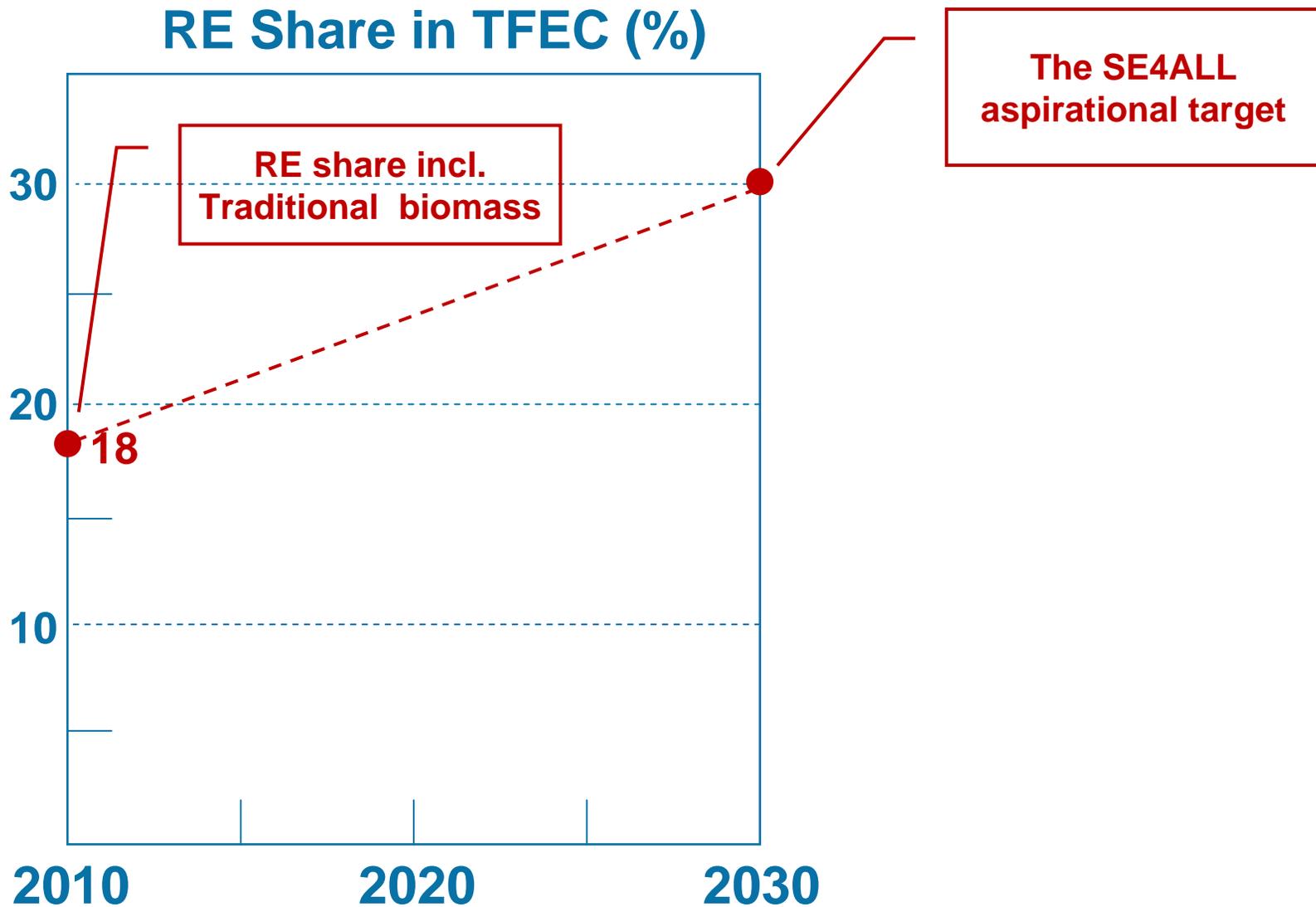
IRENA Initiatives – based on the WP

- REMAP2030
- Renewable Readiness Assessments
- Initiative on Renewables and Islands
- Technology Roadmap on Renewables in Cities
- Global Renewables Resource Map
- Renewable Energy Learning Partnership
- ADFD

IRENA REMAP 2030

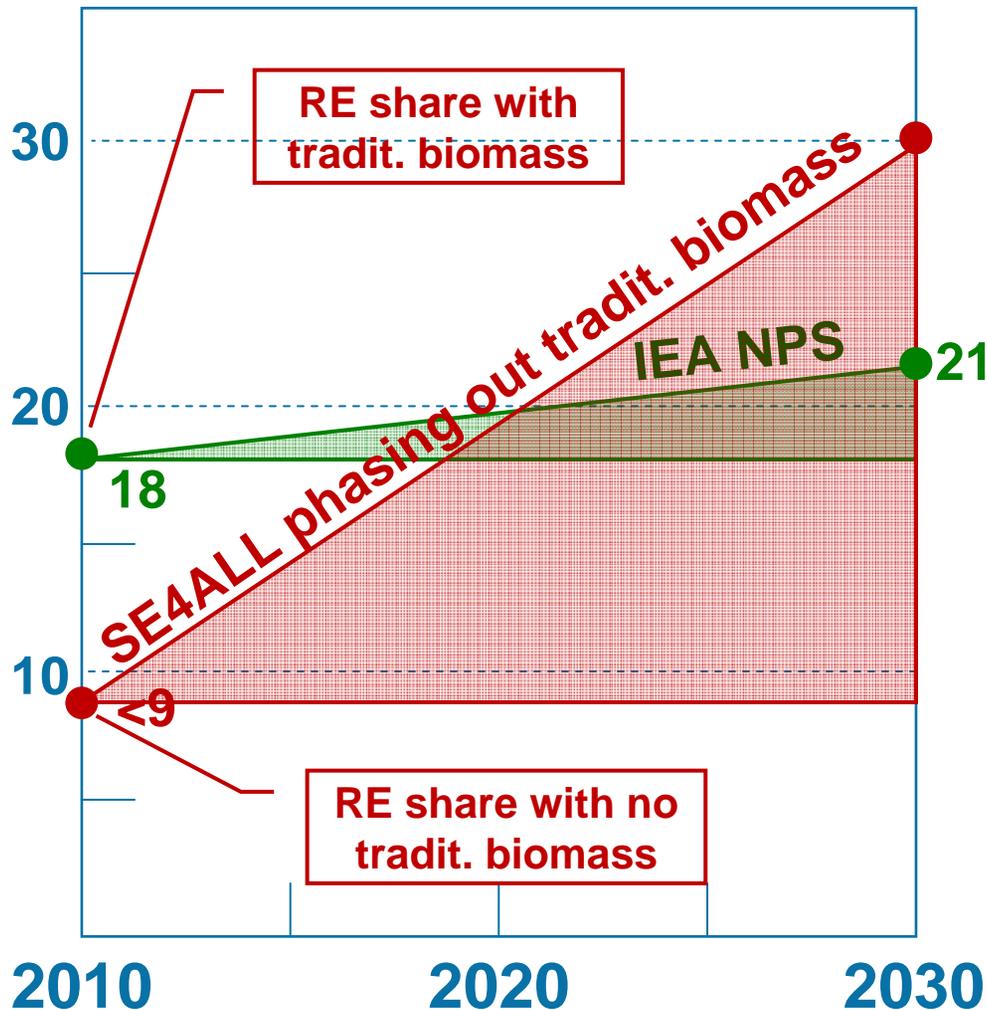
- Sustainable Energy for All will continue after 2012 as a public-private partnership. Advisory group co-chaired by UN Secretary General and World Bank President
- Three objectives, including **doubling the global share of renewable energy by 2030**
- IRENA as hub for renewables
- REMAP 2030: roadmap how to operationalize the target
- Next policy discussion at IRENA Assembly in Abu Dhabi, 12-13 January 2013
 - Followed by refinements for regions/countries/sectors/technologies
 - Action agenda under development
- Key insights
 - Strong growth of modern renewables likely, but with policies under consideration today there will be **one third shortfall of the objective in 2030**
 - Attractive opportunities exist to boost the renewable share further
 - Developed *and* developing countries must act
 - Renewables in industry, transport and buildings require more attention

Doubling the share of renewables



Why it is challenging

RE Share in TFEC (%)



Key Findings from RAES

- More RE in power sector and in “all” end-use sectors is needed to double the RE share (action in selected sectors is not enough)
- If so, a 30% RE share can be achieved
- Major contributions from RE in buildings, power generation, biofuels, and co-firing
- Lower contributions from solar heat in industry and biomass feedstock in chemical industry

Conclusions

- Doubling the RE share by 2030 is technically feasible, but poses an **unprecedented challenge** in terms of renewables deployment, if traditional biomass is to be phased out in developing regions;
- Related deployment of modern **renewable technologies** goes well beyond most ambitious energy scenarios to mitigate CO₂ emissions and climate change;
- The **regional and national dimension** of the effort vary considerably across world regions and countries, depending on starting point, natural endowment, national policy;
- The implications for **energy sectors** are crucial, e.g. power generation, transport, building, industry, but also electric grids, and energy in the cities (**sectoral approach**);
- Also crucial is to assess the **economic implications** (investment, impact on GDP, employment) of this important transformation of the energy system at regional and national level.

THANK YOU !

WWW.IRENA.ORG/PUBLICATIONS