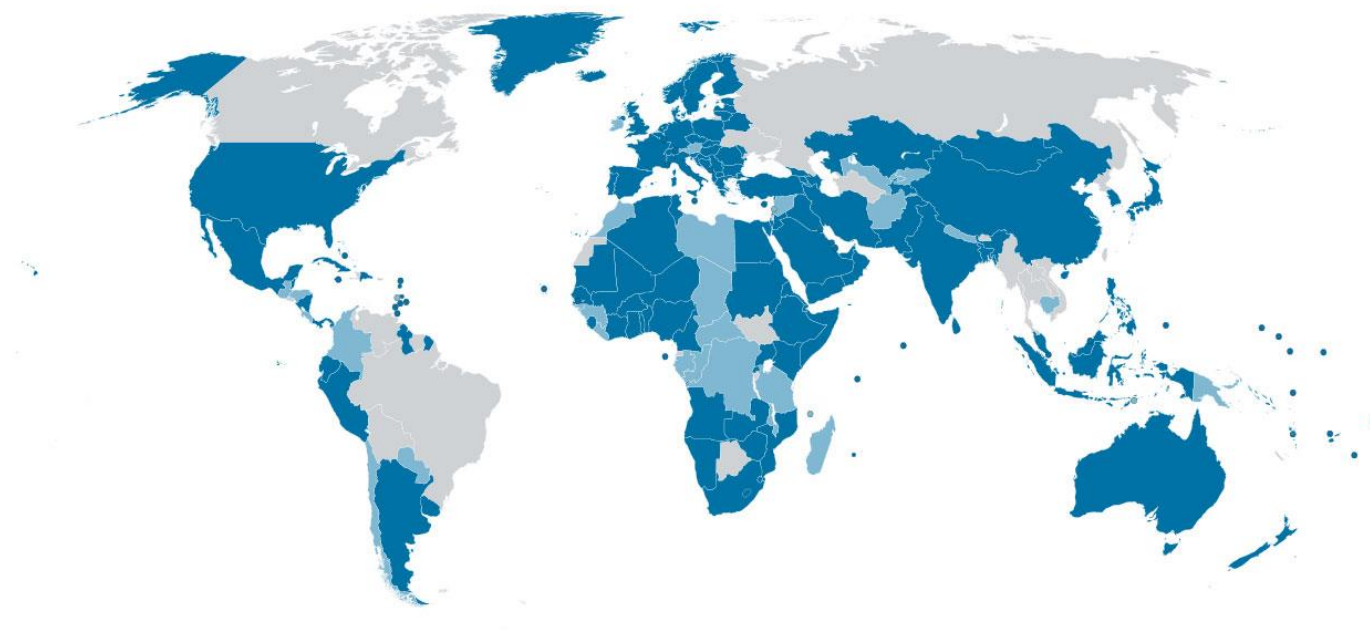


Renewable energy markets and Technology Dialogue

The renewable energy potential in Russia

Moscow, 27 October 2015

The Voice, Advisory Resource and Knowledge Hub for 173 Governments



Renewable energy can:

- Meet our goals for **secure, reliable** and **sustainable** energy
- Provide **electricity access** to 1.3 billion people
- Promote **economic development and Jobs (7.7 M jobs today)**
- At an **affordable cost. Solar UAE 6 USct/kWh, Wind Egypt 4 USct/kWh**

Headquarters:
**Abu Dhabi,
United Arab Emirates**

Three Programmes:

- **Innovation and Technology
Centre in Bonn, Germany**
- **Knowledge, Finance and
Policy Centre in Abu Dhabi**
- **Country Support Programme
in Abu Dhabi**

Foundation

**26 January 2009 in Bonn
International Agency since April 2011
The global RE agency**

Scope

**Hub, voice and source of objective
information for renewable energy**

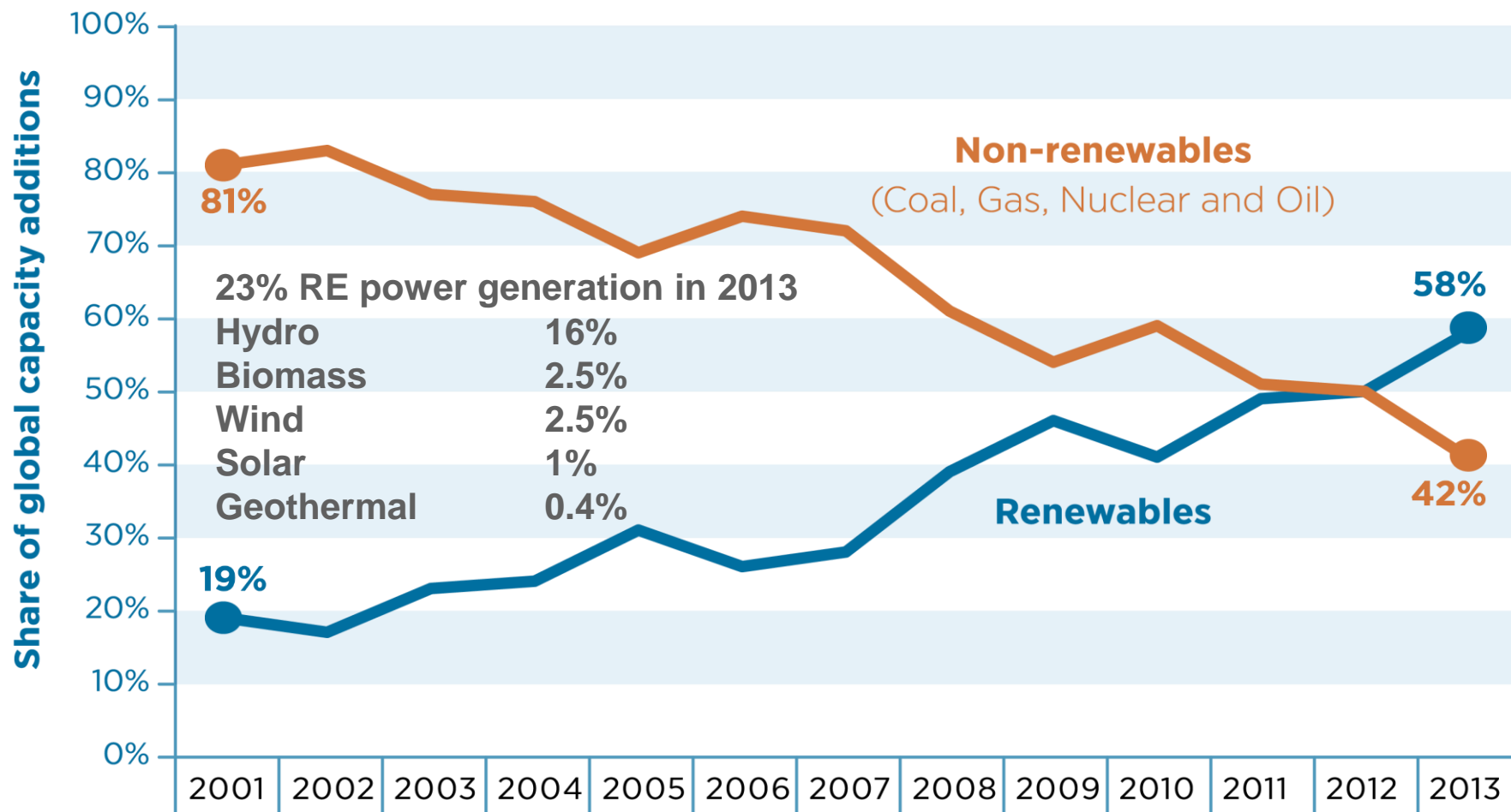
Mandate

**Sustainable deployment of the six
forms of renewable energy
resources
(Biomass, Geothermal, Hydro,
Ocean, Solar, Wind)**

- Transition planning – including REmap 2030 roadmaps, grid planning, technology status and outlook
- Knowledge gateway – including Global Atlas, Costing, statistics
- Enabling investment and growth – Navigator, Standards and Quality Control, Financing
- Access – Renewable offgrid solutions
- Islands – SIDS Lighthouses
- Regional action agenda – Africa Clean Energy Corridor

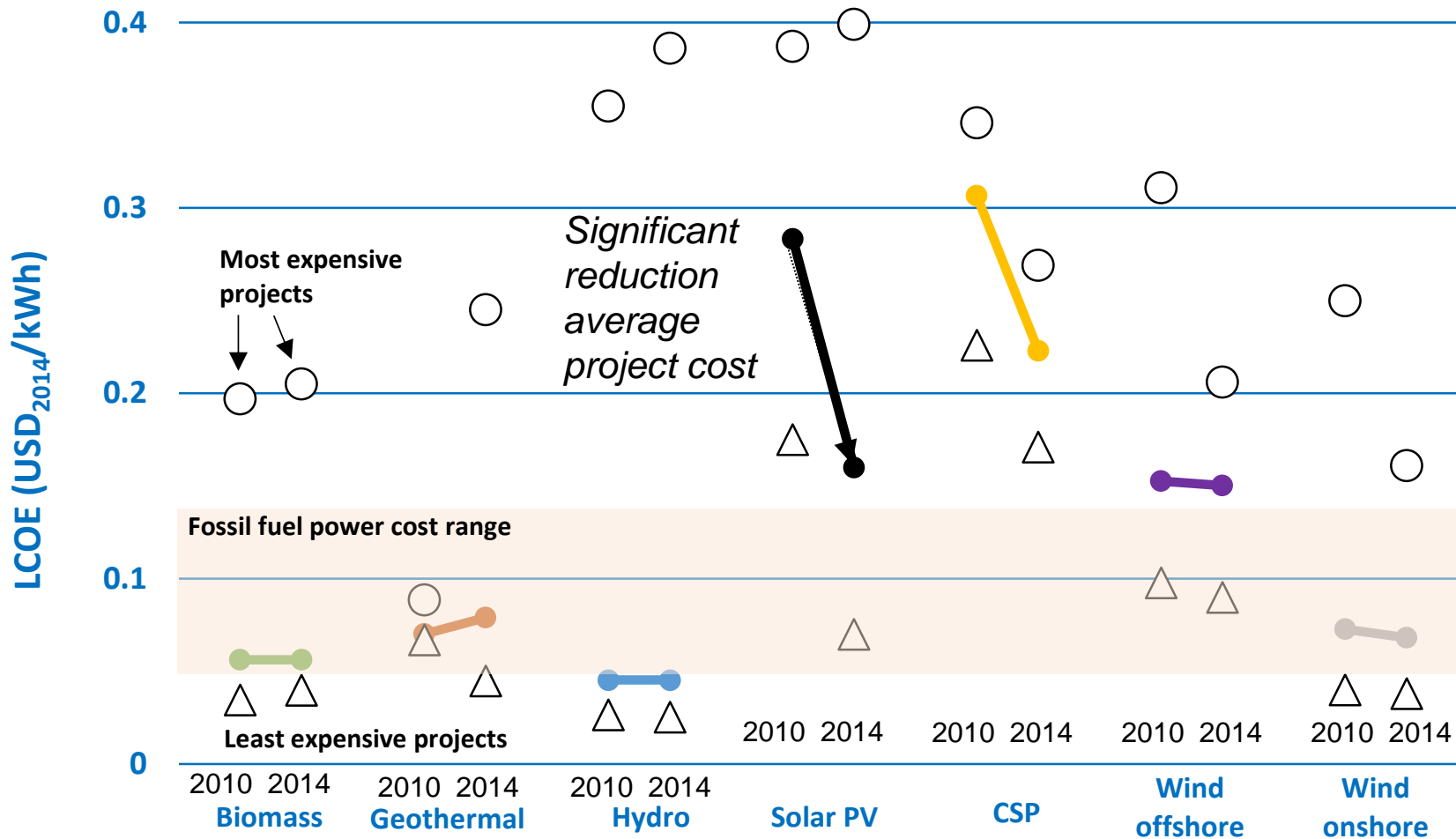
- *Abu Dhabi Fund for Development - USD 350 M for innovative project financing*

Renewables Dominate New Power Sector Capacity Additions



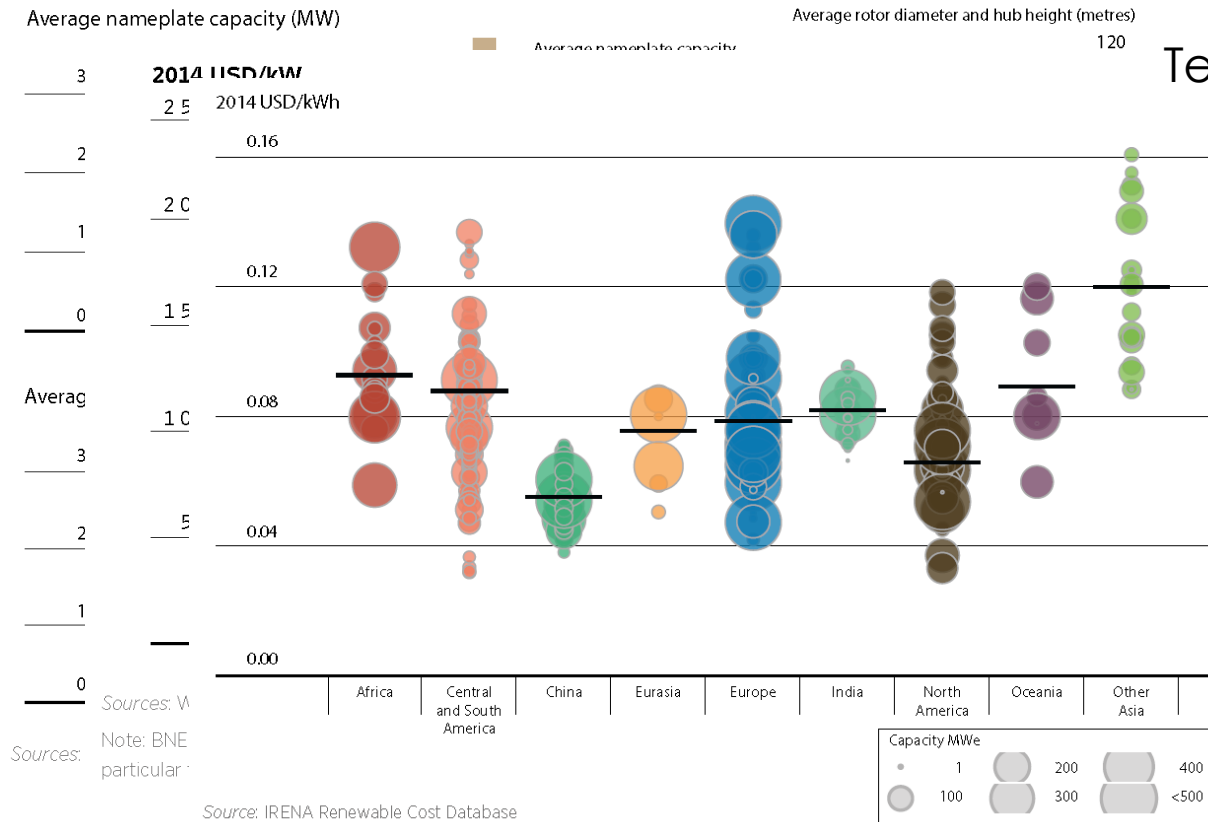
Significant cost differences persist

An opportunity to accelerate deployment



Left side: 2010
Right side: 2014

Wind power



Technology improvements

+

Capital cost declines

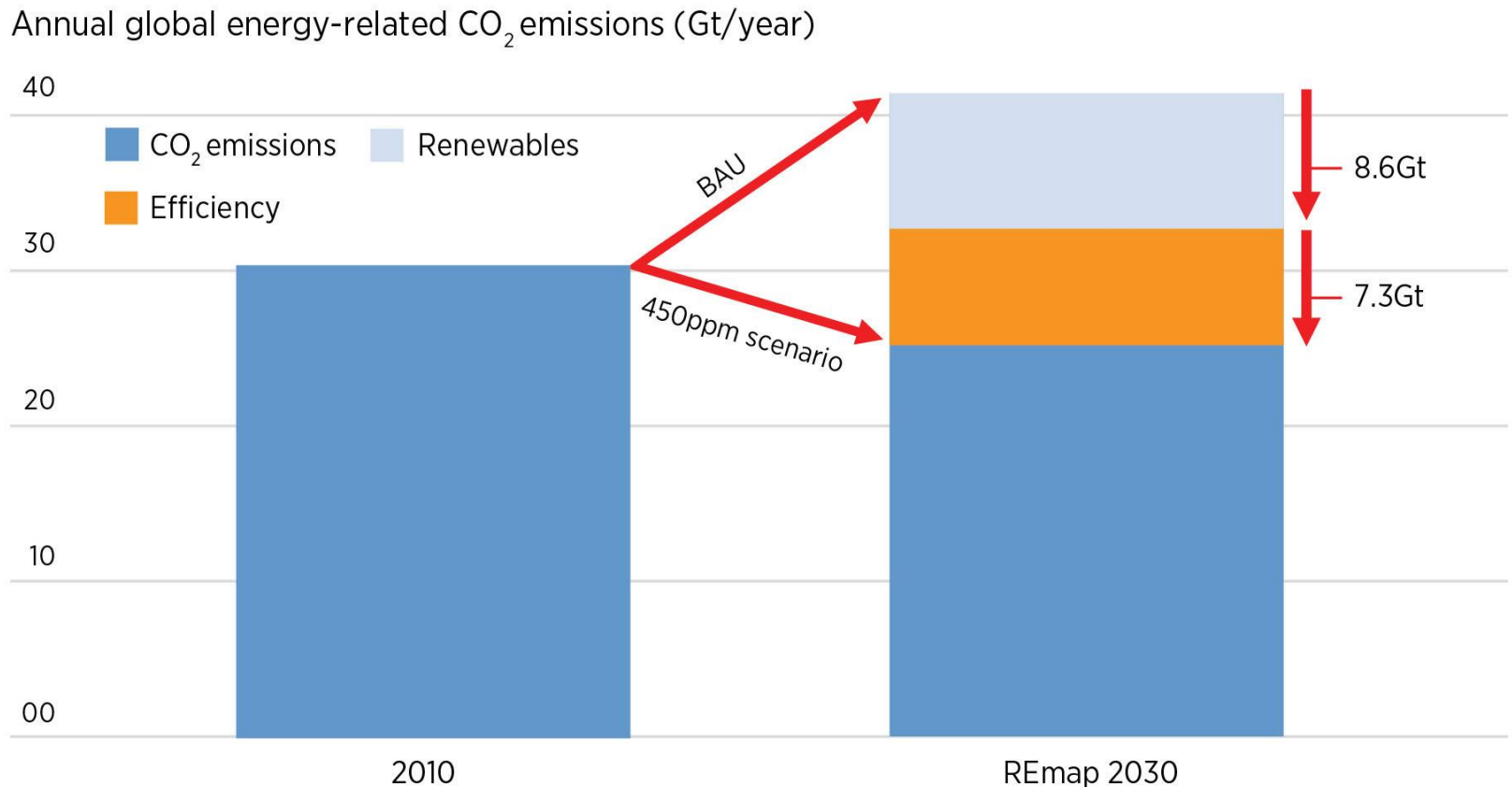
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Falling LCOEs

REmap 2030 - A roadmap for doubling the RE share

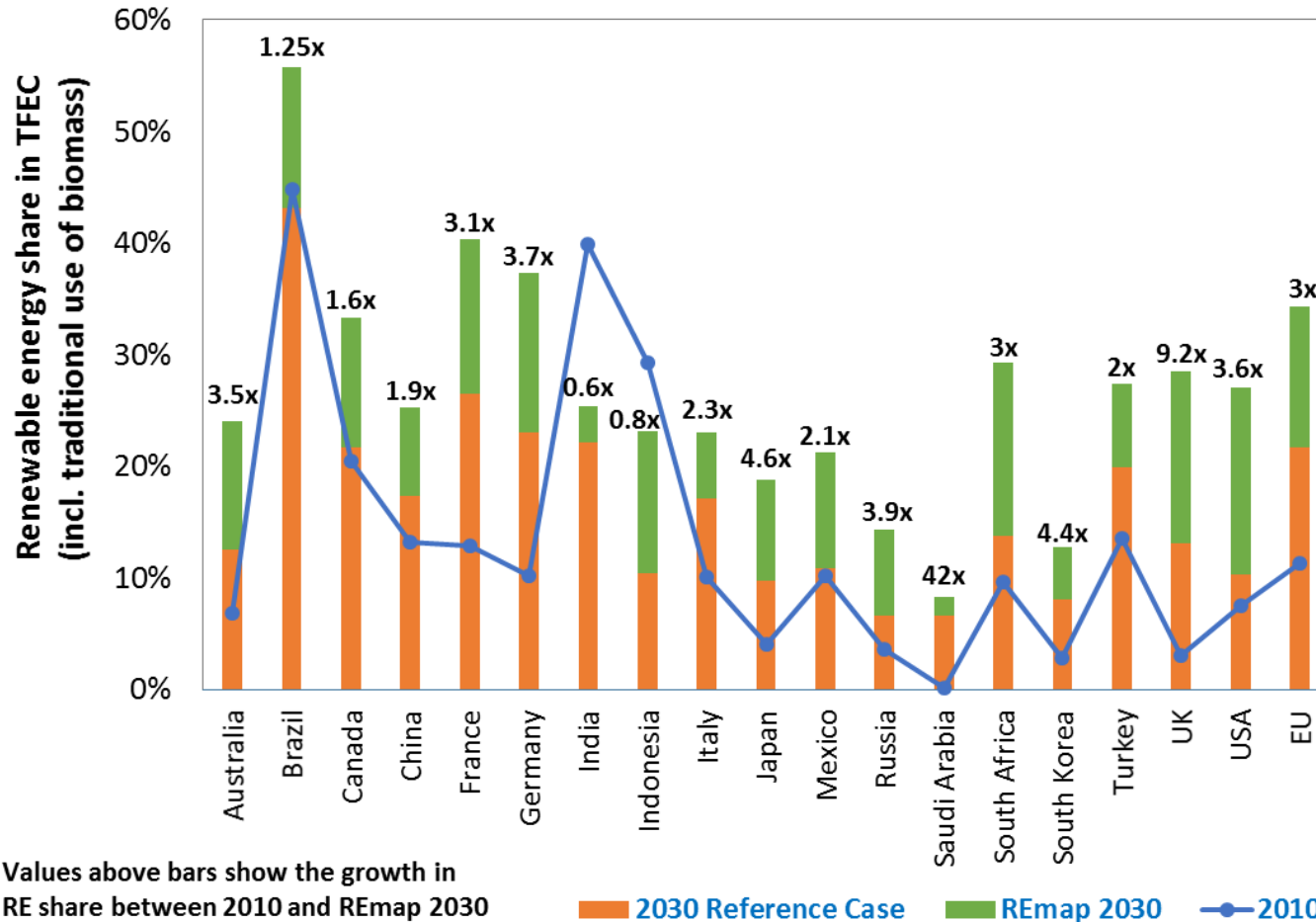
- REmap explores the **potential, cost and benefits** of doubling the renewables share in the global energy mix
- **Technology options, NOT target setting**
- Focuses on power, district heat and end-use sectors
- Coverage: **40 countries**; 80% of the global energy use
- Developed together with and validated by country experts
- Key findings:
 - Doubling is technically achievable with existing techs
 - Doubling is affordable when externalities are included
 - Potential exists in all countries

With Renewables + Efficiency on a 450ppm Path



Fossil fuel substitution yields 8.6 Gt CO₂ reduction – on par with the role of efficiency

Renewable energy potential in G20 countries to 2030 (DRAFT)



Source: IRENA (2015)

Potentials exists in all countries, but option mix and cost vary

Possible drivers

- Diversification of energy sources
- Technology development, jobs, economic growth
- Cost-effective energy access in remote areas (representing about 10% of the population without access to the central grids)
- Environmental issues (air pollution, water, land use, CO₂ emissions)

REmap Options

- Forestry residues for power and heating (incl. district heating with efficiency)
- Agriculture & organic waste, including industrial cogeneration
- Wind onshore (north, west), large hydro in Siberia and small hydro
- Geothermal (only in some areas)
- Special attention for mining industry
- Mini-grids for rural communities away from grid (wind power)
- Grid investment needs for transformation (and interconnections)
- New conventional technology plants, integration with RE? – flexibility

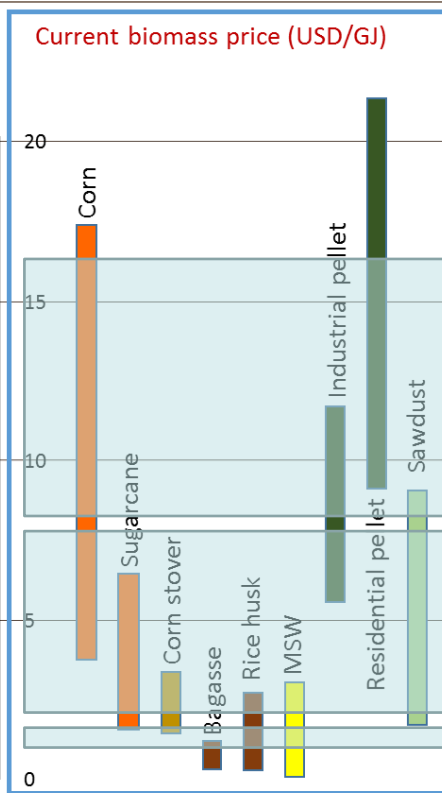
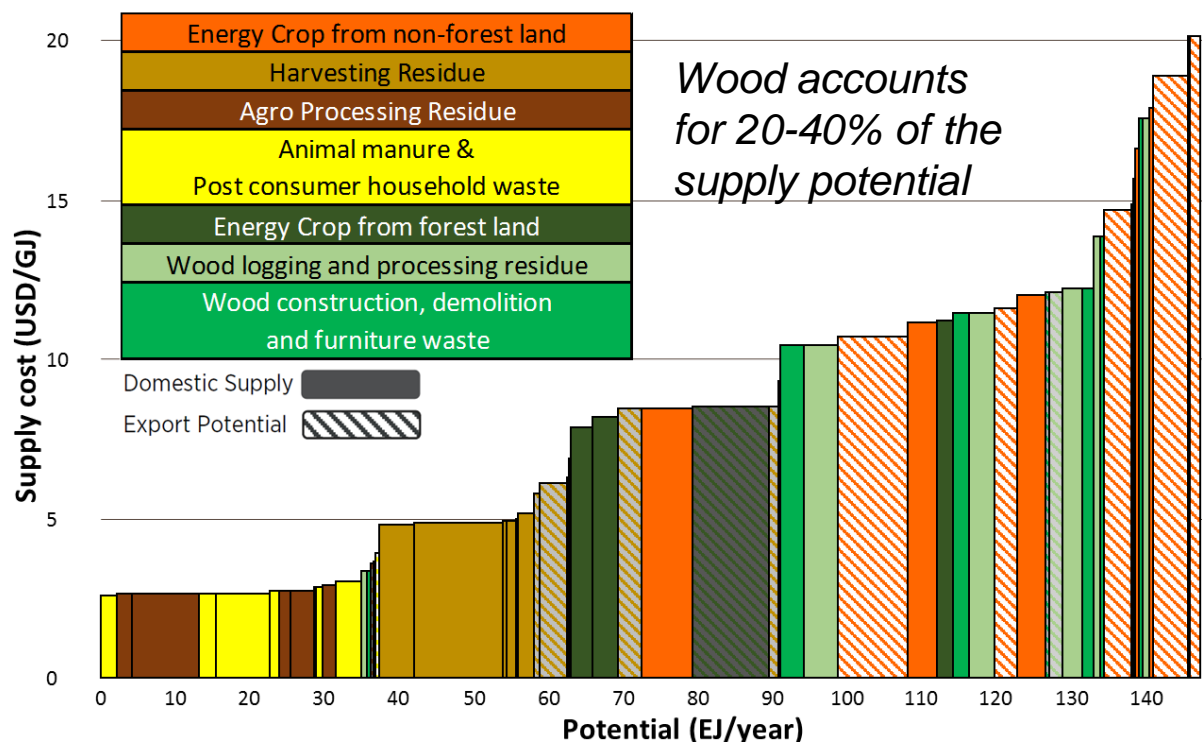
Biomass Supply

Potential to double by 2030

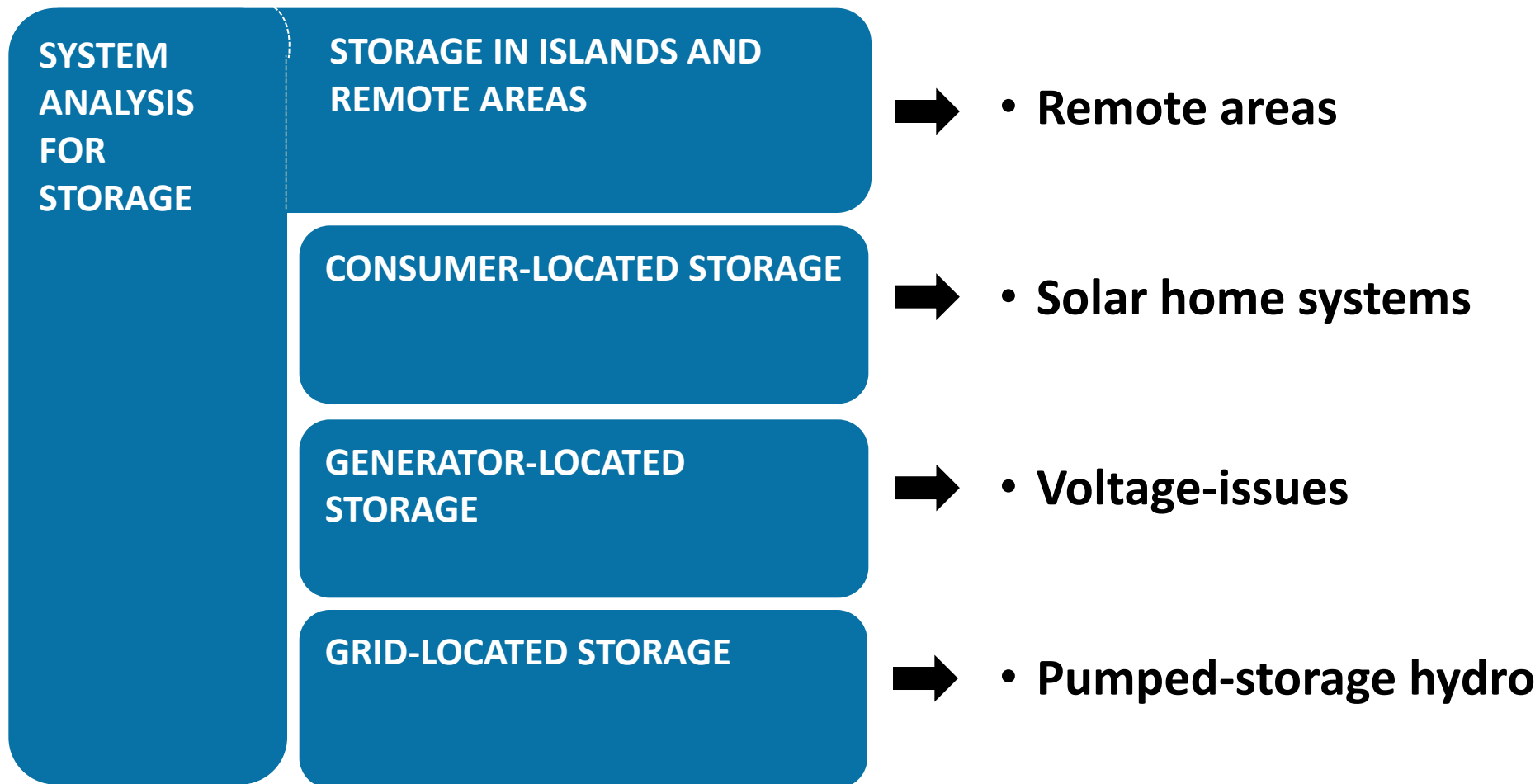
Further growth potential beyond 2030

- Wood processing waste (black liquor, sawdust, bark etc)
- Forestry residues (branches, rubber trees etc)
- Forest regrowth
- Construction & demolition waste
- Agro-food processing waste
- Agricultural residues
- Food crops
- Energy crops
- Municipal Solid Waste
- Other

Global Cost Curve for Primary Biomass Supply



Source: IRENA, 2015



INSPIRE – RE Standards & Patents Information Platform

Search Standards

Search through the catalog of important renewable energy standards

Disclaimer: The RE Standards Database has been developed and is maintained by IRENA. The main sources of data used are the ISO and IEC. While by no means exhaustive, this database aims at providing users with a thorough overview of the renewable energy standards most commonly used at an international level.

Filters

Search in title and abstract

Technology group

Solar Energy

Search

Technology sub category

PV

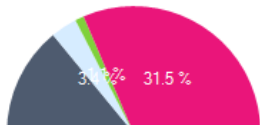
Search

Aspects covered

Search

Result charts

Bodies



We found 89 entries:

IEC 60891 ed2.0 : Photovoltaic devices - Procedures for temperature and irradiance corrections to measured I-V characteristics

Abstract:

IEC 60891:2009 defines procedures to be followed for temperature and irradiance corrections to the measured I-V (current-voltage) characteristics of photovoltaic devices. It also defines... [Read More](#)

Normative references:

IEC 60904-1, Photovoltaic devices – Part 1: Measurements of photovoltaic current-voltage characteristics
IEC 60904-2, Photovoltaic devices – Part 2: Requirements for reference... [Read More](#)

Body: IEC | Ref.-No: IEC 60891 ed2.0

Technology: PV | Publication: 14.12.2009 | Aspect: Testing, Sampling and Analysis | Status: final | More: [IEC Website](#)

IEC 60904-1 ed2.0 : Photovoltaic devices - Part 1: Measurement of photovoltaic current-voltage characteristics

Abstract:

Describes procedures for the measurement of current-voltage characteristics of photovoltaic devices in natural or simulated sunlight. Lays down basic requirements for the measurement... [Read More](#)

Normative references:

IEC 60891: Procedures for temperature and irradiance corrections to measured I-V characteristics of crystalline silicon photovoltaic (PV) devices
IEC 60904-2: Photovoltaic devices... [Read More](#)

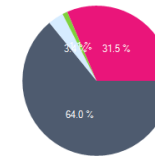
Body: IEC | Ref.-No: IEC 60904-1 ed2.0

Technology: PV | Publication: 13.09.2006 | Aspect: Testing, Sampling and Analysis | Status: ed3.0 in progress | More: [IEC Website](#)

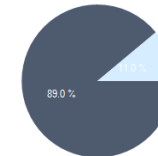
E.g. Standards for PV Systems

Result charts

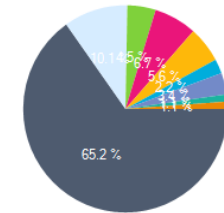
Bodies



Technologies



Aspects



Visit INSPIRE and access information on RE standards and patents

www.irena.org/inspire

- Renewables cost-competitiveness has significantly improved and benefits outweigh the costs
- Every country has potential to contribute to a global doubling of the renewable energy share by 2030
- In Russia, wind has significant potential and biomass has potential in numerous applications
- Sustainable, reliable, affordable biomass feedstock supply is key
- Important role for national policy makers, generators, local system operators, suppliers in realizing higher renewable shares

THANK YOU

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