UNECE Renewable Energy Status

Key messages on the status of renewables in 17 selected UNECE countries

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REN21 Renewable Energy Policy Network for the 21st Century

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is a **multi stakeholder network dedicated** to the rapid uptake of **renewable energy worldwide.**

Science & Academia:
IIASA, ISES, SANEDI, TERI, Fundacion Bariloche

NGOs:
CURES, GFSE, Greenpeace, ICLEI, ISEP, JREF, RCREEE, WCRE, WFC, WRI, WWF

Industry Associations:
ACORE, ARE, CEC, CREIA, EREF, GWEC, IGA, IHA, IREF, WBA, WWEA

International Organisations:
ADB, EC, ECREEE, GEF, IEA, IRENA, UNDP, UNEP, UNIDO, World Bank

National Governments:
Brazil, Denmark, Germany, India, Norway, Spain, Uganda, UAE, UK

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REN21 Renewables 2015 Global Status Report

www.ren21.net/gsr

Officially launched at Vienna Energy Forum on 18 June 2015

Network of over 500 contributors, researchers & reviewers worldwide

The report features:

- Global Overview
- Market & Industry Trends
- Investment Flows
- Policy Landscape
- Distrbuted Renewable Energy for Energy Access
- Feature: Using Renewables for Climate Change Adaptation

The report covers:

- All renewable energy technologies
- The power, heating & cooling, and transport sector
- Energy Efficiency

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A Decade Of Renewable Energy Growth Surpassing Expectations

Projected levels of renewable energy for 2020 were already surpassed by 2010.

Global installed capacity and production from all renewable technologies **have increased substantially.**

Significant cost reductions for most technologies.

Supporting policies spread throughout the world.

		START 2004	2013	2014
INVESTMENT				
New investment (annual) in renewable power and fuels	billion USD	45	232	**270**
POWER				
Renewable power capacity (total, not including hydro)	GW	85	560	**657**
Renewable power capacity (total, including hydro)	GW	800	1,578	**1,712**
Hydropower capacity (total)	GW	715	1,018	**1,055**
Bio-power capacity	GW	<36	88	**93**
Bio-power generation	TWh	227	396	**433**
Geothermal power capacity	GW	8.9	12.1	**12.8**
Solar PV capacity (total)	GW	2.6	138	**177**
Concentrating solar thermal power (total)	GW	0.4	3.4	**4.4**
Wind power capacity (total)	GW	48	319	**370**
HEAT				
Solar hot water capacity (total)	GW_{th}	86	373	**406**
TRANSPORT				
Ethanol production (annual)	billion litres	28.5	87.8	**94**
Biodiesel production (annual)	billion litres	2.4	26.3	**29.7**

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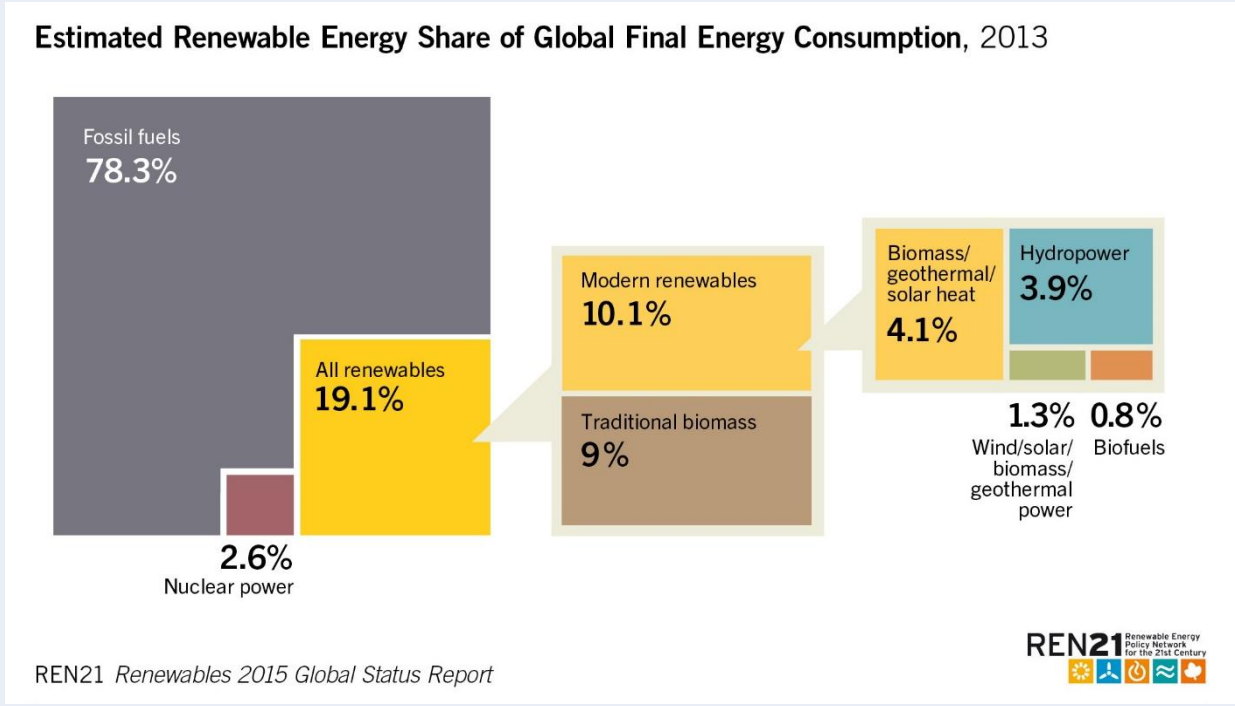
Renewable Energy in the World

Renewable energy provided an estimated **19.1%** of global final energy consumption in 2013.

The share of **modern renewable energy** increased to 10.1%.

The share of **traditional biomass** was of 9%, same in 2013.



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Renewable Energy “Champions“ - annual investment/capacity additions

ANNUAL INVESTMENT / NET CAPACITY ADDITIONS / PRODUCTION IN 2014

	1	2	3	4	5
Investment in renewable power and fuels (not including hydro > 50 MW)	**China**	United States	Japan	United Kingdom	Germany
Investment relative to annual GDP[1]	**Burundi**	Kenya	Honduras	Jordan	Uruguay
Geothermal power capacity	**Kenya**	Turkey	Indonesia	Philippines	Italy
Hydropower capacity	**China**	Brazil	Canada	Turkey	India
Solar PV capacity	**China**	Japan	United States	United Kingdom	Germany
CSP capacity	**United States**	India	–	–	–
Wind power capacity	**China**	Germany	United States	Brazil	India
Solar water heating capacity[2]	**China**	Turkey	Brazil	India	Germany
Biodiesel production	**United States**	Brazil	Germany	Indonesia	Argentina
Fuel ethanol production	**United States**	Brazil	China	Canada	Thailand

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Renewable Energy "Champions" – total capacity

TOTAL CAPACITY OR GENERATION AS OF END-2014

	1	2	3	4	5
POWER					
Renewable power (incl. hydro)	**China**	United States	Brazil	Germany	Canada
Renewable power (not incl. hydro)	**China**	United States	Germany	Spain / Italy	Japan / India
Renewable power capacity *per capita* (not incl. hydro) among the top 20[3]	**Denmark**	Germany	Sweden	Spain	Portugal
Biopower generation	**United States**	Germany	China	Brazil	Japan
Geothermal power capacity	**United States**	Philippines	Indonesia	Mexico	New Zealand
Hydropower capacity[4]	**China**	Brazil	United States	Canada	Russia
Hydropower generation[4]	**China**	Brazil	Canada	United States	Russia
Concentrating solar thermal power (CSP)	**Spain**	United States	India	United Arab Emirates	Algeria
Solar PV capacity	**Germany**	China	Japan	Italy	United States
Solar PV capacity *per capita*	**Germany**	Italy	Belgium	Greece	Czech Republic
Wind power capacity	**China**	United States	Germany	Spain	India
Wind power capacity *per capita*	**Denmark**	Sweden	Germany	Spain	Ireland
HEAT					
Solar water collector capacity[2]	**China**	United States	Germany	Turkey	Brazil
Solar water heating collector capacity *per capita*[2]	**Cyprus**	Austria	Israel	Barbados	Greece
Geothermal heat capacity[5]	**China**	Turkey	Japan	Iceland	India
Geothermal heat capacity *per capita*[5]	**Iceland**	New Zealand	Hungary	Turkey	Japan

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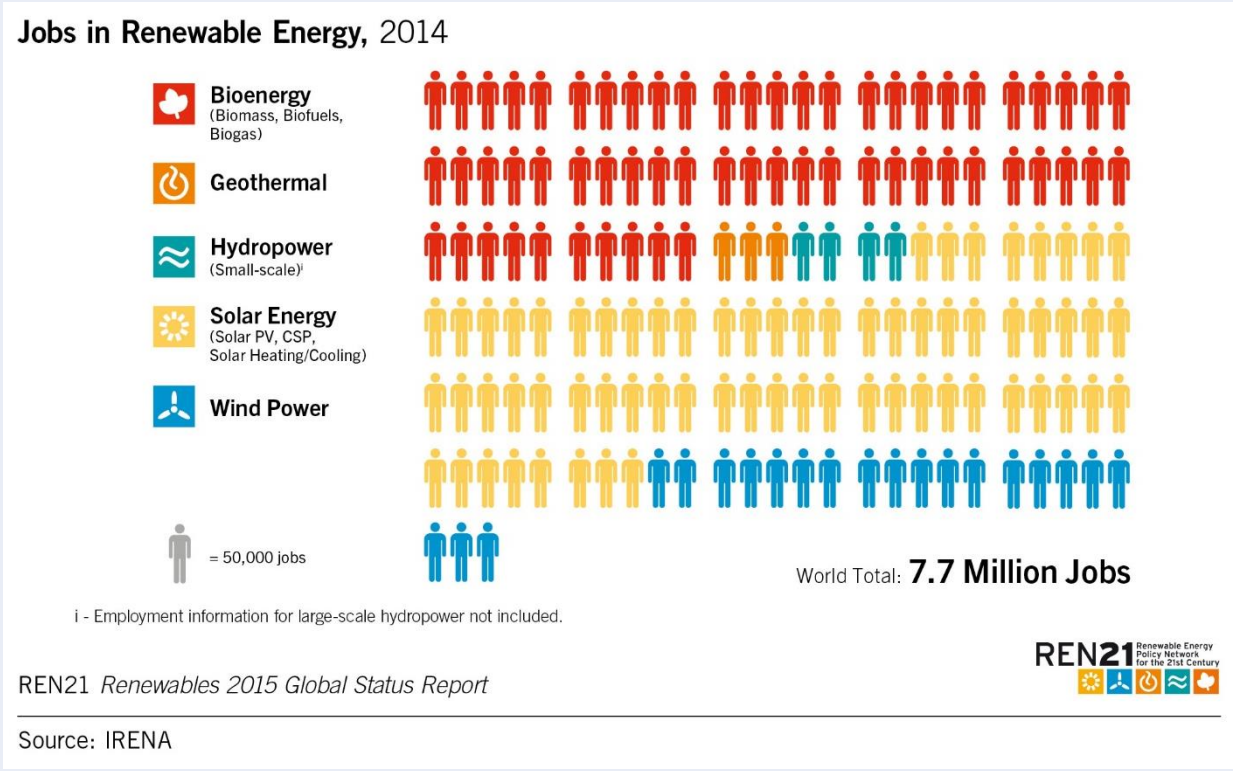
Jobs in Renewable Energy

Global employment continued to increase

An estimated **7.7 million direct or indirect jobs** in the renewable energy industry

Global wind power employment crossed the 1 million jobs threshold in 2014



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The UNECE Renewable Energy Status Report

- Detailled look at the status of renewable energy in select 17 countries in the UNECE region
- Part of the initiatives of the UNECE Group of Experts on Renewable Energy (GERE) – building on existing process
- Utilisation of the established REN21 global data collection process from formal and informal sources
- Objective to obtain a reliable data baseline for increased investment activity
- Strong Involvement of governments, international organisations (IEA, EBRD, European Commission, World Bank, UNDP, etc.) and civil society during data collection and review

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giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

On behalf of:

Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety

of the Federal Republic of Germany

iea International Energy Agency

Launch on 7 December 2015 at COP 21

- Covered countries very diverse in terms of territory, economic, social and political characteristics
- Overall population of over 300 Million
- Density ranges from 6,4 persons/km to 123,9 persons/km
- Three countries amongst coldest globally in terms of heating degree days
- Countries partake in different forms of regional energy cooperation

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Energy overview

	Energy imports, net (% of energy use) 2011	Energy Subsidies as % of GDP 2015	Energy use per capita (MJ/capita) 2011	Electrification rate (% of population) 2012
Albania	34%	1,9%	32 253	100%
Armenia	67%	4,3%	38 362	100%
Azerbaijan	-377%	6,3%	57 332	100%
Belarus	86%	7,0%	129 695	100%
Bosnia and Herzegovina	35%	37,0%	77 268	100%
Georgia	68%	5,2%	33 099	100%
Kazakhstan	-107%	11,0%	195 565	100%
Kyrgyzstan	51%	26,4%	25 133	100%
Macedonia (FYR)	44%	18,7%	61 833	100%
Moldova	96%	5,6%	39 088	100%
Montenegro	36%	16,7%	76 013	100%
Russian Federation	-78%	16,0%	216 281	100%
Serbia	31%	34,7%	93 674	100%
Tajikistan	30%	7,1%	11 691	100%
Turkmenistan	-164%	23,2%	202 591	100%
Ukraine	32%	60,7%	115 929	100%
Uzbekistan	-21%	26,3%	67 389	100%

- Several countries are facing a number of regional energy challenges:
  -Energy security - seasonal power outages - aging energy infrastructure - high energy subsidies - administrative „red tape“

- While electrification rates are high, multidimensional problems like reliable heating and energy poverty in select communities remain

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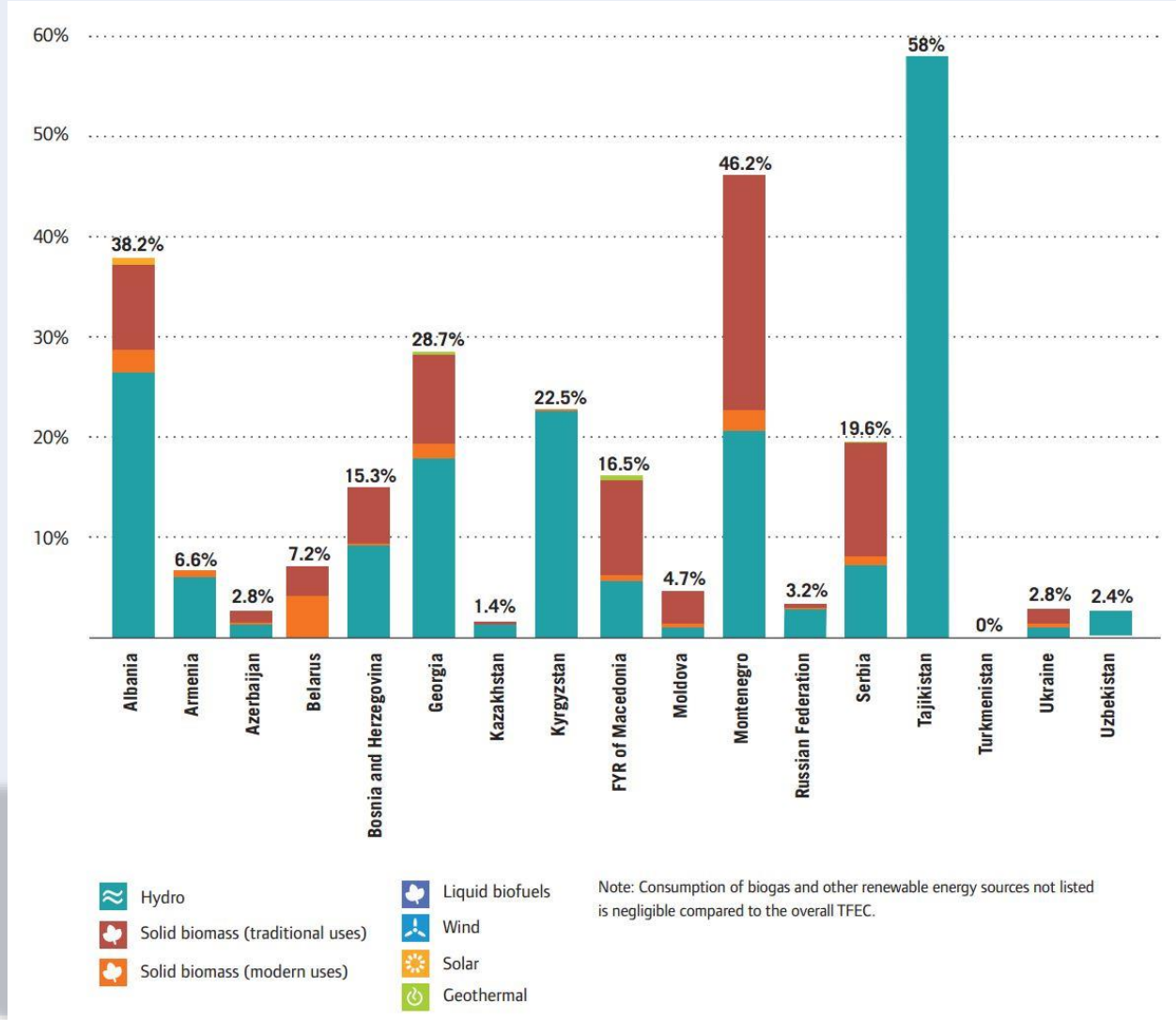
Share of Renewable Energy in Total Final Energy Consumption, 2012

- Often numbers still driven by traditional use of biomass and high shares of hydro
- Energy consumption stemming from modern renewables negligible – even when looking at preliminary 2014 data.



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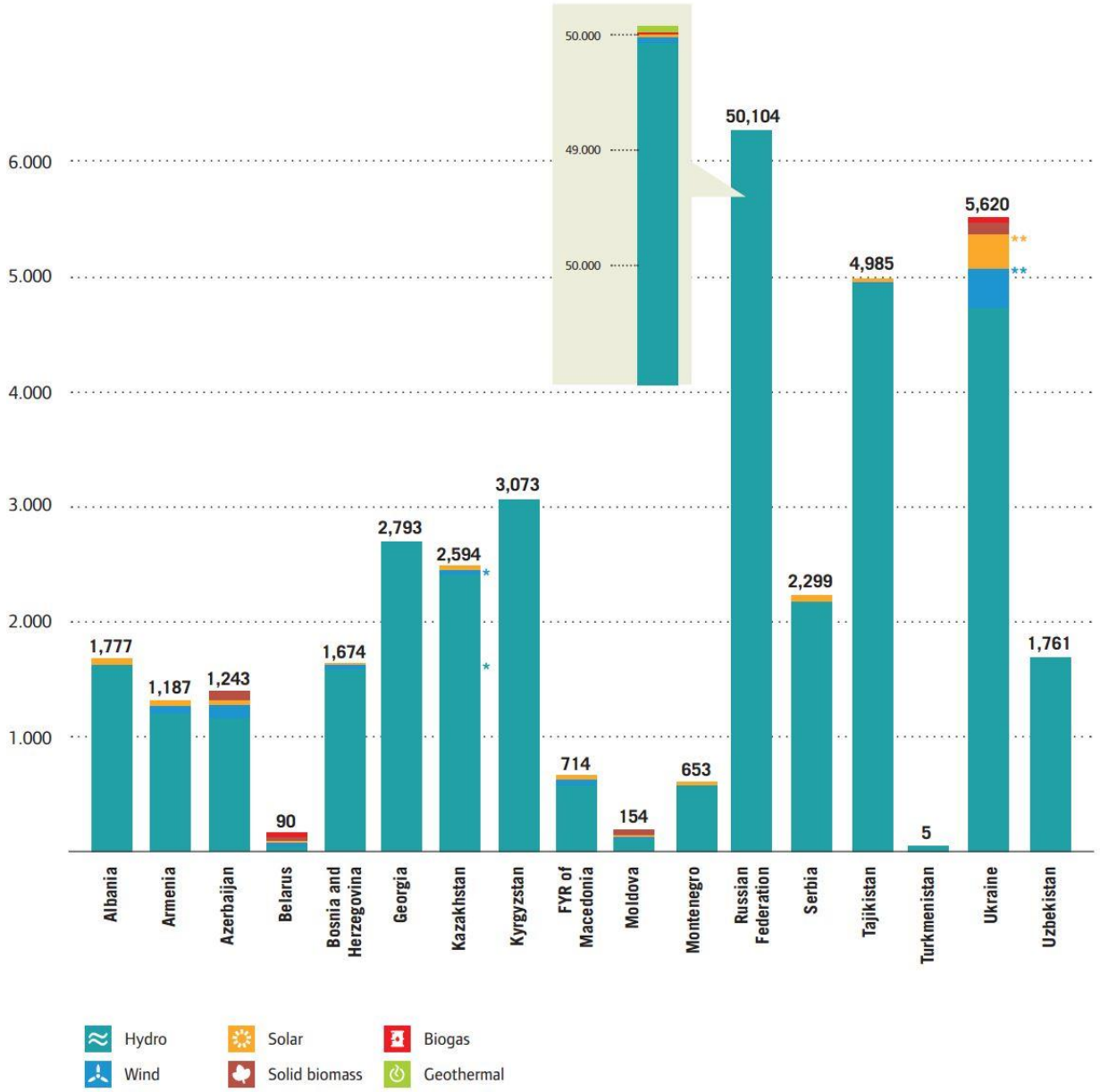
Renewable Energy for Power, Installed Capacity in MW, 2014

- Big variations from country to country
- Hydropower is backbone
- Other renewable energy technologies are nascent, with few regional exceptions
- Smaller developments are beginning to pick up



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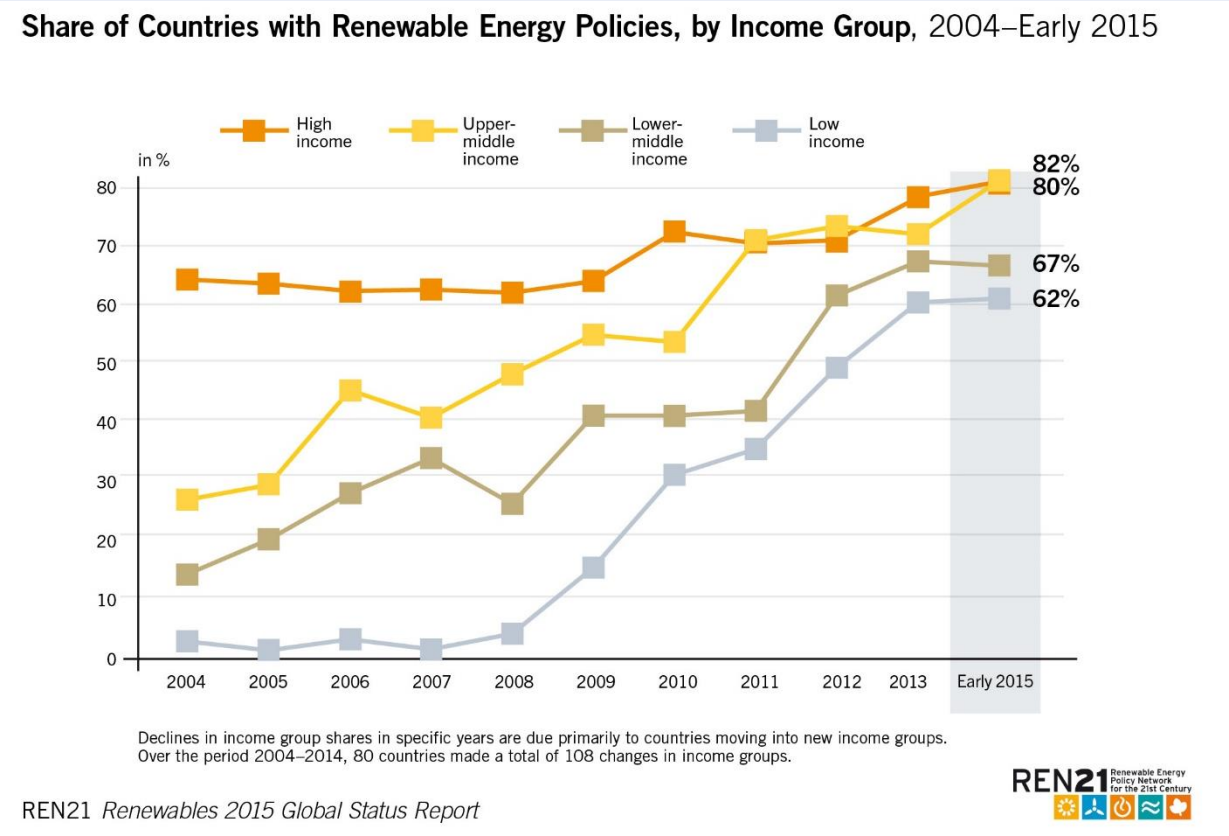
Evolution of Renewable Energy Policy Over Time (2004 – 2014)

At least **164** countries had **renewable energy targets.**

At least **145** countries had **renewable energy support policies** in place.

Low-income, lower-middle income as well as upper-middle income countries feature fastest policy uptake during the last decade.



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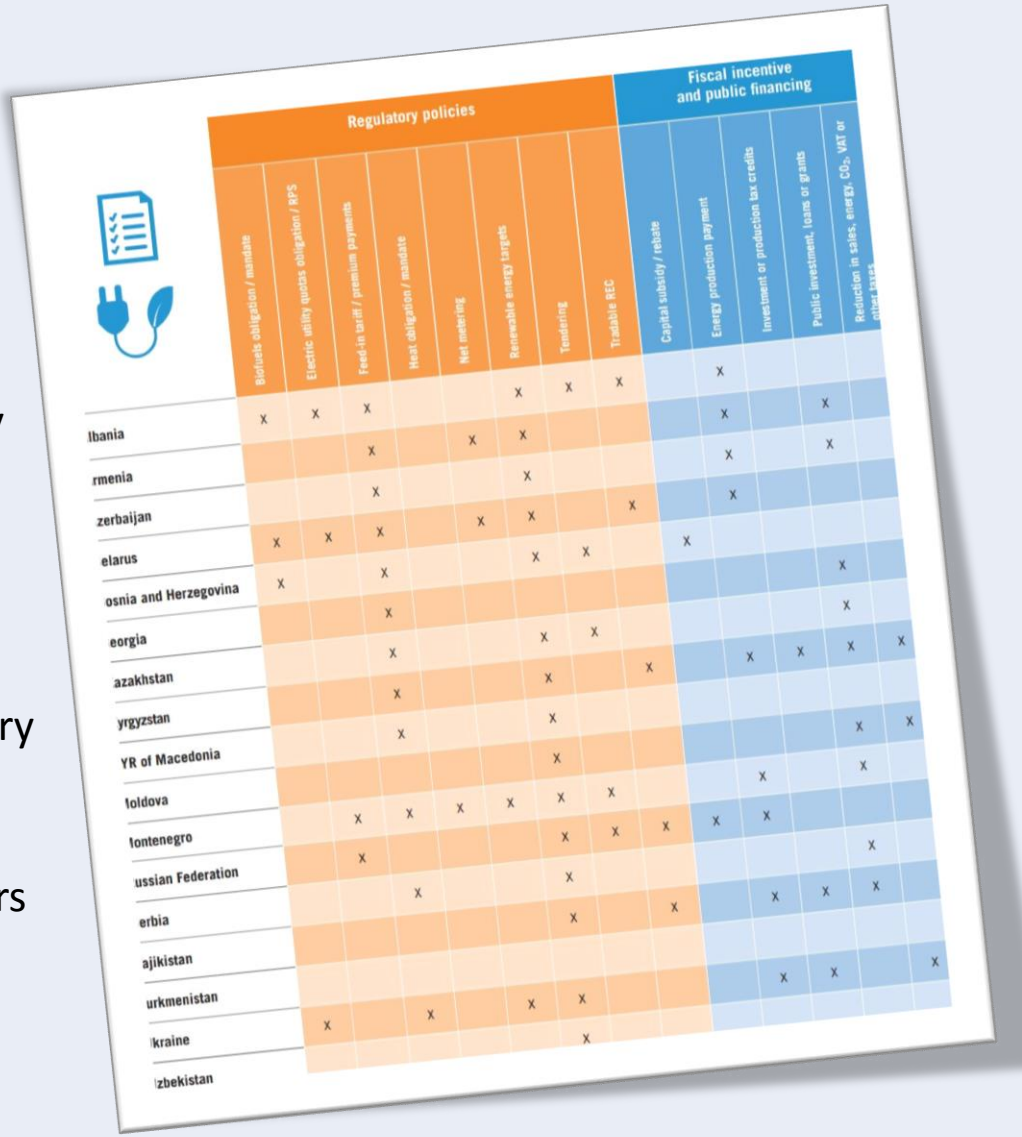
RE Policy and Target Landscape – UNECE (17)

- Positive progress has been made
- Targets are widely used and increasingly accompanied by regulatory policies
- Still significant room for improvement
- Only few examples of regional mandatory RE targets
- Still apparent that non-economic barriers hinder unfolding of full policy potential



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EE Policy and Target Landscape – UNECE (17)

- Energy Efficiency targets and policies are being pursued directly or through residential building initiatives
- Pushed by energy security concerns and by support of international donors
- Still significant room for improvement – especially in the industry and transportation sector

	Energy efficiency target	National energy efficiency awareness campaigns	National energy efficiency regulations, standards or laws	Governmental institution(s) to formulate and implement energy efficiency strategies and policies
lbania	X		X	X
rmenia			X	X
zerbaijan		X	X	X
elarus	X	X	X	X
osnia and Herzegovina	X	X	X	X
eorgia		X		X
azakhstan	X	X	X	X
yrgyzstan		X		
YR Macedonia	X	X	X	X
oldova	X	X	X	X
ontenegro	X	X	X	X
ussian Federation	X	X	X	
erbia	X	X	X	X
ajikistan	X	X	X	X
urkmenistan				
kraine	X		X	X
zbekistan	X	X	X	X

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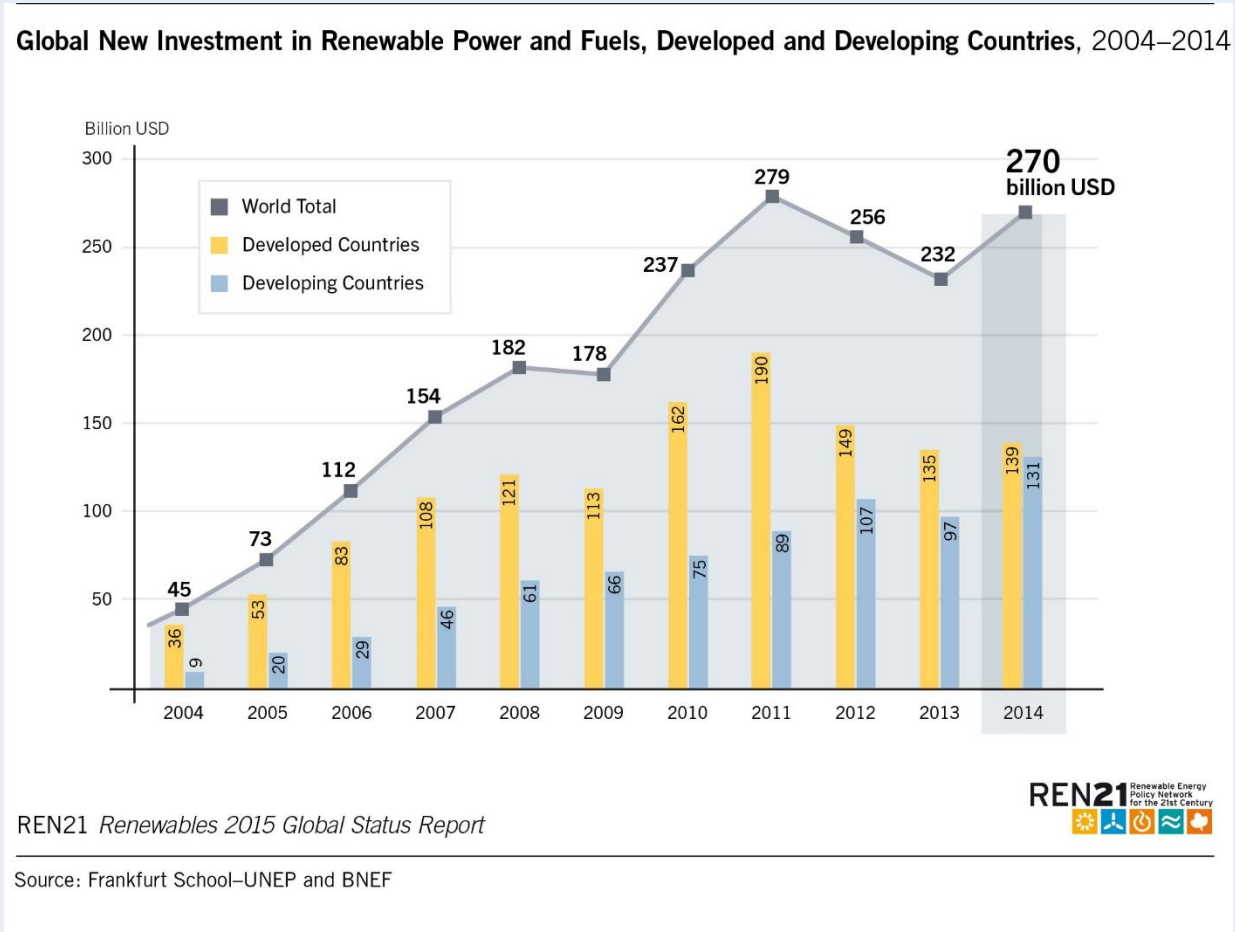
Global Investment in Renewable Energy

Global new investment estimated USD **USD 270.2 billion in 2014**

(including hydropower 301 billion**)**

Reasons for the increase:

- Increase in solar power installations in China and Japan
- Investment in solar power up **25%**
- Record investment in offshore wind projects in Europe



Investment flows in UNECE (17)

Renewable Energy Investment Overview, 2004 - 2014

- The covered countries only represent 0.5 % of new RE investment in 2014 worldwide
- Investment attraction remains an issue for RE development in the region
- Downward trend in investment activity since 2012 (in Eastern Europe & Russia)

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Investment flows in UNECE (17)

Renewable Energy Investment Overview, 2004 – 2014 – selected countries

- Investment is unevenly distributed (regionaly and by sector)
- Funding sources mainly originating in national governments, international donors and multilateral development banks.

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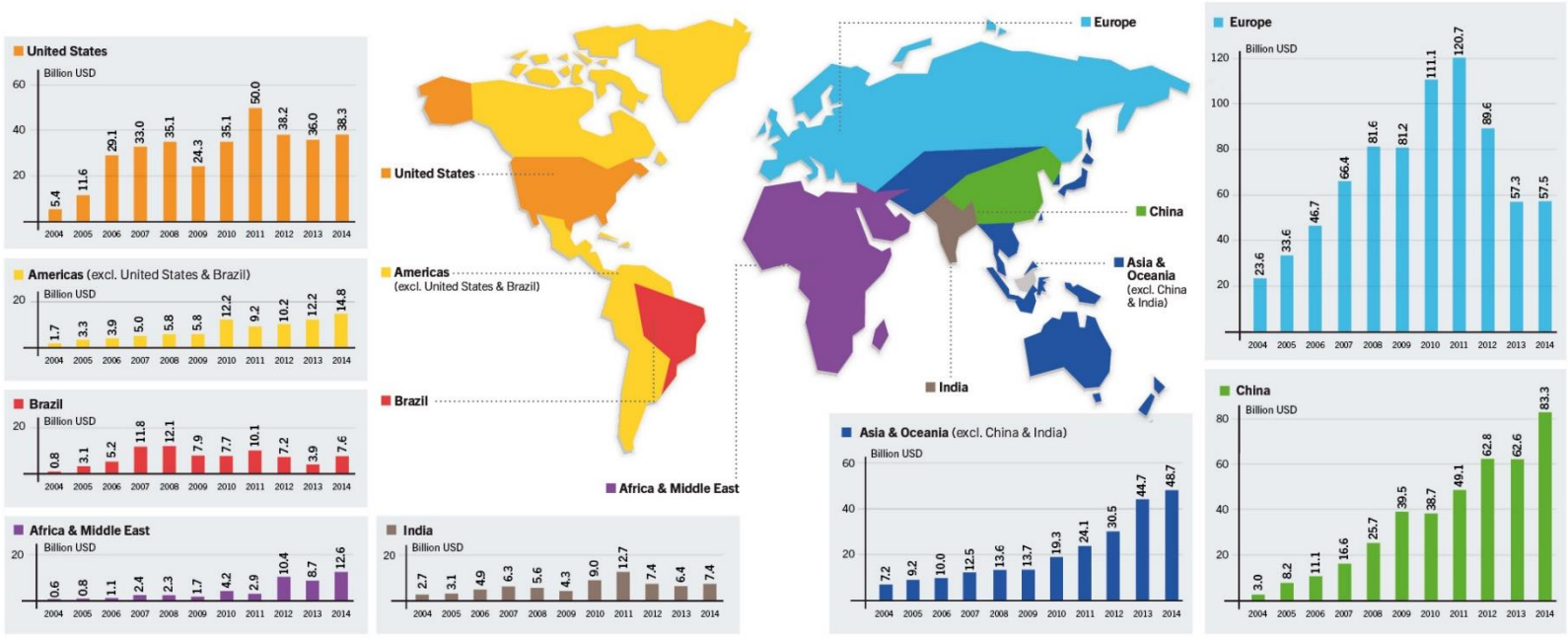
Global New Investment in Renewable Power and Fuels, by Region, 2004–2013



Data include government and corporate R&D.

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Developed Countries: Annual investment in 2014: **USD 138.9 billion** (increase of 3 % compared to 2013)

Developing Countries: annual investment in 2014: **USD 131.3 billion** (increase of 36% compared to 2013)

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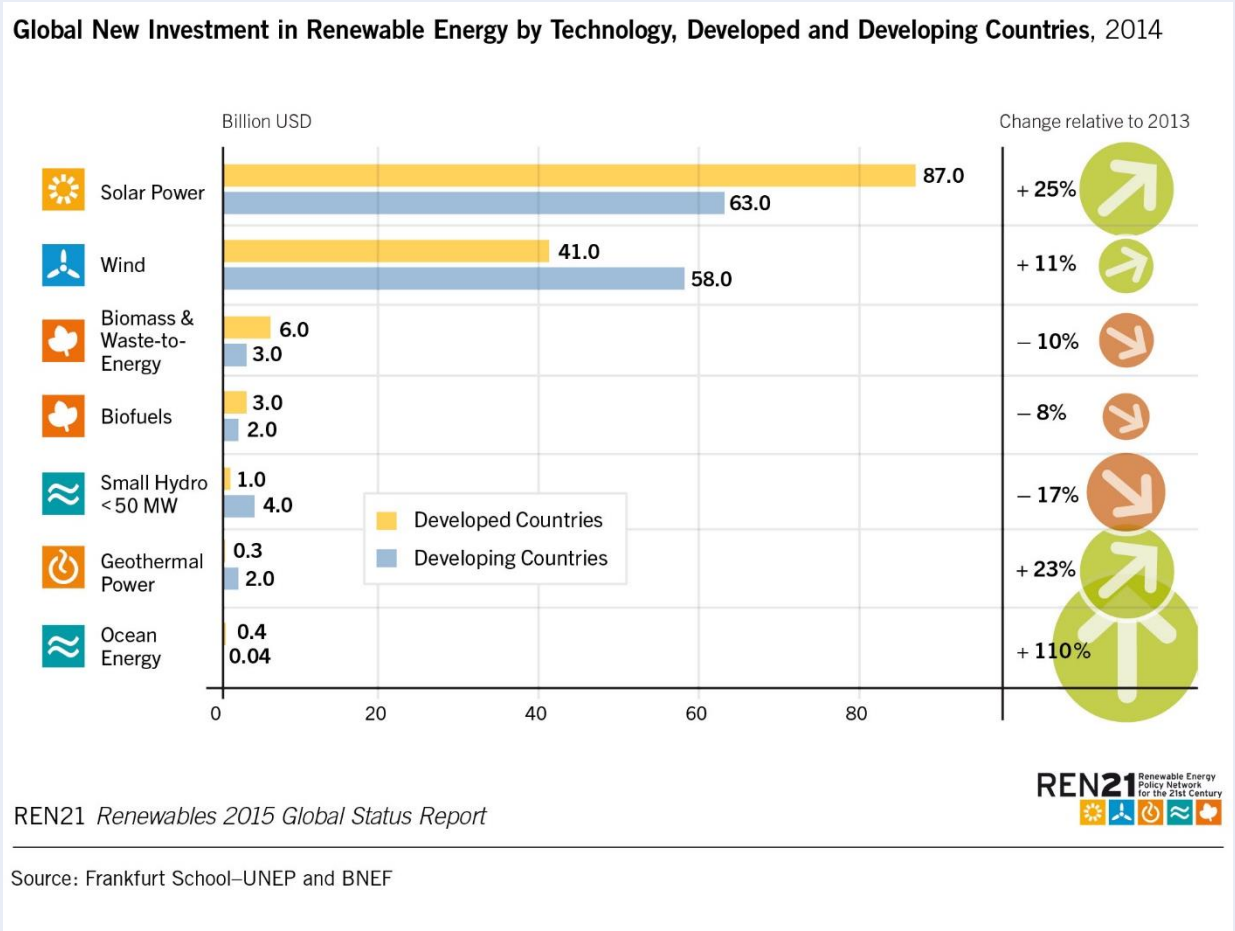
Global Investment in Renewable Energy by Technology

Solar power - leading sector for money committed during 2014, receiving more than **55% (USD 149.6 billion)** of total new investment in renewable power and fuels

Wind power followed with **USD 99.5 billion**



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Introducing the **UNECE Renewables Interactive Map** - Prototype

Contains all information collected during the development of the **UNECE Renewable Energy Status Report**

The map **can be easily integrated into existing websites** without IT know-how

Can be simply expanded with **data of future initiatives and updates to the status report**

www.ren21.net/map/UNECE

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Conclusion I

- South East and Eastern Europe, Caucasus, Central Asia and Russian Federation made strides into the realm of renewable energy and energy efficiency over the past two decades

- Governments advance in developing targets and policies that promote renewable energy sources present abundantly in different forms across the region

- Numerous barriers remain (energy subsidies, legal & administrative complexities, awareness of affordability, etc.) and delay projects implementation

- Viewed from global perspective, capacity and investment in the covered 17 countries remain marginal

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Conclusion II

Main takeaways from the global perspective:

- Establish and strengthen institutional, financial, legal, and regulatory support mechanisms
- Long-term and stable policy frameworks, which can adapt to changing environment, to sustain and increase investment levels
- Greater attention to the heating and cooling and the transport sector and “energy system thinking”
- Improve information on distributed renewable energy markets in developing countries and improve access to up-front finance

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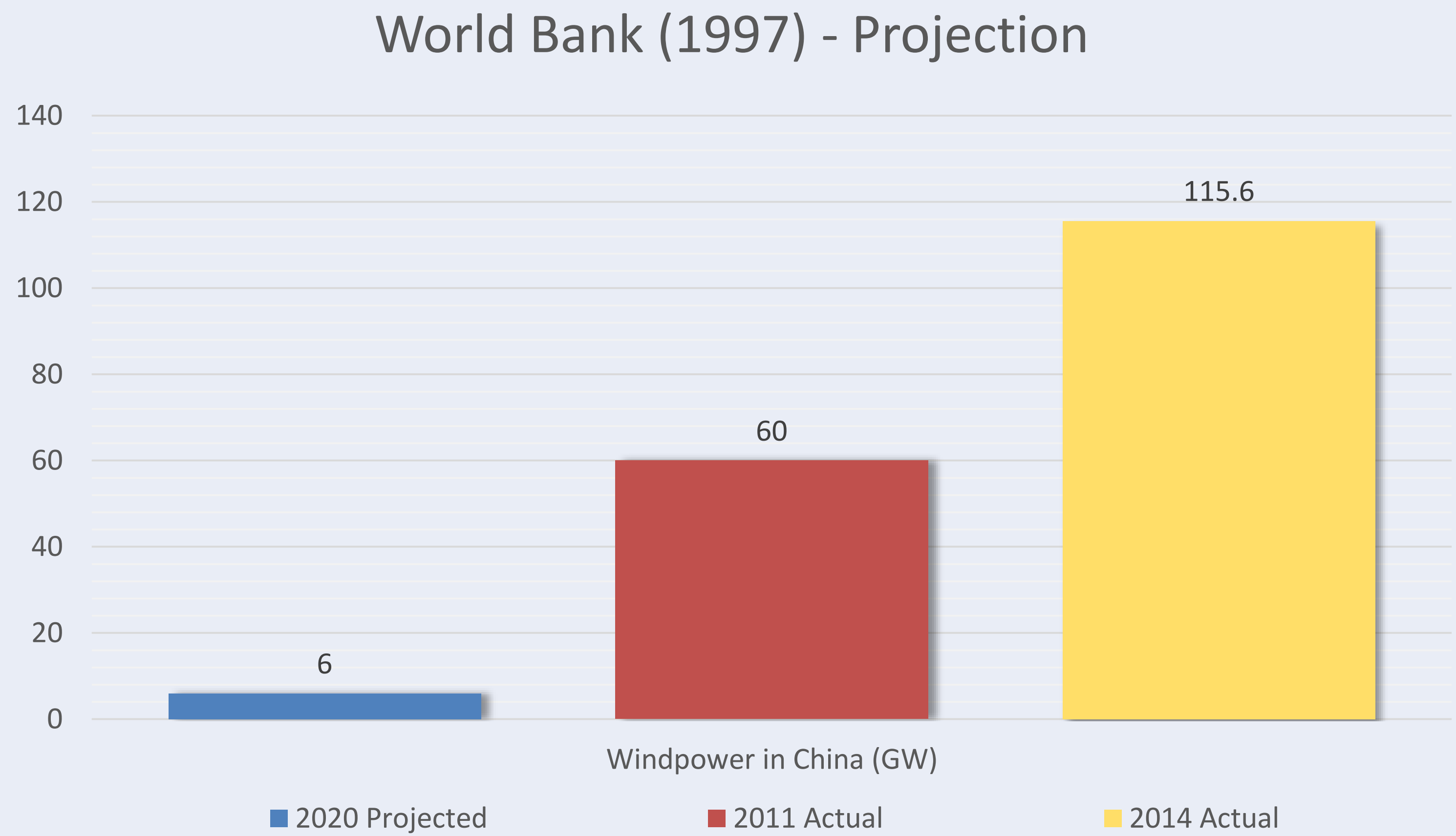
Historic Projections Fall Short…



In 1997, the World Bank predicted about 6 GW of wind in China for 2020, nearly ten times less than what was reached a decade earlier with close to 60 GW installed wind capacity in China in 2011.

“The future of renewable energy is fundamentally a choice. All the resources and technologies are there, but legislators and governments have to choose a long-term renewable path.”

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THANK YOU / Спасибо

for your attention

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