RENEWABLES 2016
GLOBAL STATUS REPORT

REN21 Renewable Energy Policy Network for the 21st Century

Seventh international forum on Energy for sustainable development

Baku, Azerbaijan
20 October 2016

Martin Hullin
Project Manager
martin.hullin@ren21.net

2016

REN21 is a **global multi stakeholder network** dedicated to the rapid uptake of **renewable energy worldwide.**

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

NGOs:
ALER, CURES, GFSE, Gogla, Greenpeace, ICLEI, ISEP, Renewable Energy Institute, RCREEE, SLoCaT, WCRE, WFC, WRI, WWF

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

Industry Associations:
ACORE, ARE, CEC, CREIA, EREF, GSC, GWEC, IGA, IHA, IREF, RES4MED, WBA, WWEA

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

REN21 Renewables 2016 Global Status Report

→ **The report features:**

- Global Overview
- Market & Industry Trends
- Distributed Renewable Energy for Energy Access
- Investment Flows
- Policy Landscape
- Energy Efficiency
- Feature: Community Energy

→ **The report covers:**

- All renewable energy technologies
- Power, heating & cooling, and transport sectors

→ **Country data** available on REN21 Renewables Interactive Map: www.ren21.net/map

An extraordinary year for renewable energy

- **147 GW** of renewable power capacity added in 2015 – the largest annual increase ever
- Renewable heat capacity increased by **38 GW_{th}**
- Total biofuels production also rose

Renewable Energy Indicators 2015

		2014	2015
INVESTMENT			
New investment (annual) in renewable power and fuels[1]	billion USD	273	**285.9**
POWER			
Renewable power capacity (total, not including hydro)	GW	665	**785**
Renewable power capacity (total, including hydro)	GW	1,701	**1,849**
Hydropower capacity[2]	GW	1,036	**1,064**
Bio-power capacity[3]	GW	101	**106**
Bio-power generation (annual)	TWh	429	**464**
Geothermal power capacity	GW	12.9	**13.2**
Solar PV capacity	GW	177	**227**
Concentrating solar thermal power	GW	4.3	**4.8**
Wind power capacity	GW	370	**433**
HEAT			
Solar hot water capacity[4]	GW_{th}	409	**435**
TRANSPORT			
Ethanol production (annual)	billion litres	94.5	**98.3**
Biodiesel production (annual)	billion litres	30.4	**30.1**

Renewable Energy "Champions"

Annual investment/capacity additions/production

	1	2	3	4	5
Investment in renewable power and fuels (not including hydro > 50 MW)	**China**	United States	Japan	United Kingdom	India
Investment in renewable power and fuels per unit GDP[1]	**Mauritania**	Honduras	Uruguay	Morocco	Jamaica

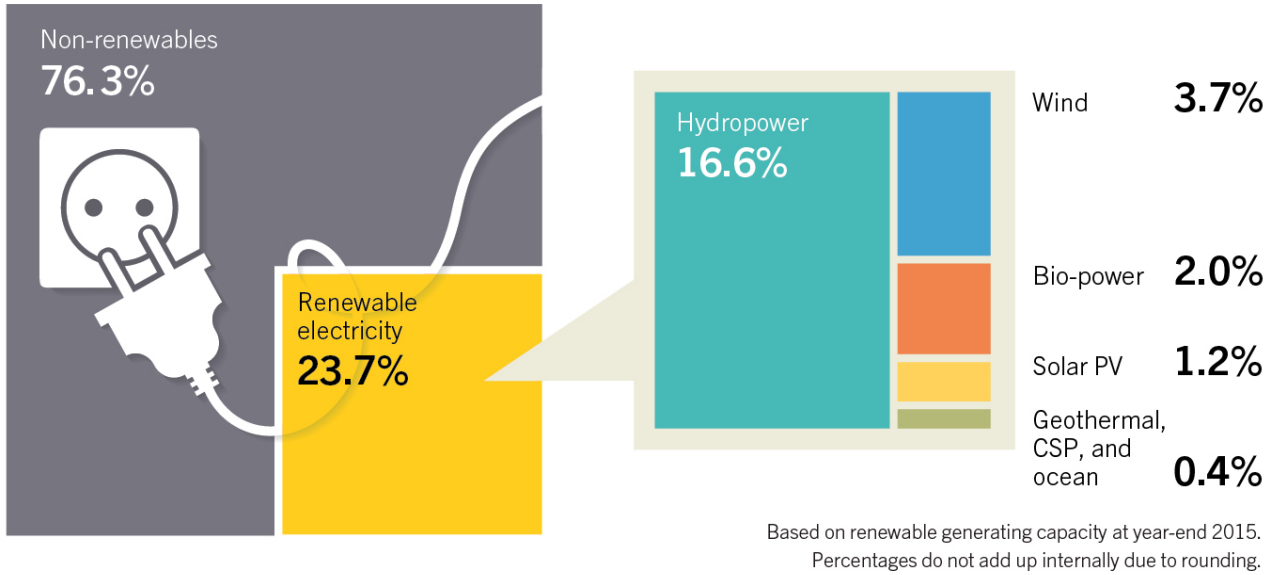
Renewable Energy "Champions"

Total capacity

	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	Japan	India
Renewable power capacity *per capita* (among top 20, not including hydro[3])	**Denmark**	Germany	Sweden	Spain	Portugal

Power Sector

Estimated Renewable Energy Share of Global Electricity Production, End-2015



Based on renewable generating capacity at year-end 2015.
Percentages do not add up internally due to rounding.

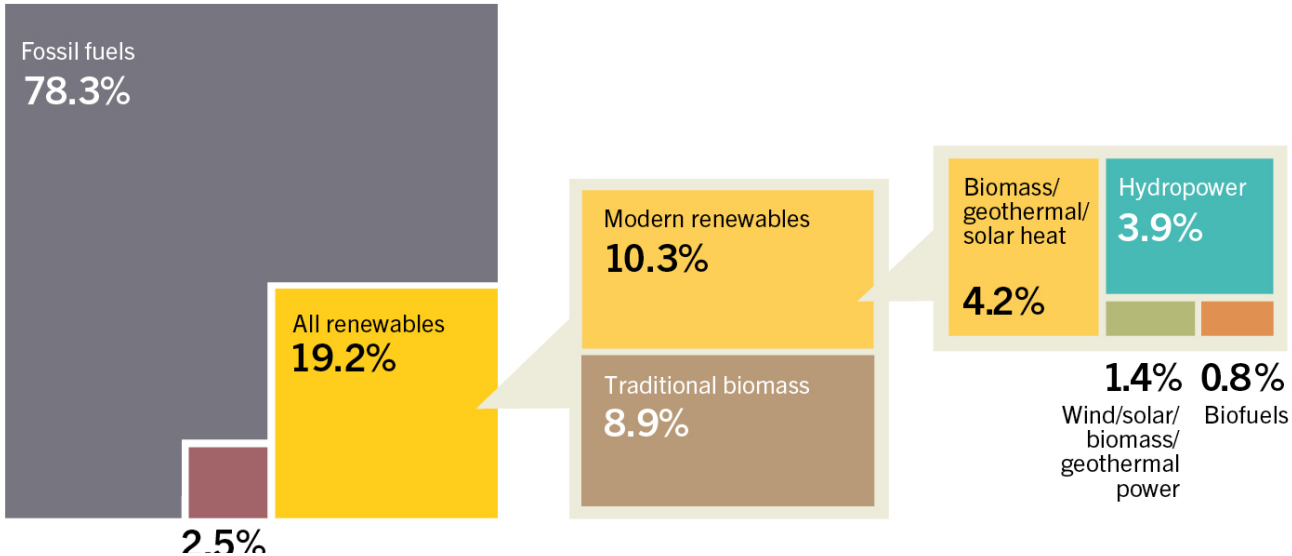
- Renewables accounted **28.9%** of global power generation capacity and **23.7%** of global electricity demand
- Renewables made up for **60%** of net additions to global power capacity
- Total RE power capacity: **1,849 GW**, an increase of almost 9% over 2014

Renewable Energy in the World

Renewable energy provided an estimated **19.2% of global final energy consumption** in 2014

Share of modern renewable energy increased to 10.3% while the share of traditional biomass was of 8.9%

Estimated Renewable Energy Share of Global Final Energy Consumption, 2014



Solar PV

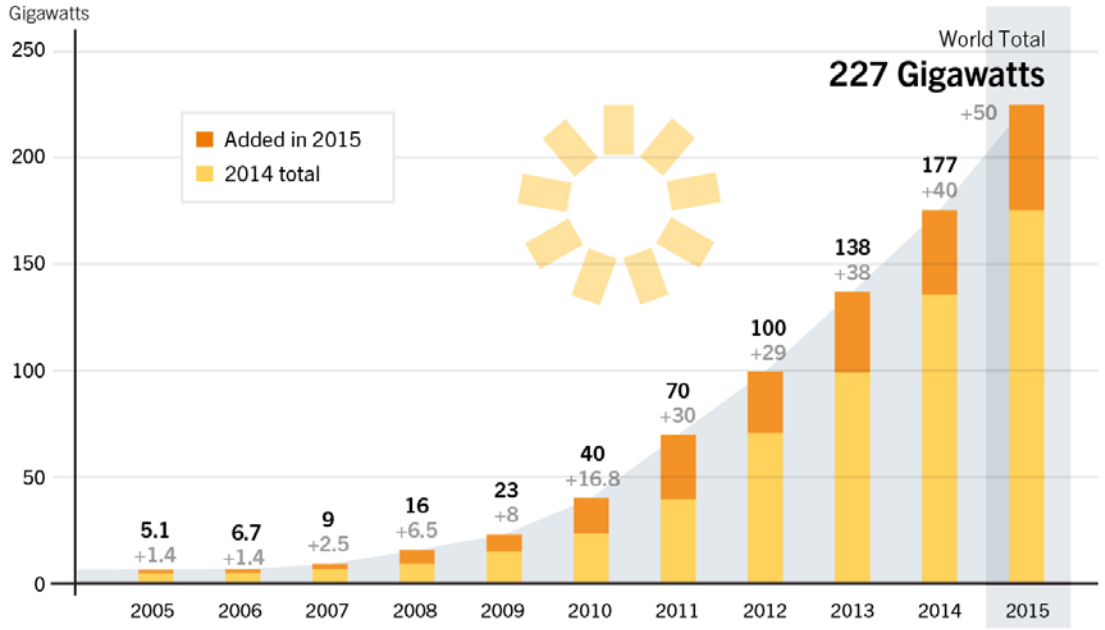
Capacity added:
+50 GW

Total capacity:

227 GW

Annual PV market in 2015 was nearly **10 times** the world's cumulative solar PV capacity of a decade earlier

Solar PV Total Global Capacity Annual Additions and Capacity, 2005–2015



REN21 *Renewables 2016 Global Status Report*

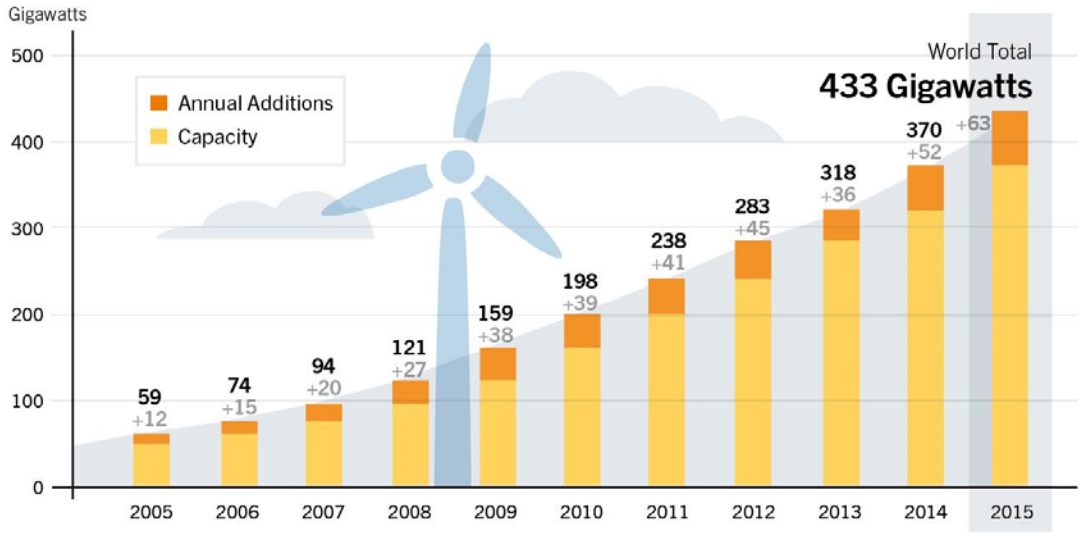
Wind Power

63 GW of capacity were added

Total capacity: **433 GW**

Offshore, an estimated **3.4 GW** of grid-connected capacity was added in 2015, for a world total exceeding **12 GW**

Wind Power Global Annual Additions and Capacity, 2005–2015



REN21 *Renewables 2016 Global Status Report*

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 – **new edition will be published in early 2017**

REN21 Renewable Energy Policy Network for the 21st Century

UNECE

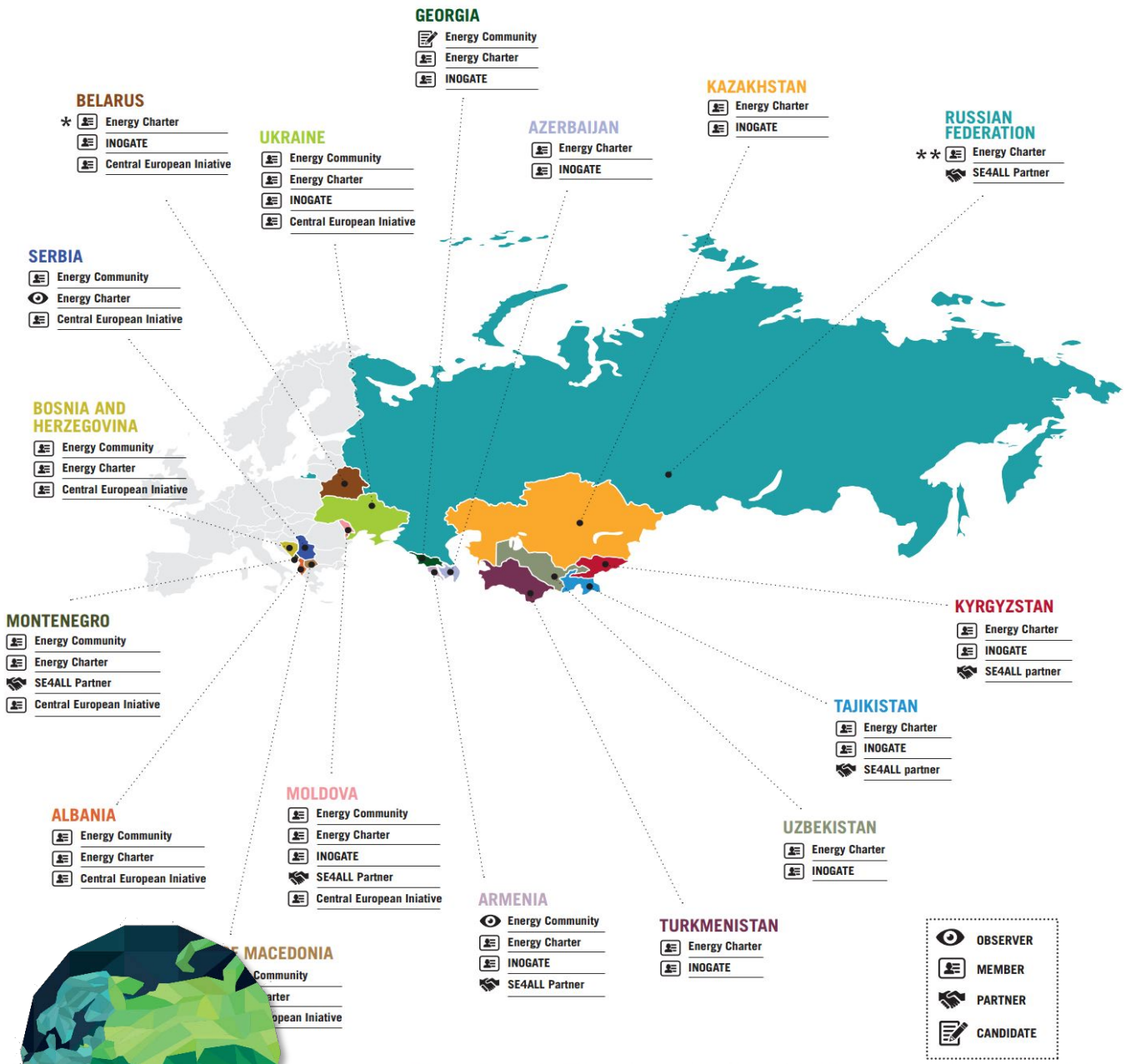
giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

On behalf of:

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

of the Federal Republic of Germany

iea International Energy Agency

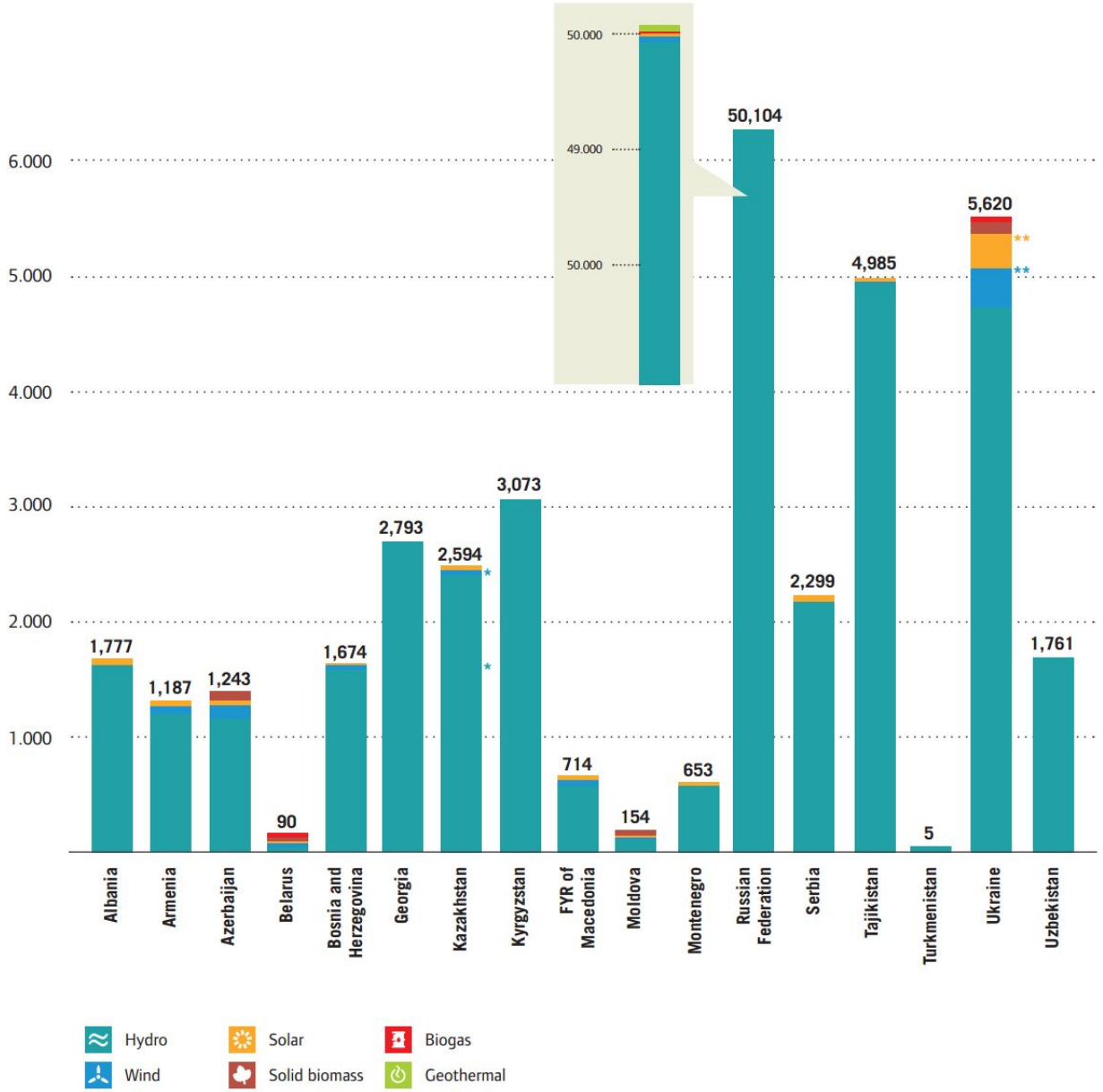


- Covered countries very diverse in terms of territory, economic, social and political characteristics
- Overall population of over 300 Million
- Density ranges from 6,4 persons/km to 123,9 persons/km
- Three countries amongst coldest globally in terms of heating degree days
- Countries partake in different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

REN21 Renewable Energy Policy Network for the 21st Century

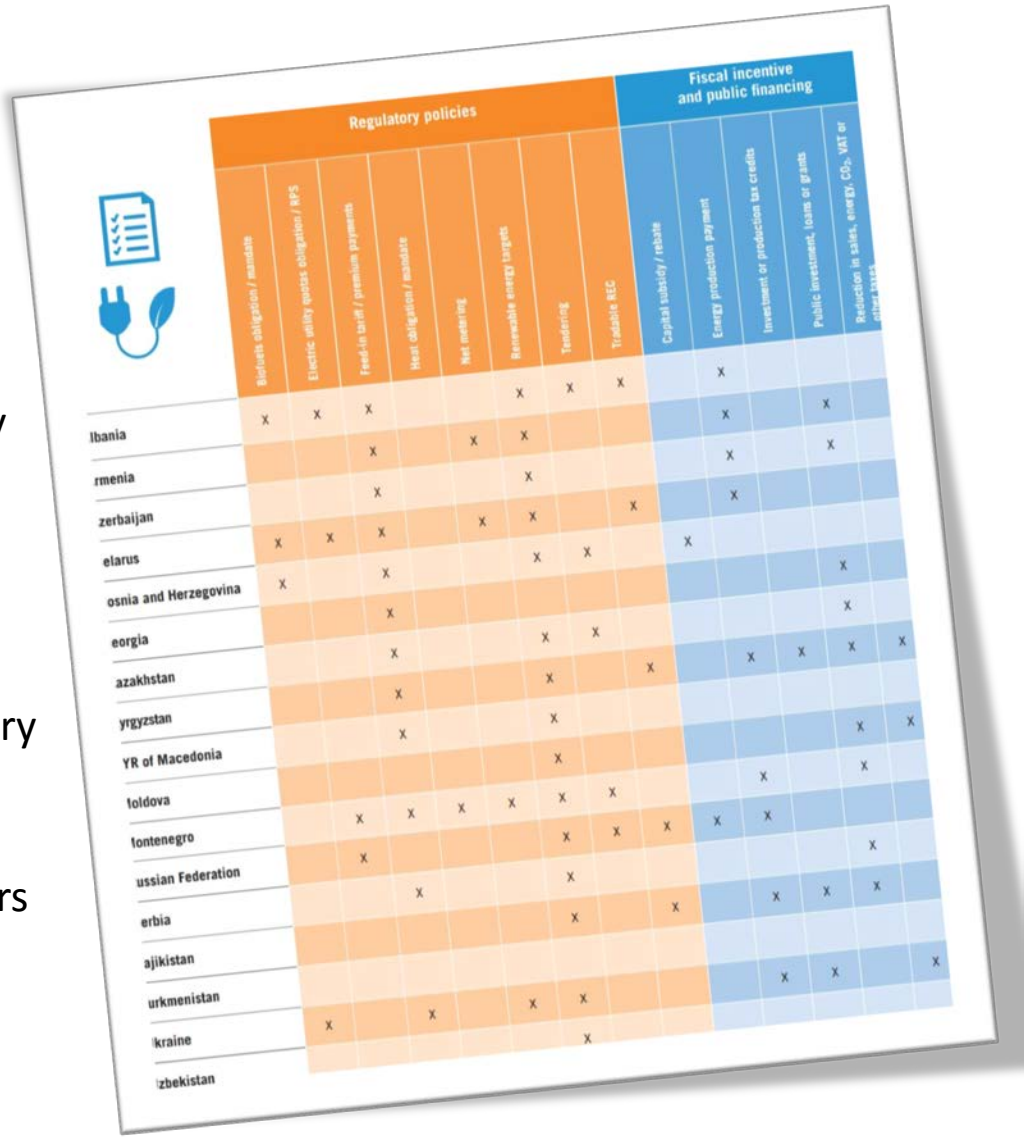
Renewable Energy for Power, Installed Capacity in MW, 2014

- 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



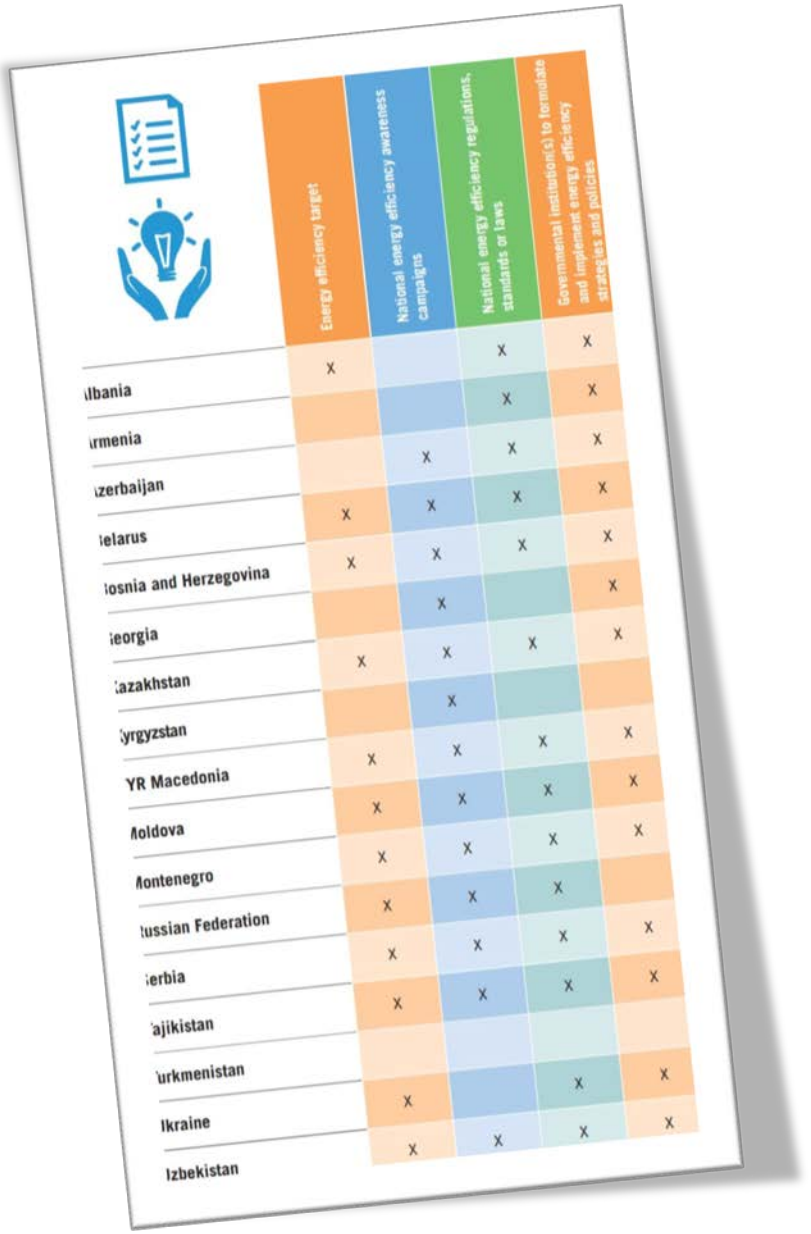
RE Policy and Target Landscape – UNECE (17)

- 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



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

REN21 Renewable Energy Policy Network for the 21st Century

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)

Global Investment in Renewable Energy

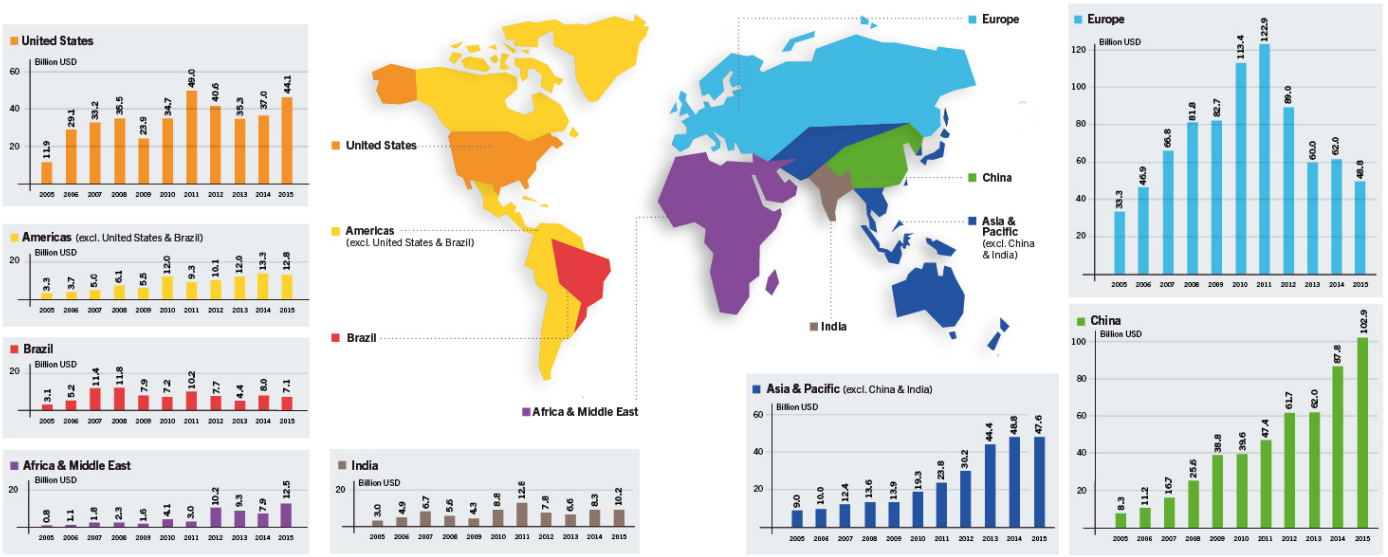
Developing & emerging countries:

- → **USD 156 billion**
- → **Increase of 19%** compared to 2014

Developed countries:

- → **USD 130 billion**
- → **Decrease of 8%** compared to 2014

Global New Investment in Renewable Power and Fuels, by Country and Region, 2005–2015



Data include government and corporate R&D.

REN21 *Renewables 2016 Global Status Report*

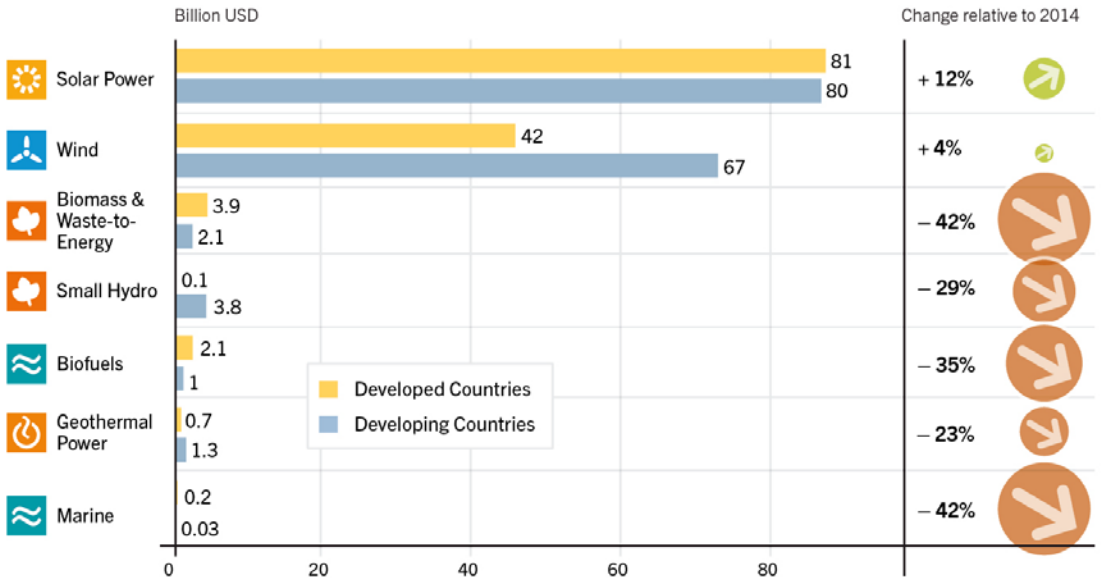
Source: BNEF

Global Investment in Renewable Energy

Solar power leading sector for money committed during 2015, receiving more than 56% (**USD 161 billion**) of total new investment in RE

Wind power followed with **USD 109.6 billion** (38.3% of total, up 4%)

Global New Investment in Renewable Energy by Technology, Developed and Developing Countries, 2015

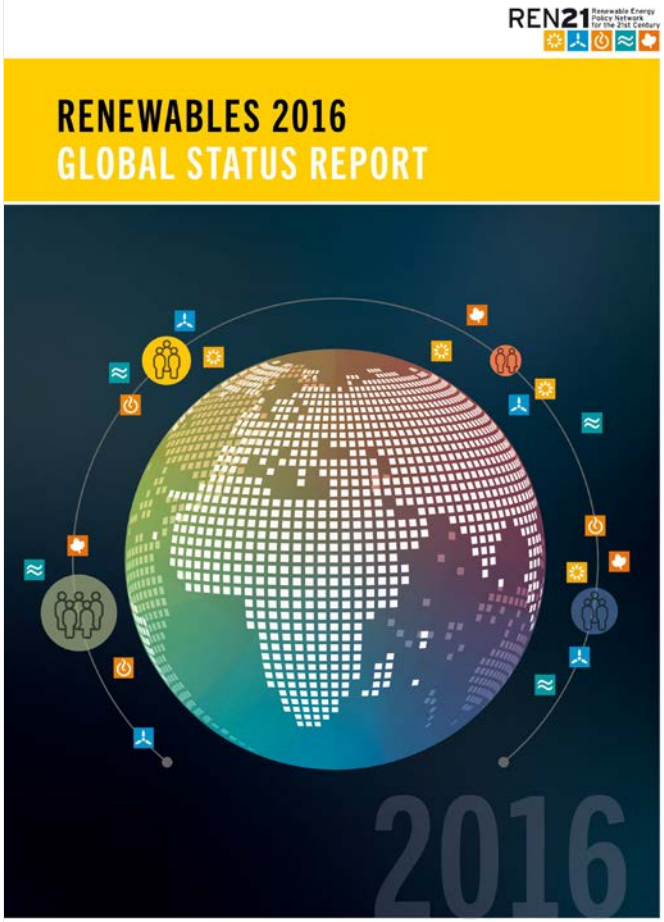


REN21 *Renewables 2016 Global Status Report*

Source: BNEF

Conclusions - Global

- **Largest global capacity additions** from renewables to date
- For the second year in a row, **global carbon emissions** associated with energy consumption **remained stable in 2015** while the global economy grew.
- **More emphasis on renewable energy in the heating and cooling as well as transport** sectors and on sector-coupling
- **Need to build a smarter, more flexible system** that accommodates both centralised as well as decentralised generation



Conclusion - UNECE

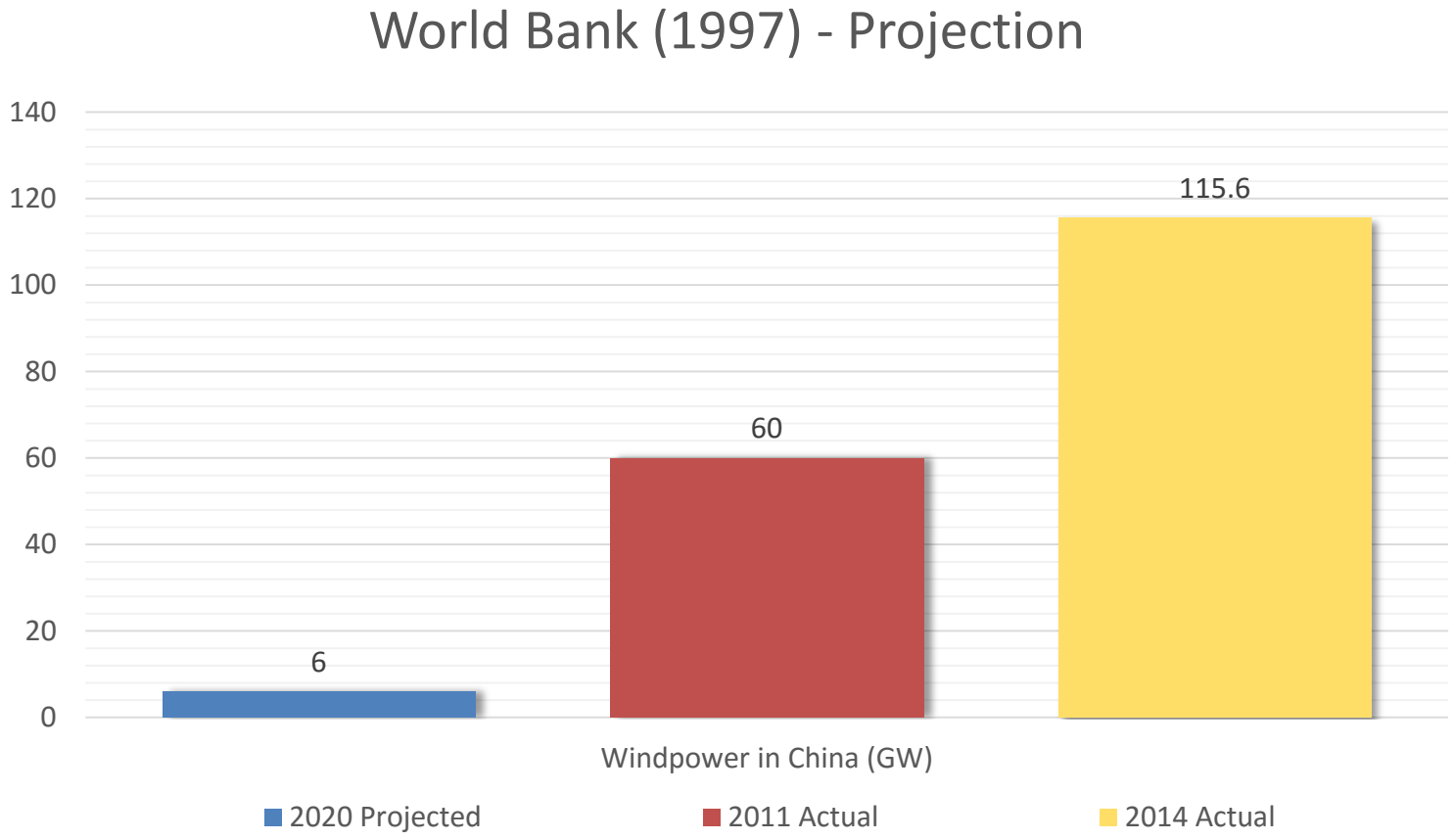
- South East and Eastern Europe, Caucasus, Central Asia and Russian Federation made strides into the realm of renewable energy and energy efficiency over the past two decades

- 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

Historic Projections Fall Short…



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

In 1997, the World Bank predicted 6 GW by 2020 for China, nearly 20 times lower than actual 2014 capacity.

Renewable Energy Policy Network for the 21st Century

Global Status Report: yearly publication since 2005

Regional Status Reports

www.map.ren21.net

Global Futures Report

REN21 Renewables Academy

International Renewable Energy Conferences

www.ren21.net/gsr
www.ren21.net/UNECE

Subscribe to our newsletter
www.ren21.net