RENEWABLES 2016
GLOBAL STATUS REPORT

REN21 Renewable Energy Policy Network for the 21st Century

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

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

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

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

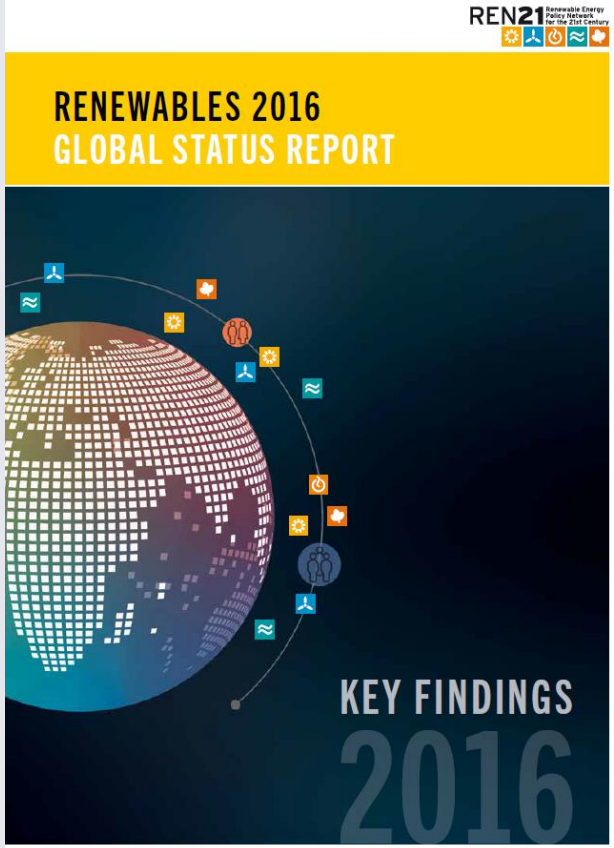
➜ **The report features:**

- 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

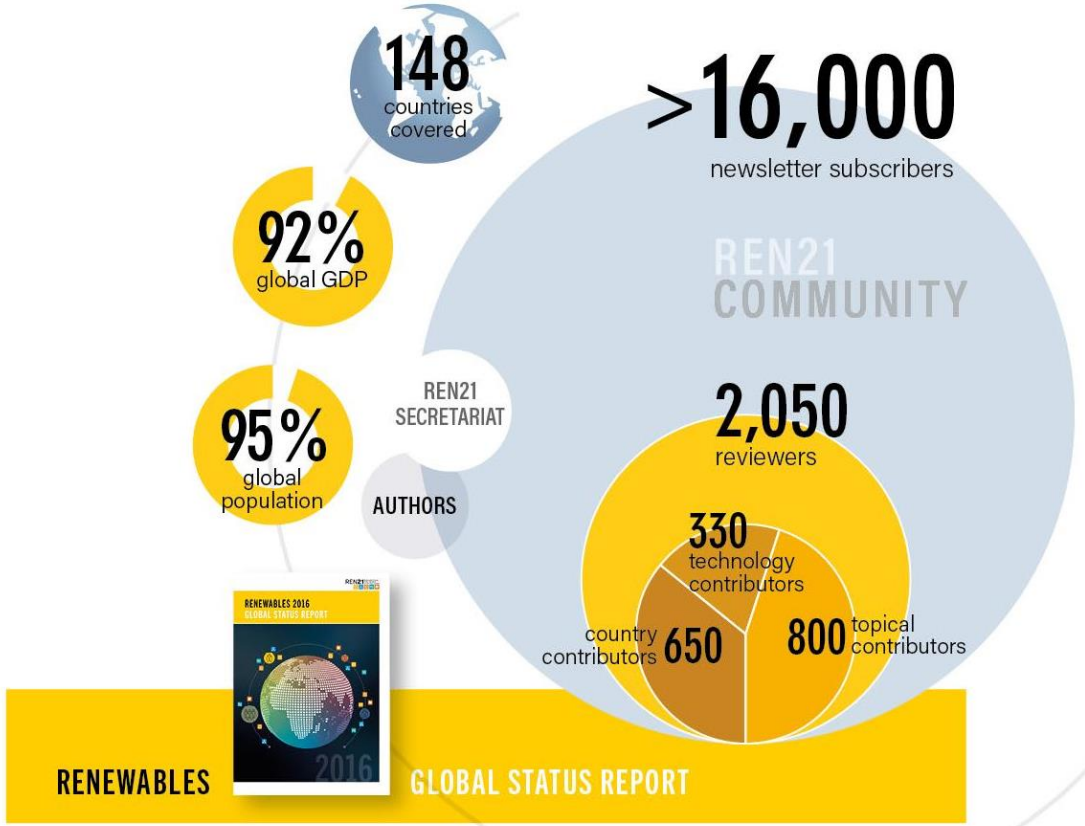
➜ **Country data** available on REN21 Renewables Interactive Map: www.ren21.net/map



REN21 Community

GSR Network: **700** renewable energy, energy access & energy efficiency experts

GSR 2016: **180** experts joined the report process, equivalent to the total number of GSR experts in 2012



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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**

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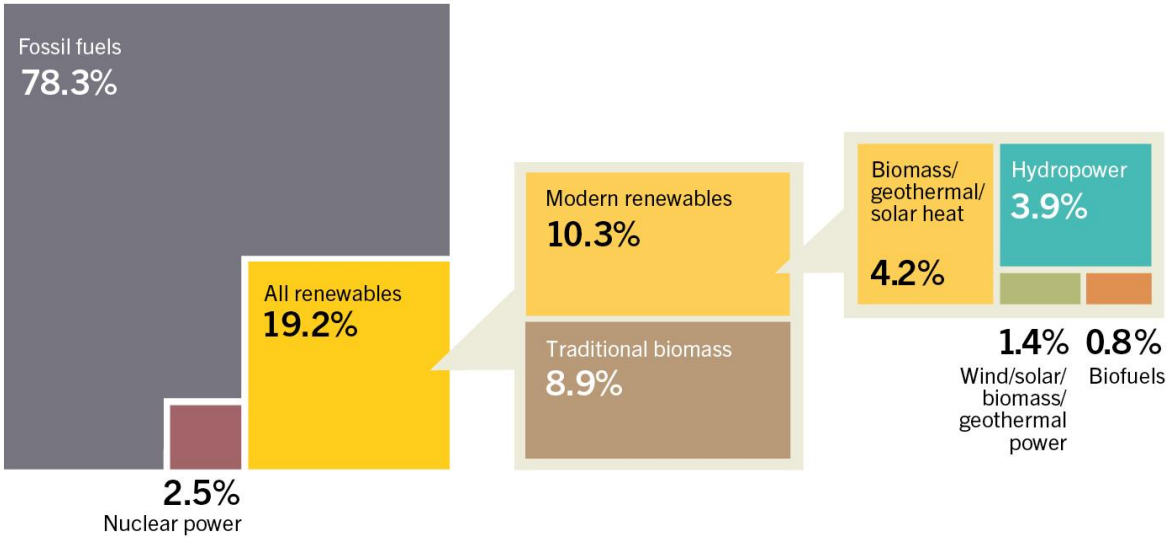
Renewable Energy in the World

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 8.9%

Estimated Renewable Energy Share of Global Final Energy Consumption, 2014



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Renewable Energy "Champions"
Annual investment/capacity additions/production

Top Five Countries – Annual investment / net capacity additions / biofuel production in 2015

	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
Geothermal power capacity	**Turkey**	United States	Mexico	Kenya	Germany/ Japan
Hydropower capacity	**China**	Brazil	Turkey	India	Vietnam
Solar PV capacity	**China**	Japan	United States	United Kingdom	India
Concentrating solar thermal power (CSP) capacity[2]	**Morocco**	South Africa	United States	–	–
Wind power capacity	**China**	United States	Germany	Brazil	India
Solar water heating capacity	**China**	Turkey	Brazil	India	United States
Biodiesel production	**United States**	Brazil	Germany	Argentina	France
Fuel ethanol production	**United States**	Brazil	China	Canada	Thailand

Renewable Energy "Champions"
Total capacity

Top Five Countries – Total capacity or generation as of end-2015

	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
Biopower generation	**United States**	China	Germany	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	Morocco	South Africa
Solar PV capacity	**China**	Germany	Japan	United States	Italy
Solar PV capacity *per capita*	**Germany**	Italy	Belgium	Japan	Greece
Wind power capacity	**China**	United States	Germany	India	Spain
Wind power capacity *per capita*	**Denmark**	Sweden	Germany	Ireland	Spain
HEAT					
Solar water collector capacity	**China**	United States	Germany	Turkey	Brazil
Solar water heating collector capacity *per capita*[5]	**Austria**	Cyprus	Israel	Barbados	Greece
Geothermal heat capacity[6]	**China**	Turkey	Japan	Iceland	India
Geothermal heat capacity *per capita*[6]	**Iceland**	New Zealand	Hungary	Turkey	Japan

Solar PV

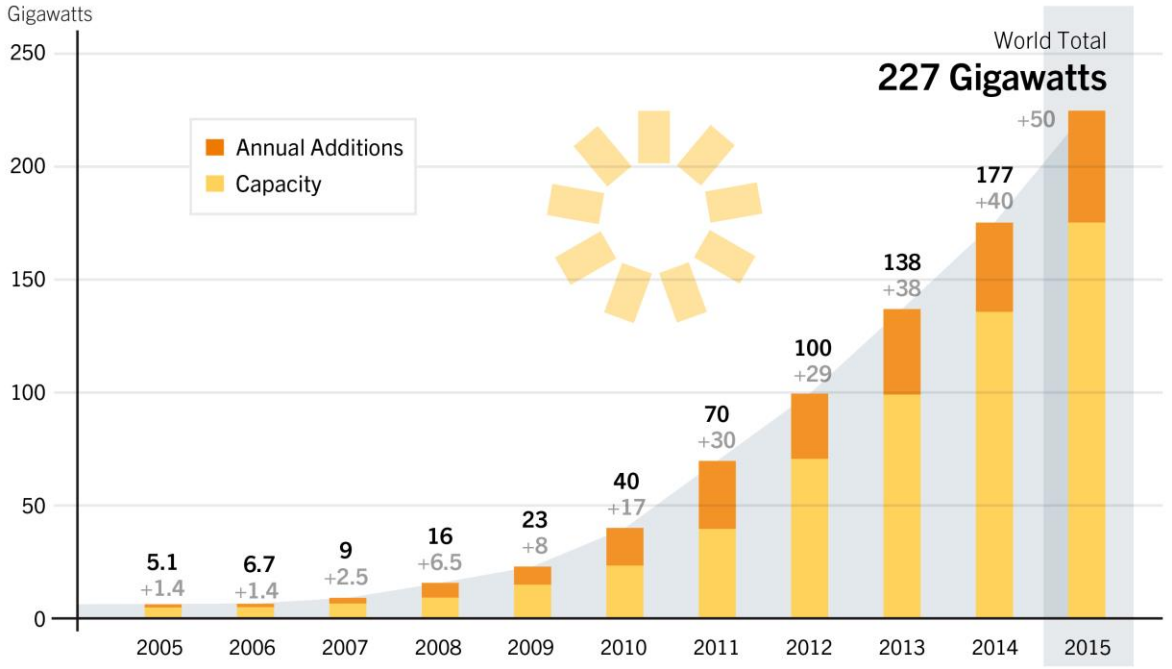
Capacity added:
+50 GW

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 Global Capacity and Annual Additions, 2005–2015



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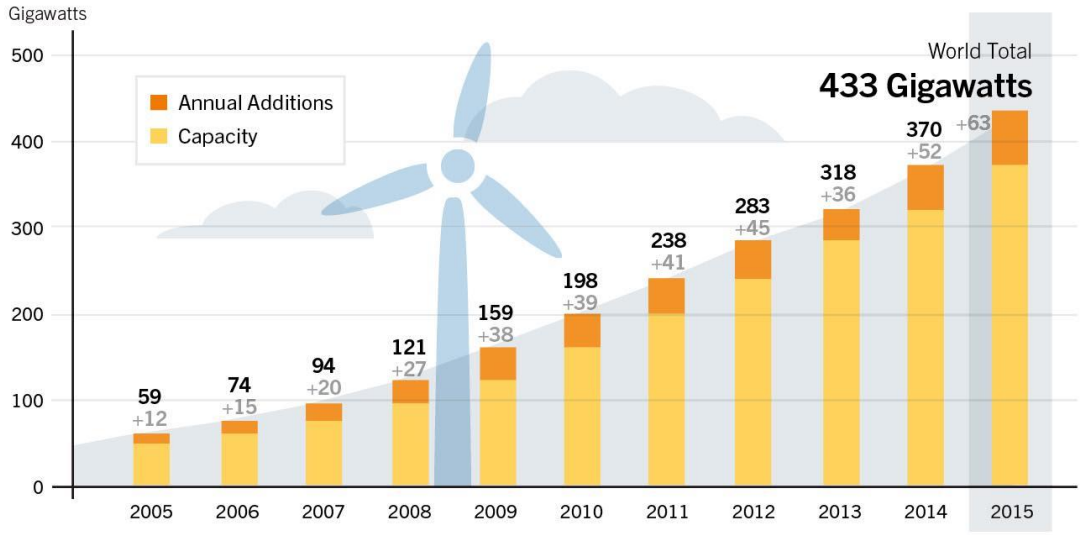
Wind Power

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



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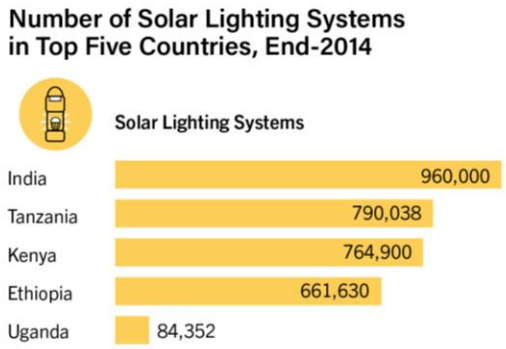
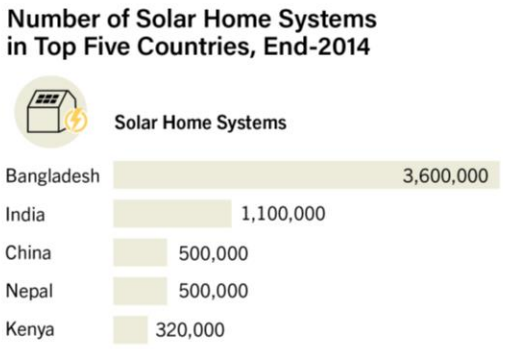
Distributed Renewable Energy for Energy Access

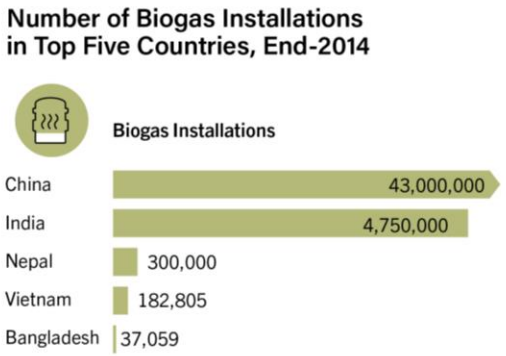
Little quantitative information exists on **DRE markets**, but information available indicates that markets are significant

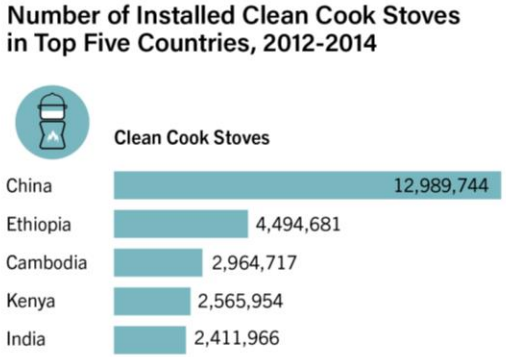
DRE solar PV markets continue to flourish:

- **44 million** off-grid pico-solar products sold
- Represents annual market of **USD 300 million**
- **70 countries** had off-grid PV capacity or programmes to support off-grid PV









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Global Investment in Renewable Energy

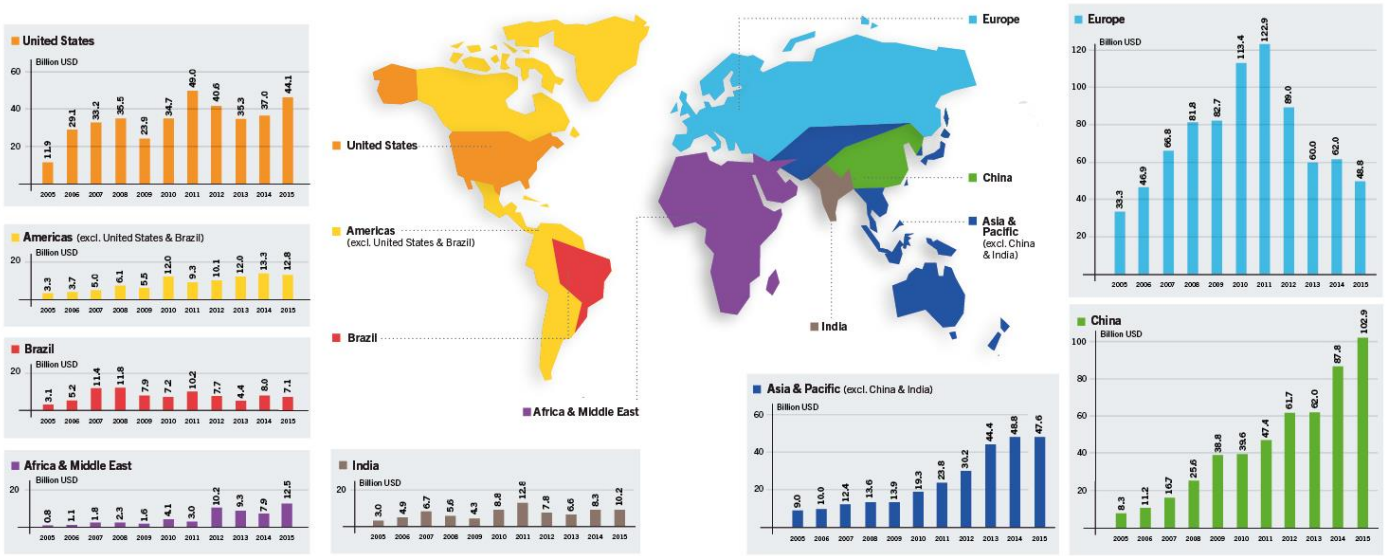
Developing & emerging countries:

- **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.

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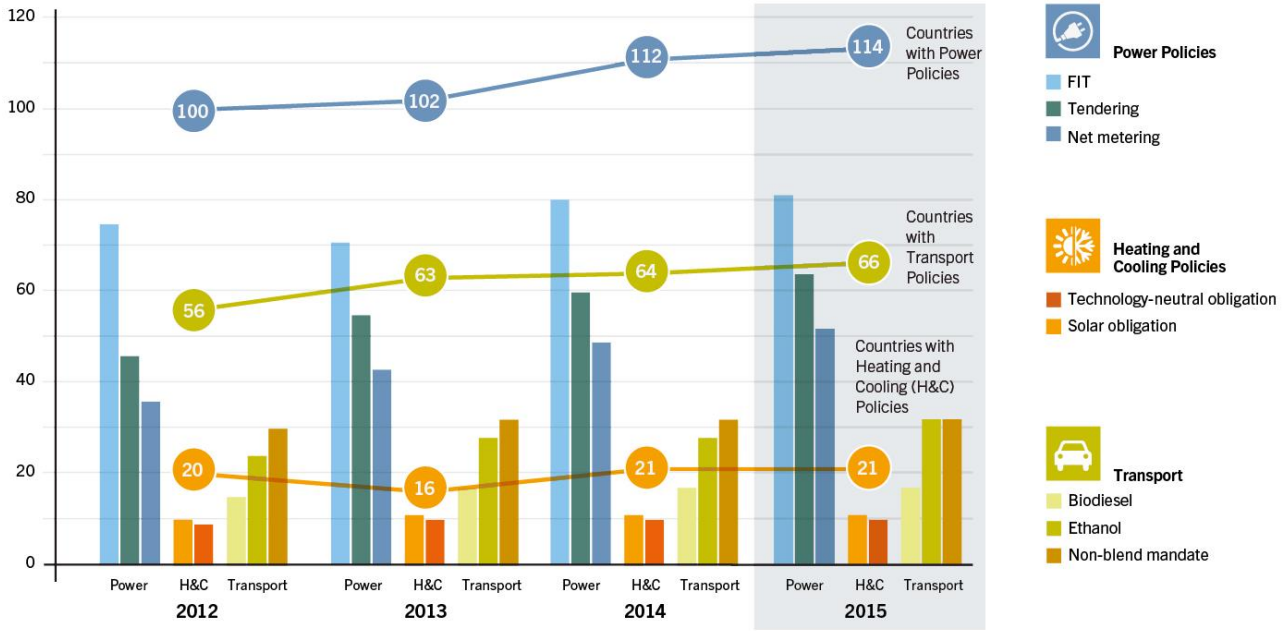
Source: BNEF

Renewable Energy Policy Landscape

173 countries had renewable energy **targets**, and an estimated **146** countries had renewable energy support **policies**:

- **114** countries with **power** policies
- **66** countries with **transport** policies
- **21** countries with **H&C** policies

Number of Renewable Energy Policies and Number of Countries with Policies, by Type, 2012–15



Note: Figure does not show all policy types in use. Countries are considered to have policies when at least one national or state/provincial-level policy is in place. Some transport policies include both biodiesel and ethanol; in this case, the policy is counted once in each category (biodiesel and ethanol).

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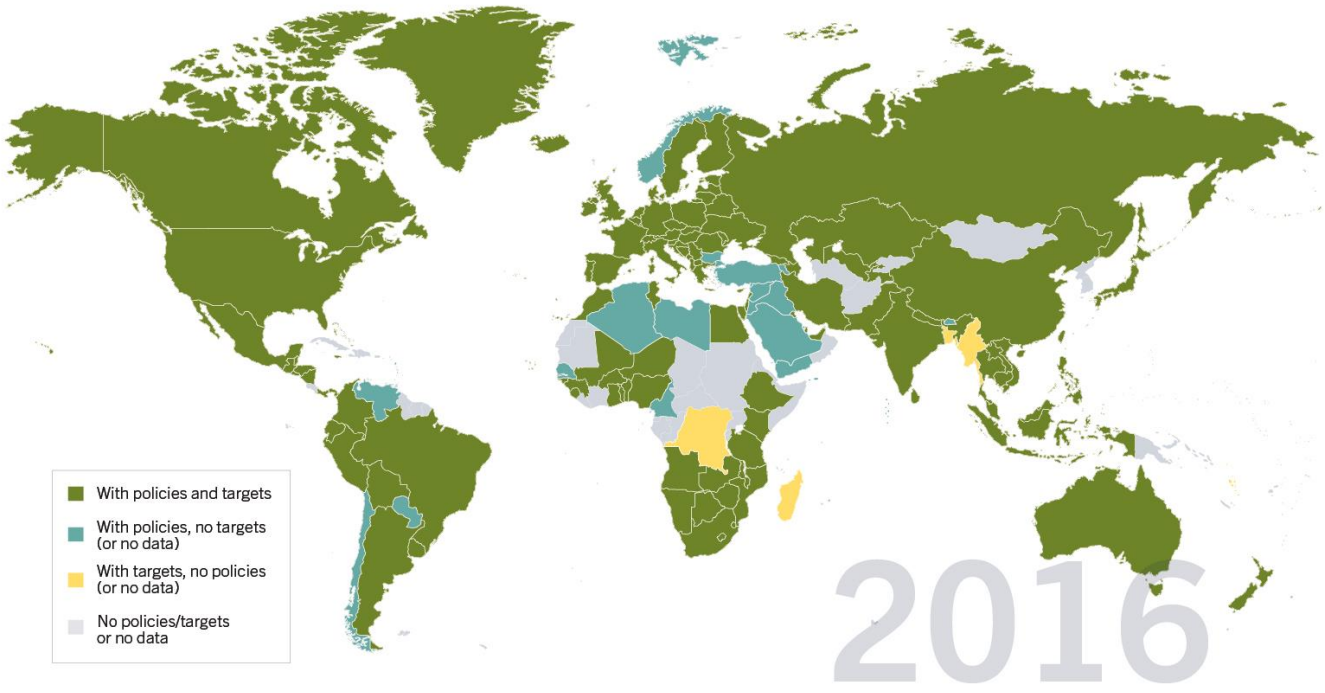
Source: REN21 Policy Database

Energy Efficiency

Increased emphasis on activities to improve energy efficiency **in all sectors**

- **146** countries with policies
- **128** countries with targets

Countries with Energy Efficiency Policies and Targets, 2015



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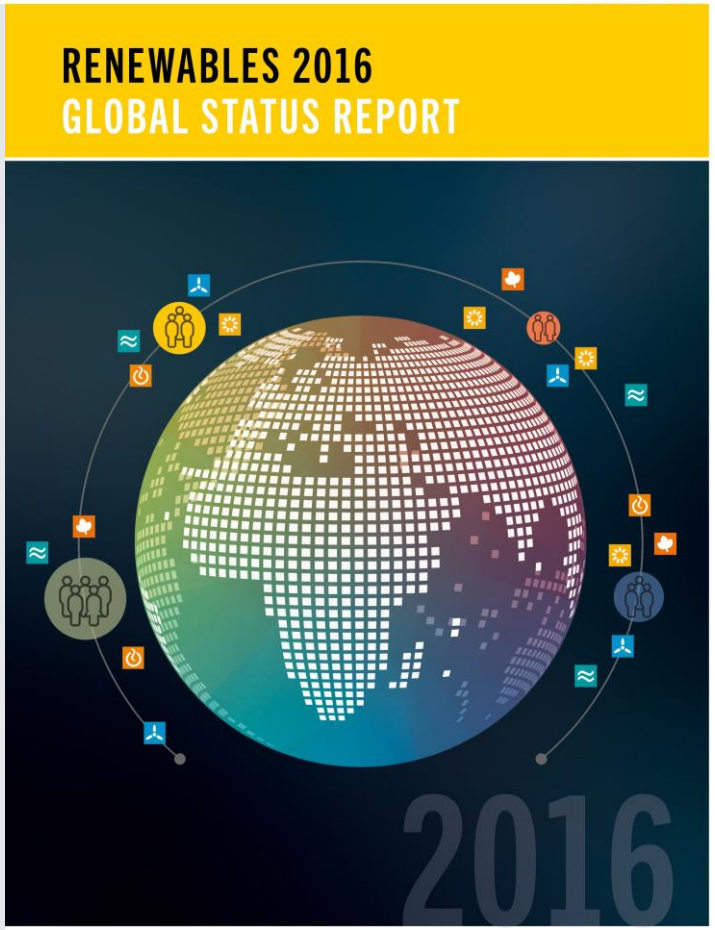
Conclusions

- **Largest global capacity additions** from renewables to date
- Majority of remaining **fossil fuel reserves will have to be kept in the ground**, and both **renewable energy and energy efficiency will have to be scaled up** dramatically in order to reach 2° climate target
- 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 and decentralised** as well as **community-based** generation



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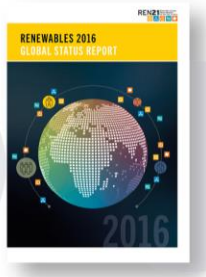

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