GLOBAL RENEWABLE ENERGY STATUS

RENEWABLES 2015 GLOBAL STATUS REPORT

Rana Adib
Research Coordinator
rana.adib@ren21.net

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REN21 Renewable Energy Policy Network for the 21st Century

REN21 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

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

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

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

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
- Distributed Renewable Energy for Energy Access
- Energy Efficiency
- 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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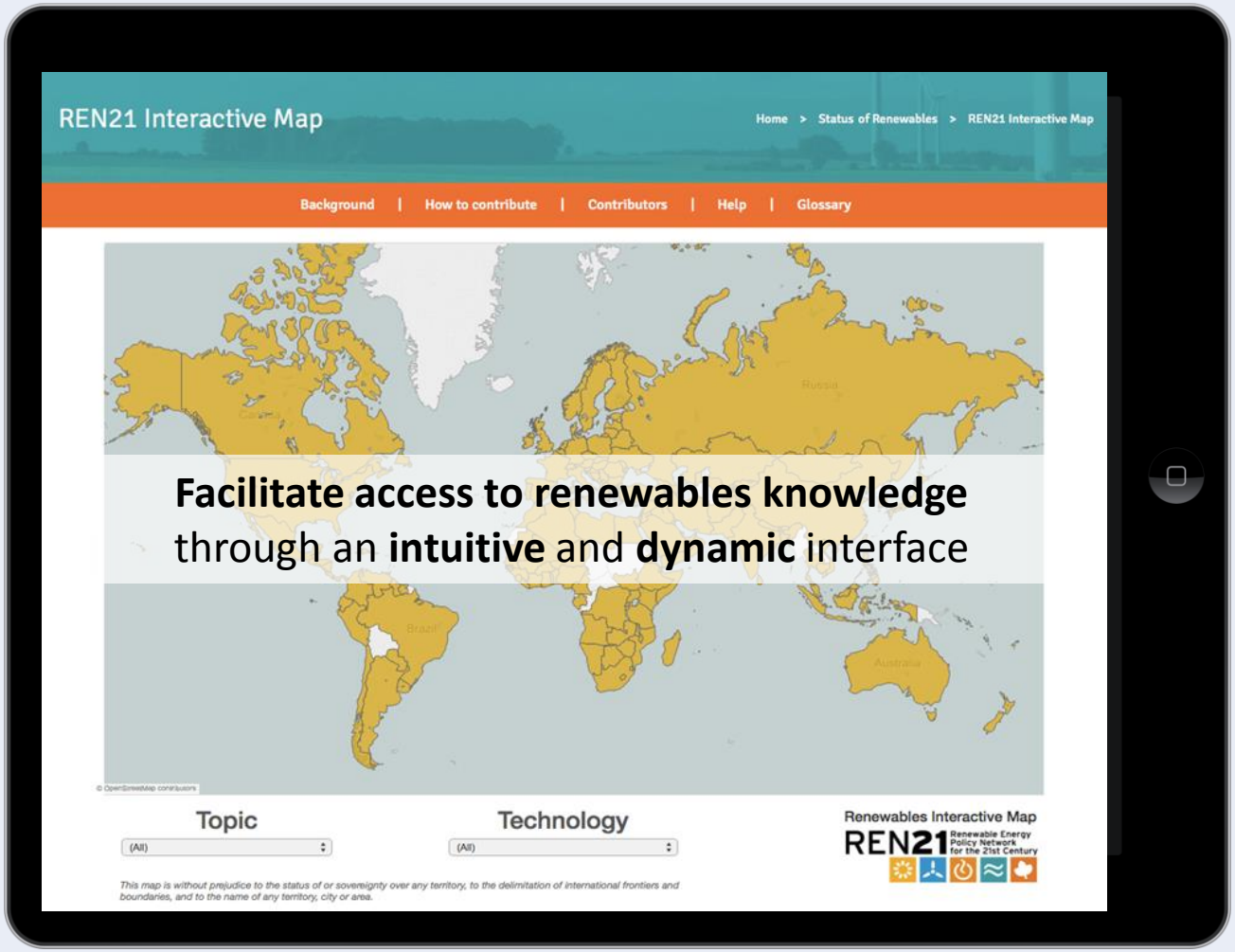
REN21 Renewables Interactive Map



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A Decade Of Renewable Energy Growth Surpassing Expectations

The evolution of renewable energy has surpassed all expectations.

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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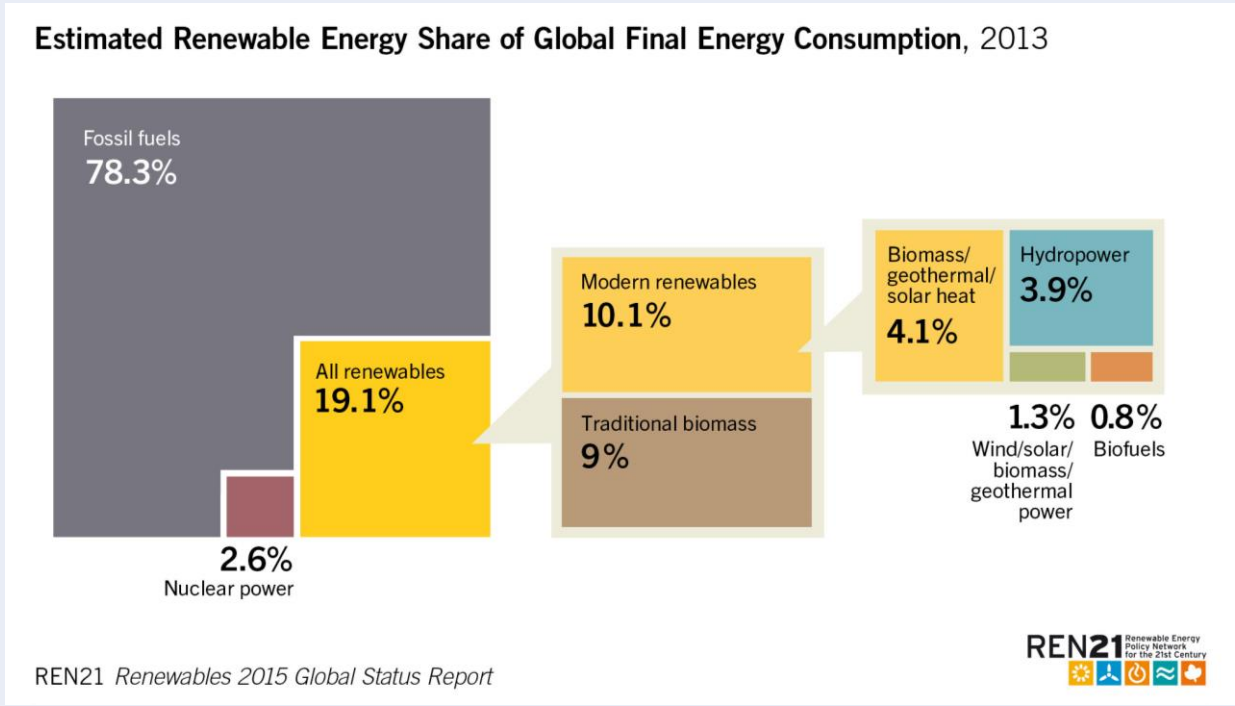
Renewable Energy in the World

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 as in 2012.



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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)	**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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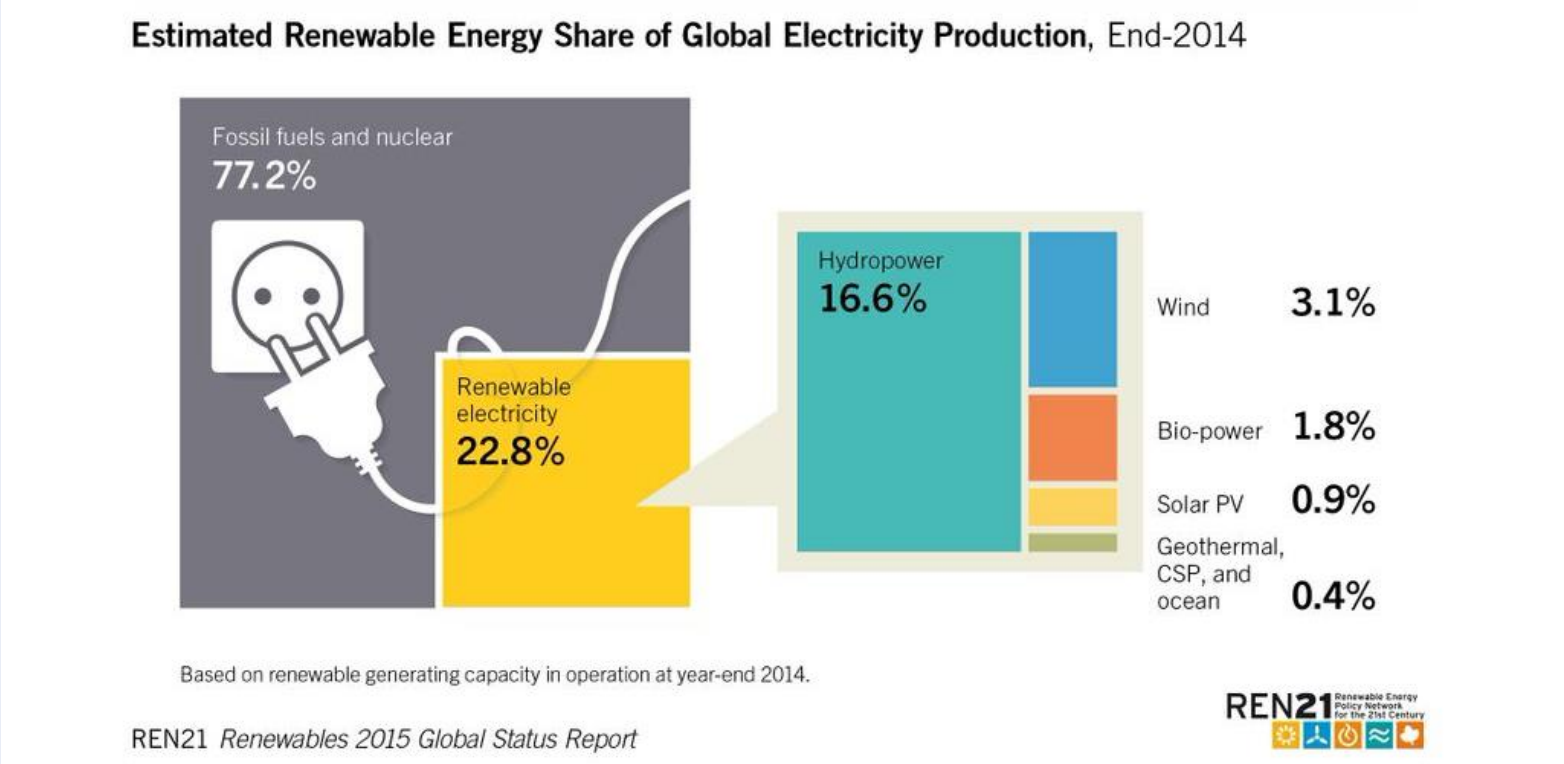
Power Sector



- Renewables accounted **27.7%** of global power generation capacity and **22.8%** of global electricity demand.
- Renewables made up for **59%** of net additions to global power capacity.
- Total RE power capacity: **1712 GW,** an increase of more than 8.5% over 2013.

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Heating & Cooling

Energy use for heat accounted for about half of total world final energy consumption in 2014.

Small but growing modern renewable energy share of final global heat demand: **approx. 8%.**

Trends:

- Growing interest, although advanced systems represent a small fraction of the global market
- Slow growth but vast potential—key for the energy transition

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Transport

Renewable energy accounted for an estimated **3.5%** of global energy demand for road transport in 2013, up from **2%** in 2007.

Primary focus of policies, markets, industry: **liquid biofuels**

Trends in the development of **gaseous fuels** and **electricity** create pathways for the integration of renewables into transportation.

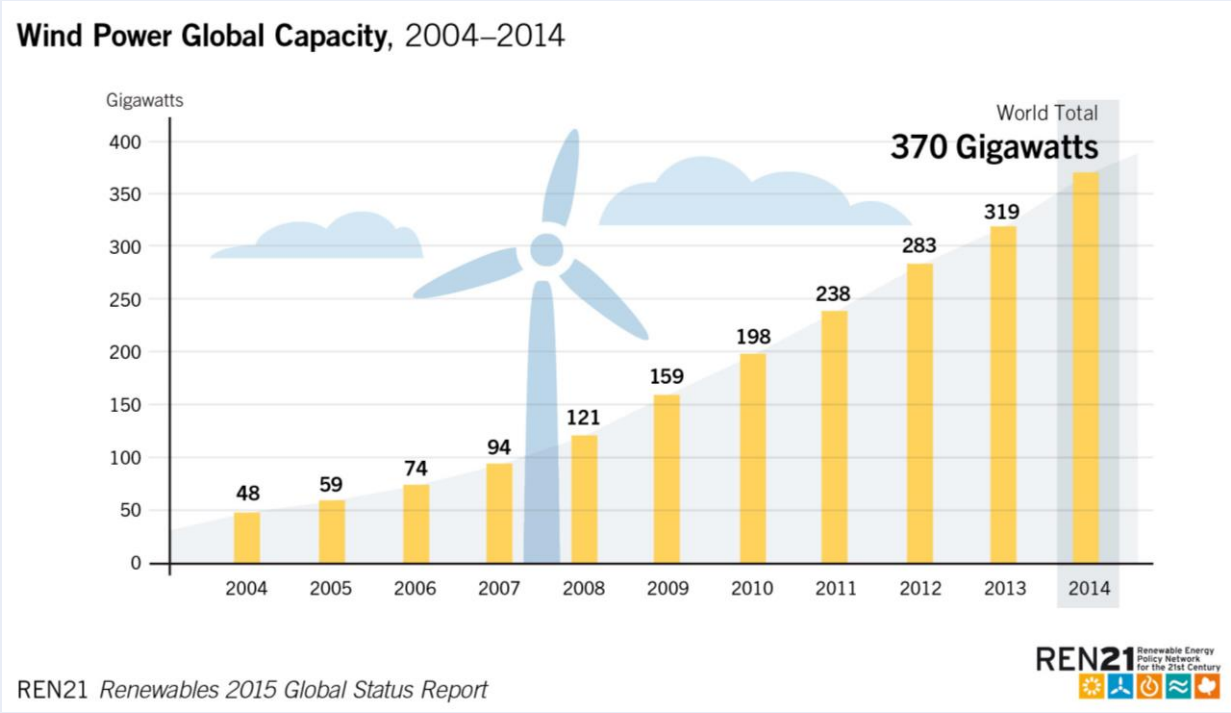
Growing interest in new applications and markets for biofuels**.**

Wind Power – total global capacity

51 GW of capacity were added

Total capacity: **370 GW**

Offshore, an estimated **1.7 GW** of grid-connected capacity was added in 2014, for a world total exceeding **8.5 GW**



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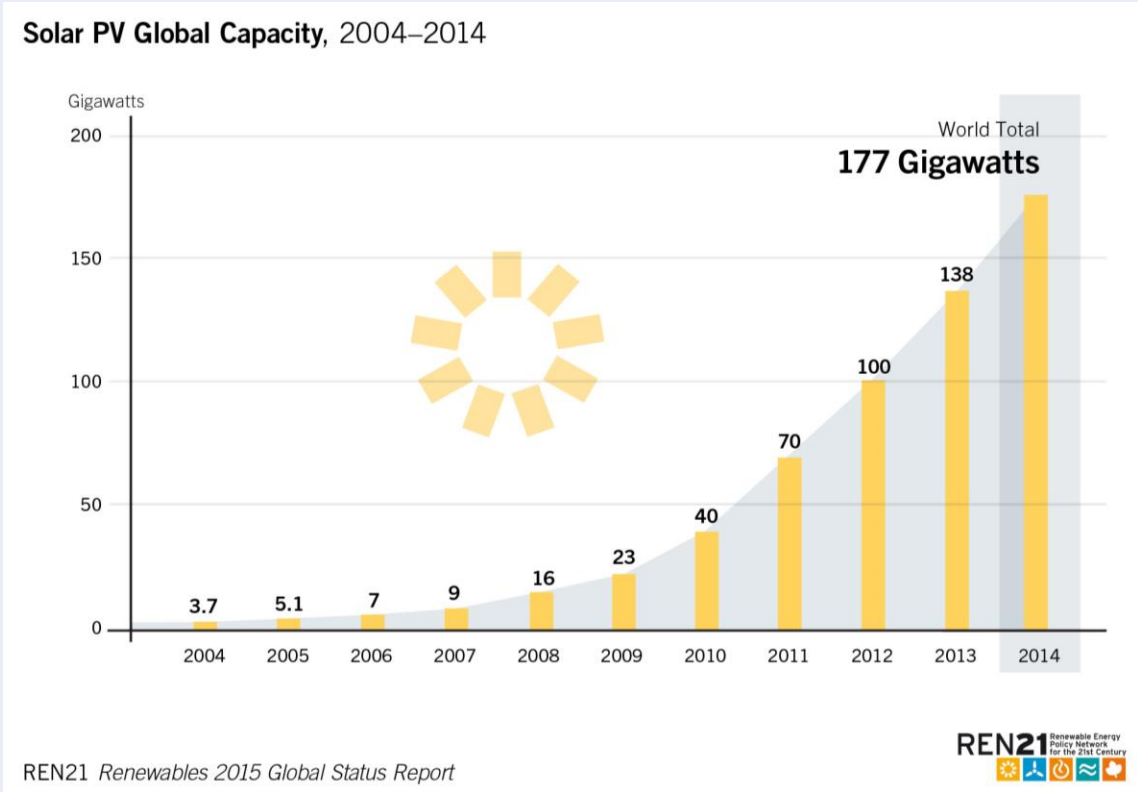
Solar Photovoltaics (PV) – total global capacity

Solar PV:

- **+40 GW** added
- Total capacity: **177 GW**

More than 60% of all PV capacity in operation worldwide at the end of 2014 was **added over the past three years**.

Asia eclipsed all other markets, accounting for almost **60%** of global additions.



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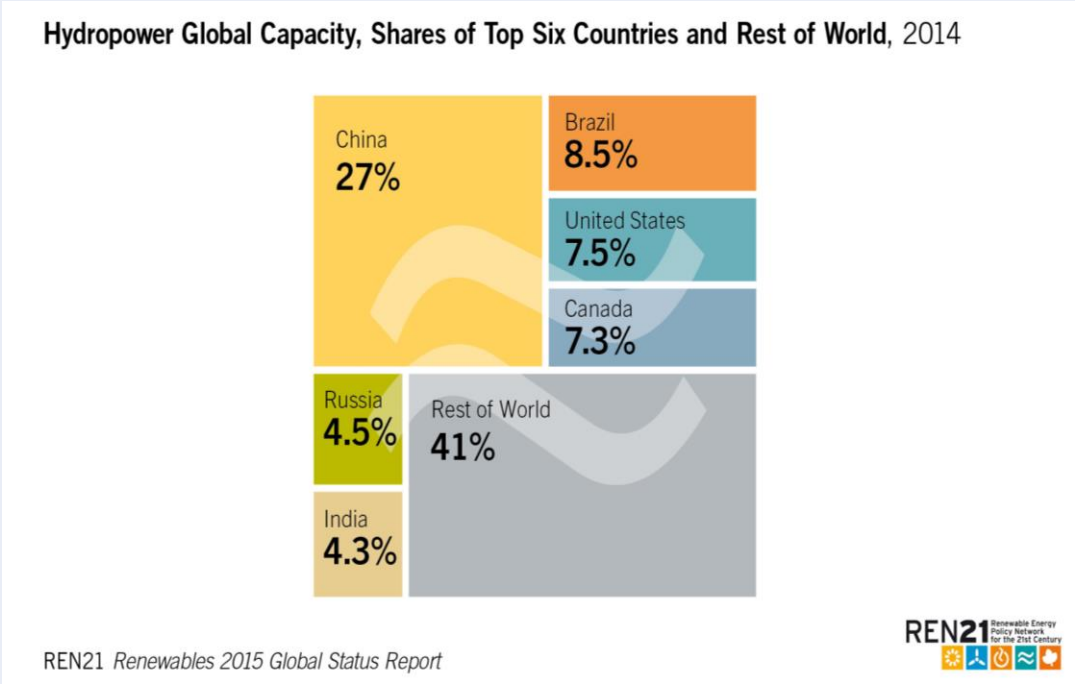
Hydropower - global capacity

Total global hydropower capacity:
1,055 GW

37GW of **new capacity** were commissioned in 2014, presenting a **3.6%** increase

Steady industry growth, driven by:

- China's expansion
- modernisation of ageing hydropower facilities.



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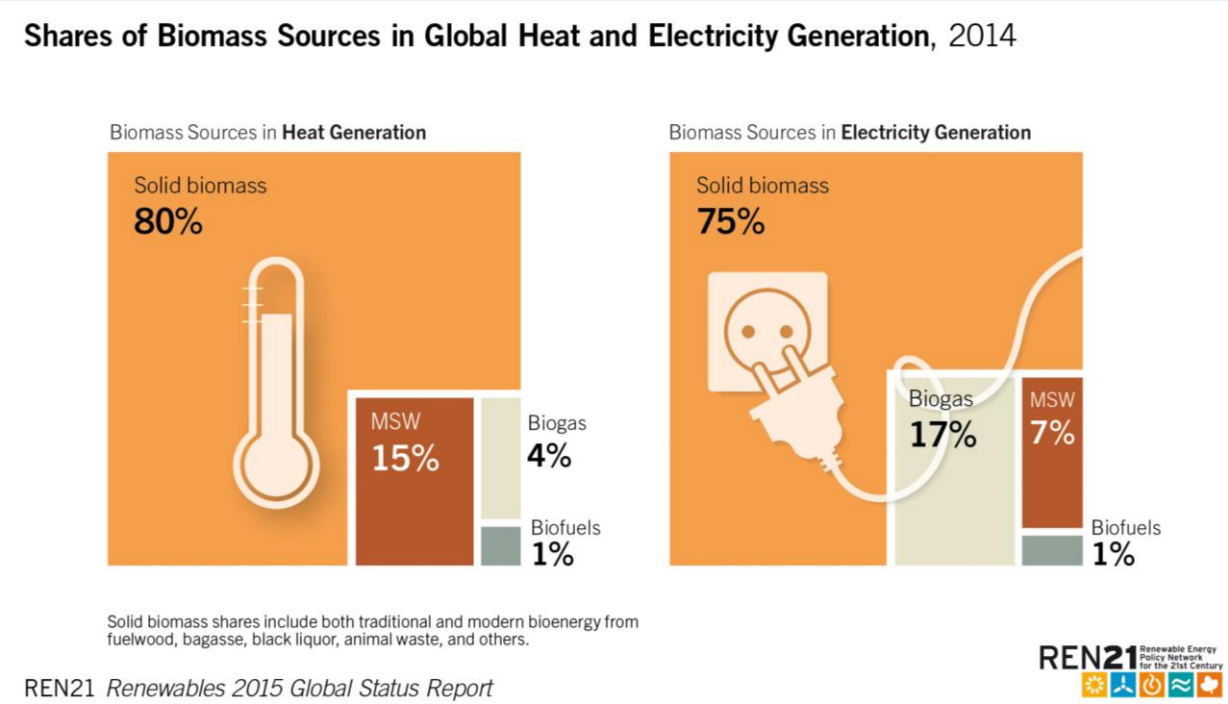
Bioenergy



Total primary energy demand from biomass was approximately **16,250 TWh** (58.5 EJ).

Biomass was used to produce an estimated **12,500 TWh** (45 EJ) of heat (addition of 9GW$_{th}$).

Bio-power capacity increased by an estimated **5 GW** in 2014 to a total of approx. 93 GW.

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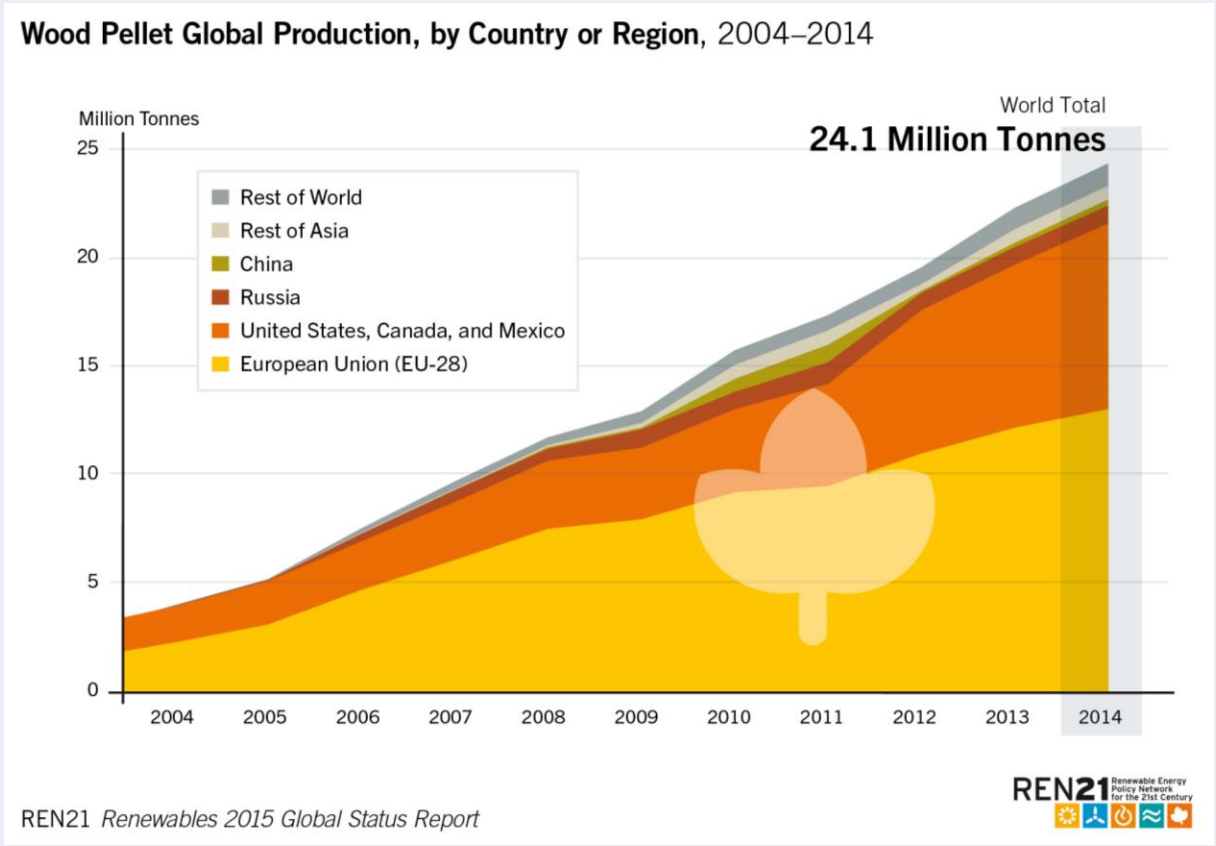
Bioenergy

Demand from modern biomass , such as wood pellets **increased international trade**

Global production of wood pellets rose by 9% to just over 24 million tonnes

Main wood pellet producing regions continue to be **Europe** (62%) **and North America** (34%)

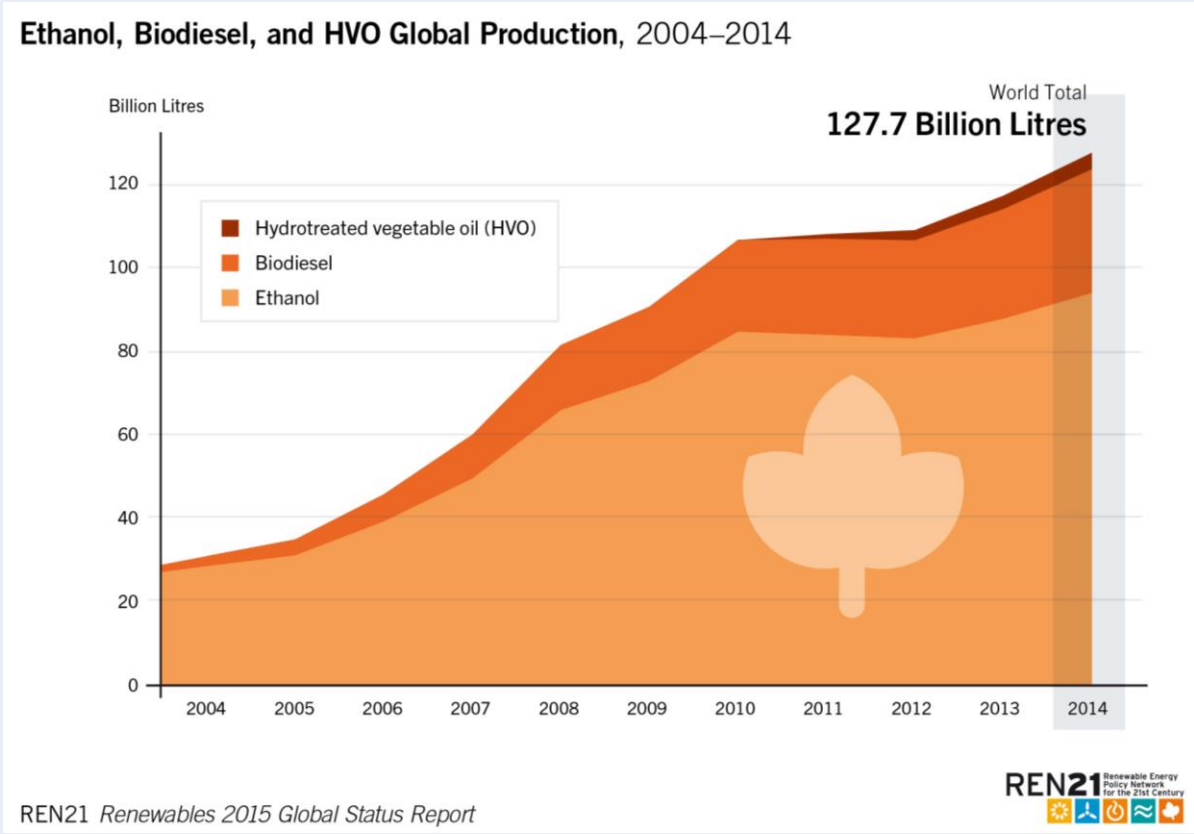


Bioenergy – liquid biofuels

The top countries for total production of biofuels were the **United States, Brazil, Germany, China, and Argentina.**

Global biofuel production increased **8%** in 2014, to a total of **127.7 billion litres**

Global investment in biofuels production capacity continued **to fall in 2014, down 8%** from 2013 and reaching a near 10-year low of **USD 5.1 billion**.



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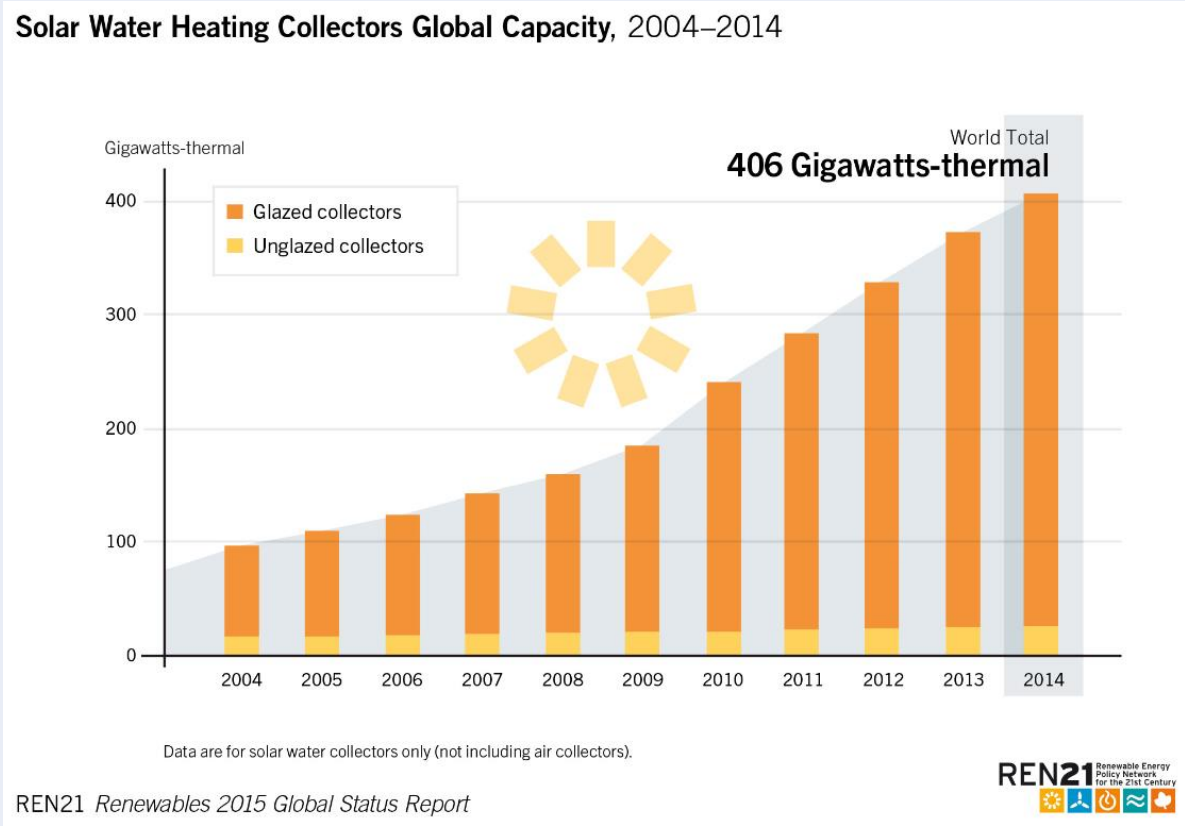
Solar Thermal Heating & Cooling

Cumulative capacity of all collector types in operation of **374.7 GWth (+ 44 GWth**)

China accounts for nearly **81%** of the global market.

2014 Trends:

- focus on glazed water collectors
- slowdown in market growth continued in 2014
- China seeing a trend away from market to commercial

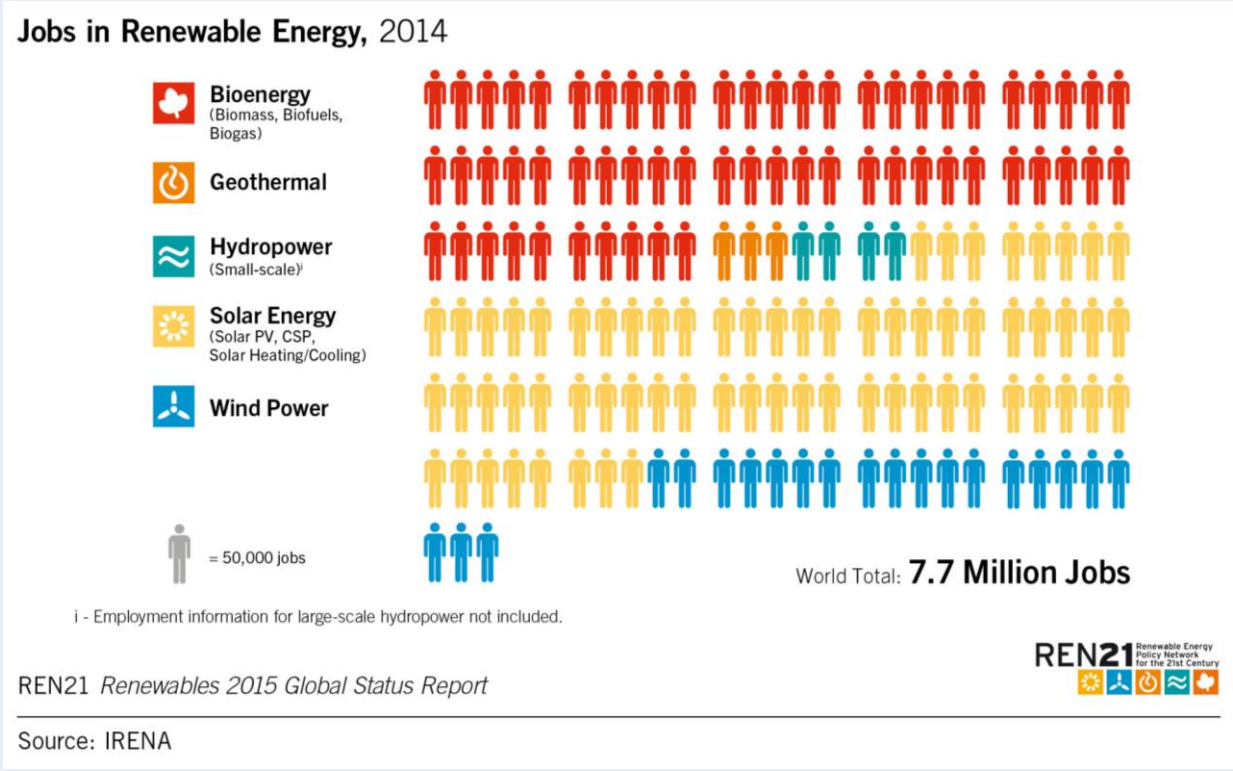


Jobs in Renewable Energy

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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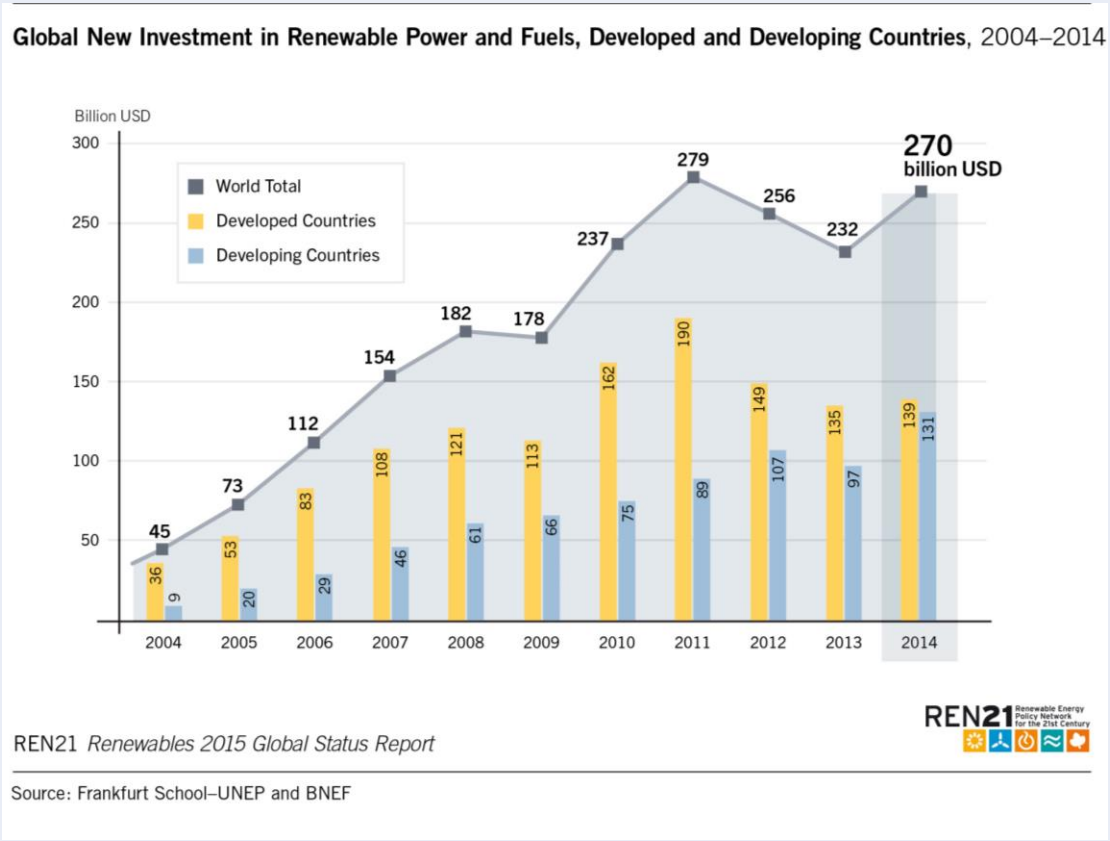
Global Investment in Renewable Energy

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

(including hydropower USD 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



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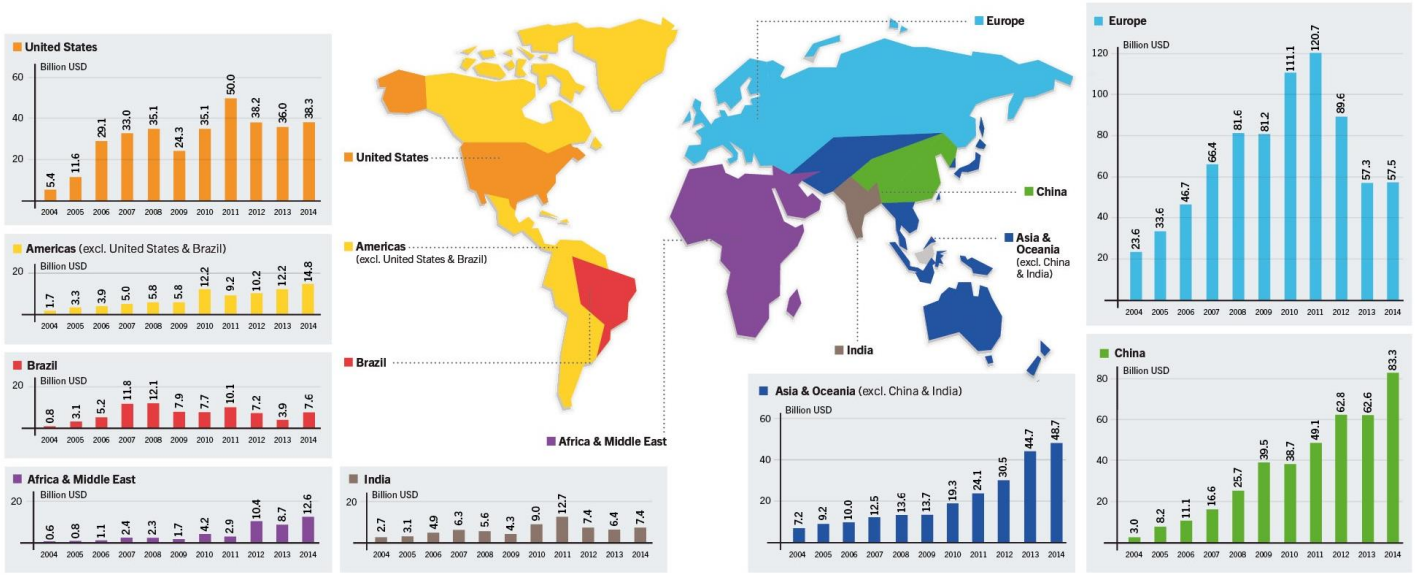
Global New Investment in Renewable Power and Fuels, by Region, 2004–2014



Data include government and corporate R&D.

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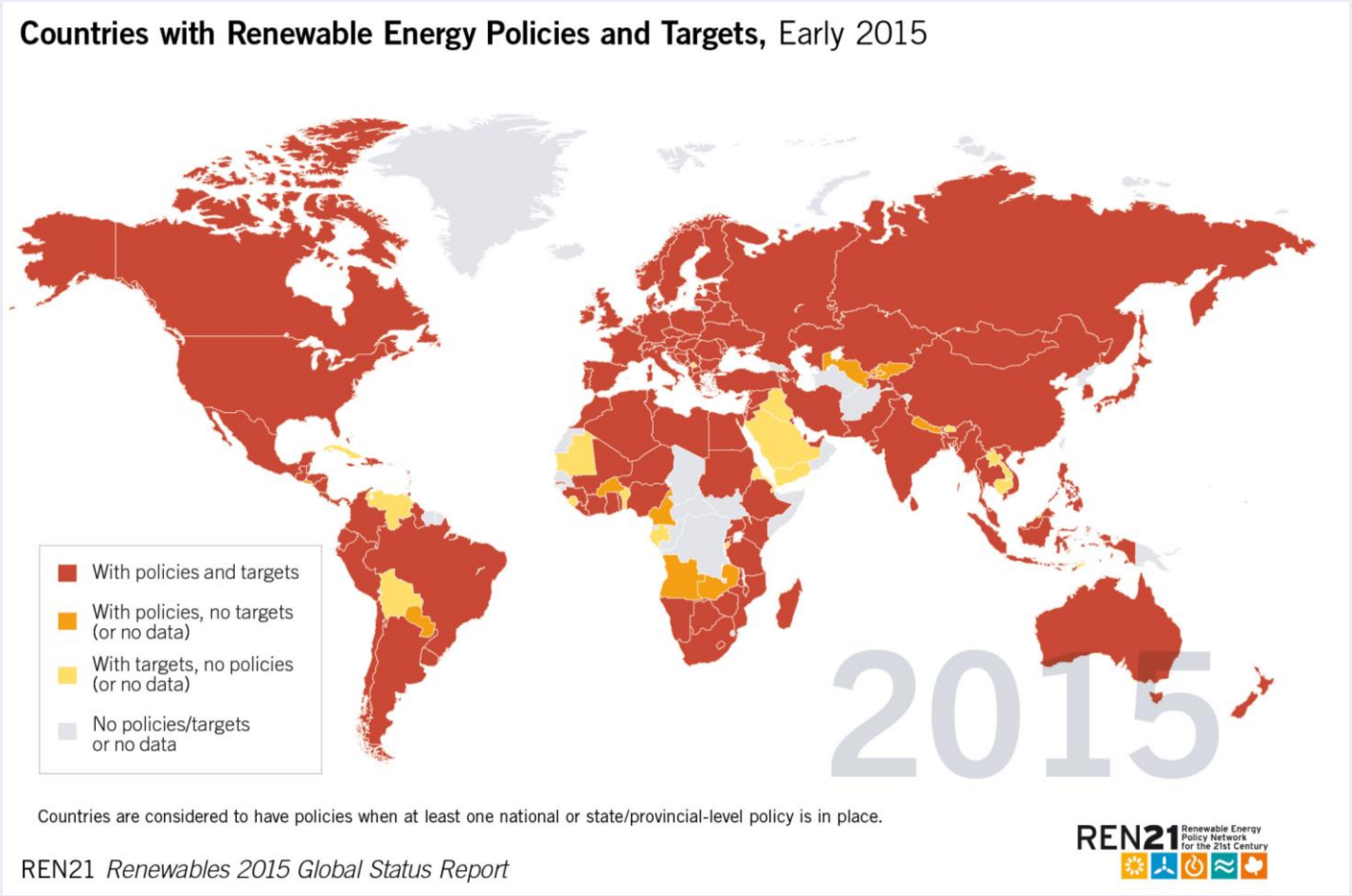
Source: Frankfurt School–UNEP and BNEF

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)

Renewable Energy Policy Landscape



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Renewable Energy Policy Landscape

		START 2004[1]	2013	2014
POLICIES				
Countries with policy targets	#	48	144	**164**
States/provinces/countries with feed-in policies	#	34	106	**108**
States/provinces/countries with RPS/quota policies	#	11	99	**99**
Countries with tendering/ public competitive bidding[5]	#	n/a	55	**60**
Countries with heat obligation/mandate	#	n/a	19	**21**
States/provinces/countries with biofuels mandates[6]	#	10	63	**64**

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

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

Most policies focus on power: mainly feed-in-tariffs and renewable portfolio standards.

Recent trends: Merging of components from different policy mechanisms.

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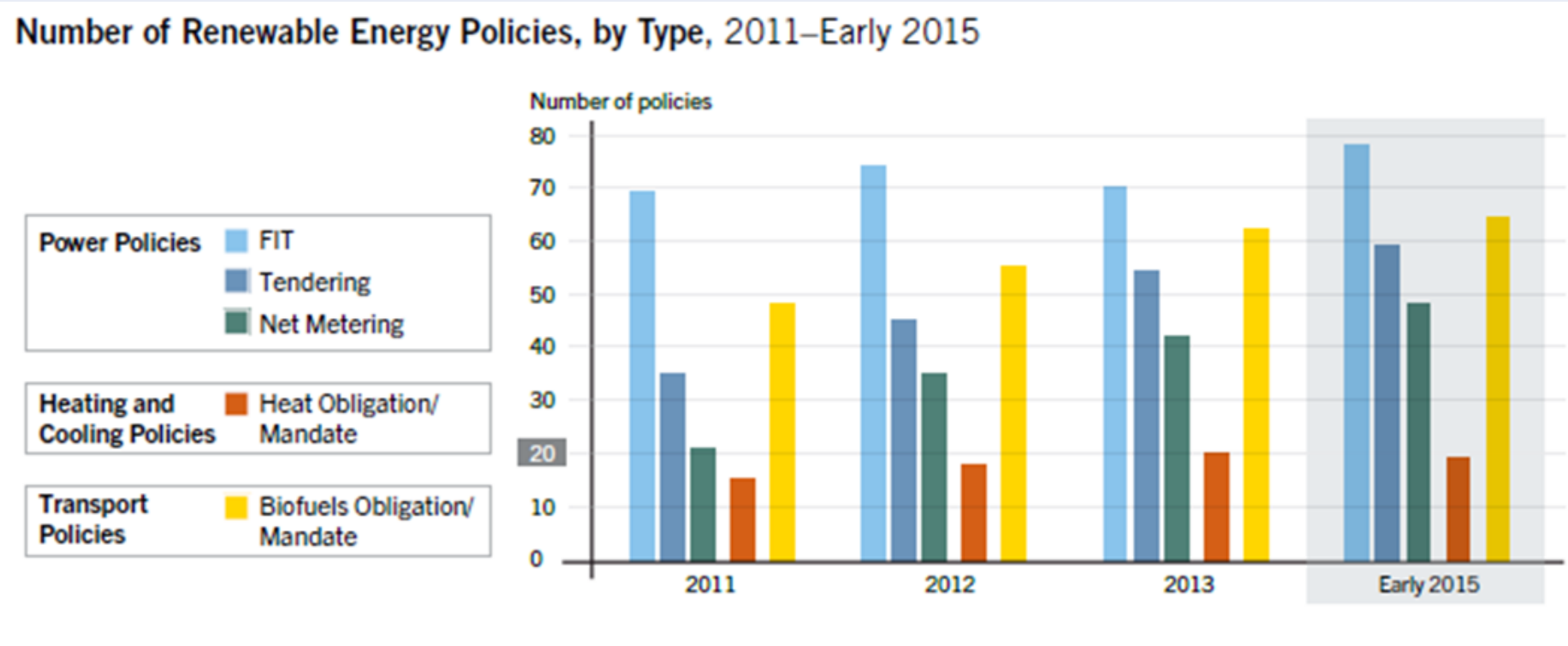
Renewable Energy Policy Landscape



Data source: REN21 Renewables 2015 Global Status Report

Power sector: the main focus of policies over the last years

FITs were the most popular type of policy

Net metering or net billing policies were in force in 48 countries as of early 2015, increase of approx. 220% . *(2010: 15 countries, 2015: 48 countries)*

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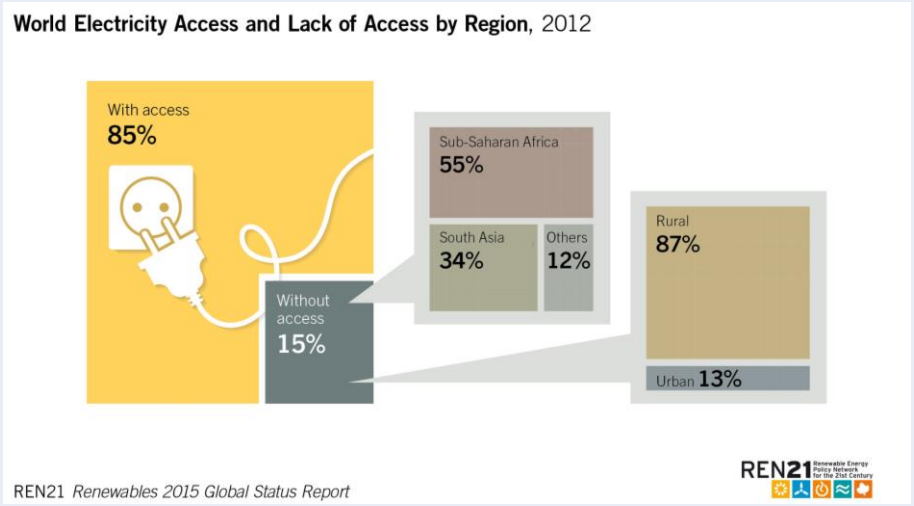
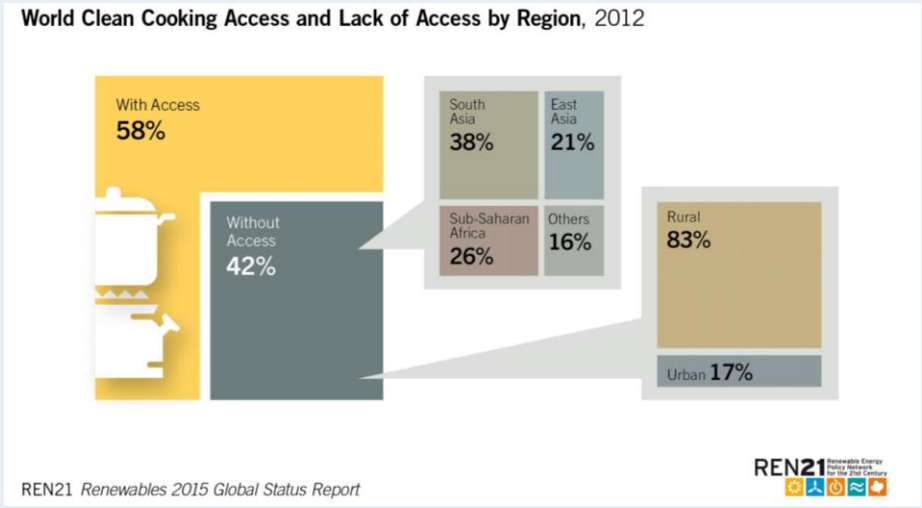
Distributed Renewable Energy in Developing Countries

15% of the global population still lack any access to an electricity.

Distributed renewable energy systems offer unprecedented opportunity to accelerate the transition to modern energy services in remote areas and new markets, as they are **more cost-competitive**.

Little quantitative information on DRE markets, but information available indicates that **markets are significant,** e.g. **off-grid solar PV** attracted approx. **USD 64 billion of investment in 2014**.





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Conclusions

Renewable energy continued to grow in 2014 against the backdrop of increasing global energy consumption, and a dramatic decline in oil prices (second half of 2014).

For the first time in 40 years, economic and CO_2 growth has " decoupled" – marking a record year for renewables.

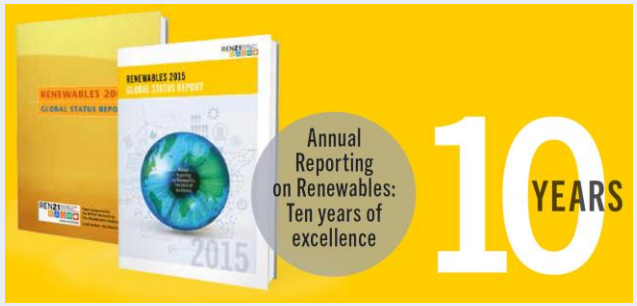
The past decade has set the wheels in motion for a global transition to renewables, but a concerted and sustained effort is needed to achieve it:

- 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

See you at SAIREC 2015

Cape Town, 4-7 October 2015

SAIREC 2015
South African International Renewable Energy Conference



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