

# RENEWABLES 2014 GLOBAL STATUS REPORT

## CESC WEBINAR

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Executive Secretary

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# 2014

# RENEWABLES 2014 GLOBAL STATUS REPORT



[www.ren21.net/gsr](http://www.ren21.net/gsr)

Launched at SE4All Forum on 4 June 2014 in New York

Network of over 500 contributors, researchers & reviewers worldwide

## The report features:

- Global Overview
- Market & Industry Trends
- Investment Flows
- Policy Landscape
- Distributed Renewable Energy in Developing Countries
- Feature: Tracking the Global Energy Transition (10 years of RE progress)

## The report covers:

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



# 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 <sup>1</sup>	END 2012	END 2013
<b>INVESTMENT</b>				
New investment (annual) in renewable power and fuels <sup>2</sup>	billion USD	39.5	249.5	<b>214.4 (249.4)</b>
<b>POWER</b>				
Renewable power capacity (total, not including hydro)	GW	85	480	<b>560</b>
Renewable power capacity (total, including hydro)	GW	800	1,440	<b>1,560</b>
Hydropower capacity (total) <sup>3</sup>	GW	715	960	<b>1,000</b>
Bio-power capacity	GW	<36	83	<b>88</b>
Bio-power generation	TWh	227	350	<b>405</b>
Geothermal power capacity	GW	8.9	11.5	<b>12</b>
Solar PV capacity (total)	GW	2.6	100	<b>138</b>
Concentrating solar thermal power (total)	GW	0.4	2.5	<b>3.4</b>
Wind power capacity (total)	GW	48	283	<b>318</b>
<b>HEAT</b>				
Solar hot water capacity (total) <sup>4</sup>	GW <sub>th</sub>	98	282	<b>326</b>
<b>TRANSPORT</b>				
Ethanol production (annual)	billion litres	28.5	82.6	<b>87.2</b>
Biodiesel production (annual)	billion litres	2.4	23.6	<b>26.3</b>

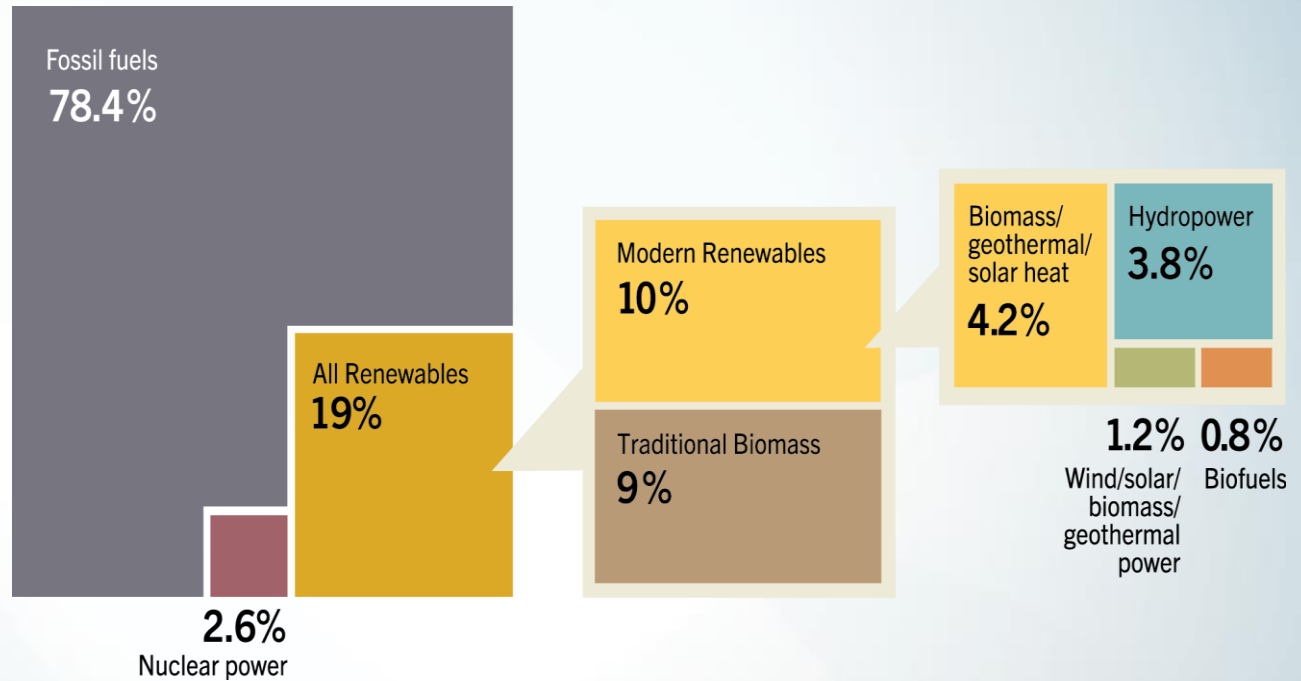
# RENEWABLE ENERGY IN THE WORLD

Renewable energy provided an estimated **19% of global final energy consumption.**

The share of **modern renewable energy** increased to **10%.**

The share of **traditional biomass** was of **9%.**

Estimated Renewable Energy Share of Global Final Energy Consumption, 2012



# RENEWABLE ENERGY CHAMPIONS - annual investment/capacity additions













## ANNUAL INVESTMENT / NET CAPACITY ADDITIONS / PRODUCTION IN 2013

	1	2	3	4	5
Investment in renewable power and fuels	<b>China</b>	United States	Japan	United Kingdom	Germany
Share of GDP 2012 (USD) invested <sup>1</sup>	<b>Uruguay</b>	Mauritius	Costa Rica	South Africa	Nicaragua
 Geothermal power capacity	<b>New Zealand</b>	Turkey	United States	Kenya	Philippines
 Hydropower capacity	<b>China</b>	Turkey	Brazil	Vietnam	India
 Solar PV capacity	<b>China</b>	Japan	United States	Germany	United Kingdom
 CSP capacity	<b>United States</b>	Spain	United Arab Emirates	India	China
 Wind power capacity	<b>China</b>	Germany	United Kingdom	India	Canada
 Solar water heating capacity <sup>2</sup>	<b>China</b>	Turkey	India	Brazil	Germany
 Biodiesel production	<b>United States</b>	Germany	Brazil	Argentina	France
 Fuel ethanol production	<b>United States</b>	Brazil	China	Canada	France



# RENEWABLE ENERGY CHAMPIONS – total capacity

## TOTAL CAPACITY OR GENERATION<sup>6</sup> AS OF END-2013

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





# POWER SECTOR

Renewable energy comprise **26.4%** of **global power generation capacity**

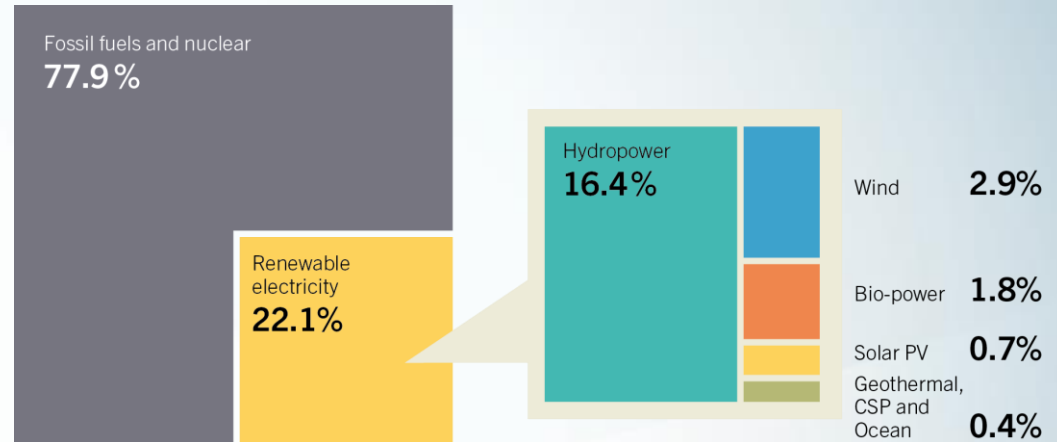
**22.1%** of **global electricity** was produced from renewable energy

Renewables accounted for 56% of new installed power capacity in 2013.

Total RE power capacity: **1,560 GW**

EU holds 42 % of global power capacity of non-hydro renewables.

Estimated Renewable Energy Share of Global Electricity Production, End-2013



Based on renewable generating capacity in operation end-2013



# HEATING & COOLING

Small but growing renewable energy share of final global heat demand: approx. **10%**

Trends:

- Increasing use of renewables in **combined heat and power** plants
- Renewables in district systems as best practice for RE integration in cities
- Growing use of renewable heat for **industrial purposes**
- Hybrid solutions in building renovation





# TRANSPORT



Liquid biofuels met about 2.3% of total transport fuel demand.

Growing interested in gaseous biofuels and hybrid options (e.g. biodiesel-natural gas buses, or electric-diesel transport)

Limited, but increasing initiatives to link electric transport systems with RE, particular at city/regional level



# HYDROPOWER

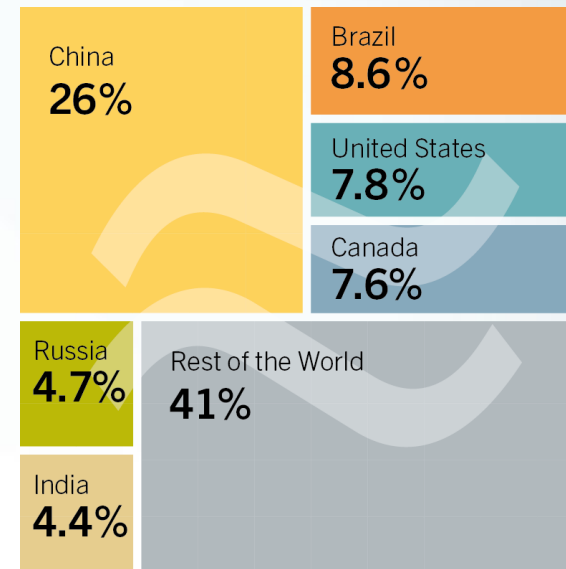
Total global hydropower capacity: **1,000 GW**

**40 GW of new capacity** were commissioned in 2013, presenting a **4%** increase.

**Steady industry growth**, driven by:

- China's expansion
- modernisation of ageing hydropower facilities
- increasing recognition of the potential for hydropower to complement other renewable technologies, such as variable wind and solar power

Hydropower Global Capacity, Shares of Top Six Countries, 2013



# SOLAR PHOTOVOLTAICS (PV)

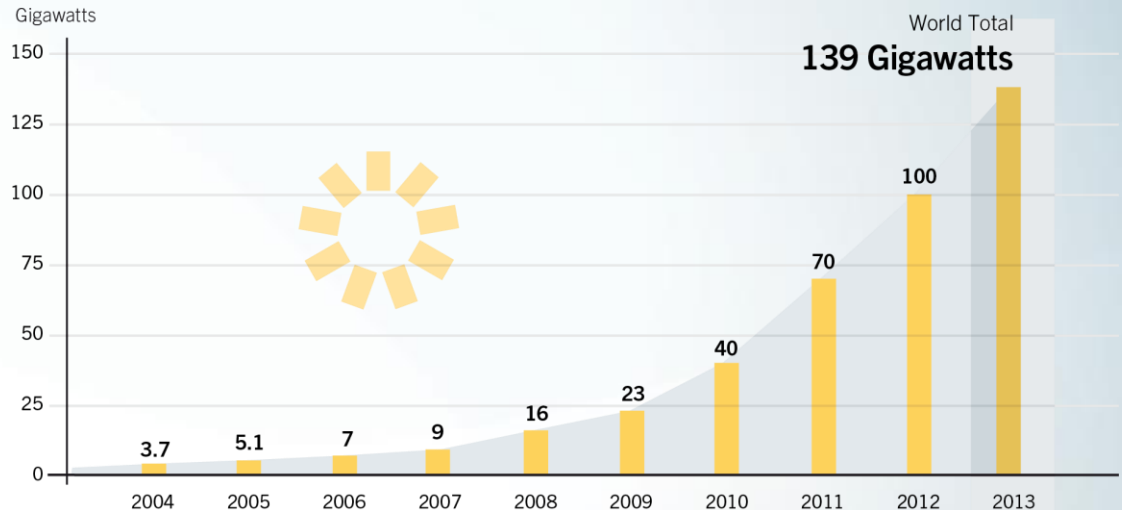
Solar PV had a **record year** in 2013:

- About **+39 GW** added
- Total capacity: **139 GW**

For the first time, **more PV capacity** was added than wind capacity, accounting for about one-third of renewable power capacity added during the year.

**China** accounted for a **third** of global capacity additions, followed by Japan & the U.S.

Solar PV Total Global Capacity, 2004–2013



# WIND POWER

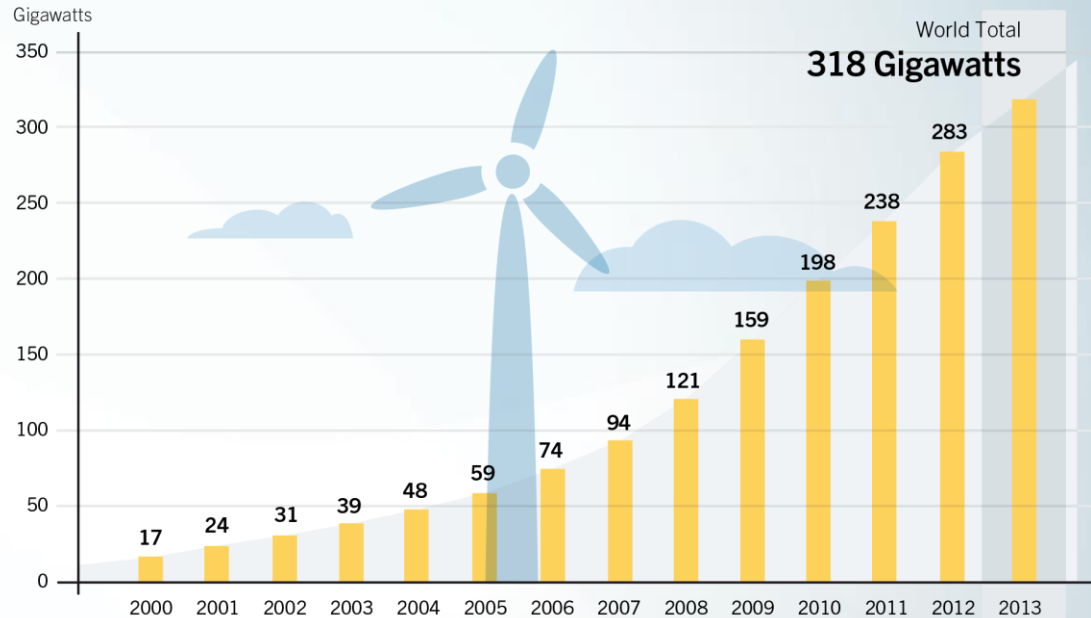
**35 GW** of capacity were added (down 10 GW from 2012).

Total capacity : **318 GW**

Wind market **slowed down** following several record years (mainly steep drop in US market).

**Offshore wind** had a **record year: +1.6 GW** added

Wind Power Total World Capacity, 2000–2013



# CONCENTRATING SOLAR POWER (CSP)

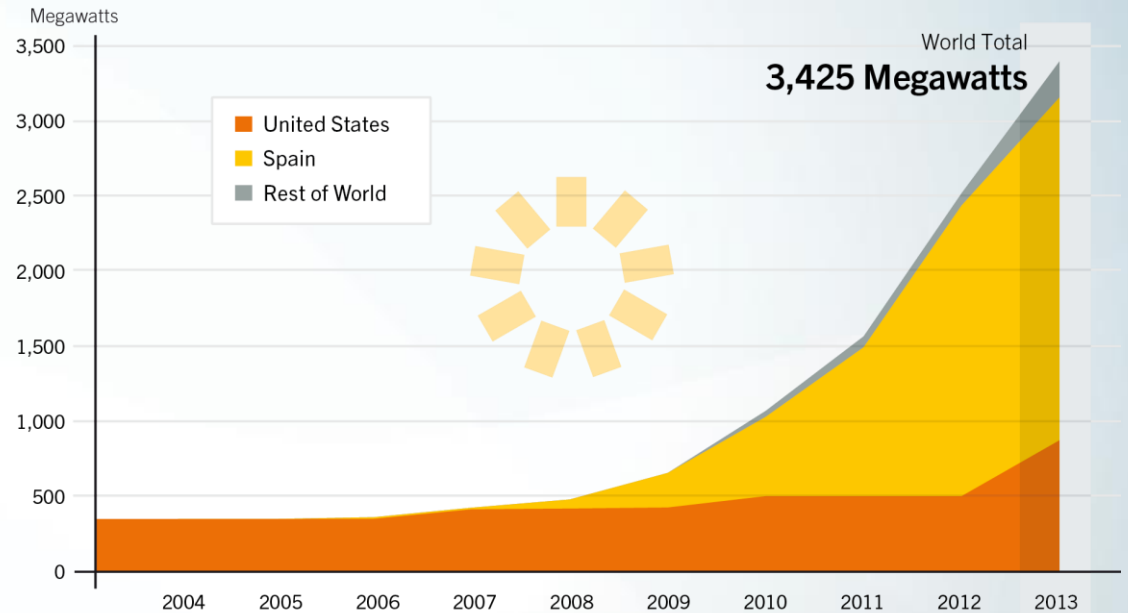
Total CSP capacity: **3.4 GW**

With **+0.9 GW** added, this represents an increase of **36%**

Markets continue to expand with projects coming online in the United Arab Emirates, India and China.

Trends towards larger plants

Concentrating Solar Thermal Power Global Capacity, by Country or Region, 2000–2013



# BIOENERGY

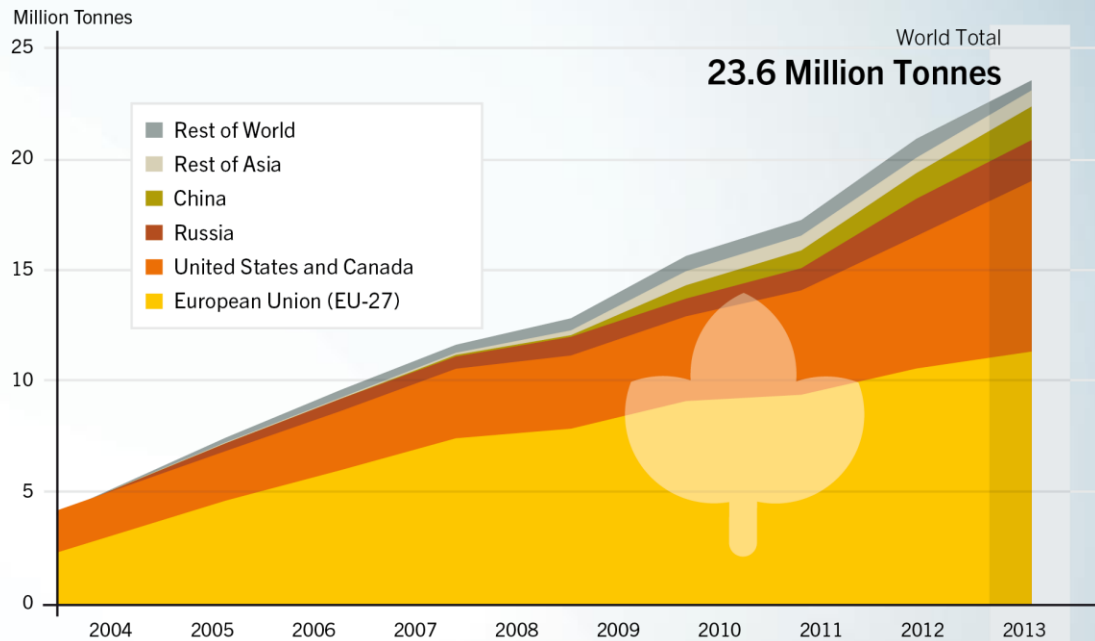
Total primary energy consumption of biomass was approx. **57 EJ in 2013**.

Almost **60%** was **traditional biomass**.

Modern biomass **heat capacity**:  
296 GW<sub>th</sub> (increase of 1 %)

Global **bio-power capacity**: **88 GW**  
(increase: + 5 GW)

Wood Pellet Global Production, by Country or Region, 2004–2013



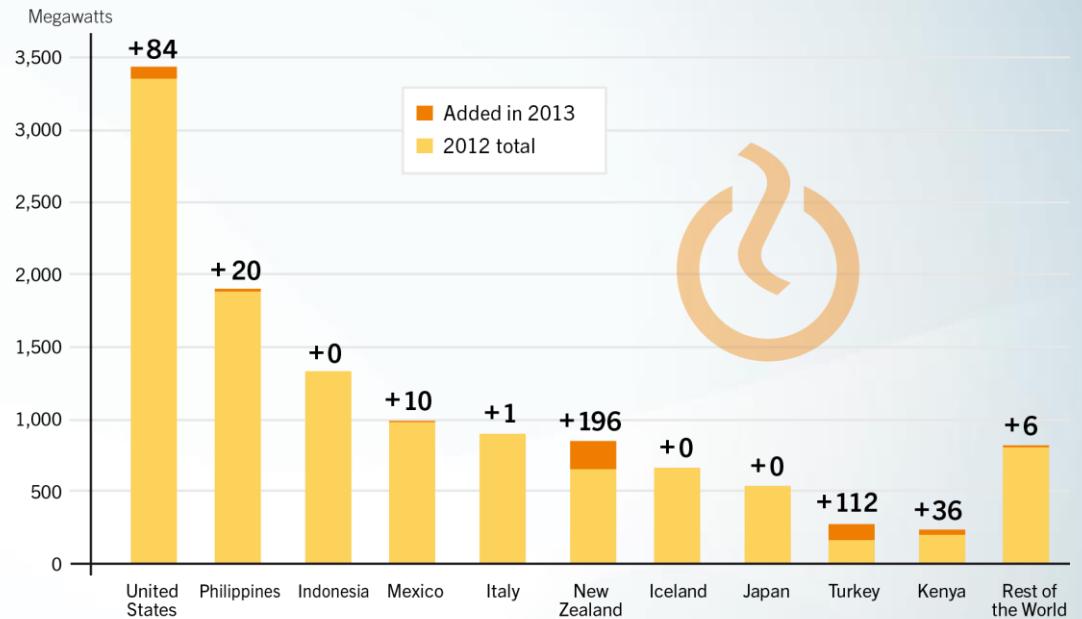


# GEOTHERMAL ENERGY

About **455 MW net additions** came on line, bringing total global geothermal capacity to **12 GW**.

The use of low-temperature fields for power and heat continued to expand.

Geothermal Power Capacity and Additions, Top 10 Countries and Rest of World, 2013



Additions are net of repowering and retirements



# SOLAR THERMAL HEATING & COOLING

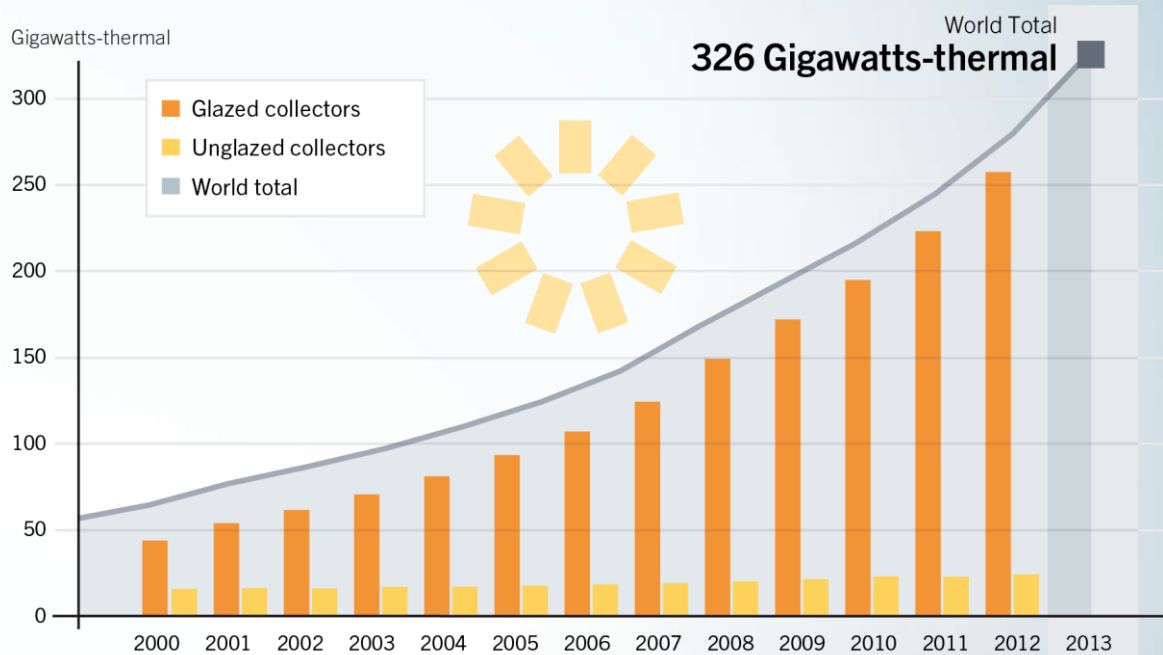
Solar water and air collector capacity: **~330 GW<sub>th</sub>**

## 2013 Trends:

- large domestic systems
- growing interest district heating & cooling as well as industrial applications
- industry consolidation

China added a capacity of **44.7 GW<sub>th</sub>** and accounts for 80 % of the global market.

Solar Water Heating Collectors Global Capacity, 2000–2013



Data are for solar water collectors only (not including air collectors)








# JOBS IN RENEWABLE ENERGY

Global employment continued to increase.

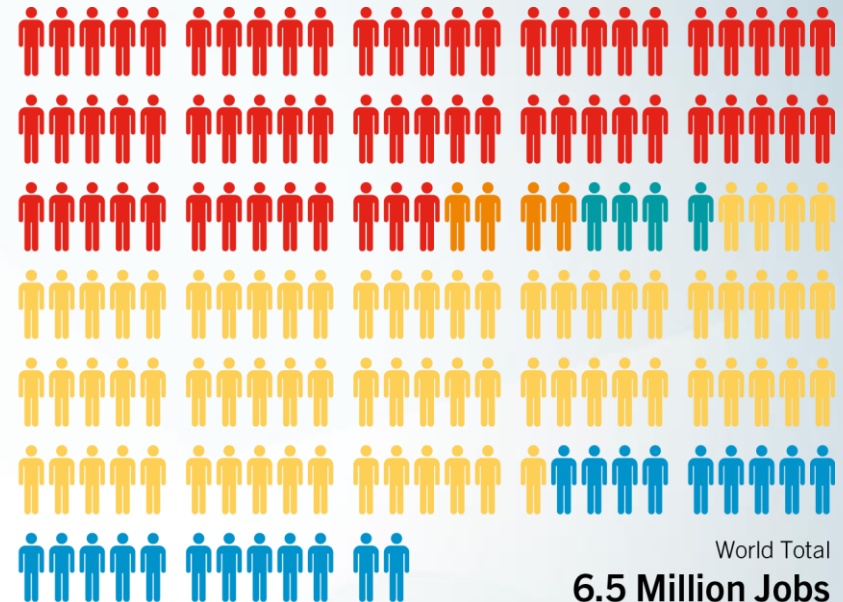
An estimated **6.5 million direct or indirect jobs** in the renewable energy industry

Noteworthy shifts along the value chain segments and from manufacturing to installation and maintenance

## Jobs in Renewable Energy

-  **Bioenergy**  
(Biomass, Biofuels, Biogas)
-  **Geothermal**
-  **Hydropower**  
(Small-scale)
-  **Solar Energy**  
(Solar PV, CSP, Solar Heating/Cooling)
-  **Wind Power**

 = 40,000 jobs



\* Employment information for large-scale hydropower is incomplete and not included

Data source: IRENA



# GLOBAL INVESTMENT IN RENEWABLE ENERGY

Global new investment estimated **USD 214.4 billion** in 2013, **down 14%** from 2012.

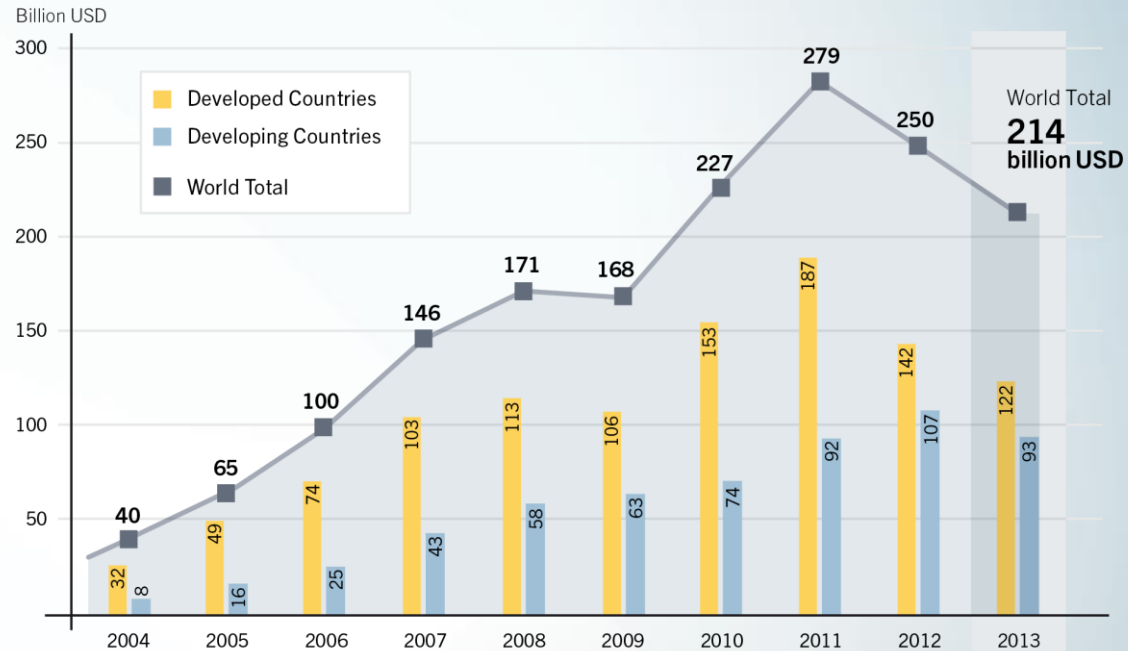
incl. hydropower > 50MW, it reached **USD 249.4 billion**.

Reasons for the decline:  
policy uncertainty, retroactive support reductions, sharp reductions in technology costs

**Net investment in new renewables power capacity** outpaced fossil fuels for the fourth year running.



Global New Investment in Renewable Power and Fuels, Developed and Developing Countries, 2004–2013



Data source: UNEP FS/ BNEF Global Trends in Renewable Energy Investment 2014  
Does not include investment in hydropower >50MW

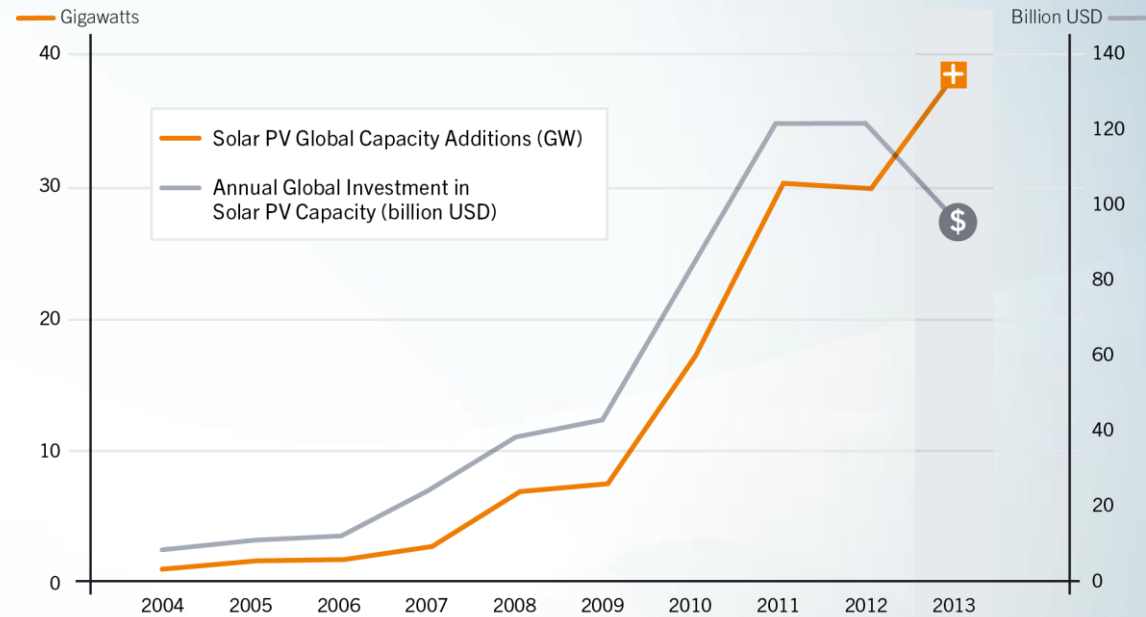
# SOLAR PHOTOVOLTAICS (PV) – global capacity additions and investment

**22% decrease in investment in 2013**, despite record capacity additions of more than 32%.

Main reason: **low module prices.**

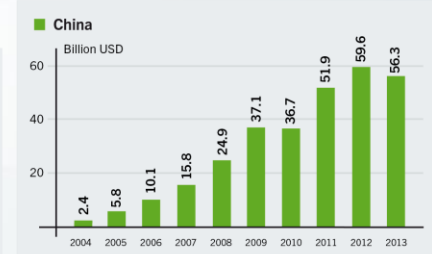
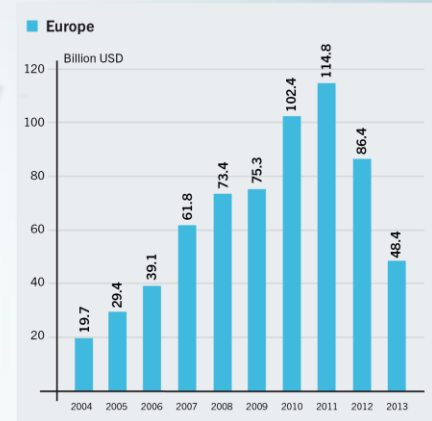
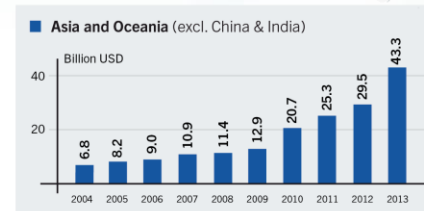
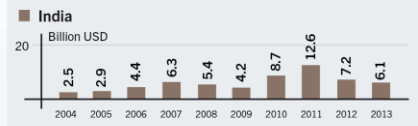
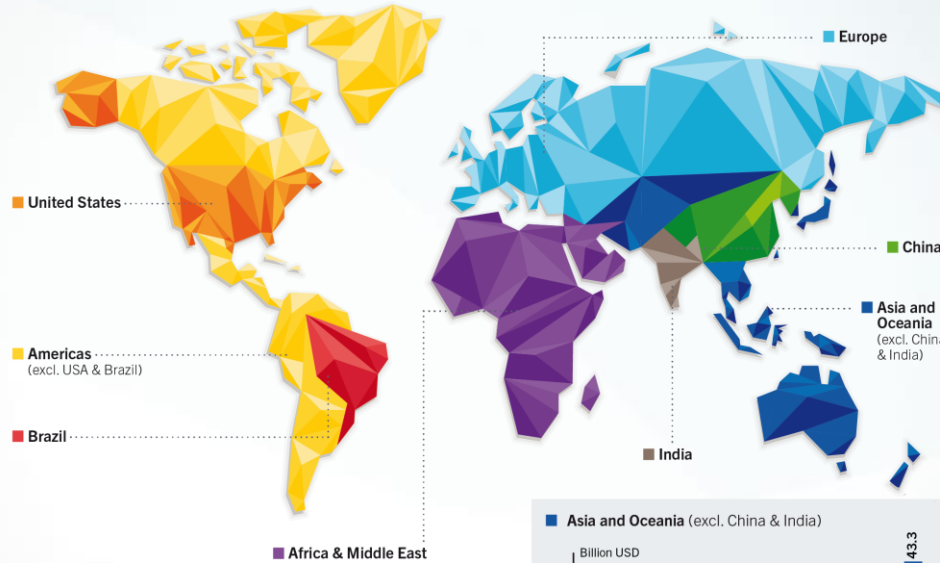
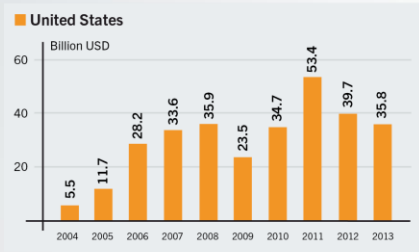
Opportunities for **new markets** to be developed

Solar PV Global Capacity Additions and Annual Investment, 2004–2013



# GLOBAL RE INVESTMENT BY WORLD REGIONS

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



Data source: UNEP FS/ BNEF Global Trends in Renewable Energy Investment 2014

Data include Government and corporate R&D



**Developed Countries: annual investment in 2013: USD122 billion**  
**Developing Countries: annual investment in 2013: USD 93 billion**



# RE POLICY LANDSCAPE

		START 2004 <sup>1</sup>	END 2012	END 2013
POLICIES				
Countries with policy targets	#	48	138	<b>144</b>
Feed-in Number of states / provinces / countries	#	34	97	<b>98</b>
RPS / quota policies Number of states / provinces / countries	#	11	79	<b>79</b>
Tendering Number of states / provinces / countries	#	8	45	<b>55</b>
Heat obligations / mandates Number of countries	#	n/a	19	<b>19</b>
Biofuel obligations / mandates <sup>5</sup> Number of countries	#	10	52	<b>63</b>

At least **144 countries** had **renewable energy targets**.

At least **138 countries** had **renewable energy policies** in place, out of which **95** are developing countries (up from 15 in 2005).

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

Revision and retroactive reductions in several countries, mainly in Europe and the US



# Renewable Energy Policy Landscape

Number of Countries with Renewable Energy Policies by Type, 2010–Early 2014

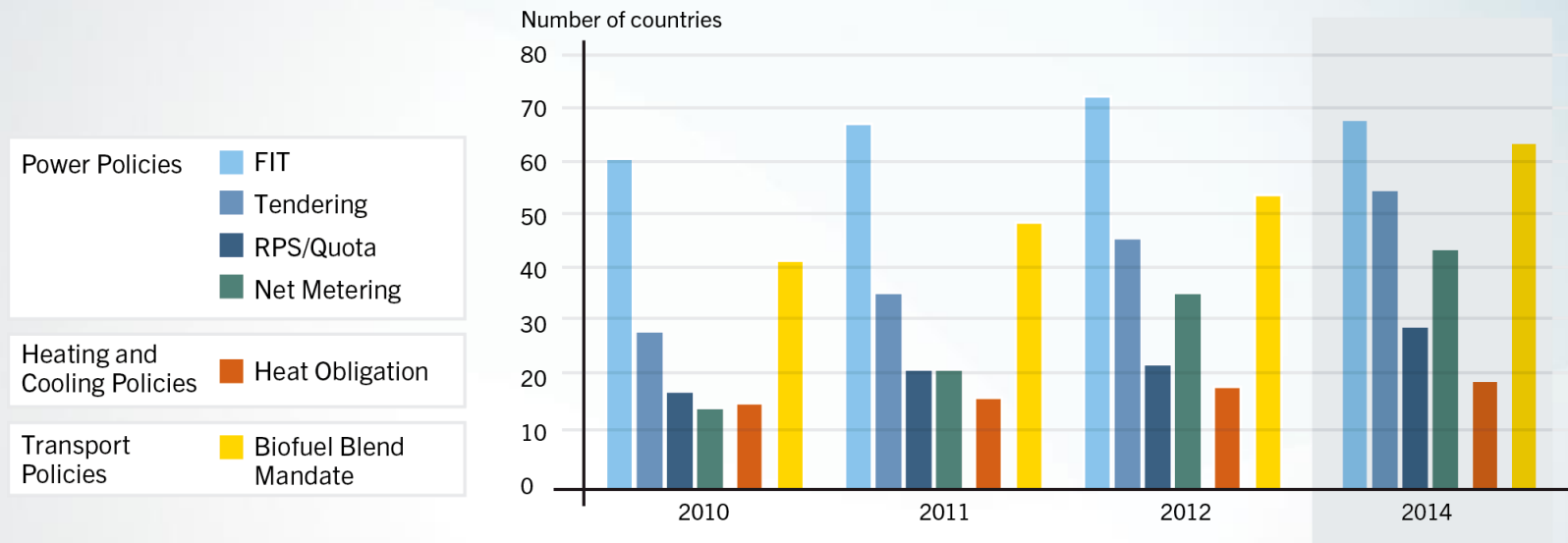


Figure does not show all policy types in use. Countries considered when at least one national or sub-national policy is in place.

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

**FITs** most popular power policy – number of countries with FITs decreased in 2013

Biggest increase in 2010-2014: **Net metering** (+187%) and **tendering** (+90%):

Countries with biofuel obligations increased by 50% (compared to 2010)

The **heat sector** is gradually gaining attention from policy makers (19% increase)



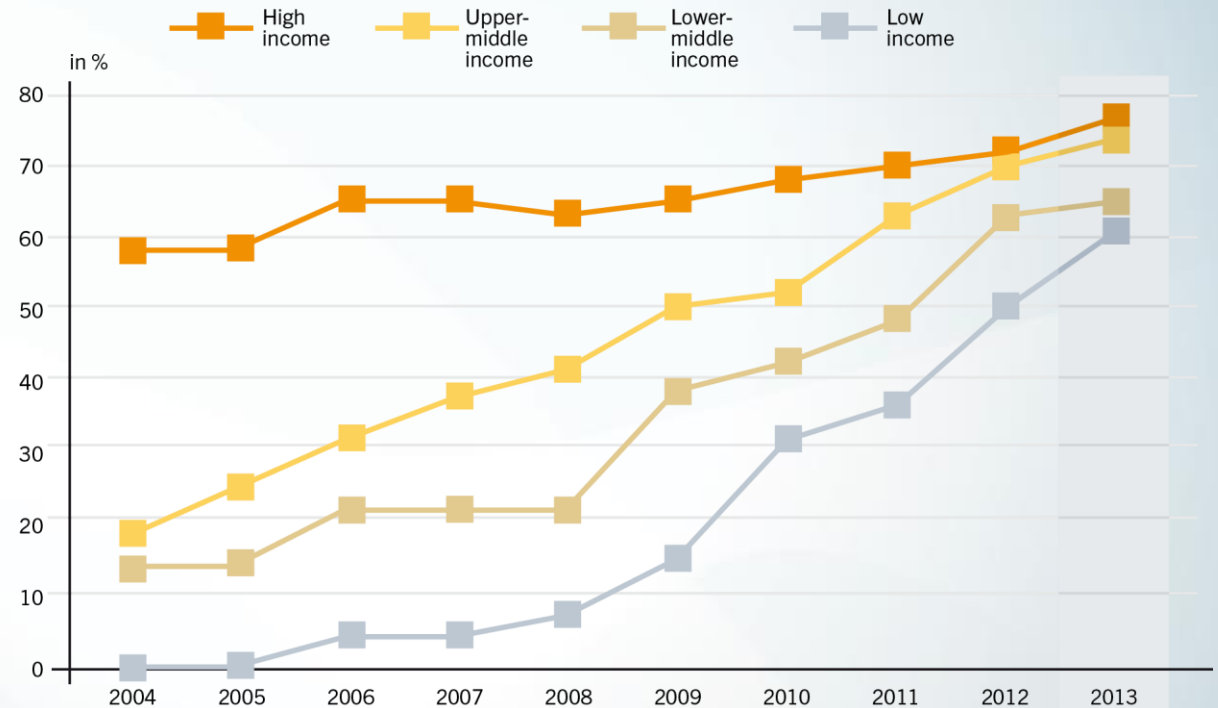
# Evolution of renewable energy policy over time (2004 – 2014)

At least **144 countries** had renewable energy targets.

At least **138 countries** had renewable energy policies in place, out of which **95** are developing countries.

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

Share of Countries with Renewable Energy Policies by Income Group, 2004–Early 2014

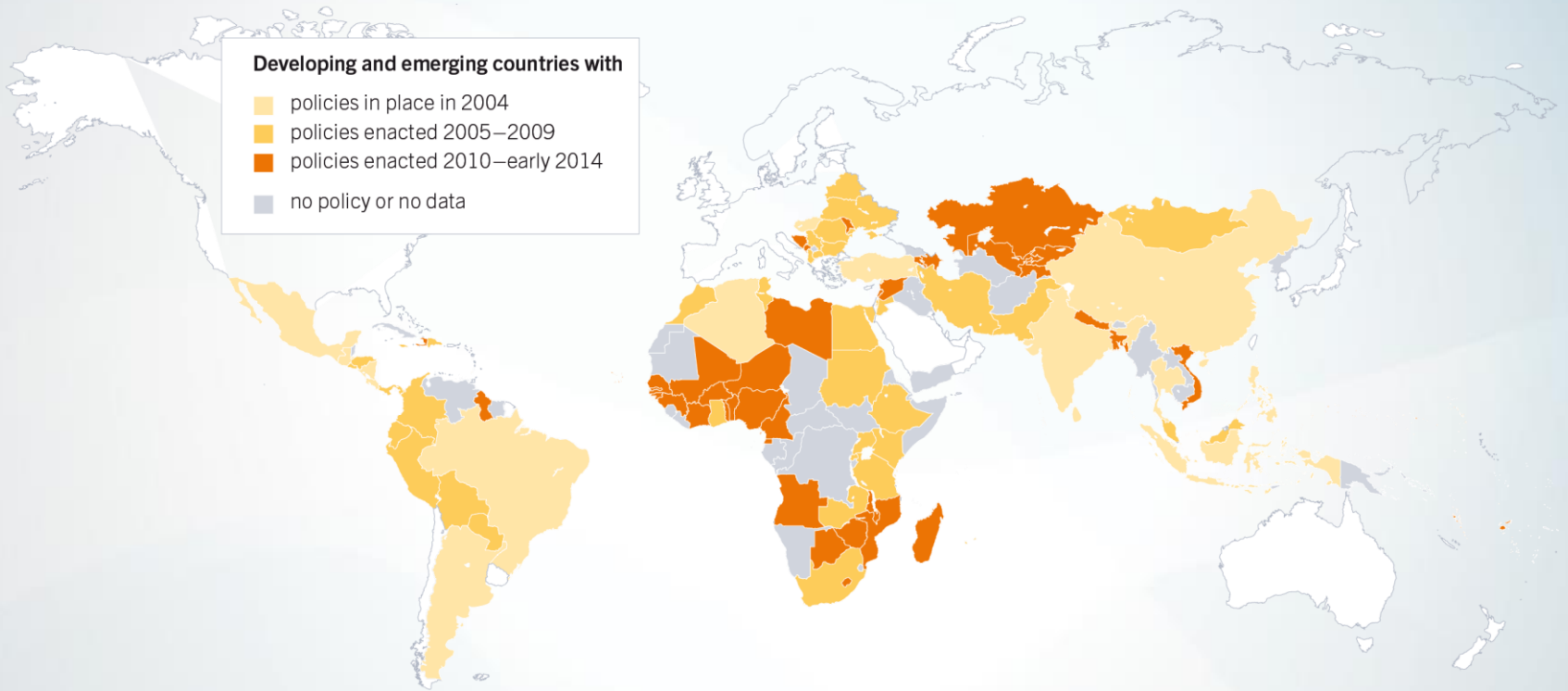


Countries are organized according to annual GNI per capita levels, per World Bank, 2014.



# Renewable Energy Policy Landscape

Developing and Emerging Countries with Renewable Energy Policies, 2004, 2009 and Early 2014



With prices of renewable energy technologies coming down, there is a **steep policy uptake** in developing countries.



# DISTRIBUTED RENEWABLE ENERGY IN DEVELOPING COUNTRIES

Energy access and the use of distributed renewable energy increased.

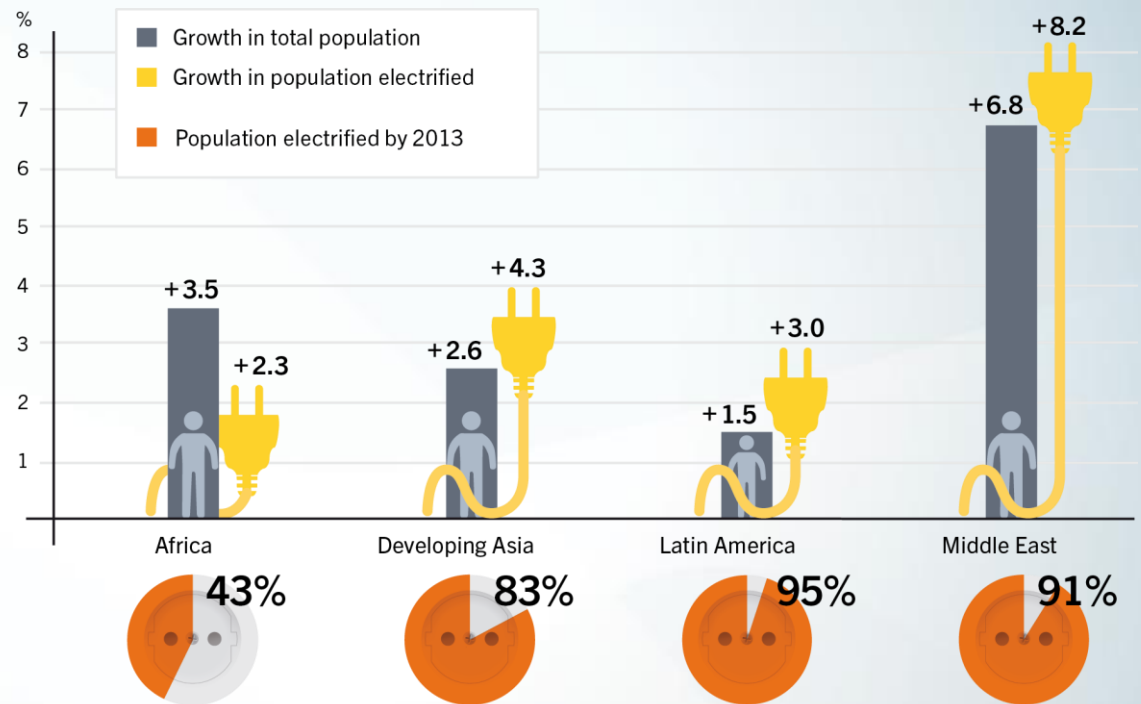
On all continents except Africa, growth in population electrified is bigger than the growth in total population.

Rural energy markets are increasingly being recognised as business opportunities.

Increasing development of mini-grids



Share of Population with Electricity Access, and Rate of Electrification versus Population Growth

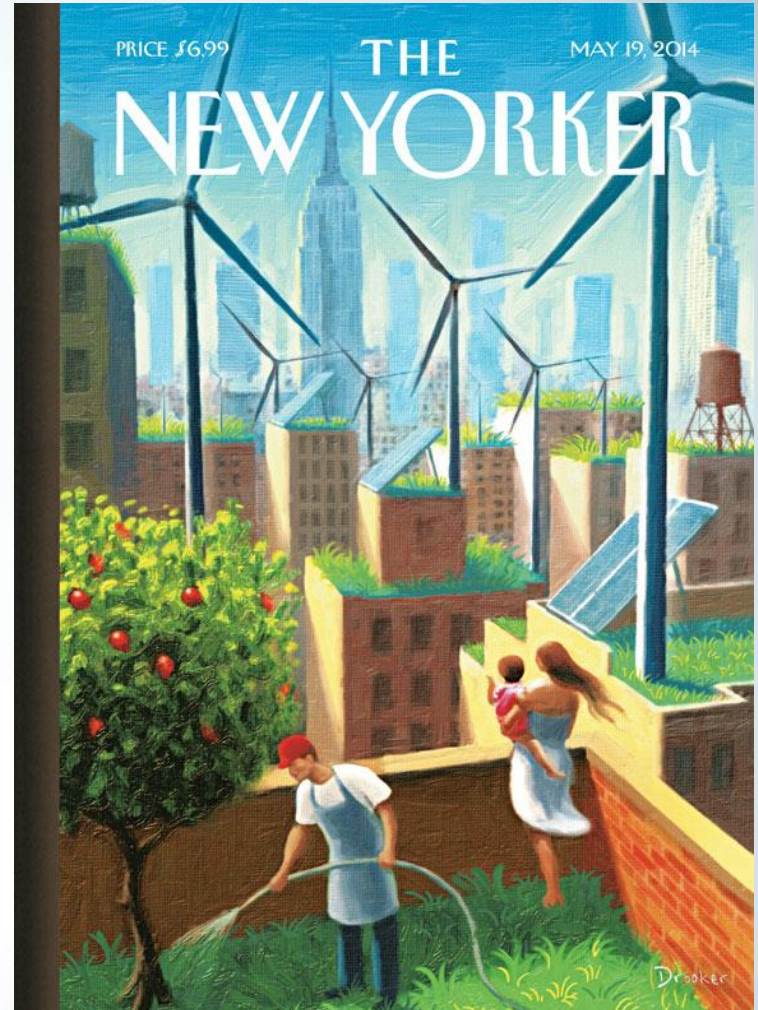




## CONCLUSIONS

Global perceptions of renewable energy have shifted considerably. 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:

- More-rigorous integration of renewable energy
- A levelised playing field for the entire energy sector
- Long-term and differentiated stable policy frameworks to sustain and increase investment levels
- Greater attention to the heating and cooling and the transport sector
- Improved energy data to monitor advancements in achieving a renewable energy transition





# RENEWABLE ENERGY POLICY NETWORK FOR THE 21st CENTURY



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