

# RENEWABLES 2014 GLOBAL STATUS REPORT

## CESC INDIA WEBINAR

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# RENEWABLES 2014 GLOBAL STATUS REPORT



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**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>

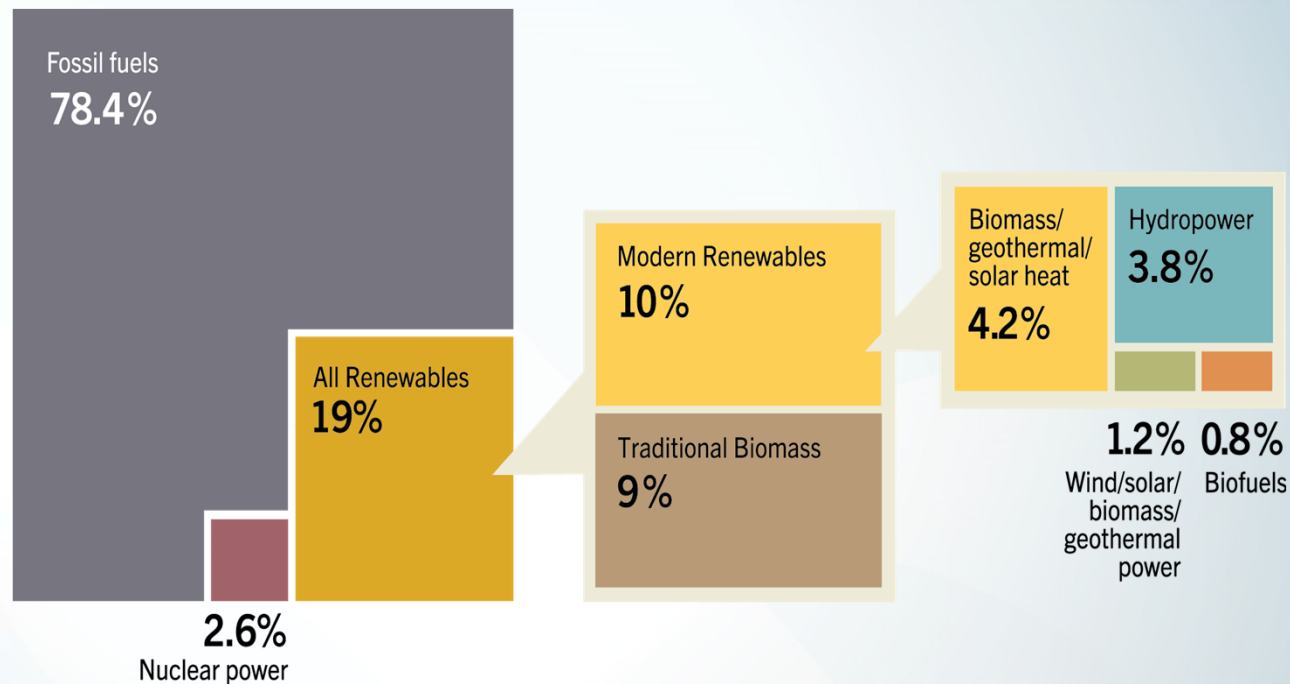
# RENEWABLE ENERGY IN THE WORLD

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

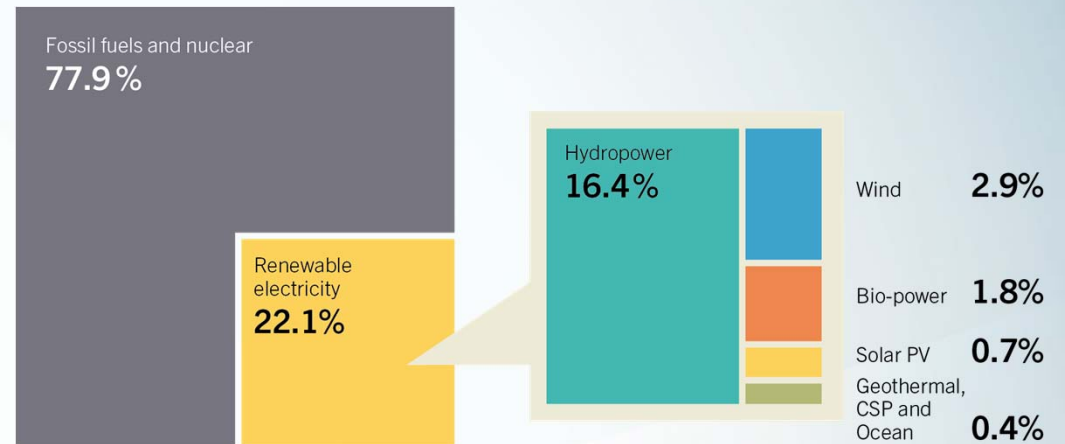
Renewables accounted for 56% of new installed power capacity in 2013.

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

Renewables represented less than 17% of total additions in 2013, due to India's rapidly expanding power capacity.



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

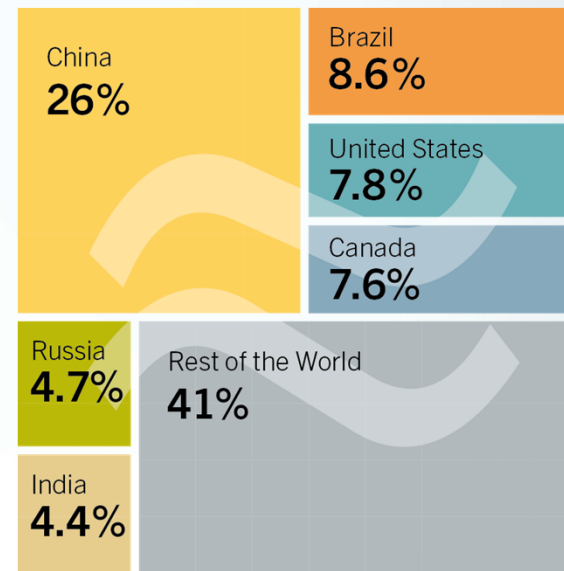
Total global hydropower capacity: **1,000 GW**

**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**

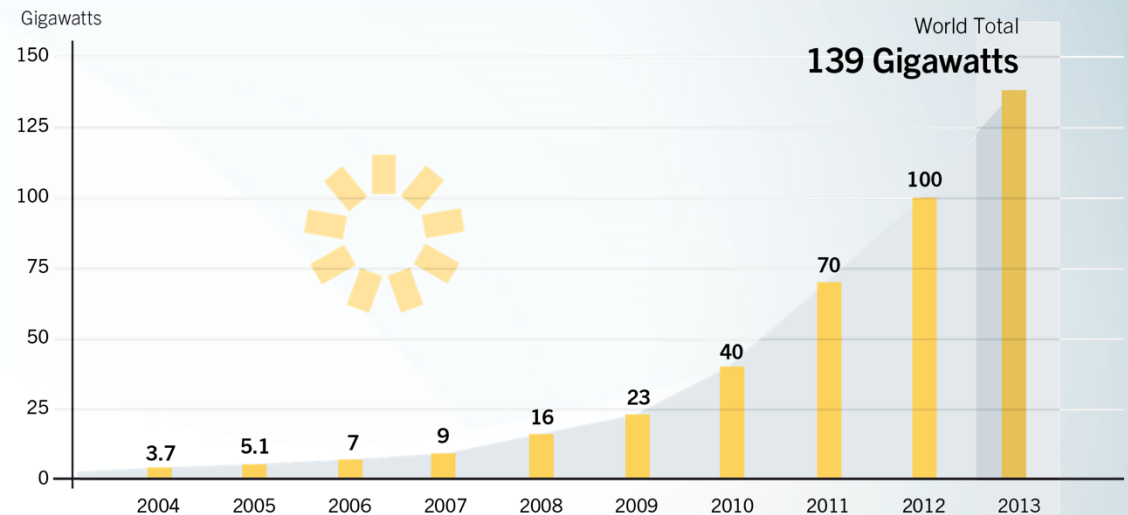
For the first time, **more PV capacity** was added than wind capacity, accounting for about one-third of renewable power capacity added during the year.

India added 1.1GW PV capacity.

India is ranked fourth for capacity of facilities >50MW.



Solar PV Total Global Capacity, 2004–2013



## WIND POWER

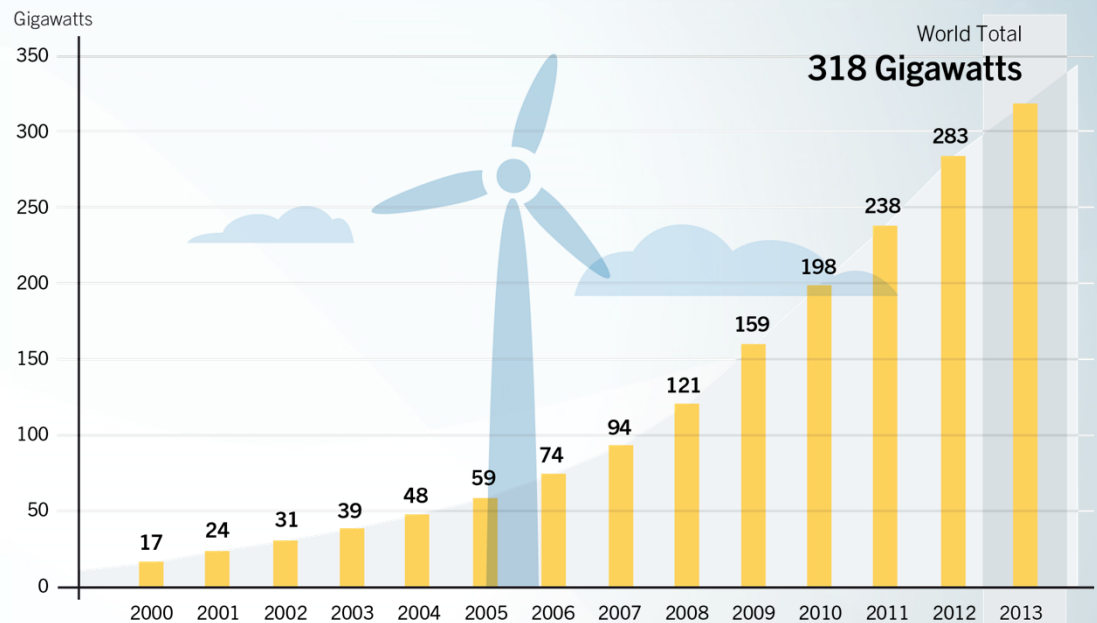
**35 GW** of capacity were added (down 10 GW from 2012).

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)

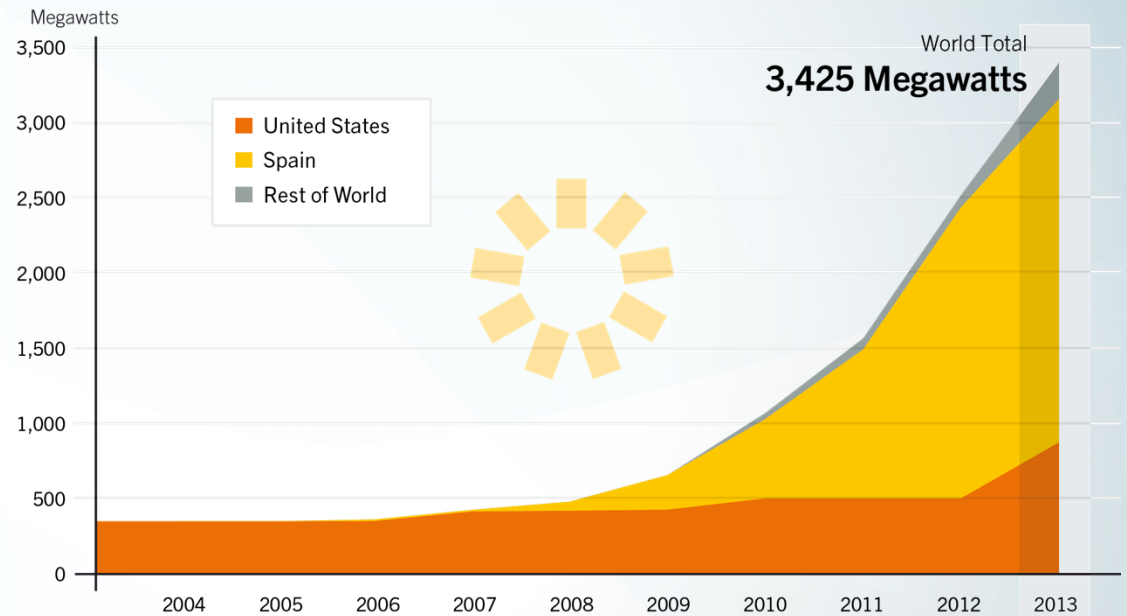
Total CSP capacity: **3.4 GW**

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.

India is number 4 for CSP net capacity additions 2013 and CSP power capacity/generation.

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



## BIOENERGY

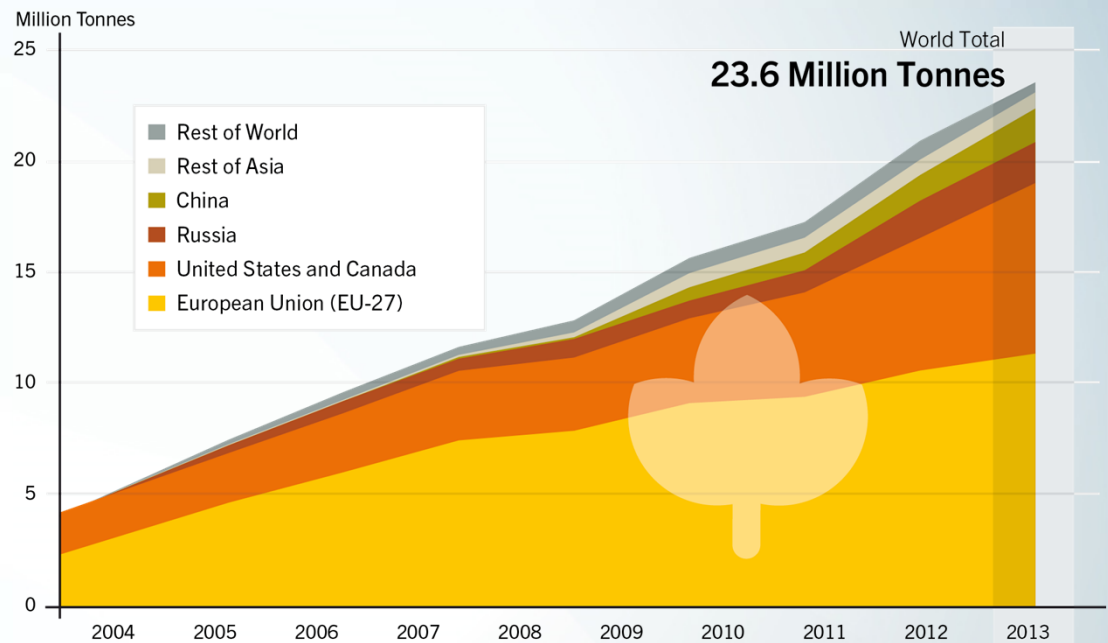
Total primary energy consumption of biomass was approx. **57 EJ in 2013**.

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

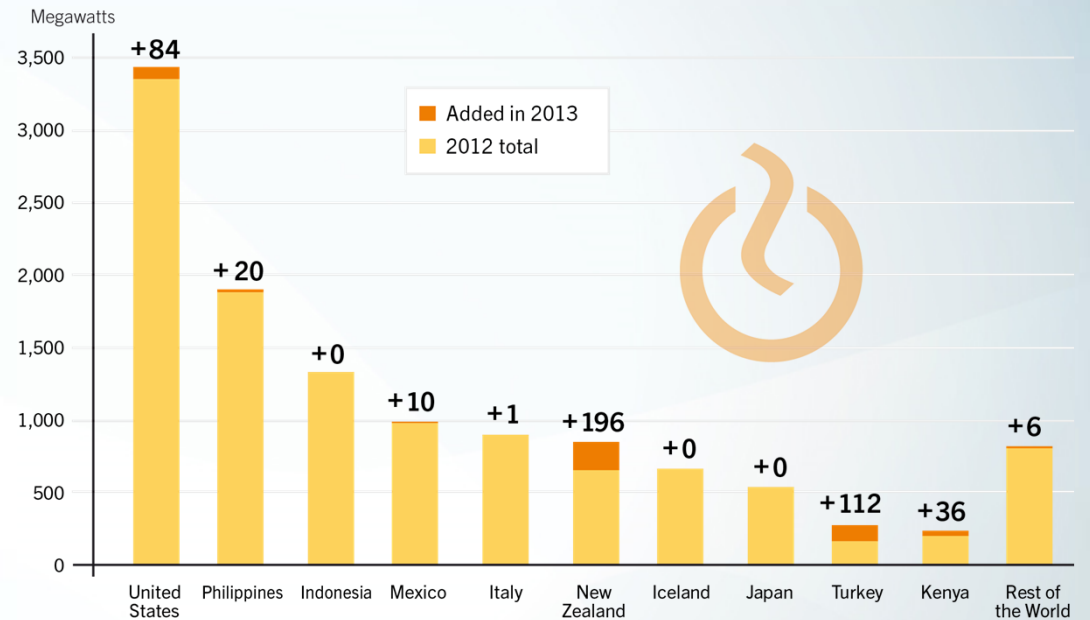


# GEOTHERMAL ENERGY

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>**

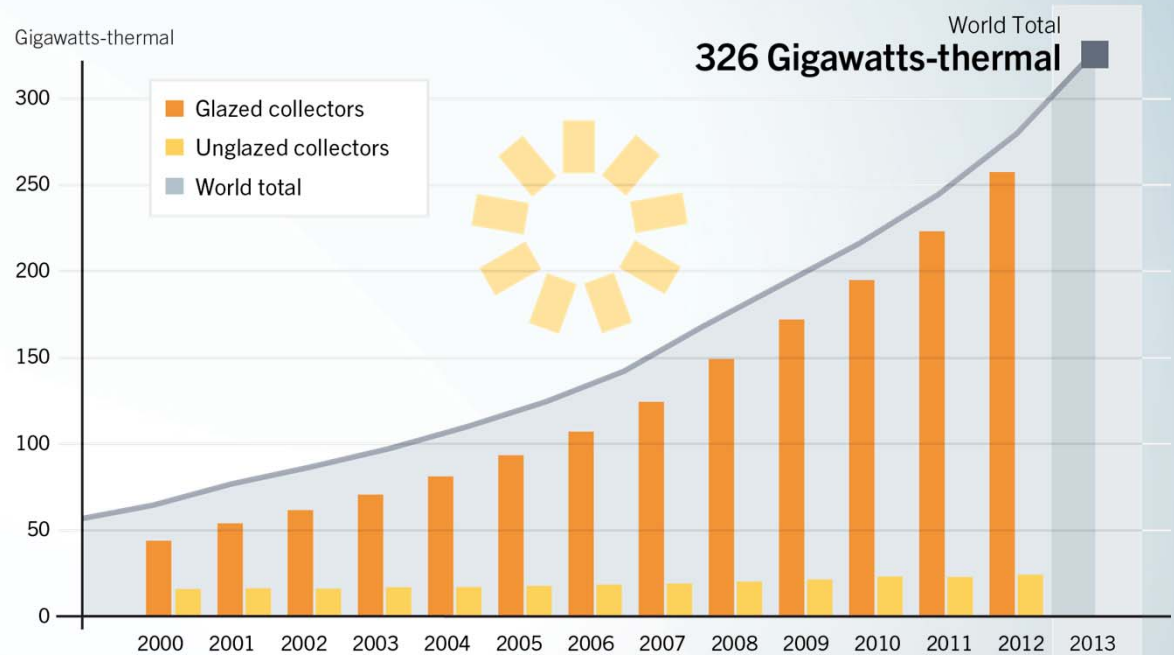
## 2013 Trends:

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

India is ranked third for SWH capacity additions – added 0.9GW<sub>th</sub> for a total of 5.2GW<sub>th</sub>.



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.

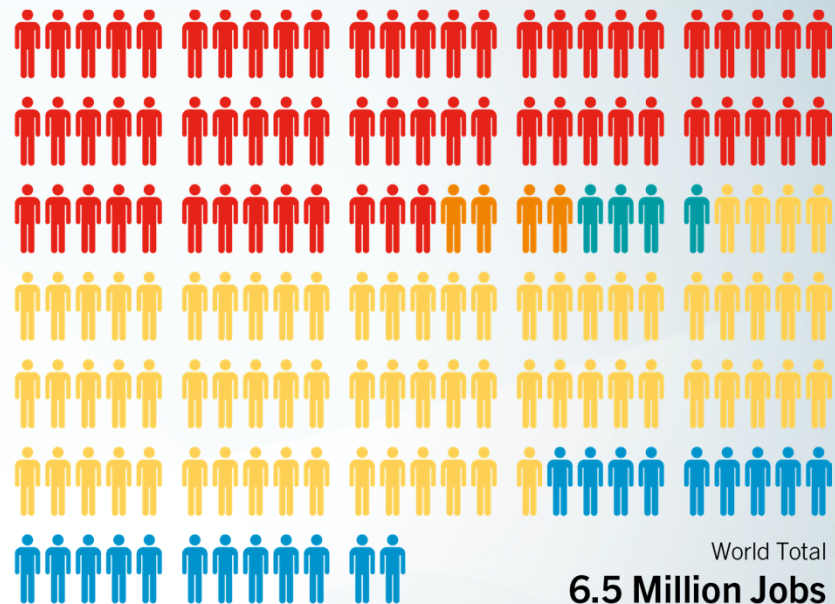
An estimated **6.5 million direct or indirect jobs** in the renewable energy industry

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.

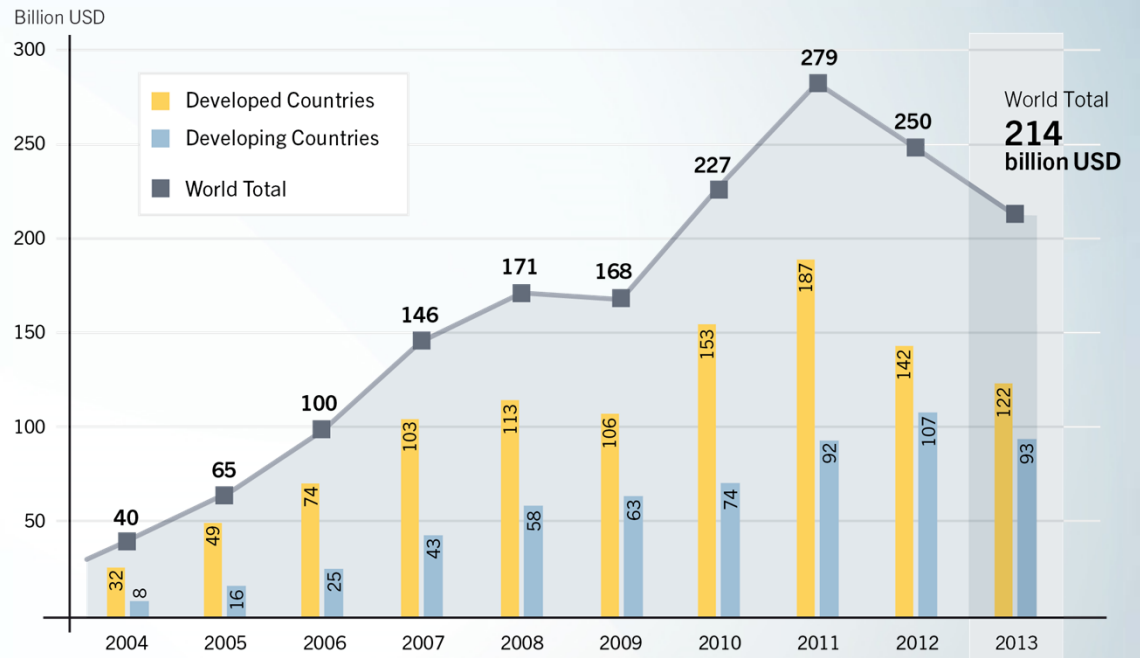
incl. hydropower > 50MW, it reached **USD 249.4 billion**.

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

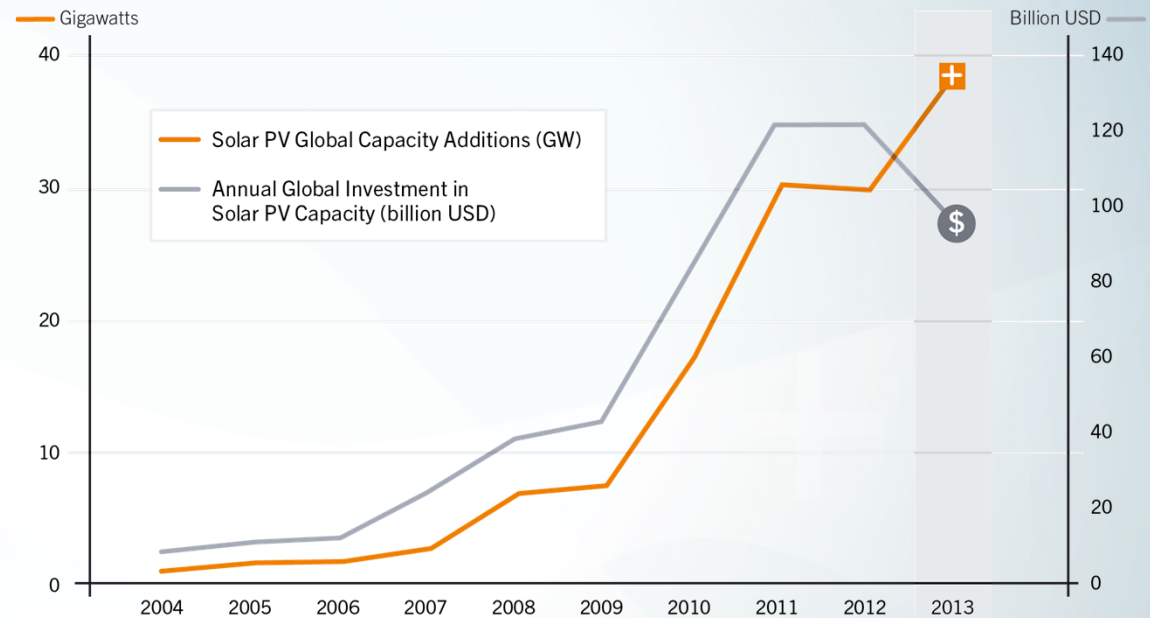
# SOLAR PHOTOVOLTAICS (PV) – global capacity additions and investment

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

Main reason: **low module prices.**

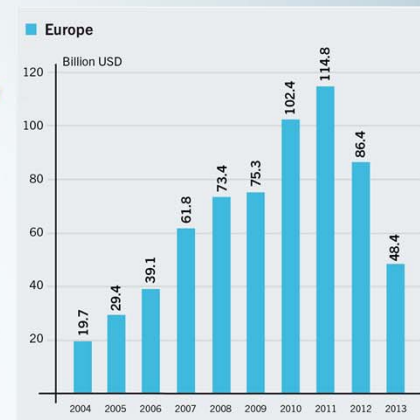
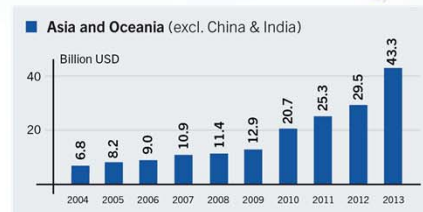
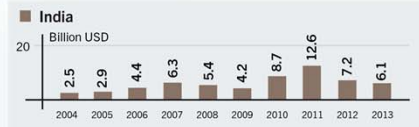
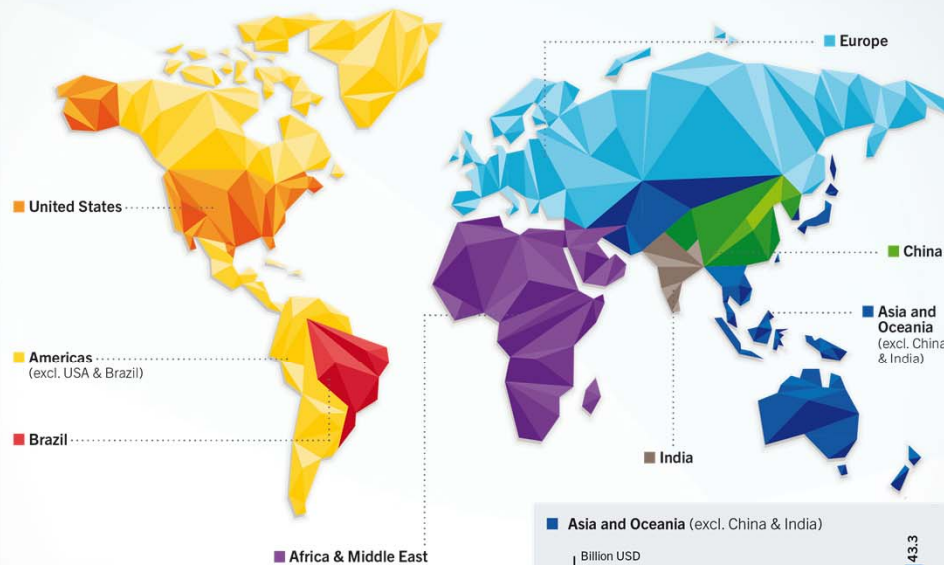
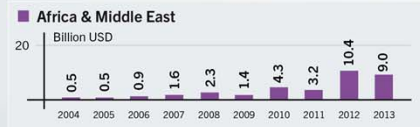
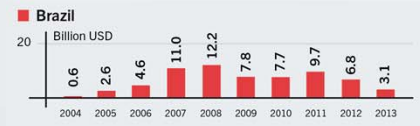
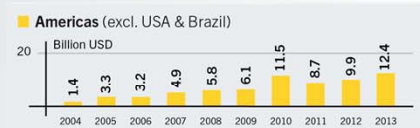
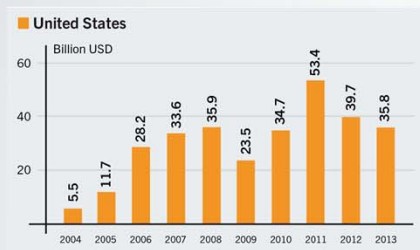
Opportunities for **new markets** to be developed

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



India was the seventh largest investor in renewables excluding R&D (USD 6 billion); just under half of 2011 peak of USD 12.5 billion. India came in sixth for investment in wind power.

## 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



## RE POLICY LANDSCAPE India

- India fell short of its target to add 4,325MW RE power capacity in the fiscal year 2013-2014
- Plans to more than double RE capacity from 25GW in 2012 to 55GW by 2017 were announced.

### *Policies*

- several policy changes made on sub-national level in 2013
- Phase 2 of the Jawaharlal Nehru National Solar Mission was launched with a call for bids on 750MW of grid-connected PV contracts (tender was twice delayed as of early 2014).
- India reintroduced Generation Based Incentive (GBI) scheme (expired April 2012)
- Allocation of USD 6.9 billion (INR 430 billion) to grid modernization program (Green Energy Corridor) to enable integration of RE.
- A 2-year rebate program for solar hot water and solar process heat installations was introduced.
- Ethanol blend was raised from E5 to E10.
- India introduced plans to produce 5-6 million EVs by 2020 (part of National Electric Mobility Mission Plan 2020)

### *City and Local Policies*

- 36 cities finalized solar city master plans by end 2013 in response to National Solar Cities Programme (will support total of 60 cities in move towards becoming green cities)
- A minimum of 90 cities in 8 states had amended building by-laws to mandate SWH as of 2013.



# DISTRIBUTED RENEWABLE ENERGY IN DEVELOPING COUNTRIES

Energy access and the use of distributed renewable energy increased.

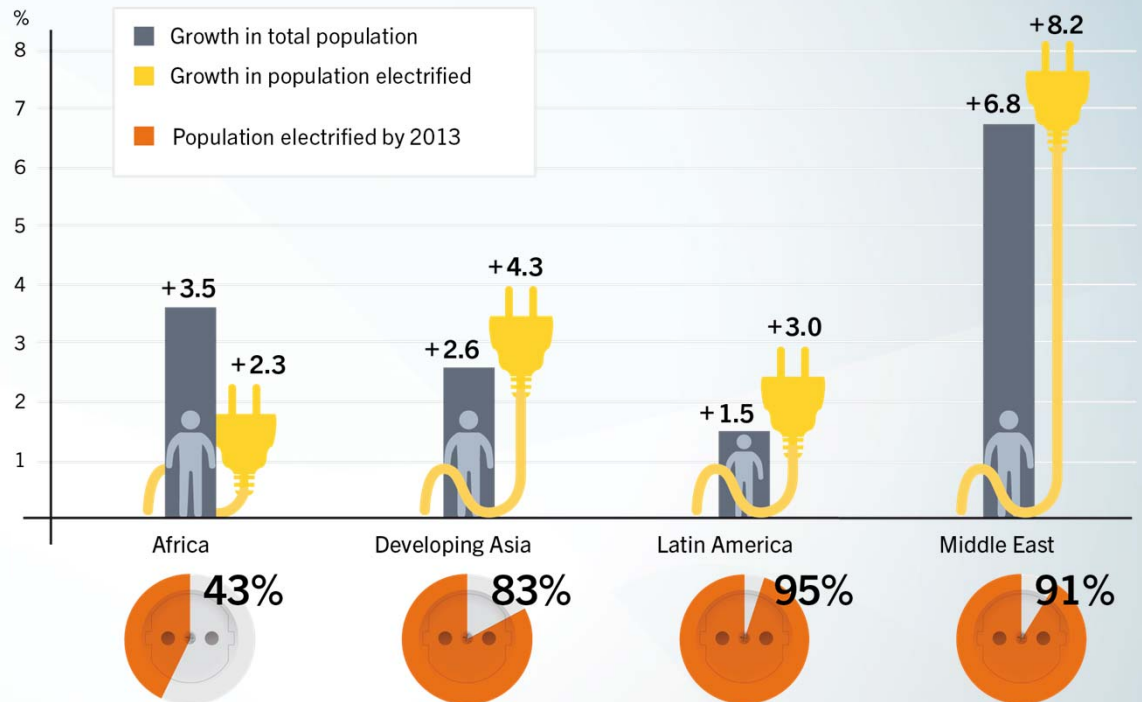
On all continents except Africa, growth in population electrified is bigger than the growth in total population.

Rural energy markets are increasingly being recognised as business opportunities.

Increasing development of mini-grids



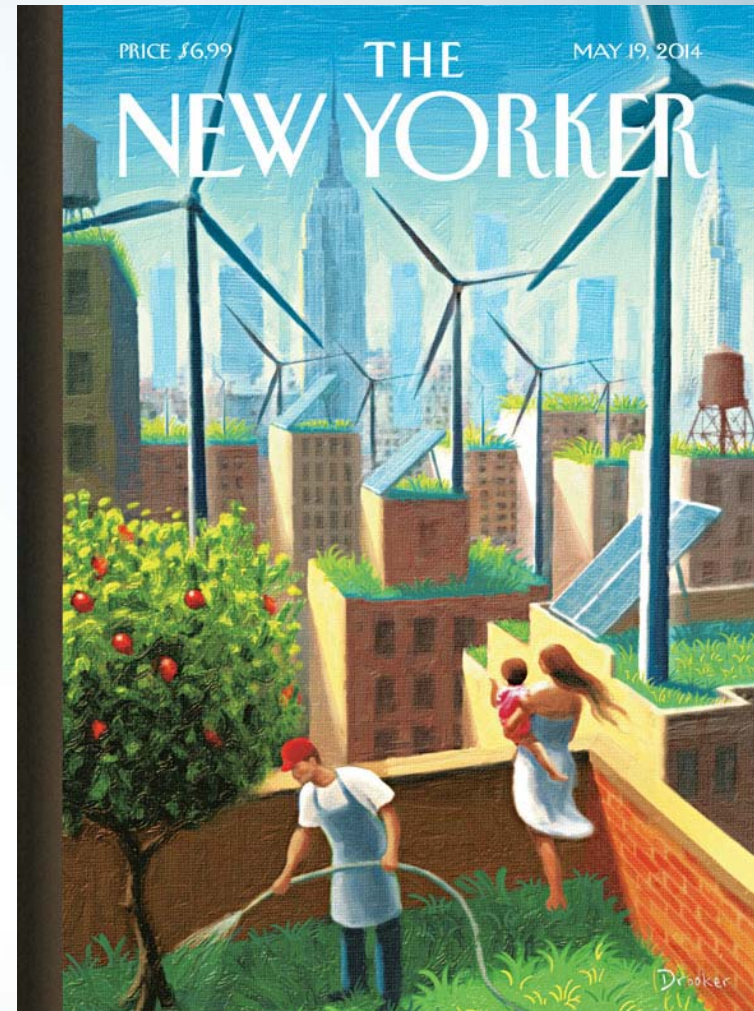
Share of Population with Electricity Access, and Rate of Electrification versus Population Growth



## 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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yearly publication since 2005



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