GLOBAL RENEWABLE ENERGY STATUS

RENISLA 2014

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REN21 Renewable Energy Policy Network for the 21st Century

REN21 Renewables 2014 Global Status Report

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
- Distrbuted 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

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

Data source: REN21 Renewables 2014 Global Status Report

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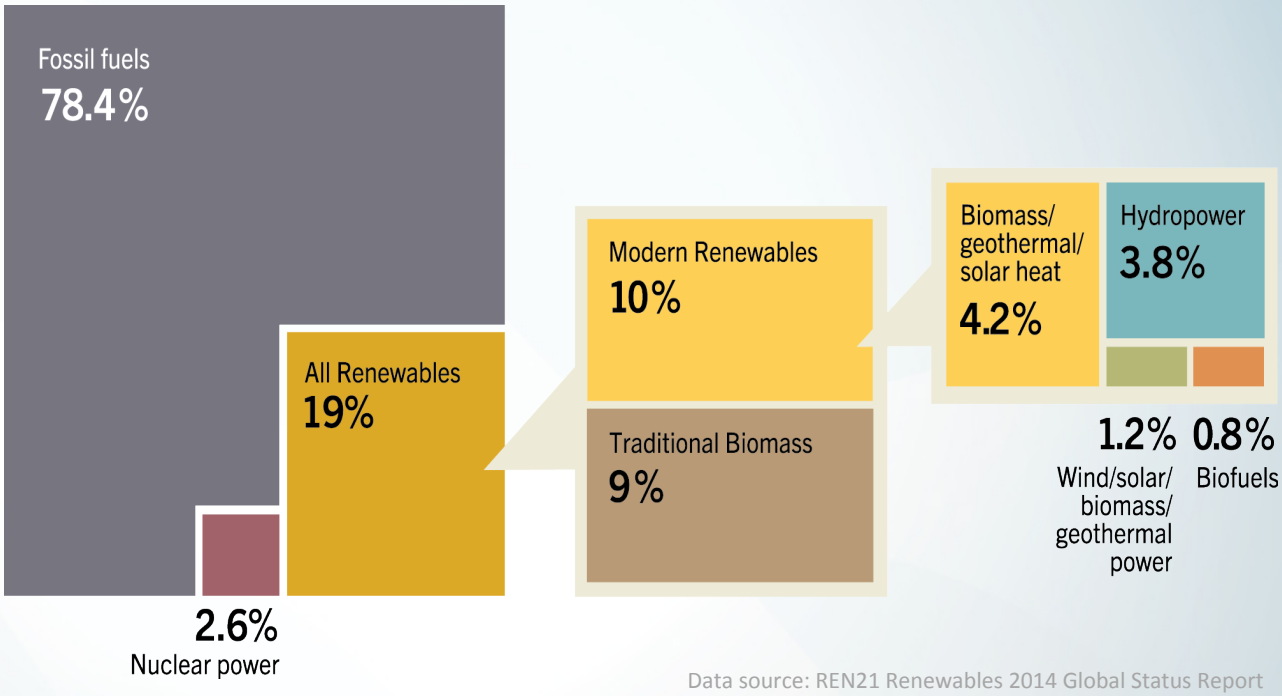
Renewable Energy in the World

Renewable energy provided an estimated **19%** of **global final energy consumption** in 2012.

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



Data source: REN21 Renewables 2014 Global Status Report

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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	**China**	United States	Japan	United Kingdom	Germany
Share of GDP 2012 (USD) invested[1]	**Uruguay**	Mauritius	Costa Rica	South Africa	Nicaragua
Geothermal power capacity	**New Zealand**	Turkey	United States	Kenya	Philippines
Hydropower capacity	**China**	Turkey	Brazil	Vietnam	India
Solar PV capacity	**China**	Japan	United States	Germany	United Kingdom
CSP capacity	**United States**	Spain	United Arab Emirates	India	China
Wind power capacity	**China**	Germany	United Kingdom	India	Canada
Solar water heating capacity[2]	**China**	Turkey	India	Brazil	Germany
Biodiesel production	**United States**	Germany	Brazil	Argentina	France
Fuel ethanol production	**United States**	Brazil	China	Canada	France

Data source: REN21 Renewables 2014 Global Status Report

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Renewable Energy "Champions" – total capacity

TOTAL CAPACITY OR GENERATION[6] AS OF END-2013

	1	2	3	4	5
POWER					
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 **per capita** (not incl. hydro)[3]	**Denmark**	Germany	Portugal	Spain / Sweden	Austria
Biopower generation	**United States**	Germany	China	Brazil	India
Geothermal power	**United States**	Philippines	Indonesia	Mexico	Italy
Hydropower[4]	**China**	Brazil	United States	Canada	Russia
Hydropower generation[4]	**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 **per capita**	**Germany**	Italy	Belgium	Greece	Czech Republic
Wind power	**China**	United States	Germany	Spain	India
Wind power capacity **per capita**	**Denmark**	Sweden	Spain	Portugal	Ireland
HEAT					
Solar water heating[2]	**China**	United States	Germany	Turkey	Brazil
Solar water heating capacity **per capita**[2]	**Cyprus**	Austria	Israel	Barbados	Greece
Geothermal heat[5]	**China**	Turkey	Iceland	Japan	Italy

Data source: REN21 Renewables 2014 Global Status Report

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Power Sector

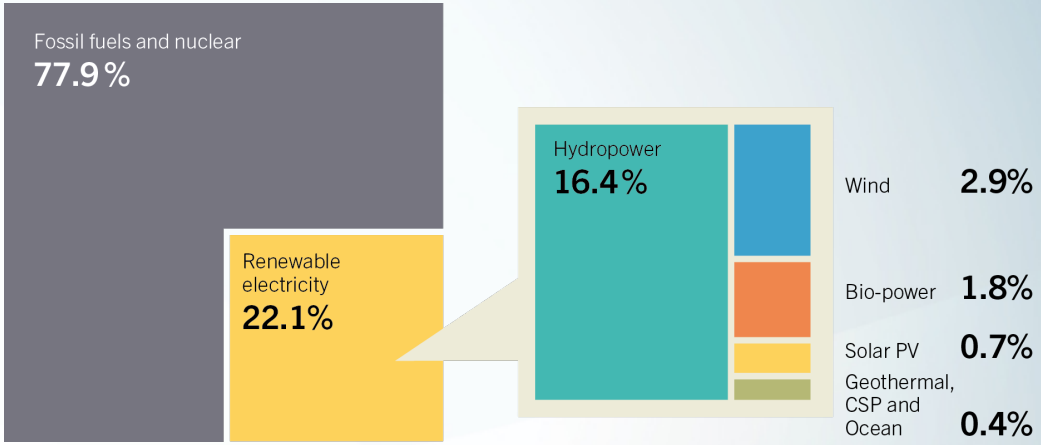
Renewable energy comprise **26.4%** of **global power generation capacity**

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

Renewables accounted for 56% of new installed power capacity in 2013. Within the EU, 72% of all new electricity capacity in 2013 was renewables based.

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

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



Based on renewable generating capacity in operation end-2013

Data source: REN21 Renewables 2014 Global Status Report

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Heating & Cooling

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

At least 20 countries in Europe use renewables in their district heat system, with at least 20% of EU wide district heat generated by renewable sources.

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

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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

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Solar Photovoltaics (PV) – total global capacity

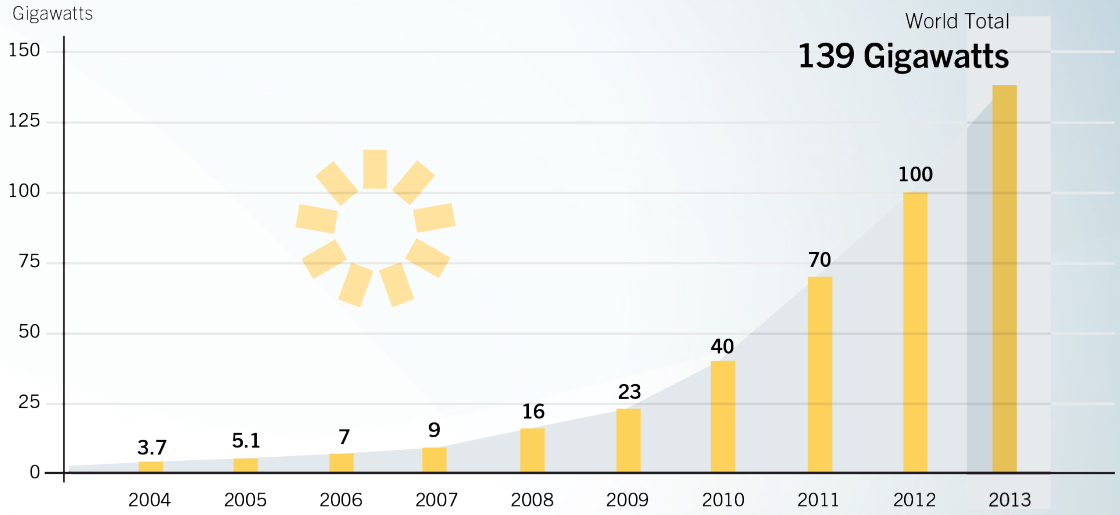
Solar PV had a **record year** in 2013:

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

For the first time, **more PV capacity** was added than wind capacity.

Europe continued to operate more solar PV capacity than any other region with more than 80 GW total by the end of 2013.

Solar PV Total Global Capacity, 2004–2013



Data source: REN21 Renewables 2014 Global Status Report

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Wind Power – total world capacity

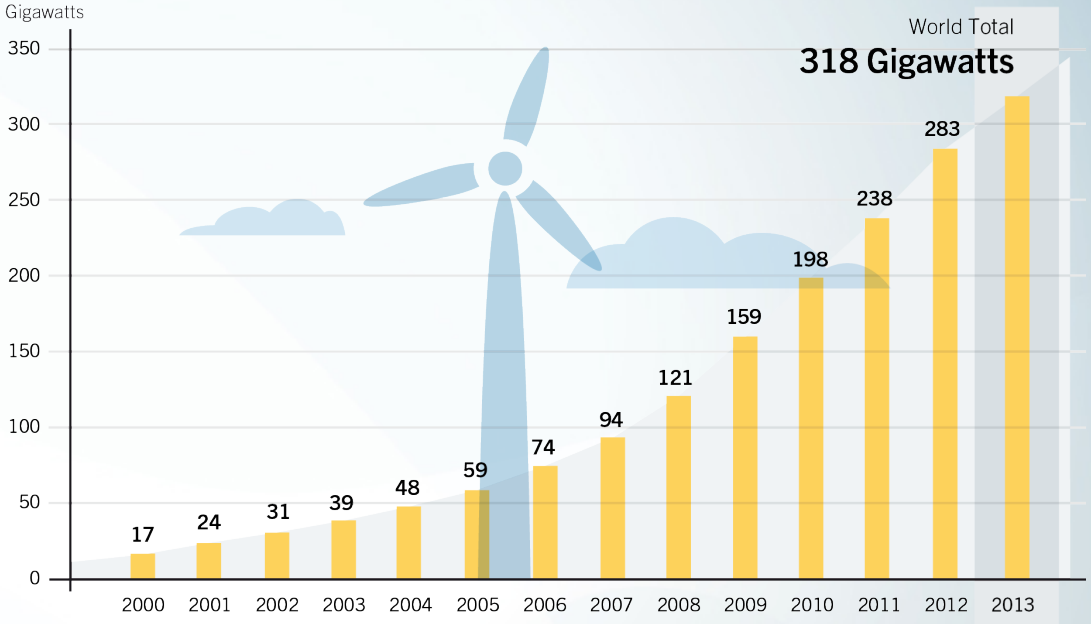
35 GW of capacity were added (down 10 GW from 2012) for a total capacity of **318 GW**.

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

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

In 2013, wind power met 33.2% of electricity demand in Denmark, 20.9% in Spain.

Wind Power Total World Capacity, 2000–2013



Data source: REN21 Renewables 2014 Global Status Report

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Bioenergy

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

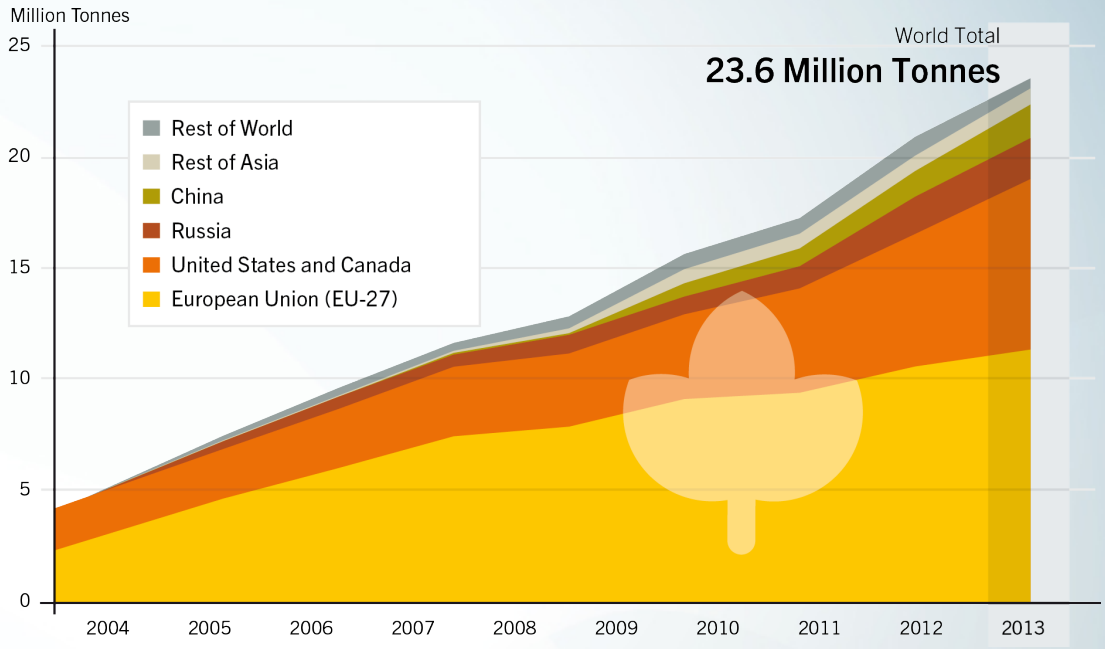
Modern biomass **heat capacity:** 296 GW_{th} (increase of 1 %)

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

Europe continued to be the world's largest consumer of modern bio-heat in 2013.

Europe was also the largest consumer of wooden pellets, burning over 15 million tons in 2013.

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



Data source: REN21 Renewables 2014 Global Status Report

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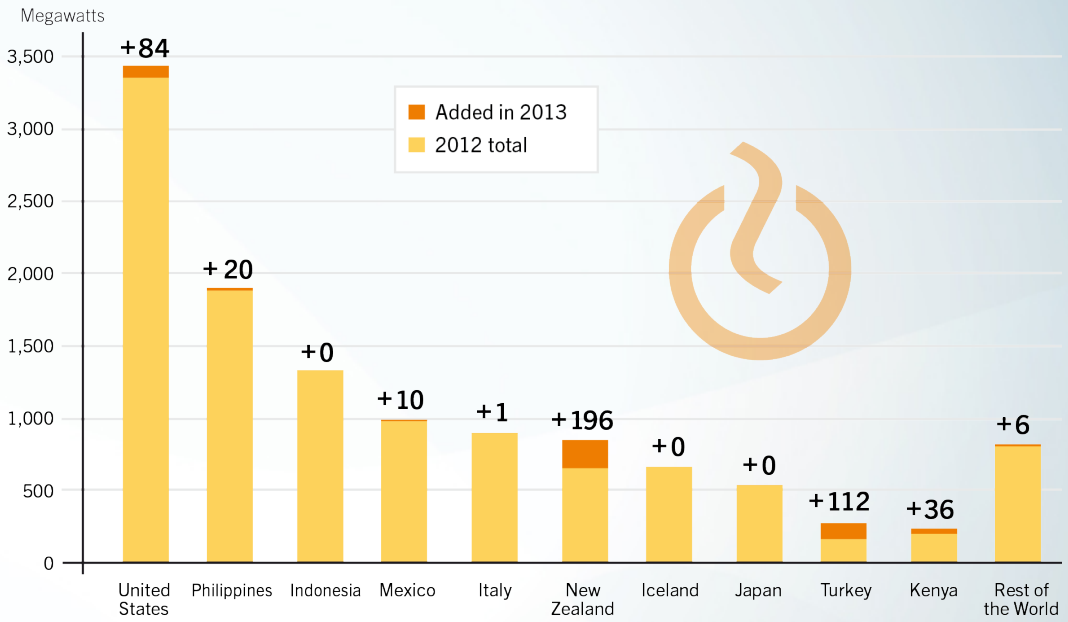
Geothermal Energy

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.

Several islands in the Caribbean have plans to begin or increase their use of geothermal power.

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



Additions are net of repowering and retirements

Data source: REN21 Renewables 2014 Global Status Report

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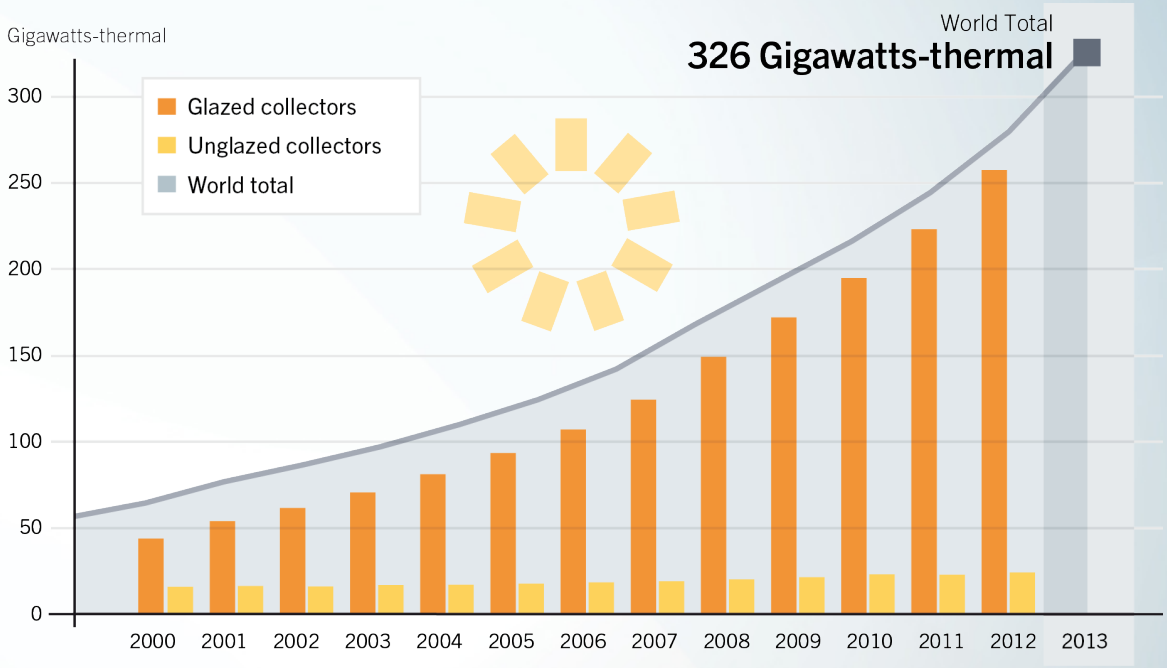
Solar Thermal Heating & Cooling

Solar water and air collector capacity: **~330 GW_{th}**

2013 Trends:

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

Solar Water Heating Collectors Global Capacity, 2000–2013



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

Data source: REN21 Renewables 2014 Global Status Report

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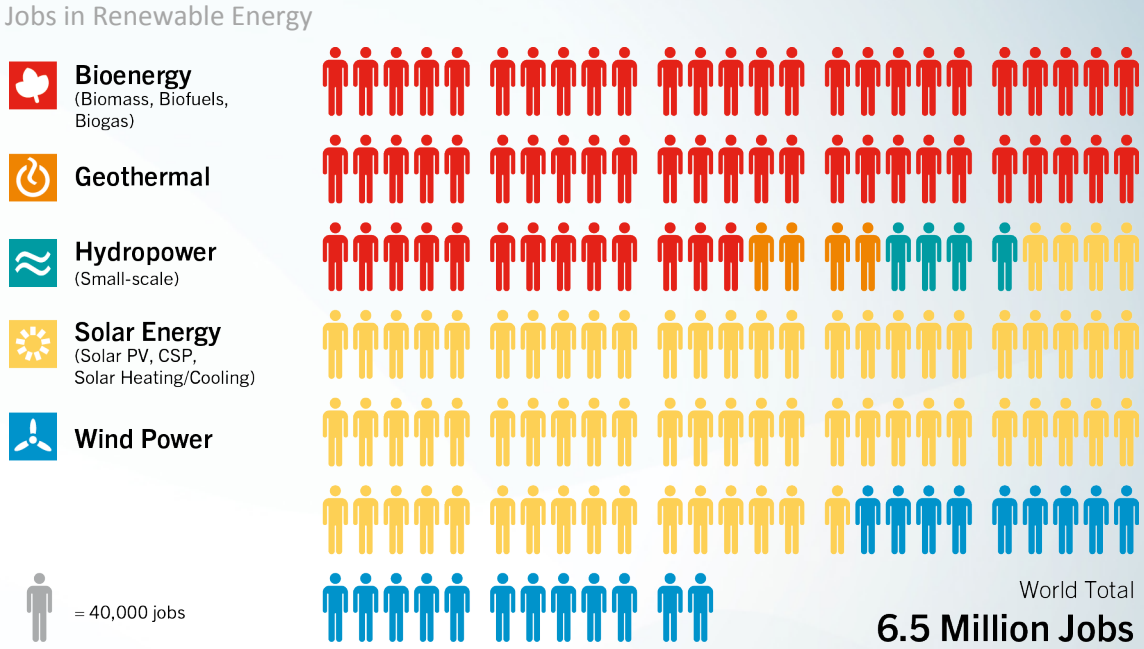
Jobs in Renewable Energy

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



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

Data source: IRENA

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Global Investment in Renewable Energy

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

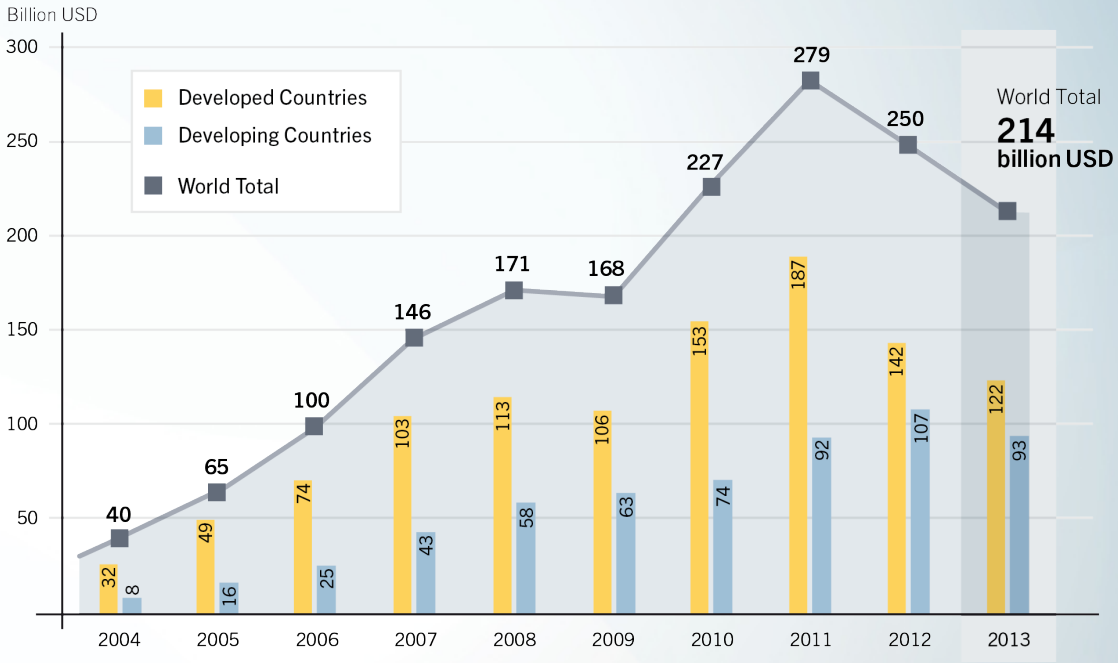
incl. hydropower > 50MW, it reached **USD 249.4 billion**.

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



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

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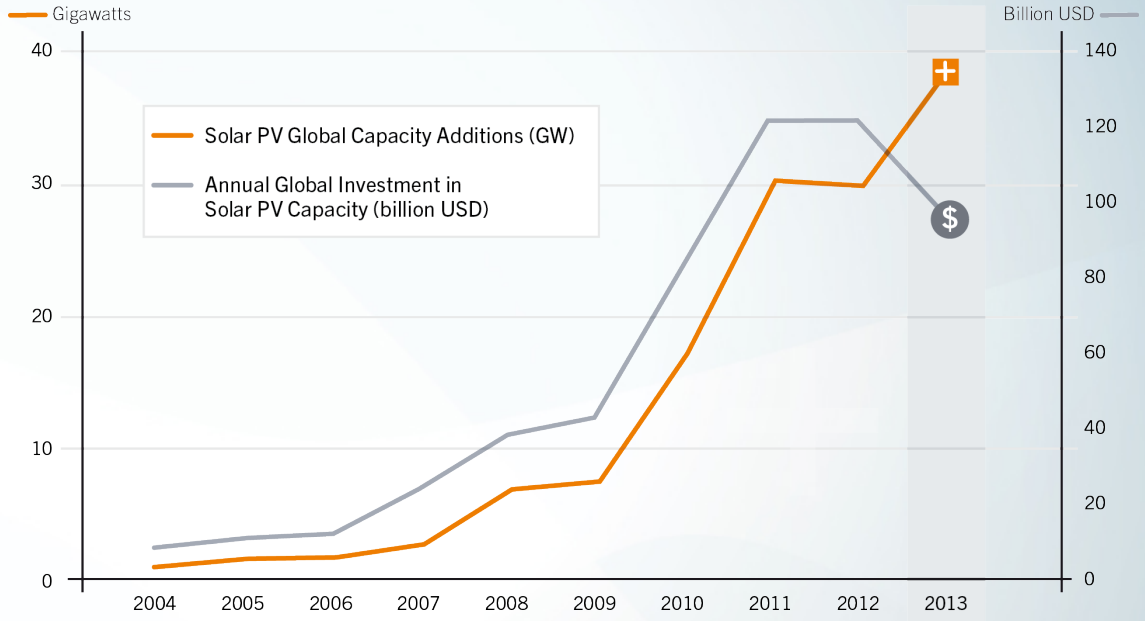
Solar Photovoltaics (PV) – global capacity additions and investment

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



Data source: REN21 Renewables 2014 Global Status Report

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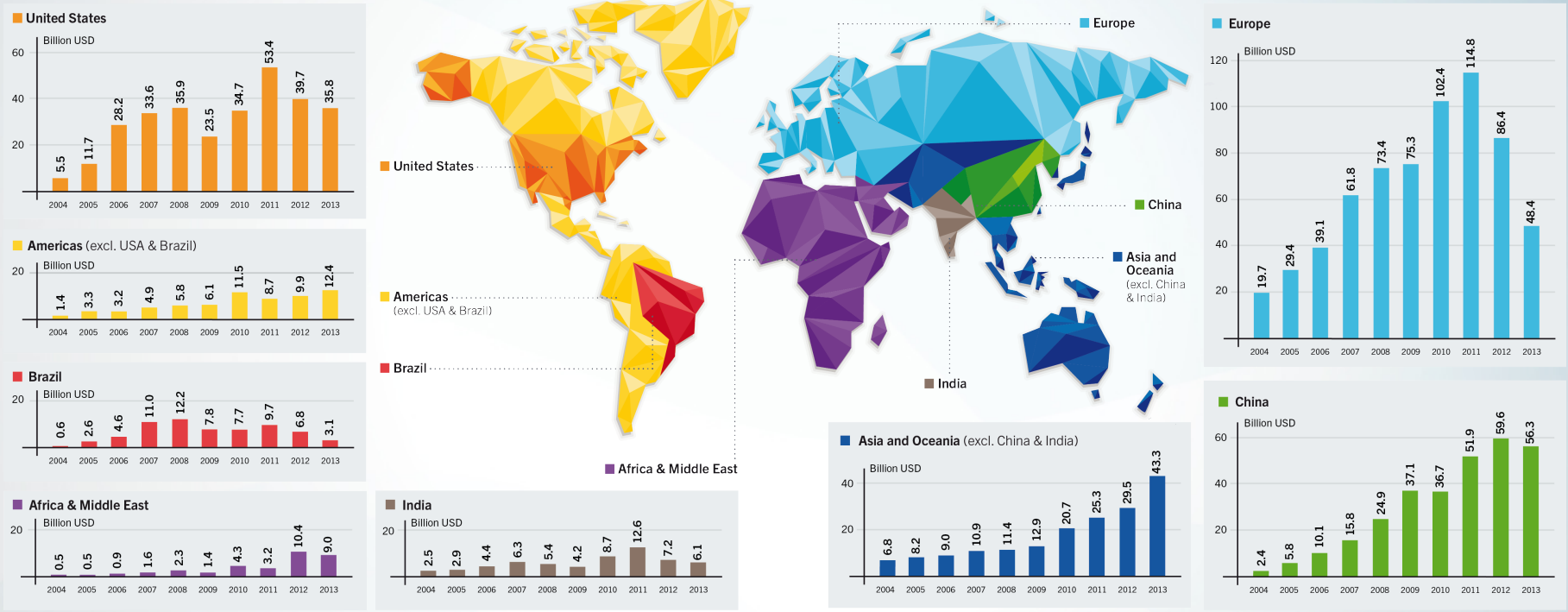
Global Investment in Renewable Energy by World Regions

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

Mauritius was the 3rd largest investor in RE in Africa.

Dominican Republic: saw triple digit growth rate in investment in 2013

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Renewable Energy Policy Landscape

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

Data source: REN21 Renewables 2014 Global Status Report

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.

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Renewable Energy Policy Landscape – examples from islands

The Caribbean Community (CARICOMi) Secretariat adopted a trans-national target on behalf of its 15 member states, calling for a regional renewable electricity share of 20% by 2017, 28% by 2022, and 47% by 2027. The shares are to be achieved by country-differentiated targets that were yet to be defined as of early 2014.

Singapore: increased cap of total power provided by variable RE during peak demand from 350MW to 600MW & had the largest solar cooling system in the world in 2012

Barbados: pilot net metering project operating

Fiji approved voluntary B5 and E10 blending in 2011 with a mandate expected.

Mauritius removed FIT in 2013.

Most common policies: reduction in taxes & net metering

Distributed Renewable Energy in Developing Countries

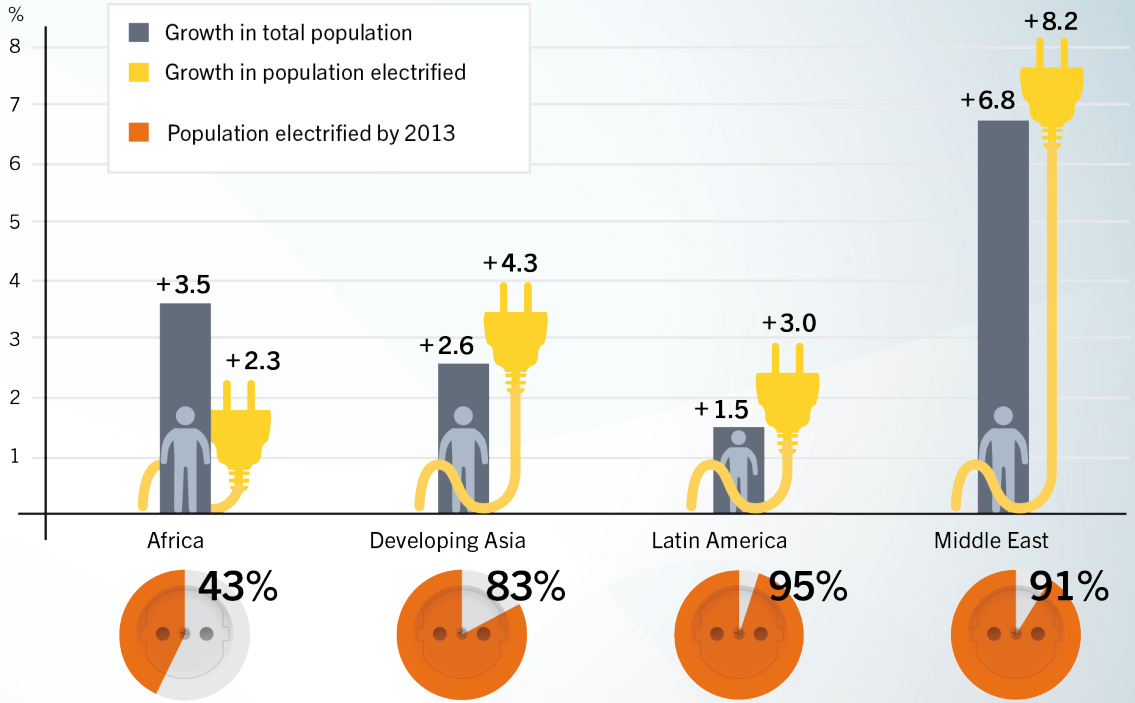
In **Africa, population growth rate exceeded rate of electrification**

In all other developing regions rate of electrification surpassed population growth

Half of the world's population without electricity live in Africa

Several countries are setting up **national renewable energy action plans** and enacting **renewable energy policies**

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



Data source: IEA, REN21 Renewables 2014 Global Status Report

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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

Islands can serve as light-house examples of sustainable energy communities.

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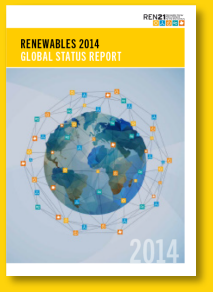
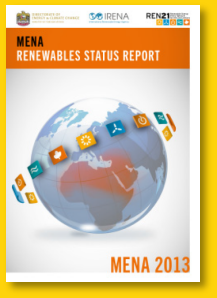
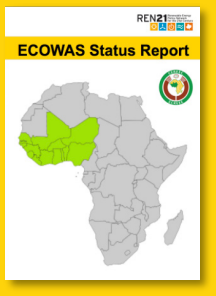
RENEWABLE ENERGY POLICY NETWORK FOR THE 21st CENTURY



Global Status Report
yearly publication since 2005

Global Futures Report





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