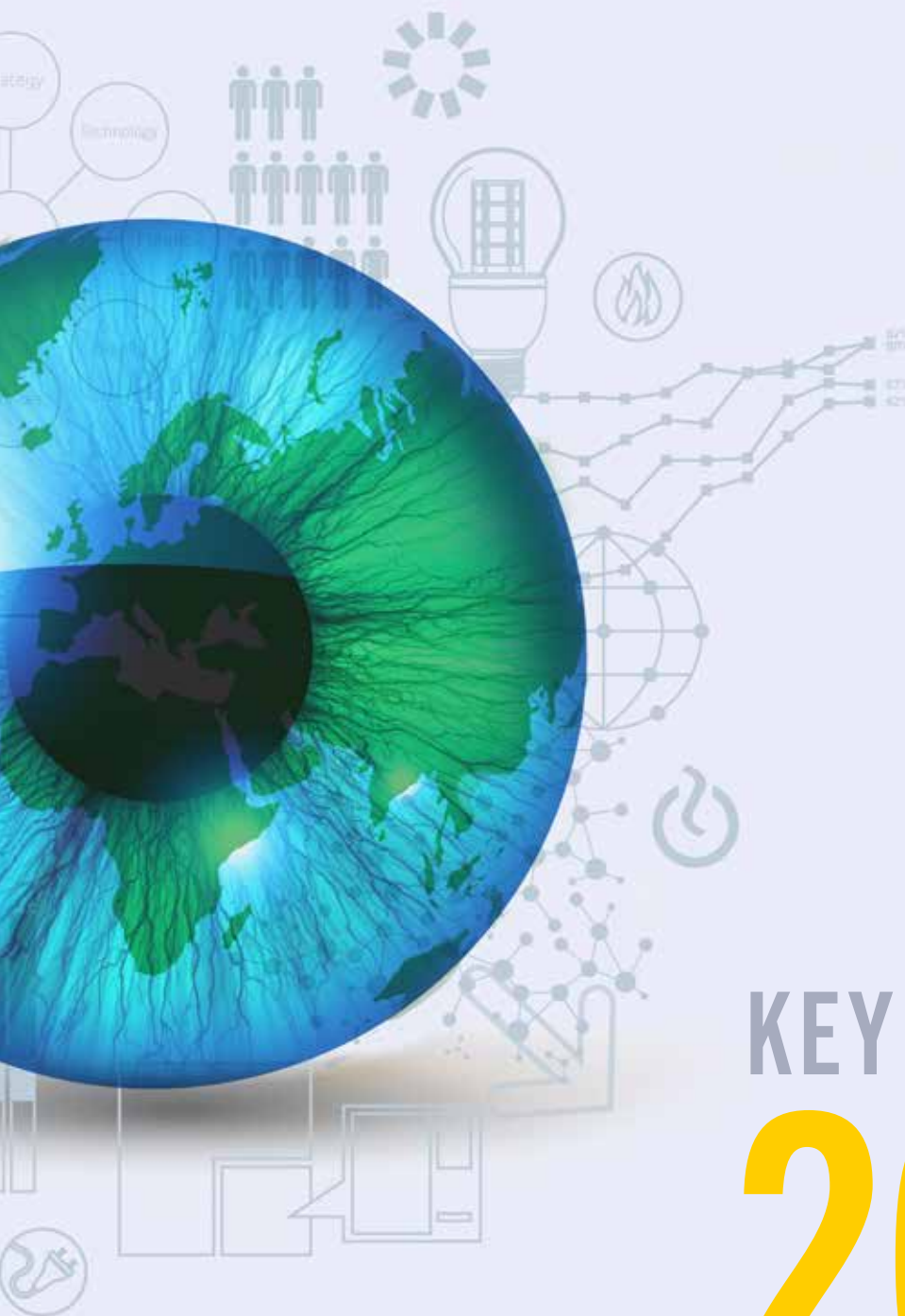


RENEWABLES 2015

GLOBAL STATUS REPORT



KEY FINDINGS

2015

RENEWABLE ENERGY POLICY NETWORK FOR THE 21st CENTURY

REN21 is the global renewable energy policy multi-stakeholder network that connects a wide range of key actors. REN21's goal is to facilitate knowledge exchange, policy development, and joint action towards a rapid global transition to renewable energy.

REN21 brings together governments, nongovernmental organisations, research and academic institutions, international organisations, and industry to learn from one another and build on successes that advance renewable energy. To assist policy decision making, REN21 provides high-quality information, catalyses discussion and debate, and supports the development of thematic networks.



Global Status Report: yearly publication since 2005



Regional Reports



Global Futures Report



www.ren21.net/map



REN21 Renewables Academy

REN21 Renewables Academy

REN21 publications:

2004

First GSR published

2005

2006

2007

2008

Chinese Renewable Energy Status Report

2009

Indian Renewable Energy Status Report

2010

REN21 events: renewables 2004, Bonn

BIREC, Beijing International Renewable Energy Conference

WIREC, Washington International Renewable Energy Conference

DIREC, Delhi International Renewable Energy Conference

REN21 facilitates the collection of comprehensive and timely information on renewable energy. This information reflects diverse viewpoints from both private and public sector actors, serving to dispel myths about renewable energy and to catalyse policy change. It does this through six product lines.

Renewables Global Status Report (GSR)

First released in 2005, REN21's *Renewables Global Status Report* (GSR) has grown to become a truly collaborative effort, drawing on an international network of over 500 authors, contributors, and reviewers. Today it is the most frequently referenced report on renewable energy market, industry, and policy trends.

Regional Reports

These reports detail the renewable energy developments of a particular region; their production also supports regional data collection processes and informed decision making.

Renewables Interactive Map

The Renewables Interactive Map is a research tool for tracking the development of renewable energy worldwide. It complements the perspectives and findings of REN21's Global and Regional Status Reports by providing continually updated market and policy information as well as providing detailed, exportable country profiles.

Global Future Reports (GFR)

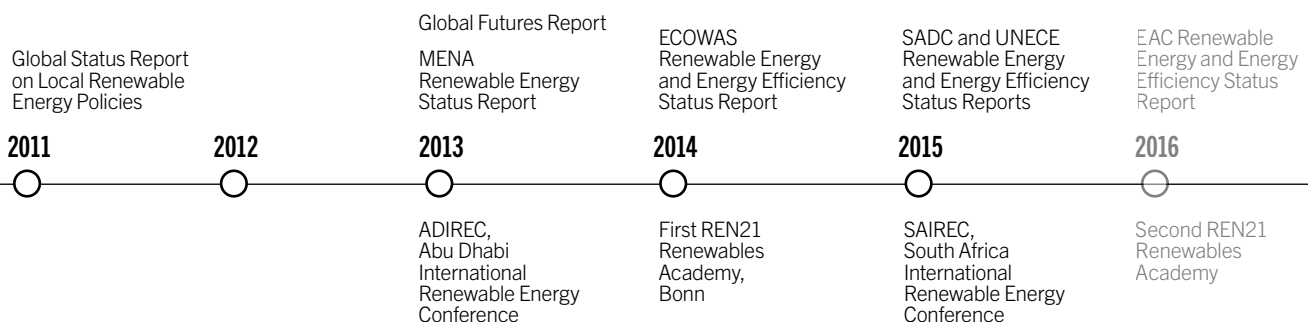
REN21 produces reports that illustrate the credible possibilities for the future of renewables within particular thematic areas.

Renewables Academy

The REN21 Renewables Academy provides an opportunity for lively exchange among the growing community of REN21 contributors. It offers a venue to brainstorm on future-orientated policy solutions and allows participants to actively contribute on issues central to a renewable energy transition. The next REN21 Renewables Academy will take place in autumn 2016.

International Renewable Energy Conferences (IRECs)

The International Renewable Energy Conference (IREC) is a high-level political conference series. Dedicated exclusively to the renewable energy sector, the biennial IREC is hosted by a national government and convened by REN21. SAIREC 2015 will be held in South Africa on 4–7 October 2015.



REN21 STEERING COMMITTEE

INDUSTRY ASSOCIATIONS

Ernesto Macías Galán
Alliance for Rural Electrification (ARE)

Todd Foley
American Council on Renewable Energy (ACORE)

Li Junfeng
Chinese Renewable Energy Industries Association (CREIA)

Kane Thornton
Clean Energy Council (CEC)

Rainer Hinrichs-Rahlwes
European Renewable Energies Federation (EREF)

Steve Sawyer
Global Wind Energy Council (GWEC)

Marietta Sander
International Geothermal Association (IGA)

Richard Taylor
International Hydropower Association (IHA)

Heinz Kopetz
World Bioenergy Association (WBA)

Stefan Gsänger
World Wind Energy Association (WWEA)

MEMBERS AT LARGE

Michael Eckhart
Citigroup, Inc.

Mohamed El-Ashry
United Nations Foundation

David Hales
Second Nature

Kirsty Hamilton
Chatham House

Peter Rae
REN Alliance

Arthouros Zervos
National Technical University of Athens (NTUA)

INTERNATIONAL ORGANISATIONS

Bindu Lohani
Asian Development Bank (ADB)

Piotr Tulej
European Commission (EC)

Robert K. Dixon
Global Environment Facility (GEF)

Paolo Frankl
International Energy Agency (IEA)

Adnan Z. Amin
International Renewable Energy Agency (IRENA)

Marcel Alers
United Nations Development Programme (UNDP)

Mark Radka
United Nations Environment Programme (UNEP)

Pradeep Monga
United Nations Industrial Development Organisation (UNIDO)

Anita Marangoly George
World Bank

NATIONAL GOVERNMENTS

Mariangela Rebuá de Andrade Simões
Brazil

Hans Jørgen Koch
Denmark

Tania Rödiger-Vorwerk / Ursula Borak
Germany

Tarun Kapoor
India

Øivind Johansen
Norway

Lorena Prado
Spain

Paul Mubiru
Uganda

Thani Ahmed Al Zeyoudi
United Arab Emirates

Nick Clements
United Kingdom

NGOS

Irene Giner-Reichl
Global Forum on Sustainable Energy (GFSE)

Sven Teske
Greenpeace International

Emani Kumar
ICLEI – Local Governments for Sustainability, South Asia

Tetsunari Iida
Institute for Sustainable Energy Policies (ISEP)

Tomas Kaberger
Japan Renewable Energy Foundation (JREF)

Ibrahim Togola
Mali Folkecenter / Citizens United for Renewable Energy and Sustainability (CURES)

Harry Lehmann
World Council for Renewable Energy (WCRE)

Athena Ronquillo Ballesteros
World Resources Institute (WRI)

Rafael Senga
World Wildlife Fund (WWF)

SCIENCE AND ACADEMIA

Nebojsa Nakicenovic
International Institute for Applied Systems Analysis (IIASA)

David Renné
International Solar Energy Society (ISES)

Kevin Nassiep
South African National Energy Development Institute (SANEDI)

Rajendra Pachauri
The Energy and Resources Institute (TERI)

EXECUTIVE SECRETARY

Christine Lins
REN21

First released in 2005, the annual **Renewables Global Status Report** provides a comprehensive and timely overview of renewable energy markets, industries, investments, and policy developments worldwide. It enables policymakers, industry, investors, and civil society to make informed decisions.

The report covers recent developments, current status, and key trends on all renewable technologies and end-use sectors. By design, it does not provide analysis or forecast. The Renewables Global Status Report relies on up-to-date renewable energy data, provided by an international network of more than 500 contributors, researchers, and authors.

KEY FINDINGS 2015 INTRODUCTION

There has been a rising awareness worldwide that renewable energy and energy efficiency are critical not only for addressing climate change, but also for creating new economic opportunities and for providing energy access to the billions of people still living without modern energy services. Over the past decade, and particularly in recent years, advances in renewable energy technologies, global increases in capacity, and rapid cost reductions have been due largely to policy support, which has attracted significant investment and has further driven down costs through economies of scale.

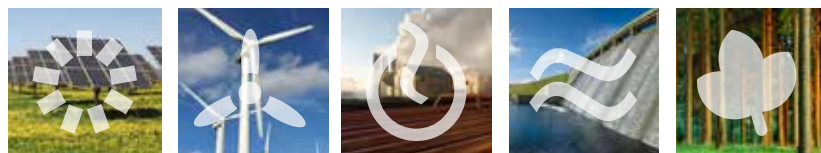
Renewable energy continued to grow in 2014 against the backdrop of increasing global energy consumption and a dramatic decline in oil prices during the second half of the year. In 2014, renewable energy expanded significantly in terms of capacity installed and energy produced, with renewable energy investments in the power sector outpacing net investments in fossil fuel power plants. The most rapid growth and the largest increase in renewable capacity occurred in the power sector and was dominated by three technologies: wind, solar photovoltaic (PV), and hydropower.

Development of renewable heating, cooling, and transport still lags behind that of renewable power. Low fossil fuel prices, ongoing fossil fuel subsidies, and competition with other possible investments, such as energy efficiency improvements and other renewable energy systems, further slowed the potential of the renewable heat sector. Despite multiple potential entry points for renewable energy in the transportation sector, development has been limited, and the primary focus of policies, markets, and industries has been on liquid biofuels.

Policy support for renewables has contributed to a growth in market volume and to strong global competition. Significant cost reductions, especially for solar PV and wind power, have played a part in the increasing electrification of transportation and heating applications, highlighting the potential for further overlap among the sectors in the future. In many countries, renewables are broadly competitive with conventional fuels, particularly in the power sector.

In developing countries, distributed renewable energy systems offer an unprecedented opportunity to accelerate the transition to modern energy services and to increase energy access. Although the falling costs of solar PV have rendered the technology the most economical source of power for off-grid electrification, access to up-front financing or the necessary equipment continued to be major barriers in 2014.

It is clear that renewables have become a mainstream energy resource. The penetration and use of both variable and non-variable renewables are increasing, thereby contributing to diversification of the energy mix. Many renewable energy technologies have experienced rapid expansion; however, growth in renewables capacity as well as improvements in energy efficiency are below the rates necessary to achieve the Sustainable Energy for All (SE4ALL) goals of doubling the level of renewable energy, doubling the global rate of improvement in energy efficiency, and providing universal energy access by 2030.



EXECUTIVE SUMMARY

GLOBAL OVERVIEW

Renewable energy continued to grow in 2014 against the backdrop of increasing global energy consumption, particularly in developing countries, and a dramatic decline in oil prices during the second half of the year. Despite rising energy use, for the first time in four decades, global carbon emissions associated with energy consumption remained stable in 2014 while the global economy grew; this stabilisation has been attributed to increased penetration of renewable energy and to improvements in energy efficiency.

Globally, there is growing awareness that increased deployment of renewable energy (and energy efficiency) is critical for addressing climate change, creating new economic opportunities, and providing energy access to the billions of people still living without modern energy services. Although discussion is limited to date, renewables also are an important element of climate change adaptation, improving the resilience of existing energy systems and ensuring delivery of energy services under changing climatic conditions.

Renewable energy provided an estimated 19.1% of global final energy consumption in 2013, and growth in capacity and generation continued to expand in 2014. Heating capacity grew at a steady pace, and the production of biofuels for transport increased for the second consecutive year, following a slowdown in 2011–2012. The most rapid growth, and the largest increase in capacity, occurred in the power sector, led by wind, solar PV, and hydropower.

Growth has been driven by several factors, including renewable energy support policies and the increasing cost-competitiveness of energy from renewable sources. In many countries, renewables are broadly competitive with conventional energy sources. At the same time, growth continues to be tempered by subsidies to fossil fuels and nuclear power, particularly in developing countries.

Although Europe remained an important market and a centre for innovation, activity continued to shift towards other regions. China again led the world in new renewable power capacity installations in 2014, and Brazil, India, and South Africa accounted for a large share of the capacity added in their respective regions. An increasing number of developing countries across Asia, Africa, and Latin America became important manufacturers and installers of renewable energy technologies.

In parallel with growth in renewable energy markets, 2014 saw significant advances in the development and deployment of energy storage systems across all sectors. The year also saw the increasing electrification of transportation and heating applications, highlighting the potential for further overlap among these sectors in the future.

POWER: MORE RENEWABLES CAPACITY ADDED THAN COAL AND GAS COMBINED

Renewables represented approximately 59% of net additions to global power capacity in 2014, with significant growth in all regions. Wind, solar PV, and hydro power dominated the market. By year's end, renewables comprised an estimated 27.7% of the world's power generating capacity, enough to supply an estimated 22.8% of global electricity.

Variable renewables are achieving high levels of penetration in several countries. In response, policymakers in some jurisdictions are requiring utilities to update their business models and grid infrastructure. Australia, Europe, Japan, and North America have seen significant growth in numbers of residential “prosumers”—electricity customers who produce their own power. Major corporations and institutions around the world made substantial commitments in 2014 to purchase renewable electricity or to invest in their own renewable generating capacity.

HEATING AND COOLING: SLOW GROWTH BUT VAST POTENTIAL—KEY FOR THE ENERGY TRANSITION

About half of total world final energy consumption in 2014 went to providing heat for buildings and industry, with modern renewables (mostly biomass) generating approximately 8% of this share. Renewable energy also was used for cooling, a small but rapidly growing sector. The year saw further integration of renewables into district heating and cooling systems, particularly in Europe; the use of district systems to absorb heat generated by renewable electricity when supply exceeds demand; and the use of hybrid systems to serve different heat applications. Despite such innovations and renewables' vast potential in this sector, growth has been constrained by several factors, including a relative lack of policy support.

TRANSPORT: DRIVEN BY BIOFUELS, WITH E-MOBILITY GROWING RAPIDLY

In the transport sector, the primary focus of policies, markets, and industries has been on liquid biofuels. The share of renewables in transportation remains small, with liquid biofuels representing the vast majority. Advances in new markets and in applications for biofuels—such as commercial flights being fuelled by aviation biofuel—continued in 2014. Relatively small but increasing quantities of gaseous biofuels, including biomethane, also are being used to fuel vehicles. Increased electrification of trains, light rail, trams, and both two- and four-wheeled electric vehicles is creating greater opportunities for the integration of renewable energy into transport.

AN EVOLVING POLICY LANDSCAPE

Renewable energy developments in 2014 continued to be shaped largely by government policy. Renewables faced challenges in some countries resulting from policy changes or uncertainties, such as the imposition of new taxes on renewable generation in Europe and the expiration of the US federal production tax credit. However, the number of countries with renewable energy targets and policies increased again in 2014, and several jurisdictions made their existing targets more ambitious—including a rising number with 100% renewable energy or electricity targets. As of early 2015, at least 164 countries had renewable energy targets, and an estimated 145 countries had renewable energy support policies in place.

Policymakers continued to focus on adapting existing policies to keep pace with rapidly changing costs and circumstances. Recent trends include merging of components from different policy mechanisms; a growing linkage of support between the electricity, heat, and transport sectors; and development of innovative mechanisms to integrate rising shares of renewables into the energy mix.

RENEWABLE ENERGY POLICIES FOR ELECTRICITY

Combined policies to accompany structural changes

Policymakers have focused predominantly on the power sector, a trend that has shaped the current landscape. Feed-in and Renewable Portfolio Standards (RPS) policies remain the most commonly used support mechanisms. Feed-in policies have been enacted in 108 jurisdictions at the national or state/provincial level. Egypt was the only country to add a new national FIT, with policymakers—particularly in Europe—continuing the recent trend of amending existing policies. RPS policies are most popular at the state and provincial levels; they are in place in at least 27 countries at the national level and in 72 states/provinces. However, existing RPS policies continued to face opposition in several US States. Tendering has been utilised increasingly around the world; at least 60 countries had held renewable energy tenders as of early 2015. Net metering or net billing policies are in force in 48 countries, and some form of financial support for renewables is in place in an estimated 126 countries.

Traditional mechanisms also are being used to increase energy storage capacity and to modernise grid infrastructure. In addition to traditional support mechanisms, green banks and green bonds represent innovative options that are gaining support from policymakers. Despite the growing prominence of renewable energy support policies for power generation globally, however, charges or fees on renewable energy have been introduced in an increasing number of countries.

RENEWABLE ENERGY POLICIES FOR HEATING AND COOLING

Less-prevalent than policies for renewable power

Policies for renewable heating and cooling are slowly gaining attention from national policymakers. An estimated 45 countries worldwide had targets for renewable heating or cooling in place by early 2015. Financial incentives continued to be the most widely enacted form of policy support for renewable heating and cooling systems, with several schemes reintroduced and existing programmes strengthened. Other policy tools include solar-specific renewable heat mandates, which were in place in 11 countries at the national or state/provincial level, and technology-neutral mandates, which were in place in an additional 10 countries by early 2015.

RENEWABLE ENERGY TRANSPORT POLICIES

Renewable transport is on the move

The majority of transport-related policies continued to focus on the biofuel sector and on road transport, although other modes of transportation also are attracting attention. Policies promoting the linkage between electric vehicles and renewable energy have received little focus to date. As of early 2015, biofuel blend mandates were in place in 33 countries, with 31 national mandates and 26 state/provincial mandates. A number of countries strengthened existing blend mandates in 2014; however, the debate over the sustainability of first-generation biofuels continued.

CITY AND LOCAL GOVERNMENT RENEWABLE ENERGY POLICIES

Local municipalities take the lead

Cities continued to lead the way, setting and achieving ambitious targets and helping to drive the trends of national and regional governments. By early 2015, several jurisdictions had 100% renewable energy or electricity targets in place, with the vast majority of targets at the city/local level. Many municipalities already have achieved such targets.

To reach their goals, policymakers in cities around the world continued a growing trend of mandating the use of renewable power generation and renewable heat technologies through building codes. Development of district systems has emerged as an important measure to facilitate the scale-up of renewable energy for heating and cooling. Public-private partnerships are being used increasingly to advance renewable energy deployment, and thousands of US and European municipalities have created community power systems. Policymakers also continued to use their purchasing authority to support local deployment of renewable energy in all economic sectors, including integrating biofuel and electric vehicles into public transportation fleets and developing related support infrastructure.

MARKET AND INDUSTRY TRENDS

Markets for all renewable energy technologies advanced in 2014, with wind power and solar PV taking the lead for capacity additions.

BIOMASS ENERGY: BIOMASS FOR HEAT, POWER, AND TRANSPORT

Bio-heat production remained stable in 2014, increasing 1% over 2013. Composition of bio-heat portfolios continued to vary widely by region, ranging from large-scale production in industry (e.g., in the United States) to vast numbers of residential-scale bio-digesters (e.g., in China). Global bio-power production increased approximately 9%, with China, Brazil, and Japan leading for capacity additions, and the United States and Germany leading for generation (despite comparatively smaller capacity additions).

Liquid biofuel production was up 9% in 2014, reaching its highest level to date. Although the United States and Brazil dominated overall volume, Asia experienced particularly high production growth rates. Policy positively influenced biofuel markets where blending mandates increased demand, but policy uncertainty, particularly in Europe, the United States and Australia, had negative effects on industry. Low oil prices in the second half of the year had some positive effects, particularly in feedstock production, but reduced turnover for some bioenergy businesses.

Trade patterns in both solid and liquid fuels saw some shifts in 2014, with a considerable share of North American wood pellets flowing to Asia, reducing the domination of flows to European markets. The share of traded biofuels destined for Europe declined slightly, while new markets (particularly for fuel ethanol) expanded in other regions.

GEOTHERMAL ENERGY: SLOW BUT STEADY GROWTH

About 640 megawatts (MW) of new geothermal power generating capacity came on line, for a total approaching 12.8 gigawatts (GW), producing an estimated 74 terawatt-hours (TWh) in 2014. The largest share of new geothermal power capacity came on line in Kenya, underscoring the growing emphasis on geothermal energy in East Africa. An estimated 1.1 gigawatts-thermal (GWth) of geothermal direct use (heat) capacity was added in 2014 for a total of 20.4 GWth; output was an estimated 263 petajoules (PJ) in 2014 (73 TWh). Over the past five years, total power capacity has grown at an average annual rate of 3.6%, and heat capacity at an estimated 5.9%. The geothermal industry continues to face significant project development risk; various efforts are under way to ameliorate such risks in developed and developing countries.

HYDROPOWER: STILL GIANT AMONG ITS PEERS

An estimated 37 GW of new hydropower capacity was commissioned in 2014, bringing total global capacity to approximately 1,055 GW. Generation in 2014 is estimated at 3,900 TWh. China (22 GW) installed the most capacity by far, with significant capacity also added in Brazil, Canada, Turkey, India, and Russia. The industry continued innovation towards ever-more flexible, efficient, and reliable facilities. Demand for greater efficiency and lower generating costs have contributed to ever-larger generating units, including some 800 MW turbines. There also is significant demand for refurbishment of existing plants to improve the efficiency of output, as well as environmental performance in the face of new regulatory requirements.

Innovations also include variable speed technology for new and refurbished pumped storage plants, which assist in further integration of variable renewable resources.

OCEAN ENERGY: TEMPERED PROGRESS BUT FULL OF PROMISE

Ocean energy capacity, mostly tidal power generation, remained at about 530 MW in 2014. Virtually all new installations were in some form of pilot or demonstration projects. Two prominent wave energy development companies faced strong headwinds. The EU Ocean Energy Forum was launched with the aim of bringing together stakeholders for problem solving and co-operation on ocean energy. Technology development continued in various test sites, with tidal and wave energy devices having advanced the most of all ocean energy technologies to date.

SOLAR PV: RAPID SPREAD TO NEW MARKETS

Solar PV is starting to play a substantial role in electricity generation in some countries as rapidly falling costs have made unsubsidised solar PV-generated electricity cost-competitive with fossil fuels in an increasing number of locations around the world. In 2014, solar PV marked another record year for growth, with an estimated 40 GW installed for a total global capacity of about 177 GW.

China, Japan, and the United States accounted for the vast majority of new capacity. Even so, the distribution of new installations continued to broaden, with Latin America seeing rapid growth, significant new capacity added in several African countries, and new markets picking up in the Middle East. Although most EU markets declined for the third consecutive year, the region—particularly Germany—continued to lead the world in terms of total solar PV capacity and contribution to the electricity supply.

The solar PV industry recovery that began in 2013 continued in 2014, thanks to a strong global market. Consolidation among manufacturers continued, although the flood of bankruptcies seen over the past few years slowed to a trickle. To meet the rising demand, new cell and module production facilities opened (or were announced) around the world.











CONCENTRATING SOLAR THERMAL POWER (CSP): DIVERSIFYING TECHNOLOGIES AND APPLICATIONS

The CSP market remains less established than most other renewable energy markets. Nonetheless, the sector continued its near-decade of strong growth with total capacity increasing 27% to 4.4 GW. Although parabolic trough plants continued to represent the bulk of existing capacity, 2014 was notable for the diversification of technologies in operation, with the world's largest linear Fresnel and tower plants coming on line.

Only the United States and India added CSP facilities to their grids in 2014. However, CSP activity continued in most regions, with South Africa and Morocco the most active markets in terms of construction and planning. Spain remained the global leader in existing capacity.

Stagnation of the Spanish market and an expected deceleration of the US market after a bumper year fuelled further industry consolidation. However, costs are declining, particularly in the global sunbelt, a large variety of technologies are under development, and thermal energy storage (TES) is becoming increasingly important and remains the focus of extensive research and development (R&D).

RENEWABLE ENERGY INDICATORS 2014

		START 2004 ¹	2013	2014
INVESTMENT				
New investment (annual) in renewable power and fuels ²	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) ³	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) ⁴	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
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

¹ Capacity data are as of the beginning of 2004; other data, such as investment and biofuels production, cover the full year. Numbers are estimates, based on best available information.

² Investment data are from Bloomberg New Energy Finance and include all biomass, geothermal, and wind generation projects of more than 1 MW; all hydro projects of between 1 and 50 MW; all solar power projects, with those less than 1 MW estimated separately and referred to as small-scale projects or small distributed capacity; all ocean energy projects; and all biofuel projects with an annual production capacity of 1 million litres or more.

³ The GSR 2014 reported a global total of 1,000 GW of hydropower capacity at the end of 2013; this figure has been revised upwards. Hydropower data do not include pumped storage capacity.

⁴ Solar hot water capacity data include water collectors only. The number for 2014 is a preliminary estimate.


⁵ Data for tendering/public competitive bidding reflect the number of countries that had held tenders at any time up to the year in question, but not necessarily during that year.

⁶ Biofuel policies include policies listed both under the biofuels obligation/mandate column in Table 3 (Renewable Energy Support Policies) and in Reference Table R18 (National and State/Provincial Biofuel Blend Mandates).














Note: All values are rounded to whole numbers except for numbers <15, and biofuels, which are rounded to one decimal point. Policy data for 2014 include all countries identified as of early 2015.

TOP FIVE COUNTRIES

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 in renewable power and fuels per unit 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

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 <i>per capita</i> (among top 20, not including hydro ³)	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 <i>per capita</i>	Germany	Italy	Belgium	Greece	Czech Republic
 Wind power capacity	China	United States	Germany	Spain	India
 Wind power capacity <i>per capita</i>	Denmark	Sweden	Germany	Spain	Ireland
HEAT					
 Solar water collector capacity ²	China	United States	Germany	Turkey	Brazil
 Solar water heating collector capacity <i>per capita</i> ²	Cyprus	Austria	Israel	Barbados	Greece
 Geothermal heat capacity ⁵	China	Turkey	Japan	Iceland	India
 Geothermal heat capacity <i>per capita</i> ⁵	Iceland	New Zealand	Hungary	Turkey	Japan

¹ Countries considered include only those covered by Bloomberg New Energy Finance (BNEF); GDP (at purchasers' prices) and population data for 2013 and all from World Bank. BNEF data include the following: all biomass, geothermal, and wind generation projects of more than 1 MW; all hydropower projects of between 1 and 50 MW; all solar power projects, with those less than 1 MW estimated separately and referred to as small-scale projects or small distributed capacity; all ocean energy projects; and all biofuel projects with an annual production capacity of 1 million litres or more.

² Solar water collector (heating) rankings are for 2013 and are based on capacity of water (glazed and unglazed) collectors only; including air collectors would affect the order of capacity added, placing the United States slightly ahead of Germany rather than in sixth place, and would not affect the order of top countries for total capacity or per capita.

³ Per capita renewable power capacity ranking considers only those countries that place among the top 20 worldwide for total installed renewable power capacity, not including hydropower. Several other countries, including Austria, Finland, Ireland, and New Zealand, also have high per capita levels of non-hydro renewable power capacity, with Iceland likely the leader among all countries.

⁴ Country rankings for hydropower capacity and generation differ because some countries rely on hydropower for baseload supply whereas others use it more to follow the electric load and to match peaks in demand.

⁵ Not including heat pumps.

Note: Most rankings are based on absolute amounts of investment, power generation capacity or output, or biofuels production; if done on a per capita, national GDP, or other basis, the rankings would be quite different for many categories (as seen with per capita rankings for renewable power, solar PV, wind, and solar water collector capacity).

SOLAR THERMAL HEATING AND COOLING: NEW MARKETS GROWING, ESTABLISHED MARKETS SLOWER

Deployment of solar thermal technologies continued to slow, due largely to declining markets in Europe and China. Cumulative capacity of water collectors reached an estimated 406 GWth by the end of 2014 (with air collectors adding another 2 GWth), providing approximately 341 TWh of heat annually. China again accounted for about 80% of the world market for solar water collectors, followed by Turkey, Brazil, India, and Germany. The trend continued towards larger domestic water heating systems in hotels, schools, and other large complexes. There also was growing interest in the use of advanced collectors for district heating systems, solar cooling, and industrial applications, although advanced systems represent a small fraction of the global market.

In much of Asia, parts of Africa, and Latin America, domestic sales expanded, as did distribution channels, in response to strong market growth in certain segments. By contrast, it was a difficult year for the industry in Europe, where consolidation continued. China's industry was troubled by overcapacity due to weak demand in 2014, but China maintained its long-term lead.

WIND POWER: THE CHEAPEST OPTION FOR NEW POWER GENERATION

The global wind power market resumed its advance in 2014, adding a record 51 GW—the most of any renewable technology—for a year-end total of 370 GW. An estimated 1.7 GW of grid-connected capacity was added offshore for a world total exceeding 8.5 GW.

Wind energy is the least-cost option for new power generating capacity in an increasing number of locations, and new markets continued to emerge in Africa, Asia, and Latin America. Asia remained the largest market for the seventh consecutive year, led by China, and overtook Europe in total capacity. The United States was the leading country for wind power generation. Wind power met more than 20% of electricity demand in several countries, including Denmark, Nicaragua, Portugal, and Spain.

After years of operating in the red, most turbine makers pulled back into the black with all the top 10 companies breaking installation records. Turbine designs for use on- and offshore continued to evolve to improve wind's economics in a wider range of wind regimes and operating conditions.



INVESTMENT FLOWS

GLOBAL INVESTMENT UP IN ALL REGIONS

Global new investment in renewable power and fuels (not including hydropower >50 MW) was up 17% over 2013, to USD 270.2 billion. Including the unreported investments in hydropower projects larger than 50 MW, total new investment in renewable power and fuels reached at least USD 301 billion. Renewables outpaced fossil fuels for the fifth year running in terms of net investment in power capacity additions.

This first increase in three years was due in part to a boom in solar power installations in China and Japan, as well as to record investments in offshore wind projects in Europe. All regions of the world experienced an increase relative to 2013. Investment in developing countries was up 36% from the previous year to USD 131.3 billion. Developing country investment came the closest ever to surpassing the investment total for developed economies, which reached USD 138.9 billion in 2014, up only 3% from 2013.

The most significant dollar increase occurred in China, which accounted for almost two-thirds of developing country investment in renewable power and fuels. The Netherlands and Brazil saw the largest percentage increases. Other top countries included the United States, Japan, the United Kingdom, and Germany. Investment continued to spread to new markets throughout 2014, with Chile, Indonesia, Kenya, Mexico, South Africa, and Turkey each investing more than USD 1 billion in renewable energy.

Solar power and wind were the leading technologies by far in terms of dollars committed, with solar power (mostly solar PV) accounting for more than 55% of new investment in renewable power and fuels (not including hydro >50 MW), and wind power taking 36.8%. Both saw significant increases over 2013: solar power investments rose 25% to USD 149.5 billion, and wind advanced 11% (to USD 99.5 billion). Overall, in 2014, more than a quarter of new investment in renewable energy went to small-scale projects (particularly solar PV).

Geothermal power investment grew by 23%, and ocean energy (up 100%) also fared well although from a very low level. Other renewables did less well: biofuels declined 8% to a 10-year low, biomass and waste-to-energy dropped 10%, and small-scale hydropower slipped 17%.

All investment types saw increases over 2013, with asset finance of utility-scale projects accounting for the vast majority of total investment. The year 2014 also saw the creation of two new South-South development banks: the USD 100 billion New Development Bank created by the five BRICS countries, and the Asian Infrastructure Investment Bank created by 23 Asian countries. The expansion of new investment vehicles for renewables—such as green bonds, yield companies, and crowdfunding—have attracted new classes of capital providers and are helping to reduce the cost of capital for financing renewable energy projects.

DISTRIBUTED RENEWABLE ENERGY FOR ENERGY ACCESS

PROVIDING ESSENTIAL AND PRODUCTIVE SERVICES

More than 1 billion people, or 15% of the global population, still lack access to electricity. With a total installed capacity of roughly 147 GW, all of Africa has less power generation capacity than Germany. Moreover, approximately 2.9 billion people lack access to clean forms of cooking. Distributed renewable energy technologies are helping to improve these numbers by providing essential and productive energy services in remote and rural areas across the developing world. Renewable technologies are playing a large and growing role—via individual household systems and by powering a rapidly growing number of mini- and micro-grids—largely because renewables are cheaper and more convenient than conventional options.

In addition to the further spread of existing, well-established technologies (solar home systems, pico-hydro stations, solar thermal collectors, etc.), 2014 witnessed the evolution of new types of equipment, configurations, and applications. These include simple and inexpensive pico-wind turbines for powering remote telecommunications; solar-powered irrigation kits; and digitisation of ancillary services and monitoring, which allow for improved after-sales services and reduce costs so that companies can reach more people.

Several factors have resulted in increased funding (public and private) for distributed renewable energy. These include the increased recognition that isolated cooking and electricity systems, particularly renewable systems, are the most cost-effective options available for providing energy services and new economic opportunities to households and businesses in remote areas.

As such, renewables have become vital elements of rural electrification and clean cooking targets and policies in many countries. Peru was one of the first countries to prepare and implement a reverse auction for distributed renewable energy, finalising a contract in 2014. Several countries initiated new programmes in 2014 to expand energy access through renewables—including Chile, Myanmar, and Sri Lanka advancing renewables for electricity; and Ecuador, Guatemala, Bangladesh, and India launching initiatives to advance clean cooking.

Dozens of international actors were involved in advancing energy access with renewables in 2014, through international initiatives such as Sustainable Energy for All (SE4ALL), as well as through bilateral and multi-lateral government programmes. Multilateral financial institutions and development banks also continued to finance renewable energy projects in 2014. Alongside traditional actors, public-private partnerships and non-governmental organisations are promoting distributed renewables.

Involvement of the private sector is expanding, due largely to a growing awareness that off-grid, low-income customers represent fast-growing markets for goods and services. Distributed renewable systems continued to attract investment from venture capitalists, commercial banks, and companies in 2014, as well as from less-conventional sources.

ENERGY EFFICIENCY: RENEWABLE ENERGY'S TWIN PILLAR

Special synergies exist between energy efficiency and renewable energy sources in both technical and policy contexts, and across numerous sectors from buildings and electrical services to transportation and industry. Although energy intensity (primary energy consumption per unit of economic output) has improved globally and in almost all world regions since 1990, there are vast opportunities to improve energy efficiency further in all sectors and countries.

Drivers for policies to promote efficiency improvements include advancing energy security, supporting economic growth, and mitigating climate change. In poorer countries, increased efficiency can make it easier to provide energy services to those who lack access. To meet such goals, an increasing number of countries has adopted targets and policies to improve the efficiency of buildings, appliances, transport vehicles, and industry.

In 2014, targets were in place at all levels of government, and numerous countries introduced new policies or updated existing ones in order to achieve their targets. Several jurisdictions enacted performance requirements or incentives to improve building efficiency during 2013 and 2014. Standards and labelling programmes are the primary tools to improve the efficiency of appliances and other energy-consuming products, and, by 2014, 81 countries had such programmes. By the end of 2013, standards for electric motors used in industrial applications had been introduced in 44 countries. As of late 2014, vehicle fuel economy standards covered 70% of the world's light-duty vehicle market.

To date, there has been relatively little systematic linking of energy efficiency and renewables in the policy arena. However, a small but growing number of policies has begun to address them in concert, particularly through building-related incentives and economy-wide targets and regulations.



ANNUAL REPORTING ON RENEWABLES: TEN YEARS OF EXCELLENCE

The REN21 *Renewables Global Status Report (GSR)* provides an annual look at the tremendous advances in renewable energy markets, policy frameworks and industries globally. Each report uses formal and informal data to provide the most up-to-date information available. Reliable, timely and regularly updated data on renewables energy are essential as they are used for establishing baselines for decision makers; for demonstrating the increasing role that renewables play in the energy sector; and illustrating that the renewable energy transition is a reality.

This year's GSR marks 10 years of REN21 reporting. Over the past decade the GSR has expanded in scope and depth with its thematic and regional coverage and the refinement of data collection. The GSR is the product of systematic data collection resulting in thousands of data points, the use of hundreds of documents, and personal communication with experts from around the world. It benefits from a multi-stakeholder community of over 500 experts.

Ten years on, the GSR has established itself as the world's most frequently-referenced report on the global renewable energy market, industry and policy landscape.



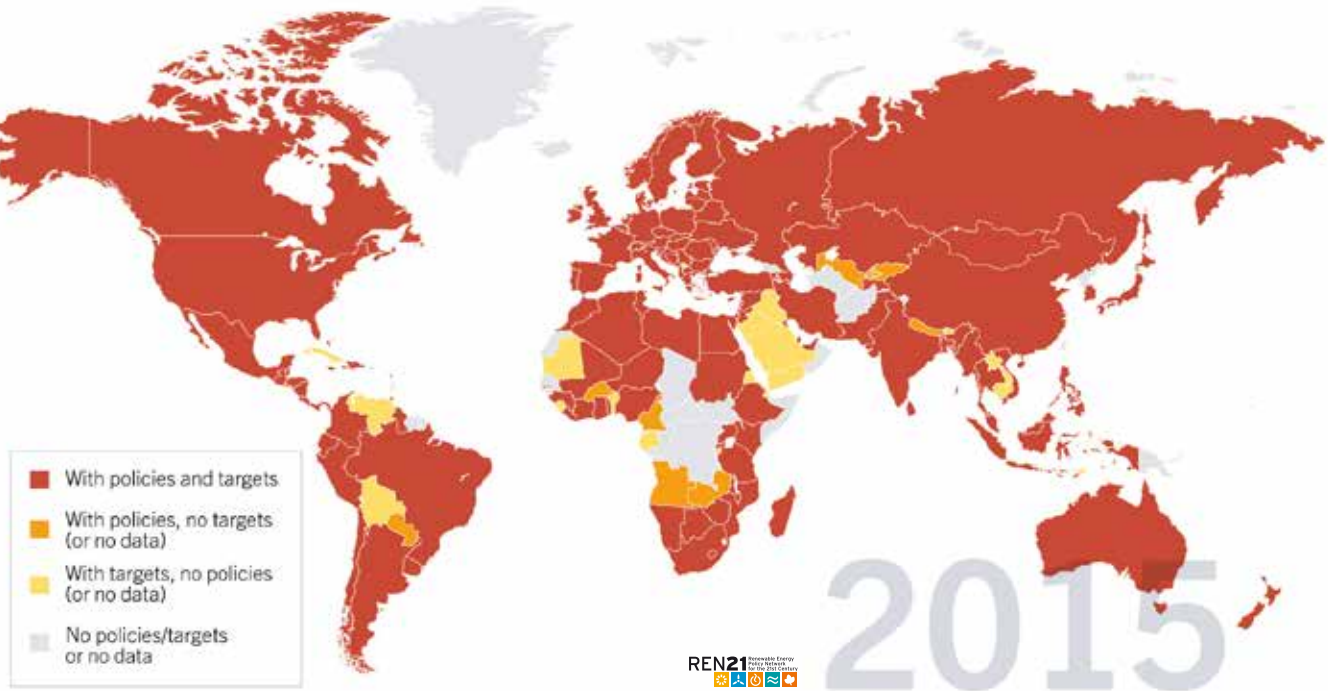
Leading
the Reporting
on Renewables:
Ten years of
counting

10
YEARS

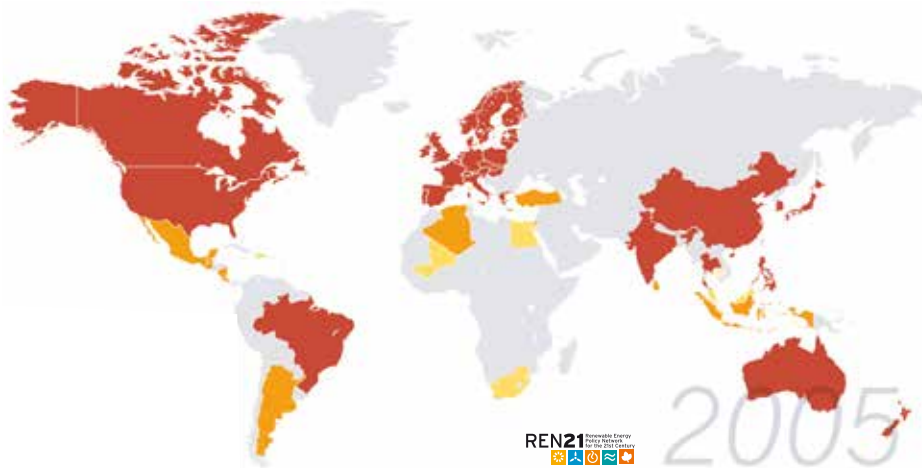
POLICY MAPS

Countries with Renewable Energy Policies and Targets, Early 2015

Countries are considered to have policies when at least one national or state / provincial-level policy is in place.



Countries with Renewable Energy Policies and Targets, 2005



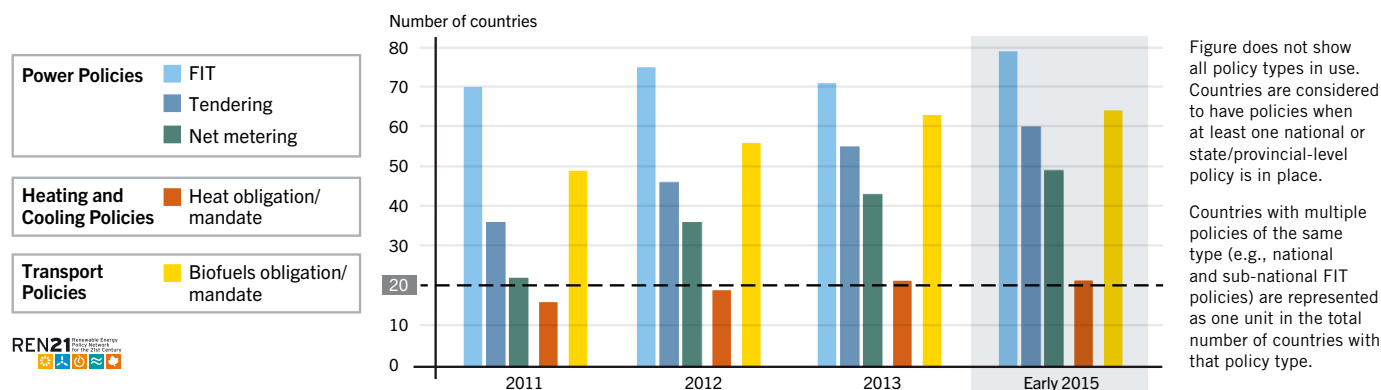
164
COUNTRIES
HAD DEFINED
RENEWABLE
ENERGY TARGETS
BY EARLY 2015



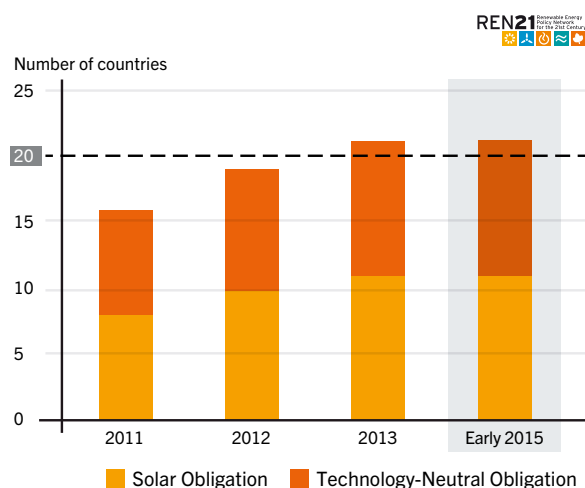
Data Source: REN21 Policy Database

POLICY TRENDS

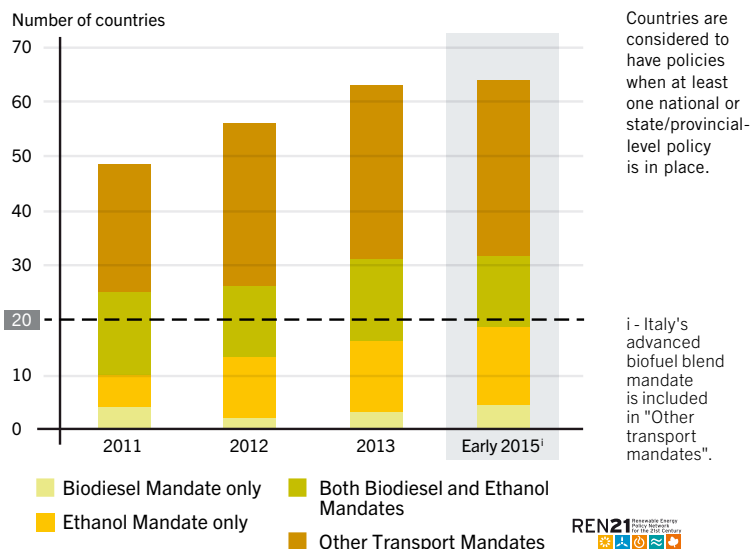
Number of Countries with Renewable Energy Policies, by Type, 2011–Early 2015



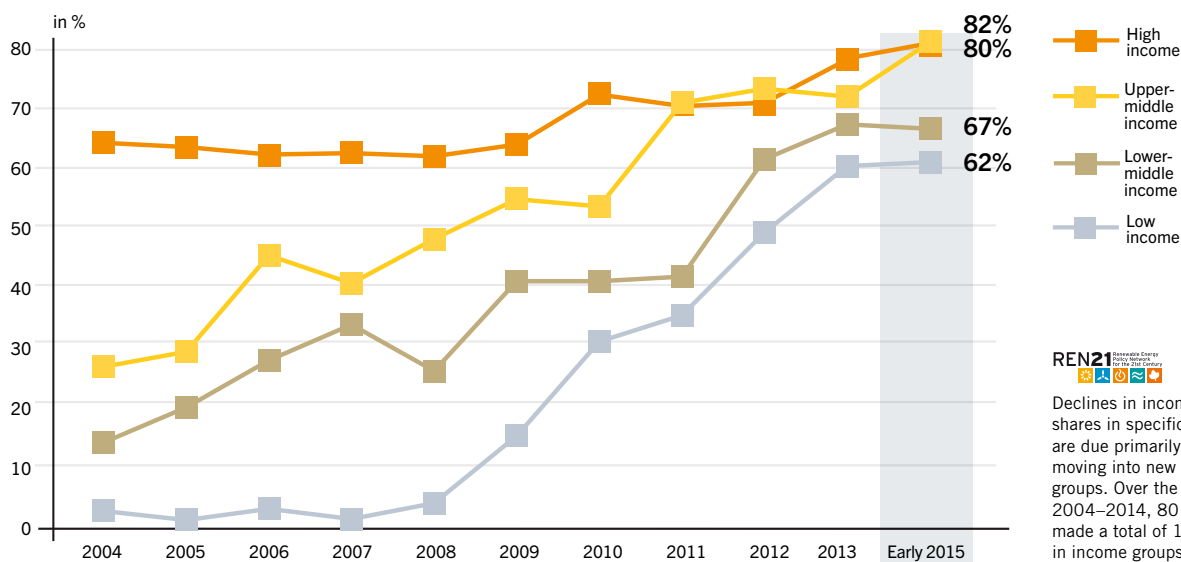
Number of Countries with Renewable Energy Heating and Cooling Obligations, by Type, 2011–Early 2015



Number of Countries with Renewable Energy Transport Obligations, by Type, 2011–Early 2015



Share of Countries with Renewable Energy Policies by Income Group, 2004–Early 2015



MAINSTREAMING RENEWABLES: KEY FINDINGS FOR POLICYMAKERS

Government support policies and increased cost-competitiveness, particularly for electricity generated from wind and solar photovoltaics (PV), have driven recent renewable energy development, resulting in changing market conditions for deployment. Future policies need to respond to emerging opportunities and challenges by addressing new developments, including: the spread of renewable energy deployment to new countries, particularly in the developing world; the need to improve existing energy infrastructure and markets in order to integrate high shares of renewable power; and the increasing electrification of non-power sectors (i.e., heating, cooling, and transport).

As the *Renewables Global Status Report* documents, renewables play an increasingly central role in the provision of energy services to people globally. The challenge now is to develop the necessary policy frameworks to drive the renewable energy transition to achieve sustainable and universal energy access for all.

DEVELOP STABLE AND PREDICTABLE POLICIES THAT CAN ADAPT TO A CHANGING ENVIRONMENT

Stability and predictability of policy frameworks are required to underpin sustained deployment of renewable energy. The renewable energy industry needs predictability in order to attract investment, build up production capacity, develop new technologies, and expand the number of sustainable jobs.

However, policies also need to have a degree of flexibility so that they can accommodate upcoming market developments and avoid unnecessary public spending. It is essential to avoid abrupt changes in the policy environment (for example, sudden reversal of feed-in policies can have major negative impacts for the industry).

Therefore, transitions towards new policy systems require full knowledge of coming changes and sufficient time for the industry to adapt its business models.

SHOWCASE AND COMMUNICATE THE ABILITY OF RENEWABLES TO PROVIDE LARGE-SCALE ELECTRICITY SUPPLY

Many developing countries are under pressure to rapidly increase energy generation capacities to address growing demand, to meet energy access challenges, and to foster economic development. Decision makers faced with such pressures often underestimate the potentially significant and rapid contribution that renewables can make. The successful integration of high shares of renewables in existing infrastructure in China, Denmark, Portugal, Spain, and the United States, for example, demonstrates that the right mix of renewable energy technologies, energy efficiency improvements, and smart management can provide an affordable and reliable power supply.

Communicating and learning from such successes and experiences is important to correct the misperception that baseload power cannot be provided by a mix of renewable energy sources.

CREATE A LEVEL PLAYING FIELD TO INCREASE COST-COMPETITIVENESS

Global subsidies for fossil fuels and nuclear power remain high despite reform efforts. Estimates range from USD 550 billion (International Energy Agency) to USD 5.6 trillion per year (International Monetary Fund), depending on how “subsidy” is defined and calculated.

Growth in renewable energy (and energy efficiency improvements) is tempered by subsidies to fossil fuels and nuclear power, particularly in developing countries. Subsidies keep conventional energy prices artificially low, which makes it more difficult for renewable energy to compete. Artificially low prices also discourage energy efficiency and conservation.

Creating a level playing field can lead to a more-efficient allocation of financial resources, helping to strengthen initiatives to advance the development and implementation of energy efficiency and renewable energy technologies. Removing fossil fuel and nuclear subsidies globally would reflect more accurately the true cost of energy generation.

Where energy or fuel subsidies focus on consumers, particularly in developing countries, subsidies should be shifted towards energy efficiency and renewable energy options.

RENEWABLE POWER: ENERGY SYSTEM THINKING IS REQUIRED

To increase shares of variable solar and wind power generation, a variety of technologies must be integrated into one resilient power supply. Thus, **policy programmes should shift away from single-technology support schemes towards measures that support a balanced combination of diverse technologies.** Policy and regulatory mechanisms must: support/enable more flexible power grids; increase demand-side management; and integrate renewable energy-based power systems with the transport, buildings, industry, and heating and cooling sectors.

Utilities and grid system operators also play an important role in managing demand and generation in renewable energy-dominated energy systems. Demand-side management of industries, transport systems, and households, as well as the operation of distributed generation fleets, require different energy policies to support new business models. The deployment of new technologies to allow for mainstreaming higher shares of dispatchable renewable generation is also necessary and requires new incentives to drive infrastructure investment.

Policymakers should work with utilities and grid system operators, in addition to major energy consumers (e.g., energy-intensive industries), to define new policy mechanisms and regulatory structures.

INCREASE SUPPORT TO THE RENEWABLE HEATING AND COOLING SECTOR

Globally, heating and cooling accounts for almost half of total global energy demand. However, this sector continues to lag far behind the renewable power sector when it comes to policies that support technology development and deployment.

Building obligations (both for energy efficiency improvements and deployment of renewable technologies) are central to increasing the penetration of renewable heating and cooling technologies. In addition to buildings, it is important that there are requirements to integrate renewable energy into industrial and district heating systems. These support not only the development of renewable energy heating, but also the integration of variable power generation, relieving pressure on power grids.

Policymakers at all levels of government need to support the development of renewable heat given the large share of heat in final energy demand. Further development of integrated approaches for the heating and electricity sectors also can contribute to reducing grid pressure.

IMPROVE ACCESS TO FINANCE IN DEVELOPING COUNTRIES

In developing countries, access to financial resources is central to establishing a diversified, stable energy supply. With renewable energy, expansion of the energy supply for all customer groups is becoming increasingly a political and financial challenge, not a technical one. Deployment is often constrained by a lack of available financial resources, high costs of capital, or reluctance on the part of investors.

In order to expand energy markets to reach full energy access, **the public sector needs to ensure political stability, which in turn sends a positive signal to investors.** Public finance mechanisms such as preferential loans and grants as well as loan guarantees can be effective in leveraging private sector investment by overcoming the lack of private financial instruments, facilitating market development, and mitigating risk. Financial instruments can be implemented on both the supply and demand sides, supporting project developers and energy users to drive the evolution of projects to high-capacity deployment. Additionally, acquiring financing and buy-in necessitates trust in the technology, which requires the development of standards, certification, etc. to ensure quality. This is similarly important for developing local industries and the ability to export renewable energy products.

DRIVE GOOD DECISIONS WITH GOOD DATA

Reliable, timely, and regularly updated data are essential for establishing energy plans, defining targets, designing and continuously evaluating policy measures, and attracting investment. The data situation for renewable energy—especially in the power sector—has improved significantly in recent years. Nonetheless, data availability, accessibility, and quality remain limited for distributed renewable energy (including modern renewable heat), in particular. Improved and consolidated data are required to understand market potential, to drive policy development, and to attract investors.

Policymakers should pay particular attention to improving the data situation on distributed renewable energy in developing countries and on renewable energy heating and cooling; due to the decentralised nature of these sectors, both present major data challenges, but they are key to meeting energy access goals and driving the energy transition, respectively. Innovative and collaborative approaches to data collection, processing, and validation are necessary. Informal data are central to closing data gaps, but they require collaboration with new players from a variety of non-energy sectors (such as agriculture, industry, and health), as well as the integration of new methods and approaches for data collection.

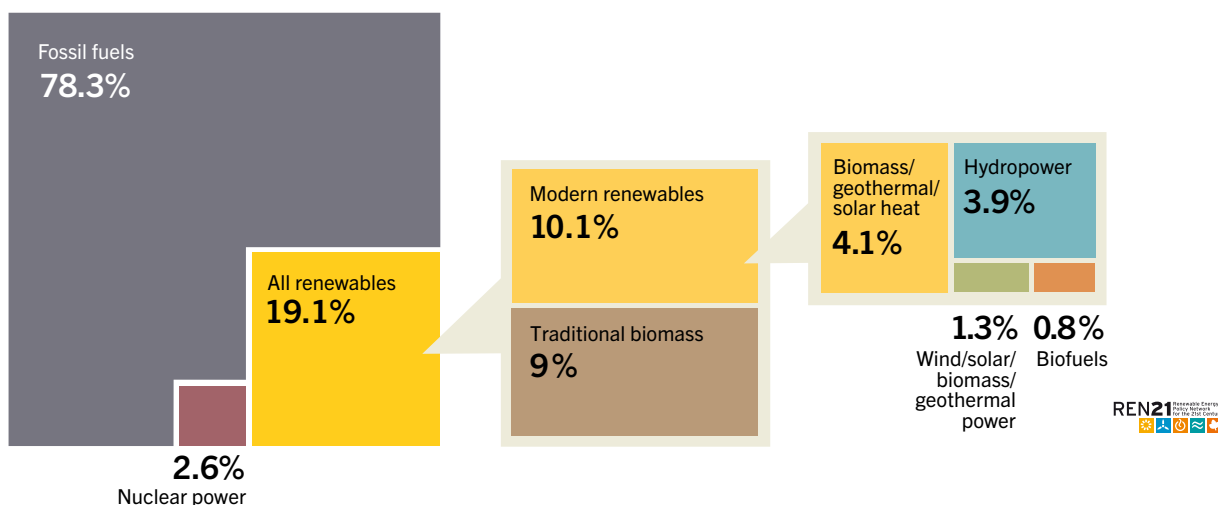
There is a critical need to broaden the definition of renewable energy data, to collect data in a regular and more systematic manner, and to increase transparency.

For decentralised renewable energy for energy access, policymakers and donors need to build into their programmes and activities continuous data collection and reporting.

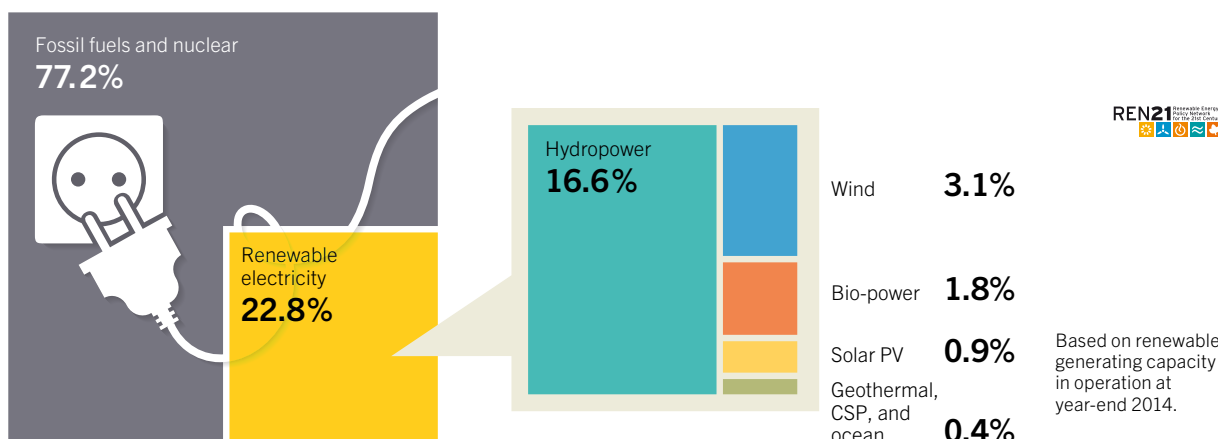


SELECTED FIGURES & TABLES **GSR 2015**

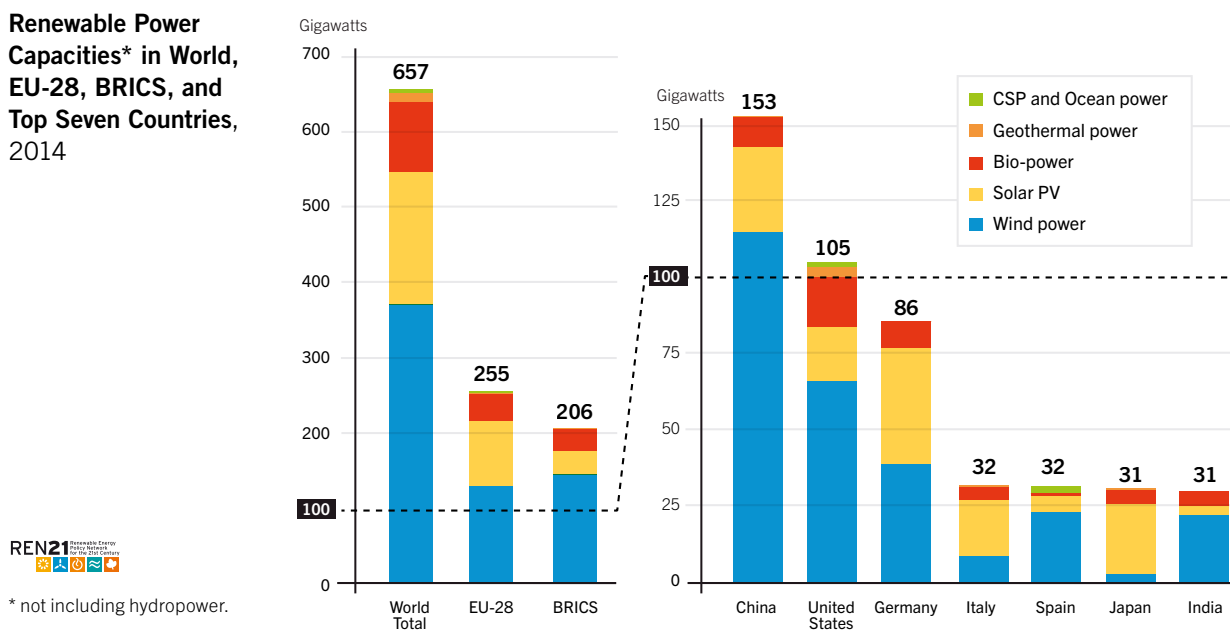
Estimated Renewable Energy Share of Global Final Energy Consumption, 2013



Estimated Renewable Energy Share of Global Electricity Production, End-2014



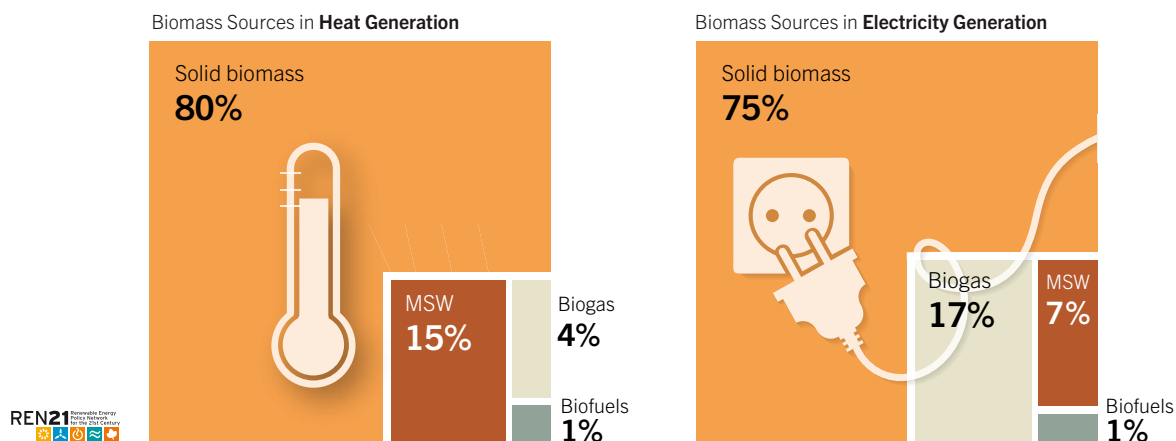
Renewable Power Capacities* in World, EU-28, BRICS, and Top Seven Countries, 2014



* not including hydropower.

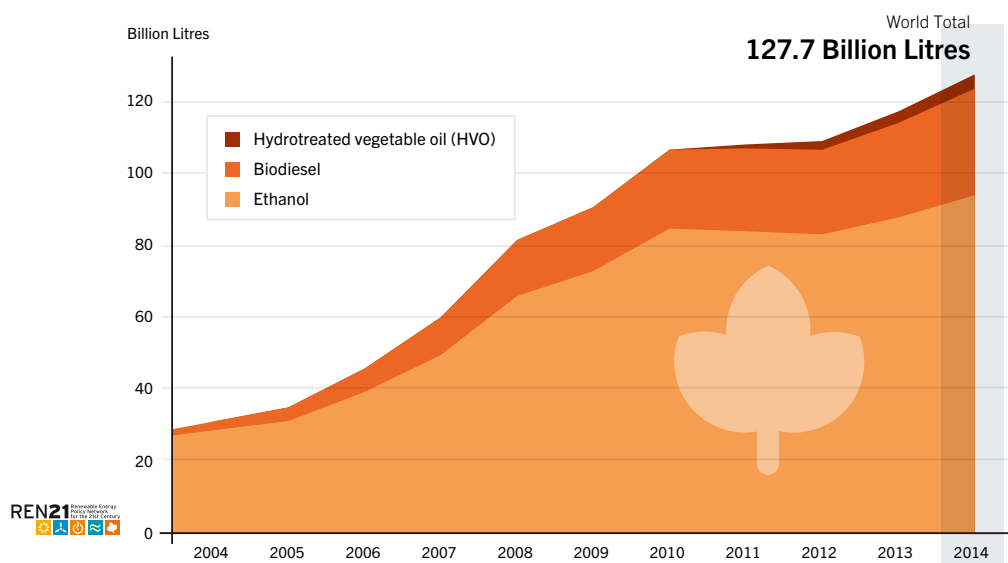
BIOMASS ENERGY

Shares of Biomass Sources in Global Heat and Electricity Generation, 2014

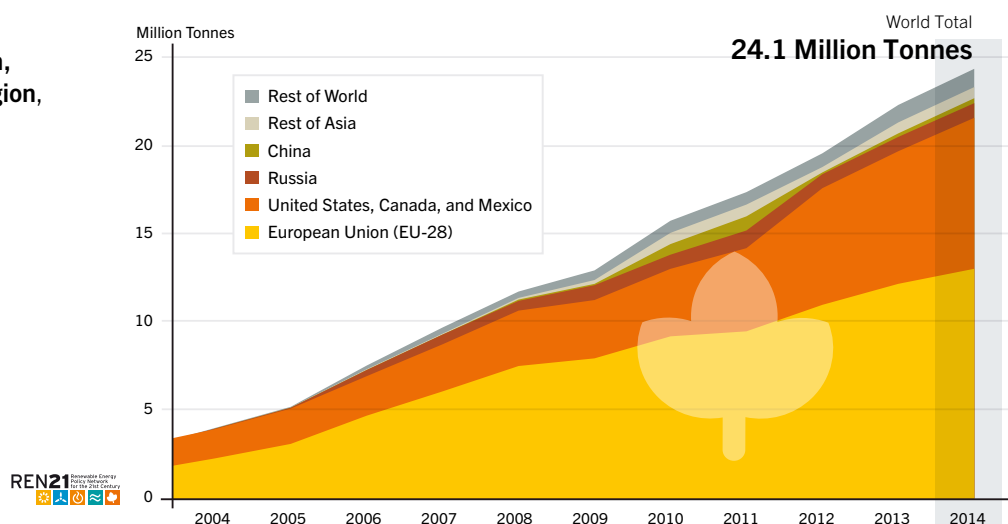


Solid biomass shares include both traditional and modern bioenergy from fuelwood, bagasse, black liquor, animal waste, and others.

Ethanol, Biodiesel, and HVO Global Production, 2004–2014

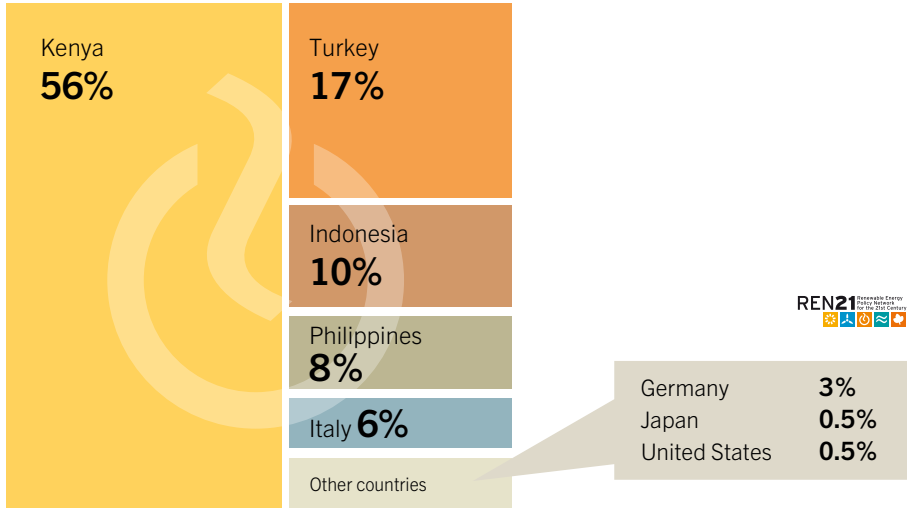


Wood Pellet Global Production, by Country or Region, 2004–2014



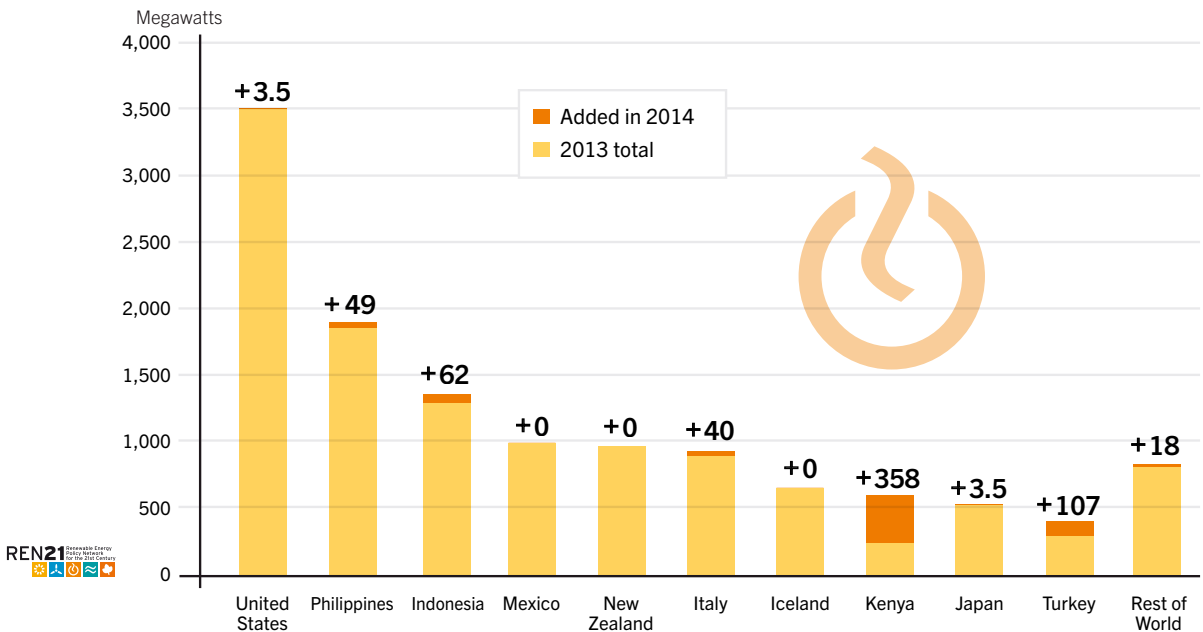
GEOTHERMAL POWER

Geothermal Power Global Capacity Additions, Share by Country, 2014



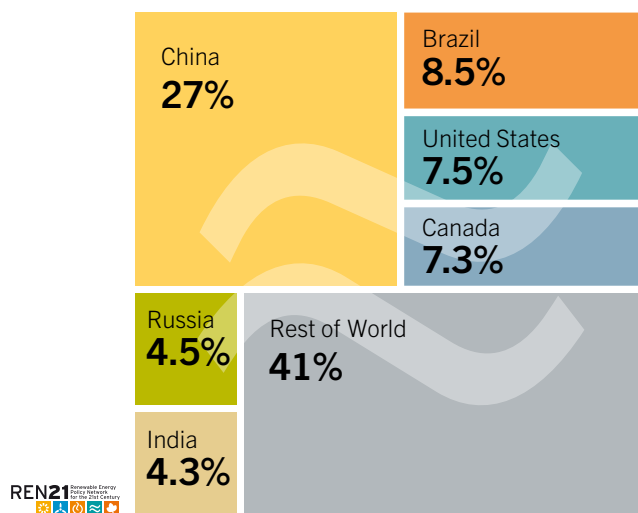
GLOBAL OUTPUT
POWER 74 TWh
THERMAL 73 TWh

Geothermal Power Capacity and Additions, Top 10 Countries and Rest of World, 2014



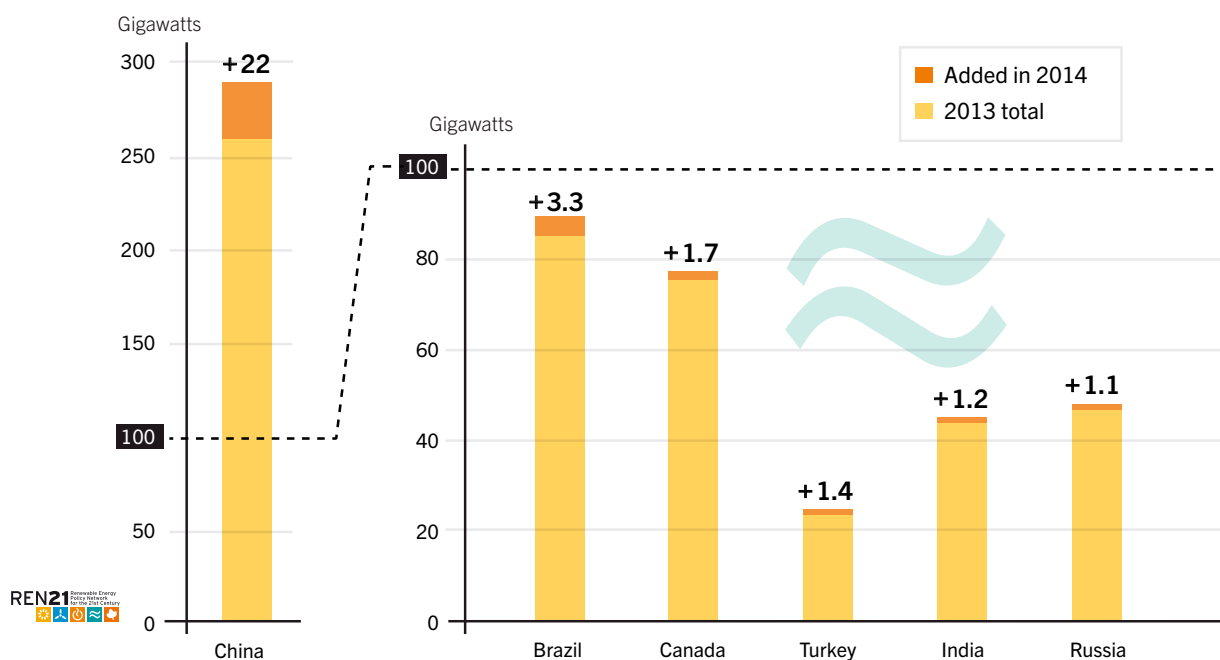
HYDROPOWER

Hydropower Global Capacity, Shares of Top Six Countries and Rest of World, 2014



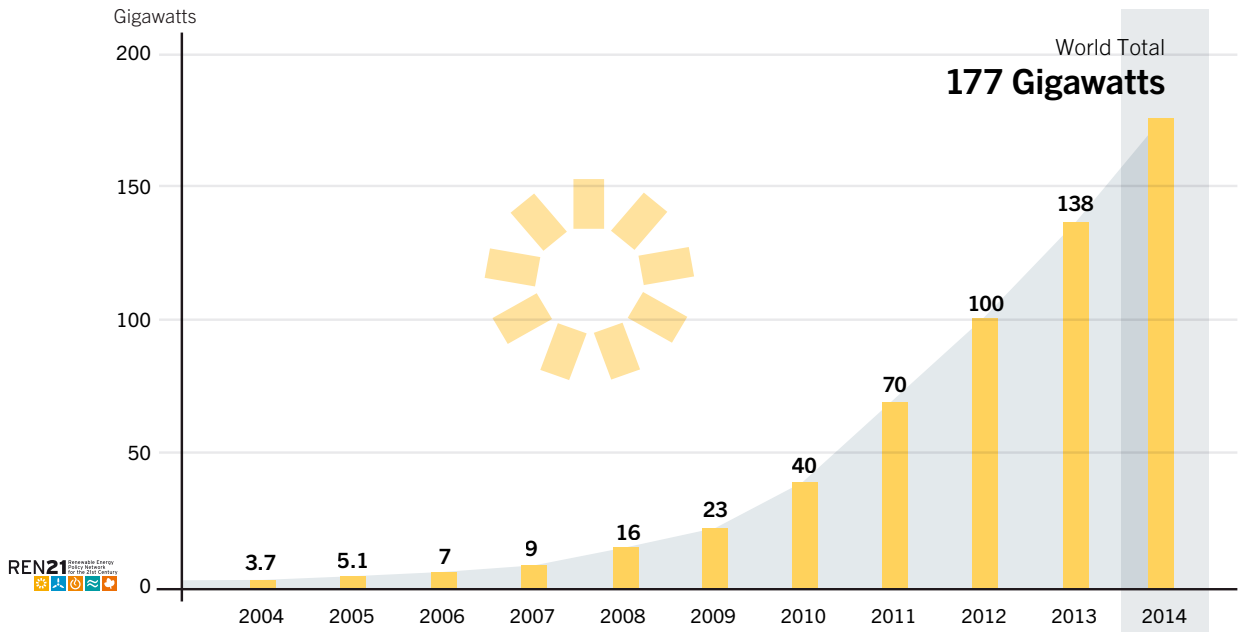
Global capacity reached
1,055 GW

Hydropower Capacity and Additions, Top Six Countries for Capacity Added, 2014



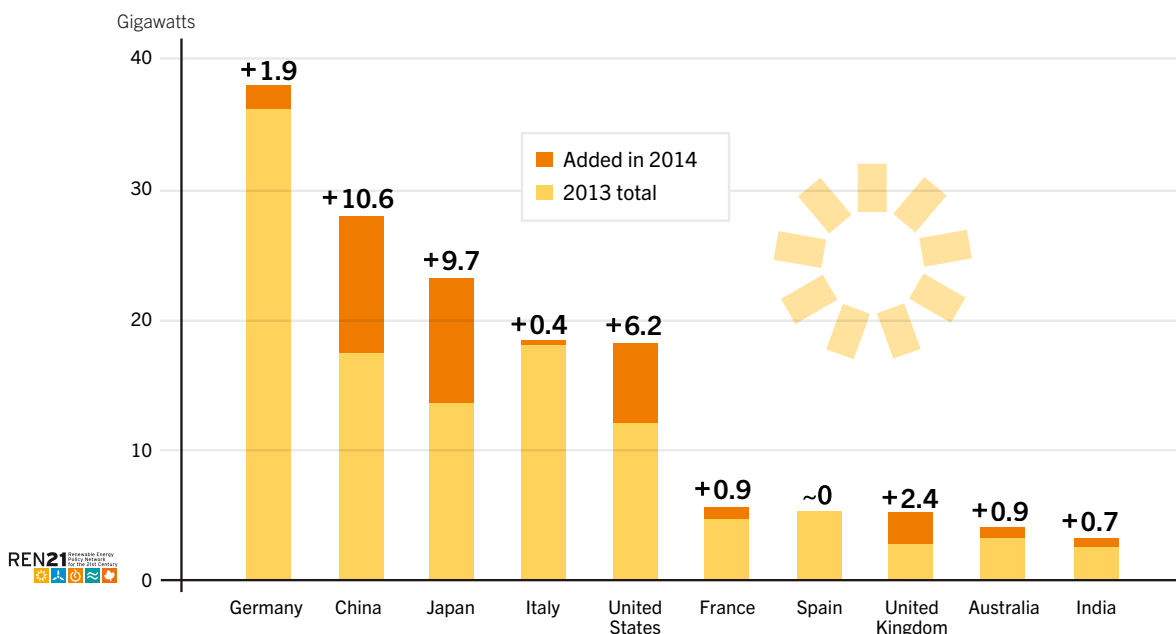
SOLAR PV

Solar PV Global Capacity, 2004–2014



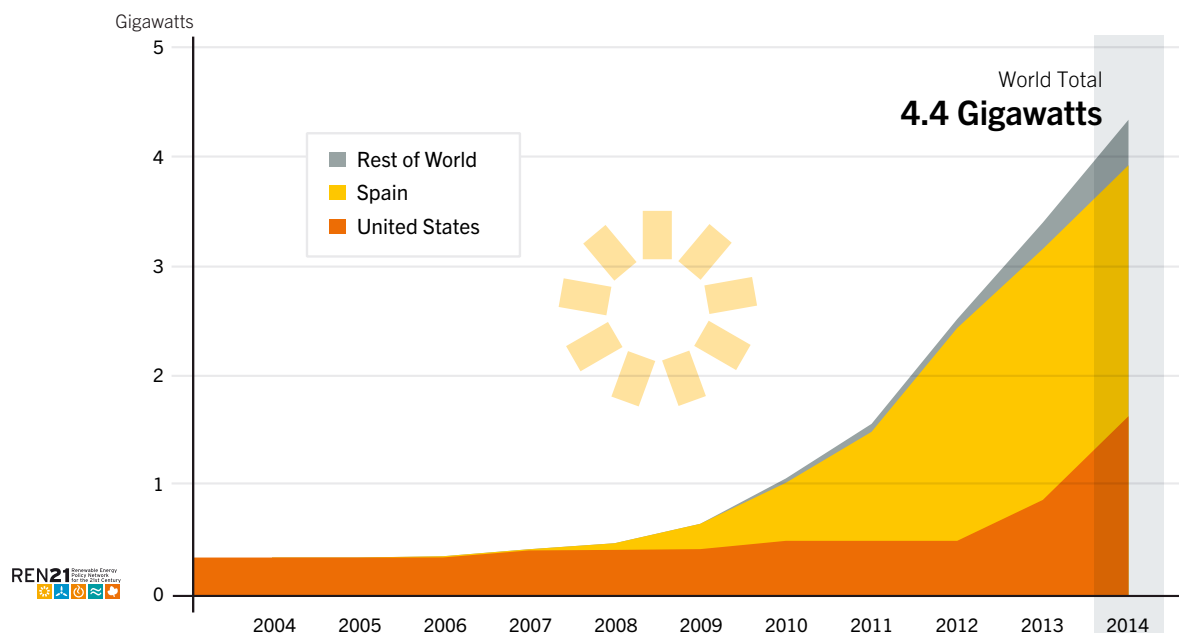
40 GW
added in 2014

Solar PV Capacity and Additions, Top 10 Countries, 2014

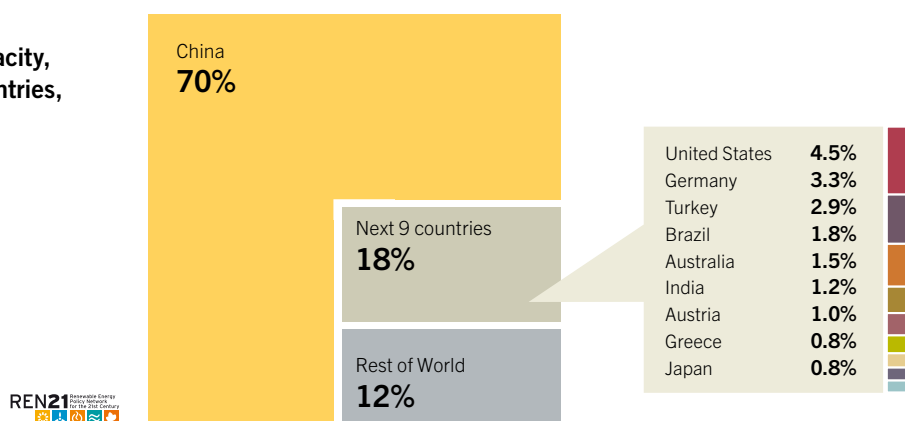


SOLAR THERMAL HEATING & COOLING AND CSP

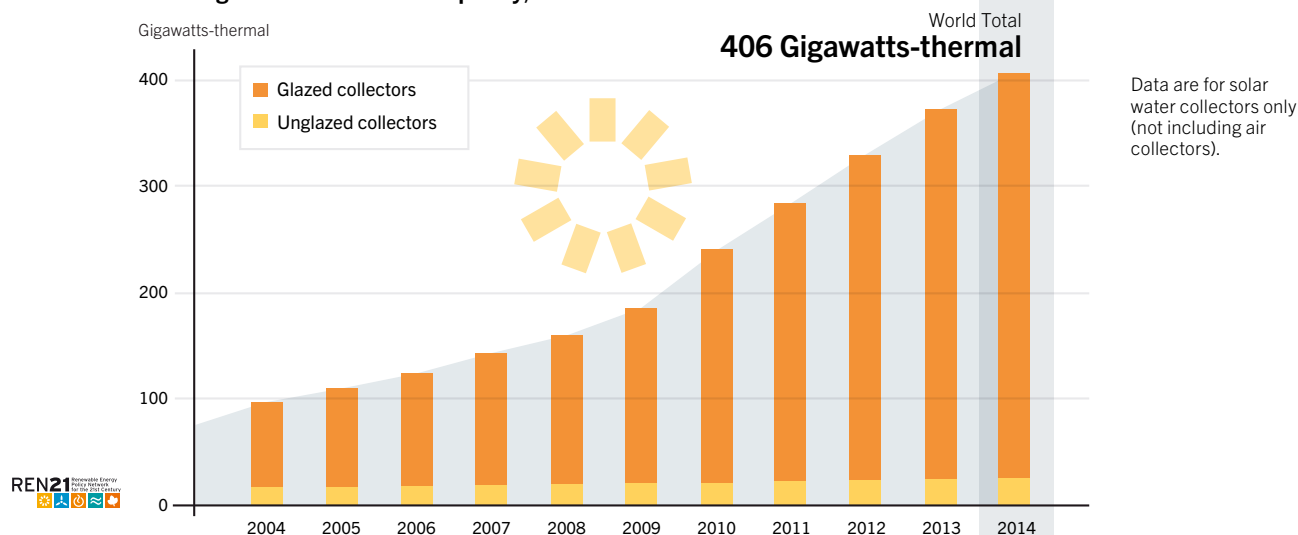
Concentrating Solar Thermal Power Global Capacity, by Country or Region, 2004–2014



Solar Water Heating Collectors Global Capacity, Shares of Top 10 Countries, 2013

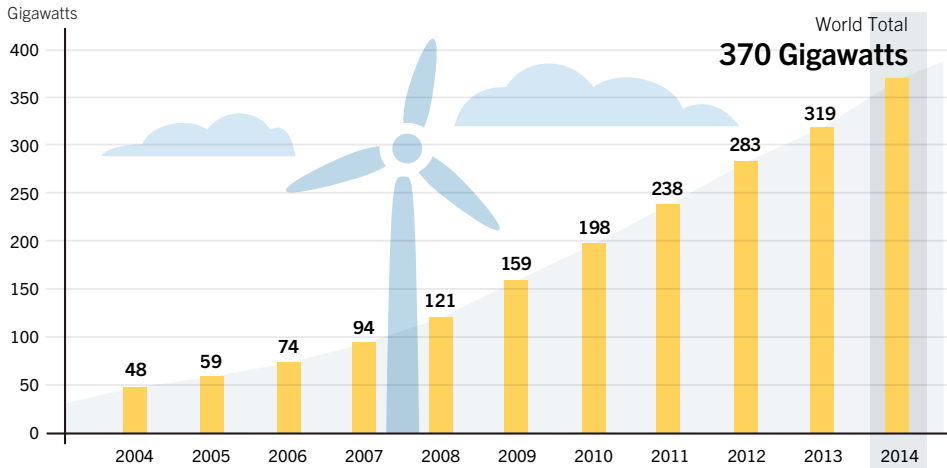


Solar Water Heating Collectors Global Capacity, 2004–2014



WIND POWER

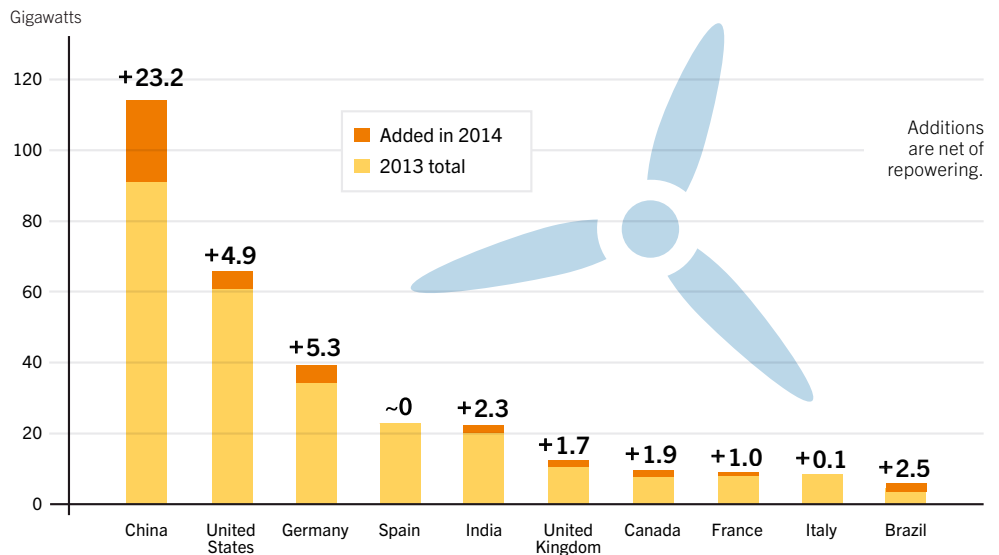
Wind Power Global Capacity, 2004–2014



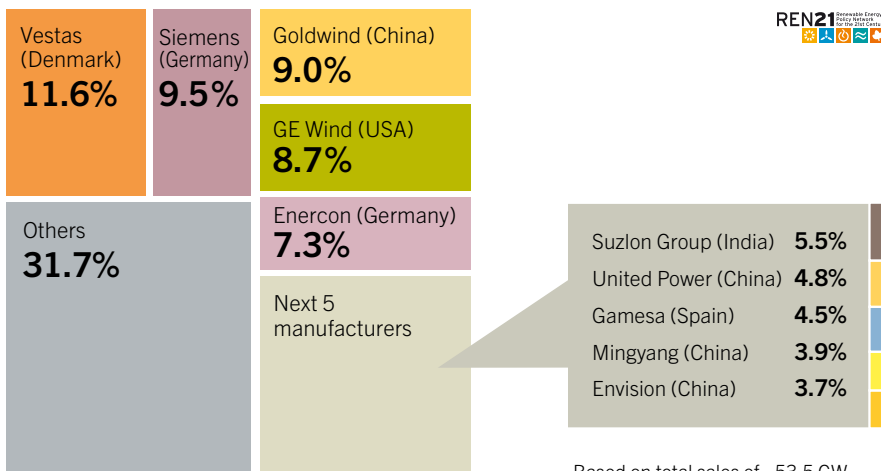
**51 GW
ADDED
in 2014**

Wind
generated more than
20%
of electricity in
several countries, including:
**Denmark,
Nicaragua,
Portugal, and Spain**

Wind Power Capacity and Additions, Top 10 Countries, 2014

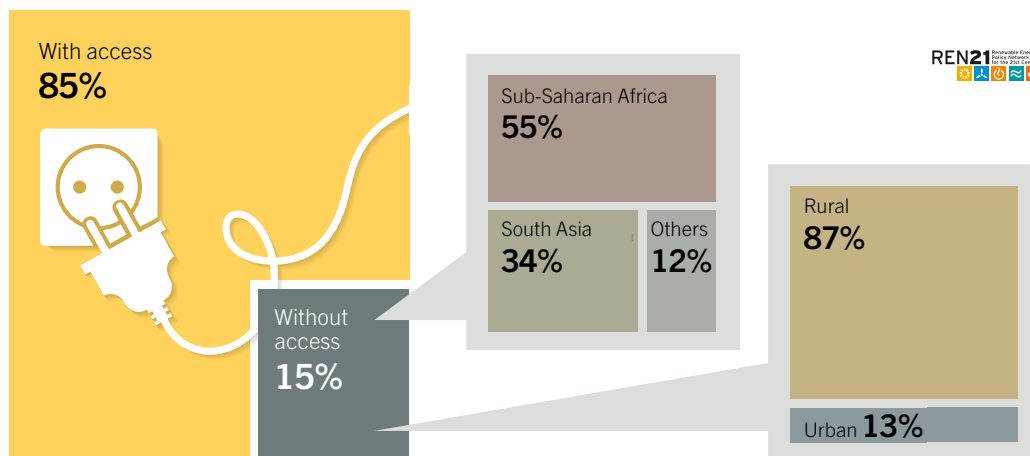


Market Shares of Top 10 Wind Turbine Manufacturers, 2014

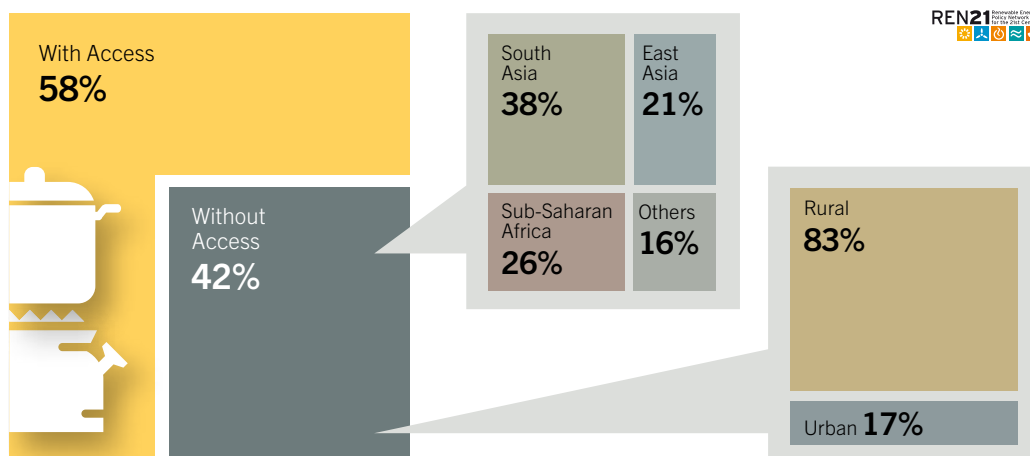


DISTRIBUTED RENEWABLE ENERGY

World Electricity Access and Lack of Access by Region, 2012



World Clean Cooking Access and Lack of Access by Region, 2012



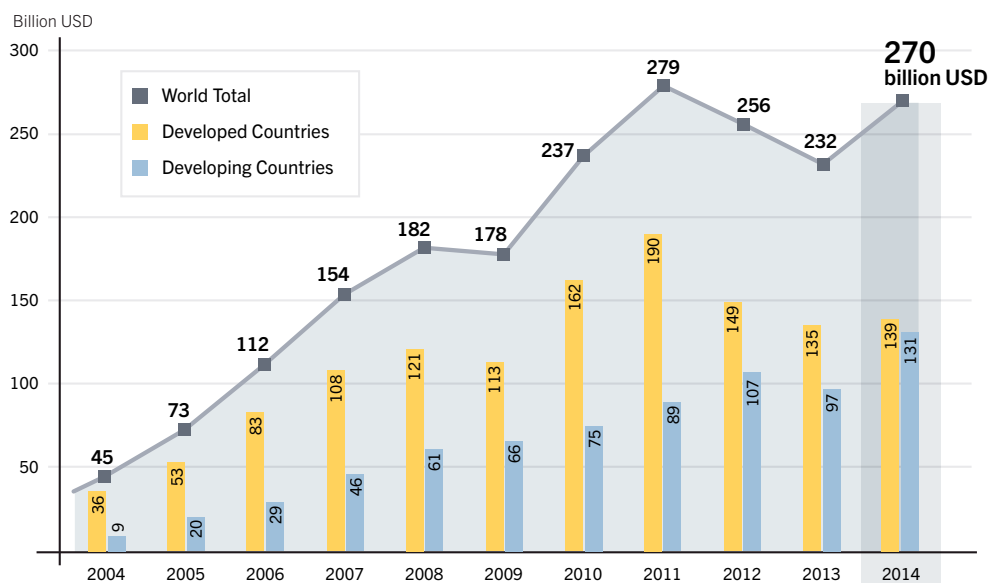
An estimated
1,095,000,000
PEOPLE
 HAVE NO ACCESS
 TO ELECTRICITY



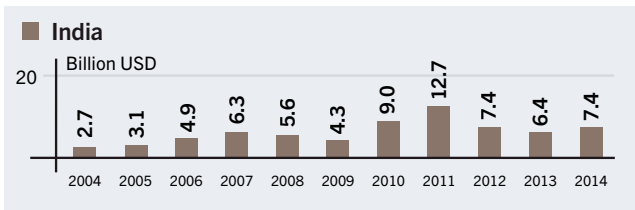
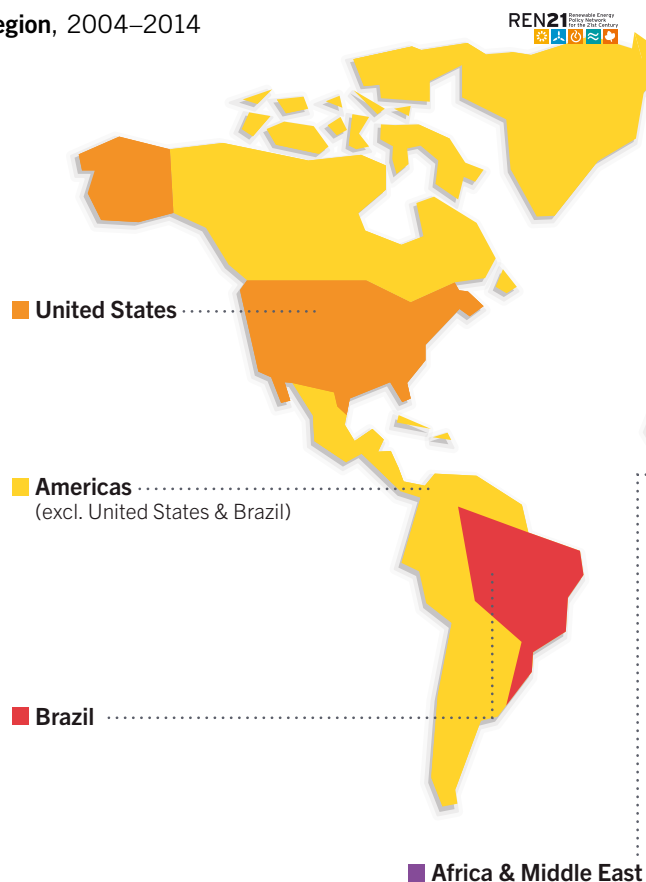
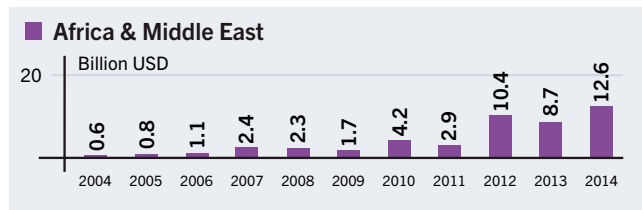
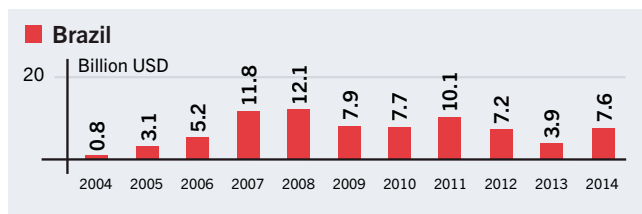
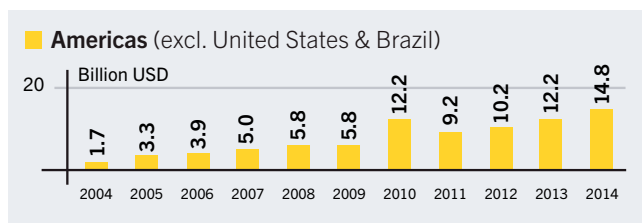
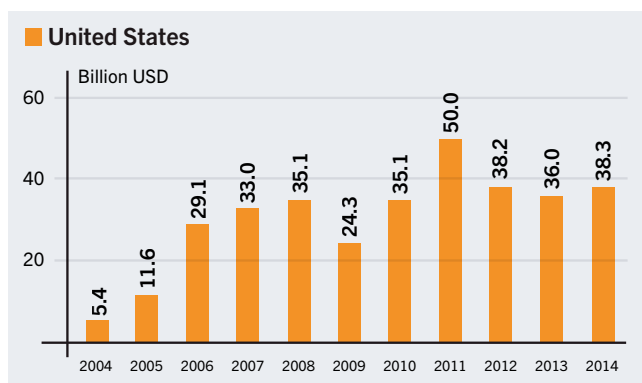
INVESTMENT FLOWS

Global New Investment in Renewable Power and Fuels, Developed and Developing Countries, 2004–2014

Does not include investment in hydropower > 50 MW

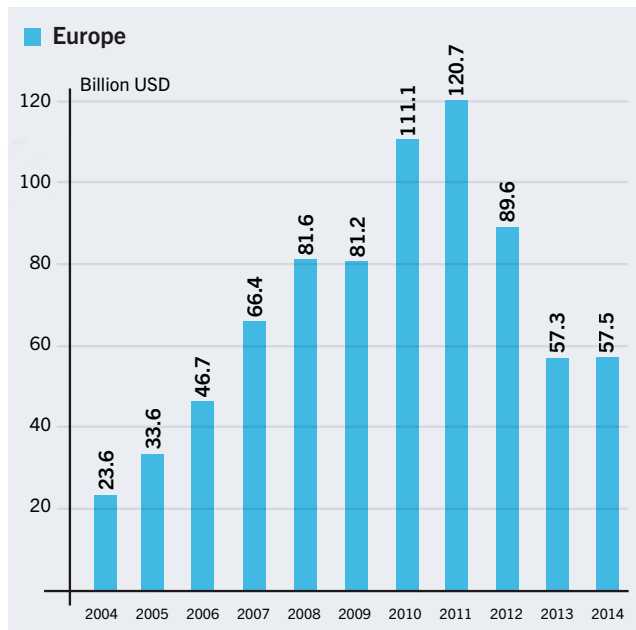
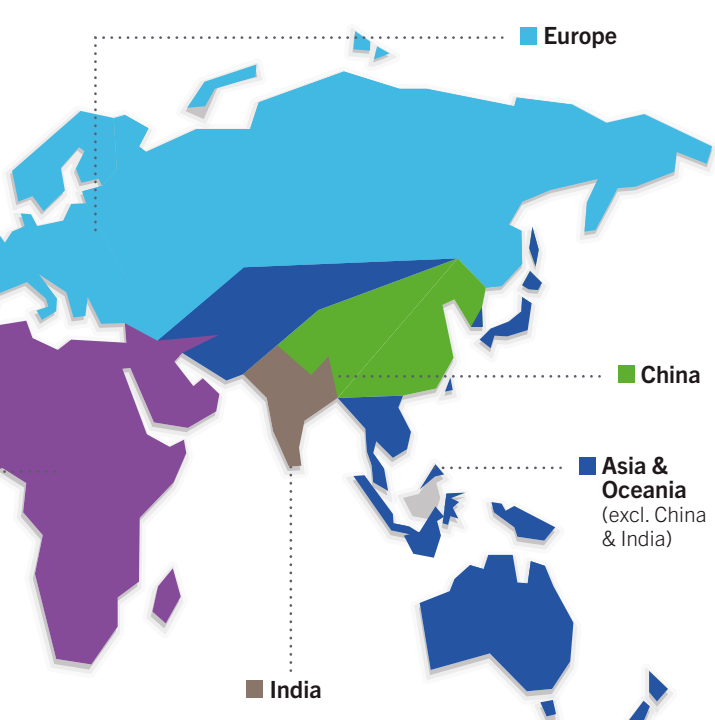
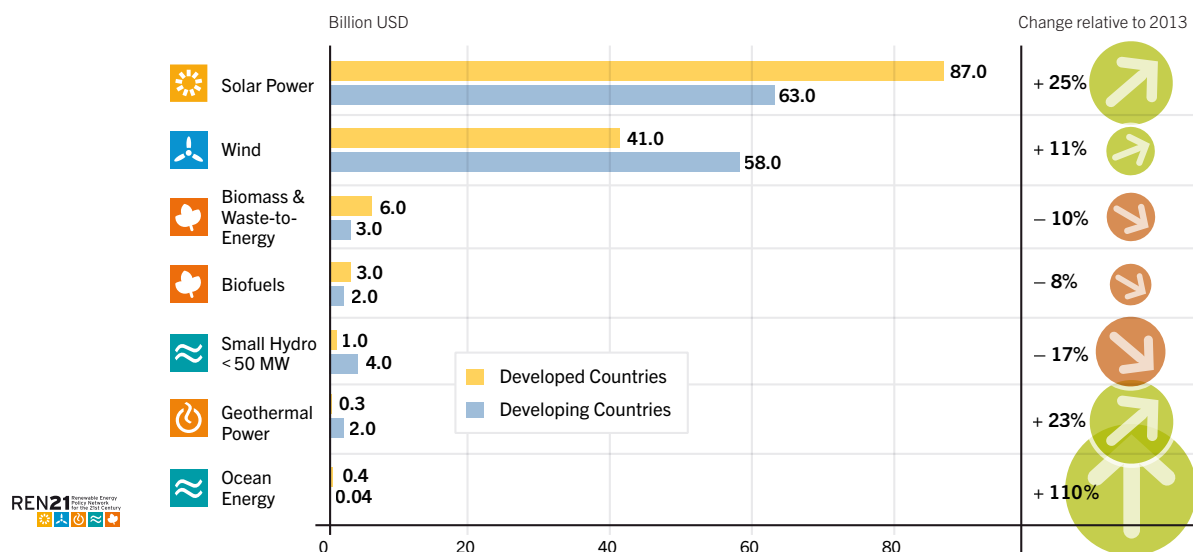


Global New Investment in Renewable Power and Fuels, by Region, 2004–2014

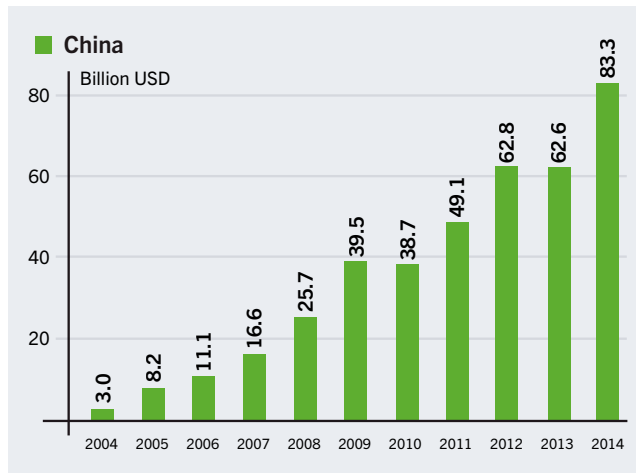
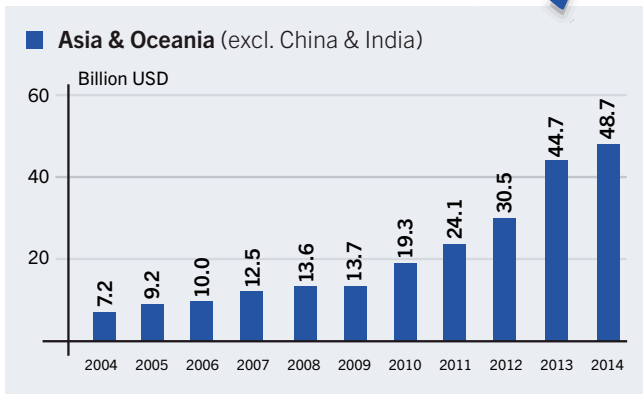


Data source: UNEP FS / BNEF Global Trends in Renewable Energy Investment 2014

Global New Investment in Renewable Energy by Technology, Developed and Developing Countries, 2014

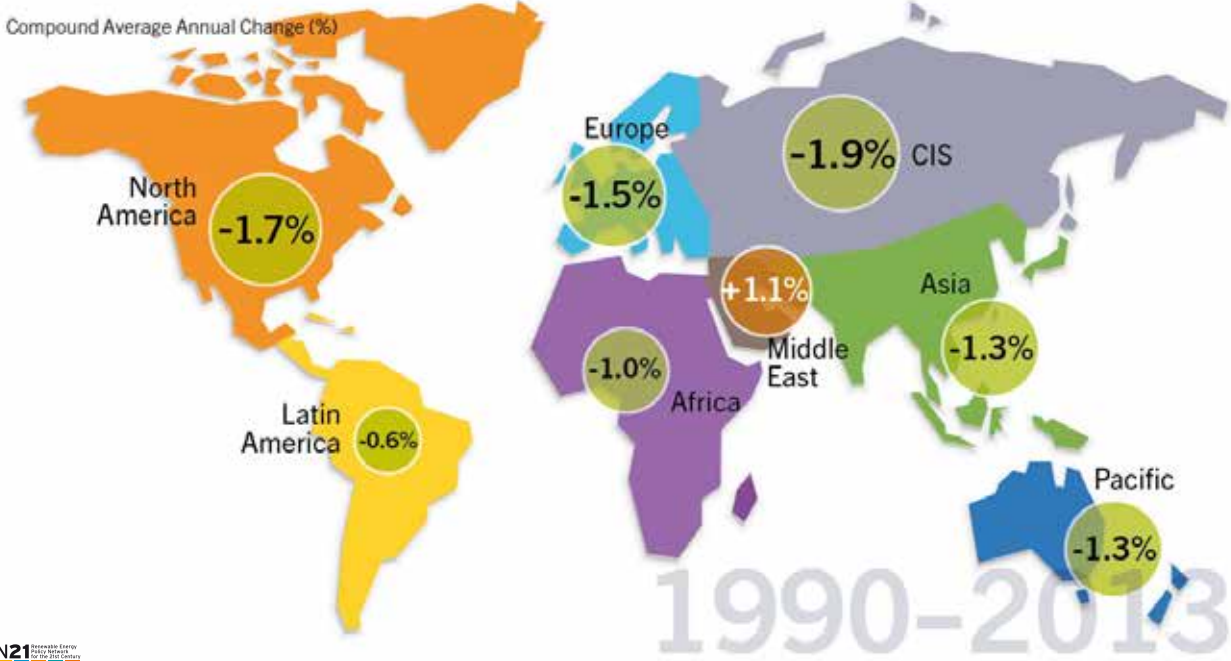
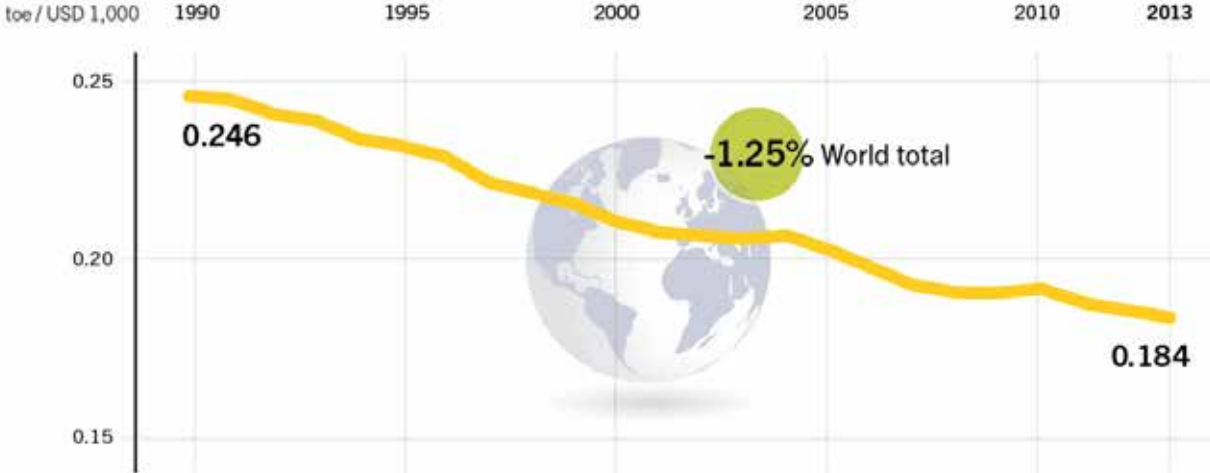


Data include government and corporate R&D



ENERGY EFFICIENCY

Global Energy Intensity, 1990–2013



REN21 Renewable Energy Policy Network for the 21st Century



Energy Intensity in Transportation by Country and Region, 2000, 2005, 2010, and 2013



Energy Intensity in Industry by Country and Region, 2000, 2005, 2010, and 2013



JOBS IN RENEWABLE ENERGY

ESTIMATED DIRECT AND INDIRECT JOBS IN RENEWABLE ENERGY WORLDWIDE, BY INDUSTRY

	World	China	Brazil	United States	India	Japan	Bangladesh	European Union ^j		
								Germany	France	Rest of EU
THOUSAND JOBS										
Biomass ^{a,b}	822	241		152 ^f	58			52	53	238
Biofuels	1,788	71	845 ^d	282 ^g	35	3		26	30	42
Biogas	381	209			85		9	49	3	14
Geothermal ^a	154			35		2		17	33	54
Hydropower (Small) ^c	209	126	12	8	12		5	13	4	24
Solar PV	2,495	1,641			125	210	115	56	26	82
CSP	22			174 ^h				1		14
Solar heating / cooling	764	600	41 ^e		75			11	7	19
Wind power	1,027	502	36	73	48	3	0.1	138	20	162
Total	7,674ⁱ	3,390	934	724	437	218	129	371^k	176	653

Note: Figures provided in the table are the result of a comprehensive review of primary (national entities such as ministries, statistical agencies, etc.) and secondary (regional and global studies) data sources and represent an ongoing effort to update and refine available knowledge. Totals may not add up due to rounding.

a) Power and heat applications (including heat pumps in the case of the European Union). **b)** Traditional biomass is not included. **c)** Although 10 MW is often used as a threshold, definitions are inconsistent across countries. **d)** About 304,400 jobs in sugarcane and 199,600 in ethanol processing in 2013; also includes 200,000 indirect jobs in equipment manufacturing, and 141,200 jobs in biodiesel in 2014. **e)** Equipment manufacturing and installation jobs. **f)** Biomass power direct jobs run only to 15,500. **g)** Includes 232,633 jobs for ethanol and 49,525 jobs for biodiesel in 2014. **h)** All solar technologies combined. **i)** The total for 'World' is calculated by adding the individual totals of the technologies, with 3,600 jobs in ocean energy and 8,300 jobs in publicly funded R&D and administration in Germany. **j)** All EU data are from 2013 and the two major EU countries are represented individually. **k)** Includes 8,300 jobs in publicly funded R&D and administration; not broken down by technology.

Jobs in Renewable Energy



i - Employment information for large-scale hydropower not included.

Data source: IRENA

PRODUCTION & AUTHORING TEAM

RESEARCH DIRECTOR AND LEAD AUTHORSHIP

Janet L. Sawin

Lead Author and Content Editor (Sunna Research)
 Freyr Sverrisson (Sunna Research)
 Wilson Rickerson (Meister Consultants Group)

SECTION AUTHORS

Christine Lins (REN21 Secretariat)
 Evan Musolino (Worldwatch Institute)
 Ksenia Petrichenko (Copenhagen Center on Energy Efficiency, C2E2)
 Wilson Rickerson (Meister Consultants Group)
 Janet L. Sawin (Sunna Research)
 Kristin Seyboth (KMS Research and Consulting)
 Jonathan Skeen
 Benjamin Sovacool (Danish Center for Energy Technology)
 Freyr Sverrisson (Sunna Research)
 Laura E. Williamson (REN21 Secretariat)

PROJECT AND GSR COMMUNITY MANAGEMENT (REN21 SECRETARIAT)

Rana Adib (Coordination)
 Hannah E. Murdock

RESEARCH AND COMMUNICATION SUPPORT (REN21 SECRETARIAT)

Martin Hullin
 Ayla Reith
 Alana Valero
 Laura E. Williamson

EDITING, DESIGN, AND LAYOUT

Lisa Mastny, editor (Worldwatch Institute)
 weeks.de Werbeagentur GmbH, design

PRODUCTION

REN21 Secretariat, Paris, France

SPECIAL ADVISOR

Frank Wouters (Wouters Ltd.)



SUSTAINABLE ENERGY FOR ALL

REN21 is committed to mobilising global action to meet SE4ALL objectives

DISCLAIMER:

REN21 releases issue papers and reports to emphasise the importance of renewable energy and to generate discussion on issues central to the promotion of renewable energy. While REN21 papers and reports have benefitted from the considerations and input from the REN21 community, they do not necessarily represent a consensus among network participants on any given point. Although the information given in this report is the best available to the authors at the time, REN21 and its participants cannot be held liable for its accuracy and correctness.

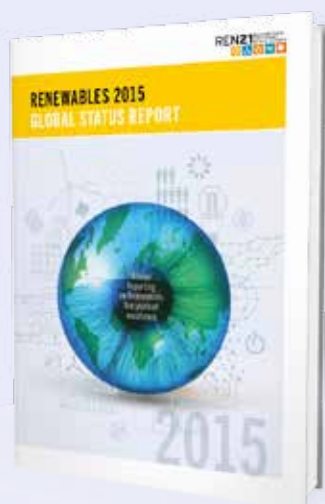
PHOTO CREDITS

Page 5	shutterstock	Page 21	Hydropower as renewable energy source – the Limmernboden reservoir in Switzerland / © Andritz
Page 11	Mac Arthur, Australia / © Courtesy of Vesta Wind System	Page 22	Solar Panels / shutterstock
Page 12	Renewable Energy used to increase energy access in developing countries © ADB	Page 24	Wind power / shutterstock
Page 14	Show the good project, Uganda / © Solar Sisters	Page 25	Renewable Energy used to increase access to education / © OSRAM
Page 14	Mac Arthur, Australia / © Courtesy of Vesta Wind System	Page 28	Biogastadet, Amanda - Biogas supported train, Sweden / © Lasse Hejdenberg and Hejdlösa bilder
Page 17	Installation of solar decentralized renewable energy for energy access / © Soltys	Page 28	Milner Meats, Australia / © Alice Solar City and Clean Energy Council
Page 20	Hellisheiði power plant, Iceland / © Kristján Pétursson		

KEY FINDINGS 2015

RENEWABLES 2015 GLOBAL STATUS REPORT

For further details and access to the full report and references, visit www.ren21.net/gsr



REN21
c/o UNEP
15, Rue de Milan
F-75441 Paris CEDEX 09
France

www.ren21.net

REN21 Renewable Energy
Policy Network
for the 21st Century



ISBN 978-3-9815934-7-1

Printed on 100% recycled paper