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Global View on Solar Heating and Cooling: Market, Industry and Policy - Webinar
29 June 2016
REN21 is a global multi stakeholder network dedicated to the rapid uptake of renewable energy worldwide.

**NGOs:**
ALER, CURES, GFSE, Gogla, Greenpeace, ICLEI, ISEP, Renewable Energy Institute, RCREEE, SLoCaT, WCRE, WFC, WRI, WWF

**Science & Academia:**
IIASA, ISES, NREL, SANEDI, TERI, Fundacion Bariloche

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

**Industry Associations:**
ACORE, ARE, CEC, CREIA, EREF, GSC, GWEC, IGA, IHA, IREF, RES4MED, WBA, WWEA

**National Governments:**
Brazil, Denmark, Germany, India, Norway, Spain, UAE, US, UK
The report features:

- Global Overview
- Market & Industry Trends
- Distributed Renewable Energy for Energy Access
- Investment Flows
- Policy Landscape
- Energy Efficiency
- Feature: Community Renewable Energy

The report covers:

- All renewable energy technologies
- Power, heating & cooling, and transport sectors

Country data available on REN21 Renewables Interactive Map: www.ren21.net/map
REN21 Community

GSR Network: 700 renewable energy, energy access & energy efficiency experts

GSR 2016: 180 experts joined the report process, equivalent to the total number of GSR experts in 2012
An Extraordinary Year for Renewable Energy

147 GW of renewable power capacity added in 2015 – the largest annual increase ever

Renewable heat capacity increased by 38 GWth

Total biofuels production also rose

<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td><strong>INVESTMENT</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>New investment (annual) in renewable power and fuels$^1$</td>
<td>billion USD</td>
<td>273</td>
</tr>
<tr>
<td><strong>POWER</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Renewable power capacity (total, not including hydro)</td>
<td>GW</td>
<td>665</td>
</tr>
<tr>
<td>Renewable power capacity (total, including hydro)</td>
<td>GW</td>
<td>1,701</td>
</tr>
<tr>
<td>Hydropower capacity$^2$</td>
<td>GW</td>
<td>1,036</td>
</tr>
<tr>
<td>Bio-power capacity$^3$</td>
<td>GW</td>
<td>101</td>
</tr>
<tr>
<td>Bio-power generation (annual)</td>
<td>TWh</td>
<td>429</td>
</tr>
<tr>
<td>Geothermal power capacity</td>
<td>GW</td>
<td>12.9</td>
</tr>
<tr>
<td>Solar PV capacity</td>
<td>GW</td>
<td>177</td>
</tr>
<tr>
<td>Concentrating solar thermal power</td>
<td>GW</td>
<td>4.3</td>
</tr>
<tr>
<td>Wind power capacity</td>
<td>GW</td>
<td>370</td>
</tr>
<tr>
<td><strong>HEAT</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Solar hot water capacity$^4$</td>
<td>GWth</td>
<td>409</td>
</tr>
<tr>
<td><strong>TRANSPORT</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ethanol production (annual)</td>
<td>billion litres</td>
<td>94.5</td>
</tr>
<tr>
<td>Biodiesel production (annual)</td>
<td>billion litres</td>
<td>30.4</td>
</tr>
</tbody>
</table>

REN21 Renewables 2016 Global Status Report
Renewable Energy “Champions”
Annual investment/capacity additions/production

<table>
<thead>
<tr>
<th>Top Five Countries – Annual investment / net capacity additions / biofuel production in 2015</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1</strong></td>
</tr>
<tr>
<td><strong>Investment in renewable power and fuels (not including hydropower &gt; 50 MW)</strong></td>
</tr>
<tr>
<td><strong>Investment in renewable power and fuels per unit GDP</strong></td>
</tr>
<tr>
<td><strong>Geothermal power capacity</strong></td>
</tr>
<tr>
<td><strong>Hydropower capacity</strong></td>
</tr>
<tr>
<td><strong>Solar PV capacity</strong></td>
</tr>
<tr>
<td><strong>Concentrating solar thermal power (CSP) capacity</strong></td>
</tr>
<tr>
<td><strong>Wind power capacity</strong></td>
</tr>
<tr>
<td><strong>Solar water heating capacity</strong></td>
</tr>
<tr>
<td><strong>Biodiesel production</strong></td>
</tr>
<tr>
<td><strong>Fuel ethanol production</strong></td>
</tr>
</tbody>
</table>

REN21 Renewables 2016 Global Status Report
Renewable Energy “Champions”
Total capacity or generating as of end-2015

<table>
<thead>
<tr>
<th>POWER</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Renewable power (incl. hydro)</td>
<td>China</td>
<td>United States</td>
<td>Brazil</td>
<td>Germany</td>
<td>Canada</td>
</tr>
<tr>
<td>Renewable power (not incl. hydro)</td>
<td>China</td>
<td>United States</td>
<td>Germany</td>
<td>Japan</td>
<td>India</td>
</tr>
<tr>
<td>Renewable power capacity per capita (among top 20, not including hydro)</td>
<td>Denmark</td>
<td>Germany</td>
<td>Sweden</td>
<td>Spain</td>
<td>Portugal</td>
</tr>
<tr>
<td>Biopower generation</td>
<td>United States</td>
<td>China</td>
<td>Germany</td>
<td>Brazil</td>
<td>Japan</td>
</tr>
<tr>
<td>Geothermal power capacity</td>
<td>United States</td>
<td>Philippines</td>
<td>Indonesia</td>
<td>Mexico</td>
<td>New Zealand</td>
</tr>
<tr>
<td>Hydropower capacity</td>
<td>China</td>
<td>Brazil</td>
<td>United States</td>
<td>Canada</td>
<td>Russia</td>
</tr>
<tr>
<td>Hydropower generation</td>
<td>China</td>
<td>Brazil</td>
<td>Canada</td>
<td>United States</td>
<td>Russia</td>
</tr>
<tr>
<td>CSP</td>
<td>Spain</td>
<td>United States</td>
<td>India</td>
<td>Morocco</td>
<td>South Africa</td>
</tr>
<tr>
<td>Solar PV capacity</td>
<td>China</td>
<td>Germany</td>
<td>Japan</td>
<td>United States</td>
<td>Italy</td>
</tr>
<tr>
<td>Solar PV capacity per capita</td>
<td>Germany</td>
<td>Italy</td>
<td>Belgium</td>
<td>Japan</td>
<td>Greece</td>
</tr>
<tr>
<td>Wind power capacity</td>
<td>China</td>
<td>United States</td>
<td>Germany</td>
<td>India</td>
<td>Spain</td>
</tr>
<tr>
<td>Wind power capacity per capita</td>
<td>Denmark</td>
<td>Sweden</td>
<td>Germany</td>
<td>Ireland</td>
<td>Spain</td>
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<table>
<thead>
<tr>
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<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solar water heating collector capacity</td>
<td>China</td>
<td>United States</td>
<td>Germany</td>
<td>Turkey</td>
<td>Brazil</td>
</tr>
<tr>
<td>Solar water heating collector capacity per capita</td>
<td>Austria</td>
<td>Cyprus</td>
<td>Israel</td>
<td>Barbados</td>
<td>Greece</td>
</tr>
<tr>
<td>Geothermal heat capacity</td>
<td>China</td>
<td>Turkey</td>
<td>Japan</td>
<td>Iceland</td>
<td>India</td>
</tr>
<tr>
<td>Geothermal heat capacity per capita</td>
<td>Iceland</td>
<td>New Zealand</td>
<td>Hungary</td>
<td>Turkey</td>
<td>Japan</td>
</tr>
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</table>

REN21 Renewables 2016 Global Status Report
173 countries had renewable energy targets, and an estimated 146 countries had renewable energy support policies:

→ 114 countries with power policies
→ 66 countries with transport policies
→ 21 countries with H&C policies

Note: Figure does not show all policy types in use. Countries are considered to have policies when at least one national or state/provincial-level policy is in place. Some transport policies include both biodiesel and ethanol; in this case, the policy is counted once in each category (biodiesel and ethanol).

REN21 Renewables 2016 Global Status Report

Source: REN21 Policy Database
Renewables accounted 28.9% of global power generation capacity and 23.7% of global electricity demand.

Renewables made up for 60% of net additions to global power capacity.

Total RE power capacity: 1,849 GW, an increase of almost 9% over 2014.
Energy use for heat accounts for about **half** of total world final energy consumption

RE share of final global heat demand: **approx. 8%**
Transport Sector

Renewable energy accounted for an estimated 4% of global energy demand for road transport in 2013, up from 2% in 2007.
Solar PV

Capacity added: +50 GW
Total capacity: 227 GW

Annual PV market in 2015 was nearly 10 times the world’s cumulative solar PV capacity of a decade earlier.
Wind Power

63 GW of capacity were added

Total capacity: 433 GW

Offshore, an estimated 3.4 GW of grid-connected capacity was added in 2015, for a world total exceeding 12 GW

REN21 Renewables 2016 Global Status Report
Concentrating Solar Thermal Power (CSP)

Total capacity: **4.8 GW**

With **+0.4 GW** added, this represents an increase of 10%.

Markets continue to shift to developing countries.
Solar Thermal Heating and Cooling

Total capacity of water collectors increased by more than 6% in 2015, bringing operating global solar thermal capacity to about $435 \text{ GW}_\text{th}$.

The slowdown in market growth continued in 2015.
Global Investment in Renewable Energy

Global new investment in renewables estimated at **USD 286 billion** in 2015

- A new **record high**
- Increase of **5%** from 2014
- Including hydropower: **USD 328.9 billion**

REN21 Renewables 2016 Global Status Report
Global Investment in Renewable Energy

Developing & emerging countries:
- USD 156 billion
- Increase of 19% compared to 2014

Developed countries:
- USD 130 billion
- Decrease of 8% compared to 2014

Data include government and corporate R&D.

REN21 Renewables 2016 Global Status Report

Source: BNEF
Solar power leading sector for money committed during 2015, receiving more than 56% (**USD 161 billion**) of total new investment in RE

Wind power followed with **USD 109.6 billion** (38.3% of total, up 4%)
Global employment continued to increase by 5% in 2015.

An estimated **8.1 million direct and indirect jobs** in the renewable energy industry.

Leading employers in 2015 were China, Brazil, the United States, and India.
Community Renewable Energy

**Consolidated data** on community initiatives limited

Since 2008, marked rise in initiatives focused on community renewable energy, especially in **Europe**:

- **Europe**: more than **2800** energy co-operatives
- **Germany**: **772**
- **The Netherlands**: **500**

100% Renewable Energy movement and energy autonomy expanding
Energy Efficiency

Increased emphasis on activities to improve energy efficiency in all sectors

→ 146 countries with policies
→ 128 countries with targets

Countries with Energy Efficiency Policies and Targets, 2015

2016

REN21 Renewables 2016 Global Status Report
Renewable energy provided an estimated **19.2%** of global final energy consumption in 2014.

Share of modern renewable energy increased to **10.3%** while the share of traditional biomass was of **8.9%**.
Conclusions

- Largest global capacity additions from renewables to date
- Second year in a row: global carbon emissions associated with energy consumption remained stable while the global economy grew
- Majority of remaining fossil fuel reserves need to be kept in the ground in order to reach 2° climate target
- More emphasis on renewable energy in the heating and cooling as well as transport sectors and on sector-coupling
- Need to build a smarter, more flexible system that accommodates both centralised as well as decentralised generation
Renewable Energy Policy Network for the 21st Century

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