REN21 is the global multi stakeholder network dedicated to the rapid uptake of renewable energy worldwide.

**NGOs:**
- CAN, CEEW, FER, GACC, GFSE, Greenpeace International, ICLEI, ISEP, MFC, SLoCaT, REI, WCRE, WFC, WRI, WWF

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

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

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

**National Governments:**
- Afghanistan, Brazil, Denmark, Germany, India, Norway, South Africa, Spain, UAE, UK, USA
REN21 Renewables 2017 Global Status Report

The report features:

→ Global Overview
→ Market & Industry Trends
→ Distributed Renewable Energy for Energy Access
→ Investment Flows
→ Policy Landscape
→ NEW: Enabling Technologies and Energy Systems Integration
→ Energy Efficiency
→ Feature: Deconstructing Baseload
176 countries had renewable energy targets, and renewable energy auctions were held in 34 countries in 2016 – more than double the year before.

Newly installed renewable power capacity set new records in 2016, with 161 gigawatts (GW) added, increasing the global total by almost 9% relative to 2015. Solar PV was the star performer in 2016, accounting for around 47% of the total additions, followed by wind power at 34% and hydropower at 15.5%.

For the fifth consecutive year, investment in new renewable power capacity was roughly double the investment in fossil fuel generating capacity, reaching USD 249.8 billion.

2016 was the third year in a row where global energy related CO₂ emissions from the energy sector remained stable despite a 3% growth in the global economy and an increased demand for energy.
Another extraordinary year for renewable energy

Total global capacity was up 9% compared to 2015, to more than 2,017 GW at year’s end (921 GW not including hydro)

- Solar PV: 47% of newly installed renewable power capacity in 2016
- Wind: 34%
- Hydropower: 15.5%
As of 2015, renewable energy provided an estimated **19.3%** of global final energy consumption.

Renewable Energy in the World

**Estimated Renewable Energy Share of Total Final Energy Consumption, 2015**

- Fossil fuels: 78.4%
- Nuclear power: 2.3%
- All renewables: 19.3%
  - Modern renewables: 10.2%
  - Traditional biomass: 9.1%
- Biomass/geothermal/solar heat: 4.2%
- Hydropower: 3.6%
- Wind/solar/biomass/geothermal power: 1.6%
- Biofuels for transport: 0.8%

**Source:** REN21 Renewables 2017 Global Status Report
Renewable Energy in the World

Overall share of renewable energy has increased only modestly.

Reasons:

→ Growth of energy demand
→ Decrease of traditional biomass at a slower pace
→ Increase in fossil fuel & nuclear

Growth in Global Renewable Energy Compared to Total Final Energy Consumption, 2004-2014

- Energy demand (TFEC)
- Combined renewables
- Traditional biomass
- Modern renewables
- All renewables, excluding hydropower
- Hydropower
- Traditional biomass
- Fossil and nuclear energy

By year’s end, renewables comprised an estimated 30% of the world’s power generating capacity and 24.5% of global electricity demand.
Modern renewable energy supplies approx. 9% of total global heat demand.

In 2016, the vast majority of renewable heat continued to be supplied by biomass, with smaller contributions from solar thermal and geothermal energy.

Deployment of renewable technologies in this market continued to be constrained by factors such as comparatively low fossil fuel prices and a relative lack of policy support.
In 2016, **liquid biofuels** provided around **4%** of world road transport fuels, which account for the majority of transport energy use.

**Biogas** use in transport grew substantially in the **United States** and continued to gain shares of the transport fuel mix in Europe.

Further **electrification** of the transport sector has the potential to create a **new market** for renewable energy and to facilitate the integration of **variable renewable energy**.
→ **176 countries** had renewable energy **targets**

→ **126 countries** had power policies

→ **68 countries** had transport policies

→ **21 countries** had heating and cooling policies

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**Renewable Energy Policy Landscape**

![Graph showing the number of renewable energy regulatory incentives and mandates by type, 2014-2016.](image)

**Note:** Figure does not show all policy types in use. In many cases countries have enacted additional fiscal incentives or public finance mechanisms to support renewable energy. Heating and cooling policies do not include renewable heat FITs (i.e., in the United Kingdom). Countries are considered to have policies when at least one national or state/provincial-level policy is in place. A country is counted once if it has one or more national and/or state/provincial-level policies. Some transport policies include both biodiesel and ethanol, in this case, the policy is counted once in each category (biodiesel and ethanol). Tendering policies are presented in a given year if a jurisdiction has held at least one tender during that year.

**Source:** REN21 Policy Database.
Global new investment in renewables was USD 241.6 billion in 2016 (-23% compared to 2015).

For the fifth consecutive year, investment in new renewable power capacity was roughly double that in fossil fuel capacity.

Source: BNEF.
Global Investment in Renewable Energy


Note: Data include government and corporate R&D.

Source: BNEF.
An estimated **USD 249.8 billion (63.5%)** was committed to constructing new renewable power plants, compared to:

- **Fossil fuel capacity:** USD 113.8 billion
- **Nuclear capacity:** USD 30 billion

Global Investment in Power Capacity, by Type (Renewable, Fossil Fuel and Nuclear Power), 2012-2016

* CSP, geothermal, small-scale hydropower and ocean energy

Source: BNEF.
Global solar PV capacity totaled **303 GW** (31,000 PV panels every hour)

By end-2016:

- Every continent had installed > **1 GW**
- At least 24 countries had **1 GW** or more of capacity
- At least 114 countries had more than **10 MW**

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**Renewables 2017 Global Status Report**
China added **34.5 GW** (up 126% over 2015), increasing its total solar PV capacity 45% to **77.4 GW**, far more than that of any other country.
Wind Power

55 GW of wind power capacity added

Global total increased 12% to 487 GW

Over 90 countries with commercial wind power activity; 29 countries > 1GW

Wind Power Global Capacity and Annual Additions, 2006-2016

REN21 Renewables 2017 Global Status Report
The global wind power market contracted in 2016.

China added most new installations: **23.4 GW** (significant decline compared to 2015).
16% of the global population lived without electricity - approx. 1.19 billion people

Electricity Access in Developing Countries, 2014

REN21: Renewables 2017 Global Status Report
38% of global population are without clean cooking facilities - approx. 2.7 billion people.
Sales of off-grid solar systems reach **8.1 million** units worldwide.

Sales were highest in sub-Saharan Africa, in particular in East Africa.

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**Sales of Off-Grid Solar Systems in Top 5 Countries, 2015-2016**

<table>
<thead>
<tr>
<th>Country</th>
<th>Total (World)</th>
<th>World Total 2016</th>
<th>India</th>
<th>Kenya</th>
<th>Ethiopia</th>
<th>Uganda</th>
<th>Tanzania</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Million units</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3.1</td>
<td>5.7</td>
<td>1.2</td>
<td>0.8</td>
<td>0.5</td>
<td>0.4</td>
<td>0.4</td>
</tr>
</tbody>
</table>

*Data reported for global sales represent approximately 50% of all sales of off-grid products.*

Source: GOGLA/IFC.
Deployment of mini-grids accelerated in 2016
Market now exceeds USD 200 billion annually
20 million clean cook stoves distributed in 2015, an 18% increase.

China leads in installations.
Asia leads in total installations of domestic biogas plants.

Most are in **China** (42.6 million units at the end of 2016), and **India** (4.7 million units).
USD 223 million raised by PAYG solar PV companies, an increase of about 40% from 2015.
Investment in clean cook stoves increased 28% (to USD 11.5 million) in 2015.
Global primary energy intensity improved by 2.6% from 2010 to 2015, energy intensity declined by an average annual rate of 2.1%.
By end-2016, at least 149 countries had enacted one or more energy efficiency targets.

Of these countries, 56 adopted a new target in 2015 or 2016.
By end-2016, at least 137 countries had enacted some kind of energy efficiency policy.

Of these countries, 48 adopted a new or revised policy in 2016.
Storage can provide **system benefits** and **flexibility** to customers, system managers and utilities.

Can be applied from the **household level to utility-scale**

- Global grid-connected storage capacity in 2016: **156 GW**
- Grid-connected **battery** storage grew by **50%**

**Global Grid-Connected Energy Storage Capacity, by Technology, 2016**

- Pumped storage: **150 GW**
- Thermal storage: **3.1 GW**
- Electrochemical: **1.7 GW**
- Electro-mechanical: **1.6 GW**

**6.4 GW**
Global sales of EVs reached 775,000 units

More than 2 million passenger EVs were on the world's roads by year's end (1% of the light vehicle market)

So far, little linking of renewable energy and electric mobility

Global Passenger Electric Vehicle Market (Including PHEVs), 2012-2016

By the end of 2016, 2 million passenger EVs were on the world's roads. EVs accounted for around 1% of global passenger car sales.
Traditional baseload generators such as coal and nuclear are beginning to lose their economic advantage and may no longer be the first to dispatch energy.

A number of countries and regions – including Denmark, Germany, Uruguay and Cabo Verde – have integrated high shares (from 20-40%) of variable renewable energy.
Global renewable energy transition advancing with record capacity additions and rapidly falling costs – more capacity for less money.

2016 was the third year in a row where decoupling of economic growth and energy-related CO₂ emissions occurred.

However, progress not fast enough to reach Paris Agreement goals.

Better-integrated sectoral planning.

Smarter, more flexible systems integrating variable renewables.

Systems approach: energy efficiency, more use of enabling technologies.
Renewable Energy Policy Network for the 21st Century