RENEWABLES 2018
GLOBAL STATUS REPORT

REN21 Renewable Energy Policy Network for the 21st Century

2018

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Renewables in Heating, Cooling, & Transport
Clean Energy Solutions Center Webinar
21 June 2018

REN21 is a **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

Science & Academia:
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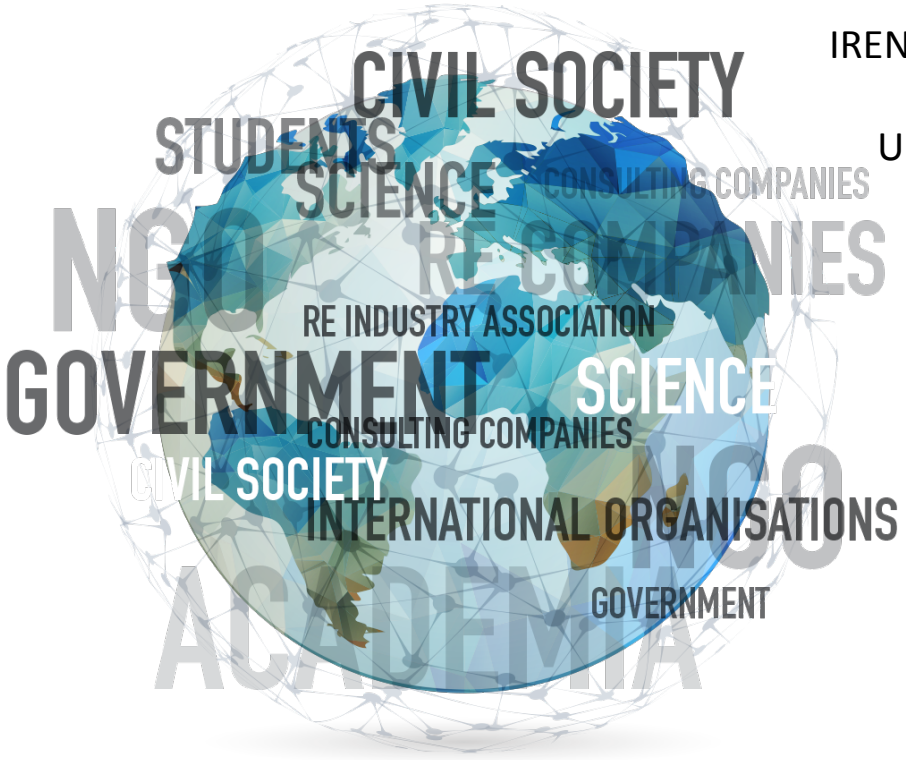
International Organisations:
ADB, APERC, ECREEE, EC, GEF, IEA, IEC, IRENA, RCREEE, UNDP, UN Environment, UNIDO, World Bank



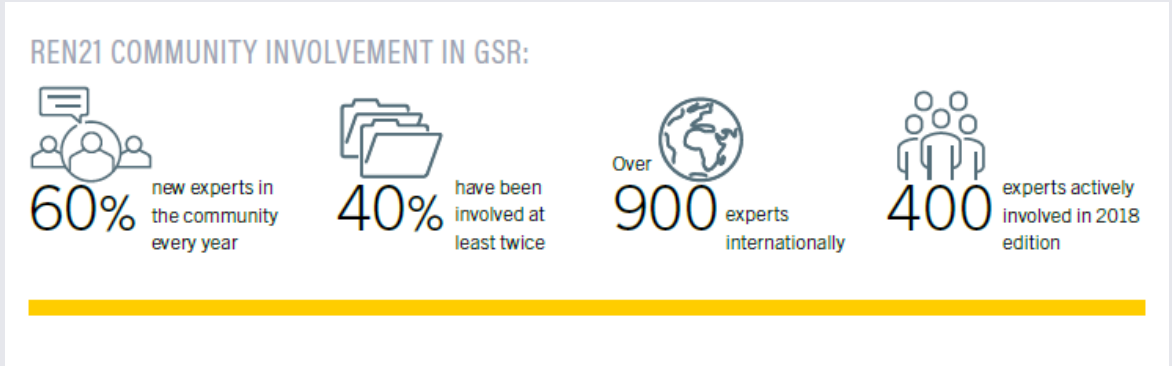
Industry Associations:
ARE, ACORE, ALER, APREN, CREIA, CEC, EREF, GOGLA, GSC, GWEC, IREF, IGA, IHA, RES4MED, WBA, WWEA

National Governments:
Afghanistan, Brazil, Denmark, Germany, India, Norway, South Africa, Spain, UAE, USA

Renewables Global Status Report

Collaborative annual reporting since 2005 building on **international expert community. The report features:**

01. Global Overview
02. Policy Landscape
03. Market & Industry Trends
04. Distributed Renewables for Energy Access
05. Investment Flows
06. Energy Systems Integration and Enabling Technologies
07. Energy Efficiency
08. Feature: Corporate Sourcing of Renewables



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Another Extraordinary Year for Renewable Energy

- **Total global capacity:** up almost **9%** compared to 2016, **2,195 GW** at year's end (**1,081 GW** not incl. hydro)
- Share in **newly installed renewable power capacity:**
  - Solar PV: 55%
  - Wind: 29%
  - Hydropower: 11%
  - Bio-power: 4.6%

RENEWABLE ENERGY INDICATORS 2017

		2016	2017
INVESTMENT			
New investment (annual) in renewable power and fuels[1]	billion USD	274	**279.8**
POWER			
Renewable power capacity (including hydro)	GW	2,017	**2,195**
Renewable power capacity (not including hydro)	GW	922	**1,081**
Hydropower capacity[2]	GW	1,095	**1,114**
Bio-power capacity	GW	114	**122**
Bio-power generation (annual)	TWh	501	**555**
Geothermal power capacity	GW	12.1	**12.8**
Solar PV capacity[3]	GW	303	**402**
Concentrating solar thermal power (CSP) capacity	GW	4.8	**4.9**
Wind power capacity	GW	487	**539**
Ocean energy capacity	GW	0.5	**0.5**
HEAT			
Solar hot water capacity[4]	GW_{th}	456	**472**
TRANSPORT			
Ethanol production (annual)	billion litres	103	**106**
FAME biodiesel production (annual)	billion litres	31	**31**
HVO production (annual)	billion litres	5.9	**6.5**

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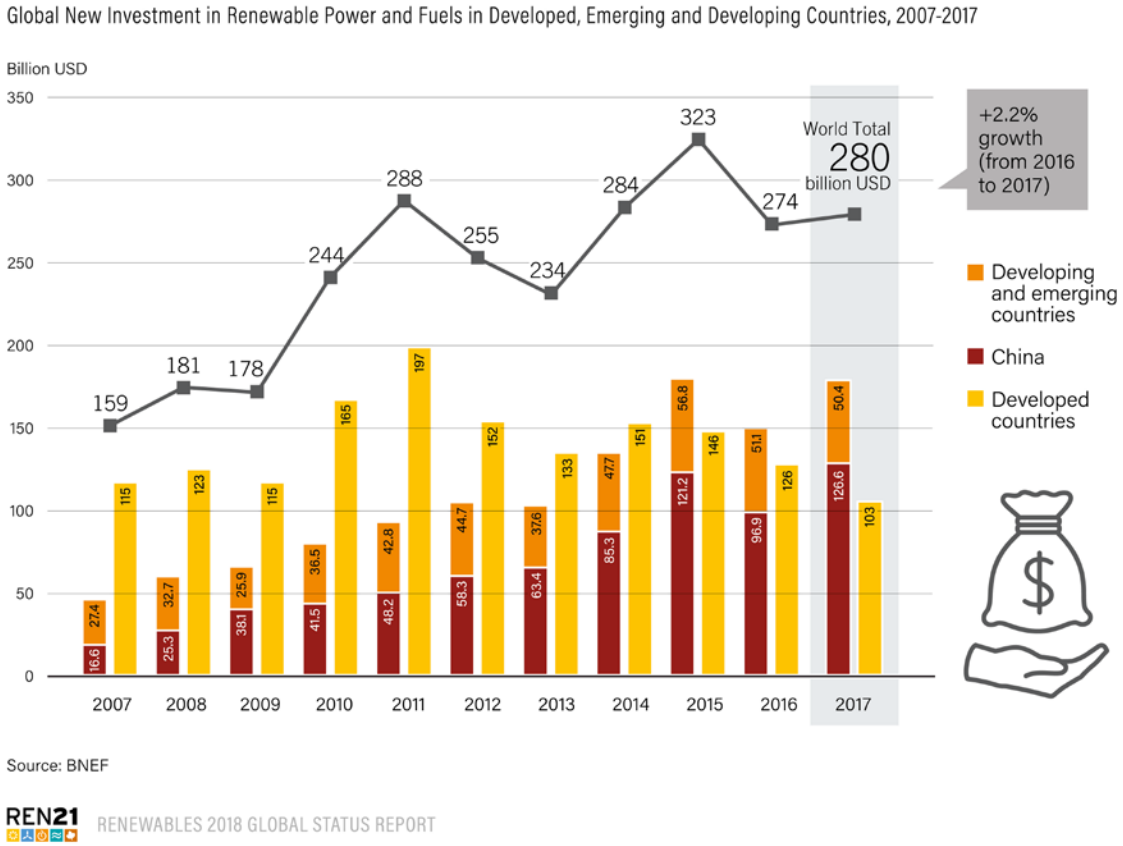
Global Investment in Renewable Energy

- Global **new investment** in renewable power and fuels in 2017: **USD 279.8 billion (+2%)** (USD 319.8 billion incl. large hydropower)
- **Developing and emerging countries** invested more than developed countries for the third year running

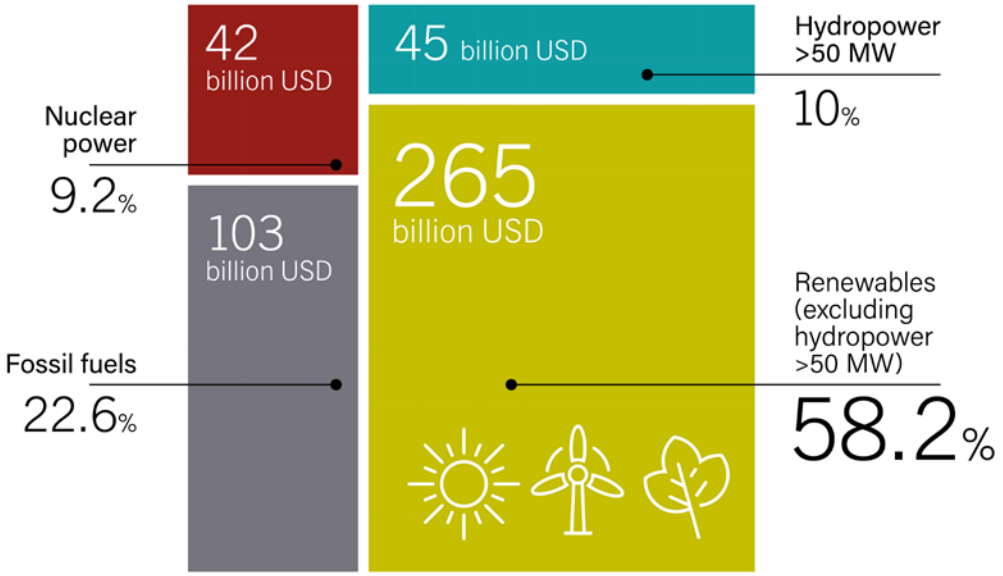


Global Investment in New Power Capacity

- Overall, **renewable energy** accounted for about **68%** of the total amount committed to **new power-generating capacity** in 2017

- **Investment in new renewable power** capacity was roughly **three times new fossil fuel** capacity and more then **twice** the investment in fossil fuel and nuclear combined

Global Investment in New Power Capacity, by Type (Renewables, Fossil Fuels and Nuclear Power), 2017



Source: BNEF

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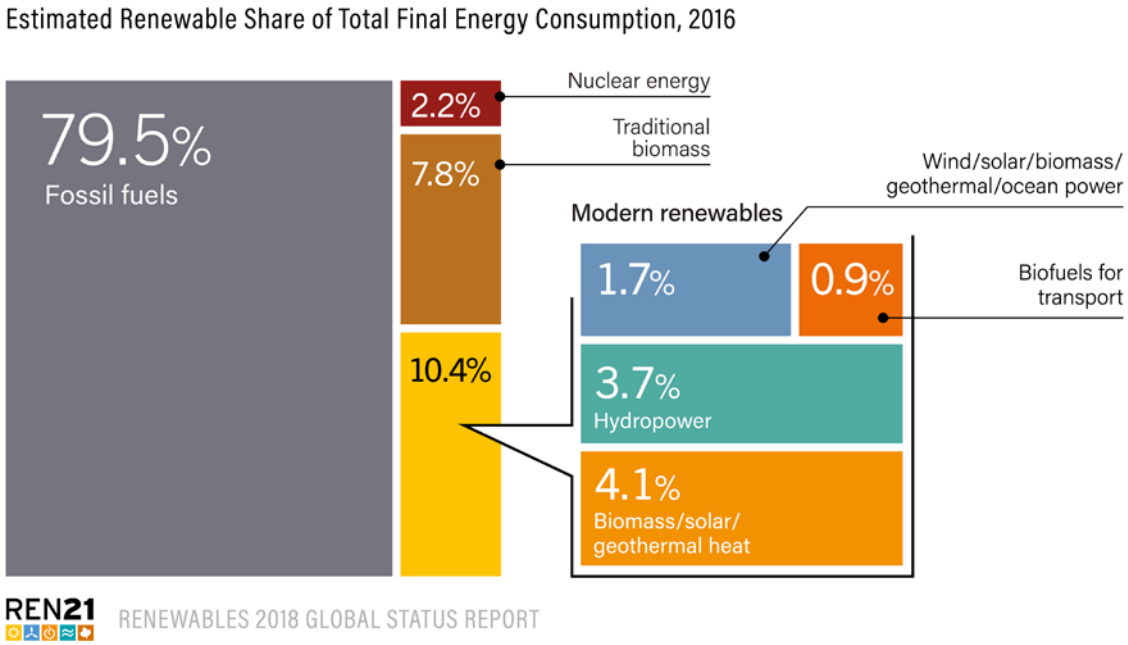
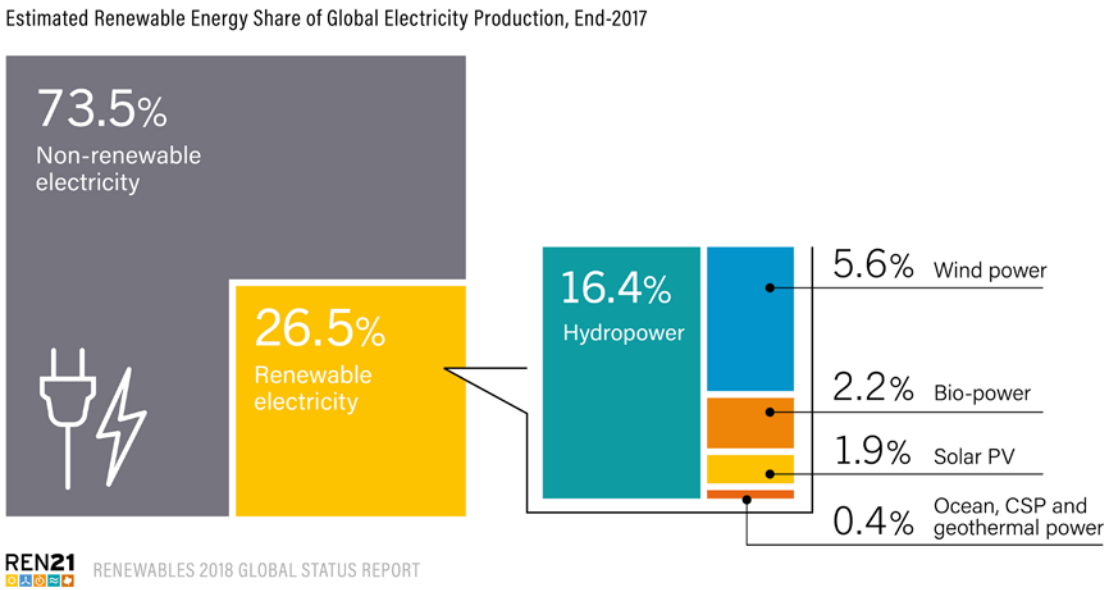
Renewable Energy in Total Final Energy Consumption

- As of **2016**, renewable energy provided **18.2%** (est.) of **global final energy consumption**
  - **10.4% modern renewables** (**+0.2%** compared to 2015)
  - **7.8% traditional biomass** (**-2.4%** than 2015)



Power Sector

- In 2017, renewables accounted for: **70%** of **net additions** to global power generation capacity
- Providing **26.5%** of global electricity demand
- **Progress in the power sector shows that the transition to renewable energy is possible!**



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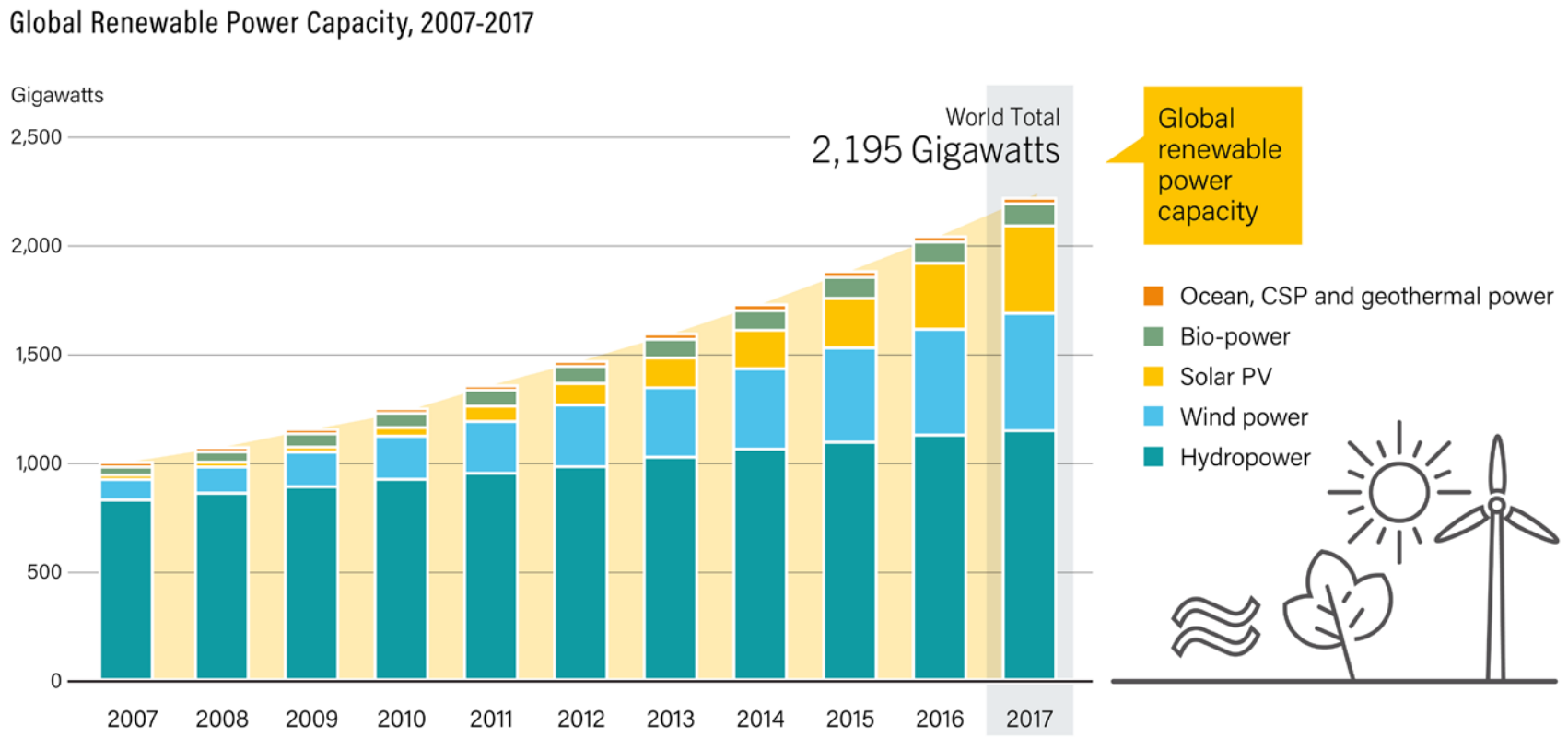
Global Renewable Power Capacity



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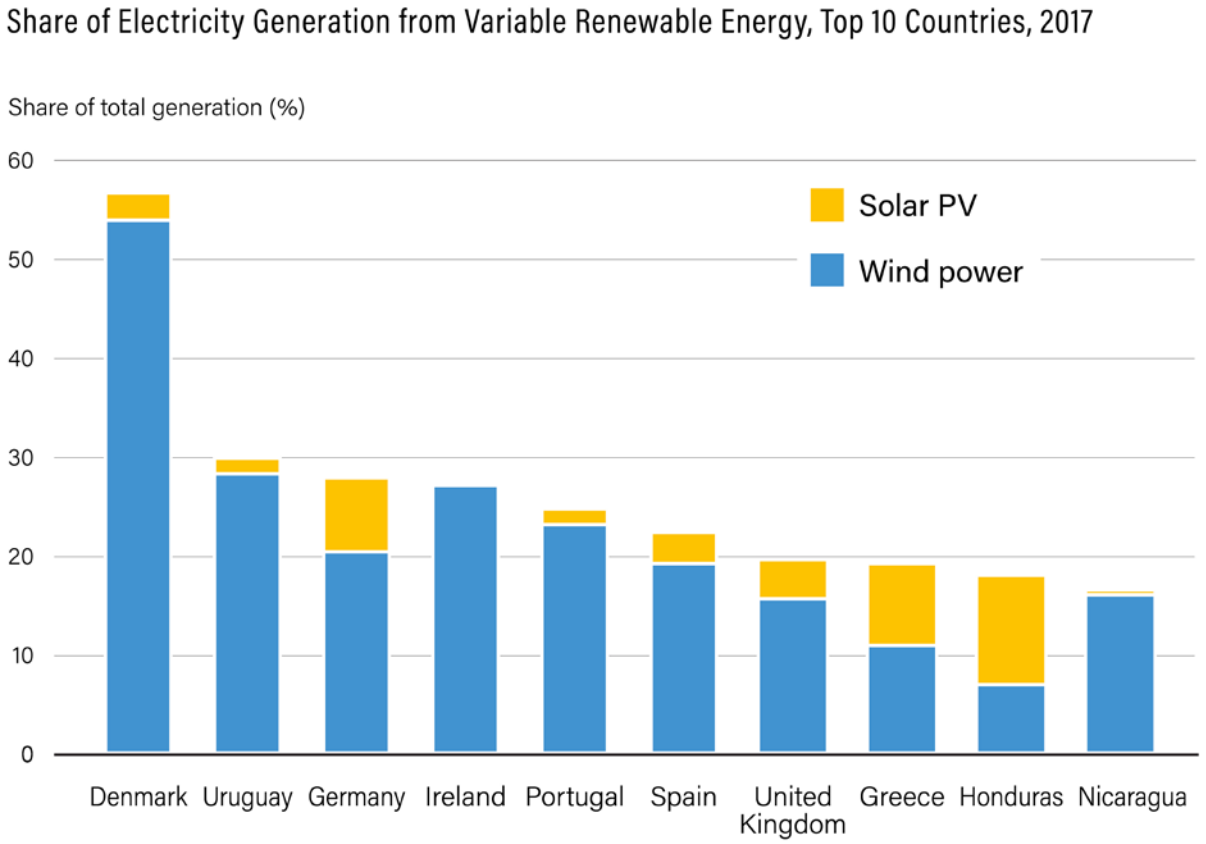
High Shares of Variable Renewable Power on the Grid



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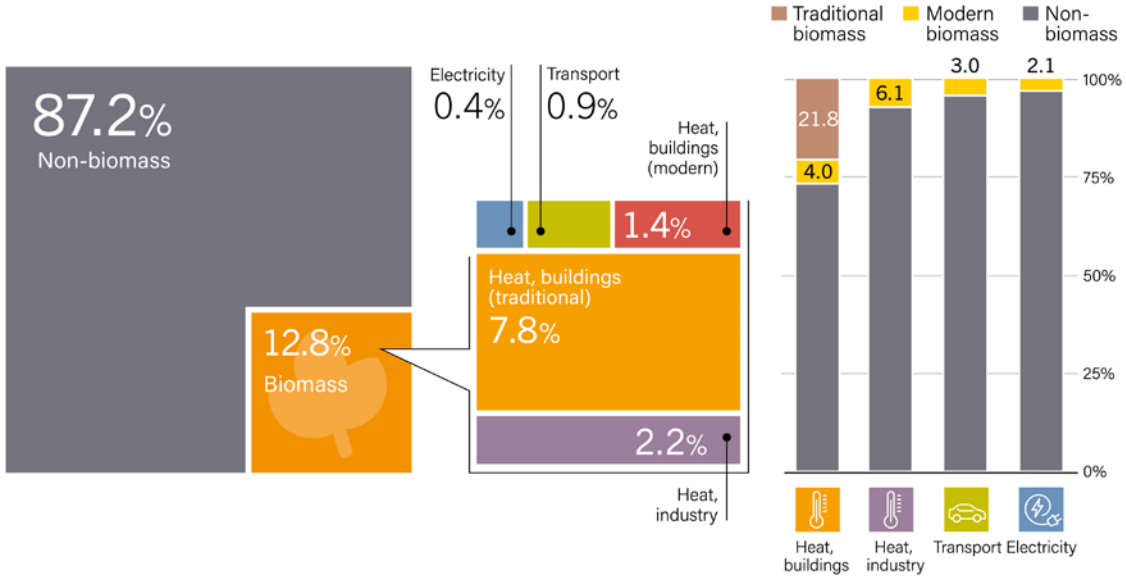
Heating and Cooling

- Modern RE share in heating and cooling: **10.3%**
- **Deployment of renewable technologies in H&C** still constrained by: **low fossil fuel prices** and **lack of policy support**
- Majority of **renewable heat** supplied by: **traditional biomass,** with smaller contributions from **modern renewables**, incl. **solar thermal** and **geothermal** energy

Shares of Bioenergy in Total Final Energy Consumption, Overall and by End-Use Sector, 2016



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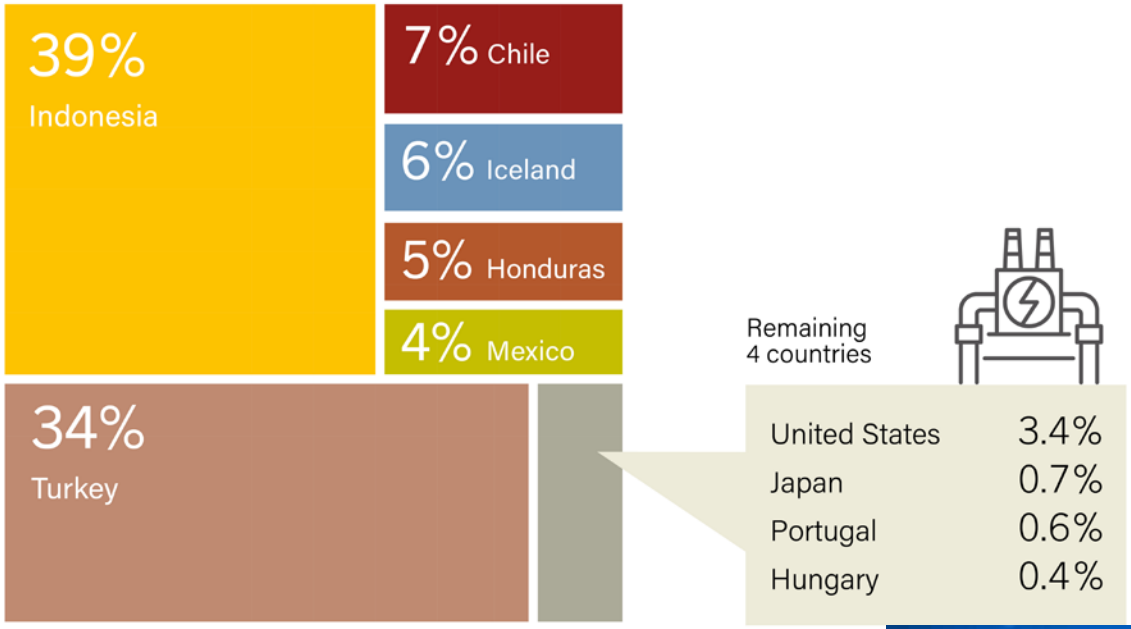
Geothermal Power Capacity Additions

- **0.7 GW** of new geothermal power generating capacity online in 2017
- Global total: **12.8 GW**
- **Indonesia and Turkey** continued in the lead for new installations (three-quarters of the new capacity)

Geothermal Power Capacity Global Additions, Share by Country, 2017



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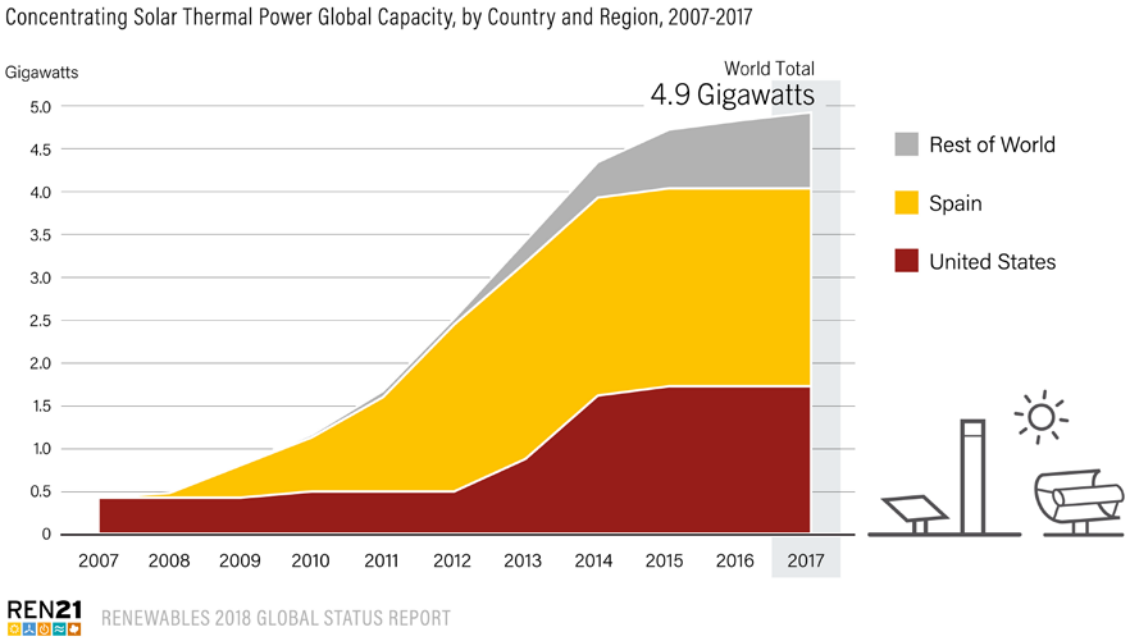
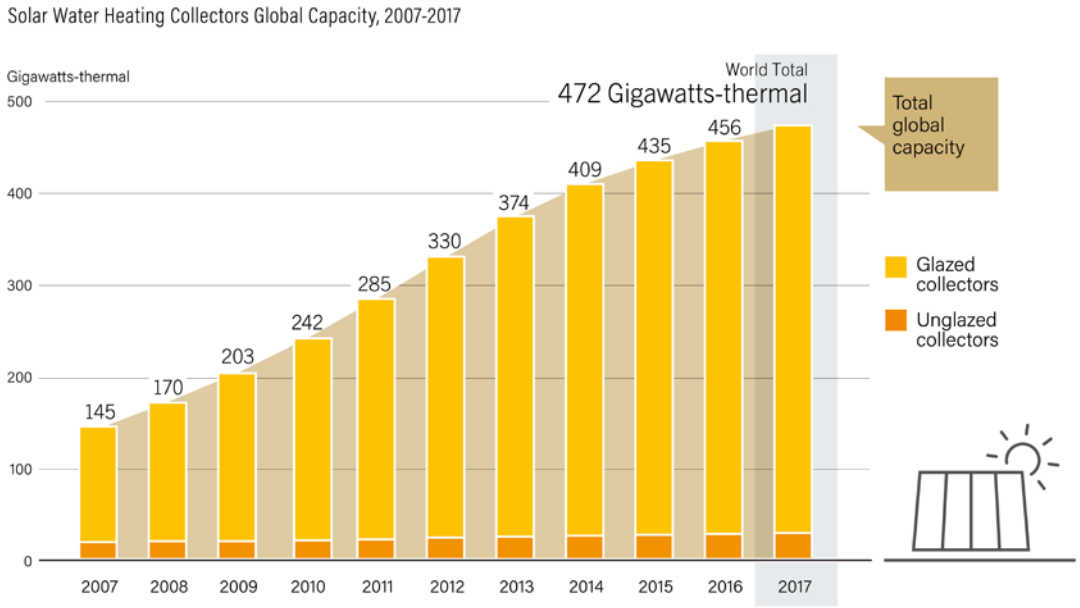
Concentrating Solar Thermal Power (CSP)

- **100 MW** of capacity came online in 2017; global capacity: **4.9 GW**
- Several projects that were due to enter operation during the year were delayed until 2018 and later
- Global capacity increased by just over **2%**
- Pipeline of about **2 GW** of projects **under construction** (particularly in China and in the Middle East and North Africa region)



Solar Water Heating Collectors

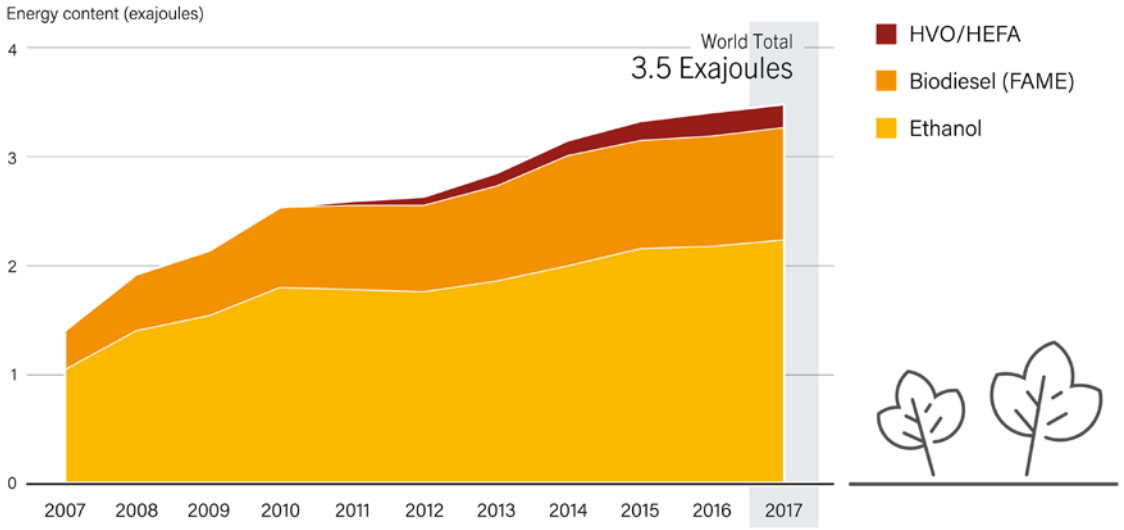
- **35 GWth** capacity of glazed (flat plate and vacuum tube technology) and unglazed collectors **newly commissioned** in 2017
- Total global capacity: **472 GWth** by year-end
- Gross additions for the year **down 3%** from 36.2 GWth in 2016



Transport – Biofuels

- Share of renewable energy in transport: **3.1%** mainly provided by biofuels (90%)
- In 2017, **global biofuels production** increased nearly **2.5%**, to **143 billion litres**
- Biofuels production and use are very **concentrated geographically**, **> 80%** production takes place in the **United States, Brazil and the EU**

Global Trends in Ethanol, Biodiesel and HVO/HEFA Production, 2007-2017



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Transport – EVs

- **<u>Electrification trend</u>:**
  - Rail and light rail
  - EVs on the road passed the 3 million mark in 2017 (**+70%,** but only **1%** of light vehicle market)

- Potential to create a **new market for renewable energy** and facilitate the **integration of higher shares of VRE**

Global Passenger Electric Vehicle Market (including PHEVs), 2012-2017

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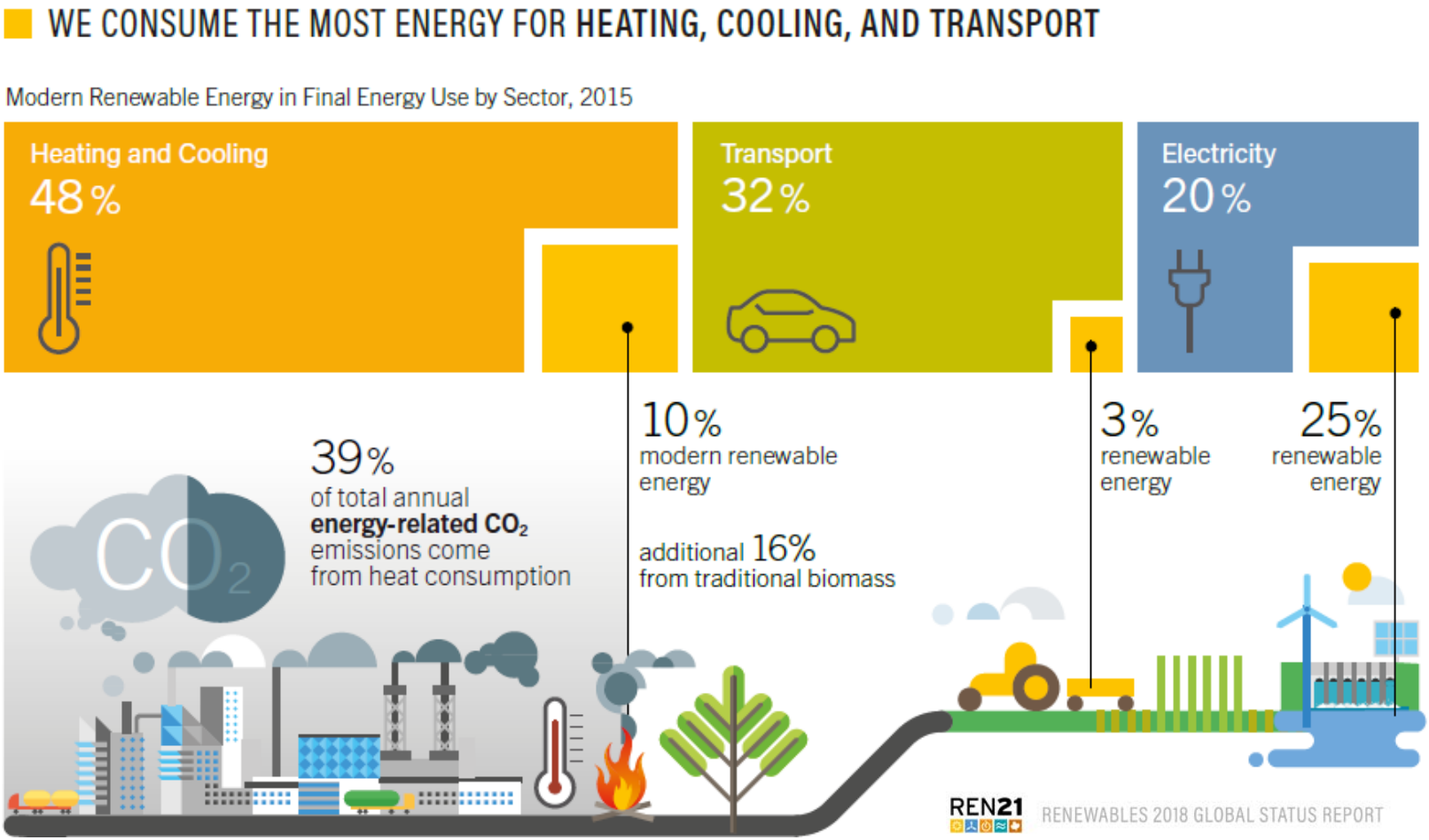
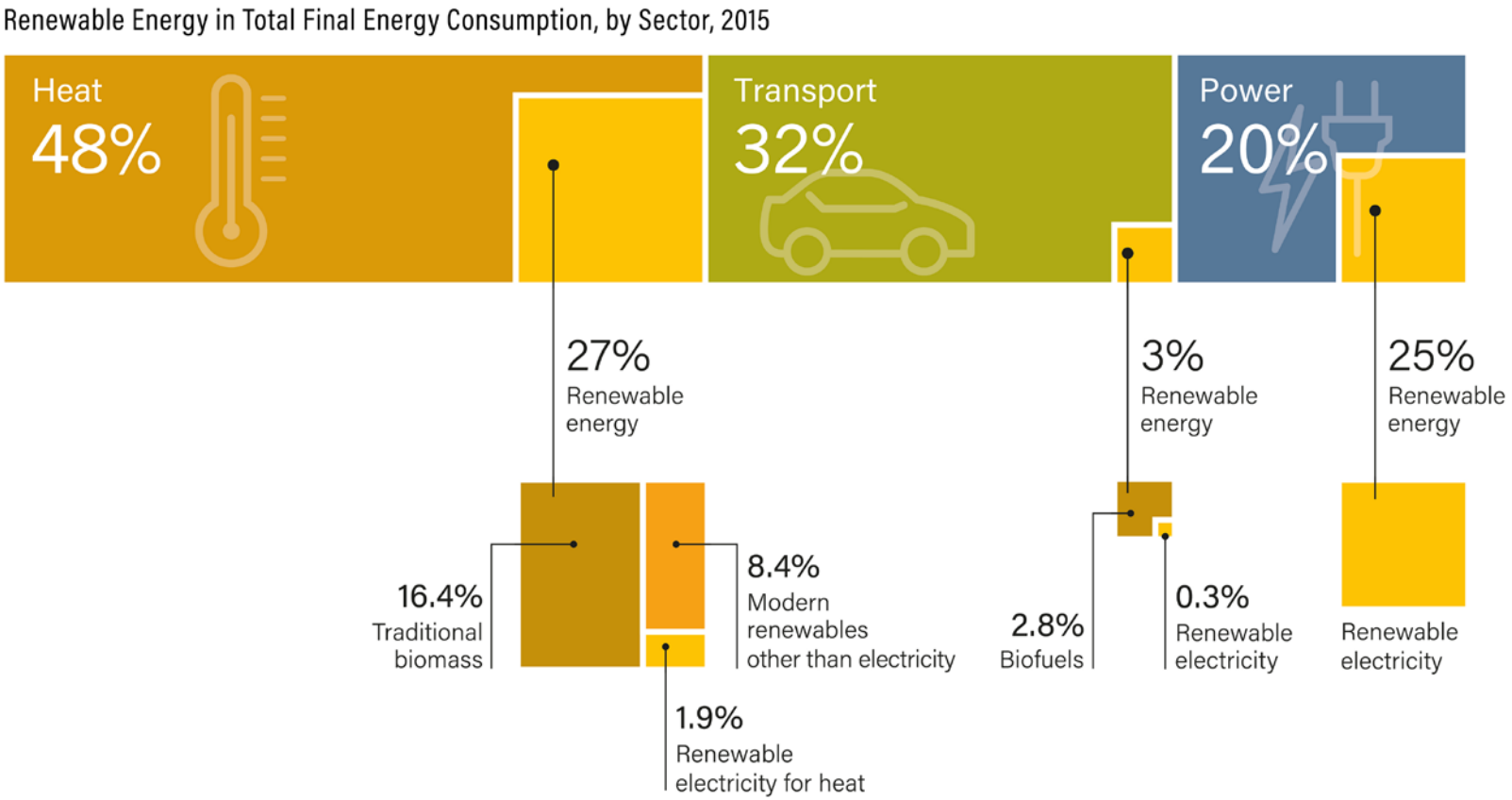
The “Sectoral Disconnect”



The “Sectoral Disconnect”



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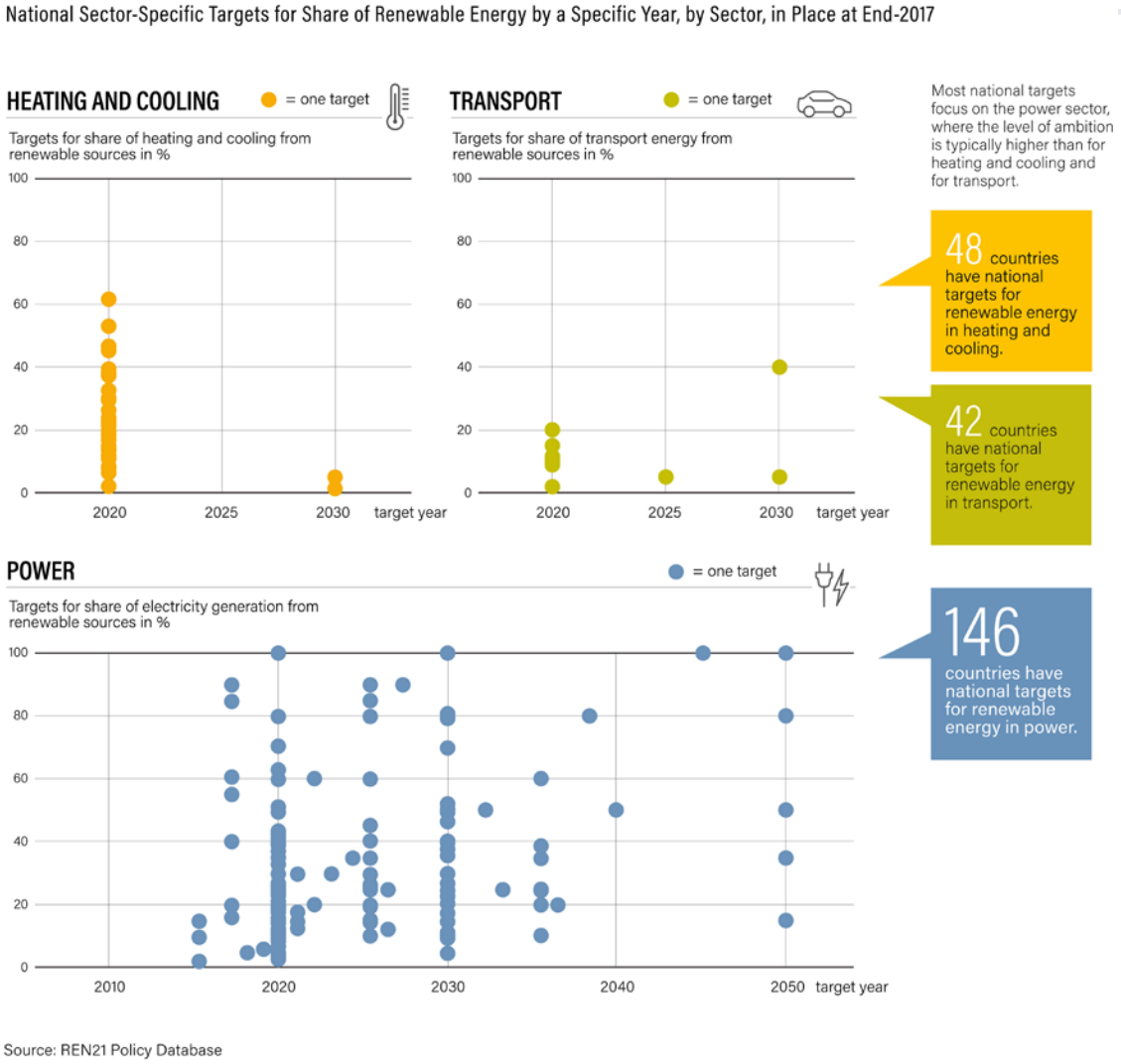
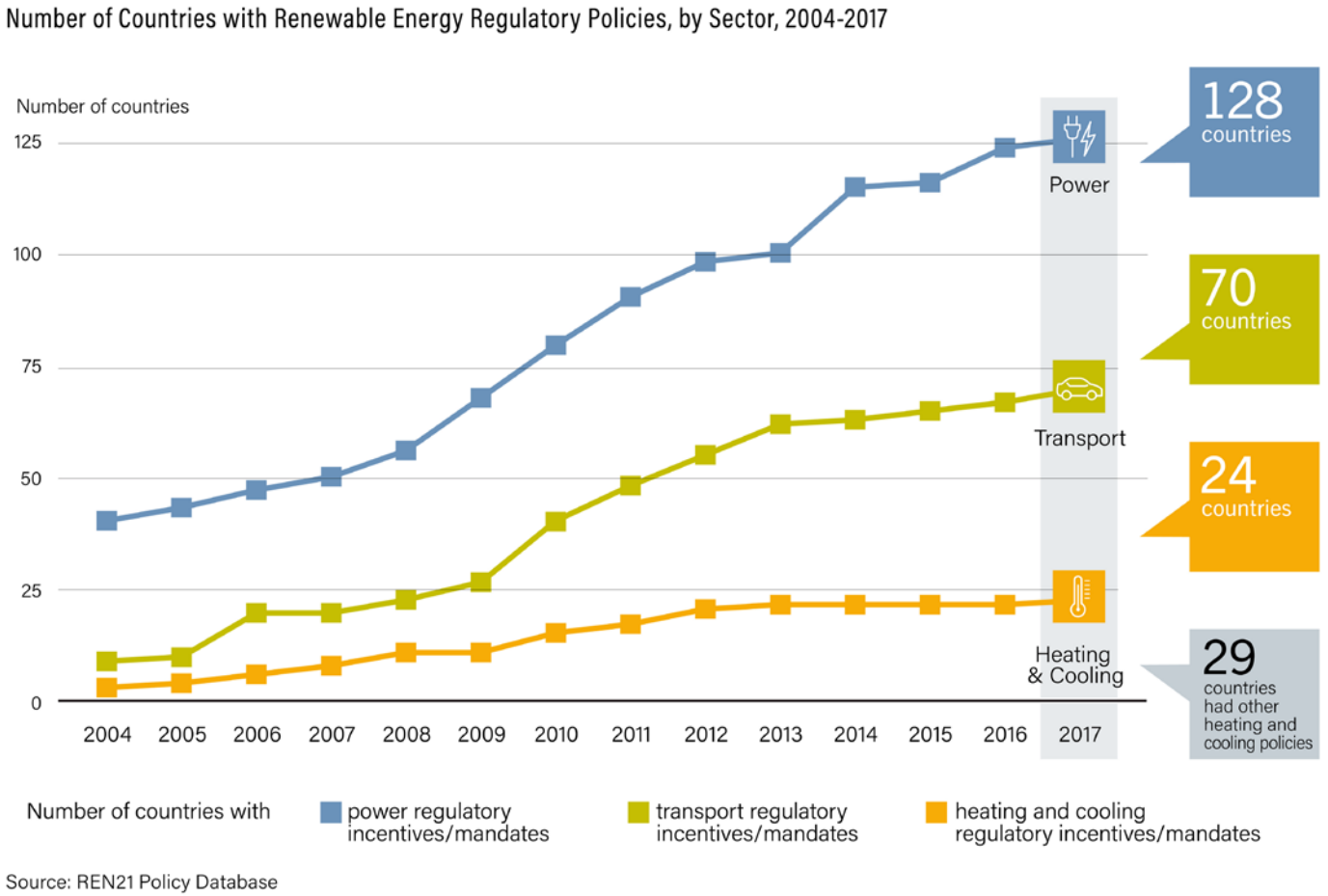
Renewable Energy Targets



Renewable Energy Policy Landscape



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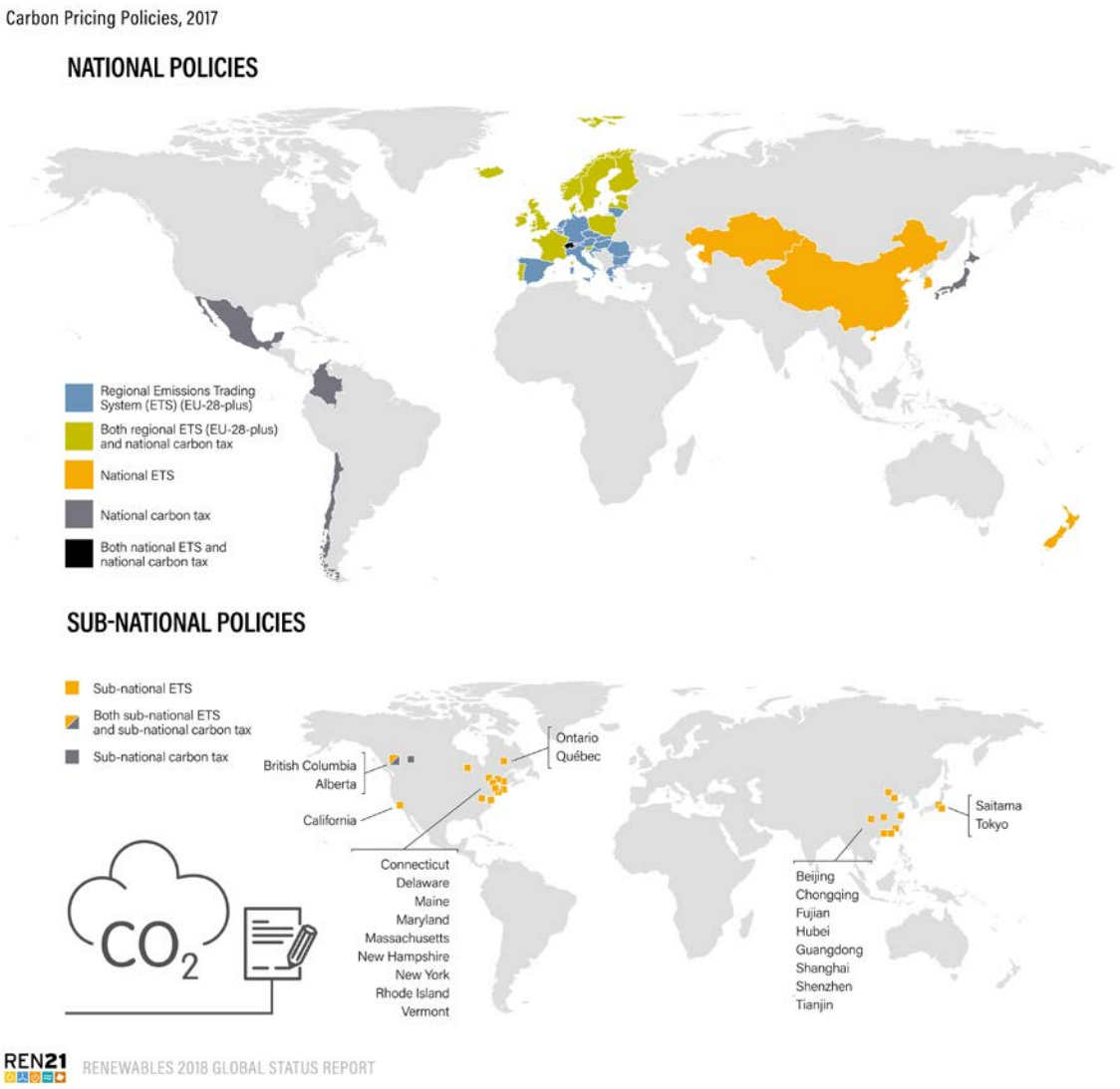
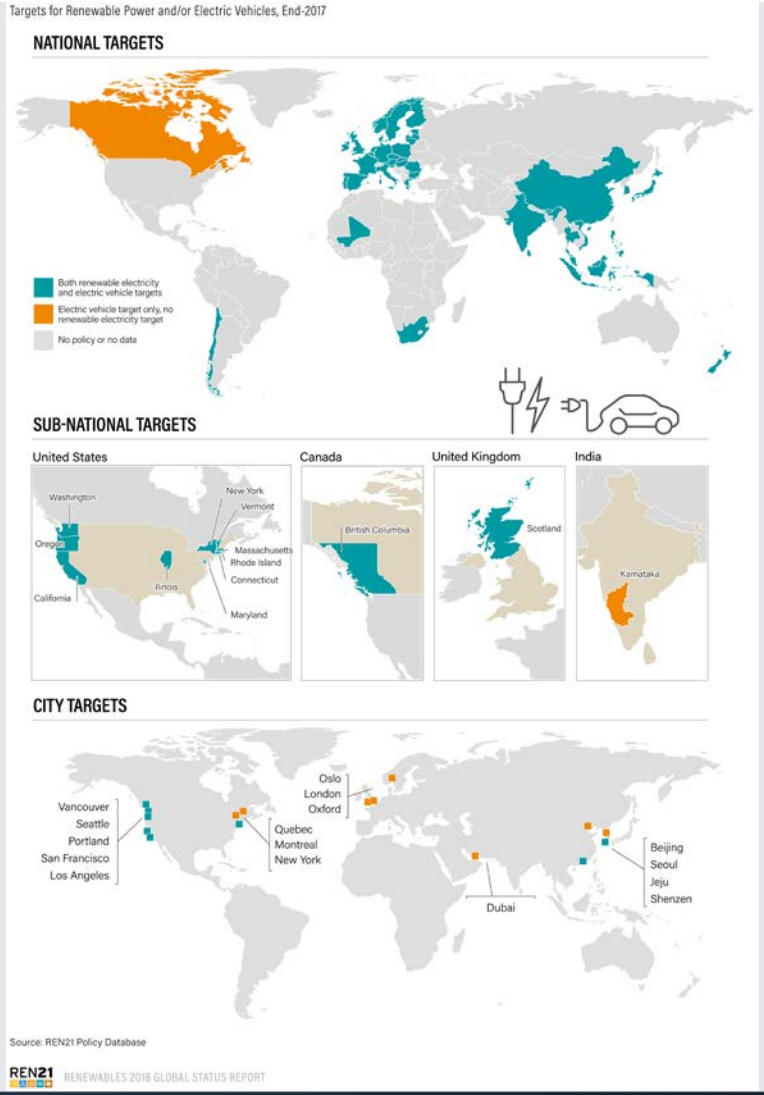
Carbon Pricing Policies

- **Carbon pricing policies** were in place in **64 jurisdictions** worldwide in 2017



Sector Coupling: Targets for RE and EVs

- Limited examples of **policies that encourage/mandate the use of renewable energy in EVs (Austria and Germany)**
- Countries with **targets for both EVs and renewable energy in power** may encourage the use of renewable deployment in transport
- Governments also are supporting EVs through **public procurement**



Corporate Sourcing of Renewable Energy

- As of end-2017, corporations had actively sourced **465 TWh** of renewable electricity across **75 countries**
- **The IT sector** purchased the largest amounts of renewable energy through **wind power and solar PV PPAs**
- **130 corporations** joined the **RE100 initiative**

Countries Where Corporations Have Sourced Renewable Electricity, up to End-2017

Source: IRENA

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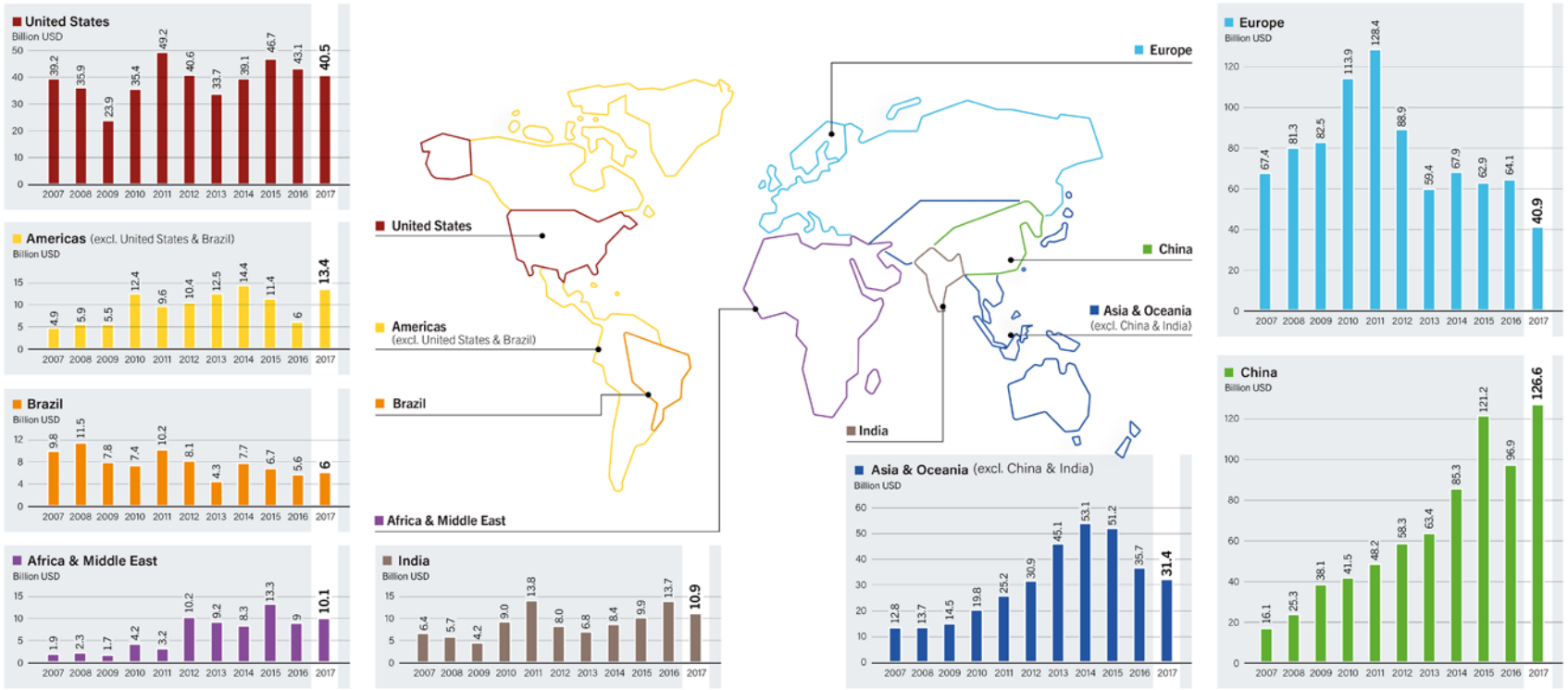
Investment in Renewable Energy

Global New Investment in Renewable Power and Fuels, by Country or Region, 2007-2017



Source: BNEF

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Renewable Energy “Champions”

TOP 5 COUNTRIES 2017

Annual Investment / Net Capacity Additions / Production in 2017

	1	2	3	4	5
Investment in renewable power and fuels (not including hydro over 50 MW)	**China**	United States	Japan	India	Germany
Investment in renewable power and fuels per unit GDP[1]	**Marshall Islands**	Rwanda	Solomon Islands	Guinea-Bissau	Serbia
Geothermal power capacity	**Turkey**	Indonesia	Chile	Iceland	Honduras
Hydropower capacity	**China**	Brazil	India	Angola	Turkey
Solar PV capacity	**China**	United States	India	Japan	Turkey
Concentrating solar thermal power (CSP) capacity[2]	**South Africa**	-	-	-	-
Wind power capacity	**China**	United States	Germany	United Kingdom	India
Solar water heating capacity	**China**	Turkey	India	Brazil	United States
Biodiesel production	**United States**	Brazil	Germany	Argentina	Indonesia
Ethanol production	**United States**	Brazil	China	Canada	Thailand

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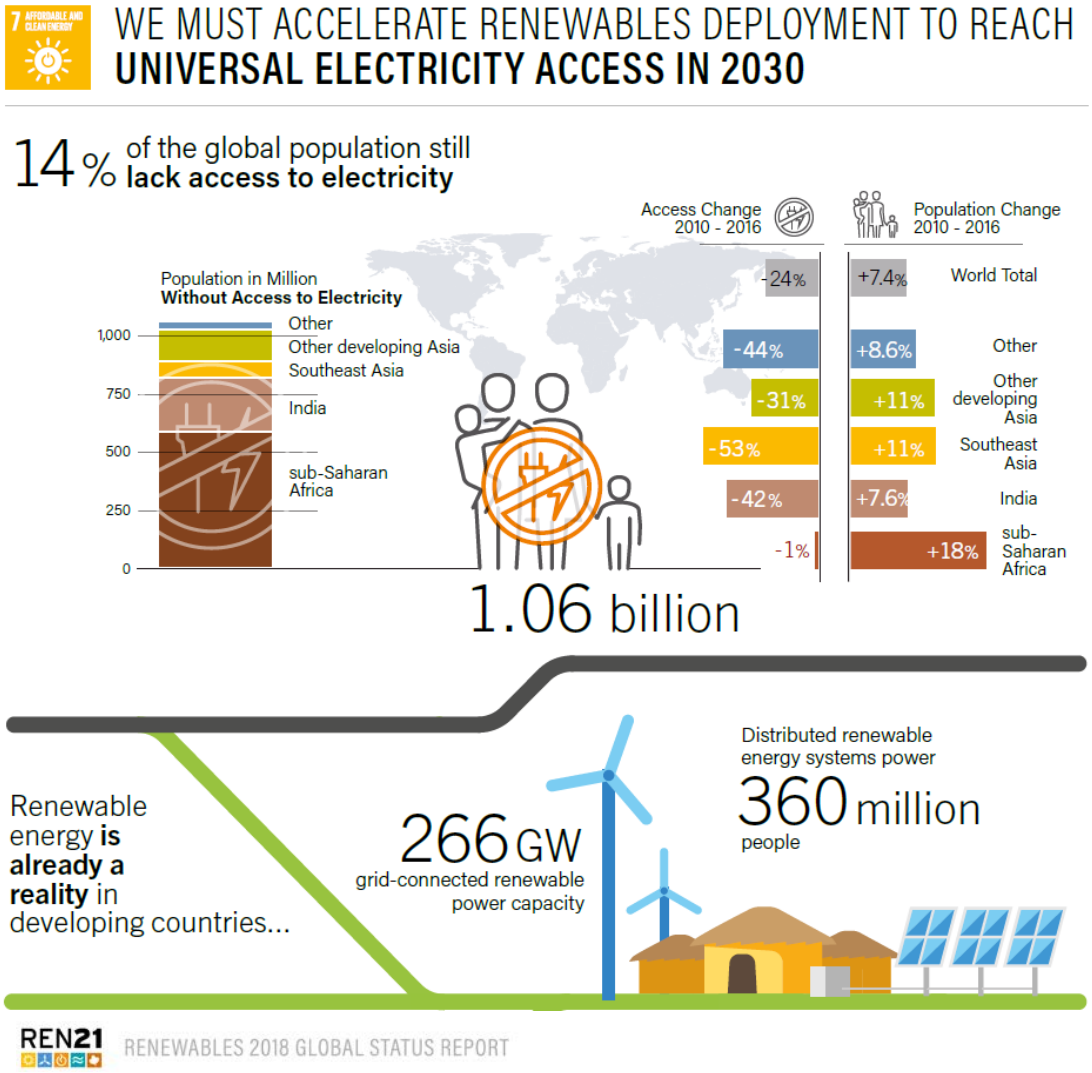
Distributed Renewables for Energy Access

- **In 2016:**
  - **~14%** of the global population lived **without electricity** – approx. 1.06 billion people
  - **38%** of the global population lived **without access to clean cooking** facilities – 2.8 billion people
  - **DREA systems** were serving **~360 million people by end-2016**



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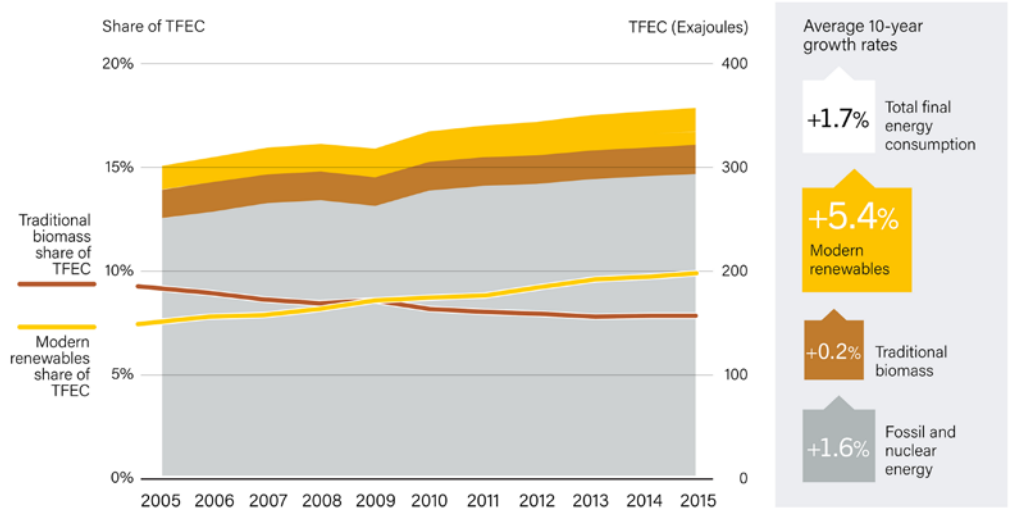
Growth in Renewable Energy

- Overall **share of renewable energy** has **increased only modestly**, due to:
  - ↗ energy demand
  - slow ↘ traditional biomass
  - ↗ fossil and nuclear fuel

- **Energy-related CO_2 emissions rose for the 1st time in 4 years**

Growth in Global Renewable Energy Compared to Total Final Energy Consumption (TFEC), 2005-2015



Source: IEA

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Conclusions

- Global renewable power transition advancing with record capacity additions and rapidly falling costs – **The transition is possible!**
- **However, progress not fast enough to reach Paris Agreement goals and SDGs**
- **Better-integrated sectors** - planning, policies and regulatory frameworks
- Systems approach: link **energy efficiency** and **renewable energy**
- Create a **level playing field** for renewables and decentralised off-grid renewables
- **Make all trends visible:** Much is happening, but data is not consolidated – renewables at local and sub-national level, distributed off-grid renewables, innovative business models

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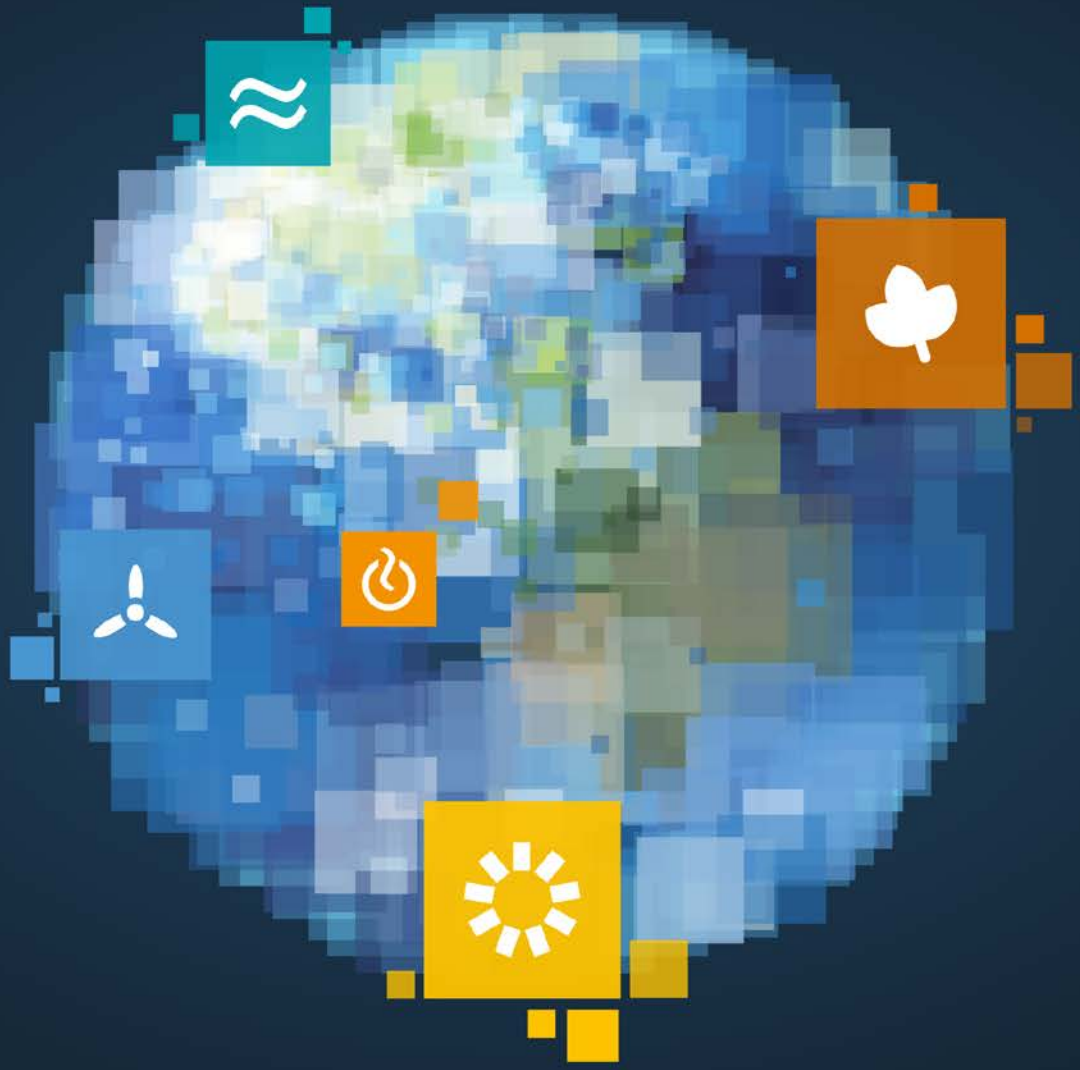

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