

RENEWABLES 2019 GLOBAL STATUS REPORT



Office franco-allemand pour
la transition énergétique

Deutsch-französisches Büro
für die Energiewende

25 March 2020

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2019

REN21 – the only global renewable energy multi-stakeholder community

INTERGOVERNMENTAL ORGANISATIONS

ADB, APERC, ECREEE, EC, GEF, IEA, IRENA, IsDB, RCREEE, UNDP, UN Environment, UNIDO, World Bank

GOVERNMENTS

Afghanistan, Brazil, Denmark, Dominican Republic, Germany, India, Mexico, Norway, Republic of Korea, South Africa, Spain, UAE, USA

NGOs

Club-ER, CLASP, CCA, CAN-I, CEEW, Energy Cities, FER, Global 100% RE, GFSE, GWNET, Greenpeace Intl, ICLEI, ISEP, IEC, JVE, MFC, SLoCaT, Power for All, REEEP, REI, SCI, WCRE, WFC, WRI, WWF

INDUSTRY ASSOCIATIONS

AMDA, ARE, ACORE, APREN, ALER, CREIA, CEC, EREF, GOGLA, GSC, GWEC, IREF, IGA, IHA, RES4Africa, WBA, WWEA

SCIENCE & ACADEMIA

AEE INTEC, Fundacion Bariloche, Higher School of Economics (Russia), IIASA, ISES, NREL, SANEDI, TERI

REN21 – the only global renewable energy multi-stakeholder community

Who we are...



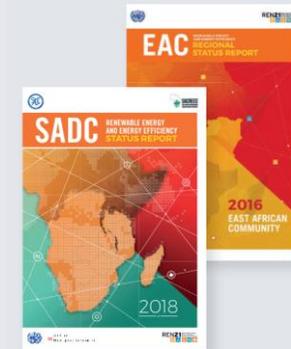
What we do...



*Global Status Report:
yearly publication since 2005*



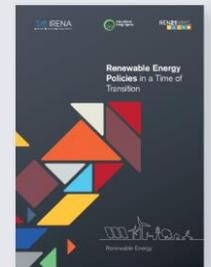
*Renewables in Cities
Status Report:*



Regional Reports



*Global Futures
Reports*



Thematic Reports



23-25 October, 2019

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: Renewable Energy in Cities



Over

1,500

experts have contributed to the GSR since its start in 2005.



70%

of these experts have participated in more than one GSR.



Over

350

experts contributed to GSR 2019, working alongside an international authoring team and the REN21 Secretariat.



45%

of these were new experts.

181 gigawatts of renewable power added in 2018

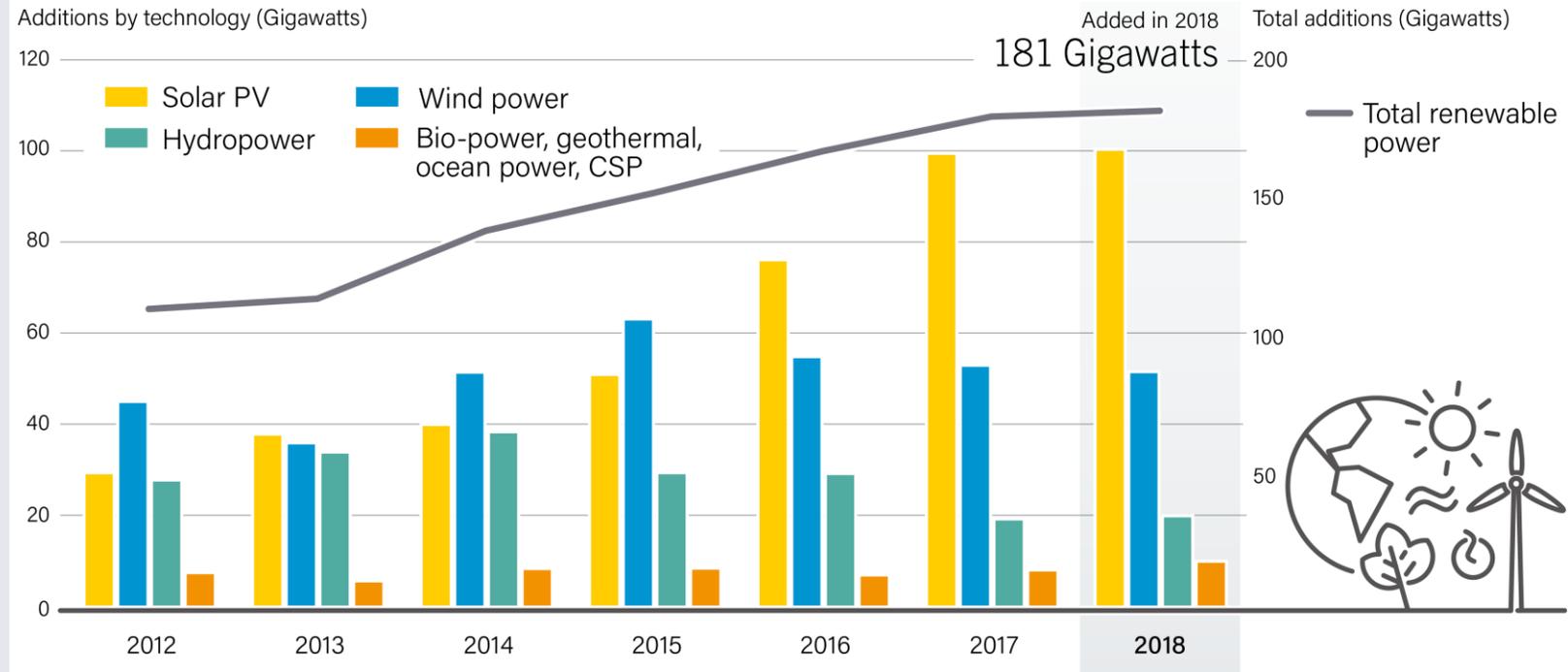
→ Around **55%** of these new additions were solar PV

→ Added in 2018:

- 100 GW of solar PV
- 51 GW of wind power
- 20 GW of hydropower
- 10 GW of bio-power, CSP and geothermal power

→ 2018 was the **4th** consecutive year that **more than 50 GW of wind power** was added

Annual Additions of Renewable Power Capacity, by Technology and Total, 2012-2018



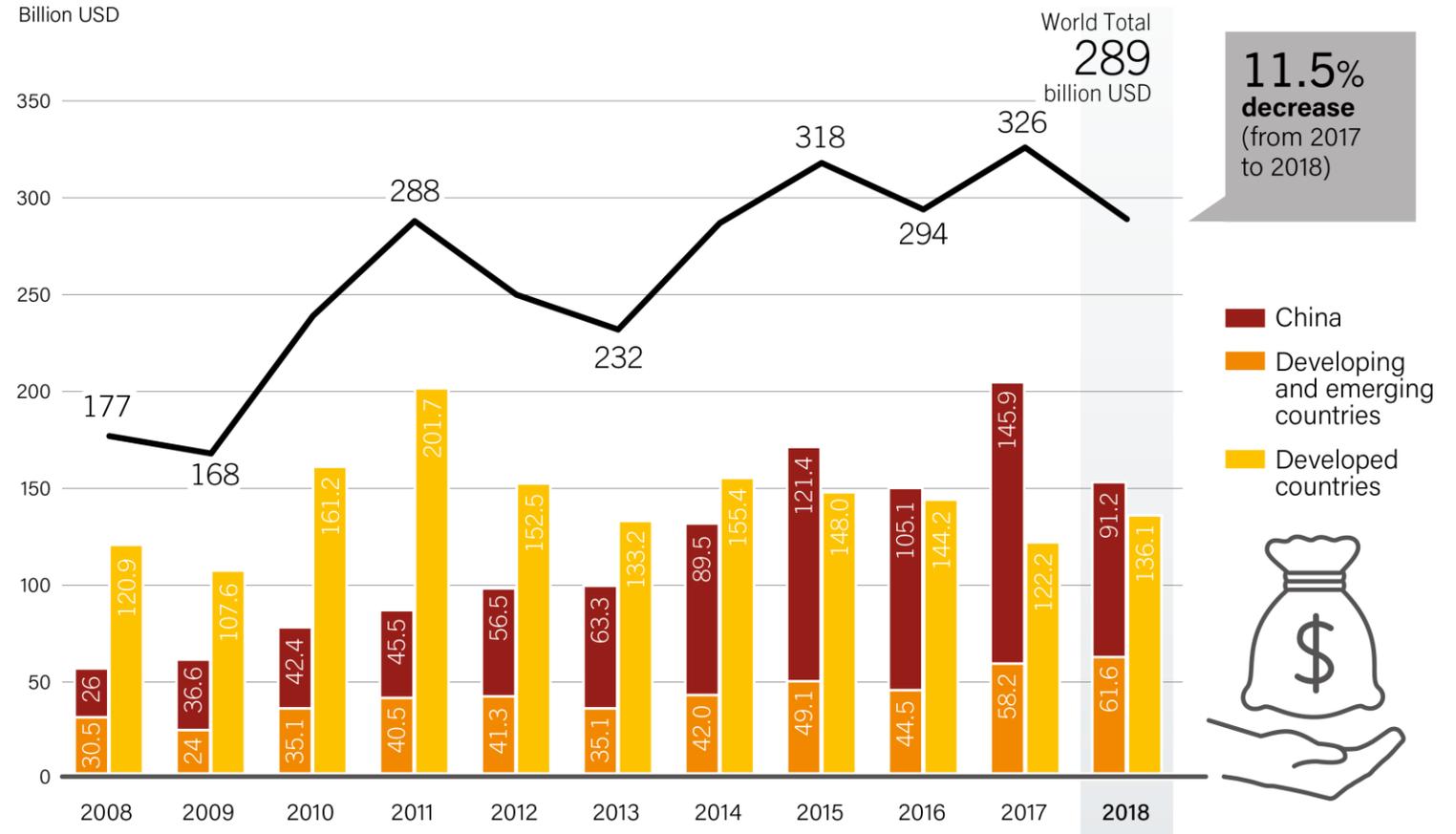
Note: Solar PV capacity data are provided in direct current (DC).

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Investment in renewable energy fell in China, rose elsewhere

- Global investment in renewable power and fuels totalled **USD 288.9 billion**, a decrease of **11.5%**
 - Fall driven mainly by China
- **Fifth consecutive year** in which investment topped USD 280 billion
- Investment in developing and emerging countries exceeded that in developed countries for the **fourth consecutive year**

Global New Investment in Renewable Power and Fuels in Developed, Emerging and Developing Countries, 2008-2018



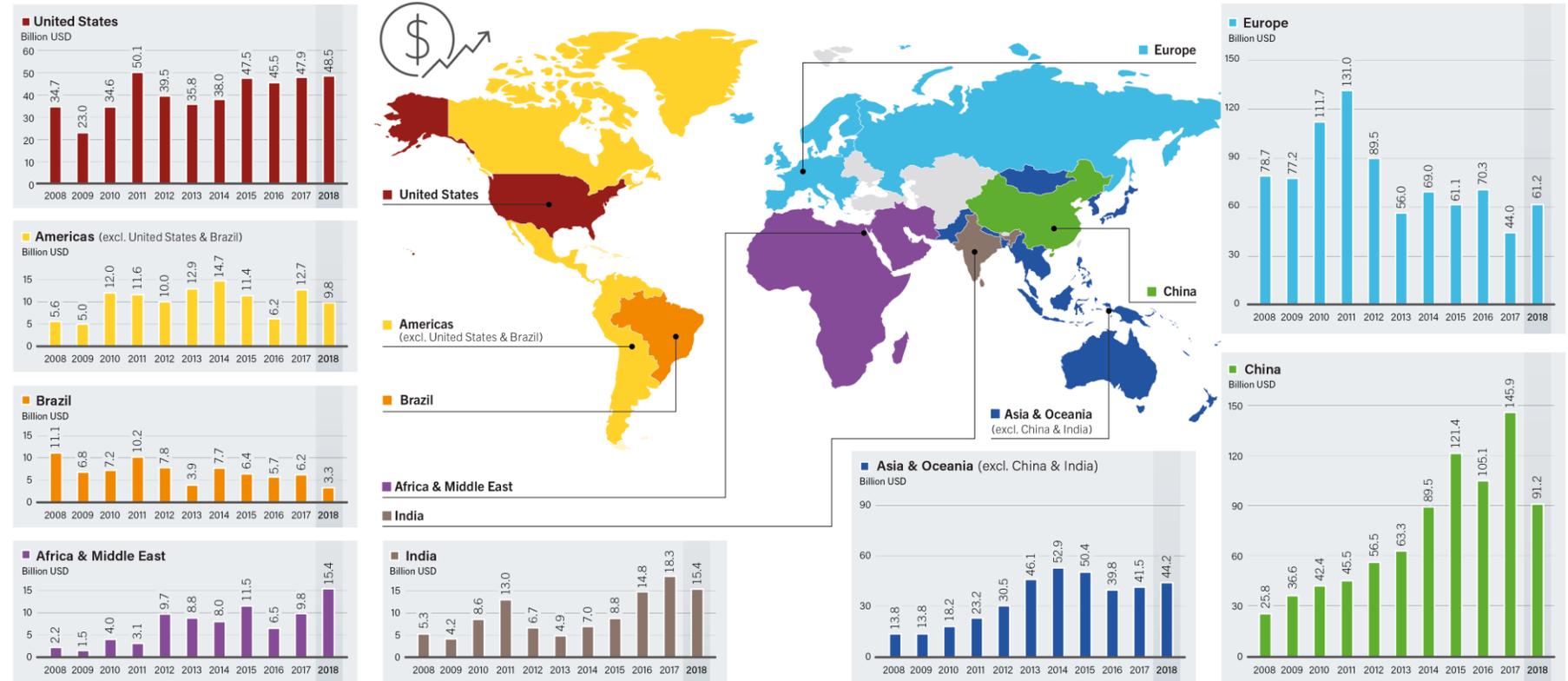
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Source: BNEF.

Investment fell sharply in China, rose elsewhere

- **China** accounted for majority of investment despite the decline in its market
- Investment varied by region:
 - Rising in Europe, the Middle East and Africa, Asia and the United States
 - Falling in the Americas, China and India

Global New Investment in Renewable Power and Fuels, by Country or Region, 2008-2018

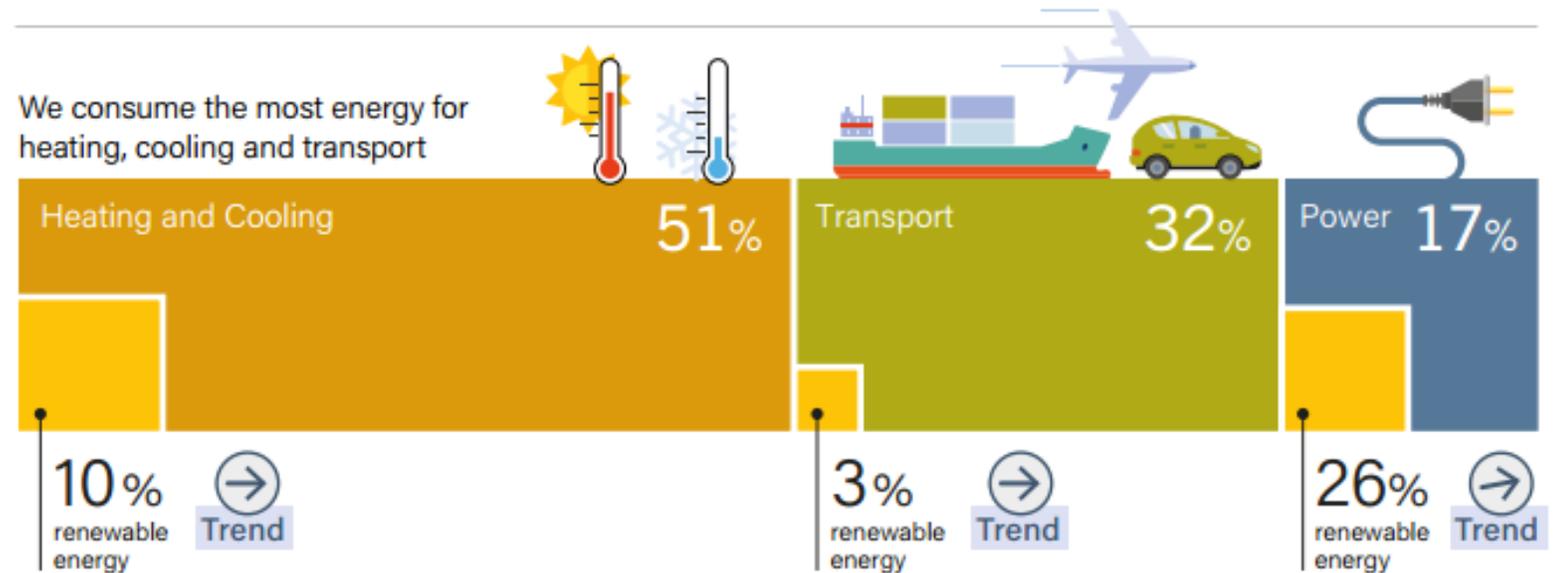


Note: Data are in current USD and include government and corporate research and development (R&D).

Source: BNEF.

Beyond Power: Over 80% of demand for heating, cooling, and transport

- **Over half** of final energy demand is from the heating and cooling sector
 - Less than 10% of this demand is supplied by renewable energy
- **32%** of final energy demand is for transport end-uses
 - Just over 3% is renewable and primarily met by biofuels
 - Renewable electricity still plays small role
- Around **26%** of electricity was renewable in 2016

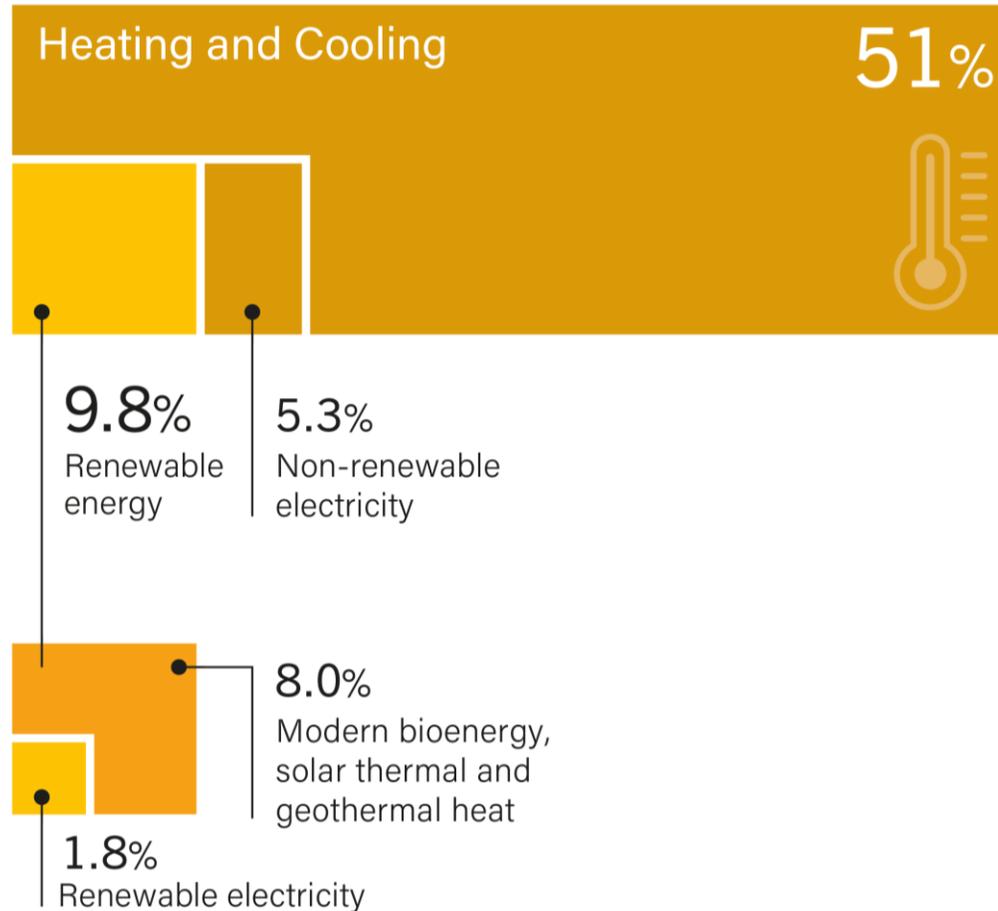


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Source: OECD/IEA.

Renewables in heating and cooling increasing very slowly

- Modern renewables account for just **10% of heating and cooling demand**
 - Demand growth is minimal (1.8%/year)
- **Lack of policy support** in the sector
 - Number of countries with regulatory policies fell from 21 to 20
 - Only 47 countries had targets for RHC
- Bio-heat provides majority but integration with **power sector** is key

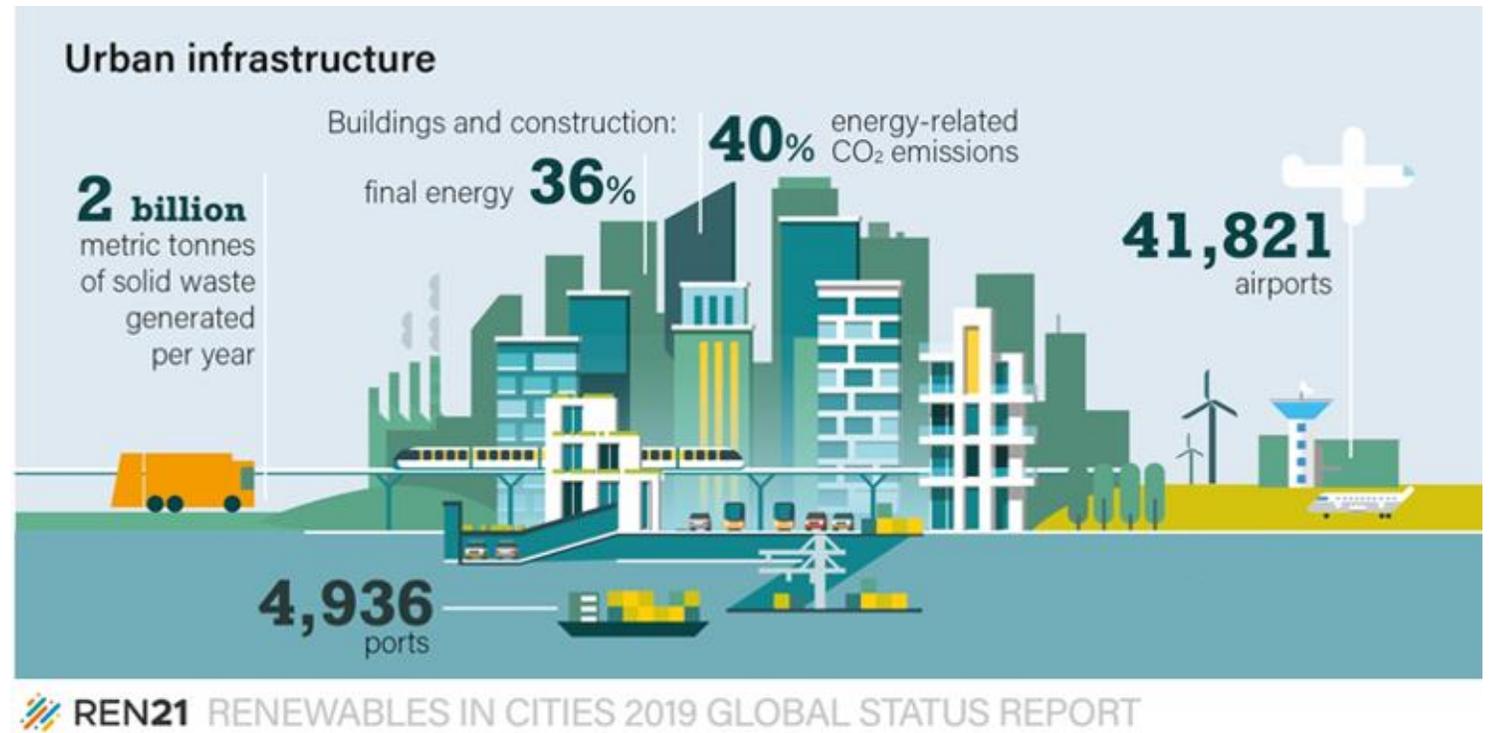
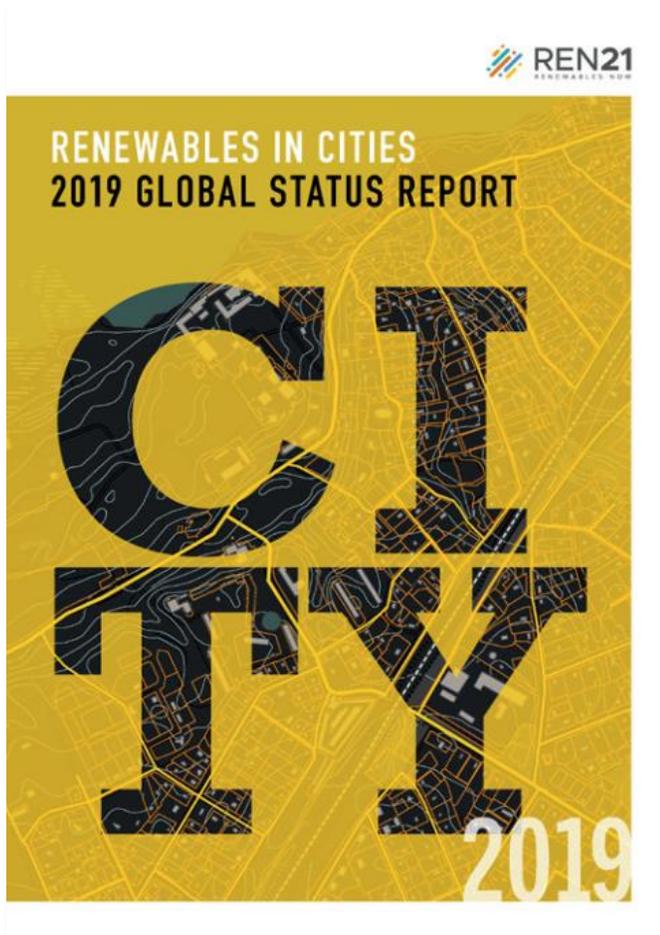


Source: OECD/IEA.

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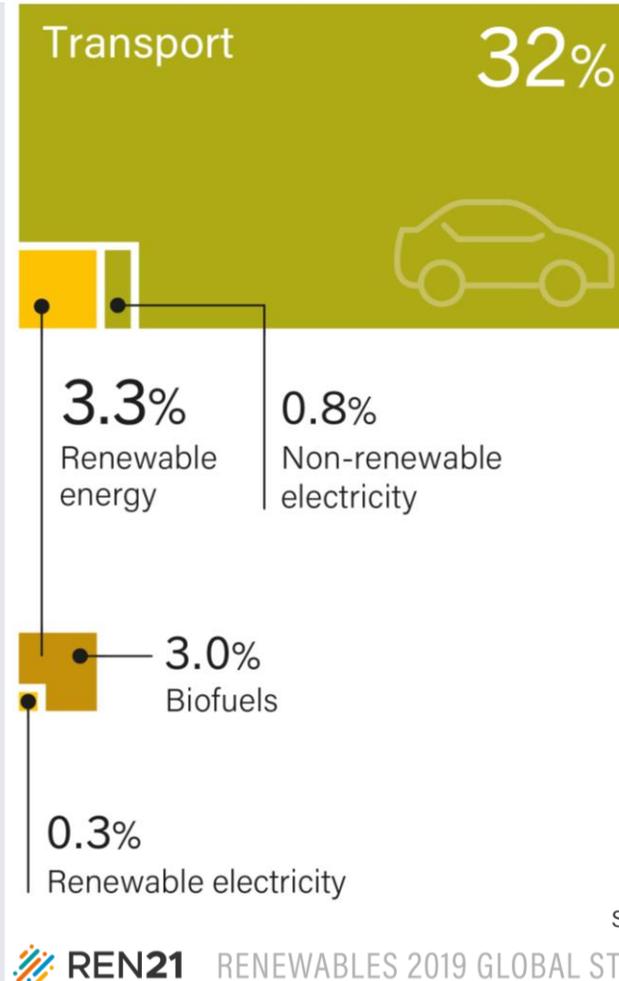


Heating and Cooling – Distributed solutions and local markets



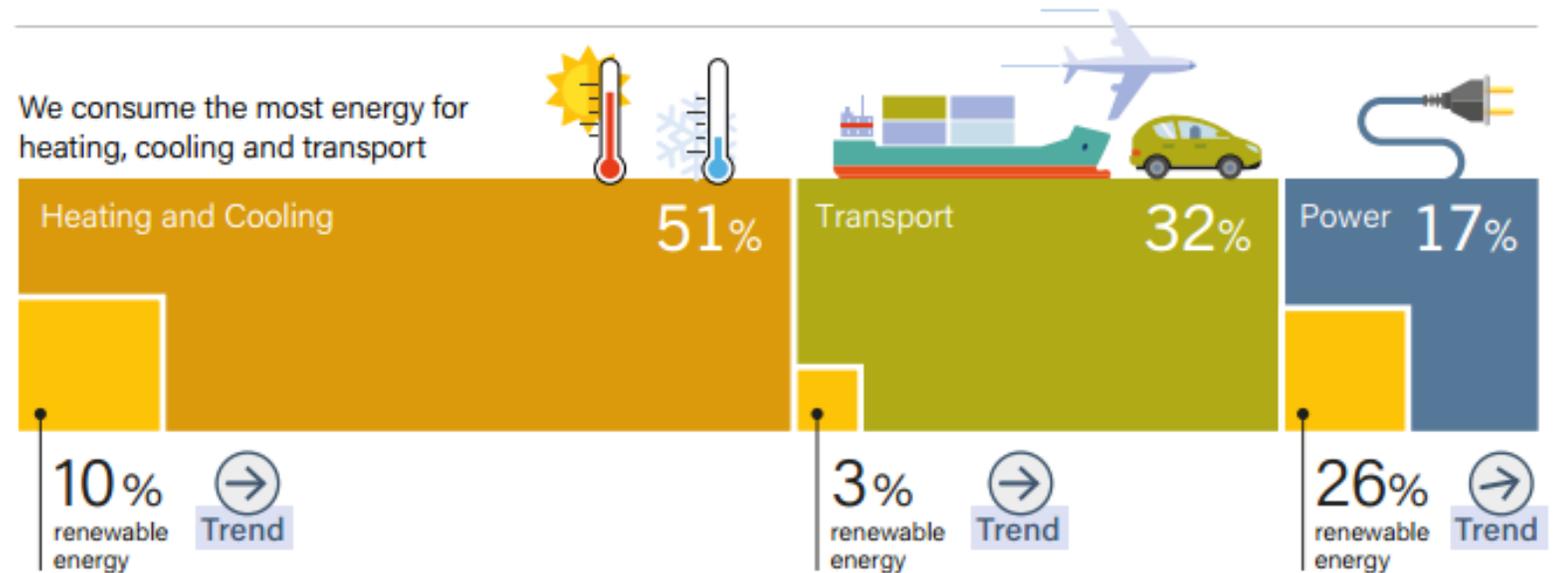
Biofuels and EVs growing but renewable share in transport remains low

- Global energy demand in transport increased **45%** since 2000
- Transport accounts for **23%** of global CO₂ emissions
- The renewable share of transport grew slightly to **3.3%**
- Biofuels make up majority of renewable contribution, but sector increasingly open to electrification



Beyond Power: Over 80% of demand for heating, cooling, and transport

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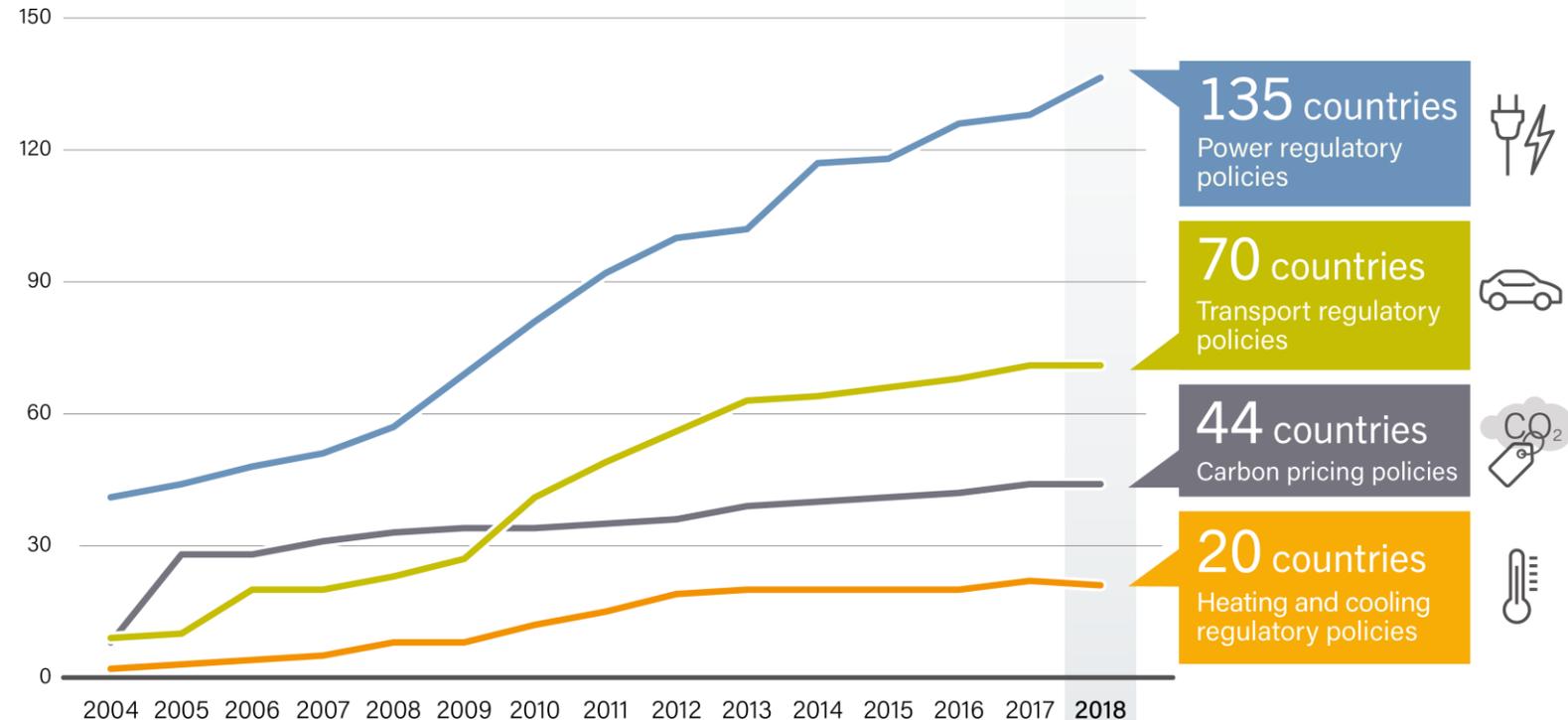
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Source: OECD/IEA.

Advances in power made possible by policy support, other sectors lacking

- Renewable power **auctions** were held in at least **48** countries
- **FITs** in place in **111** countries
- **No new countries** adopted biofuels mandates
- The number of countries with H&C regulatory policies **fell by 1**

Number of Countries with Renewable Energy Regulatory Policies and Carbon Pricing Policies, 2004-2018

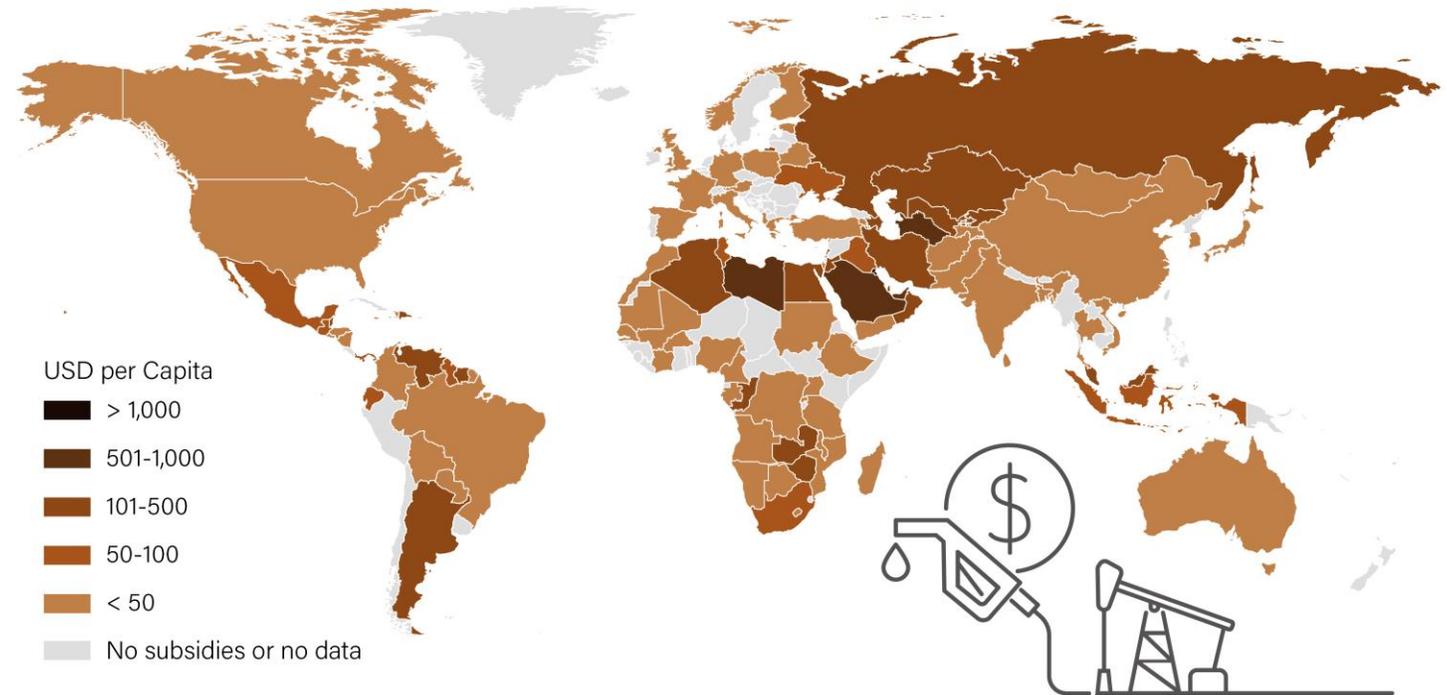


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Not a level playing field: Fossil fuel subsidies are still widespread

- Global subsidies for fossil fuel consumption reached an estimated **USD 300 billion** in 2017
 - an 11% increase from the year before
 - about double the estimated support for renewable power generation
- Fossil fuel subsidies remained in place in at least **115 countries** in 2017
- 73 countries provide subsidies of **more than USD 100 million** each

Fossil Fuel Subsidies, per Person, by Country, 2017



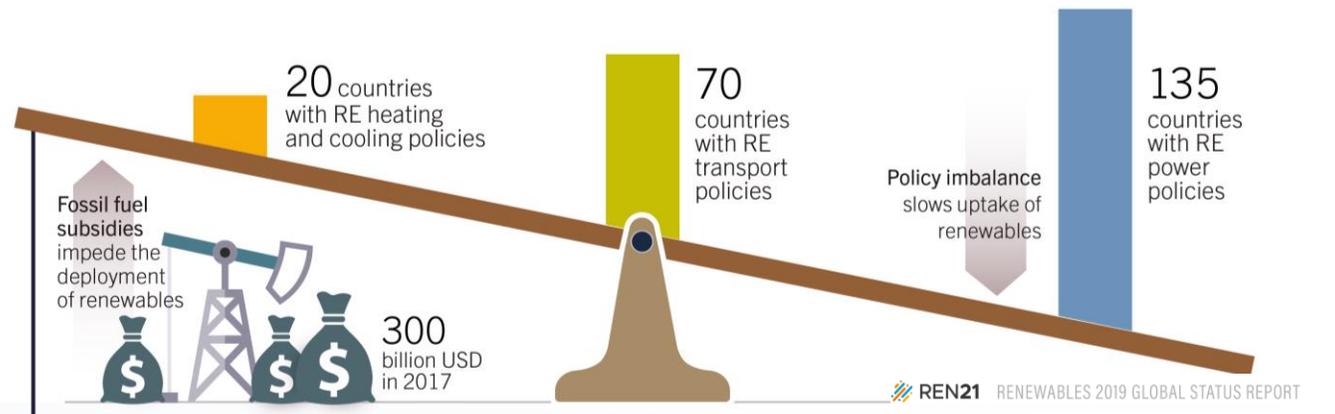
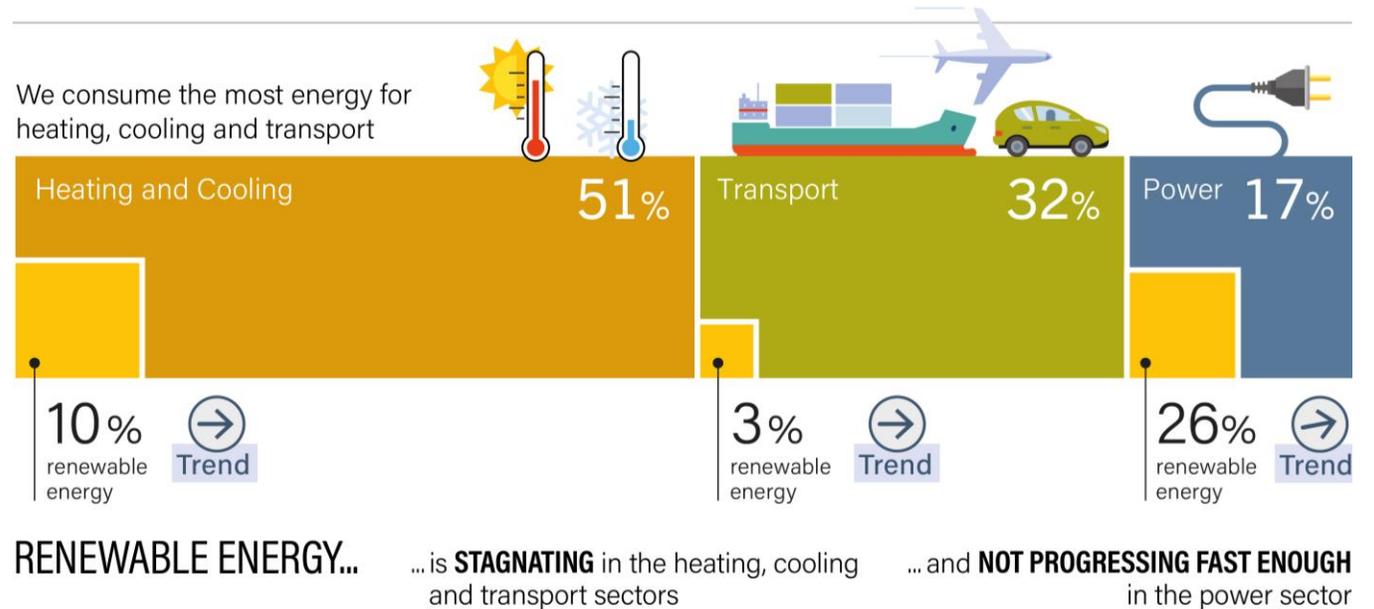
Note: Shading depicts pre-tax consumption subsidies only.

Source: IMF.

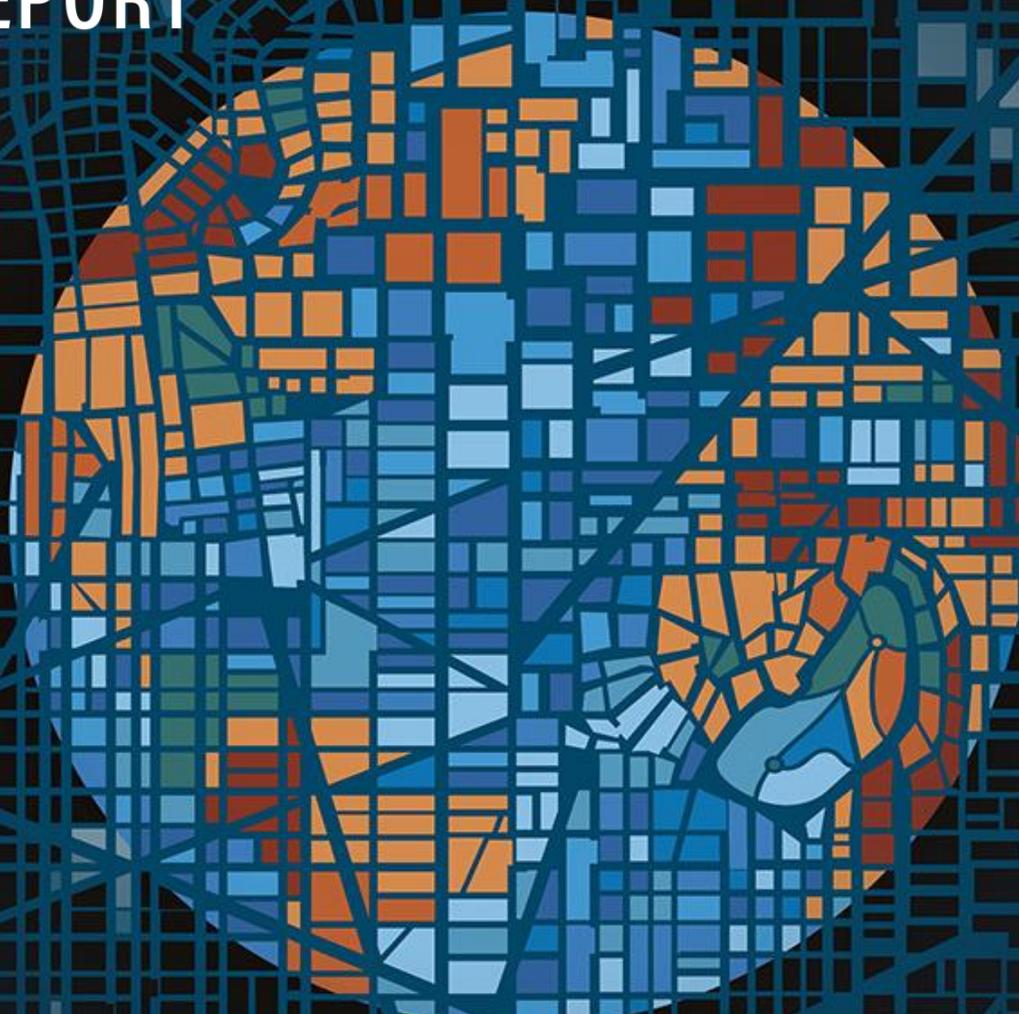
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From an electricity transition to an energy transition

- **Create a level playing field** by removing fossil fuel subsidies and adopting carbon pricing
- **Encourage sector integration** among power, heating and cooling, and transport
- **Align policies** across the national, sub-national and local levels
- **Link to energy efficiency** in renewable energy policy initiatives



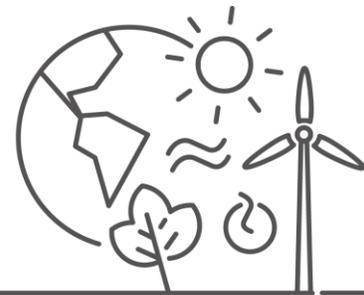
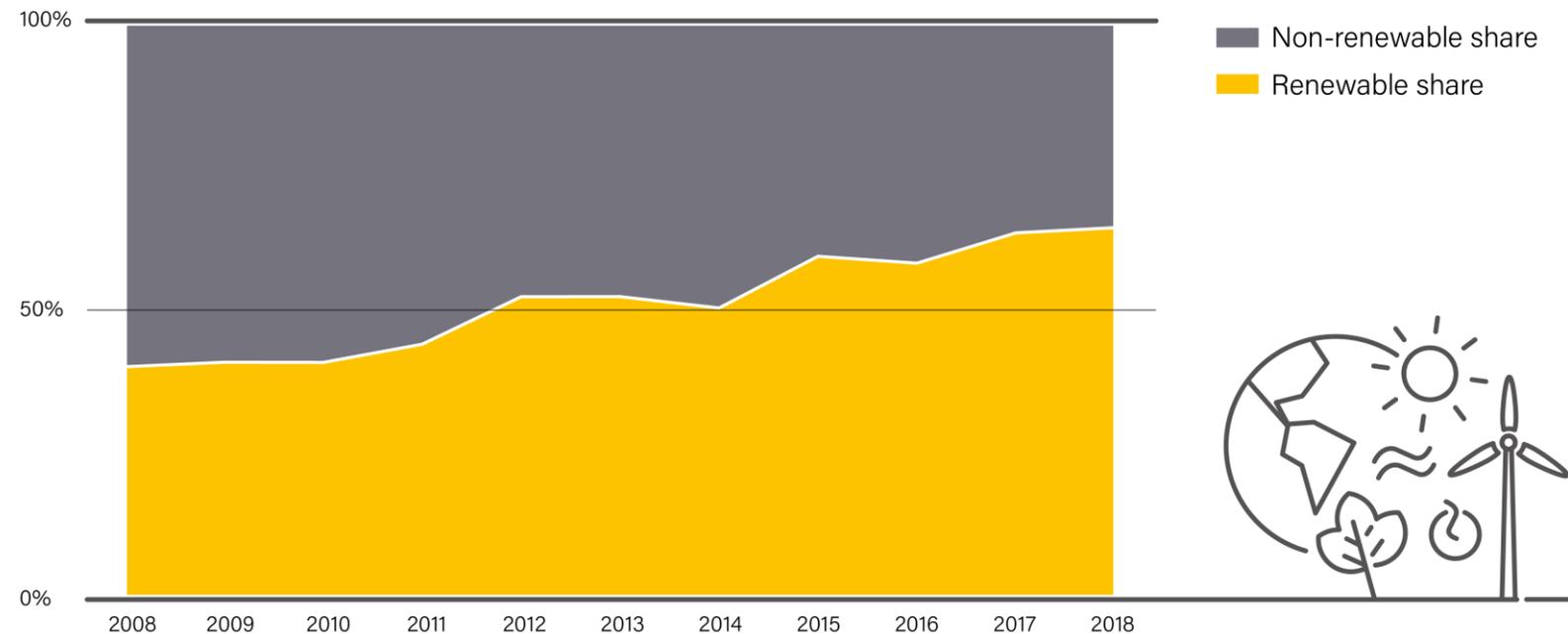
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More renewable power capacity added than fossil fuel and nuclear power

- In 2018, nearly twice as much renewable power capacity added as all other sources, **the highest share ever**
- Fourth consecutive year that net additions of renewable power were **more than 50%**
- 2011 was the last year that clearly more non-renewable capacity was added than renewable

Share of Renewables in Net Annual Additions of Power Generating Capacity, 2008-2018

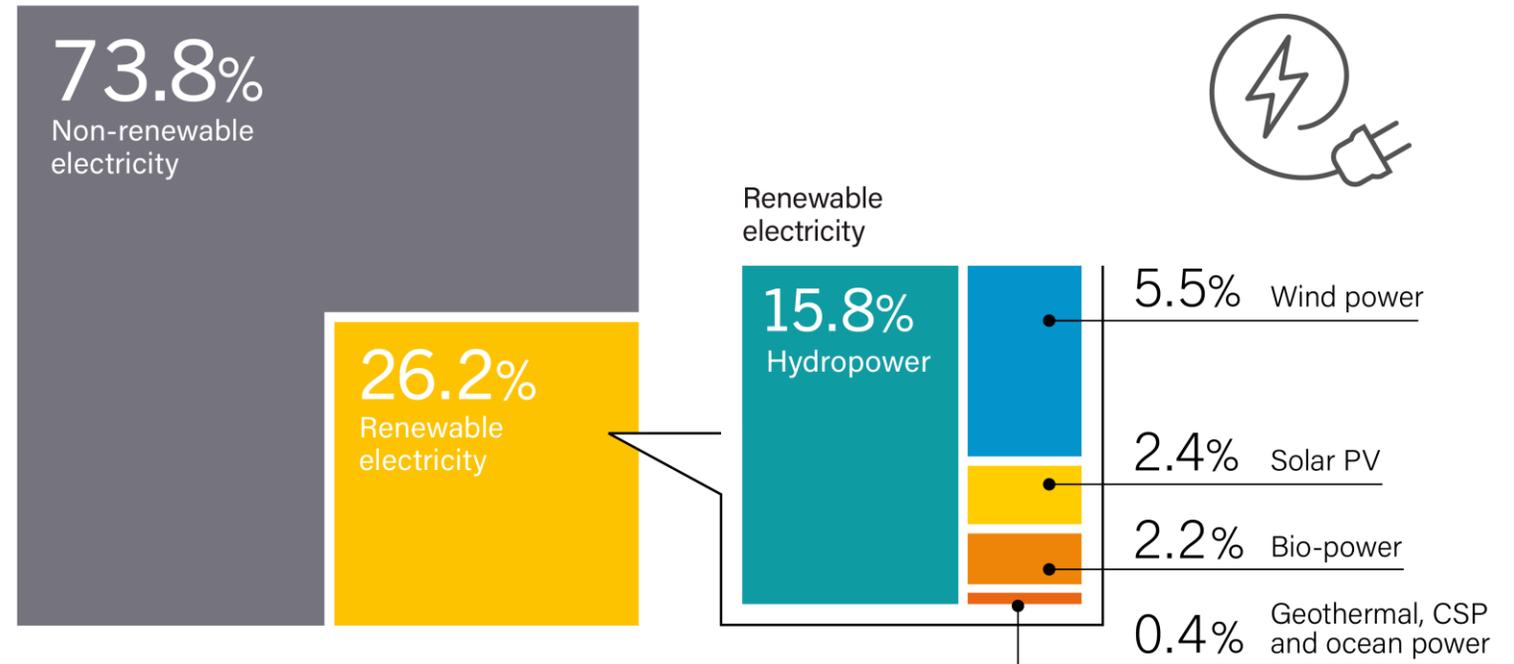


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Power sector leading: Renewables supply more than 26% of global electricity

- Renewables supplied an estimated **26.2%** of global electricity at the end of 2018
- For the first time, more electricity was from solar PV than bio-power
- Strong growth in renewable generation, but rising electricity demand (up 4% in 2018) makes it challenging to achieve larger share

Estimated Renewable Energy Share of Global Electricity Production, End-2018



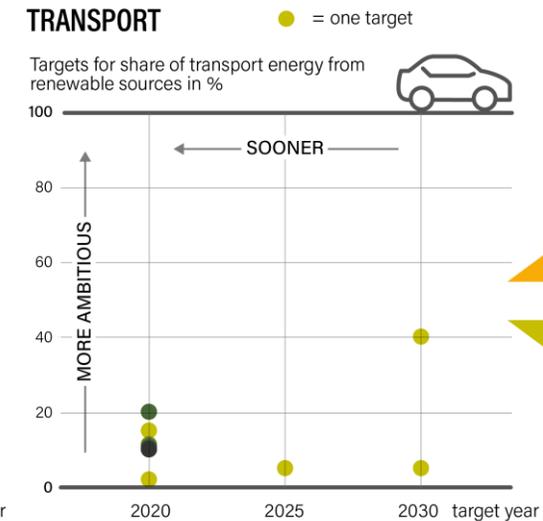
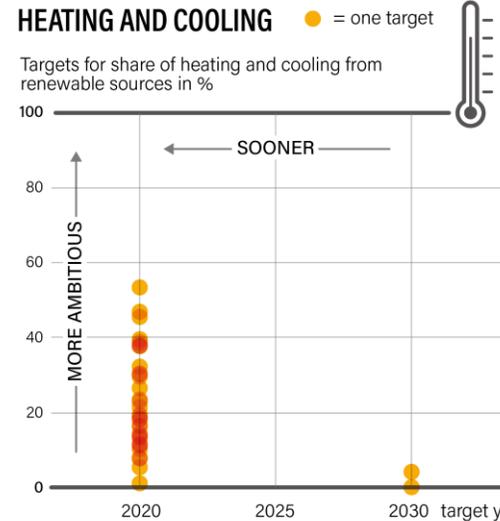
Note: Data should not be compared with previous version of this figure due to revisions in data and methodology.

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Targets uneven across sectors

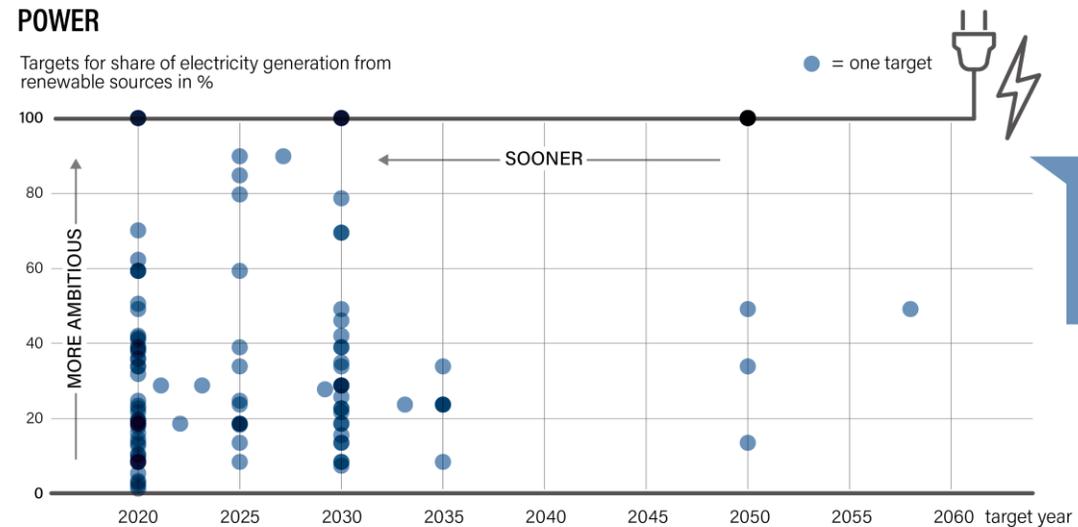
- Targets in the **power sector** remain more ambitious, more numerous than in heating and cooling and transport
- Fewer than **10** countries and states/provinces had economy-wide targets for at least **50%** renewable energy
- Still **only 1** country with a target for 100% renewables in total final energy

National Sector-Specific Targets for Share of Renewable Energy by a Specific Year, by Sector, End-2018



47 countries have national targets for renewable energy in heating and cooling.

45 countries have national targets for renewable energy in transport.

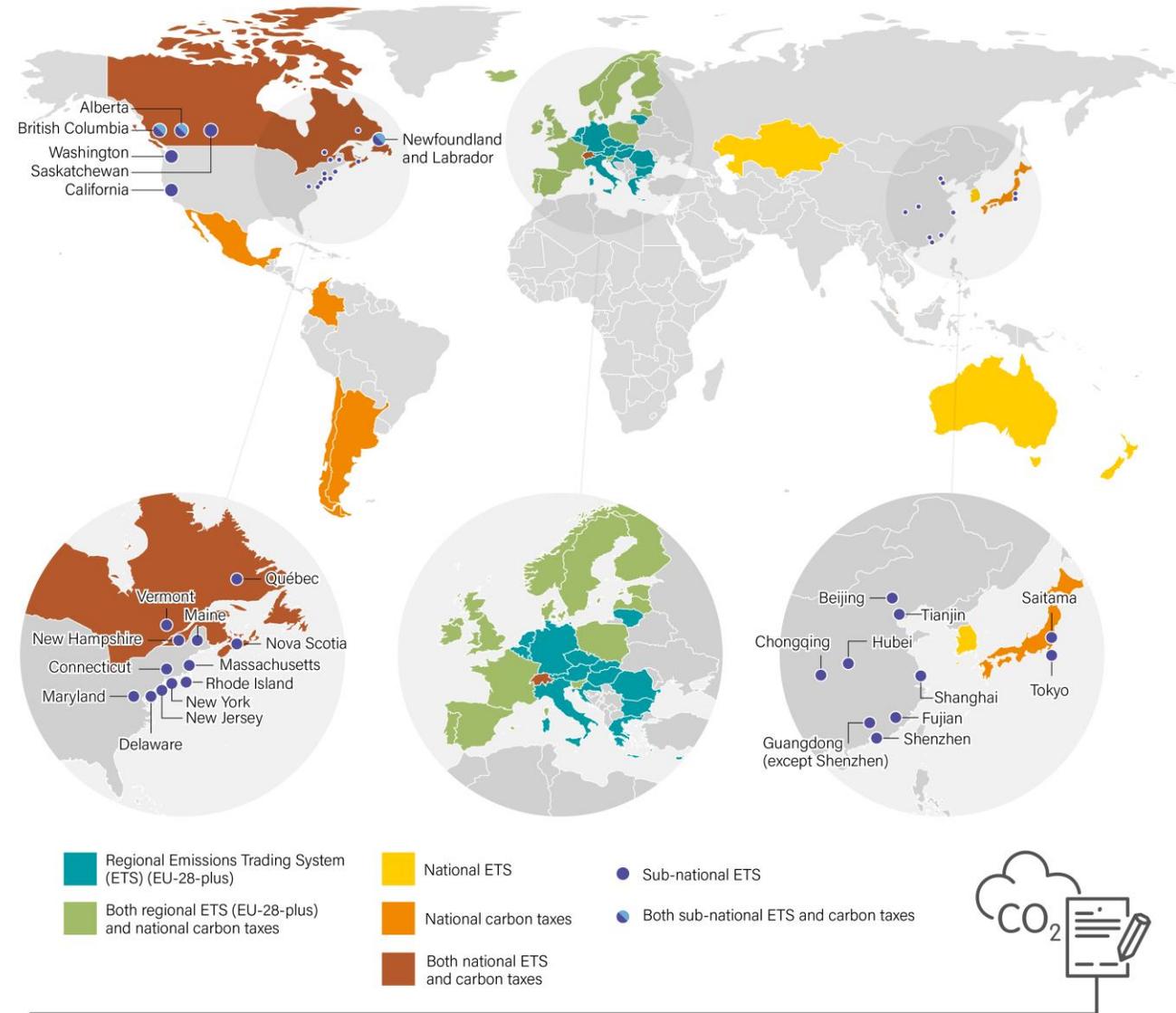


162 countries have national targets for renewable energy in power.

Carbon pricing slowly expanding

- At least **54** carbon pricing initiatives implemented by end-2018
 - 27 emission trading systems
 - 27 carbon taxes
 - Covering 44 countries
- Covering only **13%** of global greenhouse gas emissions

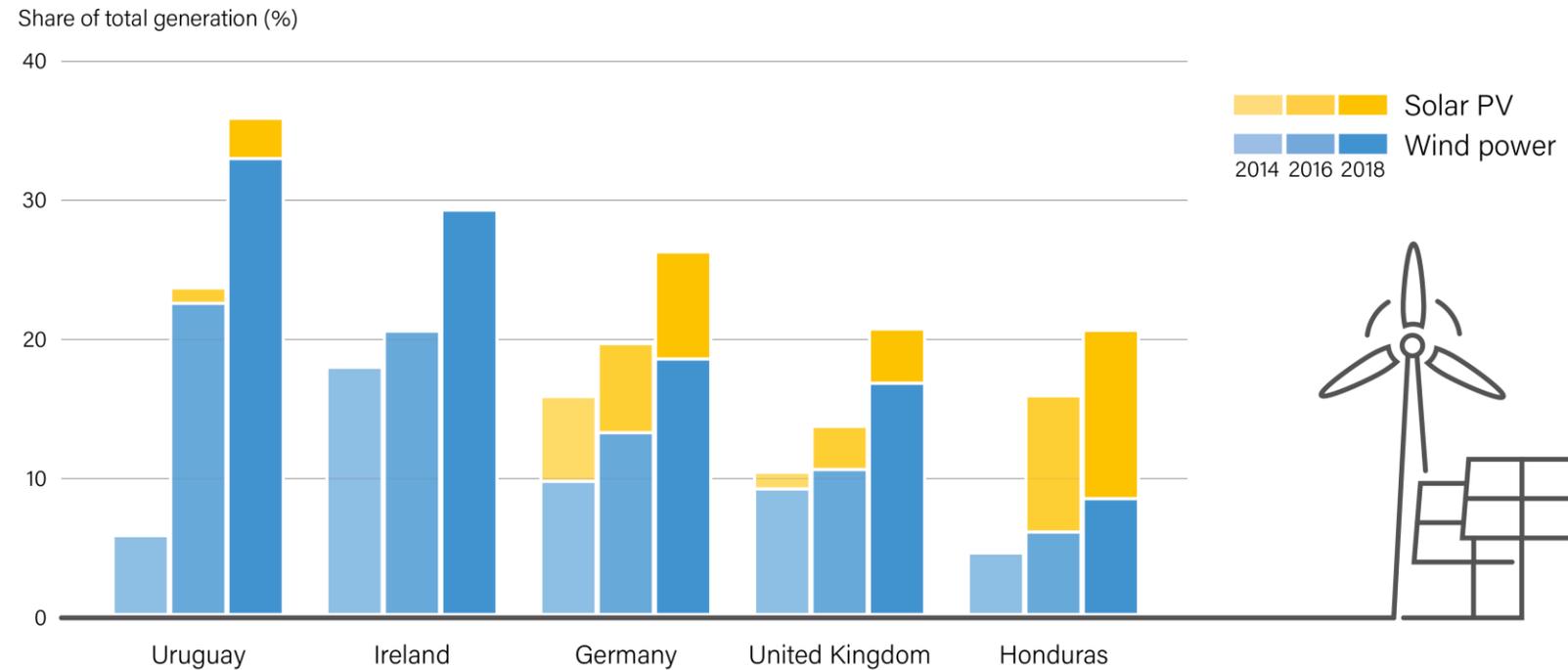
Carbon Pricing Policies, End-2018



Variable renewable shares have grown dramatically in some countries

- The power sector is transforming rapidly in some countries
- Variable renewables have seen penetration rates **above 20%** in at least nine countries in 2018
- Average annual growth rates of **more than 10%** in at least five countries

Share of Electricity Generation from Variable Renewable Energy, Selected Countries, 2014, 2016, 2018



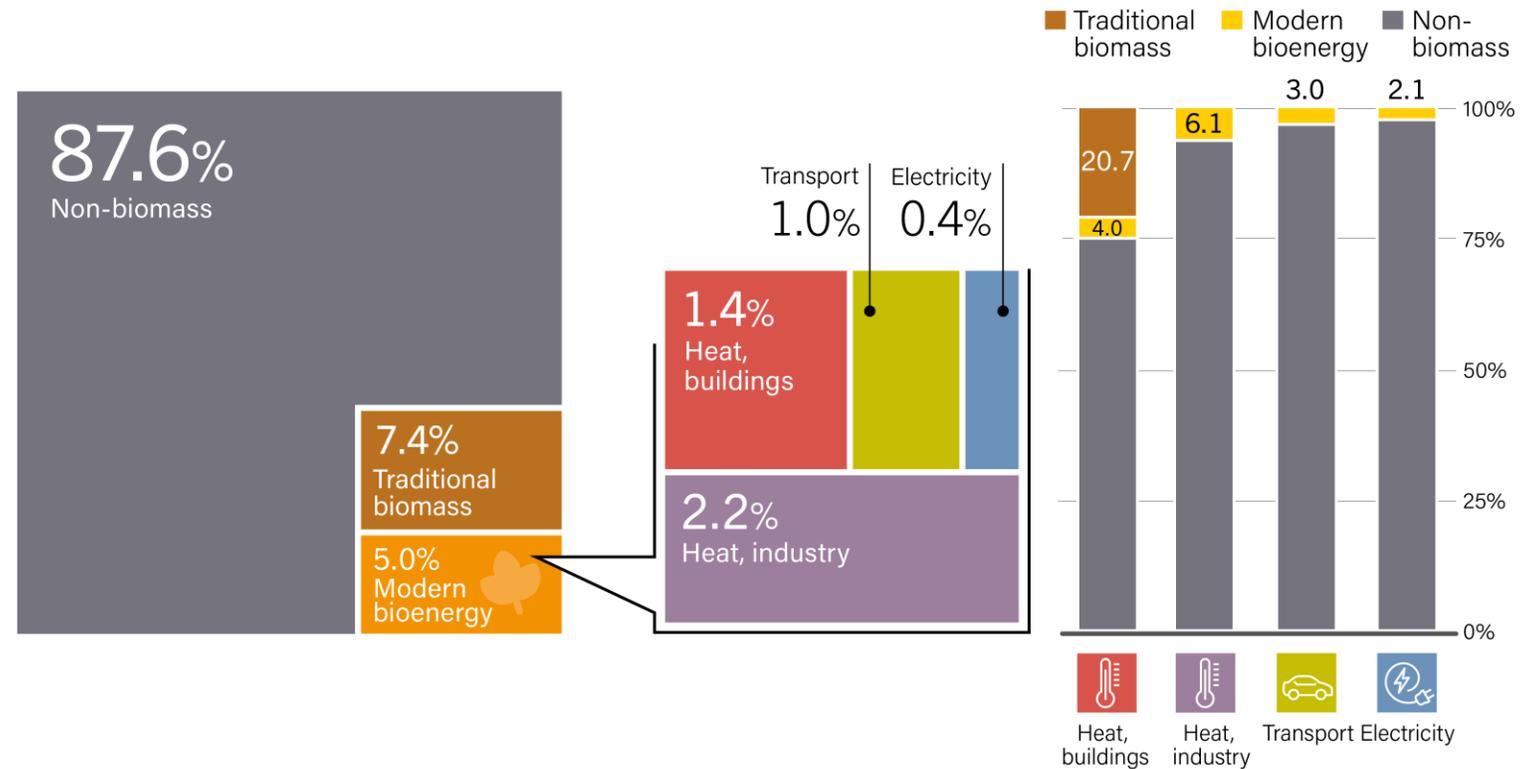
Note: This figure includes selected countries with high shares of variable renewable energy according to the best available data at the time of publication. Factors including annual weather variations may significantly impact generation from VRE in a particular year. Trends shown are not meant to imply assumed future growth of generation shares.

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Bioenergy remains largest contributor to global renewable energy supply

- Modern bioenergy contributed **5%** to total final energy consumption
- Growing at a rate of **9% per year** in electricity sector, 7% in transport, 1.8% in heat
- Contribution by sector
 - 13.3 EJ in global supply of heat
 - 3.5 EJ in transport
 - 1.6 EJ in electricity

Estimated Shares of Bioenergy in Total Final Energy Consumption, Overall and by End-Use Sector, 2017



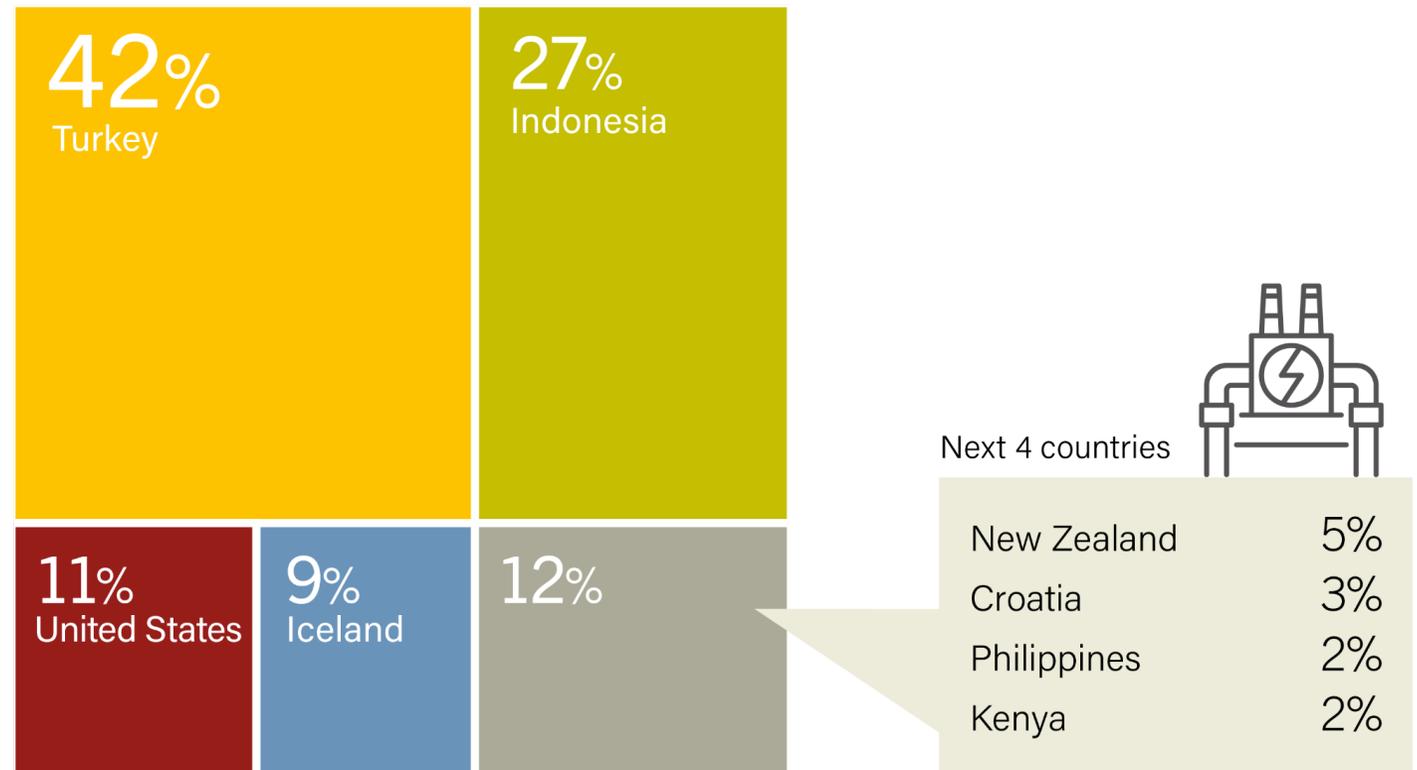
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Source: OECD/IEA.

Geothermal power capacity growing gradually

- **0.5 GW** of new geothermal power capacity came online in 2018
- Global total reached **13.3 GW**
- Turkey and Indonesia added **two-thirds** of new capacity

Geothermal Power Capacity Global Additions, Share by Country, 2018

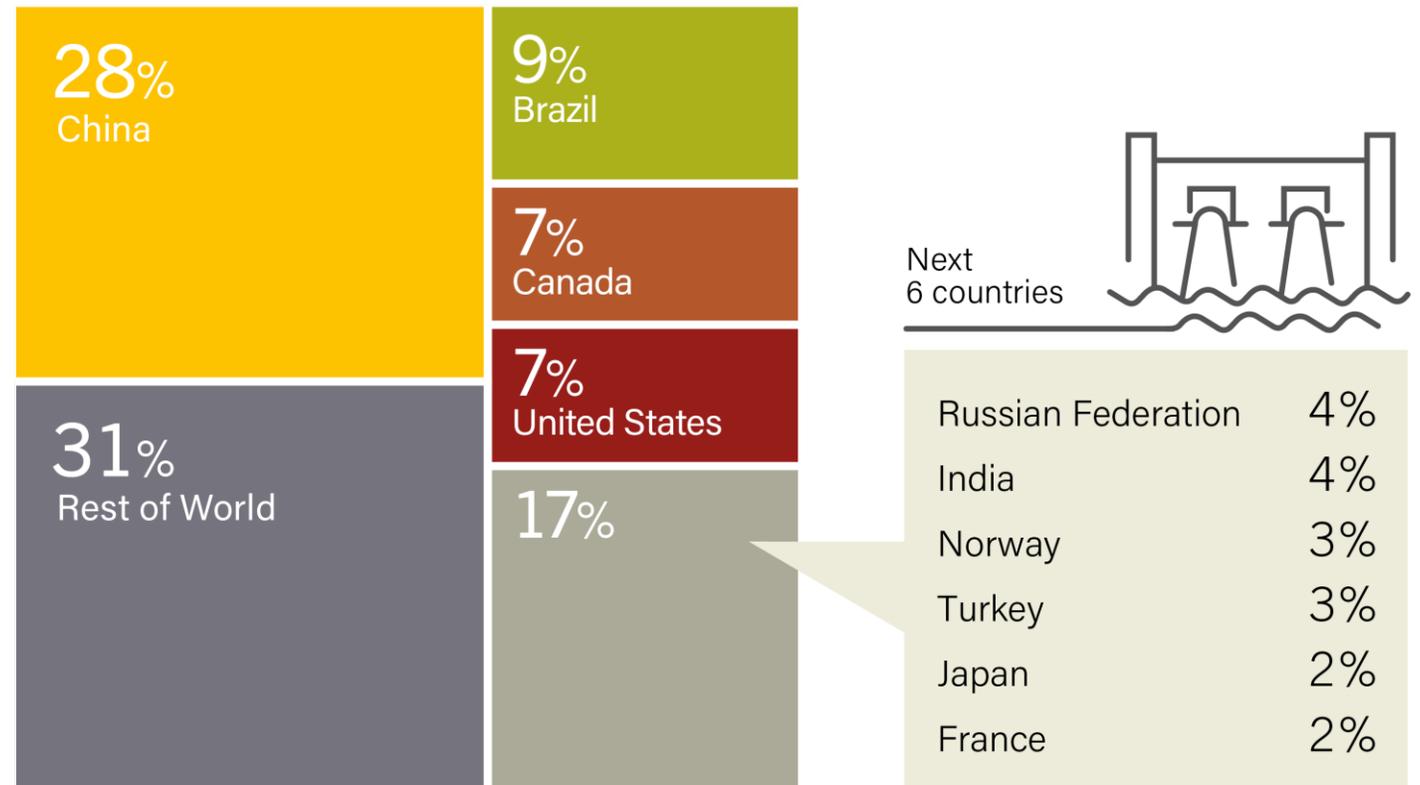


Note: Total may not add up due to rounding.

Hydropower characterised by market stability

- **20 GW** were added to reach a total of **1,132 GW** by end-2018
- China continues to lead the market, followed by Brazil, Canada, and the US
- Generation estimated at **4,210 TWh** in 2018

Hydropower Global Capacity, Shares of Top 10 Countries and Rest of World, 2018

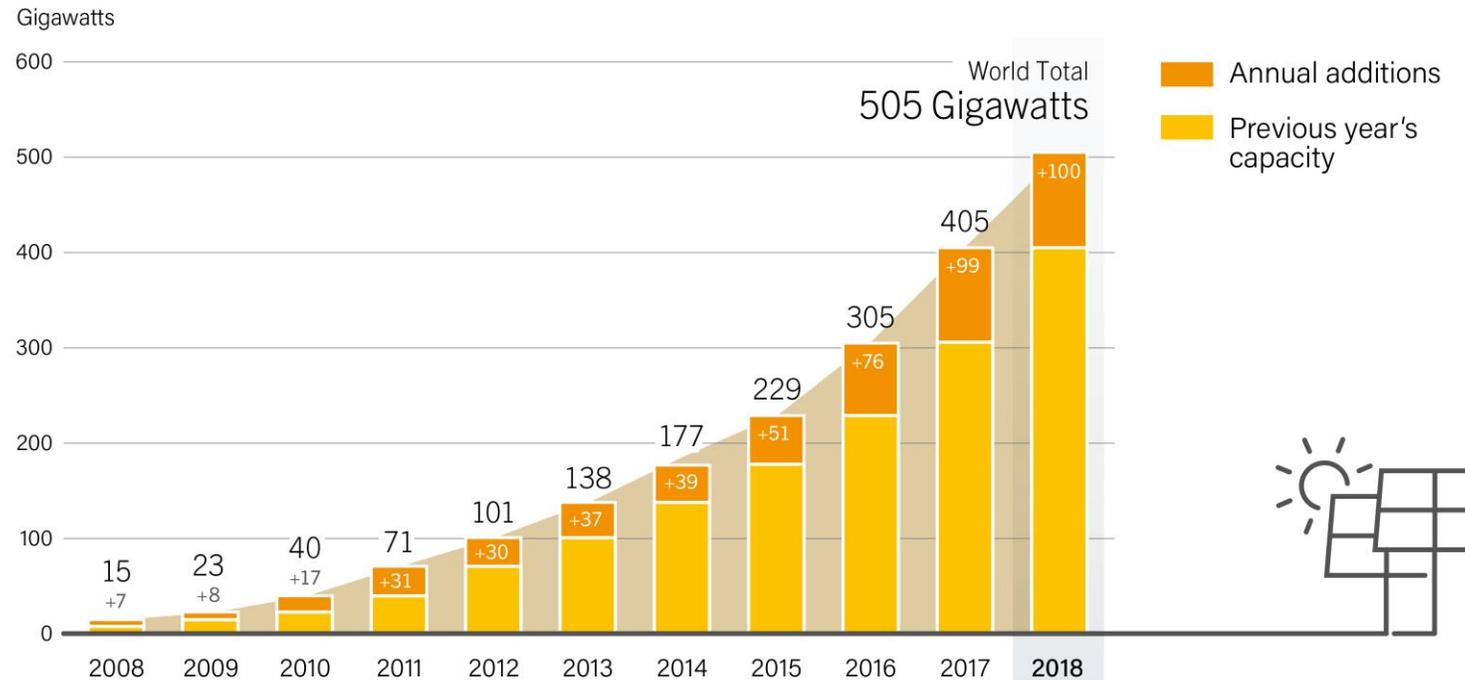


Note: Total may not add up due to rounding.

Solar PV capacity additions pass 100 GW mark

- Solar PV capacity additions were **more than 100 GW** for the first time
- Cumulative capacity reached **505 GW**, an increase of **25%** from 2017
- **11** countries added more than 1 GW in 2018

Solar PV Global Capacity and Annual Additions, 2008-2018



Note: Data are provided in direct current (DC). Totals may not add up due to rounding.

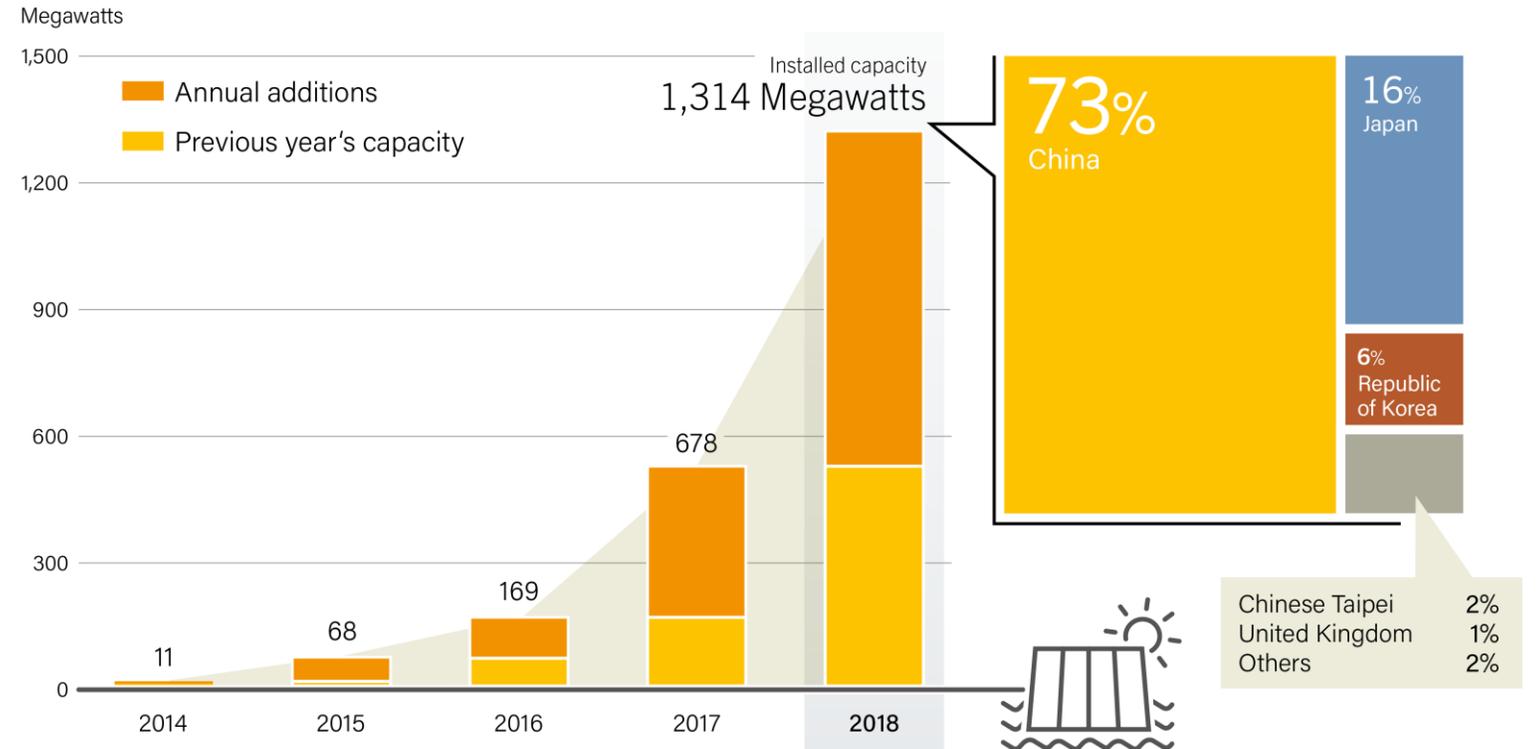
Source: Becquerel Institute and IEA PVPS.

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Floating solar PV cumulative capacity passes 1 GW mark

- In 2018, installed capacity of Floating PV crossed the **1 GW** mark
- Floating PV systems exist in at least **29** countries in nearly every world region
- Top markets include China, Japan, Republic of Korea, Chinese Taipei, and UK

Floating Solar PV Global Capacity and Annual Additions, 2008-2018, and Top Countries, End-2018



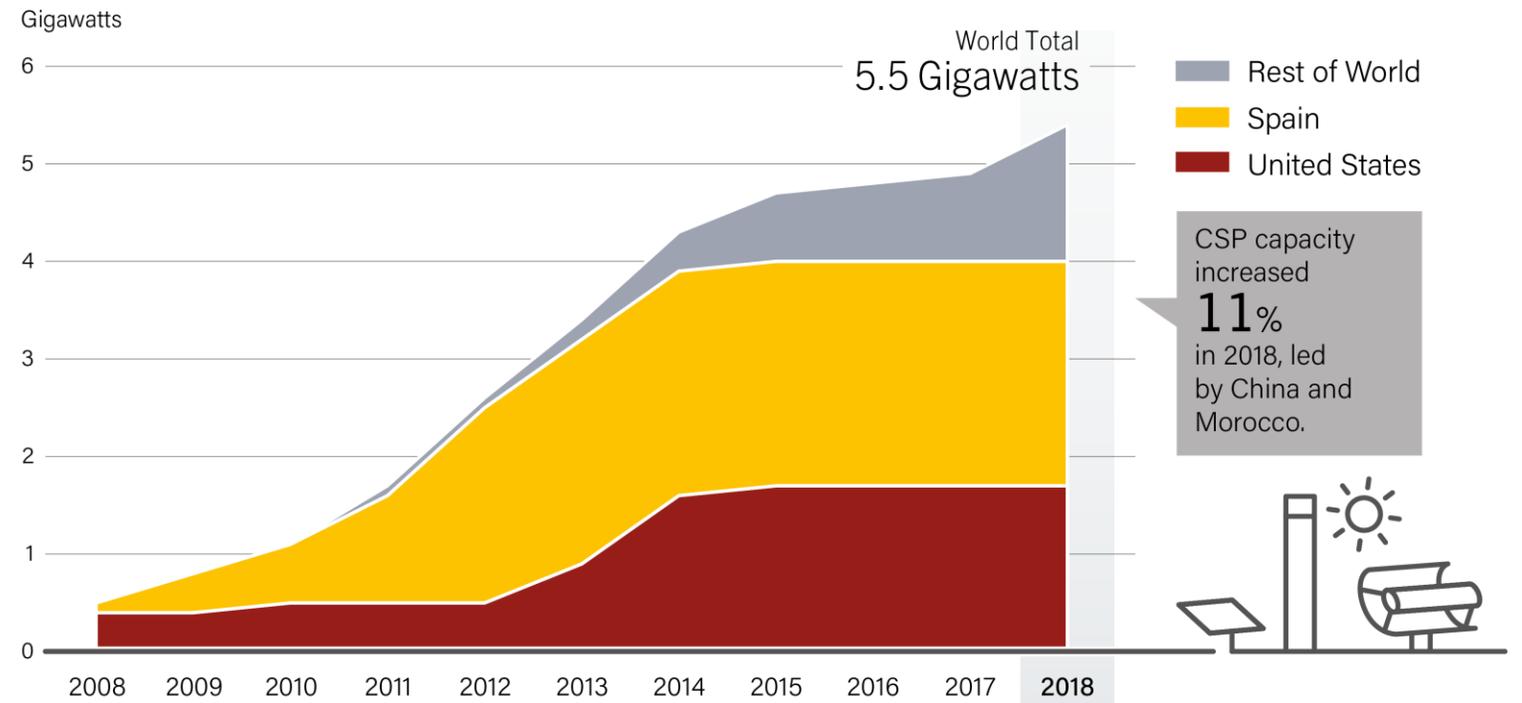
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Source: World Bank Group, ESMAP and SERIS.

New CSP additions installed exclusively in emerging markets

- An estimated **550 MW** of CSP came online in 2018,
 - 11% increase in cumulative global capacity
 - Total reached just under 5.5 GW
- **4 GW** of total installed capacity is located in Spain and the United States
- For the **third consecutive year**, new capacity came online only in **emerging markets**

Concentrating Solar Thermal Power Global Capacity, by Country and Region, 2008-2018

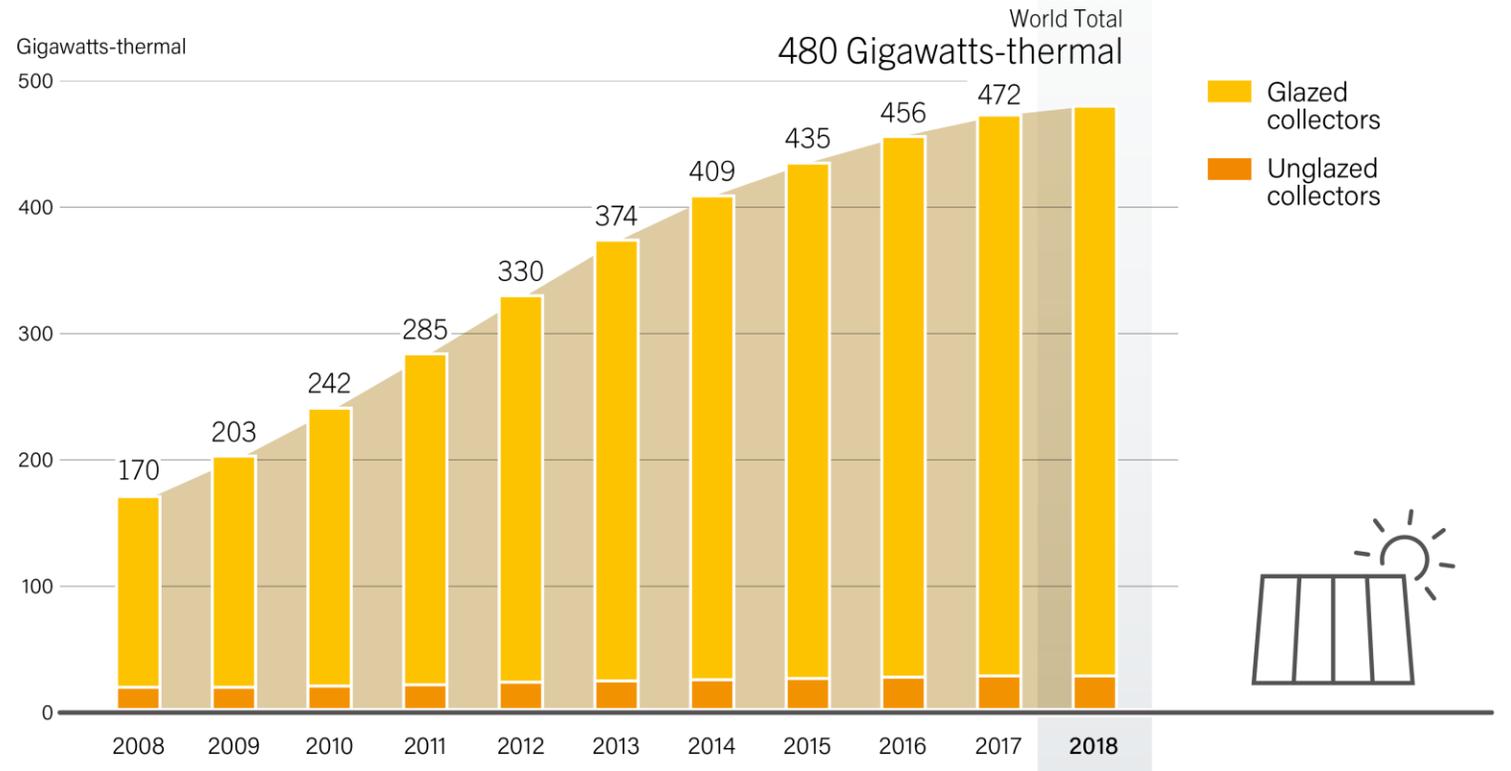


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Growth rate slows for solar water heating capacity additions

- Cumulative global operating capacity for solar water heating collectors increased **2%** to reach **480 GW_{th}**
- The majority of this capacity is glazed collectors
- The 2018 increase of **8 GW_{th}** is the smallest in the last ten years

Solar Water Heating Collectors Global Capacity, 2008-2018



Note: Data are for glazed and unglazed solar water collectors and do not include concentrating and air collectors.

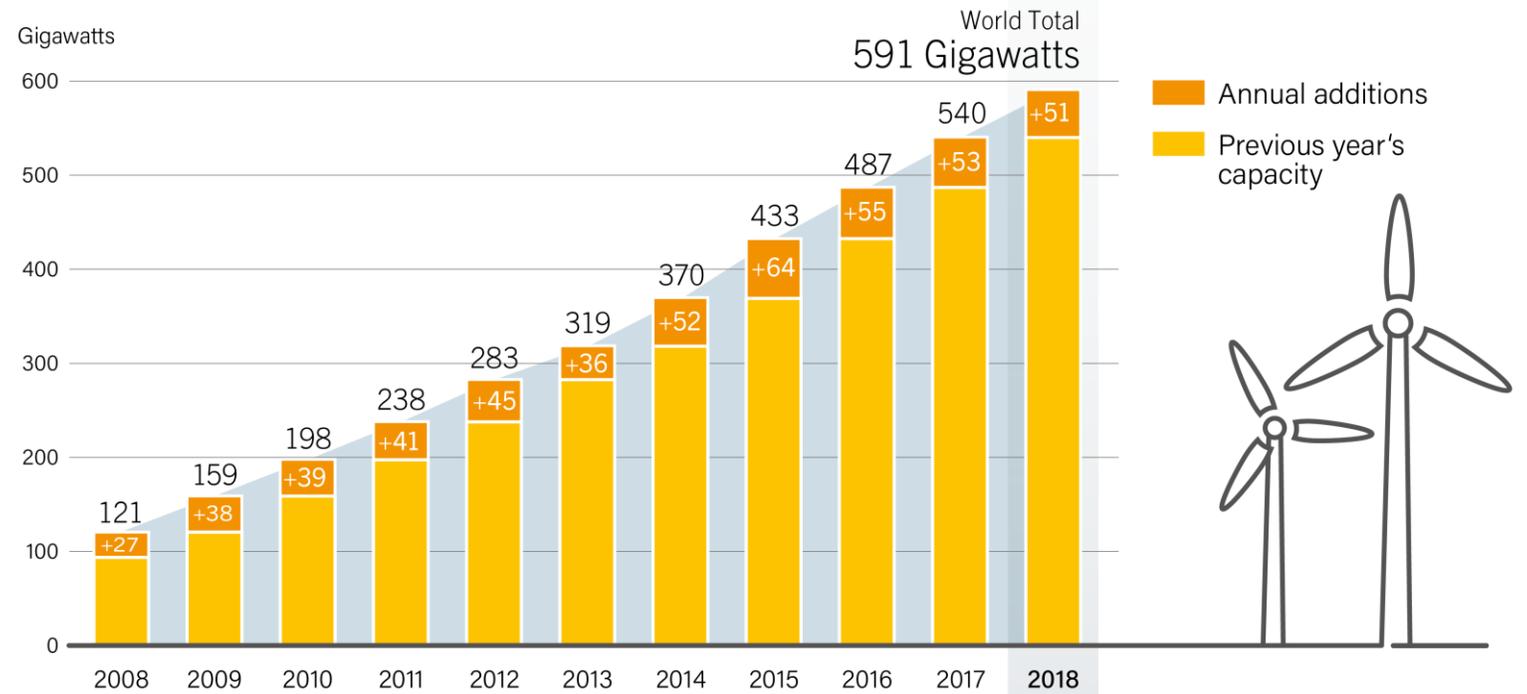
Source: IEA SHC.

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Wind power capacity continues to increase steadily year-on-year

- The additions in 2018 pushed cumulative capacity up **9%** to **591 GW**
- Of the **51 GW added**, nearly 47 GW was onshore and 4.5 GW was offshore
- This was the fifth consecutive year with annual additions **exceeding 50 GW**, but also the third year of decline following the peak in 2015

Wind Power Global Capacity and Annual Additions, 2008-2018



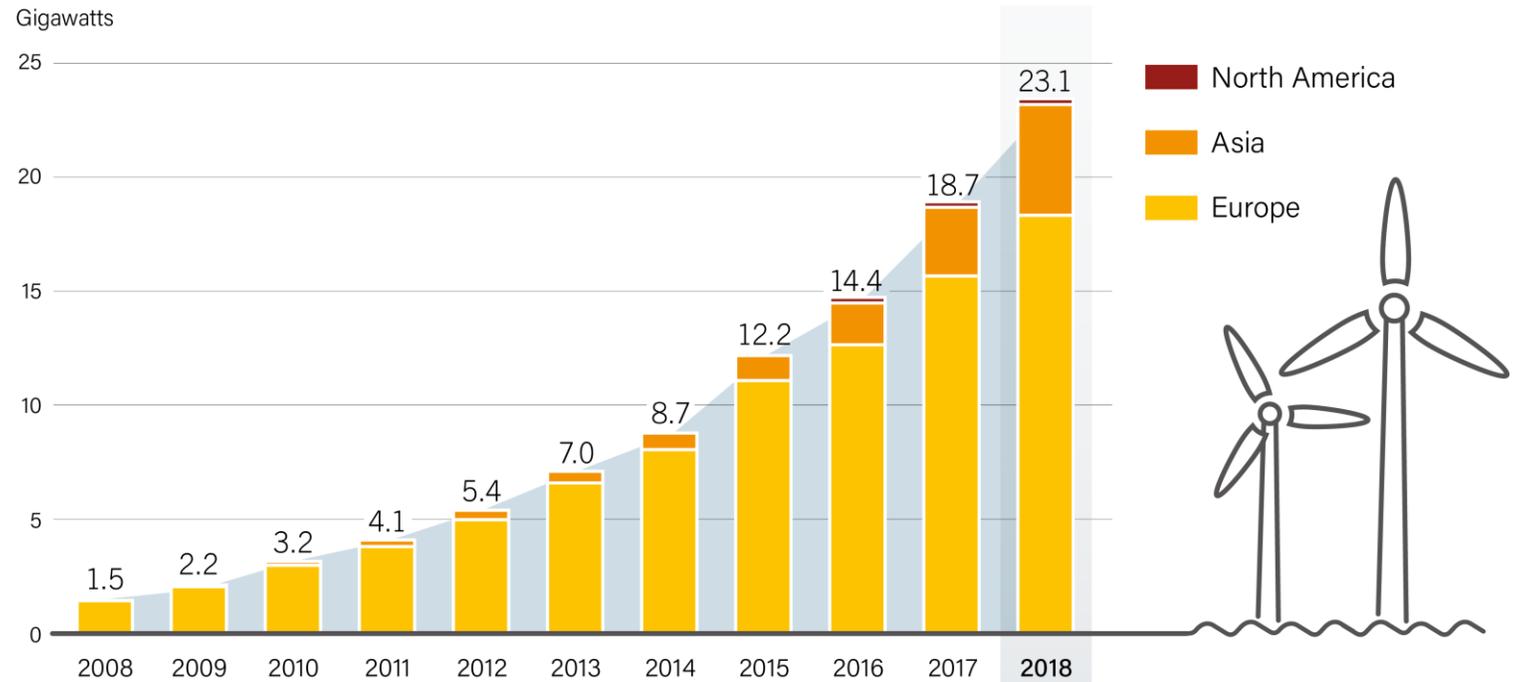
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Source: GWEC.

Success of offshore wind in Europe has sparked interest elsewhere

- By the end of 2018, **17** countries had offshore wind capacity
- The United Kingdom leads with **8 GW** of installed capacity
- In 2018, seven countries in Europe and two in Asia connected **4.5 GW**, increasing global cumulative capacity **24%**
- Europe accounts for about **79%** of global capacity

Wind Power Offshore Global Capacity by Region, 2008-2018



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