

# RENEWABLES 2019

## GLOBAL STATUS REPORT



18 June 2019  
REN21 Secretariat  
[gsr@ren21.net](mailto:gsr@ren21.net)

# 2019

# REN21: A vision, information, a story and passionate players to shape the debate and build a **sustainable energy future with renewables**

## NGOs:

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

## Industry Associations:

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



## Science & Academia:

AEE INTEC, Fundacion Bariloche, IIASA, ISES, NREL, SANEDI, TERI

## Governments:

Afghanistan, Brazil, Denmark, Germany, India, Mexico, Norway, South Africa, Spain, UAE, USA

## Inter-governmental Organisations:

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

# Evidence and knowledge to shape the global energy debate



*Global Status Report:  
yearly publication since 2005*



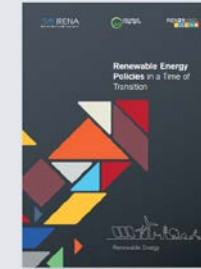
*Renewables in Cities  
Status Report:*



*Regional Reports*



*Global Futures  
Reports*



*Thematic Reports*



# 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.

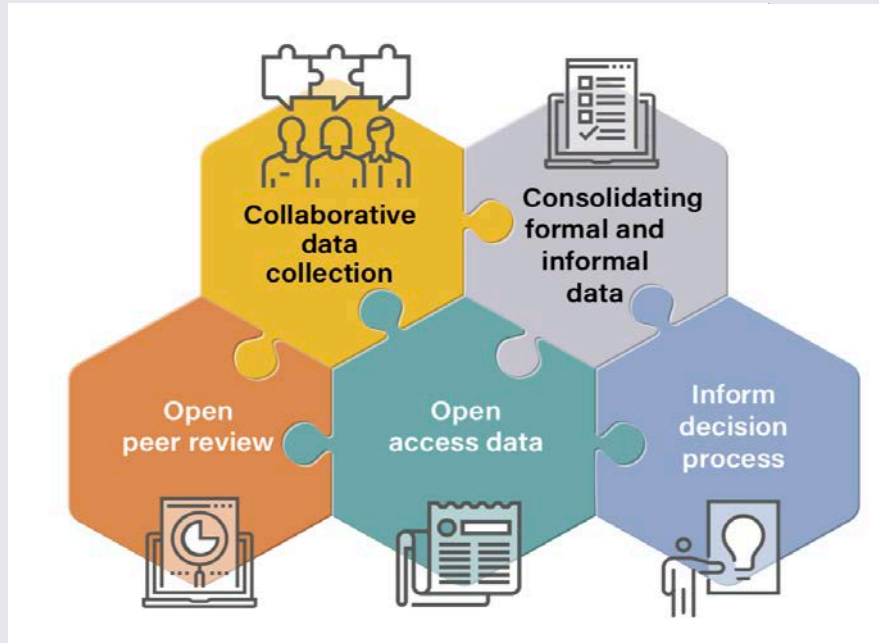


45%

of these were new experts.

# REN21 Data and Reporting Culture

Collaborative annual reporting since 2005 building on **international expert community**.






- Build on multi-stakeholder expert community that allows to consolidated **disperse information**
- Consolidate **formal and informal data** that is validated in an open peer-review process
- Full **transparency** on sources
- Peer review as **colleborative validation** process
- Provide fact-based evidence and develop a supportive narrative to shap the global debate

# Another strong year for renewable energy

- **Total global capacity rose 8% in 2018**
  - 2,378 GW capacity including hydropower
- **Non-hydro capacity grew 15%**
  - 1,246 GW by the end of 2018
- **181 GW of renewable power additions led by**
  - Solar PV with 100 GW (55% of new additions)
  - Wind power: 51 GW (28%)
  - Hydropower: 20 GW (11%)
- **Global reach of renewable power:**
  - over 90 countries have more than 1 GW
  - over 30 countries have more than 10 GW

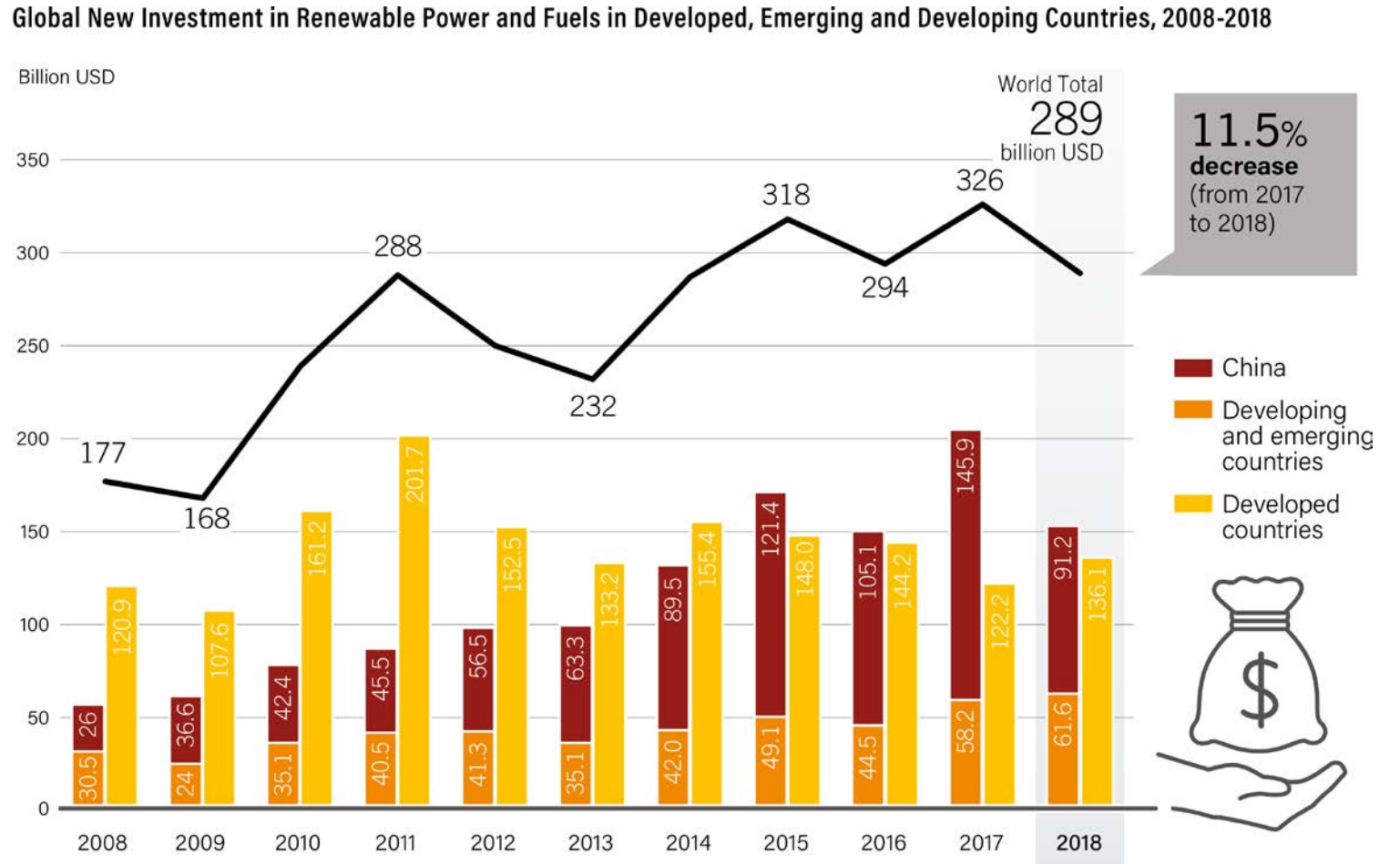
## RENEWABLE ENERGY INDICATORS 2018

		2017	2018
<b>INVESTMENT</b>			
New investment (annual) in renewable power and fuels <sup>1</sup>	billion USD	326	<b>289</b>
<b>POWER</b>			
Renewable power capacity (including hydropower)	GW	2,197	<b>2,378</b>
Renewable power capacity (not including hydropower)	GW	1,081	<b>1,246</b>
 Hydropower capacity <sup>2</sup>	GW	1,112	<b>1,132</b>
 Wind power capacity	GW	540	<b>591</b>
 Solar PV capacity <sup>3</sup>	GW	405	<b>505</b>
 Bio-power capacity	GW	121	<b>130</b>
 Geothermal power capacity	GW	12.8	<b>13.3</b>
 Concentrating solar thermal power (CSP) capacity	GW	4.9	<b>5.5</b>
 Ocean power capacity	GW	0.5	<b>0.5</b>
 Bioelectricity generation (annual)	TWh	532	<b>581</b>
<b>HEAT</b>			
 Solar hot water capacity <sup>4</sup>	GW <sub>th</sub>	472	<b>480</b>
<b>TRANSPORT</b>			
 Ethanol production (annual)	billion litres	104	<b>112</b>
 FAME biodiesel production (annual)	billion litres	33	<b>34</b>
 HVO biodiesel production (annual)	billion litres	6.2	<b>7.0</b>

 **REN21** RENEWABLES 2019 GLOBAL STATUS REPORT

# 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**



REN21 RENEWABLES 2019 GLOBAL STATUS REPORT

Source: BNEF.

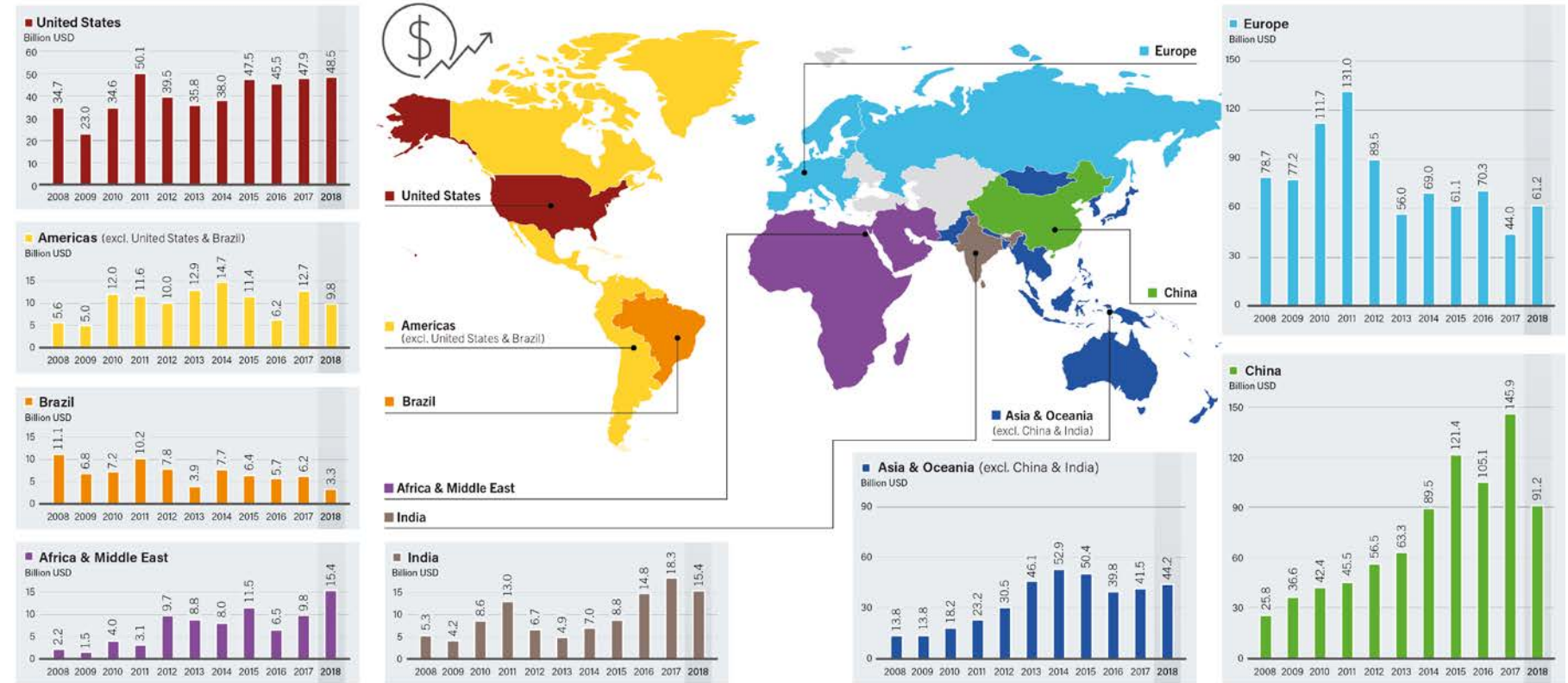
# Investment fell sharply in China, rose elsewhere

→ Investment varied by region:

- Rising in Europe, the Middle East and Africa, Asia and the United States
- Falling in the Americas, China and India

→ China accounted for majority of investment despite the decline in its market

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).

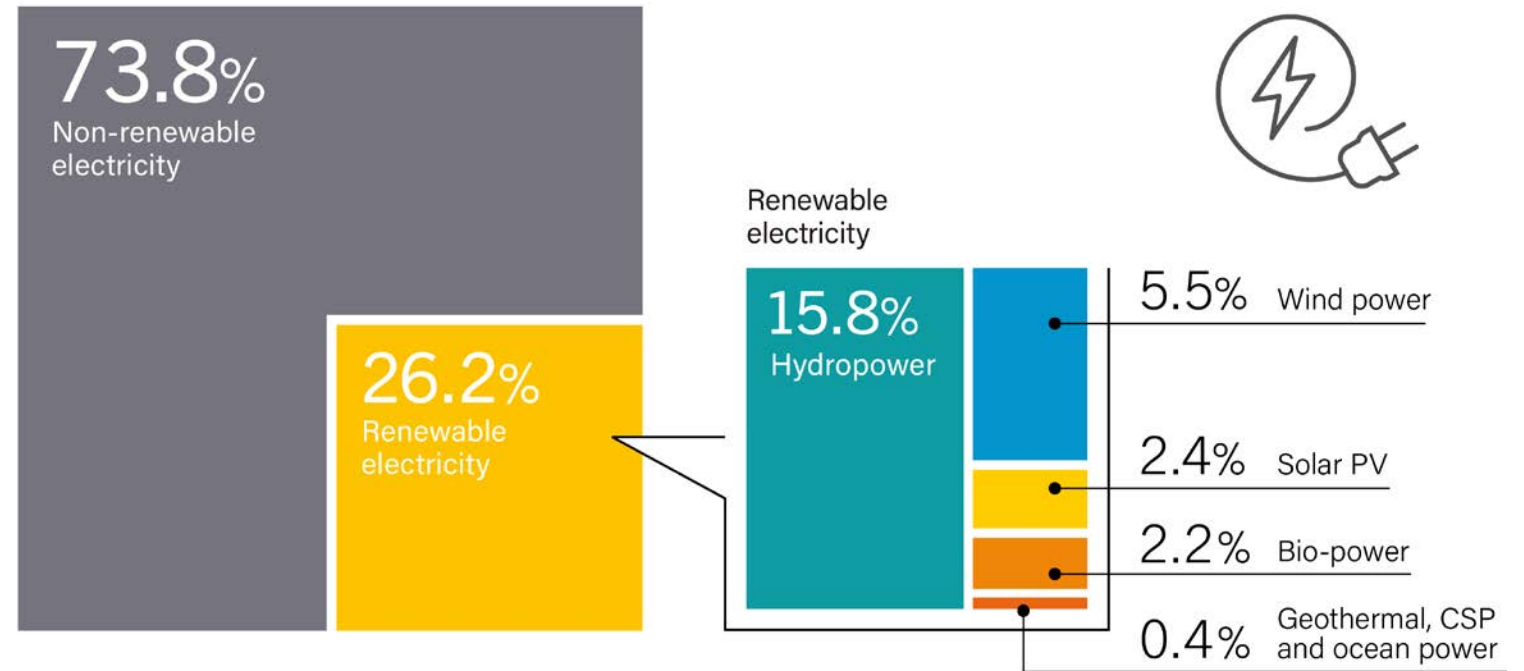
Source: BNEF.



# 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



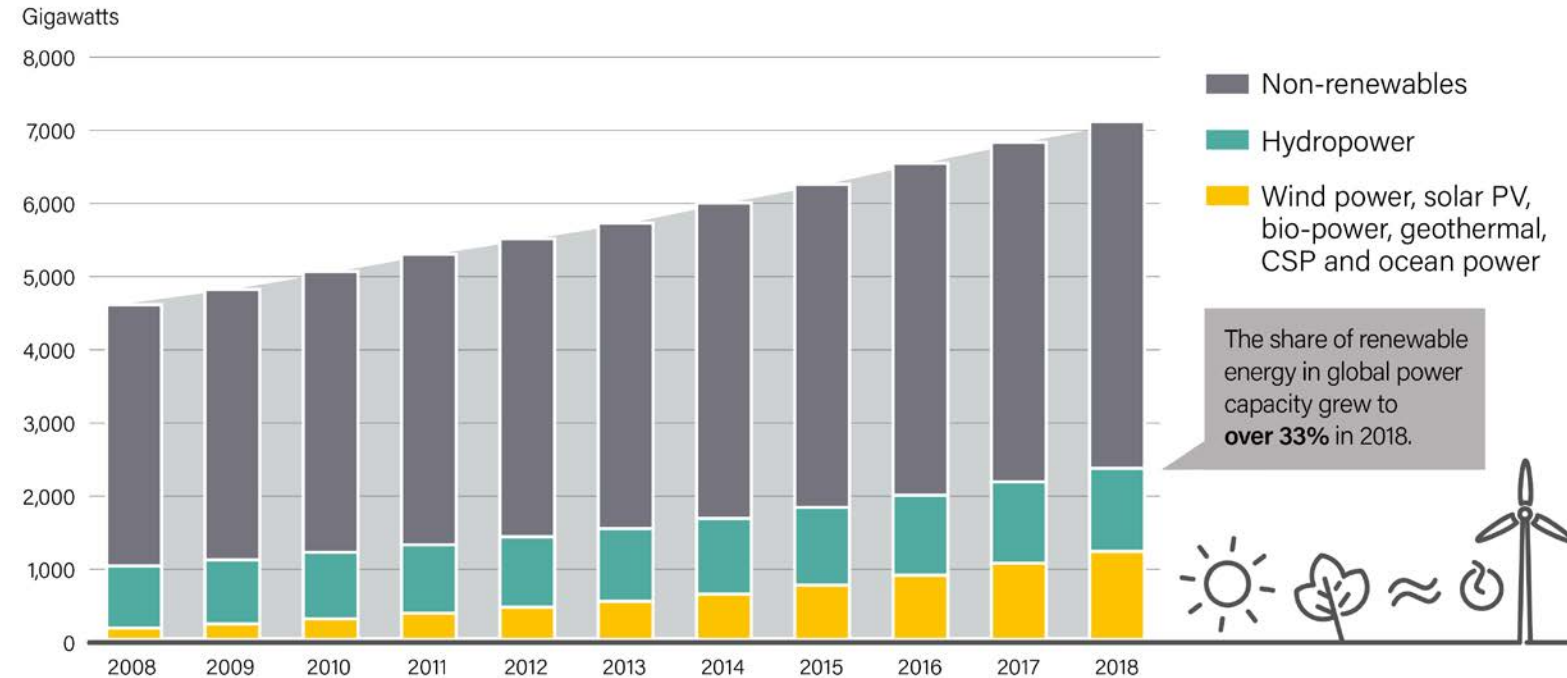
Note: Data should not be compared with previous version of this figure due to revisions in data and methodology.

 REN21 RENEWABLES 2019 GLOBAL STATUS REPORT

# Renewable power now makes up over one-third of global capacity

- Renewable energy is now **more than 33%** of global installed power generating capacity
- Within renewable capacity, hydropower (1,132 GW) no longer makes up half of installed capacity
- Wind power (592 GW) accounts for 25% and solar PV (505 GW) covers over 21%
- Remaining 6% of bio-power, geothermal power, CSP and ocean

Global Power Generating Capacity, by Source, 2008-2018



REN21 RENEWABLES 2019 GLOBAL STATUS REPORT

# 181 gigawatts of renewable power added in 2018

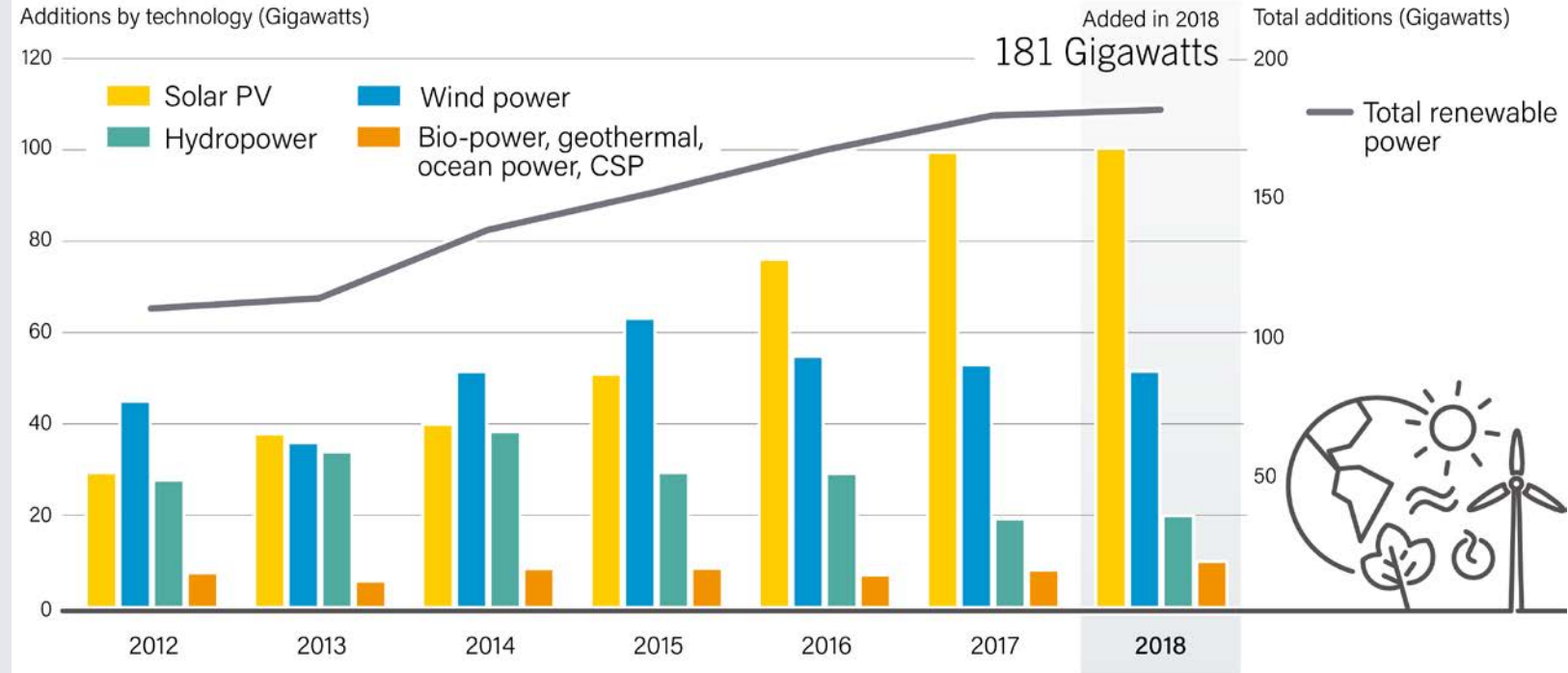
→ Around **55%** of these new additions were solar PV

→ 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 **4<sup>th</sup>** consecutive year that **more than 50 GW of wind power** was added

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



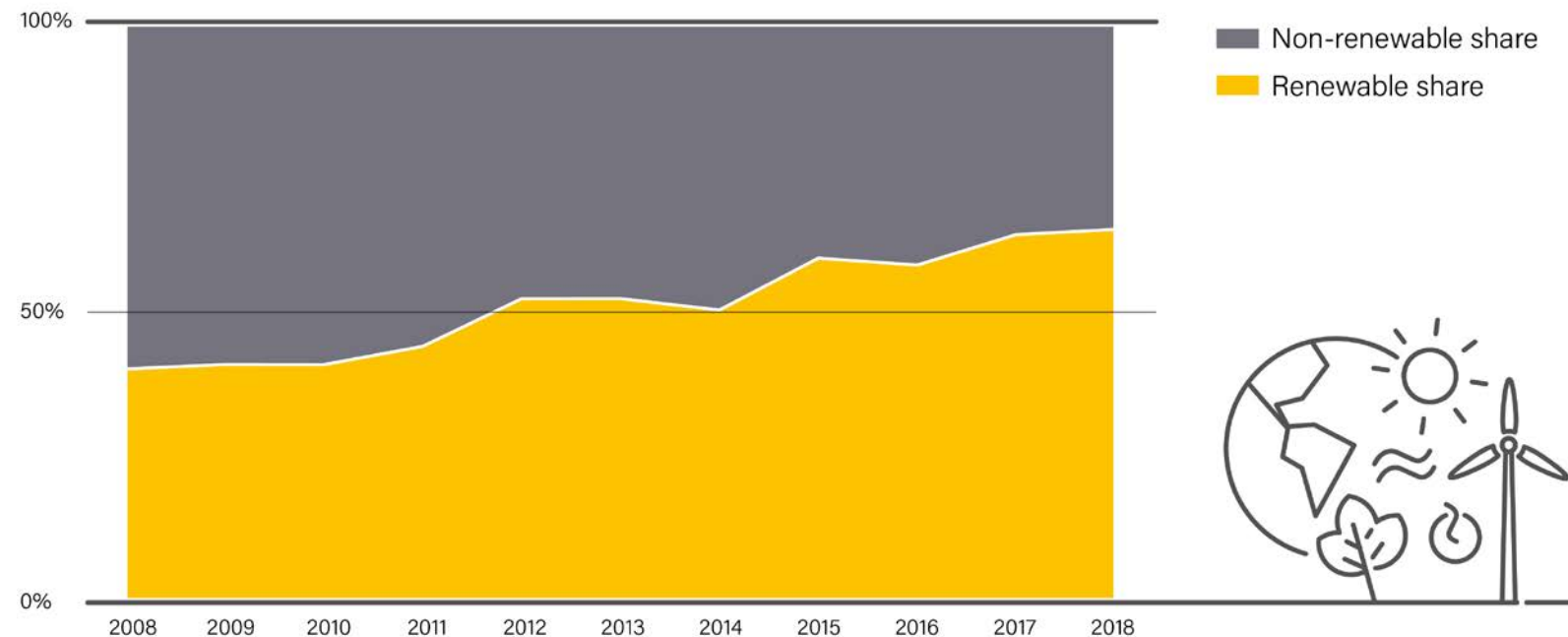
Note: Solar PV capacity data are provided in direct current (DC).

REN21 RENEWABLES 2019 GLOBAL STATUS REPORT

# 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

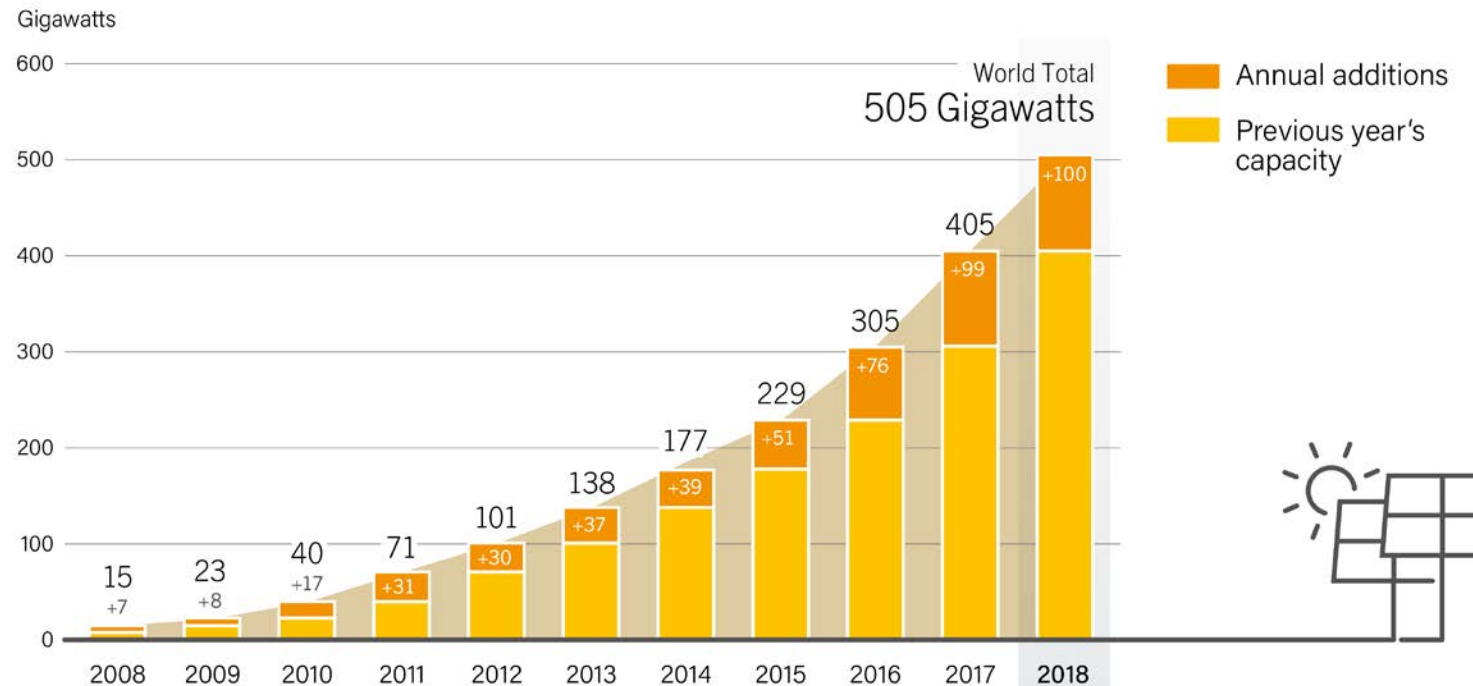


REN21 RENEWABLES 2019 GLOBAL STATUS REPORT

# 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.

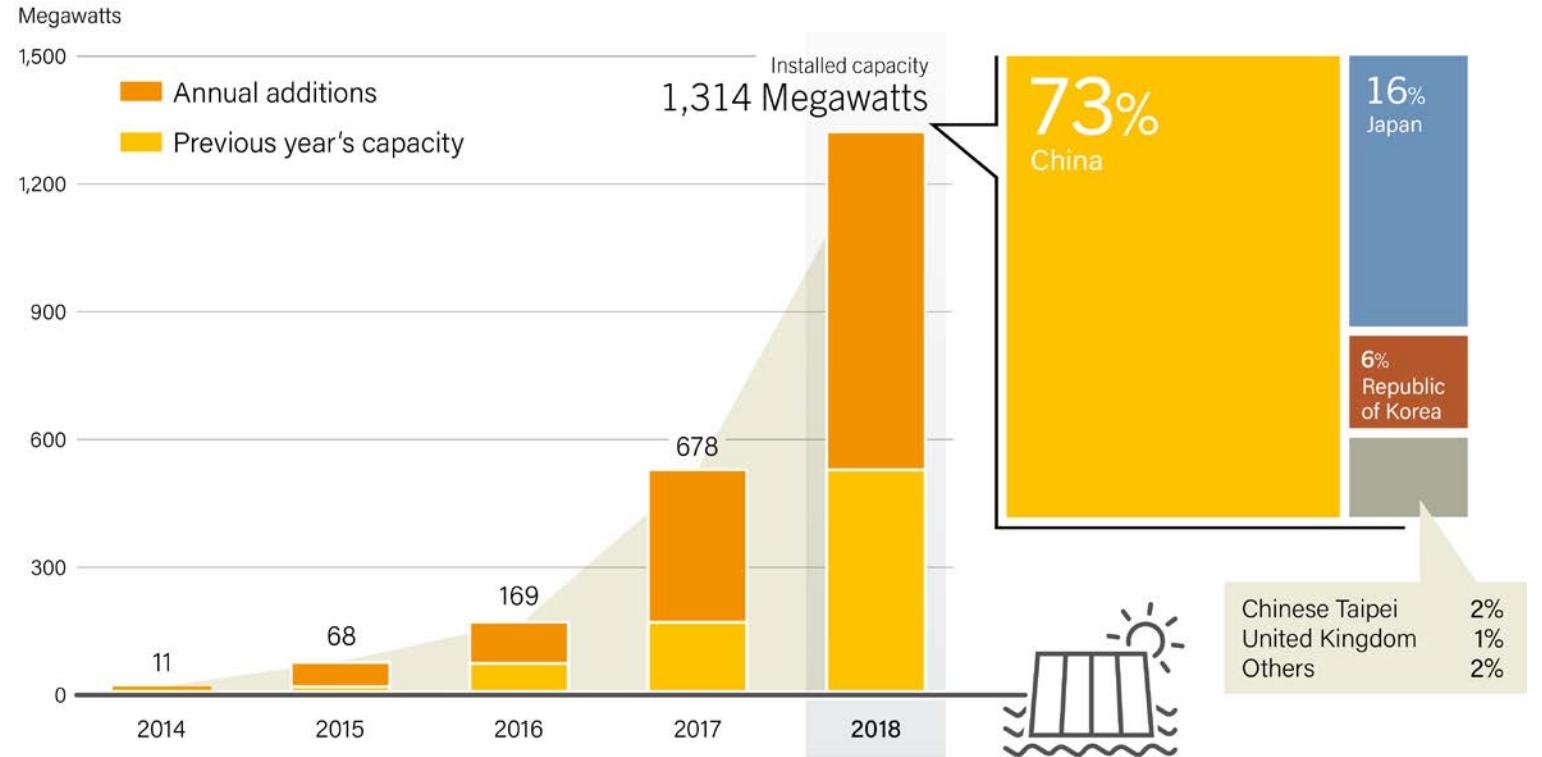
Source: Becquerel Institute and IEA PVPS.

REN21 RENEWABLES 2019 GLOBAL STATUS REPORT

# 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



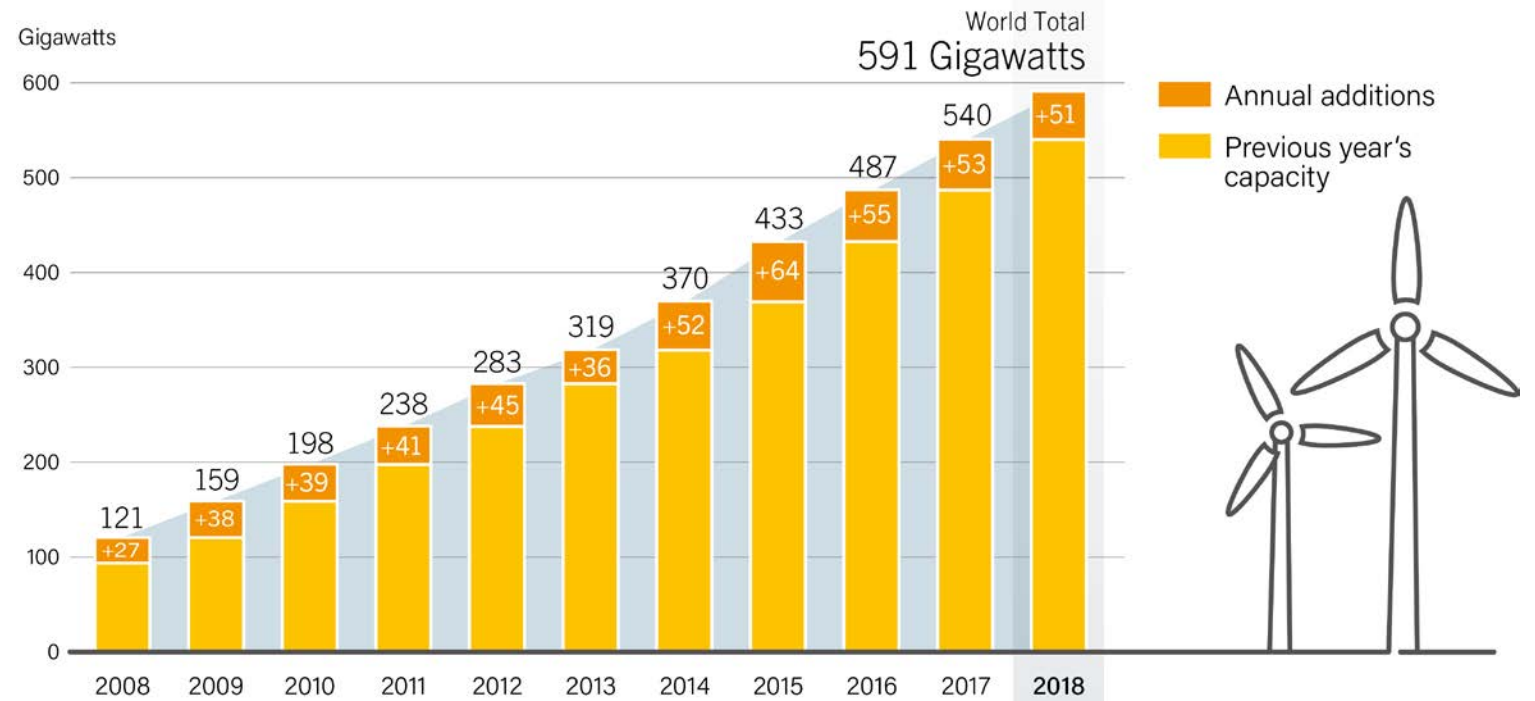
REN21 RENEWABLES 2019 GLOBAL STATUS REPORT

Source: World Bank Group, ESMAP and SERIS.

# 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



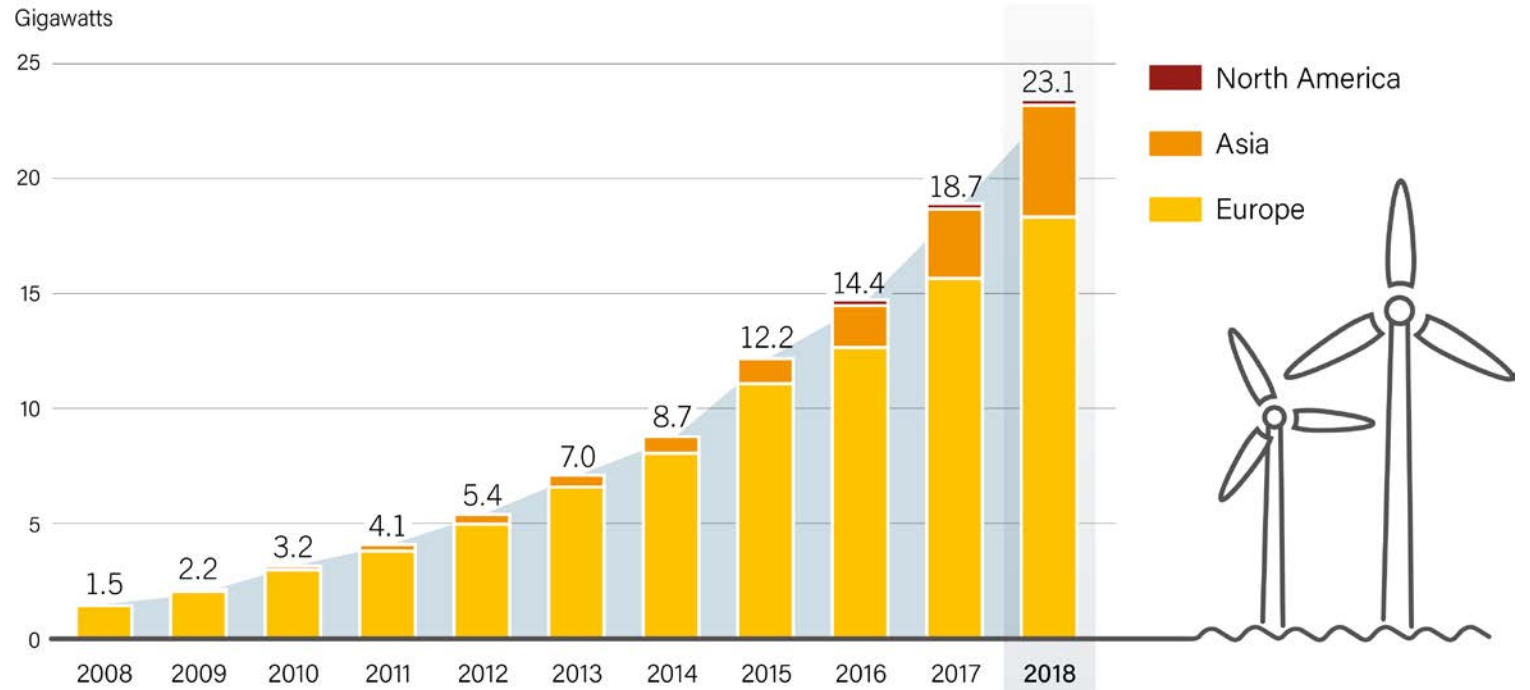
REN21 RENEWABLES 2019 GLOBAL STATUS REPORT

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



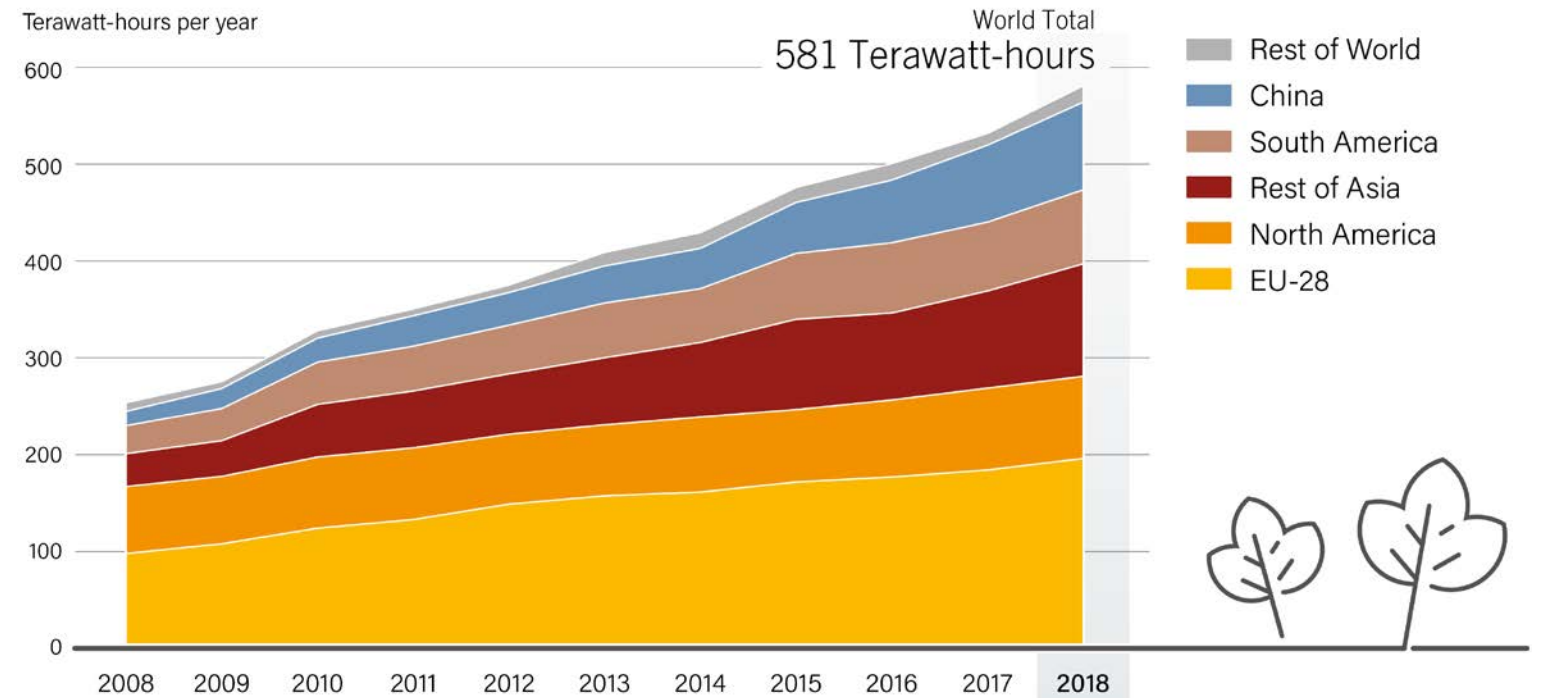
REN21 RENEWABLES 2019 GLOBAL STATUS REPORT



# Bio-power continues trends from previous years

- Bio-power capacity increased **6.5%** in 2018
- Bioelectricity generation increased **9%**, most rapidly in China
- EU remains largest generator by region
- Top countries were China, Brazil, Germany, India, UK, and Japan

Global Bioelectricity Generation, by Region, 2008-2018

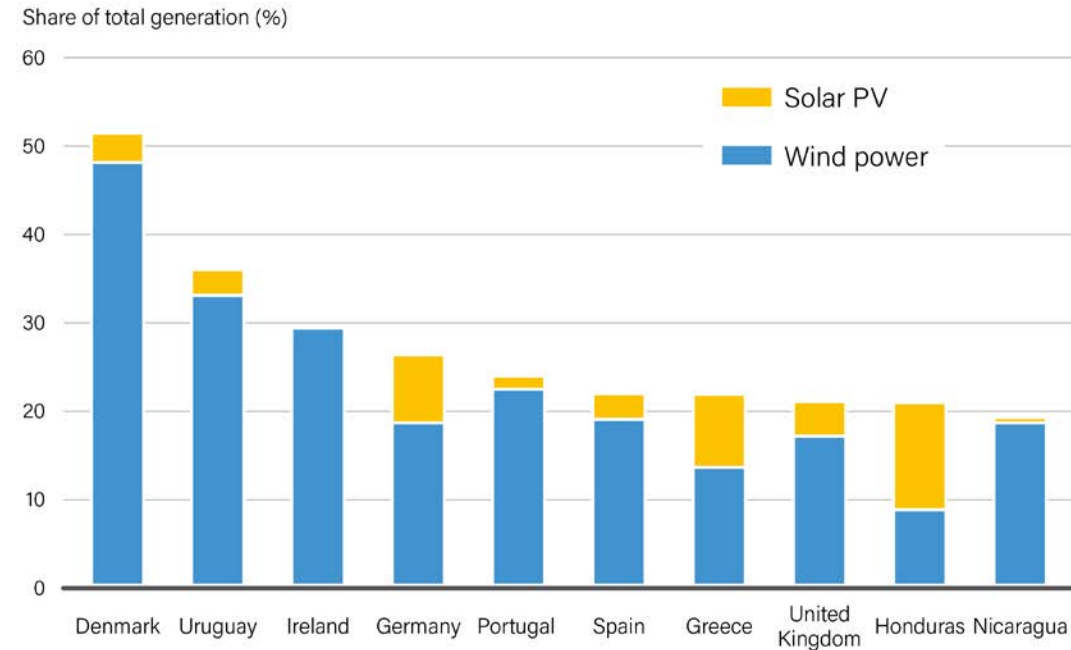


REN21 RENEWABLES 2019 GLOBAL STATUS REPORT

# Variable renewable energy is reaching high shares in power grids

- Power systems around the world are adapting to higher shares of variable renewables (wind power and solar PV)
- Shares are growing more than **10%** annually in several locations
- At least **9 countries** generated more than **20%** of their electricity from variable wind power and solar PV

Share of Electricity Generation from Variable Renewable Energy, Top 10 Countries, 2018



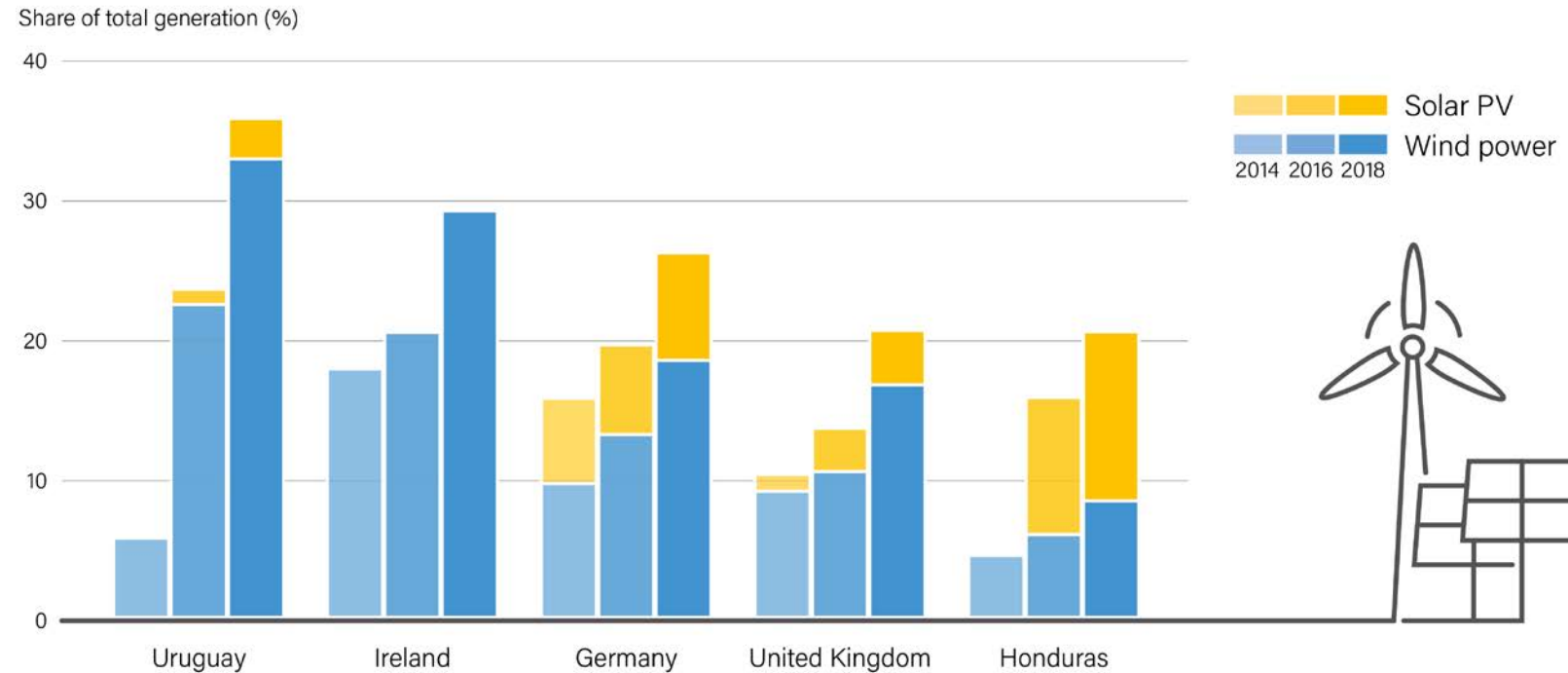
Note: This figure includes the top 10 countries according to the best available data known to REN21 at the time of publication.

REN21 RENEWABLES 2019 GLOBAL STATUS REPORT

# 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



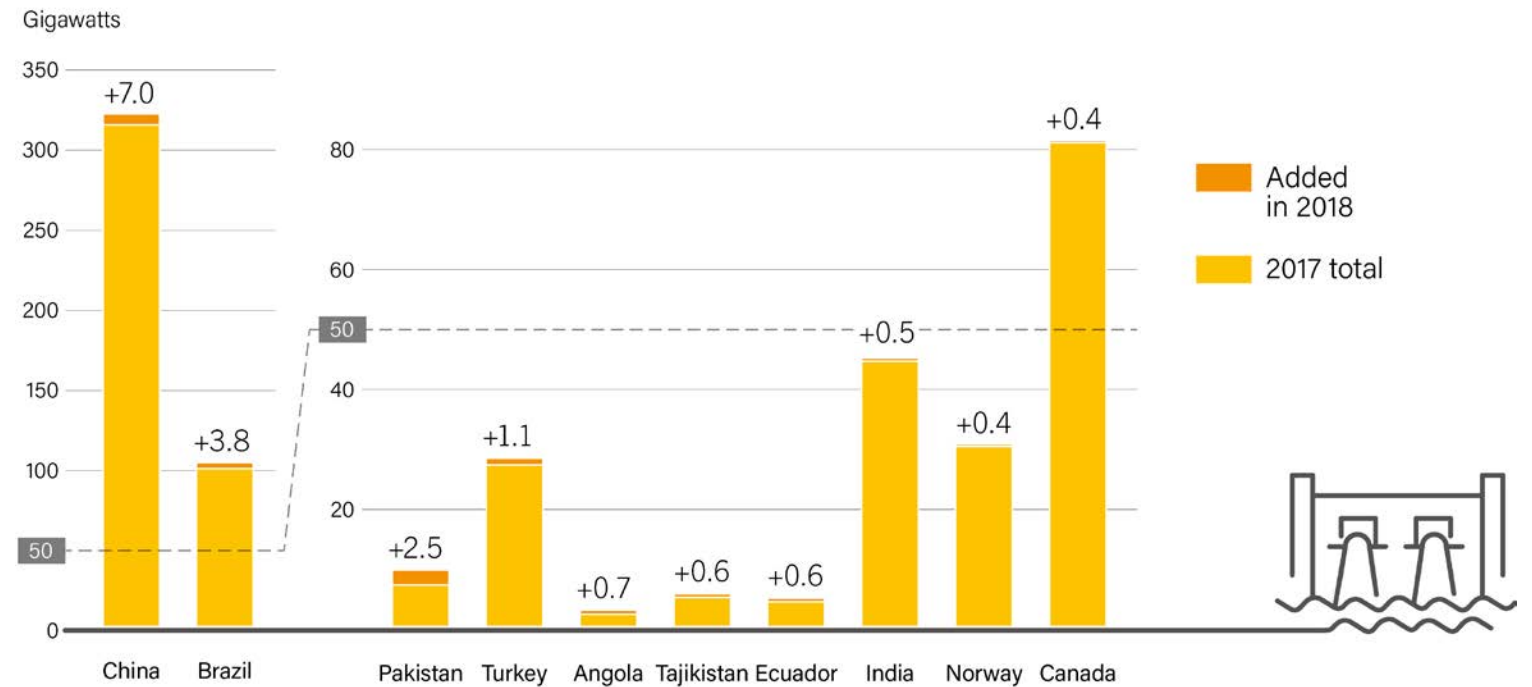
Note: This figure includes selected countries with high shares of variable renewable energy according to the best available data at the time of publication. Factors including annual weather variations may significantly impact generation from VRE in a particular year. Trends shown are not meant to imply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

REN21 RENEWABLES 2019 GLOBAL STATUS REPORT

# Hydropower characterised by market stability

- **20 GW** were added to reach a total of **1,132 GW** by end-2018
- China represented more than **35%** of new installations, followed by Brazil, Pakistan, and Turkey
- Generation estimated at **4,210 TWh** in 2018

Hydropower Capacity and Additions, Top 10 Countries for Capacity Added, 2018

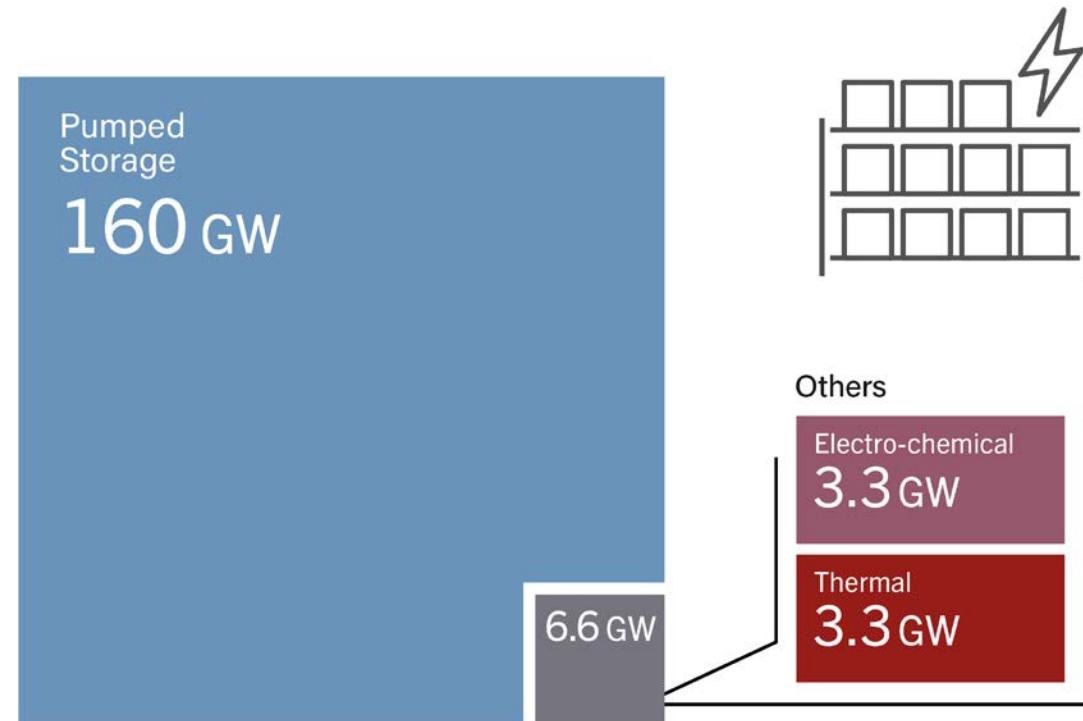


REN21 RENEWABLES 2019 GLOBAL STATUS REPORT

# Pumped storage dominant for utility-scale energy storage

- Global stationary and grid-connected energy storage capacity: **167 GW**
  - Estimated value and excluding electro-mechanical storage beyond pumped storage.
- **1.9 GW** of pumped storage added
  - Less than 3 GW commissioned in 2017
- Grid-connected battery storage capacity totalled over **3 GW**
  - More than 80% of systems located in Australia, China, Republic of Korea, United Kingdom and United States

Utility-Scale Energy Storage Capacity, Selected Technologies, 2018

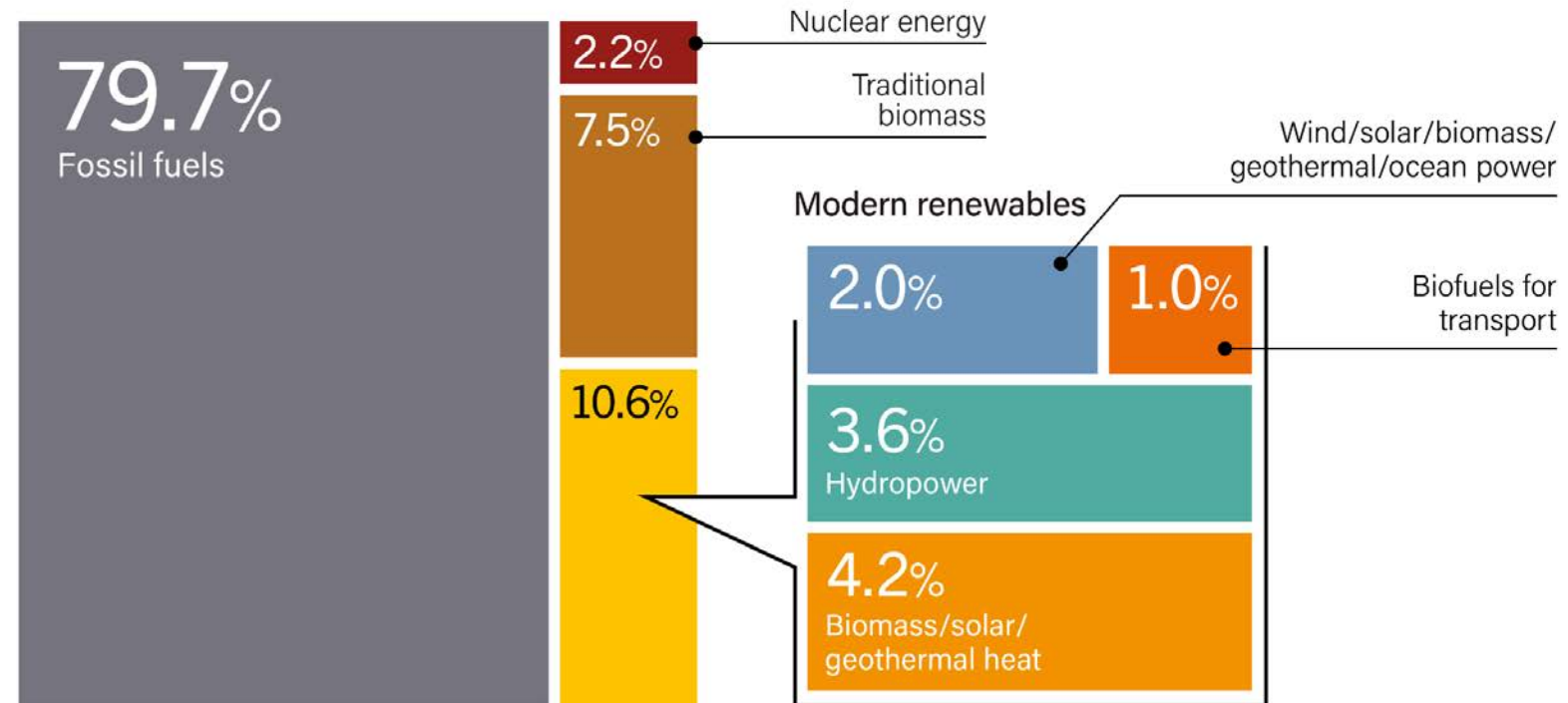


Note: Numbers should not be compared with prior versions of this figure to obtain year-by-year increases, as some adjustments are due to improved or revised data. The category of electro-mechanical storage has been excluded due to limited global data availability.

# Modern renewables slowly gaining ground in final energy demand

- **Modern renewable energy** accounted for **10.6%** of final energy demand in 2017.
- Considering traditional biomass, renewable energy covered **18.1%** of final energy demand
- 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

Estimated Renewable Share of Total Final Energy Consumption, 2017

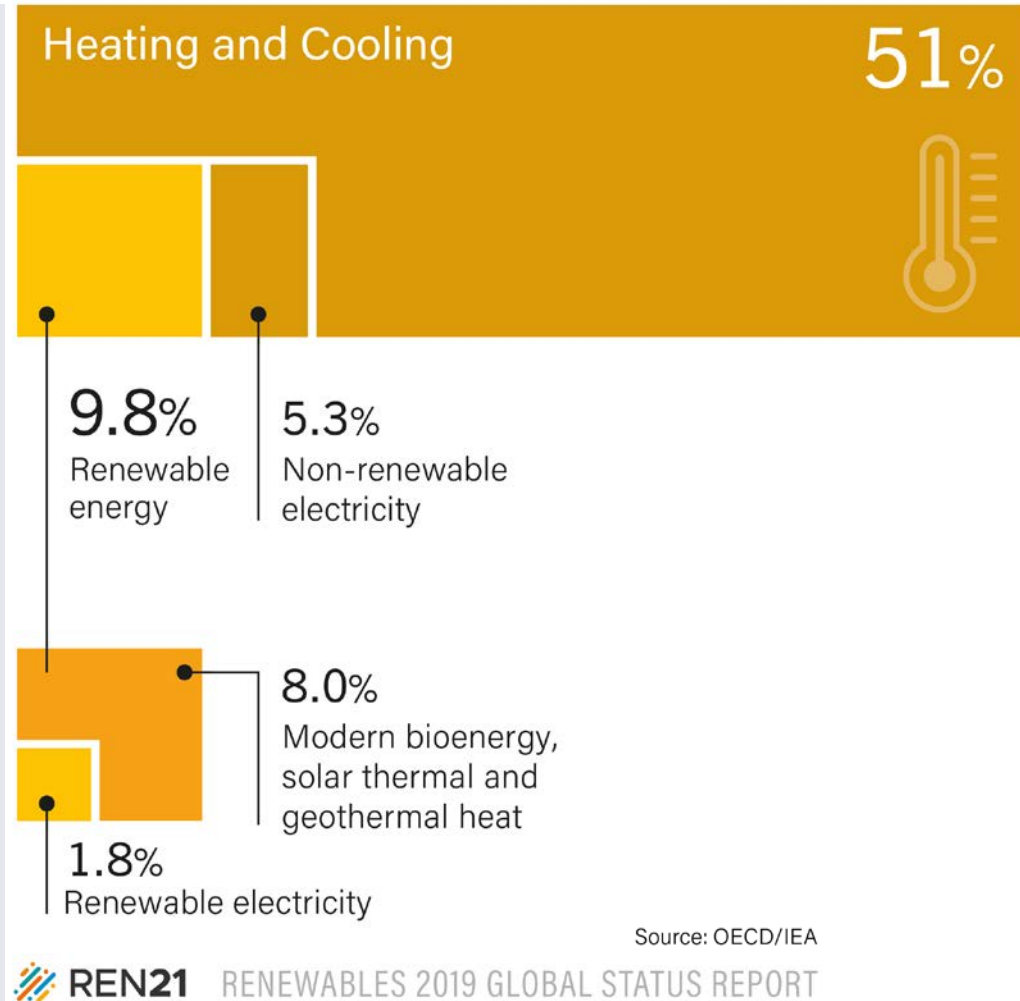


REN21 RENEWABLES 2019 GLOBAL STATUS REPORT

Source: OECD/IEA and IEA SHC

# Renewables in heating and cooling increasing very slowly

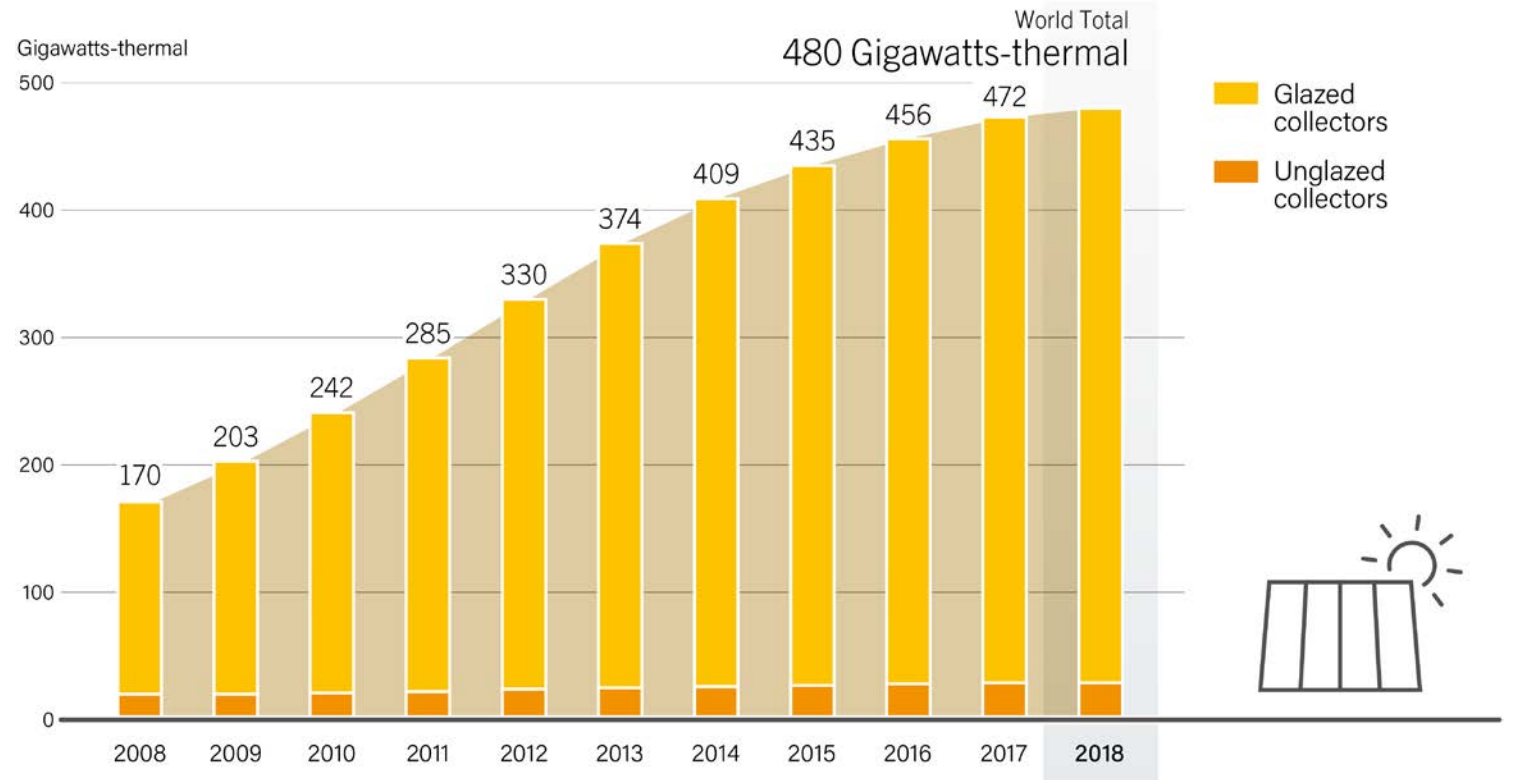
- Modern renewables account for just **10% of heating and cooling demand**
  - Demand growth is minimal (1.8%/year)
- **Lack of policy support** in the sector
  - Number of countries with regulatory policies fell from 21 to 20
  - Only 47 countries had targets for RHC
- Bio-heat provides majority but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



# Growth rate slows for solar water heating capacity additions

- Cumulative global operating capacity for solar water heating collectors increased **2%** to reach **480 GW<sub>th</sub>**
- The majority of this capacity is glazed collectors
- The 2018 increase of **8 GW<sub>th</sub>** 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.

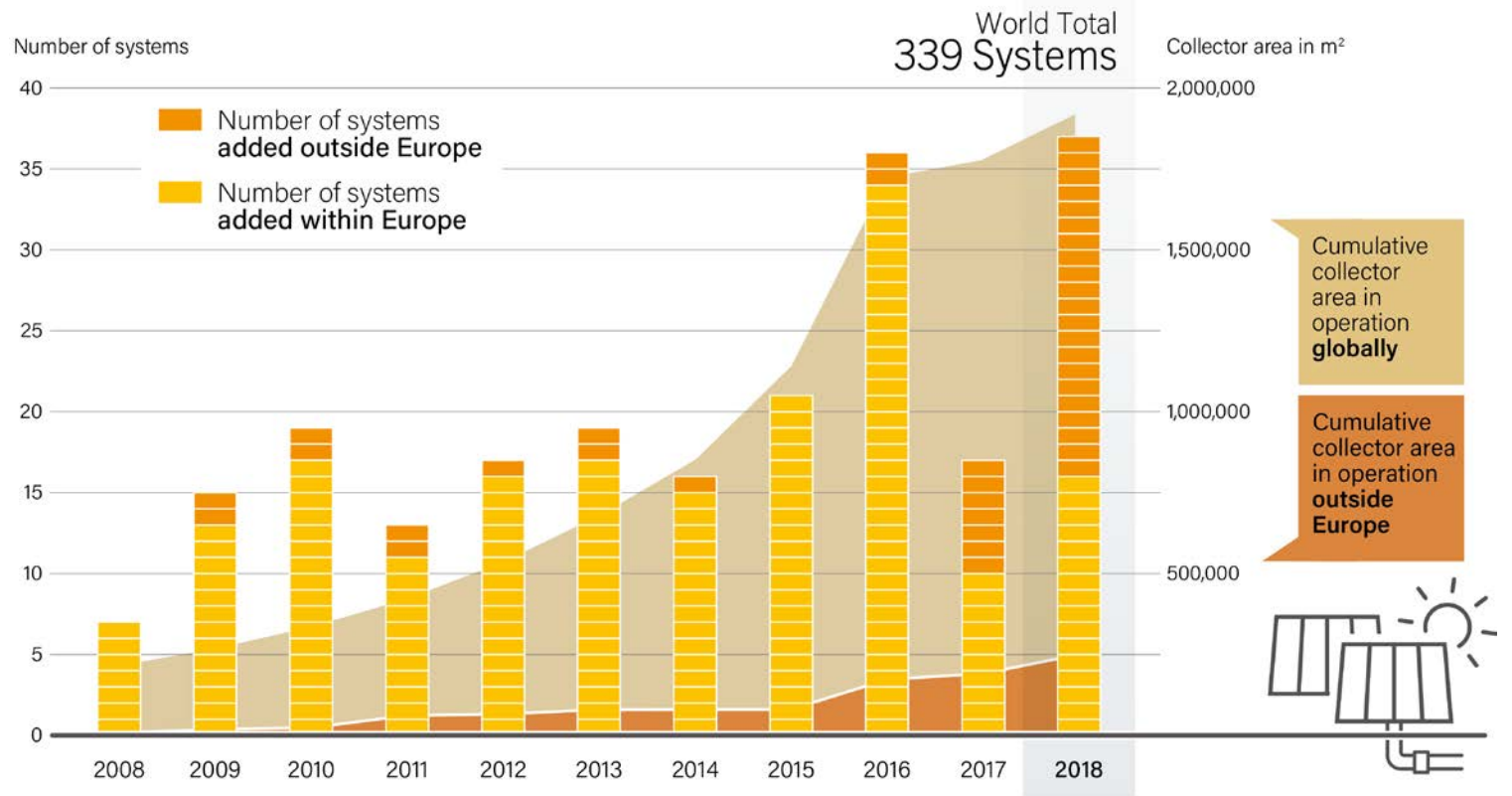
REN21 RENEWABLES 2019 GLOBAL STATUS REPORT



# Significant increase in solar district heating additions outside Europe

- **37** new large-scale solar thermal systems were commissioned in 2018
  - Significant increase compared to 17 systems reported in 2017
- Globally, at least **339** large-scale solar thermal systems were in operation by the end of 2018, for a total of **1.35 GWth**

Solar District Heating Systems, Global Annual Additions and Total Area in Operation, 2008-2018



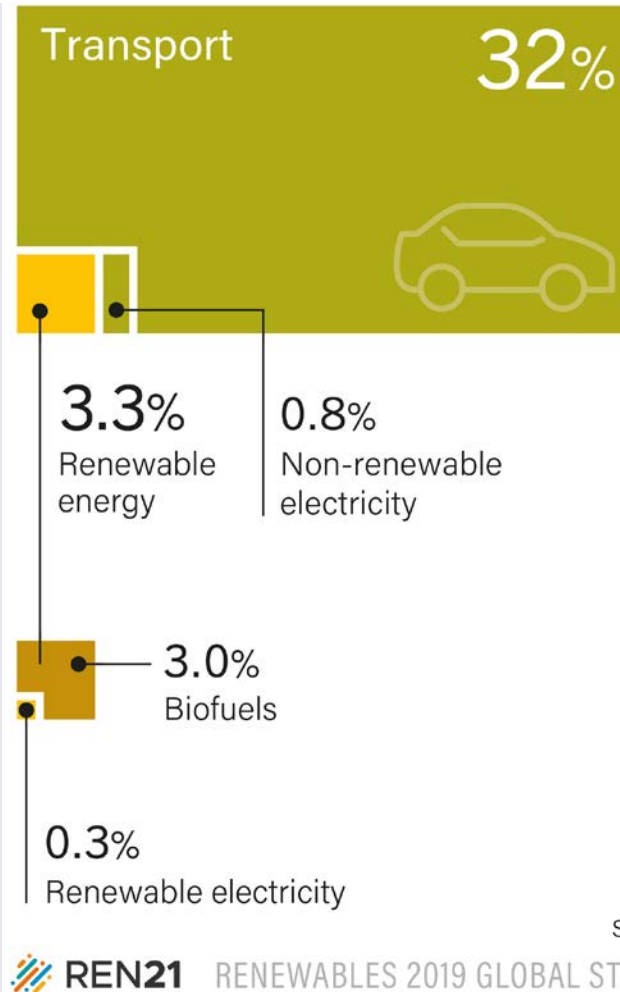
Note: Includes large-scale solar thermal installations for residential, commercial and public buildings. Data are for solar water collectors and concentrating collectors.

Source: IEA SHC.

REN21 RENEWABLES 2019 GLOBAL STATUS REPORT

# Biofuels and EVs growing but renewable share in transport remains low

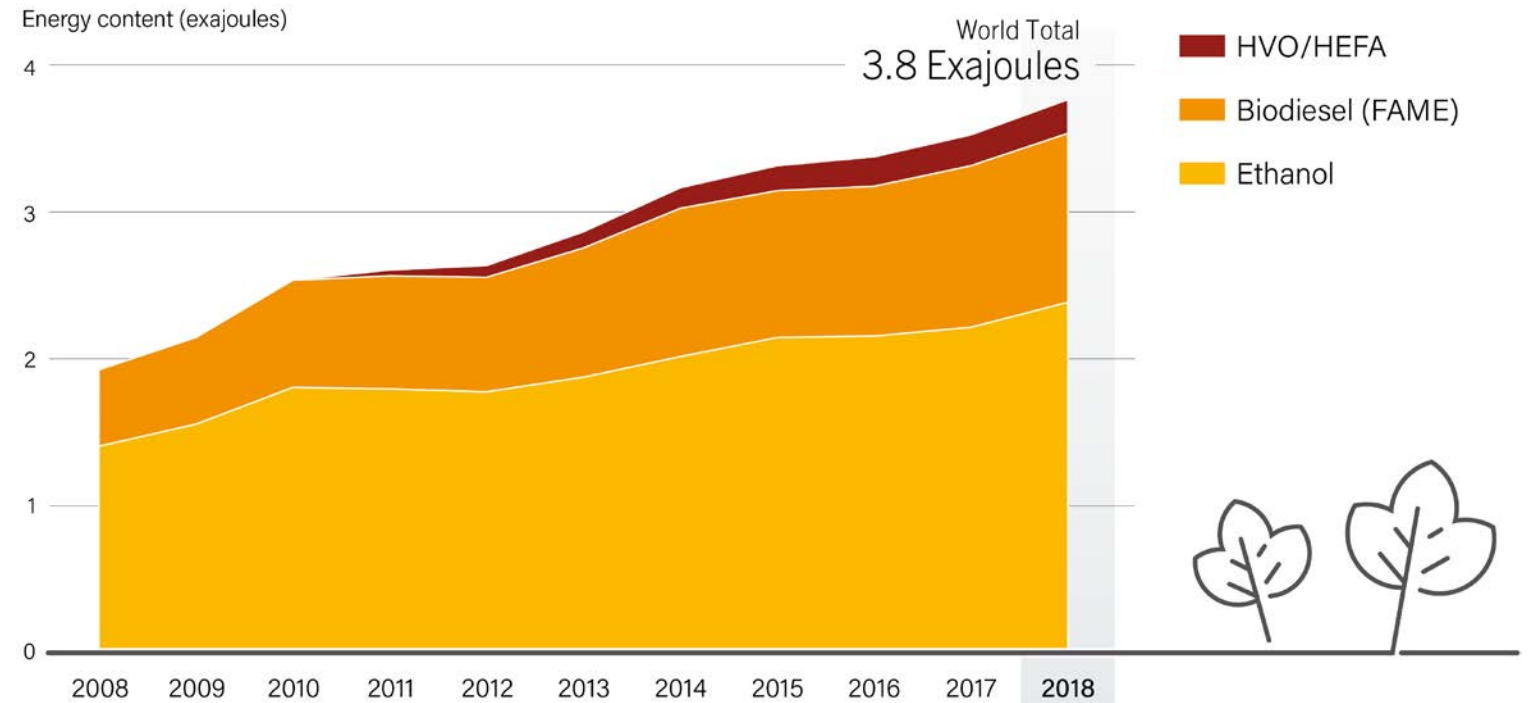
- Global energy demand in transport increased **45%** since 2000
- Transport accounts for **23%** of global CO<sub>2</sub> emissions
- The renewable share of transport grew slightly to **3.3%**
- Biofuels make up majority of renewable contribution, but sector increasingly open to electrification



# Biofuels production increases, dominated by US and Brazil

- Biofuels production increased nearly **7%** in 2018
  - US and Brazil together produced 69% of all biofuels
- Ethanol accounted to **63%** of biofuel production, FAME 31%, HVO/HEFA 6%
- Biomethane and advanced biofuels represent still small shares, though biomethane is growing rapidly in some countries

Global Ethanol, Biodiesel and HVO/HEFA Fuel Production by Energy Content, 2008-2018



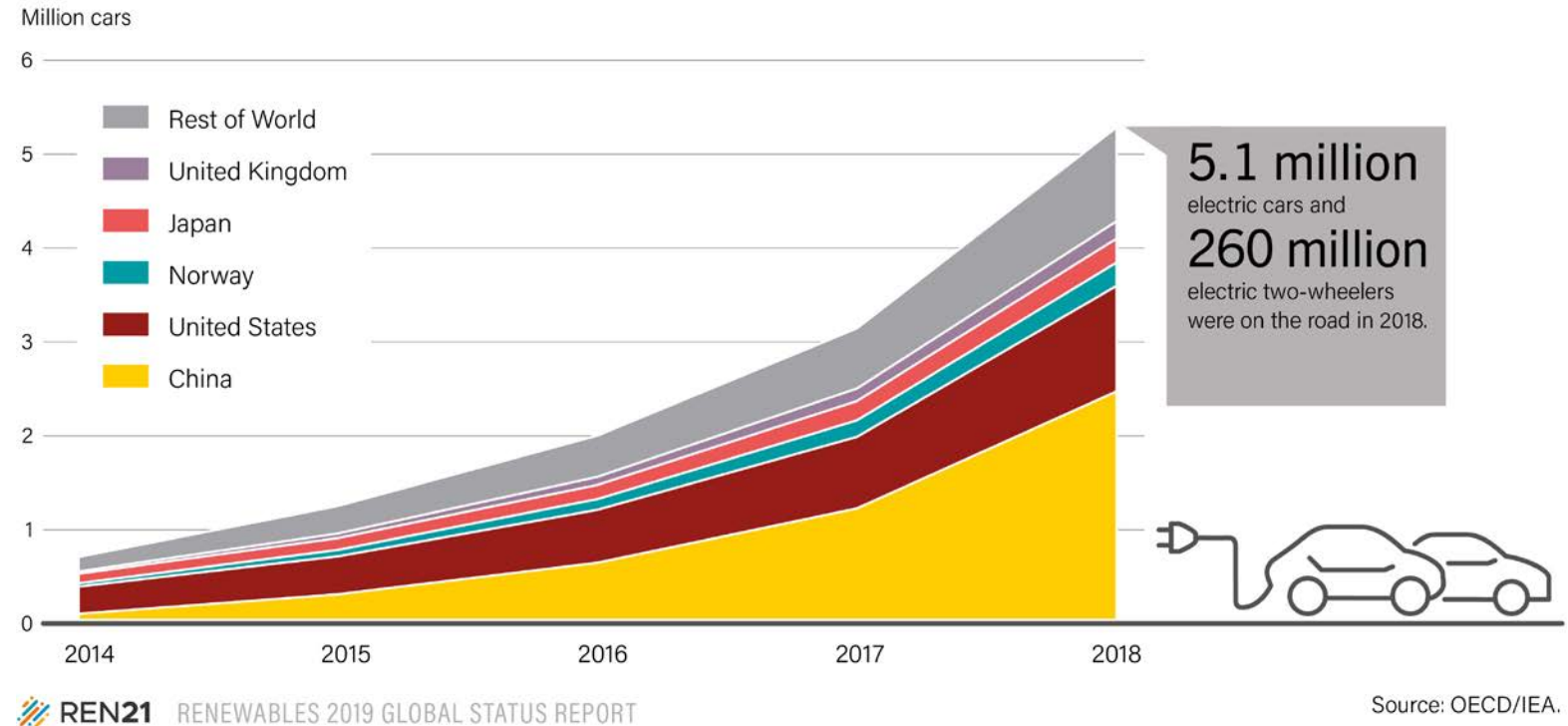
Note: HVO = hydrotreated vegetable oil; HEFA = hydrotreated esters and fatty acids; FAME = fatty acid methyl esters

REN21 RENEWABLES 2019 GLOBAL STATUS REPORT

# Electric passenger vehicle stock grew over 60%

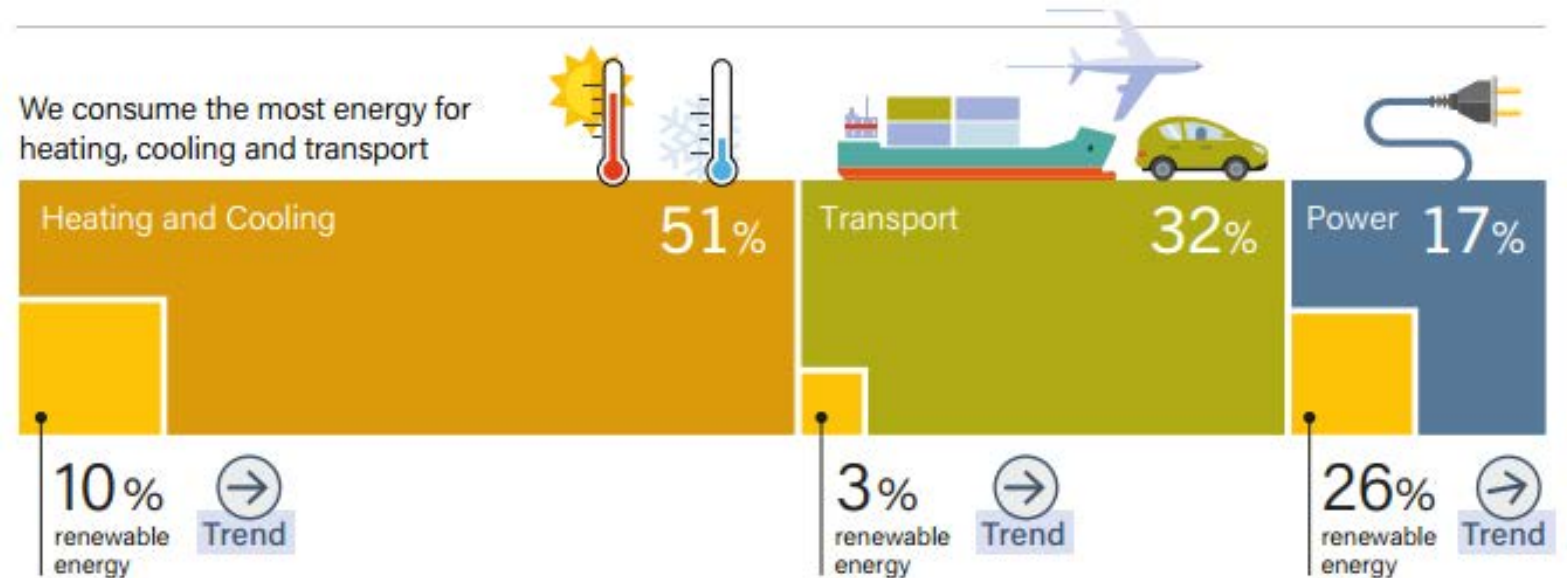
- 260 million electric two-wheelers and 40 million electric three-wheelers
- More than **2 million** electric cars (inc. battery EV and plug-in hybrid EV) were sold in 2018 (+68%)
- China had **nearly 50%** of global stock, followed by US at 22%
- EV markets **highly concentrated**: 40% of all EVs were in just 20 cities
- Share of RE power: around **25%**

Electric Car Global Stock, Top 5 Countries and Rest of World, 2014-2018



# 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



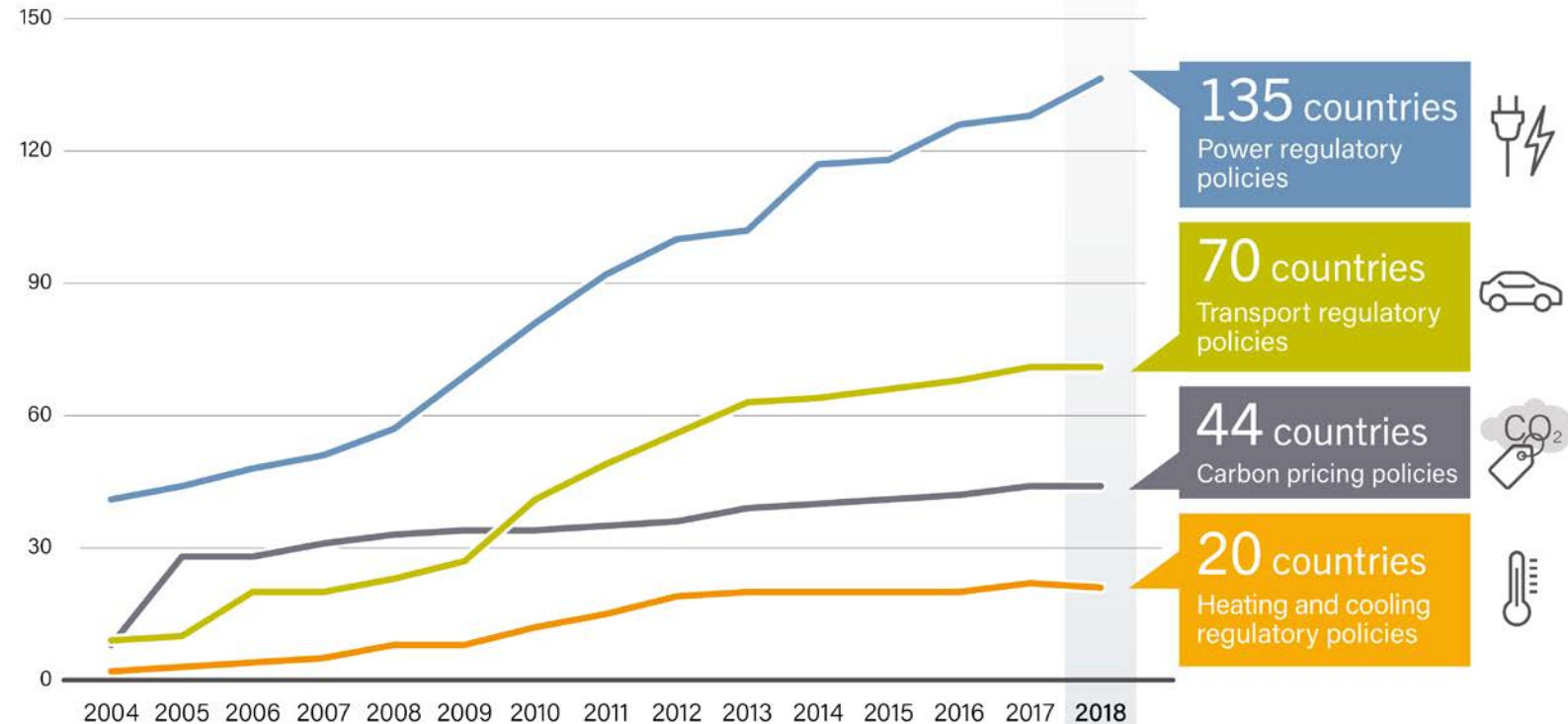
REN21 RENEWABLES 2019 GLOBAL STATUS REPORT

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

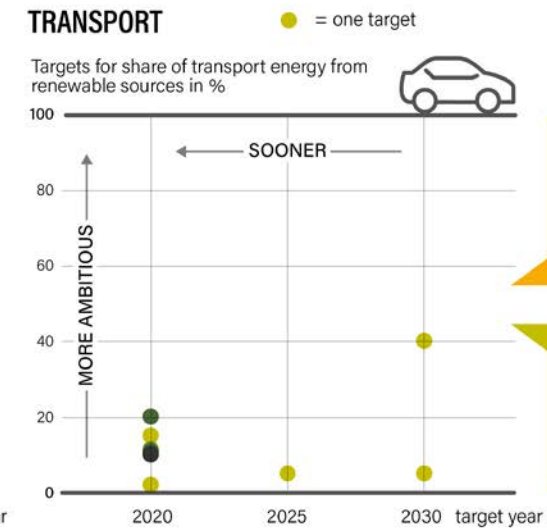
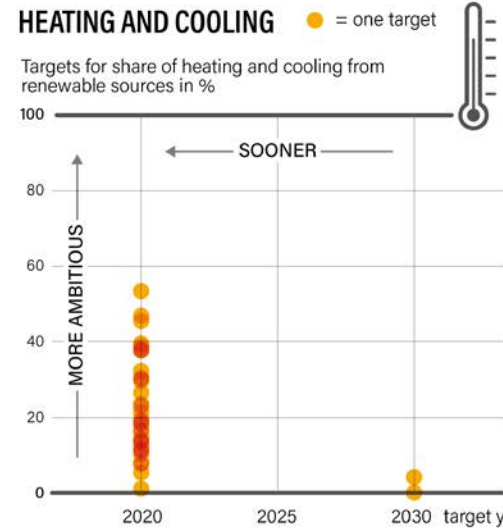


REN21 RENEWABLES 2019 GLOBAL STATUS REPORT

# Targets uneven across sectors

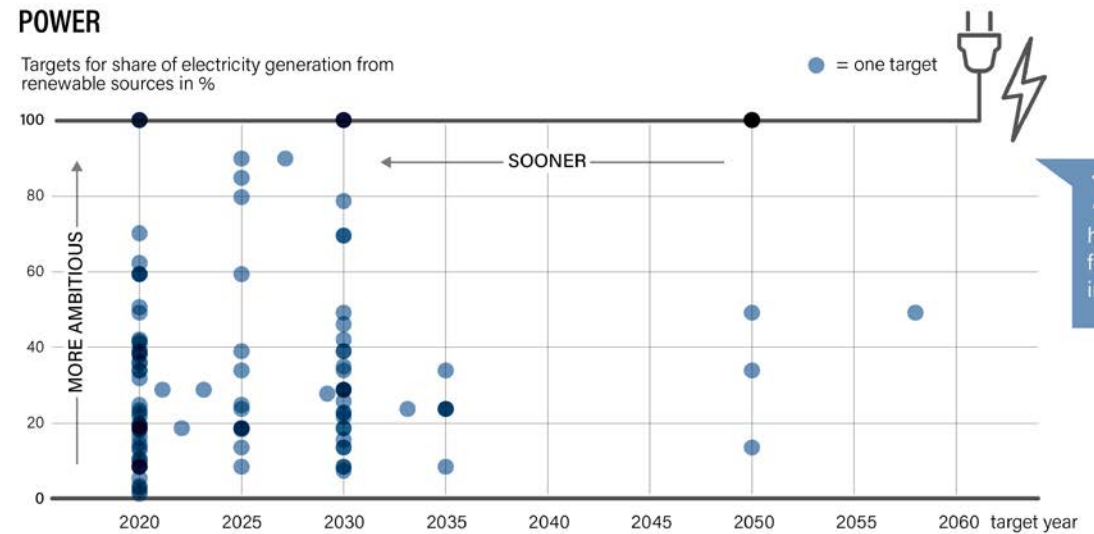
- Targets in the **power sector** remain more ambitious, more numerous than in heating and cooling and transport
- Fewer than **10** countries and states/provinces had economy-wide targets for at least **50%** renewable energy
- Still **only 1** country with a target for 100% renewables in total final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

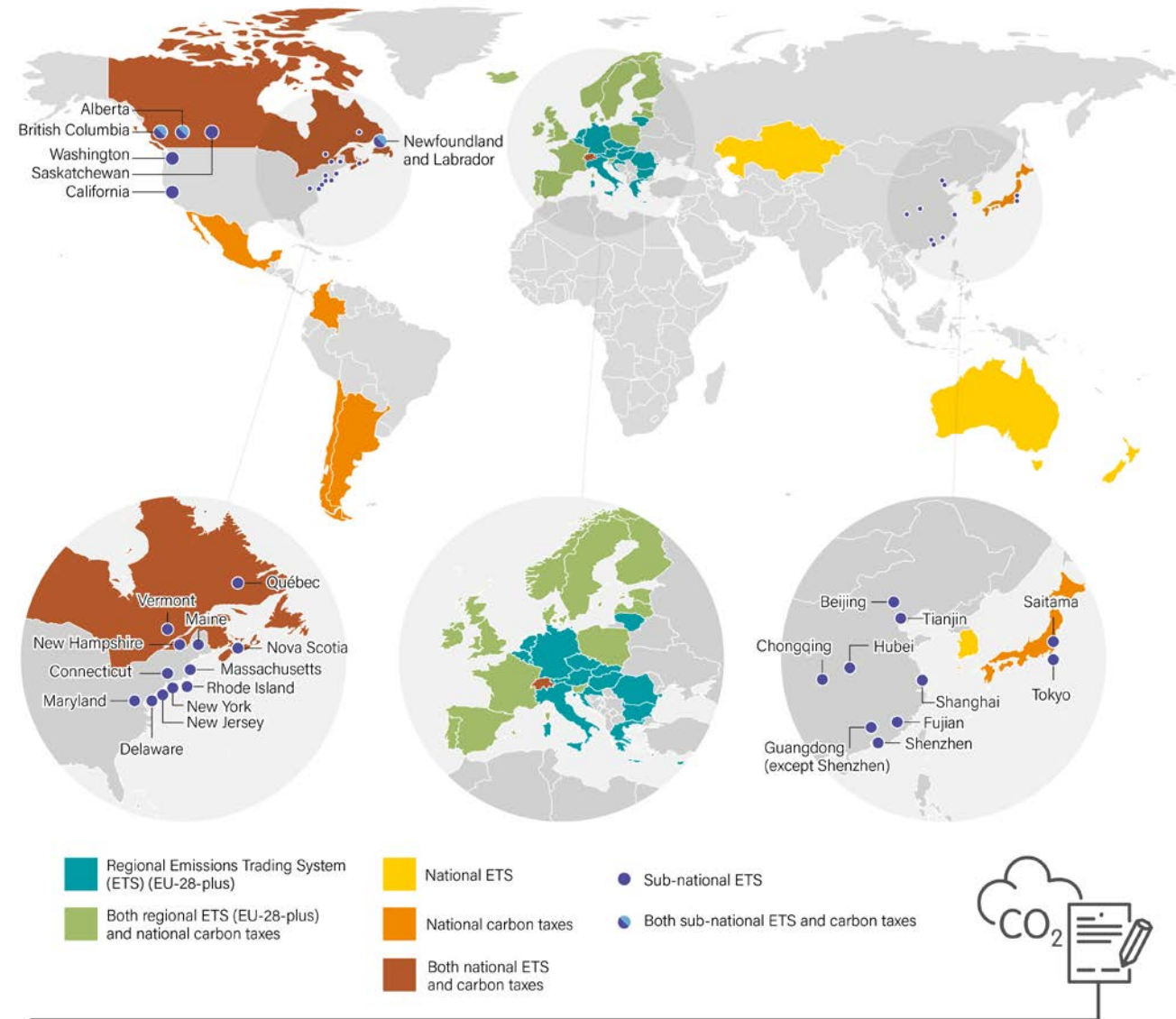


**162** countries have national targets for renewable energy in power.

# 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

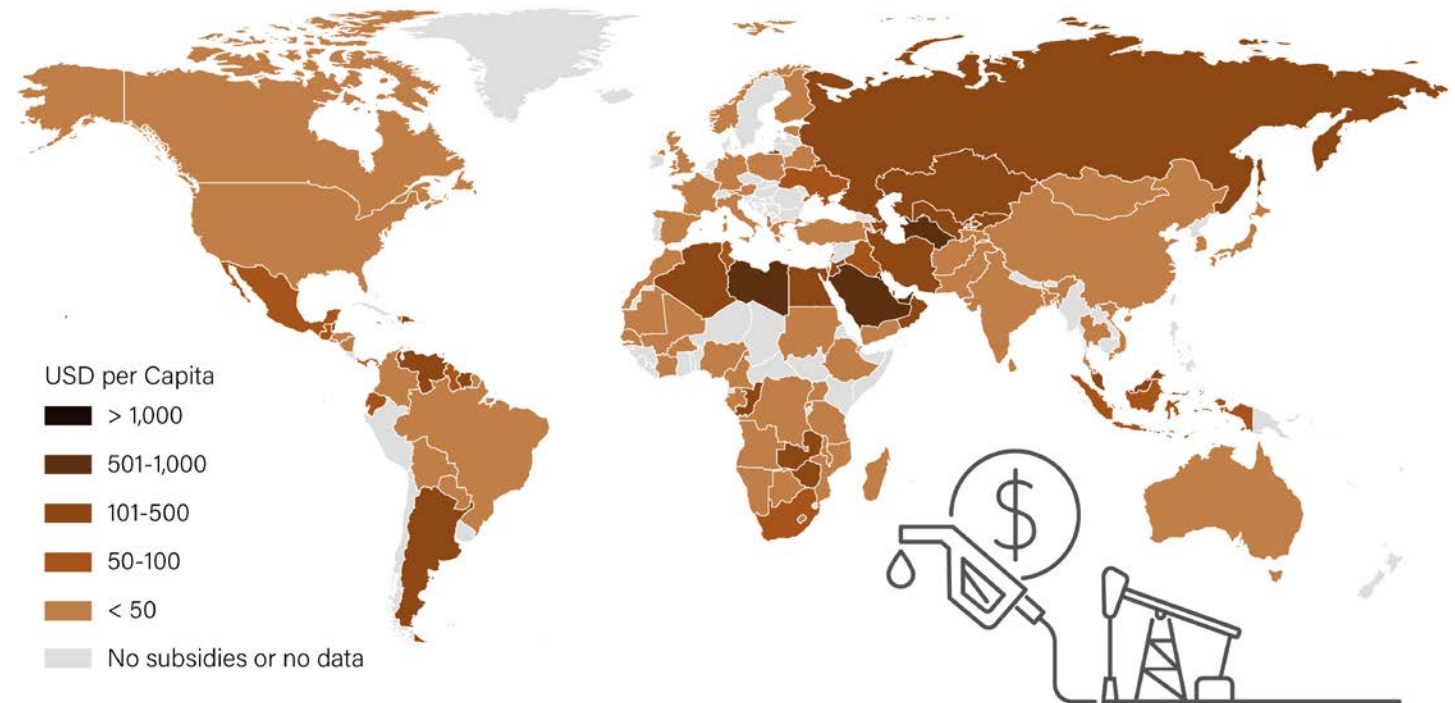




# Not a level playing field: Fossil fuel subsidies are still widespread

- 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

REN21 RENEWABLES 2019 GLOBAL STATUS REPORT

# A sustainable energy future requires stronger policy action now

## THE WORLD IS **NOT ON TRACK**...

- ... to **limit global warming** to 1.5°C as outlined in the Paris Agreement
- ... to **achieve SDG7 goals** for renewables, energy efficiency and energy access




→ CLIMATE AND DEVELOPMENT CHALLENGES CALL FOR **ACCELERATING THE TRANSITION** FROM FOSSIL FUELS TO **RENEWABLE ENERGY**



# Which countries led the way in 2018?

## TOP FIVE COUNTRIES

### Annual Investment / Net Capacity Additions / Production in 2018

	1	2	3	4	5
Investment in renewable power and fuels (not including hydropower over 50 MW)	<b>China</b>	United States	Japan	India	Australia
Investment in renewable power and fuels per unit GDP <sup>1</sup>	<b>Palau</b>	Djibouti	Morocco	Iceland/Serbia	
 Geothermal power capacity	<b>Turkey</b>	Indonesia	United States	Iceland	New Zealand
 Hydropower capacity	<b>China</b>	Brazil	Pakistan	Turkey	Angola
 Solar PV capacity	<b>China</b>	India <sup>2</sup> /United States		Japan	Australia
 Concentrating solar thermal power (CSP) capacity	<b>China/Morocco</b>		South Africa	Saudi Arabia	–
 Wind power capacity	<b>China</b>	United States	Germany	India	Brazil
 Solar water heating capacity	<b>China</b>	Turkey	India	Brazil	United States
 Biodiesel production	<b>United States</b>	Brazil	Indonesia	Germany	Argentina
 Ethanol production	<b>United States</b>	Brazil	China	Canada	Thailand

 **REN21** RENEWABLES 2019 GLOBAL STATUS REPORT

# Who were the renewable energy leaders at the end of 2018?

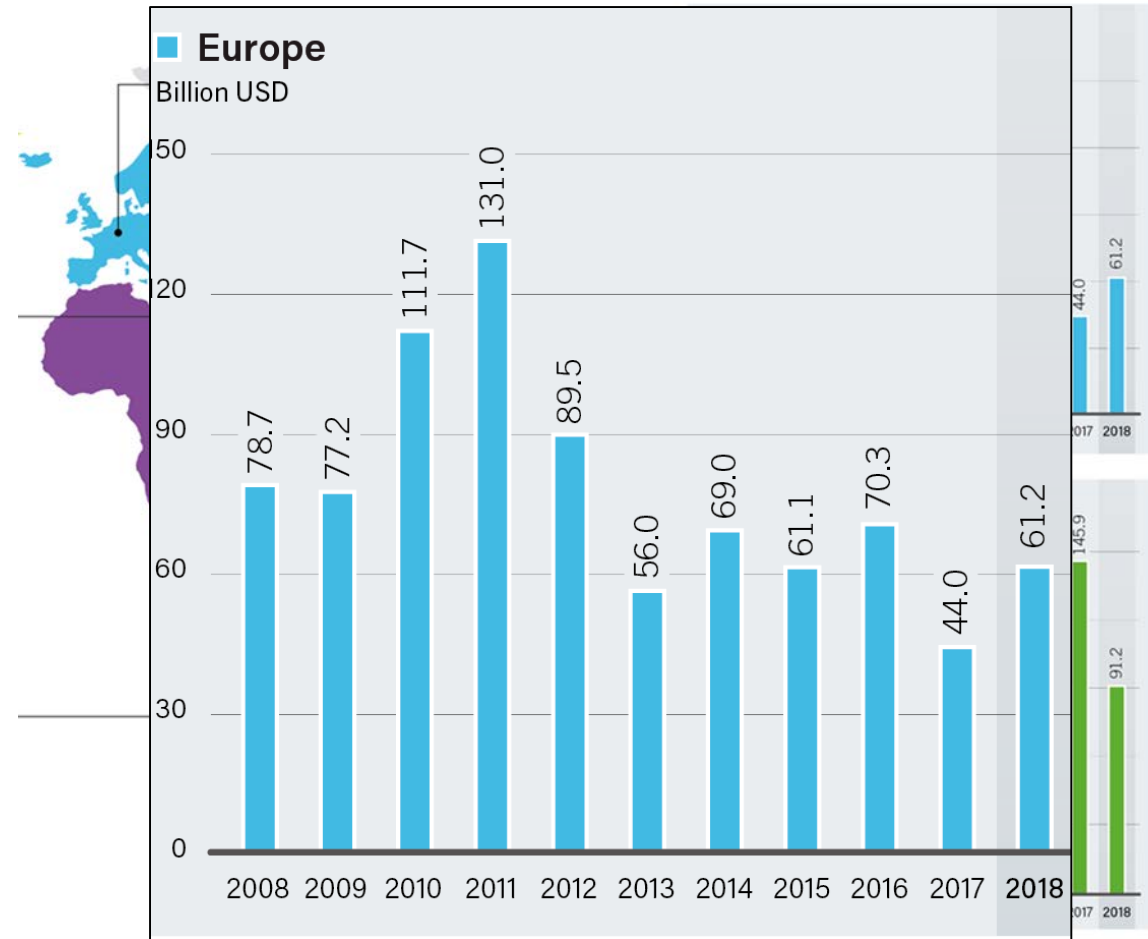
Total Capacity or Generation as of End-2018

	1	2	3	4	5
<b>POWER</b>					
Renewable power capacity (including hydropower)	<b>China</b>	United States	Brazil	India	Germany
Renewable power capacity (not including hydropower)	<b>China</b>	United States	Germany	India	Japan
Renewable power capacity <i>per capita</i> (not including hydropower) <sup>3</sup>	<b>Iceland</b>	Denmark	Germany/Sweden		Finland
🌿 Bio-power generation	<b>China</b>	United States	Brazil	Germany	India
🌿 Bio-power capacity	<b>China</b>	United States	Brazil	India	Germany
🔌 Geothermal power capacity	<b>United States</b>	Indonesia	Philippines	Turkey	New Zealand
🌊 Hydropower capacity <sup>4</sup>	<b>China</b>	Brazil	Canada	United States	Russian Federation
🌊 Hydropower generation <sup>4</sup>	<b>China</b>	Canada	Brazil	United States	Russian Federation
☀️ Solar PV capacity	<b>China</b>	United States	Japan	Germany	India
☀️ Solar PV capacity <i>per capita</i>	<b>Germany</b>	Australia	Japan	Belgium	Italy
☀️ Concentrating solar thermal power (CSP) capacity	<b>Spain</b>	United States	South Africa	Morocco	India
🌬️ Wind power capacity	<b>China</b>	United States	Germany	India	Spain
🌬️ Wind power capacity <i>per capita</i>	<b>Denmark</b>	Ireland	Germany	Sweden	Portugal
<b>HEAT</b>					
☀️ Solar water heating collector capacity <sup>5</sup>	<b>China</b>	United States	Turkey	Germany	Brazil
☀️ Solar water heating collector capacity <i>per capita</i>	<b>Barbados</b>	Austria	Cyprus	Israel	Greece
🔌 Geothermal heat output <sup>6</sup>	<b>China</b>	Turkey	Iceland	Japan	Hungary

# Investment in renewable power and fuels grew 39% in Europe

- European investment grew to USD 61.2 billion after a low in 2017
  - Also rising the Middle East and Africa, Asia and the United States
  - Falling in the Americas, China and India
- Europe accounted for 21% of global investment

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



REN21 RENEWABLES 2019 GLOBAL STATUS REPORT

Source: BNEF.

# What happened in European markets for variable renewables?

## → Non-hydro capacity:

- 32% in China
- **27% in the European Union**

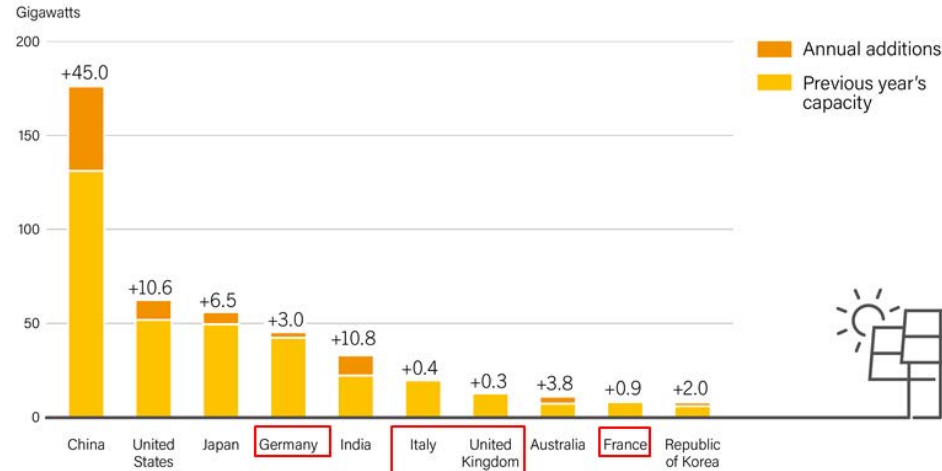
## → Solar PV in Europe

- 8.3 GW added (total capacity : 115 GW)
- **second-place** regional ranking for global capacity (DE, NL, FR, IT)

## → Wind power in Europe

- 10.1 GW added (total capacity : 179 GW)
- 2.7 GW offshore
- Market down 35% on 2017, most reductions DE and UK

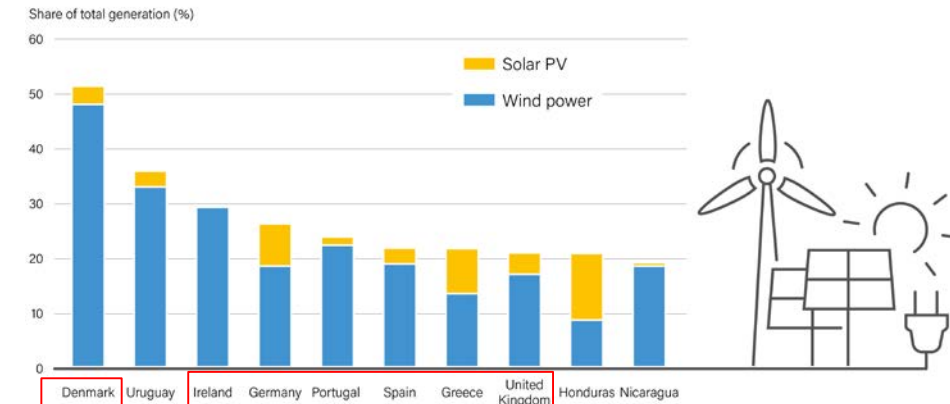
Solar PV Capacity and Additions, Top 10 Countries, 2018



Note: Data are provided in direct current (DC).  
Data for India are highly uncertain.

REN21 RENEWABLES 2019 GLOBAL STATUS REPORT

Share of Electricity Generation from Variable Renewable Energy, Top 10 Countries, 2018



Note: This figure includes the top 10 countries according to the best available data known to REN21 at the time of publication.

REN21 RENEWABLES 2019 GLOBAL STATUS REPORT

*More than 15% of EU's electricity in 2018 came from wind & solar PV*

# Where is Europe leading?

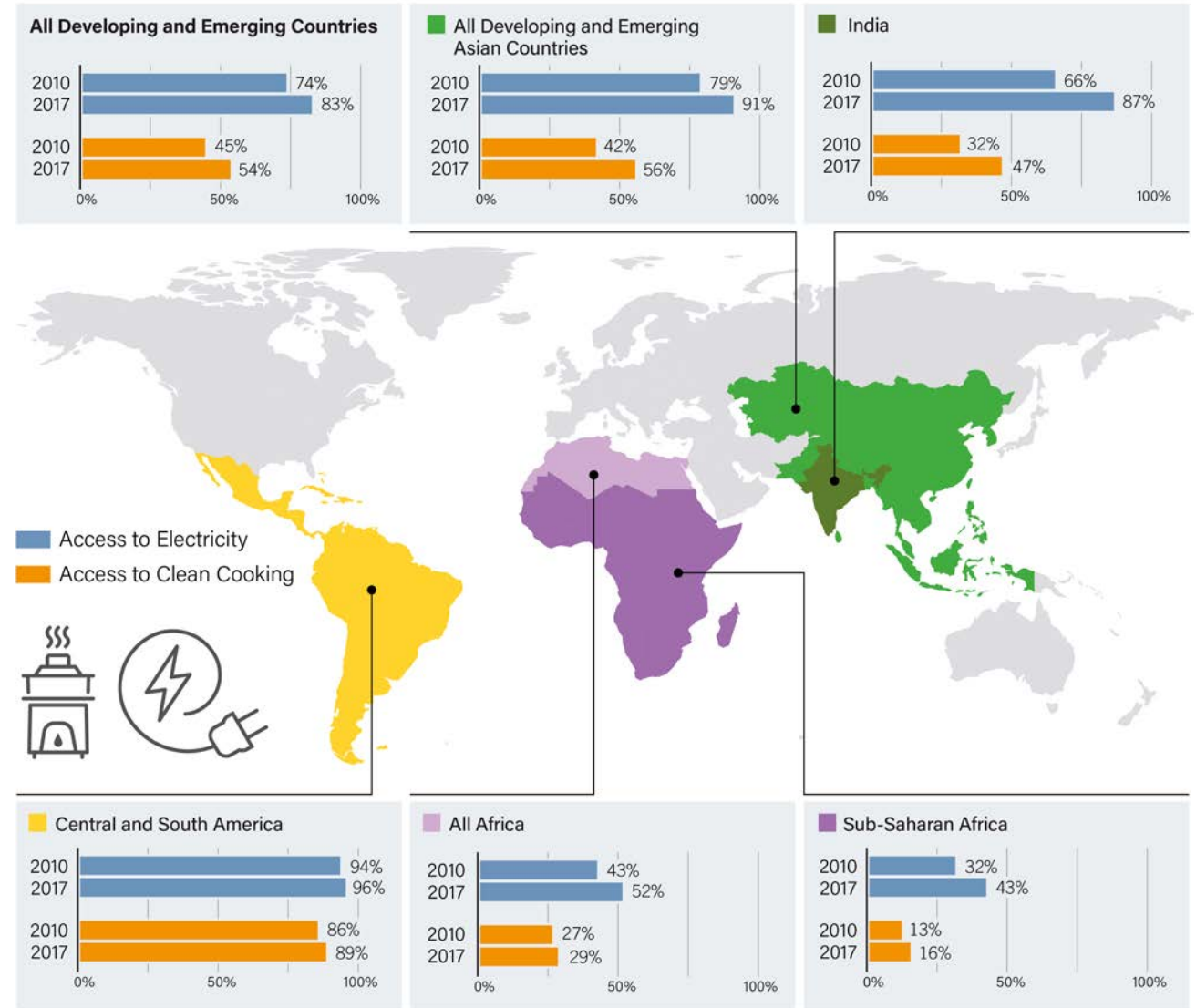
- **Corporate sourcing and clean PPAs** doubled in Europe compared to 2017
- **Renewable heating and cooling**
  - Leader in bioenergy consumption for H&C: 46% of global bio-heat used in buildings
  - higher shares of renewables in district heating: at least 8 countries over 40%
  - 12% growth in European heat pump market
- **Decarbonisation framework:**
  - 2050 Long-Term Strategy for a “climate-neutral” economy will drive action and ambition in policy-making
  - Heating and cooling: annual growth target of 1.3% in renewable heating and cooling from 2021-2030
  - Transport: target for a 14% share of renewable energy in the transport sector by 2030

# Access to energy expands

→ In 2017:

- **13%** of the global population lived **without electricity** – approx. 992 million people
- **36%** of the global population lived **without clean cooking** – approx. 2.7 billion people
- A majority live in rural areas of sub-Saharan Africa and Asia-Pacific regions

Rates of Access to Electricity and Clean Cooking, by Region, 2010 and 2017



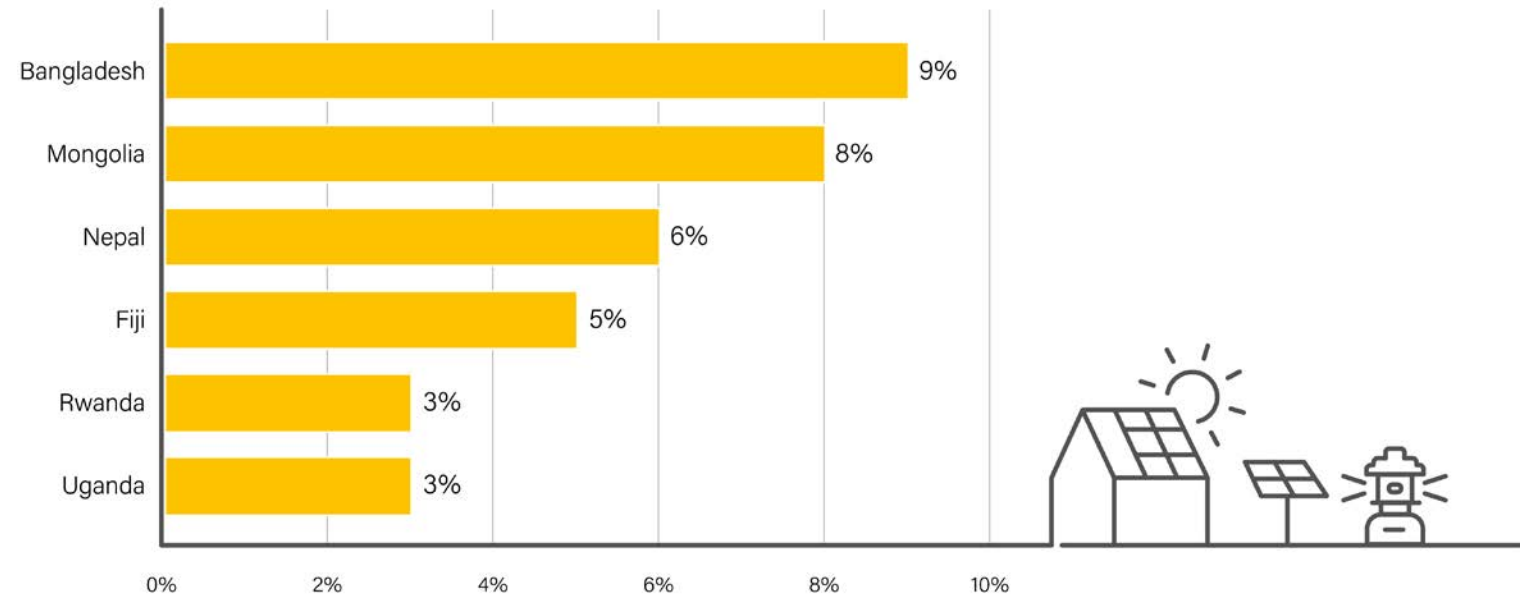


# Off-grid solar PV is increasingly widespread

→ **150 million** people across Africa and Asia benefit from energy access through **off-grid solar systems**

- 5% of the population in Africa
- 2% of the population in Asia

Top 6 Countries with Highest Off-Grid Solar PV Access Rate (Tier 1 and Above), 2016



Note: Tier 1 access, as defined in the Multi-tier Framework for measuring access to household electricity supply, equals a minimum of 3 watts or 12 watt-hours per day of peak capacity, lighting of 1,000 lumen hours per day, and a minimum four hours per day or one hour per evening of electricity supply.

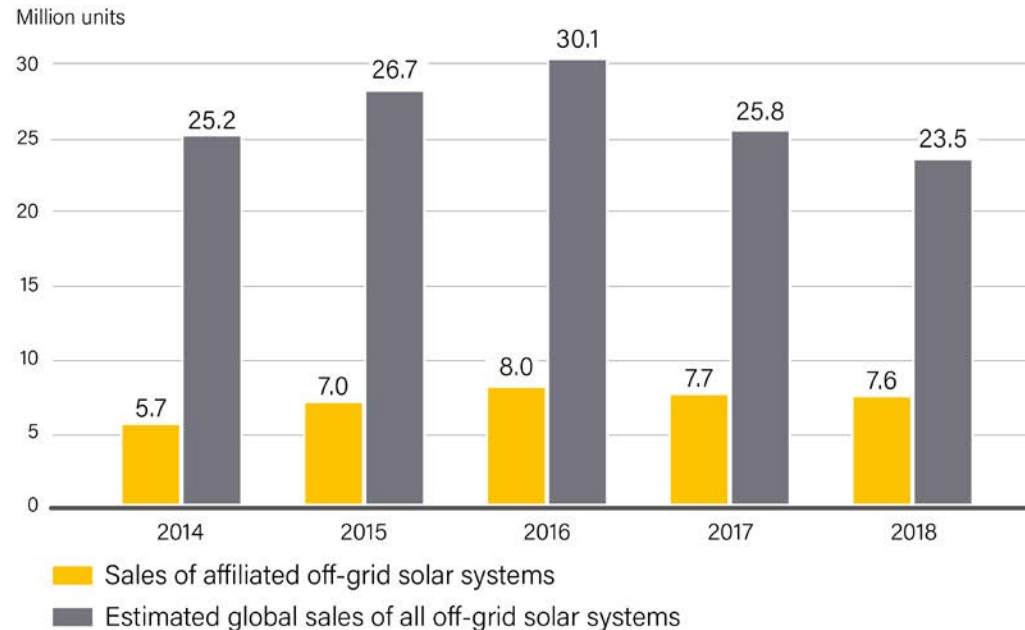
Source: World Bank.

 **REN21** RENEWABLES 2019 GLOBAL STATUS REPORT

# Global sales of off-grid solar systems sees strong growth rates

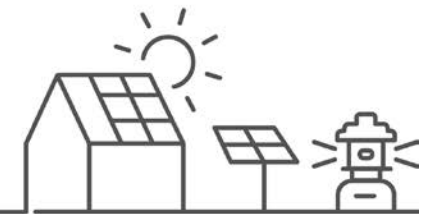
- Off-grid solar devices (solar lanterns and solar home systems): **50% annual growth** rates between 2010 and 2018
- In 2018:
  - Total sales of off-grid solar products: 23.5 million units
  - Sales of affiliated off-grid solar products: 7.6 million units
- Installed capacity of **affiliated off-grid solar products increased 45%**
- Change in the dynamics of the market:
  - Pico-solar sales decreased 9%
  - Larger solar home systems increased 77%

Annual Global Sales of Off-Grid Solar Systems, 2014-2018



REN21 RENEWABLES 2019 GLOBAL STATUS REPORT

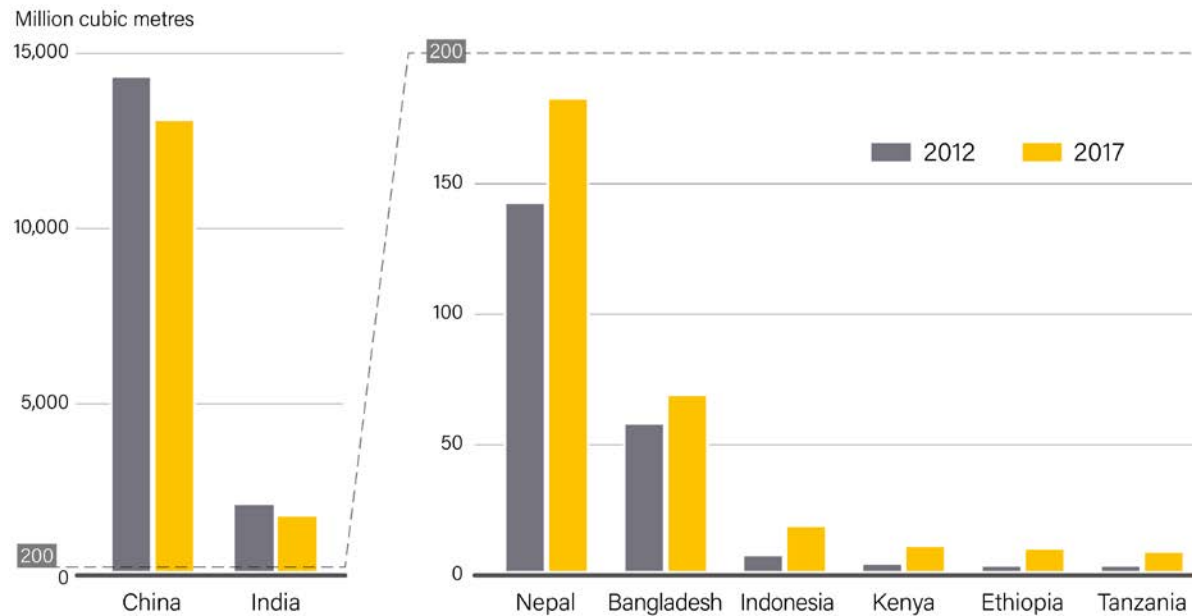
Source: GOGLA/Lighting Global.



# Production of biogas for cooking expands in new markets

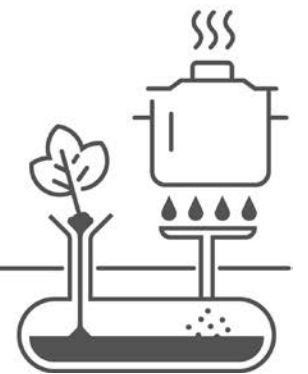
- **125 million people using biogas for cooking** (111 million in China and 9 million in India)
- **China:** 13.1 billion m<sup>3</sup> of biogas produced for cooking; **India:** 1.7 million m<sup>3</sup>
- Use of biogas for cooking grew over the past five years in Asia (Bangladesh, Cambodia, Indonesia, Nepal) and sub-Saharan Africa (Burkina Faso, Ethiopia, Kenya, Tanzania and Uganda)

Production of Biogas for Cooking in Selected Countries, 2012 and 2017



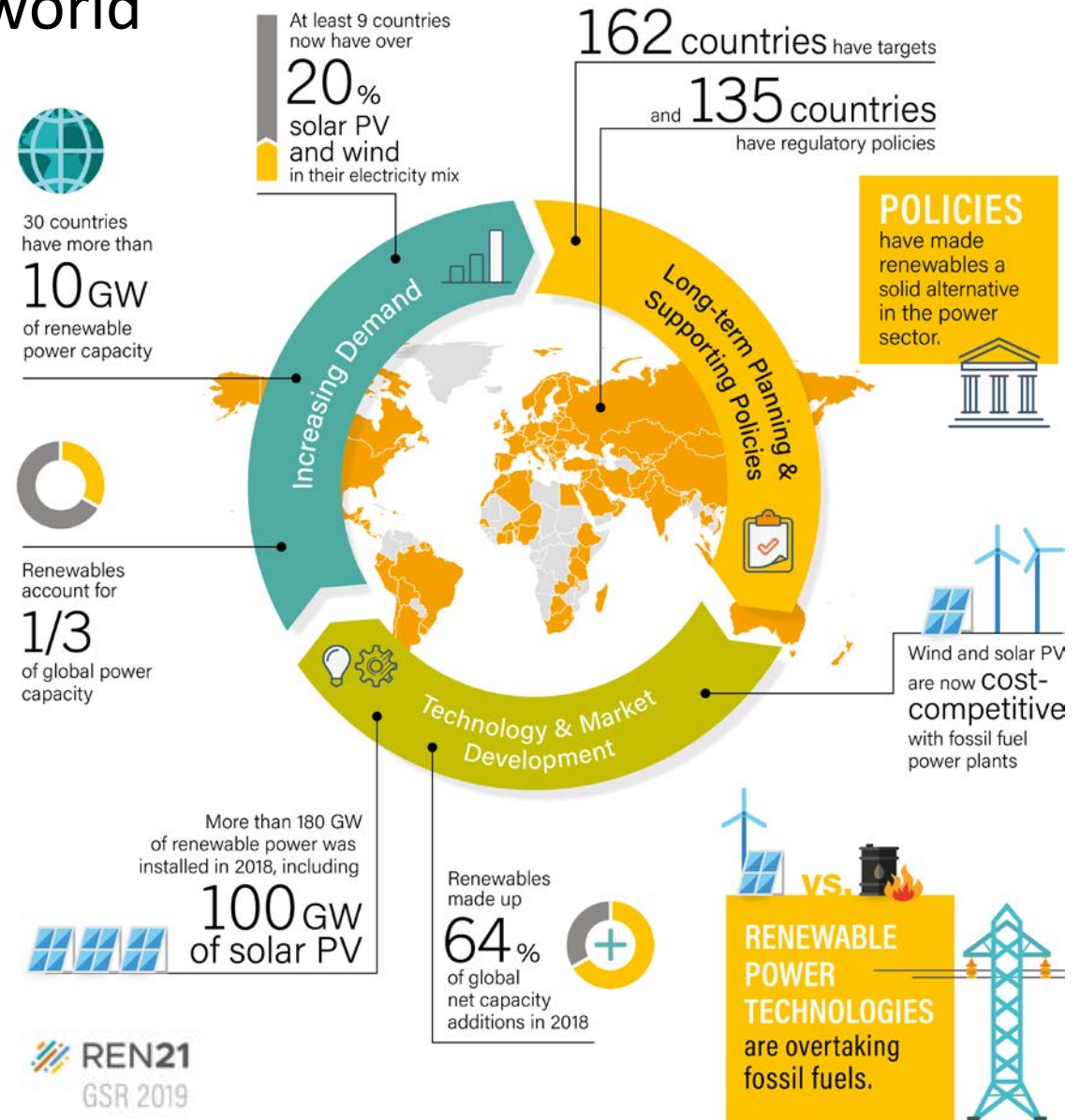
REN21 RENEWABLES 2019 GLOBAL STATUS REPORT

Source: IRENA.



# Renewable energy is powering the world

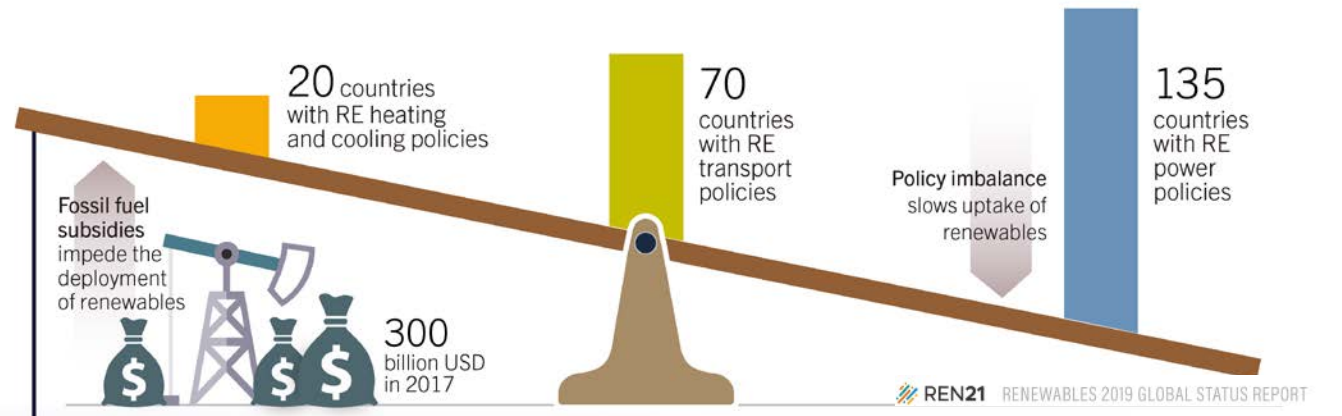
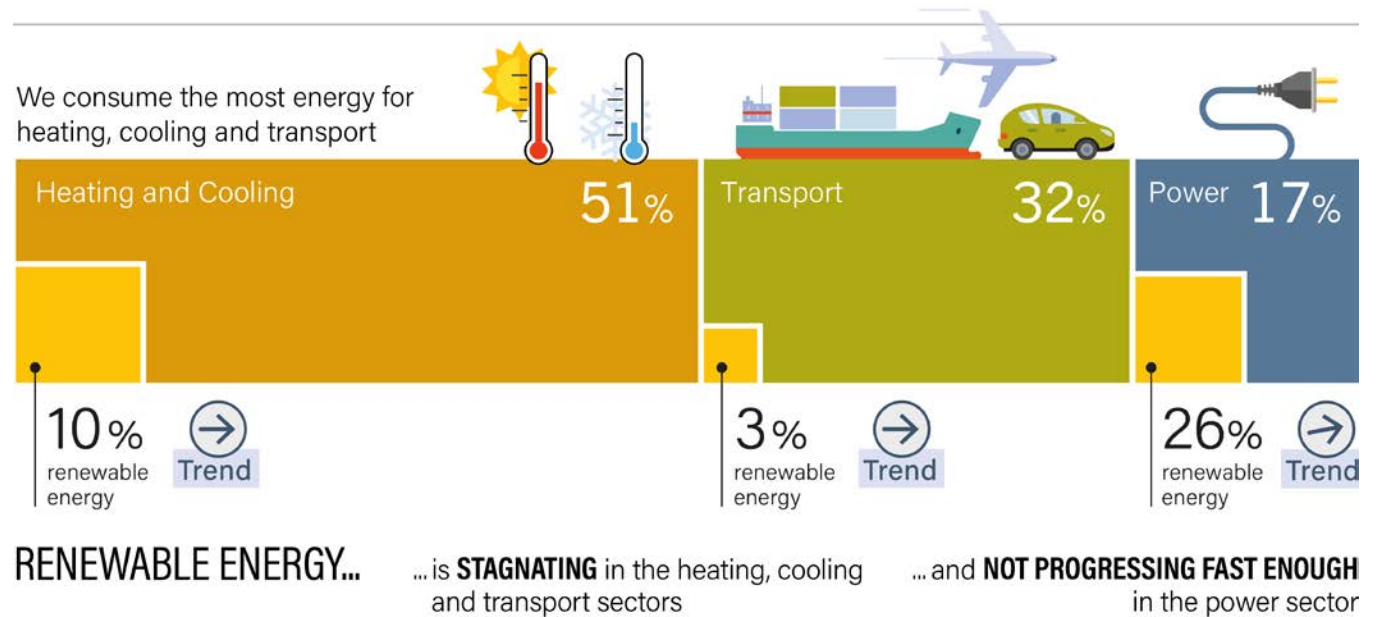
Reliable and Mainstream:  
Renewable power is here to stay!



REN21  
GSR 2019

# From an electricity transition to an energy system transformation

- **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



# The transition is possible – positive examples are showing the way!

- **Leadership from national governments** is paving the way towards 100% renewables in countries.
- **Cities and sub-national governments** are setting more ambitious policies than their national governments.
- **1000+ organisations**, totalling USD 8 trillion of managed assets, have committed to divesting from fossil fuels.
- The **private sector** has doubled its investment in sourcing renewable power.



# Renewable Energy Policy Network for the 21<sup>st</sup> Century



*Global Status Report:  
yearly publication since 2005*



*Renewables in Cities  
Status Report:*



*Regional Reports*



*Global Futures  
Reports*



*Thematic Reports*



*REN21 Academy*



*International  
Renewable Energy  
Conferences*

Making  
the invisible  
visible.

REN21 changes the way  
we think about renewable  
energy.

[www.ren21.net/gsr](http://www.ren21.net/gsr)

Subscribe to our newsletter  
[www.ren21.net](http://www.ren21.net)

**SAVE THE DATE:**  
**22-25 October 2019**  
Seoul, Republic of Korea

**RENEWABLES 2019**  
**GLOBAL STATUS REPORT**

 **REN21**

