

RENEWABLES 2019

GLOBAL STATUS REPORT



Hannah E. Murdock
Project Manager & Analyst, REN21
hannah.murdock@ren21.net

CitiesSHIFT webinar
4 July 2019

2019

REN21 is an international policy network of passionate players dedicated to building a sustainable renewable energy future.

NGOs:

CAN-I, CCA, CLASP, Club-ER, CEEW, Energy Cities, FER, GFSE, Global 100% Renewable Energy, Greenpeace International, GWNED, 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:

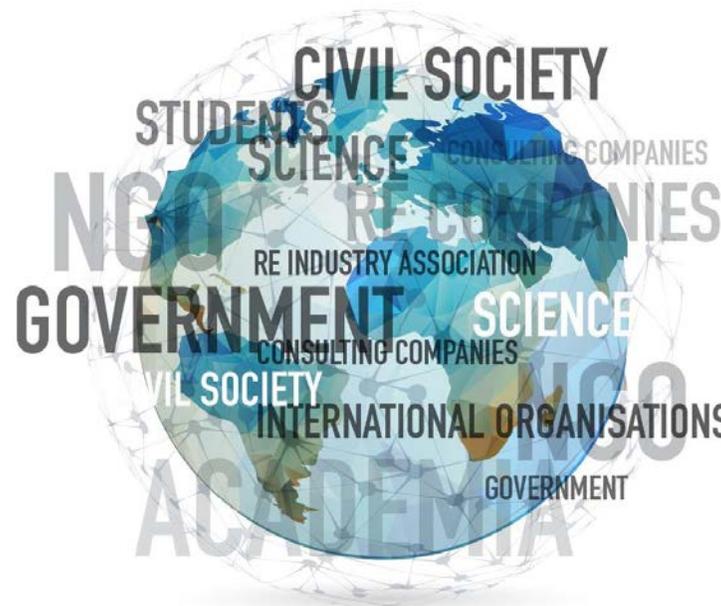
AEE INTEC, Fundacion Bariloche, IIASA, ISES, NREL, SANEDI, TERI

Inter-governmental Organisations:

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

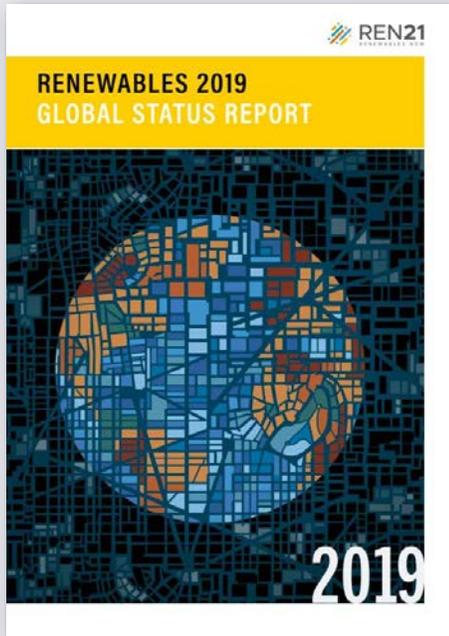
Governments:

Afghanistan, Brazil, Denmark, Germany, India, Mexico, 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: 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.

Renewable energy continues to grow

- **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

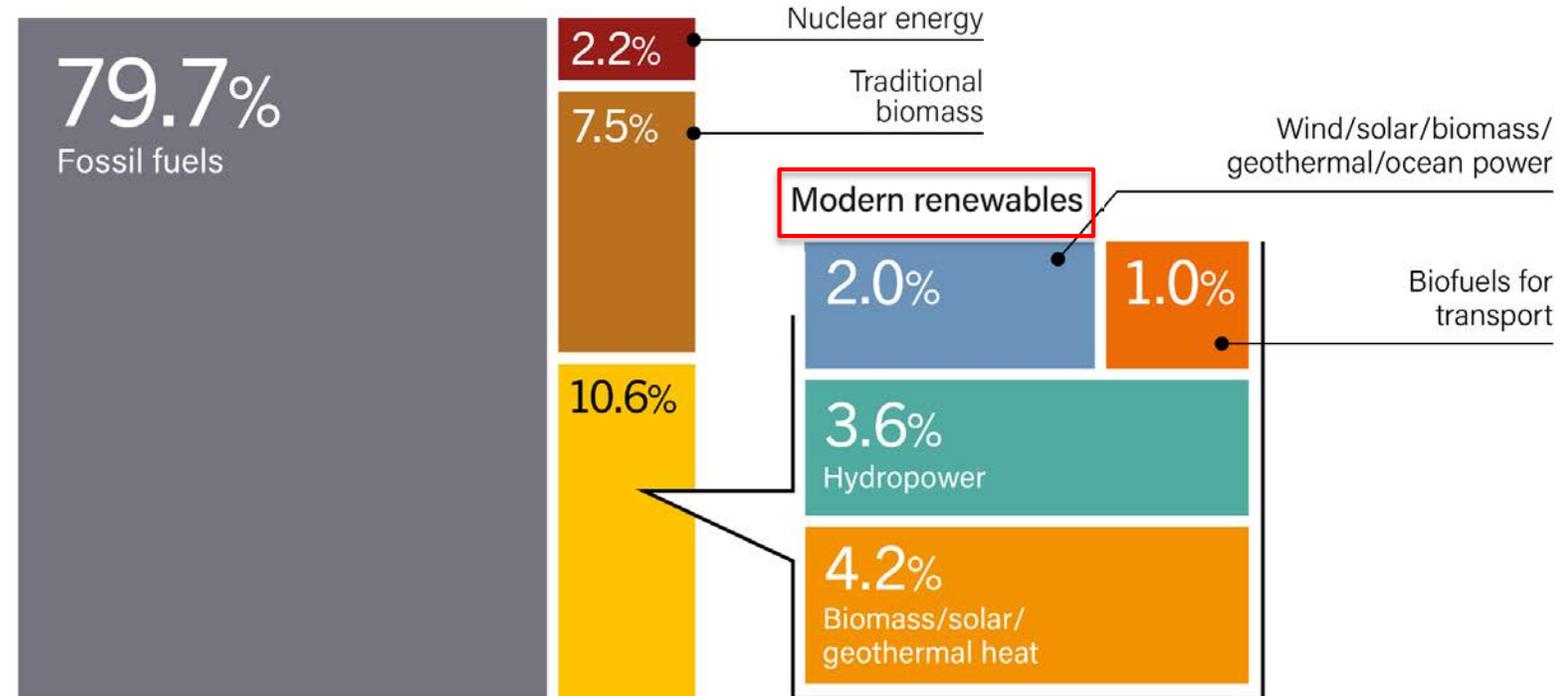
		2017	2018
INVESTMENT			
New investment (annual) in renewable power and fuels ¹	billion USD	326	289
POWER			
Renewable power capacity (including hydropower)	GW	2,197	2,378
Renewable power capacity (not including hydropower)	GW	1,081	1,246
 Hydropower capacity ²	GW	1,112	1,132
 Wind power capacity	GW	540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

 **REN21** RENEWABLES 2019 GLOBAL STATUS REPORT

Modern renewables are gaining ground in final consumption

- **Modern renewable energy** accounted for **10.6%** of final energy demand in 2017.
 - Increase from 10.4% in 2016
- Considering traditional biomass, renewable energy covered **18.1%** of final energy demand
- Modern renewable heat covered 4.2% of demand, hydropower 3.6%, non-hydro power 2% and transport biofuels 1%.

Estimated Renewable Share of Total Final Energy Consumption, 2017



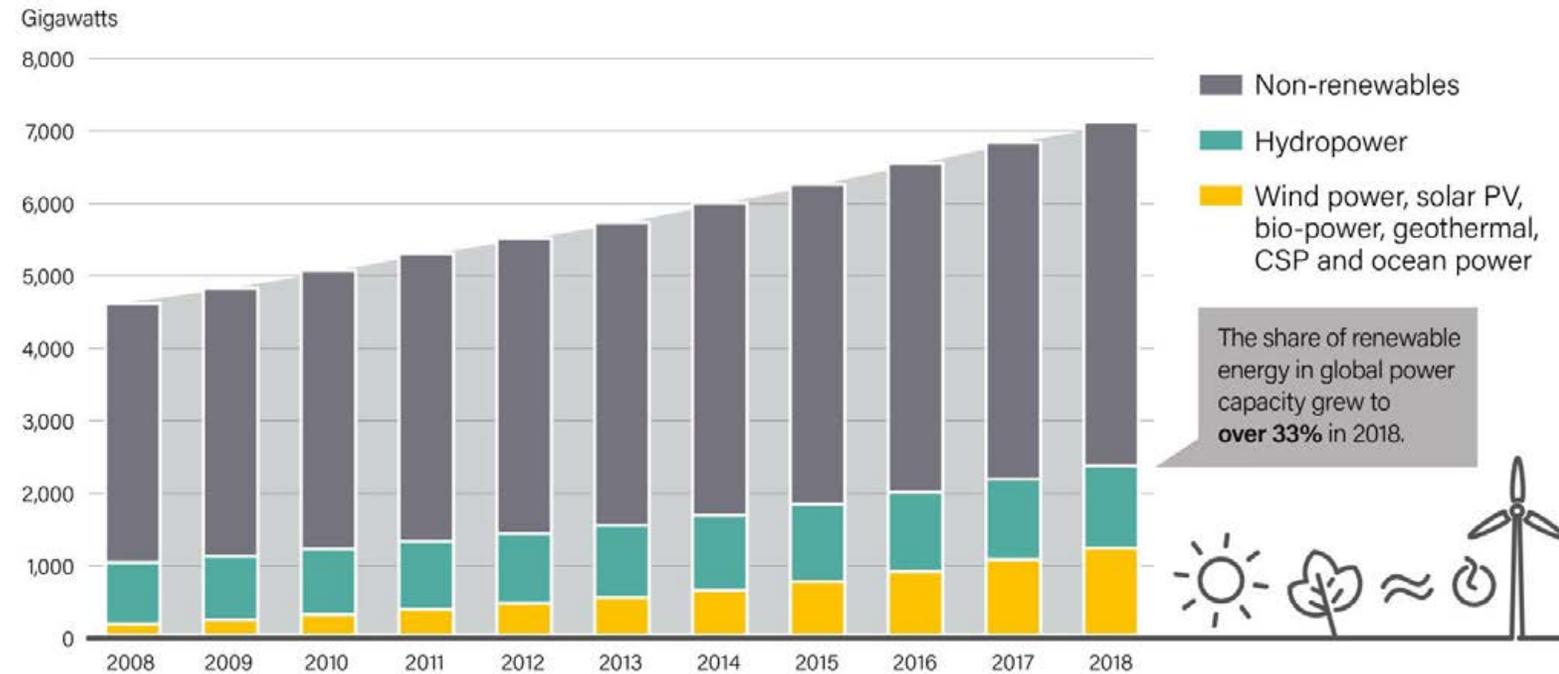
REN21 RENEWABLES 2019 GLOBAL STATUS REPORT

Source: OECD/IEA and IEA SHC

Renewable energy makes up over one-third of global power 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

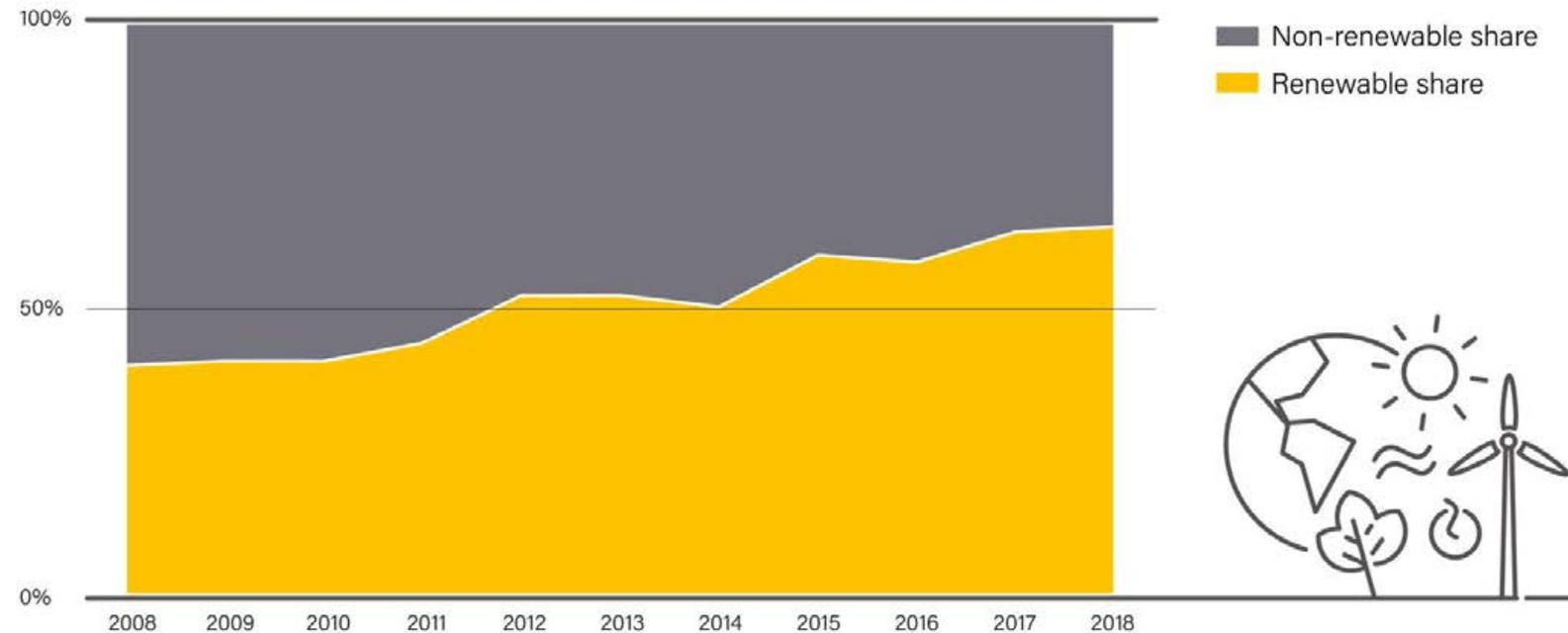


REN21 RENEWABLES 2019 GLOBAL STATUS REPORT

More renewable capacity added yearly than fossil fuel and nuclear

- 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

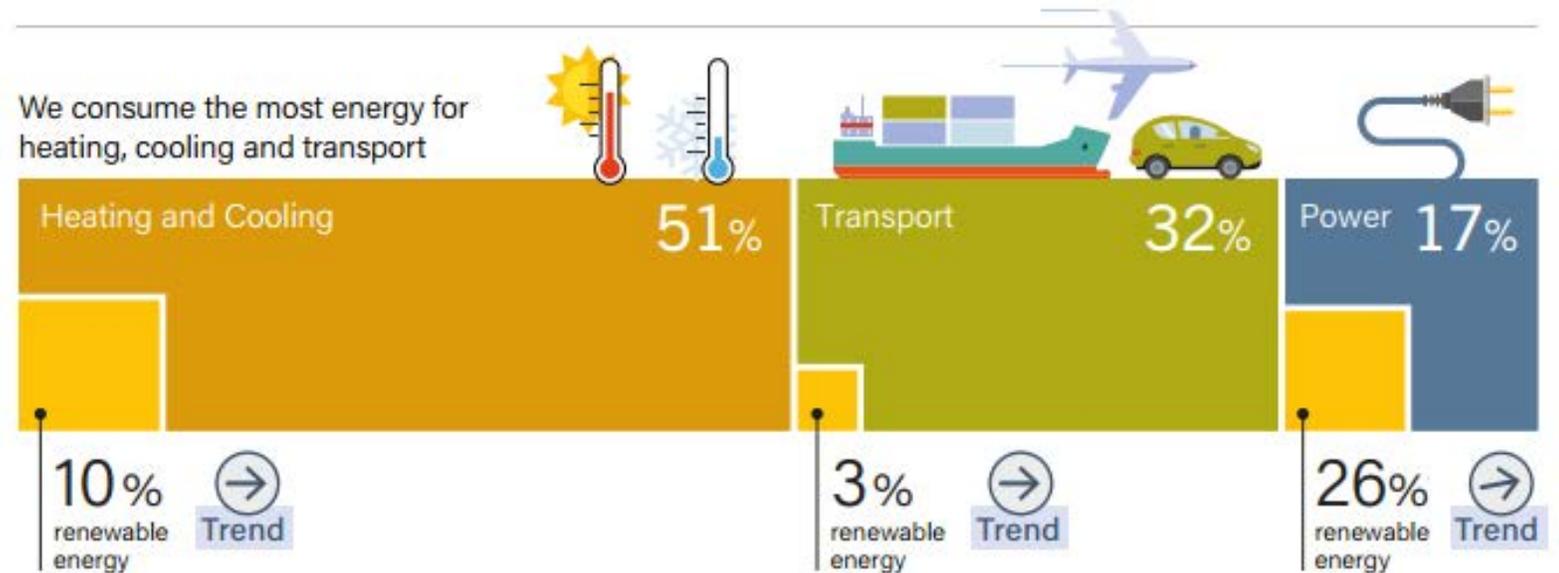
Share of Renewables in Net Annual Additions of Power Generating Capacity, 2008-2018



REN21 RENEWABLES 2019 GLOBAL STATUS REPORT

More than 80% of energy demand is 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

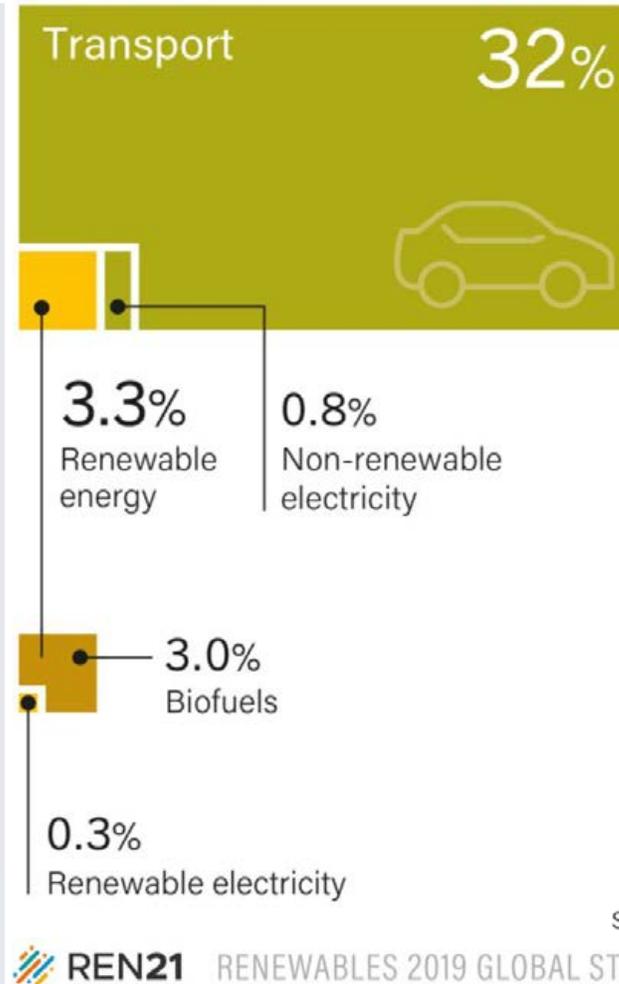


REN21 RENEWABLES 2019 GLOBAL STATUS REPORT

Source: OECD/IEA

Biofuels and EVs growing but renewable share in transport remains low

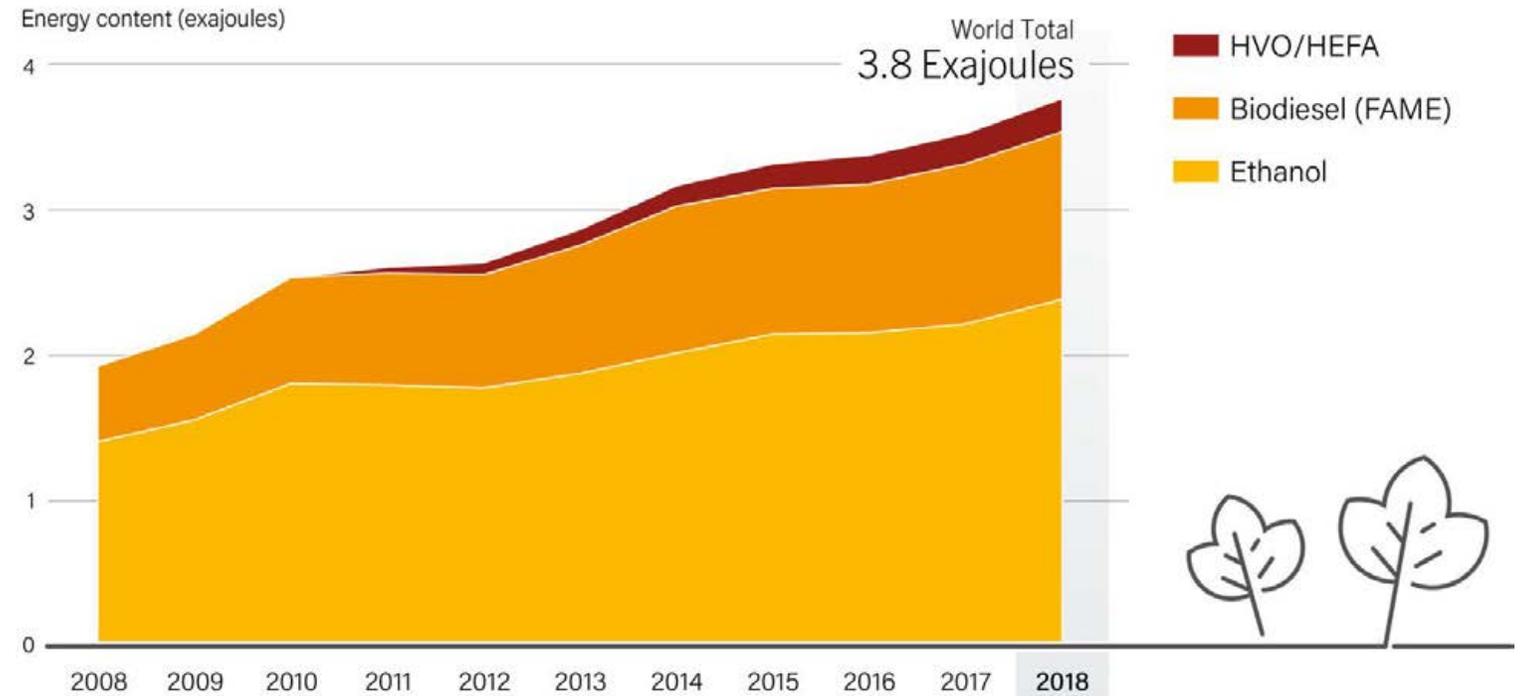
- Global energy demand in transport increased **45%** since 2000
- Transport accounts for **23%** of global CO2 emissions
- The renewable share of transport grew slightly to **3.3%**
- Biofuels make up majority of renewable contribution, but sector increasingly open to electrification



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



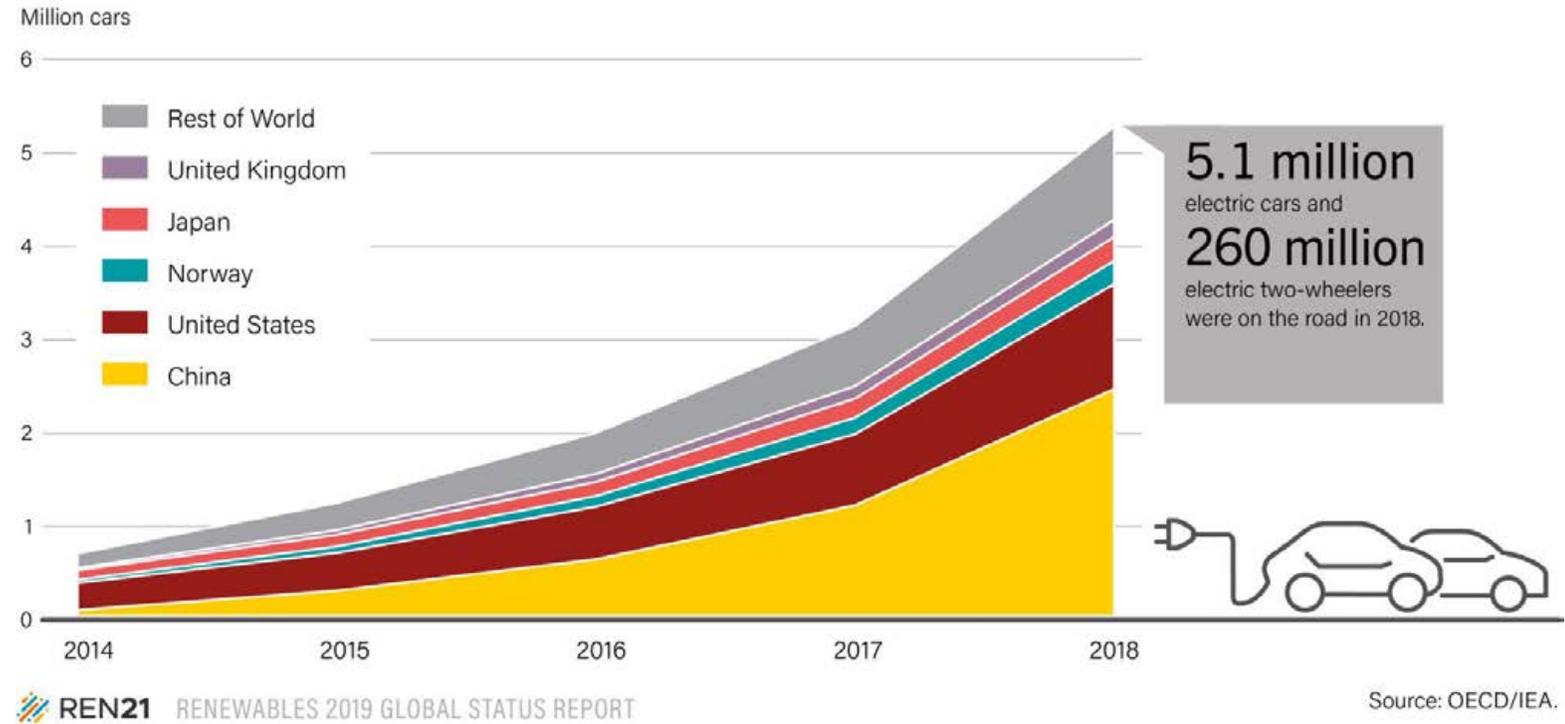
Note: HVO = hydrotreated vegetable oil; HEFA = hydrotreated esters and fatty acids; FAME = fatty acid methyl esters

REN21 RENEWABLES 2019 GLOBAL STATUS REPORT

Electric passenger vehicle stock grew over 60%

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

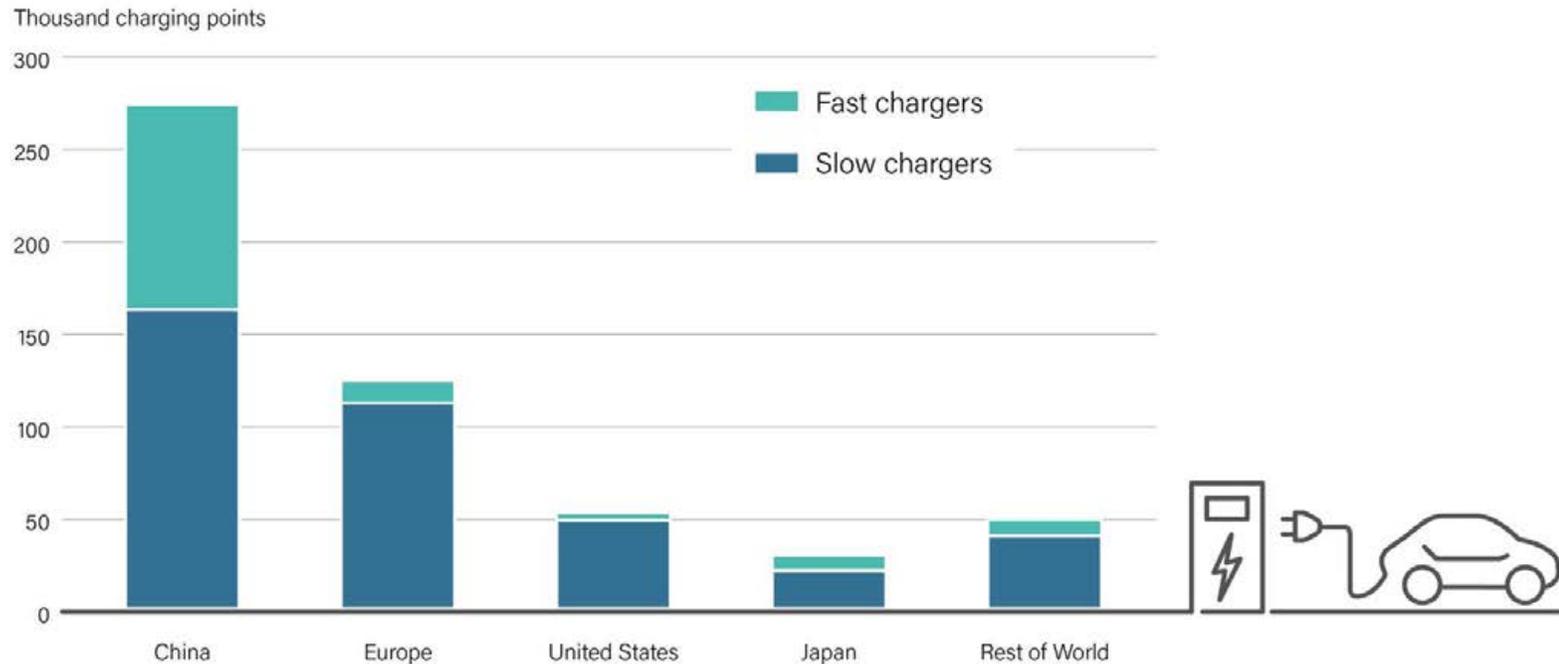
Electric Car Global Stock, Top 5 Countries and Rest of World, 2014-2018



More than 100,000 public EV charging points installed in 2018

- Global total reached around **540,000** and grew 23% from 2017 levels
- Around 72% are slow charging points
- China has more than half of all public EV charging points, and the vast majority of the fast chargers
- Public charging points still dominated by private chargers (numbering over 5 million)

Public EV Charging Points by Country or Region, Fast and Slow Charging, End-2018



REN21 RENEWABLES 2019 GLOBAL STATUS REPORT

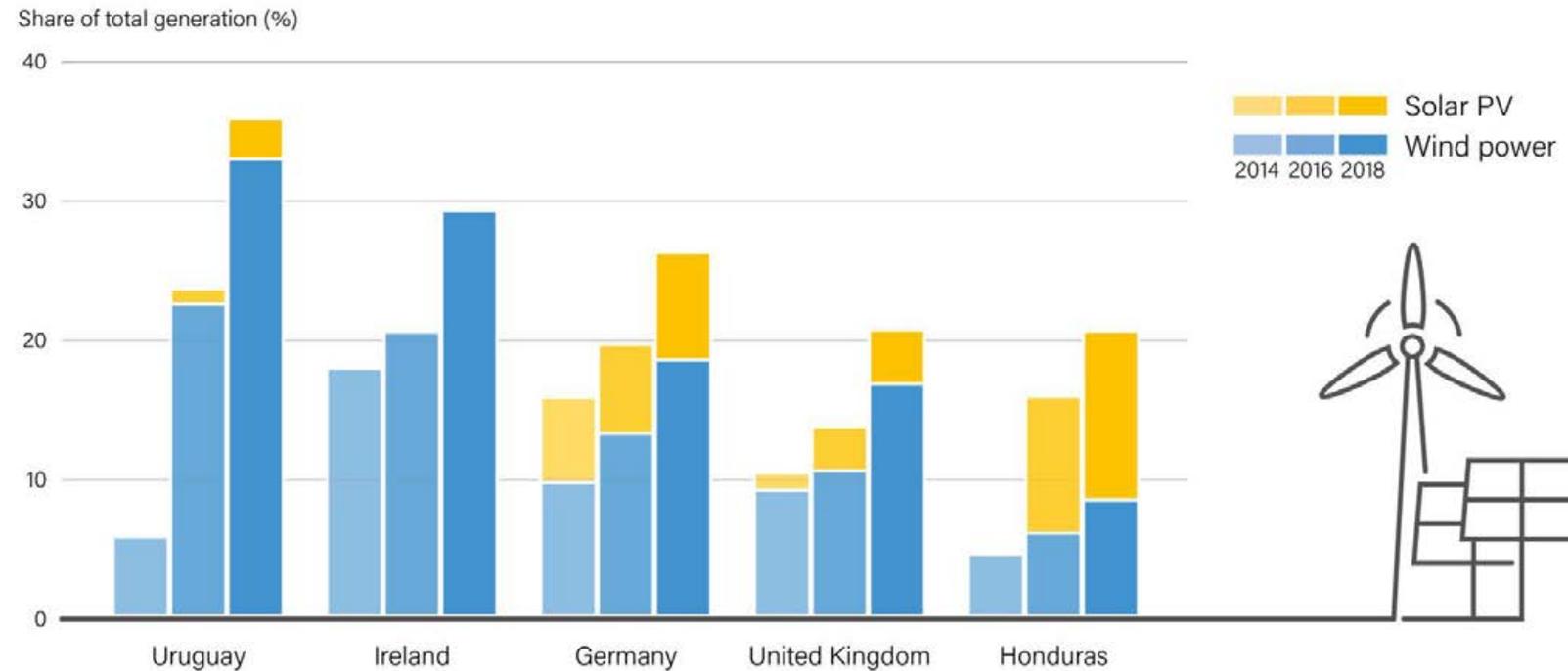
Source: OECD/IEA

Note: Europe comprises the Netherlands, Germany, France, the United Kingdom, Norway, Sweden, Portugal and Finland.

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 five countries

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



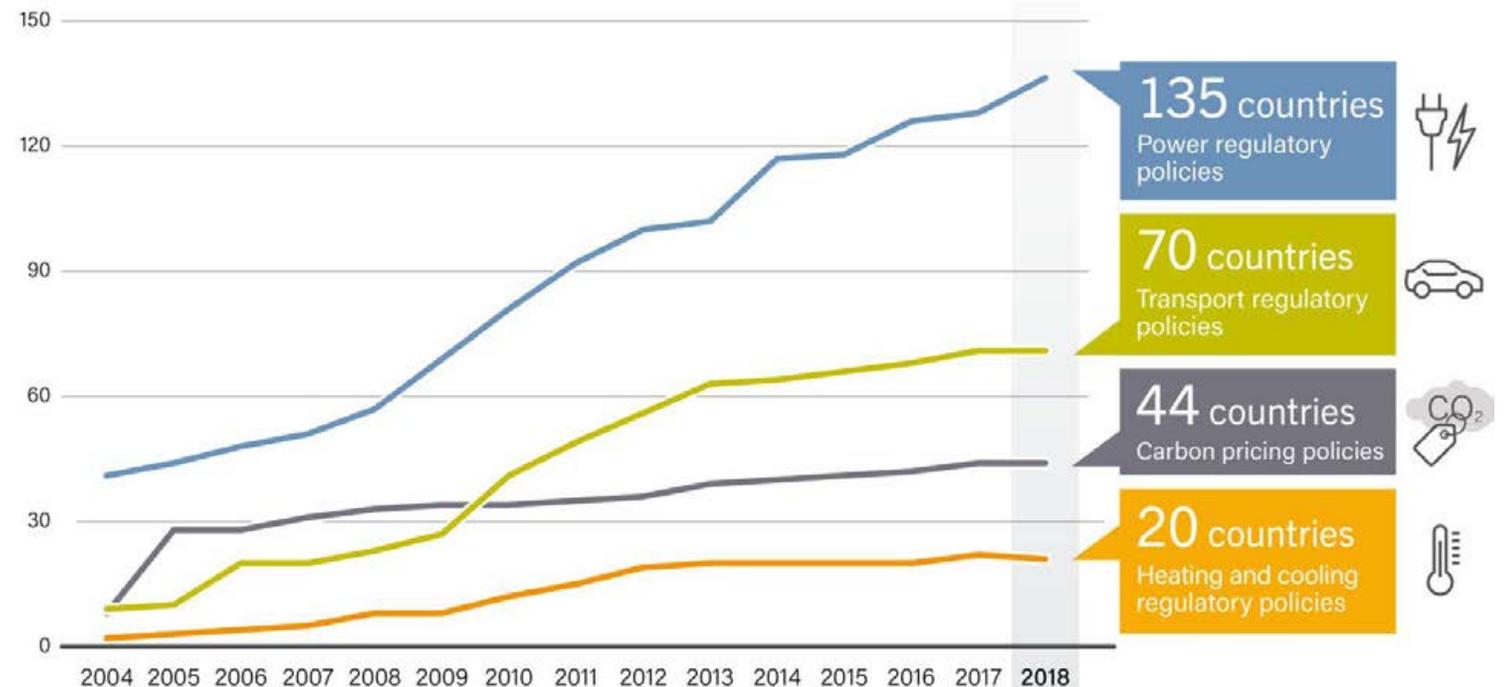
Note: This figure includes selected countries with high shares of variable renewable energy according to the best available data at the time of publication. Factors including annual weather variations may significantly impact generation from VRE in a particular year. Trends shown are not meant to imply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

REN21 RENEWABLES 2019 GLOBAL STATUS REPORT

Power sector continues to receive most policy attention

- 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

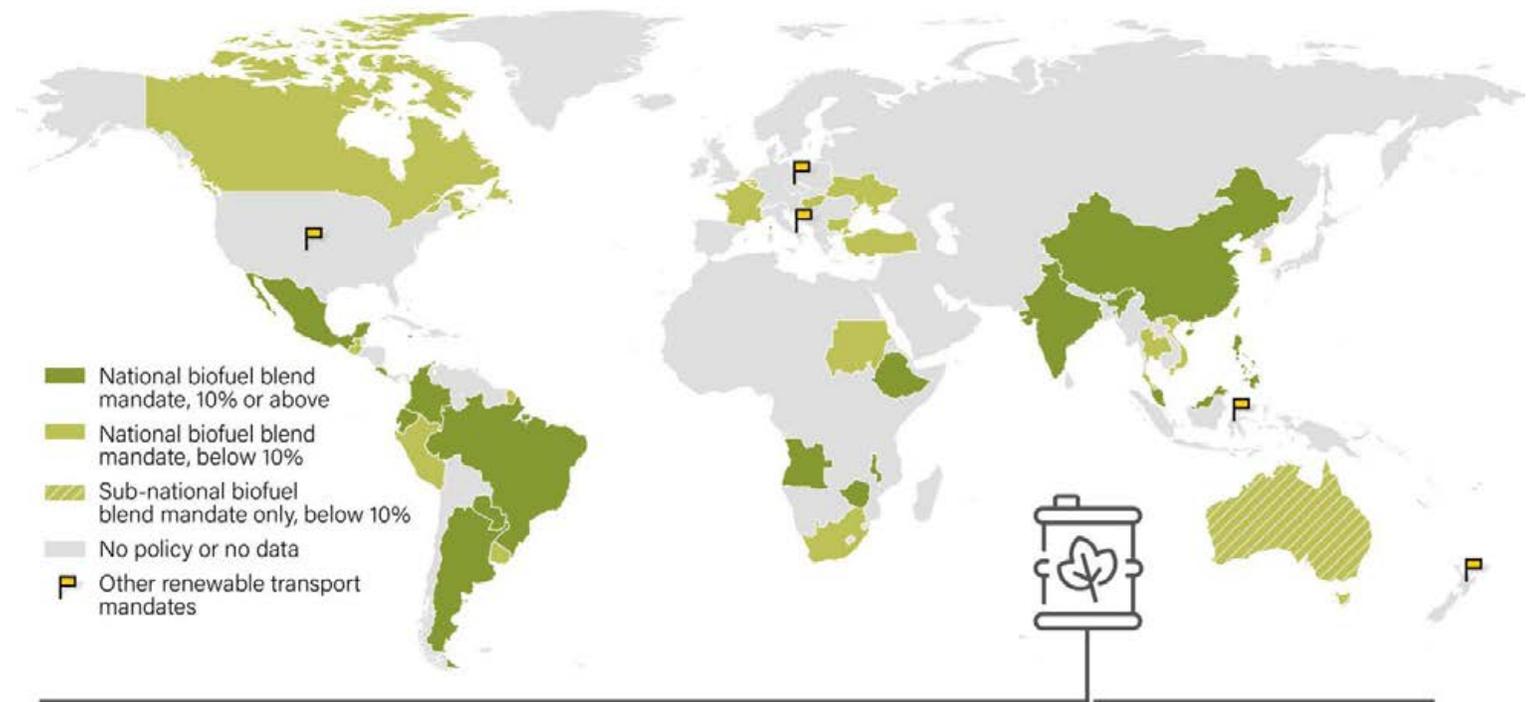


REN21 RENEWABLES 2019 GLOBAL STATUS REPORT

Policy support remains static for transport

- Only **36%** of countries have biofuel blend mandates
- Some expanded support for ethanol, biodiesel, and advanced biofuels in 2018
- Only **40** countries have fuel economy policies for LDVs
 - Just 5 countries have fuel economy standards for trucks

National and Sub-National Renewable Transport Mandates, End-2018



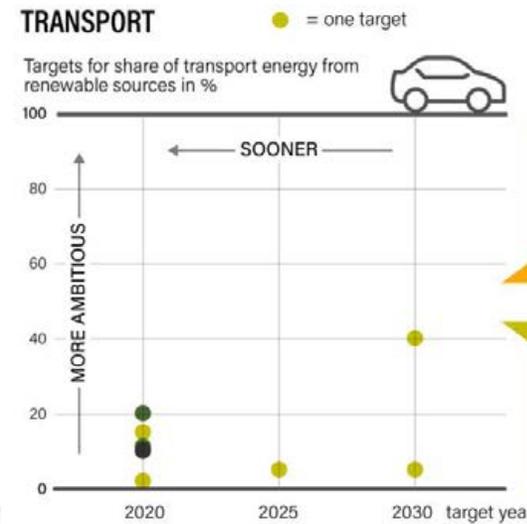
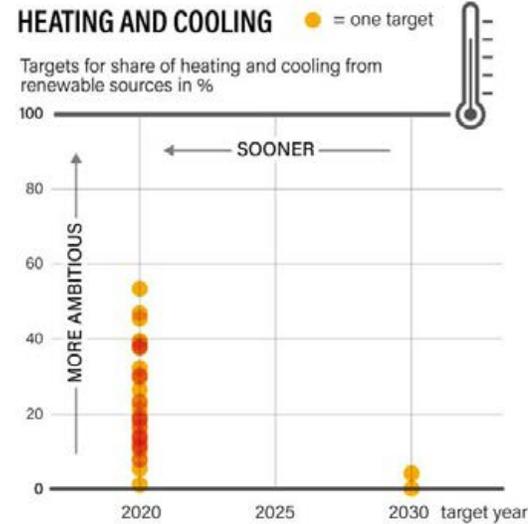
REN21 RENEWABLES 2019 GLOBAL STATUS REPORT

Source: REN21 Policy Database.

Ambition uneven across sectors

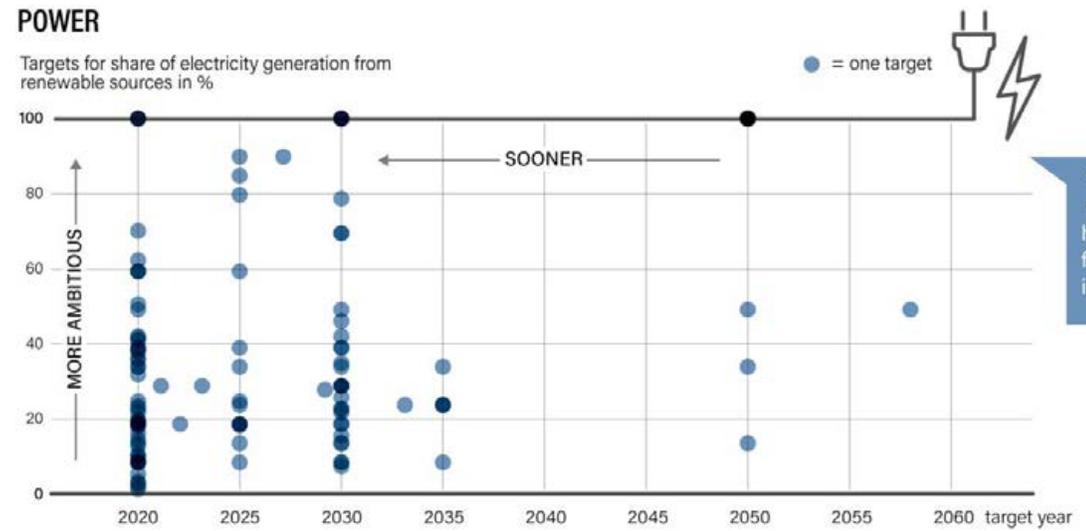
- Targets in the **power sector** remain more ambitious, more numerous than in heating and cooling and transport
- Fewer than **10** countries and states/provinces had economy-wide targets for at least **50%** renewable energy
- Still **only 1** country with a target for 100% renewables in total final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

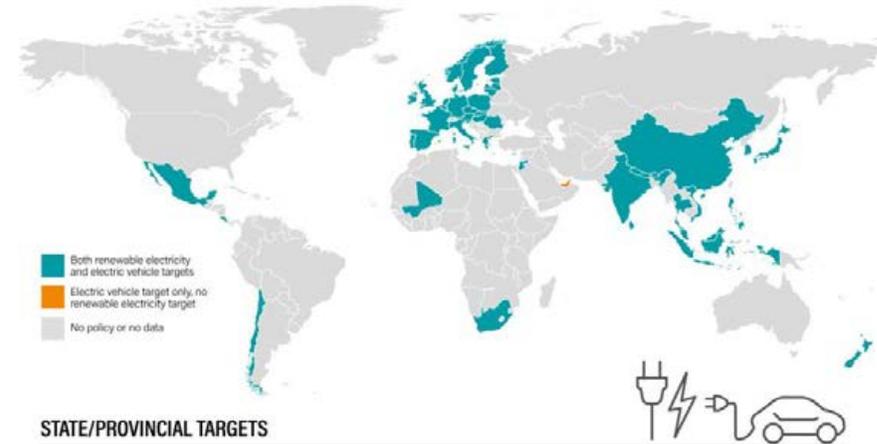


162 countries have national targets for renewable energy in power.

Little direct linking of EVs and renewables

- EVs can play a role in increasing renewables in transport **when powered by renewable electricity**
- Only **1** country with policy support **directly linking** renewables and EVs
- At least **49** countries have **independent targets** for renewable electricity and EVs

NATIONAL TARGETS



STATE/PROVINCIAL TARGETS

United States and Canada



United Kingdom



India



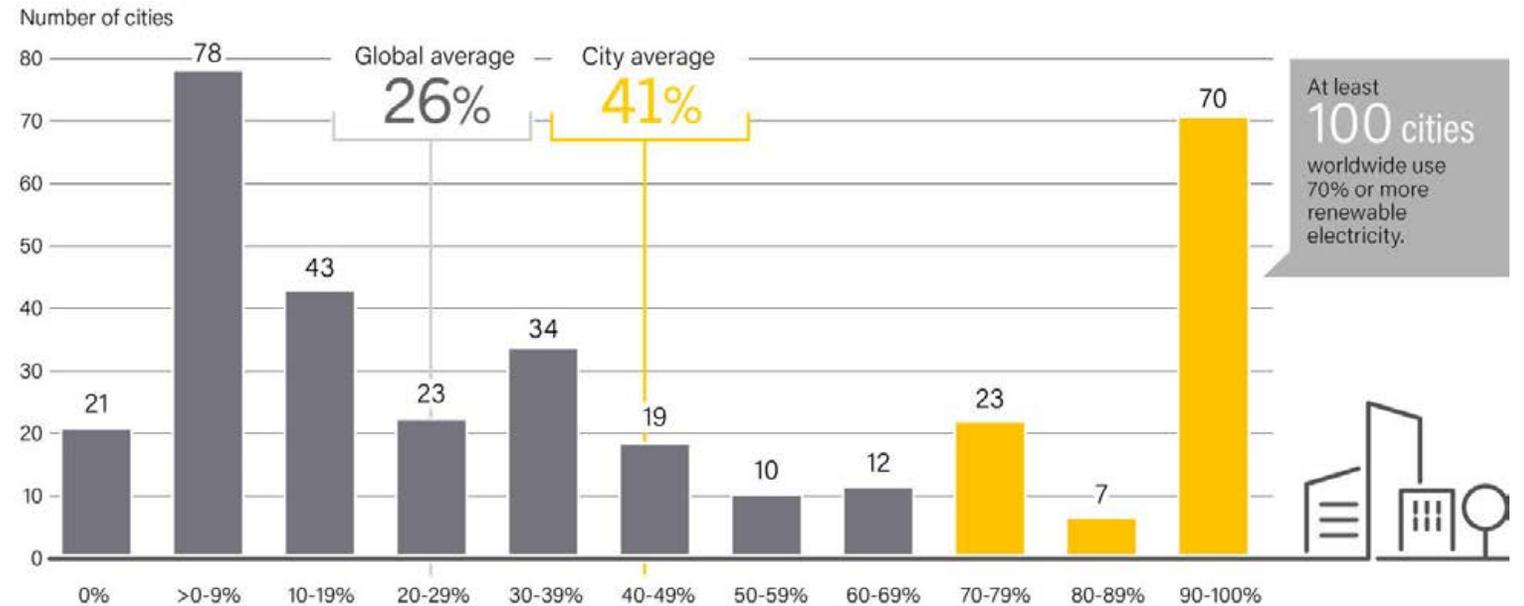
SELECTED CITY TARGETS



Cities are advancing renewables to achieve diverse goals

- Cities account for **65%** of global energy demand
- Some cities able to accomplish more ambitious renewables goals than national and state/provincial bodies
 - At least **100 cities** sourcing **70% or more** of their electricity from renewables
 - More than **40 cities** were already powered by **100%** renewables

Renewable Power in Cities*, by Number of Cities and Renewable Share, 2017



* The figure shows shares of renewables in the electricity consumption of 340 cities that self-reported to CDP.

Source: CDP.

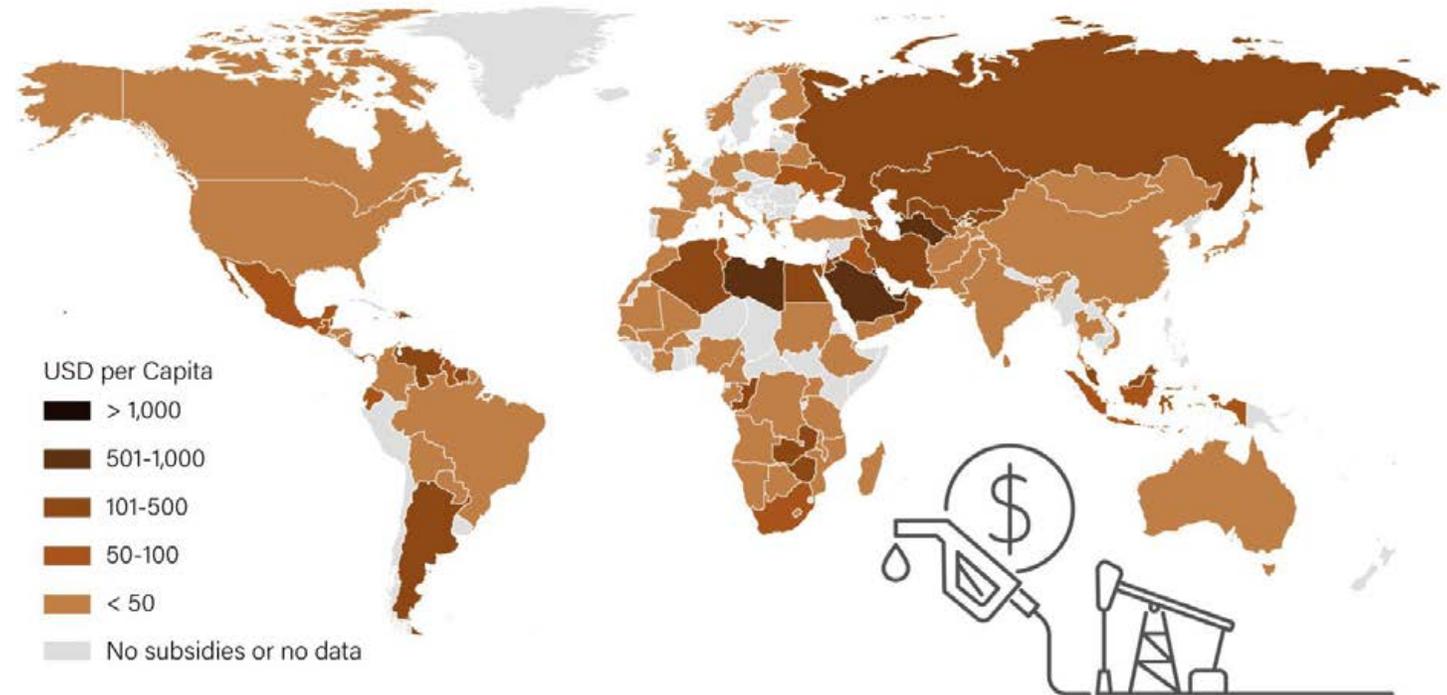
Note: City average is calculated based on the 340 cities shown. Categories include all values below the lower limit of adjacent category.

REN21 RENEWABLES 2019 GLOBAL STATUS REPORT

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

Policy Spotlight: Transformation of Road Transport in Scandinavia

- **Ambitious targets** for renewable energy in transport
- **Policy** mandates and incentives at **national and sub-national** levels
- **Investment in infrastructure** for biofuels, charging stations, public transport, walking and cycling
- **Deterrents** for purchasing higher-carbon emitting cars



Conclusions – what is needed to advance the energy transition?

- **Set ambitious targets** globally, across regions, countries and sectors
- Create the right, sustainable **market conditions**
- **Accelerate investment** in renewable power, while also establishing new (and strengthening existing) policies for renewables in heating, cooling and transport
- Encourage **sector integration** among the power, heating and cooling, and transport sectors
- **Align** regional, national and sub-national policies, and **support cities** in their actions
- Enact integrated policies that enforce **energy efficiency** measures while promoting the uptake of renewable energy
- Support local job creation and a **just transition**
- **Build social acceptance** and increase public buy-in



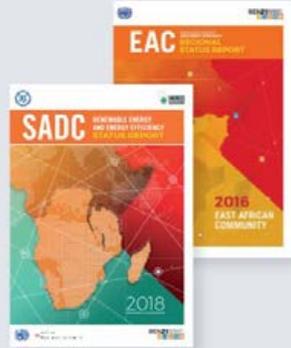
Renewable Energy Policy Network for the 21st Century



*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

Subscribe to our newsletter
www.ren21.net

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

**RENEWABLES 2019
GLOBAL STATUS REPORT**

 **REN21**

