RENEWABLES 2018
GLOBAL STATUS REPORT

REN21 Renewable Energy Policy Network for the 21st Century

2018

Rana Adib
Executive Secretary

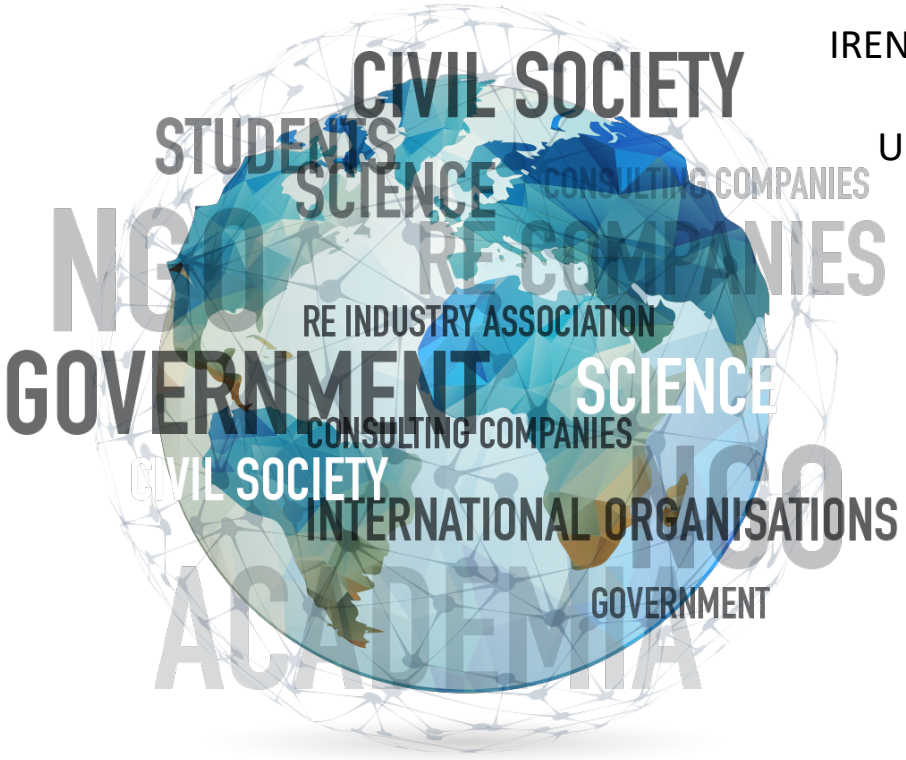
GSR2018 Launch - Webinar
Clean Energy Solutions Center
5 June 2018

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:
Fundacion Bariloche, IIASA, ISES, NREL, SANEDI, TERI

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



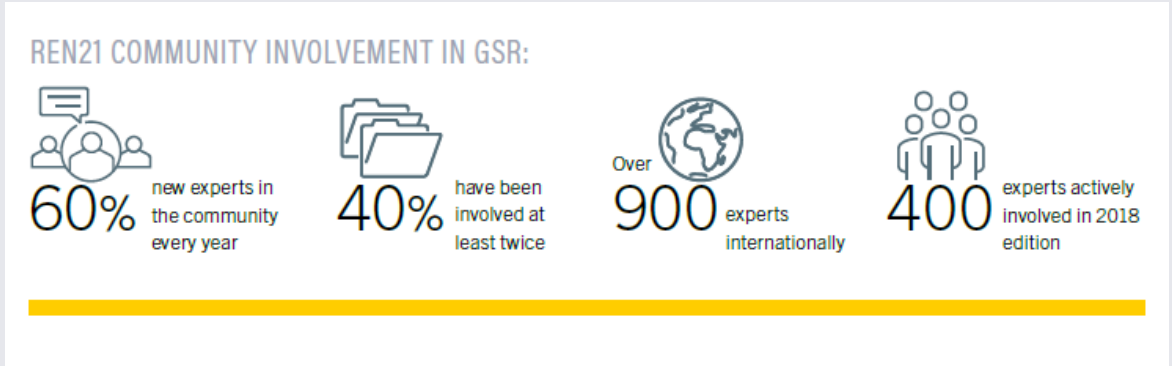
Industry Associations:
ARE, ACORE, ALER, APREN, CREIA, CEC, EREF, GOGLA, GSC, GWEC, IREF, IGA, IHA, RES4MED, WBA, WWEA

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



Another Extraordinary Year for Renewable Energy

- **Total global capacity:** 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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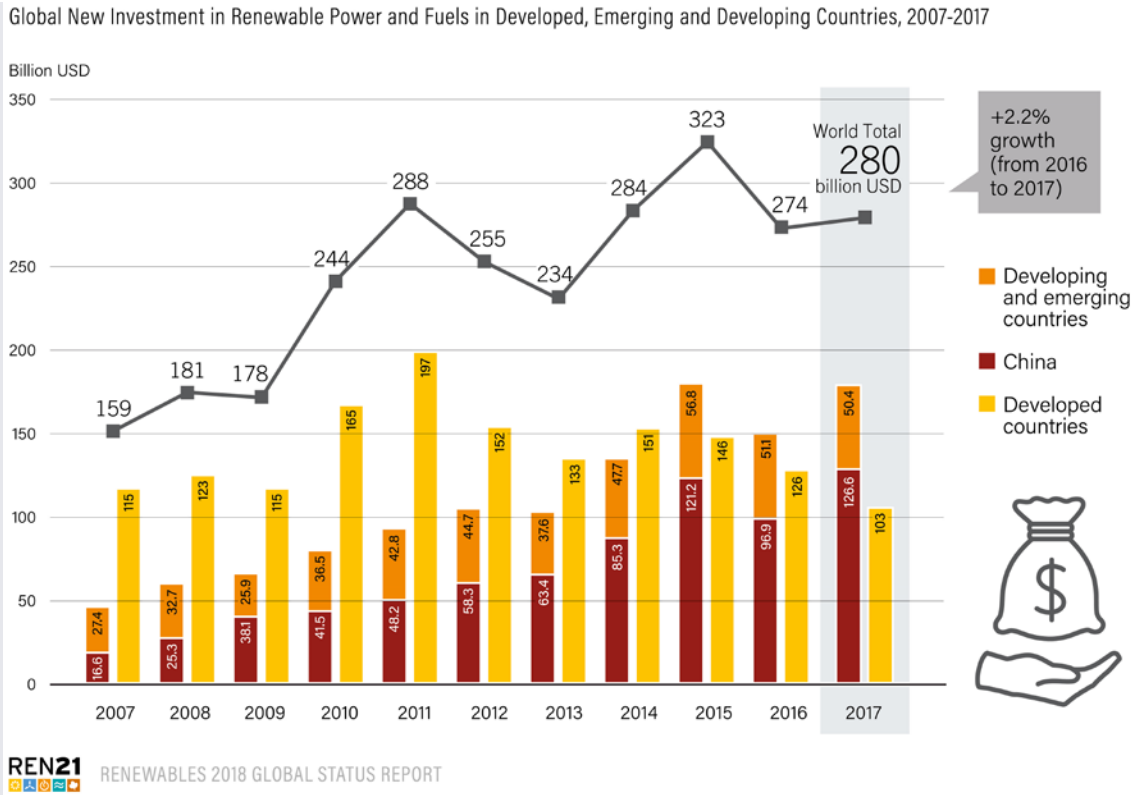
Global Investment in Renewable Energy

- Global **new investment** in renewable power and fuels in 2017: **USD 279.8 billion (+2%)** (USD 319.8 billion incl. large hydropower)

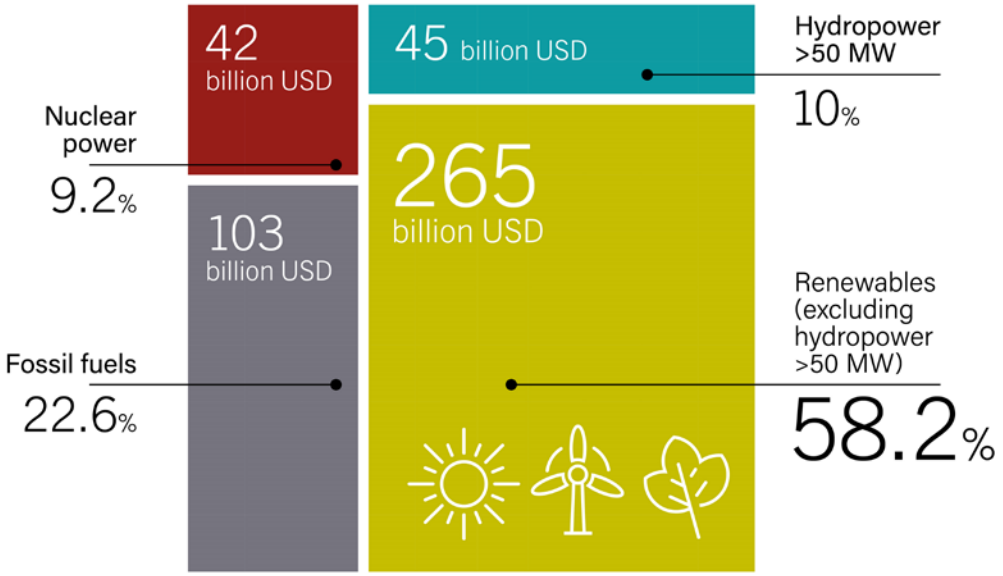


Global Investment in New Power Capacity

- 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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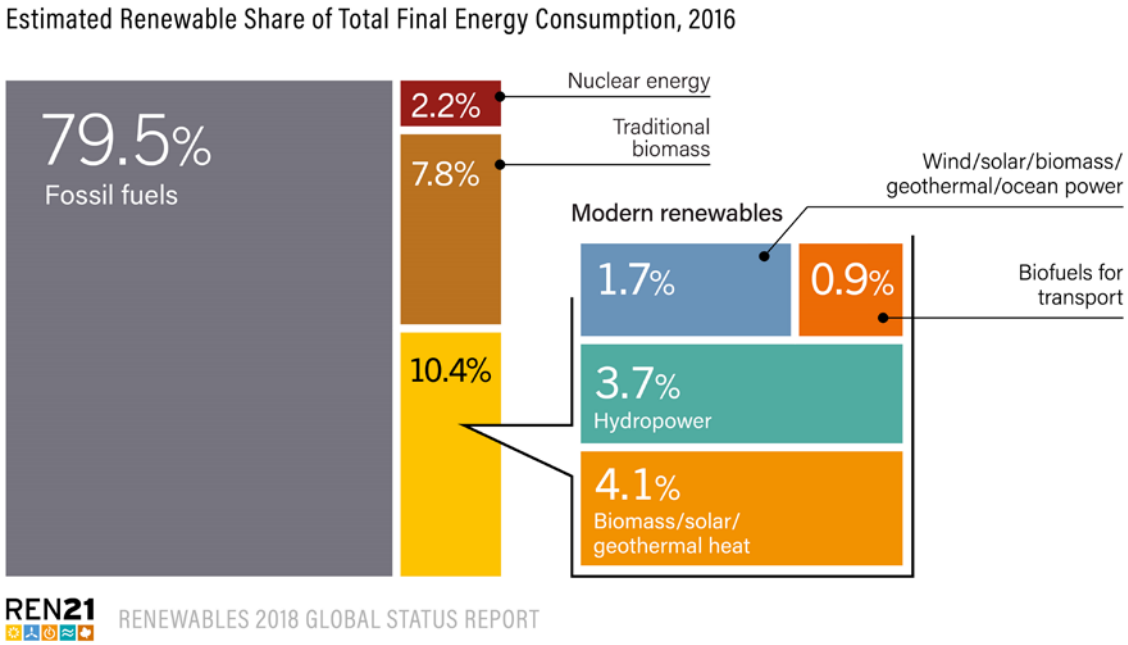
Renewable Energy in Total Final Energy Consumption

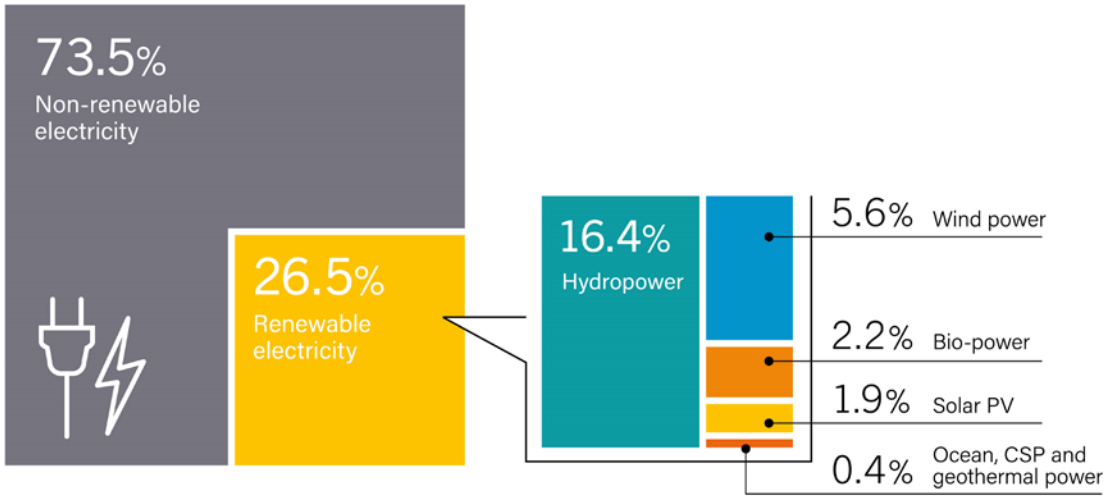
- As of **2016**, renewable energy provided **18.2%** (est.) of **global final energy consumption**
  - **10.4% modern renewables** (**+0.2%** compared to 2015)
  - **7.8% traditional biomass** (**-2.4%** than 2015)



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!**

Estimated Renewable Energy Share of Global Electricity Production, End-2017



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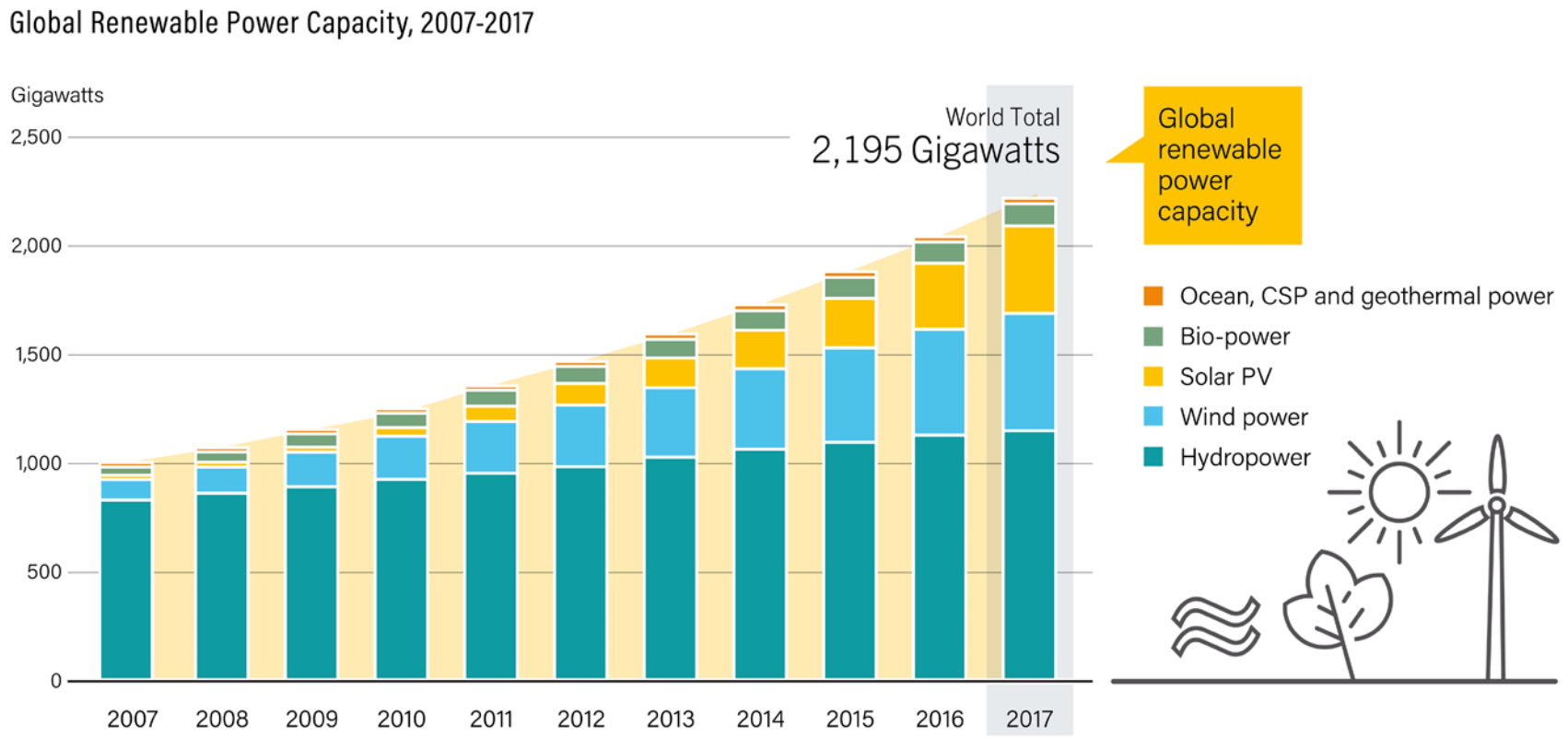
Global Renewable Power Capacity



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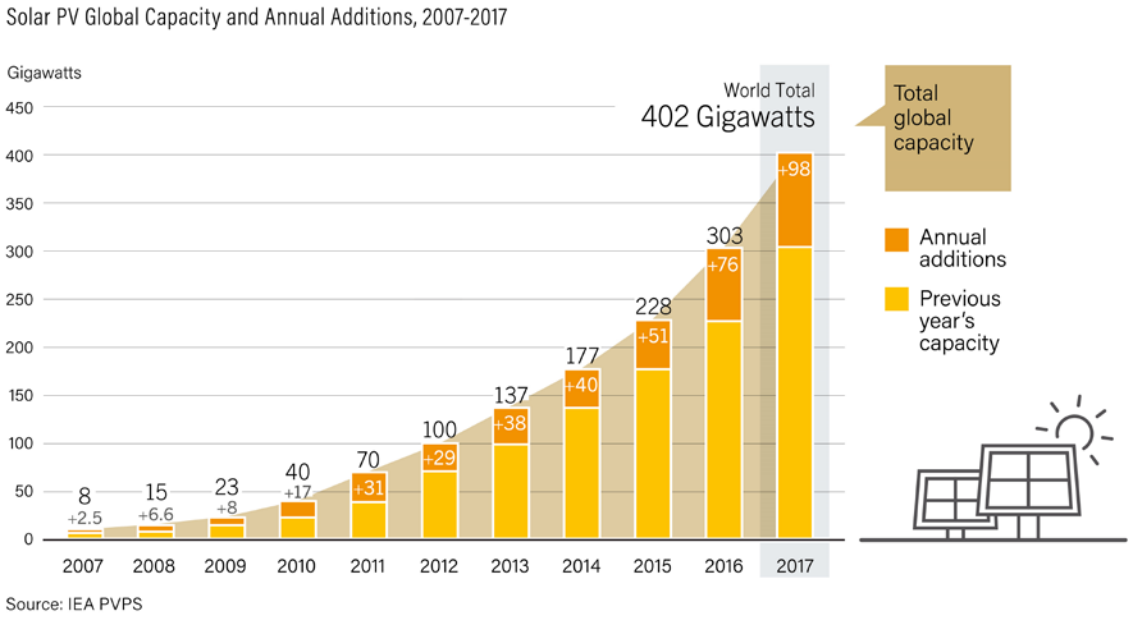
Power Sector

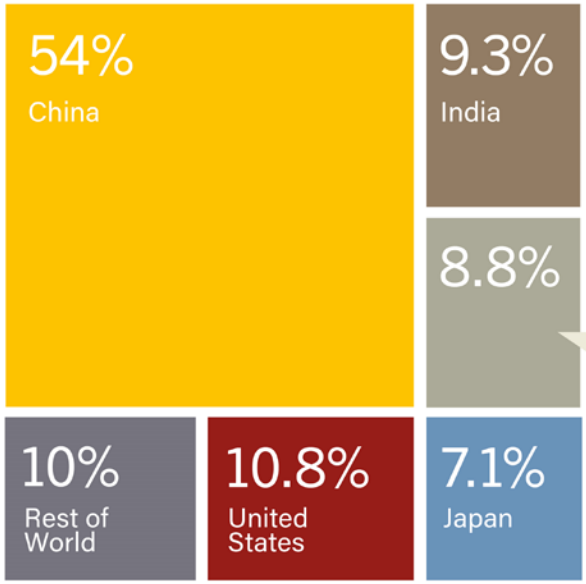
- **98 GW** of solar PV capacity added in 2017
- Global total increased **33%** to **402 GW** (40,000 PV panels every hour)
- **More solar PV was installed than the net capacity additions of fossil fuels and nuclear power combined**



Solar PV

- **China** added **53.1 GW** in 2017, **more than was added worldwide in 2015**, increasing its total solar PV capacity to **131.1 GW**
- **China reached its 2020 target** for solar installations in 2017

Solar PV Global Capacity Additions, Shares of Top 10 Countries and Rest of World, 2017



Next 6 countries

Turkey	2.7%
Germany	1.7%
Australia	1.3%
Republic of Korea	1.2%
United Kingdom	0.9%
Brazil	0.9%

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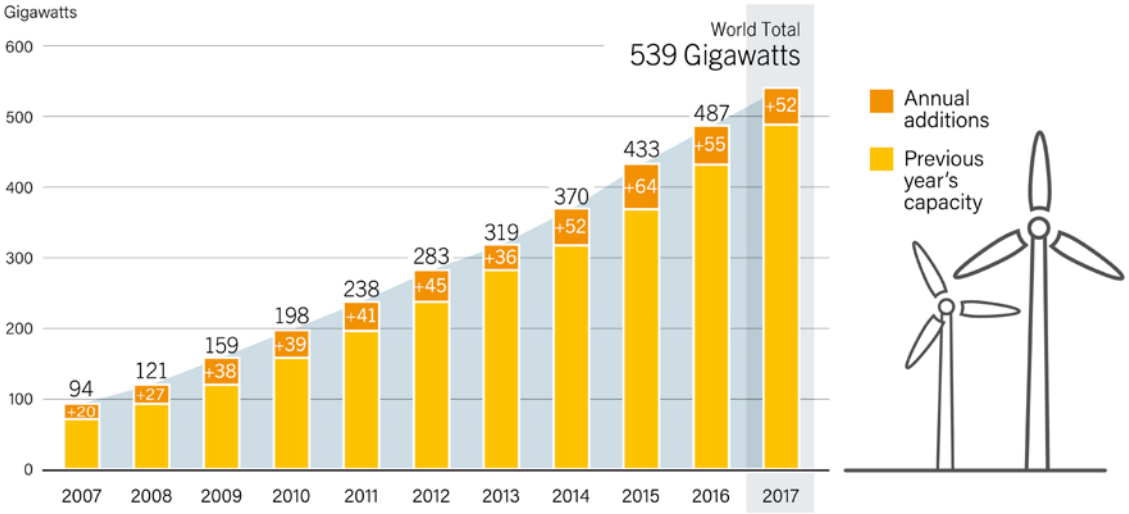
Wind Power

- **52 GW** of wind power capacity added in 2017, increasing global total by **11% to 539 GW**
- **China:** lead position for wind power as well, adding nearly **19.7 GW**, reaching a total of **188.4 GW**
- Although onshore wind represents the majority of installed capacity for wind, there was an increase of **+30%** in **global offshore capacity**

Wind Power Global Capacity and Annual Additions, 2007-2017



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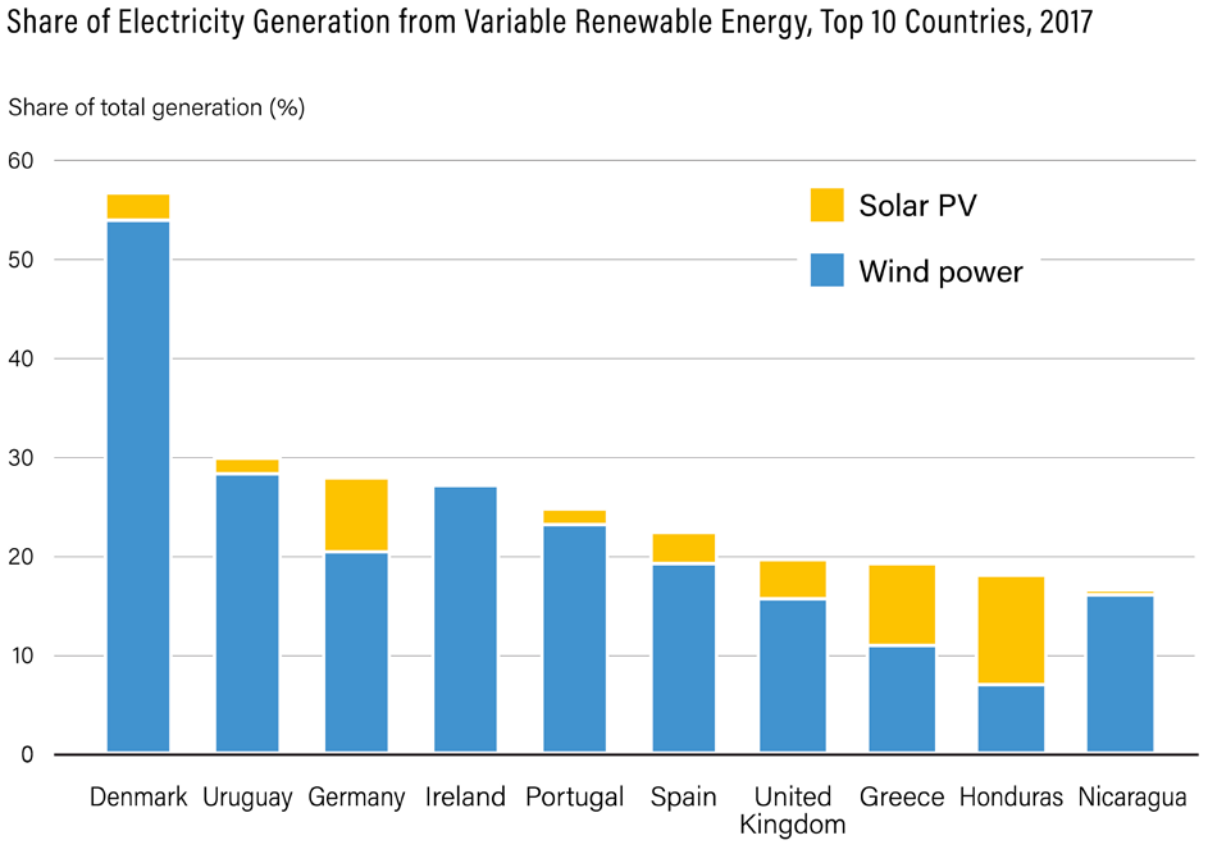
High Shares of Variable Renewable Power on the Grid



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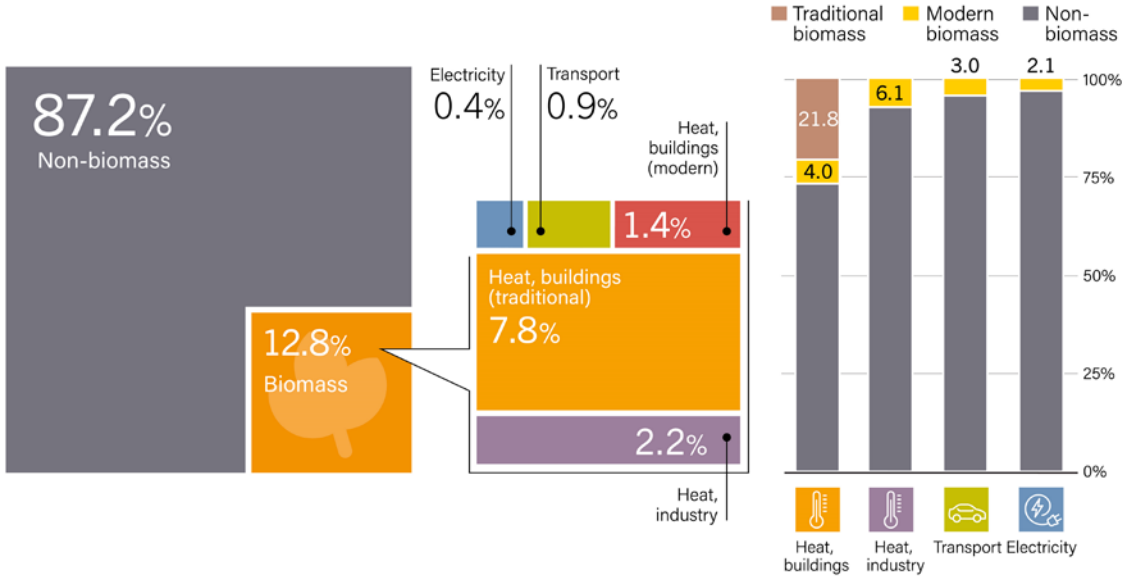
Heating and Cooling

- 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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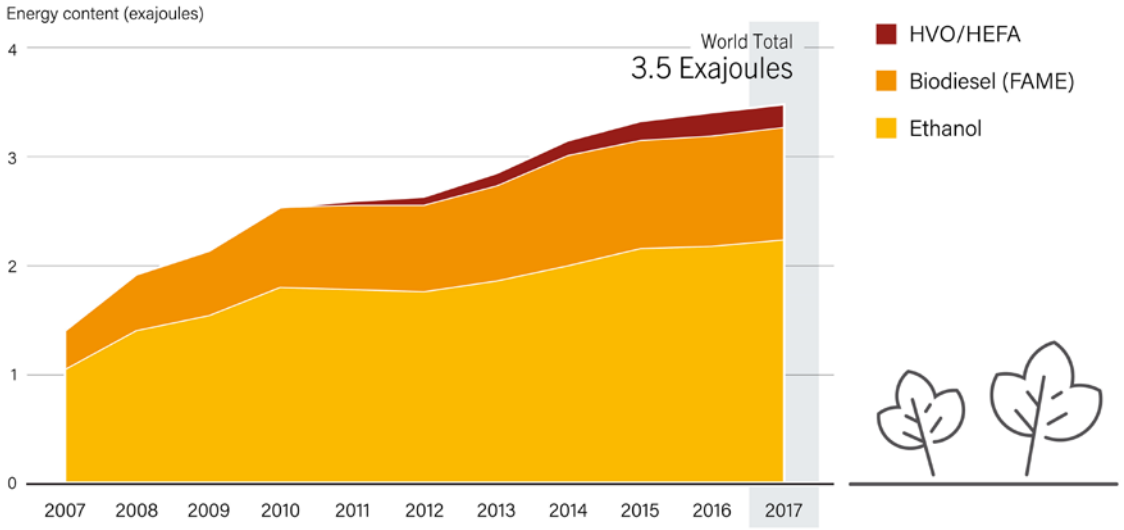
Transport – Biofuels

- 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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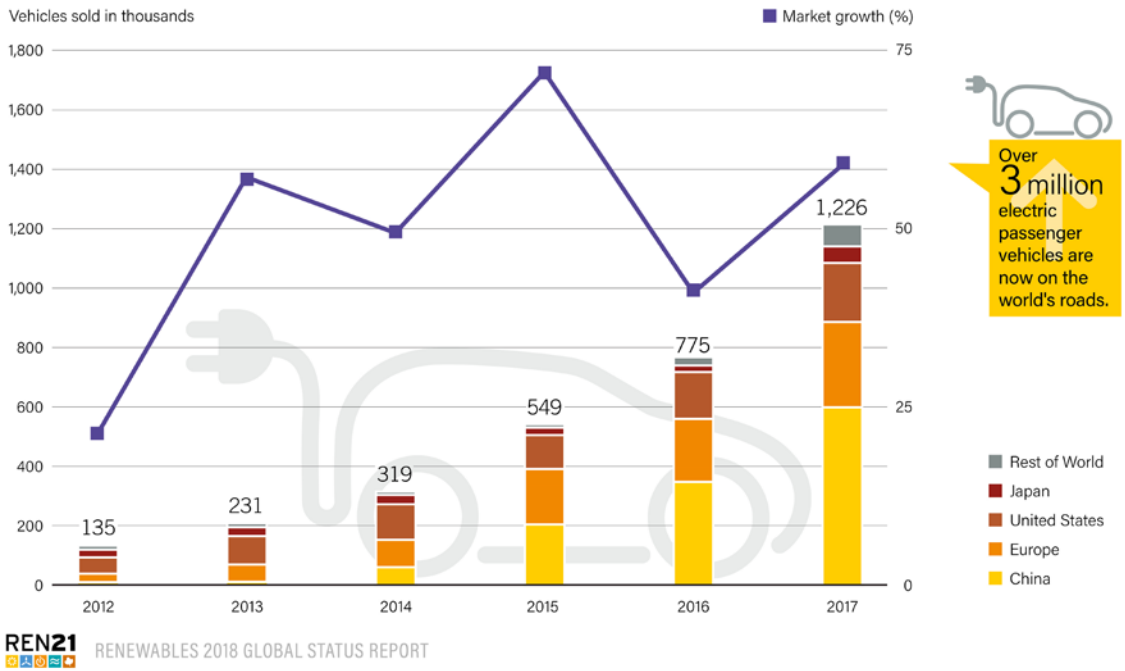
Transport

- **<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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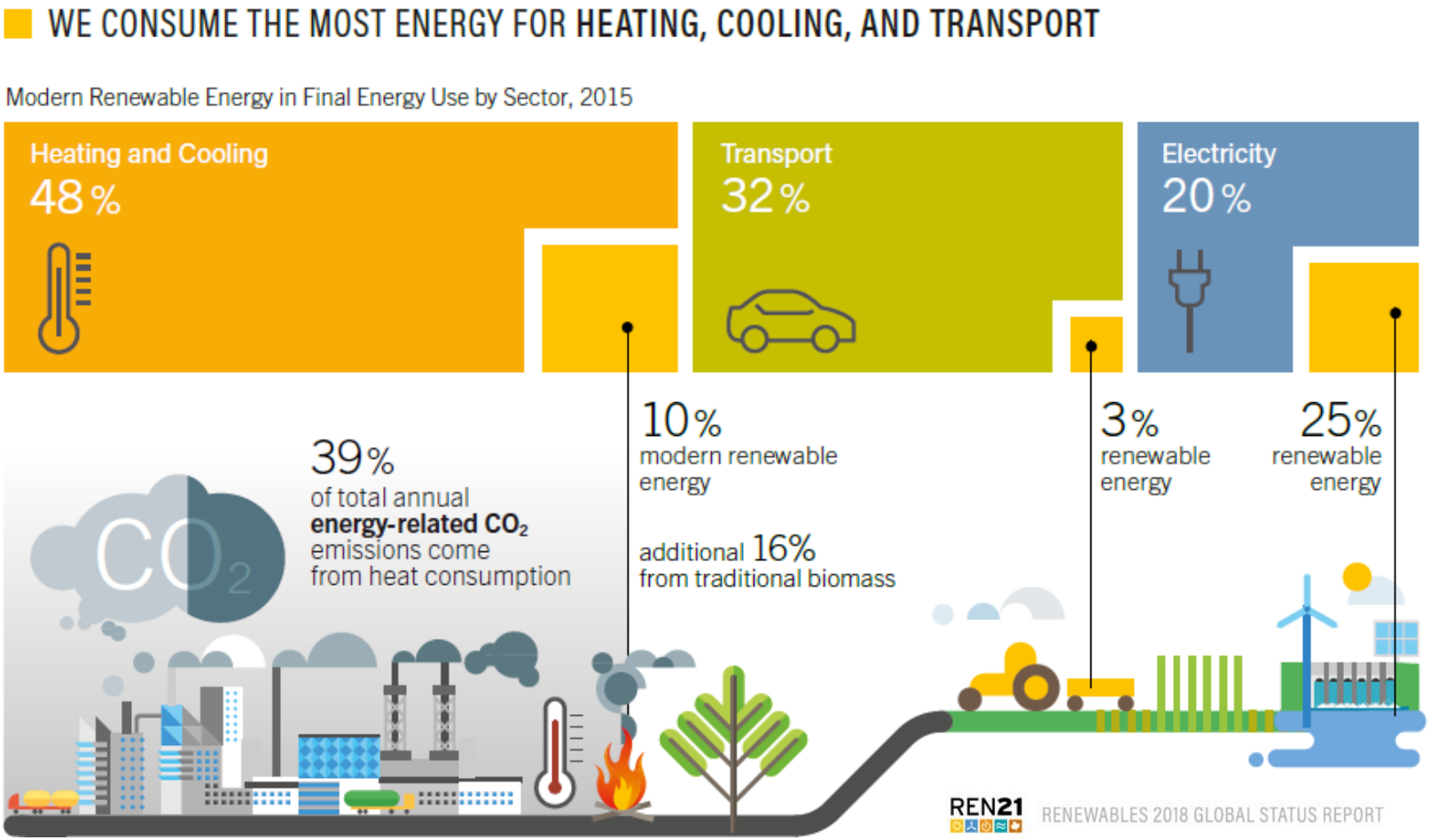
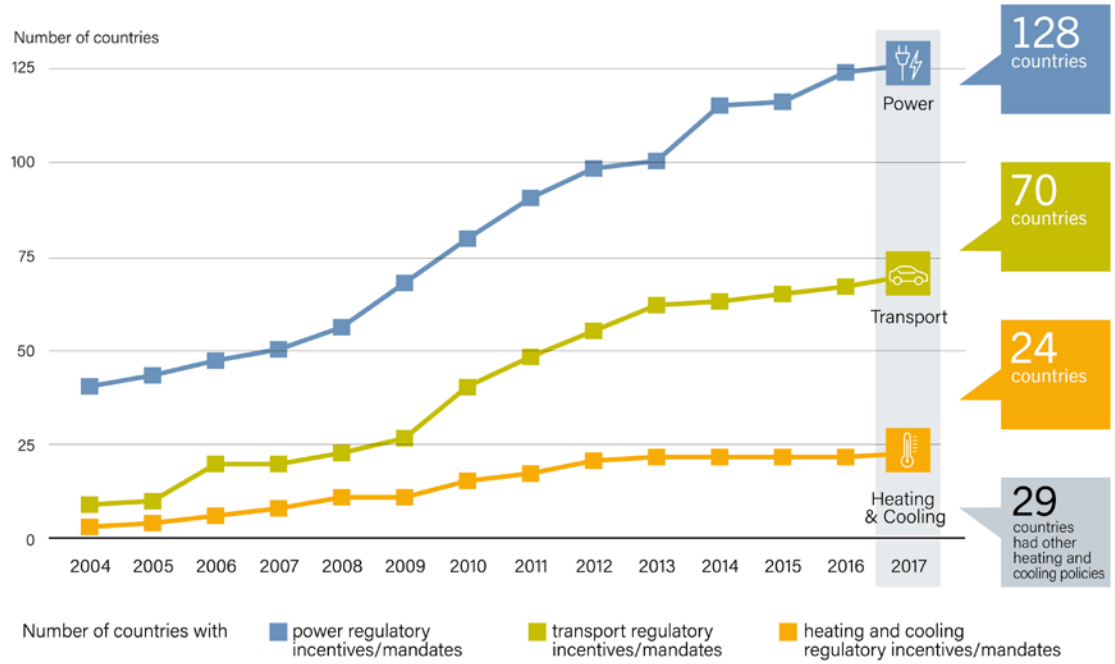
The “Sectoral Disconnect”



Renewable Energy Policy Landscape

- **179** countries had renewable energy **targets**
- **146** countries had **power targets**
- **42** countries had **transport targets**
- **48** countries had **heating and cooling targets**

Number of Countries with Renewable Energy Regulatory Policies, by Sector, 2004-2017



Source: REN21 Policy Database

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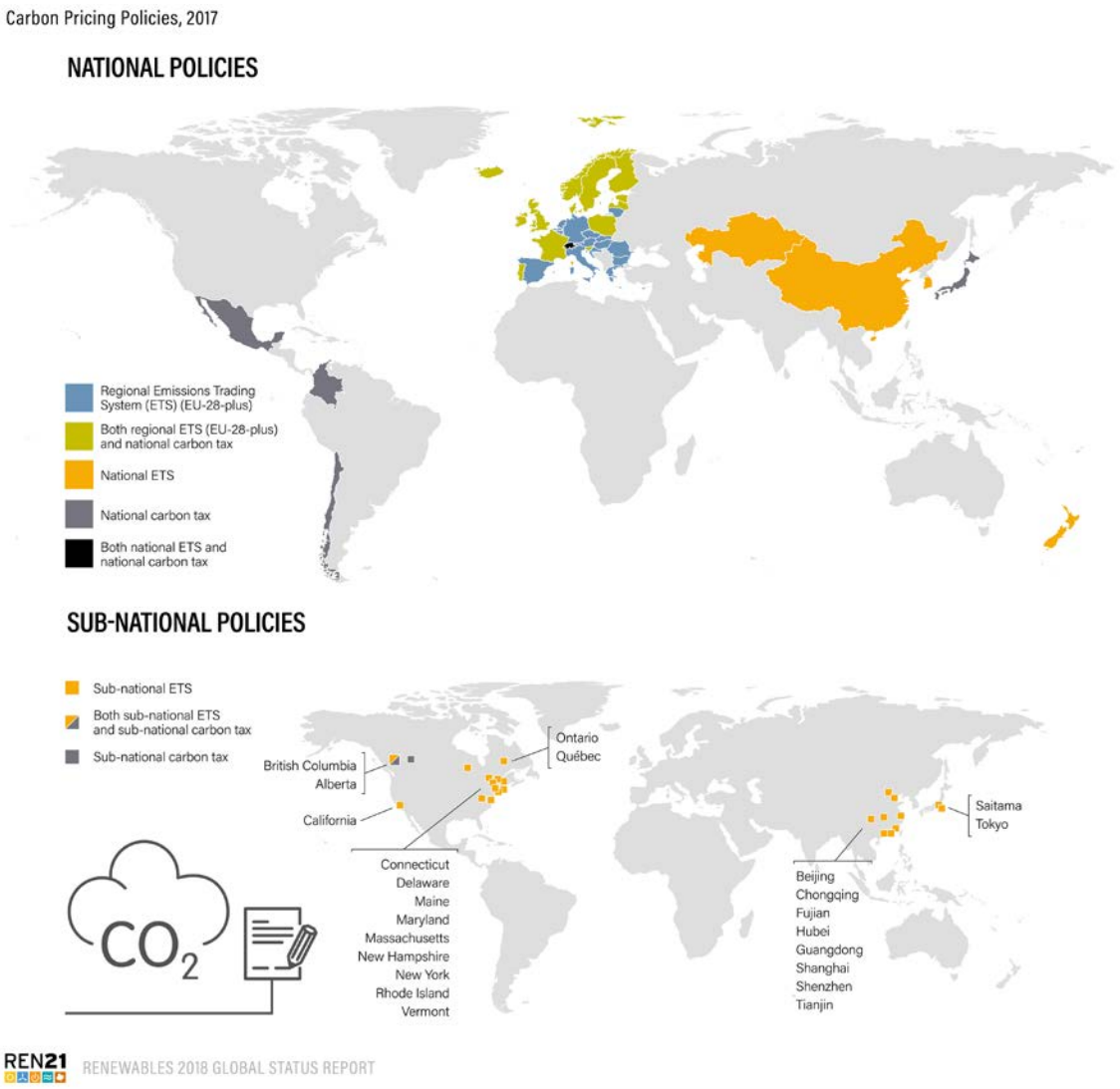
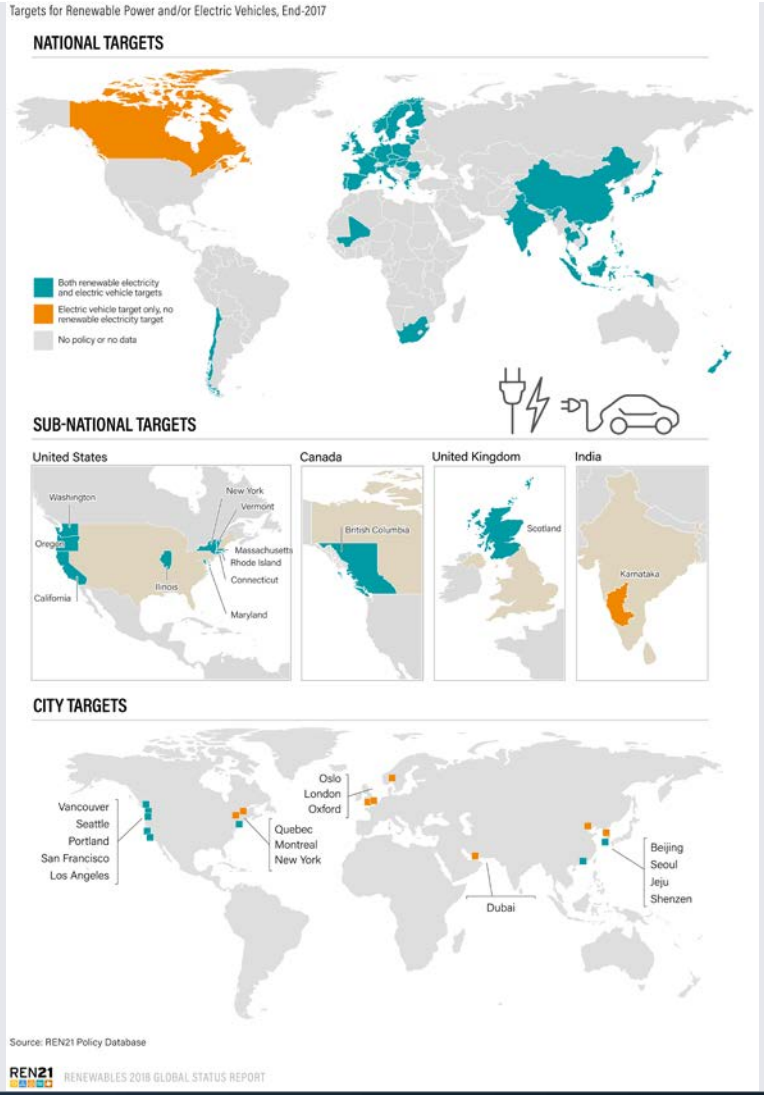
Carbon Pricing Policies

- **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**



Sub-national and local governments

- **Hundreds of jurisdictions committed to 100% renewable energy or electricity by end-2017**
  - Municipal leaders in **Japan** released the Nagano Declaration to work together towards 100% RE across the country.
  - more than **250 US mayors** committed to the US Conference of Mayors' goal of 100% RE by 2035
  - In Germany, over 150 districts, municipalities, regional associations and cities had committed to 100% renewable energy by the end of 2017 through the **100% Renewable Energy Regions network**.

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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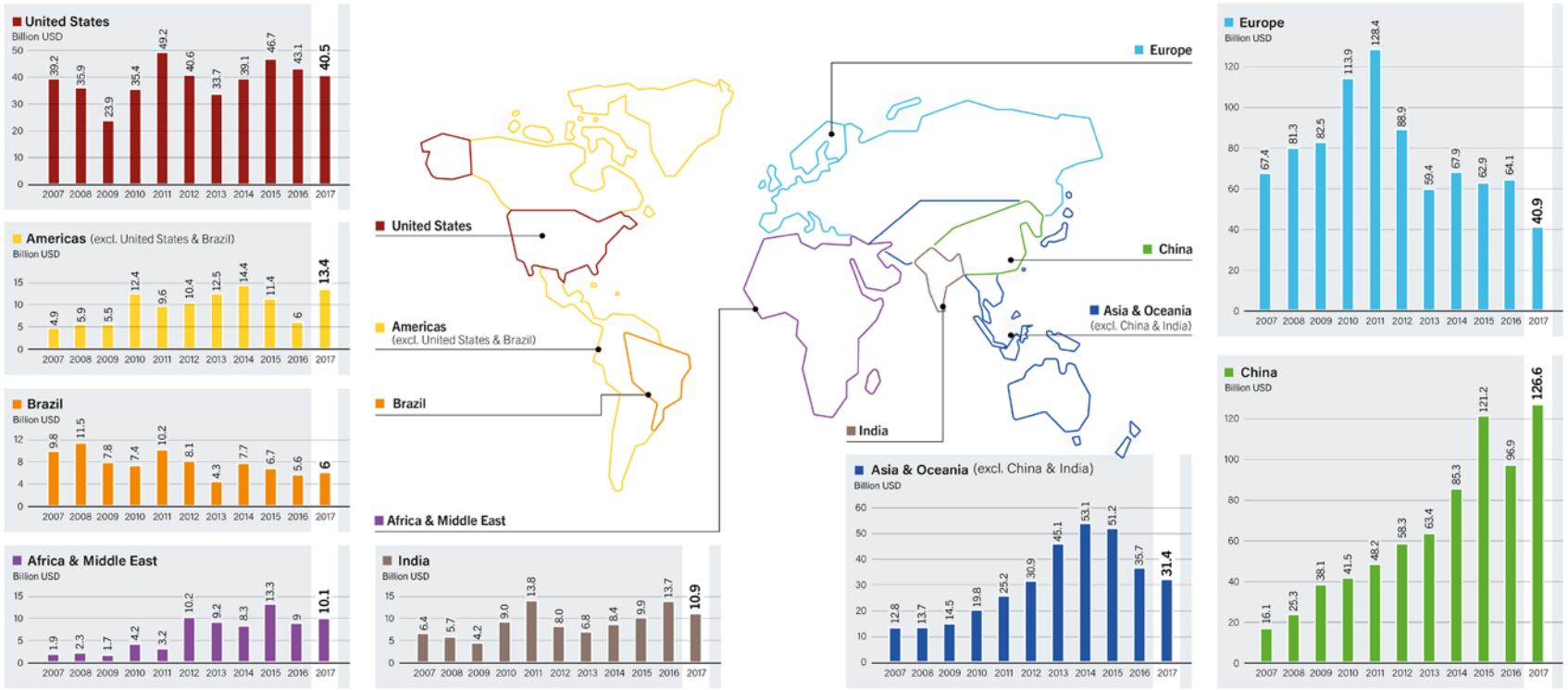
Investment in Renewable Energy

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



Source: BNEF

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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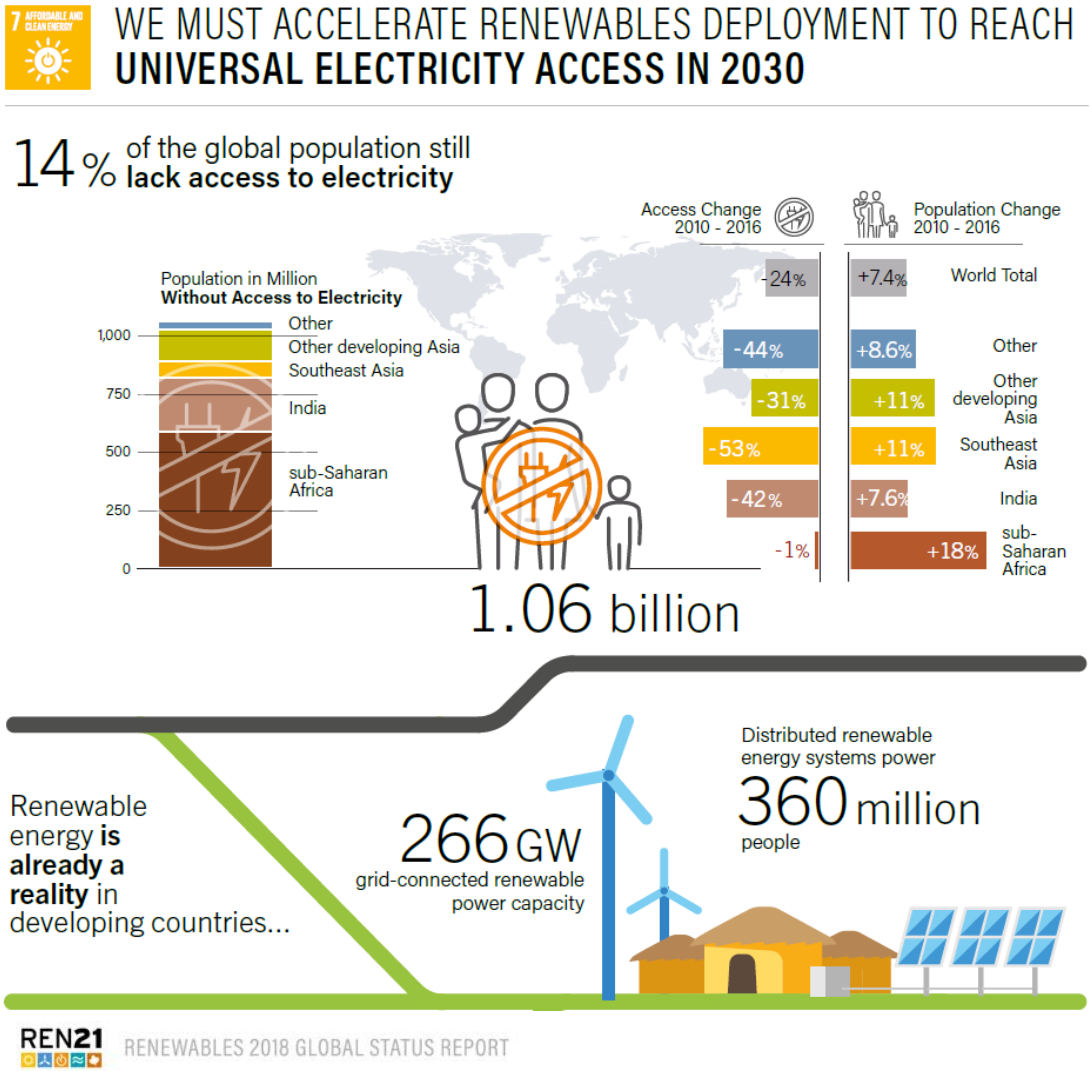
Distributed Renewables for Energy Access

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



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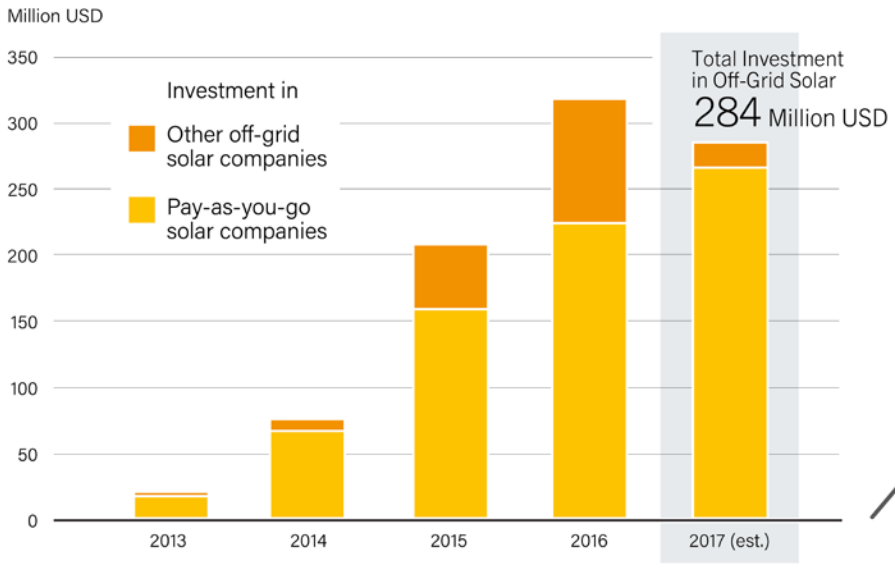
Distributed Renewables for Energy Access

- **Off-grid solar devices** (e.g. solar lanterns and solar home systems) experienced **60% annual growth** rates between 2010-2017
- **130 million off-grid solar systems** had been **sold cumulatively** by end-2017
- **PAYG companies** raised **USD 263 million** in capital (+19% from 2016)

Global Investment in Off-Grid Solar PV Companies, 2013-2017



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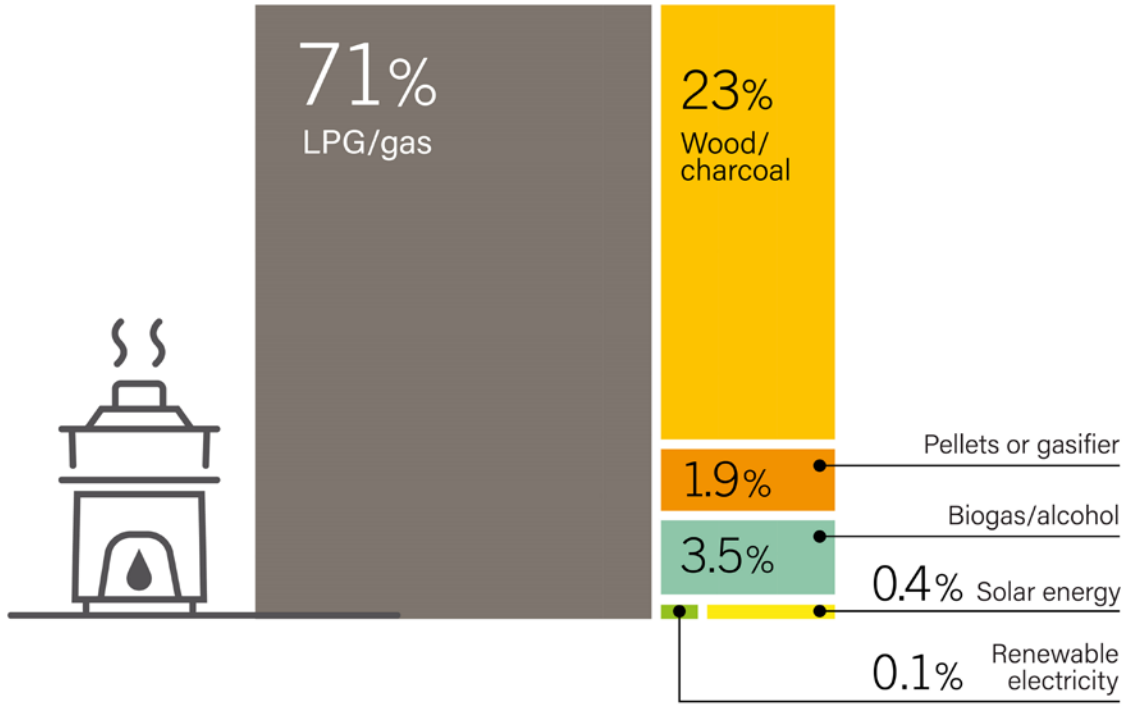
Distributed Renewables for Energy Access

- In 2016, only an estimated **29% of the 30.8 million clean cook stoves distributed used renewable fuels**, with most of those using **wood or charcoal (25%)**, followed by **biogas (3.5%)**

- **The majority of clean cook stoves (71%) use liquefied petroleum gas (LPG)**

Approximate Proportion of Clean Cook Stoves by Energy Source, 2016



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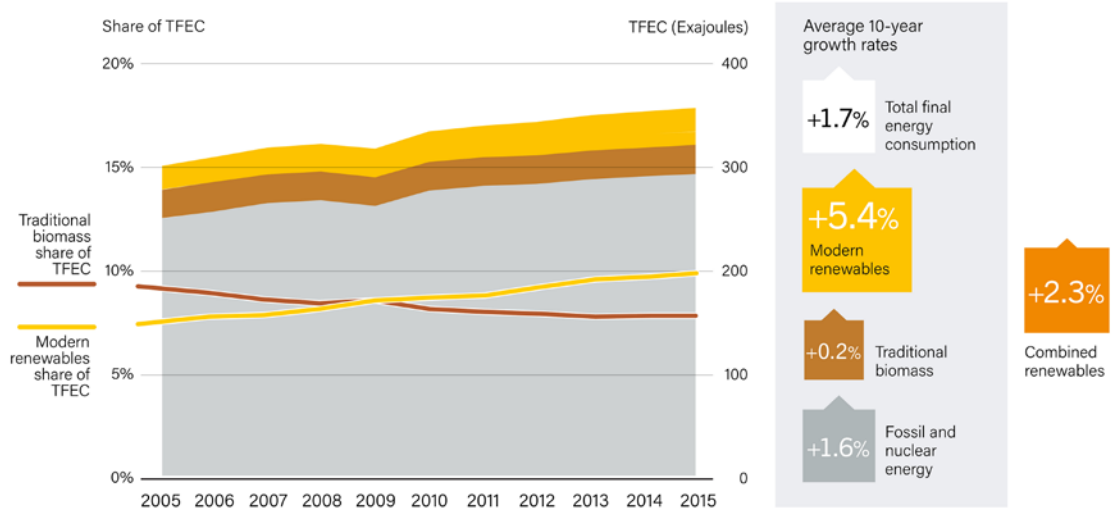
Growth in Renewable Energy

- Overall **share of renewable energy** has **increased only modestly** (↗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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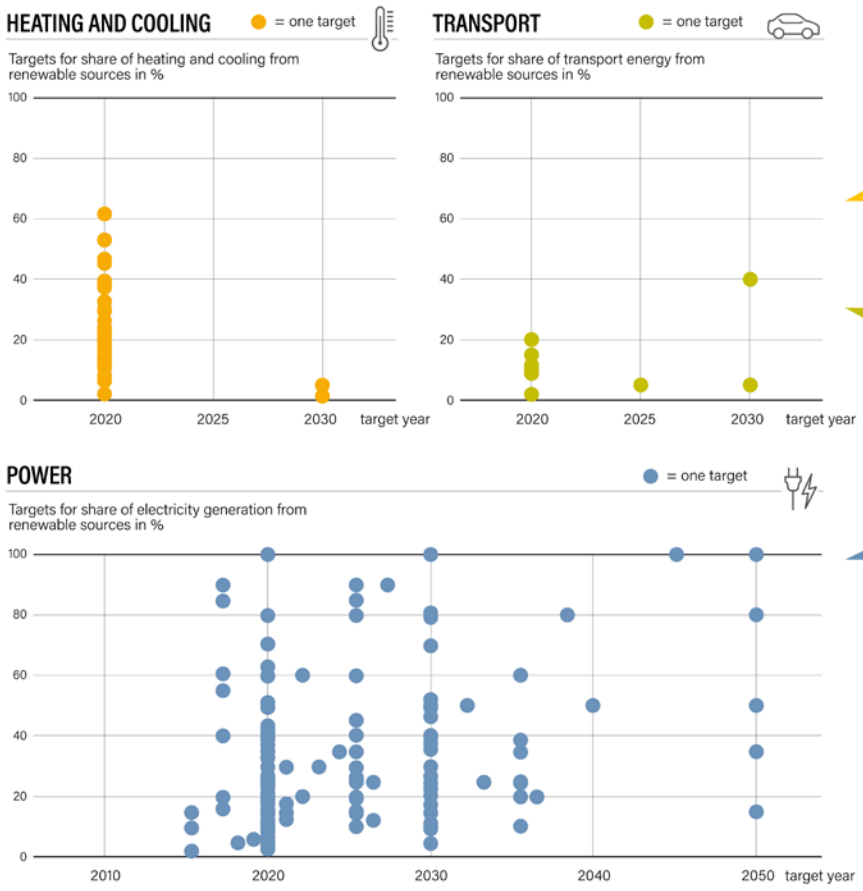
Renewable Energy Targets

National Sector-Specific Targets for Share of Renewable Energy by a Specific Year, by Sector, in Place at End-2017



Source: REN21 Policy Database

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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

REN21

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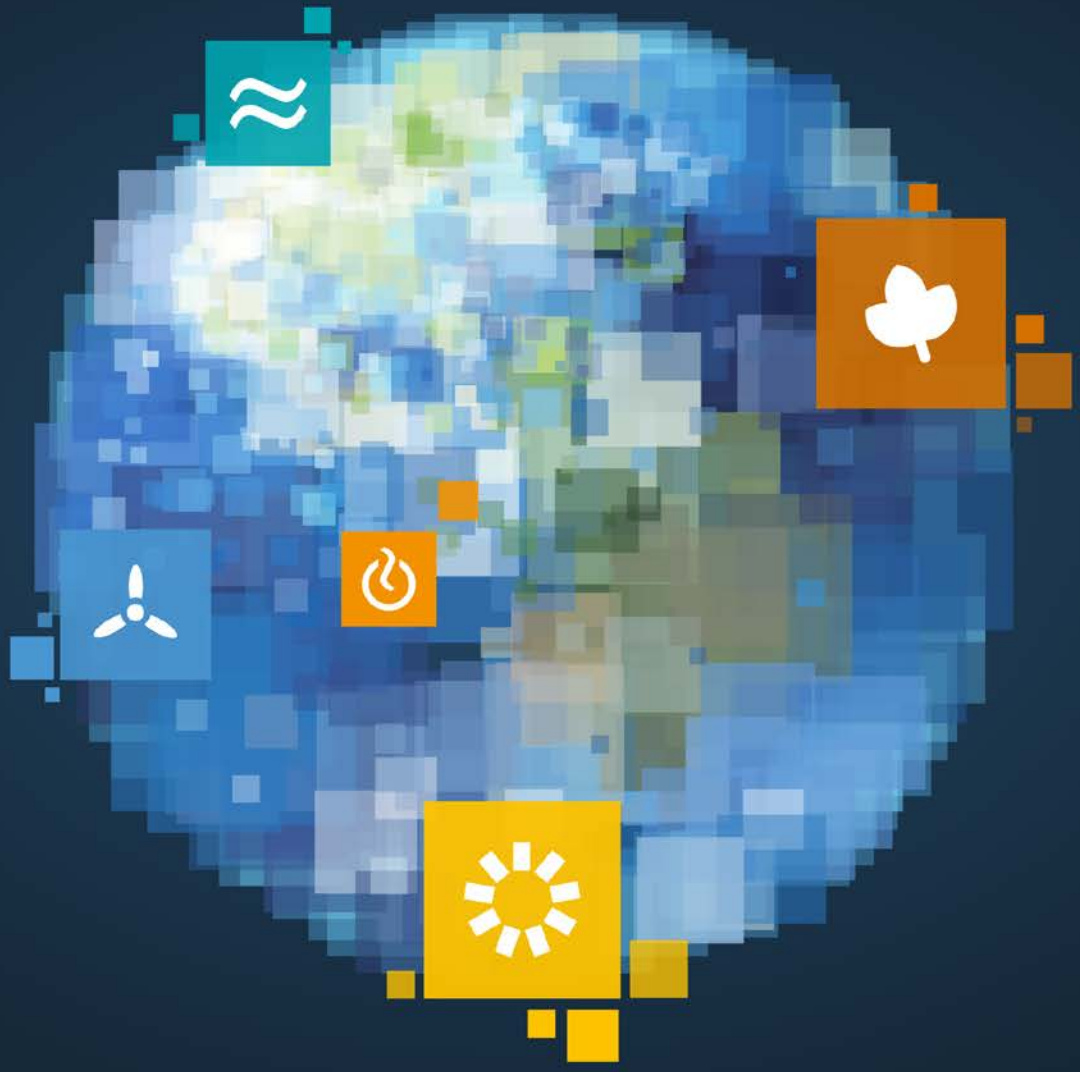

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