

The image features a light blue background with several dandelion seed heads. Some are in sharp focus, while others are blurred. In the upper right corner, there are several colorful geometric shapes: a teal circle, a blue circle, a yellow circle, a teal rounded rectangle, an orange rounded rectangle, a blue rounded rectangle, and a yellow rounded rectangle. The text "RENEWABLES NOW" is centered in a dark, sans-serif font.

RENEWABLES NOW

The logo for REN21, consisting of a stylized graphic of several parallel lines in teal, orange, and yellow, followed by the text "REN21" in a dark, sans-serif font.

 REN21

THE RENEWABLES GLOBAL STATUS REPORT 2023 COLLECTION (GSR)

International Solar Energy Society
Webinar

REN21 Secretariat
secretariat@ren21.net



DRIVING THE SHIFT TO RENEWABLES – NOW!

The only **global community** of renewable energy actors from science, academia, NGOs, governments, and industry.

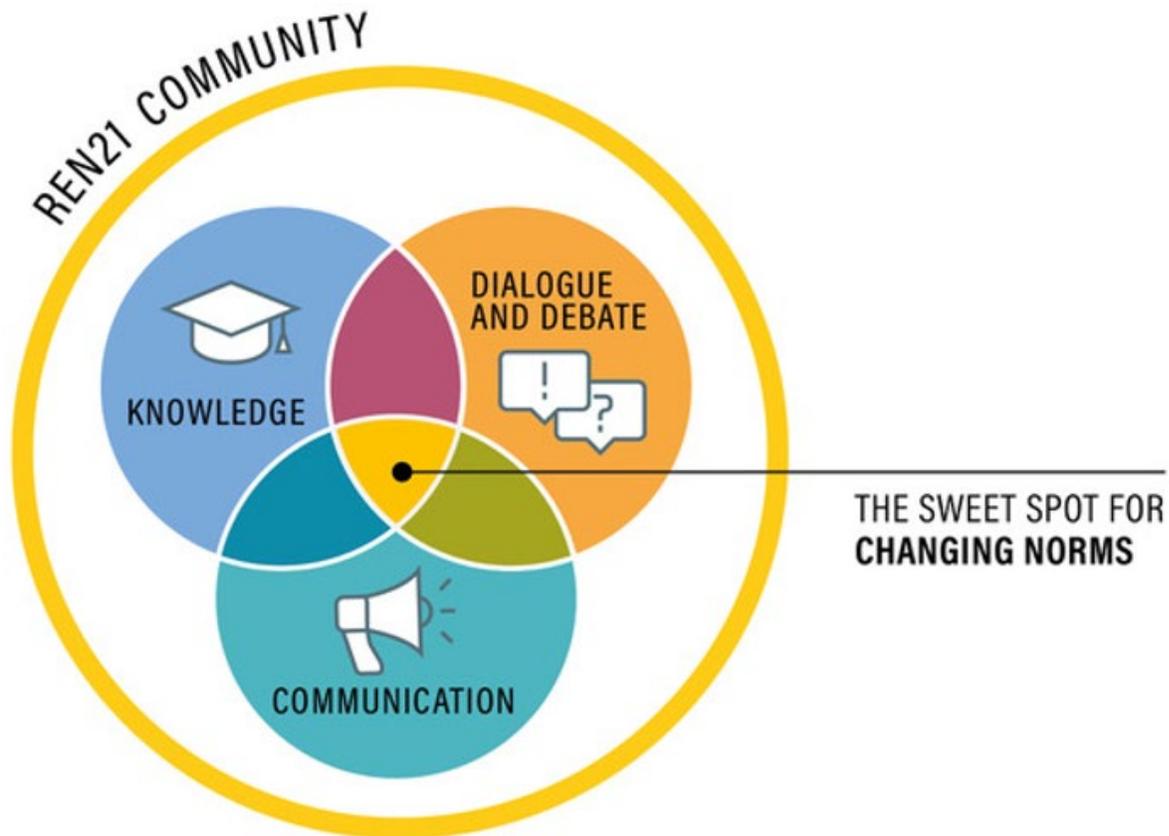
Our more than **4,000 community members** co-operate collecting information, changing norms and debating.



We build upon a **decentralised intelligence**, ensuring high responsiveness to an ever-changing environment.

Our **annual publications** are probably the world's most comprehensive, crowdsourced reports on renewables.

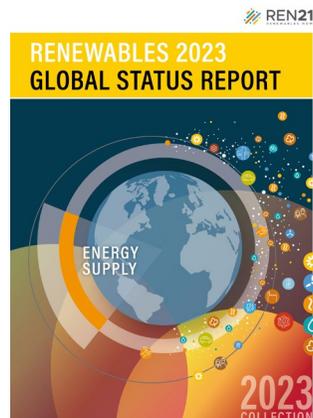
OUR APPROACH TO DRIVE CHANGE



Position knowledge strategically, build on the REN21 community and their roles, **engage** with usual and unusual suspects **to change norms.**

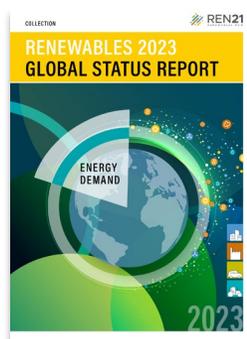
THE ANNUAL GSR COLLECTION

REPORTING ABOUT THE BUILDING BLOCKS OF THE RENEWABLES SYSTEMS



Renewables in Energy Supply (Heat, Fuel and Electricity)

- Policy
- Investment
- Market and Industry Trends



Upcoming Modules:

- Energy Systems and Infrastructure for Renewables
- Economic and Social Value Creation with Renewables
- Global Overview

RENEWABLE ENERGY SUPPLY IN 2022

KEY DRIVERS AND TRENDS

Energy prices and security of energy supply among key drivers in 2022

Record growth in installed capacity of Renewable Power Additions: **348 GW** in 2022

Solar PV leads all technologies: 1 TW milestone reached of total installed capacity



Record growth in Investment in Renewable Power: more than **USD 500 billion** in 2022



Wind Power slows amid supply chain disruption and increase material cost



Deployment uneven across energy carrier, technology and regions

700 million people lack access to electricity

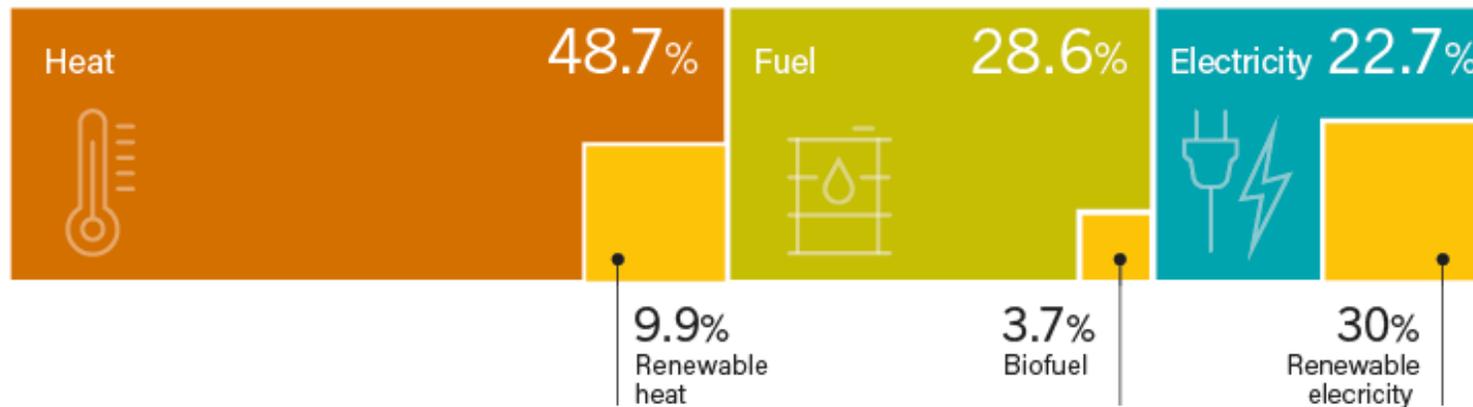


ARE RENEWABLES FUELING ALL OF THE WORLD'S ENERGY NEEDS?

ENERGY, MORE THAN ELECTRICITY

RENEWABLES UPTAKE UNEVEN ACROSS ENERGY CARRIERS

 Total Final Energy and Total Modern Renewable Energy Share, by Energy Carrier, 2020

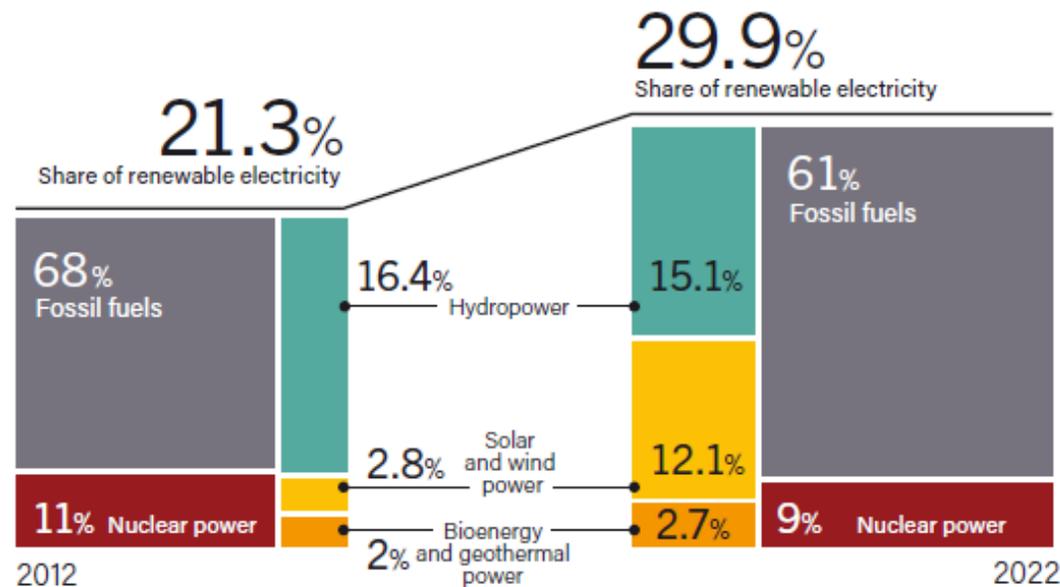


Largest focus is on the power sector, but **renewable heat** and **renewables-based fuels** seriously lag behind

RENEWABLE ELECTRICITY IS LEADING THE SHIFT IN ENERGY SUPPLY

SOLAR AND WIND DOMINATE NEW POWER DEPLOYMENT

 Share of Renewable Electricity Production, by Energy Source, 2012-2022

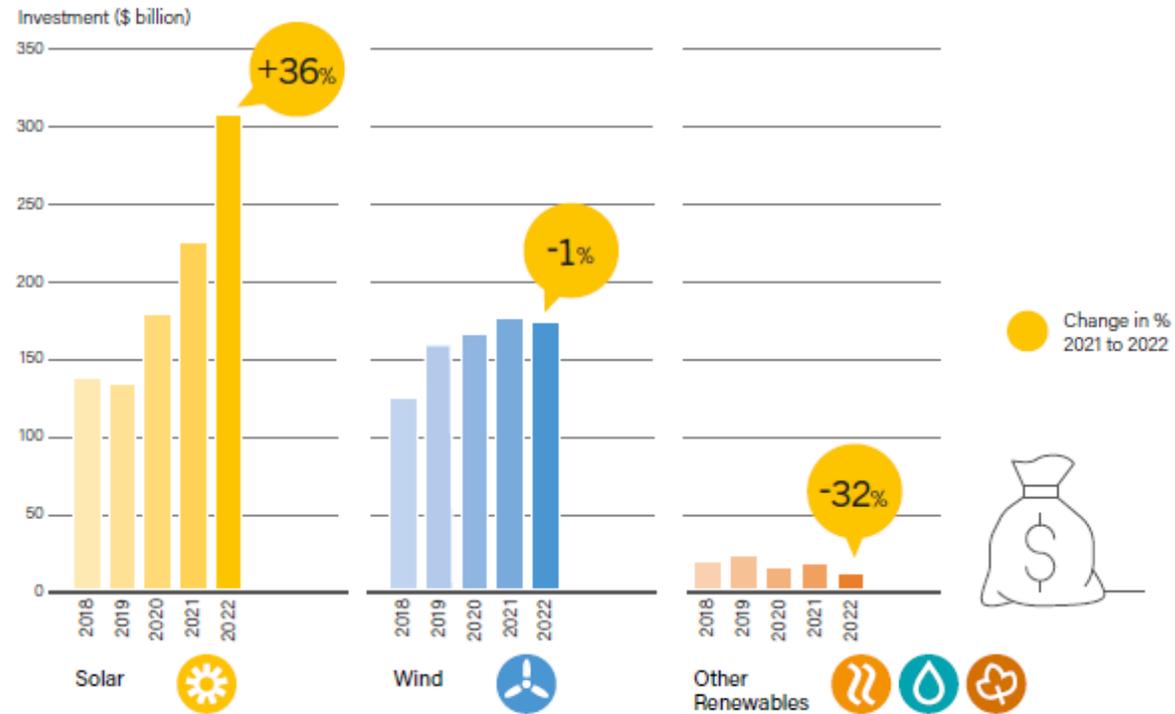


Renewable energy represented **29.9%** of the global electricity mix in 2022, with solar and wind power providing more than **12%** of the world's electricity for the first time ever.

RENEWABLES INVESTMENT UNEVEN ACROSS TECHNOLOGIES

REAL NEED FOR GROWTH IN RENEWABLE HEAT AND FUEL

 **Global Investment in Renewable Power and Fuels by Technology, 2018-2022**

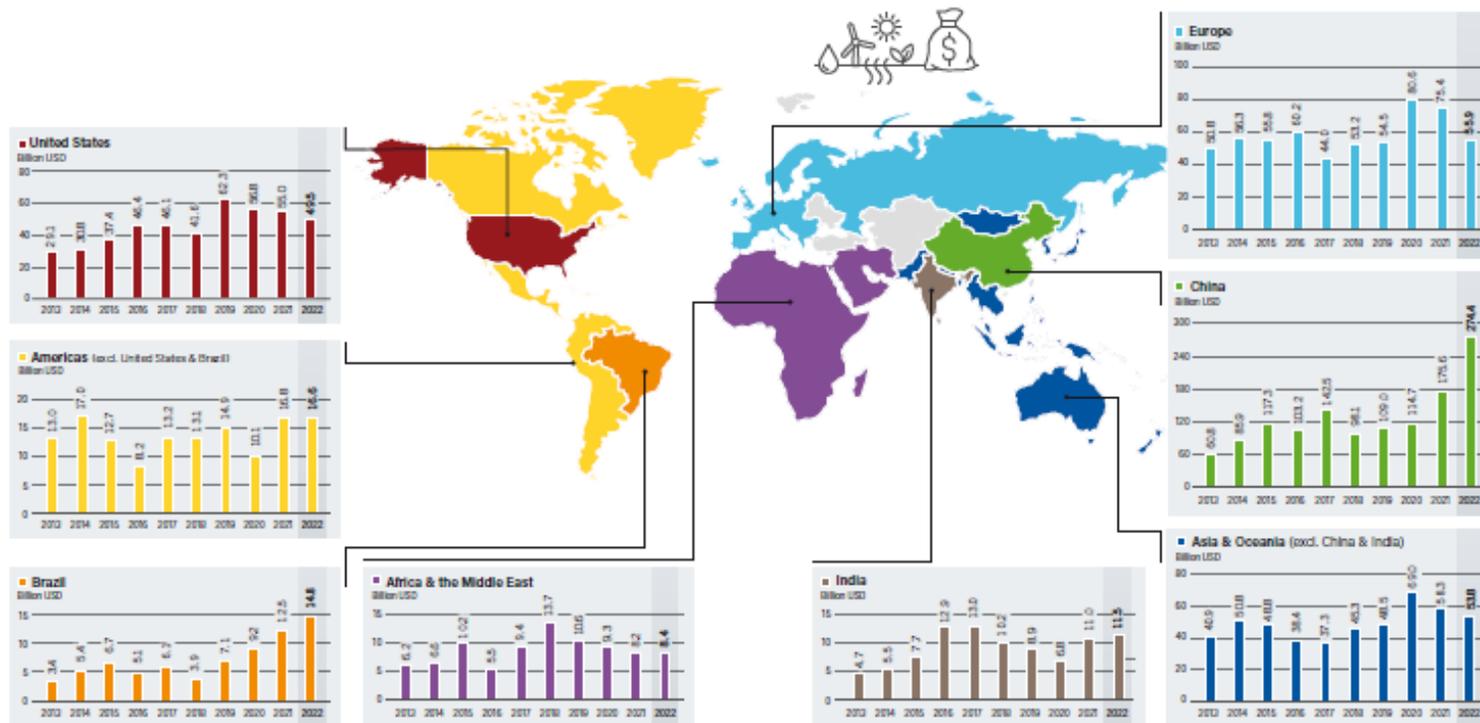


Record growth in Solar PV, investment contracting in all other renewable energy technologies.

RENEWABLES INVESTMENT UNEVEN ACROSS GEOGRAPHIES

REAL NEED TO DIVERSIFY INVESTMENT

 **Global Investment in Renewable Power and Fuels, by Country and Region, 2012-2022**



China accounted for **55%** of global investment in 2022.

The **US** and **EU** at **11%** and **10%** respectively.

The **Middle East & Africa** accounted for **1.6%** of global investment in 2022.

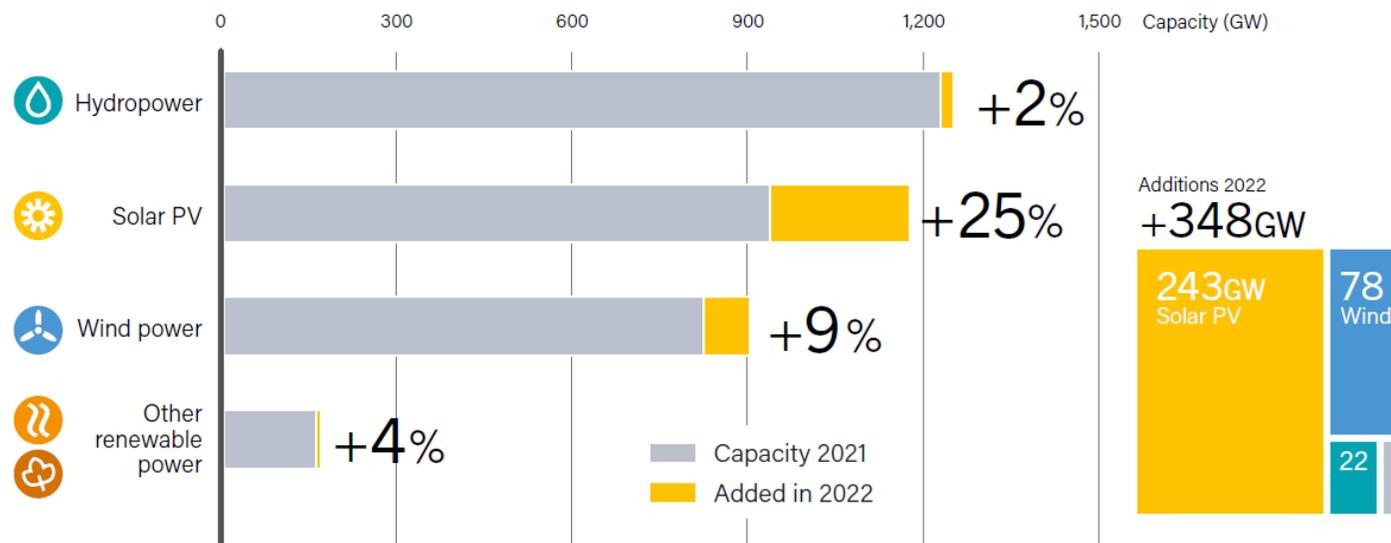


SOLAR PV LEADING RENEWABLE POWER

RECORD INCREASE IN RENEWABLE POWER CAPACITY

DESPITE SUPPLY CHAINS DISRUPTIONS AND GLOBAL RISE IN COMMODITY PRICES

 Renewable Power Total Installed Capacity and Annual Additions, by Technology, 2022

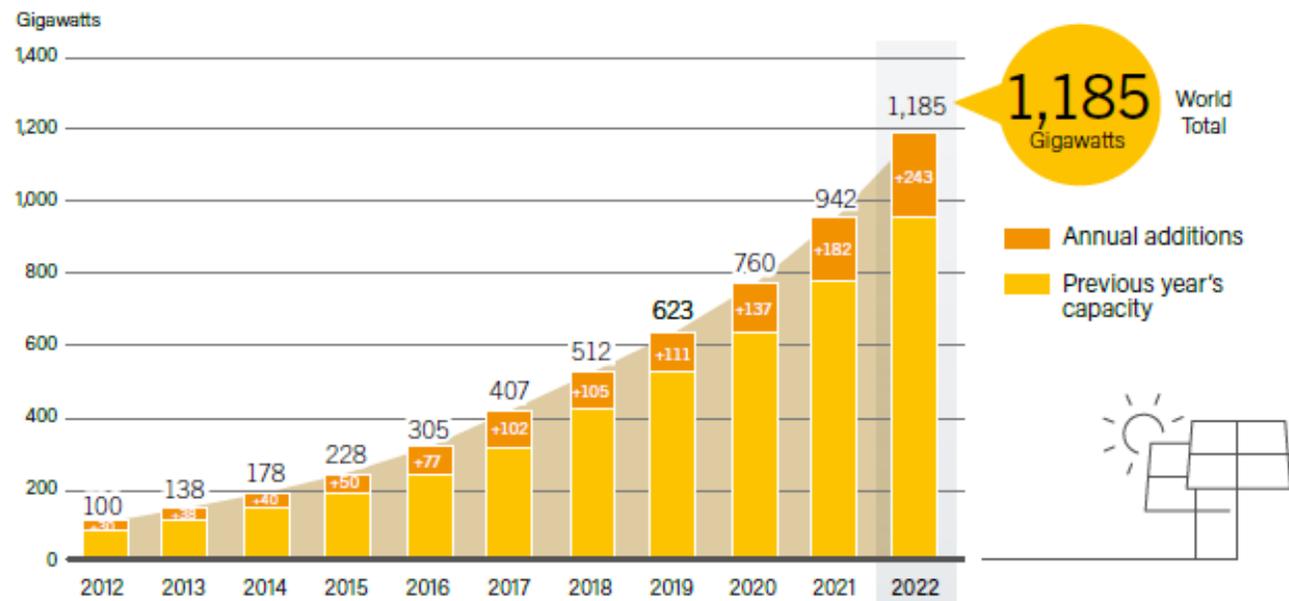


Renewable power capacity additions grew by **13% (348 GW)** in 2022, largely led by solar PV and wind power with **92%** of total. Total Installed Capacity reached **3,481 GW** in 2022.

SOLAR PV IN ENERGY SUPPLY

GLOBAL INSTALLED CAPACITY SURPASSED 1 TW

 Solar PV Global Capacity and Annual Additions, 2012-2022



Solar PV installed capacity grew **37%** in 2022.

Utility-scale solar PV market grew **25%** in 2022 adding **124.2 GW**.

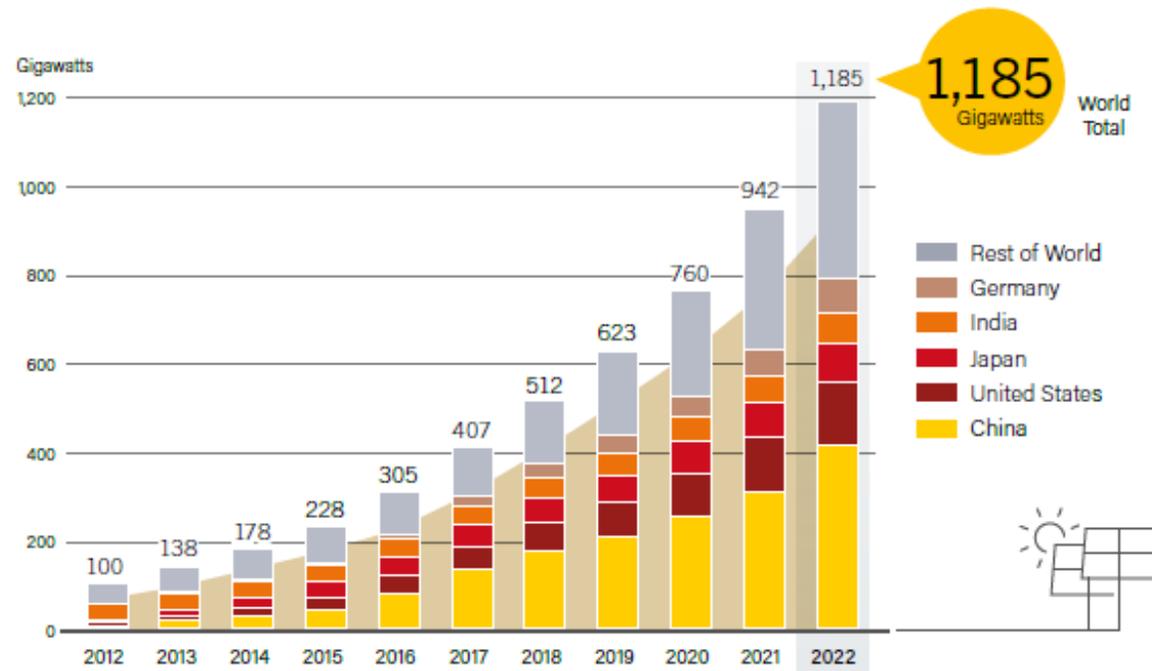
Solar PV rooftop market grew **54%** in 2022 adding **115.2 GW**.

Solar PV **generation** reached **4.5%** of total

SOLAR PV IN ENERGY SUPPLY

REGIONALLY, ASIA DOMINATES

 Solar PV Global Capacity, by Country and Region, 2012-2022



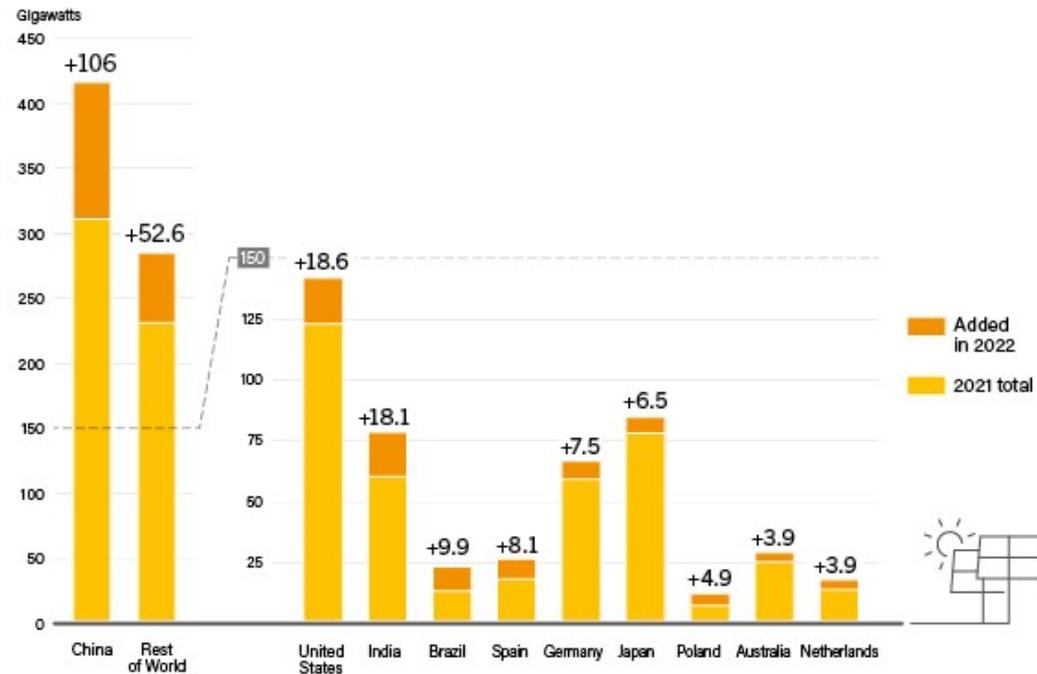
For the 10th consecutive year, **Asia dominated with 64%** of all capacity additions.

Solar PV manufacturing is concentrated in **China** with more than **80%** in all stages of supply chain.

SOLAR PV IN ENERGY SUPPLY

HIGH CONCENTRATION IN A FEW COUNTRIES

 **Solar PV Capacity and Additions, Top 10 Countries for Capacity Added, 2022**

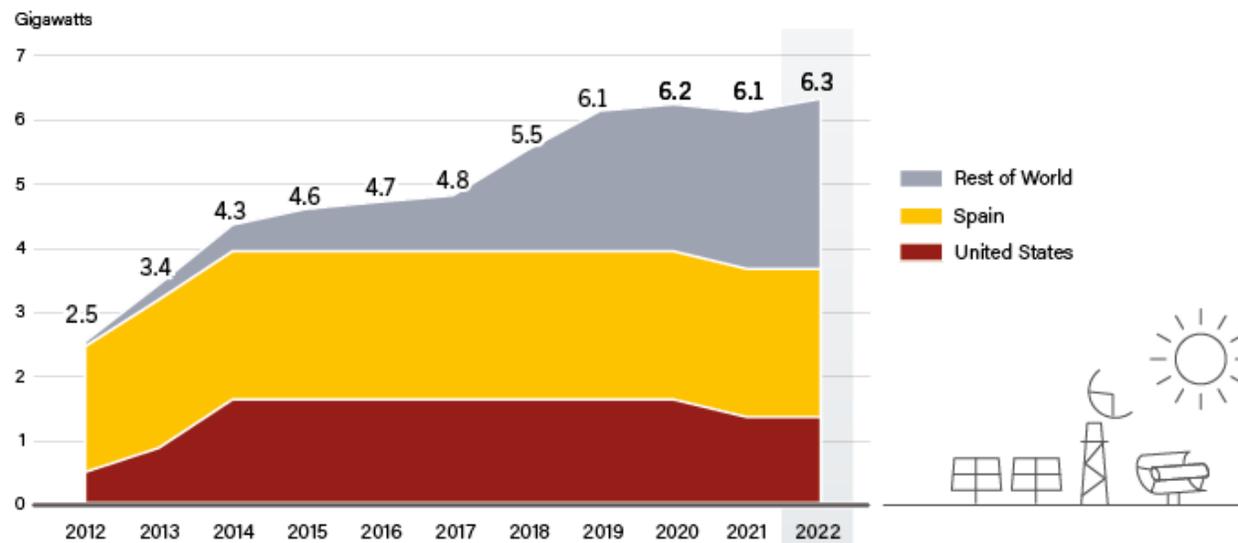


China, the United States, India, Brazil, and Spain, together comprising around **66%** of newly installed capacity, while the leading markets for per capita capacity continued to be **Australia, the Netherlands and Germany.**

CSP IN ENERGY SUPPLY

MARKET LEADERS SPAIN AND THE USA DID NOT ADD NEW CAPACITY IN NEARLY A DECADE

 Concentrating Solar Thermal Power Global Capacity, by Country and Region, 2012-2022

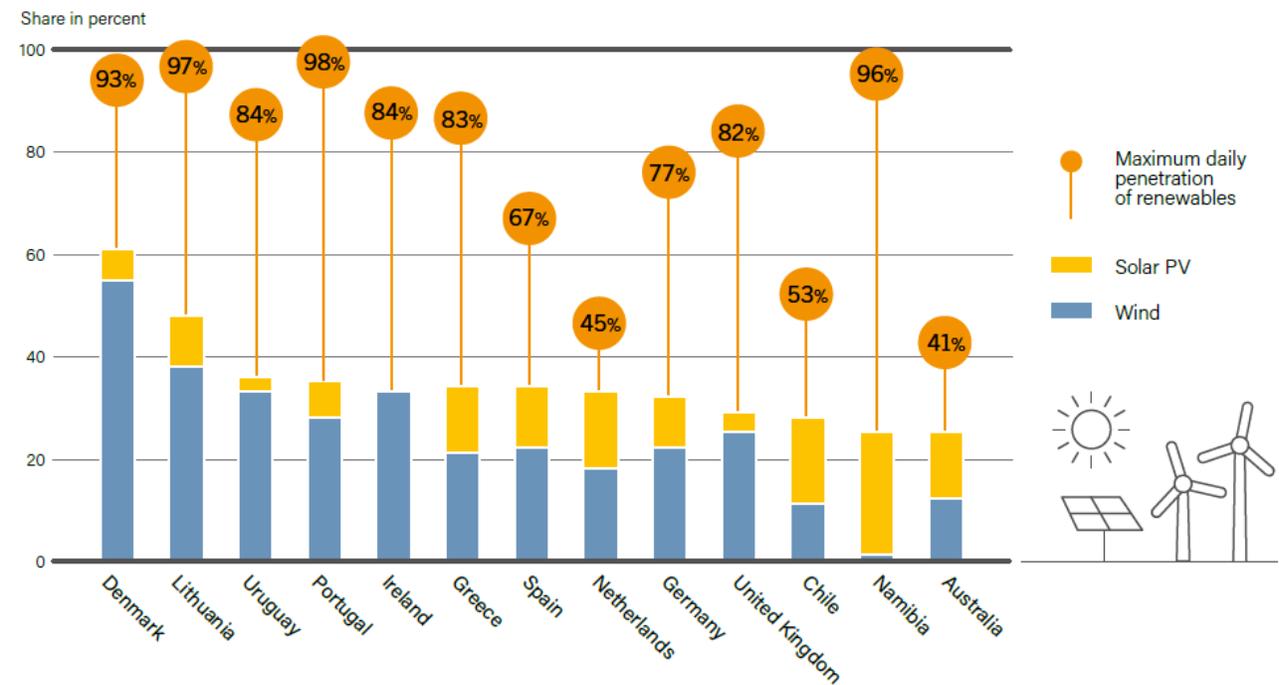


New projects have come online and are under construction in emerging markets, including **Chile, China, Israel, Morocco, South Africa** and the **United Arab Emirates**.

KEY CHALLENGES FOR RENEWABLES POWER UPTAKE

- **More than 1 TW** of renewables power waiting to be constructed or connected to the grid
- Delays linked to **permitting** processes and local acceptance delay
- Global investment in **electricity grid infrastructure** totalled estimated USD 274 billion in 2022, an 8% increase from 2021.

FIGURE 1.
Top Countries for Share of Variable Renewable Electricity Generation, and Maximum Daily Penetration, 2022



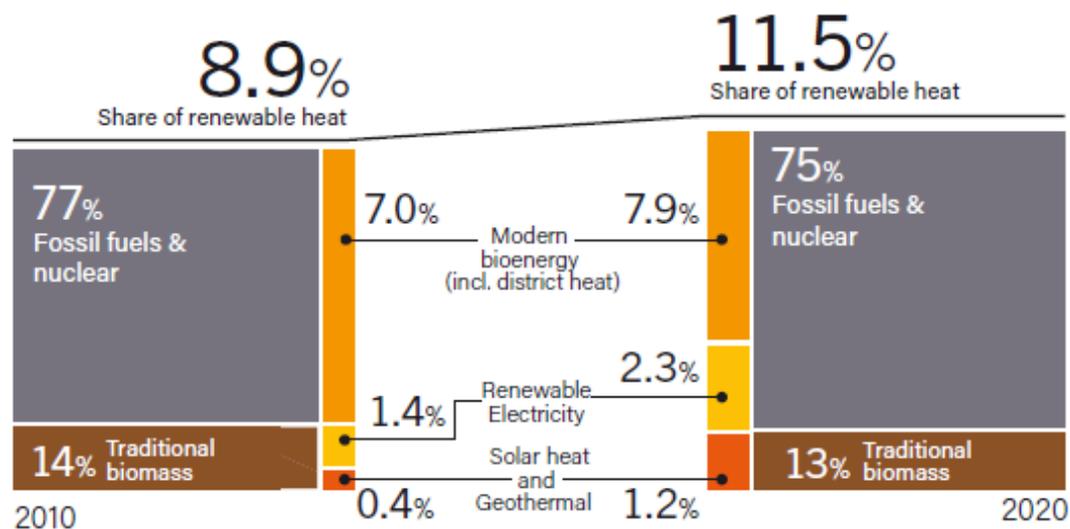


STRUCTURAL CHANGES TO DRIVE RENEWABLES HEAT

DEEP STRUCTURAL CHANGES ARE NEEDED

MOST ENERGY NEEDS ARE FOR HEATING

 **Share of Renewable Heat Production, by Energy Source, 2010 and 2020**

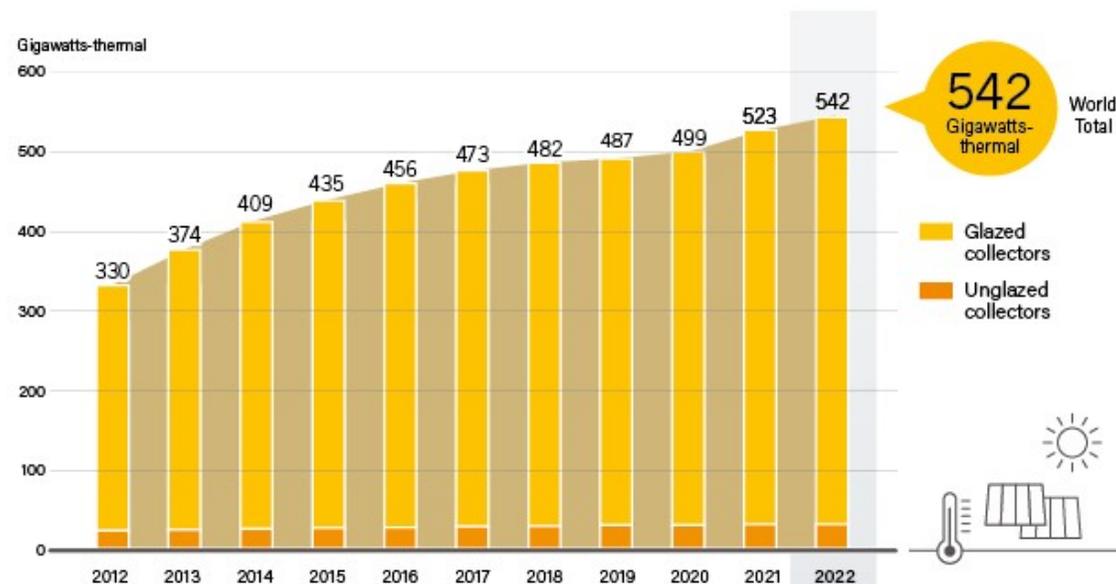


Renewable share of heat generation increased by almost 2.6 percentage points in the past decade.

Bioenergy dominates the renewable share of heat supply.

SOLAR WATER HEATERS

DEMAND FOR SMALL-SCALE SYSTEMS IS DECREASING, WHILE INCREASING FOR LARGER SYSTEMS


Solar Water Heating Collectors Global Capacity, 2012-2022


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

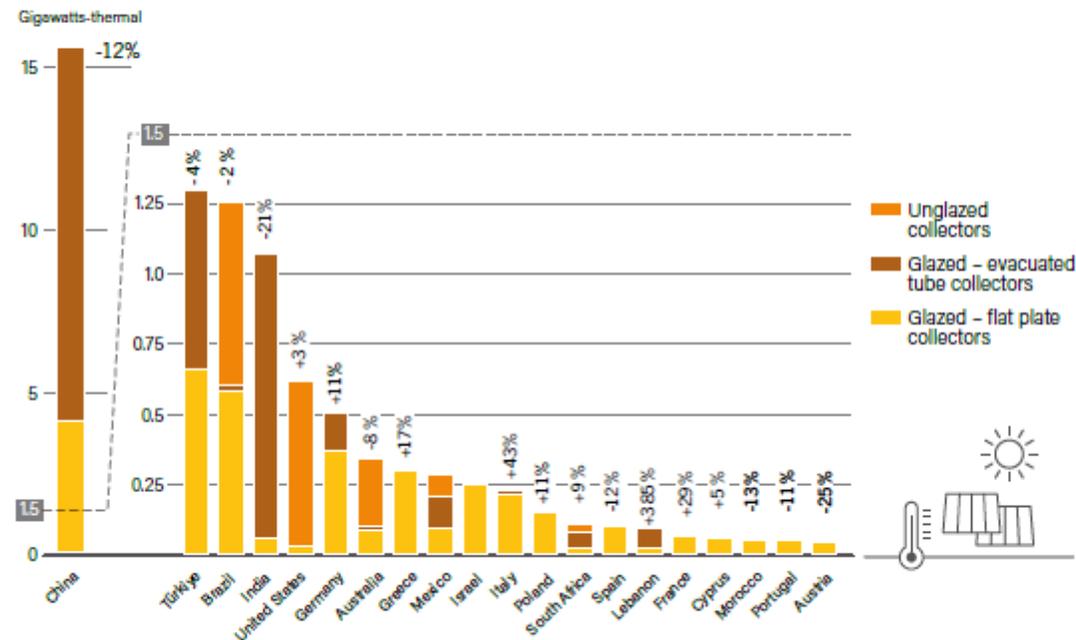
Solar **industrial** heat plants (SHIP) saw record increase in 2022. The **Netherlands** leading with 38 systems, followed by **China** (17) and **France** (14).

Solar thermal in **district heating** are picking up in **China** (25) and **Germany** (8).

SOLAR WATER HEATERS

DEMAND FOR SMALL-SCALE SYSTEMS IS DECREASING, WHILE INCREASING FOR LARGER SYSTEMS

 Solar Water Heating Collector Additions, Top 20 Countries for Capacity Added, 2022



Note: Additions represent gross capacity added and are rounded to nearest whole number. The additions for Mexico and Israel refer to 2021 (latest data available). For Morocco, the share of collector types was not available.

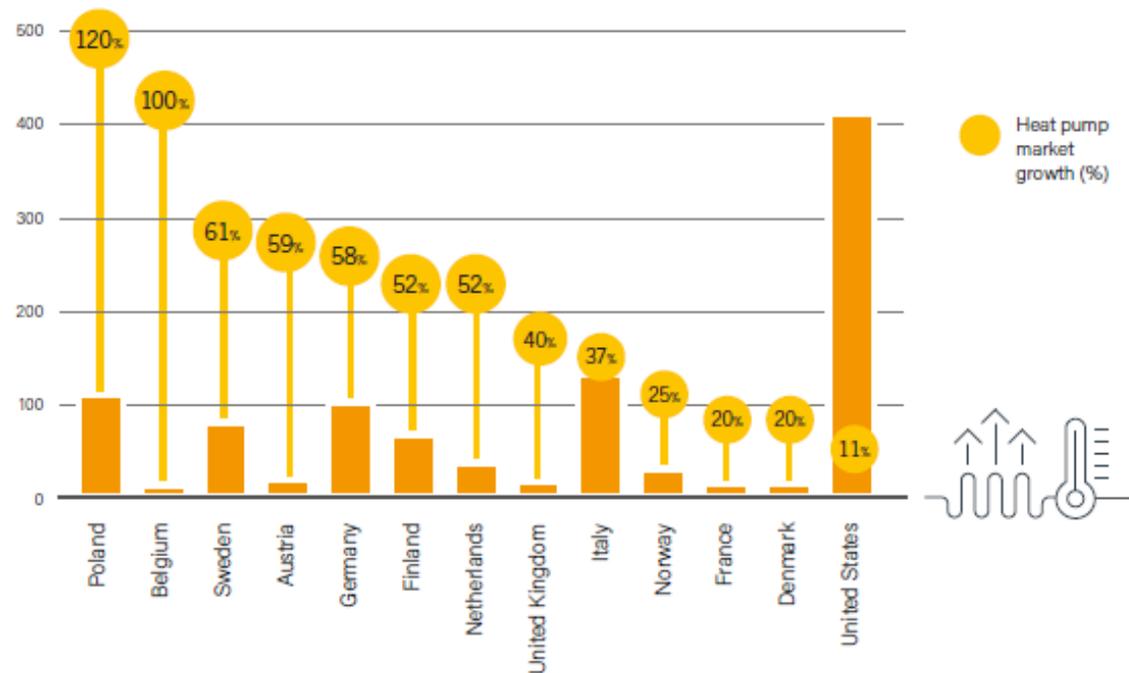
The **global** solar thermal market **contracted -9.3%** in 2022, due to **-12% drop in China**.
Sales grew at double-digit rates in several large markets including **Italy** (up 43%), **France** (29%), **Greece** (almost 17%), **Germany** and **Poland** (both 11%)

HEAT PUMPS ARE AN ESSENTIAL SOLUTION FOR RENEWABLES

THE SHARE OF RENEWABLE ELECTRICITY FOR HEATING IS ACCELERATING

 National Heat Pump Markets with the Largest Growth in 2022

Annual growth in heat pump sales (additional units sold in thousands)



The **United States** leads the heat pump market, but record **growth across Europe** in response to the energy crisis.

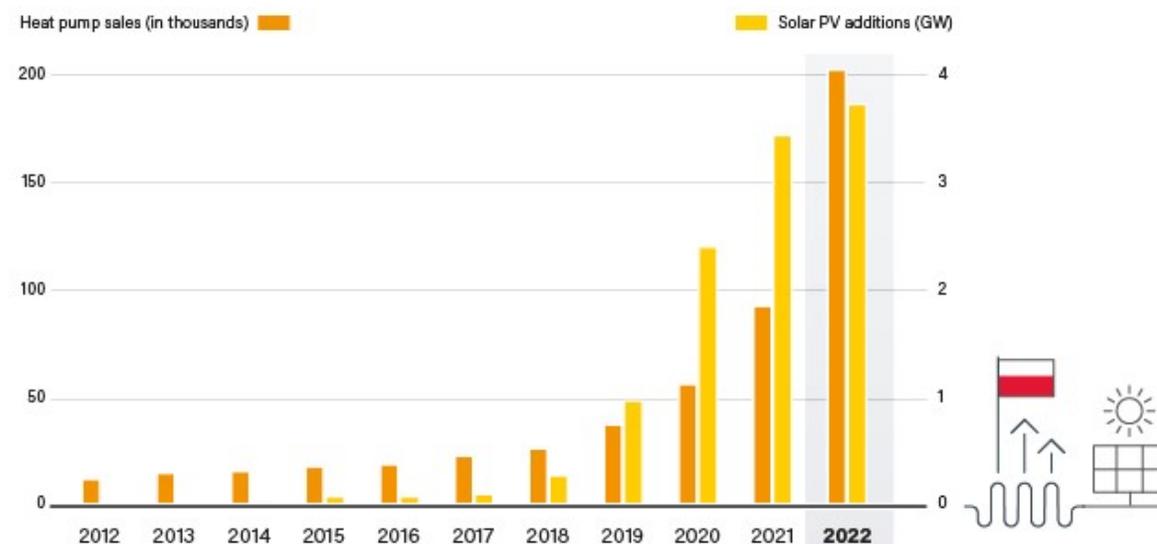
Annual growth was of **+10%** globally and **+37%** in EU

HEAT PUMPS ARE AN ESSENTIAL SOLUTION FOR RENEWABLE HEAT

SOLAR PV AND HEAT PUMPS ARE FOLLOWING SIMILAR TRENDS



Sales of Heat Pumps and Additions of Solar PV in Poland, 2012-2022



Poland witnessed the fastest growth in **heat pumps** in 2022 (+120%) and became the EU's third largest **solar PV** market (total 13.5 GW).



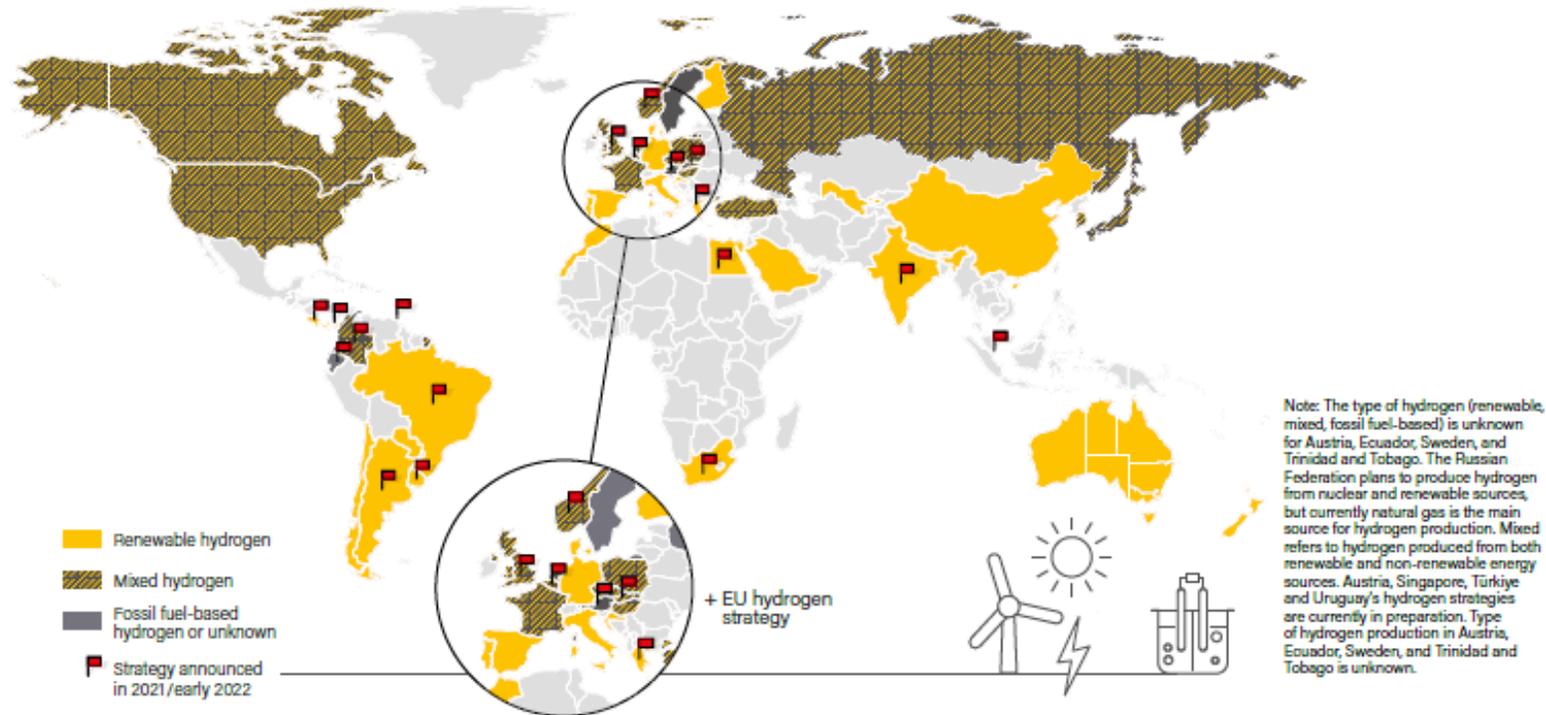
RENEWABLE FUELS

EMERGING TECHNOLOGIES AND REGIONAL SOLUTIONS

RENEWABLE HYDROGEN

SEVERAL COUNTRIES ARE POSITIONING THEMSELVES AS RENEWABLE HYDROGEN HUBS

 Hydrogen Strategies and Roadmaps in Selected Countries, as of End-2022



95% of global hydrogen demand is met with hydrogen produced from fossil fuels.

Australia, Chile, Morocco and South Africa are set to become renewable hydrogen hubs.



CHALLENGES & OPPORTUNITIES

DESPITE MULTIPLE CHALLENGES, RENEWABLES CONTINUE TO GROW

THE WAY FORWARD

ACCELERATION, BROADENING THE STRATEGIES AND STRUCTURAL SHIFT AWAY FOR FOSSIL FUELS

RENEWABLE POWER

- Accelerate deployment and investment
- Develop infrastructure
- Speed up permitting and increase societal acceptances
- Phase out existing fossil fuel power in the grids

RENEWABLE HEAT AND FUELS

- Replicate the success story of power: targets, policies, technology development, investment leading to cost reductions
- Remove fossil fuel subsidies
- Accelerate the electrification of transport, buildings and industry

EQUITY

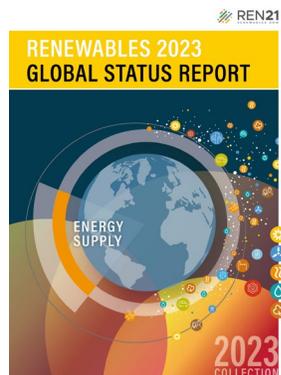
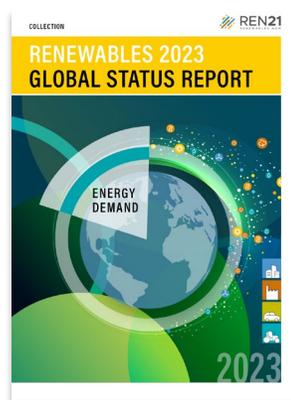
- Address energy access
- Ensure access to technologies, finance and skilling
- Strategically build on the decentralised nature of renewables:
 - Regions, countries, subnational territories, cities
 - Corporation
 - Citizens

Systemic attention is needed!!

The shift to renewables is a shift of the energy system, the economy and the society
Pillars: end fossil fuel, energy efficiency, renewable capacities, infrastructure, shifting energy demand

THANK YOU!

STAY TUNED FOR THE **UPCOMING MODULES**



REN21 Secretariat
www.ren21.net



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