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WORLD ENERGY MARKETS OBSERVATORY | GLOBAL FINDINGS

Acceleration in low carbon tech advances is essential to a successful energy transition

24TH EDITION | 2022

Renewables

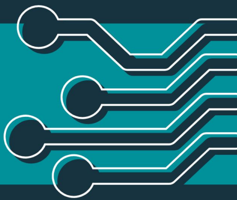
Investments in renewables continue to grow, but technology must be deployed to accelerate and scale deployment. Investments need to grow by a factor of three for the next 5 years, and then continue at a significant rate for two decades.

$361 billion invested in renewables (wind & solar)
+5% compared to 2020

295 GW renewable capacity was installed
+6% compared to 2020

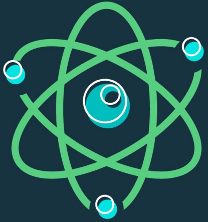
Technology advances focus on:

1. Improving wind or sun conversion rates
2. Developing offshore wind or floating solar farms
3. Decreasing the environmental footprint



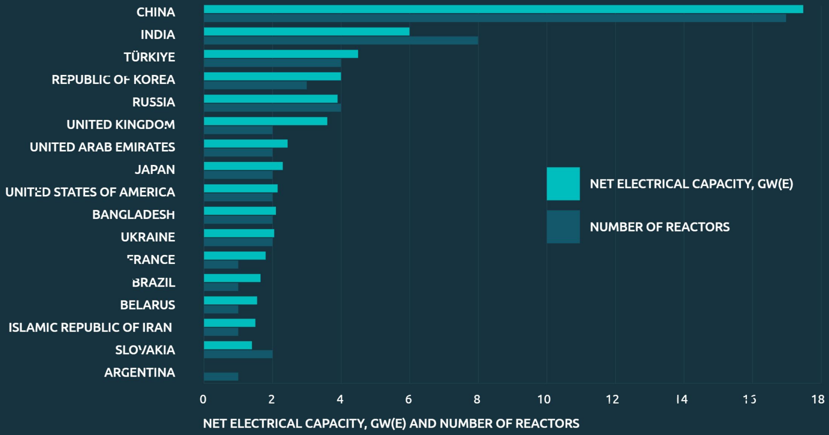
Nuclear renaissance and acceleration

The number of new nuclear projects is increasing, while utilities extend their existing reactors' operating lifetime…



…However, according to IEA estimates, we will fall short of reaching 2050 nuclear energy goals by +400 GW

Asian countries, whose economies are growing the fastest, are currently building the most new reactors, though interest is rising around the world.



There is also a move to develop small modular reactors (SMRs).

50 designs and concepts globally

4 SMRs in advanced stages of construction in Argentina, China, and Russia

CO$_2$ capture and storage (CCUS)

CCUS investments are growing but implementation should be accelerated.

36 billion tonnes of energy-related GHG emitted globally in 2021

40 MtCO$_2$ annual capture capacity in 2021

1.6 GtCO$_2$ annual capture capacity needed by 2030 to align with a 2050 net zero pathway

<3 MtCO$_2$ average, capture capacity added worldwide annually since 2010

5 plants under construction

66 plants in advanced development

97 plants in early stage or just announced

Across 25 countries, mostly in the U.S. and Europe.

Energy storage and batteries

To support a higher share of renewables in the electric mix, flexibility and storage are required to balance the grid.

$100 /kWh at the cell level

300Wh /kg energy density

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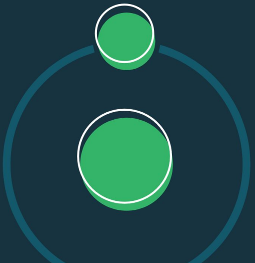
Hydrogen also allows inter-seasonal storage of electricity and is an important enabler of energy transition.

Uses of Hydrogen:
Raw material | Fuel | Energy carrier | Storage solution for electricity



€300.5 million

Investment by Europe in clean hydrogen technologies to boost renewable hydrogen production, reduce its costs, develop its storage and distribution solutions, and stimulate the use of low-carbon hydrogen in hard-to-abate sectors.

H_2

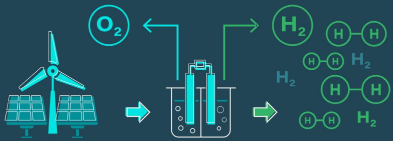
Hydrogen

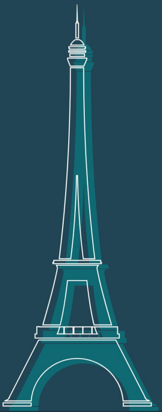
Hydrogen is an important energy vector for energy transition.

15% of the economy that is not suitable for the direct use of electricity can be decarbonized by hydrogen

80 countries support hydrogen development, with those in Europe being the most ambitious

Hydrogen production must be carbon-free, Green H2 represents only 0.04% of the global Hydrogen volumes.





To meet the Paris agreement goals:

15% Hydrogen would need to cover 15% of world energy demand by 2050

35% of hydrogen production would need to be green by 2030
(At the current pace, this goal would not be met until 2045)

30% would need to be blue (with carbon capture) by 2030

These are very challenging and ambitious objectives, notably for green hydrogen production.

Unfortunately, goals do not appear achievable based on today's capabilities and investments

Heat pumps

Heat pumps are an important technology in the transition to clean energy because they enable space heating applications to be electrified.

1 billion
tons per year

of the economy that is not suitable for the direct use of electricity can be decarbonized by hydrogen

60%
Fuel savings by hybrid heat pumps + boiler

10%
current annual average market growth

13%
Annual growth rate needed to support a net zero trajectory by 2030

Major growth markets : Germany | Finland | U.S. | Japan

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WORLD ENERGY MARKETS OBSERVATORY
BALANCING THE FIGHT AGAINST CLIMATE CHANGE WITH ENERGY SECURITY

Access all the WEMO 2022 highlights, expert perspectives and key recommendations.

> In this year's World Energy Markets Observatory, we see how the latest waves of disruption are impacting energy security and affordability, while also jeopardizing climate change plans. Emerging technologies and new use cases across the energy value chain, including green hydrogen, CCUS, storage, and e-mobility, will play a critical role in helping the world maintain security while also working towards a net zero future."

Philippe Vié
Senior advisor, Energy and Utilities sector at Capgemini

ABOUT WEMO

The World Energy Markets Observatory (WEMO) is Capgemini's annual thought leadership and research report created in partnership with De Pardieu Brocas Maffei, Vaasa ETT, and Enerdata, that tracks the development and transformation of electricity and gas markets in Europe North America, Australia, Southeast Asia, India, and China. Now in its 24th edition, the report focuses on the triggers and impact of several successive energy crises, including the Covid-19 pandemic, Russia-Ukraine war, and inflation consequences, most notably for Europe. As in years past, the latest edition of WEMO also includes in-depth coverage of: commodities markets; climate change and regulatory policies; energy transition and related technologies; infrastructure and adequacy of supply; supply and final customer; transformation; financials; and the Oil & Gas industry's shift from fossil fuels to low carbon (route to net zero).