

# Renewable Energy Policy Challenges in 2025

– The Growing Presence of Solar Power,  
and its Overconcentration on China –

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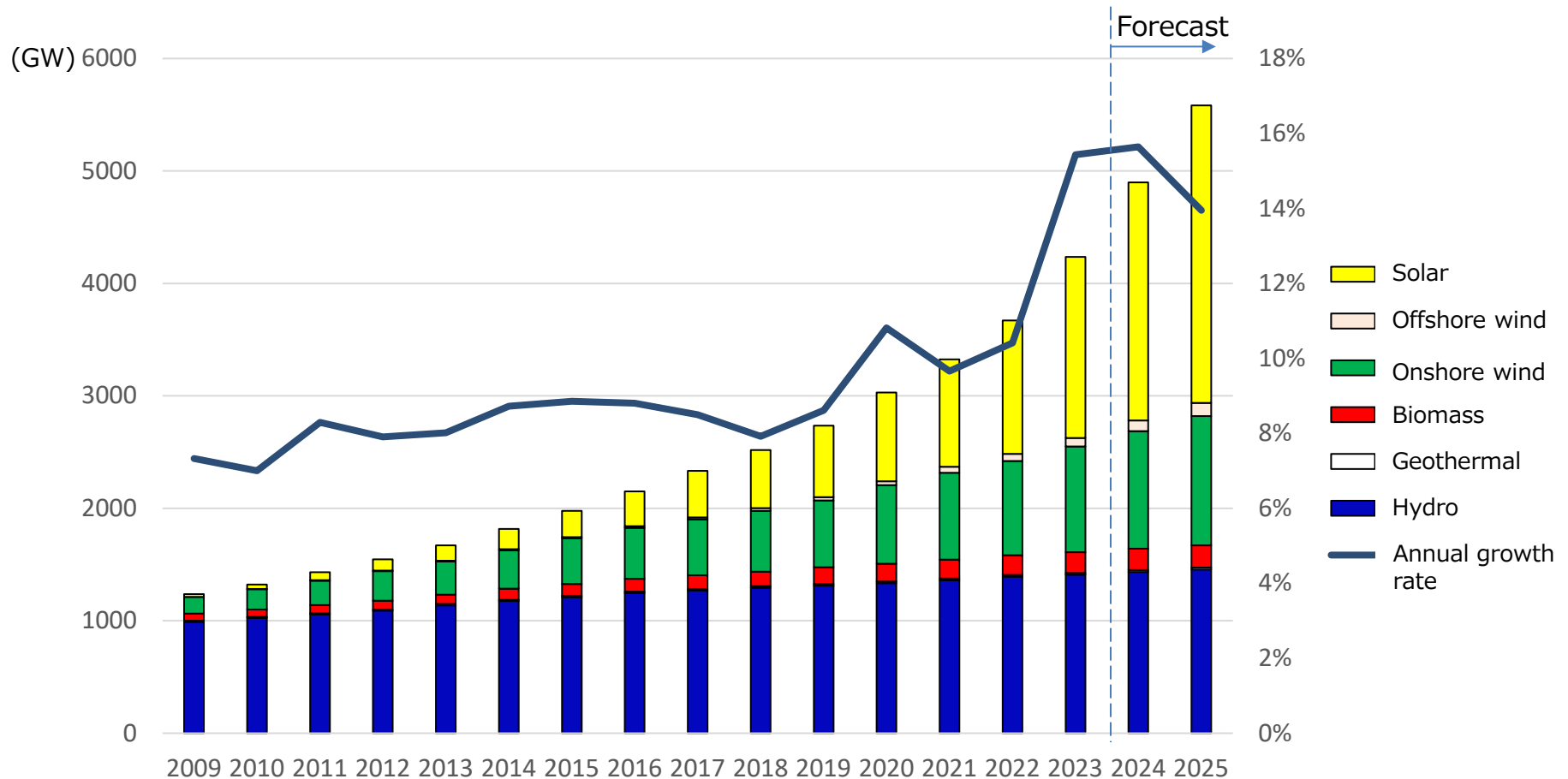
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# Key points of this report

- ✓ The annual increase in global renewable energy generation capacity will reach 670 GW in 2025 and this record is expected to be beaten again next year.
- ✓ Solar power will make up close to 80% of the global rise in renewable energy generation capacity in 2025, exacerbating the overconcentration on solar power. Wind power generation will see sluggish growth as costs rise for both onshore and offshore wind. The fortunes of solar and wind, though both are renewable energies, are diverging.
- ✓ China's share of the global annual increase in global renewable energy generation capacity is increasing every year, and will account for 60% or more of the capacity growth in 2025. China's annual rate of increase in renewable energy generation capacity stands out at 20% compared to around 9–10% for the world as a whole excluding China.
- ✓ China accounts for 83% of solar panel production, and as renewable energy growth increasingly converges on solar, concentration on China will strengthen further, both in adoption of renewable energy and the supply of renewable energy equipment.
- ✓ The increase in renewable energy generation in Japan in FY2025 is expected to be around 6 GW, the same as FY2024. The annual rate of increase peaked at 34% in FY2014 and will slow to 6% in FY2025. This is somewhat lower than the 9–10% rate of increase for the world as a whole excluding China.
- ✓ In 2025, challenges accompanying the growing uptake of renewable energy, shared by countries around the world, include: the growing number of projects not operating as they await connection to power grids or government approval; the choice of support policies for renewable energy; the concentration of renewable energy equipment production in certain countries; loss of diversity in renewable power sources as a result of the focus on solar, where costs continue to drop; and ensuring the flexibility of power grids accompanying the increase in VRE, among other challenges.

# Global renewable energy generation capacity: Growing at 14% per year, should reach nearly 5,500 GW by the end of 2025

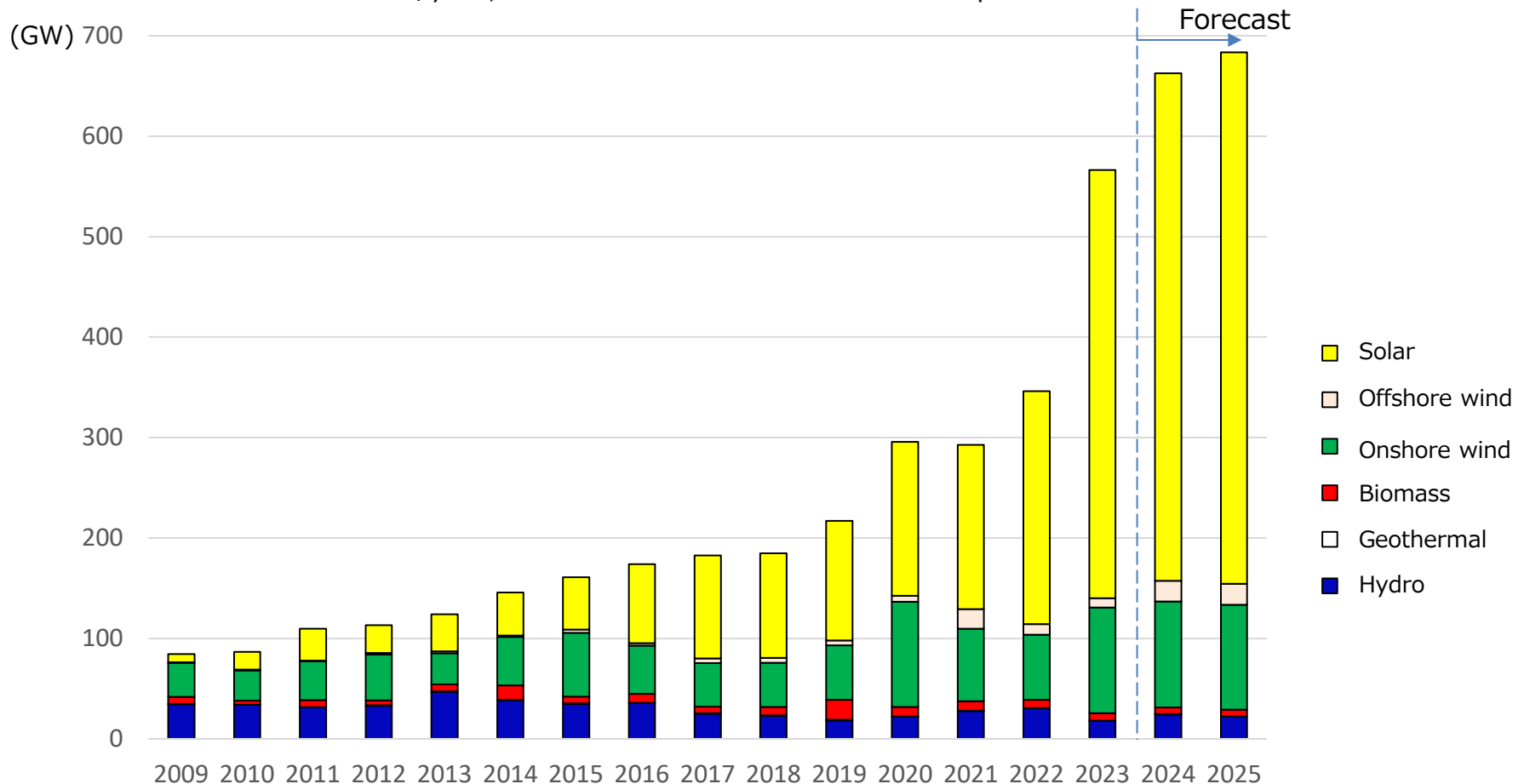
- Global renewable energy generation capacity is expected to reach 5,500 GW by the end of 2025, up 80% in the five years since 2020
  - The annual growth rate rose from 8% prior to 2020 to 10% thereafter, and has accelerated to 14% since 2023.



Source: Created with reference to IEA Renewables 2024 and other materials

# Annual growth in global renewable energy capacity: Record growth of over 650 GW/year in 2025 expected to continue

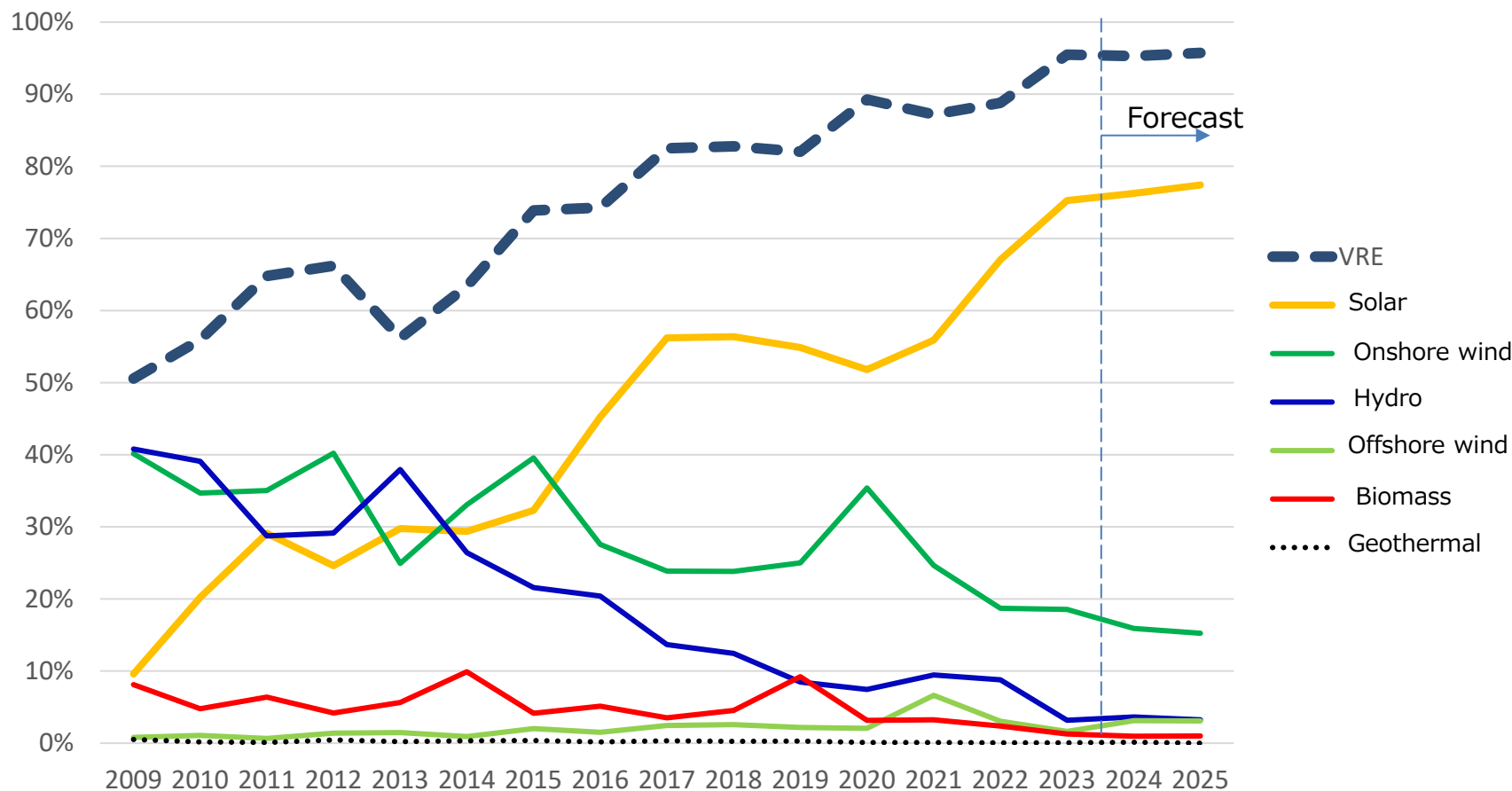
- Global renewable energy generation capacity growth jumped 60% to 550 GW in 2023 and continues to set new records with 650 GW added in 2024, and 670 GW in 2025. This trend continues
  - Until 2019, the baseline was 200 GW/year, which rose to 250 GW/year in 2020. From 2023 it shot up to 550–600 GW or more/year, an annual increase of more than triple that in 2019



Source: Created with reference to IEA Renewables 2024 and other materials

# Share of annual growth in global renewable energy capacity by renewable type: Solar power will make up close to 80% of the global increase in renewable energy generation capacity in 2025, and almost all will be VRE

- Solar will make up close to 80% of the increase, exacerbating the overconcentration on solar power
  - Worldwide decline in the price of solar panels made in China, driving down further the cost of solar generation
  - Wind power, whose materials are more often produced outside China, will see sluggish growth as costs rise amid soaring material prices and rising interest rates
  - Natural variable renewable energy (VRE: solar and wind power) will account for almost all (97%) of the global increase

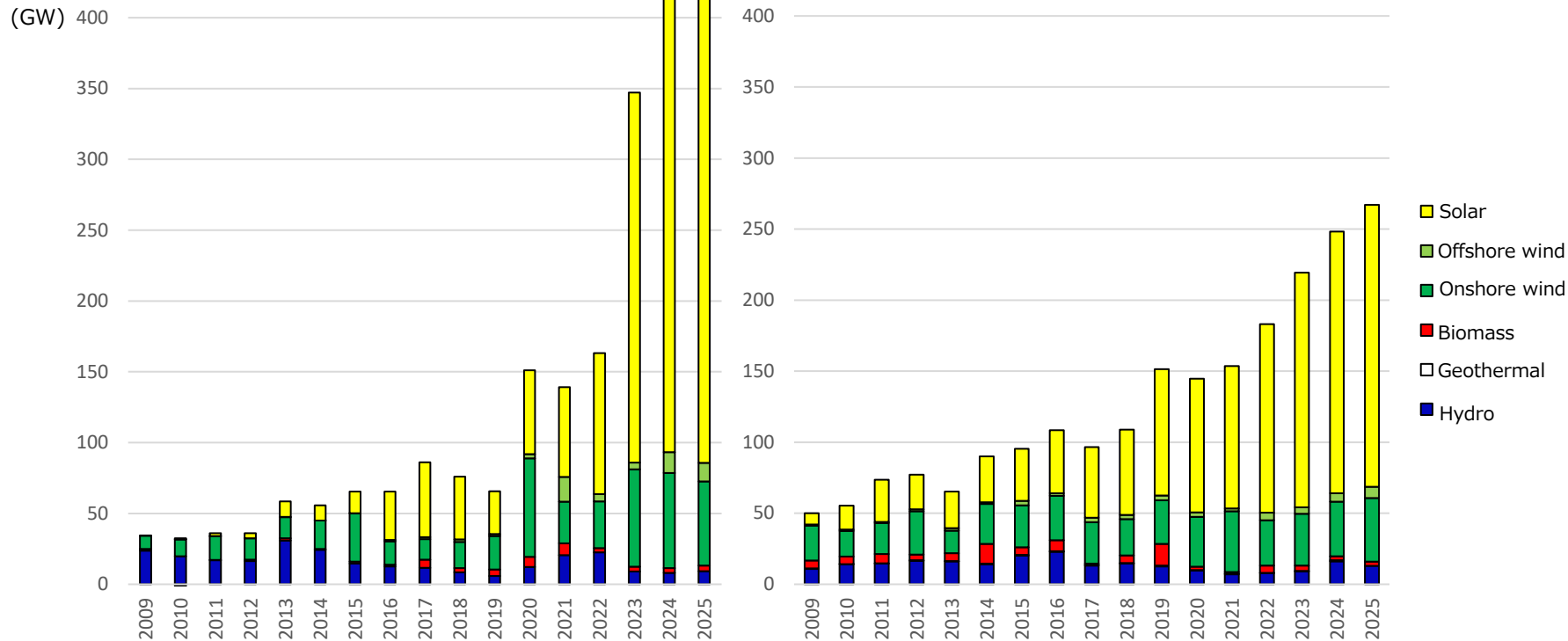


Source: Created with reference to IEA Renewables 2024 and other materials

# 60% of global renewable uptake increase in 2025 concentrated in China: a clear break in the market between China and the rest of the world

- China will account for 60% of global capacity growth in 2025
  - Growth in almost all renewable generation types is concentrated in China: solar (63%), offshore wind (63%), biomass (59%), onshore wind (58%), hydro (42%)
  - In effect, there are now two renewable energy markets, China and excl. China

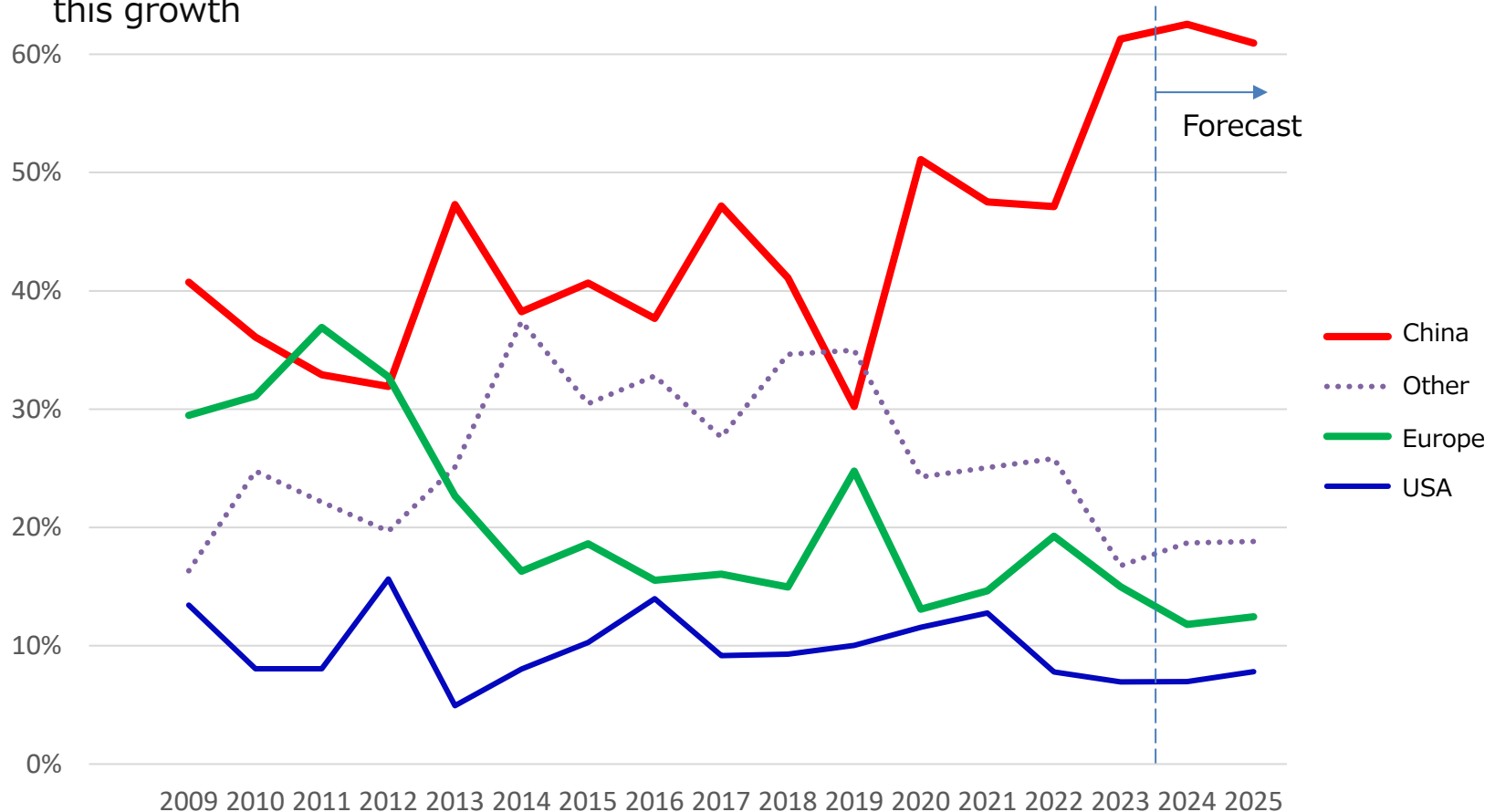
**Annual growth in renewable generation capacity: China only (left) and rest of the world outside China (right)**



Source: Created with reference to IEA Renewables 2024 and other materials

# Share of the annual global increase in renewable generation: While China accounts for over 60%, Europe's share is falling

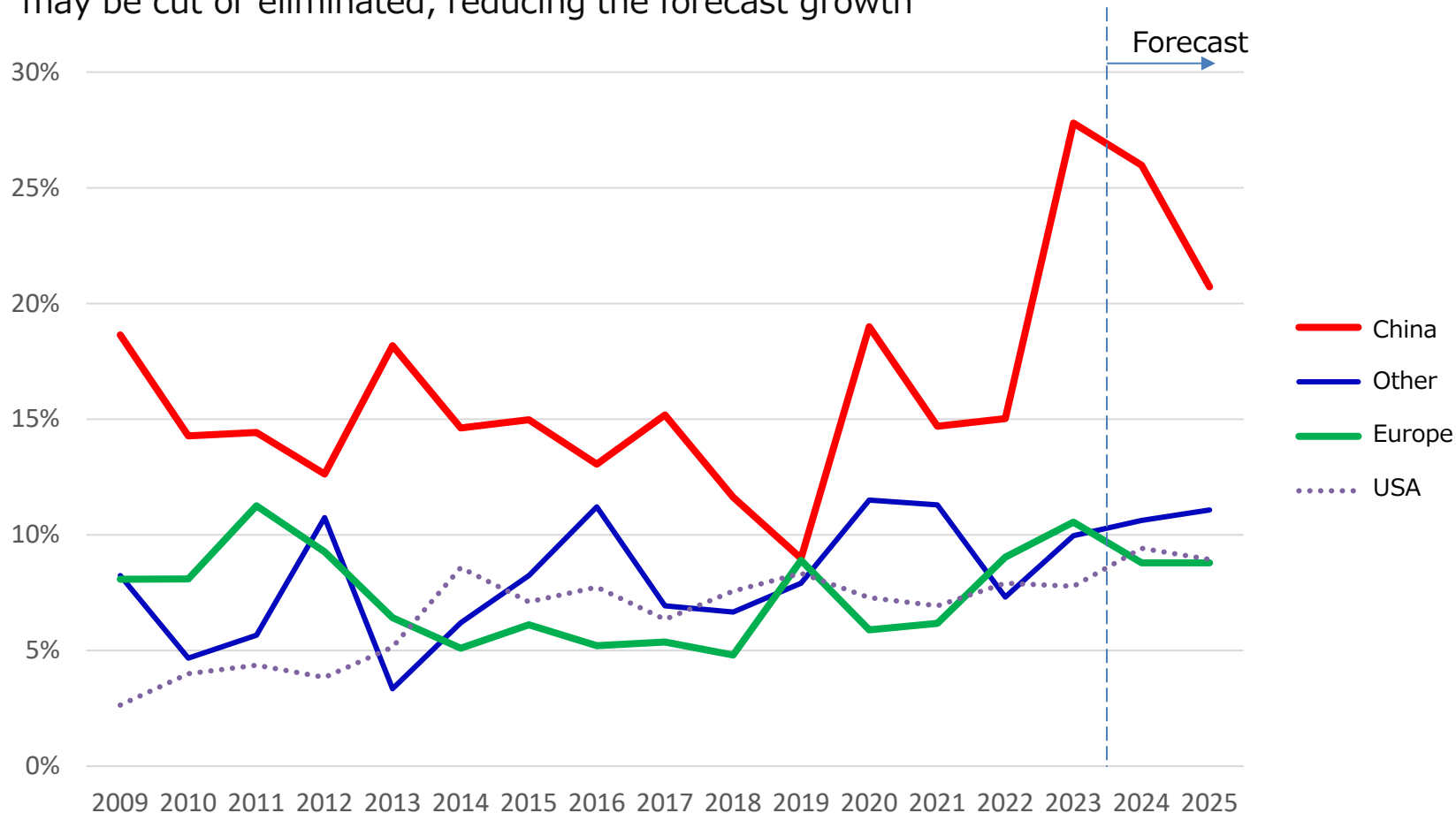
- With a share of 60% in 2025, China maintains its long-term growth trend
  - By contrast, Europe's share is in a long-term downturn, from around 20% in the 2010s to 12% in 2025
  - The U.S. remains unchanged at around 10%, but the new administration could reduce this growth



Source: Created with reference to IEA Renewables 2024 and other materials

# Rates of annual growth in each country of an annual growth in global renewable energy capacity: China's annual growth rate stands out

- China's annual growth in global renewable energy capacity is 20%, much higher than the rest of the world combined on 9–10%
  - However, due to the change of administration, U.S. tax credits for renewable energy may be cut or eliminated, reducing the forecast growth



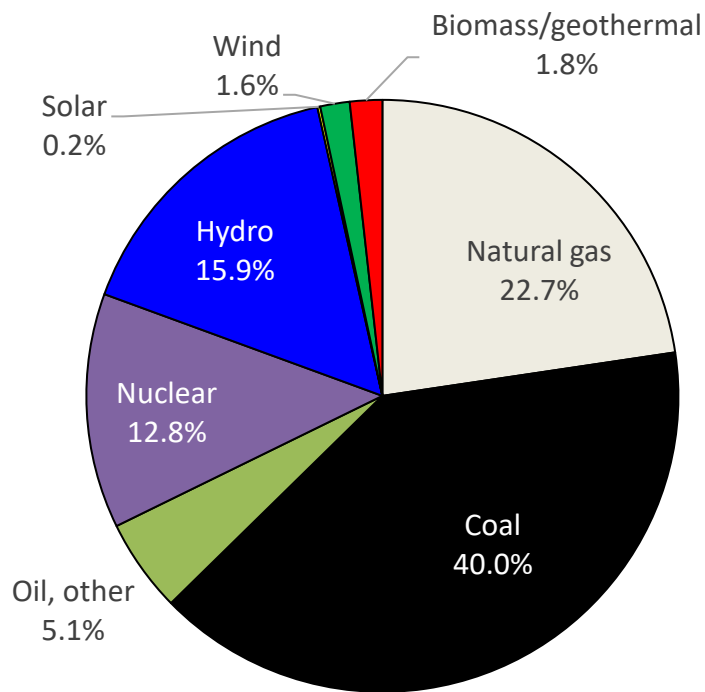
Source: Created with reference to IEA Renewables 2024 and other materials



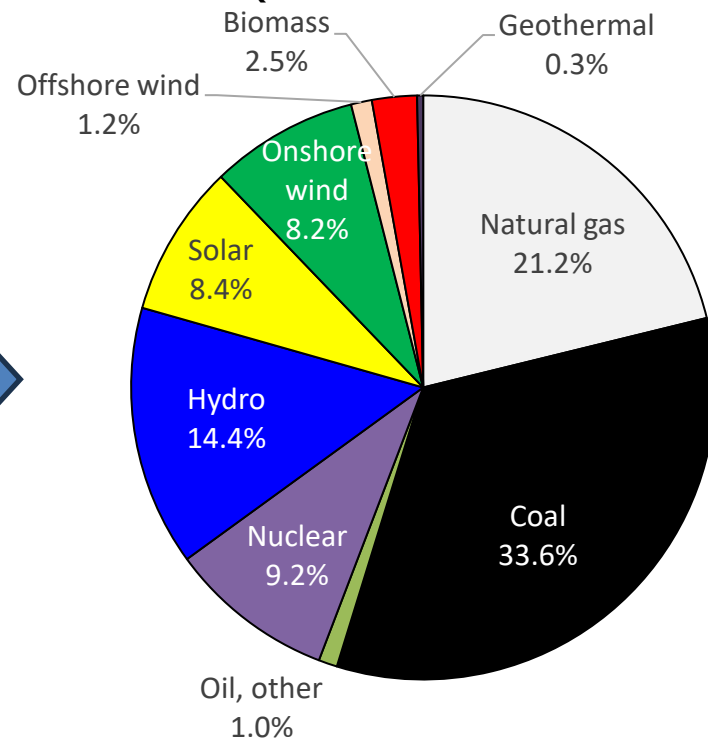
# Renewable energy could take the biggest share of global power generation in 2025

- Renewables' share of total world power generation (including hydro) to reach about 35% in 2025
  - This is about the same as the share of coal (34%), so this could be the first time renewables overtake coal for the No. 1 spot
  - VRE, which made up 2% of capacity in 2010, expected to grow to 18% in 2025
  - There is a real possibility that securing flexible power sources for grids to enable this high share of VRE to be integrated will emerge as a medium- to long-term challenge

**2010 global power generation (21,730 TWh)  
(19.3% renewables)**



**2025 global power generation (31,500 TWh) (forecast)  
(35.0% renewables)**

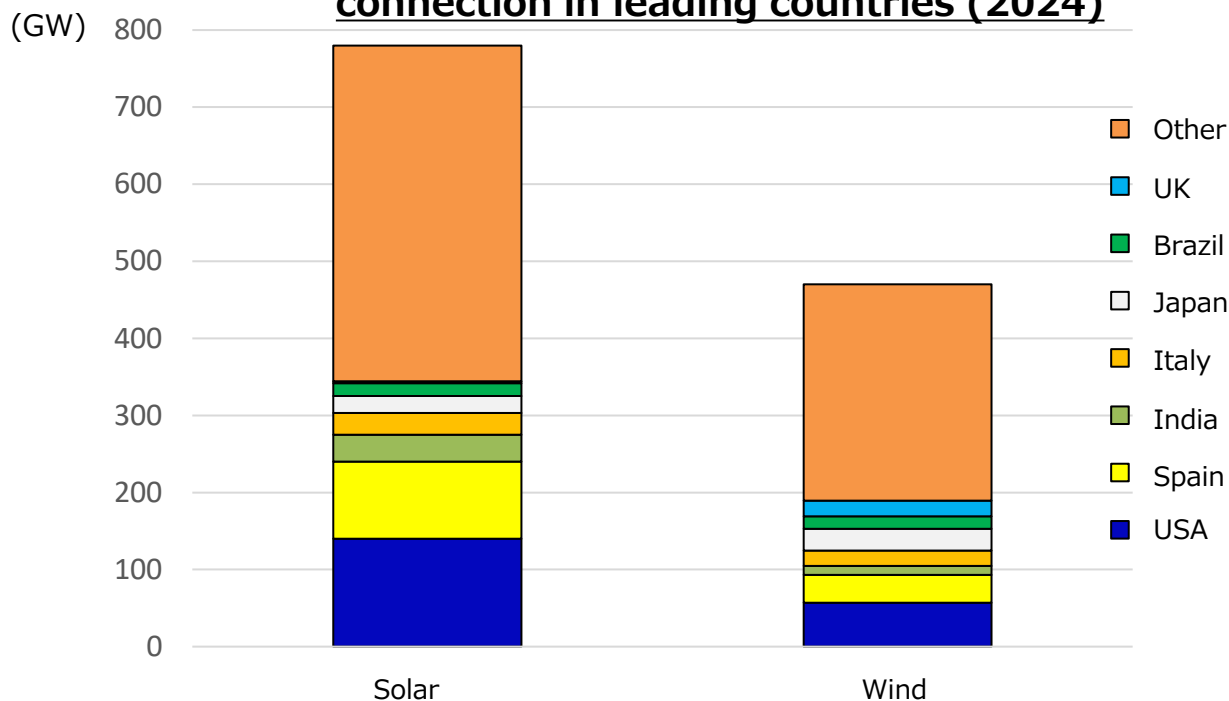


Source: Created with reference to IEA Renewables 2024, IEA Electricity Mid-Year Update July 2024 and others

# Global issue: Growing number of projects not operating as they await connection to power grids or approval

- Solar and wind projects awaiting connection to power grids worldwide approaching 1,300 GW
  - The dramatic increase in renewable power projects awaiting connection to the grid is driven by underinvestment in power networks. Subsidies to promote long-term grid construction and investment for the expansion of renewables are essential
  - Other factors include delays in the process of building consensus with local communities and more projects not operating as they await approval. Positive zoning by authorities and streamlining of approvals are needed (easier processes, one-stop-shop)

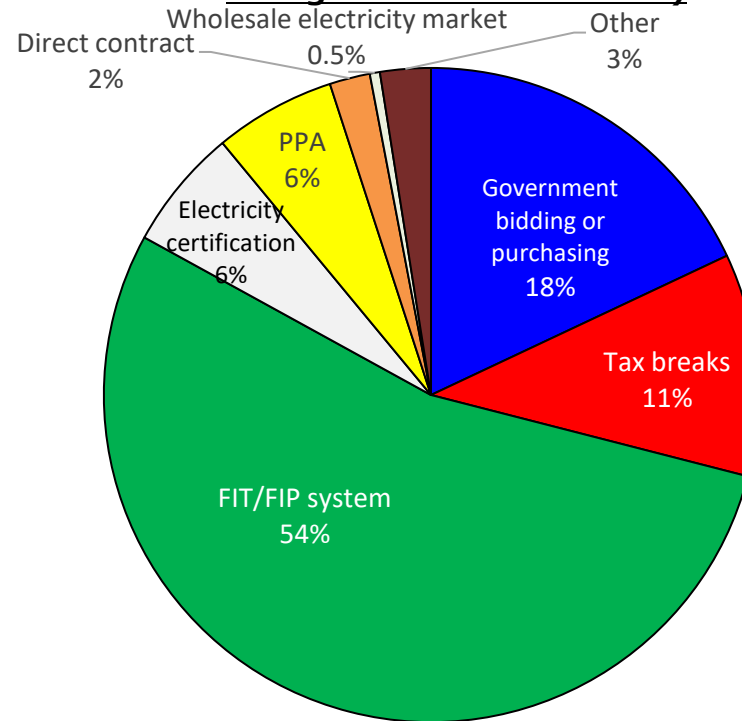
## Capacity of renewable energy projects not in operation as they await grid connection in leading countries (2024)



# Global issue: The choice of support policies to accelerate the uptake of renewable energy

- Countries exploring support policies that suit national circumstances and the competitiveness of renewables: there is no silver bullet
  - Even without any support, renewables are being built to some extent, but the urgent challenge is "how much faster can they be built?"
  - More than half of the world has adopted FIT/FIP systems (China, Japan, Taiwan), many have government bidding or purchasing (India, Australia, Europe), others have tax breaks (U.S.), electricity certification (China) or PPA (Europe, U.S., Australia)
  - We are in a policy transition that began with fixed-price trading through feed-in tariffs (FIT) and is gradually integrating renewable energy into a competitive market through FIPs, bidding and PPAs, etc. (Japan too - FIT→transitioning to market-aware FIP, PPA)

## Capacity of generating facilities of large renewable projects, by policy (globally, brought online since 2024)

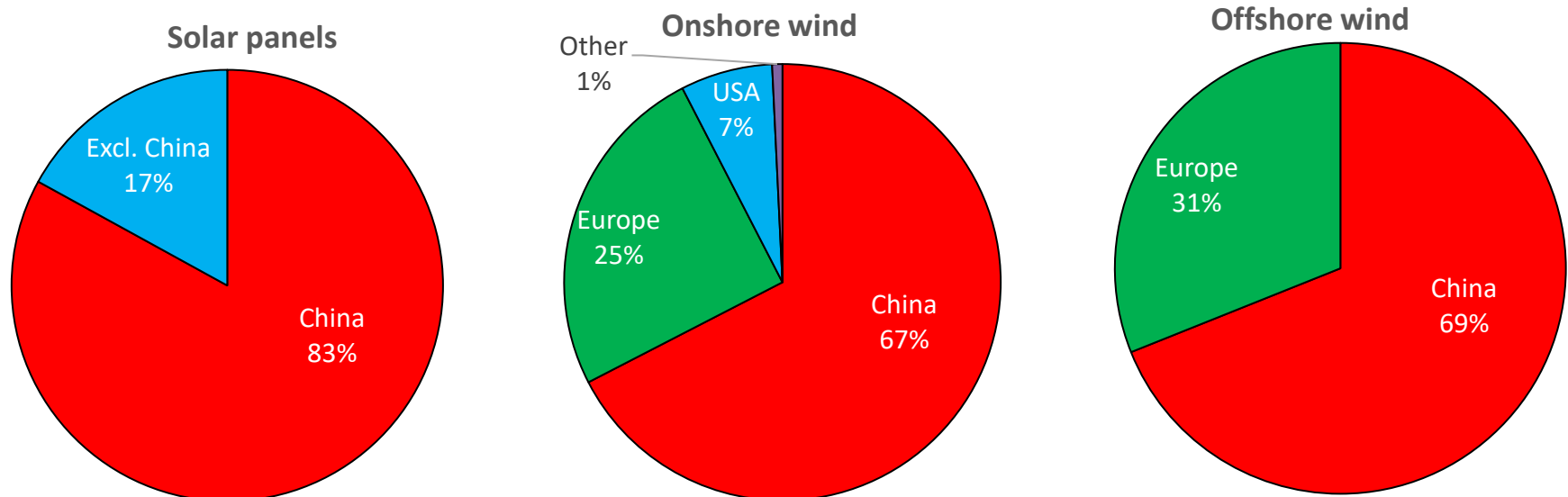


Source: Created with reference to IEA Renewables 2024 and other materials

# Global issue: Concentration of renewable generation equipment production in one certain country

- China almost monopolizes the global solar panel market and will continue to do so as solar grows. Over the long term, this monopoly is likely to remain or strengthen.
  - China's share in wind power markets outside China may also grow, due to its low price offer
  - While there is a future risk to large-scale renewables uptake as a result of one country's monopoly such as strangling or breakdown of supply, or price manipulation, the fact is the reliance on China-made products benefits renewables due to the low costs
  - It is well known that balancing diversification of supplier countries and reducing costs is a near-impossible task
  - The overconcentration on China, together with a similar situation with vital minerals, is attracting attention globally in terms of economic security

## Market share by country of headquarters of renewable energy equipment producers (2023)

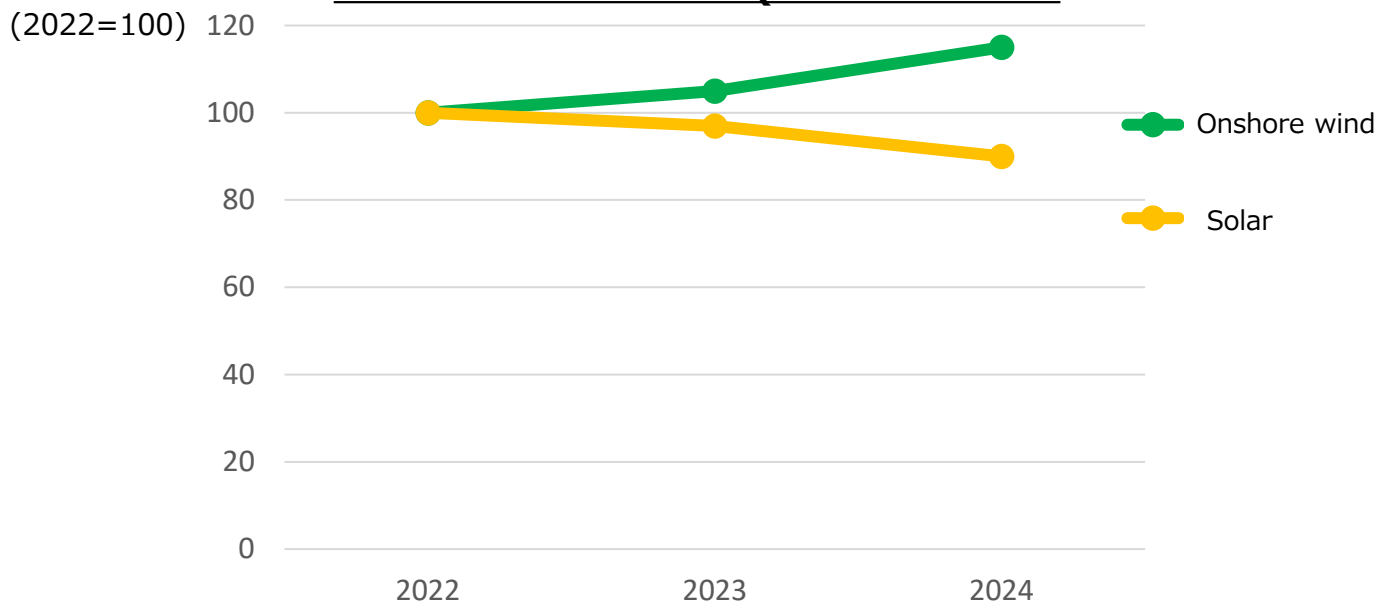


Source: Created with reference to IEA Renewables 2024 and other materials

# Global issue: Overconcentration on solar due to its falling cost amid inflation

- While LCOE for large-scale solar fell 10% from 2022 to 2024, it rose 15% for onshore wind, further cementing the cost advantage of solar power
  - As a result of the cost advantage of solar power, global overconcentration on solar is accelerating
  - Meanwhile, as costs rise for wind power, development (onshore and offshore) has slowed with a series of project cancellations
  - Overdependence on solar power reduces the diversity of renewable generation, further deepening reliance on one country as the producer of equipment and may even affect power grids due to the concentration of output fluctuation patterns
  - Rethinking of the overall way in which renewables are adopted is underway based not just on cost but on the overall renewable portfolio

## LCOE (levelized cost of electricity) of large-scale solar and onshore wind (2022=100)

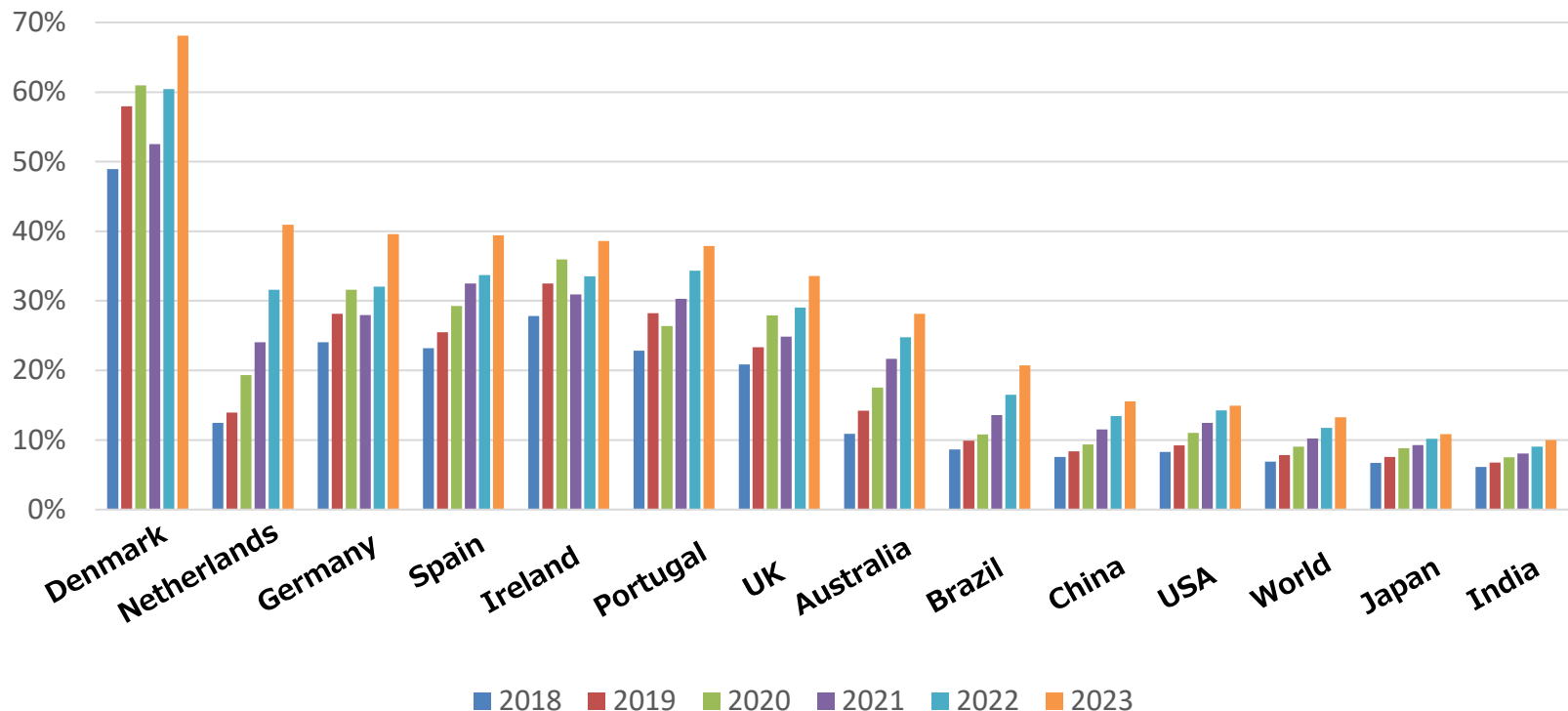


Source: Created with reference to IEA Renewables 2024 and other materials

# Global issue: Retaining grid flexibility as VRE grows

- More and more countries have a VRE share of over 40% and will attain 60–70% by 2030, while those currently at around 20% should achieve 30–40% by 2030
- Therefore, there is worldwide demand for flexible power sources able to back up grids and enable the incorporation of large-scale VRE (grid upgrading, dispatchable generation, battery storage, pumped water storage, DSM)
  - e.g. Ireland, an island nation like Japan, has maintained stable grid operations while lifting VRE share to 40% (mainly wind) with flexible use of gas thermal plants

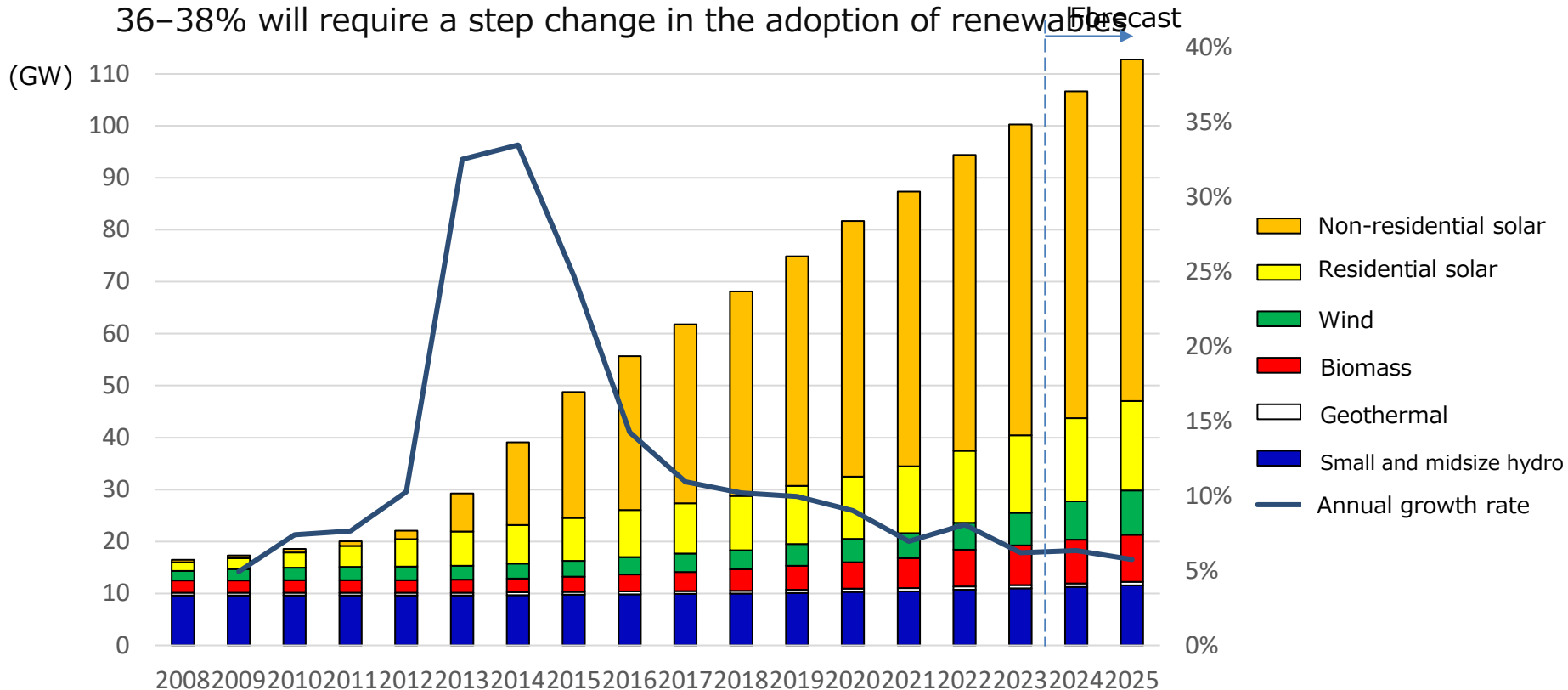
## VRE share of power generation in leading nations (solar + wind)



Source: Created with reference to 2024 Energy Institute Statistical Review of World Energy

# Japan's renewable generation capacity: Rising to 113 GW by end of FY2025, but long-term slowdown continues

- Renewable energy generation capacity will reach 113 GW\* by the end of FY2025 (excluding hydro plants of 30 MW or more) and generation of 225 TWh\*\*
  - When large-scale hydro plants of 30 MW or more are included, the renewable energy share for FY2025 should reach 25.7%
  - From its peak in FY2014 of 34%, the annual growth slows to 6% in FY2025, slightly under the level of the world excl. China of 9–10%
  - Hitting the 2030 target for a renewable energy share of overall electricity generation of 36–38% will require a step change in the adoption of renewables

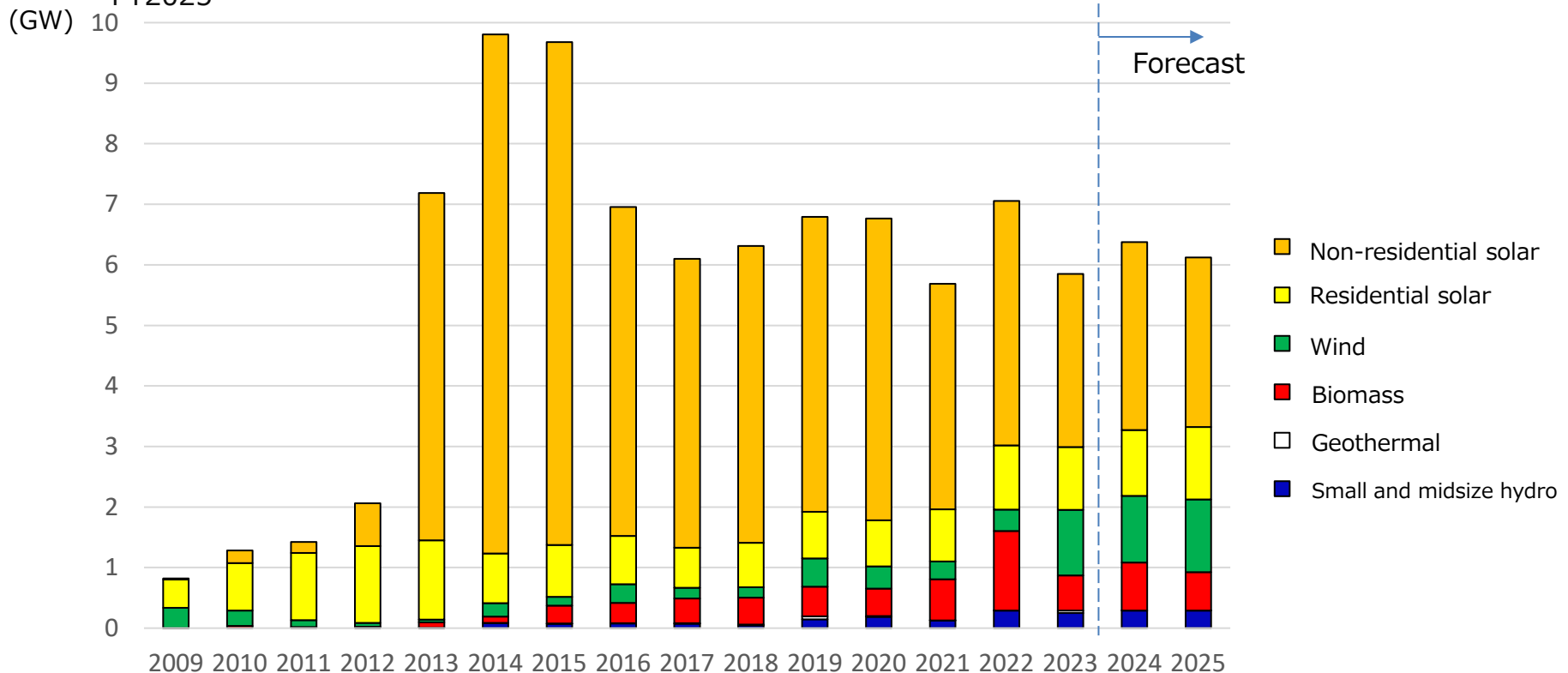


\*Solar generation estimated based on AC  
 \*\*Includes consumption of own generation under solar PPAs, etc.

Source: Japan Institute of Energy Economics estimates

# Amount of new renewable energy capacity in Japan: 6 GW extra expected in FY2025 with wind filling the gap as solar slows

- In non-residential solar, which accounts for the vast majority of overall renewable energy, PPA is coming on to fill the gap as FIT and FIP slow, but this growth will not be enough to change the overall slowing trajectory
  - Onshore wind projects that required time for environmental assessments and consensus-building with the local community are gradually coming online
  - Under the Marine Renewable Energy Act, 5.1 GW of offshore wind power projects have already been bid, which should be operating commercially in 3–4 years. Therefore, they are not yet realized in FY2025



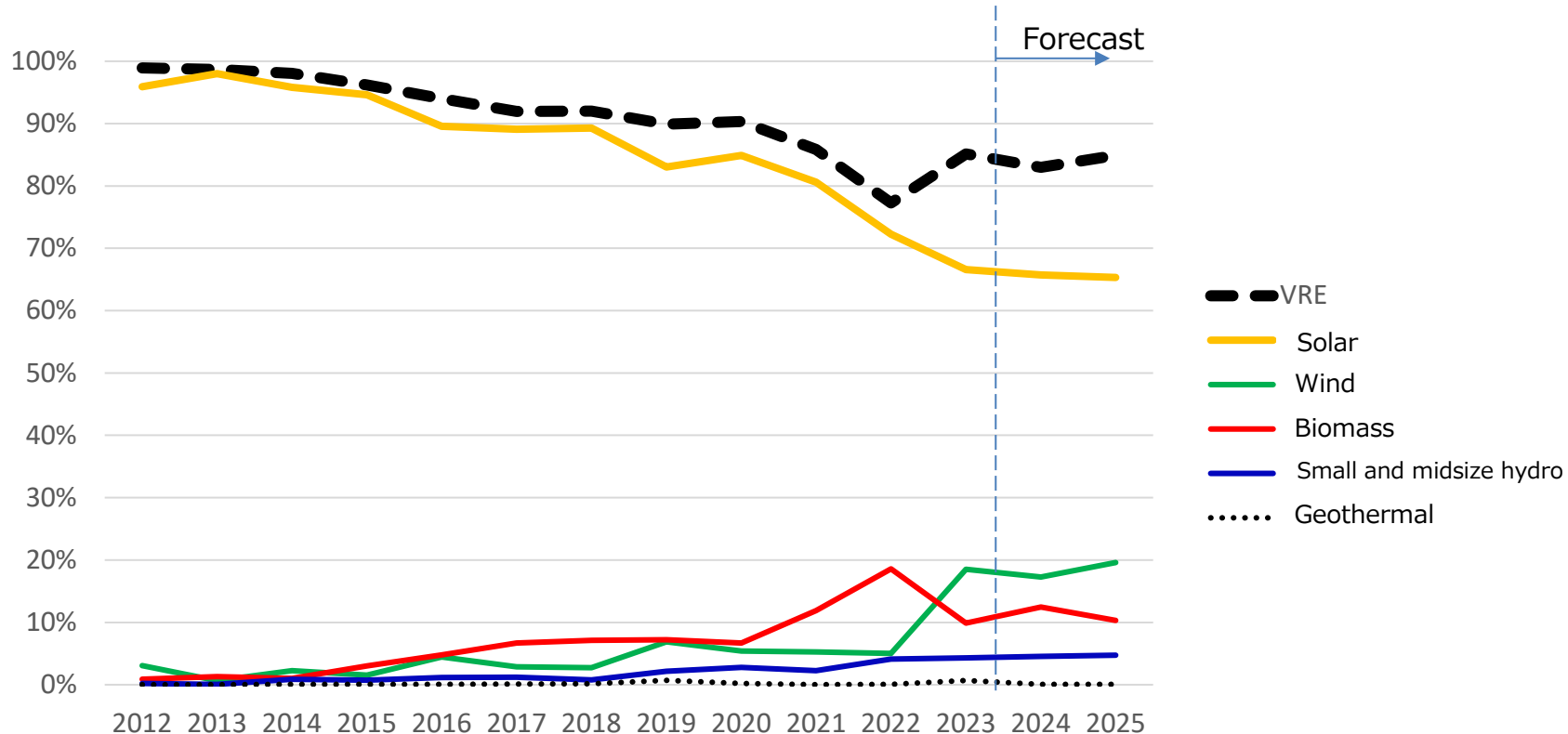
\*Solar generation estimated based on AC, consumption of own generation under PPAs, etc. is included

Source: Japan Institute of Energy Economics estimates



Share of annual increase in renewable generation capacity in Japan by renewable source:  
Slight decreasing trend in solar, which has been at over 90% of new capacity,  
with a rising trend for wind

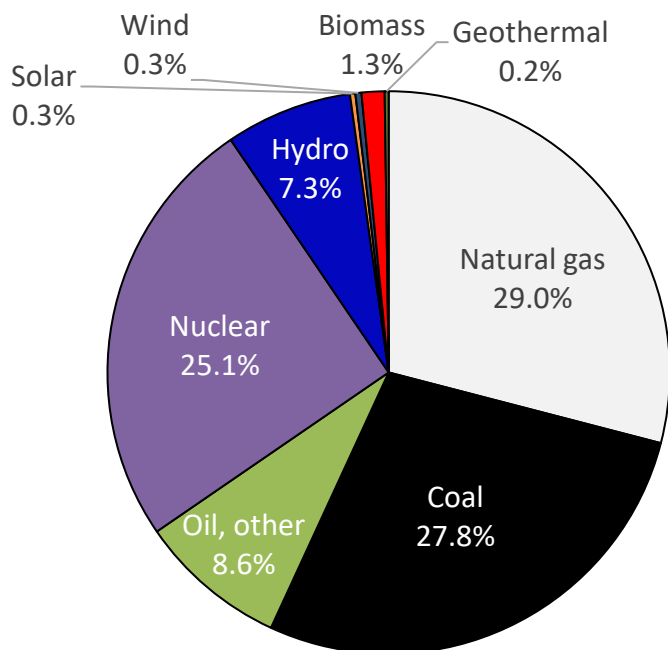
- Solar down, wind up→going against the global tide of overconcentration on solar
  - Non-residential solar has dominated new renewables since the adoption of FIT, but as good locations have dried up, FIT tariffs have been cut and bidding introduced with a move to FIP, nothing has stemmed the decreasing trend
  - With offshore wind coming online in volume from 2028, the relative growth in wind power is expected to continue
  - The VRE share of 85% is a majority but under the world average of 97%



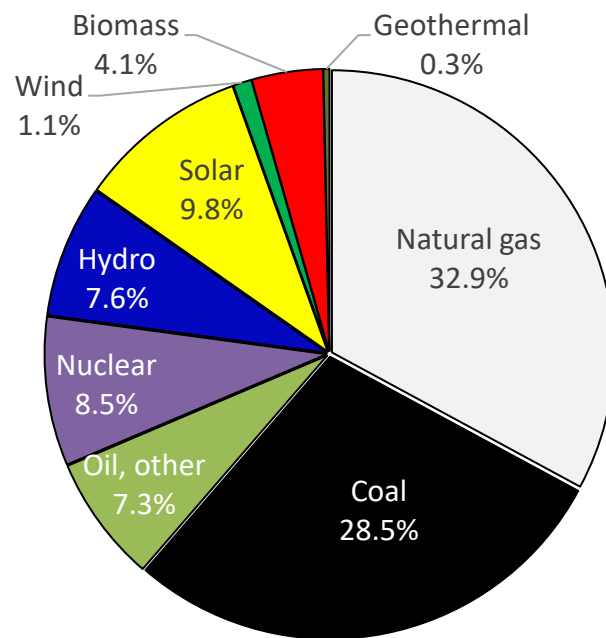
# Share of renewables in Japan's electricity mix: Reached 22.9% in FY2023 but must add another 14 percentage points to hit the 2030 goal

- Renewables held a 22.9% share in FY2023 (hydro 7.6%, non-hydro 15.3%), meeting the old goal under the 5th Strategic Energy Plan for FY2030 of 22–24%
  - However, the current FY2030 goal (36–38%) requires at least 14 percentage points to be added to the renewable share
  - The share of solar has overtaken hydro and remained there, establishing solar as the largest source of renewable energy
  - The share of VREs rose from 0.6% in FY2010 to 10.9% in FY2023 (solar 9.8% + wind 1.1%)

**Japan power generation, FY2010 (11,494 TWh)  
(of which renewables 9.5%)**



**Japan power generation, FY2023 (9,854 TWh)  
(of which renewables 22.9%)**



Source: Created with reference to Comprehensive Energy Statistics of Japan FY2023, preliminary

- **Fewer locations for renewable energy installation**
  - Promote promising offshore wind, residential solar, farm solar and use of abandoned farmland and unused property
    - Every kind of policy has been implemented and yet, there has been no major boost to renewables installation
- **Building local consensus for renewable energy projects and living in harmony with the local community**
  - Transition from a development model that leaves it to developers to a local government-led model using renewable energy promotion zones
    - Promotion zones are being created nationwide, but in only 40 districts in regional areas due to lack of human resources, etc.
- **Delays in connecting to the grid**
  - Short-term solution: Harness existing grid to the maximum through connection and management with non-farm connections
    - Some progress has been seen with 14 GW in non-farm connection contract applications and 6.5 GW with N-1 status
  - Long-term solutions: Steady development of long-term cross-regional network (Master Plan)
    - Consultations underway on financing and cost recovery for grid development
- **Establishment of new renewable energy business models such as FIP and PPA in a post-FIT environment**
  - Promoted transition from FIT to FIP, increased generation of renewable energy for own needs through PPAs, etc.
    - Output controls inherited from FIT to FIP (while FIP generation is not subject to output controls for now, more and more FIT generation is subject to output controls), promoting the transition to FIP from existing FIT projects