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By GAVIN MAGUIRE

GLOBAL electricity generation from solar farms is set to exceed output from nuclear reactors for the first time this summer, marking an important milestone in the continuing growth of solar power within global energy systems.

As solar farms only generate power during daylight, solar output remains well behind wind, nuclear and hydro systems on an annual basis.

But during peak production months solar farms can exceed output from nearly all other clean sources and have already started to surpass global wind output during the northern hemisphere summer from last year.

With solar now also set to exceed nuclear production for a spell, that leaves global hydro systems as the only other major clean power source that has yet to be eclipsed briefly by solar farms during the peak solar output period.

Capacity surge

Over the past decade, utilities have added more than twice as much solar capacity to generation networks as any other power source, thanks mainly to the relatively low cost and speedy connection times of solar systems.

As of 2024, there was 1,866GW of utili-

ty-scale solar generation capacity embedded in global electricity systems, according to data from energy think tank Ember.

That capacity footprint was 10 times more than what was in place in 2014, and was by far the largest capacity growth posted by all major power sources during that period.

In the decade since 2014, wind power posted the next largest capacity increase, by a factor of 3.2, while all other generation sources saw a less than doubling in installed capacity.

In terms of overall capacity, solar's total capacity was the third-highest among major power generation sources in 2024, trailing coal's 2,174GW and natural gas' 2,055GW, but exceeding the 1,283GW of hydro and 1,132GW of wind power.

Output impact

The steadily rising solar capacity footprint has propelled peak solar electricity generation to new highs each year so far this decade.

Utility-scale solar electricity generation has grown by an average of 25% a year since 2020, Ember data shows.

But over the first three months of 2025, solar generation was 34% more than was generated during the same months of 2024, thanks to widespread increases in generating capacity in several key regions.

If monthly solar generation continues to register around 30% more than the same month in 2024, global solar electricity output should exceed 260 terawatt hours (TWh) per month during June, July and August of this year.

Those output totals would likely handily surpass the monthly output from the world's nuclear reactor fleet, which has posted a monthly peak of just under 252TWh since 2019 and averaged 223TWh a month in 2024.

Solar generation will likely fall back below 250TWh from September as daylight hours in the northern hemisphere – home to over three-quarters of the world's solar farms – start to drop heading into winter.

But during the coming summer, more worldwide electricity supplies will come from solar farms than from nuclear reactors for the first time, establishing yet another benchmark for the solar sector.

Utility scale

For utility operators, the steady swell in solar power supplies presents both opportunities and challenges.

The intermittent nature of solar farms – which can flood grids with more electricity than needed during peak output periods before stopping production altogether at night – means real-time system

balancing with other power sources is required.

But the rapidly rising scale of solar generation within national grids is also forcing utilities to modernise their grids to better accommodate swings in renewable supplies and optimise overall power flows over time.

The declining cost of battery storage systems is also spurring a growing number of utilities to deploy batteries to store surplus solar power when it is not required, and then dispatch that power when electricity consumption peaks.

This "solar-plus-battery" model is in turn allowing utilities to cap the use of fossil fuels in their generation mixes, which can provide cost savings when coal and gas prices rise and also help reduce system emissions.

This summer, when solar farms lift output to new records, utilities may also be able to dial back nuclear production during peak solar output periods, and then crank nuclear production up again once solar output falls at night.

This could further help utilities curb reliance on fossil fuels while maximising clean power generation, and set the stage for further growth in solar generation and use in subsequent years. — Reuters

Gavin Maguire is a columnist for Reuters. The views expressed here are his own.