AUTHOR: No author available SECTION: HOME PAGE: A6 PRINTED SIZE: 223.00cm² REGION: KL
MARKET: Malaysia PHOTO: Full Color ASR: MYR 3,041.00 ITEM ID: MY0058723424

05 MAY, 2024

Why energy storage is key to global renewable goals

The Sunday Post (Kuching), Malaysia

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PARIS: G7 environment ministers committed on Tuesday to ramp up the production and deployment of battery storage technology, an essential component for increasing renewable energy and combating climate change.

Here is how and why batteries play a vital role in the energy transition:

Growing demand

Batteries have been central to the rise of electric vehicles (EVs) but are also critical to wind and solar power because of the intermittent nature of these energy sources.

Surplus electricity must be stored in batteries to stabilise distribution regardless of peaks in demand, or breaks in supply at night or during low winds.

Battery deployment in the energy sector last year increased more than 130 per cent from 2022, according to a report released last week by the International Energy Agency (IEA).

The main markets are China, the European Union and the United States.

Following closely are Britain, South Korea, Japan and developing nations in Africa, where solar and storage technology is seen as the gateway to energy access.

Six-fold goal

To triple global renewable energy capacity by 2030 - a goal set at the UN climate conference in December - the IEA says a six-fold increase in battery storage will be necessary.

Clean energy is essential to reduce emissions from burning fossil fuels and to hope to keep the international target of restricting global warming to 1.5 degrees Celsius above pre-industrial levels.

The total storage capacity required to achieve this target is an estimated 1,500 gigawatts by 2030.

Of this, 1,200 GW will need to be supplied by batteries.

Cost challenges

In less than 15 years, the cost of batteries has fallen by 90 per cent.

"The combination of solar PV and batteries is today competitive with new coal plants in India. And just in the next few years, it will be cheaper than new coal in China and gas-fired power in the United States," IEA chief Fatih Birol said last week.

"But still the pace is not fast enough to reach our goals in terms of climate change and energy security."

Costs will have to come down further, he said, while calling for supply chains to be diversified.

Most batteries are currently produced by China.

But some 40 per cent of planned battery manufacturing projects are in the United States and Europe, according to the IEA.

If those projects are realised, they would be nearly sufficient to meet the needs of those countries.

Metal matters

Another thorny issue is the availability of critical metals like lithium and cobalt that are essential to make batteries.

Experts say the development chemical alternatives could complement the dominant lithium-ion technology.

"Transition in the technology will reduce the amount of lithium" needed, said Brent Wanner, head of the IEA's power sector unit, adding, "this includes shifting to sodium-ion batteries".

Beyond 2030, high-density solid-state batteries that offer a longer lifespan are expected to become commercially available.

There are other storage options, although not as widely applicable or available as batteries.

Pumped storage hydropower has long been used in the hydroelectric sector.

The transformation of electricity into hydrogen, which can be stored and transported, is a new technology expected to become more readily available.

Be flexible

Renewable energy is not entirely reliant on storage and measures can be taken to improve the flexibility of its production to meet demands.

Industry and governments are gearing up for the transition.

The European Union's Energy Regulators Agency called on member states in September to asses their 'flexibility potential' based on estimates that renewables will need to double by 2030.

Such a rise requires greater 'flexibility' in grids, meaning energy can be stored and distributed consistently despite fluctuating production and demand.

The G7 said Tuesday it would not only support more production and use of battery storage, but promote technological advancements in the sector as well as grid infrastructure. — AFP