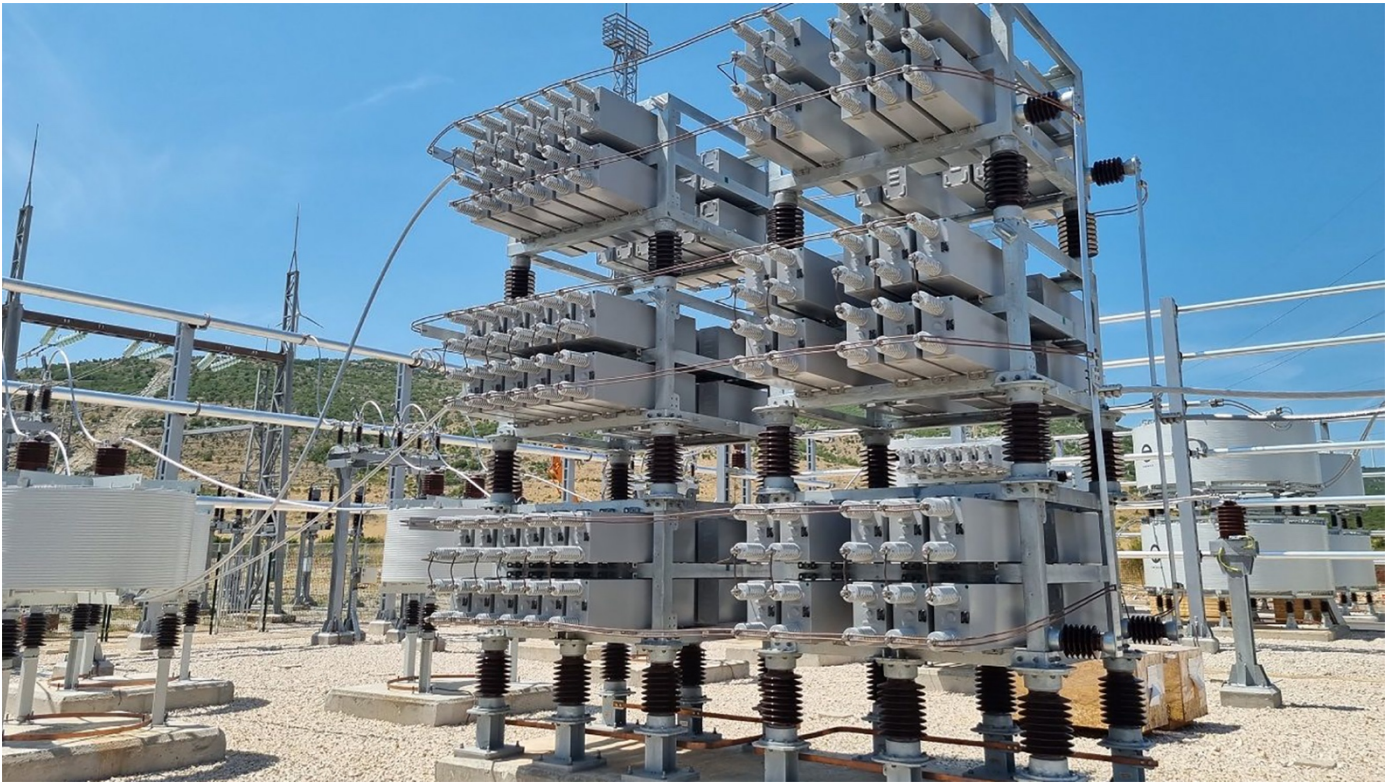




Decommissioning of Conventional Power Plants Driving the FACTS Market

by Mirza Qutab Baig, *Research Analyst* at Power Technology Research

- The EU Commission has set an ambitious target for EU countries to increase their share of renewable energy to 40% of final consumption by 2030.
- In the U.S., Minnesota Power has announced a target of providing 100% carbon free electricity to its consumers by 2050 and plans to reach 70% renewables by 2030.
- FACTS manufacturers will become crucial partners in clean energy deployments across the globe.

In order to meet climate betterment goals, countries across the globe have set renewable energy targets. In the case of Europe, for instance, the EU Commission has set an ambitious target for EU countries to increase their share of renewable energy to 40% of final consumption by 2030, up from around 20% in 2019, all aimed at achieving a 2050 net zero emissions goal.

Similarly in the Middle East, according to IRENA with the ambitious targets set by all the countries in this area, the region is expected to have a combined renewable capacity of 80 GW by 2030. Meanwhile, across the world in the U.S., anywhere from 1200 to 2000 GW of renewable capacity is expected to be deployed to generate 70-80% of the electricity by 2050.

South America generates 25% of its energy from renewables which consist mainly of hydro and biofuels with solar

and wind accounting for only 16% of the total renewable generation. However, the governments in this region have set a target of meeting 70% of total demand by renewables by 2030. Back across the world to the east, energy ministers of South-East-Asian countries, on the other hand, have set a target of 35% renewable capacity by 2025 which will potentially add 35-40 GW of renewable capacity in the region.

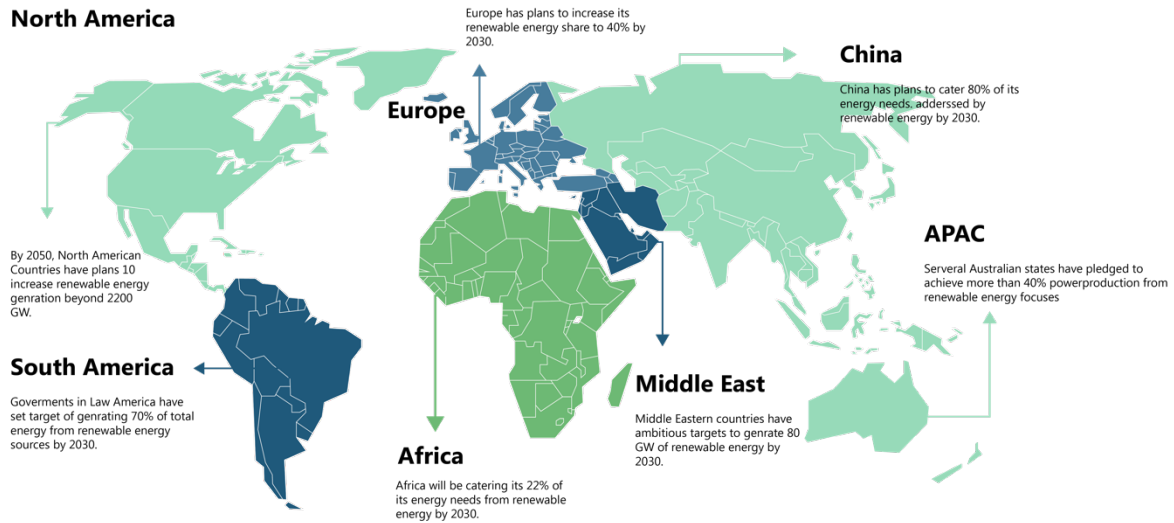


Figure 1: Region-wise Renewable Energy Goals.
Source: Power Technology Research

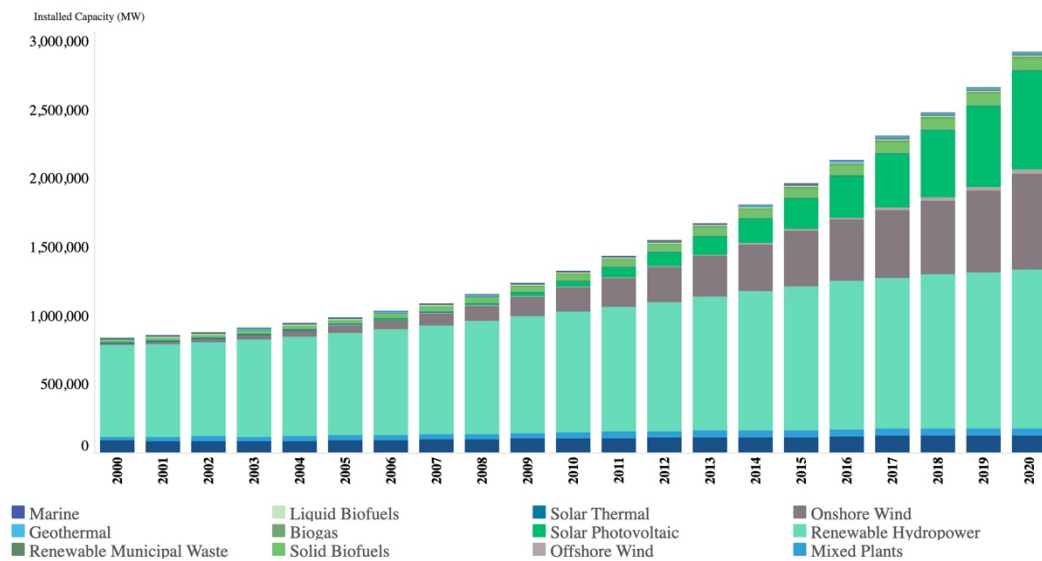


Figure 2: Net additions in the global renewable energy capacity from 2001-2020.
Source: IRENA

Decommissioning of Conventional Generation Plants

In Sweden, after 45 years of service and delivering 220 TWh of electricity, Sweden's state-owned power company Vattenfall AB retired the Ringhals 1 reactor at the Ringhals nuclear power plant. It was a boiling reactor plant which started commercial operation in 1976. Initially, the reactor had a capacity of 730MW which was later increased to 900 MW.

In the U.S., Minnesota Power has announced a target of providing 100% carbon free electricity to its consumers by 2050 and plans to reach 70% renewables by 2030 for which it would require 400 MW of additional solar and wind generation capacity. Minnesota Power also plans to decommission the last of its coal fired power plants by 2035.

Similarly, in Germany, till Feb 2020, 26 nuclear power plants underwent decommissioning, and 3 plants were dismantled. In addition to this, research reactors of different sizes in excess of 30 and nuclear fuel cycle plants in excess of 10 were permanently shut down.

As per the research conducted by the climate think tank TransitionZero, for the world to stand a chance at curtailing temperature rise below 1.5 degree Celsius, the shutdown of nearly 3,000 coal fired power plants globally is necessary before 2030. Presently, the global coal fired installed capacity is around 2,000 GW which needs to be reduced by one half. To comprehend what this means, think of this as requiring the shutdown of one coal fired unit per day till the end of this decade.

Challenges arising due to shut down of conventional power plants

As conventional nonrenewable power plants are being shut down and renewable energy resources (such as solar and wind) are intermittently being incorporated into the grid, problems like voltage stability and loss of inertia are arising. Two FACTS technologies are in high demand to address these issues: the STATCOM to ensure voltage stability and synchronous condensers to provide system inertia and short circuit strength to the grid when the system becomes unstable. Looking back at Minnesota Power, with the retirement of its coal-based power generation followed by the addition of renewables, SVC plus (STATCOM) technology developed by Siemens came to the rescue to deal with the voltage stability issues that arose.

Similarly, ElectraNet's ESCRI-SA large scale battery at the Dalrymple substation assists the system operator in providing grid stability and avoiding outages in case of disruptions in the grid. The battery is able to reduce the rate of frequency changes and serve as a virtual machine while providing the needed grid inertia which is usually provided by spinning machines. In action, we see this in South Australia which is rapidly transitioning to renewables causing instability in the grid and ElectraNet is thus installing synchronous condensers to strengthen the system and provide inertia to the grid.

Looking Ahead

In past decade, unprecedented growth has been seen in the deployment of renewable energy sources. This large deployment has given rise to several issues for transmission system operators resulting from grid instabilities. To make the net zero vision a reality, it is crucial to build and integrate solutions alongside renewable capacity additions

to keep grids stable and secure. Through the above cases, it is evident that FACTS will play a key role in this journey and FACTS manufacturers will become crucial partners in clean energy deployments across the globe.

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