Belmopan grid modernization



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By Aaron Humes: Cabinet has approved the Ministry of Public Utilities, Energy and Logistics" Sustainable Energy Roadmap 2021-2040, established with a view to progressing Belize to energy independence using renewable energy technologies buttressed by grid modernization.

Cabinet also took note of the ministry's ongoing rural electrification program and gave its approval for further efforts to be undertaken to implement electrification in several rural villages with an approach involving Belize Electricity Limited.

Renewable and distributed energy resources are top factors in grid modernization, according to Black & Veatch's 2024 Electricity Report. Close behind are aging grid infrastructure, grid resilience, supply chain issues, data centers, and cybersecurity.

Nearly 700 power professionals shared their views about issues challenging utilities' abilities to meet power demands in the coming years. They identified major trends, such as electrification, climate change, decarbonization, and changing regulations, but most remain optimistic that grid modernization will become easier.

By 2050, renewable energy in the U.S. will represent about half of all power generation. Wind and solar lead all sources, but these variable systems need energy storage to generate grid-scale power continuously. Unsurprisingly, about half of survey respondents (51%) named energy storage their top investment concern over the next five years.

Battery storage systems are expected to increase by 89% in 2024 if developers can bring their projects online as planned, according to the Energy Information Administration. If they succeed, battery capacity will grow to more than 30 GW, surpassing fossil fuels, geothermal, wood, and landfill gas.

Integrating renewable and distributed energy sources is another challenge for the near future, survey respondents said. They identified several obstacles to grid integration, including the changing energy landscape, outdated infrastructure, and evolving regulations. The uncertainty has altered their planning practices, they said. In the past, utilities created long-rage outlooks in their region, anticipating power needs in five or 10 years. Many utilities must now update their plans once a year, Black & Veatch discovered.

Since grid expansion takes time and major investment, many utilities focus on strengthening the existing grid. Almost half of power professionals (46%) named the changing energy mix the biggest challenge in bolstering grid resilience.

Most respondents stated that increases in extreme weather caused by climate change are major concerns. Cold,



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ice, and high winds were identified as the greatest concerns nationwide, but in California, wildfires also worried about 66% of respondents. Yet, power grids are making some progress, as 48% of power pros said it was taking less time to recover after a weather event.

Modernization efforts are also inadvertently leading to a worker shortage. As digital and artificial intelligence technologies become more prevalent, grid operators and technicians may need retraining.

Nearly half (45%) of survey respondents stated they aren't confident they can forecast the power load needed due to uncertain development timelines and connection details. They said it's difficult to accurately predict load ramps (30%), substation interconnect dates (18%), and point of interconnect location (15%).

About 40% of power professionals named available power as the largest obstacle. Others (30%) stated that substations needed upgrading, and 24% said equipment availability was challenging. Due to supply chain issues, utilities sometimes wait up to three years for necessary equipment, such as switchgear, transformers, circuit breakers, and gas turbines.

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