League hears how Washington can decarbonize

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How Washington can reach its greenhouse gas reduction targets for 2030, and beyond, was the topic of the League of Women Voters of Mason County's Climate Change Committee meeting June 17.

Eileen Quigley, executive director for the Clean Energy Transition Institute, spoke about her work, not only with the Northwest Deep Decarbonization Pathways Study, which CETI released in 2019, but also with the Washington 2021 State Energy Strategy.

According to Quigley, CETI conducted its study because, between 2016 and 2019, there had been electricity-sector-only pathways studies, with one state-only pathway study for Washington and a one-utility-only study for Portland General Electric, both by Evolved Energy Research, but there was no economy-wide decarbonization pathway study mapped to the states of Idaho, Montana, Oregon and Washington.

The study identified decarbonized electricity generation, and energy savings achieved via increases in appliance efficiency, as keys to achieving economy-wide carbon reduction goals.

While natural gas was identified as a means of offsetting periods of low hydroelectric and renewable energy output, sustainable biomass resources were deemed best allocated to aviation and maritime transportation, since they're the hardest to electrify.

The study also suggested using excess renewable energy to produce hydrogen, and using new technologies to produce synthetic gases and liquids, to likewise help balance out the reliability of intermittent renewables.

Quigley touted the Northwest's advantages as including its relatively clean electric grid and its proximity to California, whose aggressive climate policies aim to achieve its own transition to clean energy, but she acknowledged the intermittency and variability of the supply and demand of clean, renewable energy.

"How quickly can we achieve the electrification required, given how long it takes to replace big-ticket items like appliances, such as furnaces or cars?" Quigley asked. "How do we make sure that low-income customers are protected from significant rate increases? And what new regulations and market structures are needed for a new energy future?"

Quigley recounted how, in 2019, the state Legislature directed the Department of Commerce to revise the Washington State Energy Strategy, last updated in 2012, to align it with the requirements of the Energy Independence Act, the Clean Energy Transformation Act and the state's greenhouse gas emission reduction limits.

State law requires a "successful" state energy strategy to:

- Maintain competitive energy prices that are "fair and reasonable" for consumers and businesses, while sustaining the state's economic success.
- Increase competitiveness by fostering a clean energy economy and jobs.
- Address the needs of low-income and vulnerable populations.
- Reach and respond to urban and rural communities

The state committed to net zero emissions by 2050, which means that the residual 5% of emissions in 2050 will need to be balanced by removing an equivalent amount of biological or geological emissions from the atmosphere.

"Washington's electricity sector is already very clean, so unlike other states or regions, that can get to a 2030 target in large part by decarbonizing their grids, we have to decarbonize other sectors, especially transportation," said Quigley, who noted that hitting the 2030 target requires a 53% reduction over Washington's 2018 energy and industrial carbon dioxide emissions.

Quigley listed the five key strategies that underpin all of CETI's decarbonization analyses and pathways for the state of Washington as:

1. Energy efficiency, because "the less energy you need, the less you use — which helps reduce emissions right away, if the energy is produced with fossil fuels — and the less you have to generate."

2. Clean electricity, with Washington aiming to drop the carbon intensity of its electricity to zero by 2050.

3. Increased electrification, which means more electricity to meet that demand, and because it will take time for more clean electricity to be generated and transmitted, "the more we can do to decrease energy use, the better off we are."

4. Clean fuels, to replace and reduce the grid's dependence on fossil liquid fuels, for as many uses as possible, and for those uses that still require liquid fuels — such as planes, ships, long-haul trucking or other industrial processes — to make them as low-carbon as possible.

5. Carbon sequestration, for the emissions from the processes that can be neither electrified nor converted to low-carbon fuels.

CETI's modeling with Evolved Energy Research forecast a 97% growth in electricity end-use demand from 2020-2050, so to serve this load, Quigley asserted there must be a "significantly larger" integrated electricity system in Western Washington, which makes "regional coordination a key to decarbonization."

According to the 2019 Clean Energy Transformation Act, Washington's electricity must be carbon-neutral by 2030 and 100% clean by 2045, but the modeling by CETI and Evolved Energy Research found the grid must be 100% clean by 2030 in order for the state to achieve full decarbonization by 2050.

"We need 100% electric vehicle sales by 2035 and 100% electric vehicle stock by 2050," Quigley said. "Gasoline, diesel and jet fuel must be significantly decarbonized by 2030 and 100% decarbonized by 2050. This will happen with synthetic fuels and biofuels. Heavy-duty vehicles will be powered by either electricity or hydrogen by 2050."

The modeling found nearly 100% of building stock would be electrified by 2050, with 84% less pipeline gas used for residential heating by then, and refining in Washington is similarly assumed to drop by 75% by 2050, due to reduced fossil fuel demands.

Quigley reiterated that the state will require large quantities of synthetic fuels in 2030 to reach the target of 45% below its 1990 emissions by 2045.

"Energy efficiency and electrification require significant investments in new technology and infrastructure, and are dependent on customers replacing inefficient appliances, processes and vehicles with efficient or electrified options, which takes time," said Quigley, who added that we need to tap into the clean energy resources that are available to the state regionally.

CETI and Evolved Energy Research are working with the Washington Department of Commerce to model the impact of changes in oil and gas prices, as well as accelerated electric vehicle adoption.

"Commerce also asked us to do a deeper analysis of the state's industrial process emissions, which we're involved in with colleagues at the Stockholm Environment Institute," Quigley said.

CETI analyzed the energy burden by county in the state, where "energy burden" is defined as paying more than 6% of household income, and determined that the counties with the greatest energy burden in Washington were the rural, and especially the Tribal, counties.

Only nine of Washington's 39 counties are urban, according to the state Department of Health, and Mason County is not among them.

CETI is considering how to overcome barriers to decarbonizing rural and Tribal communities, to help bring energy independence and resilience, as well as equitable economic development, to these communities through distributed energy resources.

Ideally, CETI would like to co-create a pilot project with these community partners, which the COVID-19 pandemic has prevented them from doing thus far.

CETI would even like to look into how forests, wetlands and marine habitats can serve as "natural climate solutions" by sequestering emissions, to the point that CETI could ideally factor these processes into its decarbonization modeling.