NCPA's Green Hydrogen Future

NCPA's Long-Standing Commitment to Clean Energy

NCPA, a joint-action agency established in 1968, is a consortium of locally-owned utility systems that invested early in renewable resources to ensure a clean, reliable, and affordable energy supply for our member communities and districts. Collectively, our members provide power to approximately 700,000 electricity customers. We maintain a resource portfolio that today is over 50 percent carbon-free and on track to meet California's carbon targets on or ahead of schedule.

NCPA's generating resources include the 300-megawatt Lodi Energy Center (LEC). Constructed in 2012, the LEC is the first in the nation to use fast start technology, making it an extremely flexible resource that is capable of operating to support the integration of intermittent renewable energy resources on the grid. During droughts and low water years, when hydroelectric production is curtailed to conserve water, the LEC plays a critical role in producing consistent energy that is needed to help maintain statewide system reliability. The plant has 13 project participants, including public power utilities, special districts, and the State of California.

An Opportunity to Utilize Hydrogen at LEC

In January 2020, the LEC experienced an unplanned outage of the combustion turbine that resulted in the facility being taken offline for further investigation and repair. Following the incident, NCPA worked with the equipment manufacturer to identify a number of alternatives for repairing the plant, including an option to restore the turbine with forward-looking technologies. As a result, the NCPA Commission agreed to move forward with the installation of an upgraded turbine capable of using combustors which can blend natural gas with a mixture of up to 45% green hydrogen, a step that would reduce the plant's greenhouse gas emissions by a third, promote grid reliability, and ensure integration with intermittent renewables like wind and solar. Since this time, NCPA has initiated the process to transition toward the integration of hydrogen at this facility and is on track to be the first of its kind to demonstrate this new technology in the utility sector. The final completion of the hydrogen retrofit is expected in 2023.

The Use of Green Hydrogen and the Pathway to Decarbonization

NCPA views the use of hydrogen as a means to decarbonizing a generation fleet that is already among the cleanest in the nation. Excess renewable energy from the grid could support the production of green hydrogen, resulting in a zero-carbon resource produced through a zero-emissions process. Along with our geothermal and hydroelectric plants, which are considered carbon-free in California, blending green hydrogen at LEC for power generation would allow us to reduce GHG emissions at the plant

by a third. Depending on the outcome of this effort, NCPA may consider increasing the amount of blending that will occur at the LEC, and perhaps take a path that would eventually eliminate the use of natural gas as a fuel source at this site, consistent with statewide policy objectives.

LEC's Strategic Location

Located Along Two Major Transportation Corridors

With the installation of the hydrogen-capable turbine now complete, efforts are now underway to explore options to secure renewable hydrogen production at LEC that could both meet the needs of electricity customers, but also support decarbonization of the transportation sector along the Interstate 5 and California Highway 99 corridors. The LEC is strategically located to accomplish both of these goals, but additional funding and support are needed before this project becomes a reality.

Access to a Sustainable Water Source

Today, LEC utilizes wastewater from an adjacent treatment plant to support its operations. This sustainable source of water could also support electrolysis that occurs during the hydrogen production process, thereby eliminating impacts to precious ground water resources that are so critical as our state experiences severe drought.

Proximity to Existing Energy Infrastructure

The LEC is directly connected to existing transmission and distribution infrastructure that serves load in densely populated Bay Area communities that are actively pursuing decarbonization strategies. Access to facilities that could potentially serve as storage for green hydrogen is also being considered.

Funding the Future

Advancing use of green hydrogen in the electricity sector offers myriad benefits:

- Enabling the conversion of natural gas plants with remaining useful economic and operational life;
- Decarbonizing the electricity sector, rapidly advancing state and federal clean energy and climate objectives;
- Protecting grid reliability; and
- Expanding the uses of green hydrogen, thereby making transportation and industrial applications more economic.

However, to realize these benefits, this promising technology must be demonstrated at a commercial scale, technical hurdles must be addressed, and economies of scale realized.

Because NCPA is comprised of public agencies—including the State of California, this project is a strong candidate for intergovernmental collaboration to expand the use of hydrogen in the utility sector. As public agencies focused on purpose, not profit, NCPA and the project participants in the LEC—longtime innovators in the utility industry—offer transparency and openness with regard to sharing what can be learned from this effort while working to further the use of hydrogen in the electricity industry.

NCPA urges Congress and the Administration to make significant investments in needed R&D funding for utility-scale pilot projects, like the LEC, to realize the potential role that hydrogen technology can play in achieving state and federal clean energy and climate goals.