



Combined Heat and Power Technology: A Roadmap for Virginia

CHP Roadmap Background

The 2018 Virginia Energy Plan—published by the Department of Mines, Minerals and Energy (DMME)—recommended the development of a roadmap to achieve 750 MW of additional combined heat and power (CHP) capacity in Virginia by 2030. *Combined Heat and Power Technology: A Roadmap for Virginia* was developed and published in 2020 by DMME following a collaborative effort with officials from the U.S. Department of Energy’s (DOE’s) Mid-Atlantic CHP Technical Assistance Partnership (CHP TAP), the U.S. Environmental Protection Agency (EPA) CHP Partnership, and the Combined Heat and Power Alliance.

The purpose of the roadmap is to provide background about CHP technologies and to consider how increasing investment in CHP could support public policy strategies for energy efficiency, emergency preparedness, and resilience. The roadmap also examines the current status of CHP policy in Virginia and barriers that would prevent further development of CHP across the state. The report concludes with recommendations that serve as a plan to achieve the CHP goals laid out in the 2018 Virginia Energy Plan.

The average efficiency of fossil-fueled power plants in the United States is just 33 percent, and energy efficiency can be dramatically improved by utilizing CHP systems that can achieve efficiencies of 60 to 80 percent by producing both electricity and thermal energy. This means that CHP has a significant advantage when compared with more conventional separate heat (i.e., boilers/furnaces) and power generation (i.e., central utility plants). Furthermore, the nature of CHP as an onsite resource improves power reliability and resiliency when power outages and disruptions associated with severe storms and other weather events occur. While renewable energy resources are by far the fastest growing capacity resources, there are still challenges with their intermittent nature, and CHP can support that intermittency by providing an energy efficient and resilient source of flexible power. In addition to energy efficiency and resiliency benefits, CHP systems offer considerable emissions benefits. Most CHP systems today use natural gas as their primary fuel source, but by capturing and utilizing heat that would otherwise be wasted, CHP systems require less fuel to produce the same amount of energy. Therefore, because less fuel is combusted, greenhouse gas (GHG) emissions are reduced.

CHP systems have traditionally been customer-owned resources, meaning the electricity produced on site is used as an alternative to utility-provided power. Therefore, CHP has sometimes been viewed by utilities as competition to their supply and revenue. This perceived division between CHP and utilities is often a factor for why CHP has not reached its full implementation potential in Virginia. However, the energy industry is changing, with Duke Energy and other utilities now actively evaluating and incorporating CHP into their resource planning. Additionally, Virginia’s Grid Transformation and Security Act (GTSA) of 2018 directs Dominion Energy to consider in its next Integrated Resource Plan (IRP) the deployment of 200 MW of CHP by 2024.



**H.P. Hood CHP Plant in Winchester, Virginia
(15 MW combustion turbine CHP plant)**

SOURCE: CHP ALLIANCE CASE STUDY

Virginia Policy Landscape

During the 2020 Virginia General Assembly session, legislators passed an omnibus energy bill known as the Virginia Clean Economy Act (VCEA). This legislation brought sweeping changes to Virginia’s energy and utility policy, as well as potential opportunities for the development of utility-owned CHP. The VCEA created an Energy Efficiency Resource Standard (EERS), which requires Dominion Energy to reduce energy consumption by 5 percent and Appalachian Power by 2 percent (against a 2019 baseline) by 2025. The bill provides that the utilities can invest in new CHP and waste heat to power (WHP) facilities to reach these energy efficiency goals.

The VCEA creates concrete incentives for CHP by allowing the utilities to get credit toward the EERS goals by developing CHP. The intent of this provision is to increase utility ownership of CHP by building on previous CHP policy enacted in the Commonwealth. Given Virginia's regulated electric market and the incentives created by the VCEA, utility ownership of CHP is a feasible next step for increased CHP deployment.

A key policy goal of the VCEA was to codify Governor Northam's recently announced plans to move toward a carbon-free energy economy. More specifically, on September 17, 2019, Governor Northam announced Executive Order 43 (EO-43), which set a goal for 30% of Virginia's electricity to be produced by renewables by 2030 and 100% of electricity to be generated by carbon-free sources by 2050. The VCEA accelerates the latter goal by requiring Dominion Energy to be carbon free by 2045. These goals present an opportunity for CHP powered by biofuels, which would be characterized as renewable energy under the Commonwealth's statutory definition of renewable energy. Additionally, CHP systems powered by natural gas could fill an important role by addressing intermittency concerns associated with expanded onshore/offshore wind and solar resources.

Renewable energy brings undisputed benefits for Virginia's environment and economy; however, there are practical concerns with the intermittency of solar and wind resources. CHP technology could help support renewable sources of power, and this will become more important as Virginia continues to add significant levels of renewable energy. In this sense, adding 750 MW of CHP to Virginia's energy mix by 2030 would supplement EO-43 goals as well as other Commonwealth Energy Policy goals.

Roadmap Recommendations

The Virginia Roadmap provides for an "all of the above" approach to reduce emissions and adapt to extreme events such as disease outbreaks, hurricanes, tornadoes, and flooding as they become more frequent. The best way to accomplish these goals is to embrace more decentralized, local forms of generation. In order to expand CHP technology in Virginia, the following recommendations from the roadmap offer steps for Virginia to increase CHP deployment in the state:

- Conduct a stakeholder engagement process to raise awareness and create opportunities for collaboration.
- Conduct a geospatial study of specific CHP candidates throughout the Commonwealth.
- Examine current regulatory practices to facilitate utility-owned CHP systems at customer sites. More specifically, it is recommended that the Virginia State Corporation Commission (SCC) review IRP rules to ensure they reflect current priorities related to CHP deployment. If needed, the SCC should consider revising rules to ensure inclusion of CHP and/or issuing guidance that clarifies how CHP should be treated in the IRP process.
- Lead by example: the Commonwealth should examine its own facilities and incorporate CHP where appropriate.
- Consider incentives to support the additional costs of resilient CHP systems applied to critical infrastructure.
- Develop a program to promote the use of digesters in agriculture and wastewater treatment facilities to minimize waste and create renewable natural gas for on-site CHP systems.
- Consider offering financial support for CHP systems as a component of relevant disaster relief funding.
- Conduct outreach to multifamily facility owners and managers to identify potential candidates for CHP installations that would expand energy equality.
- Encourage electric utilities to seek partnerships and proposals from CHP developers and potential customers through either a Request for Information (RFI) or Request for Proposal (RFP) process.

For More Information

U.S. DOE MID-ATLANTIC CHP TECHNICAL ASSISTANCE PARTNERSHIP (CHP TAP)
www.machptap.org

Virginia Department of Mines, Minerals and Energy
Jordan Burns, Energy Policy Analyst
804-786 -7900
jordan.burns@dmme.virginia.gov

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