Combined Heat and Power and Onsite Resilient Power Market Assessment

Executive Summary

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Executive Summary

1.1 Background and Purpose

NYSERDA's Combined Heat & Power (CHP) intervention worked to advance a modular CHP market which would reduce soft costs and development time and increase penetration of CHP. The major activity of the program focused on providing cost-shared incentives to support the installation of CHP equipment at eligible host site locations.

This evaluation had three key purposes:

1. Update the Combined Heat and Power Baseline Assessment done in 2015
2. Conduct a baseline assessment of the market awareness of and interest in an Onsite Resilient Power (ORP) offering
3. Provide data to estimate replication to support the impact team.

1.2 Key Results

Building Types with CHP: CHP systems occur in many types of buildings and almost one-third of all CHP installations in New York are in multifamily buildings and almost two-thirds are in multifamily, hotels, nursing homes, hospitals, and colleges.

Market penetration of CHP: Market penetration varies substantially when measured by number of projects versus system capacity (kW) and some markets appear saturated with CHPs whereas others are not. U.S. Department of Energy (DOE) estimated a market potential for as many as 16,901 CHP systems in New York but identified only 594 as of 2015 (737 by 2018), a penetration rate of 3.5% (4.3% in 2018). Early adoption has tended to skew toward the largest and most cost-effective opportunities. When examined by system capacity, DOE estimates suggest that over half the capacity potential has been achieved, suggesting that the market for large CHP systems is diminishing. There appears to be noticeable opportunities to increase market penetration in certain sectors, especially restaurants, offices, hotels, and assisted living centers. The penetration rate is less than 10% for each of these sectors

CHP Professionals: In 2018, a handful of CHP professionals installed the majority of CHP systems with NYSERDA support. Seven providers installed 27 CHP systems in 2018 according to the New York State Distributed Energy Resources database and one provider, RSP Systems,

installed more than half of those systems. Almost all these systems were in New York City. Looking back to 2015, three firms installed 68% of all CHP systems.

Number of CHP Professionals: The evaluation team did not conduct a census, and a census was not in the scope of work, the team estimates that there are somewhere close to 41 CHP professionals operating in New York and the team interviewed about 41% of them (17).

Project Size: Of the seven respondents that reported installing catalog systems in 2018:

- Most respondents (6) installed catalog systems in multifamily buildings.
- One respondent each installed a catalog system in a college, hotel, assisted living, office, water treatment, landfill, or in a wastewater treatment facility.
- kW capacity ranged from 150 kW to 1,855 kW (one multifamily unit was this size).
- The cost per kW installed ranged from as little as $2,000 for an office to as much as $4,667 for an assisted living facility.

Replication: There are few, if any, CHP systems installed in New York that did not receive NYSERDA support over the last four years. The team determined there were at most 13 CHP systems installed without NYSERDA support since 2015.

CHP Costs: Most CHP professionals reported CHP system components increased in cost over the past two years and the increases were small. Respondents stated that the cost of CHP components over the last two years either increased some, a little, or stayed the same. Those that reported an increase in CHP costs attributed the increase to rising raw materials prices, commissioning labor, installation labor or parts.

CHP professionals varied widely in terms of which of the soft costs they track and there is some variation about whether they track the component in all or some projects. Between five and ten respondents track each of the soft costs (see Appendix D for descriptions of the CHP Cost Categories identified by previous NYSERDA research). Most commonly, respondents reported tracking installation labor/materials costs and engineering costs. Fewer tracked permitting and interconnection costs.

CHP professionals do not track costs when they are not overseeing that element. General contractors will sometimes track the construction, interconnection, and contingency costs. Customers will sometimes incur the engineering and permitting costs.

CHP professionals reported that catalog project costs are about half equipment and half soft costs and non-catalog projects were closer to being two-thirds for equipment and one-third for soft-costs. The difference is likely because non-catalog projects are generally larger projects overall.

Onsite Resilient Power: Most CHP professionals indicated some knowledge or experience trying to sell an element of an ORP system. Fifteen of 17 professionals were familiar with the idea of attempting to sell onsite solar, battery storage, and a CHP system as a package. However, few professionals had experience installing any element of an ORP system and those that did installed the systems outside of New York State.

Very few CHP professionals reported tangential experience with ORP in New York. Two respondents noted involvement in a CHP project that included solar and storage, but their CHP work was independent of the solar and battery work and they were not involved in the sale, design, or engineering associated with the solar and battery elements.

Barriers to Onsite Resilient Power: CHP Professionals reported multiple barriers to adopting ORP. They noted barriers related to a lack of support for CHP and ORP, physical space limitations, financial limits, a lack of relationships across firm types (CHP, solar, storage), and customer awareness.

Other barriers to ORP include:

- There is not enough roof space in New York City to accommodate solar for ORP.
- ORP is too expensive for most customers and inexpensive power rates in upstate New York exacerbate the problem for upstate customers.
- CHP, solar, and battery storage firms do not have a history of working together.
- Nonparticipant end-users indicated that their awareness and investigation of ORP components was piecemeal, not as one integrated package.
- Professionals reported that customers are unaware of ORP and its potential benefits and even if they are aware, the project complexity and cost makes it a difficult sell.

Supporting the ORP Market: CHP professionals offered many suggestions for how NYSERDA could support the ORP market. Most commonly reported suggestions pertained to how NYSERDA could develop programmatic support for ORP systems followed closely by suggestions related to financial support. Less noted ways to support the market included supporting professional development of ORP professionals – creating links between CHP, solar, and storage vendors – and improving customer awareness of ORP components.