



January 21, 2025

New York State Public Service Commission  
3 Empire State Plaza  
Albany, NY 1223-1350  
Email: secretary@dps.ny.gov

**RE: 15-E-0302 – Department of Public Service Staff  
Proposed Definitions of Key Terms in PSL §66-p**

The Northeast Chapter of the Combined Heat and Power Alliance (“The NE Chapter”) respectfully submits comments to the New York State Public Service Commission (“PSC”) on the above referenced docket.

The NE Chapter is a group of manufacturers, system developers, engineers, and end-user representatives with the purpose of reducing energy costs and carbon emissions using the highly efficient technology of Combined Heat and Power (“CHP”). The NE Chapter and its member organizations fully support the innovative and extensive objectives that are the foundation of New York State’s decarbonization goals and believe that CHP technology will play a critical role in facilitating the state’s mission. The NE Chapter strongly believes that CHP must play a crucial role in reducing marginal grid emissions in the near-term while assisting New York’s efforts for a fully decarbonized grid. The United States Department of Energy shares this sentiment in stating that “[i]ndustrial CHP can provide significant greenhouse gas emissions reductions in the near- to mid-term as marginal grid emissions continue to be based on a mix of fossil fuels”.<sup>1</sup>

The NE Chapter and its members heartily endorse the PSC’s stated mission to further the core objective of the Climate Leadership and Community Protection Act (“CLCPA”) “to reduce climate-damaging greenhouse gas emissions through the development of clean energy generation resources in the power sector along with the electrification of greenhouse gas emitting resources in other sectors.”<sup>2</sup> However, the Department of Public Service Staff Proposed Definitions of Key Terms in PSL §66-p (the “Proposed Definitions”) are insufficient to meet this core objective since they would render energy resources fed by renewable natural gas (“RNG”), biogas, hydrogen, or other low carbon intensity bio-based fuels as ineligible for renewable energy procurements under the proposed “zero emissions” definition. Energy systems and technologies fed by a demonstrably net zero<sup>3</sup> gaseous or liquid resource should be eligible for renewable energy procurements as long as they provide verified carbon savings. Furthermore,

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<sup>1</sup> US Department of Energy, Industrial Decarbonization Roadmap, Sep. 2022 at 14, <https://www.energy.gov/sites/default/files/2022-09/Industrial%20Decarbonization%20Roadmap.pdf>

<sup>2</sup> Department of Public Service Staff Proposed Definitions of Key Terms in PSL §66-p, page 2.

<sup>3</sup> Applying generally accepted principles of life cycle carbon accounting, as discussed in point 5 below, that properly draws the boundaries to include upstream, downstream, and offset effects.

as explained in more detail below, CHP systems (“cogen”, “tri-gen”, or “quad-generation”) should be encouraged by law and incentives, as properly designed and operated CHP systems are the most efficient way of using *any* input fuel source, producing several energy services, from a single input fuel.

**1. The Proposed Definitions Should Not Preclude RNG, Biogas, Syngas and Hydrogen Fed Energy Resources from Being Eligible for Renewable Energy Procurements.**

Engines, gas turbines, microturbines, gasifiers and CHP systems fed by RNG, biogas, syngas, and hydrogen produce electricity, heating, cooling and CO<sub>2</sub> for agriculture, food and beverage, hospitals, and other critical economic purposes in New York. For example, hydrogen produced by excess wind and solar production, biogas produced from food waste, syngas produced from the unrecyclable portion of clean urban biomass (vegetative prunings, yard waste, and wood waste), wastewater treatment plant sludge, and carbon produced in a Coca Cola manufacturing CHP facility all can be reused energy sources rather than simply displaced into the environment. Therefore, these resources, including CHP systems should be considered as zero emissions resources by utilizing a *net* zero emissions standard based on a full lifecycle analysis, as more fully discussed below in point 5.

**2. CHP Systems Fed by RNG, Biogas, Syngas, or Hydrogen Should be Rewarded for Their Efficient Use of Energy Resources.**

CHP systems simultaneously generate electricity, heat, and cooling. CHP powered by RNG, biogas, syngas, or hydrogen is reducing carbon emissions today given that it is still a cleaner resource for heat and power rather than separate generation by traditional central power plants and on-site boilers. Atmospheric CO<sub>2</sub> accumulation is cumulative and any attempt to discourage use of this carbon reducing technology is counterproductive vis-à-vis the state goals. The Time Value of Carbon is the concept that greenhouse gas emissions cut today are worth more than cuts promised in the future, due to the escalating risks associated with the pace and extent of climate action. “Because emissions are cumulative and because we have a limited amount of time to reduce them, carbon reductions now have more value than carbon reductions in the future. The next couple of decades are critical.”<sup>4</sup> CHP systems actively capture multiple useful outputs, including CO<sub>2</sub> is in some case from a single energy input, and is therefore the best means to most efficiently utilize any energy source. Accordingly, PSC should not penalize CHP systems powered by RNG, biogas, syngas, or hydrogen that are actively reducing carbon emissions today.

A “quad” generation facility is currently under development at Liberty Coca Cola in Elmsford, NY.<sup>5</sup> Quad generation refers to the simultaneous production of electricity, heat, cooling, and CO<sub>2</sub> where the CO<sub>2</sub> from the input fuel is beneficially recycled as part of the beverage bottling process. This would be the

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<sup>4</sup> “Time Value of Carbon,” Larry Strain. Carbon Leadership Forum. April 2020.

<sup>5</sup> Westchester Coca-Cola Plant to Be First-in-Nation Quad-Generation Facility.  
<https://www.theexaminernews.com/westchester-coca-cola-plant-to-be-first-in-nation-quad-generation-facility/>

first “quad” generation facility in the United States. While this site currently runs on natural gas, similar projects using prunings, wood waste, and other sources of organic waste, that would otherwise be deposited in landfills, where they would produce methane, are being implemented in multiple industries in Canada and Europe.<sup>6</sup> CHP systems fed by organic waste should be encouraged in New York so that this excess waste does not end up in landfills, and can instead, be utilized for beneficial economic purposes, such as controlled environment agriculture. For example, In Cobleskill, NY a state-of-the-art circular economy based “carbon negative Giga-Farm”<sup>7</sup> is proposing to create a new paradigm in agriculture for upstate NY by utilizing technologies including a gasifier, solar photovoltaics, LED grow lights, energy storage, and CHP. Similarly, in Jamestown NY, Ramsay Agriculture, LLC is developing an indoor hydroponic farm utilizing recycled gases from various organic waste sources<sup>8</sup> This system will utilize circular economy concepts producing and utilizing carbon negative electricity, heating, cooling and process CO<sub>2</sub> in a CHP system. Any proposed “zero emissions’ definitions should not preclude development of such efficient, energy saving waste utilizing resources. The PSC must take great care to ensure that zero emissions definitions are properly crafted so that New York becomes a place where innovative clean energy and circular economy technologies can be developed at scale to help achieve New York’s climate goals.

### **3. US DOE’s Industrial Decarbonization Roadmap recognizes CHP utilizing RNG, Biogas and Hydrogen as a Component of the Transition Strategy.**

The DOE Industrial Decarbonization Roadmap<sup>9</sup> identifies four decarbonization pillars, each representing foundational elements of an overall industrial decarbonization strategy. Among the four pillars is energy efficiency, and a key component of the DOE roadmap for efficiency is CHP.<sup>10</sup> In the near to midterm, the DOE Roadmap states: “Industrial CHP can provide significant GHG emissions reductions in the near- to mid-term as marginal grid emissions continue to be based on a mix of fossil fuels in most areas

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<sup>6</sup> Comments of the Pace Land Use Law Center for Sustainability in the Agrivoltaics Demonstration and Research Request for Information (RFI) – NYSEDA. RFI response to [agrivoltaicdemo@nyserda.ny.gov](mailto:agrivoltaicdemo@nyserda.ny.gov) November 15, 2023. (In the Netherlands, Sweden, Denmark, Belgium, Ontario, Quebec, and the United Kingdom, controlled environment agriculture utilizing organic materials is playing a multifaceted role that includes resilient local food production, grid support, smart waste management practices, circular economy, waste heat recovery and more.)

<sup>7</sup> CEA insight, “Carbon-negative ‘GigaFarm’ slated for Upstate New York”, January 5, 2025, Carbon Negative Giga Farm [https://ceainsight.com/esg-igs-new-york-gigafarm/?fbclid=IwY2xjawH1w5dleHRuA2FlbQIxMAABHYoBUncz4pg1HEnV1DFiXWQHajl\\_5irNwAc5oi8RyFcgEBV9IO97-EjMVA\\_aem\\_yu6oOZ4ckhid2F\\_L\\_3NAsw](https://ceainsight.com/esg-igs-new-york-gigafarm/?fbclid=IwY2xjawH1w5dleHRuA2FlbQIxMAABHYoBUncz4pg1HEnV1DFiXWQHajl_5irNwAc5oi8RyFcgEBV9IO97-EjMVA_aem_yu6oOZ4ckhid2F_L_3NAsw)

<sup>8</sup> Conjoining Food Resiliency and Grid Resiliency with CEA. Thomas Bourgeois, Thomas Bourgeois & Michael Hamersky, Pace Land Use Law Center, Jacob Christian Seiler Penn State University. ACEEE 2024 Summer Study on Energy Efficiency in Buildings. Track 11: Sustainable and Resilient Communities August 5/2024.

<sup>9</sup> U.S. Department of Energy. Industrial Decarbonization Roadmap. DOE/EE-2635. September 2022. <https://www.energy.gov/sites/default/files/2022-09/Industrial%20Decarbonization%20Roadmap.pdf>.

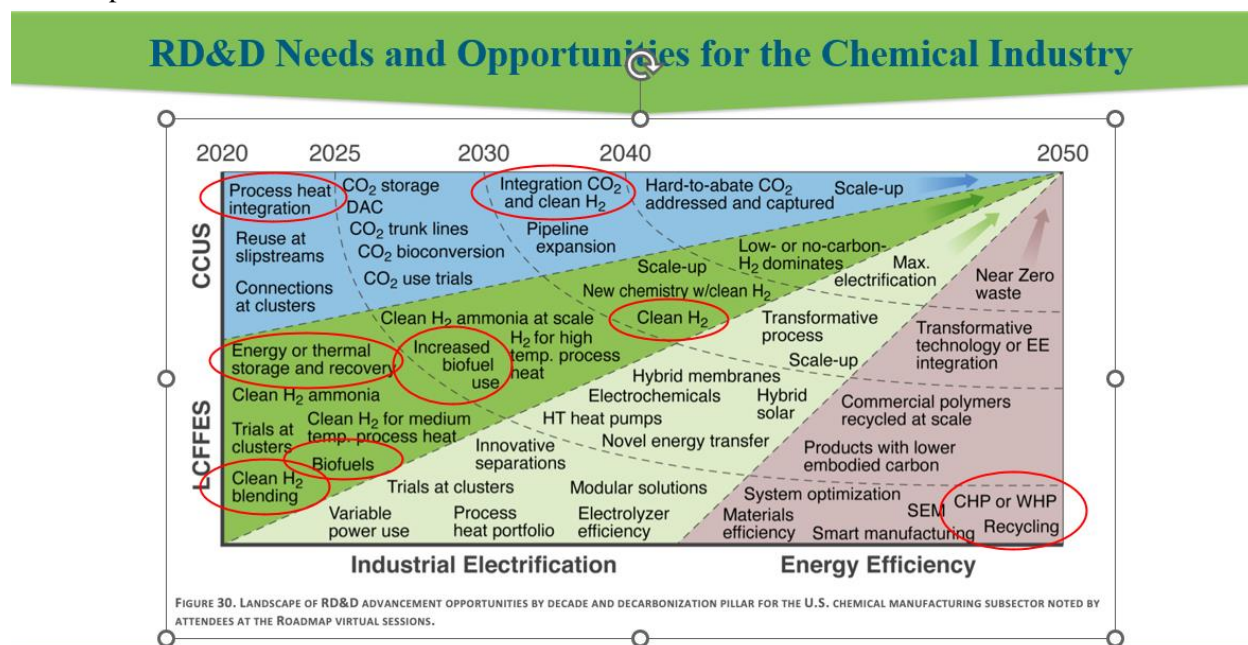
<sup>10</sup> Combined Heat and Power Alliance. The Role of CHP in the Industrial Decarbonization Roadmap. September 2022. <https://chpalliance.org/the-role-of-chp-in-the-department-of-energys-industrial-decarbonization-roadmap/>.

of the country”. In the future, RNG and hydrogen fueled CHP systems can be a long-term path to decarbonizing industrial thermal processes resistant to electrification.<sup>11</sup>

CHP is a part of a strategy to “de-risk” the decarbonization path. This is recognized in the DOE Roadmap: “There are opportunities for further integration of CHP with renewable energy and storage to backstop risk and variability and improve resilience.”<sup>12</sup>

At several points, the DOE Roadmap states CHP’s role not only in the near- to medium-term, but as a long-term decarbonization solution. CHP is cited as an essential component of the fully decarbonized economy: “The use of nuclear energy for electricity and heat, renewable and synthetic fuels, and clean sources of energy as the prime movers for CHP systems can avoid the use of fossil fuels, which will support the integration of CHP into a fully decarbonized energy economy.”<sup>13</sup>

RNG, biogas, and hydrogen used in CHP systems were identified at numerous points as key research, development, and demonstration (“RD&D”) needs for the US DOE Industrial Decarbonization Roadmap:



<sup>11</sup> U.S. Department of Energy. Industrial Decarbonization Roadmap. DOE/EE-2635. September 2022. Page 14. <https://www.energy.gov/sites/default/files/2022-09/Industrial%20Decarbonization%20Roadmap.pdf>.

<sup>12</sup> U.S. Department of Energy. Industrial Decarbonization Roadmap. DOE/EE-2635. September 2022. Page 80. <https://www.energy.gov/sites/default/files/2022-09/Industrial%20Decarbonization%20Roadmap.pdf>.

<sup>13</sup> U.S. Department of Energy. Industrial Decarbonization Roadmap. DOE/EE-2635. September 2022. Page 14. <https://www.energy.gov/sites/default/files/2022-09/Industrial%20Decarbonization%20Roadmap.pdf>.

## RD&D Needs and Opportunities for the Food and Beverage Manufacturing

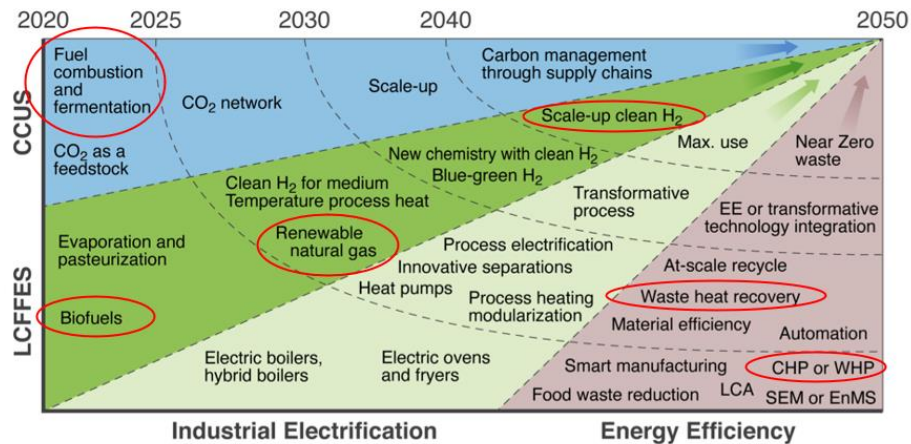


FIGURE 36. LANDSCAPE OF RD&D ADVANCEMENT OPPORTUNITIES BY DECADE AND DECARBONIZATION PILLAR FOR THE U.S. FOOD AND BEVERAGE MANUFACTURING SUBSECTOR NOTED BY ATTENDEES AT THE ROADMAP VIRTUAL SESSIONS.

#### 4. Precluding RNG, Biogas, Syngas, or Hydrogen Fed Energy Resources from Being Eligible for Renewable Energy Procurements is Inconsistent with New York State’s Need for Dispatchable Emission-Free Resources (“DEFERs”).

**CHP systems fed by RNG, biogas, syngas, or hydrogen are crucial to meet New York’s energy demand.**

The need for DEFERs is extraordinarily large in scale and is immediate. NYISO has identified DEFERs as a critical underpinning of the 100% renewable grid that the CLCPA mandates by 2040. DEFERs are critical to this goal due to the planned retirement of all currently operating fossil fuel generation utilities by 2040. According to the NYISO, DEFERs must be developed and added at scale to reliably serve demand when intermittent generation is unavailable.<sup>14</sup> To meet the demand that NYISO expects, DEFERs must be developed and deployed at scale well in advance of 2040. The New York State Climate Action Council Scoping Plan’s analysis show that the 100x40 goal requires 15 GW to 45 GW of electricity from zero-emission, dispatchable resources in 2040 to meet demand and maintain reliability.<sup>15</sup> The Proposed Definitions must be revised to include energy resources fed by RNG, biogas, and green hydrogen as “zero emissions” resources if New York is realistic about meeting its 100% renewable grid mandate under the CLCPA.

<sup>14</sup> New York Independent System Operator. 2021-2040 System & Resources Outlook (The Outlook). <https://www.nyiso.com/documents/20142/23494579/2021-2040-Outlook-Datasheet.pdf/e64b7da4-8a68-6093-307d-3b5b7949e973?t=1663848310925>.

<sup>15</sup> New York State Climate Action Council. “New York State Climate Action Council Scoping Plan”, Executive Summary, page 15. <https://climate.ny.gov/-/media/Project/Climate/Files/Chapter1ExecutiveSummary.pdf>

Energy sources utilizing CHP (or tri or quad-generation) and fed by demonstrably zero emissions RNG and biogas are an efficient means to power DEFRRs today that will result in lower carbon emissions relative to the grid for the foreseeable future. Importantly, these energy sources also enhance grid and community resiliency. For example, hospital-oriented quad-generation resulted in hospital buildings meeting their essential demands for multiple medical gases (oxygen, nitrogen, and CO<sub>2</sub>), while also meeting their simultaneous energy demands for cooling, heating, and power.<sup>16</sup> Such energy sources can continue to support New York’s energy demands and economic needs while providing New York State with energy resiliency while New York State builds adequate transmission capacity and procures sufficient zero emissions energy resources to meet New York’s increasing energy demand and climate goals.

**CHP systems fed by RNG, biogas, syngas, or hydrogen meet the characteristics of the ideal DEFRR needed to fill the gap.**

The NYISO has identified a set of 10 attributes required to operate the grid of the future safely and reliably. Zach Smith NYISO VP System and Resource Planning presented a mapping of these attributes to sample technologies:<sup>17</sup>

## Attributes of Sample Technologies

	2023 NYCA Summer Capacity (MW)	Energy Attributes							Other Reliability Attributes			
		Carbon Free	Dependable Fuel Source	Non-Energy Limited	Dispatchable	Quick Start	Flexible	Multi Start	Inertial Response	Dynamic Reactive Control	High Short Circuit Current	
Sample Technology	Fossil	25,667	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Hydro	4,265	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Pumped Storage	1,407	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Hydrogen Fuel Cell	0	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No
	Hydrogen Combustion	0	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Nuclear	3,305	Yes	Yes	Yes	No	No	No	No	Yes	Yes	Yes
	Modular Nuclear	0	Yes	Yes	Yes	No	No	Yes	No	Yes	Yes	Yes
	Battery	0	Yes	Yes	No	Yes	Yes	Yes	Yes	No	Yes	No
	Solar	154	Yes	No	No	No	Yes	Yes	Yes	No	Yes	No
	Wind	2,051	Yes	No	No	No	Yes	Yes	Yes	No	Yes	No
	Demand Response	1,234	Yes	Yes	No	No	No	Yes	No	No	No	No
	Synchronous Condenser	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes	Yes	Yes	Yes

\*see figure 39 of the CRP report for more detail

New York ISO

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<sup>16</sup> Xiaoyuan Chen, *et al.*, Hospital-oriented quad generation (HOQG) – A Combined cooling, heating, power and gas (CCHPG system), National Library of Medicine, July 13, 2021. <https://pmc.ncbi.nlm.nih.gov/articles/PMC9759119/>

<sup>17</sup> NY PSC December 11, 2023, Technical Conference. Presented by Zach Smith, VP System and Resource Planning.

CHP systems fed by RNG, biogas, syngas, or hydrogen can satisfy all the attributes identified by NYISO, with appropriate guidelines and protocol for certifying that they are net zero emissions resources. Accordingly, New York should not preclude the use of CHP systems utilizing net zero emissions energy sources because of the markedly higher total system efficiencies that can be obtained, while not sacrificing resiliency.

**As the grid gets cleaner, CHP can and will evolve to low and non-emitting fuel sources.**

Existing CHP systems can and do utilize biogas, biofuels, and hydrogen fuels. Every natural gas-fueled CHP is compatible with RNG. The DOE’s Combined Heat and Power eCatalog of recognized packaged CHP systems denotes many systems are clean fuels compatible today, including:<sup>18</sup>

- 46 existing CHP packages capable of running on digester gas;
- 4 existing CHP packages capable of running on landfill gas;
- 59 existing CHP packages capable of running on a hydrogen blend; and
- 5 existing CHP packages that are 100% hydrogen capable.

Greater availability of equipment options is soon to become available. Most existing turbines and engines can operate on hydrogen mixtures up to 10-40%. All major engine and gas turbine manufacturers are working on the capability to operate at high levels of hydrogen, targeting 2030 for 100% hydrogen prime movers.<sup>19</sup>

CHP systems can be changed out or modified in the field to operate on high hydrogen-fuel blends and/or 100% hydrogen fuel. CHP operating and installed today is easily adaptable to low-carbon and zero-carbon fuels including clean hydrogen. Limiting eligibility under the Proposed Definitions to systems not fed by RNG or biogas will discourage many large buildings from utilizing carbon reducing CHP systems that are expected to evolve to low and non-emitting fuel sources in the near future. Accordingly, the Proposed Definitions’ definition of “zero emissions” should be adjusted so that energy sources fed by RNG are eligible for renewable energy procurements as long as they provide verified carbon savings relative to marginal grid emissions in New York.

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<sup>18</sup> U.S. Department of Energy. Combined Heat & Power eCatalog. Last Accessed June 2023. <https://chp.ecatalog.ornl.gov/search>.

<sup>19</sup> Combined Heat and Power Alliance. Clean Hydrogen and CHP: A Roadmap for Industrial and Commercial Decarbonization. March 2022. <https://chpalliance.org/resources/publications/clean-hydrogen-and-combined-heat-and-power-a-roadmap-for-industrial-and-commercial-decarbonization/>.

## **5. PSC Should Utilize Life Cycle Carbon Accounting to Measure Greenhouse Gas Emissions from Energy Sources in Consideration of its “Zero Emissions” Definition.**

A life cycle carbon accounting (“LCA”) measures all greenhouse gases associated with an energy source from production and transportation through end-use, rather than measuring just emissions from the direct use of such energy source. LCA is the gold standard used by the federal government and other states with ambitious climate laws.<sup>20</sup> The PSC should consider LCA emissions impacts when characterizing resource options as “zero emissions” so that all empirically verifiable co-benefits are included in the determination of such eligible resources. RNG derived from food waste or from manure are net carbon negative, meaning over 100% greenhouse gas reductions from the baseline. More greenhouse gases are avoided (in the form of potent methane) by the production of RNG from those feedstocks than are released (as less potent CO<sub>2</sub>) when it is combusted.<sup>21</sup>

RNG impacts greenhouse gas emissions in three ways over its lifecycle: (i) contributes to sustainable waste management; (ii) reduces methane emissions from organic waste; and (iii) displaces fossil fuels as an energy source. Accordingly, we implore the PSC to amend its “zero emissions” definition so as not to discourage the operation of systems and technologies that are reducing carbon emissions now and likely to reduce carbon emissions for many years into the future, when appropriately measured by an LCA. CHP systems fed by RNG can extend the supply of renewable, and emerging net-zero carbon energy sources, while reducing landfill waste and methane emissions in both the near- and long-term.

### **Conclusion**

CHP saves energy, reduces criteria pollutants, lowers business costs, and reduces CO<sub>2</sub> emissions. CHP remains a beneficial component of a carbon mitigation strategy by avoiding CO<sub>2</sub> emissions now, in the present and near term. As the grid decarbonizes, CHP can, and will, de-carbonize as well so long as New York recognizes the climate benefits of these organic, waste-based, resources. There’s a large existing base of systems operating on renewable fuels such as RNG or other biofuels. Available equipment for delivering low and no carbon heat and power from CHP systems will continue to expand significantly over time, especially if we are able to attract investment to this sector in New York. CHP is not technology lock in. Systems can be readily adapted and replaced. If better alternatives are available, CHP can be reevaluated at the site, reconfigured to support decarbonization, or retired if it proves to be an impediment to decarbonization.

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<sup>20</sup> Michael S. Lerner and Matthew P. Tomich, “Putting New York’s Organic Waste to Work”, Energy Vision, page 22. <https://energy-vision.org/wp-content/uploads/2023/11/EV-NY-AD-Report.pdf>.

<sup>21</sup> Michael S. Lerner, “Meeting the Methane Challenge”, Energy Vision. <https://energy-vision.org/wp-content/uploads/2024/06/EV-National-AD-Report-1.pdf>.





As noted above, DOE’s Industrial Decarbonization Roadmap recognizes the myriad benefits available from CHP systems, today, as well as in the medium- and long-term. CHP delivers invaluable resiliency benefits for critical infrastructure, necessary public health and safety services, and can provide refuge centers, allowing vulnerable populations to safely shelter in place, during outages of extended duration. CHP can work in complimentary fashion, assisting decarbonization and electrification, by reducing some of the risks, and increasing the affordability of electrification schemes. CHP facilitates a 100% renewable grid, by providing necessary grid services, as a distributed and dispatchable resource.

Throughout these comments, including in the citations, we have shown that zero emissions CHP systems fed by clean energy sources *can* be done, because, it *has* been done. We have highlighted agri-industrial parks with CEA powered CEA in Ontario, data centers collocated with high tech agriculture in Sweden and Quebec, greenhouses connected to power centers fed by organic waste in the Netherlands, CEA using CHP and strategic heat storage to balance the grid in Belgium, and zero emissions wastewater treatment plant enabled by CHP in Illinois.

Right here in New York State we have the first in nation “Quad-Generation” system under construction at Liberty Coca Cola. Taylor Holdings Group, LTD has applied for permits to operate a biomass gasification facility at the existing Taylor Construction and Demolition processing facility in Montgomery, NY.<sup>22</sup> Additionally innovative proposals such as the Cobleskill Giga Factory and Ramsay Agriculture LLC in Jamestown are under consideration, The PSC must ensure that its “zero emissions” definition does not preclude such innovative clean energy solutions in New York, and must, instead, be drafted in manner that incentivizes their adoption and proliferation.

Accordingly, the Proposed Definitions definition of “zero emissions” must be amended to include energy resources, such as CHP systems, fed by RNG, biogas, syngas, or hydrogen to ensure that such efficient resources are eligible for renewable energy procurements.

Respectfully,

The Northeast Chapter of the Combined Heat and Power Alliance

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<sup>22</sup> Taylor Holdings Group LTD, Taylor Biomass Gasification Facility in Montgomery, NY, New York State Department of Environmental Conservation Notice of Complete Application, Date: 12/19/20249. <https://portal.ct.gov/deep/public-notices/public-notices-proposed-actions---opportunity-for-comment/proposed-permits-or-actions-from-adjacent-states/taylor-holdings-group-ltd>