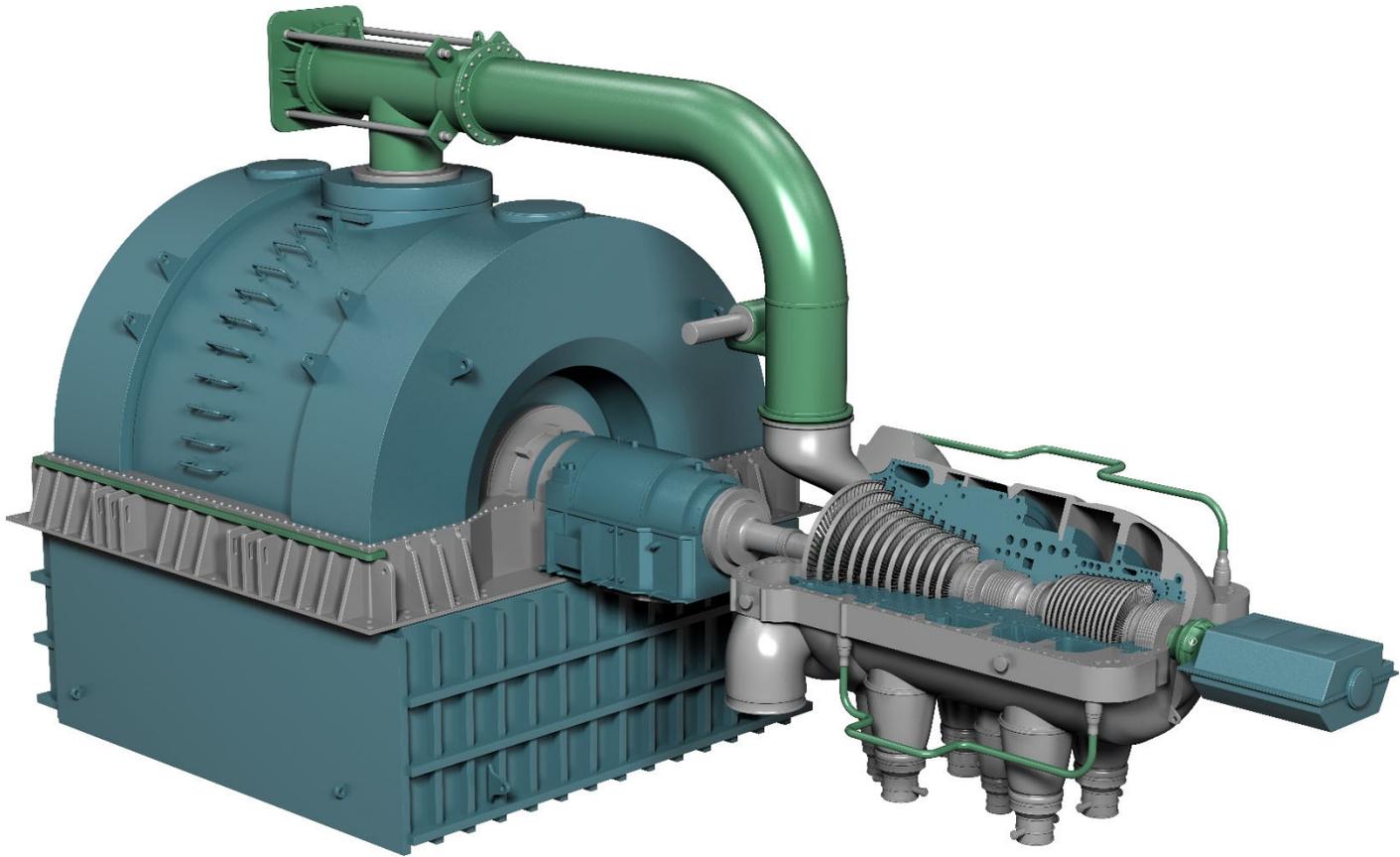

CHP BIENNIAL REPORT – 2019



MARCH 28, 2019

Pennsylvania Public Utility Commission
Bureau of Technical Utility Services
Policy & Planning Section

BACKGROUND

In the spring and fall of 2014 the Commission held *En Banc* hearings on combined heat and power (CHP) at Drexel University and the University of Pittsburgh, respectively.¹ Witnesses representing a cross section of the community interested in CHP testified at the hearings, including consultants, electric and natural gas distribution companies, universities, and CHP system owners and advocates. These hearings reinforced the Commission’s understanding that a coordinated approach to CHP can provide real benefits to the economy, the environment, and the security of residents and businesses within the Commonwealth.

On February 25, 2016, the Commission adopted a proposed policy statement in support of CHP, to encourage companies to share progress they have made with CHP development, and to help the Commission determine how to best continue the advancement of CHP.² Numerous stakeholders provided a variety of comments regarding policy issues and the proposed biennial reporting requirements.

On April 5, 2018 the Commission issued its Final Policy Statement.³ In doing so, the Commission sought to catalog known, existing and proposed CHP systems.⁴ The Commission further sought to understand 1) if and how the Electric Distribution Companies (EDCs) and Natural Gas Distribution Companies (NGDCs) encourage and/or extol the benefits of CHP, via marketing, to potential clients and, 2) if, via the establishment of a CHP Working Group process, the Commission may be able to better facilitate the deployment of CHP technology within the Commonwealth. Finally, the Final Policy Statement requires the Bureau of Technical Utility Services (TUS) to produce a report based on the findings of the biennial report filings and any timely outcomes from the CHP Working Group meetings.

The first CHP Working Group meeting was held on May 30, 2018 in Harrisburg in the Keystone Building. The main topics of discussion were clarifications to the biennial reporting requirements, clarifications of interconnection jurisdiction and costs, information on CHP financing

¹ See http://www.puc.state.pa.us/utility_industry/natural_gas/chp_cogeneration.aspx under “Combined Heat and Power (CHP) En Banc Hearing – May 5, 2014” and “Combined Heat and Power (CHP) En Banc Hearing – October 7, 2014”.

² See [Proposed Policy Statement](http://www.puc.pa.gov/pdocs/1422142.doc) at <http://www.puc.pa.gov/pdocs/1422142.doc>

³ See [Final Policy Statement](http://www.puc.pa.gov/pdocs/1560599.doc) at <http://www.puc.pa.gov/pdocs/1560599.doc>

⁴ See http://www.puc.state.pa.us/Electric/xls/CHPWG/CHP_Report_Form.xlsx for the form used by the utilities to report their CHP information.

and project support, issues and questions regarding standby rates, and an overview of alternative ratemaking. The second Working Group meeting was held on July 16, 2018 in the Keystone Building in Harrisburg. The sole focus of this subsequent meeting was standby rates, because of the significant interest and discussion on the topic during the prior meeting. Additionally, presentations were provided by the U.S. Department of Energy’s (DOE) Combined Heat and Power Technical Assistance Partnership regarding a relevant, DOE-commissioned study on standby rates, and by PECO regarding a new standby rate rider.

BIENNIAL REPORT INFORMATION

The following information, from the first CHP biennial report filings, is buttressed by research conducted by TUS staff. There was some unknown and conflicting information between the EDC and NGDC reports, necessitating TUS to: seek additional information and/or clarification from the utilities, conduct web-scraping exercises, cross-reference some information with the Departments of Community and Economic Development and Environmental Protection, and corroborate with the DOE CHP Installation Database (DOE Database).⁵ Otherwise, the information given was accepted as received.

While there is no reason to doubt the veracity of the information reported to TUS, it should be noted that the reporting effort does not constitute a complete list of all CHP systems for a variety of reasons, including systems existing within the jurisdiction of municipal authorities and rural electric cooperatives, and poorly understood systems, such as systems operating on biogas or municipal waste. Some information in the CHP Biennial Report may have required different levels of data collection and outreach by the utilities and was dependent upon the CHP system owner to provide the requested information. Because of that, some information was not obtainable, available, or known. Furthermore, the reporting of potential⁶ CHP systems should not be viewed as an assessment of CHP potential within the Commonwealth.

Figures 1 and 2 show the number of interconnected and potential CHP systems as well as the nameplate capacity of those systems. The reported generation from these systems is estimated at

⁵ See <https://doe.icfwebservices.com/chpdb/state/PA>.

⁶ In the context of this report, “potential” means any CHP system that is not yet fully operational. These could be CHP systems that are in various phases of construction, or could mean that the EDC or NGDC has had some level of conversation with a customer about the possibility of installing a CHP system. The EDCs and NGDCs had discretion as to what they deemed a potential system.

2,331,308 Megawatt-hours (MWh) and 399,365 MWh, respectively. For perspective, the average annual electricity consumption for a Pennsylvania residential customer, in 2017, was 9,656 kilowatt-hours (kWh).⁷ Therefore, the reported, estimated annual electricity generated by interconnected CHP systems could power 241,436 homes annually, while the estimated electricity that would be generated by potential CHP systems could power an additional 41,359 homes.

Figure 1. Number of interconnected and potential CHP systems, as reported by EDCs and NGDCs

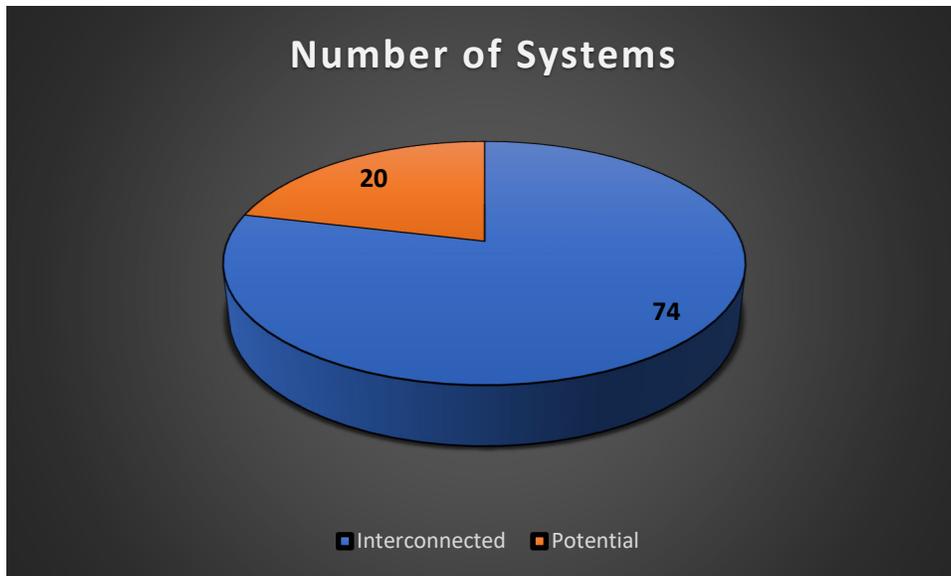
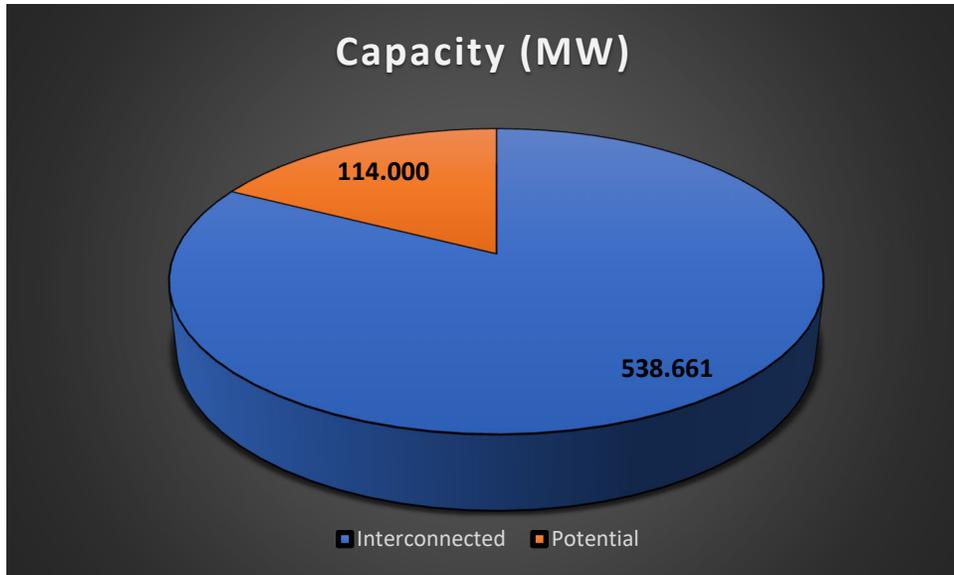


Figure 2. Nameplate capacity of interconnected and potential CHP systems, as reported by EDCs and NGDCs

⁷ From the U.S. Energy Information Administration at <https://www.eia.gov/electricity/data.php>. See "Retail sales of electricity to ultimate customers" and "Number of customers (annual)".



Figures 3 and 4 show the number of CHP systems based on nameplate capacity for interconnected and potential systems, respectively. The majority (87.8%) of the reported, interconnected CHP systems are 10 MW or less. Similarly, 16 of the 20 (80.0%) reported potential CHP systems are 10 MW or less. When compared to the DOE Database, these percentages seem to fall in line as 136 of 169 (80.5%) of the systems listed are 10 MW or less, indicating that CHP systems are predominantly designed to match the owner’s needs. Because CHP systems are designed to be site- and need-specific, they have application almost anywhere there is a continual load requirement for thermal energy (heating or cooling) and electricity.

Figure 3. Number of interconnected CHP systems based on nameplate capacity

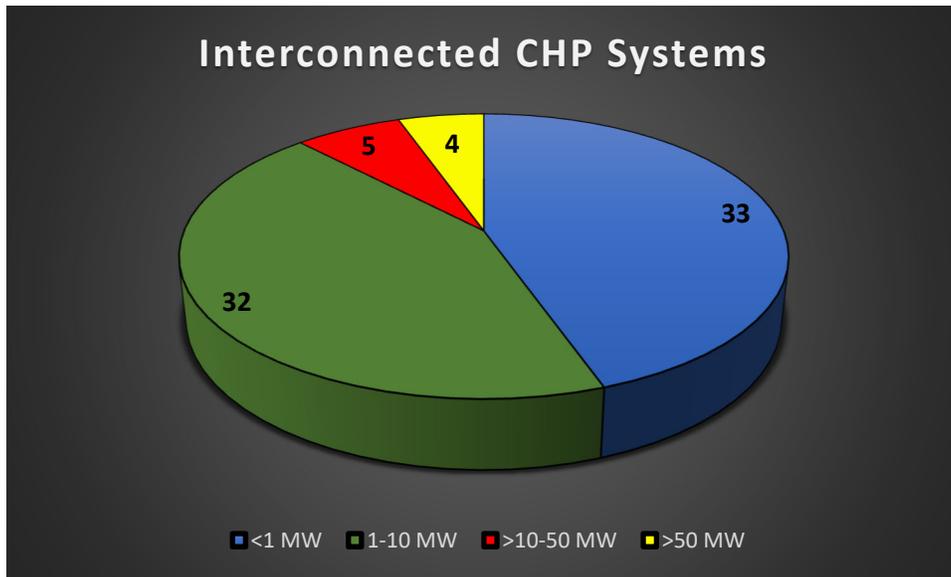
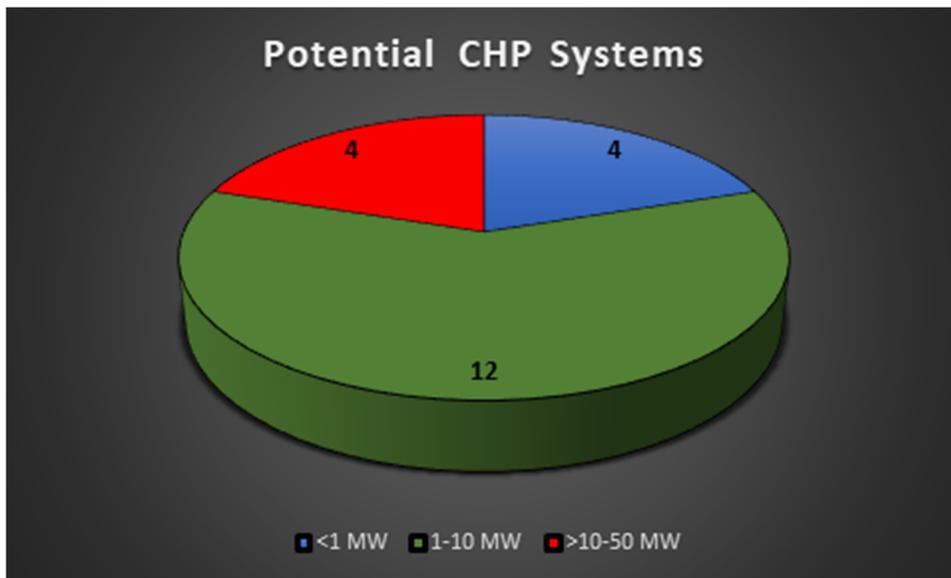


Figure 4. Number of potential CHP systems based on nameplate capacity



Figures 5 and 6 give a breakdown of the interconnected CHP systems, by EDC. Figure 5 shows the number of interconnected CHP systems by EDC. With the highest number of commercial and industrial customers, respectively, it is unsurprising that PECO and PPL have the highest number of reported CHP systems. These two EDCs represent 65% of the reported CHP systems.

Figure 6 shows each EDC's percent of the total nameplate capacity (MW) reported. It is noteworthy that Penelec has the highest share of reported nameplate capacity at nearly 41%, even though its service territory contains only 12 CHP systems while PPL has only 7% of nameplate capacity and yet has eight more systems in its service territory. This likely points to the fact that there are more industrial than commercial users of CHP in Penelec's territory since industrial customers tend to have higher electric and thermal requirements.

Figure 5. Number of interconnected CHP systems by EDC

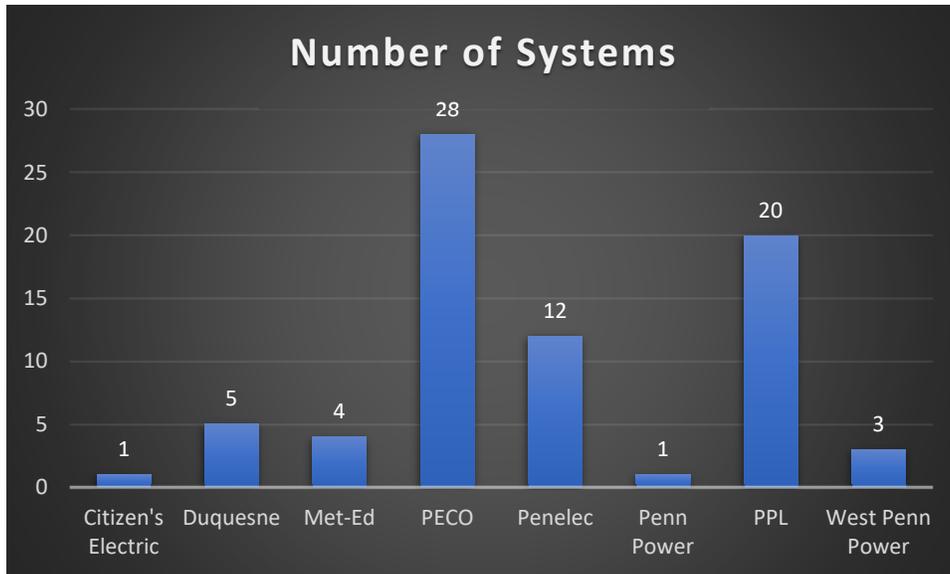
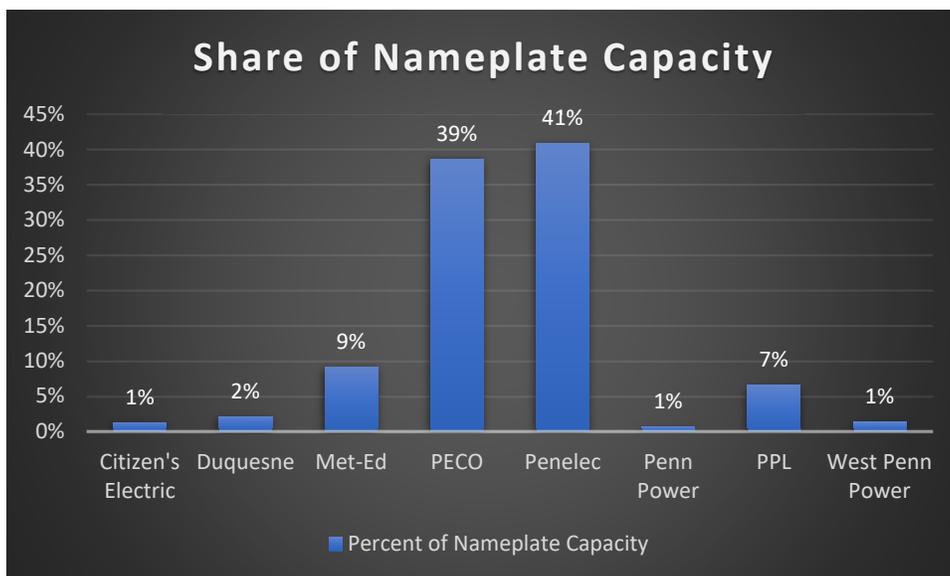


Figure 6. Percent share of MW of interconnected CHP systems by EDC



Note: Due to rounding, the sum does not equal 100%

Figures 7 and 8 show both the interconnected and potential CHP systems by technology type. As can be seen, reciprocating engine technology is the most prominent, making up 31% of the interconnected CHP systems and 65% of the potential CHP systems. Notably, there were no fuel cell-based systems reported.

According to the DOE Database, Pennsylvania has 84 sites with reciprocating engines out of a total of 169 sites (almost 50%). Though this number is much higher than what was reported to TUS, almost all agricultural applications that have CHP systems utilize reciprocating engine technology. This may be, in part, due to the greater tolerance of reciprocating engines to operate on biogas, foregoing some costly gas cleanup prior to combustion. And, for reasons that will be discussed later, these applications were usually not reported by the utilities.

Regardless, there are a few possible explanations for the higher number of reciprocating engines⁸ in the commonwealth:

- Reciprocating engines are typically better suited to smaller electric loads compared to other CHP technologies. They are a good solution for electric loads as small as 10 kW.
- The technology in a reciprocating engine is likely more understandable and identifiable than other CHP technologies. It is not that different than an engine in a motor vehicle, therefore, there is more comfort to operate and maintain it.
- Reciprocating engine efficiency is good for both partial-load and full-load applications. Compared with combustion turbines, microturbines and fuel cells that operate most efficiently at full-load, the efficiencies obtained at less than full operating capacity are not as significantly reduced in a reciprocating engine.
- Reciprocating engines can start quickly and operate at typical natural gas delivery pressure. Combustion turbines and microturbines *may* require fuel compressors to operate, thus, incurring extra costs.

⁸ For a comparison of CHP technologies, please see the Department of Energy “Combined Heat and Power Technology Fact Sheet Series” at https://www.energy.gov/sites/prod/files/2017/12/f46/CHP%20Overview-120817_compliant_0.pdf, page 3.

Figure 7. Interconnected CHP technologies

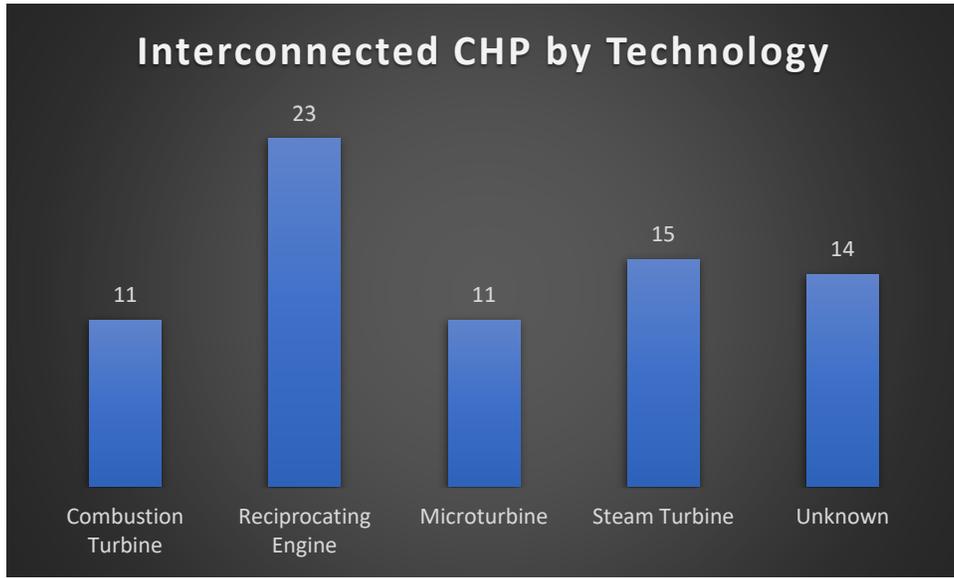
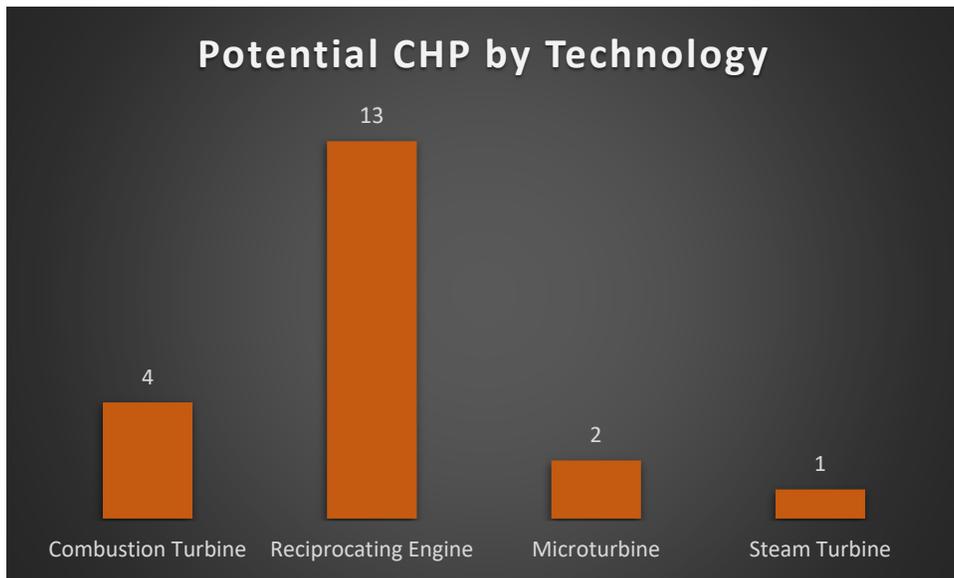


Figure 8. Potential CHP technologies



REPORTING ISSUES

Information Retention

Many EDCs and NGDCs keep data for a limited time and because of this, general information, such as the total number of CHP systems in a service territory or more granular data, such as hourly electric load, was unavailable. This was particularly true for CHP systems that were installed 10 or more years ago.

Utility Awareness of CHP Systems

Utilities are aware of changes in load due to distributed generation (e.g. solar, diesel, or CHP). However, there seems to be no reason for either EDCs or NGDCs to maintain awareness of the *specifics* of what changed the customer's load (for example, if the customer installed a 1 MW combustion turbine CHP system). Utilities may only be cognizant of CHP systems where incidental reasons exist to maintain awareness.

Some CHP systems, such as those on campuses of higher education institutions, are spoken about as part of education and outreach efforts or the CHP system may be part of an innovative process, such as at Seneca Landfill and its associated LEGO-V landfill gas processing plant.⁹ While not technically different than other CHP systems, educational opportunities at such locations offer public relations benefits to the owners of these systems and, therefore, additional details are more readily accessible than otherwise would be. In these instances, it was relatively easy for the utility to identify and report such information.

However, with *most* industrial and commercial customers, the installation of a CHP system is simply a matter of dollars and cents. Thus, the CHP system owner has no reason to market or promote their system. Additionally, once a CHP system is commissioned, there is no reason for the utility to maintain engagement with the customer about that CHP system. Hence, after a period, the utility does not necessarily maintain knowledge of what CHP systems were installed. Utility companies also have varying record retention policies.

Small Natural Gas Distribution Companies

While it is important to promote CHP deployment within the Commonwealth, there seems to be limited usefulness of the small NGDCs being required to file biennial CHP data. Small

⁹ Please see <http://www.senecalandfill.com/landfill-renewable-energy>.

NGDCs are those companies with annual revenues less than \$40 million that file annual Gas Cost Rate (GCR) adjustments in accordance with 66 Pa. C.S. § 1307(e) and 52 Pa. Code § 53.66. These small NGDCs primarily serve residential customers with very few larger customers that could support a CHP system. Indeed, two small NGDCs serve only residential customers. Additionally, any CHP systems that may be installed and operating within the territory of a small NGDC will almost assuredly be identified by the respective EDC.

According to the Rate Comparison Report, the large NGDCs (companies with annual revenue greater than \$40 million and subject to rate filings under section 1307(f) of the Public Utility Code. 66 Pa. C.S. § 1307(f) have a total of 249,060 commercial and industrial customers.¹⁰ These large NGDCs reported a total of 52 CHP systems. That means that only .02% of all industrial and commercial customers in large NGDC service territories have CHP systems.¹¹ Based upon this information, the likelihood of small NGDCs having a CHP system within their service territory is very unlikely. Although one small NGDC did report one CHP system, they were unable to gather any meaningful data from the system owner. In fact, the EDC that reported the same system supplied all the information about the system while the NGDC's report gave no additional substance. Because of this, TUS staff is recommending that small NGDCs be exempted from future reporting requirements.

Comparison with DOE Database

The DOE Database was established in 2002 and is updated monthly. It identifies 169 CHP systems in Pennsylvania¹² at 2,848 MW capacity. The DOE states that this database "...is a work in progress." While they believe the information to be accurate, they realize that it may not be comprehensive or may need updates. Because of the fluidity of the DOE Database, CHP systems may be added and/or removed on a monthly basis.

The information submitted by the EDCs and NGDCs totals 74 unique, interconnected CHP systems. The number of systems identified in the CHP biennial report filings that coincide with the DOE Database is 62, meaning that there are 12 interconnected systems reported by the EDCs or NGDCs that were not identified by the DOE at the time this report was drafted. Furthermore, there

¹⁰ See the [Pennsylvania Public Utility Commission Rate Comparison Report](http://www.puc.pa.gov/general/publications_reports/pdf/Rate_Comparison_Rpt2018.pdf), released April 15, 2018, at http://www.puc.pa.gov/general/publications_reports/pdf/Rate_Comparison_Rpt2018.pdf.

¹¹ While it is possible to have CHP systems for residential customers, the economics of such systems don't really allow it to be deployed in homes. Therefore, the calculation focuses solely on commercial and industrial customers. Indeed, none of the interconnected CHP systems reported were for residential customers.

¹² As of March 26, 2019. Please see <https://doe.icfwebservices.com/chpdb/state/PA>.

are 20 unique, potential CHP systems that are likely to come online in the near future. If these systems become operational, they would obviously need to be added to the DOE Database. The Commission will share with the DOE information about new CHP systems as it becomes available. The above data also indicates that there are 95 systems in the DOE Database that were *not* reported by either EDCs or NGDCs.

Noting its years of existence, the DOE Database contains many CHP systems that utilize biomass as a feedstock and/or operate on biogas, not all of which are located on farms. While these *are* CHP systems, they may not be viewed as traditional CHP systems by the utilities. EDCs generally tried to identify CHP systems that were fueled by refuse waste, landfill gas or biogas from anaerobic digesters at wastewater treatment plants. Such operations would particularly go unnoticed by the NGDCs.

One final note about the DOE Database is the verification year. The DOE Database identifies the year during which the data of each CHP system was last verified. Most of the systems have been verified within the last 10 years. However, there are 34 systems for which data has not been verified for more than 10 years, calling into question the current operational aspects and status of these systems.

Lessons Learned

The CHP Policy Statement gives great latitude in the amount and type of information reported. This is because it was understood that the utilities are *not* going to know all the information to be reported upon and it is expected that they should do their best to obtain that information. The effort that utilities put into information-gathering seemed to vary widely, but also, as discussed before, the information gathered was dependent upon the cooperation of the CHP system owners. Because of that, some utilities did a much better job than others when reporting the information. It should be noted that PPL, PECO, and UGI Gas did an outstanding job in obtaining information about the CHP systems in their service territories, as reflected in the quantity and quality of information received, and which generally, required few clarifications or need for additional follow-through.

Likewise, there were some utilities that did poorly with their reporting. The reports provided required a lot of clarification and follow-up such as, when the tariffed rate was reported as “unknown” or when not identifying systems that are owned by the utility. While it is understood

that some information will not be known, these are examples of deliberately withholding information or deliberately not seeking information.

Information that *was* expected, but *not* received, such as nameplate capacity, usually came with reasonable explanations as to why that information could not be provided. For example, some utilities made various attempts to contact the CHP system owner to get information but sometimes found the owners unresponsive. TUS staff will be seeking to implement a modified reporting format to ask for brief explanations in these instances.

TUS staff had hoped to get more robust load data from the utilities regarding CHP pre- and post-installation. This would have allowed for a better comparison of the net energy benefits of a CHP system. However, this data was much harder to acquire than expected. In order to properly assess the net energy impacts, certain criteria must be available and understood. These are, in no particular order:

- The CHP system must be reported by both the EDC and NGDC,
- The CHP system would therefore have to use natural gas as its primary fuel,
- The CHP system's date of interconnection must be recent enough that the EDC and NGDC still maintain the load data, and
- The basic operation and configuration of the CHP system must be available to understand its contribution to the facility. This is particularly true for CHP systems that serve relatively small portions of load at larger facilities and on campuses.

In fact, of all the systems reported by the utilities, only nine were reported by gas and electric utilities, which included load data and were identified as operating primarily on natural gas. For one of these systems, utilities couldn't provide an accurate picture of pre-installation load data since the CHP system was part of new building construction. Thus, the limited pre-installation data that was provided was not useful because it reflects a period before the building was officially open for business and not operating at its intended design capacity. To the best of TUS staff knowledge, this is the only CHP system that was integrated as part of new building construction.

In light of this, DOE does have information about the efficiencies of the varying CHP technologies. Not only does the type of CHP technology make a difference in its efficiency, but also,

its size, hours of operation, and, of course, the level of maintenance. Generally speaking, CHP applications operate between 65-75% efficiency.¹³

Despite outreach and clarifications provided by TUS staff to the utilities, another issue identified in the reports was some degree of discrepancy among the utilities regarding the meanings of questions. For example, what does an “Upcoming/Potential” CHP system mean to the utility? At what point does a utility believe a CHP system is likely to be developed, installed and, ultimately, interconnected? TUS staff will attempt to better clarify these aspects for future reporting.

Despite several statements from the Commission and TUS staff addressing the handling of confidential information, all utilities, particularly the NGDCs, continued to express concern over the confidentiality of the information they were reporting. In fact, it seems as though this impacted the reporting efforts made by two of the NGDCs, as they initially withheld reporting certain information, especially regarding upcoming/potential systems. While we tried to abate these fears and assure the utilities that the information would only be released in aggregated form, some utilities required more outreach to obtain information that should have been reported initially.

Finally, although included as a reporting element in the Final Policy Statement, the EDCs were generally unable to provide hourly load data. Specifically, during conversations with two EDCs, both stated that they only have monthly load data for such facilities. In a separate conversation with another EDC, company representatives stated they do not maintain load data beyond two years. TUS staff also notes that the requirement for load data had changed from monthly reporting in the Proposed Policy Statement to hourly reporting in the Final Policy Statement. TUS staff believe hourly load data is unnecessary, might be overly burdensome for reporters and would require too much time and difficulty to prove useful for meaningful analysis. For these reasons, TUS staff will be seeking to either modify or eliminate this reporting requirement.

¹³ Please see <https://www.energy.gov/eere/amo/combined-heat-and-power-basics>.

APPENDIX A - PROPOSED CHP SYSTEMS*

County	Prime Mover Type	Nameplate Capacity (MW)	Fuel Type
Adams	Combustion Turbine	1.25	Biogas
Allegheny	Reciprocating Engine	0.035	Natural Gas
Allegheny	Reciprocating Engine	21.25	Natural Gas
Allegheny	Reciprocating Engine	10.5	Natural Gas
Butler	Reciprocating Engine	2.85	Landfill Gas/Natural Gas Blend
Butler	Reciprocating Engine	2.85	Landfill Gas/Natural Gas Blend
Clarion	Reciprocating Engine	17.6	Natural Gas
Clinton	Microturbine	1.1	Natural Gas
Dauphin	Combustion Turbine	7.97	Natural Gas
Dauphin	Microturbine	0.13	Natural Gas
Dauphin	Reciprocating Engine	1	Natural Gas
Delaware	Reciprocating Engine	2	Natural Gas
Delaware	Combustion Turbine	29	Natural Gas
Indiana	Reciprocating Engine	0.005	Natural Gas
Luzerne	Combustion Turbine	1.13	Natural Gas
Northampton	Reciprocating Engine	1.43	Natural Gas
Philadelphia	Reciprocating Engine	8.8	Natural Gas
Philadelphia	Reciprocating Engine	0.08	Natural Gas
Union	Reciprocating Engine	1.04	Natural Gas
Westmoreland	Steam Turbine	4	Natural Gas

**Note that as of the date reported, these are in various stages of development*

APPENDIX B - INTERCONNECTED CHP SYSTEMS

County	Prime Mover Type	Nameplate Capacity (MW)	Fuel Type	EDC	NGDC
Adams	Steam Turbine	3.24	Biogas	Met-Ed	Unreported
Allegheny	Microturbine	6	Coal/ Natural Gas	Duquesne Light	Unreported
Allegheny	Reciprocating Engine	0.02	Natural Gas	Unreported	Peoples Natural Gas
Allegheny	Combustion Turbine	5	Natural Gas	Duquesne Light	Peoples Natural Gas
Allegheny	Microturbine	0.13	Natural Gas	Duquesne Light	Peoples Natural Gas
Allegheny	Microturbine	0.065	Natural Gas	Duquesne Light	Peoples Natural Gas
Berks	Reciprocating Engine	1.1	Natural Gas	Unreported	UGI Gas
Berks	Steam Turbine	10	Natural Gas	Met-Ed	UGI Gas
Berks	Reciprocating Engine	0.4	Natural Gas	Unreported	UGI Gas
Blair	Steam Turbine	1.2	Natural Gas	Penelec	Peoples Natural Gas
Bradford	Steam Turbine	2	Natural Gas	Penelec	Valley Energy
Bradford	Steam Turbine	1	Natural Gas	Penelec	Unreported
Bradford	Steam Turbine	2	Natural Gas	Penelec	Unreported
Bucks	Reciprocating Engine	1.6	Natural Gas	PECO	Unreported
Butler	Reciprocating Engine	0.3	Biomass	West Penn Power	Peoples Natural Gas
Cambria	Steam Turbine	0.45	Natural Gas	Penelec	Unreported
Cambria	Steam Turbine	2	Natural Gas	Penelec	Unreported
Centre	Steam Turbine	7	Natural Gas	West Penn Power	Columbia Gas
Clarion	Microturbine	0.065	Natural Gas	West Penn Power	National Fuel
Cumberland	Microturbine	1	Natural Gas	PPL	UGI Gas
Dauphin	Reciprocating Engine	0.27	Biogas	Unreported	UGI Gas
Dauphin	Microturbine	1	Natural Gas	PPL	UGI Gas
Dauphin	Microturbine	0.8	Natural Gas	PPL	UGI Gas

Elk	Steam Turbine	60	Natural Gas	Penelec	Unreported
Indiana	Reciprocating Engine	6	Diesel/Natural Gas	Unreported	Peoples Natural Gas
Lackawanna	Reciprocating Engine	0.225	Natural Gas	PPL	UGI Gas
Lancaster	Reciprocating Engine	12.8	Biomass/Landfill Gas	PPL	Unreported
Lancaster	Reciprocating Engine	0.4	Natural Gas	PPL	UGI Gas
Lancaster	Reciprocating Engine	1	Natural Gas	PPL	UGI Gas
Lancaster	Combustion Turbine	3.2	Natural Gas	PPL	UGI Gas
Lancaster	Microturbine	0.39	Natural Gas	PPL	UGI Gas
Lancaster	Reciprocating Engine	1	Natural Gas	PPL	UGI Gas
Luzerne	Reciprocating Engine	0.55	Natural Gas	PPL	UGI Gas
Luzerne	Steam Turbine	2	Natural Gas	PPL	UGI Gas
Lycoming	Reciprocating Engine	1.9	Natural Gas	PPL	UGI Gas
Montgomery	Combustion Turbine	4.5	Natural Gas	PECO	PECO Gas
Montgomery	Reciprocating Engine	2	Natural Gas	PECO	Unreported
Montgomery	Combustion Turbine	3.8	Natural Gas	PECO	Unreported
Montgomery	Combustion Turbine	38	Natural Gas	PECO	Unreported
Montgomery	Combustion Turbine	27	Natural Gas	PECO	Unreported
Montour	Combustion Turbine	5	Natural Gas	PPL	UGI Gas
Northampton	Reciprocating Engine	0.63	Natural Gas	Unreported	UGI Gas
Philadelphia	Unknown	0.14	Natural Gas	Unreported	PGW
Philadelphia	Unknown	0.21	Natural Gas	PECO	PGW
Philadelphia	Unknown	0.14	Natural Gas	Unreported	PGW
Philadelphia	Reciprocating Engine	1.1	Natural Gas	PECO	PGW
Philadelphia	Unknown	0.13	Natural Gas	Unreported	PGW
Philadelphia	Reciprocating Engine	1.1	Natural Gas	PECO	Unreported
Philadelphia	Unknown	0.225	Natural Gas	PECO	PGW
Philadelphia	Reciprocating Engine	5.67	Biogas/Natural Gas	PECO	Unreported
Philadelphia	Microturbine	0.13	Natural Gas	PECO	Unreported

Philadelphia	Unknown	1.1	Natural Gas	Unreported	PGW
Philadelphia	Combustion Turbine	118	Natural Gas	PECO	Unreported
Philadelphia	Unknown	0.065	Natural Gas	Unreported	PGW
Philadelphia	Unknown	0.21	Natural Gas	PECO	PGW
Philadelphia	Unknown	0.21	Natural Gas	Unreported	PGW
Philadelphia	Unknown	0.13	Natural Gas	Unreported	PGW
Philadelphia	Unknown	0.2	Natural Gas	Unreported	PGW
Philadelphia	Unknown	1.4	Natural Gas	Unreported	PGW
Philadelphia	Reciprocating Engine	0.075	Natural Gas	PECO	PGW
Philadelphia	Unknown	0.225	Natural Gas	Unreported	PGW
Philadelphia	Microturbine	0.18	Natural Gas	PECO	PGW
Philadelphia	Unknown	0.8	Natural Gas	Unreported	PGW
Philadelphia	Reciprocating Engine	0.075	Natural Gas	PECO	PGW
Schuylkill	Reciprocating Engine	1.426	Natural Gas	PPL	Unreported
Schuylkill	Reciprocating Engine	0.86	Methane/Natural Gas	Unreported	UGI Central Penn Gas
Schuylkill	Steam Turbine	0.18	Biogas/Natural Gas	PPL	Unreported
Somerset	Steam Turbine	6.8	Methane	Penelec	Unreported
Union	Combustion Turbine	6.7	Oil/Natural Gas	Citizen's Electric	UGI Central Penn Gas
Warren	Combustion Turbine	29	Natural Gas	Penelec	Unreported
Westmoreland	Microturbine	0.065	Natural Gas	West Penn Power	Peoples Natural Gas
Wyoming	Steam Turbine	57.08	Natural Gas	Penelec	UGI Gas
Wyoming	Combustion Turbine	53	Natural Gas	Penelec	Unreported
York	Steam Turbine	35	Black Liquor	Met-Ed	Unreported