



Packaged CHP eCatalog
On-Site Energy Summit

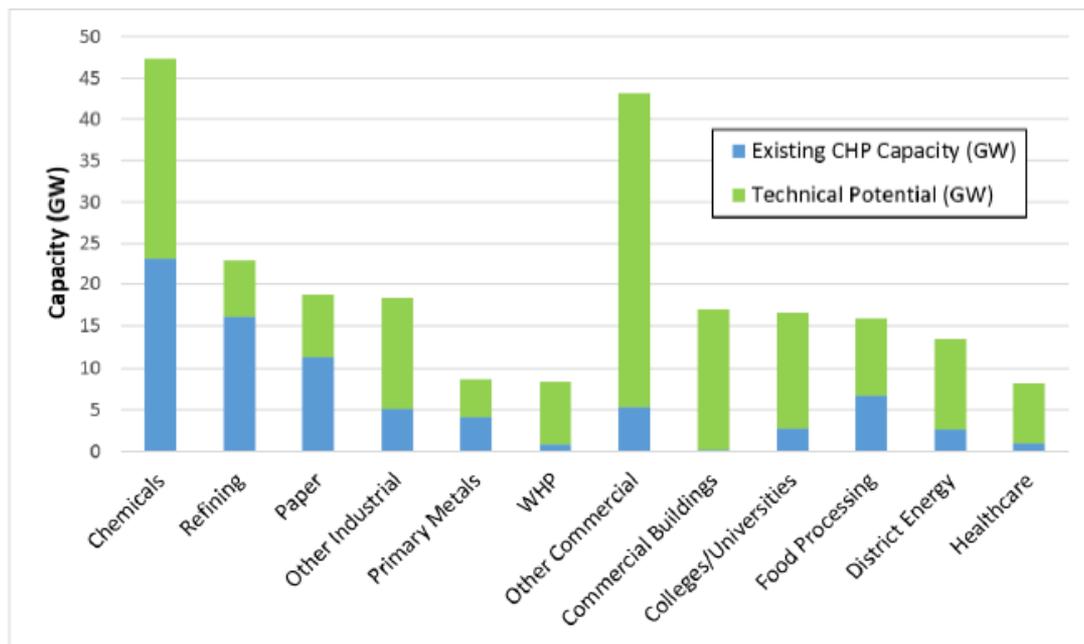
April 3, 2019

Bruce Hedman

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Non-Traditional CHP Markets are an Untapped Resource

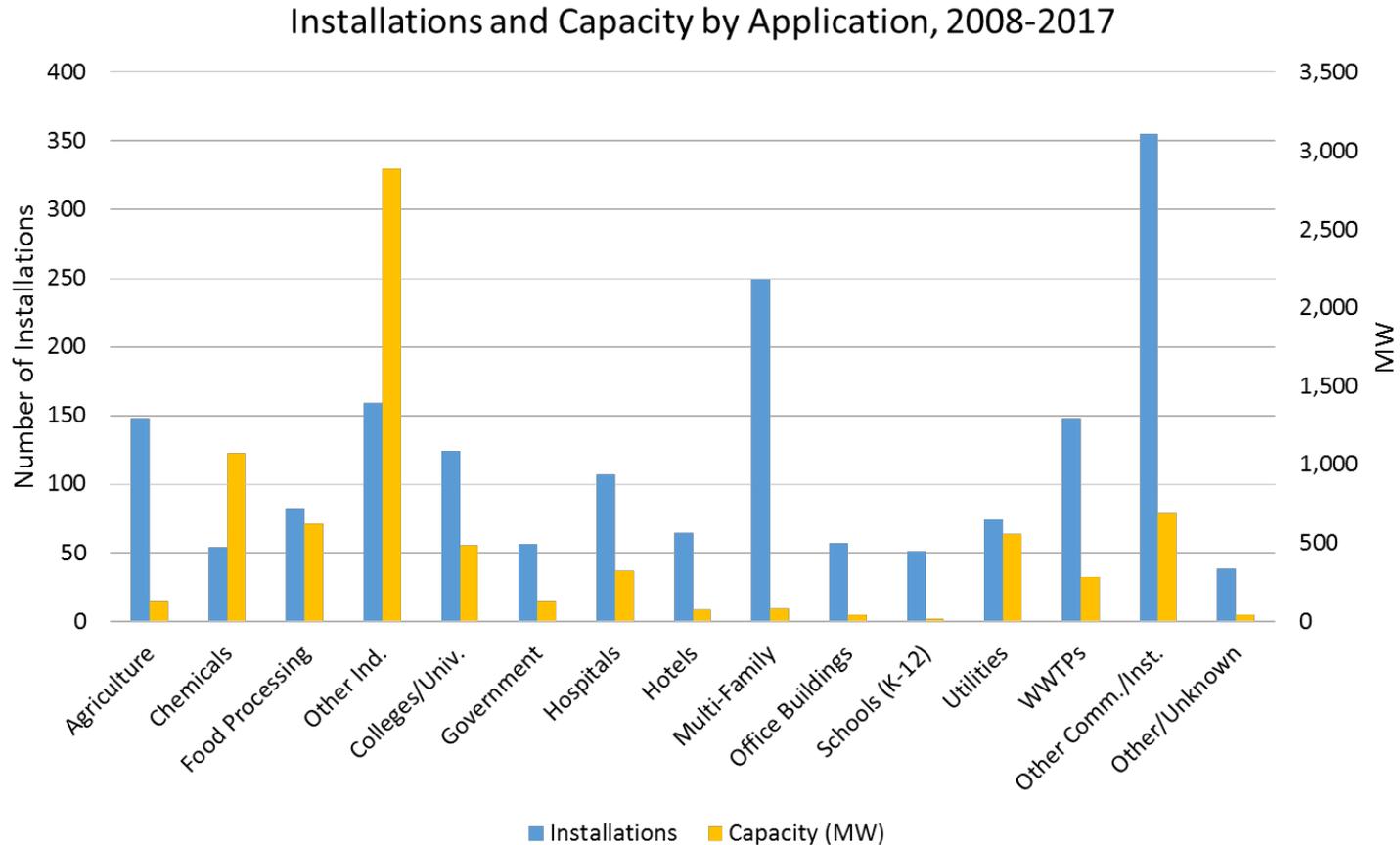
- Large CHP potential in commercial, institutional, light manufacturing, government and military applications
- Markets utilize smaller systems (< 10MW)
- Markets have limited CHP experience
- Users have limited technical resources
- History of issues with system performance and with CHP sales and service support
- Many perceived risks by both users and suppliers



U.S. DOE CHP Deployment Program, 2016.

CHP is Growing in these Markets

Non-traditional markets represented 35% of the capacity and 70% of the projects installed since 2008



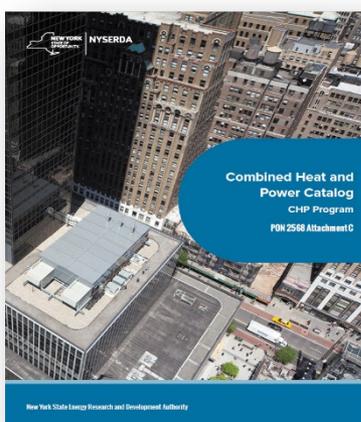
Source: DOE CHP Installation Database (U.S. installations as of Dec. 31, 2017)

Objectives of NYSERDA's CHP Program

- Educate the market on the benefits of CHP
- Prime the pump to grow market to scale
- Attract focus of world-class solution providers
- Coach customers to have mature expectations, groom a cadre of providers to be able to deliver
- Help market learn how to reduce costs and capture market-based compensation (displacing the need for subsidies)
- Provide consumer protection to yield good-quality projects

NYSERDA's Packaged CHP Catalog Program

- Reducing perceived risk of installing and operating CHP by promoting standardized CHP systems and service agreements.



Source: NYSERDA CHP Catalog

NYSERDA 26

2G Energy, Inc. package 100KG S1 100kW

Category	Value	Unit	Notes
Capacity	100	kW	
Efficiency	85%		
Cost	\$1.50	/kW	

Performance

Parameter	Value	Unit	Notes
Efficiency	85%		
Capacity	100	kW	
Cost	\$1.50	/kW	

Footprint

Parameter	Value	Unit	Notes
Area	100	sq ft	
Height	10	ft	

Vendor Information

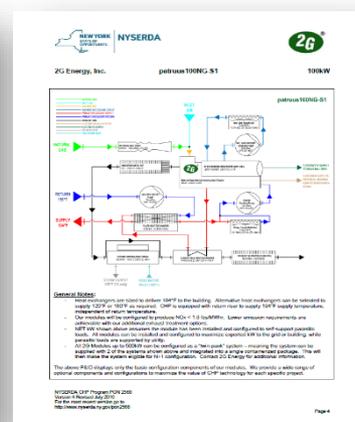
2G Energy, Inc.
2000 Avenue of the Americas
New York, NY 10013
www.2genergy.com

Vendor Statement

2G Energy, Inc. is a global leader in manufacturing highly efficient CHP cogeneration power generation systems. Our systems are designed to provide clean, efficient, and reliable energy to our customers. Our systems are designed to provide clean, efficient, and reliable energy to our customers. Our systems are designed to provide clean, efficient, and reliable energy to our customers.

"Quality... is everything we do!"

NYSERDA CHP Program PON 2588
Catalog Attachment C
For the most recent version of this catalog, please visit the website at www.nyserda.org



- Requires single-point-responsibility as the basis for customer-vendor relationship and replicability.
- Approved CHP Vendors and Approved Packages grew from 8 Vendors and 36 packages in 2013 to 22 Vendors and 220 packages in 2018

DOE Packaged CHP eCatalog

- A national web-based catalog (eCatalog) of DOE-recognized packaged CHP systems supported by two groups of partners:
 - **CHP Suppliers** that assemble, install and/or service packaged CHP systems
 - **CHP Engagement** partners that provide CHP market deployment programs at the state, local and utility level
- End-users search for CHP system characteristics, and get connected to packagers, installers and CHP engagement programs
- Allows users to compare technology options on a common basis
- Builds on NYSERDA's successful Packaged CHP Catalog Program

The screenshot displays the DOE Packaged CHP eCatalog website. The header includes the U.S. Department of Energy logo and the text "Combined Heat & Power eCatalog RECOGNIZED PACKAGED CHP SYSTEMS". Navigation links include "SHOP THE eCATALOG", "ABOUT THE eCATALOG", "ABOUT CHP & PACKAGED SYSTEMS", "UPDATES", and "FOR PACKAGERS & SOLUTION".

The main content area is divided into several sections:

- FOCUS YOUR RESULTS:** A search filter for "ELECTRIC CAPACITY RATING (KW)" with a slider set to 800 KW. Below it, a "PRIME MOVERS" section with checkboxes for Reciprocating engines, Combustion turbines, Microturbines, and Fuel Cells. A "THERMAL OUTPUTS" section with checkboxes for Steam Only, Hot Water Only, Hot Exhaust Only, Chilled Water Only, and Steam and Hot Water. A "GRID CONNECTION TYPE" section with checkboxes for Grid Parallel, Grid Island w/ Black Start & Manual Transfer, and Grid Island w/ Black Start & Auto Transfer.
- UPDATES:** A notification for "AVUS 1200NGG NO LONGER SUPPORTED" with a message: "Please note this package has been discontinued by the vendor partner. Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut enim ad minim veniam, quis nostrud exercitation ullamco..."
- DISPLAYING:** 9 of 1,200 systems. A "SORT BY" dropdown menu is set to "Relevance".
- Filters:** "Show Only Available Near 21671" and "Show Only Assurance Plan Offered".
- System Cards:** Three cards are shown for "Avus 800KG", "ER815MF HW", and "C200S". Each card includes an image, a logo, and technical specifications: Output, Prime Mover, Thermal Output, Assurance Plan, Grid Interconnection, and Fuel. Match indicators (High, Partial) and program stars are also present.

Packaged CHP eCatalog – Key Definitions

- User
- Packager
- Solutions Provider
- Recognized Packaged System
- Customer Engagement Partner



QUICK START

FIND CHP PACKAGES

PRIMARY SITE LOCATION

Zip Code

Installation and Assurance Plan offered in this location

POWER OUTPUT ⓘ

1,000

kw

[Help Me Choose](#)

PRIME MOVERS ⓘ

- Reciprocating engines
- Combustion turbines
- Microturbine
- Fuel Cell

THERMAL OUTPUT ⓘ

- Hot Water Only
- Chilled Water Only
- Hot Water and Chilled Water
- Steam Only
- Steam and Hot Water
- Steam and Chilled Water
- Steam, Hot Water, and Chilled Water

FUEL TYPE ⓘ

- Natural Gas
- Propane
- Digester Gas
- Landfill Gas

GRID CONNECTION TYPE ⓘ

- Grid Parallel Only
- Grid Island, Black Start, Manual Transfer
- Grid Island, Black Start, Auto Transfer

FIND PACKAGES

or [SHOP ENTIRE eCATALOG](#)

PACKAGED CHP SYSTEMS. RIGOROUS RECOGNITION PROCESS.

The Packaged Combined Heat and Power Catalog (eCatalog) is a voluntary public/private partnership designed to increase deployment of CHP in commercial, institutional and multi-family buildings and manufacturing plants. The core of the eCatalog are CHP Packagers who commit to provide pre-engineered and tested Packaged CHP systems that meet or exceed DOE performance requirements and CHP Solution Providers who commit to provide responsible installation, commissioning, maintenance and service of recognized Packaged CHP systems and also provide a single point of responsibility.

MARKET ENGAGEMENT PROGRAMS: INCENTIVIZING CHP IN YOUR AREA MAXIMIZE YOUR CHP INVESTMENT WHEN YOU INSTALL QUALIFYING SYSTEMS

State, local and utility programs are designed to remove barriers and/or incentivize technologies that improve energy efficiency, reduce electric demand, improve resiliency and/or reduce emissions. CHP systems often qualify for these programs. State and local agencies, as well as utilities with CHP programs that have selected to use the eCatalog an integral part of their program have entered their locations where their programs are in effect. When you search the eCatalog, using your site ZIP code, the equipment cards will show an icon indicating that the equipment is eligible for a program. Also the specific program entity will appear on the right margin of the equipment detail sheets.

[ABOUT CHP & PACKAGED SYSTEMS](#)

[SHOP THE ECATALOG](#)

[BECOME A PACKAGER OR SOLUTION PROVIDER](#)

FOCUS YOUR RESULTS

[reset](#) | [save search](#) | [view favorites](#)

PRIMARY SITE LOCATION

10005

Selected: New York, NY

ASSURANCE PLAN OFFERED

- Prioritize systems that offer an assurance plan

CUSTOMER ENGAGEMENT PARTNER

- Prioritize program-eligible packaged systems

POWER OUTPUT (kW)

1500 Size

[APPLY](#) [Help Me Choose](#)

Target Range: 1050 kw to 1800 kw

*Default includes a max. of 120% of unit size and a min. of 70% of unit size.

- Consider Multiple Units

MAXIMUM MULTIPLE UNITS: 4

PRIME MOVERS

- Reciprocating engines (6)
 Combustion turbines (0)
 Microturbine (42)
 Fuel Cell (0)

THERMAL OUTPUTS

- Hot Water Only (48)
 Chilled Water Only (0)
 Hot Water and Chilled Water (0)
 Steam Only (0)
 Steam and Hot Water (0)
 Steam and Chilled Water (0)
 Steam, Hot Water, and Chilled Water (0)

FUEL TYPE

- Natural Gas (47)
 Propane (0)
 Digester Gas (1)
 Landfill Gas (0)

GRID CONNECTION TYPE

- Grid Parallel Only (21)
 Grid Island, Black Start, Manual Transfer (0)
 Grid Island, Black Start, Auto Transfer (20)

OUTDOOR INSTALLATION

DISPLAYING: 48 Packages ordered by Relevance

Available Solution Provider Assurance Plan Local Support Outdoor Install Within Footprint U.S.A. Packaged Installed Favorite



AB

ECOMAX 15 NGS-0.6-HW

- Power Output: 1,429 kW
- Thermal Output: Hot Water Only
- Fuel: Natural Gas
- Prime Mover: 1x Reciprocating engine
- Grid Connection: Black Start, Auto

AV CE D

FULL MATCH (100%)



TEDOM

M285 OM

- Power Output: 281 kW
- Thermal Output: Hot Water Only
- Fuel: Natural Gas
- Prime Mover: 1x Reciprocating engine
- Grid Connection: Black Start, Auto

AV D

FULL MATCH (100%)



SWCS-340-HW-OD

RELIABLE. EFFICIENT. GREEN.

- Power Output: 326 kW
- Thermal Output: Hot Water Only
- Fuel: Natural Gas
- Prime Mover: 1x Reciprocating engine
- Grid Connection: Black Start, Auto

AV D

FULL MATCH (100%)



TEDOM

M285 C

- Power Output: 281 kW
- Thermal Output: Hot Water Only
- Fuel: Natural Gas
- Prime Mover: 1x Reciprocating engine
- Grid Connection: Black Start, Auto

AV D

FULL MATCH (100%)



FLEXENERGY

333SM GRID PARALLEL

- Power Output: 330 kW
- Thermal Output: Hot Water Only
- Fuel: Natural Gas
- Prime Mover: 1x Microturbine
- Grid Connection: Parallel Only

AV D 3

HIGH MATCH (91%)



FLEXENERGY

333SM DUAL MODE

- Power Output: 330 kW
- Thermal Output: Hot Water Only
- Fuel: Natural Gas
- Prime Mover: 1x Microturbine
- Grid Connection: Other

AV D 3

HIGH MATCH (91%)



KRAFT ENERGY SYSTEMS
COMBINED HEAT AND POWER

KN 285

- Power Output: 278 kW
- Thermal Output: Hot Water Only
- Fuel: Natural Gas
- Prime Mover: 1x Reciprocating engine
- Grid Connection: Other



C800S-ICHP HPNG DM MAX EFFICIENCY

- Power Output: 800 kW
- Thermal Output: Hot Water Only
- Fuel: Natural Gas
- Prime Mover: 4x Microturbine
- Grid Connection: Black Start, Auto



GEM ENERGY
RADIANT LINE GROUP

C600S-ICHP HPNG DM MAX EFFICIENCY

- Power Output: 600 kW
- Thermal Output: Hot Water Only
- Fuel: Natural Gas
- Prime Mover: 3x Microturbine
- Grid Connection: Black Start, Auto

x1





ECOMAX 15 NGS-0.6-HW

<input checked="" type="checkbox"/>	Power Output:	1,429 kW
<input checked="" type="checkbox"/>	Thermal Output:	Hot Water Only
<input checked="" type="checkbox"/>	Fuel:	Natural Gas
<input type="checkbox"/>	Prime Mover:	1x Reciprocating engine
<input checked="" type="checkbox"/>	Grid Connection:	Black Start, Auto

AV
CE

0

FULL MATCH (100%)
☆



	100% GROSS POWER			75% GROSS POWER			50% GROSS POWER		
Ambient Temperature	95°F	59°F	0°F	95°F	59°F	0°F	95°F	59°F	0°F
CHP Fuel Input (MMBtu per hour HHV)	13.60	13.60	13.60	10.50	10.50	10.50	7.50	7.50	7.50

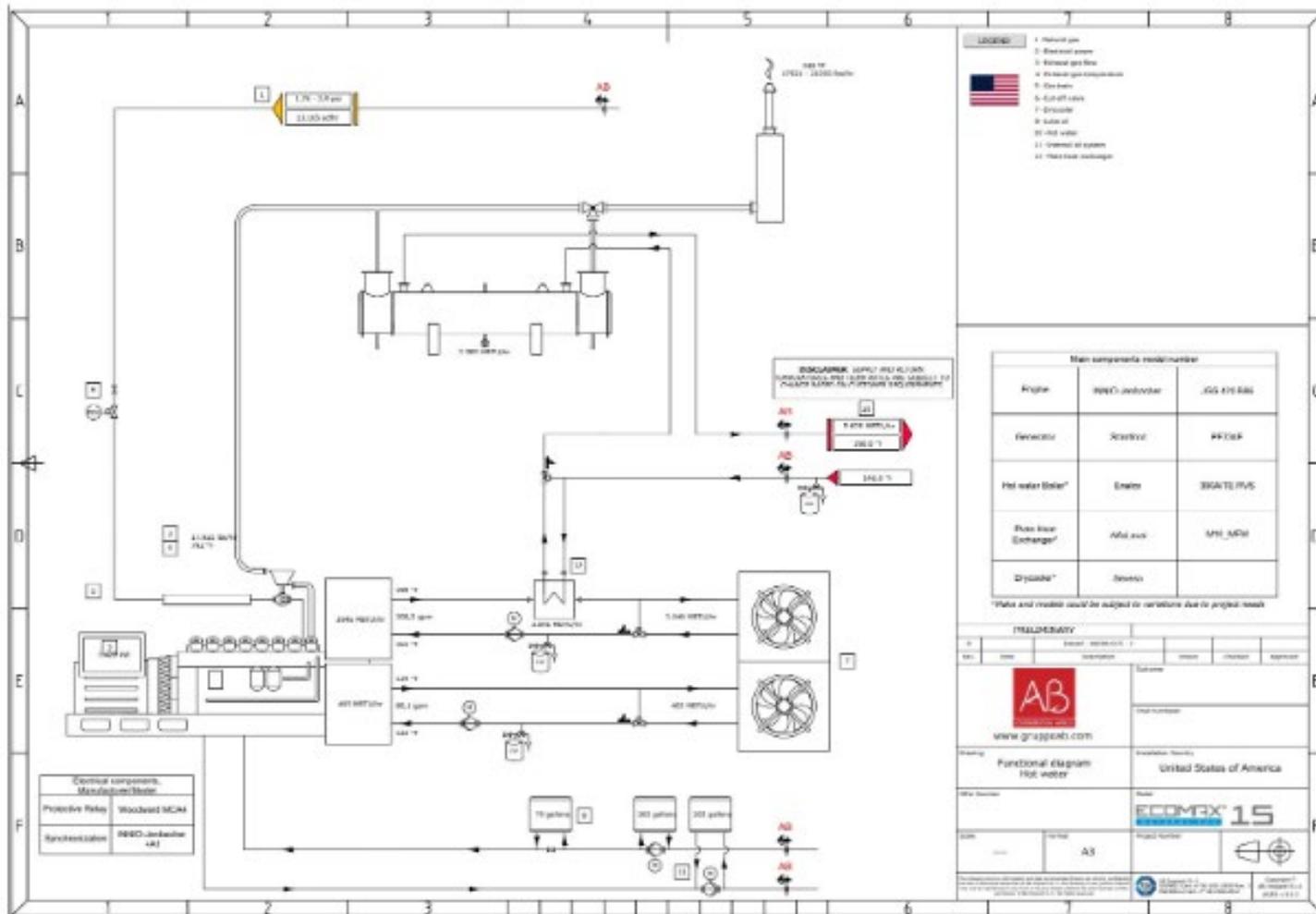
POWER	Gross Electricity Output (kW)	1,466	1,466	1,466	1,100	1,100	1,100	733	733	733
	Net Electricity Output (kW) ⓘ	1,429	1,429	1,429	1,072	1,072	1,072	711	711	711
	Net Electric Efficiency % (HHV) ⓘ	35.9	35.9	35.9	34.8	34.8	34.8	32.3	32.3	32.3

HOT WATER	Supply Temp to Site (°F)	180 °F			180 °F			180 °F		
	HW flow (GPM)	287	287	287	233	233	233	170	170	170
	Return Temp from Site (°F)	140	140	140	140	140	140	140	140	140
	Hot Water Capacity (MMBtu/hr)	5.60	5.60	5.60	4.60	4.60	4.60	3.30	3.30	3.30
	Thermal Efficiency % (HHV) ⓘ	41.2	41.2	41.2	43.8	43.8	43.8	44.0	44.0	44.0
	CHP Fuel Use Eff % (Hot Water Operation) ⓘ	77.0	77.0	77.0	78.6	78.6	78.6	76.3	76.3	76.3

**Be sure that the site thermal load will handle return water temperatures to the CHP system as stated. (e.g. 5 to 10 F below) Otherwise, hot water capacity will be less than stated. Contact the Packager/Solutions Provider for details.*

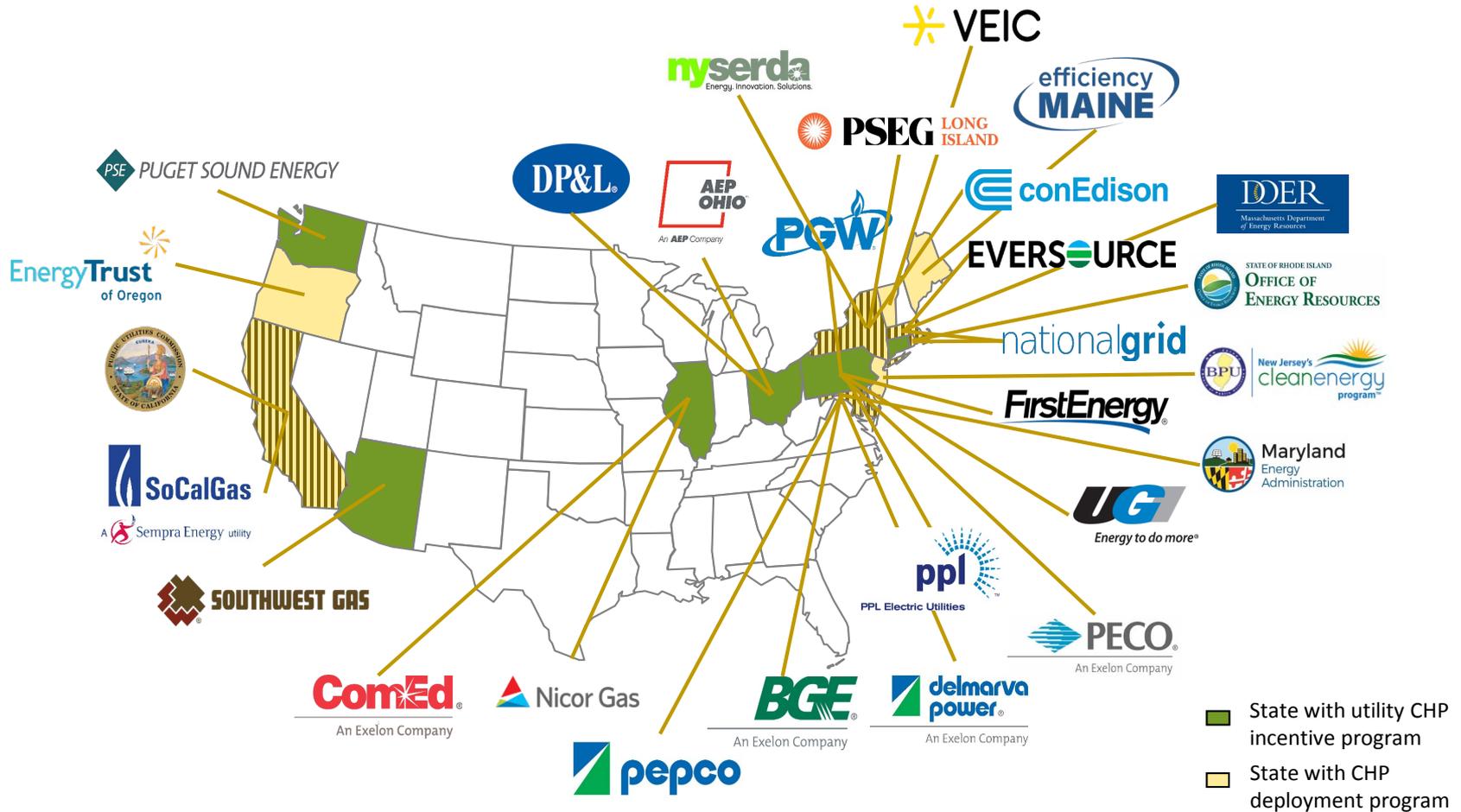
EMISSIONS ⓘ	Emissions Aftertreatment	Lean-burn engine with no aftertreatment
	NOx Emissions without Aftertreatment (lb/MWhe) ⓘ	1.8
	CO Emissions without Aftertreatment (lb/MWhe) ⓘ	7.0
	NMHC Emissions without Aftertreatment (lb/MWhe) ⓘ	1.7

PACKAGED CHP SYSTEM SIMPLIFIED SCHEMATIC



HIGHLIGHTED COMPONENTS

State and Utility CHP Programs are Growing



DOE Packaged CHP Accelerator

Better Buildings Accelerators demonstrate, catalyze and validate innovative approaches to increase investment in efficient energy technologies

- A venue to populate and launch the Packaged CHP eCatalog – success requires state/utility market engagement programs to promote CHP deployment, publicize the eCatalog, and provide technical and market assistance
- *CHP Supplier Partners* – CHP system packagers and solution providers participating in the national *eCatalog* of packaged CHP systems
- *CHP Engagement Partners* – Utilities, federal agencies, states, cities or other market entities committed to promoting packaged CHP (via the *eCatalog*)

Questions

<https://chp.ecatalog.industrialenergytools.com>



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