

# FEDERAL UTILITY PARTNERSHIP WORKING GROUP SEMINAR

November 7-8, 2019  
Washington, DC

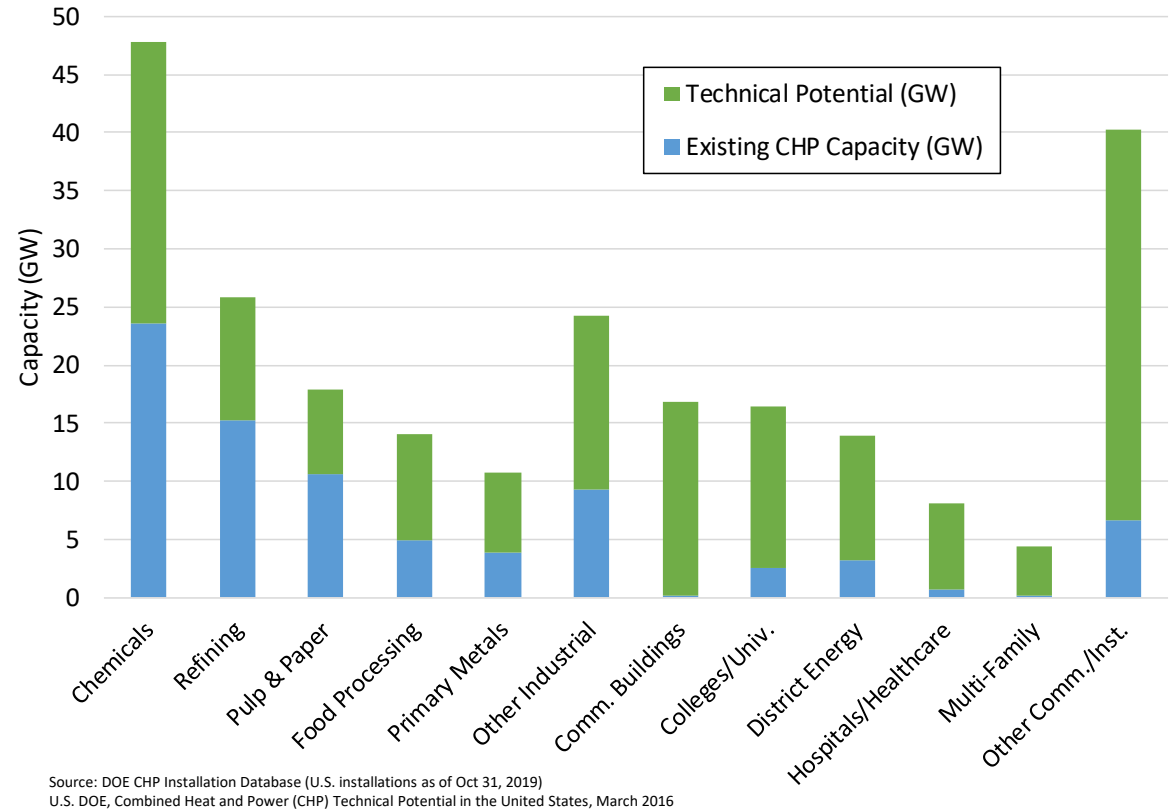
## DOE's Packaged CHP eCatalog

Hosted by:



# Non-Traditional CHP Markets Are Growing

- Large CHP potential in light manufacturing, commercial, institutional, 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



*Non-traditional markets represent 35% of the capacity and 70% of the projects installed since 2008.*

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# Challenges

- CHP viewed as a discretionary purchase
- Lack of user awareness / understanding
- Under-developed sales and service infrastructure
- Every installation is considered unique
- High soft costs
- End-user responsibility

# NYSERDA's CHP Program Evolution

**CHP Demonstration Program**  
Goal: Diversity -- Broad Portfolio  
for Learning via Trailblazing Examples



**CHP Performance Program**  
Goal: Further acquisition of grid load  
relief

**Packaged CHP Catalog Program**  
Goal: Market Transformation via  
Standardization & Maturity



2000

2006

2012

# *DOE eCatalog Builds on NYSERDA's Packaged CHP Program*

- Realign the way CHP deals are transacted in the marketplace to:
  - Achieve genuine cost reductions
  - Increase consumer confidence
- Facilitate customer acquisition to reduce marketing / soft costs and early-stage project development
- Facilitate replicable project designs to reduce design errors, associated performance losses, and re-work expenses
- Reduce uncertainty for consumers and suppliers

# *Specific 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 competent solution providers to be able to deliver
- Help the market learn how to reduce costs and capture alternative sources of market-based compensation (displacing need for subsidies)
- Provide consumer protection to ensure high-quality installations



# NYSERDA's Packaged CHP Catalog Program

NYSERDA Packaged CHP Catalog - Reduce perceived risk of installing and operating CHP by offering comparable standardization of CHP systems and field service agreements.



Source: NYSERDA CHP Catalog

2G Energy, Inc. patrus100NG-S1 100kW

Description		Synchronous or Inverter		Type	Block Load	Qualification
Type of prime mover	Number of prime movers			CHP	Capacity	State/Manufacturer's qualification
ICE	1	Synchronous		CHP	Yes	Manufacturer's qualification

Performance		Fuel in	Net Electric	Heat & Cooling	Water	100 System	Max.
% Load	Temperature	MBtu/h (MMBtu/hr)	Efficiency % (FPP)	MBtu/h	Temperature	Efficiency % (FPP)	Flow/Min.
100%	250°F	250	30.1	481	100	35.5	1.0
75%	250°F	188	29.8	359	100	35.5	1.0
50%	250°F	125	29.5	237	100	35.5	1.0

Notes: 1 - All performance data based on fuel energy content of 1007 Btu/CF HHV.

Footprint		Width ft.	Length ft.	Height ft.	Weight lbs.
Case system based on minimum gas		45"	120"	71"	Approx. 7,100
Case system based on minimum water		45"	120"	71"	Approx. 7,100
Heat Rejection Substation	Included in module	Included in module	Included in module	Included in module	Included in module
Package part for delivery	45"	120"	71"	Approx. 7,100	
Package part for delivery	45"	120"	71"	Approx. 7,100	

Includes maintenance obstructions.

Vendor Information  
2G Energy, Inc.  
200 Commercial Drive  
St. Augustine, FL 32086  
(904) 876-5217  
www.2genr.com

Vendor Statement  
2G® is a global leader in manufacturing highly efficient CHP cogeneration power plants. Proven for producing the world's most advanced and efficient cogeneration modules, and as per March 2016, having more than 1000 CHP's installed and operating. 2G® is specialized in modular energy conversion technologies. All cogeneration systems are designed and manufactured "connection ready", are fully factory tested and come as complete "Plug & Play" modules. This allows for an extremely fast and cost-effective installation, increases product reliability, and assures trouble-free operations. (Please watch our video located at [www.2genr.com](http://www.2genr.com))  
\*We offer fully containerized and inside building installations.  
"Quality... is everything we do!"

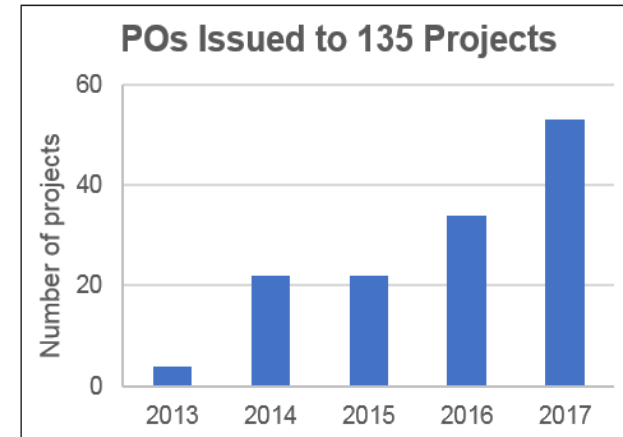
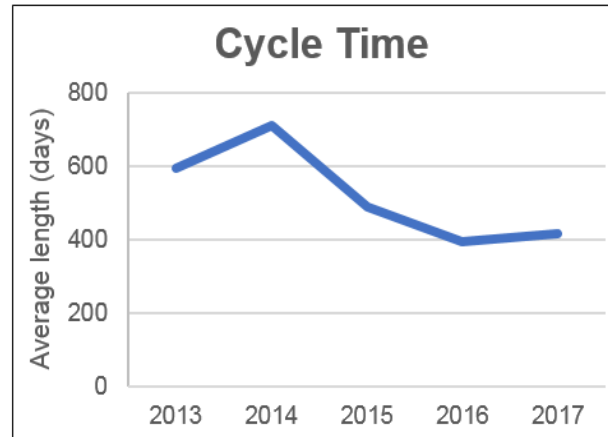
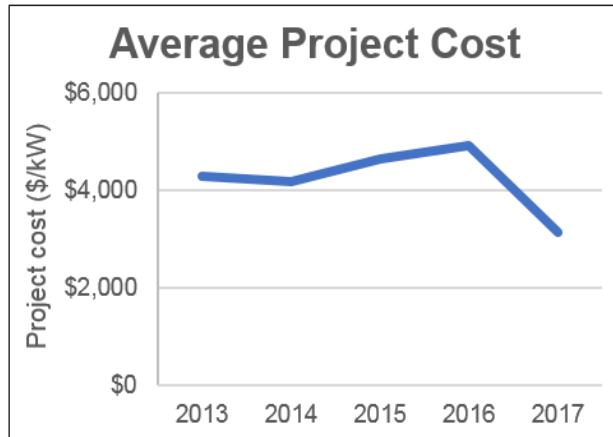
NYSERDA CHP Program PON 2568  
Version 4 Released July 2016  
For the most recent version go to  
<http://www.nyserda.org/poc2568>

- v1: 8 Vendors & 36 systems
- v2: 10 Vendors & 64 systems
- v3: 13 Vendors & 141 systems
- v4: 22 Vendors & 219 systems
- V5: 26 Vendors & 253 systems

- Independent endorsement based on in-depth analytical review
- Single-point-responsibility as the basis for customer-vendor relationship
- Comparison shopping to promote competition and expand offerings

# *NYSERDA CHP Program Successes*

- Commoditization of offerings and expansion of options
- Project cost reductions and time compression
- Increased program uptake
- Less dependent on subsidies (incentives ramping down over time)





# DOE Packaged CHP eCatalog

- **Reduce Risks for end-users and vendors** through a combination of a national web-based catalog (*eCatalog*) of DOE-recognized packaged systems and suppliers, and state/utility partners with CHP market engagement programs
- End-users and design engineers search for applicable CHP system characteristics, and get connected to packagers, installers and CHP engagement programs
- Allows users to compare technology options on a common basis

The screenshot displays the DOE Packaged CHP eCatalog website. The header includes the U.S. Department of Energy logo and navigation links for 'SEARCH eCATALOG', 'ABOUT eCATALOG', 'ABOUT CHP & PACKAGED SYSTEMS', 'UPDATES', 'FOR PACKAGERS & SOLUTION PROVIDERS', and 'CUSTOMER ENGAGEMENT PARTNERS'. A search bar is visible in the top right corner.

The main content area features a large image of industrial CHP equipment. A dark sidebar on the left contains a 'QUICK START' section with a 'FIND CHP PACKAGES' button. Below this are filters for 'PRIMARY SITE LOCATION' (Zip Code), 'SUPPLIER PRIORITY' (Packagers offering Recognized systems, Solution Providers offering installing, commissioning and maintaining Recognized systems, Solution Providers offering Assurance Plans), 'POWER OUTPUT' (1,000 kW), 'PRIME MOVERS' (Reciprocating engines (75), Combustion turbines (7), Microturbine (12)), 'THERMAL OUTPUT' (Hot Water Only (140), Hot Water and Chilled Water (1), Steam Only (2), Steam and Hot Water (2)), 'FUEL TYPE' (Natural Gas (156), Digester Gas (1)), and 'GRID CONNECTION TYPE' (Grid Parallel Only (60), Grid Island Black Start, Auto Transfer (13)). A 'FIND PACKAGES' button and a link to 'SHOP ENTIRE eCATALOG' are at the bottom of the sidebar.

The main content area has a heading: 'COMBINED HEAT & POWER eCATALOG OF RECOGNIZED PACKAGE CHP SYSTEMS: RIGOROUS RECOGNITION PROCESS'. Below the heading are three buttons: 'SHOP THE eCATALOG', 'ABOUT CHP & PACKAGE SYSTEMS', and 'ENROLL AS A PACKAGER OR SOLUTION PROVIDER'. The text below explains that the eCatalog is a voluntary public/private partnership designed to increase deployment of CHP in commercial, institutional and multi-family buildings and manufacturing plants. It also mentions that 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 project responsibility.

Below this is a section titled 'CUSTOMER ENGAGEMENT PARTNERS: INCENTIVIZING CHP IN YOUR AREA' with the sub-heading 'MAXIMIZE YOUR CHP INVESTMENT WHEN YOU INSTALL RECOGNIZED SYSTEMS'. The text describes an essential element in market success of energy efficient technologies, such as CHP, is a robust customer engagement partner to educate end-users and provide assistance through the project development process. States, localities and utilities that are implementing programs and policies to increase the use of CHP in support of key economic, security, efficiency and environmental goals can integrate the eCatalog into their efforts by linking recognized CHP packages offered by Solution Providers or Packagers in their region to their programs. The eCatalog provides a unique platform for convening recognized CHP equipment and suppliers with state, local and utility market outreach, customer acquisition and incentive programs.

The final section is titled 'eCATALOG PACKAGED CHP SYSTEM PERFORMANCE'. The text explains that Packaged CHP System standardized electrical and thermal performance data presented for comparison in the eCatalog have been reviewed and recognized as accurate based on engineering data and available performance test data submitted by the Packagers. Emissions data presented in the eCatalog are based on either third-party emissions test results when available, or prime mover manufacturer's emissions certification data, both using standard EPA test methodologies or equivalent. When evaluating CHP performance for a particular project, it is important to use final performance data from the Package or Solution Provider that reflects specific site conditions such as actual fuel characteristics, ambient temperatures and altitude, and thermal load temperatures or pressures. As an example, hot water thermal capacity ratings in the eCatalog are based on a standard hot water supply temperature of 180 F, with package specified return temperatures for each system. Actual hot water available from a packaged CHP system for a project will depend on the specific temperature requirements of the hot water supply and return at the site, and may vary from data presented in the eCatalog.

FOCUS YOUR RESULTS

reset | save search | 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)

kW Size

APPLY Help Me Choose

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

PRIME MOVERS

- Reciprocating engines (39)
- Microturbine (82)

THERMAL OUTPUTS

- Hot Water Only (120)
- Steam and Hot Water (1)

FUEL TYPE

- Natural Gas (120)
- Digester Gas (1)

GRID CONNECTION TYPE

- Grid Parallel Only (47)
- Grid Island, Black Start, Auto Transfer (63)

OUTDOOR INSTALLATION

- Required (94)

PACKAGED IN THE U.S.A

- Final System Packaging facility is in the U.S.A. (94)

PACKAGED SYSTEM FOOTPRINT

DISPLAYING: 121 Packages ordered by Relevance

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



**C1000S-ICHHP HPNG GC MAX EFFICIENCY**

- Power Output: 1,000 kW
- Thermal Output: Hot Water Only
- Fuel: Natural Gas
- Prime Mover: 5x Microturbine
- Grid Connection: Parallel Only

AV 
  SP 
  AP 
  U.S.A. Packaged 
  52 
  0

FULL MATCH (100%)



**JMC 416**

- Power Output: 1,109 kW
- Thermal Output: Hot Water Only
- Fuel: Natural Gas
- Prime Mover: 1x Reciprocating engine
- Grid Connection: Black Start, Auto

AV 
  SP 
  AP 
  U.S.A. Packaged 
  0

FULL MATCH (100%)



**AEGIS POWER THERM 75**

- Power Output: 73 kW
- Thermal Output: Hot Water Only
- Fuel: Natural Gas
- Prime Mover: 1x Reciprocating engine
- Grid Connection: Parallel Only

AV 
  SP 
  AP 
  U.S.A. Packaged 
  0

FULL MATCH (100%)



**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 
  SP 
  AP 
  U.S.A. Packaged 
  0

FULL MATCH (100%)

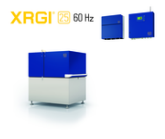


**KN 285**

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

AV 
  SP 
  AP 
  U.S.A. Packaged 
  2

FULL MATCH (100%)



**XRGI 25**

- Power Output: 24 kW
- Thermal Output: Hot Water Only
- Fuel: Natural Gas
- Prime Mover: 1x Reciprocating engine
- Grid Connection: Parallel Only

AV 
  SP 
  AP 
  U.S.A. Packaged 
  1

FULL MATCH (100%)



**CPT-GE-JMS616-F01**

- Power Output: 2,637 kW
- Thermal Output: Steam, Hot Water



**AVUS 500PLUS**

- Power Output: 523 kW
- Thermal Output: Hot Water Only



**333SM GRID PARALLEL**

- Power Output: 330 kW
- Thermal Output: Hot Water Only

PERFORMANCE DATA

	100% GROSS POWER			75% GROSS POWER			50% GROSS POWER			25% GROSS POWER		
Ambient Temperature	95°F	59°F	0°F	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)	10.70	11.40	10.90	9.00	8.60	8.20	6.00	5.70	5.50	2.60	2.30	2.20
Gross Electricity Output (kW)	879	1,000	1,000	750	750	750	500	500	500	200	200	200
Net Electricity Output (kW)	879	1,000	1,000	750	750	750	500	500	500	200	200	200
Net Electric Efficiency % (HHV)	28.0	29.9	31.3	28.4	29.8	31.2	28.4	29.9	31.0	26.2	29.7	31.0
Supply Temp to Site (°F)	180 °F			180 °F			180 °F			180 °F		
HW flow (GPM)	500	500	500	500	400	400	300	300	300	200	100	100
Return Temp from Site (°F)	161	163	167	166	164	169	164	166	170	170	163	167
Hot Water Capacity (MMBtu/hr)	4.60	4.30	3.10	3.50	3.20	2.30	2.30	2.10	1.40	1.00	0.90	0.60
Thermal Efficiency % (HHV)	43.0	37.7	28.4	38.9	37.2	28.0	38.3	36.8	25.5	38.5	39.1	27.3
CHP Fuel Use Eff % (Hot Water Operation)	71.0	67.7	59.7	67.3	67.0	59.3	66.8	66.8	56.5	64.7	68.8	58.3

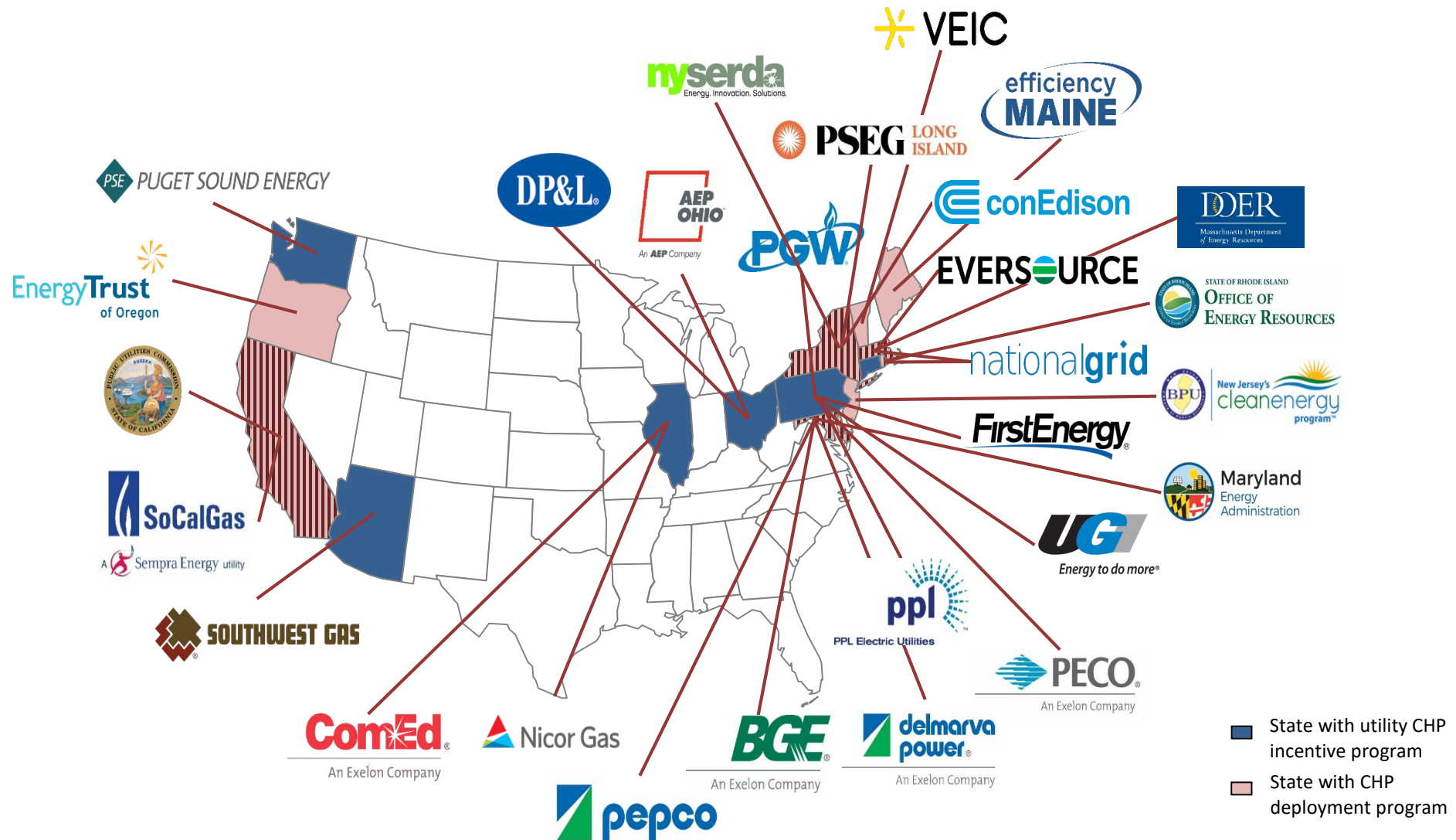
Unique Verified System Level Performance Data

# 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*)

# State and Utility CHP Programs are Growing



# Questions

<https://chp.ecatalog.lbl.gov/>

<https://betterbuildingsinitiative.energy.gov/accelerators/packaged-chp>



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