

# U.S. DOE MID-ATLANTIC CHP TECHNICAL ASSISTANCE PARTNERSHIP (CHP-TAP) WEBINAR SERIES

Welcome to the Mid-Atlantic CHP TAP Webinar reviewing the history, focus and operation of the U.S. DOE's Packaged CHP Systems eCatalog. Please keep your microphones muted and video cameras off. Use the Chat feature to ask any questions and we will try to answer them at the end of the presentation. If our one hour time slot does not allow time to answer all the questions, we will send the questions and answers out to all the registered participants. This webinar is being recorded.



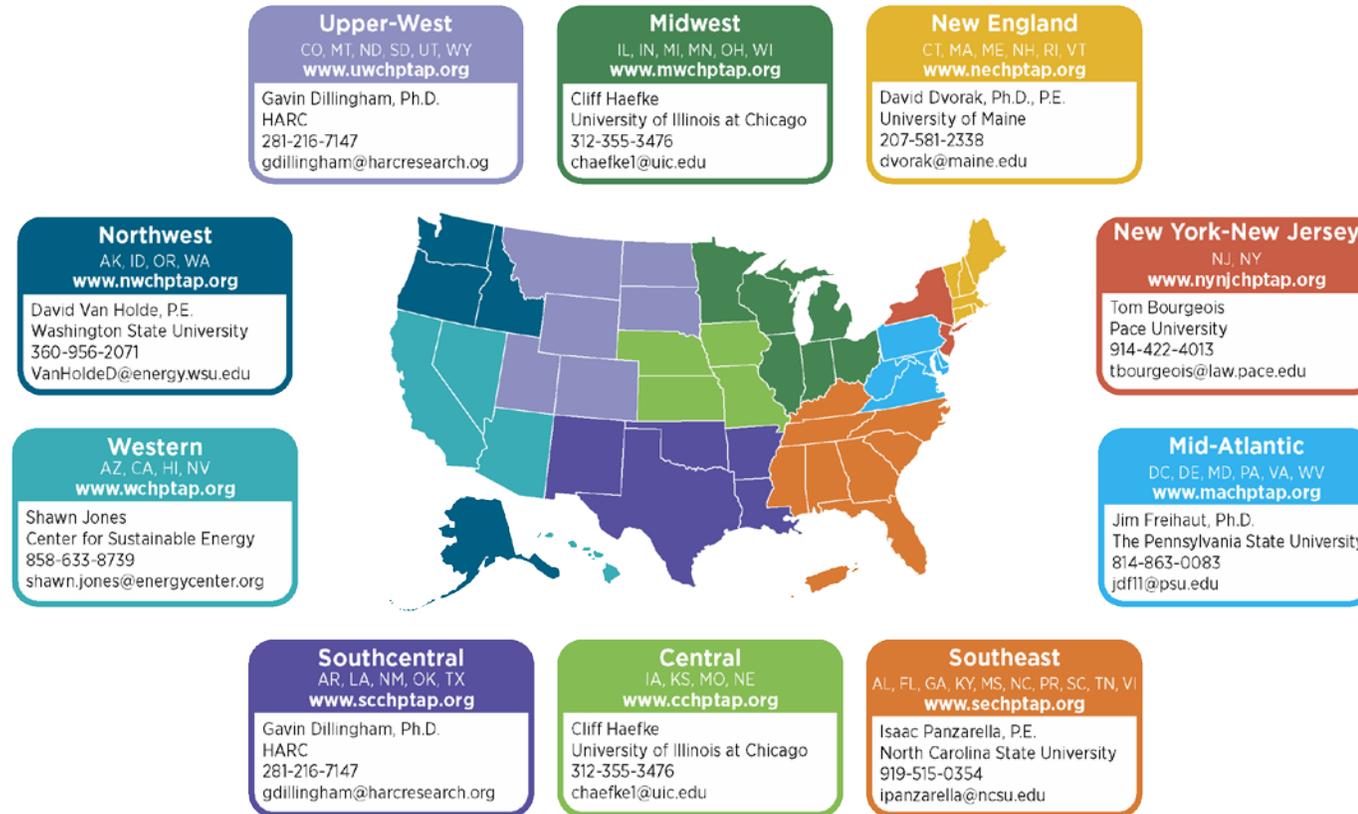
**Mid-Atlantic**  
[www.machptap.org](http://www.machptap.org)

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September 22, 2020

# DOE CHP Technical Assistance Partnerships



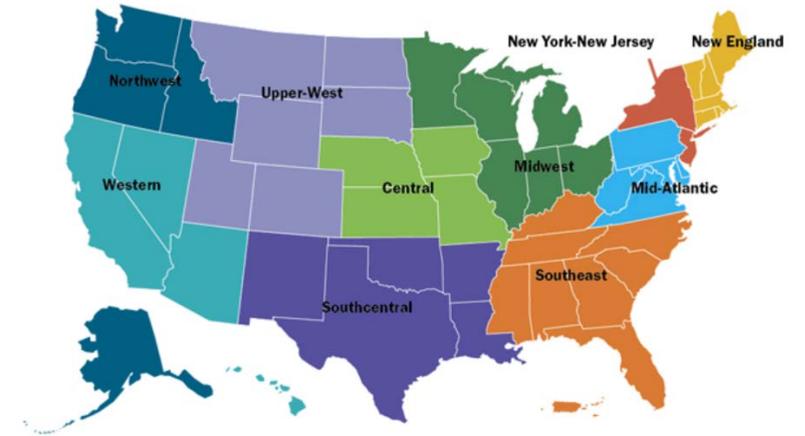
DOE CHP Deployment  
Program Contacts  
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# DOE CHP Technical Assistance Partnerships (CHP TAPs)

- **End User Engagement:** Partner with strategic End Users to advance technical solutions using CHP as a cost effective and resilient way to ensure American competitiveness, utilize local fuels and enhance energy security. CHP TAPs offer fact-based, non-biased engineering support to manufacturing, commercial, institutional and federal facilities and campuses.
- **Stakeholder Engagement:** Engage with strategic Stakeholders, including regulators, utilities, and policy makers, to identify and reduce the barriers to using CHP to advance regional efficiency, promote energy independence and enhance the nation's resilient grid. CHP TAPs provide fact-based, non-biased education to advance sound CHP programs and policies.
- **Technical Services:** As leading experts in CHP (as well as microgrids, heat to power, and district energy) the CHP TAPs work with sites to screen for CHP opportunities as well as provide advanced services to maximize the economic impact and reduce the risk of CHP from initial CHP screening to installation



[www.energy.gov/chp](http://www.energy.gov/chp)

# Packaged CHP Systems

U.S. DEPARTMENT OF  
**ENERGY**

Energy Efficiency &  
Renewable Energy



**Reducing Risk with Recognized Packaged  
CHP Systems in the U.S. DOE eCatalog**

Richard Sweetser, President - Exergy Partners Corp.  
Packaged CHP Systems eCatalog Coordinator

September 22, 2020

- eCatalog Background
- eCatalog Definitions
- eCatalog Demo

Reducing Risk with Recognized Packaged  
CHP Systems in the DOE eCatalog



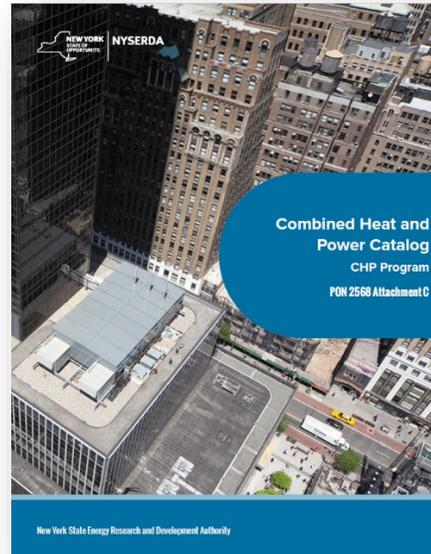
# CHP Market Challenges

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



# NYSERDA's Packaged CHP Catalog

- 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.**      **p01rus100NG-S1**      **100kW**

**Description**

Type of prime mover	Synchronous or Inverter	Type	Stack-Heat	Certification
RICE	Synchronous	Open	Yes	California

**Performance**

% Load	Fuel in (MMBtu/hr)	Net kW	Net Efficiency (%)	Stack & Cooling (MMBtu/hr)	Net Cooling (MMBtu/hr)	Net Heat (MMBtu/hr)
100%	224	24	36.1	480	224	24
75%	168	18	36.1	360	168	18
50%	112	12	36.1	240	112	12

**Footprint**

Stack	Length	Height	Weight
48"	120"	71"	Approx. 7,100

**Vendor Information**

2G Energy, Inc.  
220 Commercial Circle  
St. Augustine, FL 32080  
888-679-2217  
[www.2genergy.com](http://www.2genergy.com)

**Vendor Statement**

2G is a global leader in manufacturing highly efficient CHP cogeneration power plants. Incept for producing the world's most advanced and efficient cogeneration modules, and as per March 2015, having more than 1000 CHP's installed and operating, 2G is specialized in modular energy conversion technologies. All cogeneration systems are designed and manufactured "turnkey ready", are fully factory tested and come as complete "Plug & Play" modules. This allows for an extremely fast and cost-effective installation, increases production reliability, and assures trouble-free operations. (Please watch our video located at [www.2genergy.com](http://www.2genergy.com))

"We offer fully comprehensive and onsite building installations."  
**"Quality... is everything we do!"**

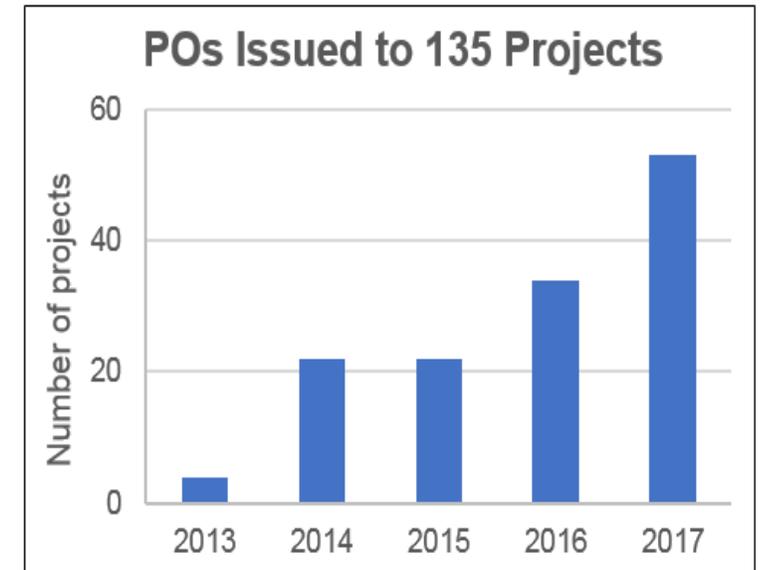
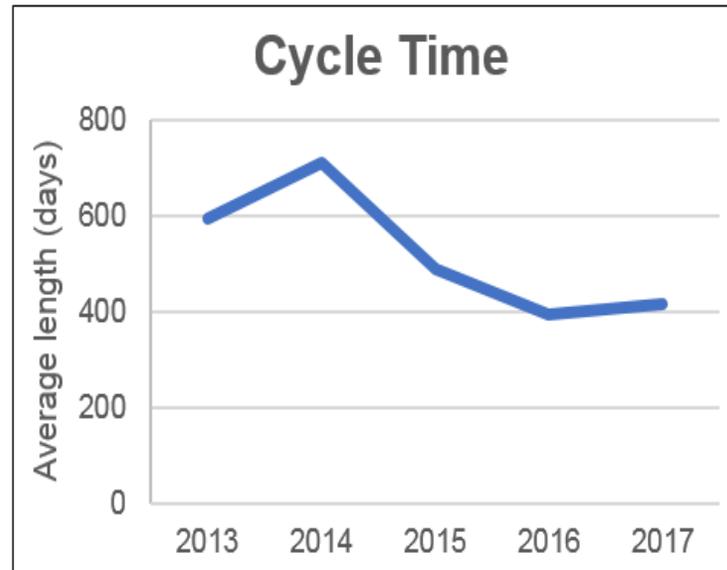
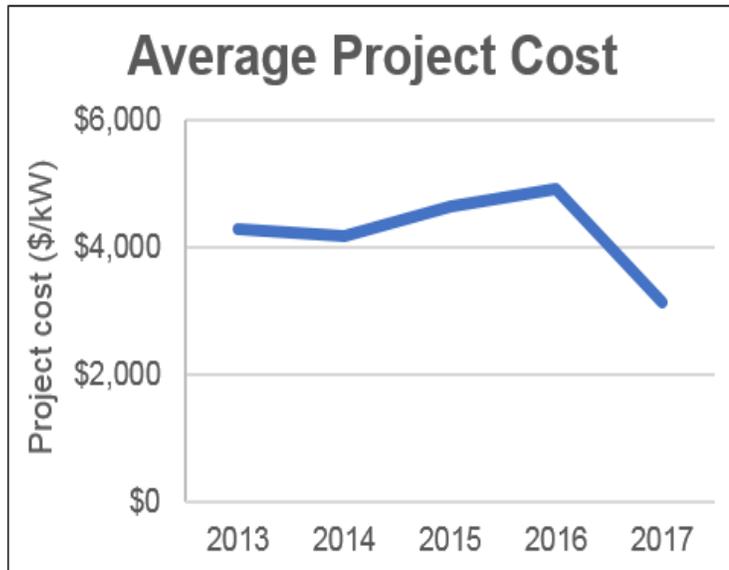
NYSERDA CHP Program PON 2568  
Version 4 Revised July 2015  
For the next revision go to:  
<http://www.nyseda.org>

- 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)



# Robust Market Engagement Was Key to Success

- **Public events** – Opportunities to provide introductions to CHP and connect end users with suppliers
- **Education** – Personalized understanding of technology and value proposition to specific business
- **Pre-screening** – High-level review of specific costs and benefits offered by CHP
- **Technical assistance** along project development path
- **Concierge to access financing, navigate permitting, identify supporting resources**



## Event Detail

### Combined Heat and Power (CHP) Power Breakfast and TOUR: Enhance Your Building's Power Reliability

Dani Levy Program Manager, NYSERDA and Davetta Thacher Project Manager, NYSERDA with NYSERDA are speaking at this event.  
NYSERDA is a sponsor of this event.



# Ongoing Technical Assistance Was Critical

- Many projects stall at the vendor bid solicitation and selection process
- Proposals come in all different shapes and sizes
- Lack of meaningful and accurate data for customers to make a decision
- **Once customers lose interest, the project usually doesn't get revived**



# Why Packaged CHP Systems

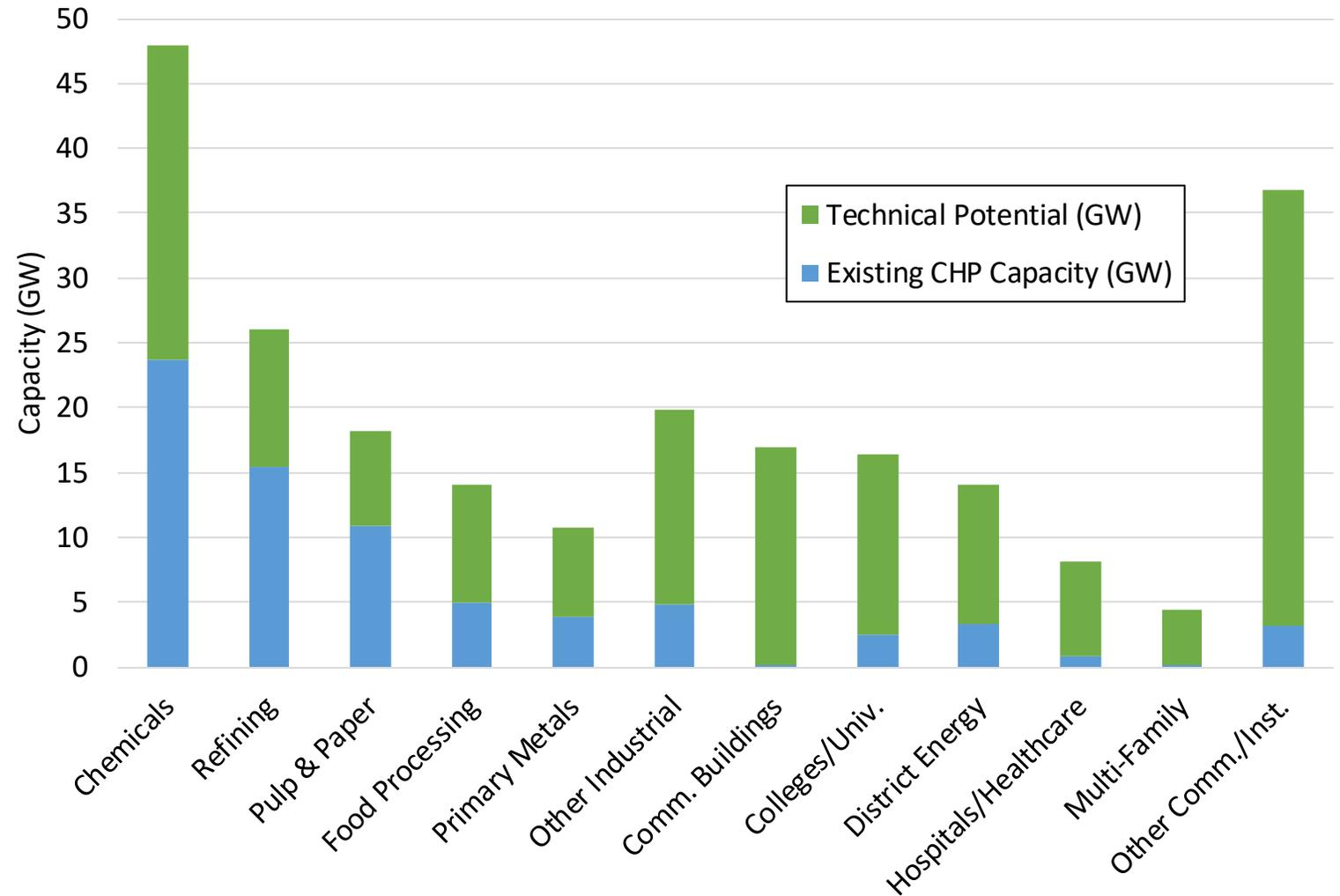
# Energy/CHP Market Trends

- Non-traditional Applications
- Resilience
- Complete Solutions
- Flexible Financing Solutions
- No Touch Solutions
- Carbon Reduction
- Low Risk



# Non-Traditional CHP Markets Are Growing

- Large CHP potential in commercial, institutional, light manufacturing, government and military applications
- Markets utilize smaller systems (< 10 MW) 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 represents 35% of the capacity and 70% of the projects installed since 2008*

# Packaged CHP Market

Packaged CHP systems are designed to increase deployment of CHP in key markets that are underdeveloped due to a variety of barriers that increase the perceived risks to end-users, engineers, equipment providers and project developers. These markets are served by smaller systems, generally less than 10 MW, which are also conducive to packaging and/or modularization.

Catalog focus

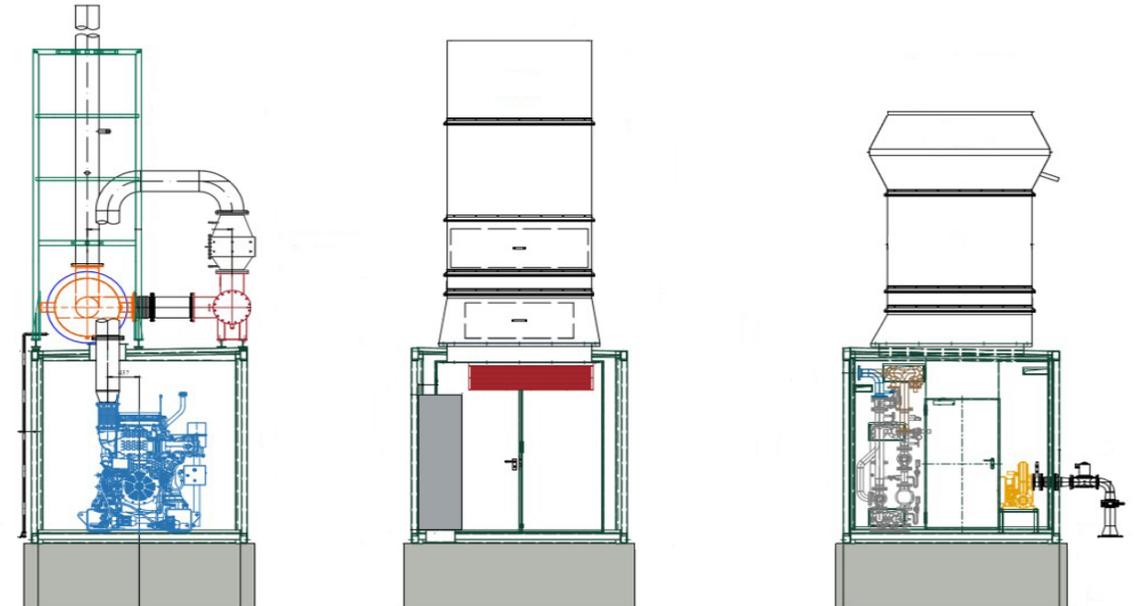
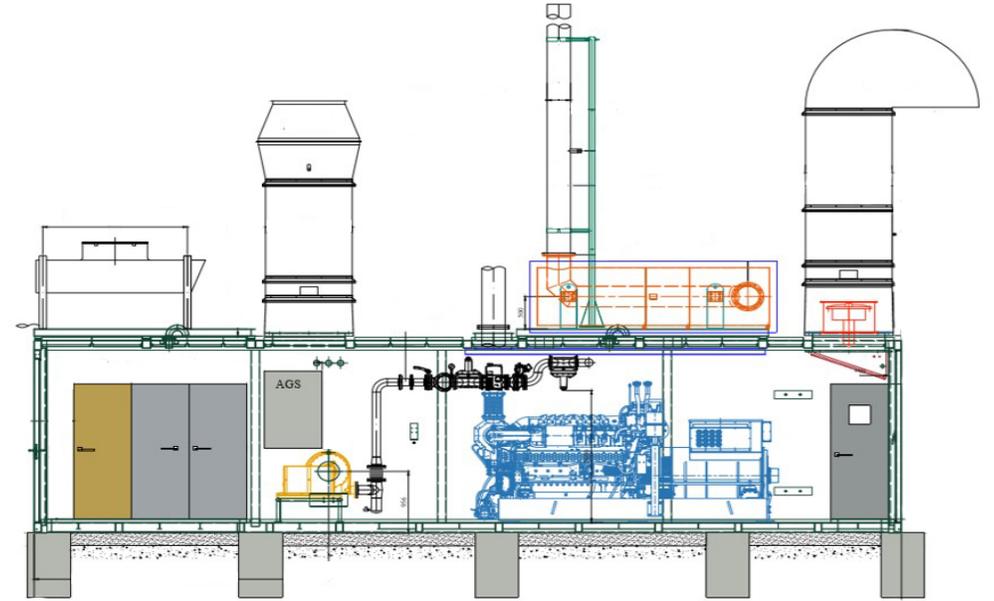
Application	50-500 kW	0.5 - 1 MW	1 - 5 MW	5 - 10 MW	5 - 20 MW	> 20 MW	Total
Industrial	6,281	4,351	15,567	9,064	7,971	21,157	65,381
Commercial	20,068	18,100	20,284	5,504	3,948	8,026	75,930
<b>Total</b>	26,349	22,451	35,470	14,568	11,919	30,183	140,941

Source: US DOE CHP Technical Potential in the US, June 2017

*50 kW to 10 MW systems represent 98,838 MW of technical potential which is 70% of the total technical potential*

# A Packaged CHP System Are Standard Repeatable Designs Including:

- 100% pre-wired
- 100% pre-piped with customer ready connection
- Properly ventilated
- Sound insulated
- Fire rated
- With a gas detection and smoke alarm
- Fluid containment system
- Auxiliaries sized appropriately and shipped complete with connecting piping and wiring
- Packagers have bulk purchasing power that local contractors do not have



# The Packaged CHP Systems eCatalog

# DOE Packaged CHP eCatalog

- A national web-based searchable catalog of DOE-recognized packaged CHP systems and suppliers with the goal to reduce risks for end-users and vendors through partnerships with:
  - **CHP Packagers** that assemble and support recognized Packaged CHP Systems
  - **Solution Providers** that install, commission and service packaged CHP systems
  - **CHP Engagement partners** that provide CHP market deployment programs at the state, local and utility level
- **Pre-engineered and tested packaged CHP systems that meet DOE performance requirements**
- **eCatalog audience:** end-users with engineering staff, consulting engineers, utilities, state energy offices, regulators, federal agencies, and project developers.
- **Users 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 shows the DOE Packaged CHP eCatalog website. The header includes the U.S. Department of Energy logo and the title 'COMBINED HEAT & POWER eCATALOG RECOGNIZED PACKAGED CHP SYSTEMS'. Navigation links include 'SEARCH eCATALOG', 'SITE GUIDE', 'BENEFITS', 'FINANCING', 'PACKAGERS', 'SOLUTION PROVIDERS', 'CUSTOMER ENGAGEMENT PARTNERS', and 'CHP TAPS'. A 'Contact Us' and 'Sign In' button are also present.

The main content area features a large image of industrial piping and a search filter overlay. The filter overlay includes the following sections:

- QUICK START**
  - FIND CHP PACKAGES**
  - PRIMARY SITE LOCATION**
    - Zip Code
  - SUPPLIER PRIORITY**
    - Packagers offering Recognized systems (6)
    - Solution Providers offering, installing, commissioning and maintaining Recognized systems
    - Solution Providers offering Assurance Plans (6)
    - Solution Providers offering Energy Services (6)
  - POWER OUTPUT**
    - 1,000 kW
    - Help Me Choose (6)
  - OUTDOOR INSTALLATION**
    - Required (174)
  - FUEL TYPE**
    - Natural Gas (231)
    - Propane (1)
    - Digester Gas (26)
  - GRID CONNECTION TYPE**
    - Grid Parallel Only (37)
    - Grid Island, Black Start, Auto Transfer (18)
  - THERMAL OUTPUT**
    - Hot Water Only (240)
    - Hot Water and Chilled Water (1)
    - Steam Only (1)
    - Steam and Hot Water (12)
    - Steam, Hot Water, and Chilled Water (3)
  - PRIME MOVERS**
    - Reciprocating engines (175)
    - Combustion turbines (1)
    - Microturbine (2)

A 'FIND PACKAGES' button is located at the bottom of the filter overlay.

The main content area below the filter overlay features the heading 'COMBINED HEAT & POWER eCATALOG OF RECOGNIZED PACKAGE CHP SYSTEMS' and 'PACKAGED CHP SYSTEMS: RIGOROUS RECOGNITION PROCESS'. Below this heading are two buttons: 'SHOP THE eCATALOG' and 'LEARN MORE'. A 'Getting Started: REGISTER' button is also present.

The text below the buttons reads: '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 project responsibility.'

Below this text 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 the importance of customer engagement and the eCatalog's role in linking recognized CHP packages to state, local and utility market outreach programs.

At the bottom of the page, there is a section titled 'eCATALOG PACKAGED CHP SYSTEM PERFORMANCE' which provides detailed information about the standardized performance data presented in the eCatalog, including the use of actual fuel characteristics, ambient temperatures and altitude, and thermal load temperatures or pressures. It also mentions that the data is based on a standard hot water supply temperature of 180 F, with package specified return temperatures for each system.

The URL <https://chp.ecatalog.lbl.gov/> is displayed at the bottom right of the page.

# Packaged CHP eCatalog September 22, 2020 Status

- Launched Nov 8, 2019
- 32 recognized Packagers
- 22 recognized Solution Providers
- 258 Package Offerings
  - 175 reciprocating engine
  - 82 microturbine
  - 1 gas turbine
  - 231 natural gas
  - 26 digester gas
  - 1 propane
  - 57 grid parallel only
  - 189 grid islandable/auto transfer
  - 24 kW to 7.5 MW
  - Multiple suppliers and packages in every zip code
- 9 Customer Engagement Partners

**FOCUS YOUR RESULTS** reset | save search | favorites

**PRIMARY SITE LOCATION**  
 Zip Code  
 Selected: **Somerset, NJ**

**SUPPLIER PRIORITY**

- Packagers offering Recognized systems
- Solution Providers offering, installing, commissioning and maintaining Recognized systems
- Solution Providers offering Assurance Plans
- Solution Providers offering Energy Services

**CUSTOMER ENGAGEMENT PARTNER**

- Prioritize program-eligible packaged systems

**POWER OUTPUT (kW)** Help Me Choose  
 kW Size  
 Consider Multiple Units  
 \*Default includes a max. of 120% of unit size and a min. of 70% of unit size.

**PRIME MOVERS**

- Reciprocating engines (168)
- Combustion turbines (2)
- Microturbine (122)

**THERMAL OUTPUTS**

- Hot Water Only (269)
- Hot Water and Chilled Water (1)
- Steam Only (2)
- Steam and Hot Water (16)
- Steam, Hot Water, and Chilled Water (4)

**FUEL TYPE**

- Natural Gas (285)
- Digester Gas (7)

**GRID CONNECTION TYPE**

- Grid Parallel Only (83)
- Grid Island, Black Start, Auto Transfer (192)

**OUTDOOR INSTALLATION**

- Required (180)

DISPLAYING: 187 Packages ordered by Relevance

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



**AVUS 1500C NG**

Power Output: **1,508 kW**

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

Full Match (100%)



**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

Full Match (100%)



**ECOMAX 9 NGS 1.1 HW**

Power Output: **838 kW**

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

Full Match (100%)



**CG132B-16 POWER HEAT MAX CONTAINER NG**

Power Output: **784 kW**

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

Full Match (100%)



**QUANTO 800 C**

Power Output: **784 kW**

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

Full Match (100%)



**MARTIN ENERGY GROUP MEG S1000N-HW**

Power Output: **988 kW**

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

Full Match (100%)



**UNISON AVUS 2000C NG**

Power Output: **1,928 kW**

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

Full Match (100%)



**CPT - SOLAR TURBINE - TAURUS 70**

Power Output: **7,501 kW**

- Thermal Output: Steam Only
- Fuel: Natural Gas
- Prime Mover: 1x Combustion turbines
- Grid Connection: Black Start, Auto

Full Match (100%)



**XRGI 25**

Power Output: **24 kW**

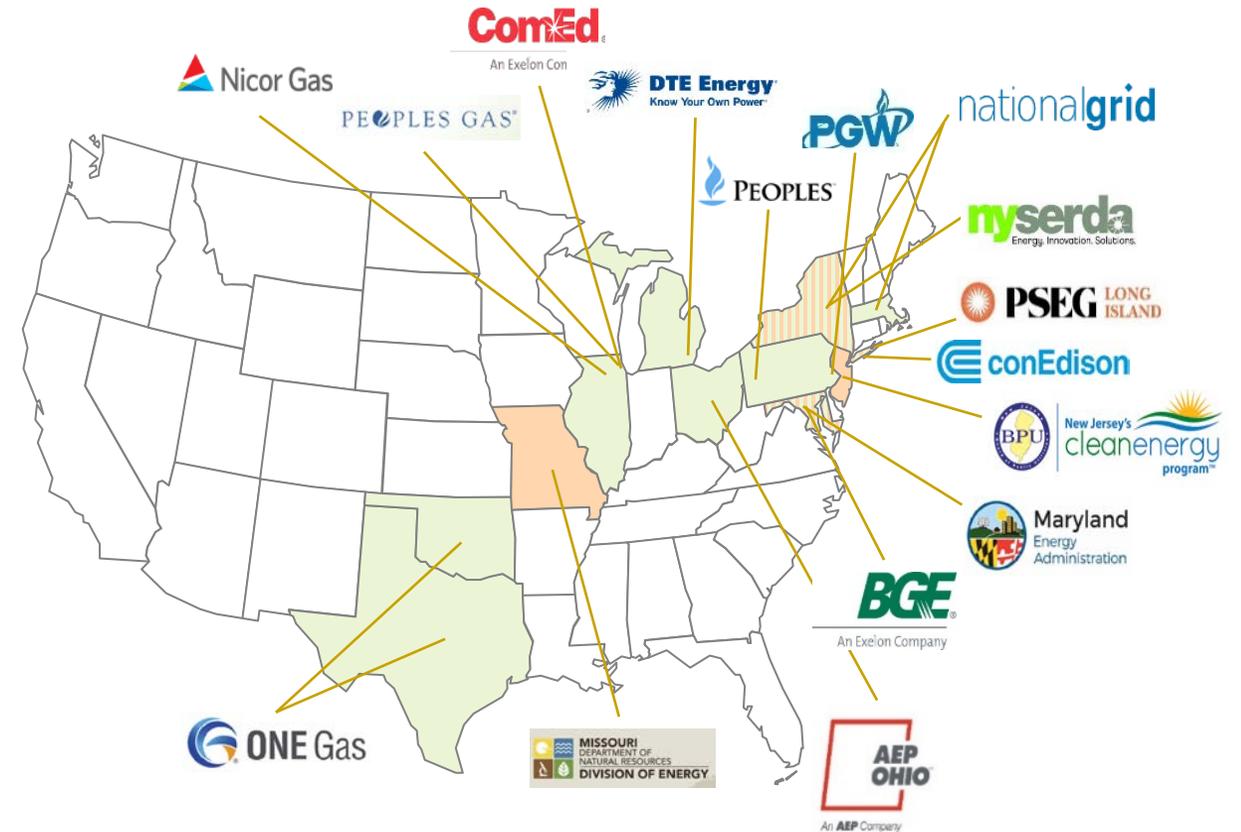
- Thermal Output: Hot Water Only
- Fuel: Natural Gas
- Prime Mover: 1x Reciprocating engine
- Grid Connection: Parallel Only

Full Match (100%)

# DOE Packaged CHP Accelerator

- **Better Buildings Accelerators** demonstrate innovative policies and approaches designed to accelerate investment in energy efficiency
- **Objective:** Populate, launch and publicize the eCatalog and promote packaged CHP
- **Goals:** Verify packaged CHP system performance in industrial, commercial, institutional and government markets
- **CHP Engagement Partners:** Utilities, states and federal agencies committed to promoting packaged CHP via CHP deployment and/or incentive programs
- **CHP Supplier Partners:** CHP packagers and solution providers participating in the national eCatalog

## Current CHP Engagement Partners



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

# eCatalog Live Demo



FOR MORE INFORMATION ABOUT THE eCatalog OR CHP TECHNICAL ASSISTANCE



**Mid-Atlantic**

**[www.machptap.org](http://www.machptap.org)**

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814-863-0083

**[jdf11@psu.edu](mailto:jdf11@psu.edu)**

**Packaged CHP eCatalog**

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



**CHP Technical Assistance Partnerships**

**MID-ATLANTIC**