CHP
EPA COMBINED HEAT AND POWER PARTNERSHIP

Using the EPA CHP Screening Tool

April 30, 2019

Housekeeping

- Audio is available for this presentation through your computer's mic and speakers or by telephone. Your call-in number and access code are in the control panel box on the right-hand side of your screen.
- All attendees have been muted to minimize background noise.
- If you have a question during the presentation, please type it into the questions box on the upper right-hand side of your screen. We will have a dedicated time to answer questions at the end of the presentation.
- If you are experiencing any technical difficulties, please contact us and we will try to troubleshoot the issues.
- Today's presentations will be posted to the EPA CHP Partnership website within one week. All attendees will receive an email announcement.

EPA CHP COMBINED HEAT AND POWER PARTNERSHIP

Today's Speakers

- Neeharika Naik-Dhungel, EPA CHP Partnership Program Manager
  - naik-dhungel.neeharika@epa.gov
- Meegan Kelly, Senior Consultant – Distributed Grid Strategy, ICF International
  - Meegan.Kelly@icf.com
- Dr. Bruce Hedman, Senior Technical Consultant to U.S. DOE CHP Program
  - bhedman.entropyresearch@gmail.com
- John Moynihan, Managing Partner, Cogen Power Technologies
  - jmoynihan@powerbycogen.com

EPA CHP COMBINED HEAT AND POWER PARTNERSHIP

Combined Heat and Power (CHP) Screening Tool

Meegan Kelly, ICF

April 30, 2019

CHP
EPA COMBINED HEAT AND POWER PARTNERSHIP

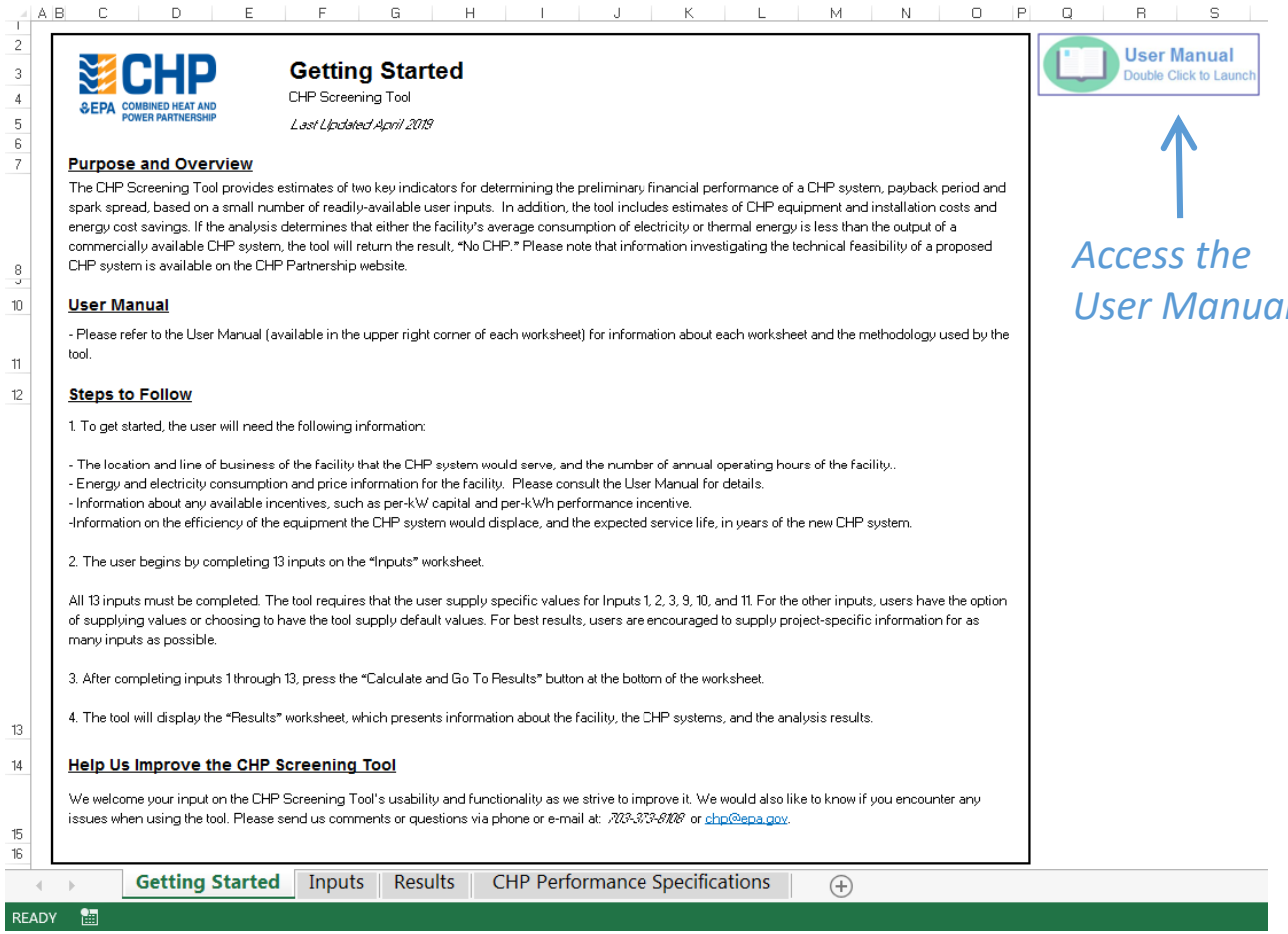
Agenda

- CHP Screening Tool overview
  - Goals, purpose, intended audience
  - Updates since last version
- How to use the tool
  - User inputs
  - Results
- Additional information
  - User manual

CHP
EPA COMBINED HEAT AND POWER PARTNERSHIP

Screening Tool Overview

- **Purpose**: To provide an initial "screen" of the economic feasibility of CHP during exploration phase of a potential project
- **Format**: Tabbed Excel workbook
  1. *Getting Started*
  2. *Inputs*
  3. *Results*
  4. *CHP Performance Specifications*



CHP
EPA COMBINED HEAT AND POWER PARTNERSHIP

Screening Tool Updates

- Simplified results to help users identify key metrics like payback period
- Added new CHP systems in order to provide more selection options for smaller, packaged CHP installations
- Format includes a range of results from two representative CHP systems

Option Reference Names	Option 1	Option 2
Electric Load That Could be Supported by CHP (kW)	342	342
CHP System Type Options	285 kW Packaged Recip Engine	375 kW Packaged Recip Engine
Total CHP Efficiency (HHV)	77.4%	81.6%

User Inputs

- Users will need to input 4 basic types of information:
  1. Basic site characteristics (Inputs 1 – 5)
  2. Incentives available (Inputs 6 – 8)
  3. Energy consumption and price information (Inputs 9 – 11)
  4. Additional equipment questions (Inputs 12 – 13)
- Most can be selected from drop-down menus or default options
- Instructions included for each question

Site Information – Inputs 1 - 5

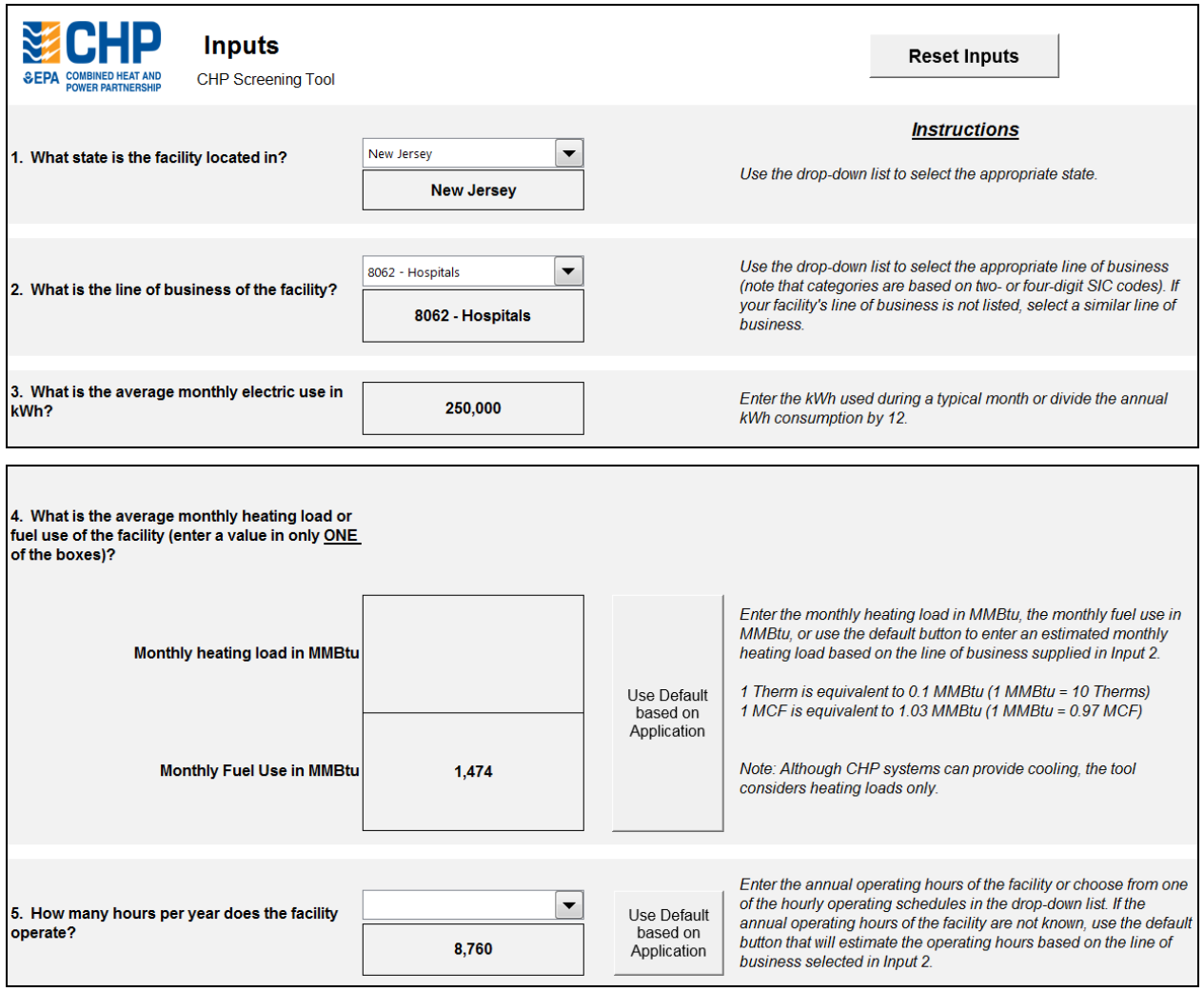
Input No.	Question	Input Type	Notes
1	What state is the facility located in?	User-defined	-
2	What is the line of business of the facility?	User-defined	Options for selecting from 39 different C&I sectors
3	What is the average monthly electric use in kWh?	User-defined	Obtained from utility bill information or estimated by the user
4	What is the average monthly heating load or fuel use (MMBtu) of the facility?	User-defined or default	For the default option, the tool calculates heating load based on site electric use and thermal factor associated with the line of business of the facility
5	How many hours per year does the facility operate?	User-defined or default	For the default option, the tool estimates operating hours based on the line of business of the facility

Example Site

CHP Screening Tool – Example Site Information		
State	**Line of Business**	**Monthly Electric Use**
New Jersey	Small Hospital	250,000 kWh

CHP
EPA COMBINED HEAT AND POWER PARTNERSHIP

Example Site Information – Inputs 1 - 5



Inputs

CHP Screening Tool

Reset Inputs

Instructions

1. What state is the facility located in?	New Jersey / **New Jersey**	*Use the drop-down list to select the appropriate state.*
2. What is the line of business of the facility?	8062 - Hospitals / **8062 - Hospitals**	*Use the drop-down list to select the appropriate line of business (note that categories are based on two- or four-digit SIC codes). If your facility's line of business is not listed, select a similar line of business.*
3. What is the average monthly electric use in kWh?	**250,000**	*Enter the kWh used during a typical month or divide the annual kWh consumption by 12.*
4. What is the average monthly heating load or fuel use of the facility (enter a value in only ONE of the boxes)?		
Monthly heating load in MMBtu		Use Default based on Application — *Enter the monthly heating load in MMBtu, the monthly fuel use in MMBtu, or use the default button to enter an estimated monthly heating load based on the line of business supplied in Input 2.* *1 Therm is equivalent to 0.1 MMBtu (1 MMBtu = 10 Therms)* *1 MCF is equivalent to 1.03 MMBtu (1 MMBtu = 0.97 MCF)* *Note: Although CHP systems can provide cooling, the tool considers heating loads only.*
Monthly Fuel Use in MMBtu	**1,474**	
5. How many hours per year does the facility operate?	/ **8,760**	Use Default based on Application — *Enter the annual operating hours of the facility or choose from one of the hourly operating schedules in the drop-down list. If the annual operating hours of the facility are not known, use the default button that will estimate the operating hours based on the line of business selected in Input 2.*

CHP
EPA COMBINED HEAT AND POWER PARTNERSHIP

CHP Incentives – Inputs 6 - 8

Input No.	Question	Input Type	Notes
6	Would the facility be eligible for the federal Business Investment Tax Credit (ITC)?	User-defined, drop-down	Systems up to 50 MW, factored into overall CHP capital costs
7	Would the facility be eligible for a capital incentive ($/kW)?	User-defined, drop-down	Typically tiered based on CHP size with a project cap ($), factored into overall CHP capital costs
8a.	Would the facility be eligible for a performance ($/kWh) incentive?	User-defined, drop-down	Used to reduce operating costs, factored into estimated annual operating savings calculations
8b.	If the facility is eligible for a performance incentive ($/kWh), what is the length of this incentive in years?	User-defined, drop-down	Typically last less than 3 years, factored into estimated annual operating savings calculations

Example CHP Incentives – Inputs 6 - 8

6. Would the facility be eligible for the federal Business Investment Tax Credit (ITC)?	Yes		*The federal Business Investment Tax Credit (ITC) was recently amended in February 2018 to reinstate CHP technologies. The rebate amount for CHP is 10%, which is applied to the total capital cost of the CHP system.* *Information about the federal ITC is available in dCHPP (CHP Policies and Incentives Database).*
7. Would the facility be eligible for a capital incentive ($/kW)? If yes, please enter a value.	Yes **$1,000**	**/kW**	*Capital incentives are offered to assist customers with the upfront costs of installing a CHP system.* *Information about CHP incentives is available in dCHPP (CHP Policies and Incentives Database).*
8a. Would the facility be eligible for a performance ($/kWh) incentive? If yes, please enter a value.	No		*Note that performance incentives are typically between $0.001/kWh and $0.10/kWh, and the payout periods do not typically exceed 5 years. Information about CHP incentives is available in dCHPP (CHP Policies and Incentives Database).*
8b. If the facility is eligible for a performance incentive ($/kWh), what is the length of this incentive in years?			

CHP
EPA COMBINED HEAT AND POWER PARTNERSHIP

Energy Prices – Inputs 9 - 11

Input No.	Question	Input Type	Notes
9	What is the price of fuel for on-site thermal equipment, in $/MMBtu?	User-defined	Existing on-site price, typically for boilers producing steam or hot water
10	What is the CHP fuel price, in $/MMBtu?	User-defined	Can be a special CHP price depending on utility territory, but in most cases it is the same as the on-site thermal price
11	What is the facility's electricity price, in $/kWh?	User-defined	Obtained from utility bill information, an also be obtained from online sources

Example Energy Prices – Inputs 9 -11

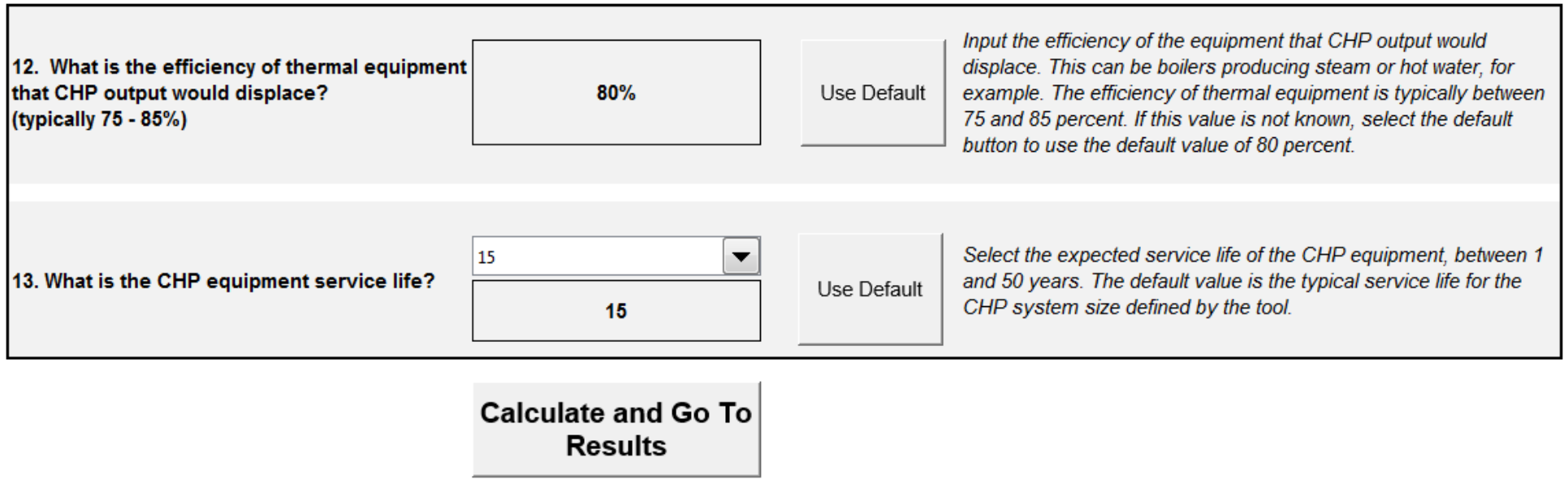
9. What is the price of fuel for on-site thermal equipment, in $/MMBtu?	**$7.00**	*Enter the cost of fuel for on-site thermal equipment, in dollars per MMBtu. For a monthly gas bill, divide the total bill ($) by the monthly MMBtu (0.1 * Therms).* *1 Therm is equivalent to 0.1 MMBtu (1 MMBtu = 10 Therms)* *1 MCF is equivalent to 1.03 MMBtu (1 MMBtu = 0.97 MCF)*
10. What is the CHP fuel price, in $/MMBtu?	**$7.00**	*In many cases the CHP fuel price will be the same as the fuel price entered in Input 9. However, in certain locations, fuel for CHP systems is provided at a special price. If the utility offers a special CHP fuel price, enter it here, otherwise enter the same fuel price used in Input 9.*
11. What is the facility's electricity price, in $/kWh?	**$0.100**	*Enter the all-in price of electricity in $/kWh (for a monthly electric bill, divide the total bill ($) by the monthly kWh).*

CHP
EPA COMBINED HEAT AND POWER PARTNERSHIP

Additional Questions – Inputs 12-13

Input No.	Question	Input Type	Notes
12	What is the efficiency of thermal equipment that CHP output would displace? (typically 75 - 85%)	User-defined or default	Typically boilers producing steam or hot water, default value is 80%
13	What is the CHP equipment service life?	User-defined or default	Expected service life for equipment available on performance specifications page

Example Additional Questions – Inputs 12-13



CHP
EPA COMBINED HEAT AND POWER PARTNERSHIP

Results

The results sheet contains tables with individual results for two CHP system options, and additional explanations for user interpretation:

1. Facility energy use
2. CHP performance information
3. Payback period
4. CHP spark spread
5. Estimated CHP cost to generate electricity
6. CHP capital cost and incentives
7. Estimated change in annual energy and fuel use
8. Estimated annual operating savings

EPA CHP COMBINED HEAT AND POWER PARTNERSHIP

Results – Facility Energy Use

- The following average loads are calculated for example site:

Facility Energy Use

Facility Average Electric Load, kW	342
Facility Average Heating Load, MMBtu/hour	1.6

- Tool identifies two sizes (one to meet average electric load, one to meet average heating load) and selects the smaller of these as the basis for the CHP cost and performance options.

Results – CHP Performance Information

- Option 1: The tool identifies a commercially available CHP system from the “CHP Performance Specifications” worksheet having a kW output less than electric load that could be supported by CHP.
- Option 2: The next larger system on the “CHP Performance Specifications” worksheet is used for option 2.

CHP Performance Information

Option Reference Names	Option 1	Option 2
Electric Load That Could be Supported by CHP (kW)	342	342
CHP System Type Options	285 kW Packaged Recip Engine	375 kW Packaged Recip Engine
Total CHP Efficiency (HHV)	77.4%	81.6%

CHP
EPA COMBINED HEAT AND POWER PARTNERSHIP

CHP Performance Specifications

Option 1 and 2
for example site

CHP EPA COMBINED HEAT AND POWER PARTNERSHIP

Cost and Performance Specifications

CHP Screening Tool

User Manual
Double Click to Launch

System	No CHP	5 kW Packaged Recip Engine	10 kW Packaged Recip Engine	35 kW Packaged Recip Engine	75 kW Packaged Recip Engine	100 kW Packaged Recip Engine	285 kW Packaged Recip Engine	375 kW Packaged Recip Engine	550 kW Packaged Engine	1.1 MW Recip Engine	3.3 MW Recip Engine	7.5 MW Gas Turbine	10.7 MW Gas Turbine	20.4 MW Gas Turbine	40.4 MW Gas Turbine
Minimum CHP Size, kW	0	5	10	35	75	100	285	375	550	1141	3325	7487	10669	20440	40485
Electric Capacity, kW	0	5	10	35	75	100	285	375	550	1141	3325	7487	10669	20440	40485
Thermal Energy Output, MMBtu/hour	0	0.034	0.057	0.20	0.52	0.61	1.32	1.78	2.84	4.46	10.69	36.3	52.2	77.4	133.8
Power to Heat Ratio	No CHP	0.50	0.60	0.59	0.49	0.56	0.74	0.72	0.66	0.87	1.06	0.70	0.70	0.90	1.03
Technology	No CHP	Recip Engine	Recip Engine	Recip Engine	Recip Engine	Recip Engine	Recip Engine	Recip Engine	Recip Engine	Recip Engine	Recip Engine	Gas Turbine	Gas Turbine	Gas Turbine	Gas Turbine
Equipment Cost, $/kW*	No CHP	$4,000	$3,300	$1,680	$1,200	$1,650	$1,600	$1,400	$1,200	$1,380	$1,080	$1,260	$1,100	$910	$770
Installation Cost, $/kW*	No CHP	$8,000	$6,700	$2,710	$2,130	$1,250	$1,600	$1,300	$1,000	$990	$720	$750	$700	$560	$500
Total Installed Cost, $/kW	No CHP	$12,000	$10,000	$4,390	$3,330	$2,900	$3,200	$2,700	$2,200	$2,370	$1,800	$2,010	$1,800	$1,470	$1,270
Heat Rate, Btu/kWh	No CHP	13,650	12,190	11,770	12,640	11,530	10,387	10,003	9,950	9,070	8,340	11,680	12,190	10,310	9,610
Thermal Energy Output, Btu/kWh	No CHP	6,820	5,730	5,829	6,973	6,100	4,632	4,747	5,164	3,909	3,215	4,848	4,893	3,787	3,305
Electric Efficiency, % (HHV)	No CHP	25.0%	28.0%	29.0%	27.0%	29.6%	32.8%	34.1%	34.3%	37.6%	40.9%	29.2%	28.0%	33.1%	35.5%
O&M Costs, $/kWh	No CHP	$0.060	$0.030	$0.021	$0.021	$0.0240	$0.0210	$0.0190	$0.0170	$0.0190	$0.0160	$0.0120	$0.0120	$0.0090	$0.0090
Equipment Service Life, Years	No CHP	15	15	15	15	15	15	15	15	15	15	20	20	20	20
Availability	No CHP	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%
Power to Heat Ratio	No CHP	0.50	0.60	0.59	0.49	0.56	0.74	0.72	0.66	0.87	1.06	0.70	0.70	0.90	1.03
Hot Water or Steam	No CHP	Hot Water	Hot Water	Hot Water	Hot Water	Hot Water	Hot Water	Hot Water	Hot Water	HW/Steam	HW/Steam	Steam	Steam	Steam	Steam

CHP EPA COMBINED HEAT AND POWER PARTNERSHIP

Results – Payback Period

- Simple metric to help users easily estimate the viability of a potential CHP project
- Period of time required to recoup the capital cost of the CHP system
- $$Payback\ Period = \frac{Net\ Capital\ Cost\ After\ Incentive\ (\$)}{Annual\ Operating\ Savings\ (\$)}$$

Payback Period

CHP System Type Option	Option 1	Option 2
Payback Period (Years)	6.5	4.8
Payback Period Range	4 - 7 Years	

CHP
EPA COMBINED HEAT AND POWER PARTNERSHIP

Results – CHP Spark Spread

- Another useful metric to understand the viability of a potential CHP system
- Difference between the all-in electric rate (before CHP), and the effective electric rate paid with CHP
- The greater the CHP spark spread, the higher the potential return on investment

CHP Spark Spread

CHP System Type Option	Option 1 ($/kWh)	Option 2 ($/kWh)
All-in Electric Rate Before CHP, $/kWh	$0.100	$0.100
Effective Electric Rate with CHP, $/kWh	$0.093	$0.081
CHP Spark Spread, $/kWh	**$0.007**	**$0.019**

Note: If the CHP spark spread is a negative value, the project may still be favorable depending on the user's needs (such as resilience) and payback period requirements. To further understand the results, please contact the CHP Partnership at chp@epa.gov.

Results – Estimated CHP Cost to Generate Electricity

- Cost for the facility to generate electricity with CHP ($/kWh), including:
  - Variable costs to operate and maintain the system
  - Fixed costs associated with the purchase of the CHP system
  - Available incentives

Estimated CHP Cost to Generate Electricity

CHP System Type Option	Option 1 ($/kWh)	Option 2 ($/kWh)
CHP Fuel	$0.073	$0.070
Operation and Maintenance	$0.021	$0.019
Thermal Energy Credit	($0.041)	($0.041)
Operating Costs to Generate Electricity	**$0.053**	**$0.048**
Capital Charge	$0.029	$0.022
Total Costs to Generate Electricity	**$0.082**	**$0.070**
Performance Incentive	$0.000	$0.000
Net Total Cost to Generate Electricity After Perf. Incentive	**$0.082**	**$0.070**

Variable costs, including a thermal energy credit that takes into account the avoided boiler fuel

Fixed (capital) costs, including the capital incentives, also includes 7% cost of capital assumption

Net cost to the facility, including all costs and incentives

CHP
EPA COMBINED HEAT AND POWER PARTNERSHIP

Results – CHP Capital Cost and Incentives

- Breakdown of all capital costs associated with the CHP systems, including incentives
- Estimated based on CHP systems in *CHP Performance Specifications* worksheet, and pro-rated based on the "electric load that could be supported by CHP (kW)"

CHP Capital Cost and Incentives

CHP System Type Option	Option 1 (Total $)	Option 2 (Total $)
Equipment Cost	$547,945	$479,452
Installation Cost	$547,945	$445,205
Total Capital Cost	**$1,095,890**	**$924,658**
Federal ITC	$75,342	$58,219
Capital Incentive	$342,466	$342,466
Net Capital Cost After Incentives	**$678,082**	**$506,849**

CHP
EPA COMBINED HEAT AND POWER PARTNERSHIP

Results – Estimated Change in Annual Energy and Fuel Use

- Estimates annual electricity use, thermal energy use, and fuel use for a facility without CHP, and for the two CHP system options
- Useful for comparing energy and fuel use of different CHP systems to a facility without CHP
- Non-CHP thermal equipment fuel also include purchases required when the CHP system is not available because of planned and unplanned outages

Estimated Change in Annual Energy and Fuel Use

	No CHP	With Option 1	With Option 2
Annual Electricity Use, kWh			
Purchased Electricity	3,000,000	150,000	150,000
CHP Electricity Generation	0	2,850,000	2,850,000
Total Annual Electricity Use, kWh	**3,000,000**	**3,000,000**	**3,000,000**
Annual Thermal Energy Use, MMBtu/yr	0	0	0
CHP	0	13,200	13,442
Non-CHP Thermal Equipment	14,150	950	707
Total Thermal Energy Use, MMBtu/yr	**14,150**	**14,150**	**14,150**
Annual Fuel Use, MMBtu/yr	0	0	0
CHP	0	29,602	28,510
Non-CHP Thermal Equipment	17,687	1,187	884
Annual Total Fuel Use, MMBtu/yr	**17,687**	**30,789**	**29,394**

CHP
EPA COMBINED HEAT AND POWER PARTNERSHIP

Results – Estimated Annual Operating Savings

- Highlights annual operating costs for a facility without CHP, and for the two options identified in the *CHP Performance Information* table
- Calculates operating savings for both CHP options compared to the facility with no CHP

Estimated Annual Operating Savings

	No CHP	With Option 1	With Option 2
Annual Operating Costs			
Purchased Electricity	$300,000	$43,500	$43,500
Purchased Non-CHP Thermal Equipment Fuel	$123,810	$8,310	$6,191
Purchased CHP Fuel	$0	$207,214	$199,567
Operation and Maintenance	$0	$59,850	$54,150
Total Annual Operating Costs	**$423,810**	**$318,874**	**$303,407**
Annual Operating Savings Compared to No CHP		***$104,936***	***$120,403***

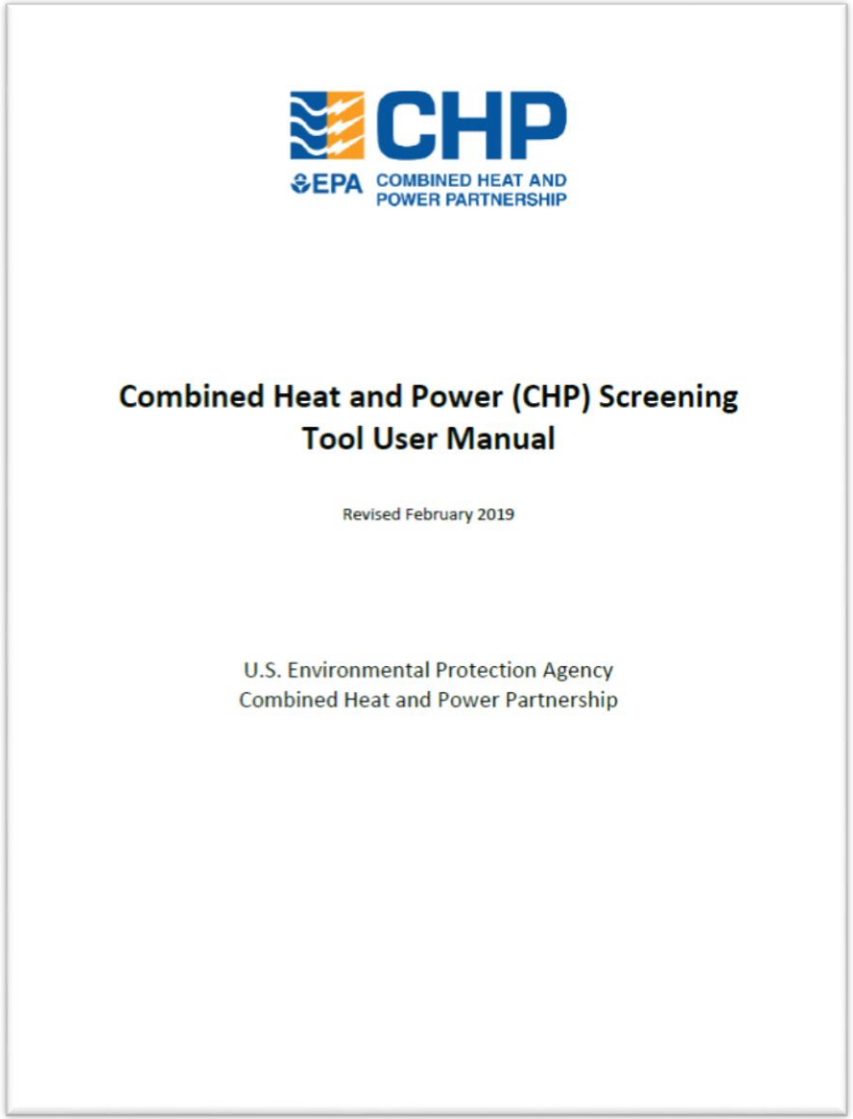
CHP
EPA COMBINED HEAT AND POWER PARTNERSHIP

Key Takeaways

- EPA's CHP Screening Tool is a comprehensive, preliminary screening tool that is downloadable for the public online. Additional tools that are not publicly available may provide more sophisticated screenings.
- The tool estimates the size and economic performance of a potential CHP system at a facility using cost and performance data from a set of commercially available CHP systems.
- By using this tool during the project exploration stage, project teams can gain a better understanding of CHP and CHP's potential value for their facility.
- A detailed feasibility study is an important next step and will take into consideration the typical load profile that can be used to more accurately determine the appropriate CHP size and equipment options for the facility.

User Manual

- For additional details on methodology, assumptions, and calculations refer to the ***User Manual*** included in each sheet in the tool



CHP
EPA COMBINED HEAT AND POWER PARTNERSHIP

Thank you

EPA CHP Screening Tool Landing Page

https://www.epa.gov/chp/my-facility-good-candidate-chp

CHP Screening Tool Direct Download

https://www.epa.gov/sites/production/files/2019-03/chp_screening_tool.xlsm

Meegan Kelly

meegan.kelly@icf.com

+1.301.572.0978

EPA CHP COMBINED HEAT AND POWER PARTNERSHIP

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

CHP for Resiliency Screening Tool

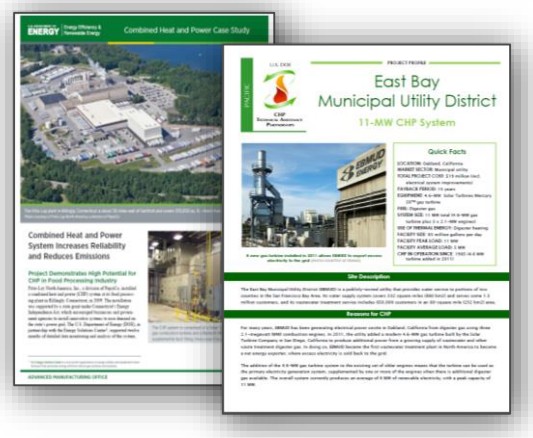
April 30, 2019

Bruce Hedman

Senior Consultant, DOE CHP Deployment Program

U.S. DOE CHP Deployment Program

- **Mission**
  - Provide stakeholders with the resources necessary to identify CHP market opportunities
  - Support implementation of cost-effective CHP systems in industrial, commercial, institutional, and other applications
- **Scope**
  - CHP Technical Assistance Partnerships (CHP TAPs)
  - CHP Market and Project Resources
  - CHP for Resiliency Accelerator
  - Packaged CHP eCatalog and Accelerator

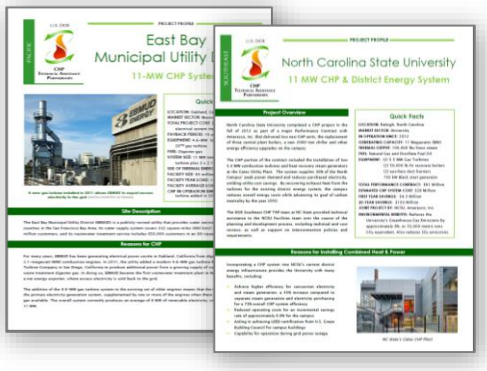


www.energy.gov/chp

32

CHP Market and Project Resources

DOE Project Profile Database



www.energy.gov/chp-projects

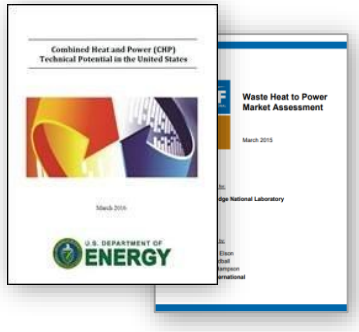
Technology Fact Sheets

www.energy.gov/chp-technologies

DOE CHP Installation Database

www.energy.gov/chp-installs

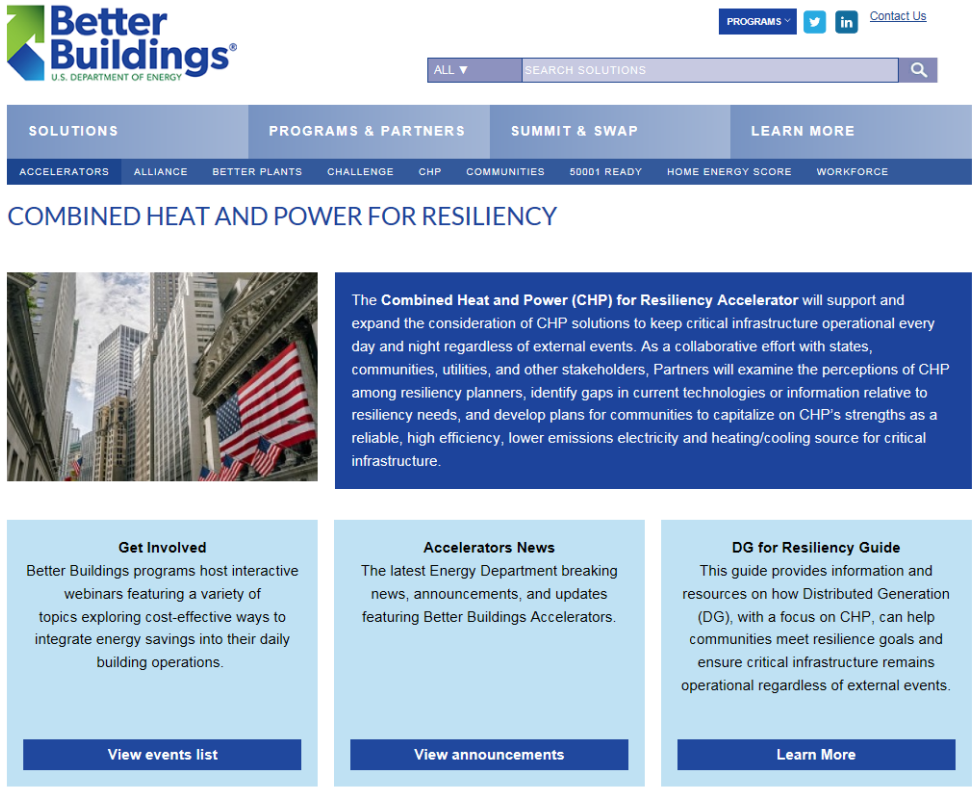
Market Reports



www.energy.gov/chp-potential

CHP for Resilience Accelerator

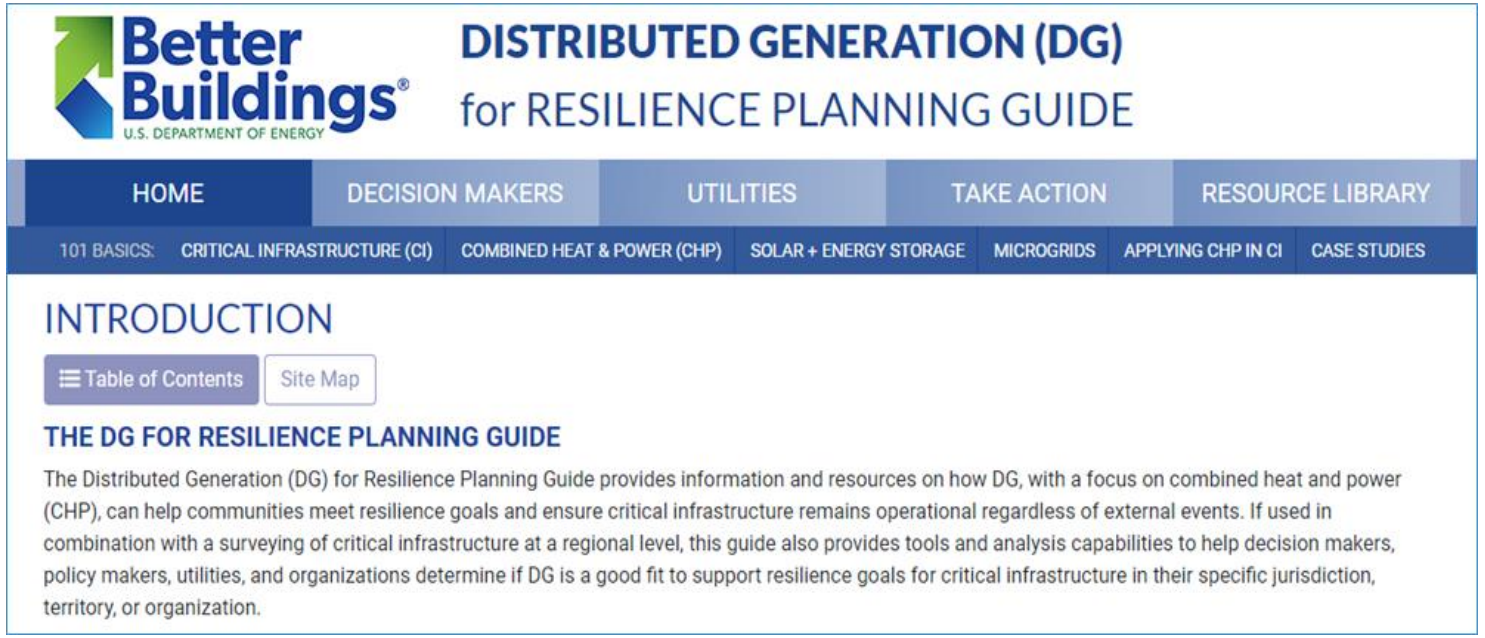
- Purpose:
  - Incorporate consideration of CHP into resiliency planning efforts at the city, state, and utility levels
- Collaborate with Partners to:
  - Assess opportunities for CHP to maintain critical operations
  - Document Partner process for replicability
- Key Materials Developed:
  - DG for Resilience Planning Guide
  - CHP for Resilience Screening Tool
  - Partner Profiles



https://betterbuildingsinitiative.energy.gov/accelerators/combined-heat-and-power-resiliency

The DG for Resilience Planning Guide

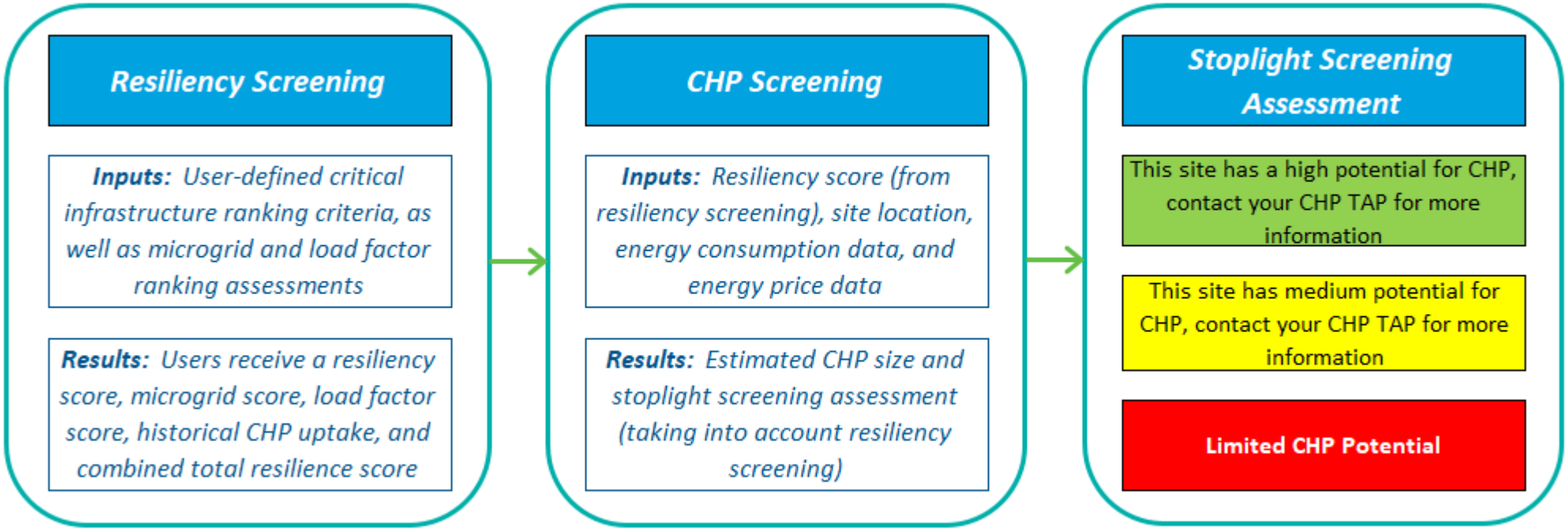
Web-based guide that provides information and resources on how distributed generation (w/a focus on CHP), can help communities meet resilience goals and ensure critical infrastructure remains operational regardless of external events.



https://resilienceguide.dg.industrialenergytools.com/

The CHP for Resilience Screening Tool

- Excel-based tool that provides a site screening assessment for CHP based on a variety of resiliency factors, user inputs and pre-determined metrics



https://betterbuildingsinitiative.energy.gov/accelerators/combined-heat-and-power-resiliency

36

Resiliency Screening

- Provides a framework to identify and prioritize critical infrastructure facilities based on resilience factors
- Allows users to provide individual rankings for each site entered
- Eight factors identified as a means to prioritize Critical Infrastructure facilities for CHP:

Critical Infrastructure Priority Rankings	
Government Continuity	Economic Impact
Locational	Microgrid
Leverage / Scalability	Load Factor
Life Safety	Historical Uptake

37

Resiliency Screening

CHP for Critical Infrastructure Facility Priority Ranking Table

Using the ranking criteria above, select a facility type, and provide a score for each ranking (A-H)		Factor A	Factor B	Factor C	Factor D	Factor E	Factor F		Resiliency Total	Factor G			Factor H	Combined Total
Facility Identification	Facility Type	Government Continuity Ranking	Locational Ranking	Leverage/ Scalability	Life Safety	Economic Impact	Part of Microgrid	Microgrid Score	Resiliency Score	Question	Answer	Load Factor Score	Historic Uptake	Combined Score
Example Site 1	College or University	3	3	2	4	4	Yes	3	19	Student housing	Yes	5	5	29
Example Site 2	Hospital	4	4	4	5	5	Yes	3	25	> 50 beds	Yes	5	4	34
Example Site 3	Police Station	4	4	3	3	3	Yes	3	20			2	1	23
Example Site 4	Airport	4	2	1	3	5	No	0	15			5	3	23

Users enter ranking scores (1-5) or select from ranking drop-downs

Additional questions for select facility types provide further detail

Combined resiliency score used in CHP screening calculations

CHP Screening

- Builds upon resilience screening to provide high-level economic screening for CHP
- Utilizes basic site data and resilience screening to estimate economic viability for CHP

Site Information – The three metrics below are internally transferred from the Resiliency Screening step:
- Facility Identification (Site Number)
- Facility Type (one of the 17 CHP sub-sectors identified in the Take Action section of the DG for Resilience Planning Guide)
- Resiliency Score (out of 28)
Location – U.S. state or territory
Climate Zone – building climate zones based on average heating load requirements
Electric Utility – what electric utility serves the site? (from drop-down list for each state)
Annual electric use (kWh) – user input only
Annual Fuel Use (MMBtu) – user input or default based on facility type
Fuel price ($/MMBtu) – user input or can select state average price
Electric price ($/kWh) – user input or can select state average or utility average price
Resilience value ($, $/kW, or $/kWh) – user input for a value of resilience for the individual facility
Incentive value ($, $/kW, or $/kWh) – user input for an incentive value for the individual facility

39

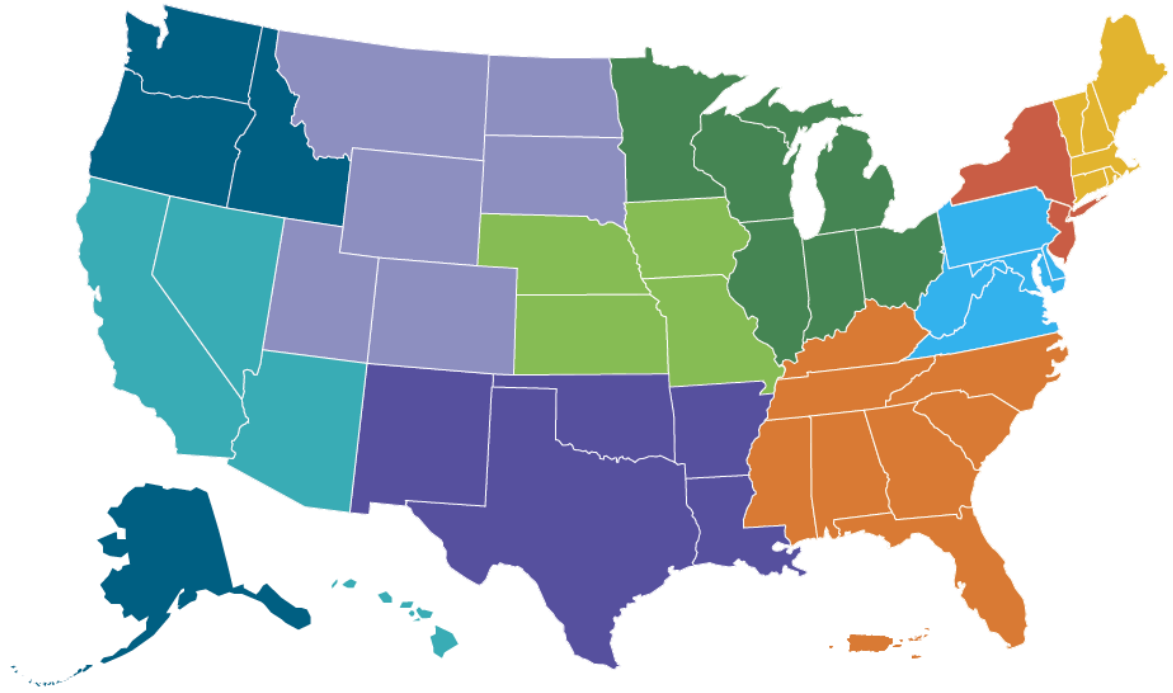
Results

- Screening tool estimates CHP system size range based on user inputs
- Stoplight screening indicates the potential for CHP at the individual facility, and additional information for moving to more detailed screening or analysis

CHP Site Screening Results					
Site Summary Information (transferred based on the information entered in the resiliency screening section and Input 1)			The results below include the estimated CHP size, a stoplight screening indicating the potential for CHP at the individual facility, and additional information to assist users in determining which sites should move forward in contacting their CHP TAP for further analysis and useful implementation resources.		
Facility Identification	**Facility Type**	**State**	**CHP Size Range**	**Stoplight Screening**	**Additional Information**
Example Site 1	**College or University**	NJ	9-10 MW	**This site has a high potential for CHP, contact your CHP TAP for more information**	New York-New Jersey CHP TAP
Example Site 2	**Hospital**	WA	2-3 MW	**This site has a high potential for CHP, contact your CHP TAP for more information**	Northwest CHP TAP
Example Site 3	**Police Station**	IA	25-50 kW	**Limited CHP Potential**	*If this building is still a critical facility, you should consider other resilient technologies or talk to your utility about additional rebates that may be available*
Example Site 4	**Airport**	RI	300-350 kW	**This site has medium potential for CHP, contact your CHP TAP for more information**	New England CHP TAP

40

CHP Technical Assistance Partnerships (CHP TAPs)



Northwest WA, OR, ID, AK
www.northwestCHPTAP.org
David Van Holde, P.E.
Washington State University
360-956-2071
VanHoldeD@energy.wsu.edu

Upper-West UT, CO, WY, MT, ND, SD
www.upperwestCHPTAP.org
Gavin Dillingham, Ph.D.
HARC
281-216-7147
gdillingham@harcresearch.org

Midwest MN, WI, MI, IL, IN, OH
www.midwestCHPTAP.org
Cliff Haefke
University of Illinois at Chicago
312-355-3476
chaefk1@uic.edu

New England VT, NH, ME, MA, RI, CT
www.newenglandCHPTAP.org
David Dvorak, Ph.D., P.E.
University of Maine
dvorak@maine.edu
207-581-2338

New York-New Jersey NY, NJ
www.newyorknewjerseyCHPTAP.org
Tom Bourgeois
Pace University
914-422-4013
tbourgeois@law.pace.edu

Mid-Atlantic PA, WV, VA, DE, MD, DC
www.midatlanticCHPTAP.org
Jim Freihaut, Ph.D.
The Pennsylvania State University
814-863-0083
jdf11@psu.edu

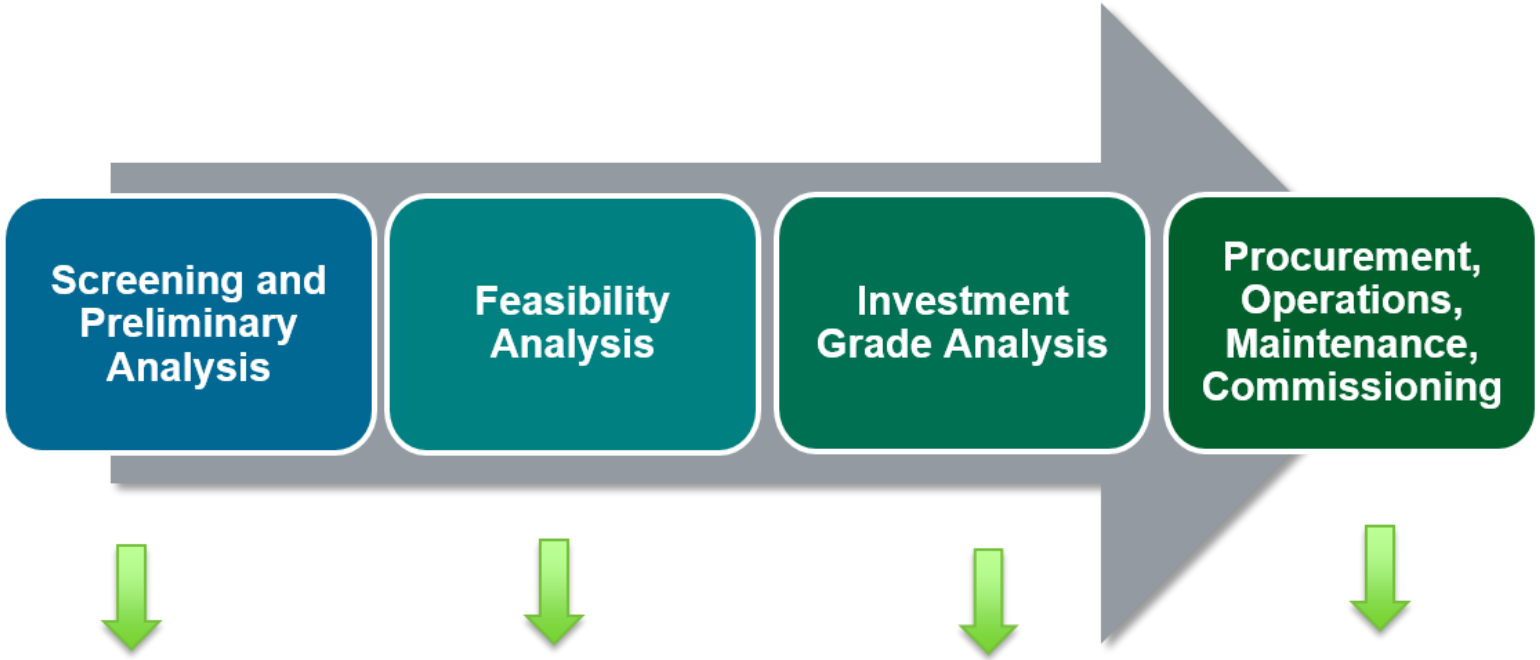
Southeast KY, TN, NC, SC, GA, FL, AL, MS
www.southeastCHPTAP.org
Isaac Panzarella, P.E.
North Carolina State University
919-515-0354
ipanzarella@ncsu.edu

Western CA, NV, AZ, HI
www.westernCHPTAP.org
Gene Kogan
Center for Sustainable Energy
858-633-8561
gene.kogan@energycenter.org

Southcentral TX, NM, OK, AR, LA
www.southcentralCHPTAP.org
Gavin Dillingham, Ph.D.
HARC
281-216-7147
gdillingham@harcresearch.org

Central NE, IA, KS, MO
www.centralCHPTAP.org
Cliff Haefke
University of Illinois at Chicago
312-355-3476
chaefk1@uic.edu

CHP TAP Technical Assistance



Speaker Info

CONTACT INFO:

John Moynihan
Cogen Power Technologies
518-213-1090
jmoynihan@powerbycogen.com

John Moynihan, CEM, CEP

John has nearly 25 years of combined experience in cogeneration, energy management, procurement, and systems design.

He is the Managing Partner of *Cogen Power Technologies,* an award-winning energy consulting firm and has led the firm to become a frontrunner and innovator in providing all-inclusive onsite cogeneration services – bridging the gap between the technology and the practical application for end users.

His signature projects include cogeneration plants at Penn State Health Milton S. Hershey Medical Center, Albany Medical Center, and Union College.

Mr. Moynihan has a Bachelor of Science degree in electrical engineering from Rochester Institute of Technology and a Master of Engineering degree in Electrical Power Engineering from Rensselaer Polytechnic Institute. He is a Certified Energy Manager (CEM) and Certified Energy Procurement Professional (CEP).

John has completed 10 different CHP plants since 2009. These plants have produced over half-a-billion kWhs of electricity since then, and average over 94% availability each year. John is the current Chairman of the Board for the Northeast Clean Heat and Power Initiative.

Questions?