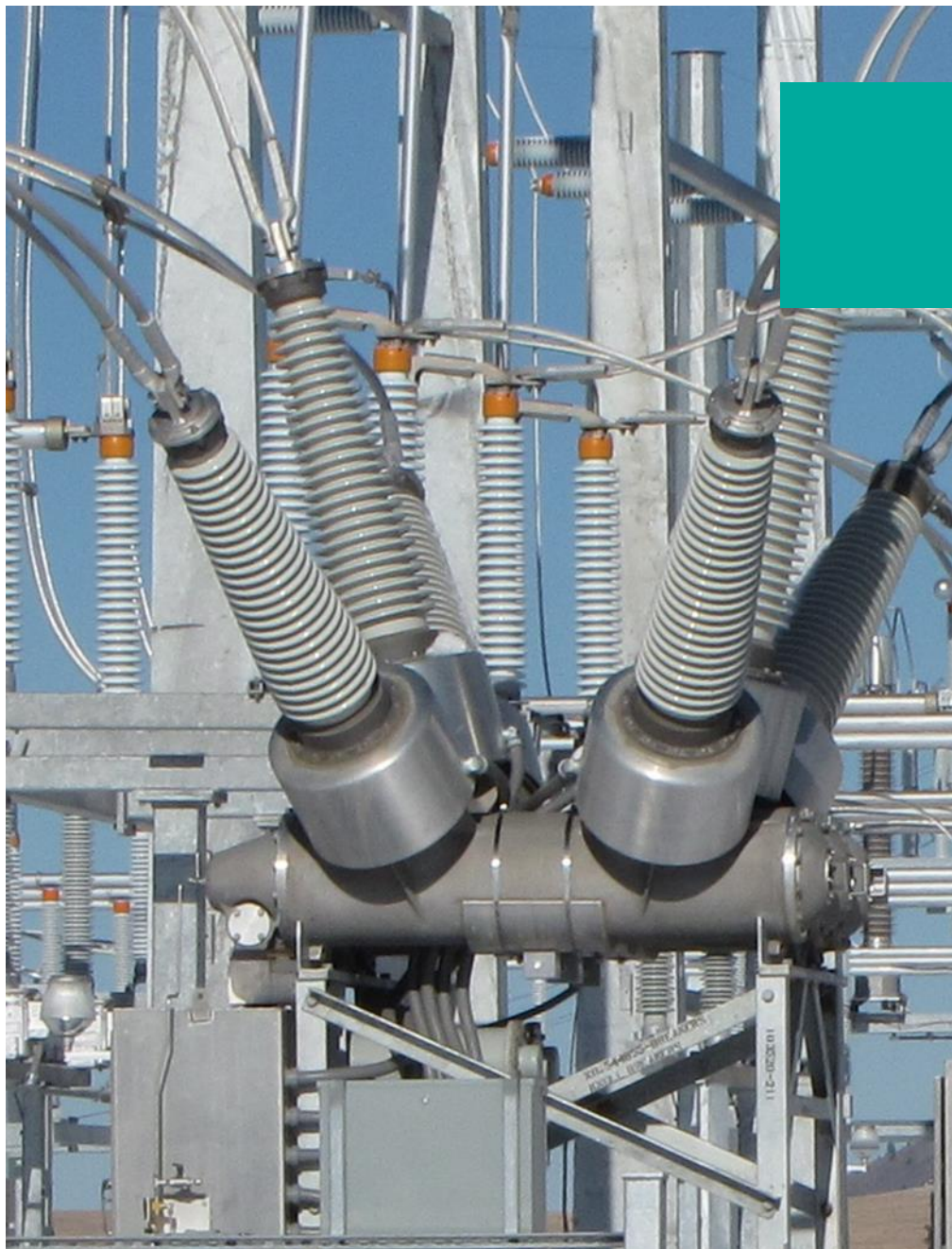




NYSERDA's CHP PROGRAM & SUPPORTING MARKET ENGAGEMENT EFFORTS

Matthew Lockwood, ERS



AGENDA

1

NYS CHP before PON 2568

2

PON 2568 overview

3

Ecosystem of NYS CHP Programs

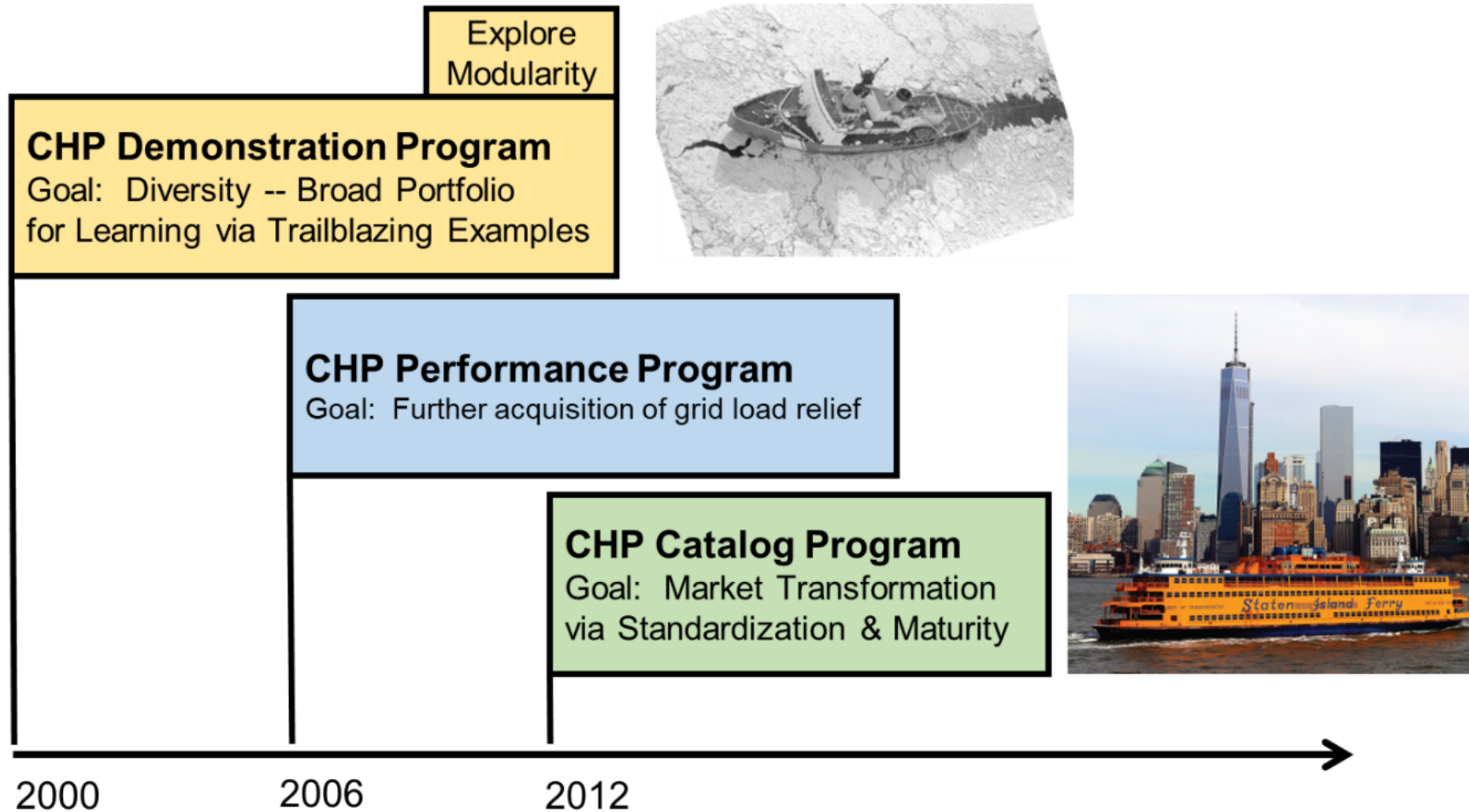
4

Closing – DOE's eCatalog

5

Q & A

NYSERDA's PROGRAM EVOLUTION



A photograph of an industrial facility, likely a CHP plant, featuring large green units with silver frames and yellow piping. A person is visible in the background near one of the units. The floor is light-colored and reflective. The ceiling has exposed pipes and lighting fixtures.

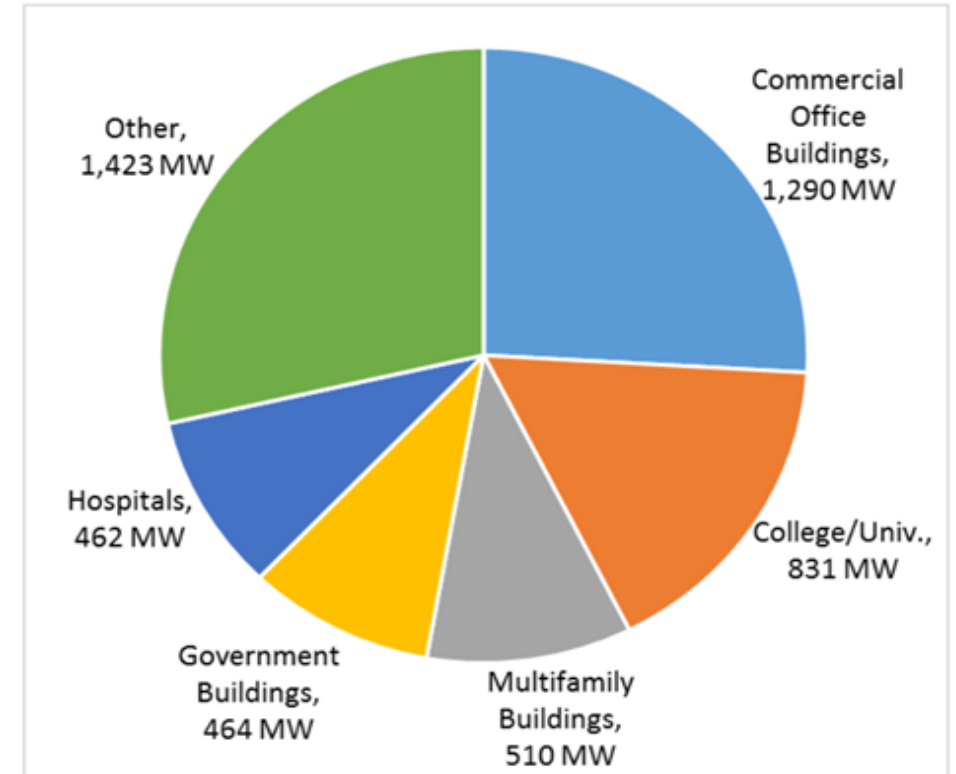
NYS CHP BEFORE PON 2568

NYS CHP TECHNICAL POTENTIAL

US DOE, 2016

- US DOE CHP Installation Database:
 - 415 MW installed between 1960 and 2011
 - 40% Colleges/Universities (165 MW)
 - 24% Multifamily (99 MW)
 - 11% Hospitals (44 MW)
- NYSERDA Market Potential Study, 2012:
 - ≈ 6,500 MW in all sectors

Figure 2: Top Commercial Business Types with On-site CHP Technical Potential



There is 4,981 MW of commercial, institutional and multifamily on-site CHP technical potential in New York, primarily in the commercial (office) buildings, colleges and universities, multifamily buildings, government buildings, and hospitals sectors.



NEW YORK STATE ENERGY GOALS

- 40% reduction in GHG emissions by 2030
- 50% of generation from renewables
- 600 TBtu increase in EE from 2012
- Promote reliability and resiliency via the development of local energy resources

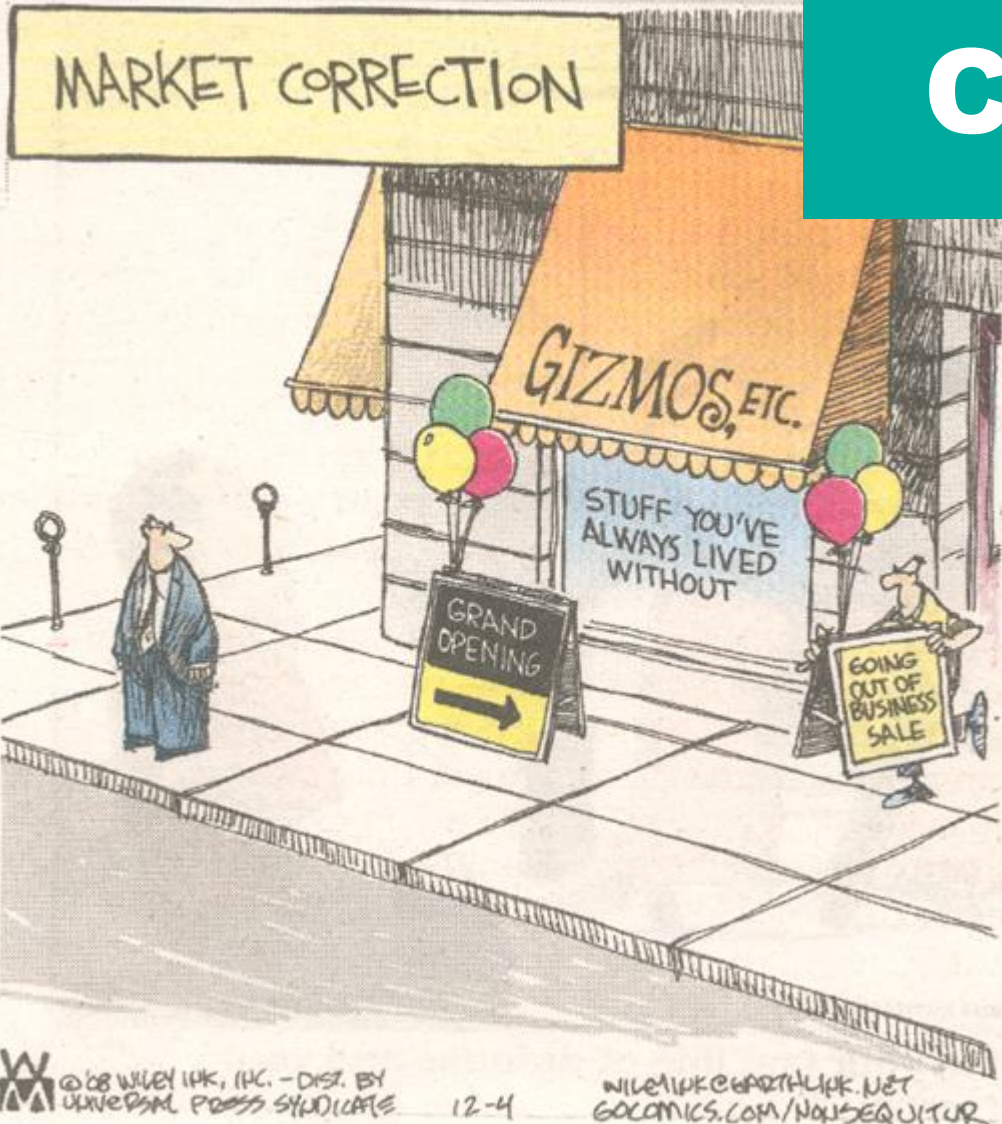
Application	50- <500 kW (MW)	500 kW- <1 MW (MW)	1- <5 MW (MW)	5-<10 MW (MW)	10 - <20 MW (MW)	≥20 MW (MW)	Total MW
Industrial	6,281	4,341	15,567	9,064	7,971	22,157	65,381
Commercial	20,068	18,100	20,284	5,504	3,948	8,026	75,930
Total	26,349	22,441	35,851	14,568	11,919	30,183	141,311

Source: US DOE *CHP Technical Potential* in the US, March 2016

**99,200 MW
POTENTIAL <10
MW NATIONWIDE**



NON SEQUITUR by Wiley



CHALLENGES

- CHP viewed as a discretionary purchase
- Installations are often unique
- End-user responsibility
- Soft costs
- Lack of consumer awareness/ understanding

An aerial photograph of the New York City skyline at sunset. The sun is low on the horizon to the right, casting a warm, golden glow over the city. The Empire State Building is prominent in the center. The Hudson River is visible on the left, and the East River is on the right. The sky is filled with soft, orange and yellow clouds.

NYSERDA's CHP PROGRAM

PON 2568

NYSERDA's AXIOMS

- Public policy objectives encourage the deployment of clean and efficient CHP systems.
- The perpetual use of publicly funded subsidies is a less-desirable mechanism than transforming the market to where it can be self-sustaining.
 - Incentivizing projects builds competency in the marketplace, but this alone is too passive to achieve market transformation.
 - The market needs genuine cost reductions to achieve self-sufficiency.
 - A well-crafted incentive program is important, but it is not enough.

PROGRAM APPROACH

- **Objective:** Realign the way deals are transacted in the marketplace to:
 1. Achieve genuine cost reductions.
 2. Increase consumer confidence.
- Facilitating customer acquisition will reduce marketing/soft costs and early-stage project development.
- Facilitating replicable project designs will reduce design errors, associated performance losses, and re-work expenses. This will also reduce uncertainty for AHJs.

OBJECTIVES OF NYSERDA's CHP PROGRAM

- Educate the market on the benefits offered to their organization by 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 yield high-quality installations



NYSERDA's CHP CATALOG

Packaged CHP facilitates:

- Cost reductions for customer acquisition
- Incorporation of value via expert design professionals
- Single-point responsibility (no finger pointing)
- Expansion of alternative financing strategies, such as PPAs
- Independent endorsement based on in-depth analytical review
- Comparison shopping



BRINGING CHP INTO THE MASS-MARKET AGE

- No more science experiments
- CHP as a pre-assembled, mass-market product
- Simplification via *personalization*, not *customization*



INGREDIENTS FOR SUCCESS

Qualified team

Quality equipment

Well-sized to building loads

WARRANTY AND MAINTENANCE

- **Warranty:** All vendors are required to include a 5-year bumper-to-bumper warranty for each pre-approved *catalog* project. The CHP solution provider has responsibility to implement immediate fixes regardless of the cause of the defect (e.g., item supplied by subcontractor, fault of integrator, fault of installer, fault of maintainer).
- **Maintenance Plan:** NYSERDA requires a minimum 5-year maintenance package offered by the CHP solution provider. The customer receives the best service via vendor-trained technicians. This is a conduit for feedback to the vendor whenever issues are observed in a specific model number.

INCENTIVE GLIDE PATH

2/1/2013 – 8/31/2016	100%
9/1/2016 – 2/28/2017	95%
3/1/2017 – 8/31/2017	90%
9/1/2017 – 2/28/2018	85%
3/1/2018 – 8/31/2018	80%
9/1/2018 – 12/14/2018	75%
12/15/2018 – Close	65%

NYSERDA CHP Program - PON 2568

Incentive Calculator

This tool is provided as an incentive estimator. Final project incentive will be confirmed by NYSERDA *when a purchase order is issued*. Do not use this tool to estimate incentives for back-pressure steam-turbines or ORC-only projects.

CHP System Size

Please enter the aggregate system kW-electric in the appropriate highlighted cell.

The size of the chiller or ORC should reflect only the capacity resulting from using the thermal output of the CHP prime mover(s).

Aggregate Nameplate Generation Capacity (black-start) (kW)		kW
Aggregate Nameplate Generation Capacity (non-black-start) (kW)		kW
Integrated Chiller Capacity (Tons)		tons
Integrated ORC Generation Capacity (kW)		kW

CHP Incentive Estimator

Date Application Received in Full:	Through 8/31/16	9/1/16 - 2/28/17	3/1/17 - 8/31/17	9/1/17 - 2/28/18	3/ 8/
Upstate Incentive	\$0	\$0	\$0	\$0	\$0
+ One Bonus ¹	\$0	\$0	\$0	\$0	\$0
Downstate Incentive	\$0	\$0	\$0	\$0	\$0
+ One Bonus ¹	\$0	\$0	\$0	\$0	\$0
+ Two Bonuses ¹	\$0	\$0	\$0	\$0	\$0

¹ Bonuses: 10% bonus for critical infrastructure, 10% bonus for ConEd Target Zone

CHP Funding Links

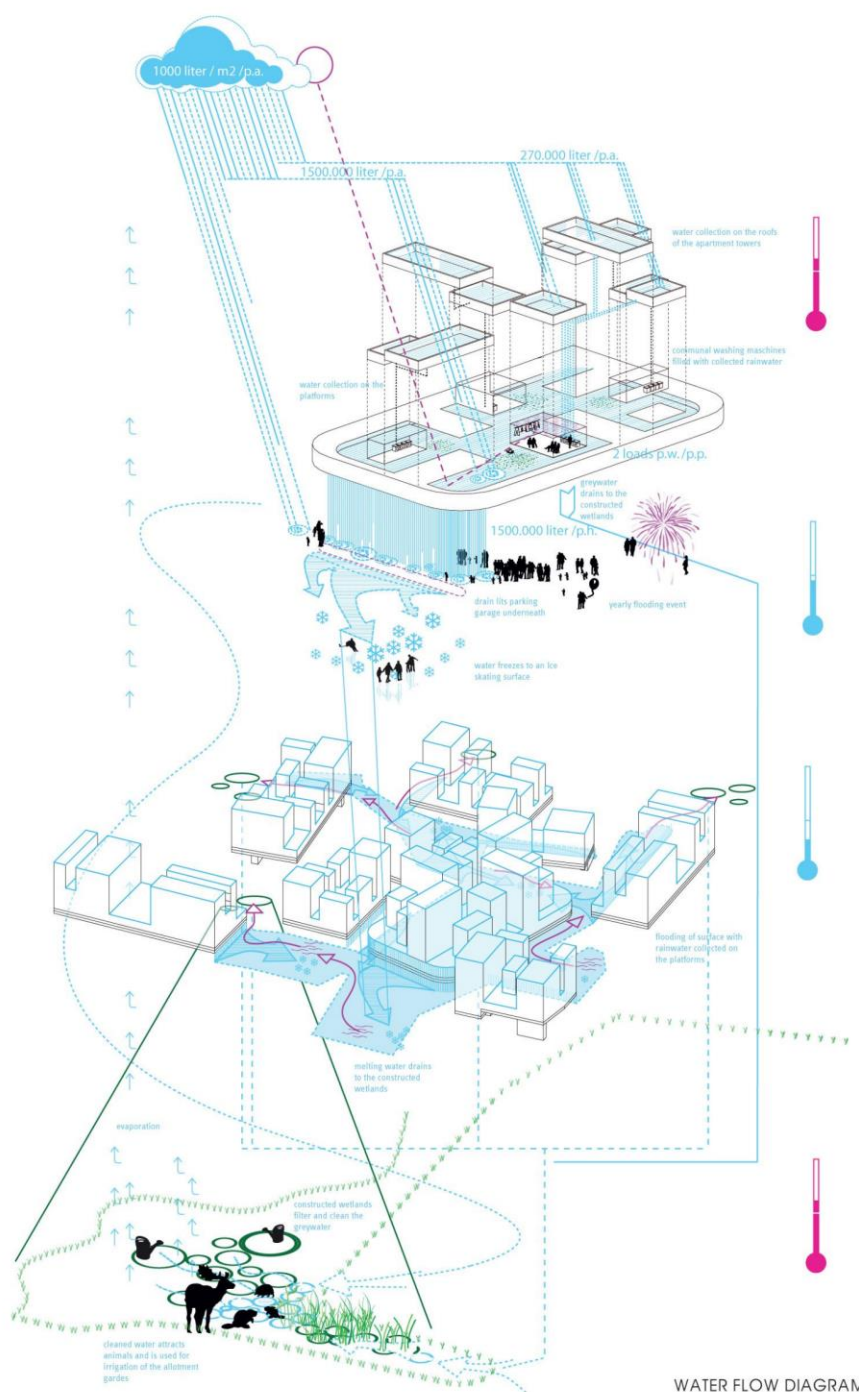
CHP Program PON 2568 will close on 12/31/19 or whenever the budget becomes fully-committed, whichever comes first. A CHP Rem availability of remaining funds is posted at the following link. Please consult the dashboard often.

https://portal.nyserdera.ny.gov/CORE_Solicitation_Detail_Page?SolicitationId=a0rt0000000QnqyAAC

The Joint Utilities offer Non-Wires Alternative programs that may offer an additional source of funding for CHP projects. Con Edisor May 1, 2020 in the Brooklyn-Queens Demand Management zone.

<http://jointutilitiesofny.org/utility-specific-pages/nwa-opportunities/>

<https://www.coned.com/-/media/files/coned/documents/save-energy-money/rebates-incentives-tax-credits/rebates-in-customers/commercial-and-industrial-program/combined-heat-and-power-program.pdf?la=en>



WATER FLOW DIAGRAM

ECOSYSTEM OF CHP MARKET SUPPORT



VARIETY OF EFFORTS

- Public Events
- Outreach and Technical Assistance
- FlexTech Feasibility Studies
- Engagement with AHJs
- Inspection and Recommissioning

ERS / NYSERDA TECHNICAL ASSISTANCE

- Paid for by NYSERDA
- End-to-end support
- Guidance and consultation
- Customer education
- Supporting feasibility assessment process
- Guidance on selecting an appropriate system
- **Neutral, third-party analysis**
- **Acting as NYSERDA's agent**

SERVICES OFFERED BY ERS

- **Public events** – Opportunities to provide introductions to CHP and connect end users with solutions providers
- **Education** – Personalized understanding of technology and value proposition to specific business
- **Pre-screening** – High-level review of specific costs and benefits offered by CHP
- **Site visits** – Discover any site-specific obstacles to CHP
- **RFP services** – Opt-in coordination of competitive solicitations
- **Proposal review** – Apples-to-apples comparisons of proposals
- **Concierge** to access other NYSERDA supports or navigate AHJ process



PUBLIC EVENTS

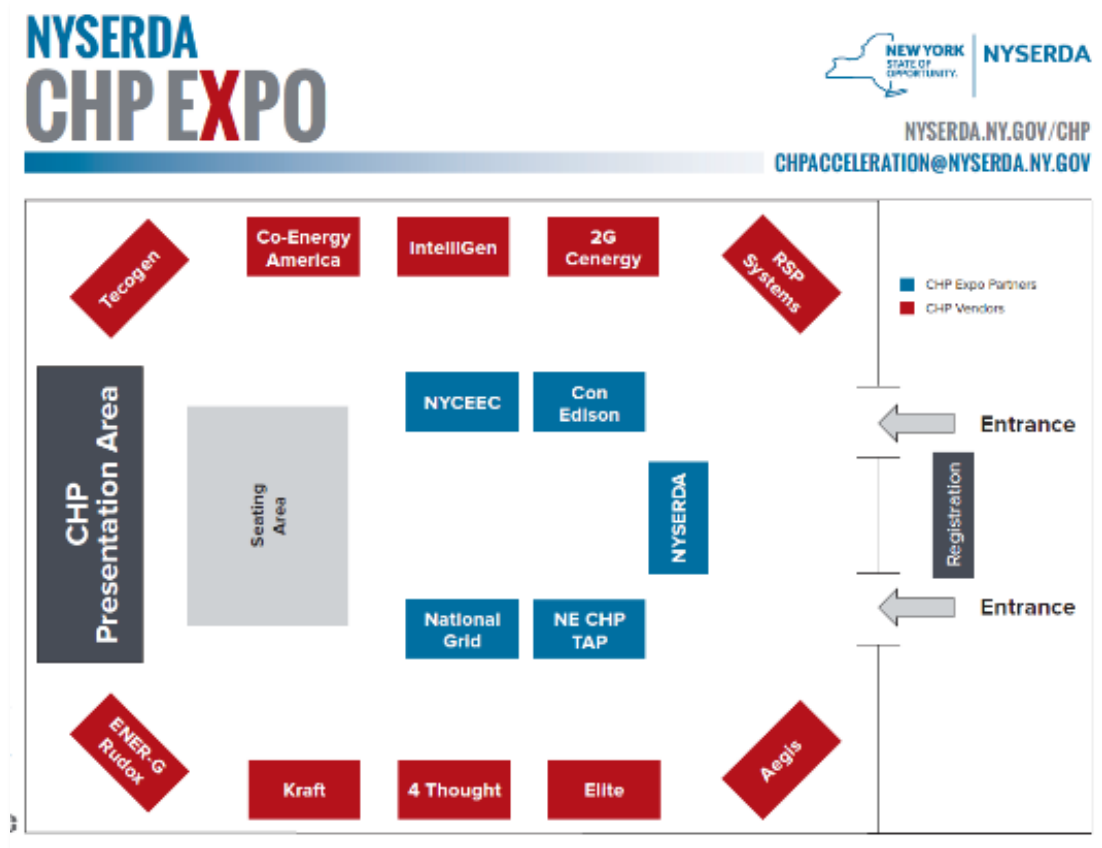
- Talk and Tour events
- Webinars
- CHP expos
- Presence at strategic partner events/networking events

TALK AND TOUR EVENTS

- Introduction to CHP technology
- Opportunity to view successful CHP installation – seeing is believing
- Engage with other customers and organizations who have already installed CHP
- Learn about the CHP project process
- Limited vendor presence
- Focus on customer-to-customer



EXPOSITIONS – COMPARISON SHOPPING



- Introduction to CHP technology, strong focus on steps necessary to implement projects
- Opportunity to meet with strategic partners – financing communities, AHJs, technical assistance resources, and sources of market-based compensation
- Meet and greet with solution provider community
- Focus on face-to-face interactions

SERIES OF NYSERDA CHP EXPOS

NYSERDA CHP EXPO

MANHATTAN

SEPTEMBER 9, 2015

The TimesCenter
242 West 41st Street, New York, NY 10036
10:00 a.m. to 3:00 p.m.

Register today: chpExpoManhattanSept9.eventbrite.com
There is no cost to attend this event.

NYSERDA's Combined Heat and Power Expo is designed to help commercial, industrial, and multifamily building owners and managers connect with pre-approved Combined Heat and Power (CHP) equipment vendors and other organizations offering financial and technical support for the installation of CHP systems. NYSERDA's CHP programs offer support for systems 50 kW and larger.

Building owners, managers, and other representatives are invited to stop by and speak with CHP system vendors, NYSERDA staff, and U.S. Department of Energy's CHP Technical Assistance Partnership representatives about the various products and services available to capture significant energy savings and improve the resiliency of their buildings.

THE EXPO WILL FEATURE:

- Information from vendors of pre-approved CHP systems featured in NYSERDA's CHP Catalog.
- Information on the support available through NYSERDA's CHP Program (PON 2568).
- Information on FREE technical assistance and project screening offered through the U.S. Department of Energy's Northeast CHP Technical Assistance Partnership.
- Q&A time with representatives from Con Edison, National Grid, and NYCEEC.

REGISTER TODAY:

chpExpoManhattanSept9.eventbrite.com

Questions? chpAcceleration@nyserra.ny.gov

Please note: NYSERDA's CHP Catalog includes systems for buildings with a monthly electric bill of \$5,000 or more.

For more information on CHP program details,
please visit nyserra.ny.gov/chp

November 22, 2013

The TimesCenter – 242 West 41st Street
Expo Hours – 10:00 a.m. to 3:00 p.m.

There is no cost to attend this event.

Manhattan

Wednesday, February 26, 2014

Sheraton LaGuardia East Hotel
135-20 39th Avenue, Flushing, NY
Expo Hours – 10:00 a.m. to 3:00 p.m.

There is no cost to attend this event.

Queens

Wednesday, May 14, 2014

Holiday Inn Albany
205 Wolf Road, Albany, NY
Expo Hours – 10:00 a.m. to 3:00 p.m.

There is no cost to attend this event.

Albany

Tuesday, May 20, 2014

Sheraton Brooklyn New York Hotel
228 Duffield Street, Brooklyn, NY
Expo Hours – 10:00 a.m. to 3:00 p.m.

There is no cost to attend this event.

Brooklyn

Wednesday, September 17, 2014

The TimesCenter
242 West 41st Street, Manhattan, NY
Expo Hours – 2:00 p.m. to 7:00 p.m.

Register today: chpExpoManhattan.eventbrite.com

There is no cost to attend this event.

Manhattan

Friday, October 17, 2014

DoubleTree by Hilton Hotel
455 South Broadway, Tarrytown, NY
Expo Hours – 10:00 a.m. to 3:00 p.m.

Register today: chpExpoWestchester.eventbrite.com

There is no cost to attend this event.

Westchester

Tuesday, February 10, 2015

Fordham University
Bronx, NY 10458
Expo Hours – 10:00 a.m. to 3:00 p.m.

Register today: chpExpoBronx.eventbrite.com

There is no cost to attend this event.

The Bronx

BROOKLYN

TUESDAY, MAY 5, 2015

Marriott, Brooklyn Bridge | 333 Adams Street
Expo Hours – 10:00 a.m. to 3:00 p.m.

Register today: chpExpoBrooklyn.eventbrite.com
There is no cost to attend this event.





EDUCATION

- Adjusting common misperceptions on CHP technology
- Informing customers, utilities, vendors, and strategic partners on use-cases for CHP that fulfill carbon reduction goals
- Education on utility rate structures, spark-spread, and other concepts

EDUCATION AND OUTREACH

- Engagement with decision makers at all levels of organization
 - Facility managers, sustainability coordinators, C-suite, and everything in between
- Identification of a project champion within the organization
- Providing clear and actionable information to customers
- Working with strategic partners for a one-to-many outreach strategy
- Early-stage screening to discover any CHP show-stoppers

EDUCATION AND OUTREACH
MEETING POTENTIAL END
USERS WHERE THEY ARE

- Understanding clients' needs and expectations
- Illustrating how CHP works and its value proposition, catered to the site and customer
- Help customer gather relevant data; prepare customer for CHP screen



PRE-SCREENING

CHP PRE-SCREENING PROCESS

- Connect with a client
- Request utility data (electric and thermal)
 - The more granular the better
- Enter utility data, facility information, and equipment information into the pre-screening tool input form
- Review results
- Present results to client
- Refine based on project evolution

CHP PRE-SCREENING TOOL – HIGH-LEVEL

- Financial and operational DER/CHP modeling tool with GHG accounting
- Iterative process designed to identify and rank CHP opportunities
 - First cut – Look for optimal CHP configurations and determine project feasibility (go/no-go)
 - Iterations – Adjust facility input parameters based on site findings
 - Determine the project's sensitivity to changes in fuel rates, upfront costs, incentive/tax structures, etc.
- Cloud-based processing engine with a web-based input form (front-end) and a standardized Excel template for reviewing and presenting results
 - Flexibility – Ability to model standalone or hybrid CHP systems, with solar and energy storage integration, inclusion of different rate structures (standby vs. time-of-use or monthly demand charges)
 - Processing power – Ability to model up to ~10 technology/control strategy/rate combinations and conduct multiple iterative simulations in a single run

CHP PRE-SCREENING PROCESS – DETAILED

■ Inputs:

- Electric load data – ranging from monthly utility bills to AMI data
- Thermal load data – typically monthly utility bills
- Site information – facility type, utility rate, weather dependency, and incentive eligibility
- Equipment details – size (kW), efficiency, cost, and technology type

■ Outputs

- Detailed breakdown of costs and revenue streams
- Automatic ranking of opportunities by simple payback (years) or annual savings (\$)
- Visualization of DER-modified facility load profiles (electric and thermal)
- Financial pro forma, including a 20-year analysis with depreciation and other interesting tax situations covered
- Accounting for GHG savings

CHP PRE-SCREENING PROCESS

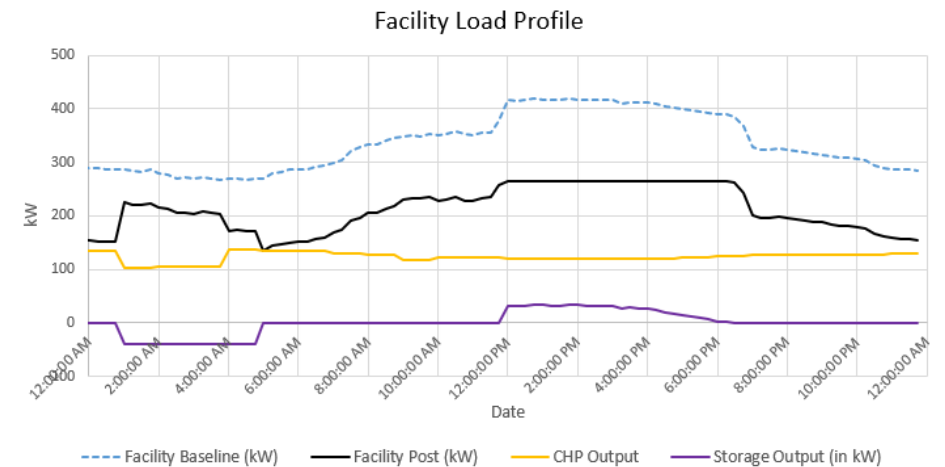
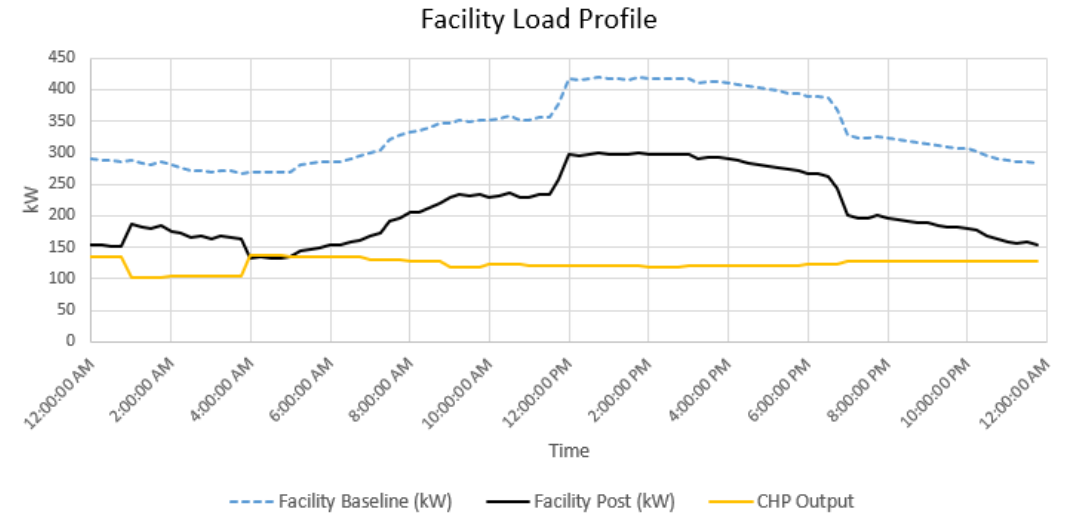
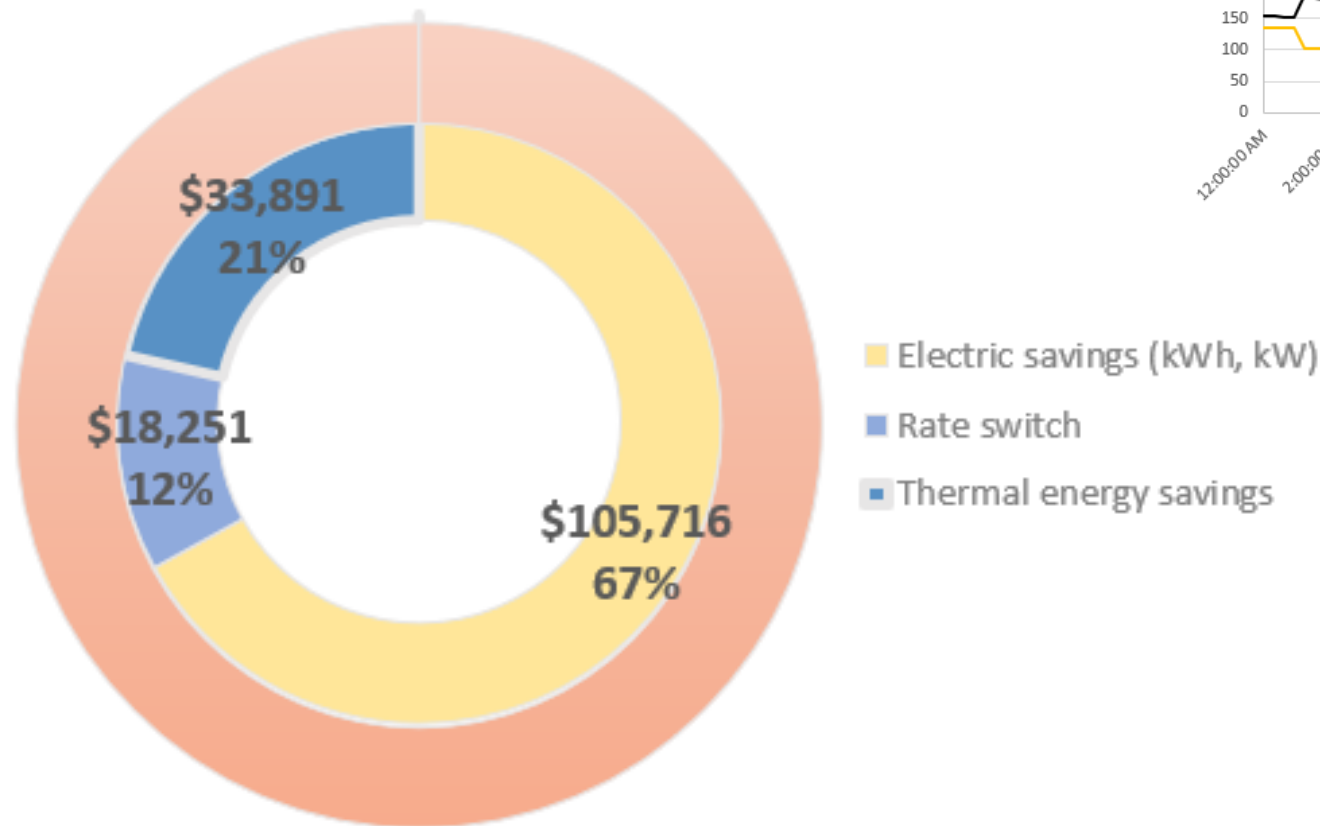
Site Screening Information		CHP Details		Prime Mover		Facility Location	
ERS Project Owner	<input type="text"/>	CHP Quantity & Capacity (#kW)	<input type="text" value="1:70,2:100"/>	Prime Mover	<input type="text" value="Reciprocating"/>	Facility Location	<input type="text" value="Downstate"/>
Client	<input type="text"/>	Fuel/Steam Rate (\$/MMBtu)	<input type="text"/>	Thermal Output	<input type="text" value="Hot Water"/>	BQDM Bonus?	<input type="text" value="No"/>
Site Name	<input type="text"/>	CHP Gas Rate (\$/MMBtu)	<input type="text" value="7.5"/>	CHP Control Strategy	<input type="text" value="Thermal-following"/>	Critical Infrastructure Bonus?	<input type="text" value="No"/>
Site Address	<input type="text"/>	Minimum Import (kW)	<input type="text" value="25"/>	Addressable Thermal Baseload	<input type="text" value="100"/> %	Targeted Zone Bonus?	<input type="text" value="No"/>
City	<input type="text"/>	Fixed Cost (\$)	<input type="text" value="100000"/>	Addressable Thermal Cooling Load	<input type="text"/> %	Interconnection Type	<input type="text" value="Synchronous"/>
State	<input type="text"/>	Variable Cost (\$/kW)	<input type="text" value="5000"/>	Addressable Thermal Heating Load	<input type="text"/> %		
Zip Code	<input type="text"/>	Maintenance Cost Basis	<input type="text" value="kWh"/>	Minimum Turndown	<input type="text" value="50"/> %		
		Maintenance Rate (\$/kWh)	<input type="text" value=".025"/>	CHP Electric Efficiency	<input type="text" value="28"/> %		
		Maintenance Rate (\$/hour)	<input type="text" value="2.5"/>	CHP System Efficiency	<input type="text" value="77"/> %		
				Existing Thermal Efficiency	<input type="text" value="80"/> %		
				Offset Electric Chiller Efficiency (kW/ton)	<input type="text" value=".6"/>		

Model and Rate Selections	
Model Solar?	<input type="text"/>
Model CHP?	<input type="text"/>
Model ES?	<input type="text"/>
Model Rider Q?	<input type="text"/>
Electric Commodity Rate (\$/kWh)	<input type="text" value=".12"/>

Data Type and Regression Inputs	
Electric Data Type	<input type="text" value="Interval or Monthly"/>
Monthly Electric or Monthly Thermal File Path	<input type="text" value="S:\Shared\ERS\Projects\NYSERDA\Energy Storage Soft Cost\DER Tool\Monthly data\utility_data_PLACEHOLDER.xlsx"/>
Interval Electric File Path	<input type="text" value="Please input entire file address including extension, eg. *.xlsx"/>

CHP PRE-SCREENING PROCESS

Cost Savings Per Technology and Value Stream





SITE VISITS

SITE VISITS

- Important for both the customer and vendor
- Establishes personal connection with customer
- Identifies physical obstacles
 - Space
 - Exhaust
 - Access
 - Noise
 - Utilities
- Qualifies opportunities for vendors



OPTIONAL RFP SERVICES

- ERS submits request for proposals (RFP) to vendors on behalf of customer
- Customers are anonymized
- Typically one week for vendor to respond with interest
- ERS reports back to customer

CUSTOMER VENDOR RELATIONSHIP



Encourage direct communication between vendor and customer



Encourage customers to organize site visits for vendors – at customer's discretion



KEY BARRIERS

- 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

PROCESS IMPROVEMENT STEPS

- Vendor summary sheet
- Consistent data among vendors
- Best results are when used at the beginning stage of proposal process
- Apple to apples comparison



A light blue background featuring several white paper airplanes and one red paper airplane. The white airplanes are arranged in a cluster on the left, while the red one is on the right, pointing towards the center. A teal banner is at the bottom.

PROPOSAL REVIEW

PROPOSAL REVIEW

Step 1: Request assumptions, inputs, & outputs from vendor

- Where possible, have proposals use common utility data
- Helpful to have data form submitted along with proposal
- This facilitates an “apples-to-apples” analysis

Summary Table		
revised 9/13/2016		Value
System Information	System name (from catalog)	
	CHP Unit Quantity	
	Total CHP plant size, kW	
	Total net kW, kW	
	Additional thermal storage capacity, gals	
	Control strategy, thermal or electrical following?	
	Electrical efficiency at full load (HHV), %	
	Overall system efficiency at full load (HHV), %	
	Existing heating/DHW system efficiency, %	
	Installed cost before incentives, \$	
	NYSERDA incentives, \$	
Utility Data	Base electric rate (not blended), \$/kWh	
	Summer demand rate, \$/kW	
	Winter demand rate, \$/kW	
	Current fuel/steam rate, \$/MM Btu	
	CHP gas rate, \$/MM Btu	
System Operation and Savings	Annual run time (or EFLH), hrs	
	Annual dumping time, hrs	
	Annual electric usage savings, kWh	
	Annual electric usage cost savings, \$	
	Average monthly electric demand savings, kW	
	Annual electric demand savings, \$	
	Annual hot water generated, MM Btu	
	Annual thermal cost savings, \$	
Annual Costs	Annual overall system efficiency, %	
	Assumed downtime for maintenance & outages, hrs	
	CHP gas consumption, MM Btu	
	CHP gas cost, \$	
Economics	Maintenance rate, \$/kWh or \$/hr	
	Total annual maintenance cost, \$	
Economics	Payback (before incentive), yrs	
	Payback (after NYSERDA incentive), yrs	

PROPOSAL REVIEW

Step 2: Compare proposals side-by-side

- Compare multiple proposals and computer modeling
- Line-by-line analysis highlights significant differences
- Facilitates discussions on differences in assumptions and/or calculation methods

ERS does not make recommendations

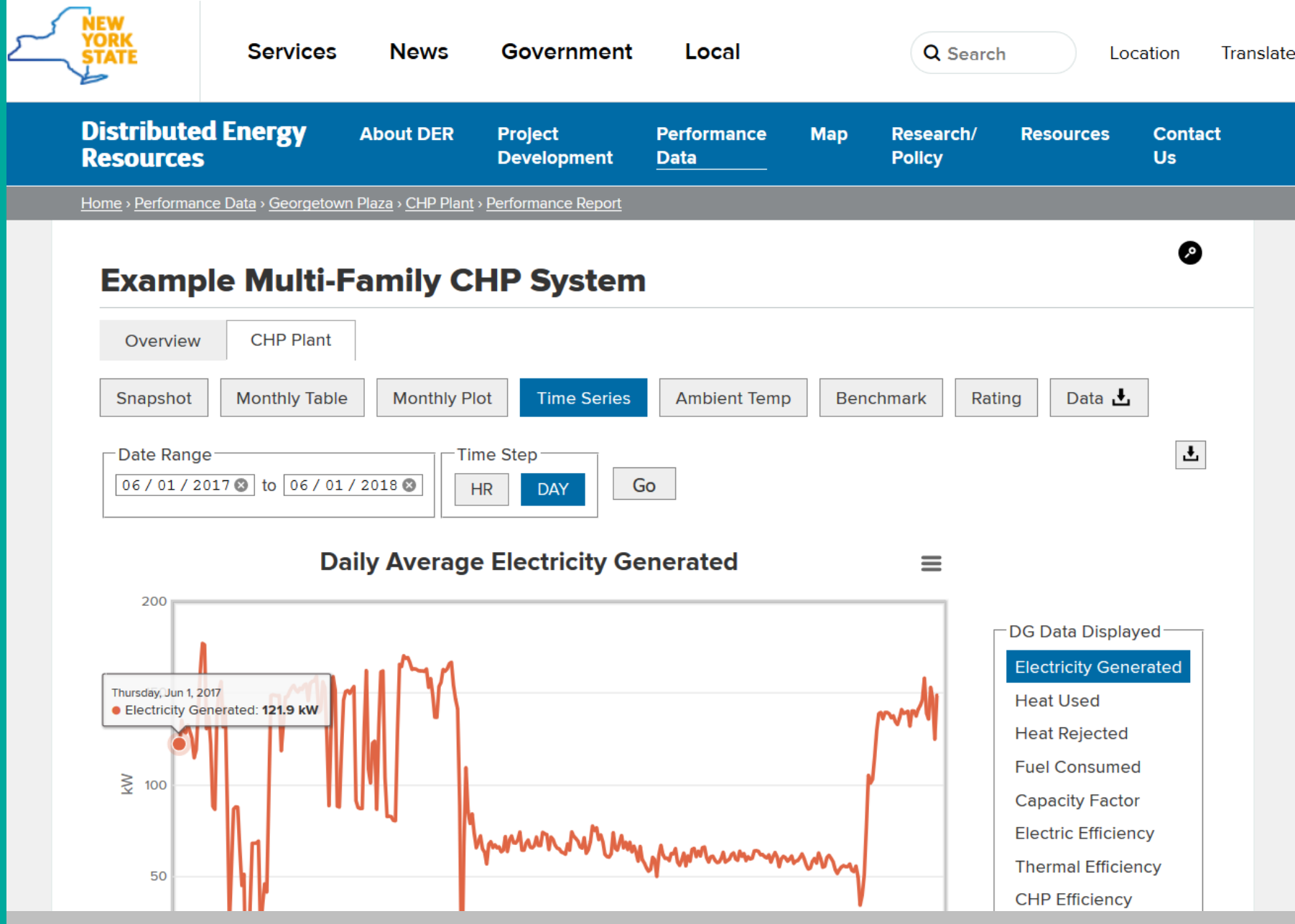
	Ajax Cogen	Acme CHP	Computer Modelling
System name (from catalog)	123ABC	ABC123	123456
CHP unit quantity	1	1	1
Total CHP plant size, kW	75	125	125
Total net kW, kW	75	95	119
Electrical efficiency @ full load (HHV), %	25.2%	26.6%	26.6%
Total system efficiency @ full load(HHV), %	79.2%	81.7%	81.7%
Existing heating/DHW system efficiency, %	80%	75%	80%
Installed cost before incentives, \$	\$575,000	\$650,000	\$650,000
Incentives, \$	43,500	\$62,000	\$60,500
Base electric rate (not blended), \$/kWh	0.095	0.110	0.110
Summer demand rate, \$/kW	\$34.50	\$29.04	\$32.29
Winter demand rate, \$/kW	\$22.33	\$29.04	\$24.95
Current fuel/steam rate, \$/MMBtu	\$9.50	\$9.50	\$9.50
CHP gas rate, \$/MMBTU	\$8.50	\$8.50	\$8.50
Annual run time, hours	6,200	5,066	7,234
Annual dumping time, hours	1,453	0	0
Annual electric usage savings, kWh	422,135	625,600	633,548
Annual electric usage cost savings, \$	\$40,102	\$68,816	\$80,841
Annual electric demand savings, \$	\$17,899	\$32,668	\$8,717
Annual fuel savings for heating, MMBtu	3,946	5,890	5,812
Annual fuel cost savings for heating, \$	\$37,489	\$50,063	\$55,212
Annual overall system efficiency, %	72.0%	80.8%	80.3%
CHP gas consumption, MMBTU	5,078	7,520	8,482
CHP gas cost, \$	\$43,158	\$63,920	\$72,093
Maintenance, \$/kWh or \$/hr	\$0.025	\$0.020	\$0.025
Total annual maintenance cost, \$	\$10,553	\$12,665	\$15,839
Payback (before incentive), yrs	13.8	8.7	11.4
Payback (after incentive), yrs	12.7	7.8	10.4



INSPECTION & RECOMMISSIONING

- Confirm scope of project
- Ensure proper system operation
- Review program compliance
- Verify accurate performance M&V
- Highlight issues for follow-up RCx
- Checks and balances

NYSERDA's DER Data Integrator



der.nyserda.ny.gov

A photograph of three arrows hitting the bullseye of a target. The target has concentric rings of red, white, and blue. The arrows are white with yellow fletching and black nocks. They are positioned horizontally, with the bullseye on the right. The background is a soft, out-of-focus light blue and white.

PROOF POINTS

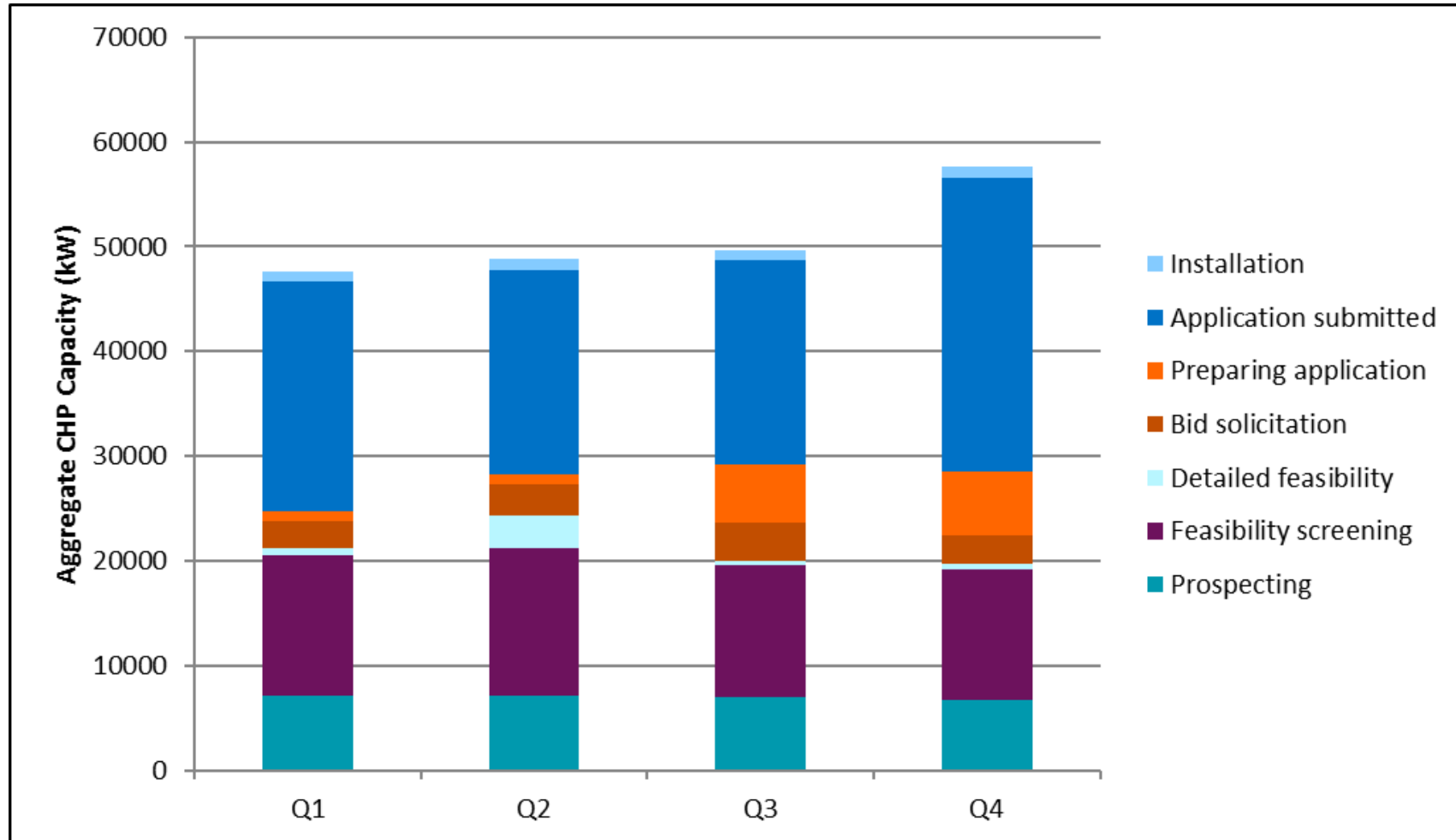
OUTREACH AND TECHNICAL ASSISTANCE

SUMMARY OF ACTIVITY – 57 MW TOTAL PIPELINE DEVELOPMENT

Key Metrics		2015	2016	2017	2018
Direct outreach	Leads contacted	1,585	3,219	1,633	1,017
	Meetings with customers	84	115	113	95
	Events and presentations	49	35	16	25
Partner outreach	Vendor discussions and meetings	86	80	171	28
	Other consultants/developers contacted	612	307	33	32
Projects	Projects in development	56	113	181	205
	Site visits	13	54	37	26
	Vendor bid interest emails sent	4	25	12	6
	Cumulative kW pipeline	11,198	36,178	48,540	57,605

2018 OUTREACH PROGRESS

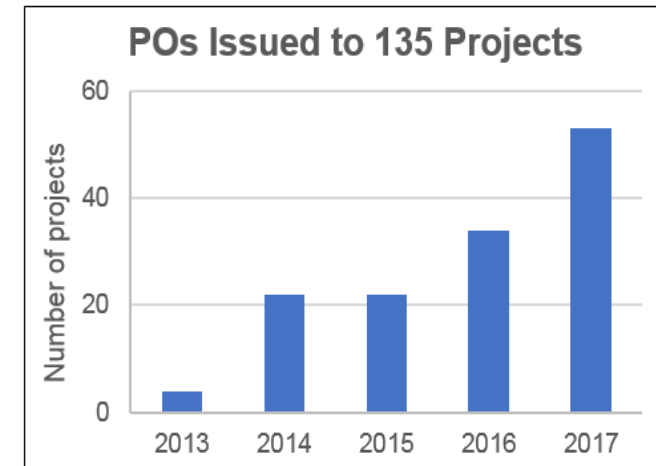
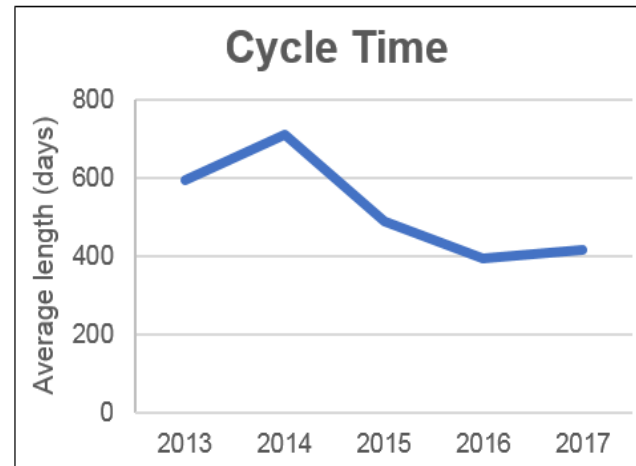
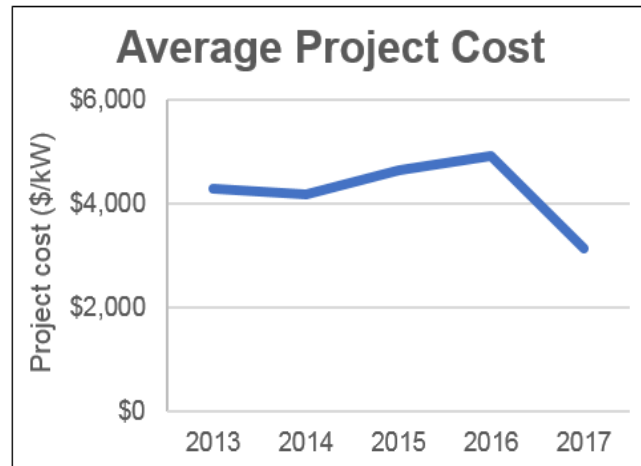
29 MW INSTALLED/APPLIED



NYSERDA CHP PROGRAM SUCCESSES

CHP as a single-technology solution:

- Primed-the-pump to grow market to scale
- Gained focus of world-class solution providers
- Coached customers to have mature expectations, groomed a cadre of providers to be able to deliver



NYSERDA CHP PROGRAM SUCCESSES

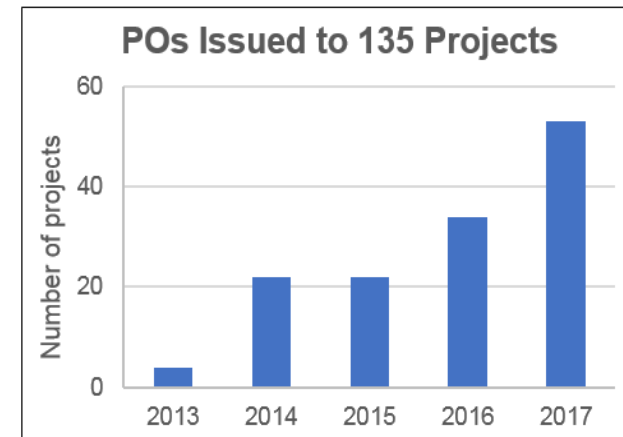
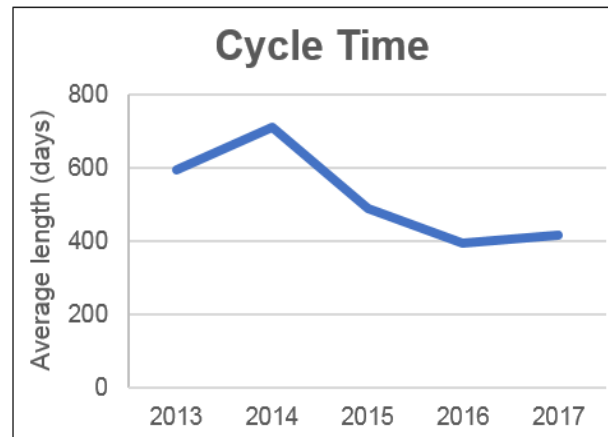
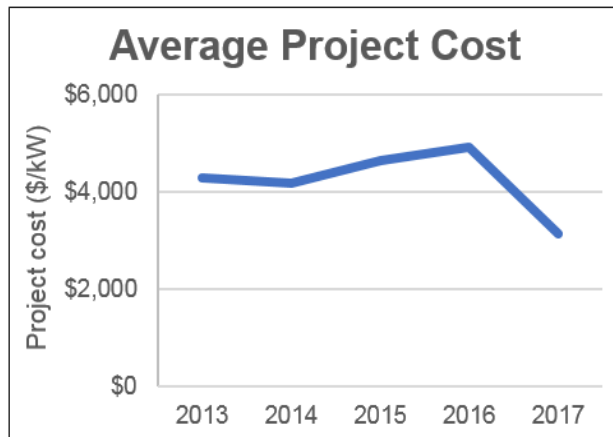
Proof-points that we were able to drive Packaged CHP single-point-responsibility as the basis for customer-vendor relationship, and replicability:

- Ramped-up Approved CHP Vendors and their Approved Packages from launch in 2013 (8 vendors, 36 packages) to end of 2017 (20 vendors, 219 packages).
- Reduced total project costs by 24%, comparing projects to which NYSERDA issued a purchase order in 2014 (22 projects with average cost of \$4,165/kW) versus 2017 (53 projects with average cost of \$3,150/kW).
- Concurrently compressed project implementation timelines (from project approaching NYSERDA to commissioning) by 44% (from 711 days for the 19 projects commissioned in 2014, to 395 days for the 21 projects commissioned in 2016).

NYSERDA CHP PROGRAM SUCCESSES

Proof-points cont.

- Drove program traction metric of issued purchase orders totaling 135 projects (ramp-up from 4 issued in 2013, to 22 in 2014 and another 22 in 2015, to 34 in 2016, to 53 issued in 2017).
- Convinced US DOE to take over the back-office administration of the CHP Catalog and widen its applicability nationwide as a market-nurturing best practice (US DOE CHP eCatalog will launch on or around April 1, 2019).





QUICK START

FIND CHP PACKAGES

PRIMARY SITE LOCATION

Zip Code

**CLOSING
THOUGHTS:
DOE'S eCATALOG**



CONTACT Us



Matthew Lockwood



mlockwood@ers-inc.com



(212) 789-8182 x244



www.ers-inc.com

ERS is an energy and engineering consulting firm that serves clients providing services in energy efficiency program design, customer engagement and outreach activities, implementation, evaluation, both pre- and post-installation M&V, custom feasibility studies, distributed and renewable generation assessment, and sustainable building development.