CHP Multi-State Working Group

Hosted by
Todd Olinsky-Paul, Project Director, CESA
Friday, May 1, 2015
Housekeeping

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Following today’s presentation, we will be calling on one representative from each state to present a brief update on your state’s interest and activities related to CHP. When we call on your state, please “raise your hand” by clicking the icon to request to be unmuted.

You can also use the question box on your webinar console to type in a question, or to let us know if you are having technical difficulties.
About CESA

Clean Energy States Alliance (CESA) is a national nonprofit coalition of public agencies and organizations working together to advance clean energy. CESA members – mostly state agencies – include many of the most innovative, successful, and influential public funders of clean energy initiatives in the country.
Today’s Guest Speakers

Dana Levy, Program Manager, New York State Energy Research and Development Authority (NYSERDA)

Val Stori, Project Director, CESA
Incentive Program based on a List of Pre-approved CHP Systems Helps to Boost Uptake & Transform the Market

Dr. Dana Levy of NYSERDA:
NYSERDA CHP thought-leader since 1999.
Recipient of the USCHPA CHP Champion Award in 2007.
Recipient of the NECHPI CHP Champion Award in 2014.

May 1, 2015
Clean Energy States Alliance -- Webinar
**Axioms (we hold these truths to be self-evident)**

- Public policy objectives encourage the deployment of clean & efficient CHP.
- The perpetual use of publicly-funded subsidies is a less-desirable mechanism than transforming the market to where it can be self-sustaining.
- Incentivizing one CHP project after another helps build competency in the marketplace, but this alone is too passive an approach for achieving “market transformation”.
- A well-crafted CHP incentive program is important, but is not enough. The market needs genuine cost reductions in order to reach self-sufficiency.
Vision for CHP: Transform the market to the point where a sufficient swath of customers is willing to implement CHP in the absence of NYSERDA-furnished incentive payments.

In a self-sustaining market:

- **Project Paybacks**
  - Satisfy Customer Expectations
  - Seek to influence this by:
    1. Lowering project costs, and
    2. Increasing project revenues

Current Situation:
- Customer Demands 3 – 4 year payback
- Market Delivers 5 – 6 year payback

Desired Future Situation:
- Customer Tolerates 4 – 5 year payback
- Market Delivers 4 – 5 year payback

Seek to influence this by:
- Raising customer confidence with resultant transition from
  a) “hedged” expectations that demand short paybacks, to
  b) “mature” expectations that tolerate longer paybacks
Approach

Program Administrators can use “the power of the purse” to re-align the way deals are transacted in the marketplace in order to (1) achieve genuine cost reductions, and (2) increase customer confidence. Kill-two-birds-with-one-stone by incentivizing CHP projects in a way that creates permanent streamlining of transactions AND delivers reliable projects:

• Facilitating “customer acquisition” will reduce marketing costs.

• Facilitating “replicable project designs” will reduce design errors and the associated performance losses and/or re-work expenses.

• Facilitating “replicable project designs” will reduce uncertainty among Authorities Having Jurisdiction and thereby reduce time and costs for permitting.

A program structured around a “list of pre-approved products furnished by eligible installers” enables these market alignments.
Our ‘Aha’ Moment

Well-functioning markets align themselves to serve the buying-habits of customers.

The automobile marketplace has many similarities to the CHP marketplace (for example, in a given size range both offer a durable good in the form of standardized products, appeal to mass-markets, and involve sales plus on-going routine mechanical servicing).

NYSERDA is attempting to decode features of the automobile market that can serve as inspiration for supportive interventions in the CHP market.

For example, to mimic the automobile market’s resources of independent product reviews (e.g., Consumer Reports, Road & Track, Car & Driver), NYSERDA has vetted and approved modular packaged CHP systems and published a “catalog” which details 141 reliable turnkey products.

NYSERDA’s CHP program has mimicked numerous success-features from the automobile market, and continues to actively explore additional opportunities, taking cues from a variety of well-functioning markets.
CHP Offered as an Appliance

Dress-Rand CHP Solutions

IntelliGen Power Systems LLC

Inverde Ultra 100

CENERGY

Capstone

Aegen PowerVerter PV75

EAGEN ENERGY SERVICES, INC.

Kraft Energy Systems

AEGIS Energy Services, Inc.

New York State Opportunity: NYSDERA
Vending & Purchasing Habits at “Standardized Products”

<table>
<thead>
<tr>
<th>“Mature” Market Features</th>
<th>Example: Automobile Market</th>
<th>CHP Market (mass market)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standardized Products</td>
<td>Fully-equipped car</td>
<td>Packaged “modular” CHP</td>
</tr>
<tr>
<td>Replicates (fleets)</td>
<td>Police cars, Taxi cabs</td>
<td>Supermarkets, Hotels</td>
</tr>
<tr>
<td>Shoppers’ Guides</td>
<td>Road &amp; Track, Car &amp; Driver, Consumer Reports</td>
<td>NYSERDA CHP “Catalog”</td>
</tr>
</tbody>
</table>
A Customer buys a “Product”

Not an “assemblage of components”

Car:
• A customer buys a car which is a “product” that has been produced from a factory assembly line, as opposed to hiring a mechanic to procure 40,000 components and assemble them into a car

Johnny Cash song “One Piece at a Time”
… up to now my plan went alright, ‘til we tried to put it all together one night, and that’s when we noticed that something was definitely wrong …

CHP:
• The “old way” resulted in a situation where “each project looked like a science experiment”
• The “new way” emphasizes the purchase of a “product” and conveys this image via the “catalog” approach which includes “model numbers”
Warrantees

Bumper-to-Bumper Warrantee

Car:
• If there is a problem with the radio, the car-maker fixes immediately, then seeks to recover from the radio-OEM-supplier (the customer does not suffer without a radio during a long period while the car-maker/radio-OEM argue regarding whom is to blame)

CHP:
• The “new way” includes minimum 5-year bumper-to-bumper warrantee such that the CHP Vendor “integrator” has responsibility to implement immediate fix regardless of root cause of defect (e.g., whether defect in an item supplied by a subcontractor, fault of the Integrator, fault of the Installer, or fault of the Maintainer)
Independent Endorsements

Based on in-depth analytical reviews

Car:
- Consumer Reports Magazine
- Road & Track Magazine
- Car & Driver Magazine

CHP:
- NYSERDA’s CHP “Catalog”
  Version 3 has 13 Vendors with 141 products

http://www.nyserda.ny.gov/Funding-Opportunities/Current-Funding-Opportunities/PON-2568-CHP-Acceleration-Program
CHP Acceleration “Catalog” Program

Program Mechanism:

• Created a catalog of “pre-qualified” systems
  – reputable vendors, reputable components
  – harmony “within the box” (components properly size-matched)
  – bumper-to-bumper coverage (product, installation, service)
  – “turn-key solutions” with adequate local sales & support

• Assigned a specific “rebate” to each system

• Inviting customers to comparison-shop from catalog
CHP Acceleration “Catalog” Program

Catalog Items:

• Clean and Efficient CHP and CCHP
• Integrated Controls Package
• Built-in Data Monitoring Features
• Bumper-to-Bumper Warrantee / single-point responsibility
• 5-year Service Plan
• “Stand-alone” Operability is included in All Packages

Attention CHP Vendors (system “packagers”):
Instructions at RFI 2568 for how to get your products added to the Catalog

Comparability of Benchmarks

Apples-to-Apples

CHP:
• The “old way” had non-standard reference ambient temperatures for performance data (MBtu/hr of hot water production at manufacturer’s stated temperature)
• The “new way” NYSERDA asked each CHP Vendor to standardize their data to three reference ambient temperatures (0°F and 59°F and 95°F)
Comparison Shopping -- facilitated via Expos

NYSERDA 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, NYCEEC, and NY Clean Heat.

REGISTER TODAY:
chpExpoBrooklyn.eventbrite.com

Questions? chpAccelerator@nysedanys.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 nyserva.ny.gov/chp

Incorporating CHP in
LEED-Certified New Construction
NYSERDA, in partnership with the USEPA, is
also offering a free seminar for architects and
engineers at the Marriott the morning of the Expo.

Two hours of PDH credits will be awarded.

For more information and to register, visit:
chpSeminarMay5.eventbrite.com

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.

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.

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.

Tuesday, May 20, 2014
Sheraton Brooklyn New York Hotel
228 Flatbush Street, Brooklyn, NY
Expo Hours – 10:00 a.m. to 3:00 p.m.
There is no cost to attend this event.

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.

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.

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

NYSERDA

CHP EXPO

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.

Manhattan

Queens

Albany

Brooklyn

Manhattan

Westchester

The Bronx

NEW YORK STATE OF OPPORTUNITY

NYSERDA

NYSERDA
Comparison Shopping via CHP “Catalog”

<table>
<thead>
<tr>
<th>Eligible Vendor</th>
<th>Air/Range of Approved Systems</th>
</tr>
</thead>
<tbody>
<tr>
<td>2G Carvergy</td>
<td>50 - 999</td>
</tr>
<tr>
<td>Angi Energy Services</td>
<td>100 - 299</td>
</tr>
<tr>
<td>Cogen Power Technologies</td>
<td>300 - 499</td>
</tr>
<tr>
<td>Emer-G Rundell Inc</td>
<td>500 - 999</td>
</tr>
<tr>
<td>GEM Energy</td>
<td>500 - 999</td>
</tr>
<tr>
<td>Inaloygen Power Systems</td>
<td>1000 - 1499</td>
</tr>
<tr>
<td>Kirsh Power Corporation</td>
<td>1500 - 1999</td>
</tr>
<tr>
<td>LC Associates</td>
<td>2000 - 2499</td>
</tr>
<tr>
<td>RSB Systems</td>
<td>2500 - 2999</td>
</tr>
<tr>
<td>Teogen, Inc</td>
<td>3000 - 3499</td>
</tr>
<tr>
<td>Unison Energy</td>
<td>3500 - 3999</td>
</tr>
</tbody>
</table>

v1: 8 Vendors & 36 systems  
v2: 10 Vendors & 64 systems  
v3: 13 Vendors & 141 systems  
v4: due to be issued soon

All of these systems are capable of running during a grid outage.

Customers seem satisfied with this breadth of due diligence when starting with this batch of pre-approved vendors and then down-selecting.

http://www.nyserda.ny.gov/Funding-Opportunities/Current-Funding-Opportunities/PON-2568-CHP-Acceleration-Program
Example of a Catalog Cut Sheet

Ener-G Rudox Inc

ER265F HW

265 kW

Description

<table>
<thead>
<tr>
<th>Type of prime mover</th>
<th>Number of prime mover units</th>
<th>Synchronous or Inverter</th>
<th>Type</th>
<th>Eligible for NH1 installation</th>
<th>Qualification Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICE</td>
<td>1</td>
<td>Inverter</td>
<td>CHP</td>
<td>No</td>
<td>Conditionally qualified</td>
</tr>
</tbody>
</table>

NYSERDA Incentives

Downstate

Grant $350.130

Upstate

Grant $375.038

Performance at Full Load

<table>
<thead>
<tr>
<th>Ambient</th>
<th>Fuel in</th>
<th>Net kW</th>
<th>Hot Water to Building @ 150°F</th>
<th>Hot Water to Building @ 180°F</th>
</tr>
</thead>
<tbody>
<tr>
<td>0°F</td>
<td>2230 Btu/hr</td>
<td>102</td>
<td>102</td>
<td>1403</td>
</tr>
<tr>
<td>20°F</td>
<td>2230 Btu/hr</td>
<td>102</td>
<td>102</td>
<td>1403</td>
</tr>
<tr>
<td>30°F</td>
<td>2230 Btu/hr</td>
<td>102</td>
<td>102</td>
<td>1403</td>
</tr>
</tbody>
</table>

Footprint

<table>
<thead>
<tr>
<th>Core system based on minimum area</th>
<th>Width ft</th>
<th>Length ft</th>
<th>Height ft</th>
<th>Weight lbs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core system based on minimum width</td>
<td>12.0</td>
<td>20.3</td>
<td>8.1</td>
<td>12.970</td>
</tr>
<tr>
<td>Heat Rejection sub-system</td>
<td>12.0</td>
<td>20.3</td>
<td>8.1</td>
<td>2,000</td>
</tr>
<tr>
<td>Largest part for delivery</td>
<td>5.2</td>
<td>13.7</td>
<td>7.2</td>
<td>9,240</td>
</tr>
<tr>
<td>Heaviest part for delivery</td>
<td>5.2</td>
<td>13.7</td>
<td>7.2</td>
<td>9,240</td>
</tr>
</tbody>
</table>

Vendor Statement

Ener-G Rudox Inc, part of the KDI-G group offers a range of efficient cogeneration and co-generation systems from 25kw to 25MW. Ener-G offers turnkey solutions, with unrivaled capabilities from Project Development, Financing, Design, Assembly, Delivery, Installation, Commissioning, and ongoing 24/7 maintenance with dedicated remote monitoring facilities based at our US Head Office. We seek a full inventory of spare parts for all of our equipment.

The demand for energy is ever growing whilst it is becoming increasingly expensive. Businesses and individuals are seeking to reduce their costs and carbon footprint. Ener-G cogeneration can help.

Ener-G offer flexible finance models, offering access to our energy solutions without the upfront capital expenditure normally required.

Ener-G is 100% dedicated to the development of its products and markets and over the years has seen rapid growth, both organically and through acquisition, to achieve a strong global presence within the energy industry. Currently Ener-G operates in the UK, BlueSky, UK, Ireland, Iceland, Norway, Italy, France, China, Mexico and South Africa, with partners across the globe.

Vendor Information

Ener-G Rudox Inc

1251 Broadway, Suite 609
New York, NY 10036

(212) 551-1770

Contact Person: Vishnu Baner

vishnu.baner@ener-g.com

www.ener-g.com

NYSERDA CHP Acceleration Program PON 2868

Version 5 Revised September 2014

For the most recent version go to

http://www.nyserda.ny.gov/Funding-Opportunities/Current-Funding-Opportunities/Chp-2868-Acceleration-Program.aspx
Reliable Maintenance

CHP:
• NYSERDA requires a minimum 5-year maintenance package c/o the CHP Vendor
• Best service via Vendor-trained technicians
• Best informed via Vendor “service bulletins” for each specific model
• Conduit for feedback to Vendor whenever issues are observed with each specific model (facilitates opportunity for Vendor to conduct data analytics to inspire fixes for problems in the field as well as engineer-out at subsequent products)
Fleets

Replicates of a given item

Car:
- Police cars
- Taxi cabs

CHP:
- Supermarkets
- Hotels

Aspiration: A future where CHP vendors sell a standard product so frequently that they are willing to build some on speculation and have them shrink-wrapped and sitting in their warehouse -- this approaches the market mechanisms where a shopper can pick a car at the auto showroom and drive it home that same day.
Psychology of Decision Making

Rob Sheldon, Managing Director of Accent Marketing and Research, spoke of the psychology behind customer decision making and how it should be approached in the same way, whether buying a micro-CHP or a car.

Communicating price was highlighted as a major challenge for any expensive product – with many customers struggling to know what is being sold to them. This highlighted the importance of customer research - like that conducted by Delta-ee and Accent - to “de-mystify” the product and pricing.


Summit Highlights

Edinburgh, Scotland

July 2014
Unified Marketing

Example from the Dairy sector (not automobile)

Milk:
- Previously, each dairy farm ran their own advertisements saying “buy milk, buy it from me”
- Now, on behalf of the dairy industry in general, the Milk Processor Education Program runs generic advertisements promoting “buy milk” without differentiating between vendor dairy farms (e.g., the Got Milk? campaign). Concept: a rising tide floats all boats.

CHP:
- NYSERDA is currently running a CHP marketing campaign “CHP is good, each of our vendors is qualified”
- Exit Strategy: Opportunity for “the market” to take this over at some point.
Program Accomplishments

We’ve proven that this program format:

• Gets good projects (46 projects in 2-years of launch, of which 29 have equipment delivered to the site or further progress, zero attrition).
• Accelerates timelines.
• Drives-down “soft costs” such as customer acquisition.

Transformed the way “deals” occur in marketplace:

• Expanded the tendency toward “healthy” comparison shopping.
• Market embraces a new objective of “partnerships” instead of “sales”.
• CHP Vendor (packager/system integrator) at center-of-the-universe.
• Consultants act as “personal shoppers” for building owner clients.
Standardized/Regionalized Product

Car:
• Buick sold in Albany = 100% identical to Buick sold in Boston
• Buick sold in Albany = 99.9% identical to Buick sold in Phoenix
  (version in Phoenix has heavy-duty radiator)
• Buick sold in Albany = 99.9% identical to Buick sold in California
  (version in California has extra emissions control)
• Buick sold in Albany = 99.9% identical to Buick sold in Alaska
  (version in Alaska has engine block heater)

CHP:
• Have had initial discussions to “nationalize” the CHP Catalog with regionalized
  features (MA, CA, NJ, MD, PA, IL, OH, VT, OR) and allies (USDOE, ORNL,
  ACEEE, CEE, CESA, EPRI, HUD)
Thank You!

www.nyserda.ny.gov/chp
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(518) 862-1090 x 3377

NYSERDA, a public benefit corporation, offers objective information and analysis, innovative programs, technical expertise, and funding to help New Yorkers increase energy efficiency, save money, use renewable energy, and reduce their reliance on fossil fuels.

NYSERDA professionals work to protect our environment and create clean-energy jobs.

NYSERDA has been developing partnerships to advance innovative energy solutions in New York since 1975.

Next Steps:

• The entire marketplace will benefit if other states adopted a similar “Catalog” approach (enables Vendors to claim multi-state approval). NYSERDA is eager to work with other states to evolve this.

• NYSERDA seeks your suggestions regarding opportunities for government intervention to initiate CHP market features that mimic successful surrogate markets.
Thank you for attending our webinar

Todd Olinsky-Paul
Project Director, CESA
todd@cleanegroup.org

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