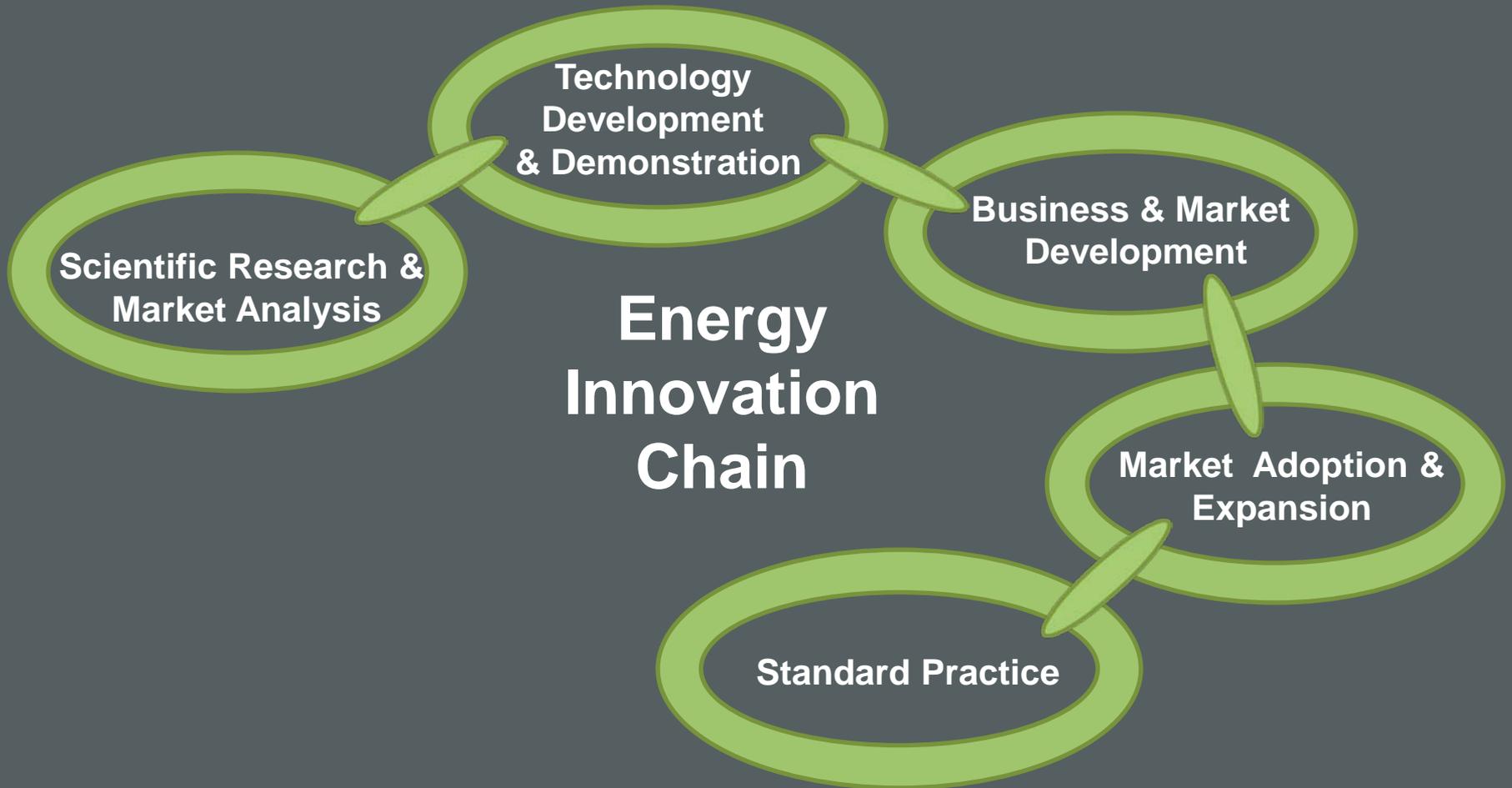


NYSERDA's CHP Programs: Going Forward

CHP in New York State
The Next Generation

June 20, 2012

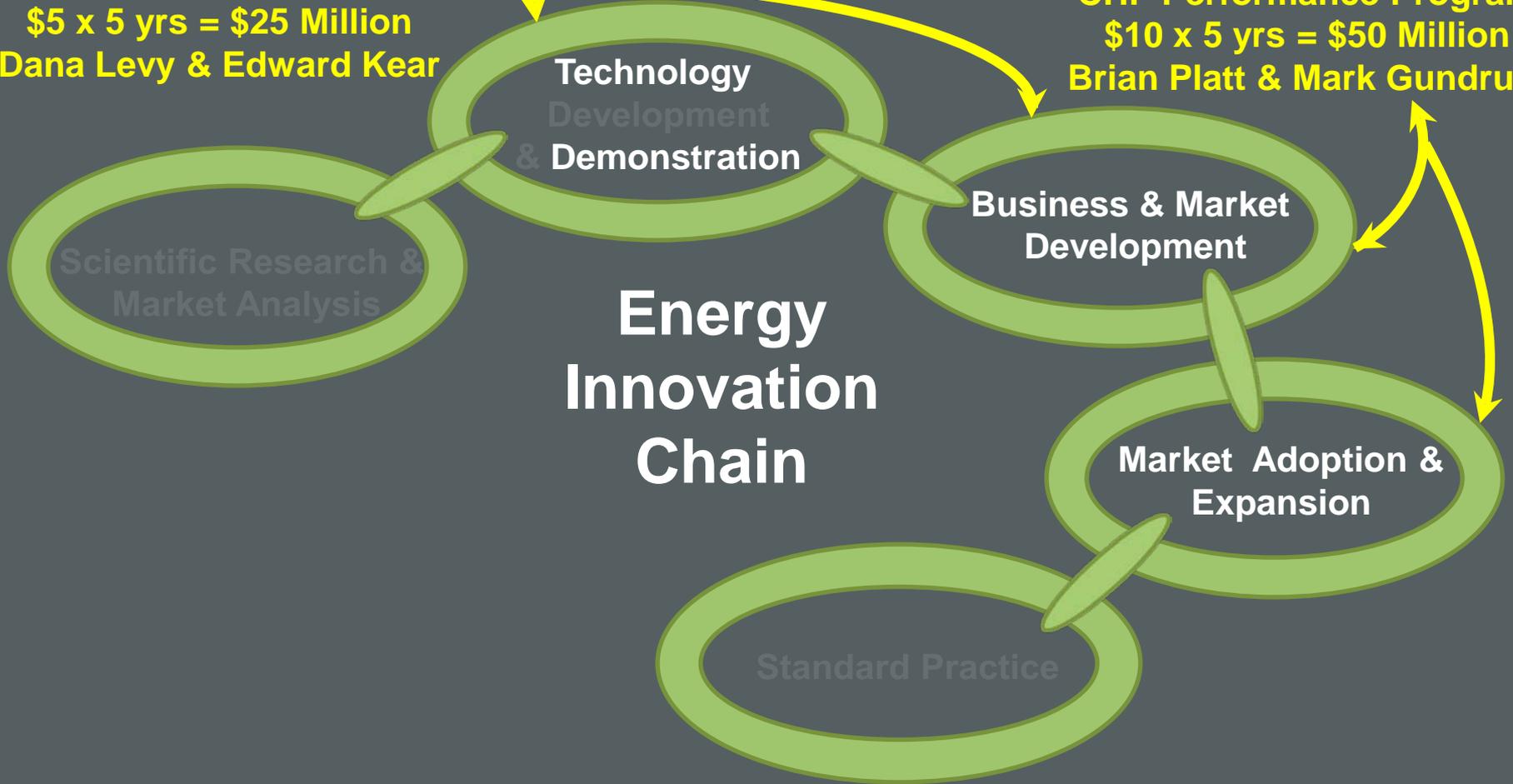
NYSERDA's Multiple Objectives



NYSERDA's Multiple Objectives

CHP Acceleration Program
\$5 x 5 yrs = \$25 Million
Dana Levy & Edward Kear

CHP Performance Program
\$10 x 5 yrs = \$50 Million
Brian Platt & Mark Gundrum



TOTAL: \$15 x 5 yrs = \$75 Million

CHP “Markets” have Different Needs

CHP Acceleration:

- Technology Demonstration
- Business Development
- Market Development

CHP Performance:

- Market Development
- Market Adoption
- Market Expansion

Small-to-Medium (50 – 1,300 kW):

- Aegis
- Capstone
- Intelligen
- Tecogen
- Others

Medium-to-Large (greater than 1.3 MW):

- Caterpillar
- GE Jenbacher
- Solar Turbines
- Others

Two Objectives

CHP Acceleration:

- Demonstrate CHP approaches that are highly replicable so as to drive down costs and accelerate market uptake

CHP Performance:

- Achieve installed capacity that will perform reliably

Strategy: CHP Acceleration

“Torch-bearer” program to nurture CHP

Acceleration via “Pre-qualification” of CHP Systems

- Focus on “modular kits” of CHP size 1.3 MW or smaller, which are now more-widely available
- Improve comfort of building inspectors & utility personnel via replicable equipment
- Improve the matchmaking and deal-making structure of developer/hostsites interactions
- Leverage efforts of USDOE regarding common goal for “component matching” into pre-engineered packages
- Support re-commissioning and technology transfer activities

Strategy: CHP Performance

An additional “Tool” that can reduce load

CHP Performance Program

- Drive efficiency, economic and environmental performance
- Performance-based payments.
- Documented w/robust M&V

Schedules

CHP Acceleration:

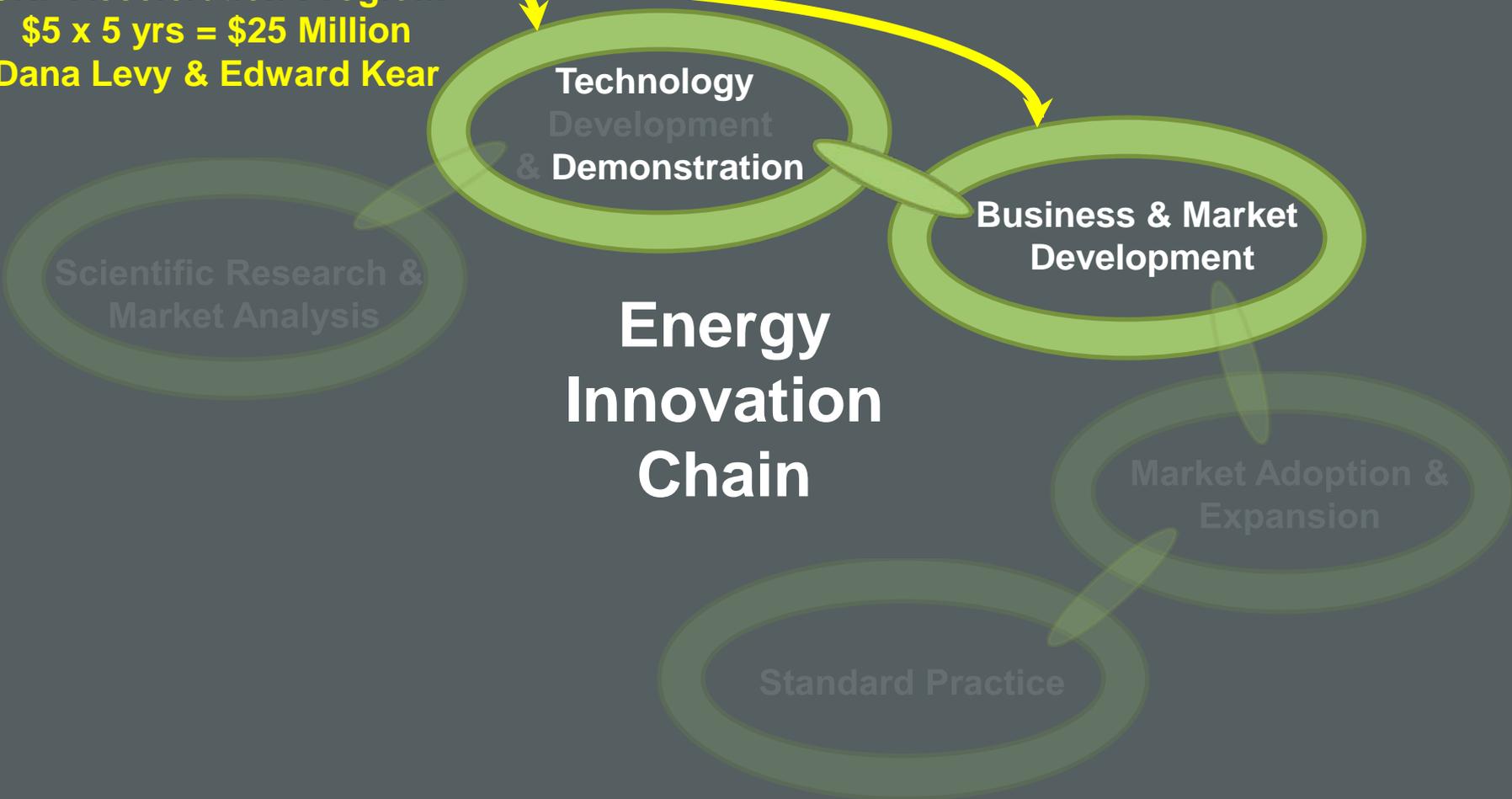
- Funds are in-hand
- “Request for Information” recently issued
- Launch of “catalog” and incentives in October

CHP Performance:

- Awaiting NYSPSC decision on NYSERDA program Petition

NYSERDA's Multiple Objectives

CHP Acceleration Program
\$5 x 5 yrs = \$25 Million
Dana Levy & Edward Kear



Energy
Innovation
Chain

CHP Acceleration “Catalog” Program

Program Mechanism:

- Create catalog of “pre-qualified” systems
- Assign specific “rebate” to each system
- Invite customers to shop from catalog
 - Streamlined approach to system sizing
 - Customized approach to system sizing

CHP Acceleration “Catalog” Program

Program Mechanism:

- Create catalog of “pre-qualified” systems
- Assign specific “rebate” to each system
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 - Customized approach to system sizing

CHP Acceleration “Catalog” Program

Creating the Catalog:

- Issuance of RFI 2568 this month
- Launch of catalog in October
- Periodic update of catalog
- Catalog items either “pre-qualified” or “conditionally-qualified”

CHP Acceleration “Catalog” Program

Catalog Items:

- **Pre-qualified:**
 - Has demonstrated actual performance based on testing of the fully-integrated system
- **Conditionally-qualified:**
 - Each component and subsystem has been individually performance tested, and
 - The integration of the complete system has been designed and performance rated using accepted engineering methods

Conditionally-qualified systems can eventually be upgraded to pre-qualified status, until then, each conditionally-qualified system will undergo high-scrutiny factory testing prior to ship

CHP Acceleration “Catalog” Program

Catalog Items:

- Clean and Efficient CHP
- Integrated Controls Package
- Built-in Data Monitoring Features
- Bumper-to-Bumper Warrantee
- 5-year Service Plan
- Capable of “stand-alone” operability

CHP Acceleration “Catalog” Program

The marketplace is touting “packaged” CHP

DRESSER-RAND.

CHP 250

250kW_e Combined Heat and Power System

Dresser-Rand CHP Solutions (a Dresser-Rand strategic business unit) provides a complete range of fully packaged and tested combined heat and power (CHP) systems to commercial, industrial and municipal energy users worldwide. CHP (or cogeneration) systems reduce on-site energy costs and carbon dioxide emissions through the highly efficient delivery of power and heating. Combined cooling, heat and power (CCHP or Trigeneration) systems, provide the high efficiency of CHP, with the added benefit of chilled water output.



■ A CHP TR250 trigeneration unit.

CHP systems offer an environmentally-friendly option for the provision of electricity and heat by recovering thermal energy that would typically be wasted in conventional power plants. With standard modular CHP and trigen systems ranging from 250kW_e to 2.4MW_e, a Dresser-Rand packaged CHP solution increases energy productivity, efficiency and reliability, while substantially lowering clients' greenhouse gas (GHG) emissions.

CHP System Performance

Operating Load		100%	75%	50%
Electrical output [1]	kW	250	188	125
Hot water output [2]	BTU/hr x 1000	1,351	1,073	815
Chilled water output	USRT	76	60	45
Fuel input (LHV) [3]	BTU/hr x 1000	2,451	1,943	1,512
Generating efficiency	%	34.8	32.9	28.2
Heating efficiency [2][3]	%	55.1	55.2	53.9
Plant efficiency (LHV)	%	89.9	88.2	82.1

250kW_e of Continuous, On-site Electrical Power

Energy consumers demand high efficiency and reliability in order to minimize operating costs and maximize uptime. Our CHP systems are supplied as a comprehensive factory tested package that can be easily integrated into existing site operations. Items such as synchronizing switchgear, heat recovery equipment, emissions treatment, attenuation, and lube oil systems are included “within the box” dramatically reducing the risk of cost overruns and performance issues associated with traditional “site built” systems.

CHP Acceleration “Catalog” Program

The marketplace is touting “packaged” CHP

INTELLIGEN
POWER SYSTEMS LLC
Intelligent Cogeneration

Saving Money Through Efficiency
Is an Efficient way to Save the Globe



[On Site Power](#) | [Capabilities](#) | [Sample Projects](#) | [Product Specifications](#) | [Contacts](#)

- Why Choose Intelligen Power?
- **The Intelligen Platform**
- Intelligen Product Benefits
- Intelligen Product Line and Specifications
- Custom Equipment Packages
- Operation and Maintenance Services
- Consulting



The Intelligen Platform

Standardized Approach

Intelligen Power Systems has developed a standardized cogeneration platform that can be refined and customized to meet the needs of a particular site. The standardized platform greatly simplifies the design process and leads to significant cost savings. It also improves reliability and the maintenance function.

Pre-Packaged

In order to simplify the installation, Intelligen Power Systems seeks to pre-package as much equipment as possible in its factory which leads to a quick and cost effective installation process.

Fully Automated Control System

The Intelligen Power Systems control system has been specially designed to provide fully automated operation of the cogeneration system as well as integration with the host facility. The onboard controls package provides full monitoring of system functions to allow for reliable unattended operation.

Remote Monitoring

The Intelligen Power Systems control package provides full remote monitoring functionality which is part of the active ongoing maintenance program that is designed for maximum run-time availability. Intelligen service technicians monitor system performance 24 hours per day and 7 days per week and respond quickly when needed in order to minimize downtime.

Highest Quality Components

Intelligen Power Systems obtains its high levels of availability by incorporating the highest quality components into its equipment. The prime mover is a heavy duty industrial reciprocating engine that is designed for highly reliable continuous operation.

Simplified Utility Connection

Intelligen provides standardized utility interface packages which can simplify the process of obtaining approval for interconnecting with your electrical utility. Intelligen has extensive experience of interfacing with many utilities in a variety of configurations.

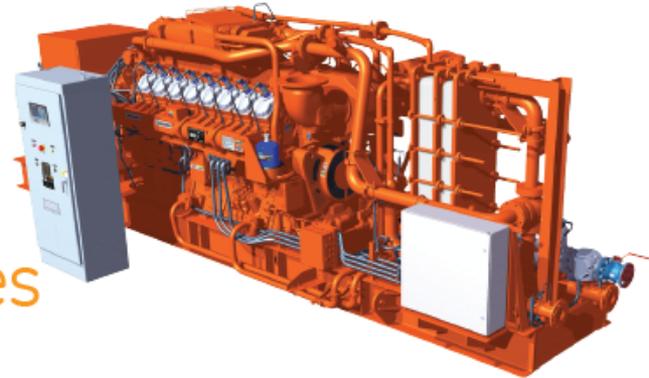
CHP Acceleration “Catalog” Program

The marketplace is touting “packaged” CHP

GE Energy

Waukesha* gas engines APG1000

APG* Gas Enginator* Generating System
1000 kWe @ 50 Hz/1100 kWe @ 60 Hz



CHP

The APG1000 Combined Heat and Power (CHP) package allows for optimized efficiency by maximizing heat recovery. This minimizes packaging cost and time by including CHP components factory mounted. Achieve up to 89.4% total efficiency with the APG1000 CHP package.

With a reputation for rugged durability and ongoing design advancements, Waukesha engines are the sound investment you can depend on in mission-critical applications. Now a part of GE Energy, Waukesha provides enhanced support in the form of parts, service and a network of distributors to make us an even stronger partner for today's global energy industry.

CHP Acceleration “Catalog” Program

The marketplace is touting “packaged” CHP

AEGEN THERMO POWER™ TP-75

The AEGEN THERMO POWER 75 is a compact, modular combined heat and power (CHP) system producing 75 kW of power and 5.23 therms of heat per hour. A three-way non-selective catalyst reduction (NSCR) emissions control package includes a catalytic converter and temperature and oxygen controls designed to reduce emissions of nitrogen oxide, carbon monoxide, and hydrocarbons. The CHP module has a natural gas-fired reciprocating engine, an induction generator, heat recovery system, a sound attenuating enclosure, electrical switchgear, and solid-state controls for automatic and unattended operation. High efficiency heat recovery components consist of oil cooler, engine jacket for heat transfer, marine type exhaust gas manifolds and exhaust gas heat exchangers. The AEGEN THERMO POWER 75 operates in parallel with existing mechanical and electrical systems in the facility. The module includes an advanced utility-grade relay (U.L., C.S.A., and C.E. listed or certified) for electrical protection and redundancy as standard equipment.

Features

- ✦ Reliable, proven technology
- ✦ Highly efficient
- ✦ Environmentally sound with low emissions
- ✦ Quiet operation
- ✦ Modular – scaleable into larger systems
- ✦ Compact – easily fits in most buildings
- ✦ Indoor or outdoor installation
- ✦ Ease of installation – no business disruption
- ✦ U. L. listed
- ✦ Remote monitoring and control
- ✦ Digital display and user-friendly interface
- ✦ Infinite system life with maintenance program
- ✦ Electric and thermal load following
- ✦ Modbus compatible for networking with building automation systems



AEGENCO
AEGIS GENERATOR COMPANY 55 Jackson Street, Holyoke, MA 01040 • (413) 536-1156 • (413) 536-1104 (fax)
Website: www.AegisEnergyServices.com • Email: Aegis@AegisEnergyServices.com

CHP Acceleration “Catalog” Program

The marketplace is touting “packaged” CHP



**C1000 Megawatt Power Package
High-pressure Natural Gas**

1MW of reliable electrical power in one small, ultra-low emission, and highly efficient package.

- High electrical efficiency over a very wide operating range
- Low-maintenance air bearings require no lube oil or coolant
- Ultra-low emissions
- High availability – part load redundancy
- Proven technology with tens of millions of operating hours
- Integrated utility synchronization and protection with a modular design
- 5 and 9 year Factory Protection Plans available
- Remote monitoring and diagnostic capabilities
- Internal fuel gas compressor available for low fuel pressure natural gas applications



C1000 Power Package

CHP Acceleration “Catalog” Program

The marketplace is touting “packaged” CHP



InVerde Ultra 100

Ultra-Low Emissions Inverter-Based Cogeneration

Key Features & Benefits

- 100 kW Continuous / 125 kW Peaking
- Delivers ultra-low emissions levels compliant with strict “CARB 2007” Standards
- Standardized Interconnection
- Black-Start Grid-Independent Operation
- Microgrid compatible with licensed CERTS¹ power balancing control software
- Premium Quality Wave Form, Voltage and Power Factor for Special Applications
- Power Boost for Demand-Side Response
- Enhanced Efficiency from Variable Speed Operation
- Simplified Inter-Unit Controls for either Mode of Operation (parallel or standby)
- ETL Listed - Labeled for compliance with UL 1741 - Utility Interactive; Inverters, Converters, Controllers and Interconnection System Equipment for Use with Distributed Energy Resources
- Renewable Energy Compatible, a Clean Energy Solution for Today and Tomorrow

¹CERTS - Consortium for Electric Reliability Technology Solutions

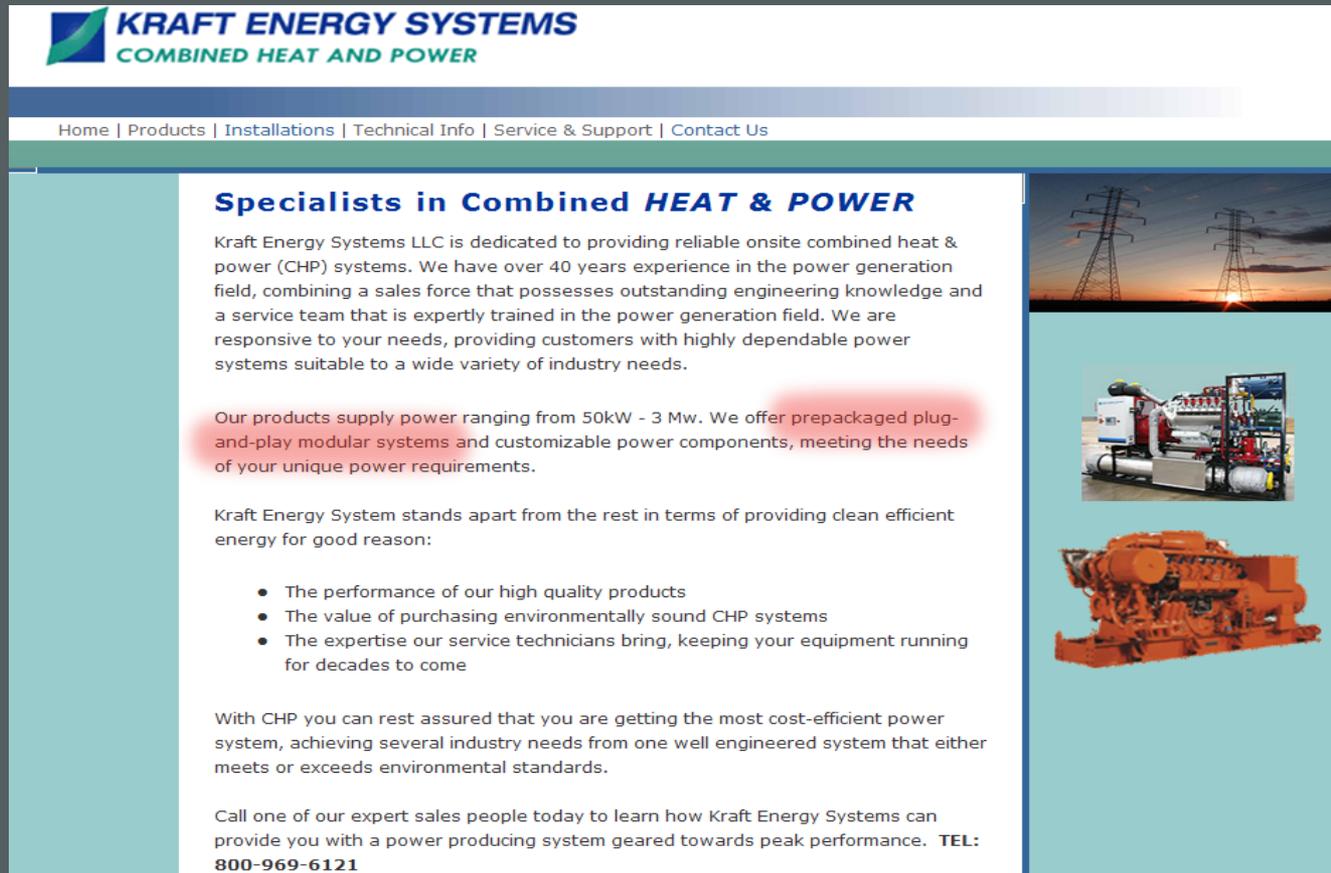


- Over 25 years experience in packaged co-generation, chillers and refrigeration systems
- More than 1,400 operating units in the field
- Extensive service network with factory-trained technicians exclusively servicing Tecogen products

Tecogen Inc. • 45 First Avenue, Waltham, MA 02451 • 781-466-6400 • 781-466-6466 (fax) • www.tecogen.com

CHP Acceleration “Catalog” Program

The marketplace is touting “packaged” CHP



KRAFT ENERGY SYSTEMS
COMBINED HEAT AND POWER

Home | Products | Installations | Technical Info | Service & Support | Contact Us

Specialists in Combined *HEAT & POWER*

Kraft Energy Systems LLC is dedicated to providing reliable onsite combined heat & power (CHP) systems. We have over 40 years experience in the power generation field, combining a sales force that possesses outstanding engineering knowledge and a service team that is expertly trained in the power generation field. We are responsive to your needs, providing customers with highly dependable power systems suitable to a wide variety of industry needs.

Our products supply power ranging from 50kW - 3 Mw. We offer prepackaged plug-and-play modular systems and customizable power components, meeting the needs of your unique power requirements.

Kraft Energy System stands apart from the rest in terms of providing clean efficient energy for good reason:

- The performance of our high quality products
- The value of purchasing environmentally sound CHP systems
- The expertise our service technicians bring, keeping your equipment running for decades to come

With CHP you can rest assured that you are getting the most cost-efficient power system, achieving several industry needs from one well engineered system that either meets or exceeds environmental standards.

Call one of our expert sales people today to learn how Kraft Energy Systems can provide you with a power producing system geared towards peak performance. **TEL: 800-969-6121**



CHP Acceleration “Catalog” Program

The marketplace is touting “packaged” CHP



**NATURAL GAS CHP COGENERATION MODULE
PRODUCT LINE DATA SHEET**

Natural Gas Cogeneration CHP Modules
34kVA / 27ekW up to 3750kVA / 3000ekW* – 60Hz – U.S. 
*(*Larger Plants are available. Please contact us for more information.)*

- Especially designed for NG CHP
- Proven Technology
- Professionally Engineered
- Factory Tested
- Lean Burn with optimum AFR
- Compact Standardized Design
- Extended Life Cycle
- Higher Reliability
- All-In-One (Plug & Play)
- Decreased Operating Expenses
- Optimized Combustion Geometry
- More than 1500 Units in Operation
- Production Line Manufactured
- Reliable & Fuel Efficient
- Economical Rich Burn Options
- Low Service & Maintenance Cost
- Fully Automated User Friendly
- Connection Ready
- Best In Class Technology
- Increased ROI

No other CHP Systems are manufactured more thoroughly. 2G® delivers the ultimate Solution in High Efficiency, Performance and Design. Unmatched Quality and Reliability like nothing Else.

CHP Acceleration “Catalog” Program

The marketplace is touting “packaged” CHP

Elite Energy Systems, LLC
20 Industrial Parkway
Carson City, Nevada 89706
Tel (775) 246-8111 Fax (775) 246-8116

ELITE ENERGY

Combined Heat and Power

Cut energy expenses and reduce emissions with a packaged combined heat and power (CHP) EnviroGen® Energy Module powered by a Caterpillar natural gas or diesel engine.

- Standard Natural Gas CHP Modules:
 - 100 kW
 - 157 kW
 - 250 kW
 - 375 kW
- Standard Diesel CHP Modules:
 - 250 kW
 - 400 kW
- Digester Gas CHP Modules
- Custom CHP Systems

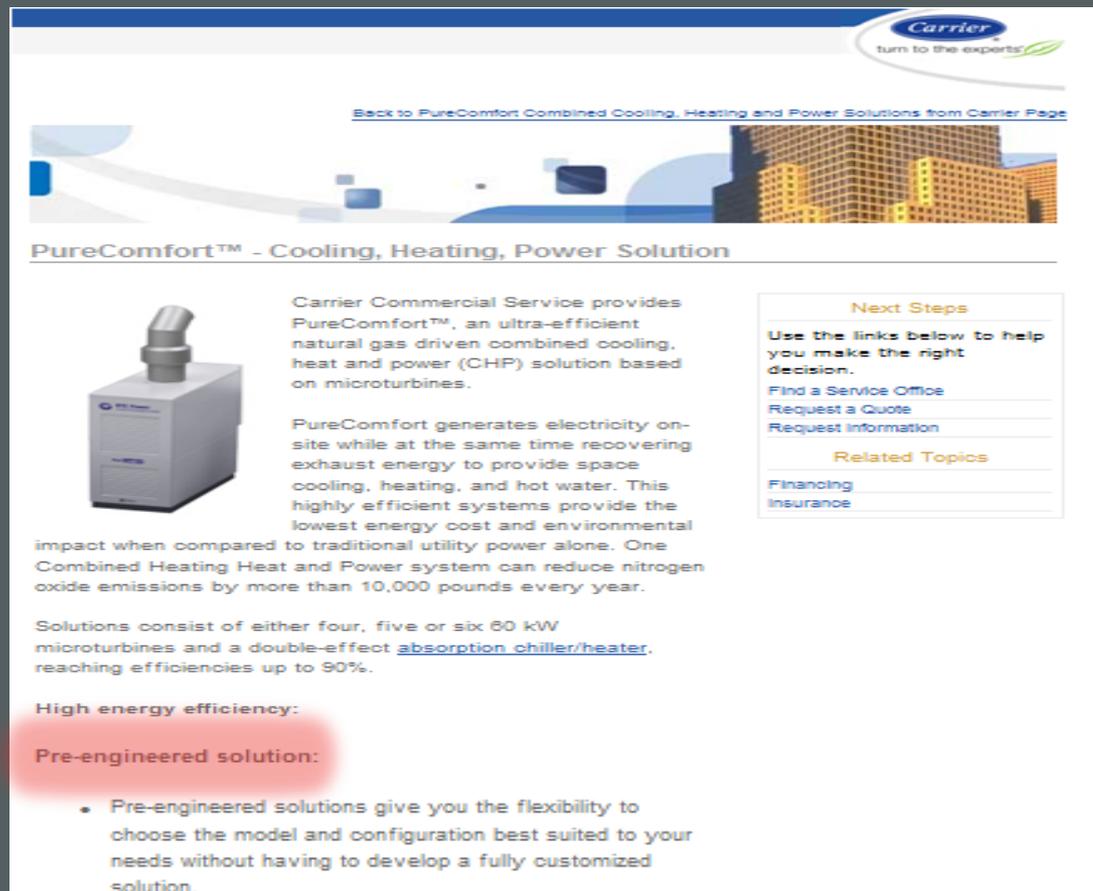


Integrated Control System

Manage your CHP system anytime and from anywhere with our advanced GenView™ Control System.

CHP Acceleration “Catalog” Program

The marketplace is touting “packaged” CHP



The screenshot shows a webpage for Carrier's PureComfort system. At the top right is the Carrier logo with the tagline "turn to the experts". Below it is a navigation link: "Back to PureComfort Combined Cooling, Heating and Power Solutions from Carrier Page". The main heading is "PureComfort™ - Cooling, Heating, Power Solution". On the left is an image of the PureComfort unit. To its right is descriptive text: "Carrier Commercial Service provides PureComfort™, an ultra-efficient natural gas driven combined cooling, heat and power (CHP) solution based on microturbines." and "PureComfort generates electricity on-site while at the same time recovering exhaust energy to provide space cooling, heating, and hot water. This highly efficient systems provide the lowest energy cost and environmental impact when compared to traditional utility power alone. One Combined Heating Heat and Power system can reduce nitrogen oxide emissions by more than 10,000 pounds every year." Below this is a paragraph: "Solutions consist of either four, five or six 60 kW microturbines and a double-effect absorption chiller/heater, reaching efficiencies up to 90%." There are two highlighted sections: "High energy efficiency:" and "Pre-engineered solution:". The "Pre-engineered solution:" section contains a bullet point: "Pre-engineered solutions give you the flexibility to choose the model and configuration best suited to your needs without having to develop a fully customized solution." On the right side of the page, there are two boxes: "Next Steps" with links for "Find a Service Office", "Request a Quote", and "Request Information"; and "Related Topics" with links for "Financing" and "Insurance".

Carrier
turn to the experts

[Back to PureComfort Combined Cooling, Heating and Power Solutions from Carrier Page](#)

PureComfort™ - Cooling, Heating, Power Solution



Carrier Commercial Service provides PureComfort™, an ultra-efficient natural gas driven combined cooling, heat and power (CHP) solution based on microturbines.

PureComfort generates electricity on-site while at the same time recovering exhaust energy to provide space cooling, heating, and hot water. This highly efficient systems provide the lowest energy cost and environmental impact when compared to traditional utility power alone. One Combined Heating Heat and Power system can reduce nitrogen oxide emissions by more than 10,000 pounds every year.

Solutions consist of either four, five or six 60 kW microturbines and a double-effect absorption chiller/heater, reaching efficiencies up to 90%.

High energy efficiency:

Pre-engineered solution:

- Pre-engineered solutions give you the flexibility to choose the model and configuration best suited to your needs without having to develop a fully customized solution.

Next Steps

Use the links below to help you make the right decision.

[Find a Service Office](#)

[Request a Quote](#)

[Request Information](#)

Related Topics

[Financing](#)

[Insurance](#)

CHP Acceleration “Catalog” Program

Program Mechanism:

- Create catalog of “pre-qualified” systems
- **Assign specific “rebate” to each system**
- Invite customers to shop from catalog
 - Streamlined approach to system sizing
 - Customized approach to system sizing

CHP Acceleration “Catalog” Program

Assignment of specific rebates to catalog items:

- Rebates may vary within the range of \$1,500 to \$2,000 per kW at Downstate (lower at Upstate)
- Smaller systems will get a greater “per kW” incentive (examples for illustrative purposes only):
 - 100 kW system would get a \$200,000 rebate
 - 1,000 kW system would get a \$1,500,000 rebate
- Bonus for thermal systems that displace electric load

CHP Acceleration “Catalog” Program

Program Mechanism:

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CHP Acceleration “Catalog” Program

Invite customers to shop from the catalog:

- **Streamlined** approach to system sizing:
 - Based on available data, NYSERDA will create a collection of “rules-of-thumb” for maximum sizing for various end-use sectors
 - Customers that shop within the “safe harbor” size limit recommended by a rule-of-thumb will automatically be admitted into the Program

CHP Acceleration “Catalog” Program

Invite customers to shop from the catalog:

- Customized approach to system sizing:
 - Unable to develop rules-of-thumb for every conceivable scenario
 - Occasionally, a customer will have an explicit need for a size greater than recommended by the rule-of-thumb
- To be handled on a case-by-case basis where the Customer will need to furnish a detailed site-specific feasibility study for consideration for admittance into the Program

CHP Acceleration “Catalog” Program

Invite customers to shop from the catalog:

- Eligible Customers:
 - Multi-family Residential
 - Commercial / Institutional / Municipal
 - Industrial / Agricultural
 - Etc.

Customer must pay SBC Surcharge

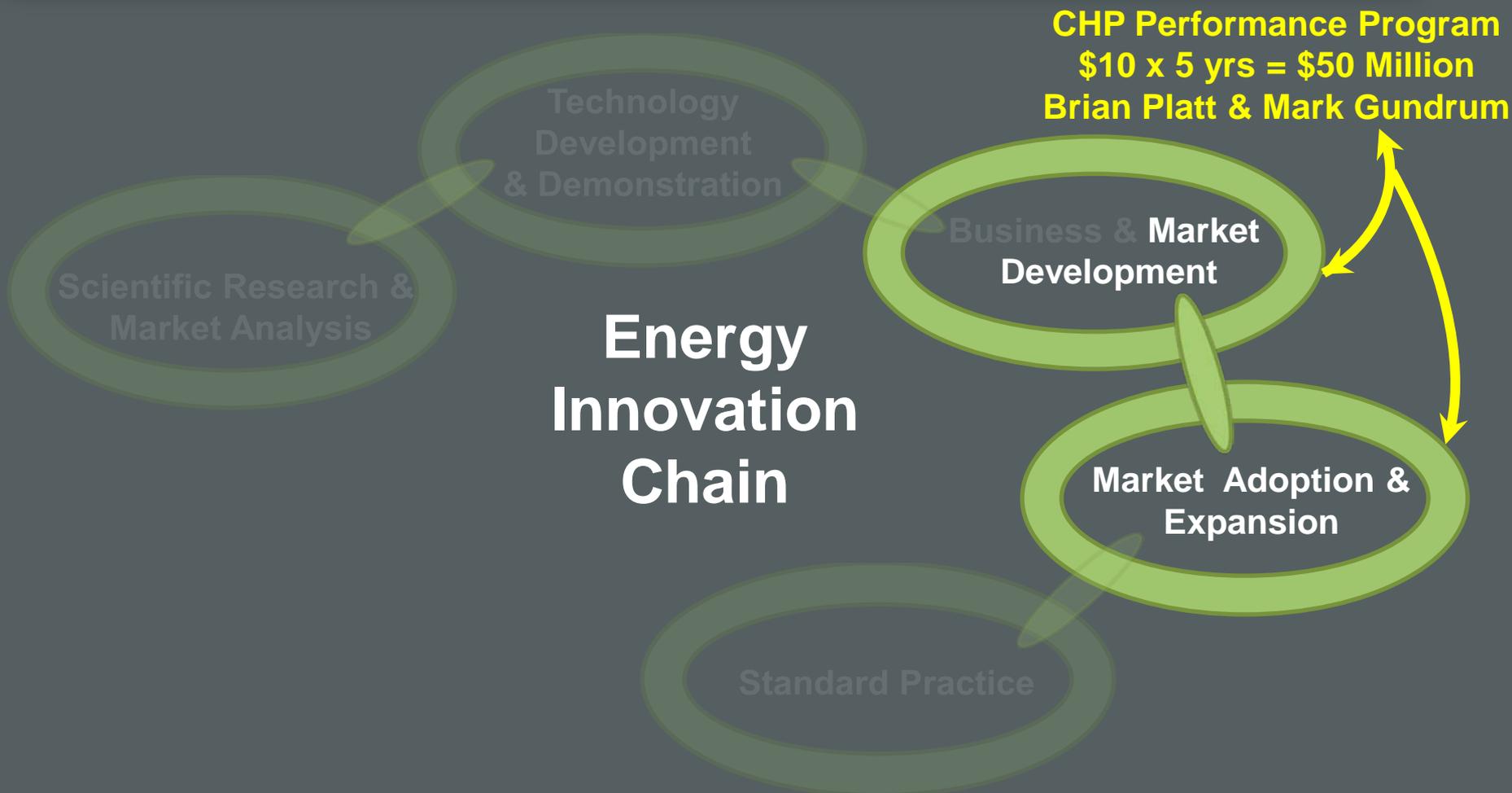
CHP Acceleration “Catalog” Program

System “re-commissioning” in sophomore year

Win-Win-Win-Win-Win Outcomes:

- **Customer:** confidence, “vetted” system
- **Developer:** transparency of Program
- **Equipment Vendor:** marketing edge
- **Auth-having-Juris:** familiarity & comfort
- **NYSERDA:** acceleration of uptake

NYSERDA's Multiple Objectives



CHP Performance Program

- Program was proposed under T&MD
 - May 16, 2011
- Budget
 - \$50 MM over 5 years
- Goals
 - 25 Peak Load MW
 - 208,000 MWhr

CHP Performance Program

- Program in PSC Order; October 24, 2011
- NYSERDA directed to provide Petition regarding
 - Funding
 - Program criteria

Including criteria addressing Con Edison Steam

CHP Performance Program

- CHP Performance Program Petition
 - Submitted March 30, 2012
 - Budget - \$50 MM over 5 years
 - 29 Peak Load MW
 - 240,000 MWhr

CHP Performance Program

- Petition is open for Public Comments
 - Initial Comments Due July 13, 2012
 - Reply Comments Due August 3, 2012

<http://documents.dps.ny.gov/public/MatterManagement/CaseMaster.aspx?MatterSeq=35164>

- Working with DPS Staff on program details
- Hopefully, issue program 4th quarter 2012

CHP Performance Program

Program Design

- Larger than 1.3 MW
- Engineering study demonstrating system meets site needs and program requirements
- Performance based
 - Funds for delivery of KWhr and peak load KW
- Performance criteria
 - Fuel Conversion Efficiency
 - Exhaust emissions
- 2-Yr M&V Requirement

Please Contact Us

www.nyserda.ny.gov

NYSERDA
17 Columbia Circle
Albany, NY 12203
(518) 862-1090

Dana Levy

DLL@nyserda.org

x 3377

Brian Platt

BCP@nyserda.org

x 3309