

Department of Energy
2015 Better Buildings Summit

CHP Opportunities and Benefits
2015

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HARBEC goals for CHP

- Problems: (late 90's)
 - Poor power quality caused expensive damage to high tech manufacturing equipment
 - When asked, utility had no answers that would guarantee reduction or elimination of problems
 - A desire to improve employees' working conditions (sweat-shop) while remaining competitive
 - A need to improve part quality by reducing ambient moisture



Initial Concerns...

- More potential conflicts with the utility
- Customers' impressions that we were 'buying toys'
- Customer concerns that we would have unreliable power and not be able to deliver
- That we were not in the utility business and so it (managing and maintaining) might be too big of a distraction for us to handle



Actual Outcomes

- We ran our CHP plant for 2 years before telling any customers it was there, so that when we did tell them we already had 2 years of confidence and excellent performance...
- We also were able to offer the ability to stay fully operational when the grid was down...something that our competition could not offer to our customers
- Eventually we were able to demonstrate and quantify the fact that we were reducing our operating cost and making our pricing more competitive



Meeting Expectations...

- Economically
 - Beat ROI expectations due to increase in gas cost
- Maintenance
 - Never had a Capstone serviceman in our building
- Reliability
 - After 14 years of constant operation we are updating and refurbishing mostly for efficiency improvement opportunities



If We Knew Then What We Know Now...

Unexpected Problems

- Our utility will not recognize the energy that our CHP produce for net-metering purposes and worse, because it is mixed with our energy from our wind turbines they determined that we were not eligible for net-metering of the power they produce either.
- The result of this is we donate \$50k to \$60k worth of green power to the grid annually.



If We Knew Then What We Know Now...

Unexpected Bonuses

- Our CHP experience taught us how to think 'thermally' which can make very significant improvements in company economics
- We learned that if a CHP plant is operated under Thermal Priority it will always be economically positive, regardless of changing fuel and utility pricing
- Having one moving part in your generator is worth the extra initial cost
- DOE CHP TAP and NYSERDA



Value of DOE CHP TAP

- Providing resources to interested communities including:
 - Assessing economic viability
 - Addressing interconnection issues
 - Navigating legal and regulatory matters
 - Understanding tariffs and standby charges
 - First Order District Energy Screening Tool
 - CHP Qualification Screenings & Technical Assessments



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Value of DOE CHP TAP

- Main Features
 - Data – Regional Load Profiles, Energy Prices, Labor Rates, Financial rates, Pipe Cost,
 - Project Definition - District Composition, Phasing
 - Options appraisal – LIFE CYCLE COST Comparison of Costs of Options vs Baseline (Building Boilers and Chillers and Purchased Power)
 - NOT Proforma



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Screening Tool Parameters

Operating Expense

- Energy Costs
- Labor Costs
- Maintenance Costs (LTSA)
- Consumables

Capital Expense

- Unit Cost estimates by system type
 - Boilers
 - Chillers
 - Electric gear
 - CHP equipment
 - Distribution Piping
 - Building SF Costs
- Debt Service

Economic Considerations

- Discount Rate
- Escalation Rates
 - Electricity
 - Natural Gas
 - General Inflation
- Loan Terms

Value of **NYSERDA**

Financial Assistance

- **PON 2701 Combined Heat and Power (CHP) Performance Program**
 - The New York State Energy Research and Development Authority (NYSERDA) offers incentives to promote the installation of clean, efficient, and commercially available Combined Heat and Power (CHP) systems with an aggregate nameplate greater than 1.3 megawatts (MW)
- **PON 2568 CHP Acceleration Program**
 - NYSERDA will provide financial incentives for the installation of pre-qualified (or conditionally qualified), pre-engineered CHP systems by approved CHP system vendors at customer sites



Energy – CHP = Electricity and HVAC

Combined Heat and Power CHP

- 25 CNG fueled 30kW Microturbine Generators
- 750 kW max potential provides:
 - 500 kW for *HARBEC*'s max electric load requirement
 - 250 kW redundancy for back-up and maintenance

Thermal Advantages

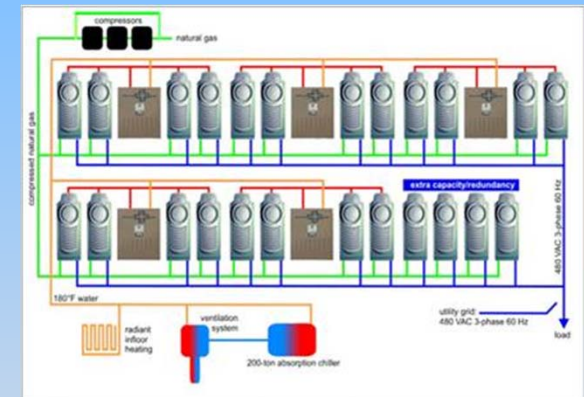
Heating and A/C almost energy (fuel) free

No Magic

We just use the 65 - 75% that Utilities throw away

By using the thermal energy from exhaust, we heat and air condition 9000 sq.ft. molding area with 25 injection molding machines and a 17,000 sq.ft. manufacturing/warehouse space

\$\$\$ 7 Year ROI paid for with energy dollars not spent \$\$\$



Energy – CHP – Upgrade in progress

Combined Heat and Power CHP

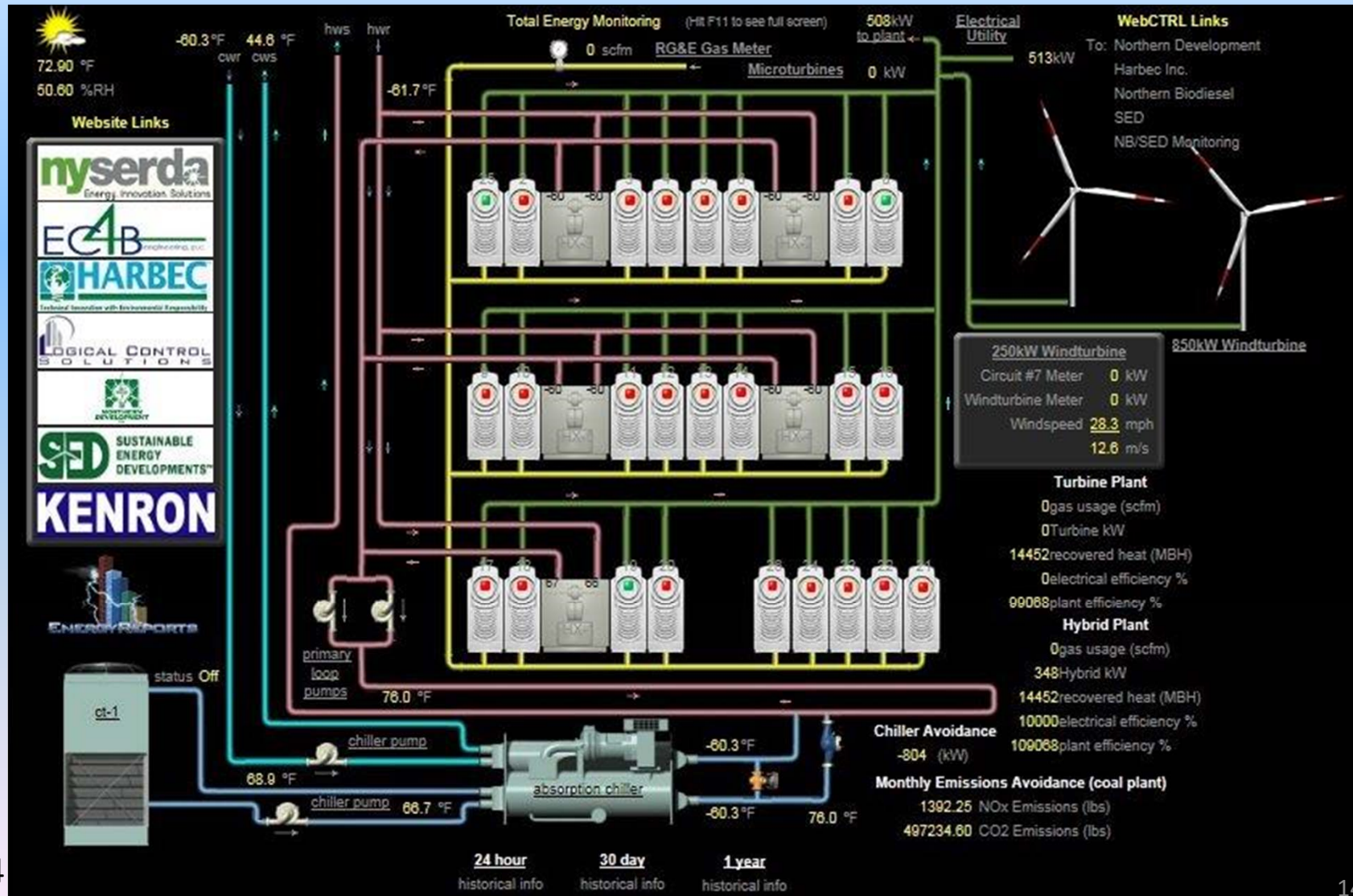
- 10- CNG fueled 30kW Microturbine Generators –Refurb
- 8- 65kW Microturbine Generators = 520 kW
- Increase to 820 kW max potential provides:
 - 500 kW for *HARBEC*'s max electric load requirement
 - 320 kW redundancy for *WISP* and maintenance

By using the thermal energy from exhaust, we heat and air condition 9000 sq.ft. molding area with 25 injection molding machines and a 17,000 sq.ft. manufacturing/warehouse space and soon 14,000 sq.ft. of shop and office



The HARBEC CHP Project

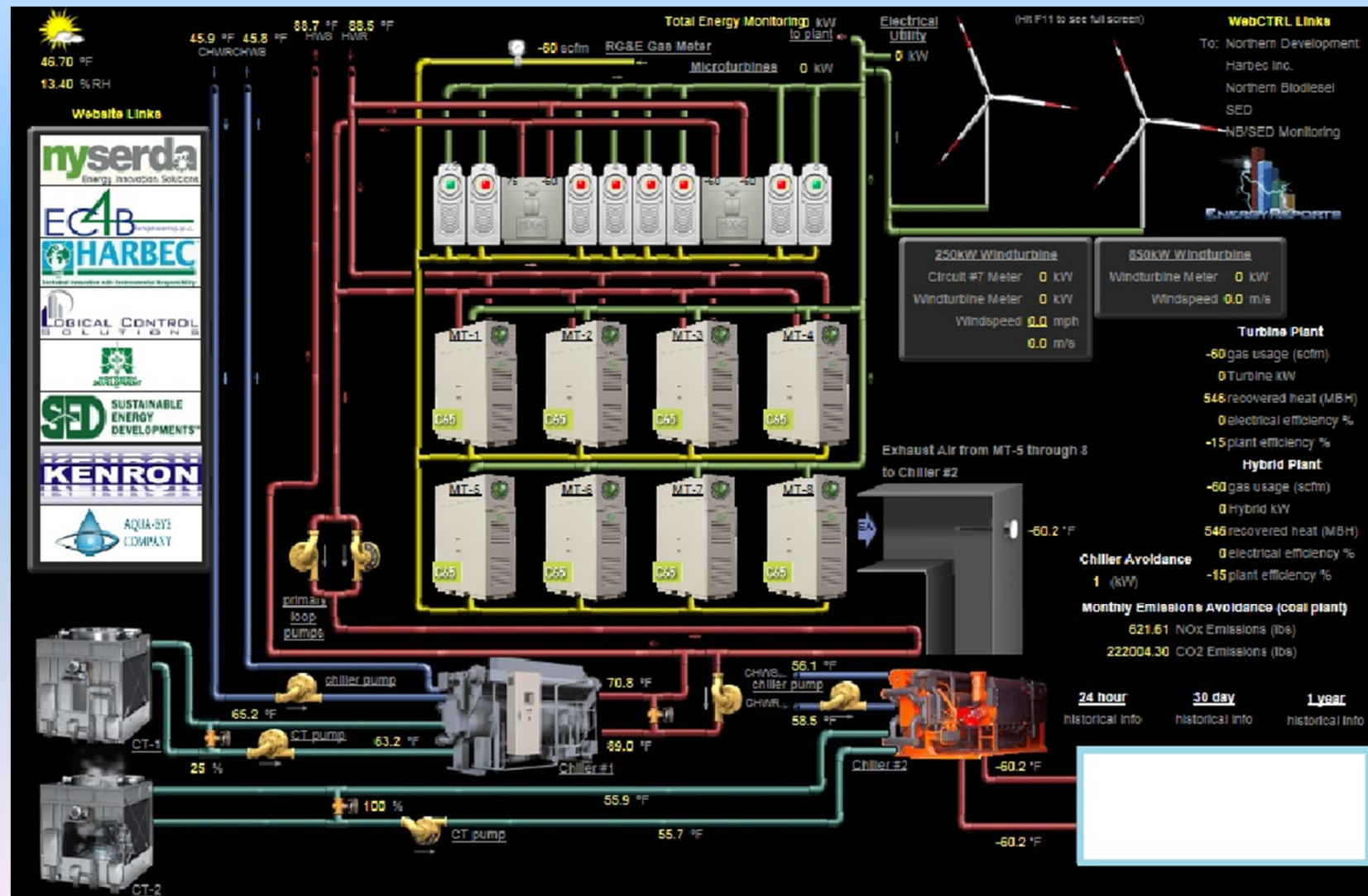
www.northerndevelopment.com



Coming soon...

The NEW HARBEC CHP Project

www.northerndevelopment.com



HARBEC conviction to Eco-economic Sustainable Manufacturing

At *HARBEC* we regard Eco-economic Sustainability as absolutely critical to the future of our business, and we believe that our success in the pursuit of it, will improve our competitive advantage by insuring our efficiency.



A Carbon Neutral
manufacturing company

Striving to be
Water Neutral by 2015



ISO 50001/SEP Platinum Nov. 2013

DOE - Better Plants – Challenge Jan. 2014

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Thank You

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