POWER TO PROFIT

INTRODUCTION TO COMBINED HEAT & POWER

January 2014

AMERICAN DG ENERGY

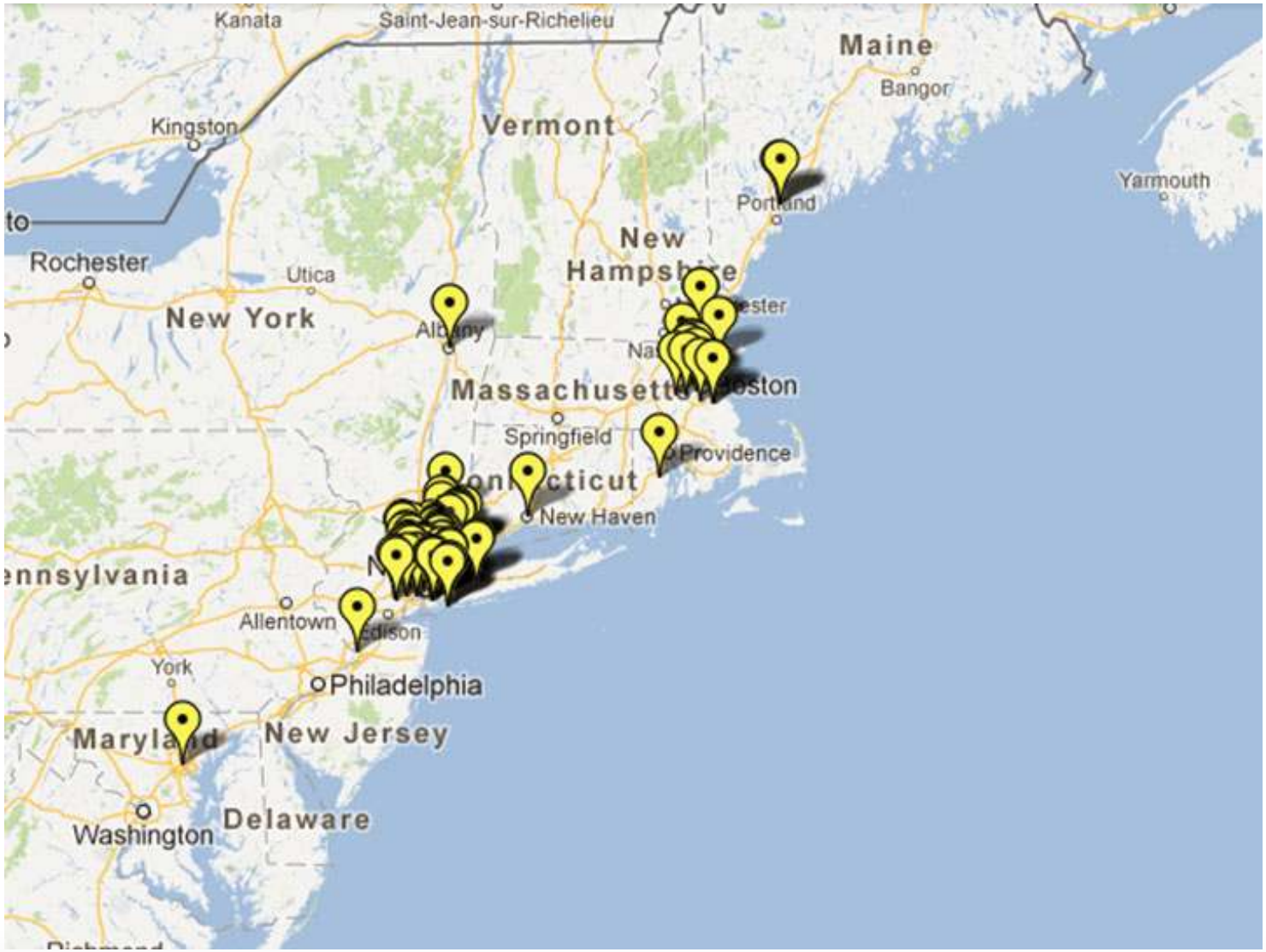
AMERICAN DG ENERGY AT A GLANCE

→ The leading On-Site Utility offering clean electricity, heat, hot water and cooling in North American & Europe

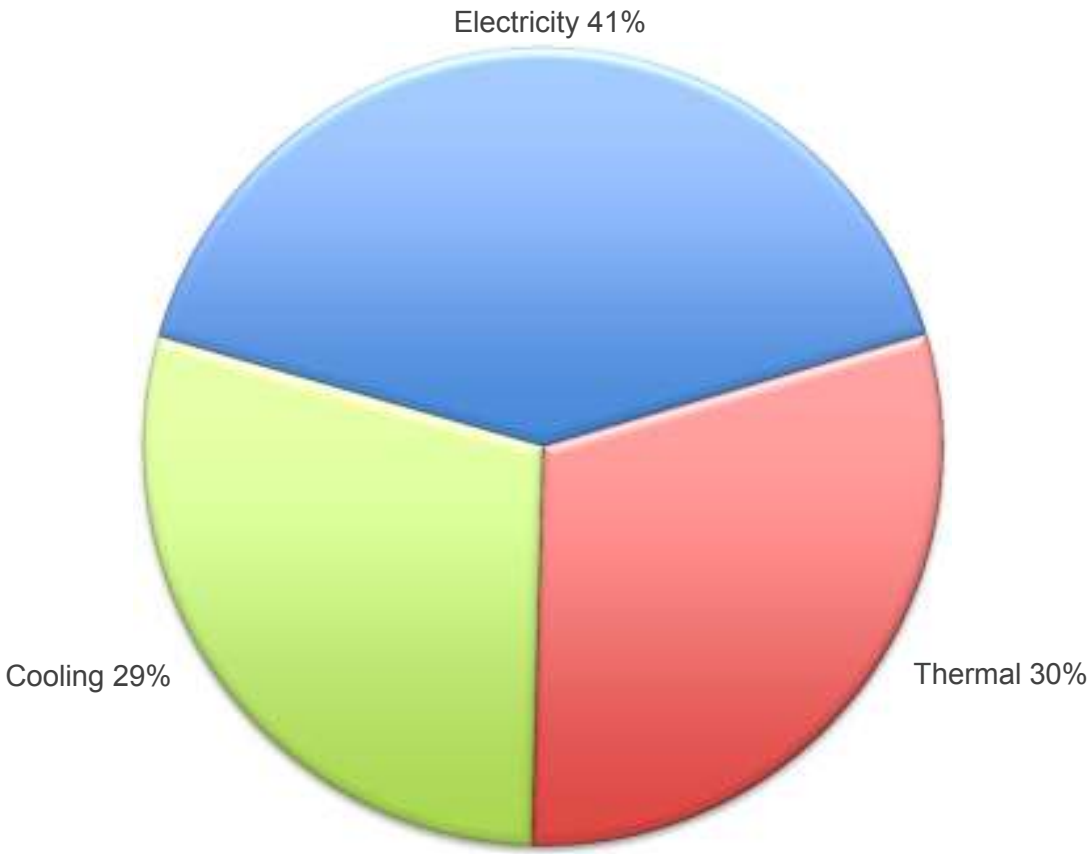
→ Established in 2001 and common stock began trading in 2007 under the ticker symbol NYSE MKT: ADGE

→ Operating in Europe through EuroSite Power subsidiary (OTCQB: EUSP)

ADGE ENERGY SYSTEMS: NORTHEAST US

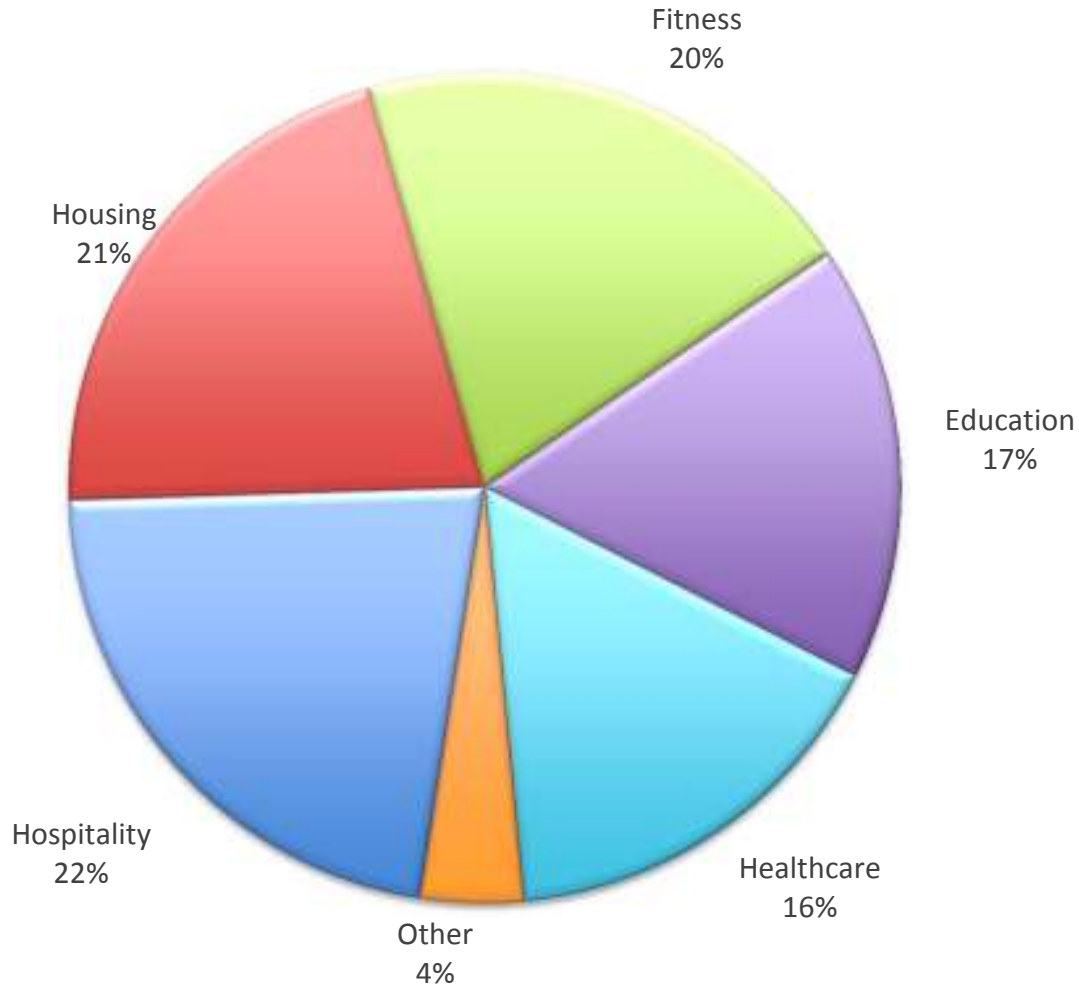


ENERGY TYPE (Q3 2013 REVENUE)



Q3 2013 Energy Production = 22.7 Million kWh

US MARKET SEGMENT (Q3 2013 REVENUE)



COMBINE HEAT & POWER (CHP) AND COGENERATION

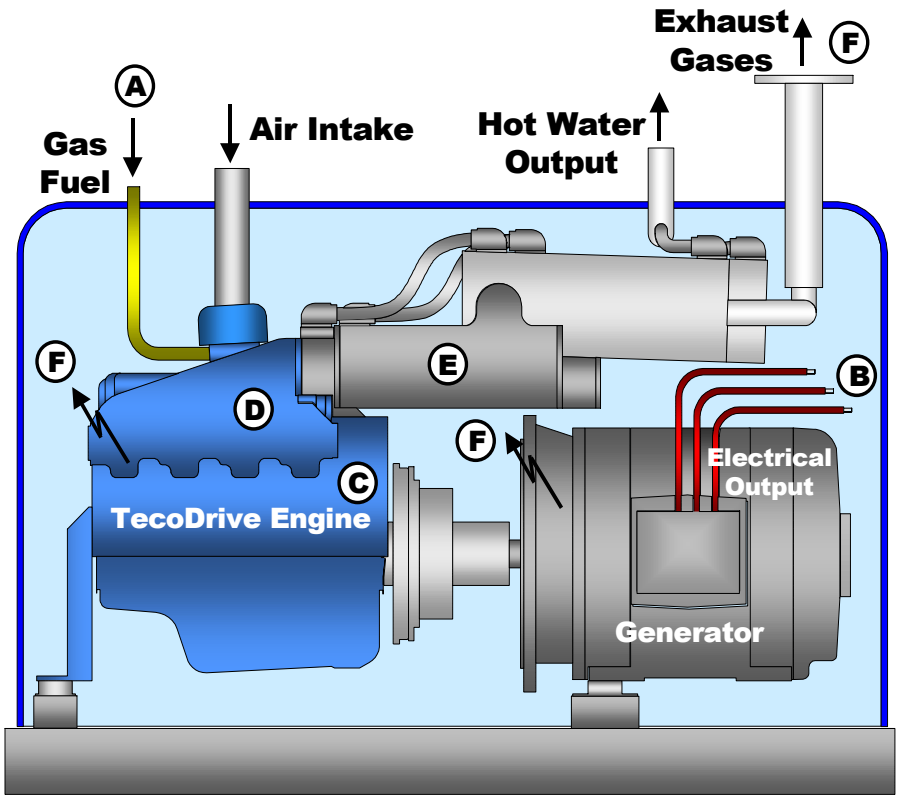
VARIOUS ENERGY SYSTEMS

AMERICAN DG ENERGY

CHP SYSTEM

CHP SYSTEM

Fuel (natural gas) IN



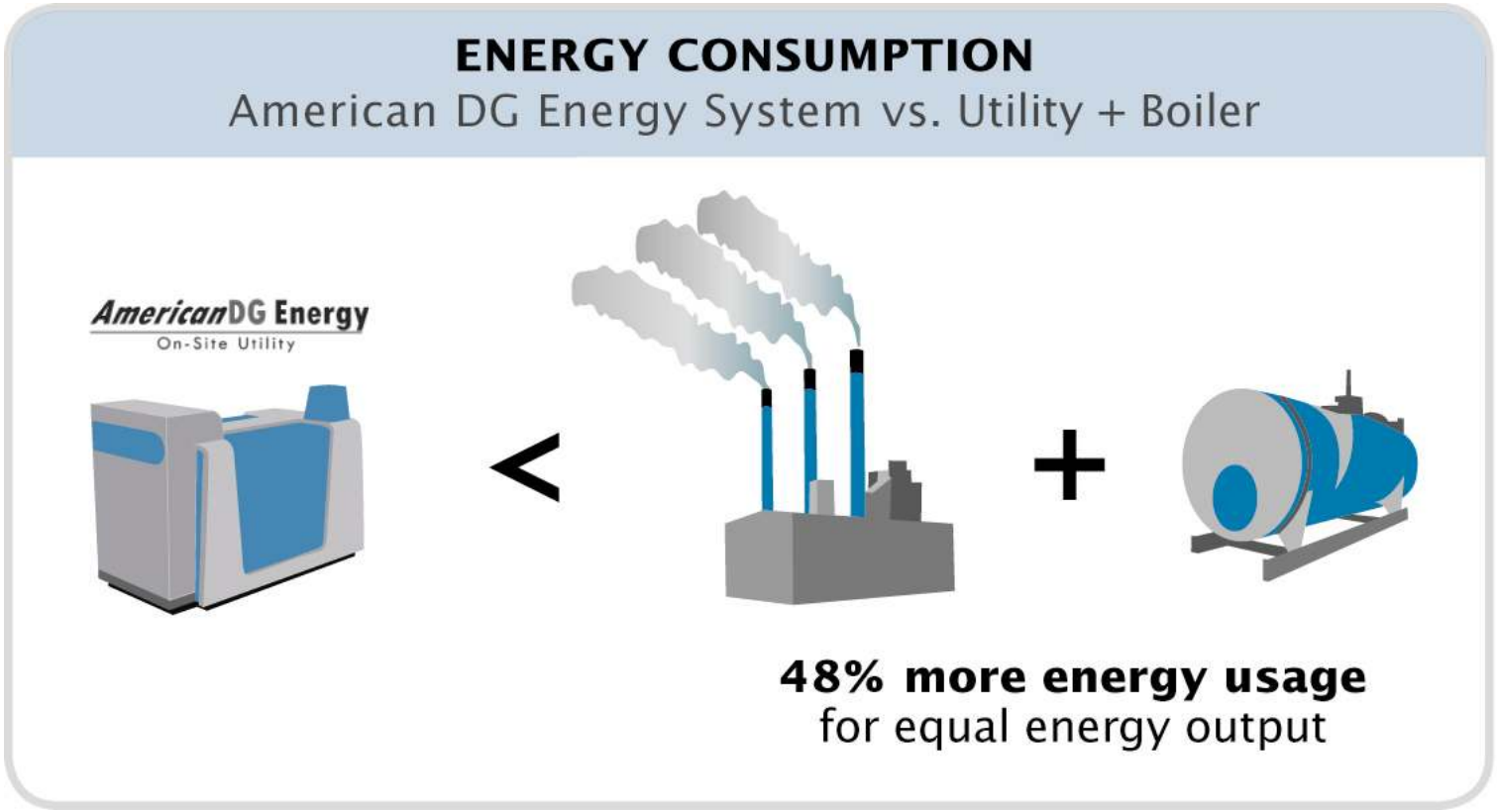
Hot Water & Heat OUT

Electricity OUT

→ **Percent Load:**

- **Domestic hot water, space heating, laundry, pool heating (70-80%)**
- **Site Electricity (30-50%)**

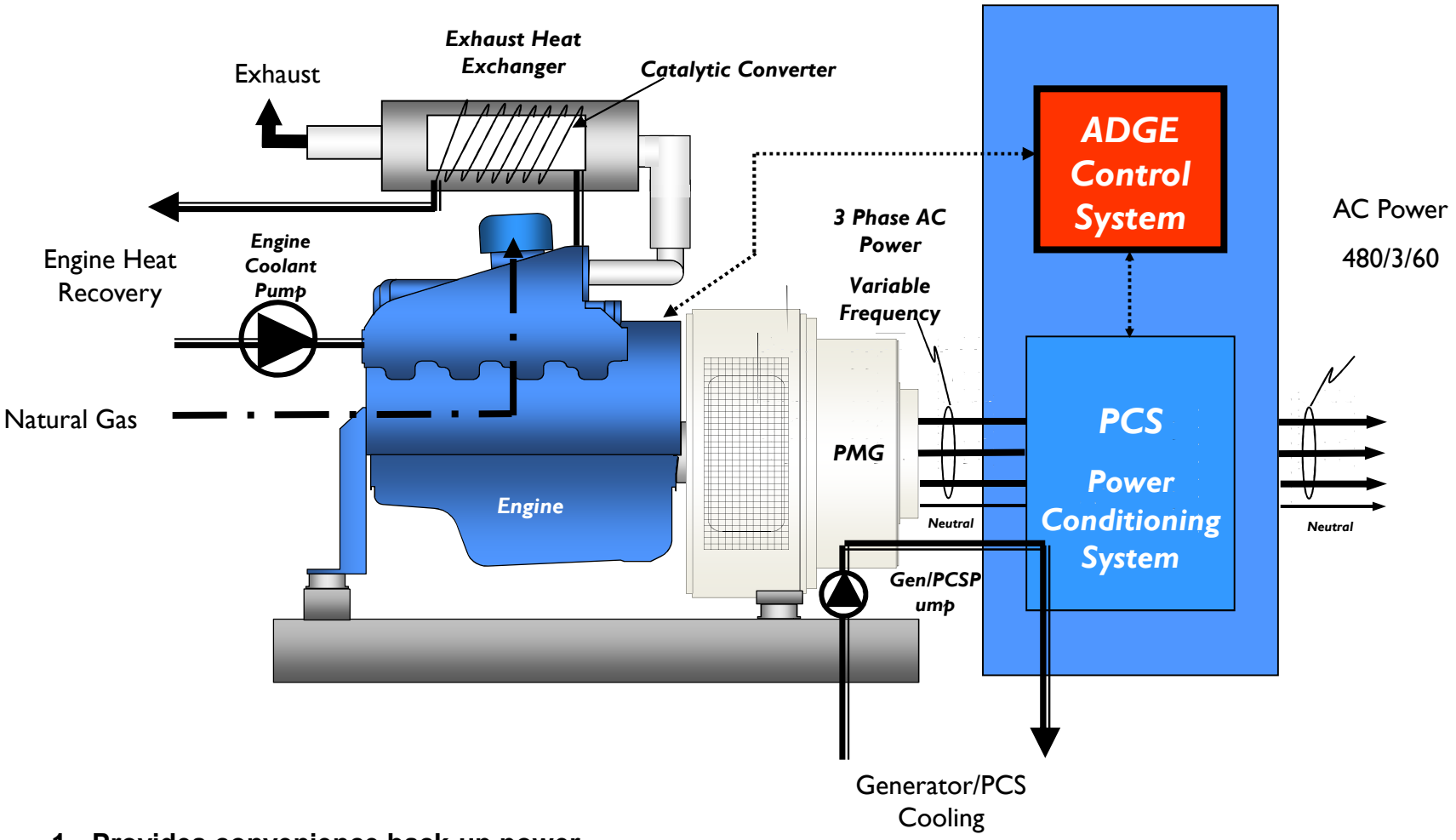
ENERGY EFFICIENCY IMPROVEMENT



→ **Seasonal Effective Efficiency Comparison:**

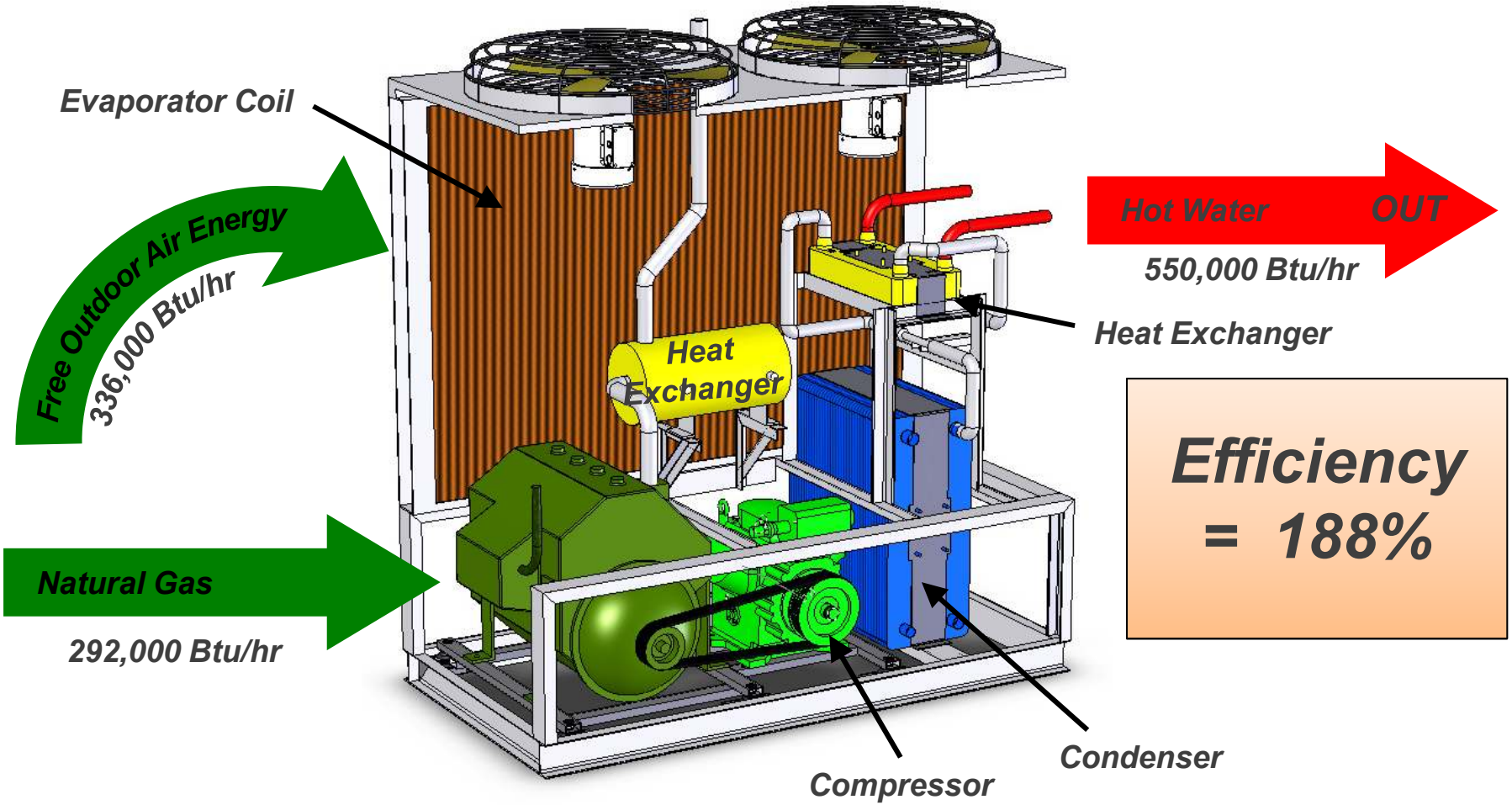
- **CHP (88%) versus Electric Grid (35%) + Boilers (65%)**

INVERTER BASED CHP



1. **Provides convenience back-up power**
2. **Clean energy with 0.98+ power factor**
3. **Designed for world market**

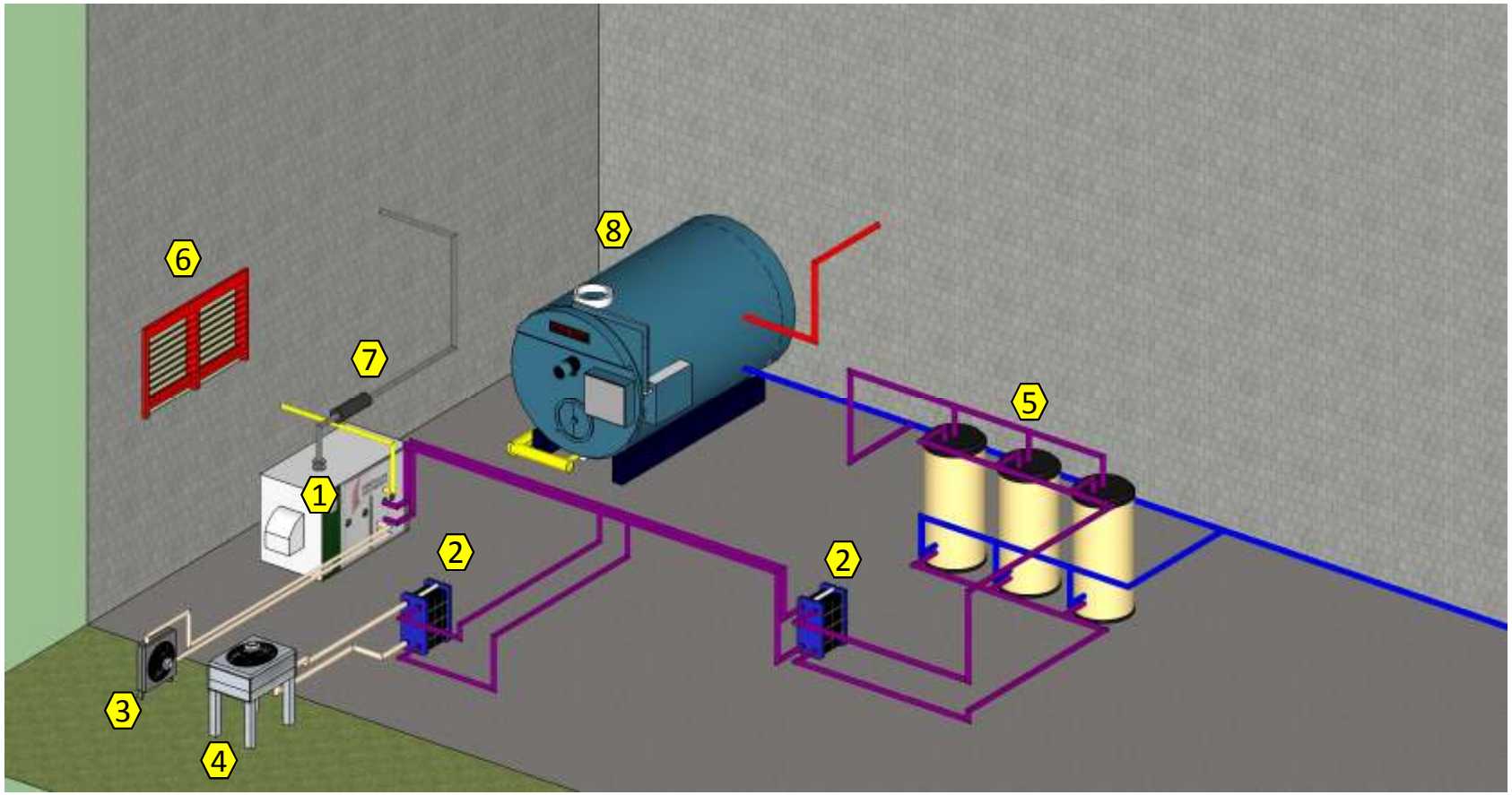
ULTRA-HIGH EFFICIENCY WATER HEATING SYSTEM



→ *Advanced heating systems for commercial and industrial applications*

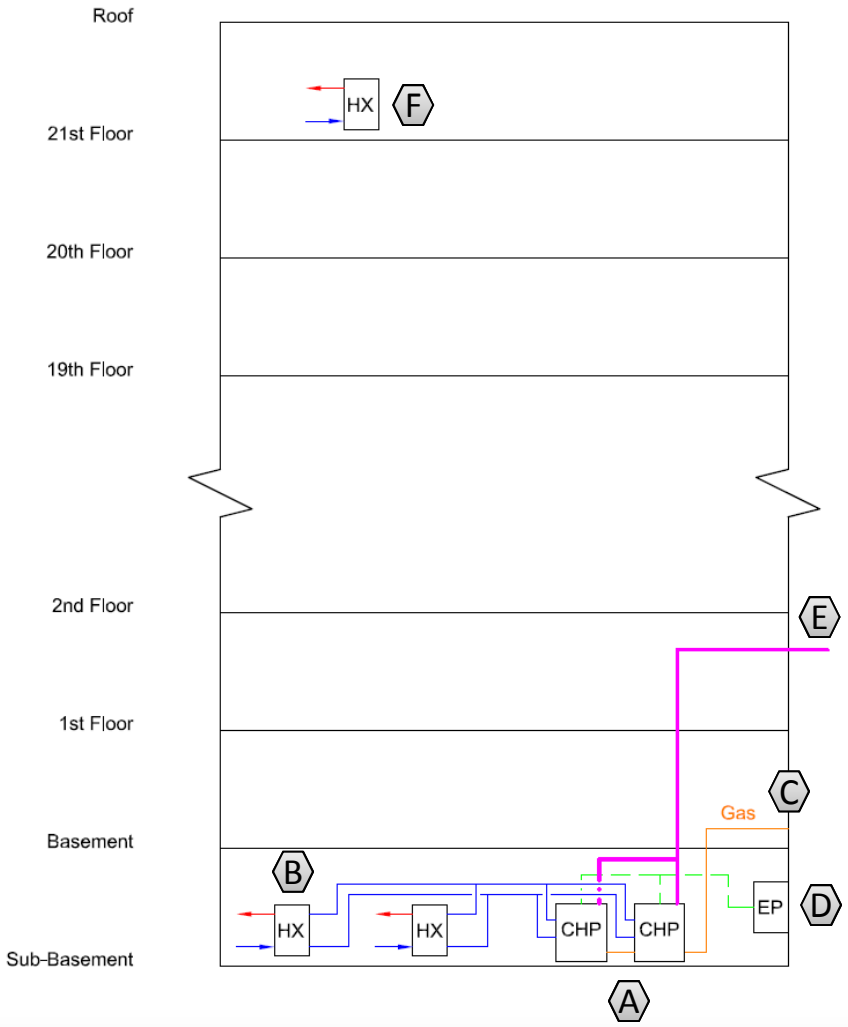
→ *Efficiency = 550,000/292,000 = 188%*

EXAMPLE – KEY CHP SYSTEM COMPONENTS



1. Cogeneration unit
2. Heat exchangers
3. Electronics Cooler
4. Dump Radiator (standby mode only)
5. Storage
6. Air louver (combustion air)
7. Exhaust (with muffler)
8. Boiler (existing)

SAMPLE CHP INSTALLATION RISER SCHEMATIC



A – (2) CHP modules in sub-basement mechanical room.

B – CHP to tie into lower DHW zone (floors 3-16) and building heating loop.

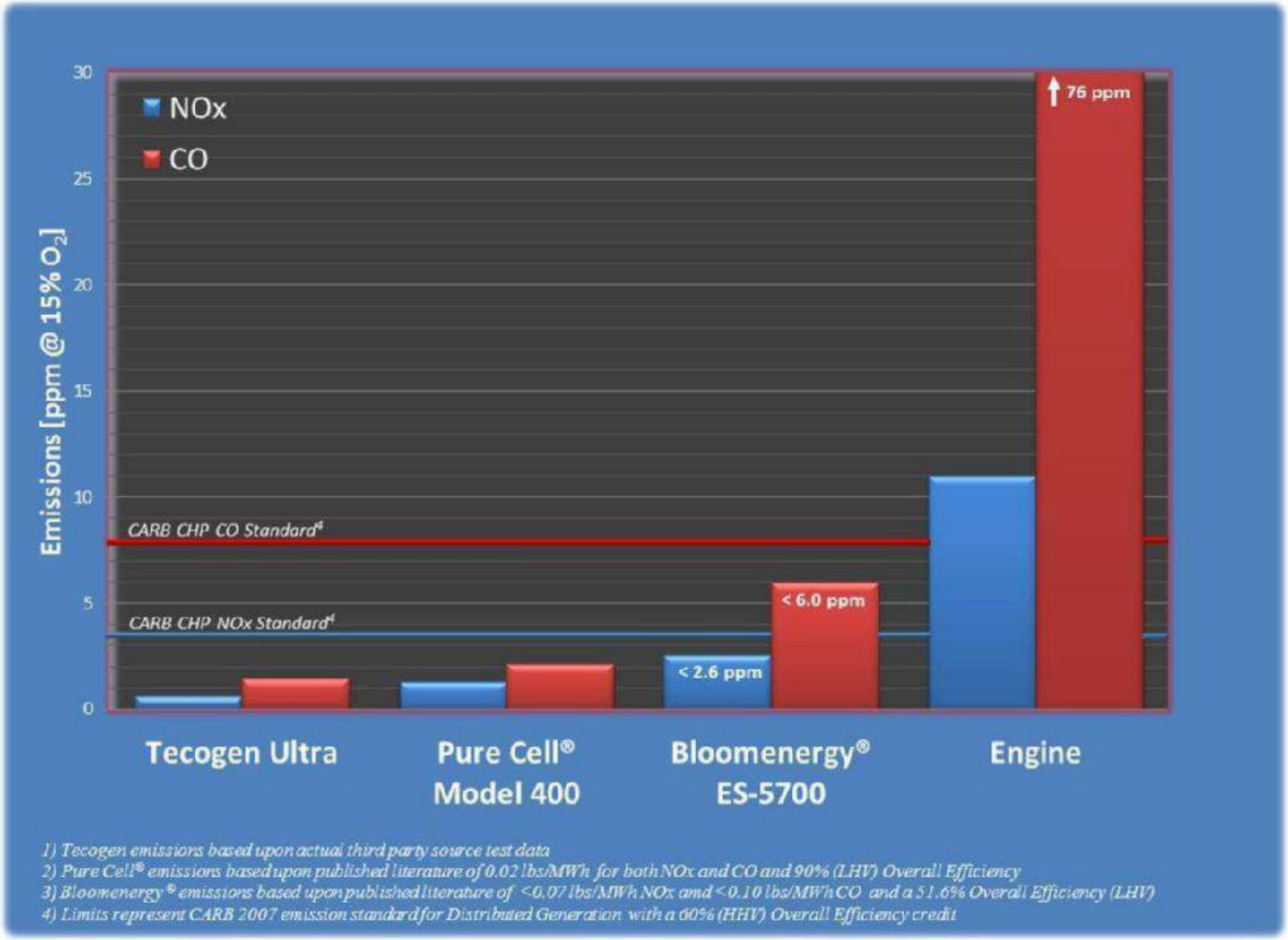
C – Dedicated natural gas line from gas POE in basement to CHP machines.

D – Electrical tie into main distribution bus in sub-basement.

E – Pipe the CHP exhaust flue through air intake into loading dock, and then adjacent to the existing flue in the loading dock area

F – Upper DHW zone (floors 17-21) not feasible to attack

ADVANCED EMISSIONS SYSTEM



1) Tecogen emissions based upon actual third party source test data
2) Pure Cell® emissions based upon published literature of 0.02 lbs/MWh for both NOx and CO and 90% (LHV) Overall Efficiency
3) Bloomenergy® emissions based upon published literature of <0.07 lbs/MWh NOx amd <0.10 lbs/MWh CO and a 51.6% Overall Efficiency (LHV)
4) Limits represent CARB 2007 emission standard for Distributed Generation with a 60% (HHV) Overall Efficiency credit

ENERGY EFFICIENCY

→ Cogeneration **Reduces CO_2**

- **Example: 150 kW, 6,000 run hours/year: 607 tons/year**

→ Equivalent to:

451 acres

115 cars

POWER PURCHASE AGREEMENT
OR
ON-SITE UTILITY

TECHNOLOGY RANGE

Combined Heat and Power (CHP)

- → Generates heat, hot water and electricity
- → Back-up power
- → Low emissions
- → 15 kW – 1MW

Air Conditioning

- → Generates chilled water for cooling applications
- → Electric & Gas
- → 50 – 2,000 Tons

Hot Water & Heat

- → Heat pumps
- → Highly efficient boilers
- → Conversions from oil & steam

ON-SITE UTILITY

→ Supplies low cost energy On-Site

- Electricity
- Heat
- Hot water
- Chilled water

→ Supplies energy as an alternative to purchasing energy equipment

NO COST, NO RESPONSIBILITY

→ American DG Energy owns & pays for energy systems

- Equipment, engineering, installation and financing
  - CHP or Cogeneration
  - Chillers
  - Heat pumps and boilers

→ American DG Energy pays for all operating costs

→ 100% American DG Energy responsibility

- Maintenance & service
- Full operations
  - 24/7 monitoring
  - Performance optimization
- Fuel (natural gas) purchasing

NO RISK

→ You only pay for energy you use

- Energy price is typically discounted below utility rates
- Discount rate guaranteed below utility rates

→ Energy supplied is metered On-Site

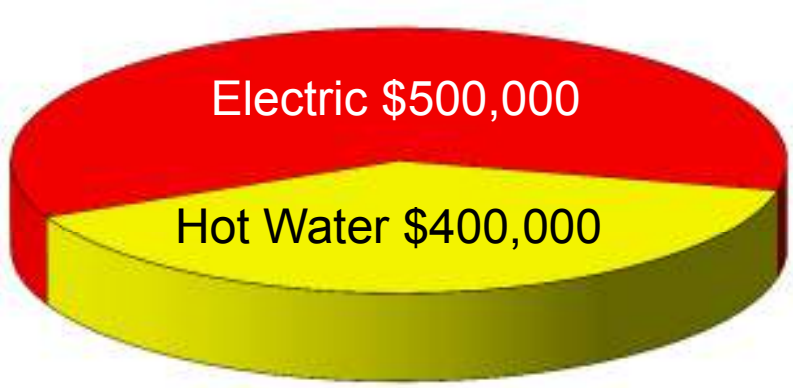
- Electricity (kWh & kW)
- Heat, hot water & chilled water (therms)

→ Term: Typically 15 years

ANNUAL ENERGY COST (EXAMPLE)

Before

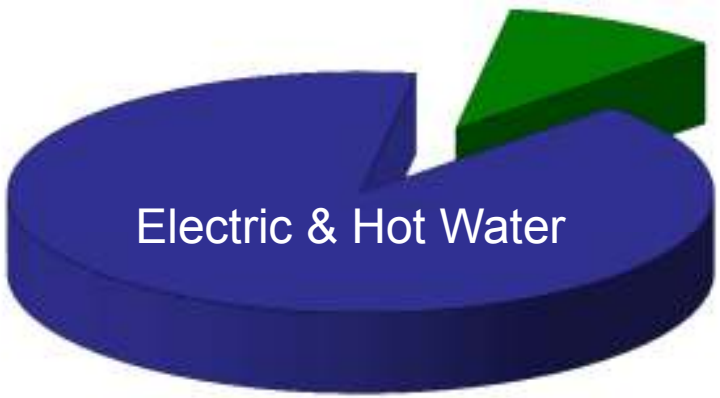
$900,000



After

$810,000

First Year Savings
$90,000



Your Investment = $0

Total Savings = $1,800,000

COMPELLING CUSTOMER VALUE PROPOSITION

→**Guaranteed lower** energy costs – discount to utility rates

→**Immediate** positive cash flow and increased net income

→**No cost alternative** to purchasing energy equipment

→**No capital**, budget or financing required

→**No operating costs**; pay only for energy used

→**No maintenance**, staffing, or other operational responsibilities

→**Low carbon** technology delivers green, sustainable solutions

→**Back-up power** for blackouts and energy shortages

→**Extended** boiler/mechanical plant life and lower maintenance costs

CASE STUDIES

DOUBLETREE SUITES BY HILTON HOTEL

→ System

- 75 kW CHP
- On-Site Utility: Discounted heat and hot water
- Thermal Use: Space heat and Domestic hot water
- Term: 15 years
- Installation Location: Plant Room
- Location: Massachusetts

→ Goal

- Improve cash flow
- No operating responsibility
- Investment: $0
- Estimated savings: $180,000

CUSTOMER VIDEO TESTIMONIAL

HOTEL INDIGO – BOSTON-NEWTON RIVERSIDE

→ System

- 100 kW CHP
- On-Site Utility: Discounted electricity, heat and hot water
- Thermal Use: Space heat, domestic hot water, pool heat
- Term: 15 years
- Installation Location: Plant room
- Location: Massachusetts

→ Goal

- Reduce energy costs
- Sustainable technology
- Reduce carbon emissions
- Investment: $0

DORAL ARROWWOOD HOTEL CONFERENCE CENTER

→ System

- 375 kW CHP
- 450 Ton chiller
- On-Site Utility: Discounted electricity, heat and hot water
- Thermal Use: Space heat, pool heat and domestic hot water
- Term: 15 years
- Installation Location: Outdoors
- Location: New York

→ Goal

- Reduce energy costs
- Green energy
- Investment: $0
- Estimated savings: $600,000

WHAT TO DO NEXT

QUICK PROJECT SCREENING QUESTIONS

→ Is There Natural Gas Service at the Facility?

→ How many keys?

→ What thermal loads does the building have?

- Domestic hot water (DHW), laundry, banquet, chilled water, heated pool

→ How is the building heated & how is DHW made?

- Boilers – steam or hot water
- Central plant steam
- Electric

→ How is the building cooled?

- Chilled water of DX units

KEY STEPS

→ Select appropriate sites

→ Evaluate site energy bills

- 12 months of electric and natural gas

→ Meter sites for thermal loads

→ Perform site evaluation/construction design

→ Review proposal & agreement for approval

→ Install : 3 to 9 months

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