

# Development, Installation, Testing and Demonstration of a Combined Cooling Heating & Power System at Floyd Bennett Field

---

Dennis R. Landsberg  
*Project Manager*  
*Landsberg Engineering, P.C.*  
*Clifton Park, NY*

CHP in New York State - June 20, 2002

## CHP Project at Floyd Bennett Field

---

- Floyd Bennett Field
- Project Development
- Description of Floyd Bennett Field Project
- Design Issues
- Project Status

## Floyd Bennett Field

---

- Part of Gateway National Recreation Area
- Only National Park with Camping in New York City
- Air Field Was Historically Important in the 1930s and 1940s
- Park Includes Pine Forests and Wetlands
- NPS Center for Sustainable Design in Eastern Half of the U.S.

3

## Project Development

---

- Facility Energy Audit Performed
- Park is pursuing adaptive re-use of existing buildings
- Interest in Energy efficiency Projects
- Interest in Public Education and Demonstration

4

## Floyd Bennett Field

---

- Landsberg Engineering, Inc. - Project Manager
- Originally 6 30-kW Capstone Microturbines
- Heat recovery: space heating and cooling
- Funding:
  - NYSERDA: \$425,000
  - National Park Service: \$200,000
  - KeySpan Energy R&D: \$100,000
  - Oak Ridge National Lab \$100,000 - In-Kind
  - Office of Power and Technology: \$50,000
  - FEMP \$50,000

5



6

## Building Description

---

- Two story 17,000 sf
- Building to be developed as a Human Ecology Laboratory
- Requires 40 tons of cooling
- Heating system is 650 MBH output
- 60# gas available at building line
- Existing HVAC system is 4-pipe fancoil

7

## Design Issues

---

- 30 kW vs 60 kW Turbines
- Water Chiller vs Direct-Fired Chiller
- Ducting Through Heat Exchanger to Chiller

8

## Design Issues 30 kW vs 60 kW Turbines

---

- 30 kW Advantages
  - No compressors needed - 60 psi gas available
- 60 kW Advantages
  - Produces 60 kW while powering compressors
  - Lower installed cost including compressors
  - Peak power output up to 82F vs 58F for 30 kW
  - 2.5% more power production in NYC climate
  - Lower maintenance costs

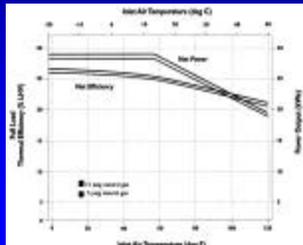
9

## Design Issues 30 kW vs 60 kW Turbines

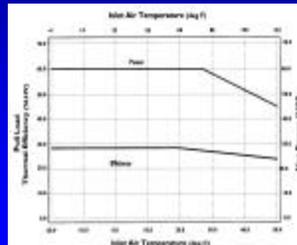
---

### Turbine Performance

30 kW



60 kW



10

## Design Issues

### Water Chiller vs Direct-Fired Chiller

---

- Direct-Fired Chiller
  - Eliminates need for heat exchanger for cooling
  - Can eliminate need for heat exchangers in new building (180F water needed for heating)
  - Broad Direct-Fired Chiller less costly than Yazaki, but air damper makes pricing roughly equal

11

## Design Issues

### Water Chiller vs Direct-Fired Chiller

---

- Water Chiller
  - Requires heat exchanger for operation
  - 10-ton Yazaki units used to date expensive to buy and install
  - 40-ton Yazaki more costly than Broad direct-fired unit
- Direct-Fired selected - advances state-of-art

12

## 60 kW Capstone with Broad Chiller

---



Courtesy of Aris Marantan, and The University of Maryland

13

## Design Issues Ducting Exhaust To Chiller

---

- Ducting Through Heat Exchanger
  - Less complex system
  - Adds 4" water back pressure (8" maximum)
  - In-line fan might be needed
- Ducting Around Heat Exchanger
  - More costly and complex system
- Probably Duct Through Heat Exchanger

14

## Project Status

---

- Pre-Monitoring Completed
- Design 95% Complete
- Construction to Begin in July
- Startup Planned for Fall 2002
- Chiller Installation Planned for Spring 2003 (warranty advantages)
- Visitor's Display Planned

15

## Presenters

Paul King  
DOE Boston Regional Office  
617-565-9712  
[paul.king@ee.doe.gov](mailto:paul.king@ee.doe.gov)

Keith Kline  
Oak Ridge National Lab  
865-574-4230  
[klinekl@ornl.gov](mailto:klinekl@ornl.gov)

For more information contact:

Dena Saslaw  
National Park Service, Floyd Bennett Field  
718-354-4613  
[dena\\_saslaw@nps.gov](mailto:dena_saslaw@nps.gov)

16