

Combined Heat and Power For HUD Programs

CHP for the Multi-family Residential Sector

Bob Groberg, Energy Management Officer, Office of Environment and Energy

U.S. Department of Housing and Urban Development

(202) 708-1201, Ext. 4642 • robert_groberg@hud.gov

Why CHP for Multifamily?

Favorable Conditions

- Aggregated thermal loads
- Many all-electric buildings
- Appropriate scales for several DOE/industry “packaged systems”

Why CHP for Multifamily?(2)

- Multifamily sector is low risk—according to Moody's.
- District energy systems can heat/cool multiple buildings in urban areas.
- Desiccant dehumidifiers reduce potential for mold and bacteria growth.
- Hydronic heating could use hot water or steam.

HUD CHP “Markets”

Three housing “markets”

- Public, non-profit, FHA insured

Plus Community Development “markets”

- Brownfield
- Community Development Block Grant

Housing: Properties with 50+Units

- Public Housing: 7,100
- FHA Insured: 12,600
- Non-Profit Elderly: 4,000 (40-50)

Public Housing Economics

- HUD funds utilities, capital improvements
- 10-15 years payback acceptable
- Energy performance contracts encouraged
- Maintenance contract supports public housing management

Public Housing Utilizing CHP

- Connecticut
 - Danbury (*Project Profile*)
 - Seymour
 - Winsted
- Massachusetts
 - North Adams
- Vermont
 - Burlington

Wooster Manor Public Housing

Danbury, CT (1998)

60kW gas engine/100 unit, 7-story family building

- Service company did feasibility study and installation, maintenance for \$10,000/ year
- Converted 4 floors all electric to hot water heat
- Electricity costs went from \$116,000 to \$29,700
- Gas \$33,500 for running system 22 hours/day
- System serves 50% space heating, 100% hot water needs
- Yankee Gas financed 10-year \$275,000 loan
- See *Project Profile* on www.hud.gov [search “energy”]

FHA “Economics”

- 3-5 years payback expected
- Use of depreciation
- FHA may release reserves
- FHA keeps 1st mortgage position

FHA Projects Using CHP

California

Capistrano Beach- Beverly Manor

New Jersey

Jersey City- Summit Plaza

Newark – Clinton Hill Gardens, Zion Towers, Carmel Towers

Orange- Salem Towers

New York

Brooklyn- Linden Plaza Apartments

Pennsylvania

Philadelphia-Unico Village, Inc.

Summit Plaza Complex

Jersey City, NJ (1974)

Four 600kW #2 fuel reciprocating (diesel) and one gas engine produce 3MW

- Serve 4 residential towers with 485 units, public school with pool, commercial space
- System provides power, cooling, heating
- Saves 160,000 gallons of fuel oil a year
- Maintained by four daytime staff, off-site monitoring at night



Nonprofit Housing-Elderly Projects

- HUD capital advance
- 160 new projects/year (40-50 units)
- Payback somewhere between PH and FHA
- Connecticut-
 - examples used tax credit “donations”
 - Hamden Davenport & Dunbar Elderly Housing



Community Development Agendas

- HUD-DOE 1980-90 history of district heating/cooling feasibility/design studies
- Buffalo “Cogen Project” may serve apartments
- Boston Maverick Gardens HOPE VI-
new public housing with CHP for 119 units

HUD 2002 Energy Action Plan

- Secretary Jackson's Energy Task Force
- HUD Energy Action Plan with 21 initiatives
- #20: "Promote CHP in housing and community development"

Reaching the Apartment Buildings CHP Market

- DOE BChP web site and RFPs don't address apartment buildings.
- EPA views kW apartments as "niche" market.
- Resource guides mainly for MW size installations.
- Software programs mainly for MW size installations.

2003 DOE-HUD CHP Working Agreement Tasks

- Update Guide to CHP for Apartment Buildings
- Work with Regional Application Centers
- Establish peer networks
- Case studies of HUD CHP projects
- Reports on brownfield, CDBG redevelopment
- CHP market analysis

Update Guide to CHP for Apartment Buildings

New York 1989 “Cogeneration Manual”

1. Q & A for Apartment Building Owners
2. Feasibility Worksheets
3. Equipment Specifications

Examples of Qs in the Q&A

- What is cogeneration?
- How is it used for multi-family housing?
- What are the benefits?
- What are packaged cogeneration systems?
- Any limitations in building size?
- How much space is required?
- What approvals are needed?
- What about utility backup?
- Who maintains the system?

Examples of Qs in the Q&A (2)

- What are the electric metering issues?
- How should a system be sized?
- Is special fuel needed?
- What are the electric rate considerations?
- What makes a building a good candidate?
- Can cogeneration be combined with other building upgrades?
- What are some of the risks?

UK System of CHP Guides

- Good Practice Guides, Case Studies
- Energy Consumption Guides
- Future Practice R&D Support
- New Practice Projects
- <http://www.actionenergy.org.uk/>
 (“publications”)

UK Guides for Small-Scale CHP

- Intro to small scale ...
- Environmental guide...
- Financing options...
- Operation and Maintenance...
- How to appraise CHP
- Option appraisal for managers
- Option appraisal for engineers

DOE Regional CHP Application Centers

- Northeast:
(CT,MA,ME,NH,NY,RI,VT)
- Middle Atlantic:
(DC,DE,MD,NJ,PA,VA,WV)
- Midwest:
(IA,IL,IN,MI,MN,MO,OH,WI)
- Intermountain States:
(AZ,CO, NM,UT,WY)
- Pacific:
(CA, HA, NV,
Pacific Territories)

RAC Support for HUD

- HUD field environmental staff are contacts
- Midwest: feasibility analysis for new apartment development
- Northeast: Pace U Energy Project-emissions credits for oil conversion
- Kick-off meetings: Mountain, Mid-Atlantic

HUD Sources of Information

- **www.hud.gov** (search for “energy”)
 - Energy Action Plan
 - District heating/cooling program reports, projects, conferences, special studies
- **NYSERDA Multifamily 2003 Presentation**
- *Project Profiles* of successful CHP installations in Danbury, Summit Plaza