

## *Frank F. Fasi Municipal Building & Honolulu Police Department Headquarters ESPC*



Rebuild Hawaii Quarterly Meeting  
May 22, 2007

### *Energy Conservation Measures*

- ECM 1 – FMB Lighting Retrofit
- ECM 2 – FMB Central Air Conditioning Plant Upgrade/Retrofit
- ECM 3 – FMB Rooftop Photovoltaic System (Not Implemented)
- ECM 4 – HPD-HQ Lighting
- ECM 5 – HPD-HQ HVAC System Modernization
- **ECM 6 - Personnel Computer Power Management  
"Network Energy Manager"**

*Future Consideration:*

- HECO's Commercial/Industrial Direct Load Control (CIDLC) Program

## *ECM 1 – FMB Lighting Retrofit*



Typical Floor Before Retrofit

- Occupancy sensors in selected offices and areas
- New fluorescent fixtures in elevator lobbies
- Dimmable fluorescent lighting in selected conference rooms

- “Super T8” lamps and ballasts (~7,800 fixtures)
- De-lamp fixtures from 2-lamps to 1-lamp with custom reflectors
- Tandem/quad wiring of ballasts



Same Floor After Retrofit

## *ECM 2 – FMB Central Air Conditioning Plant Upgrade/Retrofit*



New 400-ton Centrifugal Chiller



New 100-Ton Air-cooled Chiller (Night Time & Emergency)

- New high-efficiency chillers with VFDs
- New induced draft cooling tower



New Induced Draft Cooling Tower

## ECM 2 – FMB Central Air Conditioning Plant Upgrade/Retrofit (Cont.)



New Premium Efficiency Motors



New Variable Frequency Drives

- New premium efficiency motors on chilled water pumps
- New VFDs on pump motors
- Converted chilled water piping from series to parallel flow
- Modernized the building's two main air handler units
- Replaced 286 constant volume boxes with new digital controlled VAV boxes in office space
- New web-based energy management and control system
- Re-commissioned computer room HVAC system
- Upgraded mechanical room to ASHRAE refrigeration standards

## ECM 4 – HPD-HQ Lighting



HPD Courtyard

- Replaced MV courtyard lighting with MH lighting
- Installed 160 occupancy sensors in selected offices and areas



Typical Private Office

## *ECM 5 – HPD-HQ HVAC System Modernization*



Existing 500-ton Centrifugal Chillers with new VFD

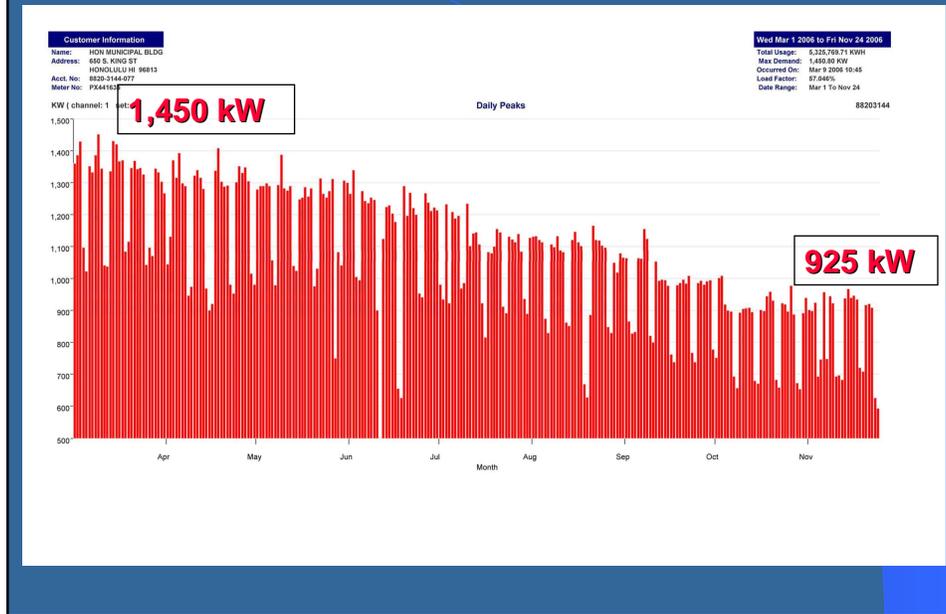
- Retrofitted VFD
- Retrofit supply air fans with VFDs and CO<sub>2</sub> sensors
- Install new VAV controllers
- Replace air handler valves and actuators
- Install new VAV in Traffic Division office
- Install new DDC controller in central dispatch center
- New web-based energy management and control system
- Converted one 500-ton chiller to VFD operation
- Replaced failed VFDs of air handlers and chilled water pumps

## *ECM 6 - Personnel Computer Power Management “Network Energy Manager”*

- Currently deployed on 1,000 PCs on the City’s computer network; expandable up to 1,700 PCs
- Collecting data to determine the template for the energy saving settings

Energy Savings:	207,576 kWh/yr
Software Cost:	\$ 66,121
Estimated Cost Savings:	\$ 18,000
Payback:	3.7 Years

## FMB Peak kW Demand Reduction



## Energy Savings

	kWh	kW	Cost
FMB Baseline (11/04 to 10/05)	7,786,975	1,511	\$1,085,016
Projected FMB Savings	2,236,133	617	\$ 354,766
Reduction	29%	41%	33%

	kWh	kW	Cost
HPD Baseline (11/04 to 10/05)	8,878,513	1,309	\$1,177,308
Projected HPD Savings	1,925,546	233	\$ 256,632
Reduction	22%	18%	22%

Construction Cost:	\$7,180,586
HECO Rebates Received:	\$ 109,580
HECO Rebates Pending:	\$ 75,000
Net Cost:	\$6,996,006

Estimated Cost Savings: **\$ 629,398**

Estimated Payback: 11.1 Years

	kWh	Cost
FMB Electricity Usage (March 2006)	609,000	\$101,081
FMB Electricity Usage (March 2007)	406,000	\$ 63,202
Reduction	33%	37%

*Completion of Construction – December 2006 (FMB)  
May 2007 (HPD-HQ)*

*Project Keys*

- Preliminary Energy Assessment by HECO
  - Provided scope of work and budget estimates
  - Incorporated the PEA into the RFP
  
- City personnel familiarity of ESPC process
  - Incorporated City Design-Build, Basic Mechanical & Electrical Specifications into the RFP
  - Provided training to City Evaluation Committee Members on the ESPC process
  - Pre-screened offers and prepared a table comparing proposals
  - Prepared detailed instructions for evaluators to use during review
  - Used a City consultant-style contract as an "over-arching" contract to tie together the RFP, Proposal and Detailed Energy Study
  - Buy in of new City Administration
  
- Experienced project team
  - Worked on Honolulu Hale and other City projects

*Project Team*

Contractors:



Heide & Cook



Consultants: Randolph H. Murayama & Associates, Inc.  
Ronald N.S. Ho & Associates, Inc.

Questions: Allyn Lee  
Department of Design & Construction  
City & County of Honolulu  
768-8428

