
UTC Power PureComfort 240 Ritz-Carlton San Francisco

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Agenda

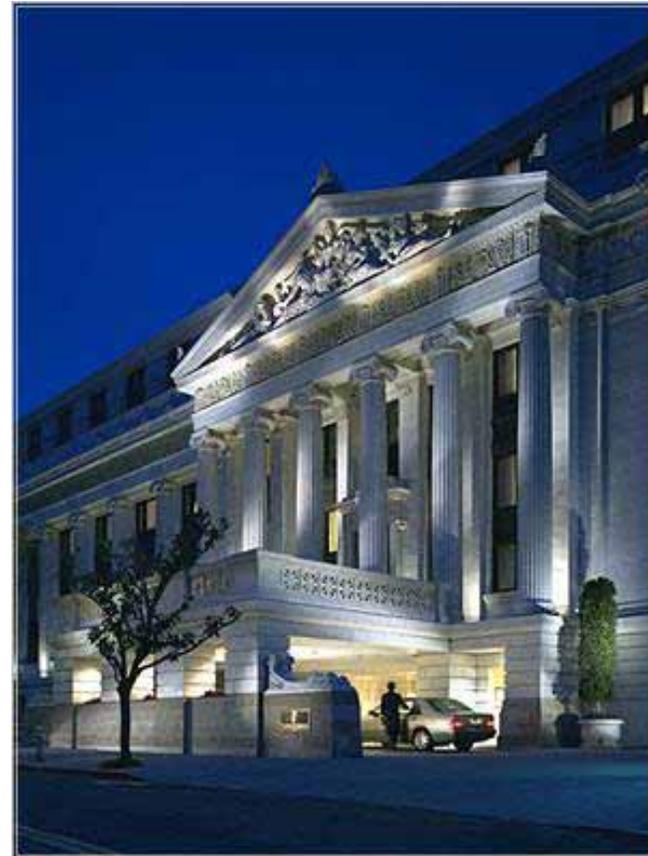
- Background
 - Ritz-Carlton San Francisco
 - UTC Power PureComfort™ System
 - Installation site
- Project Execution
- Installation
- Performance



Background

Ritz-Carlton San Francisco

- 336 room full service luxury hotel located in heart of San Francisco
- Network connection to maximize grid reliability
- Electrical and cooling profiles consistent with output from PureComfort™ System

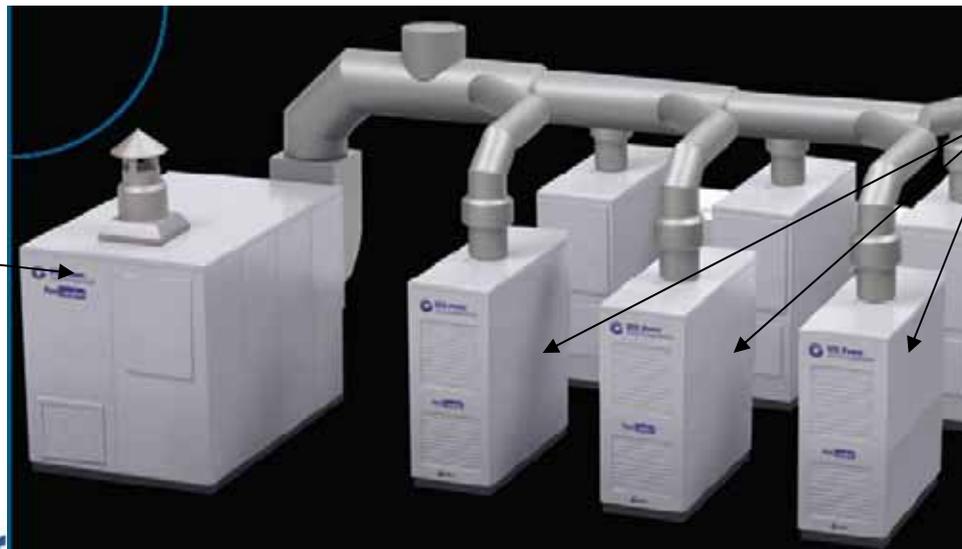


Background

UTC Power PureComfort™ System

Model	240M	300M	360M
Hot Day (ARI, 95°F)			
Net Power*, kW	193	239	285
Cooling Output, RT	124	149	173
Net System Efficiency, % (LHV)	80%	79%	76%
ISO Day (59°F)			
Net Power*, kW	227	284	341
Cooling Output, RT	142	171	198
Net System Efficiency, % (LHV)	91%	91%	86%

Carrier
Absorption
Chiller



Capstone C-60
Microturbines

Background

Installation Site

Location: Rooftop location above mechanical room adjacent to courtyard



Concerns:

- Limited width
- Limited length
- Limited access from alley (private access)
- 4 stories above grade
- Noise attenuation

Background

Installation Strategy

- PureComfort™ 240 System w/2 FGBs
 - Space
 - Gas Pressure
 - 100% Electrical utilization
 - Higher cooling utilization
- Year round chilling
- Base load electric with PureComfort system with watt meter
- Keep two existing electric chillers
- Use existing cell of cooling tower with recirculation. loop
- Base load absorption chiller with electric chiller in standby

Project Execution

Organization

- Project Managers:



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- Funding Partners:



- Engineer:

- Electrical:



- Mechanical:



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Project Execution

Execution Issues

Description	Milestone Impact	Project Impact
Gas interconnection changes mandated by PG&E	3 month	<ul style="list-style-type: none"> •Multiple site disruptions. •Additional engineering and materials costs
PG&E insurance requirements	7 month	<ul style="list-style-type: none"> •SGIP funding reservation confirmation received 1 month after reservation officially expired
BAAQMD public notice delayed	5 month	<ul style="list-style-type: none"> •Public notice finished 1 week before scheduled start-up
Neighbor renegotiated usage of property for lift	2 month	<ul style="list-style-type: none"> •2 month slip in installation •~\$3k for new gate
PG&E changed electrical interconnection requirements after drawings were approved	2 month	<ul style="list-style-type: none"> •2 month delay in commissioning •Additional cost in engineering and installation

Installation

Limited Access for lift

- First lift could be accomplished using public access
 - Kitchen exhaust fan
 - Microturbines
 - Gas boosters

Privately owned alley required for chiller lift



Installation

Limited Access for lift



- Alley owner concerned about liability
- Initial communication was sporadic
- RC/UTC Power and alley owner agree on term of alleys usage that included a new gate for the alley owner



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Project Costs

Item	Actual	100% Hindsight	50th** Installation
Turbine	\$ 224,640.00	\$ 224,640.00	\$ 224,640.00
CHP unit/chiller	\$ 141,000.00	\$ 141,000.00	\$ 126,900.00
Mechanical	\$ 158,000.00	\$ 133,000.00	\$ 100,000.00
Electrical	\$ 344,000.00	\$ 300,000.00	\$ 230,000.00
Civil	\$ 52,000.00	\$ 52,000.00	\$ 30,000.00
Consulting Engineering	\$ 16,000.00	\$ 12,000.00	\$ 5,000.00
Project Mangement	\$ 76,800.00	\$ 57,600.00	\$ 19,200.00
TOTAL	\$ 1,012,440.00	\$ 920,240.00	\$ 735,740.00

Institutional Experience

Permitting

- What approvals were required/obtained?
 - BAAQMD approval
 - 30-public notice b/c of proximity to school
 - City building permits
 - Historical permit
 - Electrical Interconnection
 - Network grid

Approximately 130 hours of time on project spent on coordinating/managing permits (AQMD, gas and electric interconnection)

General Experience

Lessons learned

- Network interconnection is challenge – but doable
- Written approval of gas interconnection schemes early
- Secure lift permits/access early

Post Install Experience

- Current savings ~\$10k/month
- Electric chillers have been off since December 23rd
- 100% chiller and microturbine availability



Questions?



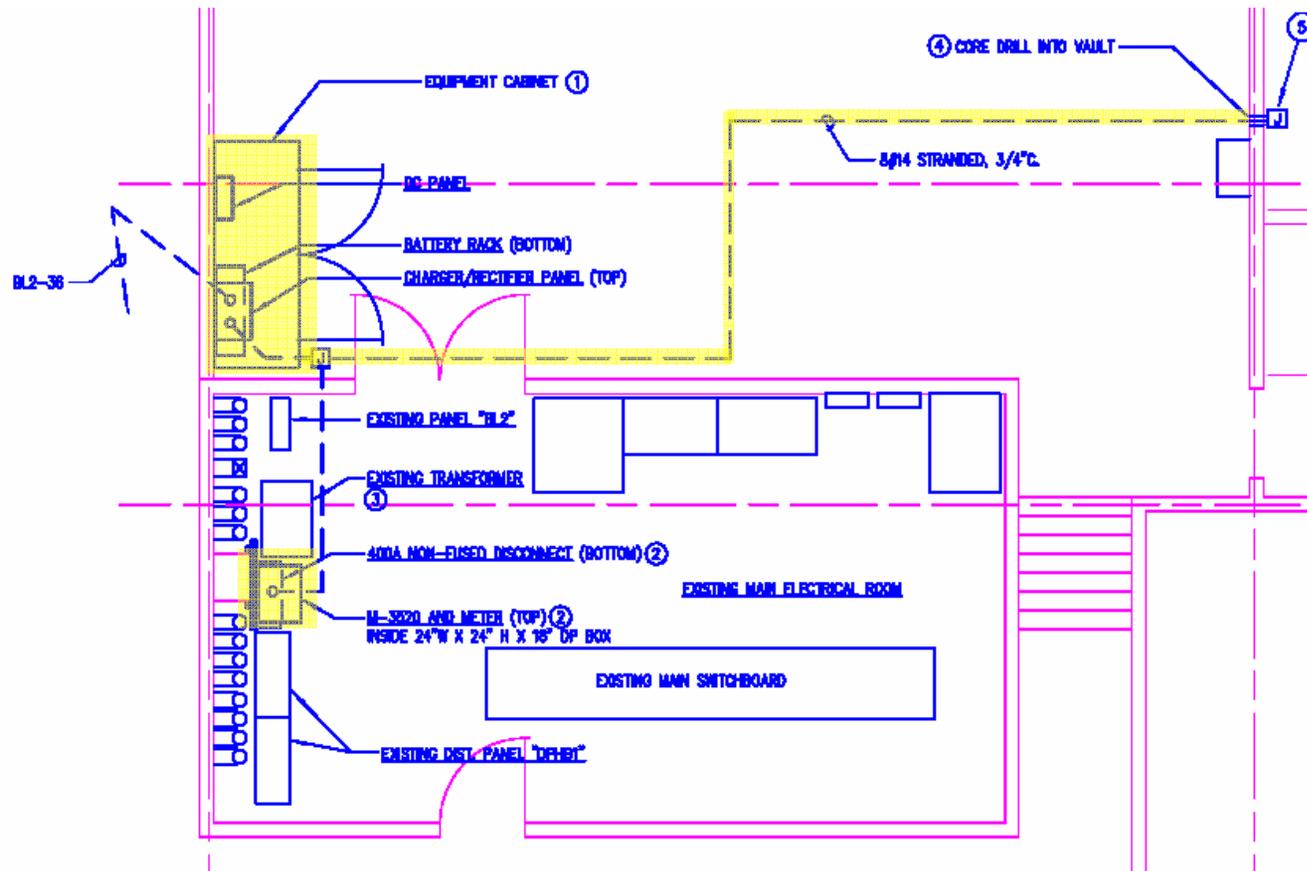
Additional Slides



Background

Electrical Equipment Installation

New Equipment



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Project Execution

Timeline

- January 29, 2004 – PG&E Reservation for \$240,000
- December 20, 2004 –Contract with HM/RC signed
- January-June: Engineering/Site Preparation/Permitting
- June 21-29,2005 – Equipment Delivered to Riggers Yard
- June 10, 2005 – Electrical drawings approved
- July 21, 2005- First Lift Completed (Microturbines, FGBs)
- August 27, 2005- Second Lift Completed (Chiller, switchgear)
- September 22, 2005- PG&E reservation confirmation received
- October 13, 2005 – PG&E Gas meter set
- October 14, 2005 – Conditional approval to run in grid parallel granted
- December 19, 2005 – Final approval to run in grid parallel granted
- December 21, 2005 – System commissioning completed/system operational



O&M Performance

December/January Performance

- Availability
 - To date, availability of microturbines and chiller has been 100%
- 5 year full maintenance contract with customer
 - Remote monitoring and service dispatch
 - SGIP
 - Reduce customer burden after install

Project Execution

Execution Issues

Description	Milestone Impact	Project Impact
Gas interconnection changes mandated by PG&E	3 month	<ul style="list-style-type: none"> •Multiple site disruptions. •Additional \$30k in engineering and materials costs
Customer reticence to supply PG&E with all required insurance information	7 month	<ul style="list-style-type: none"> •SGIP funding at risk, reservation confirmation received 1 month after reservation officially expired
BAAQMD public notice delayed	5 month	<ul style="list-style-type: none"> •Public notice finished 1 week before scheduled start-up
Neighbor renegotiated usage of property for lift	2 month	<ul style="list-style-type: none"> •2 month slip in installation •~\$3k for new gate
PG&E changed electrical interconnection requirements after drawings were approved	2 month	<ul style="list-style-type: none"> •2 month delay in commissioning •Additional \$10k in engineering and installation + ~\$2k in test