

Computing Division Operations

Computer Facility Support

Project Status Report

5/23/06

Topics

- GCC
 - Computer room A
 - Tape robot room
 - Computer room B
 - Projections
 - Monitoring
- LCC
 - Room 108
 - Room 107
 - Projections
- FCC
 - Usage
 - Projections
- Outlook

GCC Computer Room A

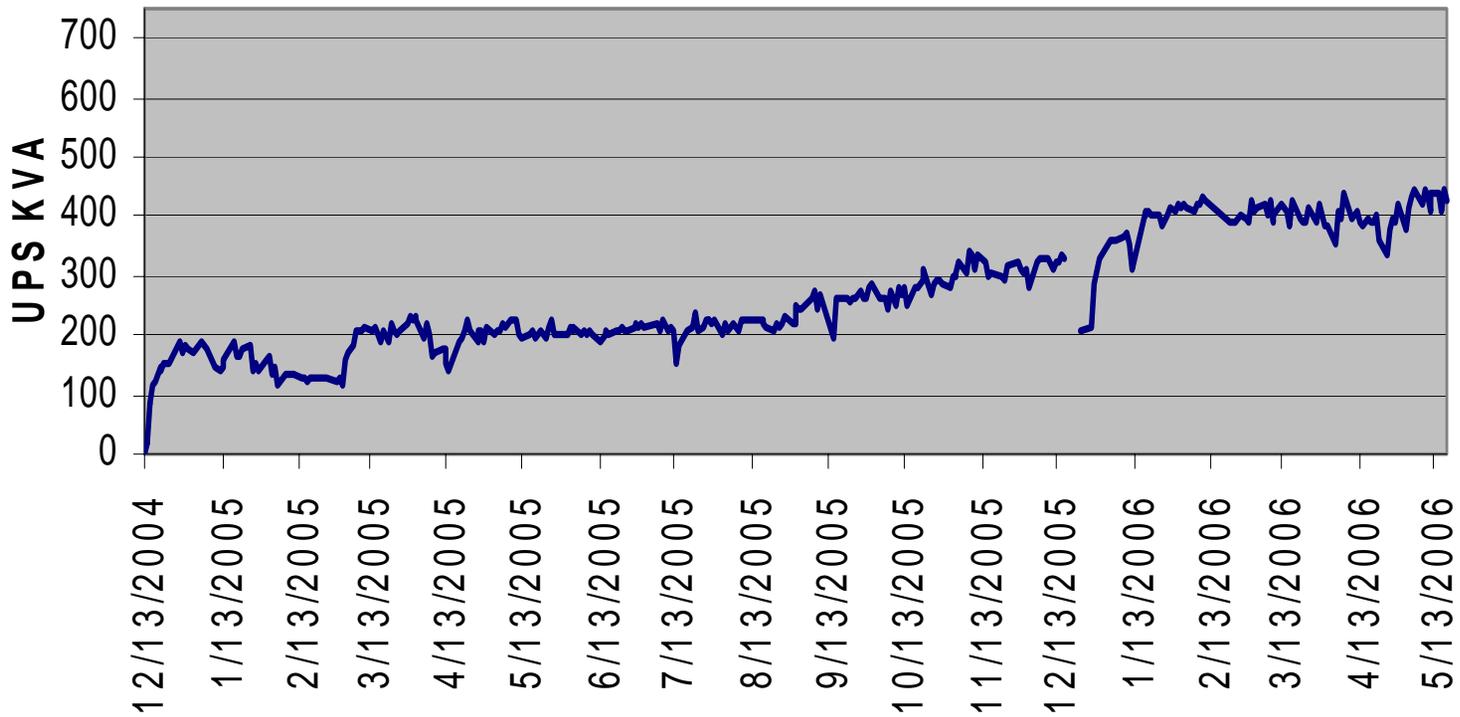
- Constructed Feb. 2004 – Jan. 2005
- Built for 72 racks of 40 computers each (2880 computers), 840 KW of power & 720 KW of cooling
- 55 racks in room now using 450 KW
- Averaging 80% of projected (10 KW/rack)
- 17 rack spaces & 270 KW cooling remaining

GCC Computer Room A (cont.)

- FY06 acquisition plans
 - CMS: 240 computers (6 racks)
 - CDF: 280 – 320 computers (7 – 8 racks)
 - D0: 280 – 320 computers (7 – 8 racks)
 - GP Farms: 40 computers (1 rack)
 - Total: 20 – 22 racks, meaning 3 – 5 rack spaces short
- So we added electrical for 5 more racks
- Since we are running at 80% projected, we anticipate <720 KW
- Floor space will be essentially full after FY06 acquisitions
- GPP construction cost: \$2.2M

GCC Computer Room A UPS Readings

— UPS KVA



GCC Tape Robot Room

- Construction recently completed
- One STK SL8500 10K cartridge robot in room
- Built for 3 STK robots and 75 mover nodes
- Total tape storage capacity (3 robots)
 - LT03: 12 Pbytes
 - LT04: 24 Pbytes
- GPP construction cost: \$795K

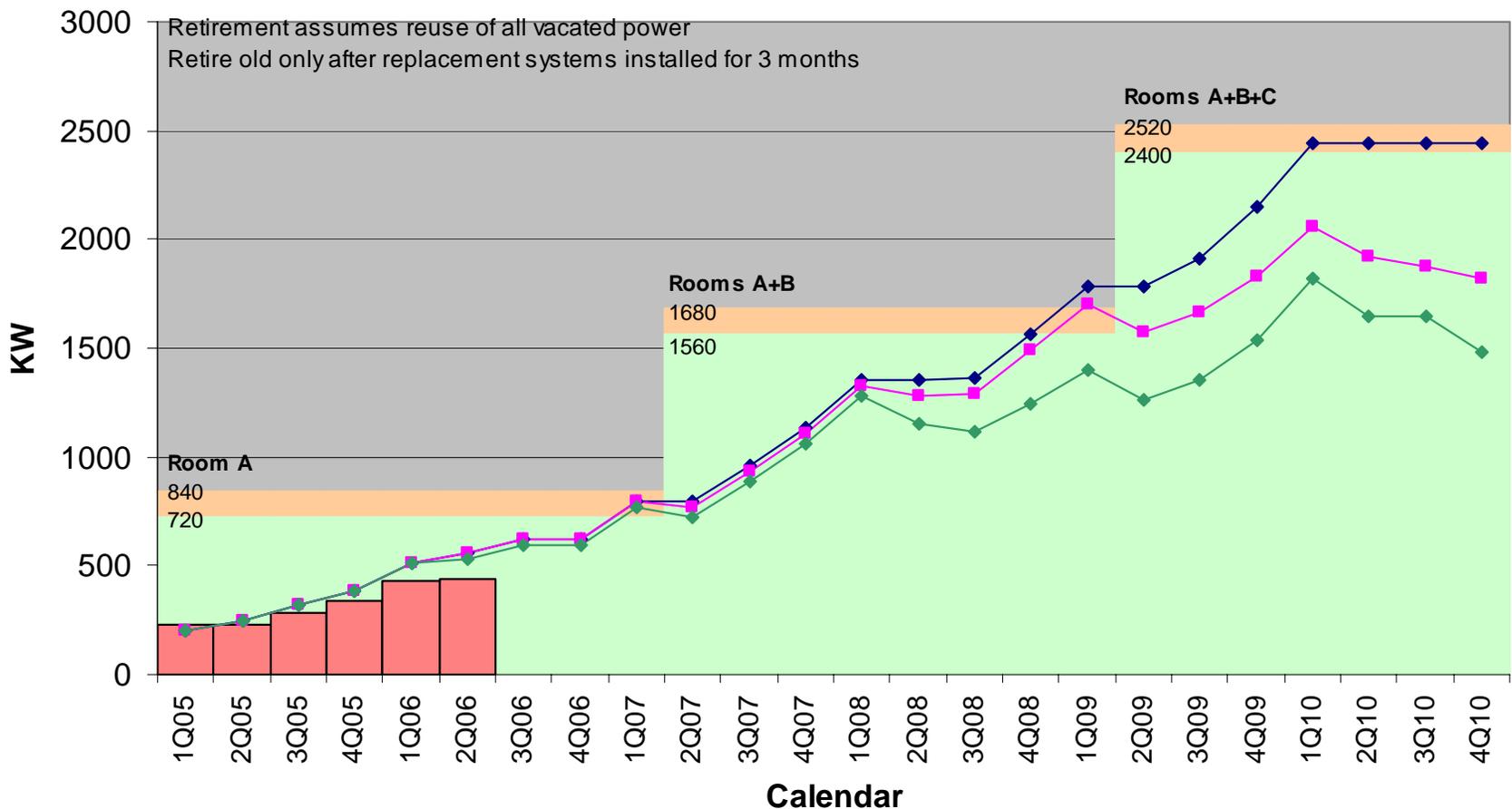
GCC Computer Room B Building Addition

- Construction just starting
- Building for 84 racks, 840 KW capacity
- New building addition includes network/tech, electrical/UPS rooms and shell for a 3rd computer room
- Target beneficial occupancy 11/24/06
- GPP construction budget: \$4.6M



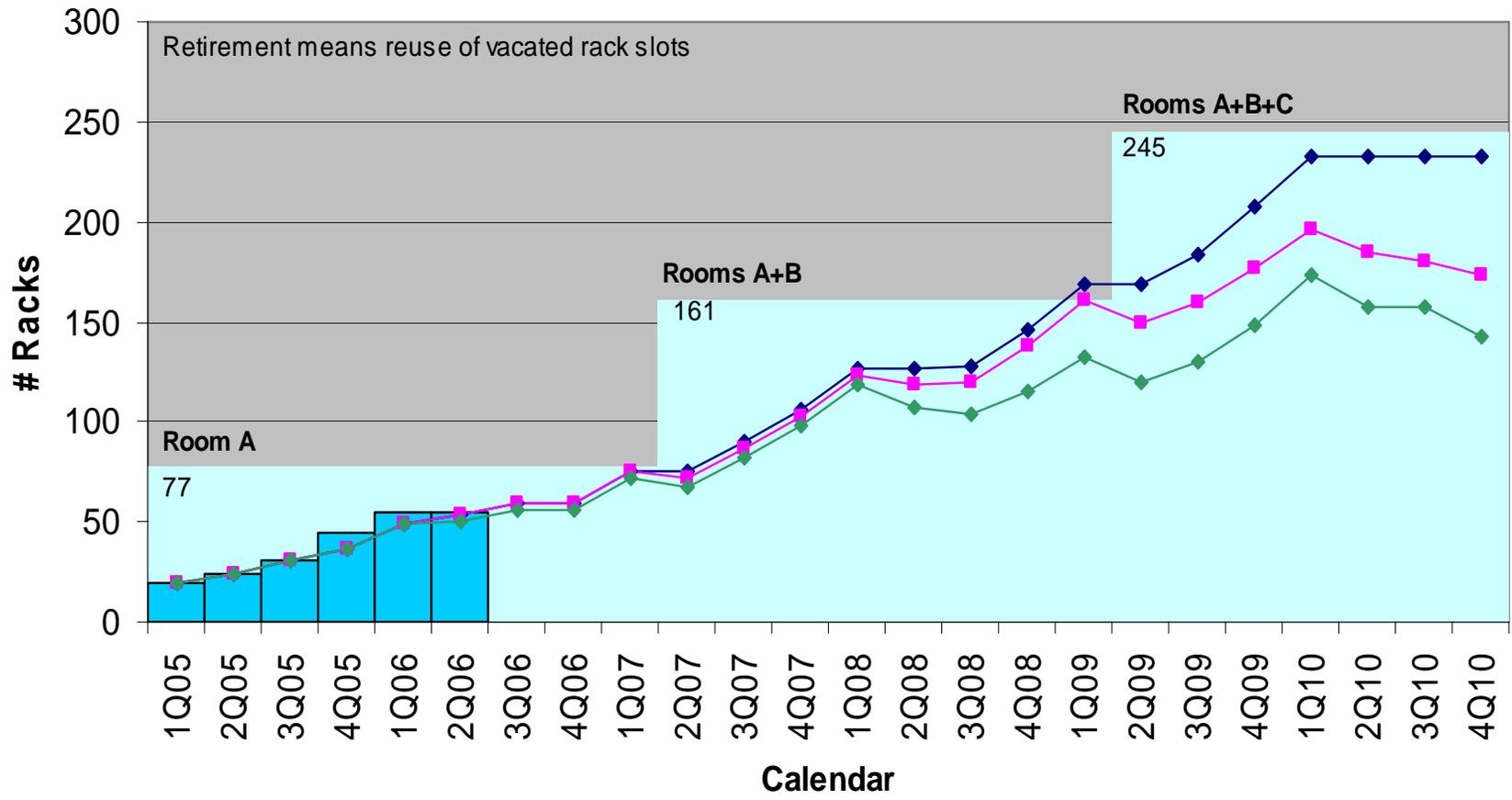
GCC Usage & Projections

■ Power Capacity
 ■ Cooling Capacity
 ■ Power in use
 ◆ no retire
 ■ 4yr retire
 ◆ 3 yr retire



GCC Floor Space Utilization

Rack Spaces Racks in place no retire 4 yr retire 3 yr retire



GCC Power Protection

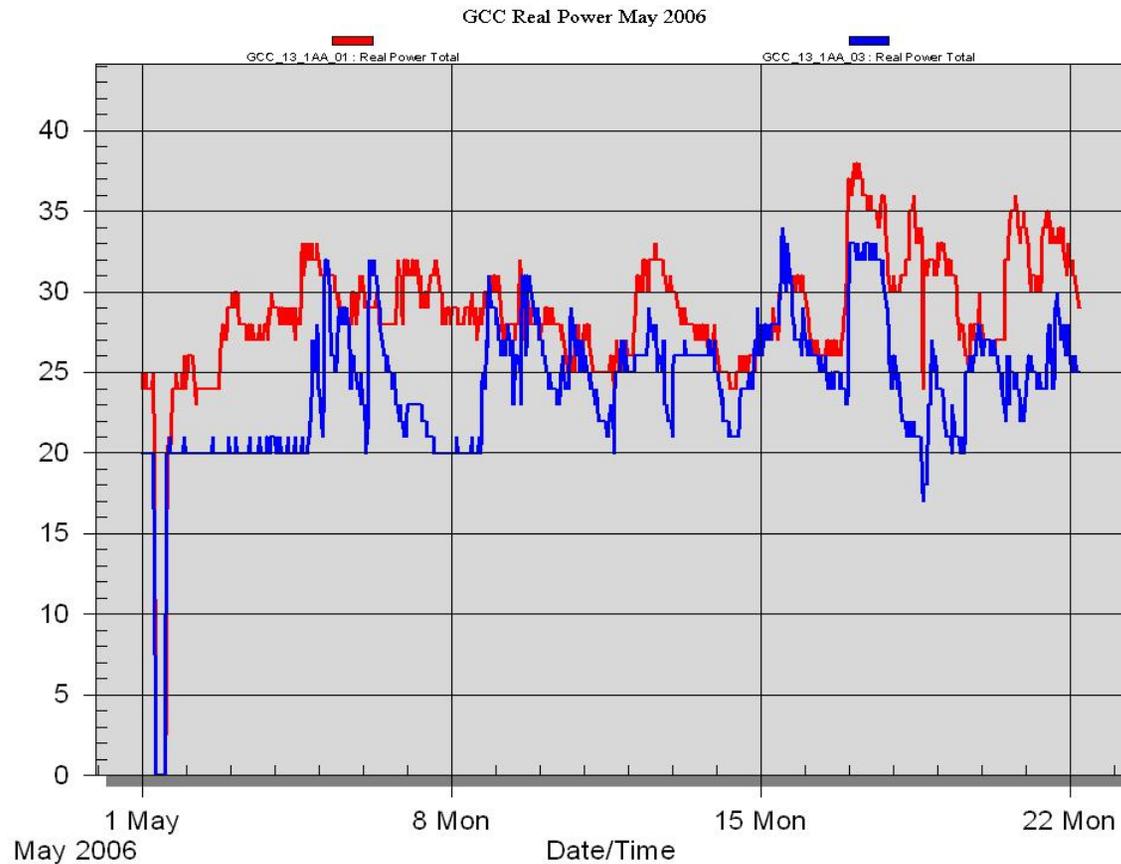
- CRA has 1,000 KVA UPS (840 KW load)
- Networking uses CRA 1,000 KVA UPS and redundant street power
- CRB and new network room will have same power configuration
- Robot room has 40 KVA UPS + redundant power from CRA 1,000 KVA UPS
- CRA, network & tape robot room can be powered by rental generators
- CRB will also have rental generator backup

GCC Facilities Monitoring

- Metasys – monitoring...
 - Most CRAC units except...
 - UPS room second CRAC, tape robot room CRAC; Computer Room A two newest CRAC's (#8, #9)
 - UPS-A
 - Switchboards for CRAC's and CRA panels
 - Roof AC in Network/Tech Room
- Provides general alarms and paging
- Accessible easily only from Ops Office ;-(!

GCC Facilities Monitoring

PowerLogic operational: GCC CR-A example panels (units: 208 amps)



GCC Facility Monitoring

- Temperature and Other Conditions
 - Operational
 - shunt-trip breaker – hard CR-A power-off if 95°F. exceeded
 - UPS for CR-A – on batteries notifies stakeholder equipment
 - Not Operational
 - rack temperature sensors – yet to achieve peaceful coexistence between PowerLogic and Python temperature sensor read-out script
- Cameras
 - deployed in tape robot room, high-bay hallway, entrance way, network/tech, CR-A, UPS room, electrical room
 - 30 day retention



Site Scan Web

- Site Scan Web

- Status and Plans

- ordered: s/w (delivered) and h/w (PC)
 - facility maps supplied (for drill-down clickable screen visuals)
 - GCC first, LCC, FCC next
 - expect to deploy in 4 to 6 weeks

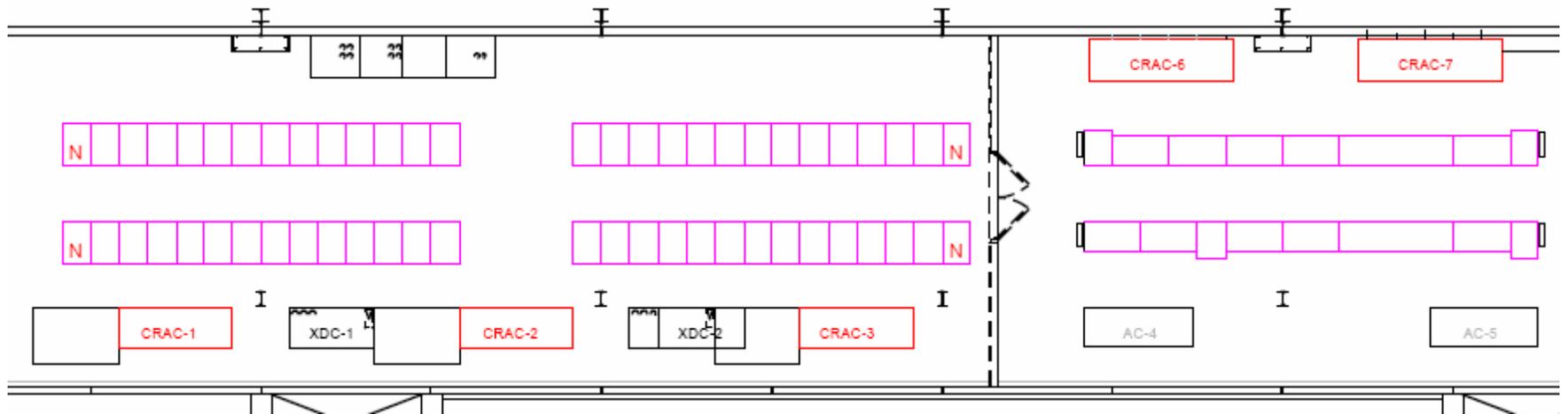
- Approach

- monitoring – *not* control – only in CD: GCC, LCC, FCC,...
 - allows Ops personnel to monitor from other than Ops Office – maybe even mobile (gasp!) ;-)
 - coexists with Metasys
 - paging and alerts more customized to CD needs

LCC Computer Rooms

- Room 108 (built 2 years ago)
 - Full with 670 LQCD computers
 - No electrical measure yet, but estimate ~120 KW
- Room 107
 - Under construction for 52 racks (2080 computers), 450 KW
 - Target completion 6/16/06
- FY06 acquisition: 1,000 computers
- LCC does not have UPS power protection
- LCC can be powered by rental generators
- GPP construction cost: \$1.65M

LCC



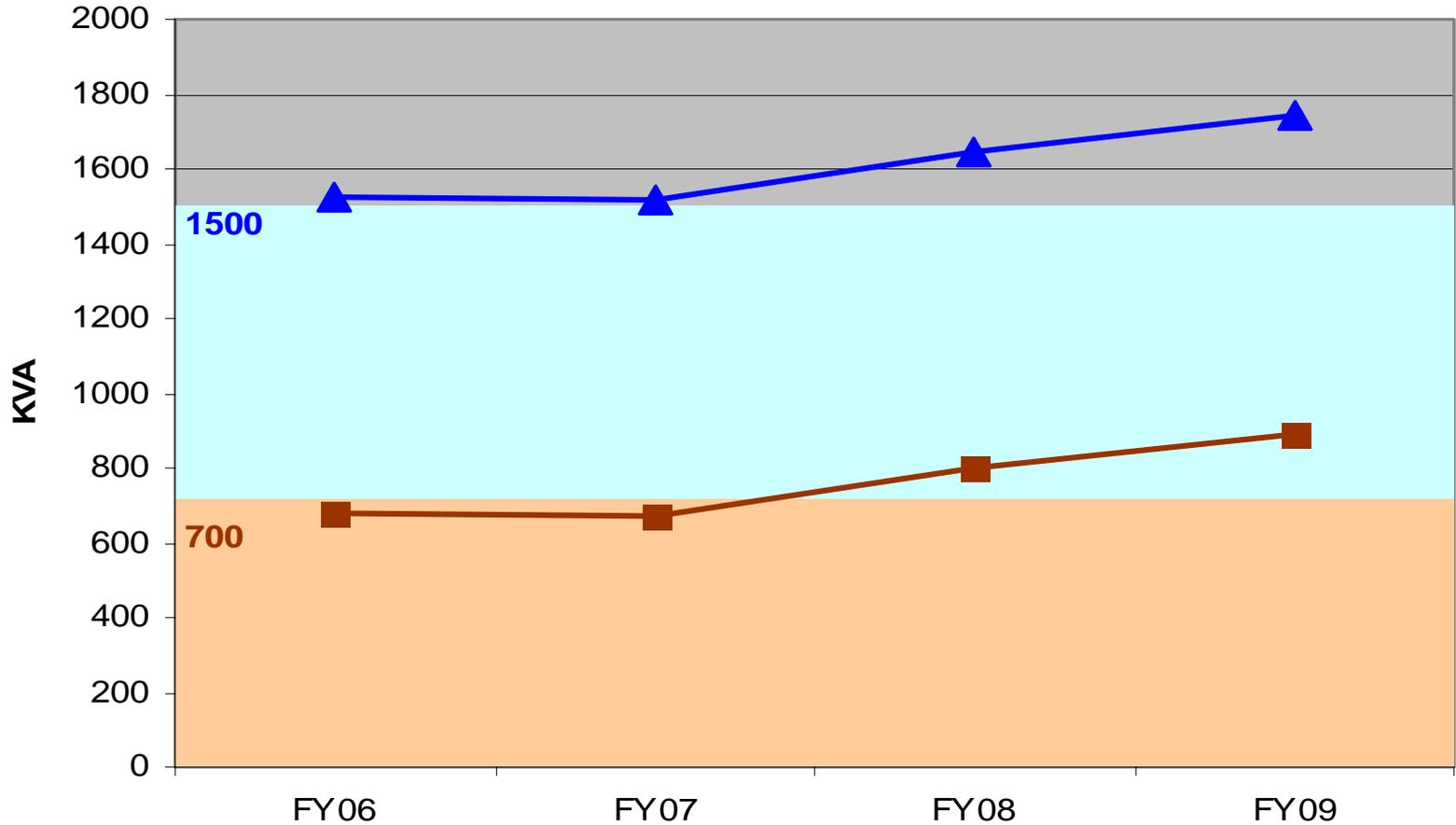
FCC Computer Rooms

- FCC1, FCC1 Mezzanine (tape robots), FCC2
- Max UPS power available 700 KW across 4 UPS's (500, 60, 2x100 KVA rated)
- Currently running 565 KVA with 135 KVA remaining
- Floor space not an issue
- Partitioned power across UPS's is an issue since each UPS powers different computer room areas

FCC Computer Rooms (cont.)

- FY06 acquisitions
 - CMS: 65 KW
 - CDF: 20 KW
 - D0: 20 KW
 - Misc: ?
- FY06 projected power 670 KW
- Will need summer load shed plan since building can consume 800 – 850 KW during summer and generator is limited to 1500 KW
- FY07 projected additions: +126 KW
- We might get through FY07 if we can decommission 126 KW

FCC Power Projection Based on FY07 126 KW Decommissions



Bottom Lines

- **GCC**
 - We believe that GCC computer room A will satisfy FY06 additions
 - We believe that computer room B will be ready in time for FY07 additions
- **LCC:** Room 107 new room will satisfy FY06 LQCD acquisitions with room for 1,000 more computers
- **FCC:** If we can reduce load by ~126 KW through decommissions, we may make it through FY07, however load shedding may be needed on some days of high heat