

# University of Illinois

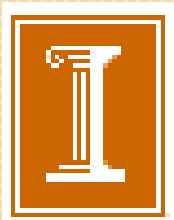


## Utilities & Energy Services

CCNet Meeting  
May 17, 2012

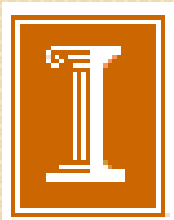
# Overview

- Utilities & Energy Services Structure
- Production / Distribution
- Utility Rates / Costs
- Energy Goals & Consumption
- Projects and Initiatives



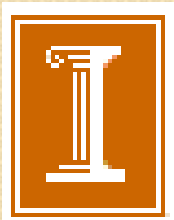
# Utilities & Energy Services

- Utilities Production – Mike Larson
  - Abbott Power Plant
  - Central Chilled Water System / Vet Med
- Utilities Distribution – Keith Erickson
  - Electrical Distribution System
    - Main Campus Substation / purchased vs. generated
  - Steam – Campus Heat / HP Utility
  - Natural Gas
  - Chilled Water (Air / Raw Water)



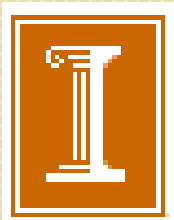
# Utilities & Energy Services

- Systems & Controls
  - Temperature Control
  - DDC Programming
- Energy Conservation
  - Retrocommissioning – Karl Helmink
  - ESCO – Josh Whitson
- Business Operations – Mike Marquissee
  - Metering & Energy Billing System
  - Budget and Financial Management
  - Market Interface (PEI / UA)



# Utilities Distribution Overview

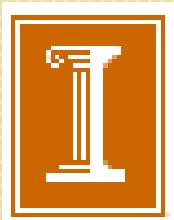
- Campus Utilities - Distribution
  - Electricity (Energy)
  - Steam (Energy)
  - Chilled Water - CA (Energy)
  - Natural Gas (Energy)
  - Water
  - Sanitary
  - Storm Sewer





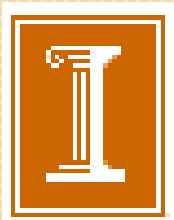
# Utilities Distribution Systems

- 8 miles of Compressed Air
- 9 miles of Steam Tunnels
- 23 miles of Chilled Water
- 43 miles of Telecommunication
- 31 miles of Natural Gas
- 47 miles of Lighting
- 10 miles of Steam
- 36 miles of Sanitary Sewers
- 54 miles of Electrical
- 87 miles of Storm Sewers
- 63 miles of Water
- 6,133 Manholes

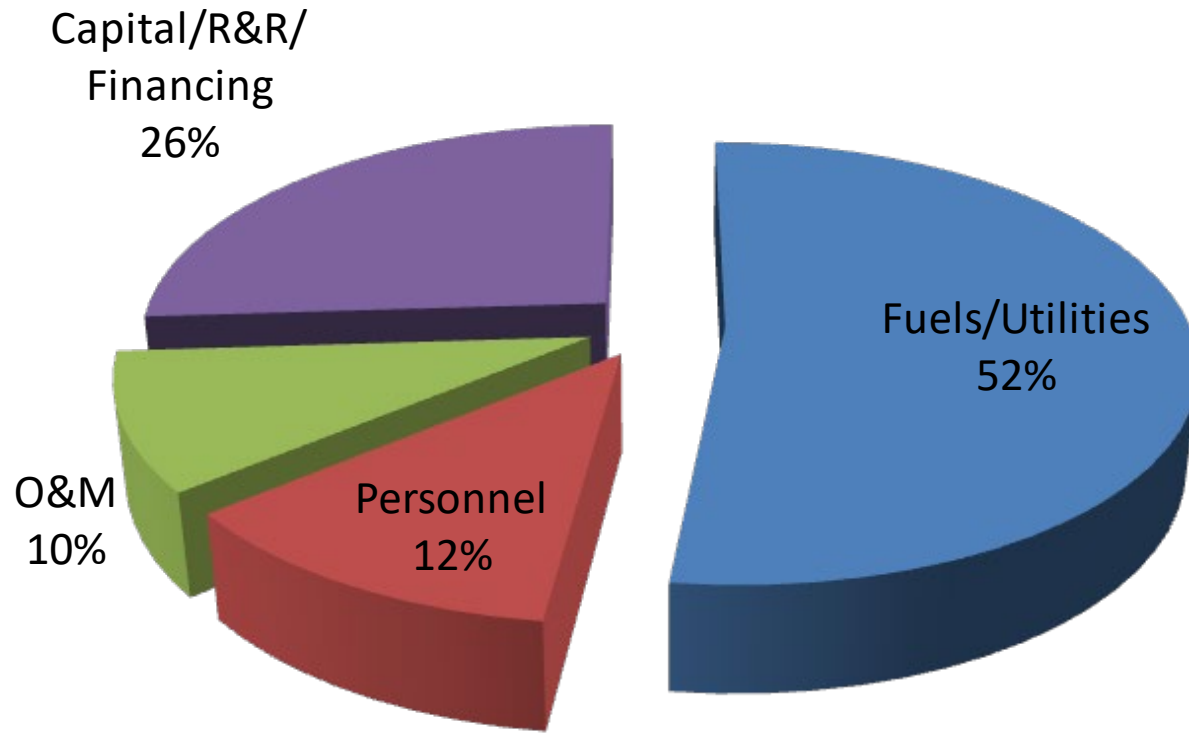


# FY 2012 Utility Rates

UTILITY	RATE	Variable Portion
Steam (per klb)	\$19.17	\$9.68
Electricity (per kwh)	\$0.0754	\$0.0469
Chilled Water (per MBTU)	\$13.92	\$9.723
Water (per kgal)	\$2.9125	
Sanitary Sewer (per kgal)	\$2.8675	
Natural Gas (per MBTU)	\$8.444	



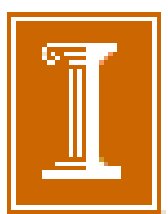
# Uses of Funds (Expenses)



Expenses

Fixed

Variable





# Energy Overview - Conservation

- Energy Goals

## Chancellor's Campus Goal (Baseline FY2007)

*Three year goal:* 10% reduction in overall energy use

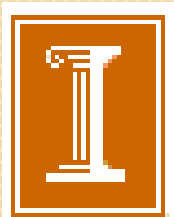
*Five year goal:* Return to 1990 levels of energy use, requires 17% reduction in usage, and smaller carbon footprint

## iCAP Energy Goals (Baseline FY2008)

*FY15 goal:* 20% reduction Energy Utilization Index (EUI)

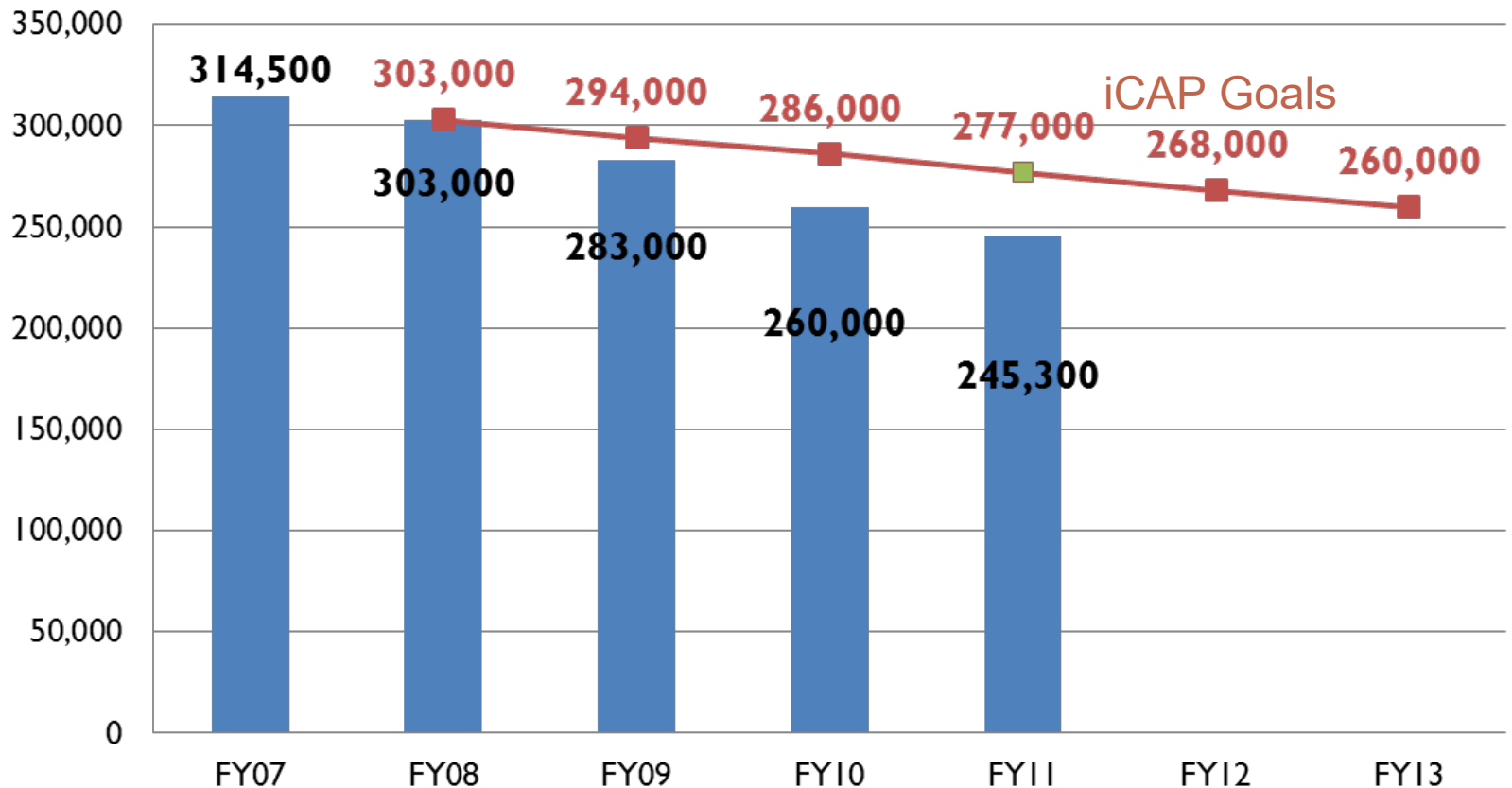
FY 2020 Goal: 30% reduction EUI (212,100)

FY 2011 Results: 19% reduction (245,300)

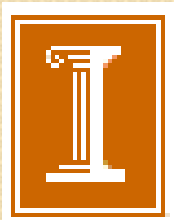


# Consumption - Energy / GSF

**BTU / SqFt / Year (EUI)**

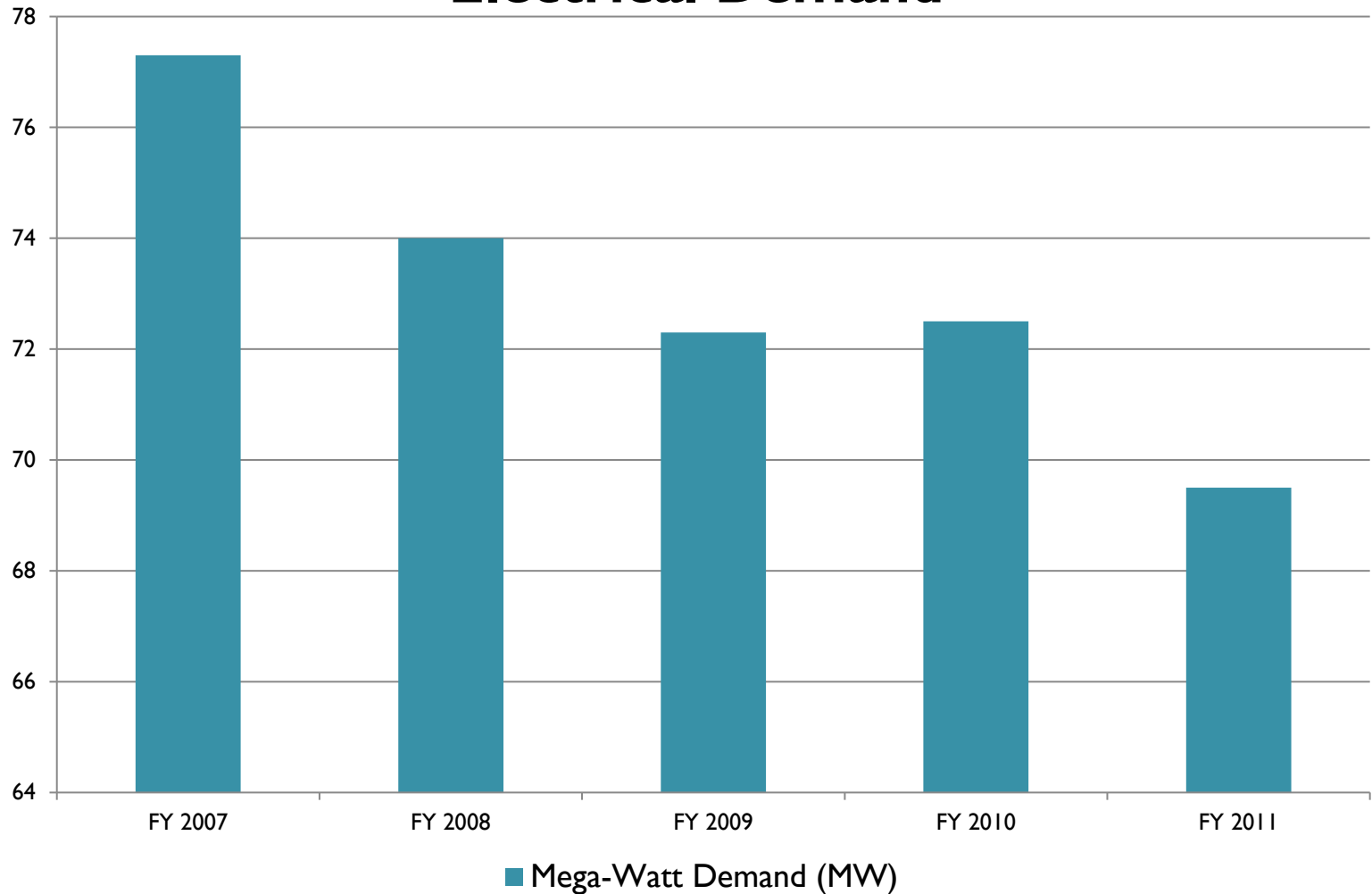


Reached FY12 Chancellor's goal (17% / 260k) from FY07 early!

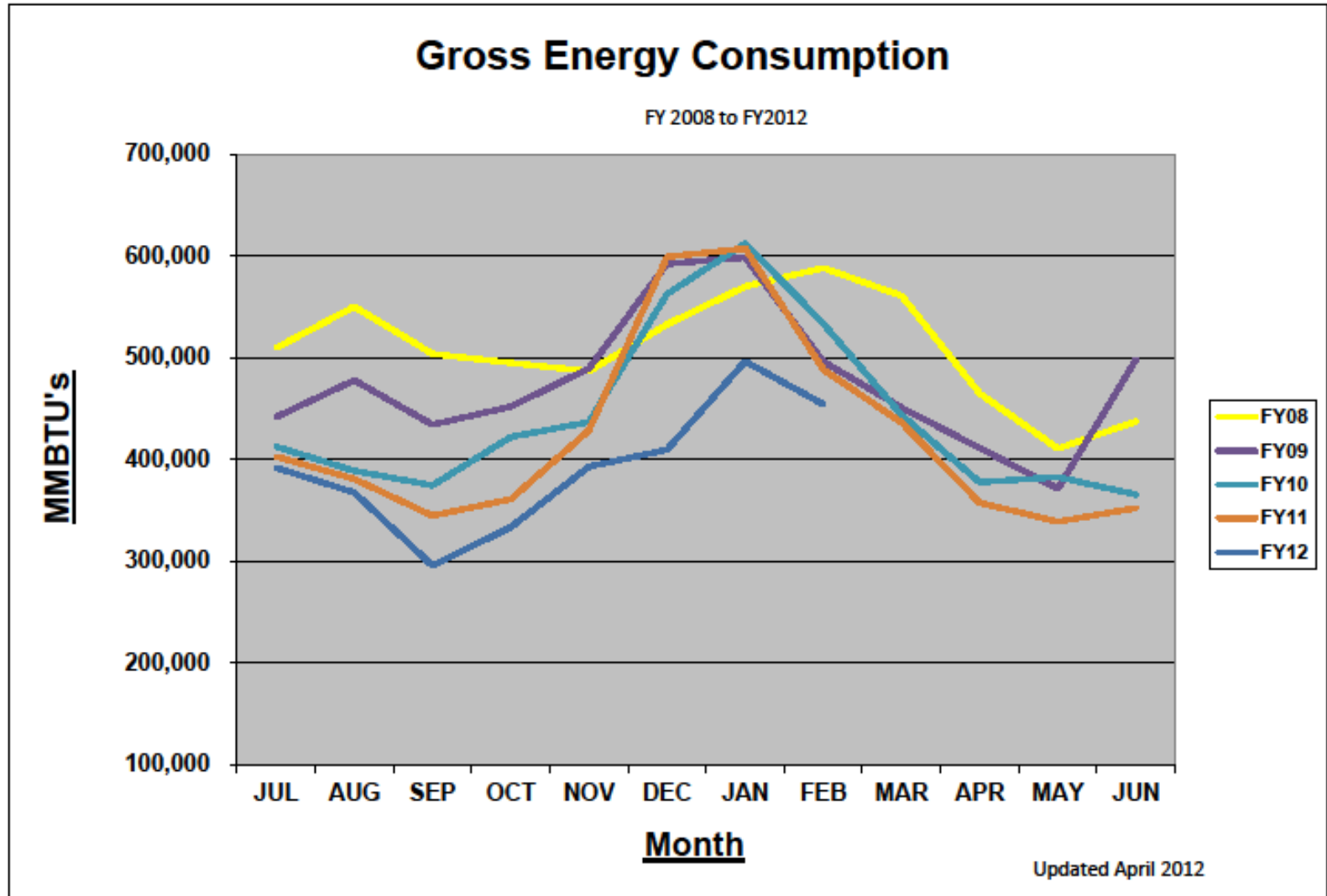


# Energy Overview – Electric

## Electrical Demand



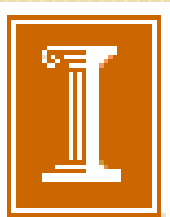
# Fuel and Electric Purchase Totals



FY11: Natural Gas ~ 3.3 M mmbtu; Coal ~1.3 M mmbtu; Purch Elec ~.5 M mmbtu

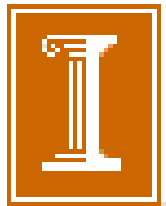
# Energy Projects & Initiatives

- Evaluate full energy production and distribution system
  - Construct a direct-digital control command center – smarter campus
  - Smart microgrid
- Use renewable energy sources
  - Power Purchase Agreements for renewables – under discussion
  - Solar
    - Solar Farm – under discussion
    - Rooftop solar
      - BIF rooftop solar – done
      - ECE rooftop solar – approved
      - Solar on parking decks – under discussion
      - KCPA solar options – conceptualization study funded



# Energy Projects & Initiatives

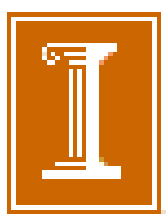
- SSC Solar Feasibility Study – done
- Solar thermal at ARC – in progress
- Wind
  - Utility Scale wind turbine generator on south farms - cancelled
  - RFP for wind power – in progress
  - Rooftop wind pilot test – approved to pilot
- Geothermal
  - Allerton geothermal at Evergreen Lodge - completed
- Biomass
  - Vet med miscanthus boiler - cancelled
  - Biomass co-firing at Abbott Power Plant – in progress
- Biogasification – under discussion
- Methane capture
  - Anaerobic digester at Beef and Sheep facility
    - Feasibility Study – approved to start





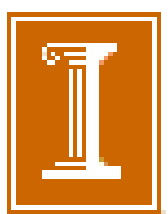
# Energy Projects & Initiatives

- Energy conservation projects
  - SAIC projects – ongoing
  - Retrocommissioning (RCx) – in progress
  - Thermal Energy Storage Tank – done
  - Lighting Retrofit
    - T-12 to T-8 retrofit – in progress
    - Adaptive lighting pilot project – in estimating
    - Install occupancy and daylight sensors – ongoing
  - AFMFA energy conservation projects from deferred maintenance – ongoing
  - Energy recovery wheel installations – ongoing



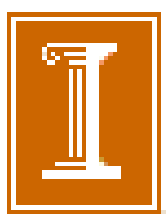
# Energy Projects & Initiatives

- ESCOs
  - Vet Med – in progress
  - Oak Street Chiller Plant – in progress
- Plant Sciences Window Shades – on going
- Net-Zero Energy Building ECE – in progress
- Insulation hot water heaters and pipes – ongoing
- Convert fume hoods from CAV to VAV – ongoing
- Reduce fume hoods (or mothball un-needed hoods) – ongoing
- Steam system maintenance – in progress



# Energy Projects & Initiatives

- Behavior change
  - Energy dashboard project – in progress
  - Presentations about energy conservation with Energy Liaisons – ongoing
  - Fume hoods education system – done
  - Temperature setbacks from energy use policy – in discussion
  - Update building maintenance procedures to support long-term energy savings – in progress
  - Energy chargeback system – changed to incentivization program

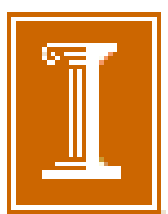


# Energy Projects & Initiatives

- Facility Standards

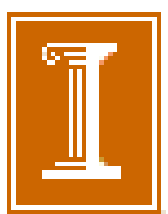
- LEED certification

- Test LEED certification process with Business Instructional Facility – done
    - Require all new construction to be LEED Silver certified – done
    - Require all new construction to be LEED Gold certified by 2011 – done
    - Require all new construction to be LEED Platinum certified by 2015
    - Incorporate LEED principles into Facility Standards for smaller projects – done



# Energy Projects & Initiatives

- Consider green roofs for new buildings and expansions – ongoing
- Update standards for new construction, major renovations, and replacement units – ongoing
- Computers & Technology
  - Update and enforce campus computer policy
  - Consolidate servers with virtualization
    - Piloting consolidation at F&S – in progress



# Questions / Comments

