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Comprehensive Greenhouse Gas Management at PPPL

Sustainability Assistance Network Conference Call

December 20, 2012

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Environment, Safety, Health & Security





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Princeton Plasma Physics Laboratory

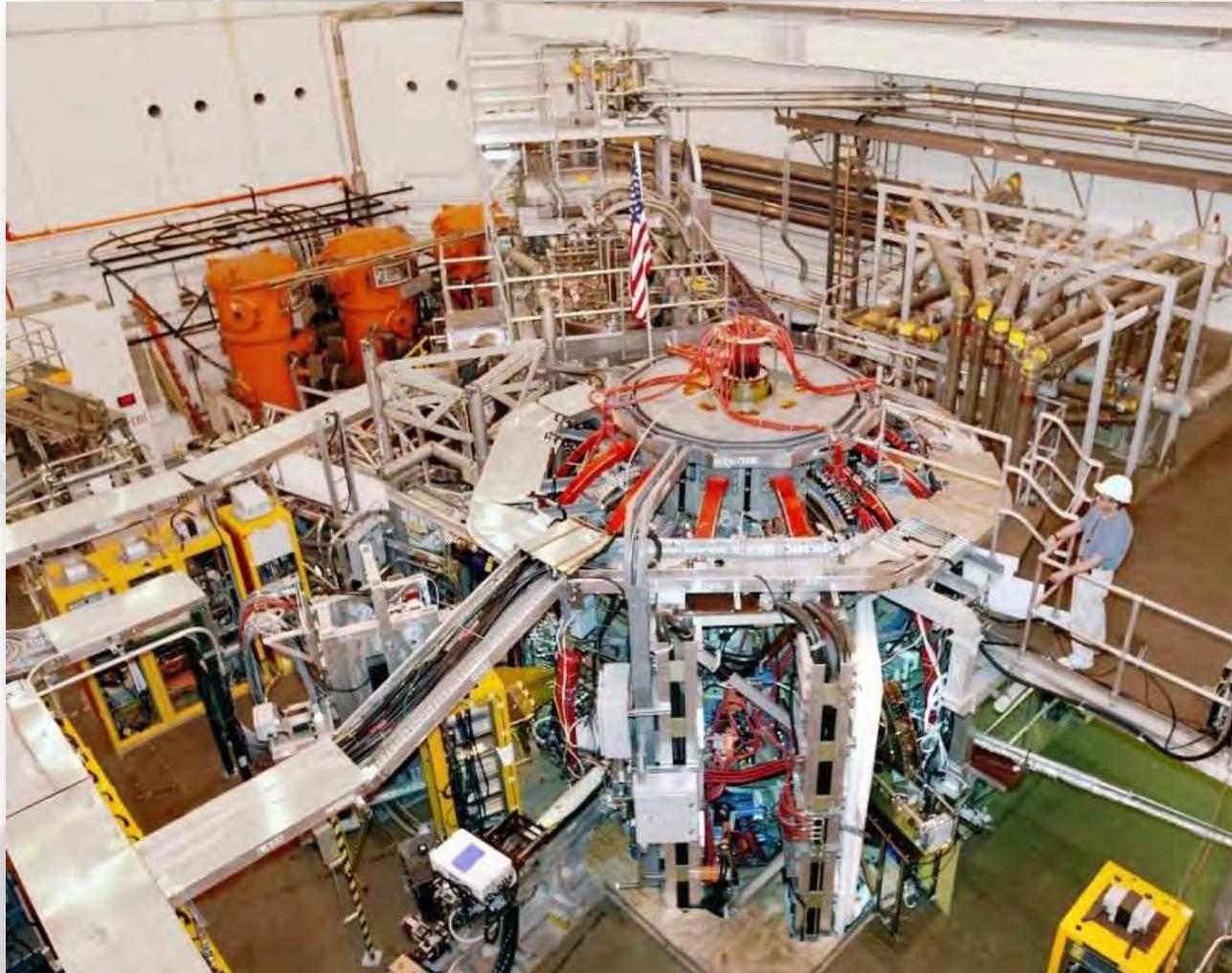




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National Spherical Torus Experiment (NSTX)

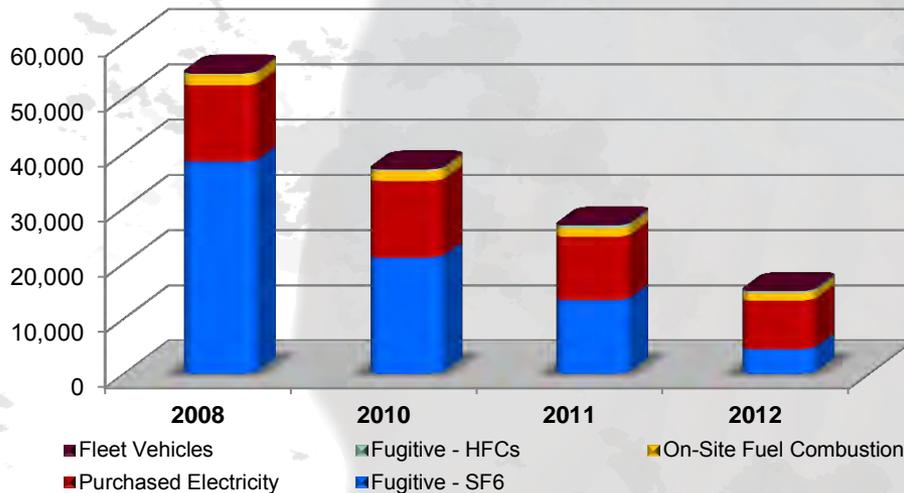




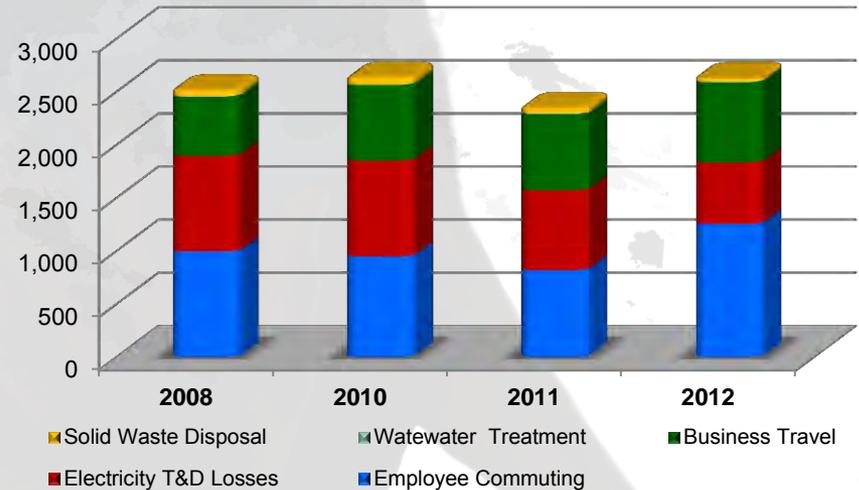
Comprehensive GHG Reductions

GOAL: Reduce Scope 1 & 2 emissions by 28% by 2020 relative to FY2008 baseline.
Reduce Scope 3 emissions by 13% by 2020 relative to FY2008 baseline.

SCOPE 1 & 2 GHG EMISSIONS - 2008-2012



SCOPE 3 GHG EMISSIONS - 2008-2012

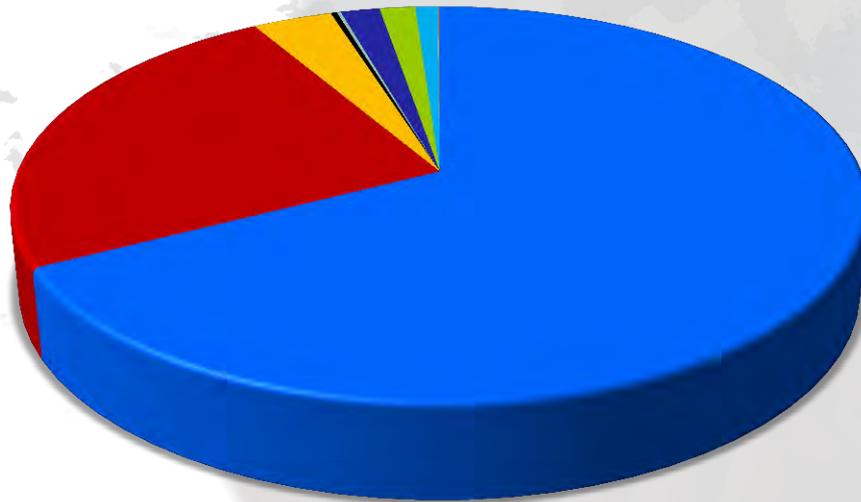


Scope 1 & 2: 84.7% reduction - Scope 3: 4.4% increase



FY2008 GHG Baseline

GOAL: *Reduce Scope 1 & 2 emissions by 28% by 2020 relative to FY2008 baseline.
Reduce Scope 3 emissions by 13% by 2020 relative to FY2008 baseline.*



FY2008 Baseline

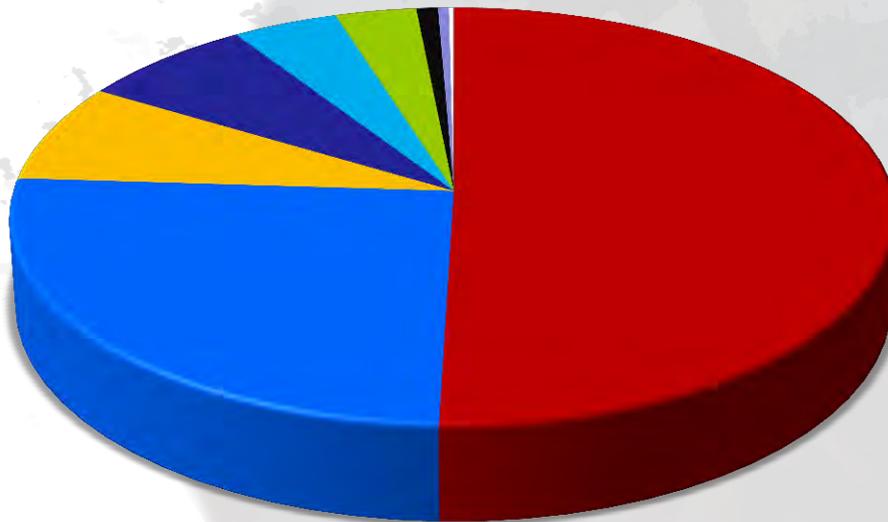
- **Fugitive SF6: 68%**
- **Purchased Electricity: 24%**
- **On-Site Fuel: 4%**
- **Elec. T&D Losses and Employee Commuting: 2% each**

- | | | |
|--------------------------|-------------------------|---------------------------|
| ■ Fugitive - SF6 | ■ Purchased Electricity | ■ On-Site Fuel Combustion |
| ■ Fugitive - HFCs | ■ Fleet Vehicles | ■ Employee Commuting |
| ■ Electricity T&D Losses | ■ Business Travel | ■ Wastewater Treatment |
| ■ Solid Waste Disposal | | |



FY2012 GHG Inventory

GOAL: *Reduce Scope 1 & 2 emissions by 28% by 2020 relative to FY2008 baseline.
Reduce Scope 3 emissions by 13% by 2020 relative to FY2008 baseline.*



- Purchased Electricity
- Employee Commuting
- Fugitive - HFCs
- Wastewater Treatment
- Fugitive - SF6
- Business Travel
- Fleet Vehicles
- On-Site Fuel Combustion
- Electricity T&D Losses
- Solid Waste Disposal

FY2012 Emissions	
• Scope 1 & 2:	-72.4%
• Scope 3:	+4.4%
• SF6 releases:	-88%
• Purchased Elec.:	-36%
• Onsite Fuel:	-34%
• T&D Losses	-36%
• Fleet Fuel	-19%
• Commuting:	+26%
• Business Travel:	+28.8%
• Fugitive HFCs:	+116%



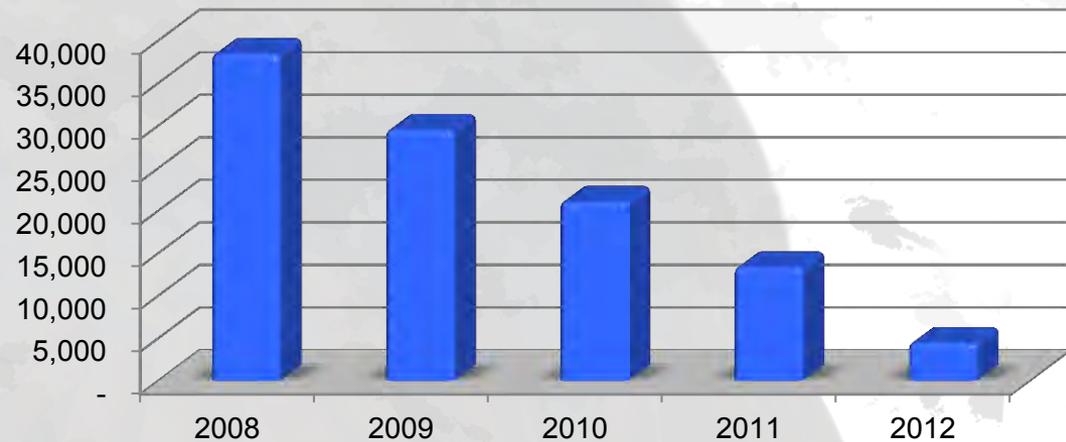
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Fugitive SF6 Management



Annual SF6 GHG Equivalent Emissions
(mtCO₂e)



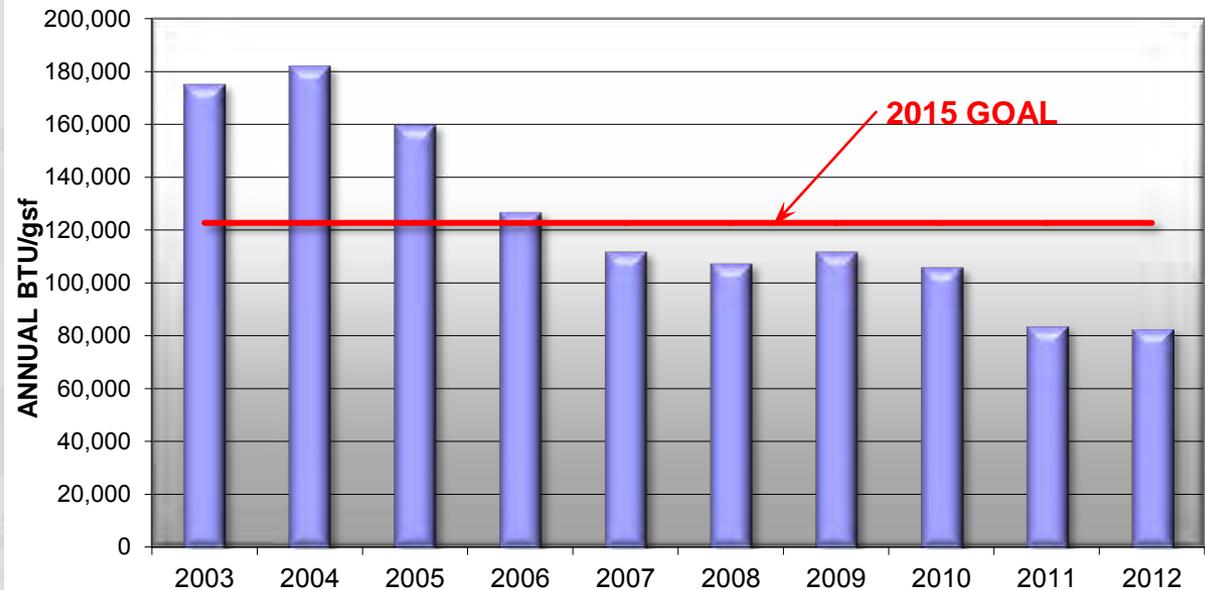


Energy Efficiency

GOAL: *Reduce energy intensity by no less than 30% on average by FY2015, relative to the site energy use in FY2003...reduce CO₂ emissions by 3% per year - 30% by FY2015.*

- PPPL's non-experimental buildings use **less than half** of the energy per square foot than they did in 2003.
- Additional opportunities: lighting, experimental house power, support systems, etc.

NON-EXPERIMENTAL ENERGY INTENSITY





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Building Energy Efficiency



- Main office building LEED-EBOM Gold
- Ongoing facility & office renovations
- Energy-efficient fluorescent, LED and induction lighting
- Cradle-to-Cradle[®] office furnishings
- Green building products, biobased cleaners, recycled flooring, etc.
- ~40,000 sf of R-30+ ENERGY-STAR roofing installation competed in FY12





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Environmental Performance Energy Efficient Buildings Hub *Roofing for the Region Study*

EEBHUB Energy Efficient Buildings Hub
Re-energizing buildings for the future.™

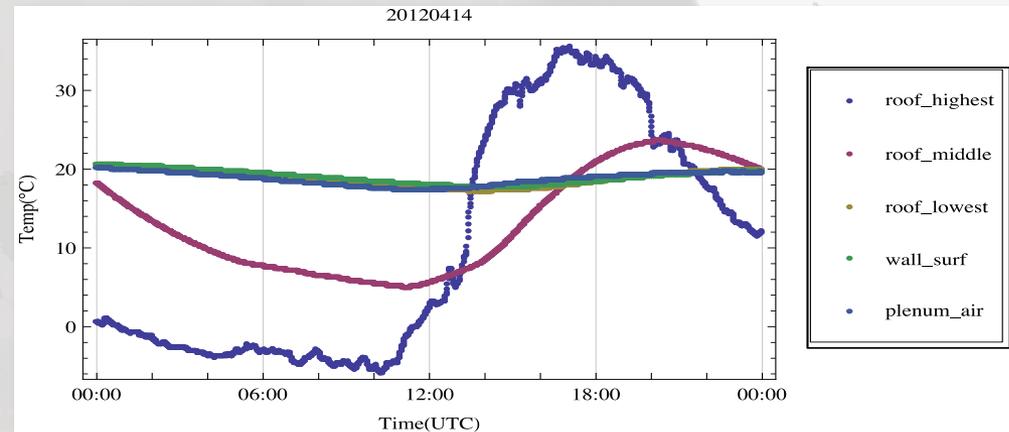
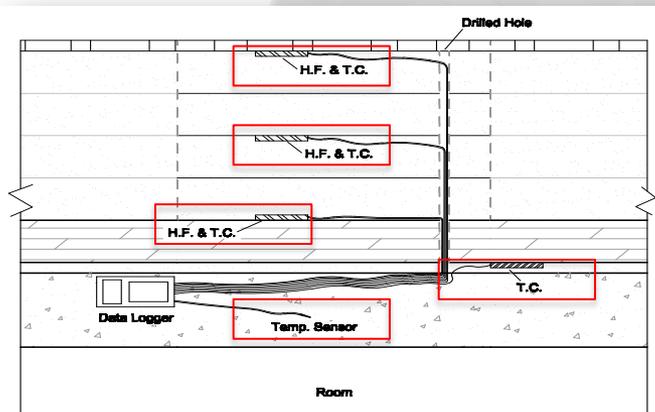




Building Energy Efficiency Roofing for the Region Study



- Analyze white, black & vegetated roof systems
- Analyze actual building energy use v. models

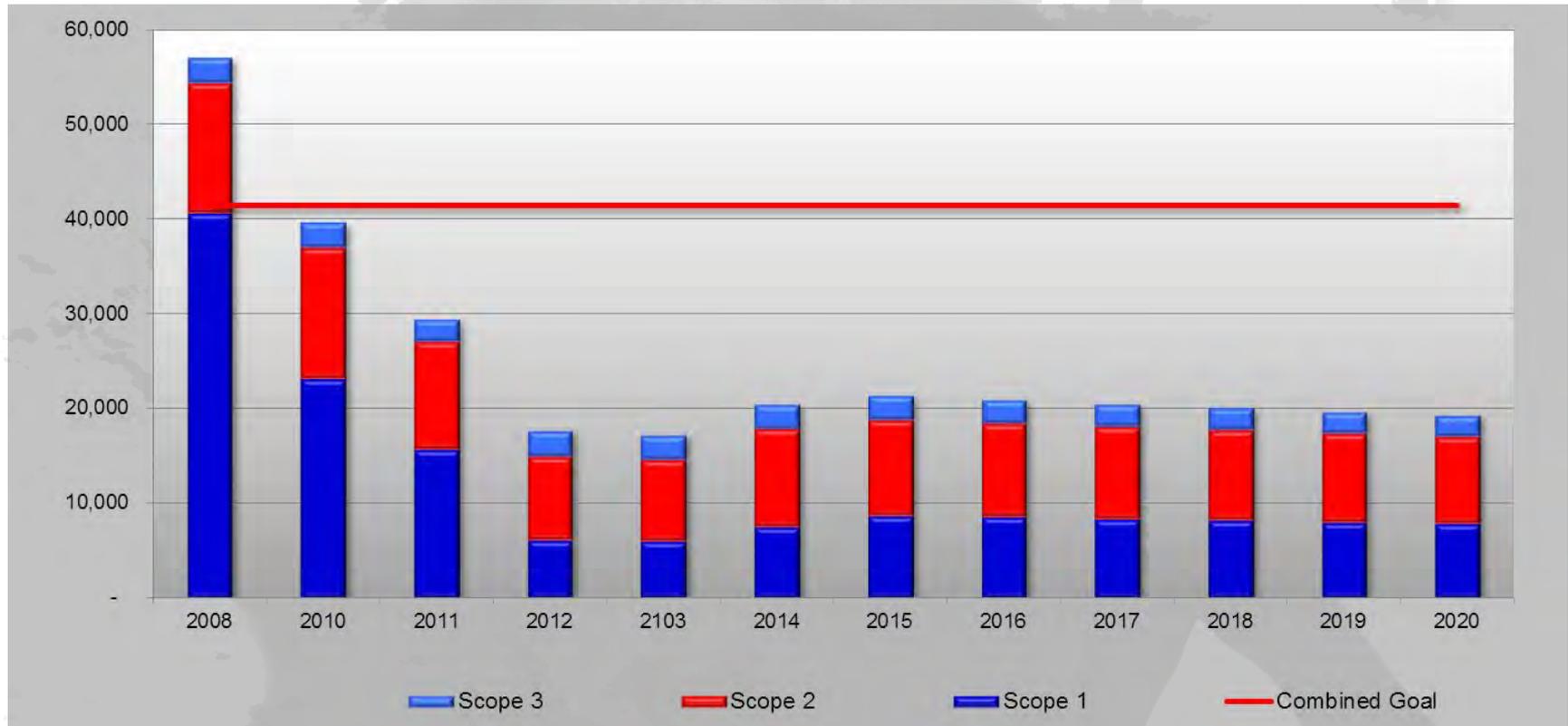




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Projected GHG Emissions



Challenges: Employee Commuting, Business Travel, Experimental Electricity Use, On-Site Renewable Energy



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John Lacenere, AC Power
Matthew Lawson, Material Services
Bill Gervasi, Facilities
Margaret King, Facilities

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