

Energy Master Planning Case Studies of New York State Campuses

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#obgPresents



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Presentation Summary - Energy Master Planning



➤ **Drivers / Goals / Commitments**

➤ **Elements of an EMP**

➤ **Case Study Examples:
Learned Outcomes**

SUNY, University at Albany
SUNY Buffalo State
City University of New York

➤ **Key Takeaways**

What is an Energy Master Plan?



Not an energy audit, but it's a component



Supports institutional energy and sustainability goals



Aligns with Campus / Facility Master Plan and Strategic Plan



Addresses energy consumption, demand, production, supply, reliability, and security



Considers the impacts of growth

Drivers / Goals / Commitments

PlaNYC –

**30% GHG/per GSF
reduction by 2017**



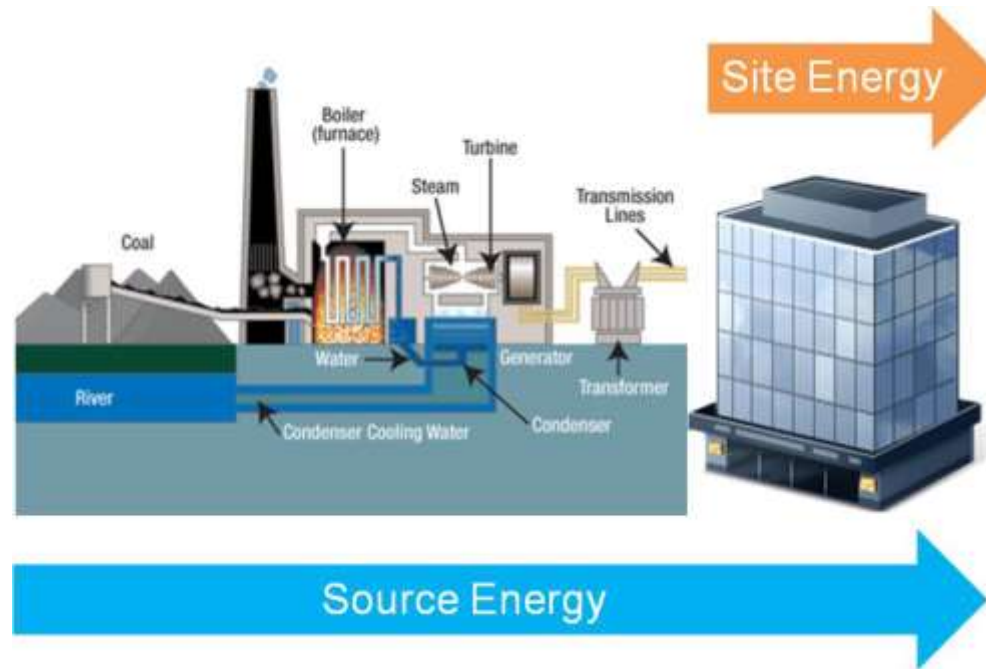
BuildSmartNY

Build Smart NY –

**20% Source EUI kBtu/GSF
reduction by 2020**



Site Versus Source EUI



Energy Use Intensity (EUI)

Annual energy consumed by a building, measured as thousands of Btu per gross square foot (kBtu/SF-year)

Site Energy

Thermal energy and electricity consumed by a building as reflected in utility bills

Source Energy

Total amount of fuel consumed in the generation and use of energy consumed including generation, transmission and storage losses

Elements of an Energy Master Plan

- Preliminary energy analysis and benchmarking
- Campus/facility energy assessment (ASHRAE Level 1 and Level 2)
- Energy conservation measures (ECMs)
- Infrastructure renewal projects (IRs)
- Energy supply, reliability, and security
- Submetering and Energy Management System
- O&M plan (including EBCx and continuous Cx)
- Metrics tracking and reporting
- Funding and implementation schedule



Case Studies of New York State Campuses



SUNY University at Albany



SUNY Buffalo State



City University of New York



Learned Outcomes

- Established Campus Energy Manager – demonstrating benefits
- Proactive ECM implementation; but significant \$\$ to get deeper savings
- Need enhanced Operations & Maintenance – \$\$\$\$ and training
- Established temperature setpoint policy
- Buildings slated for gut rehab – execute short-term projects or hold?
- Planned Instrumentation & Controls Shop



Savings Strategy Summary

EMP Savings Strategy	Electrical (kWh/yr.)	Natural Gas (MMBtu/yr.)	Site Energy (kBtu/yr.)	Percentage of Baseline Site Energy	Source Energy (kBtu/yr.)	Percentage of Baseline Source Energy
2010-2011 UAlbany Baseline	71,040,900	459,618	735,760,103	100%	1,325,226,945	100%
ECM/TA Savings	12,868,399	165,996	209,928,660	28.5%	320,533,021	24.2%
O&M Savings	1,420,818	9,192	14,043,039	1.9%	25,825,654	1.9%
CHP Savings	14,400,000	-57,752	-8,590,400	-1.2%	103,733,400	7.8%
Renewable Energy Savings (500 kW PV)	550,000	0	1,877,700	0.3%	6,271,518	0.5%
Total Savings	29,239,217	117,436	217,258,998	29.5%	456,363,593	34.4%

SUNY Buffalo State EMP

Learned Outcomes

- Take credit for implemented measures
- Existing energy data, but limited review time
- Needed position – Campus Energy Manager
- Need enhanced Operations & Maintenance – \$\$\$\$ and training
- Build energy savings into new projects – Ask for it
- Environmental mitigation – Impacts on the business case



SUNY Buffalo State EMP Portfolio – Case Study Example

		ID	Measure	Description	Capital Cost (\$)	Reduction in Source EUI (%)	Cumulative Reduction in Source EUI (%)
BUFFALO STATE COLLEGE ENERGY MASTER PLAN	30% SUNY OFFICE OF SUSTAINABILITY GOAL	22% BUILDSMART GOAL FOR SUNY	COMPLETED / FUNDED PROJECTS	1	EUI Reductions as of June 2013	N/A	10.0%
				2	NC-5 Technology Building	Funded	12.1%
				3	NC-2 Houston Gymnasium Rehabilitation	Funded	12.9%
				4	NC-8 Caudell Hall Renovation	Funded	12.6%
				5	NC-3 Siemens Upgrade Project	Awaiting Approval & Funding	16.3%
				6	NC-1 Heating Plant Replacement	Design Funded	20.0%
				7	LC/NC Low Cost/No Cost Energy Conservation Measures	N/A	22.9%
				Subtotal		\$0	22.9%
				8	ECM-16* Campus Energy Manager	\$135,000	31.8%
				Subtotal		\$135,000	31.8%
				9	ECM-13* Install Removable Insulation Covers	\$47,000	33.1%
				10	ECM-11* Implement Steam Trap Maintenance Program	\$198,000	35.0%
				11	ECM-8* Perform Existing Building Commissioning (EBCx)	\$396,000	36.5%
				12	ECM-15* Building Level Utility Submetering	\$372,000	37.8%

About City University of New York

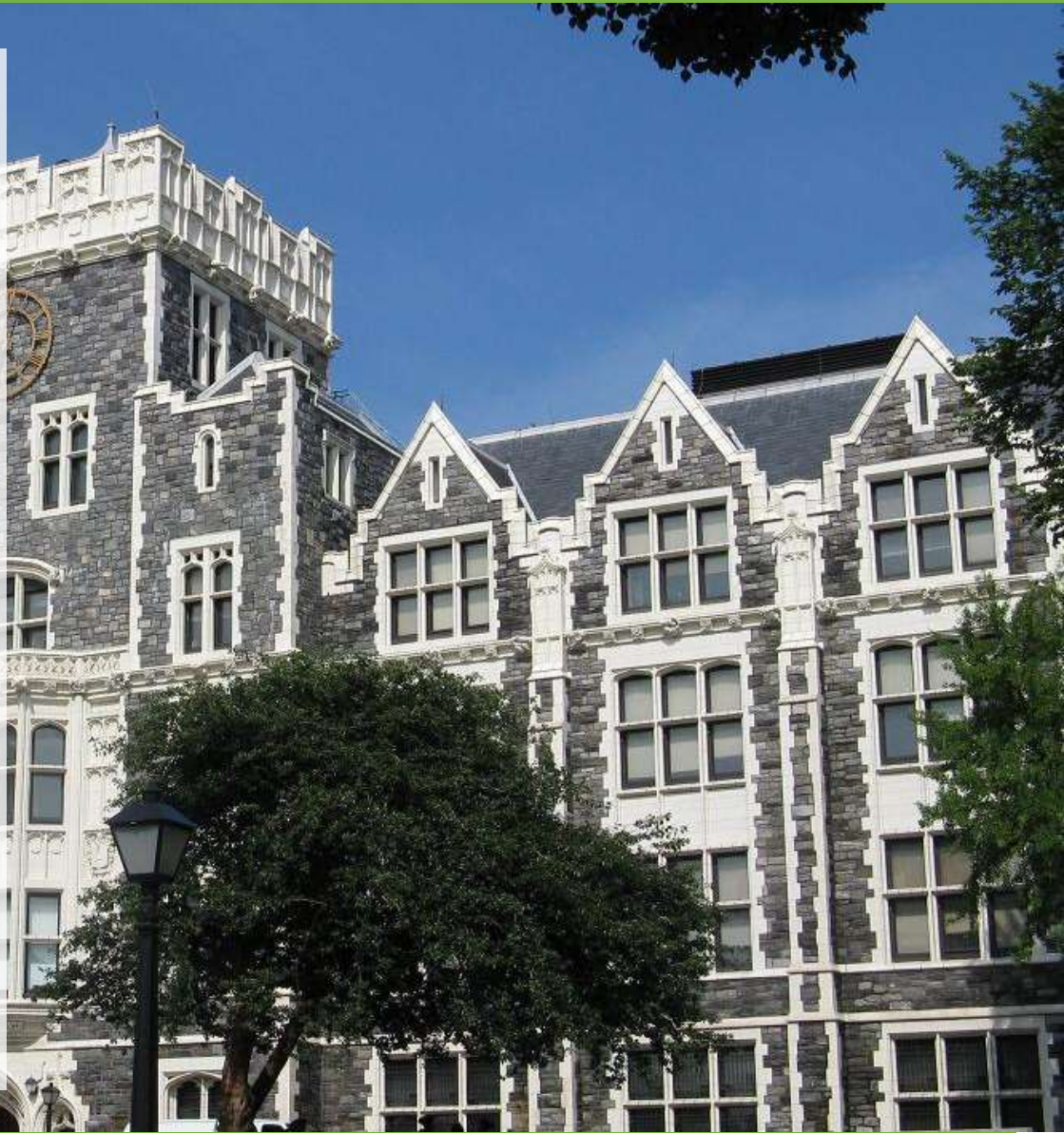
Largest Urban University System in the U.S.



- Senior, community, honors , graduate, and professional colleges
 - Over 500,000 students
 - 36,000 faculty and support staff
 - 300 buildings
 - 26.3 million gross square feet
-
- Annual CUNY energy cost = \$84M
 - Approx 1% of NYC energy load
 - Decentralized governance
 - Average building age of 52 years

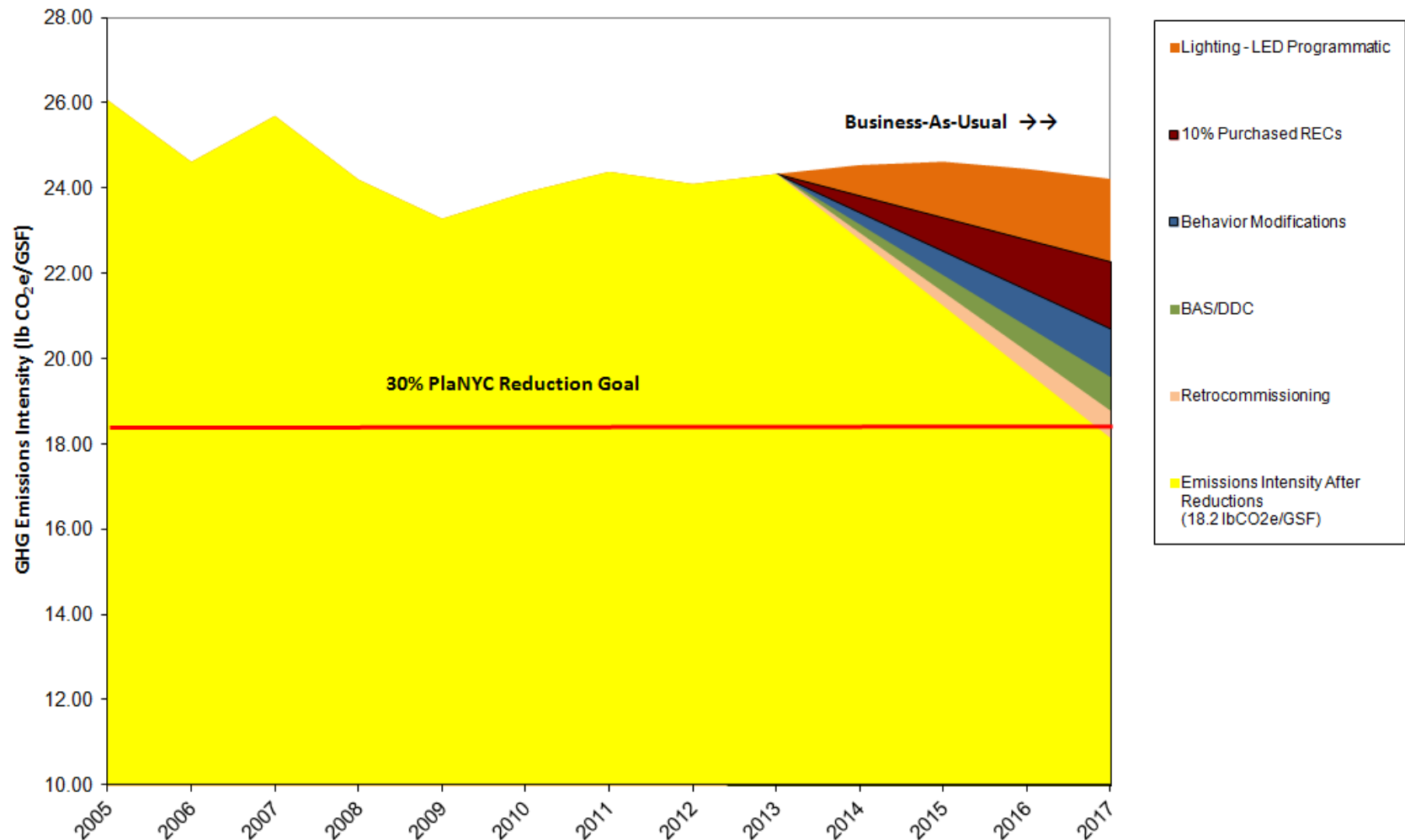
Learned Outcomes

- Establishment of CUNY Conserves at University level
 - Submetering and Energy Management System
 - Peak Load Management
 - Operations & Maintenance Plan
 - Training and Education
- Lighting technology advancements impacted Climate Action Plans
- Strong energy conservation history
 - Early adopters have to dig deeper



CUNY Stabilization Wedge

CUNY Stabilization Wedge Diagram: Actions in Meeting PlaNYC Goals by 2017



Key Takeaways

1. **Alignment with Campus/Facilities Master Plan and Strategic Plan**
2. **Submetering and Energy Management System platform**
3. **Campus Energy Manager – Need and benefits**
4. **Enhanced O&M and Training – Smart building systems**
5. **Incorporate energy savings into new designs and projects – Ask for it**
6. **Continual awareness of technology advancements**
7. **Environmental mitigation – Impacts on the business case**
8. **Early energy conservation adopters – Dig deeper for energy savings**
9. **Cultural change takes policies and time**
10. **Existing Building and Continuous Commissioning needs**

THANK YOU

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