

# Energy Master Planning Case Studies of New York State Campuses

Robert M. Neimeier  
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#obgPresents



# Acknowledgements

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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**

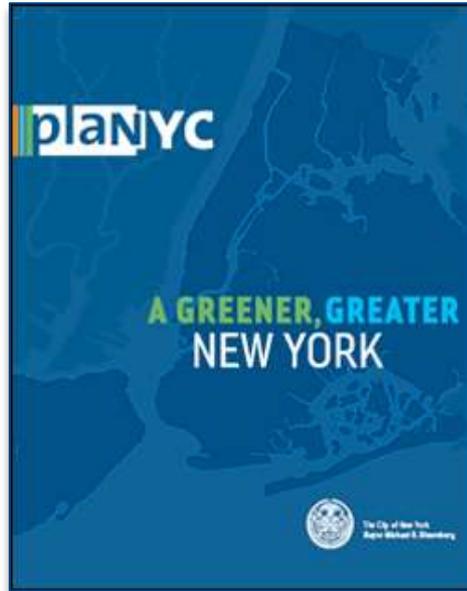


**Considers the impacts of growth**

# Drivers / Goals / Commitments

**PlaNYC –**

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



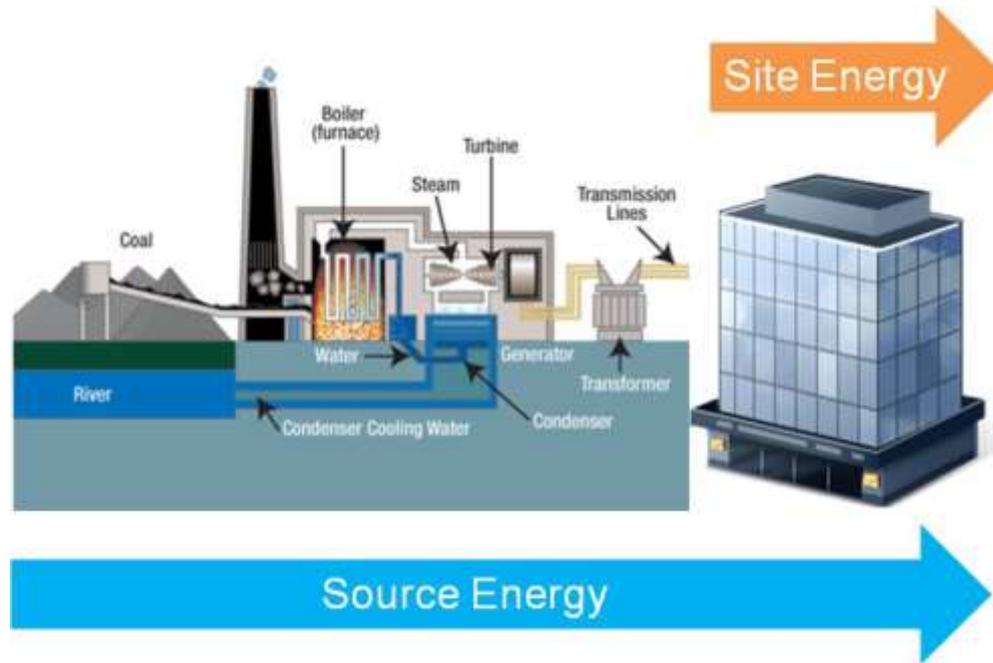
**BuildSmartNY**

**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



# UAlbany EMP

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

# 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	1		EUI Reductions as of June 2013	N/A	10.0%	10.0%	
		2	NC-5	Technology Building	Funded	2.1%	12.1%	
		3	NC-2	Houston Gymnasium Rehabilitation	Funded	0.8%	12.9%	
		4	NC-8	Caudell Hall Renovation	Funded	-0.3%	12.6%	
		5	NC-3	Siemens Upgrade Project	Awaiting Approval & Funding	3.7%	16.3%	
		6	NC-1	Heating Plant Replacement	Design Funded	3.7%	20.0%	
		7	LC/NC	Low Cost/No Cost Energy Conservation Measures	N/A	2.9%	22.9%	
				<b>Subtotal</b>	<b>\$0</b>		<b>22.9%</b>	
			8	ECM-16*	Campus Energy Manager	\$135,000	8.9%	31.8%
				<b>Subtotal</b>	<b>\$135,000</b>		<b>31.8%</b>	
			9	ECM-13*	Install Removable Insulation Covers	\$47,000	1.3%	33.1%
			10	ECM-11*	Implement Steam Trap Maintenance Program	\$198,000	1.9%	35.0%
		11	ECM-8*	Perform Existing Building Commissioning (EBCx)	\$396,000	1.5%	36.5%	
		12	ECM-15*	Building Level Utility Submetering	\$372,000	1.3%	37.8%	

# About City University of New York

## Largest Urban University System in the U.S.



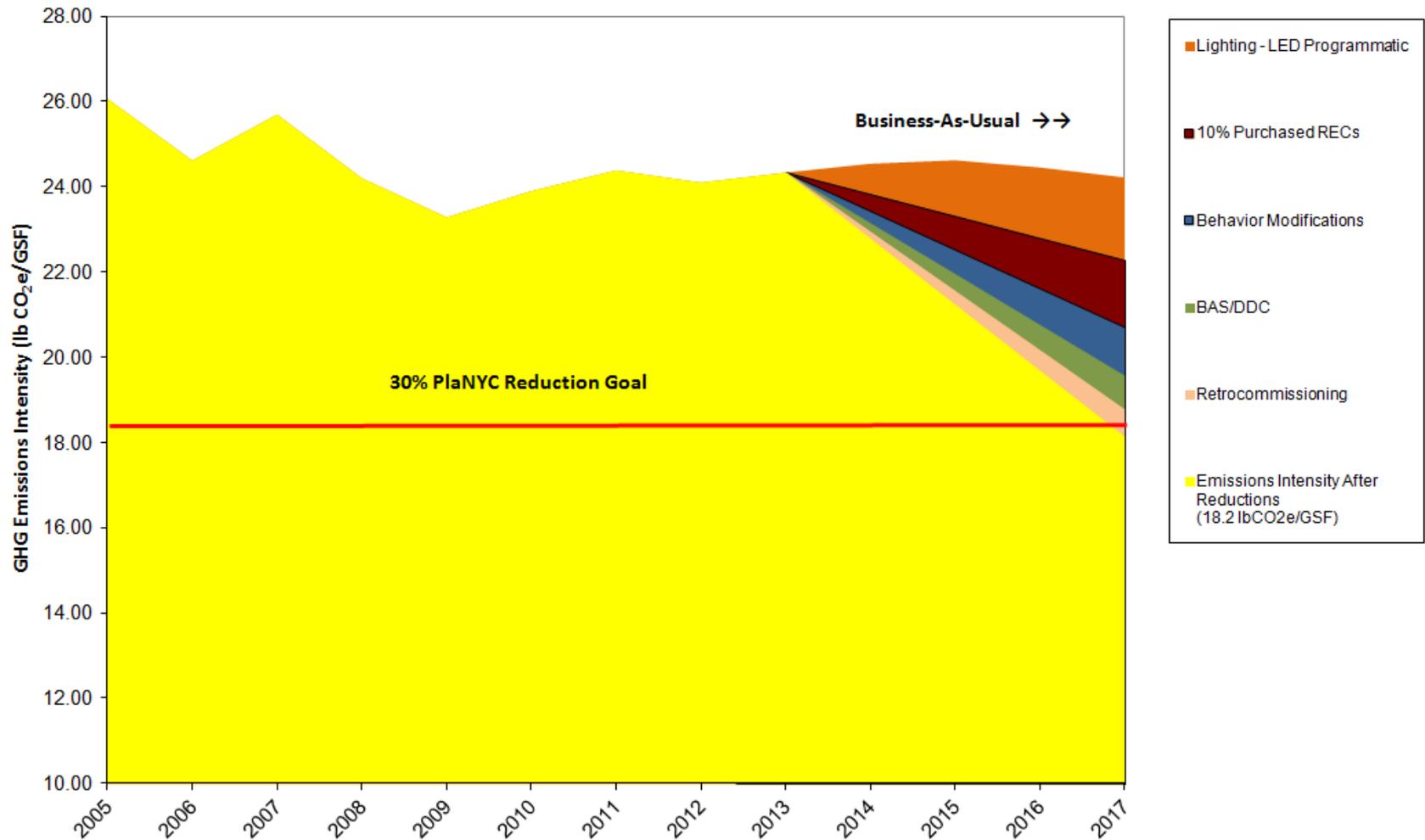
- Senior, community, honors , graduate, and professional colleges
  - Over 500,000 students
  - 36,000 faculty and support staff
  - 300 buildings
  - 26.3 million gross square feet
- 
- Annual CUNY energy cost = \$84M
    - Approx 1% of NYC energy load
  - Decentralized governance
  - Average building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

Robert Neimeier | [Rob.Neimeier@obg.com](mailto:Rob.Neimeier@obg.com)

