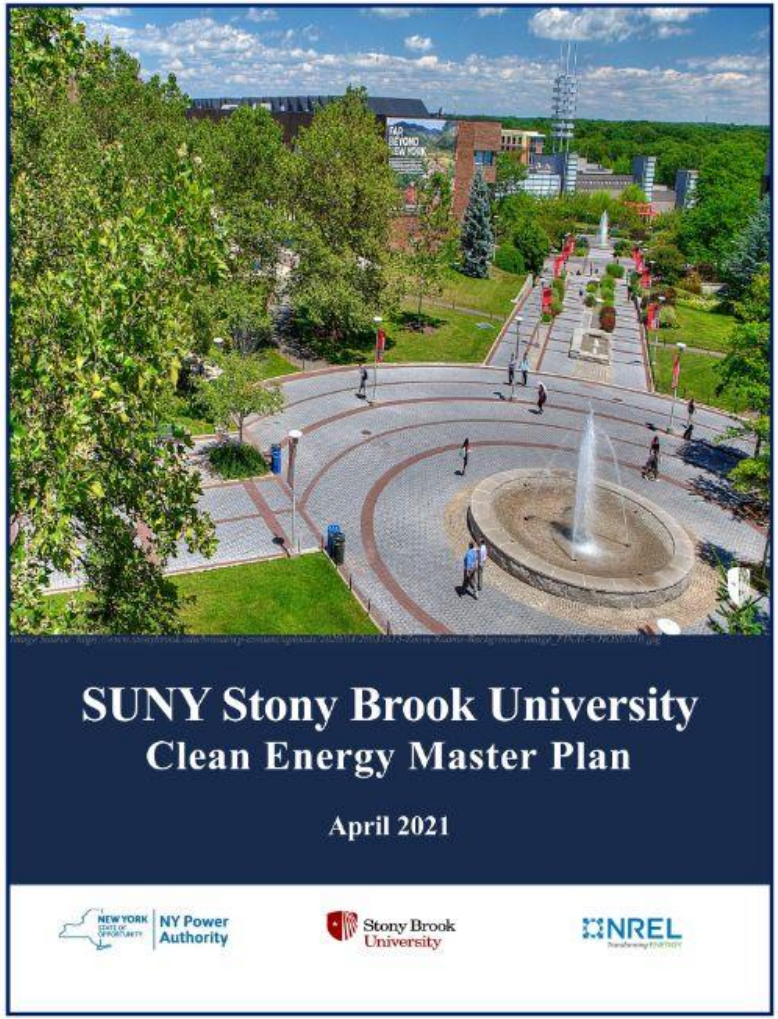
Getting Stony Brook Off Fossil Fuels

A report to the Stony Brook University Senate by the University Environment Committee - December 4th, 2023



BACKGROUND

APRIL 2021: Stony Brook University publishes a Clean Energy Master Plan for West Campus, which is available on the University website.

Since the fall of 2021, the University Senate Environment Committee has engaged the University administration to discuss the CEMP, its implementation, and its evolution. The University administration has been very open and cooperative in that process.

OCTOBER 2023: Environment Committee publishes a response to the CEMP, which is available on the Senate website under UEC committee minutes.

April 24, 2023: President Maurie Mcinnis celebrates the selection of Stony Brook University as the lead institution for The New York Climate Exchange on Governors Island:

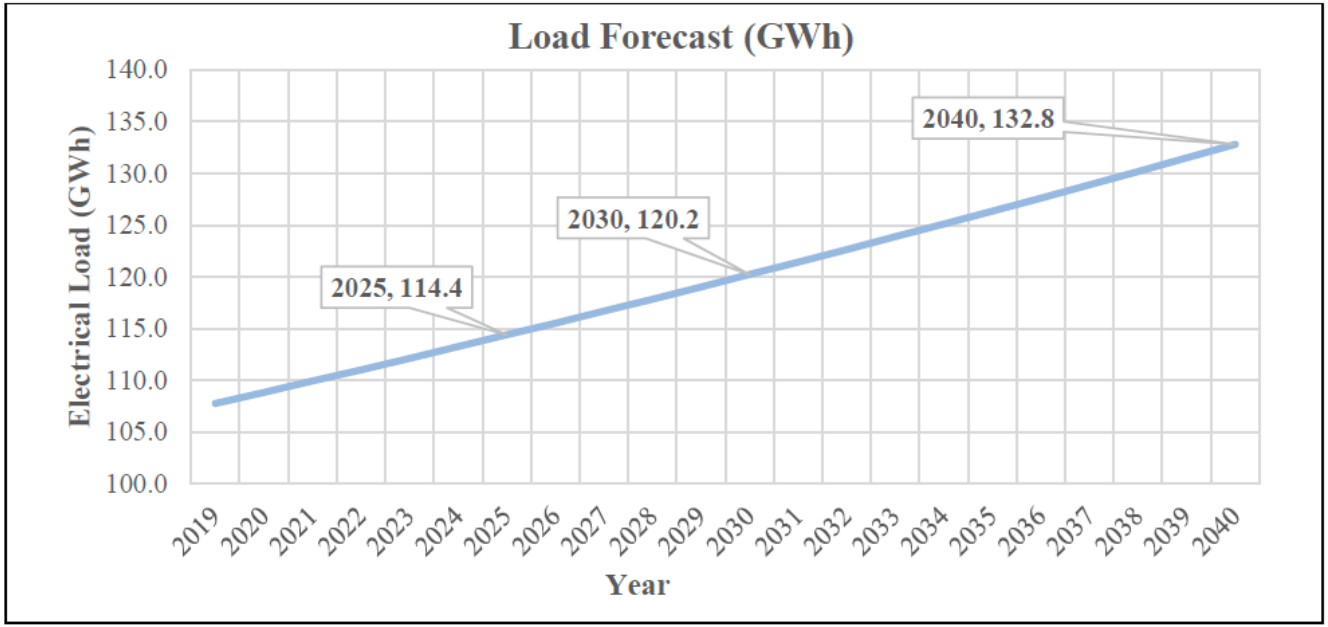
Excerpted remarks:

- SBU is an “international leader on climate.”
- “Up until now, the development of climate solutions has been siloed, with world leaders separate from expert scientists separate from the on-the-ground green workforce.”
- “[We] will bring stakeholders together from the academic, government and business communities to make The Exchange the center of research, innovation, education and collaboration to address this global crisis.”

What better place for applying these principles than right here on the SBU campus?

2:00

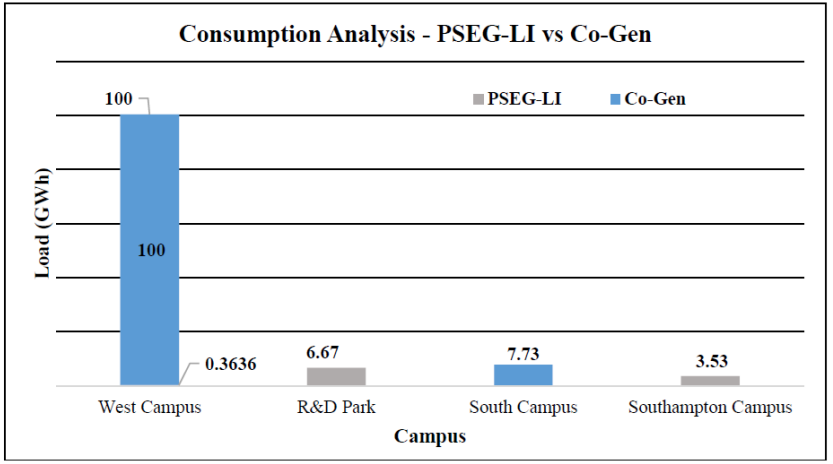
HOW MUCH ELECTRICITY DOES SBU USE?



- West Campus 2023: approximately 112 GigaWatt hours.
- Electrical bill for campus: > $1,000,000 *per week.*
- West Campus usage is predicted to increase 19% by 2040 to 133 GWh.

2:30

WHERE DOES SBU GET ITS ELECTRICITY?



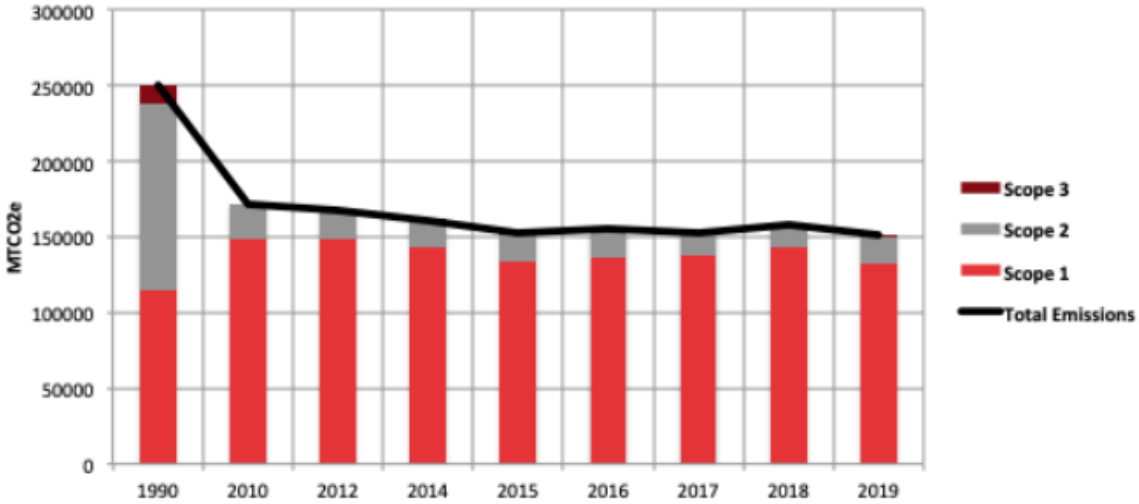
- CoGen: Natural gas cogeneration power plant produces 91% of electricity used on campus.
- Also produces hot and chilled water for building heating and cooling.
- 47 megawatt maximum capacity, 19 megawatt minimum output needed for stability.
- Opened in 1995. Operated by energy company Calpine under contract with SBU.
- Previous contract restricting on-campus alternative energy generation (wind,solar) expired March 31, 2023.
- Seven year contract extension allows unlimited on-campus alternative energy generation.
- BUT the current energy plan envisions CoGen plant operating until 2050.

3:30

HOW MUCH GREENHOUSE GAS DOES SBU EMIT?

Scope 1 = emissions from on campus generation, Scope 2 = emissions from purchased power, Scope 3 = on-campus leakage and loss.

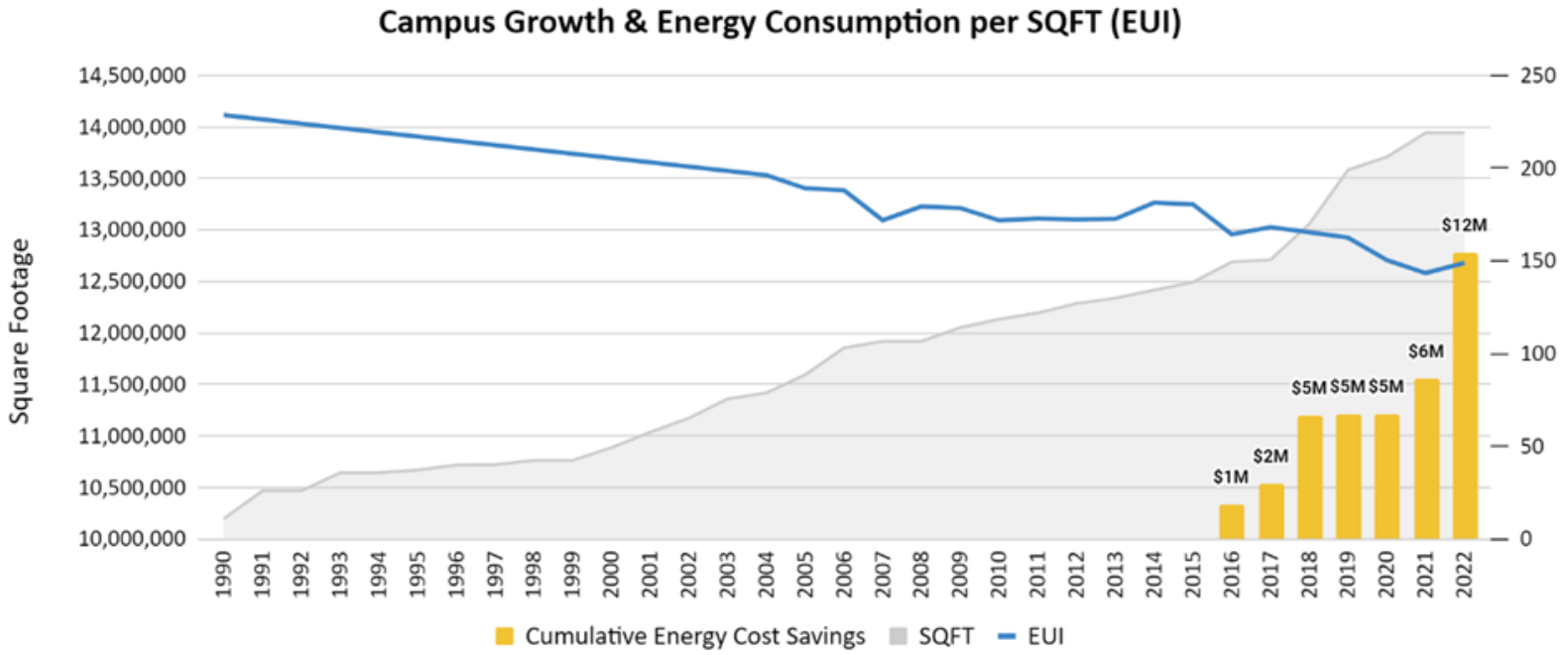
Figure 2. **GHG Emissions Inventories 1990-2019**



- Reduction of 30% in GHG emissions 1990-2010 (Calpine plant commissioning).
- Reduction of 10% in GHG emissions 2010-2019 (efficiency and conservation).

4:30

HOW EFFICIENTLY IS ENERGY USED AT SBU?



- From 1990-2022 decrease of 10% in energy consumption per square foot.
- >$12M in cumulative energy savings despite campus growth of >33%.

5:00

NY STATE MANDATES

CLCPA = Climate Leadership and Community Protection Act of 2019

EO22 = Executive Order 2022

CLCPA vs. EO22	Goal	Baseline Year	Target Year		% Achieved
			CLCPA	EO22	
40% Reduction in GHG Emissions	40%	1990	2030	N/A	141%
85% Reduction in GHG Emissions	85%	1990	2050	N/A	25%
70% Renewable Electric Energy	70%	-	2030	N/A	0.01%
Zero-emissions Electricity *	100%	-	2040	2030	0.01%
0.88 Trillion Btu Reduction of Site Energy use SBU**	100%	2015	N/A	2025	11%
185 Trillion Btu Reduction of Site Energy use Statewide ***	100%	2015	2025	N/A	-
Convert Light-Duty non-Emergency Vehicles to ZEVs	100%	-	N/A	2035	0%
Convert Medium and Heavy-Duty Vehicles to ZEVs	100%	-	N/A	2040	0%
No Fossil Fuel Combustion Infrastructure can be Designed/Constructed at State Facilities after 2024	-	-	N/A	2024	-

Notes:

* RECs could be purchased to meet goals if sufficiently available

** 11 Trillion Btu for all affected State facilities, 4.4T for SUNY campuses, 0.88T for SBU

*** Applies to all entities in NYS

CLCPA - Community Leadership and Climate Protection Act. NYS Law 2019

EO22 Repeals EO88 and EO166

- 40% GHG emissions reduction 1990-2030 - achieved.
- 85% GHG emissions reduction by 1990-2050 - 25% achieved.
- 70% renewable electricity by 2030 - 0.01% achieved.
- 100% zero emission electricity by 2030 - 0.01% achieved.
- 100% light duty non-emergency vehicles to ZEV by 2035 - 0% achieved.
- 100% of medium and heavy duty vehicles to ZEV by 2040 - 0% achieved.

6:00

COMPARING STONY BROOK WITH OTHER CAMPUSES

Stony Brook: No current solar. 2 MW by 2025, 4 MW by 2030 will generate 5,850,000 kWH/yr = 4.9% of campus energy needs. Stated barriers: Master Plan completion, high upfront cost, existing roofs not designed for solar.

	Project	kWh	Electric
1	R&D Ground	3,295,000	1.38%
2	Southampton East and West Cottage Ground	1,928,000	0.80%
3	Building 17 Rooftop (BTM)	468,100	0.20%
4	Southampton Chancellors Hall Rooftop (BTM)	159,600	0.07%

SUNY ESF: Participating in a New York Higher Education Large Scale Renewable Energy (NY HE LSRE), a consortium of campuses negotiating for purchase of electricity generated by offsite solar.

SUNY Buffalo: seven solar installations already on campus with 12,700,000 kWh annual capacity. Proposed mandate that all new construction be compatible with rooftop solar. Has reduced carbon footprint 33% in the last 3 years.

Cornell: 15 onsite solar projects completed, supplies 100% of campus electricity needs on sunny days and 20% overall.

ENVIRONMENT COMMITTEE RECOMMENDATIONS:

On-Campus

- Recommendation:

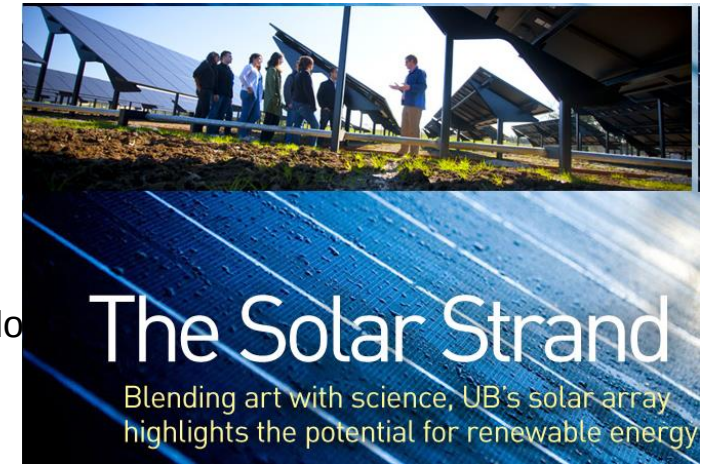
<u>Expand plans for onsite solar</u>

(#1 in report)

What we *could* do:

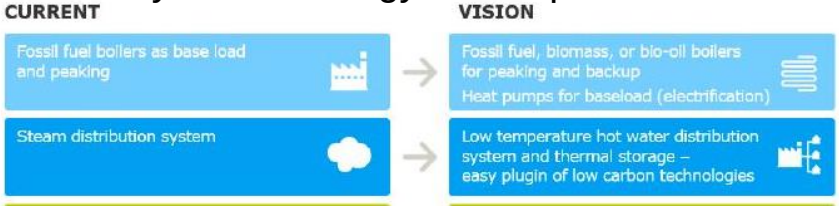
- Make onsite solar a master planning **<u>priority</u>**
- Incorporate solar into repair and renovation programs
  - rooftop solar for buildings
  - carport solar for parking lots
- More fully consider
  - the diminishing costs for onsite solar
  - new federal funding opportunities through the Inflation Reduction Act

Opened 2013
@SUNY-Buffalo

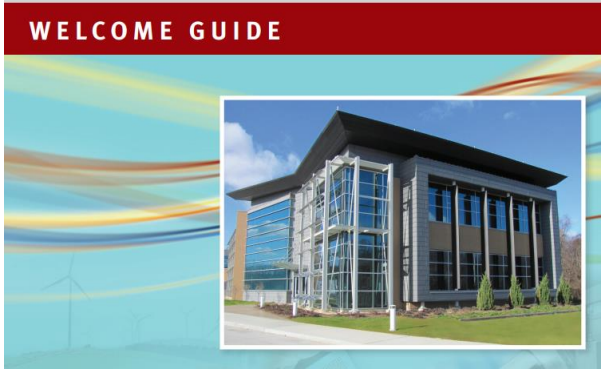


- Envision renewable alternatives to Stony Brook's reliance on gas- generated steam and hot water (Rec. #4)
  - Extending electrification to heating and cooling
  - Looking to other campuses for models: SUNY ESF

From SUNY-Environmental Sciences and Forestry Clean Energy Masterplan



ADVANCED ENERGY™
Research and Technology Center
AT STONY BROOK UNIVERSITY
A New York State *designated* Center of Excellence



- Emphasize on-site energy storage (Rec. #6)
  - Long-term, battery storage needs consideration to avoid the large fluctuations in electricity prices also in availability of on-site and off-site renewable energy sources
  - Stony Brook's own considerable expertise in these technologies in energy storage should be tapped

Still 0 Zero-Emissions Vehicles?

Still just 11 charging stations on the entire campus?

- Address Stony Brook's greenhouse emissions from transportation (Rec. #8)
  - Commit to long-as well as short-range plans and secure funding to replace the campus's own vehicle fleet with zero-emissions vehicles
  - Develop a university transportation plan that prioritizes reducing gasoline and diesel usage by individually-owned as well as university vehicles.
  - Step up the retrofitting of our campus for electrified transportation

- <u>Plan to phase out the Cogeneration Plant</u> (Rec. #3 in report)

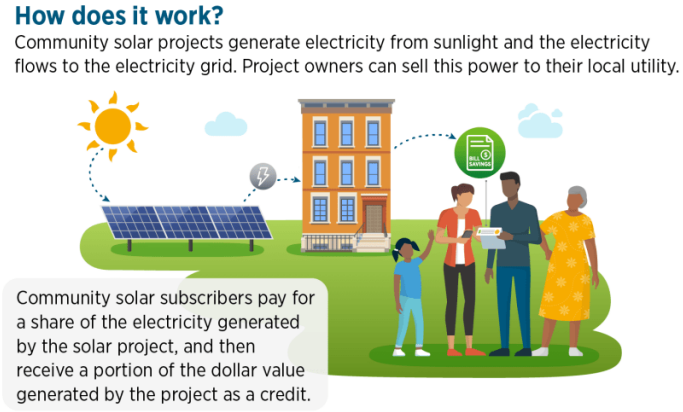
Start planning for full conversion to solar, battery, and other onsite alternatives to natural gas for resilient and reliable energy

SBU continues to assume that fossil-fueled electric current as well as steam from Cogen will serve as mainstays of on-campus energy production until 2050.

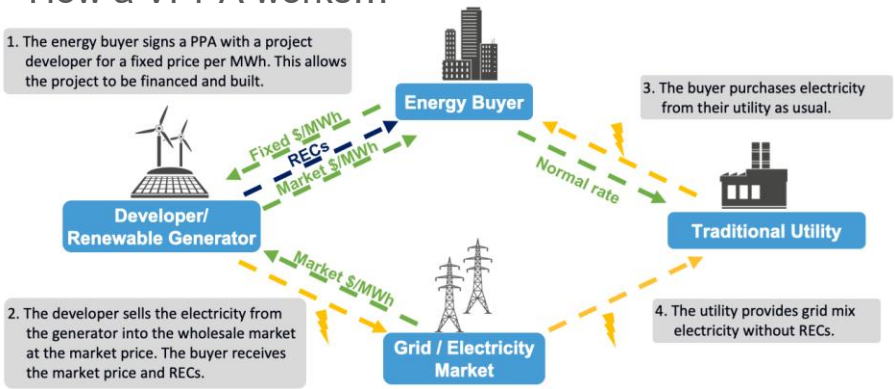
But any plan for getting us to zero- emissions electricity needs to envision some way for getting the campus's actual electricity usage to that point.

Off-Campus

- Seek more alternatives for off-site clean energy supply (Rec. # 2)
  - Current plans rely on
    - Virtual Power Purchase Agreements
    - Purchase of Clean Energy Credits (CECs) to offset our continuing fossil fuel burning at the Cogen plant.
      - But much uncertainty about price and availability



How a VPPA works…



- Consider “community solar” and other models
- Also the LIPA/PSEG alternative, of progressively buying more from them and relying on their transition to clean

Who’s Going to Pay?

Currently, investments in clean energy

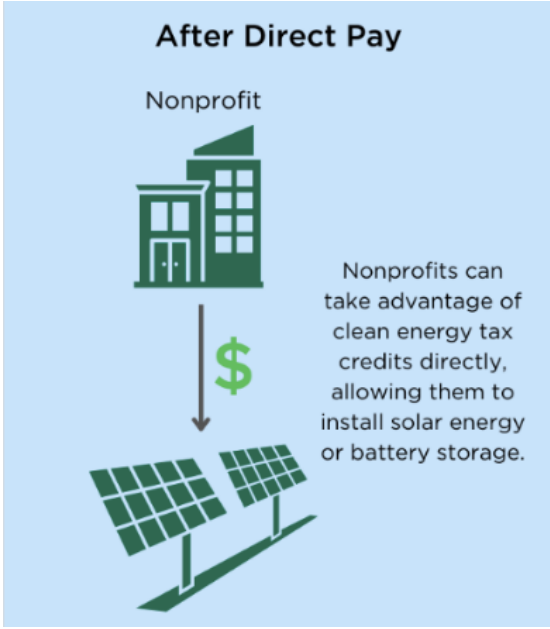
- Rely on operating funds of Sustainability, Transportation, etc.; separate mid-level office budgets
- When financing through NYPA, require <7 year payback– an overly truncated time-frame

How about a whole-university, longer-term budgeting approach?

Other capital funding opportunities <u>are</u> out there

- New York State
- 2022 Federal Inflation Reduction Act (IRA):
  - programs now allow for 30% reduction in costs for tax-exempt organizations

We need to pursue these aggressively…with a vigor akin to SBU’s campaign to be selected for Governor’s Island.



Available via IRA: “Direct Pay”

Who's Going to Do All This?

- Addressing administrative constraints and complacency(?) (Rec. #5)
  - A dearth of personnel:
    - of 101 positions in dept. covering utilities and power plants, only 3 tasked to energy management and sustainability.
    - We need to keep the trains running, but we also need to plan the railroad of the future - *and at >$1M per week just for electricity, even modest savings more than offset personnel cost.*

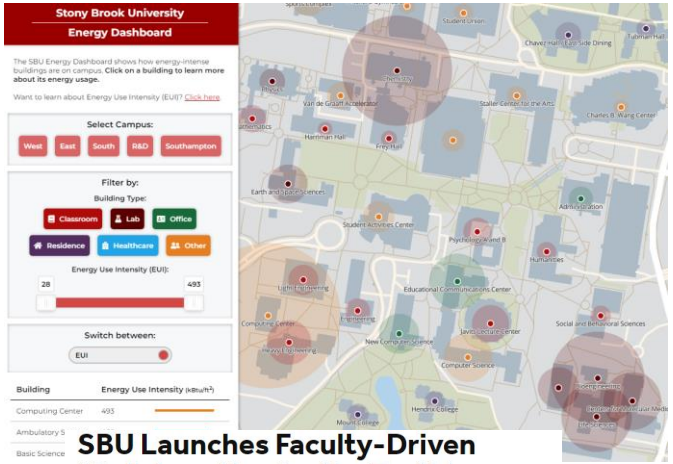
Sustainability has done well with the resources it has, but…

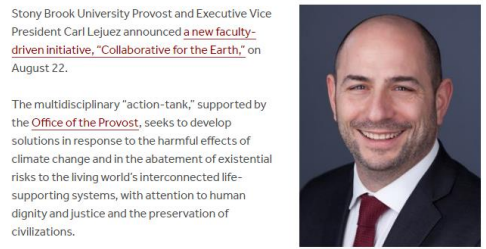
Greater focus, priority, and investment is needed by senior administration if the University is to meet legislative, executive, and our own programmatic goals.

Toward a Campus-Wide Effort..

- Bottom-up initiatives to keep improving building and energy efficiency (Rec. #7)
  - Building on Office of Sustainability's innovative tracker of buildings' energy usage
  - Incentivizing students, faculty and staff, to consume less energy

- Involving more of the campus in Stony Brook's efforts to wean itself from fossil fuels (Rec. #9)
  - Mobilizing faculty expertise
  - Decentralizing our transition efforts, engaging the student body as well as staff and faculty, encouraging **their** innovations
    - from energy audits to storage experiments to collaborations in clean energy deployment





SBU Launches Faculty-Driven 'Collaborative for the Earth'

August 23, 2023 · 2 min read

Stony Brook University Provost and Executive Vice President Carl Lejuez announced a new faculty-driven initiative, "Collaborative for the Earth," on August 22.

The multidisciplinary "action-tank," supported by the Office of the Provost, seeks to develop solutions in response to the harmful effects of climate change and in the abatement of existential risks to the living world's interconnected life-supporting systems, with attention to human dignity and justice and the preservation of civilizations.

TEACHING BY EXAMPLE

Climate change is an existential crisis challenging the survival of our civilization - if not our species. But we need to "**act locally**" as well as "think globally"…

Demonstrating best practices and setting aspirational goals right here on our campus provides experiential learning to our students and helps validate their educational, career, and life choices.

THANKS TO

University Senate President Richard Larson The University Senate Executive Committee.

Terence Harrigan, Associate Vice President of Campus Operations and Maintenance.

Ralph Tortora, Assistant Director of Utilities.

Tom Lanzilotta, Campus Sustainability and Energy Manager.

AND

The members and friends of the University Senate Environment Committee for their continuing dedication and service to the committee and our University.

University Senate Environment Committee Energy Working Group

Christopher Sellers, Working Group Coordinator

Daniel Amarante Malcolm Bowman Giacinto Piacquadio Tom Wilson

THANK YOU!

QUESTIONS?