

Launching the SUNY Green Building Experiential Learning Collaborative: First Year Update (2018-19)



Dr. Paul Crovella, Co-PI
Forest and Natural Resources
Management
plcrovella@esf.edu



Mark Bremer, PI
College of Arts & Sciences
mark.bremer@sunypoly.edu



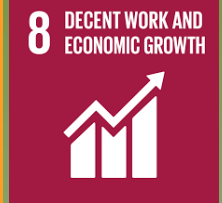
sunypoly.edu/gbelc

Rachel Kornhauser, Co-PI
Office of Sustainability
rachel.kornhauser@oneonta.edu



Overview

- Project objectives
- Why it matters
- Executing the plan
- Advanced preparation
- Course development
- Course delivery
- Progress toward objectives
- Student feedback



Project Objectives

Make campuses into living laboratories

- Teach new experiential learning courses in which students certify existing campus green buildings

Develop NYS Workforce

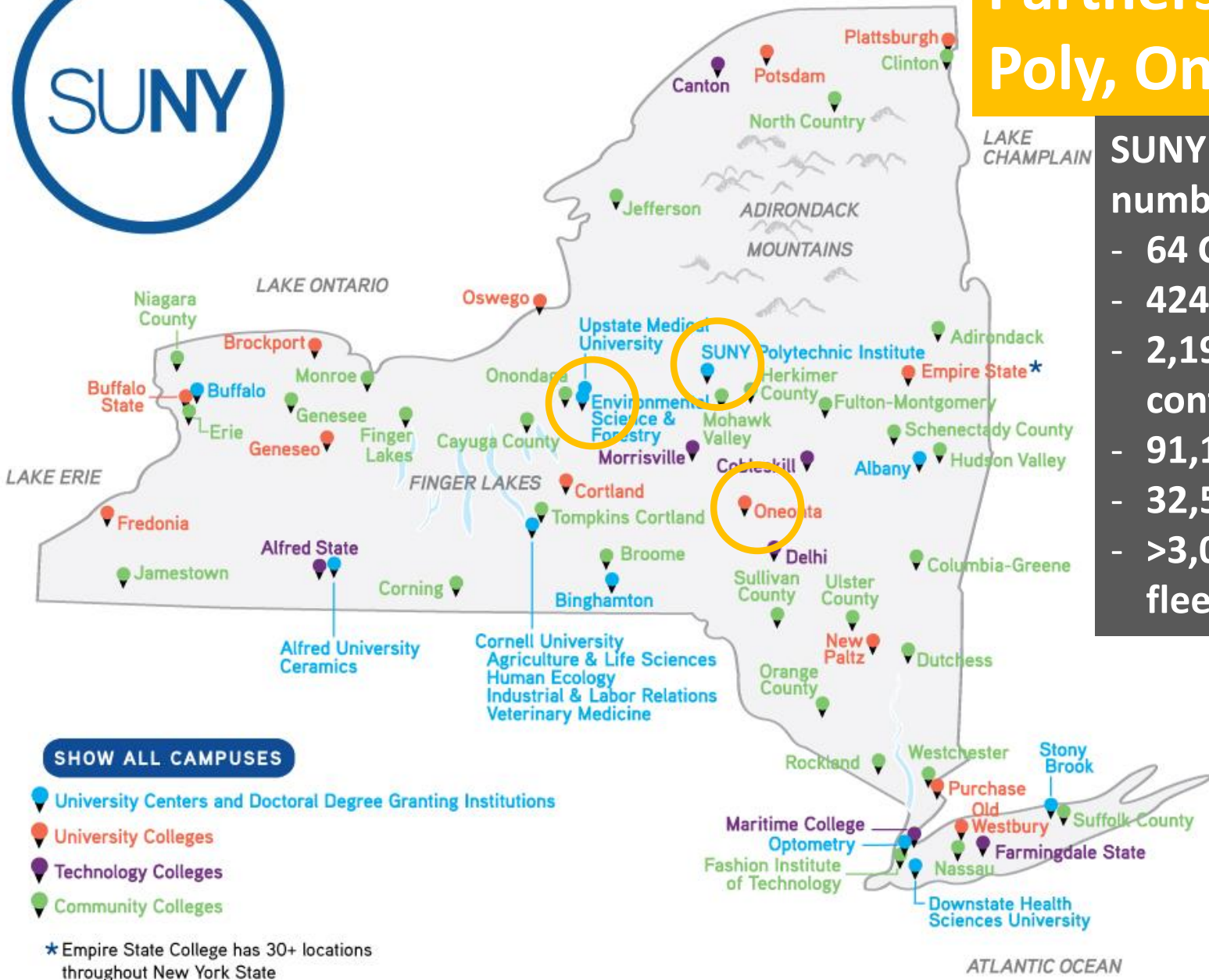
- Students earn personal industry credentials (LEED GA)
- Develop capacity of faculty & staff accreditations (LEED AP)

Scale capabilities across SUNY

- Share expertise and best-practices with other campuses
- Increase in-house capacity for measuring air quality and real-time performance sensing



Partners: ESF, Poly, Oneonta



- SUNY by the numbers**
- 64 Campuses
 - 424,051 students
 - 2,195,000 continuing ed.
 - 91,180 staff
 - 32,500 faculty
 - >3,000 Vehicle fleet

SHOW ALL CAMPUSES

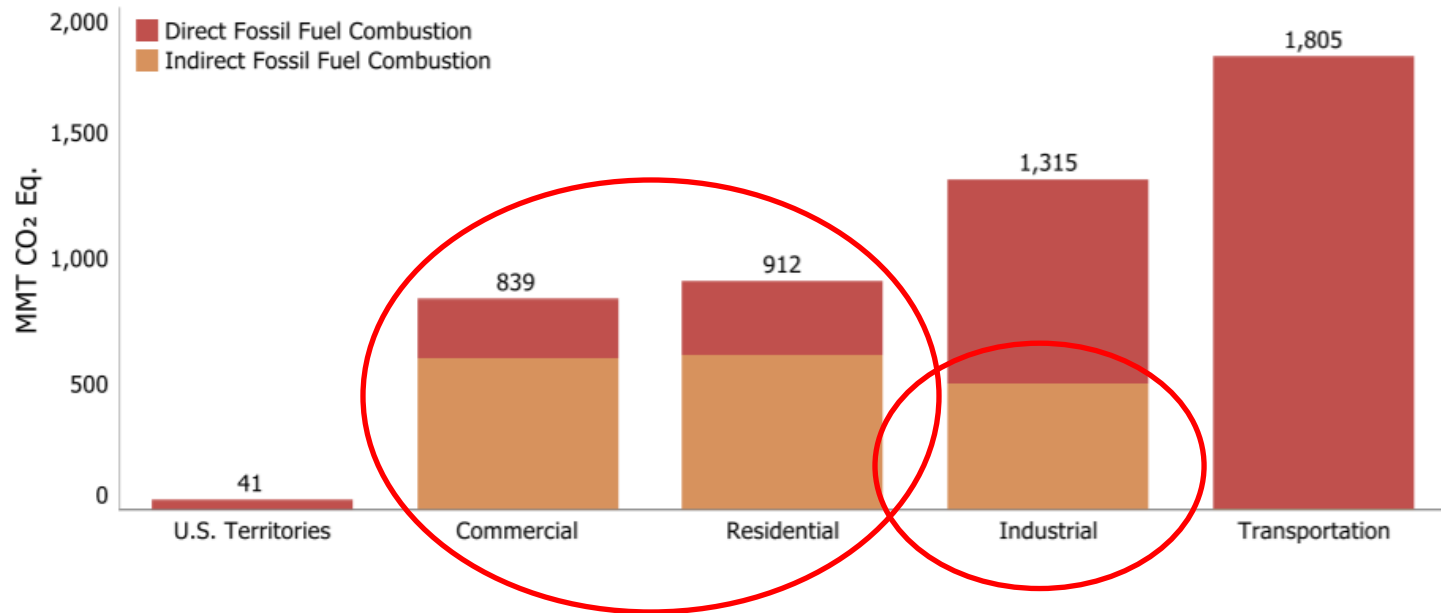
- University Centers and Doctoral Degree Granting Institutions
- University Colleges
- Technology Colleges
- Community Colleges

* Empire State College has 30+ locations throughout New York State

Why it matters

- NYS Reforming the Energy Vision
- SUNY Clean Energy Road Map
- Workforce development
- Experiential learning opportunities
- Building occupant health and well-being
- Environmental impact of buildings

Figure ES-7: 2017 End-Use Sector Emissions of CO₂ from Fossil Fuel Combustion (MMT CO₂ Eq.)



United States Environmental Protection Agency. "Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990-2017." Annual Report EPA 430-R-19-001. Apr. 2019, p.94.



LEED
v4

LEED v4 SYSTEM GOALS



Reduce contribution to **global climate change**



Enhance individual **human health**



Protect and restore **water resources**



Protect and enhance **biodiversity and ecosystem services**



Promote **sustainable and regenerative** material cycles



Build a **green economy**



Enhance **community quality of life**



CERTIFIED
40-49 points



SILVER
50-59 points



GOLD
60-79 points



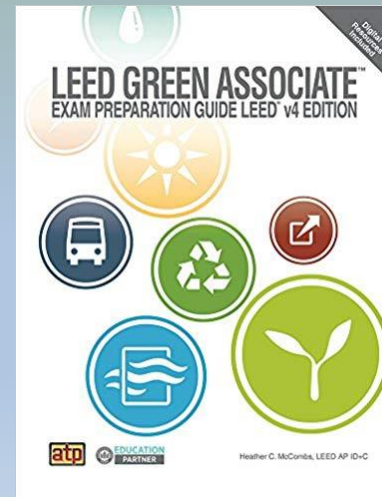
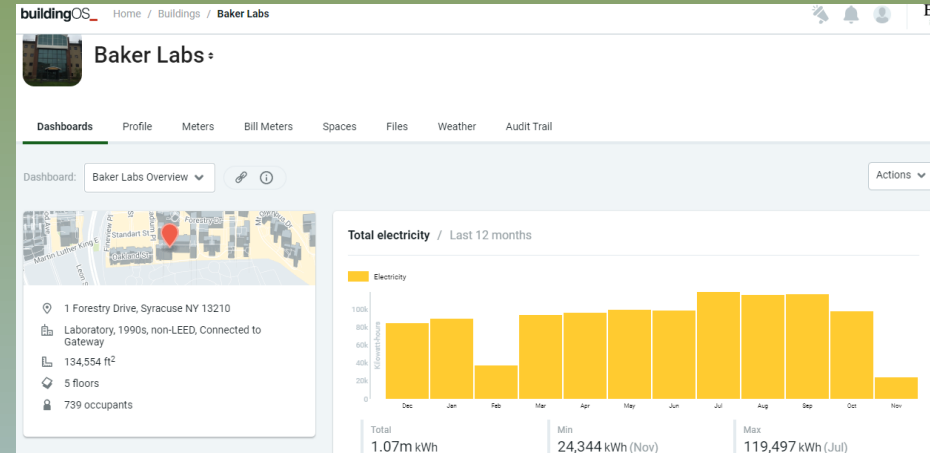
PLATINUM
80+ points

Executing the plan

- Define objectives:
 - Green building knowledge
 - Credential – LEED Green Associate
 - Experiential – Project documentation
- Benefits
 - Memorable student experience and industry recognizable skills
 - Recognition for campus efforts
 - Partnerships to share educational load
- Challenges
 - Organizational structure of institution (e.g. policy implementation)
 - Organizational structure of USGBC
 - Student's working on projects need guidance in:
 - Communication with teammates and with professionals
 - Project management skills vs. typical linear educational assignments

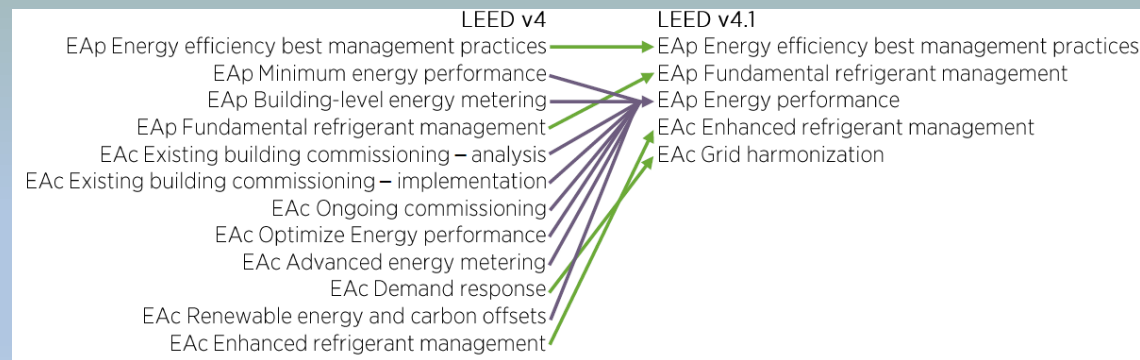
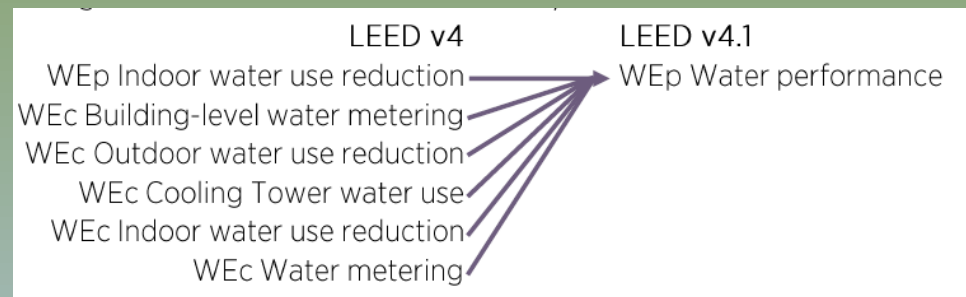
Advanced Preparation

- Arrange for access to Campus information
 - Meet with physical plant staff to discuss their collaboration
 - Students will need access to project documents (plans, and specifications if available)
 - Students will need access to energy/water use data (historical and current)
- Arrange for access to USGBC materials
 - Study bundles, exam registration
 - LEED Online
 - ARC platform
 - LEED Reference Guide



Course Development

- Select LEED O+M version
- Course materials shared from “LEED Lab”
- Determine performance period
- Select collaboration platform
- Create groups
- Outline experiential assignments



LOCATION AND TRANSPORTATION 14

Prerequisite	Transportation Performance	14
--------------	----------------------------	----

SUSTAINABLE SITES 4

Credit	Rainwater Management	1
--------	----------------------	---

Credit	Heat Island Reduction	1
--------	-----------------------	---

Credit	Light Pollution Reduction	1
--------	---------------------------	---

Credit	Site Management	1
--------	-----------------	---

WATER EFFICIENCY 15

Prerequisite	Water Performance	15
--------------	-------------------	----

ENERGY AND ATMOSPHERE 35

Prerequisite	Energy Efficiency Best Management Practices	Required
--------------	---	----------

Prerequisite	Fundamental Refrigerant Management	Required
--------------	------------------------------------	----------

Prerequisite	Energy Performance	33
--------------	--------------------	----

Credit	Enhanced Refrigerant Management	1
--------	---------------------------------	---

Credit	Grid Harmonization	1
--------	--------------------	---

MATERIALS AND RESOURCES 9

Prerequisite	Purchasing Policy	Required
--------------	-------------------	----------

Prerequisite	Facility Maintenance and Renovations Policy	Required
--------------	---	----------

Prerequisite	Waste Performance	8
--------------	-------------------	---

Credit	Purchasing	1
--------	------------	---

INDOOR ENVIRONMENTAL QUALITY 22

Prerequisite	Minimum Indoor Air Quality	Required
--------------	----------------------------	----------

Prerequisite	Environmental Tobacco Smoke Control	Required
--------------	-------------------------------------	----------

Prerequisite	Green Cleaning Policy	Required
--------------	-----------------------	----------

Prerequisite	Indoor Environmental Quality Performance	20
--------------	--	----

Credit	Green Cleaning	1
--------	----------------	---

Credit	Integrated Pest Management	1
--------	----------------------------	---

INNOVATION 1

Credit	Innovation	1
--------	------------	---

TOTAL 100 Possible Points



LOCATION AND TRANSPORTATION		14
-----------------------------	--	----

Prerequisite	Transportation Performance	14
--------------	----------------------------	----

SUSTAINABLE SITES		4
-------------------	--	---

Credit	Rainwater Management	1
Credit	Heat Island Reduction	1
Credit	Light Pollution Reduction	1
Credit	Site Management	1

WATER EFFICIENCY		15
------------------	--	----

Prerequisite	Water Performance	15
--------------	-------------------	----

ENERGY AND ATMOSPHERE		35
-----------------------	--	----

Prerequisite	Energy Efficiency Best Management Practices	Required
Prerequisite	Fundamental Refrigerant Management	Required
Prerequisite	Energy Performance	33
Credit	Enhanced Refrigerant Management	1
Credit	Grid Harmonization	1

MATERIALS AND RESOURCES		9
-------------------------	--	---

Prerequisite	Purchasing Policy	Required
Prerequisite	Facility Maintenance and Renovations Policy	Required
Prerequisite	Waste Performance	8
Credit	Purchasing	1

INDOOR ENVIRONMENTAL QUALITY		22
------------------------------	--	----

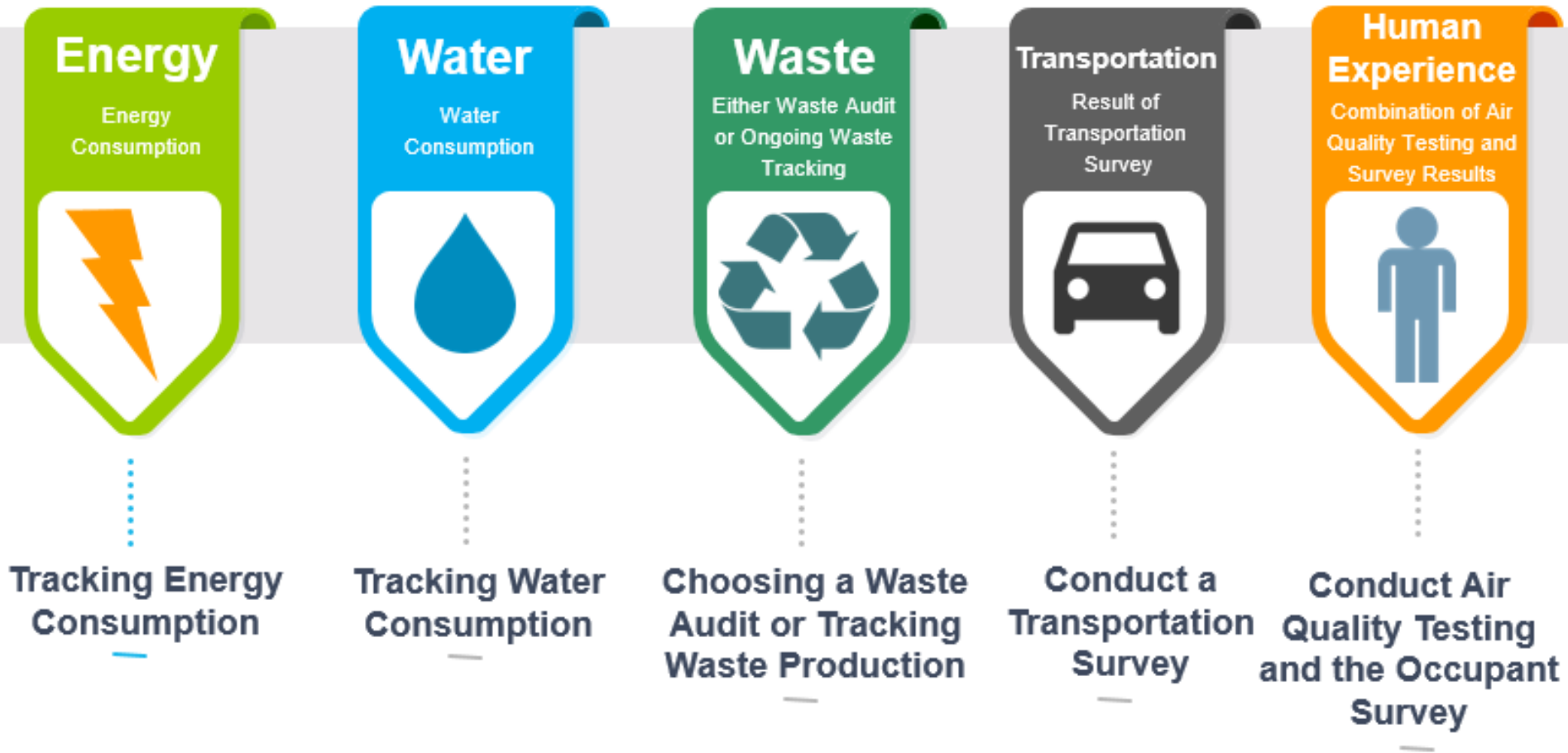
Prerequisite	Minimum Indoor Air Quality	Required
Prerequisite	Environmental Tobacco Smoke Control	Required
Prerequisite	Green Cleaning Policy	Required
Prerequisite	Indoor Environmental Quality Performance	20
Credit	Green Cleaning	1
Credit	Integrated Pest Management	1

INNOVATION		1
------------	--	---

Credit	Innovation	1
--------	------------	---

TOTAL		100 Possible Points
-------	--	---------------------

Performance Pathway → v4.1



Course Development

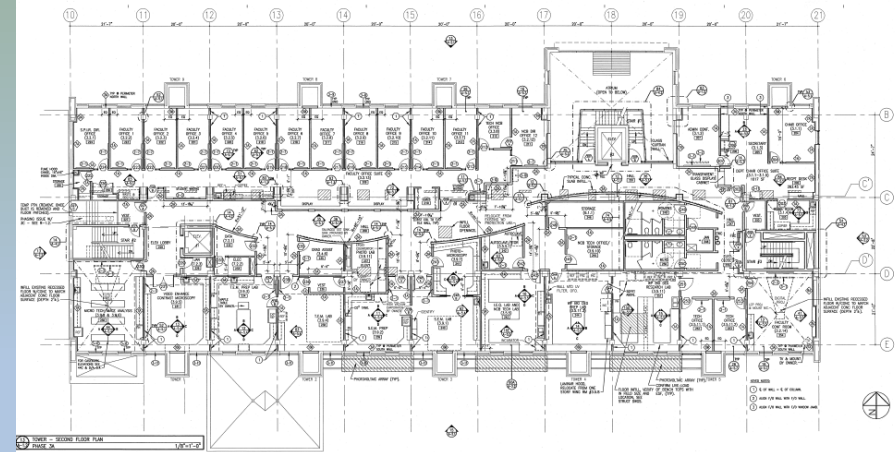
- Followed existing USGBC LEED Lab model
- Engaged stakeholders for staff and faculty support
- Different approaches
- **ESF** – CME 496 experimental course, allowed as option for degree program requirement, co-taught
- **Poly** – CE/ME 448 & IDS 251 formally approved by campus curriculum committee as electives, co-taught
- **Oneonta** – courses under development for online delivery, hired new full-time visiting faculty



State University of New York
College of Environmental Science and Forestry

Course Delivery

- Orientation to the course and to the building –
- Delivery - Two times a week, 1 Lecture, 1 quiz/work/presentation session
- Topics covered in lecture will not necessarily align with work students will be doing for documentation
- Quizzes simulated LEED GA questions
- Students presented to classmates on progress, challenges



Weekly quiz	25%
Score on LEED GA	25%
Class Project/Participation – Instructor evaluation	25%
Class Project/Participation – Team members	25%



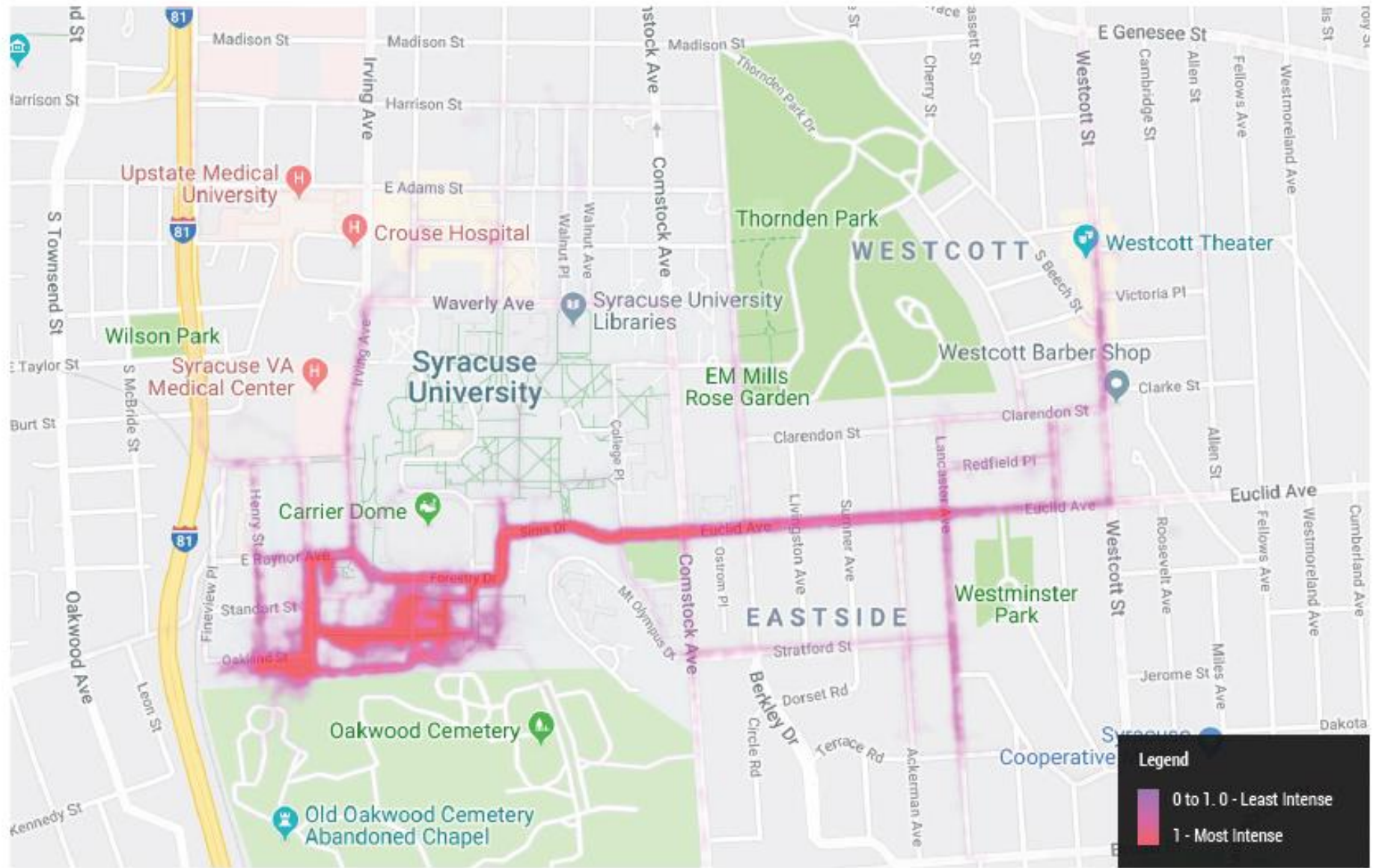
B-LINE
ANALYTICS

Generates better,
cheaper

mobility data in *real time*



Map 1: All Modes of Transportation

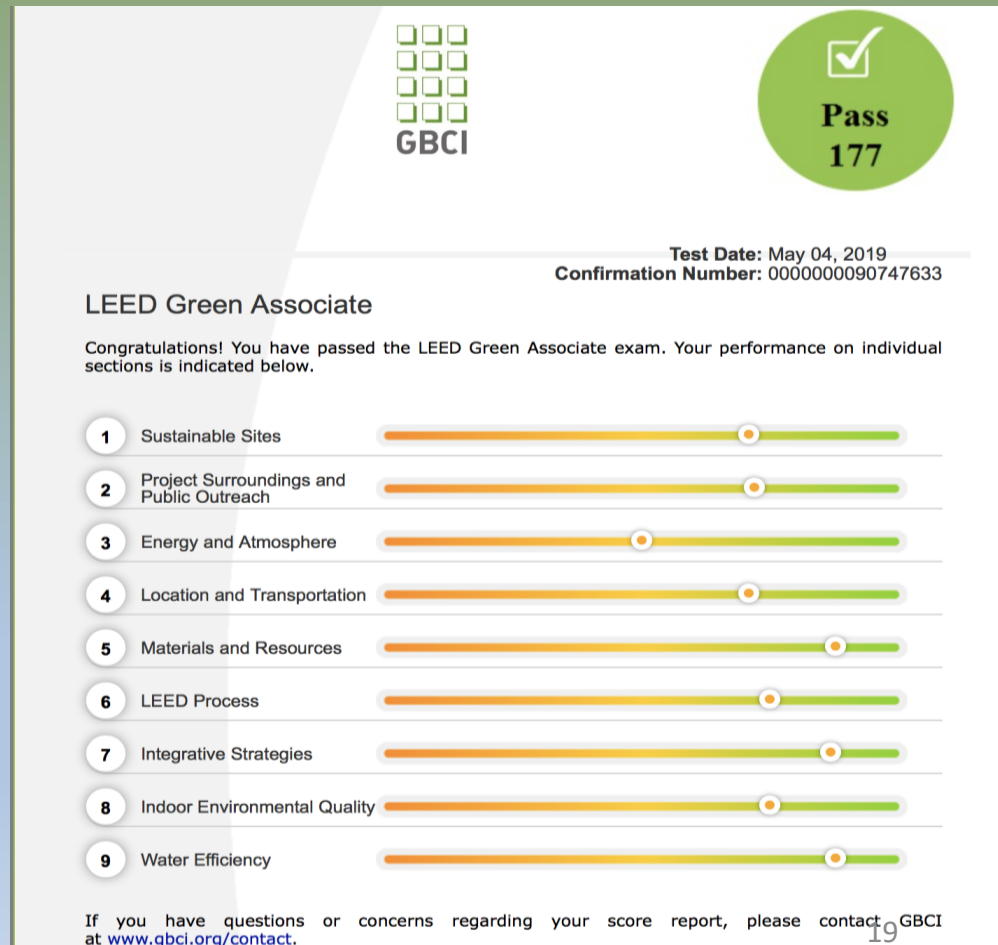




State University of New York
College of Environmental Science and Forestry

Results and Student Feedback

- Key challenges:
 - Prerequisites
 - Policies
 - Project Management skills
- Student Performance
 - 23 (25) out of 35 passed LEED GA
 - 1 out of 2 passed LEED AP (O+M)
- Feedback:
 - Course Organization
 - Group work
 - O+M vs. BD+C





State University of New York
College of Environmental Science and Forestry

Jobs and Internships

Kayla Conway	I have a fellowship for the summer and a full-time job afterwards related to sustainability. Taking the LEED GA class was helpful for me in getting my long term job , as it relates to sustainability consulting. Post landfill action network. Zero waste campus strategist.
Emily Kleiner	SU center for sustainable Community Solutions
Justin Miroff	I am currently working at a company called Aesthetic Green Power where I am manufacturing solar tiles
Adam Ludwicki	Solar Advocate Apollo Energy
Jordan Randall	Empower Energies. They are a solar developer and I am currently hired as a sales analyst. LEED is the reason I was picked to go to BOMA (Building Owners and Managers Association International) in Salt Lake City on June 22nd and represent my company
Ryan Smith	Intern at Alfandre Architecture - yes
Pat Whitford	Intern for PIF project at SUNY Poly
Andrew Spring	Army National Guard - Lake Ontario Shoreline erosion and flood control
Corrin Collins	Penn State internship - research to reverse climate change based on the Drawdown plan
Jack Zalewski	Job possibility - ICF as and Energy Efficiency Analyst- attracted by the LEED GA accreditation
Joe Maioli	Energy Engineer for Pathfinder Engineers and Architects - I do! I just got a job as an Energy Engineer for Pathfinder Engineers and Architects doing energy modeling for high performance, green, and LEED buildings. They're actually also doing work with the Marshall renovation, you may know some of them. Literally using everything I've learned in class
John Enoch	. I have an internship this summer at Healthy Homes, Shenorock, NY. We are an energy auditing/retrofit company serving residential homes in Westchester County. A lot of what we do is insulation installation, air sealing, and heat pump installations. I am learning a lot of practical energy auditing techniques and real-world business applications that relate to LEED.



CE 448/ ME 448 Green Building Strategies

Fall
2019

EXISTING
BUILDINGS
OPERATIONS
AND
MAINTENANCE



LEED v4.1





CE 448/ ME 448 Green Building Strategies

Fall
2019

EXISTING
BUILDINGS
OPERATIONS AND
MAINTENANCE



LEED v4.1



20

LEED
GREEN
ASSOCIATE

1+?

LEED
AP

2+?

0+M





Performance Pathway → v4.1

The screenshot displays the Performance Pathway v4.1 interface. On the left is a dark sidebar with the 'arc' logo and a menu containing 'Projects', 'All', 'My Cities', 'My Communities', 'Buildings', 'SUNY Poly Wildcat Field House', 'Credits/Actions', 'Data Input', 'Review', 'Score', 'Analytics', and 'Manage'. The main content area is titled 'Data Input' and features a search bar at the top right with the user name 'Mark Bremer'. Below the title is a list of meters and surveys for the 'SUNY Poly Wildcat Field House' project, with a progress indicator of '0 / 100'. The list includes categories like Energy (0/33), Water (0/15), Waste (0/8), Transportation (0/14), and Human Experience (0/20). The 'Transportation Survey' is highlighted in grey and circled in red. To the right of the list is a 'Building Settings' section and a 'Survey Responses' section. The 'Survey Responses' section shows a progress bar at 0% and a warning message: 'Missing Information/Unsaved Changes' with the text 'Survey contributes to total score when at least 25.00% of occupants have taken survey' and 'Occupancy is required to calculate the performance score'. Below this is a 'Monthly Survey Responses' chart with a y-axis labeled 'Individual Responses' ranging from 0 to 10.

arc

Projects

All

My Cities

My Communities

Buildings

SUNY Poly Wildcat Field House

Credits/Actions

Data Input

Review

Score

Analytics

Manage

Search

Mark Bremer

Data Input

Meters & Surveys 0 / 100

SUNY Poly Wildcat Field House

Building Settings

- Energy 0 / 33
- Water 0 / 15
- Waste 0 / 8
- Transportation 0 / 14
- Human Experience 0 / 20

TRANSPORTATION
Transportation Survey

Survey Responses

Survey Tools and Resources

% OF PEOPLE RESPONDED 0 %

For your project, a response rate of 25.00% will generate a score.

Missing Information/Unsaved Changes

Survey contributes to total score when at least 25.00% of occupants have taken survey

Occupancy is required to calculate the performance score

Monthly Survey Responses

Individual Responses

10

8

6

4

2


0

Performance Pathway → v4.1



SUNY Poly Wildcat Field House, 100 Seymour Rd SUNY Polytechnic Institute

Language: English 

1. On a typical day, how do you get to and from this building?
Enter results for "one day, one way" 

Route 1

Select Travel Method 

+ Add Another Route

2. Use the slider to indicate how satisfied you are with the environment in this building

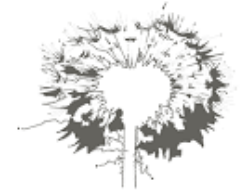
Neither satisfied nor unsatisfied





IDS 251 Principles of Green Buildings

Spring
2020



INTERNATIONAL
LIVING FUTURE
INSTITUTE™



CARBON
CERTIFICATION



Hilltop Residence Hall
(anticipated occupancy Fall 2020)

Back to the drawing board...

Original plan:

- Hiring a FT professor to teach for 2 years
- Develop courses and a Sustainable Design certificate within Dept of Geog & ENVS
- Purchase several energy dashboards for campus use
- Train a group of faculty/staff to help with building certification projects and with data collection

New plan:

- Hire a FT professor to build online courses 1 year, teach online courses 1 year
- Develop online courses with no certificate or badge within Dept of Geog & ENVS
- Still exploring energy dashboards
- Trained 9 faculty/staff and all have passed LEED GA

Deep Energy Retrofit



**Huntington Residence Hall
(anticipated occupancy Fall 2020)**

Developing New Courses (2019-20) For Online Delivery (2020-21)

- Sustainable Building Design (Intro)

- Green Design and Construction



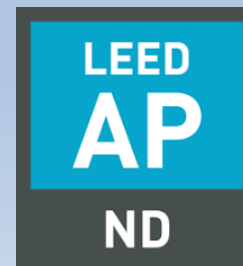
- Net Zero Building Design



or



- Sustainable Neighborhood Design



Green Building Experiential Learning Collaborative

Course Lessons

- Experimental/special topics course
- Curriculum committee course action (6+ months)
- Coordination with facilities staff and building occupants for measurement activities involving students
- IRB exemption application for survey
- Counting visitors for weighted occupancy calculation
- Cost per student \$220 (education materials + LEED GA exam fee)
- Building registration fee \$1200
- Building certification fee \$0.38/sf

Green Building Experiential Learning Collaborative

Admin Lessons

- Good communication among stakeholders
 - Copy relevant staff on communications
- Shared google doc for related emails, calls, and meeting minutes
- Adequate time for project coordination, course release and compensation
- Meet with staff early in the planning stages to review requirements
- Cost for staff accreditation \$600 (education materials + LEED AP exam fee)
- Compensate staff for their time

Green Building Experiential Learning Collaborative

→ Share & Scale-up

- Lead with pilot projects at partner campuses
- Build course and certification project templates
- Share templates and best-practices with other campuses
- Develop a SUNY inter-campus Sustainable Buildings minor or micro-credential
- Develop indoor air quality testing and teaching lab
- Enhance real-time building performance monitoring capacities



Acknowledgements

- SUNY Performance Improvement Fund



- [Dr. Zhanjie Li](#), Assistant Professor, Civil Engineering
- Aaron LaFave, Energy Manager
- Kaila Aimino, Assistant Director of Residential Programming
- Eric Hotchkiss, Associate Director of Residential Housing
- Alvito DiStefano, Summer Intern



- Alex Poisson, PhD Candidate & Energy Coordinator
- Josh Arnold, Director of Energy Management & Utilities
- Patrick Whitford, Undergraduate Student



- [Dr. Farzaneh Soflaei](#), Visiting Assistant Professor, Geography and Environmental Sustainability
- Tracy Allen, Interim Dean, School of Sciences

Questions?



Dr. Paul Crovella, Co-PI
Forest and Natural Resources
Management
plcrovella@esf.edu



Mark Bremer, PI
College of Arts & Sciences
mark.bremer@sunypoly.edu



sunypoly.edu/gbelc

Rachel Kornhauser, Co-PI
Office of Sustainability
rachel.kornhauser@oneonta.edu

