

The Business Council & NYSERDA Webinar Series:

Workforce Development and Training

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NYSERDA

March 28, 2019

What is a Clean Energy Job?

All employees from **qualifying clean energy firms** that spend **any portion** of their time supporting **clean energy products and services**

Job Growth: New York's clean energy economy continues to see stronger job growth than the State's economy overall

- > Clean energy employment **grew by 3.9% from 2016 to 2017**
- > Overall NY employment grew 1.7% in that time

Clean Energy Jobs Landscape

New York's nation leading policies are fueling job growth

nearly
152k clean energy jobs
across New York State at the end of 2017



3.9% growth of clean energy jobs in 2017
double the statewide average

CLEAN ENERGY EMPLOYMENT BY TECHNOLOGY
(number of jobs, December 2017)

117,000
Energy Efficiency

22,000
Renewable Electric Power Generation

2,500
Renewable Fuels

1,500
Grid Modernization and Storage

7,800
Alternative Transportation

Clean Energy Jobs Landscape

Employers see plenty of applicants, but often **not with desired qualifications**

The occupations employers find **hardest to hire** for are:

- > Technicians
- > Sales, marketing, and customer service staff
- > Engineers

Reasons for Hiring Difficulty Reported by Employers



Workforce Programs Informed by Industry Input

Common themes across companies

- Lack of qualified candidates for open positions
- Significant skills gaps between what businesses are looking for and what workers have been traditionally trained to do
- Training equipment is not being updated and limited opportunities for hands-on training
- Large number of skilled workers expected to retire, creating shortage of workers with the relevant skills and experience
- Startups have limited resources and face difficulty hiring new workers

Benefit From Workforce Development

- **Increase profitability** through improved productivity and reduced downtime
- **Reduce soft costs**, leading to lower costs for clean energy consumers
- **Drive workforce retention** by investing in employee development
- **Extend life span of equipment** by training employees on efficient operations
- **Reduce time** needed to hire and train new workers
- **Contribute to a cleaner environment** by reducing your carbon footprint

When to Consider Workforce Development and Training

Making this investment may be good for your business if you are:

- Looking to advance the skills of your employees
- Expanding your business' clean energy services
- Identifying ways to increase profitability and lower costs
- Trying to make your building more efficient, safer, and comfortable
- Investing in new equipment, systems, and technologies
- Interested in reducing your carbon footprint and building sustainable business practices
- Trying to obtain or improve a green building certification

Workforce Funding and Impacts

Nearly \$70 million investment (2017-2025)

Training Goals:

- > 18,800 trained
- > 2,000 new hires through on-the-job training incentives
- > 3,200 student internships, work co-ops, etc.
- > 200 trainers trained
- > Private investment of \$66 million

Workforce Funding Opportunities

Energy Efficiency & Clean Technology Training - *(PON 3981; \$7 million)*

Supports organizations providing training and experience to workers in clean energy businesses

Energy Efficiency & Clean Technology On-the-Job Training - *(PON 3982; \$10 million)*

Provides incentives to eligible energy efficiency and clean technology businesses throughout the supply chain to hire and provider on-the-job training

Clean Energy Internship Program - *(PON 4000; \$10.5 million)*

Helps prepare the next generation of clean energy workers through internships – open to both prospective interns and the businesses that will employ them

Workforce Funding Opportunities

Coming soon:

Building Operations and Maintenance - *(PON 3715; \$10.0 million)*

Supports curriculum development, career path training, apprenticeships, internships, training trainers, and coaching/mentorships to ultimately help reduce energy costs and carbon emissions

Energy Efficiency & Clean Technology Training

(PON 3981)

\$7 million available

Projects funded intended to develop and deliver training, provide hands-on experience and job placement assistance to ensure new and existing clean energy workers have skills businesses need

Training activities eligible for funding include:

- > developing, modifying, or implementing curriculum
- > delivering training (on-line, classroom, on-site, etc.)
- > equipment purchase for hands-on training
- > hiring and training trainers
- > marketing
- > internships
- > job placement services
- > pre-apprenticeships and apprenticeships

Proposers can include unions, colleges and universities, manufacturers, distributors, trade associations, community-based organizations, technical high schools, training and job placement intermediaries, etc.

Maximum proposal \$250,000, 30% cost share required

Proposals Due*: May 23, 2019; August 6, 2019; October 22, 2019; January 23, 2020

* Due dates after May 2019 are dependent upon funding availability as determined by demand.

Energy Efficiency & Clean Technology On-the-Job Training

(PON 3982)

\$10 million available

Funding to hire and provide on-the-job training (OJT) for workers for energy efficiency and clean technology jobs in these areas:

- > high efficiency heating, ventilation, and air conditioning (HVAC)
- > renewable heating and cooling
- > high efficiency water heating
- > insulation and air sealing
- > high efficiency lighting and controls
- > building automation and controls
- > smart grid
- > energy storage; and related areas

Businesses with 100 employees or less, NYSERDA will pay 50% of new employee's hourly wage for 16 weeks. And 50% of the wage for 24 weeks if the worker is from a priority* population

Businesses with over 100 employees, NYSERDA will only pay incentives for new employees from priority populations – 50% for of hourly wage for 24 weeks

The maximum OJT award amount for a business is \$100,000

* Priority Populations include veterans, disabled workers, low-income individuals, formerly incarcerated, Native Americans, dislocated power plant workers, and 18-24 year-old trainees in energy related job preparation programs.

Clean Energy Internship Program

(PON 4000)

**\$10.5 million available
over next six years
approximately
\$1.75 million reserved
annually through 2024**

Enhances talent pipeline for energy efficiency and clean technology businesses by reimbursing employers who offer paid internship opportunities to college students or 18- to 24-year-olds that have completed or are enrolled in technical high schools, energy training, or certificate programs

NYSERDA will reimburse interns' salaries based on business size:

- > **20 or fewer employees**, reimbursement of 90% of intern wages
- > **21 to 100 employees**, reimbursement of 75% of intern wages
- > **100 or more employees**, reimbursement of 50% of intern wages

Maximum of 12 weeks: fall or spring - maximum 18 hours per week;
summer - maximum 40 hours per week

Maximum of five interns per session

Maximum of 12 interns over the course of the program

Reimbursed intern wages can range from minimum wage, up to \$2 above minimum wage

Building Operations and Maintenance

(PON 3715)

\$10.5 million available

Opening Again Soon

Improving the skills of employees can significantly improve building efficiency and reduce operating costs

Proposals must be for buildings or groups of buildings, including partnerships between businesses with common training needs – with annual expenditures of \$1 million or more

NYSERDA will share up to 50% of the cost of eligible projects, with a cap of \$400,000 per application

Funding is available to help employers and building owners develop training projects that create the educational strategy, on-site training framework, and tools needed to advance the skills of building O&M workers and prepare new workers beyond conventional classroom training

Building O&M Partners

Here are some examples of training providers, building owners and facility management companies developing and implementing building O&M staff training projects

ES Energy, LLC
Memorial Sloan Kettering
Cancer Center
Ridgewood Bushwick
Senior Citizens Council
NYS School Facilities
Association
Rensselaer Polytechnic
Institute (RPI)
SUNY Brockport
Related Management
NYU Medical Center
Montefiore
The Cooper Union
Housing Works
Realty Operations Group

32BJ Training Fund
Urban Green Council
Weill Cornell Medical College
SUNY School of Environmental
Science and Forestry (ESF)
Association of Energy Affordability (AEA)
Interstate Renewable Energy Council (IREC)
Steven Winters Associates, Inc.
Dunn Development Corporation
Douglas Elliman
Property Management
New York University
Robert E. Hill, Inc
A&E Real Estate
The Feil Organization
Smith Engineering

Thank you



Adele Ferranti, NYSERDA

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Radiant Store

Specializes in renewable energy

- BPI Gold Star Contractor
- Provides businesses and homeowners with cost-efficient, carbon-neutral solutions for their energy needs.
- **Participated in NYSERDA's On-the-Job training (OJT) program**
 - > Hired seven people in two OJT programs over the past 5 years
 - > New hires have been in the trades: plumbing, heating, solar energy



OJT - Benefits for Employers

- Subsidized wages
- Customized training for your specific business needs
- Used as a tool to attract new hire candidates
- **The OJT process is easy**
 - > The Department of Labor facilitates the paperwork and usually comes to your place of business for signatures once the paperwork is completed
 - > NYSERDA reimburses the employer very quickly

OJT - Benefits for Employees

- Customized to meet the needs of the organization and the employees
- Allows for input from the OJT candidate
 - > A skills assessment takes place to identify areas that need attention from a training perspective. The skills assessment is an integral first step in the OJT process and facilitates good communication about the candidates' current skill levels.
 - > Feedback throughout the process to adjust and make course corrections through the Department of Labor survey process.
- Retention of OJT trained employees is high

Thank you



Terrence M. Moag/CEO

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Radiant Store Inc.

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Zerothllc.com

The radiantstore.com

Cooper Union Facilities Training and Curriculum Development



Project Goals

- Reduce energy use and carbon emissions
- Reduce operating costs by building the O&M skills of facilities staff
- Provide faculty and students opportunities to gain industry-relevant expertise by working alongside building energy professionals
- Build culture of continuous improvement and building recommissioning helping Cooper achieve its 40 x 30 carbon intensity reduction goal



41 Cooper Square



- LEED-Platinum-certified academic building
- Central atrium with recirculation
- Radiant heating/cooling ceiling panels and floors
- Six AHUs, some dedicated 100% OA units, some with enthalpy-based economizers
- Laboratory VAV fume hoods and several zone damper actuator applications and sequences
- Occupancy and CO₂ sensors
- Two 500-ton water cooled chillers
- Water-side free cooling
- 250 kW cogeneration plant with absorption chiller
- Siemens Building Management System



Mechanical Systems Overview

Space Description	Overhead VAV supply	Radiant Ceiling Panels		Radiant Floor		Finned Tube Radiation	Fan Coil Units
		Heating	Cooling	Heating	Cooling		
Laboratories	*	*					
Classrooms/Offices	*	*	*				
Main Entrance Lobby	*			*			
Multi-purpose Seminar Room & Gallery Space	*			*	*		
Art rooms (all subcellar and 9 th floor levels)	*					*	
Auditorium	*						
Retail, Data, Elev.							*

Training Scope of Work & Process

Develop Training and Curriculum – *Learn the building to find operational insights*

- Site specific equipment fundamentals, historical operation and data analysis
- Develop Preventive Maintenance (PM) schedules and onsite assistance

Perform Training – *Most of the energy opportunities are operations related*

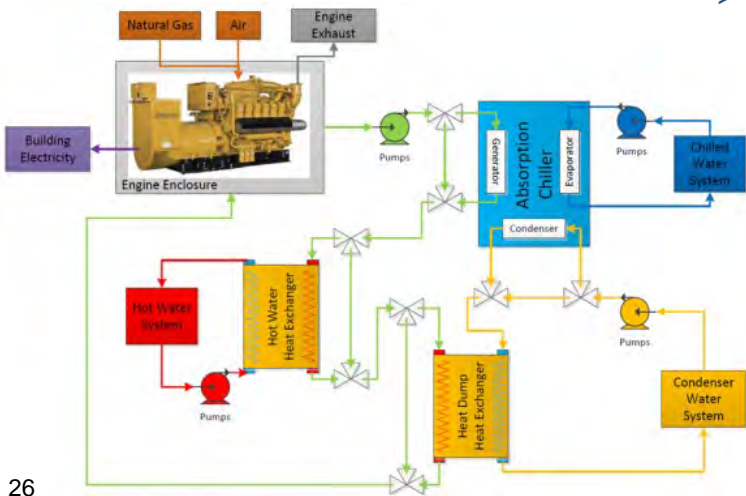
- Classroom training (PowerPoint decks)
 - > Chiller Plant Operation
 - > Operator Airside Training
- PM training and field assistance
 - > Damper Actuator Troubleshooting – Make repairs as we are learning building
 - > BMS PPCL Training, Troubleshooting & Optimization – Deep dive into control system
 - > Chief Engineer Training

Training Example:

Cogen Heat Recovery Opportunity

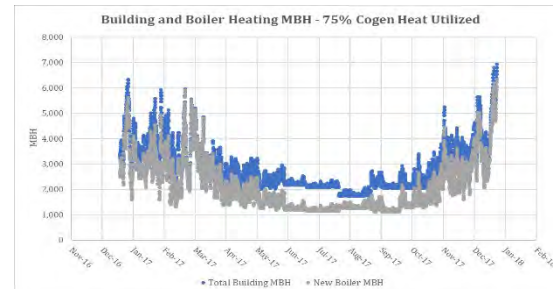
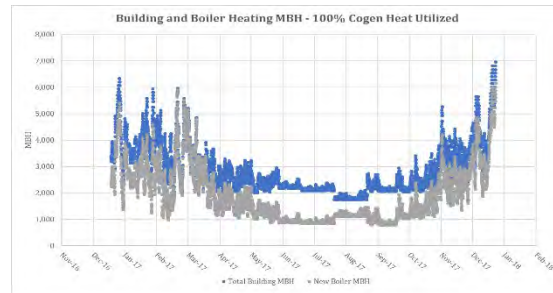
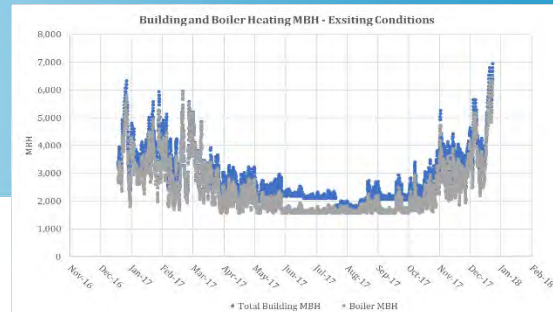
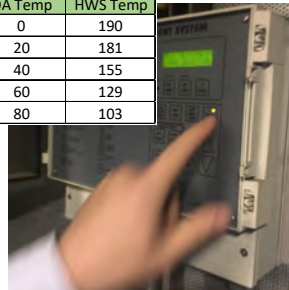
Current recovery ~53%
Improvement opportunity

- > 75% recovery = \$21k annually
- > 100% recovery = \$40k annually



Implemented more aggressive hot water supply resets to improve heat recovery

Previous		Current	
OA Temp	HWS Temp	OA Temp	HWS Temp
0	190	0	190
20	190	20	181
40	170	40	155
60	138	60	129
80	106	80	103



Training Example:

Temperature Day/Night Setbacks

SIEMENS

AREA: RESEARCH LAB - 701

SERVED BY: AH04 / AH05

OCCUPANCY STATUS: OCC

MODE: COOLNG

TOTAL SUPPLY: 344.00 CFM

TOTAL EXHAUST: 656.00 CFM

DIFFERENTIAL: 312.00 CFM

DIFF SETPT: 300.00 CFM

LAB CTRL SEQUENCE

LAB EXH SEQUENCE

AIR CHANGE RATES

- MIN ACH: 5.90 ACH
- UNDERSIDE ACH: 1.00 ACH
- CURRENT ACH: 5.90 ACH

EA #701

EXHAUST DAMPER: 22.00 PCT

GEN EXHAUST AIR VOLUME: 648.00 CFM

GENERAL EXHAUST

- MIN CFM: 300.00 CFM
- MAX CFM: 1052.00 CFM

EA #702

POINT EXHAUST AIR VOLUME: 0.00 CFM

POINT EXHAUST

- MIN FLOW: 141.17 CFM
- MAX FLOW: 141.17 CFM
- H ALARM: []
- LO ALARM: []

EA #701

SUPPLY DAMPER: 39.20 PCT

SUPPLY TEMP: 65.00 DEG F

SUPPLY AIR VOLUME: 344.00 CFM

VALVE COMMAND: 100.00 PCT

73.00 DEG F

ROOM TEMPERATURE

ROOM TEMP. SPACE STPT

HTG.	CLG.	DAY	NIGHT
70.00	74.00	DAY	DAY/NIGHT
60.00	82.00	NIGHT	

VALVE COMMAND: 100.00 PCT

RADIANT HWR

RADIANT HWS

GENERAL SUPPLY

- MIN CFM: 340.00 CFM
- MAX CFM: 900.00 CFM

Outside Air Conditions

- Temperature: 40.28 DEG F
- Humidity: 58.16 % RH

LINKS

Level 7 Floor Plan

1 .LAB DAY/NIGHT Scheduler with PPCL.
Use PPCL to change!!!

Use Point Commander to change Temperature STPT.

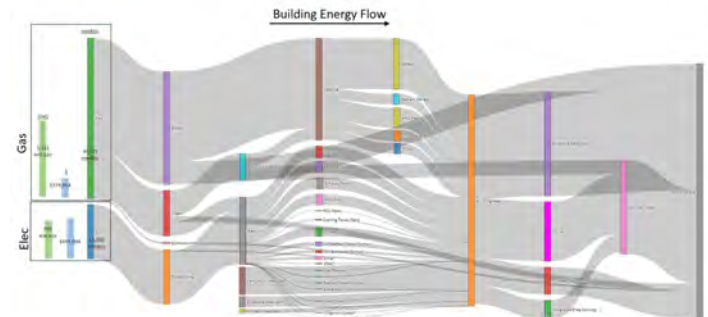
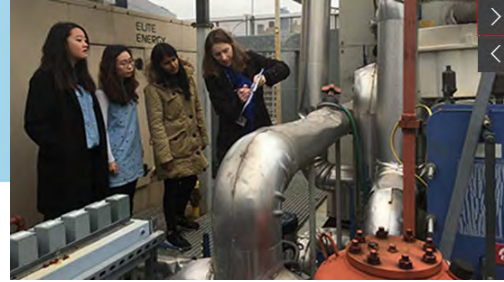
Student Involvement

Co-teaching of new Energy Efficient Building Systems Course

Engage student interns and undergraduate and Master's students on building projects

- > Baseline building energy consumption and tracing energy use using Sankey diagram
- > Create data historian, energy dashboards, and reporting tools

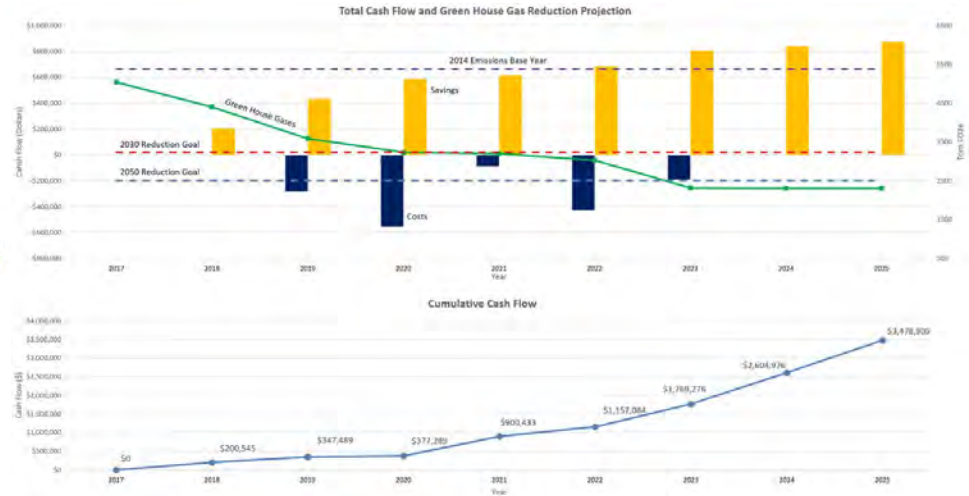
A goal is that Cooper students enter the workforce with industry relevant knowledge and skills



Outcomes:

Energy Master Plan Assistance

- Reduced unoccupied office and laboratory air change rates
- AHU discharge air temperature resets
- Static pressure resets
- More aggressive hot water supply resets to improve cogen heat recovery
- Optimized scheduling and day/night setbacks
- Condenser water supply temperature optimization
- Repair damper actuators
- Identified leaky reheats



Energy Savings and Training Results

\$192,659 in energy savings

215 tons of CO₂ reduction

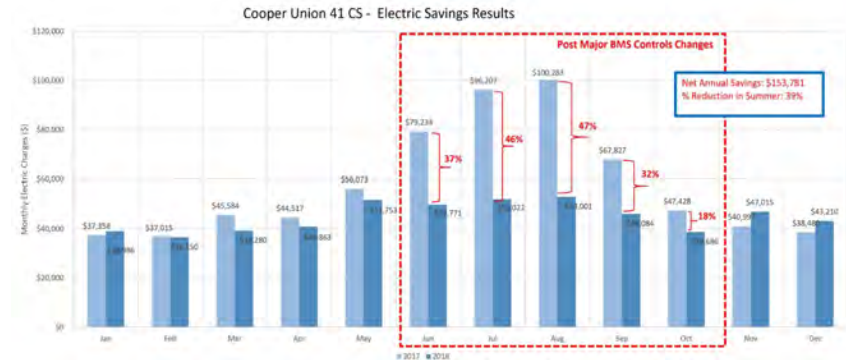
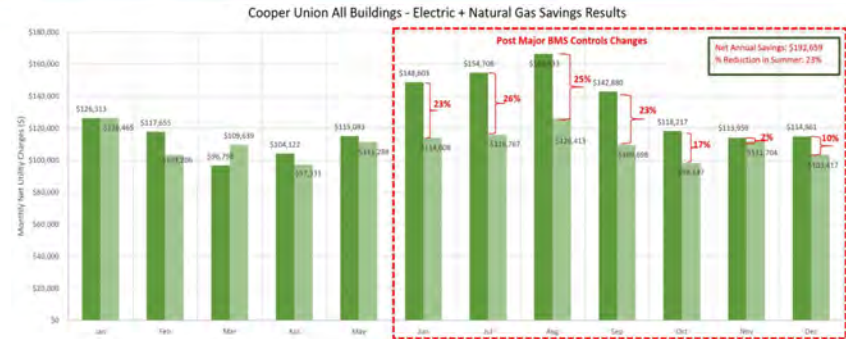
10 facilities staff trained

25 students trained

5 Master's thesis projects

2 Senior Capstone Design projects

Students involved have gone on to full time positions at HVAC and energy firms and to pursue related graduate research



Lessons Learned and Potential Replicability

- Facilities staff are more engaged when training is site specific
- Align training initiatives to current operational needs
- Building trust with facilities staff and finding time for training is key

Cooper Union project provides a model for how industry professionals, operations staff, and engineering faculty and students can partner to strengthen the building industry skillset and workforce pipeline



Thank you



THECOOPERUNION

Melody Baglione

Professor and Chair of
Mechanical Engineering,
Facilities Energy Efficiency Advisor,

The Cooper Union for the
Advancement of Science and Art

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Advancing Innovative Energy Solutions

*a series of topical energy
webinars and resources
for members of the
Business Council of NYS*

**Make Energy Work for you with
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**Create a Reliable Supply of Energy
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The Future of Transportation is Already Here

Building Operational Intelligence

**Clean Heating and Cooling – A Better Way to
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