



Wisconsin K-12 Energy Education Program (KEEP)
College of Natural Resources
University of Wisconsin - Stevens Point

Clean Energy Careers

Classroom resources & career pathways

WTEA Conference
Chula Vista
March 16-18, 2022

Samara Hamzé – KEEP
Jenny Brinker – NWTC
Adam Wehling – CVTC



Wisconsin Center for Environmental Education
College of Natural Resources
University of Wisconsin - Stevens Point

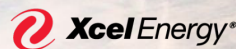
We would like to recognize that the University of Wisconsin-Stevens Point occupies the lands of the Ho Chunk and Menominee People. Please take a moment to acknowledge and honor this ancestral Ho Chunk and Menominee land, and the sacred lands of all indigenous peoples.



Communities making informed energy decisions now and for a sustainable future.

KEEP leverages teacher education to improve and increase energy literacy in Wisconsin's K-12 schools as a means of contributing to statewide energy savings.

KEEP is a partnership between Wisconsin utilities and the Wisconsin Center for Environmental Education within the College of Natural Resources at the University of Wisconsin-Stevens Point.



Wisconsin K-12 Energy Education Program (KEEP)

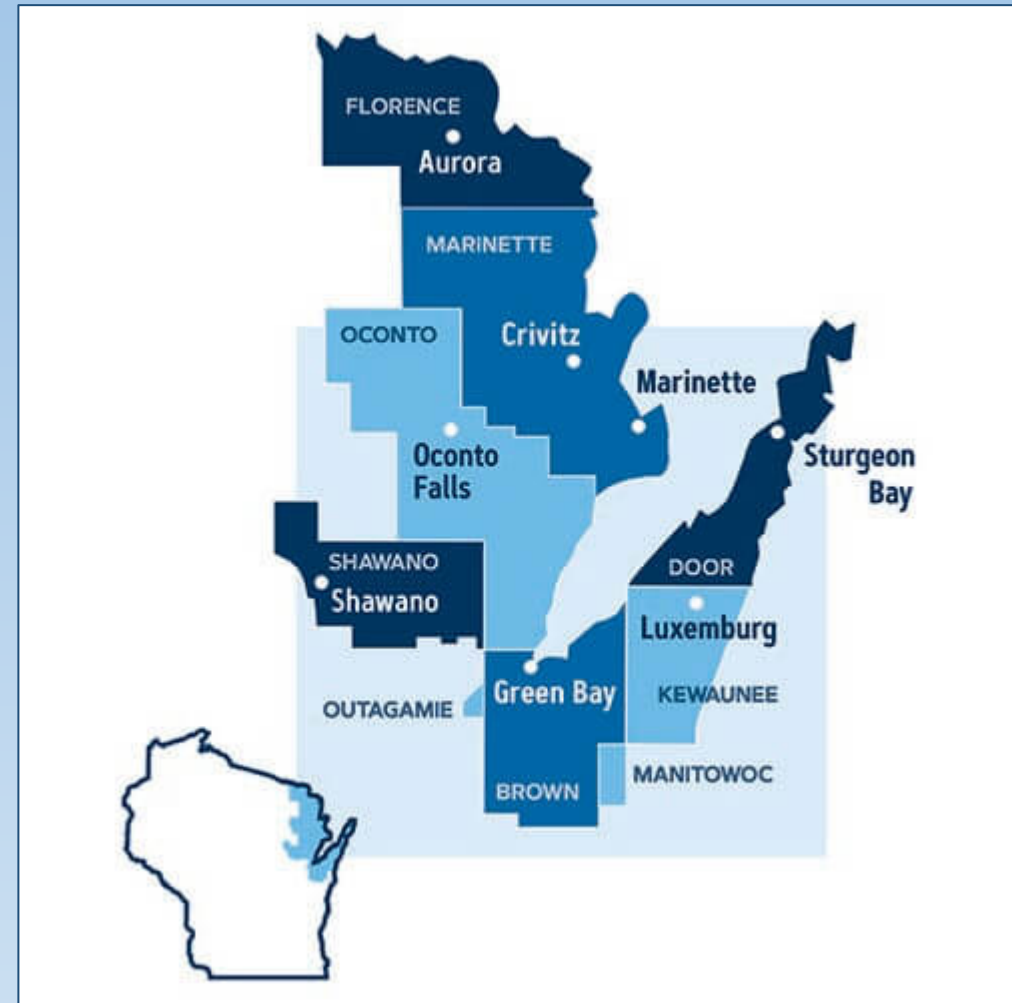


Wisconsin Center for Environmental Education
College of Natural Resources
University of Wisconsin-Stevens Point

Northeast Wisconsin Technical College

NWTC

- Main campus in Green Bay
- Five regional centers and other locations
- Great Lakes Energy Education Center
- 200+ programs
- Serves 27,000 people annually
- 100+ transcribed courses





Chippewa Valley
**Technical
College**



Adam Wehling

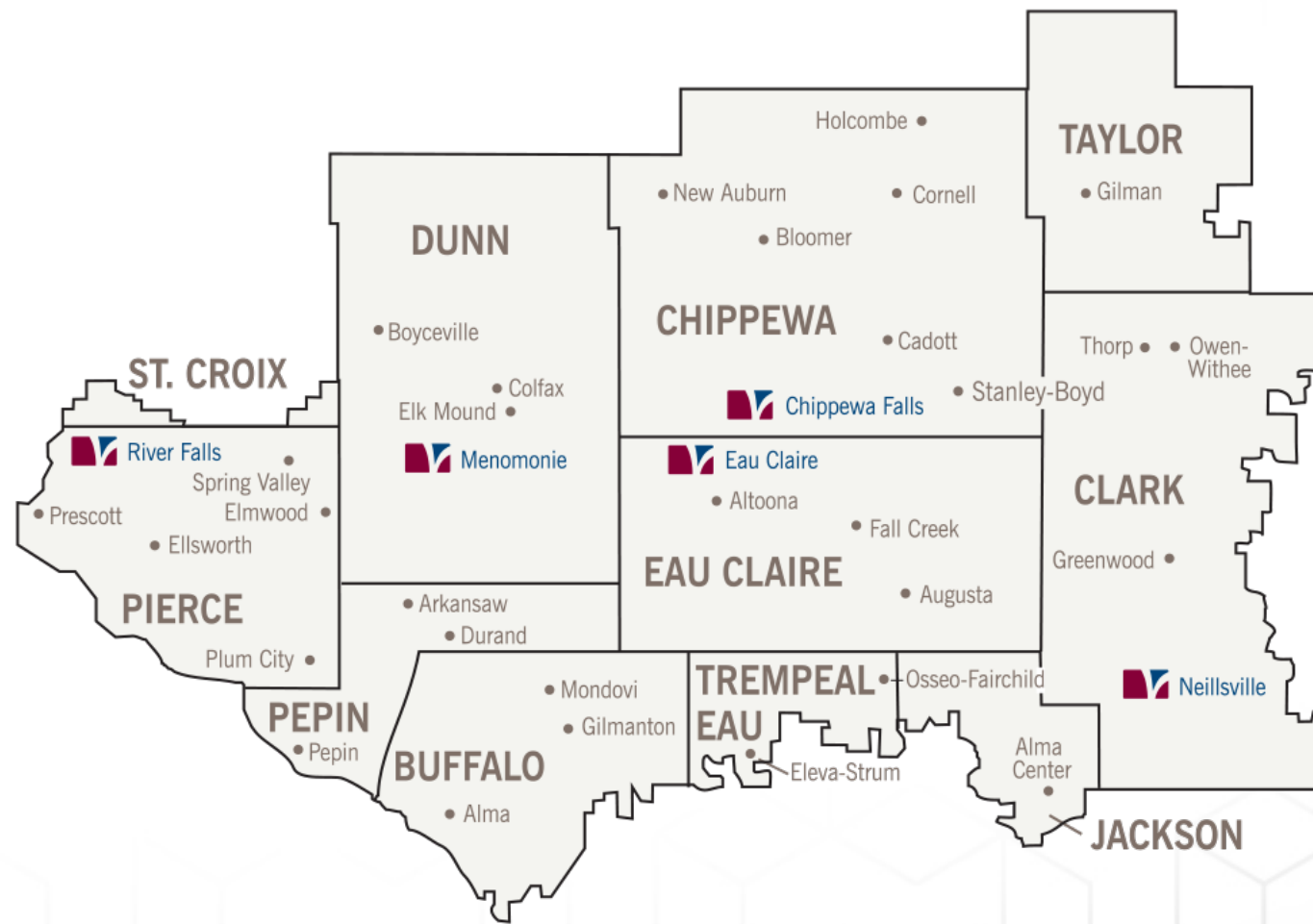
**Dean of Agriculture, Energy,
Construction & Transportation**

awehling@cvtc.edu

cvtc.edu

CVTC OVERVIEW

- 4,325 FTE (2020-21)
- 15,537 unduplicated students (2020-21)



EDUCATIONAL OFFERINGS

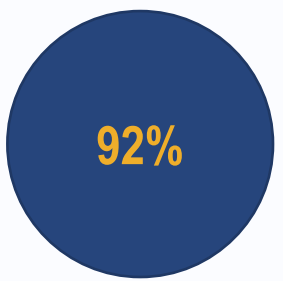
- 122 programs
 - Associate Degrees
 - Technical Diplomas
- 39 certificates
- 15 apprenticeships
- High School Dual Enrollment
- Workforce Solutions & Continuing Education
 - Customized contract training
 - Technical assistance
 - Seminars, training, and coaching
 - Educational pathways to program degrees
- Adult Education & College Prep





CVTC MISSION

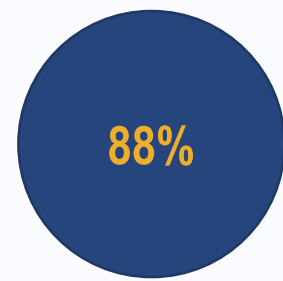
CVTC **delivers innovative, applied, and flexible education that supports a diverse community of learners**, improves the lives of students, and adds value to our communities.



Percentage of CVTC graduates employed within **6 months of graduation**



CVTC offers **122** programs, **39** certificates, and **15** apprenticeships



Percentage of graduates who find **employment in Wisconsin** after graduation



Total **number of students** CVTC served in 2020-2021



Average **starting salary** of CVTC associate degree graduates



Workshop focus



Clean Energy jobs are in demand



Video & classroom lesson resources to support educator & student learning about these in-demand careers



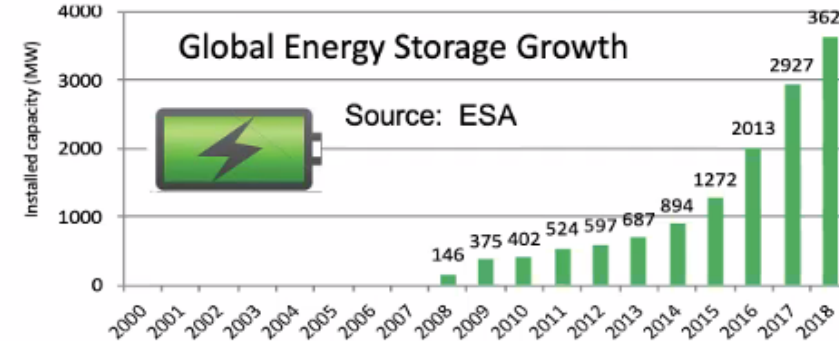
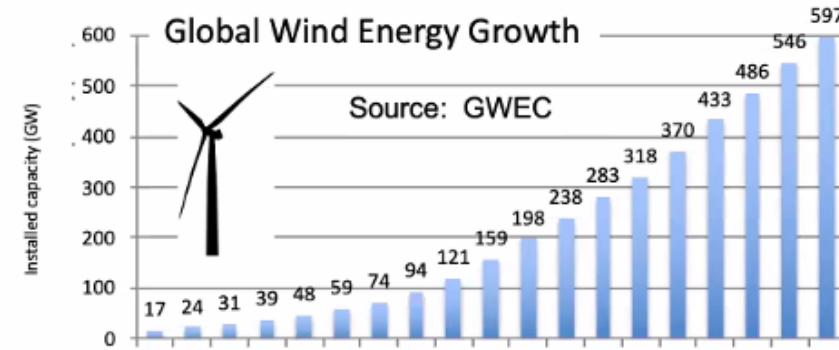
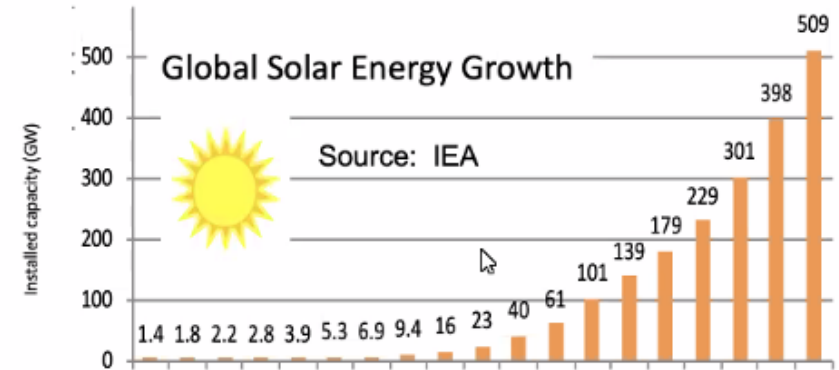
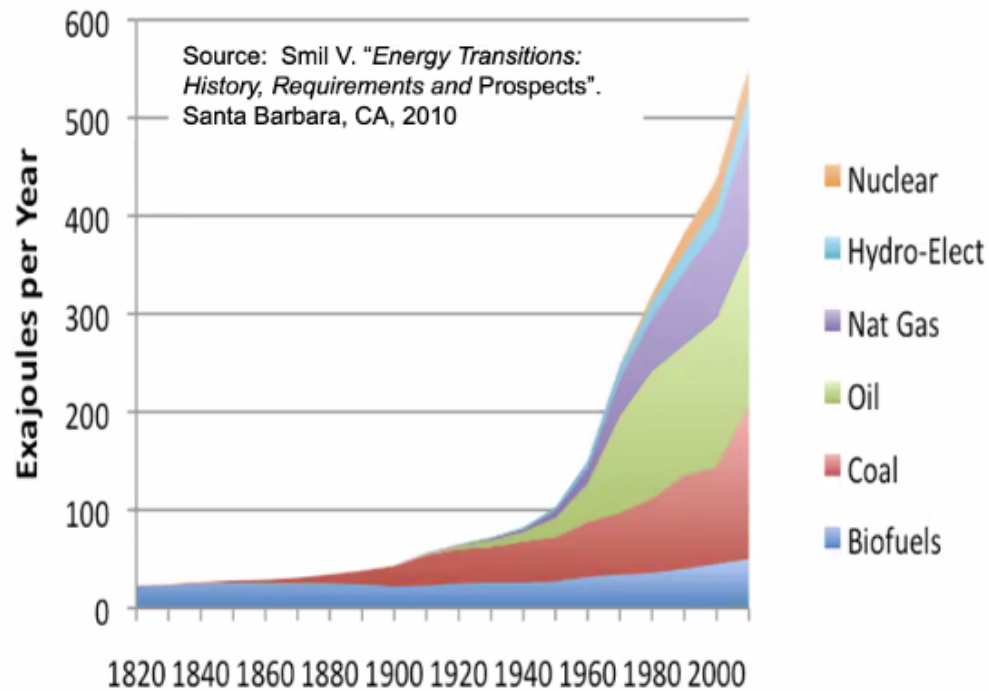
Some possible Clean Energy education pathways





The big picture...

Historic Global Energy Consumption





US Energy History Visualization

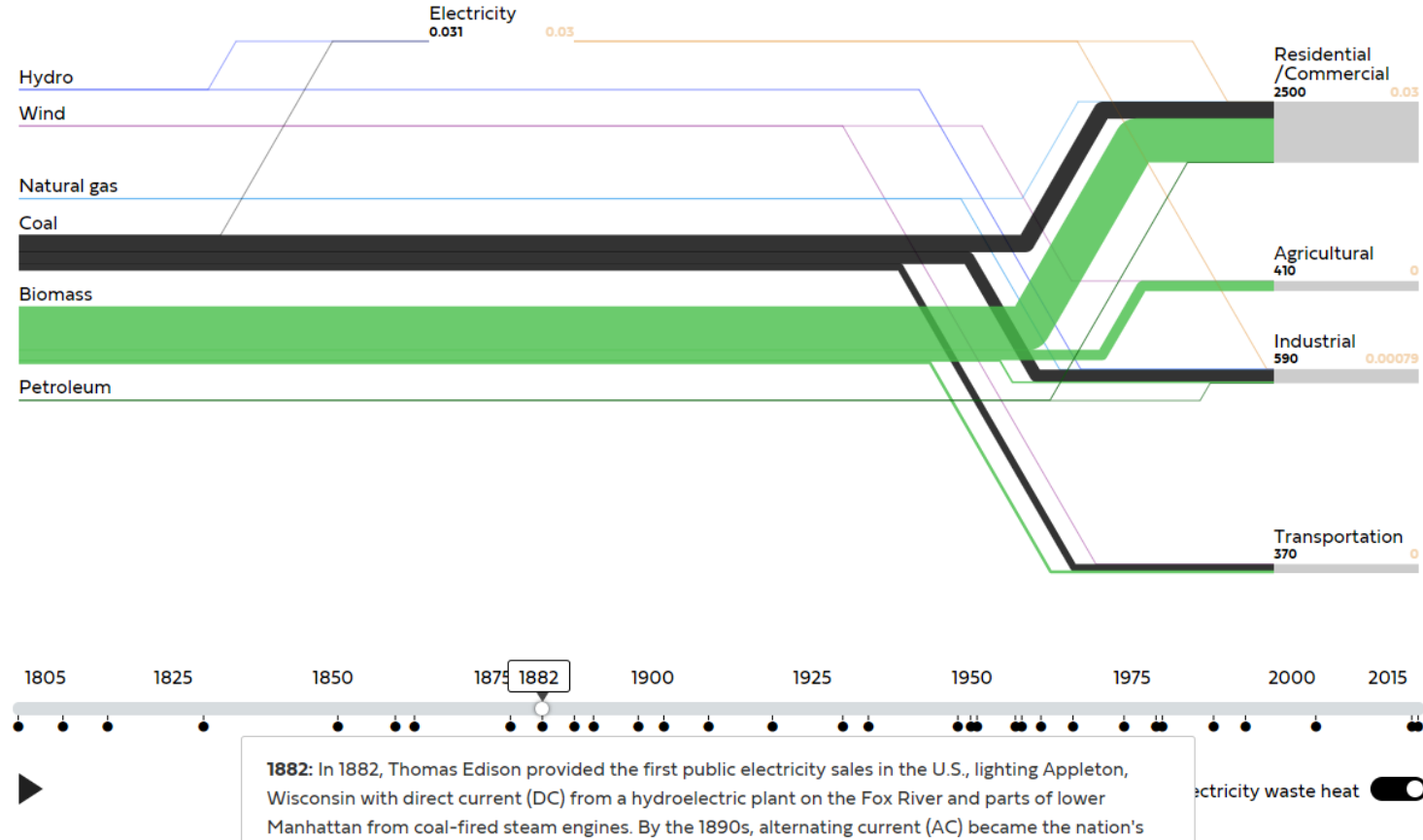
ABOUT INSIGHTS CONTACT



U.S. energy usage
3904 W/capita **1882**

Energy Transitions in U.S. History, 1800-2019
Suits, Matteson, and Moyer (2020)

Center for Robust Decision-making on
Climate and Energy Policy, UChicago

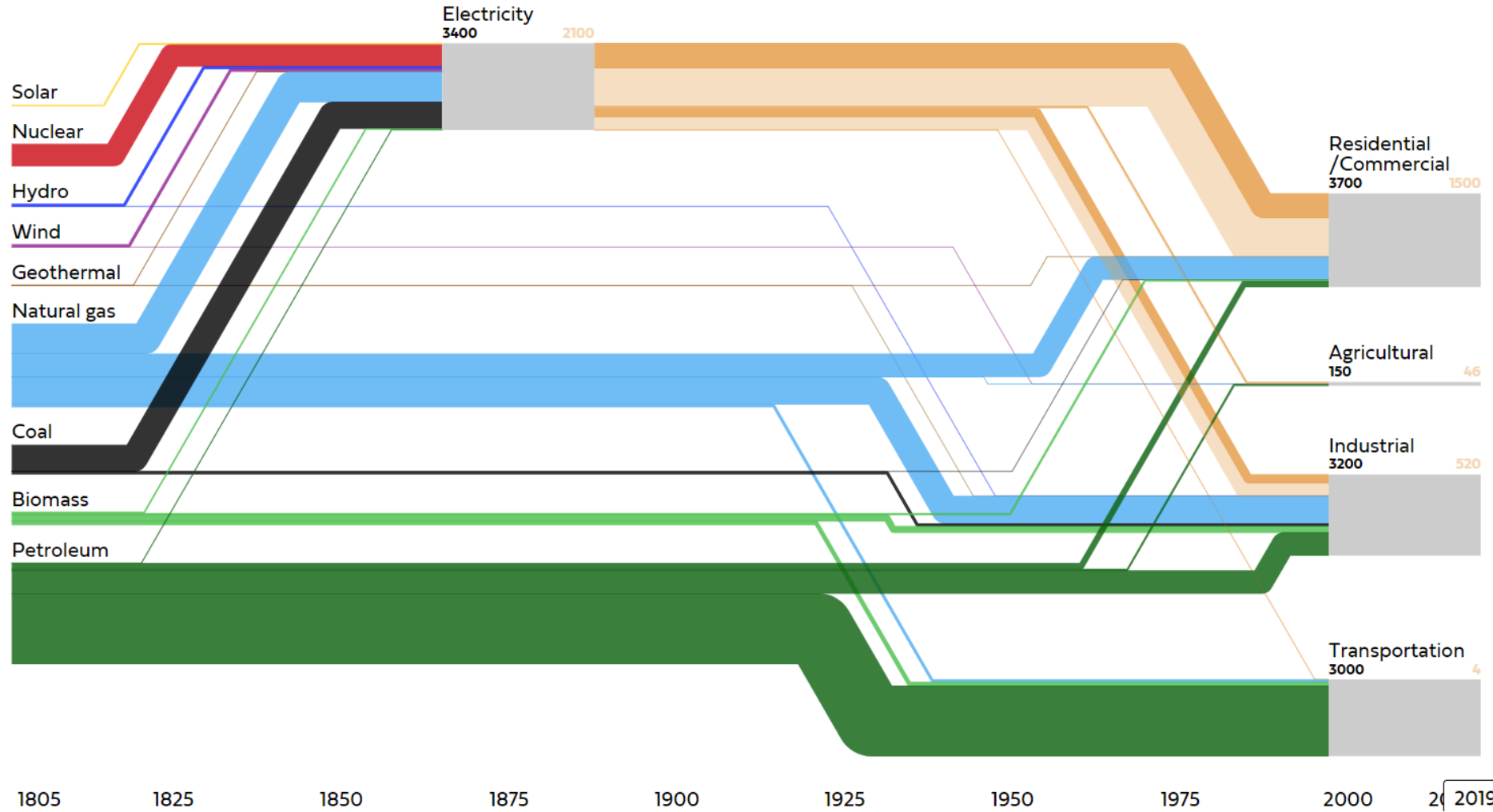




U.S. energy usage
10067 W/capita **2019**

Energy Transitions in U.S. History, 1800-2019
Suits, Matteson, and Moyer (2020)

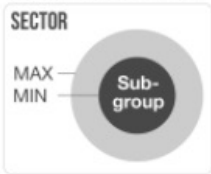
Center for Robust Decision-making on
Climate and Energy Policy, UChicago



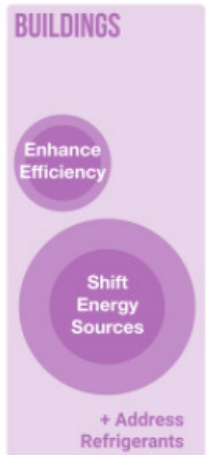
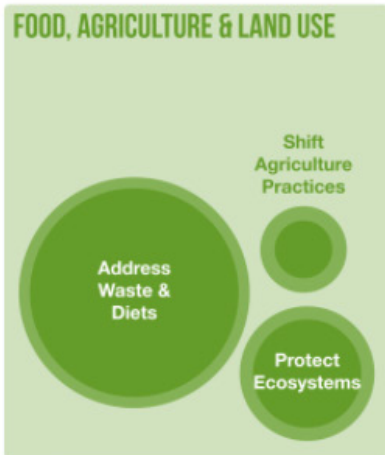
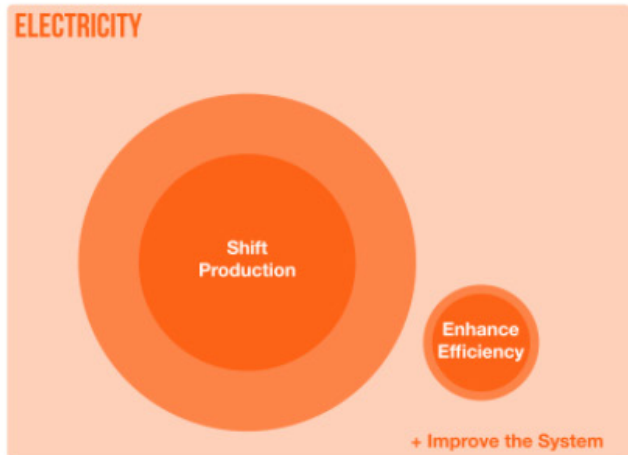


DRAWDOWN FRAMEWORK FOR CLIMATE SOLUTIONS

How to Read It
Size represents potential emissions reductions (CO₂-eq (Gt)) 2020-2050



1. REDUCE SOURCES

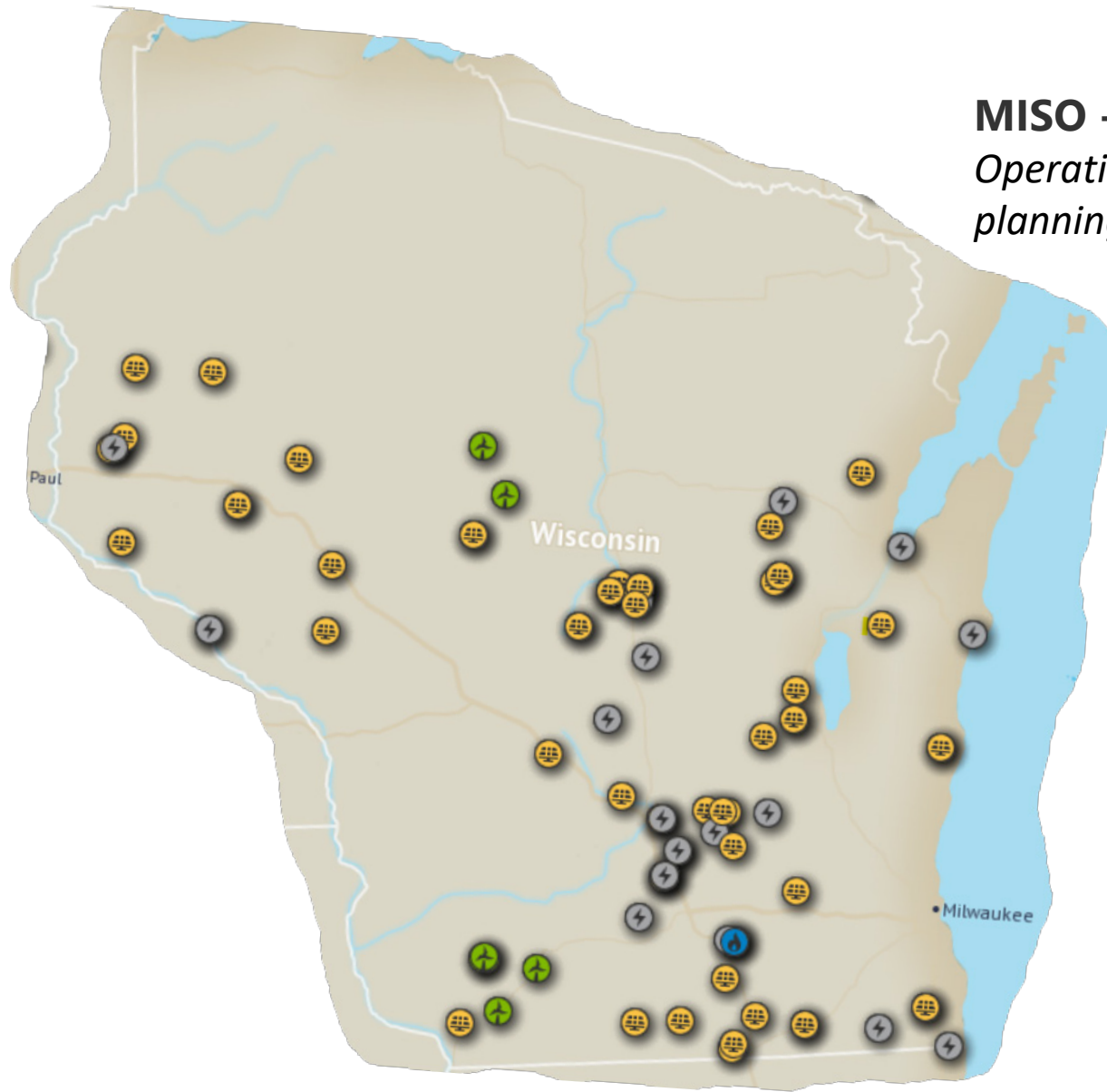


2. SUPPORT SINKS



3. IMPROVE SOCIETY





MISO - Midcontinent Independent System Operator

Operating the power grid, managing the energy markets, planning the future grid

ALL planned projects in Wisconsin are:

- Solar (many)
- Wind (some)
- Storage – battery & distribution (many)

5 Results

[Intern - Surveying Summer 2022](#)

R0000984 | Cottage Grove, WI | Posted 10 Days Ago

[Intern - Engineering\(Civil\) Summer 2022](#)

R0000919 | 3 Locations | Posted 26 Days Ago

[Intern - Operations Training & Development](#)

R0000967 | Pewaukee, WI | Posted 30+ Days Ago

[Intern - Desktop Administrator Summer 2022](#)

R0000973 | Pewaukee, WI | Posted 30+ Days Ago

[Substation Services Intern - Summer 2022](#)


R0000914 | 3 Locations | Posted 30+ Days Ago





US Bureau of Labor Statistics

Fastest Growing Occupations

PRINTER-FRIENDLY 

Fastest growing occupations: 20 occupations with the highest projected percent change of employment between 2020-30.

Click on an occupation name to see the full occupational profile.

OCCUPATION	GROWTH RATE, 2020-30	2020 MEDIAN PAY
Motion picture projectionists	70%	\$27,490 per year
Wind turbine service technicians	68%	\$56,230 per year
Ushers, lobby attendants, and ticket takers	62%	\$25,110 per year
Nurse practitioners	52%	\$111,680 per year
Solar photovoltaic installers	52%	\$46,470 per year



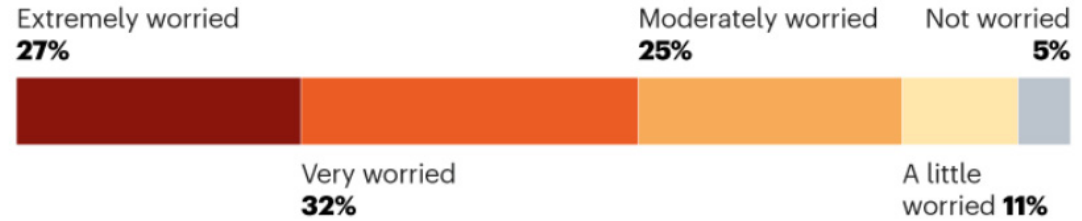


CO-BENEFIT

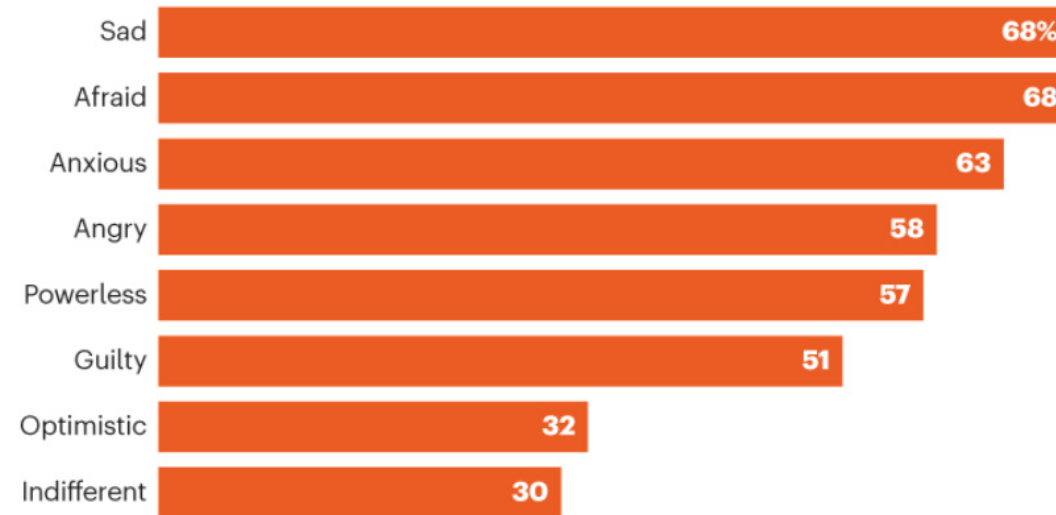
CLIMATE ANXIETY

A survey of 10,000 young people shows that negative feelings about climate change can cause psychological distress.

How worried are you about climate change?



Climate change makes me feel...



©nature

Nature: 7 Sept. 2021

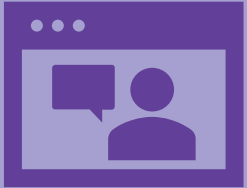


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Videos & supporting lessons



Clean Energy jobs are in demand



Video & classroom lesson resources to support educator & student learning about these in-demand careers



Some possible Clean Energy education pathways





CBLE Guide

Wisconsin Career-Based Learning Experience Continuum

KNOW CBLEs

- Classroom speakers
- Company tour
- Career fair
- Career-related project
- Part-time or summer job

EXPLORE CBLEs


- Job shadow
- CTSO or career-related out-of-school activity
- Career-related volunteer or service learning

PLAN & GO CBLEs

- Informational interview
- School-based enterprise (SBE)
- Student entrepreneurial experiences (SEE)
- Simulated worksite
- Internship or local co-op
- State-certified co-op program





 1. Classroom speaker	 10. Career mentoring
 2. Company tour	 11. Simulated worksite
 3. Career fair	 12. School-based enterprise (SBE)
 4. Career-related project	 13. Student entrepreneurial experience (SEE)
 5. Part-time or summer job	 14. Supervised Agricultural Experience (SAE)
 6. Job shadow	 15. Internship or local co-op
 7. Career-related volunteer or service learning	 16. State-certified Employability Skills Co-op
 8. Career and technical student organization (CTSO) or career-related out-of-school activity	 17. State-certified Occupational Program Co-op Program
 9. Informational interview	 18. State-certified Youth Apprenticeship

VIDEO FORMAT:

- What is **exciting** about the clean energy industry?
- Describe a **day on the job**.
- **What do you like best** about working for a utility?
- Name some **skills** needed for a career with a utility.
- What was your **education** like?
- What are your **recommendations** for high school students? What **classes** should they think about taking?



Clean Energy Career Video Series

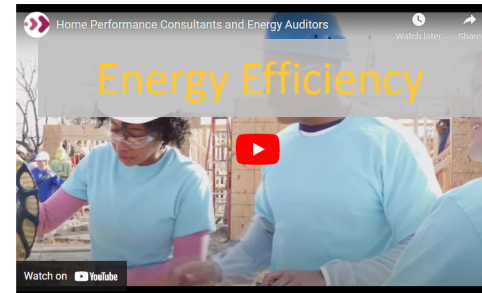
Leading the Way with Policy



Solar Energy Careers



Home Performance Consultants and Energy Auditors



Exploring the Chippewa Valley Technical College's electric power distribution program



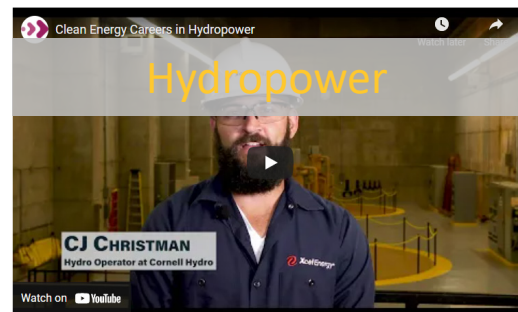
Utility Careers Featuring an Electric Superintendent and a Lineworker



Facility Operations Clean Energy Careers in Healthcare



Clean Energy Careers in Hydropower



Coming Summer 2022
Electric Vehicle Careers



Student Lessons

Access companion lesson and student activities, by clicking here [clicking here.](#)

Individual lessons (check back soon for more lessons):

- Solar Careers
- Hydro Careers

Resources

- Wisconsin Technical Colleges
- Get Into Energy
- Green Buildings Careers Map
- Solar Careers Map
- HVAC Careers Map
- DOE Solar Decathlon Clean Energy Careers
- USGBC Green Building Careers
- Clean Energy Jobs Midwest
- People Powered Podcast

For a complete guide to clean energy careers and even more resources, please visit Wisconsin's K-12 Energy Education Program (KEEP).

To read a press release about this project, [click here.](#)

Sponsors



Partners



<https://bit.ly/CleanEnergyCareers> | Lesson Bundle



Scan this QR code to access
videos & lessons
*Slide 20 for all videos &
mini-lessons*





Companion Lesson & Student Worksheet

Careers in Energy Auditing & Home Performance



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KEEP: Wisconsin's K-12 Energy Education Program - www.uwsp.edu

Clean Energy Careers Video Series Careers in Energy Auditing & Home Performance Student Sheet

Objectives:

- I can explain what Home Performance Consultants and Energy Auditors do and describe the skills needed to be successful in these careers.

Directions:

Watch the [Home Performance Consultants and Energy Auditors](#) video from Slipstream and use the energy profiles and career maps linked in the slideshow to complete the following table.

	Energy Auditor &/or Home Performance Consultant
What does someone in this career do on the job?	
What are some skills needed for this career?	
What type of education is required for this career?	



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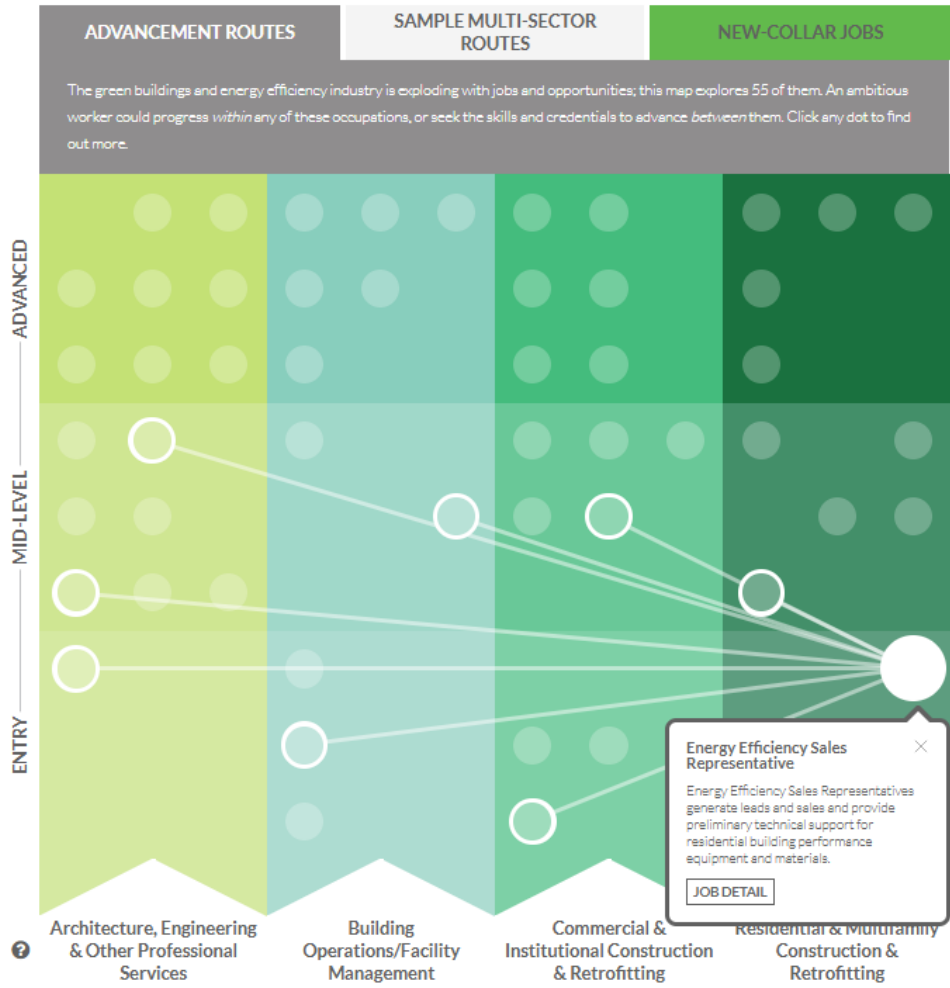
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JOB

Where's my job?

- Architecture, Engineering & Other Professional Services +
- Building Operations/Facility Management +
- Commercial & Institutional Construction & Retrofitting +
- Residential & Multifamily Construction & Retrofitting +



Exploring A Job In The Energy Industry



Exploring A Job In The Energy Industry encourages students to explore a potential, future energy job. Using [Career Maps](#), students research compensation, qualifications, job demands, and advancement opportunities for the job they selected.

▶ [Student Materials](#)

▶ [Instructor Materials](#)

<https://bit.ly/CREATElessonIREC>



Clean Energy Education Pathways



Clean Energy jobs are in demand



Video & classroom lesson resources to support educator & student learning about these in-demand careers



Some possible Clean Energy education pathways





Regional Career Pathways

Educator Resources

Industry Sectors

Business Administration

Construction

Digital Technology

Healthcare

Manufacturing

STEM - Energy

Regions

Related Links

[Inspire Wisconsin](#)

[Academic and Career Planning](#)

[Academic Standards](#)

[Career and Technical Education](#)

[Comprehensive School Counseling](#)

REGIONAL CAREER PATHWAYS / INDUSTRY SECTORS / STEM - ENERGY

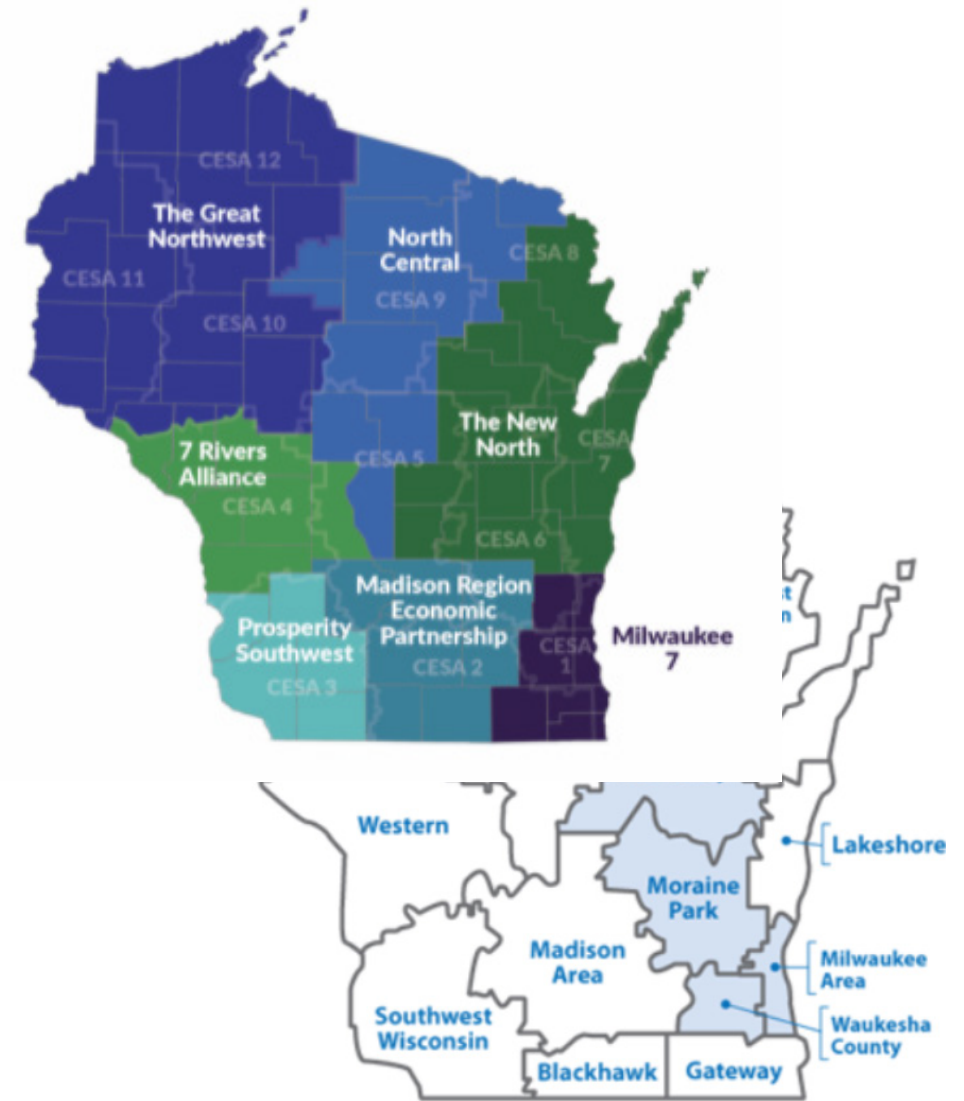
STEM - Energy



Energy Generation, Transmission, and Distribution

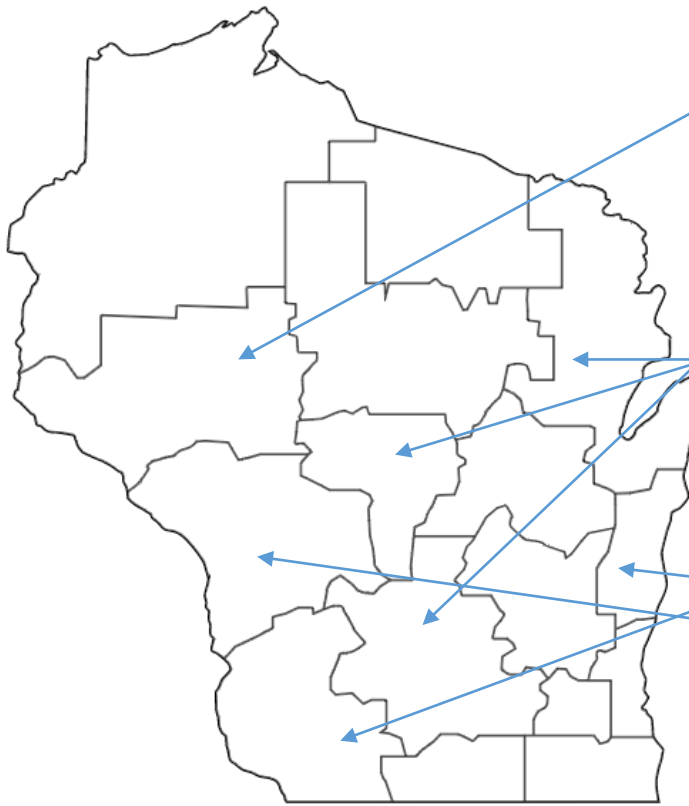
As the electric power industry transforms with increasing technological advancements, managed by an aging skilled workforce, the need to participate in developing a diverse and qualified talent pool is critical. The energy sector nationally, and in Wisconsin, enjoys strong employer support through membership in the national Center for Energy Workforce Development (CEWD). The CEWD “focuses on closing the skill gaps in mission critical jobs as the industry faces changes in technology and leads the way to a cleaner energy future. Over the past 10 years, CEWD has worked to create a strong foundation of partnership between the energy industry, education, and workforce development to implement proven and scalable workforce solutions that save time, conserve resources, and reduce costs” (CEWD 2020; [Source](#) accessed 8/7/2020).

Wisconsin’s Energy Workforce Consortium (WEWC) chapter was instrumental in developing this particular career pathway for secondary students. In early 2020, the WEWC education subcommittee prioritized developing a career pathway as a means to reach out and promote career development in high school for the high skill energy industry sector.





Wisconsin Technical Colleges offering Renewable Energy certificate or AAS



- Chippewa Valley TC – HVAC program with integrated Renewable Energy (*Adam Wheling in [Electrical Power Distribution Video](#)*)
- Madison Tech College – Renewable Energy certificate, within Architecture & Engineering
- Midstate TC – Renewable Energy Technician (AAS)
- NWTC – Solar Thermal and Solar PV - Assoc degree and Certificate – multiple diplomas, certificates, AAS (*Jenny Brinker in [Policy Video](#)*)
- Southwest TC – in development
- Lakeshore Tech – Wind Energy Technology (AAS)
- Western TC – Solar Installation Technician - Certificate





NORTHEAST
WI Technical College

Solar Certificates

Renewable Energy & Sustainability

4 credits

Intro to Solar

4 credits

Choose PV or Thermal

Photovoltaics-Design & Site

3 credits

Photovoltaics-Advanced

4 credits

Solar Thermal-Design & Site

3 credits

Solar Thermal-Advanced

4 credits

Associates Degrees add basic electricity, physics, welding and general studies courses

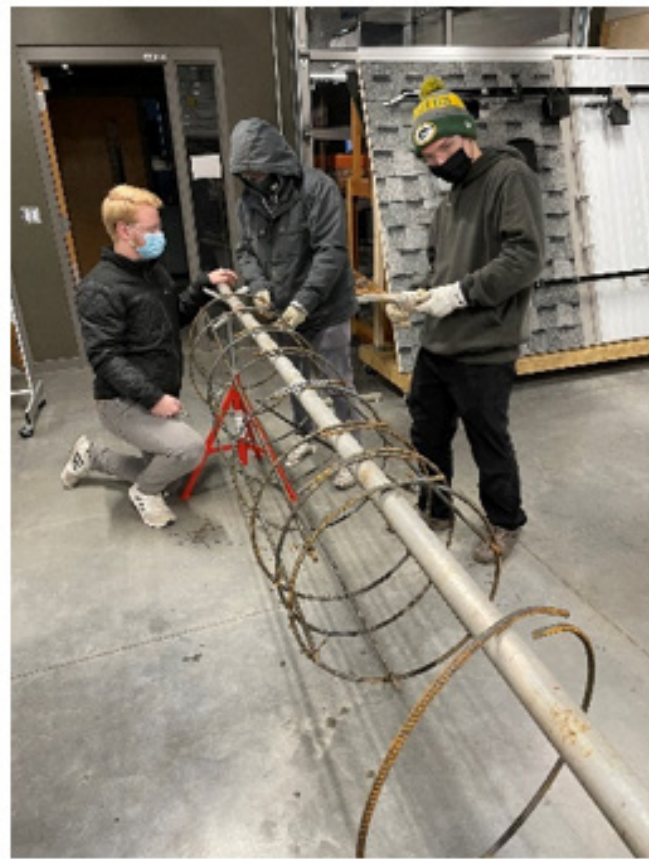
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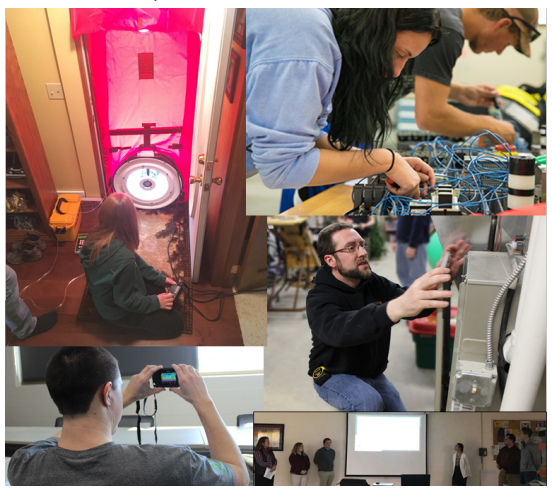
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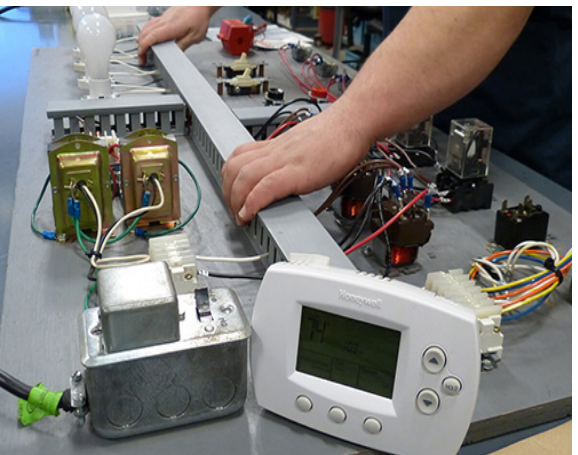


Energy Management Certificate

Intro to Energy Management	3 credits
Renewable Energy & Sustainability	4 credits
Smart Start to BAS	1 credit
BAS Networking 1	1 credit
Energy Control Strategies	2 credits
Lighting Fundamentals	3 credits
Commercial HVACR Analysis	3 credits



NEW Building Energy & Comfort Controls (BECC) Career Pathway Certificate



Automation 1*	1 credit
Automation 2*	1 credit
DC1*	1 credit
Smart Start to BAS*	1 credit
BAS Networking 1	1 credit
Energy Control Strategies	2 credits

Associates Degrees add basic electricity, physics, Excel and general studies courses

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National Science Foundation Funding



- Advanced Technical Education (ATE)
- Utility & Energy Coordination Network



JOIN
NOW!

- Award No. 2000519
- Platform where educational institutions, industry members, and professional organizations share resources and to form partnerships that will expand training opportunities across the country

Smart Start to Energy Management



- Award No. 2055555
- Create Energy Controls Career Pathway Certificate
- Increase energy career awareness and educational opportunities to support expanded pipeline of students
- Support high school instructor delivery of one-credit Smart Start to BAS course


Partial support for this work was provided by the National Science Foundation's Advanced Technological Education (ATE) program under Award No.'s 2000519 & 2055555. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.



Introduction to Sketchbox

New energy efficiency curriculum through
interactive energy modeling tool

March 2022



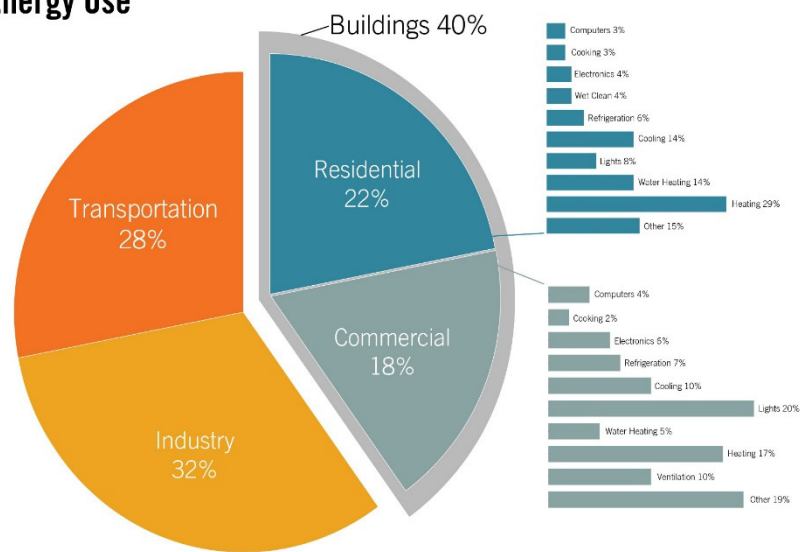
Sketchbox simplified energy modeling tool

Enables energy analysis of new construction and retrofits of commercial buildings

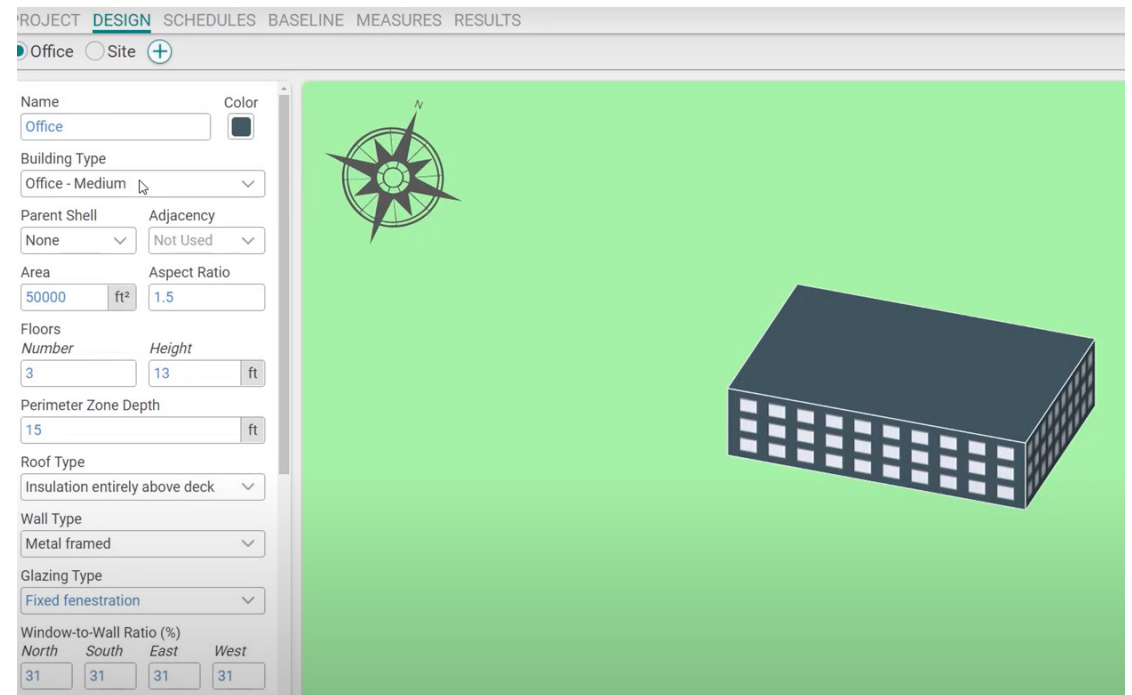
- Educate students on energy efficiency and building design
- Approachable for less technical users
- Remote-hosted, scalable to many users
- Web browser interface, works on mobile
- Could support cross-curriculum goals
- *The tool is FREE to use!*

Students can create a model of their own high school or design a new building

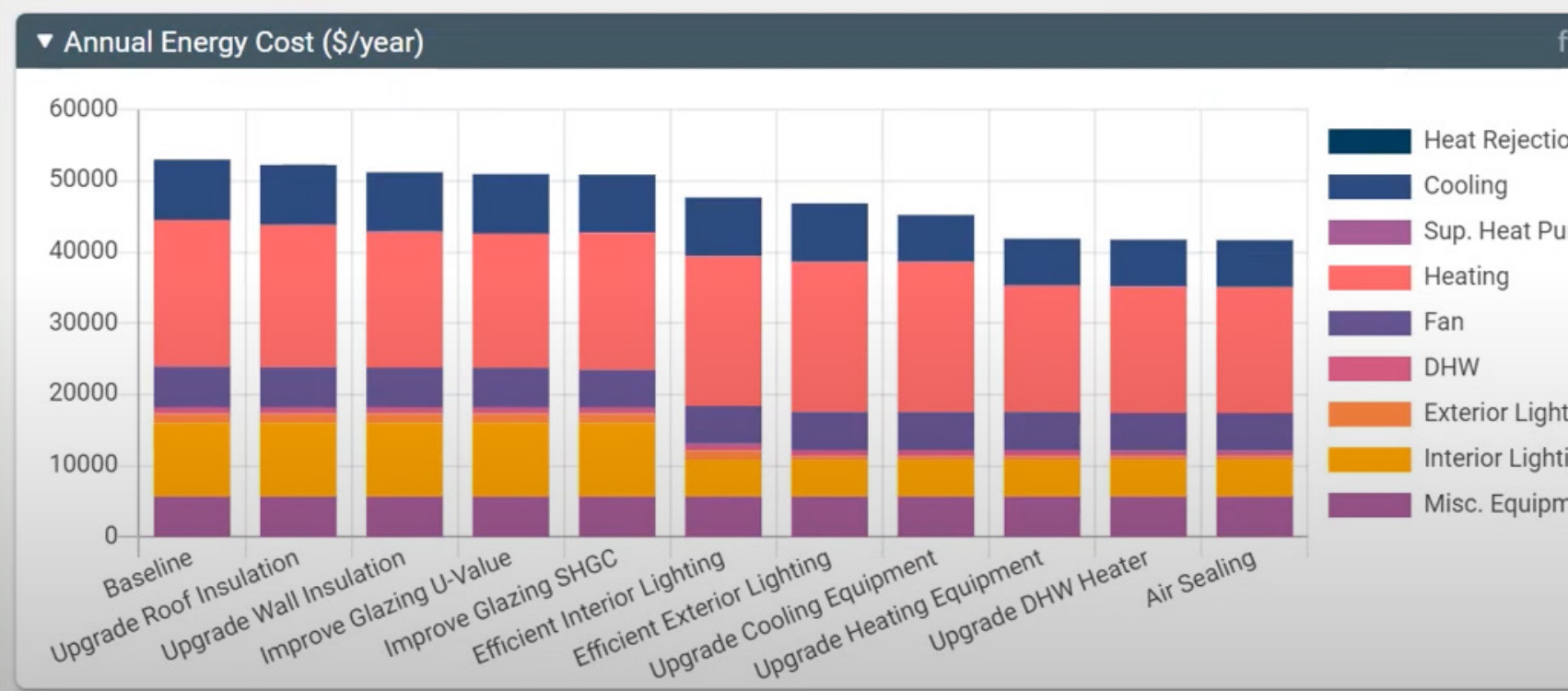
U.S. Energy Use



Buildings account for 40% of energy use in the U.S.



Annual Summary ft² ↑				
	Baseline	Proposed	Absolute Savings	Relative Savings
Energy Cost (\$)	53,374	42,089	11,285	21%
Electric Consumption (kWh)	354,617	263,156	91,460	26%
Natural Gas Consumption (therm)	30,965	26,559	4,406	14%
Site EUI (kBtu/ft ²)	39.1	32.3	6.8	17%
Source EUI (kBtu/ft ²)	60.4	48.2	12.1	20%
CO ₂ Equivalent (kg of CO ₂ e)	295,675	238,391	57,284	19%



Analyze results

- Learn how building systems interact
- Explain energy savings beyond code baseline
- Discuss energy efficiency measures that have the most impact
- Identify carbon impacts

Slipstream

- Mission-based **nonprofit** organization in Madison, WI that specializes in energy efficiency education and research
- Received a **grant** to support lessons for tech colleges and high schools utilizing its energy modeling tool
- Looking for **teachers** to help guide the lessons so it is suitable for high school units.
- **Inspire** students to consider careers in the emerging clean energy sector
- Contact **Dave Vigliotta** at Slipstream if interested to pilot the class or to learn more.



Dave Vigliotta

Director of Strategic Partnerships

(608) 210-7143

dvigliotta@slipstreaminc.org

www.slipstreaminc.org





Renewable Energy Technical Diploma

- + 15 credits
- + Embedded into HVAC program
- + August Start
- + \$2,796 est. Program cost
- + Solar, Wind, Geothermal focus
- + 2021-2022 will start 70 new students in this program



Energy Education Center | Eau Claire, WI

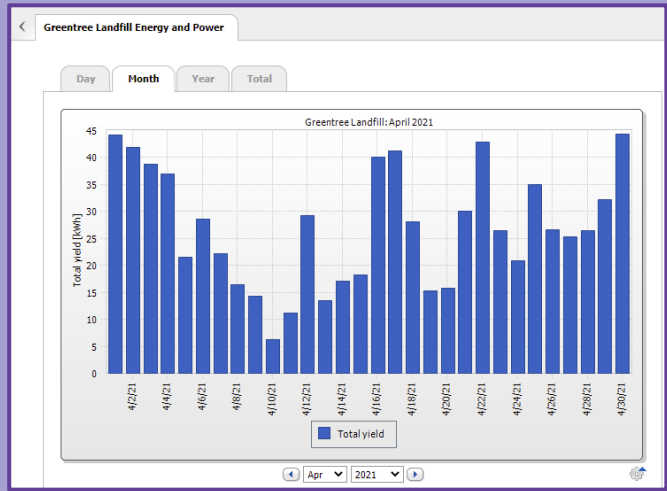
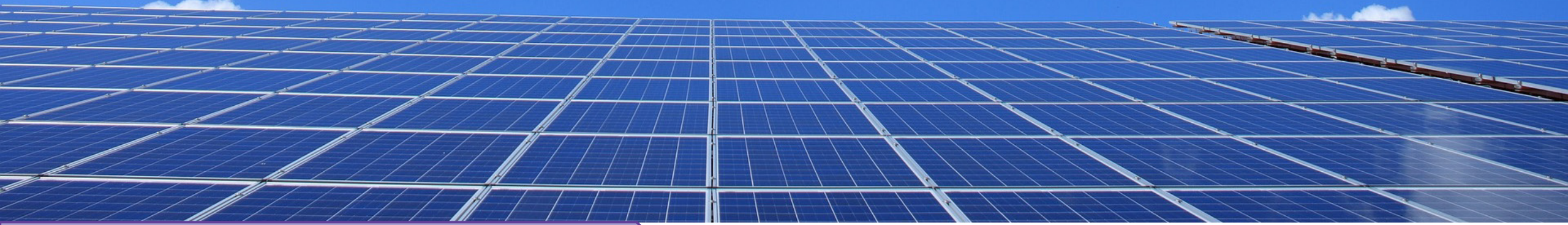
Click [here](#) for building tour

100KW renewable wind & solar





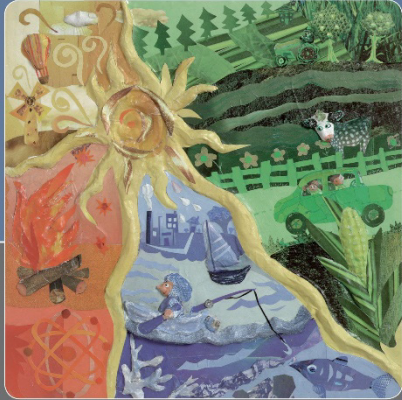
What's Next?




Renew Our Schools – March 31
NWTC Tech Challenge – April 8
Energy Educator of the Year – April 10
MREA Energy Fair - June 24-26
CREATE Institute – July




KEEP Curriculum




**Wisconsin K-12
Energy Education Program**
Energy Education Activity Guide




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Energy and Your School
A School Building Energy Efficiency Education Supplement
to the KEEP Energy Education Activity Guide




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Know the Flow of Energy in Your School
A Supplement to the KEEP Energy Education Activity Guide
for teachers of kindergarten through fourth-grade students



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Doable Renewables
A Renewable Energy Education Supplement
to the KEEP Activity Guide



Wisconsin K-12 Energy Education Program (KEEP)
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[Download Free Resources](#)



Wisconsin Center for Environmental Education
College of Natural Resources
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Trunks & Kits

- 30+ Kits and Trunks available
- KEEP, LEAF, WCEE themed
- Ready to go & use
- Most can ship (share shipping costs)

[Reserve](#)
[a Kit!](#)



Stay Connected



www.KEEPprogram.org



www.facebook.com/wiskeep



mruether@uwsp.edu



715-346-4770



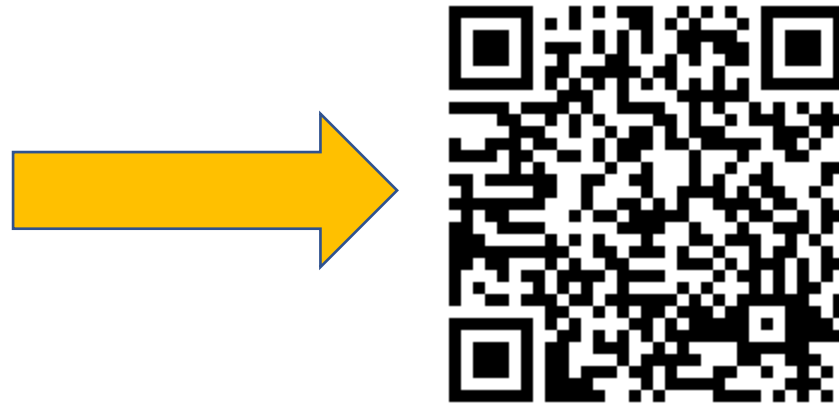
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Session Evaluation

Please take a couple of minutes to give us anonymous feedback on this workshop. Thank you!



<https://bit.ly/WCEE3Questions>



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