

High School to Tech College Energy Career Pathways

Jenny Brinker, NWTC

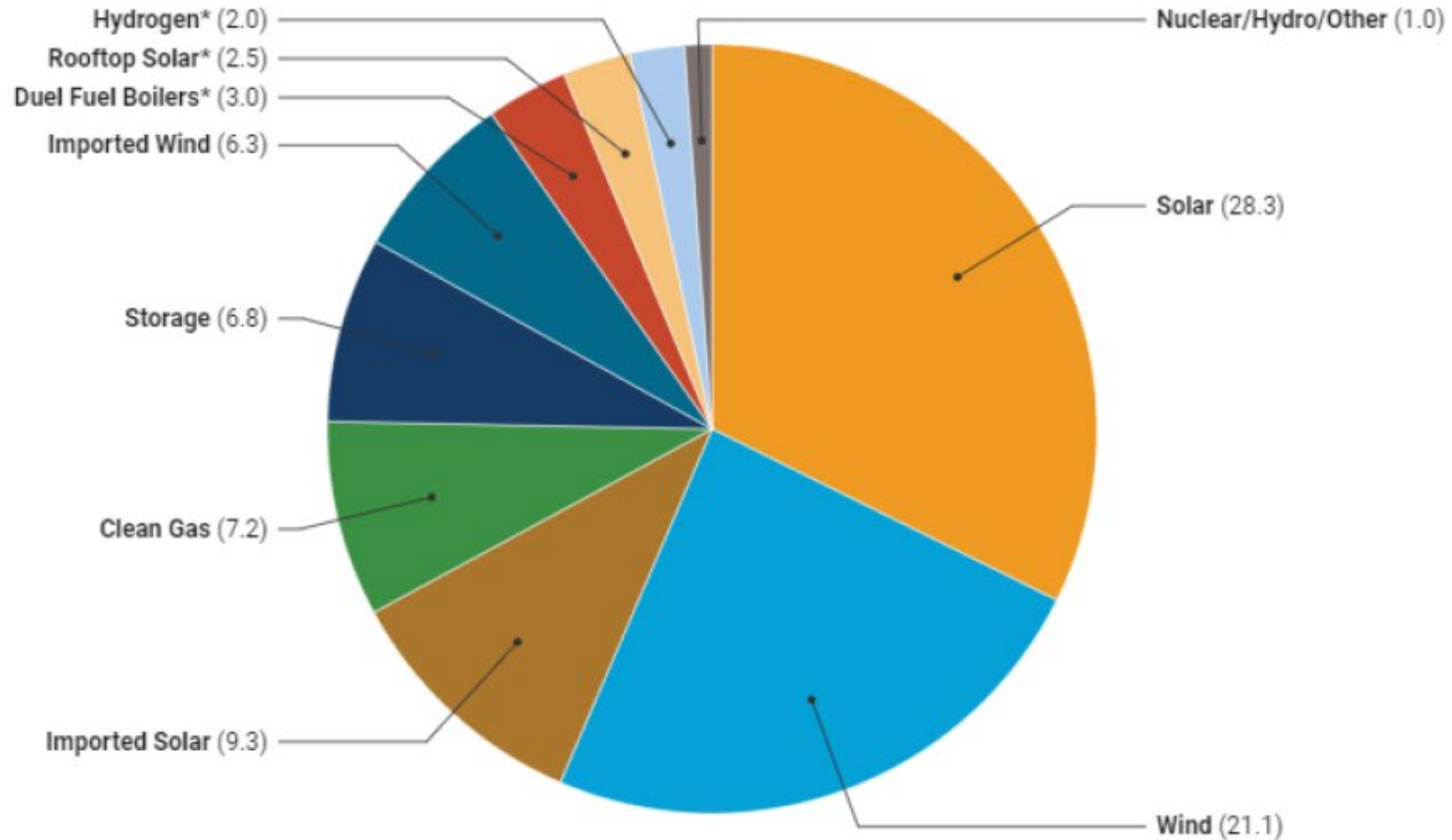
James Reichling & Ken Walz, Madison College

Adam Wehling, CVTC



A Diverse WI Clean Energy Portfolio by 2050

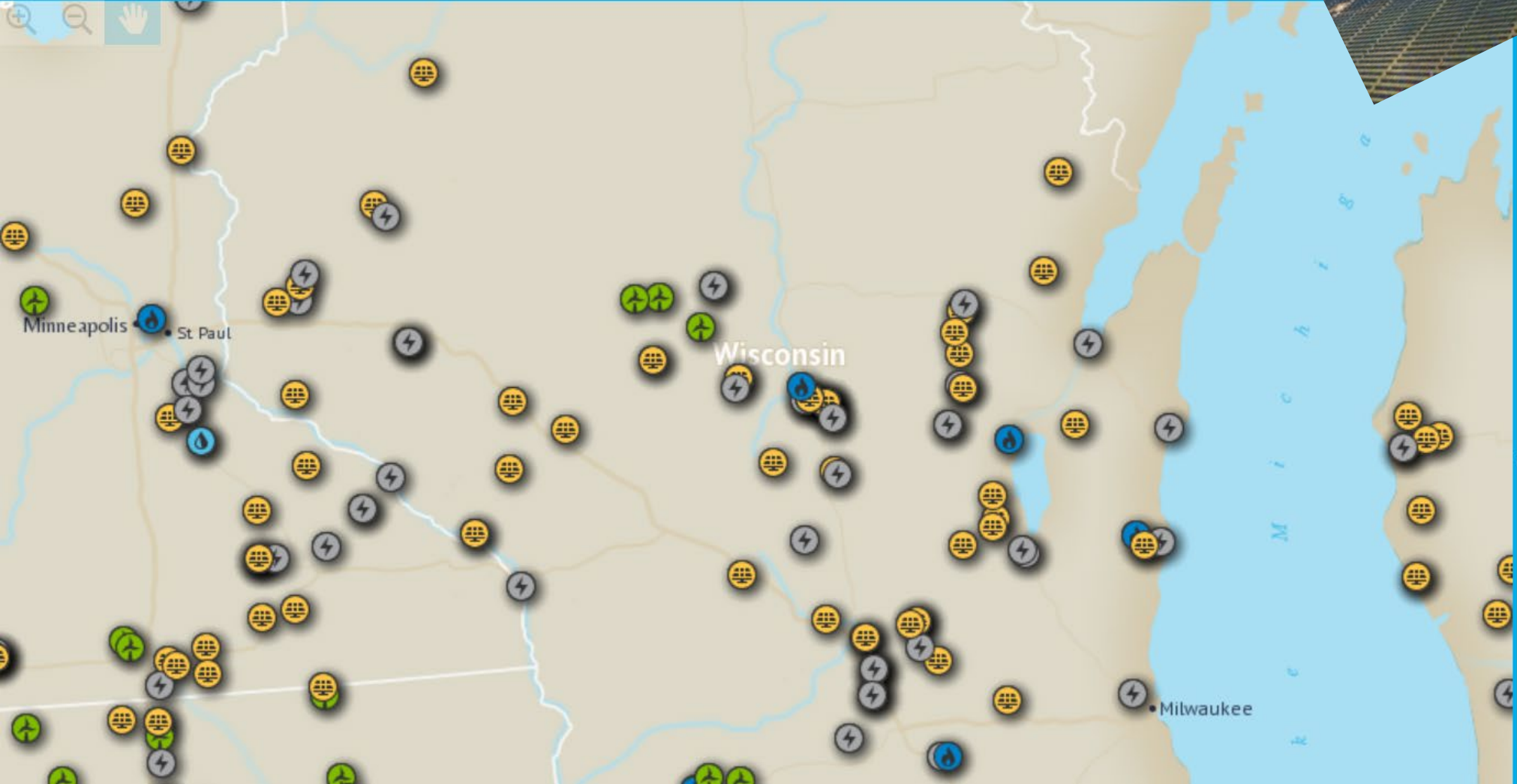
NETZERO ECONOMY WIDE CAPACITY BY 2050 (IN GW)



MISO Queue
















 Generator Interconnection Queue – Active Projects Map View Options
Fuel Type ▾ 



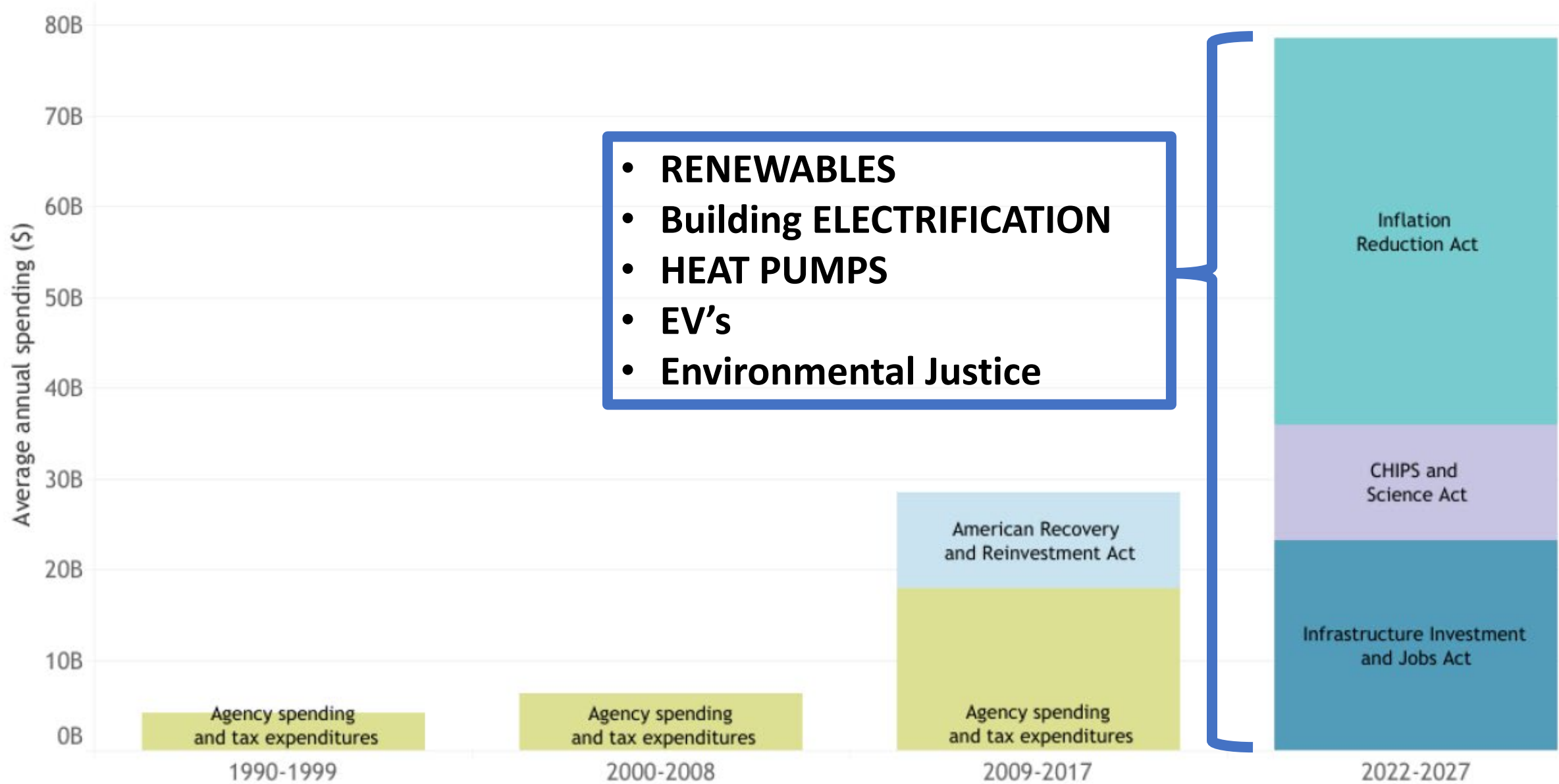
Projects

J1000

▼ Projects

-  Battery Storage (360)
-  Biomass (0)
-  Coal (1)
-  Co-Gen (0)
-  Combined Cycle (0)
-  Diesel (1)
-  Gas (27)
-  High Voltage DC (3)
-  Hybrid (245)
-  Hydro (4)
-  Landfill Gas (0)
-  Nuclear (0)
-  Oil (0)
- Solar (833)

Historic Level of Federal Investment





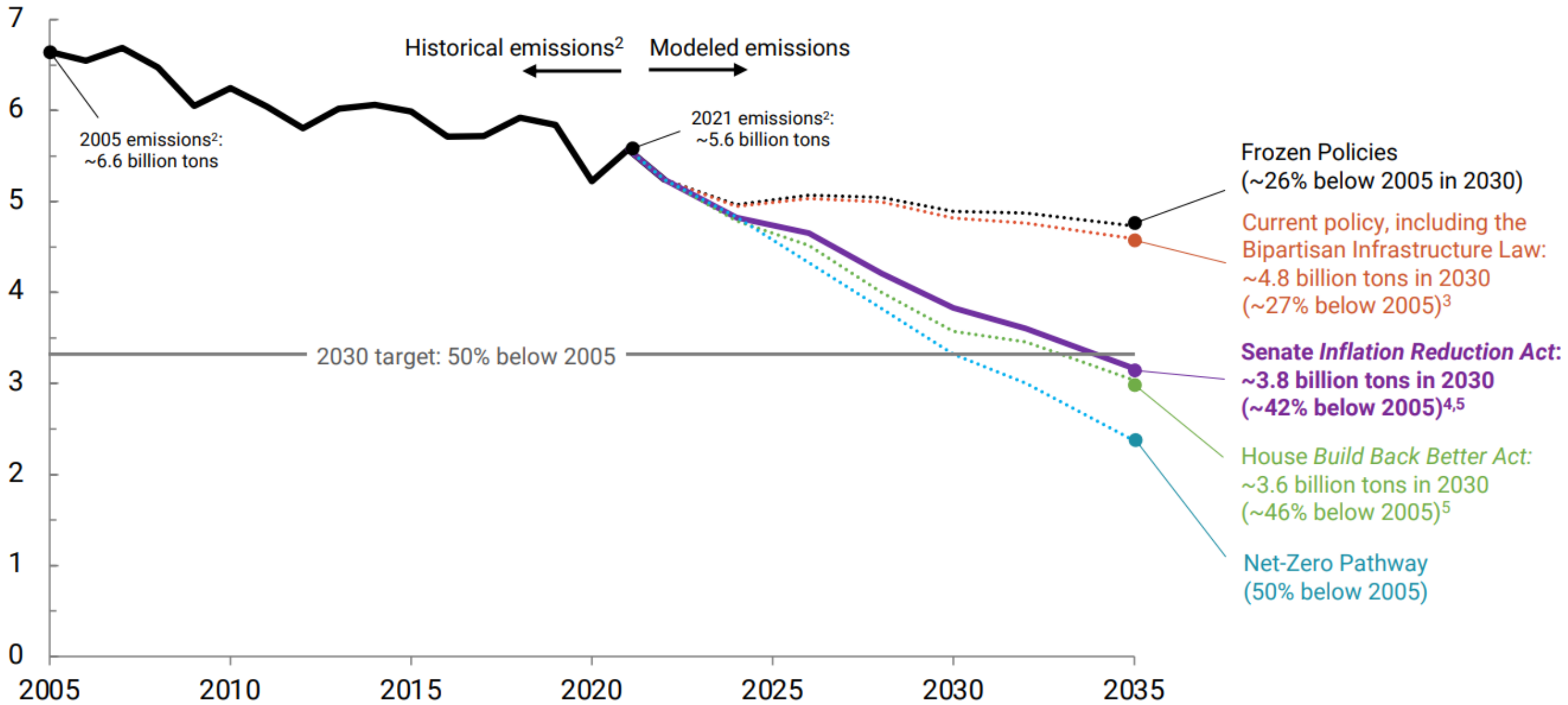
NORTHEAST

WI Technical College



Historical and Modeled Net U.S. Greenhouse Gas Emissions (Including Land Carbon Sinks)

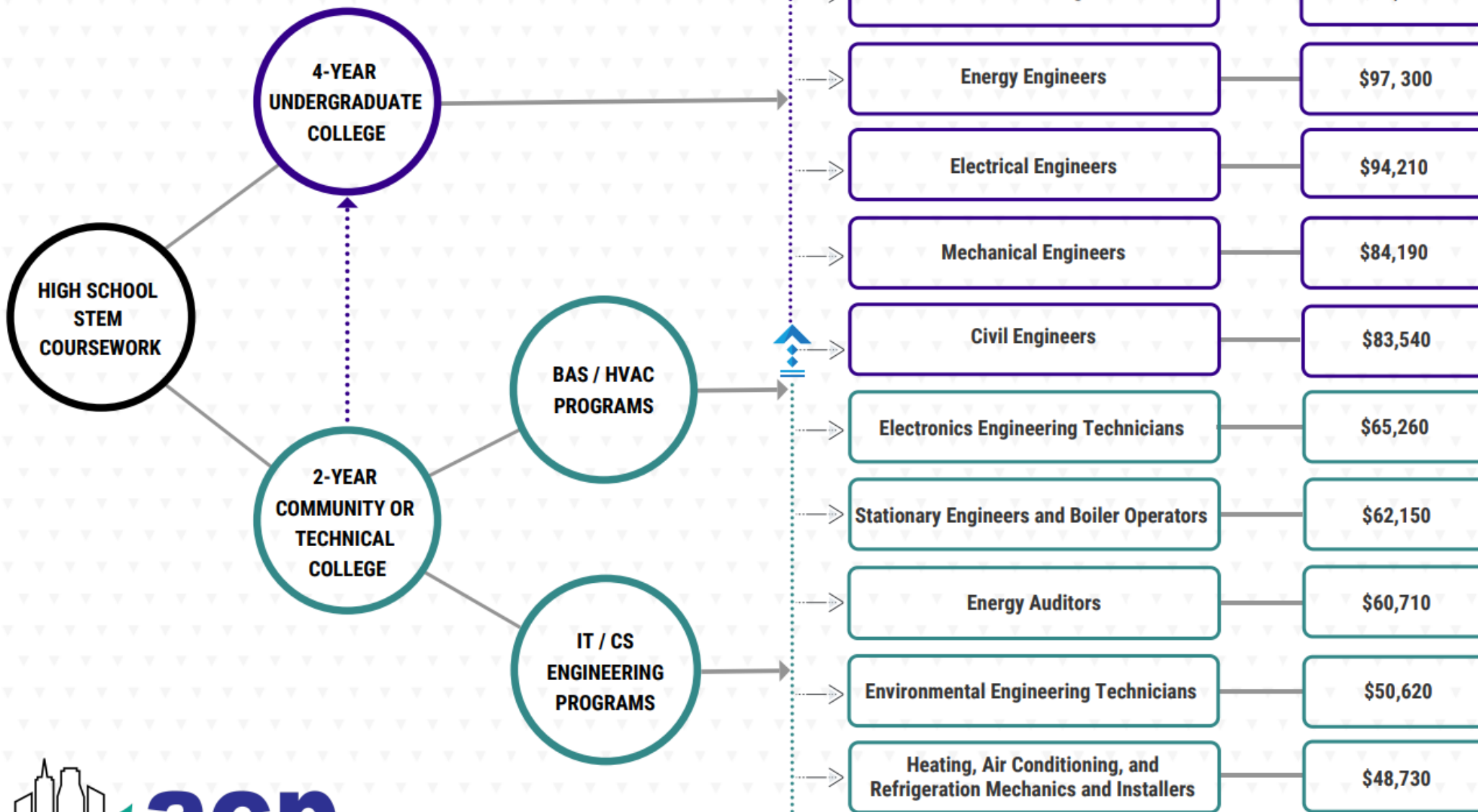
billion metric tons CO₂-equivalent (Gt CO₂-e)¹



BAS ECOSYSTEM OCCUPATIONS

SOME OCCUPATIONS

SALARY



BAS Ecosystem Occupations data on some occupations and salary are based on the research conducted by ACP. For further details, contact the Association of Controls Professionals
 Data Source: O*Netonline.org (Bureau of Labor Statistics, May 2019)



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ASSOCIATE DEGREE

ENERGY MANAGEMENT TECHNOLOGY ASSOCIATE DEGREE

10-481-3
Total Credits: 64

CERTIFICATE

ENERGY MANAGEMENT CERTIFICATE

90-481-1
Total Credits: 17

CERTIFICATE

BUILDING ENERGY & COMFORT CONTROLS CERTIFICATE

64-481-6
Total Credits: 7

HS

↪

K12

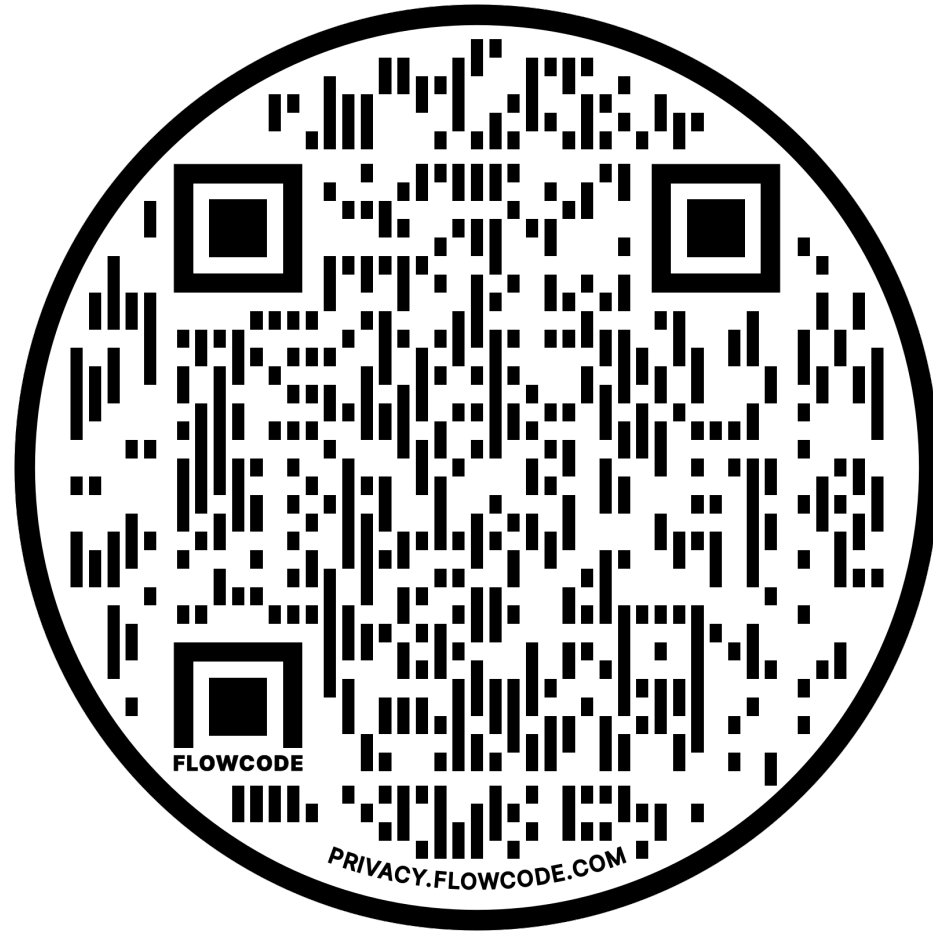
K12

*Not all K12 credits will apply to all credentials.
Your high school may offer these transcribed
credits that may apply towards a higher credential.*

Catalog Number	Course Title	Credit Value
10-664-100	Automation 1: Control Logic*	1
10-664-101	Automation 2: Motor Control*	1
10-664-104	DC 1: Introduction*	1
10-481-103	Smart Start to Building Automation Systems (BAS)	2
10-481-104	Building Automation System (BAS) Networking 1	1
10-481-117	Energy Control Strategies	1

TOTAL CREDITS: 7

*Available as transcribed credit



Smart Start to BAS Lesson Folder



NORTHEAST
WI Technical College



Dean of Agriculture, Energy, Construction & Transportation

awebling@cvtc.edu

www.cvtc.edu

Energy Education Center | Eau Claire, WI
Click [here](#) for building tour (skip to 2:42)



100KW
grid tied
renewable
wind & solar



CAREER PATHWAYS

-EARN CREDENTIALS ALONG THE WAY-



PATHWAY CERTIFICATES

Air Conditioning

Gas, Heating and Airflow

Oil, Electric and
Hydronic Heating

Refrigeration

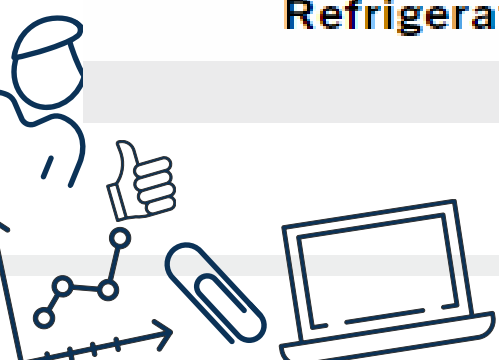
TECHNICAL DIPLOMAS

Renewable Energy

Air Conditioning, Heating &
Refrigeration-HVACR
Technician

ASSOCIATE DEGREE

Air Conditioning, Heating &
Refrigeration Technology



RENEWABLE ENERGY

15 Credit Technical Diploma

LENGTH OF PROGRAM //

One Year

DELIVERY METHOD //

Face-to-Face

PROGRAM LOCATION //

Eau Claire

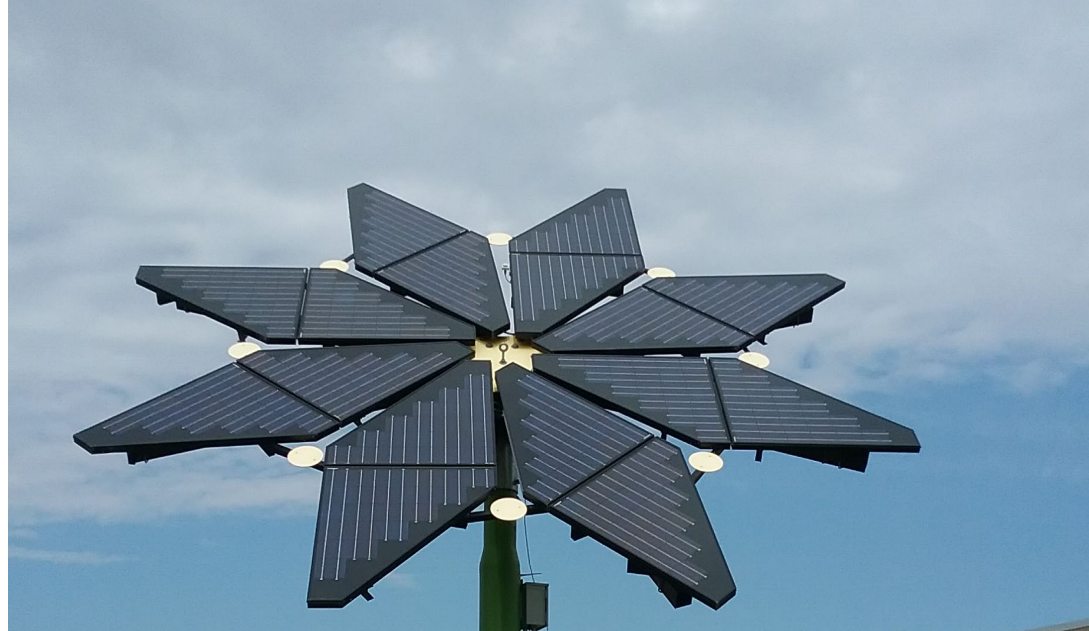
START MONTHS //

August

 Non-Traditional Occupation

Renewable Energy Technical Diploma

- Embedded into HVAC program
- \$2,784 est. Program cost
- Solar, Wind, Geothermal focus
- 2022-23 will start 70 new students in this program





Gas Utility Construction & Service



 Gas Utility Construction & Service Program



JUST THE FACTS

GAS UTILITY CONSTRUCTION & SERVICE

33 Credit Technical Diploma

LENGTH OF PROGRAM //

One Year

DELIVERY METHOD //

[Face-to-Face](#)

PROGRAM LOCATION //


Eau Claire

START MONTHS //

June

 Financial Aid Eligible

ESTIMATED PROGRAM COST >

 Estimated Total: \$7,431



Electrical Power Distribution & Lineman Apprenticeship

JUST THE FACTS

ELECTRICAL POWER DISTRIBUTION

35 Credit Technical Diploma

LENGTH OF PROGRAM //

One Year

DELIVERY METHOD //

[Face-to-Face](#)

PROGRAM LOCATION //

Eau Claire

START MONTHS //

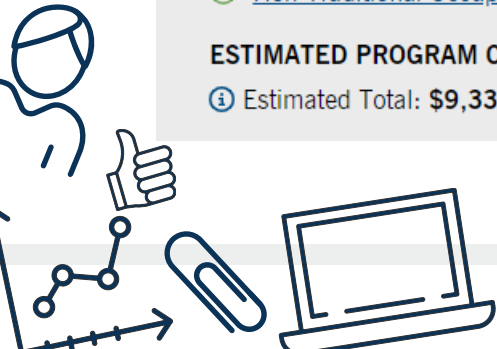
June

Financial Aid Eligible

[Non-Traditional Occupation](#)

ESTIMATED PROGRAM COST >

Estimated Total: \$9,338





Oct. 4, 2023 Glenwood City, WI



This event gives students the opportunity to spend a day in the Construction Industry through a hands-on interactive showcase.

Student activities include educational displays, equipment operations, and learning labs.





Leading the Charge

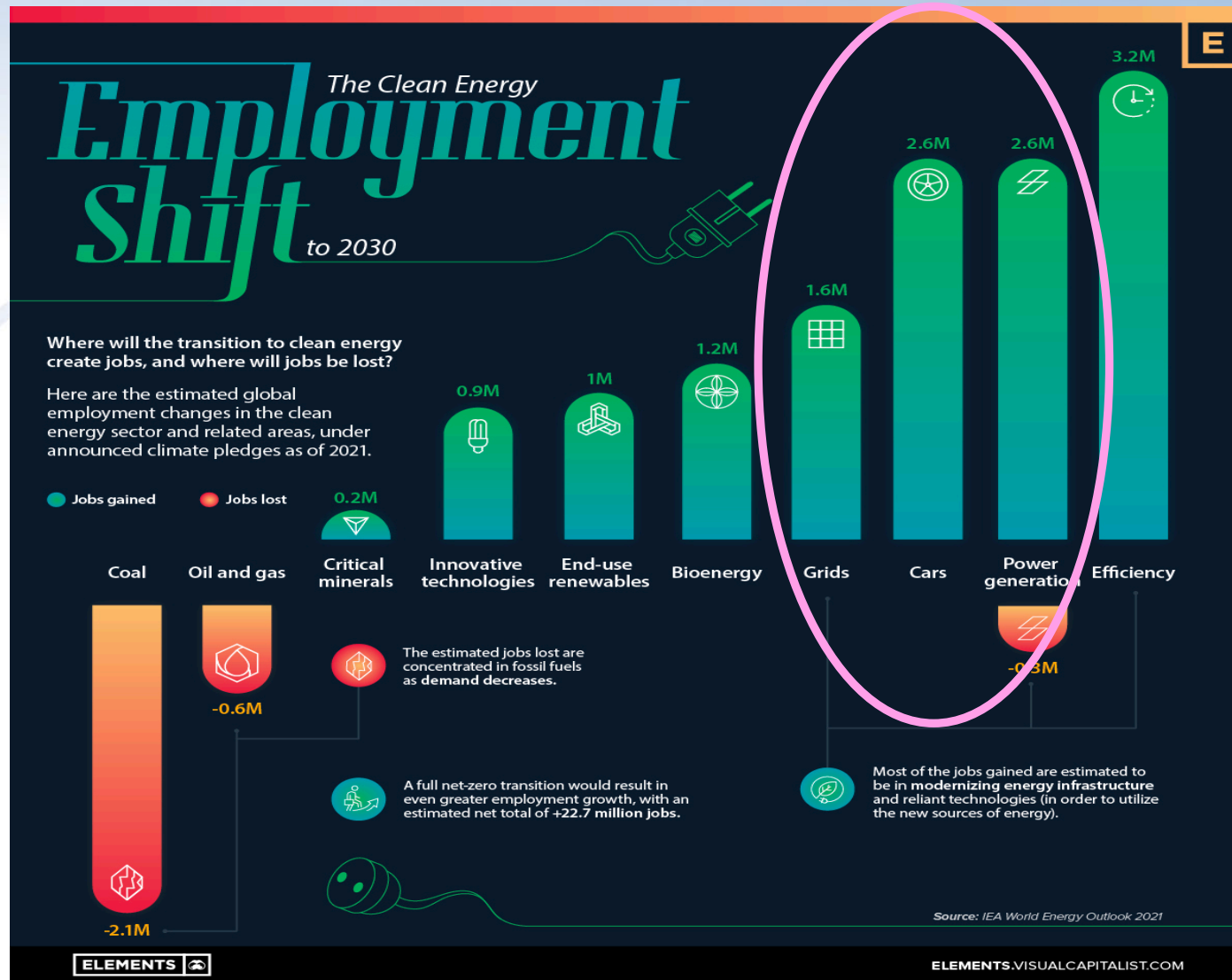
Jim Reichling

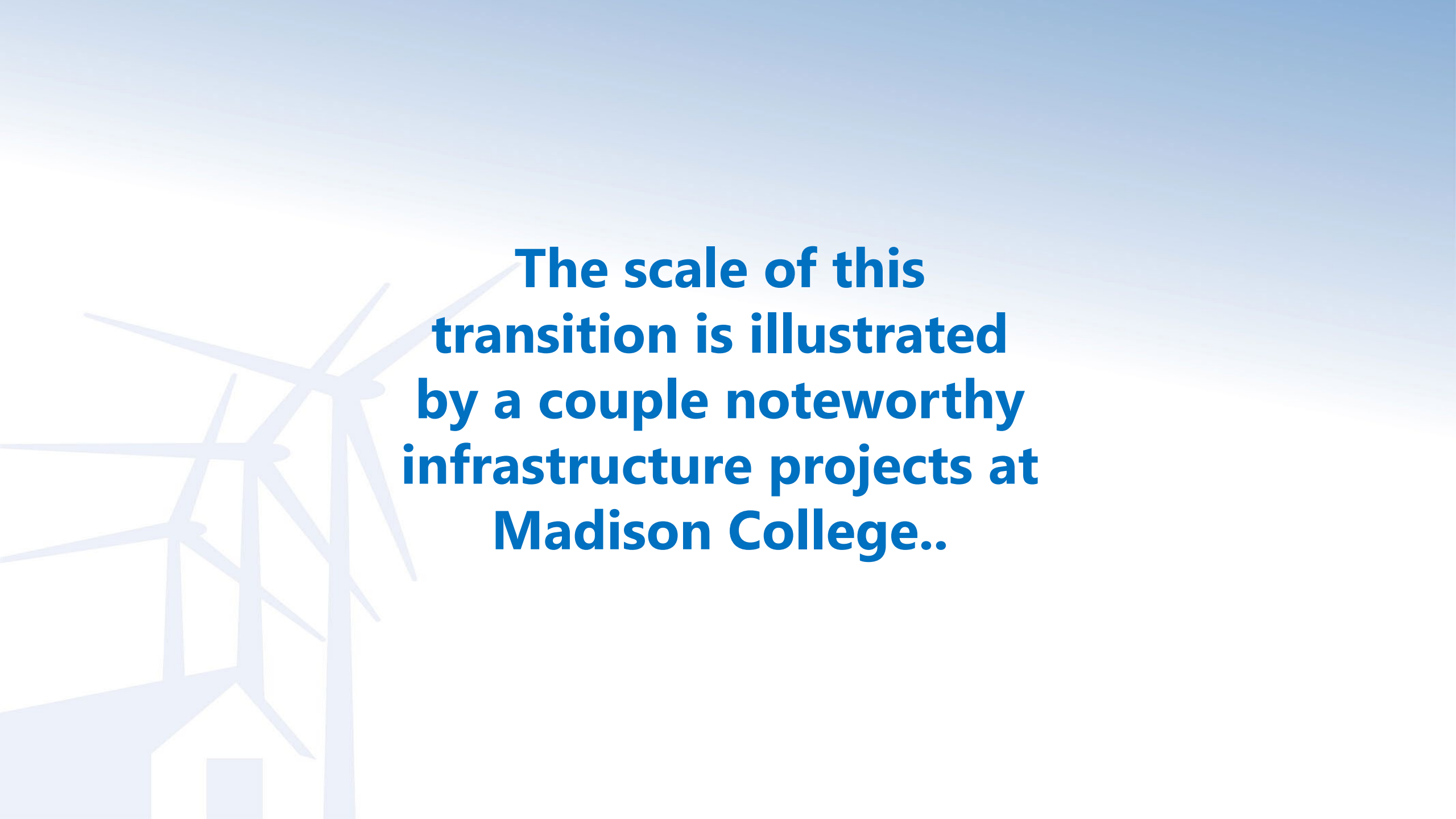


Renewable Energy Education
at Madison College



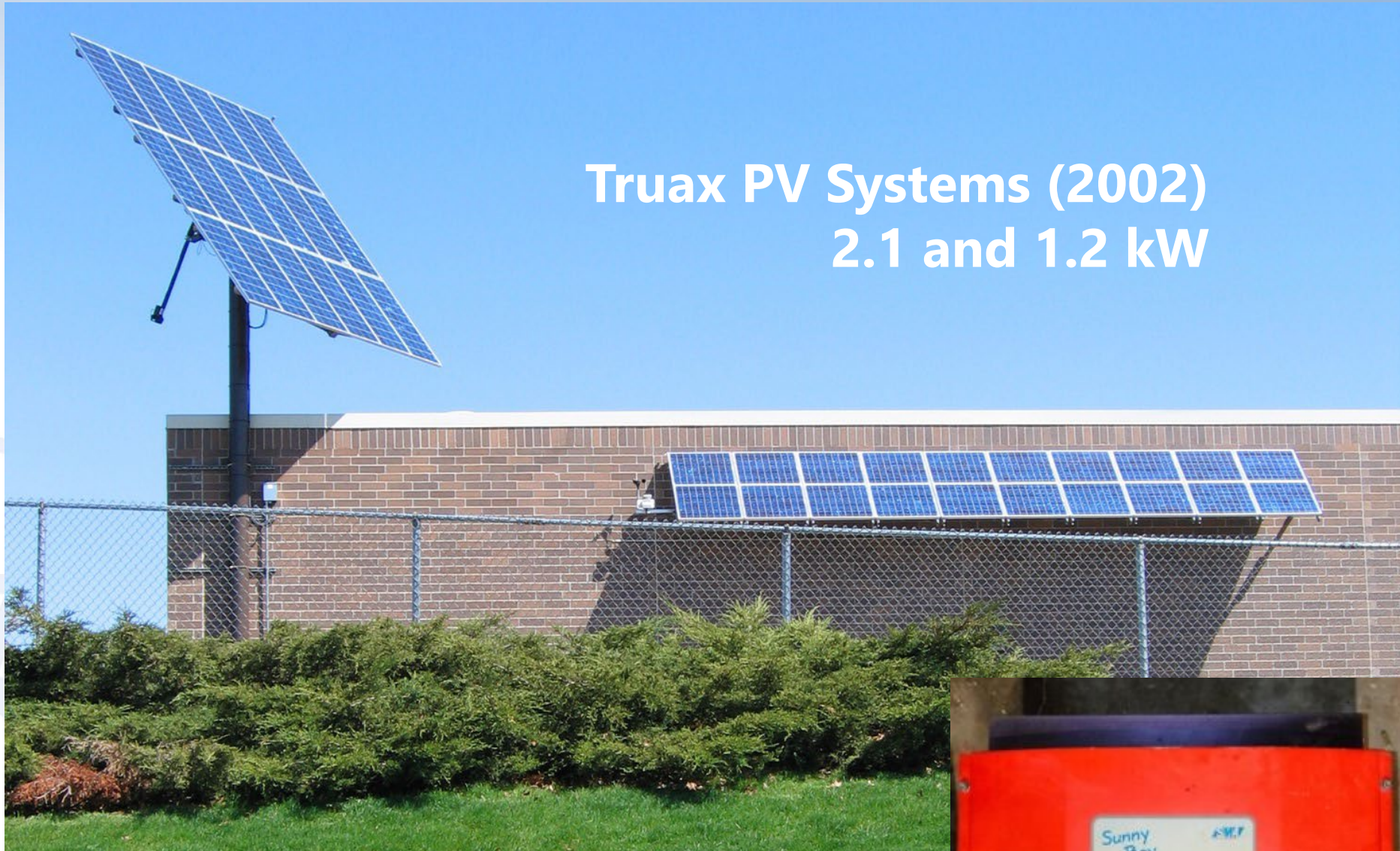
The next decade will feature a once in a century transition in our energy sector !



The background features a light blue gradient with faint, semi-transparent silhouettes of wind turbines and a building on the left side. The text is centered in a bold, dark blue font.

The scale of this transition is illustrated by a couple noteworthy infrastructure projects at Madison College..

Truax PV Systems (2002) 2.1 and 1.2 kW



- 18 Kyocera 115 Watt modules + 20 Kyocera 60 Watt modules
- Single Sunny Boy 3kW DC to AC inverter
- LCD data screen with two data parameters:
 - Instantaneous Power and Lifetime Energy output
- Produced about 0.01% of campus energy consumption



Madison College Truax PV System 1,850 kW



- 5,700 Yingli 325 Watt solar modules
- 2850 DC optimizers (one per per pair of modules)
- 50 SolarEdge 33kW kW Inverters
- Real time energy monitoring of individual panel output
- Robust data analytics and performance monitoring
- Produces ~ 20-25% of the building's electricity





RENEWABLE ENERGY

Certificate

Program number: 904802CERT

OVERVIEW

ADMISSION

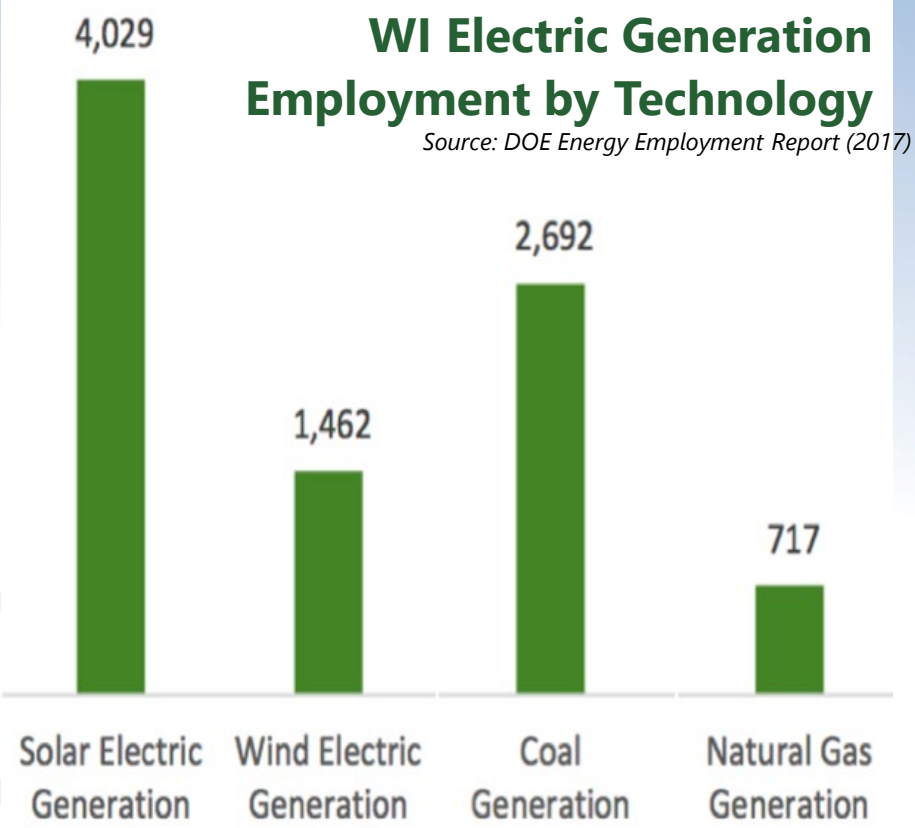
CURRICULUM

CAREERS

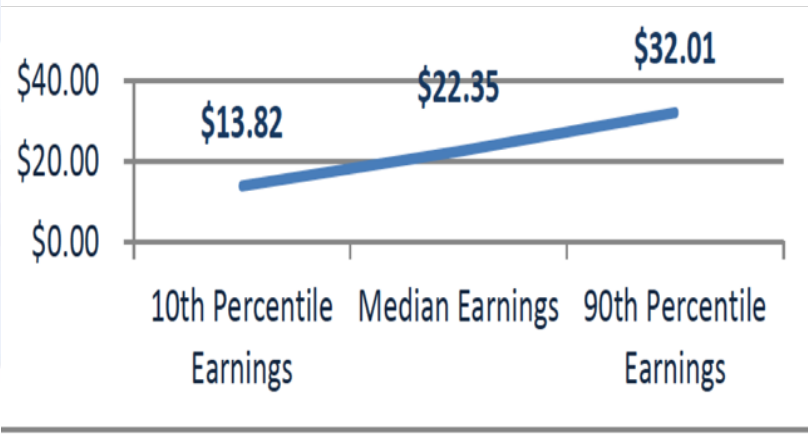
Madison College offers a variety of Renewable Energy certificate programs for students pursuing a career in renewable energy or enhancing their current career.

The [Photovoltaics](#), [Renewable Energy](#) and [Wind Energy Technology](#) programs are designed to integrate interdisciplinary technical courses taught by faculty who hold appointments and certifications in a variety of instructional areas, including electrical and mechanical technology, engineering, agriculture, and basic and applied sciences.

Madison College has offered a RE Certificate since 2005. Students can pair this credential with education in traditional academic fields such as architecture, construction, engineering and electrical apprenticeship programs.



Renewable Energy Occupation Wages (per hour)



Source: Economic Modeling Specialists (EMS) Int'l data

CNN Money
u.s. + Business Markets Tech Media Personal Finance Small Biz Luxury
stock tickers

American Opportunity
Log In

Solar jobs growing 17 times faster than US economy

by Matt Egan @MattEganCNN
May 25, 2017: 4:20 PM ET

Mortgage & Savings

Mortgage Personal Loans Credit Cards

Loan Type	Rate	APR
30-yr fixed	3.63%	3.71%
15-yr fixed	2.86%	3.04%
5/1 ARM	2.5%	3.7%

Loan Amount	APR	Payment
\$225,000 (5/1 ARM)	3.7%	\$889/mo
\$350,000 (5/1 ARM)	3.72%	\$1,499/mo

Get Personalized Rates >

Inside the U.S. solar jobs boom

LendingTree
Terms & Conditions apply

The Motley Fool
Paid Partner

You Can Still Buy This "Millionaire Maker" Stock

These are jobs that:

- 1) Pay a family supporting wage
- 2) Cannot be outsourced
- 3) Cannot be done by robots
- 4) Have huge growth potential
- 5) Benefit society



Renewable Energy Career Pathway at Madison College

Because renewable energy is growing so fast, there are great opportunities for rapid promotion and career advancement

High School Opportunities
Start on your path while still in High School with dual enrollment options.

Credit for Prior Learning
Transfer in, experiential credit, challenge exams.

Renewable Energy
Local Certificate—9 credits

[Program Information](#)

Continued Education

- [Construction & Remodeling](#)
- [Electronic Service Technician](#)
- [Industrial Maintenance Mechanic](#)

Apprenticeship

- [Electrician Apprenticeship \(ABC\)](#)

Continued Education

- [Electrical Engineering Technology](#)
- [Architectural Technology](#)
- [Small Business Entrepreneurship](#)

Apprenticeship

- [Electrician Apprenticeship \(ABC\)](#)

Bachelor's Degree
[4-Year Transfer Options](#)

Upper-Level Employment

Example Job Titles:

- ◊ Photovoltaic Electrical Installer/Operator
- ◊ Photovoltaic System Designer
- ◊ Electrician/Contractor
- ◊ Solar Sales

Average Industry Wages:
\$21.74-\$48.83 per hour

Mid-Level Employment

Example Job Titles:

- ◊ Photovoltaic Installer/Operator
- ◊ Solar Maintenance Technician

Average Industry Wages:
\$14.36-\$23.60 per hour

Entry-Level Employment

Example Job Titles

- ◊ Solar Installation Helper

Average Industry Wages:
\$9.60-\$17.11 per hour

EXPERIENCE

EDUCATION

Career Pathways
Real world smart.

Madison College "Solar Yard" (Photo: Ken Walz)



Monitoring of systems, PV arrays at other campuses including Madison South Campus, Reedsburg, Watertown, Fort Atkinson



CREATE workshops for Teachers

<https://createenergy.org/renewable-energy-workshops/>

STEM Educator Virtual Solar Institute- April 2023

STEM Educator Solar Institute July 11 – 13 in Madison

Both have stipends and funding for materials

New Energy Storage workshop

CREATE Resources

<https://createenergy.org/teaching-materials/>

Student lessons and instructor materials

Select a category to view lesson plans in a specific Renewable Energy topic.

Energy
Fundamentals

Energy
Management &
Efficiency

Solar PV

Bioenergy

SCADA

Dual Credit Class – Introduction to Renewable Energy

1 semester, 0.5 physical science credit

Best if students have taken (or concurrent) chemistry

3 Madison College cr, count toward renewable certificate

One class so far, 17 students

Course Topics

Energy and Thermodynamics

Fossil Fuels

Biomass and Biogas

Biofuels

Solar Thermal

Electricity & Electromagnetism

Hydropower

Wind Energy

Solar Photovoltaics

Concentrated Solar Power

Geothermal

Energy Storage

Energy Management /Energy
water nexus

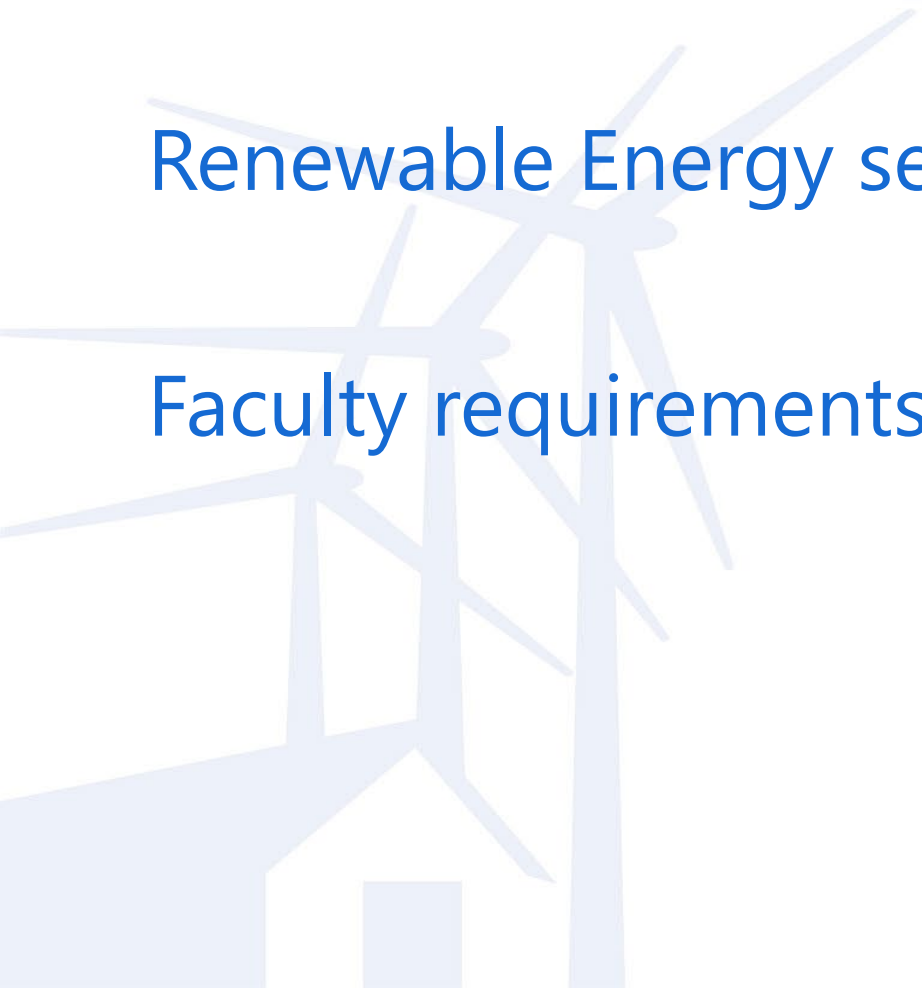
Energy Economics and Policy

Two semesters in Green Bay / NE Technical College

Energy fundamentals first semester

Renewable Energy second semester (dual credit)

Faculty requirements



**Thank you for
your attention!**

Questions?



Link to Reedsburg online display and south campus

<https://pubdisplay.alsoenergypreview.com/kiosk/18014398509536628?dashkey=2a5669734a65472f4542513d3d&tag=8122124>

South:

<https://eland.solarlog-web.net/dashboard/?username=545024073&password=4bf8e43287d439f7bb24daa9e2dc0627&tiles=Yield%7Ctrue,Graphic%7Ctrue,Balance%7Ctrue,Plant%7Ctrue,Env%7Ctrue,Weather%7Ctrue,Overview%7Ctrue>