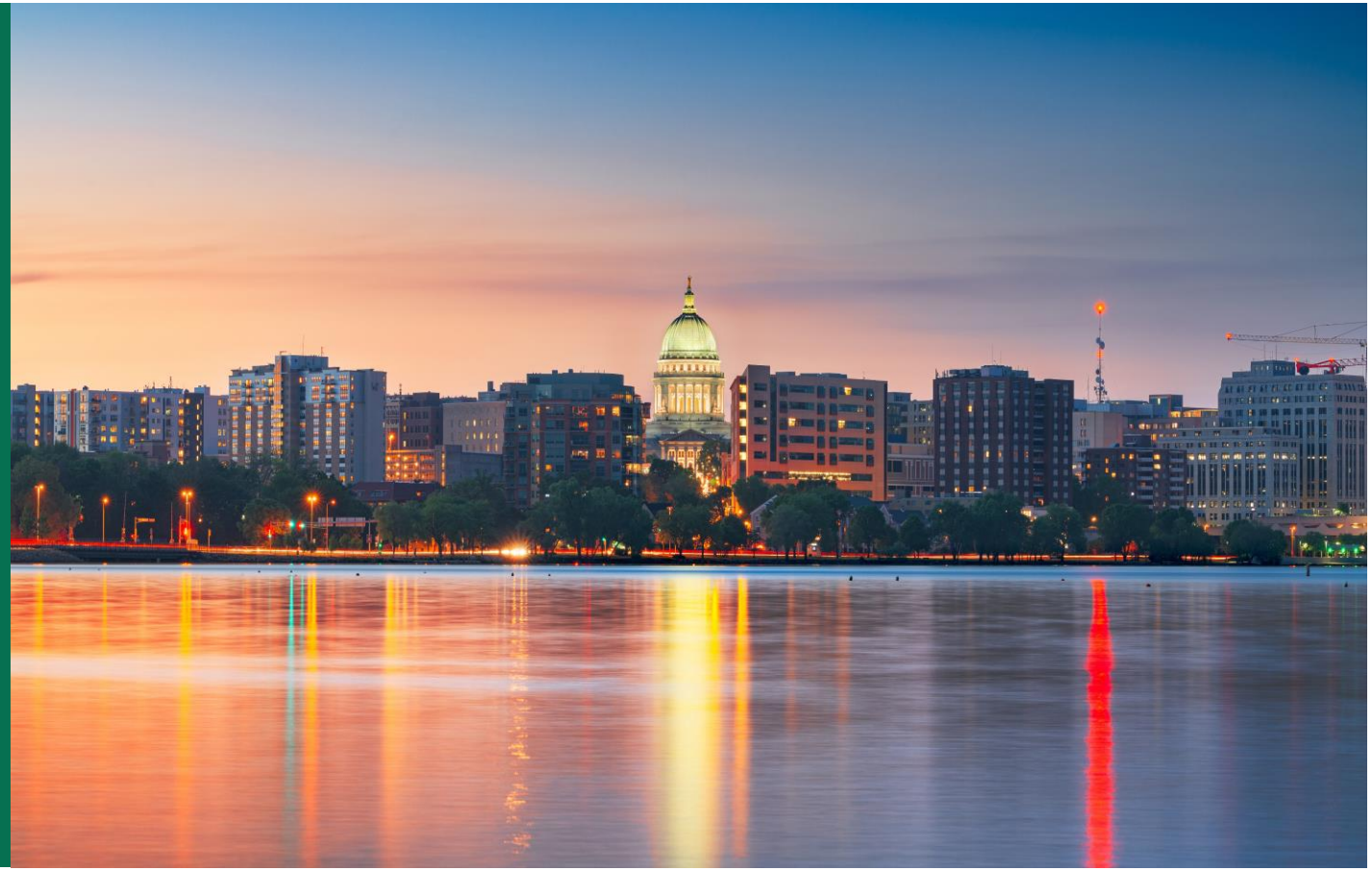
Building Decarbonization Forum

Thursday, October 27, 2022
8 am–11:30 am

The Goodman Community Center
Madison, Wisconsin



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Introduction to Decarbonization

Building Decarbonization Forum

Jeannette LeZaks | Slipstream

October 27, 2022

slipstream

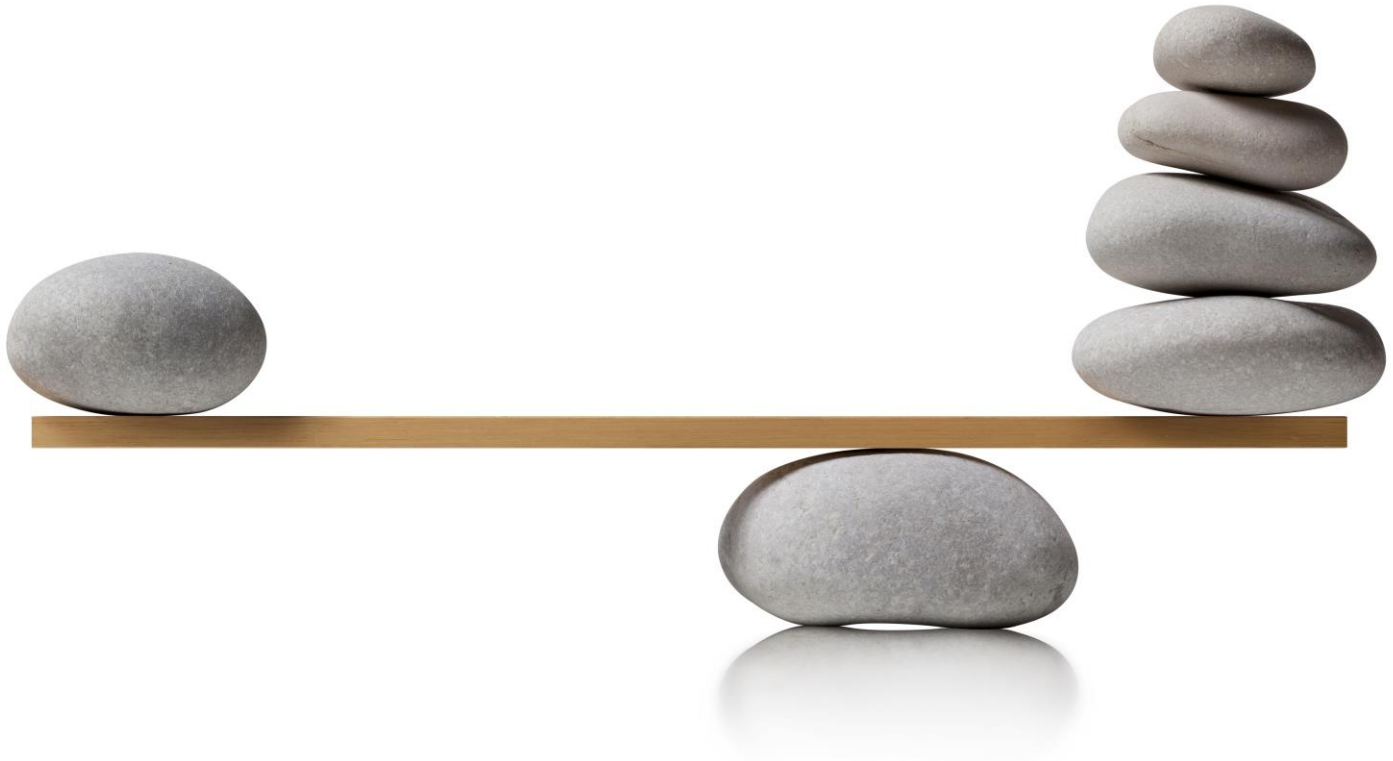
Climate + Clean Energy Solutions for everyone.

The knowledge, people, and resources to solve our biggest energy challenges.

Setting the Stage for Today

What are our challenges?

Where are the opportunities?



What is Decarbonization?

Definition

The process of reducing carbon intensity and lowering the amount of greenhouse gas emissions produced by the burning of fossil fuels.

The Challenges

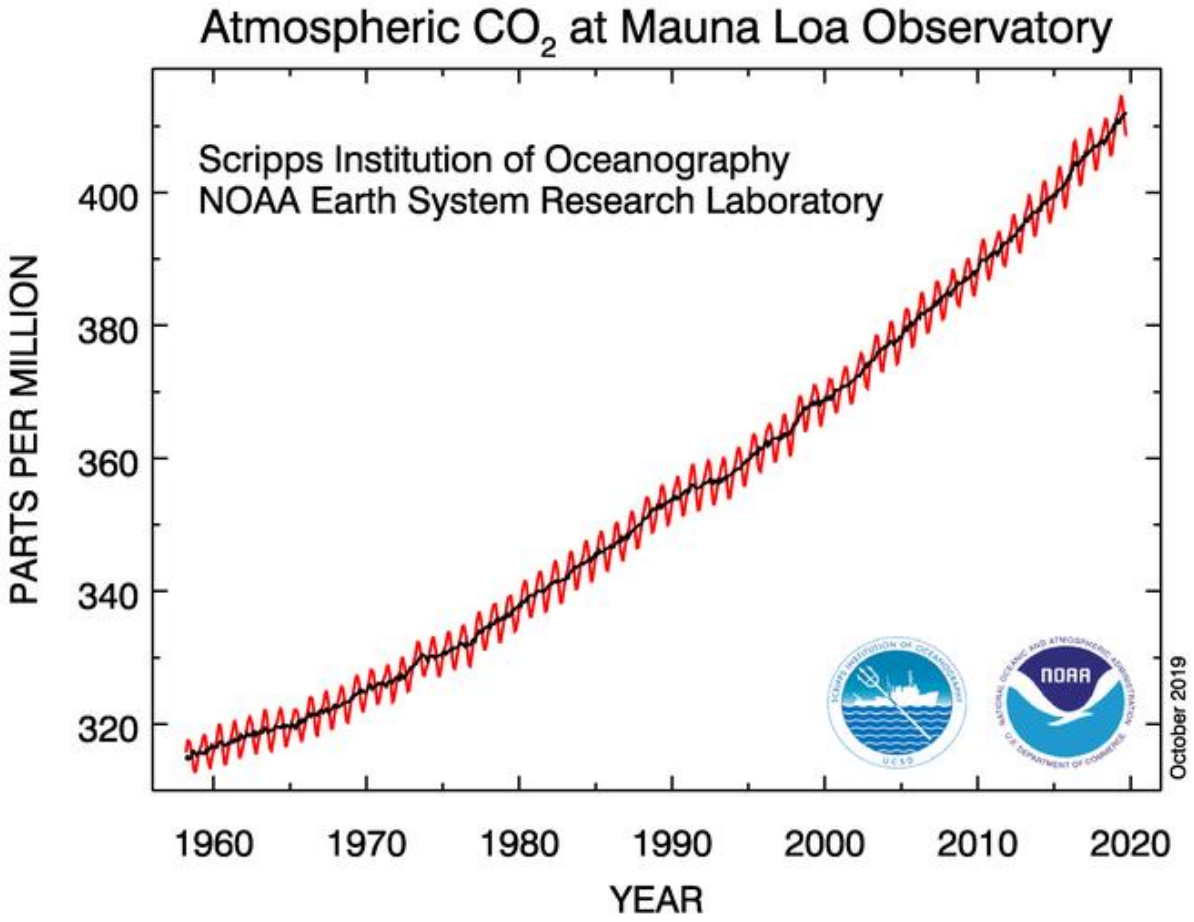
The Challenges are Big

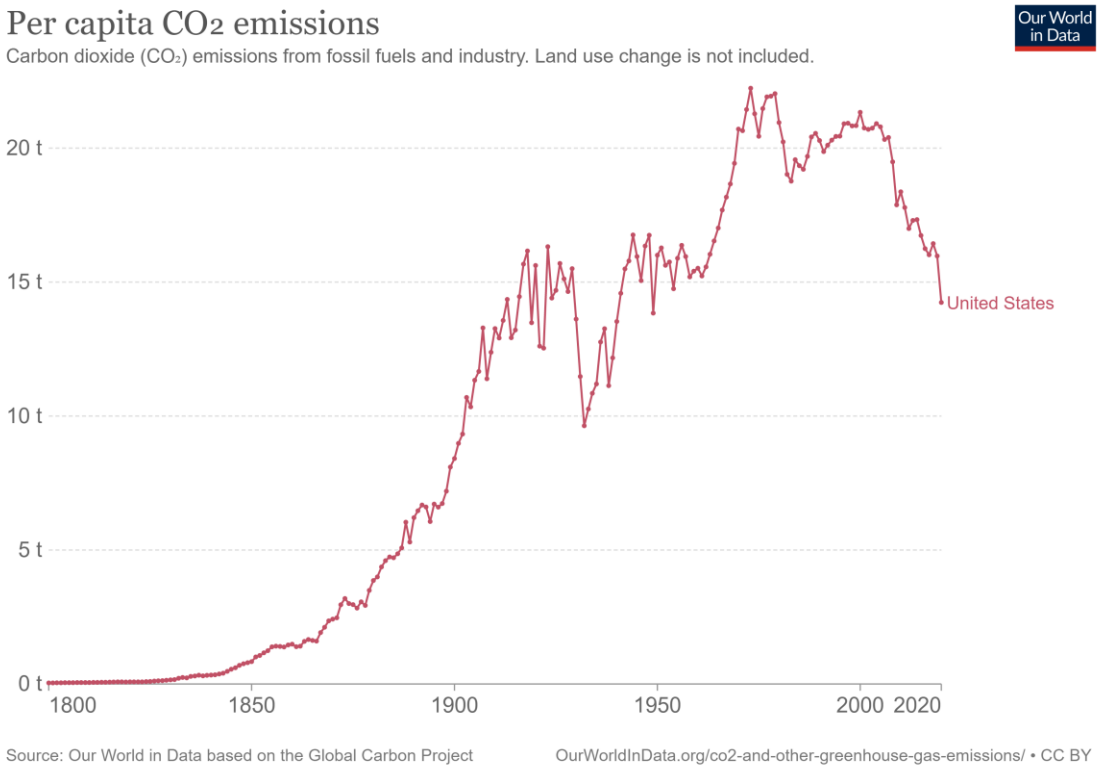
Climate pollution continues to rise

Global growth is tied to fossil fuels

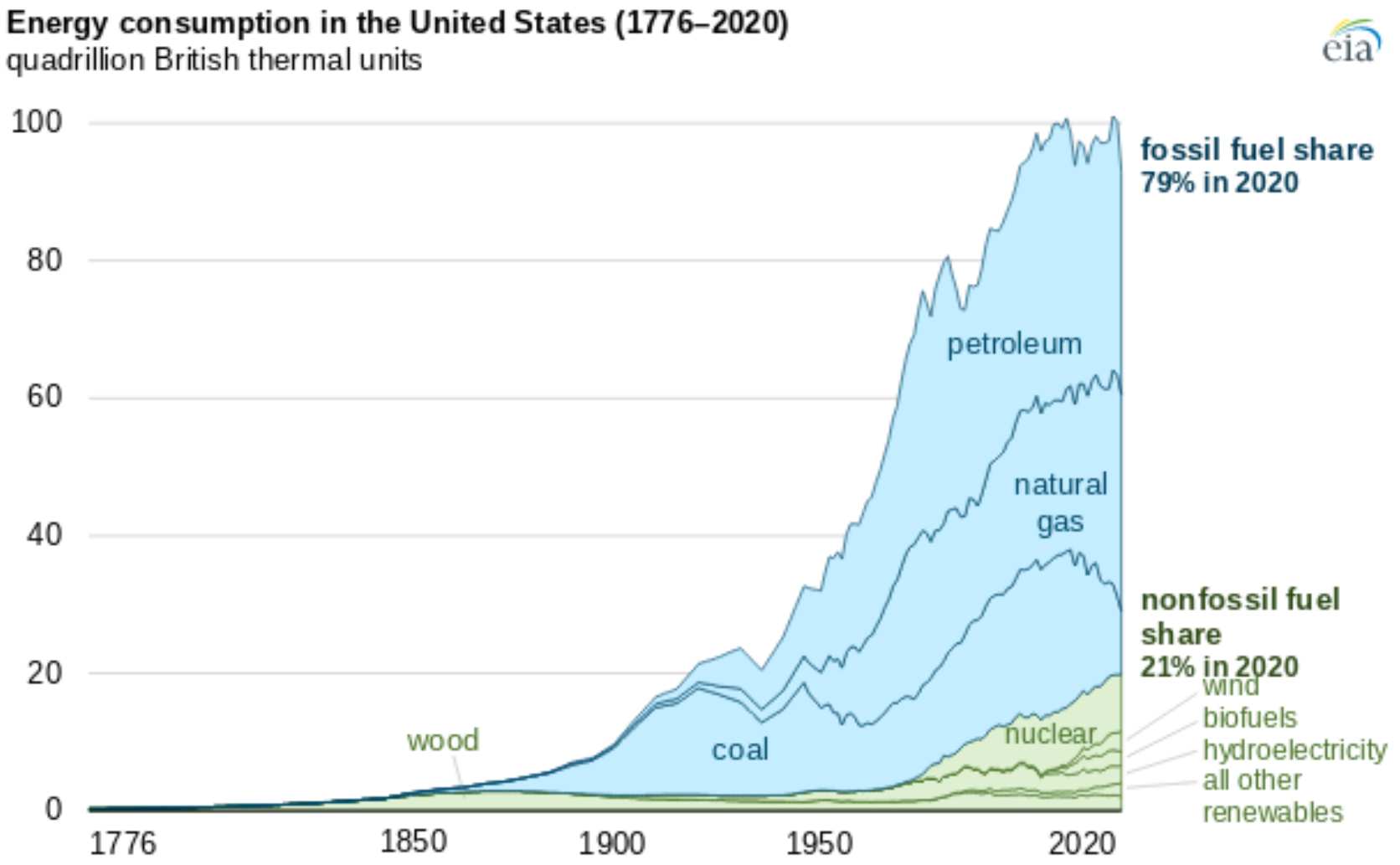
Already feeling effects of a changing climate

Human Impact on a Global Scale





Energy Consumption Dominated by Fossil Fuels



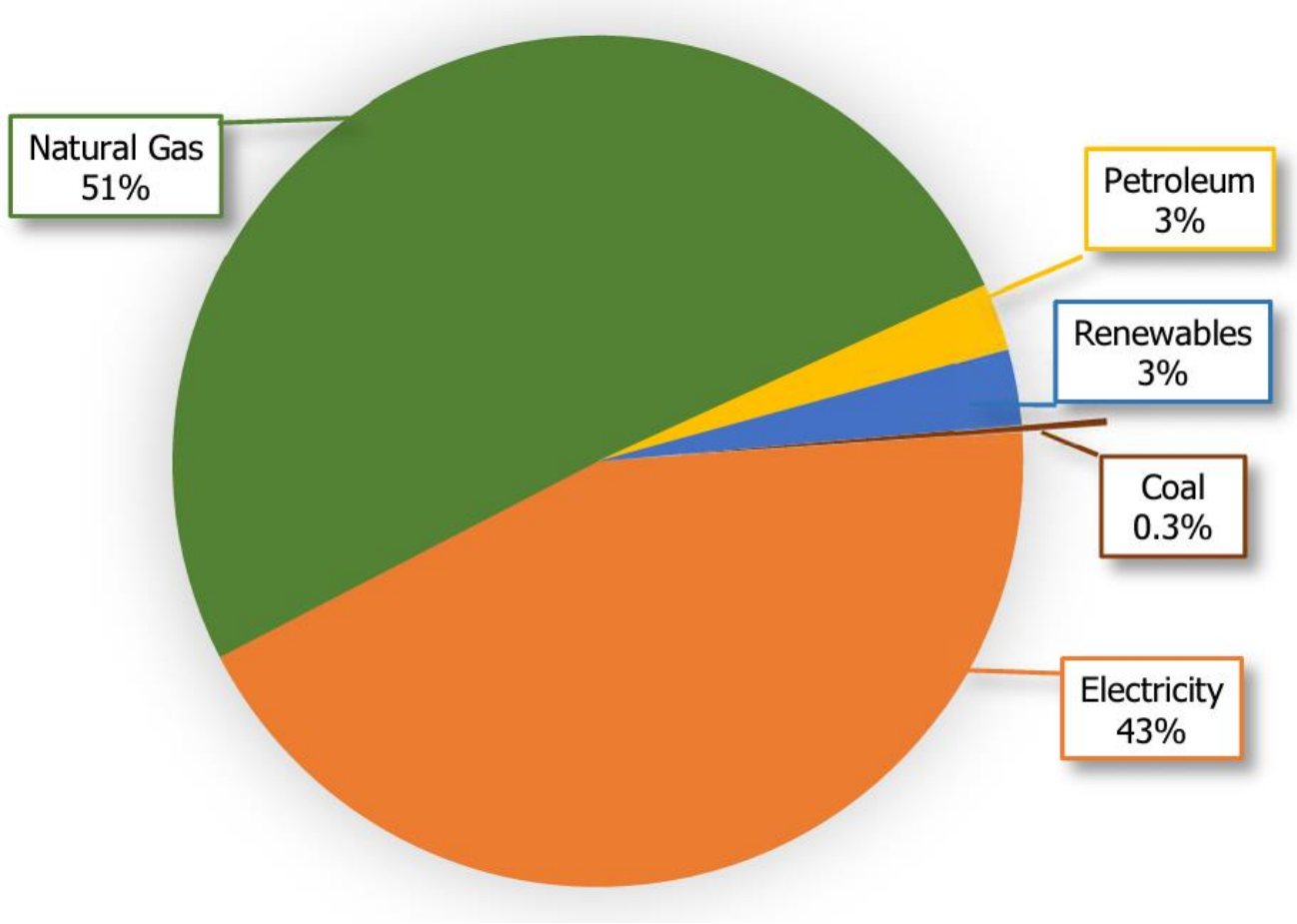
https://www.eia.gov/todayinenergy/detail.php?id=52959

Energy Consumption Dominated by Fossil Fuels

Wisconsin Commercial Sector

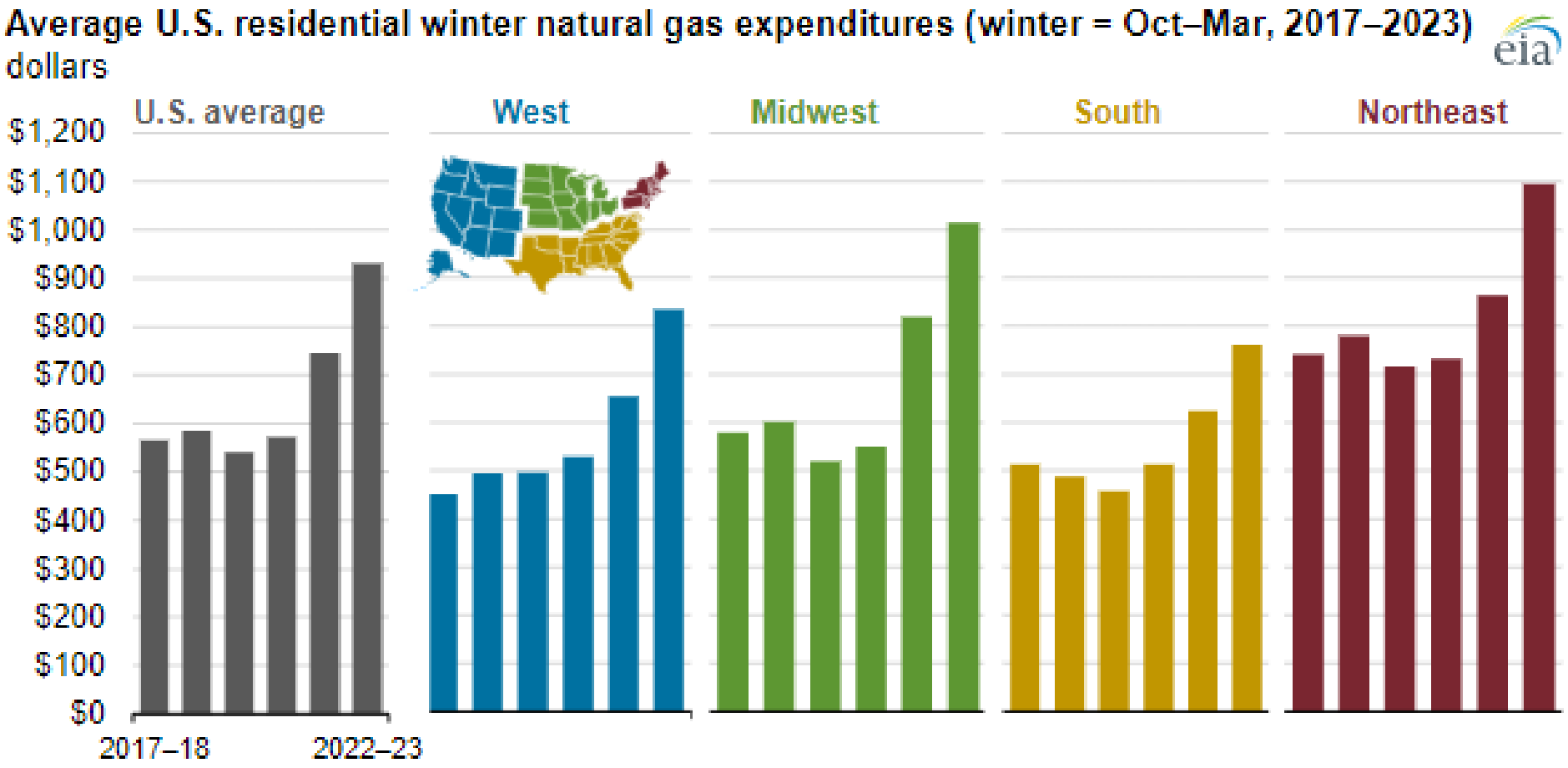
Energy End Use Consumption in

(2017 data)

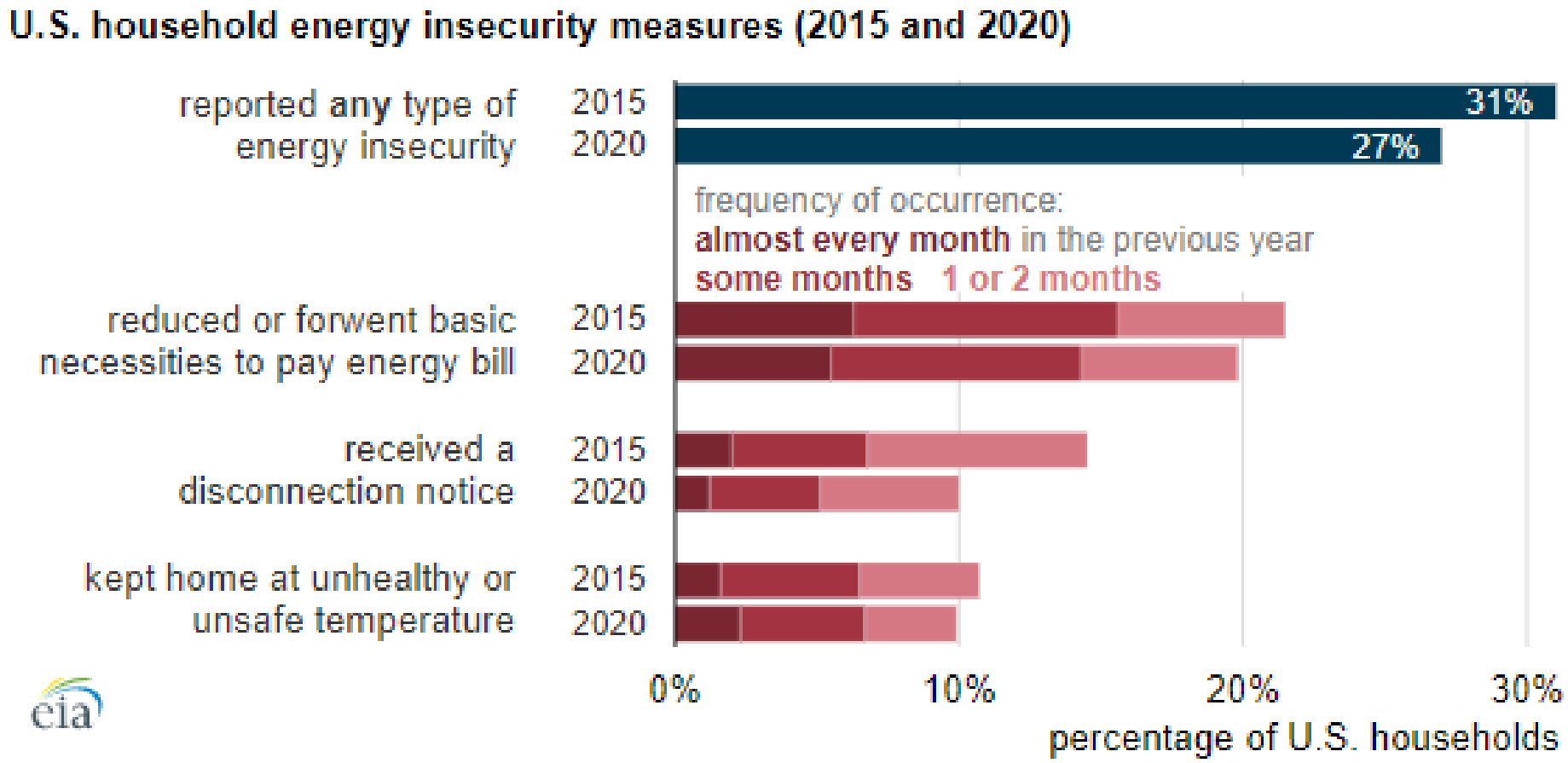


https://psc.wi.gov/Documents/OEI/WisconsinEnergyStatistics/Final_Wisconsin%20Energy%20Statistics%20book%202017pdf%20v5_0.pdf

Natural Gas Prices are Rising



Increasing Levels of Energy Insecurity



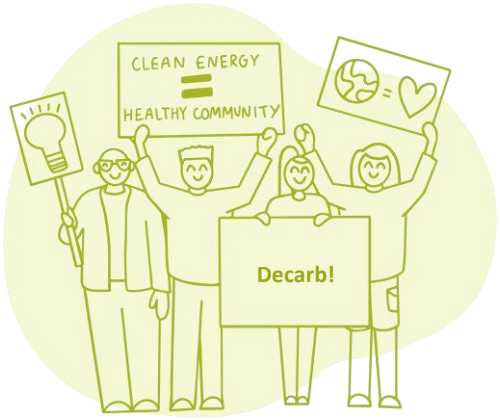
Source: U.S. Energy Information Administration, *Residential Energy Consumption Survey* (RECS)

The Opportunities

We Already Have the Tools We Need

Strategic Approaches to Decarbonization

Energy Efficiency First

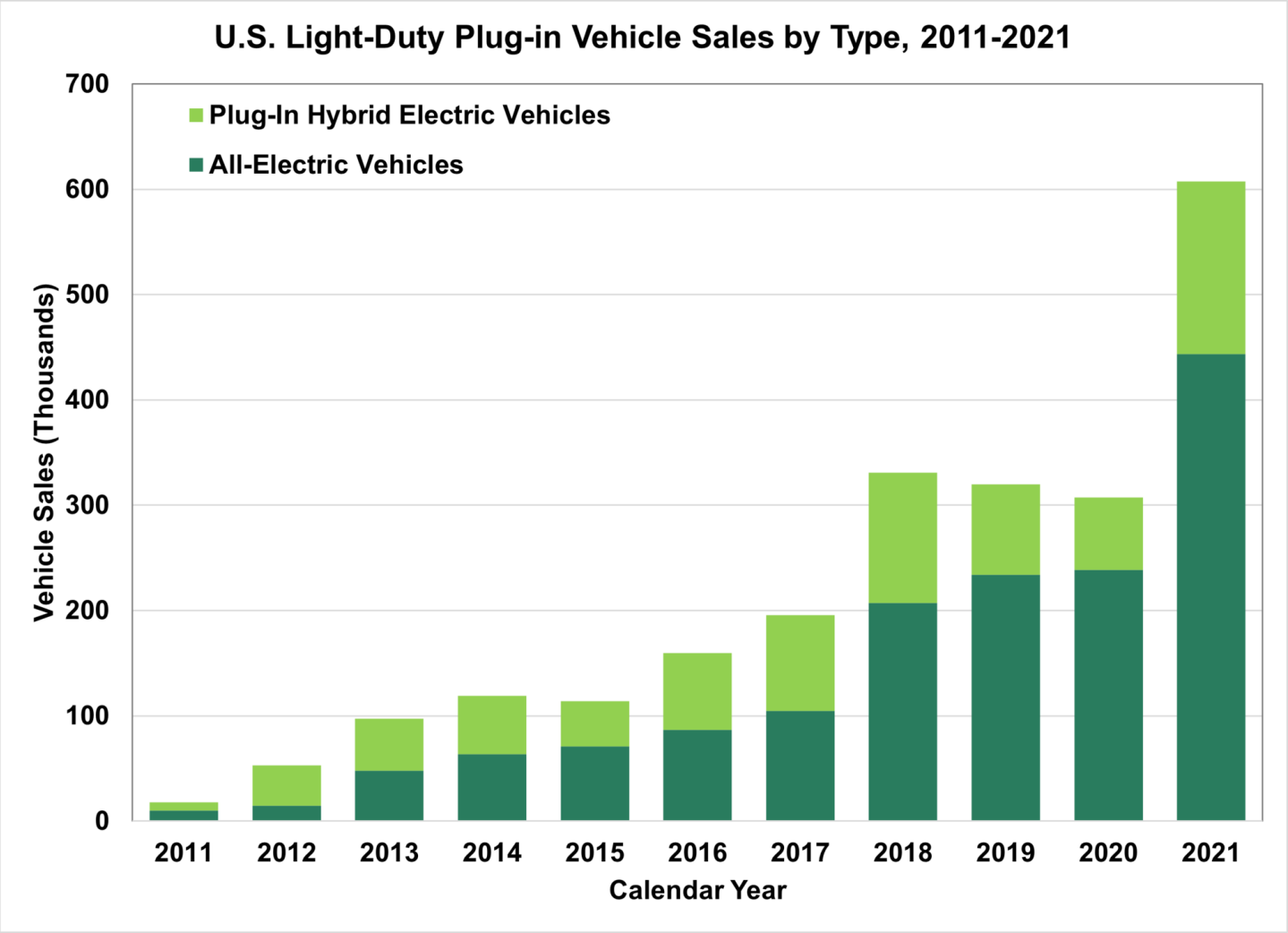


Identify Low/No Carbon Sources of Energy

Increase Renewable Energy and Interactivity with Grid

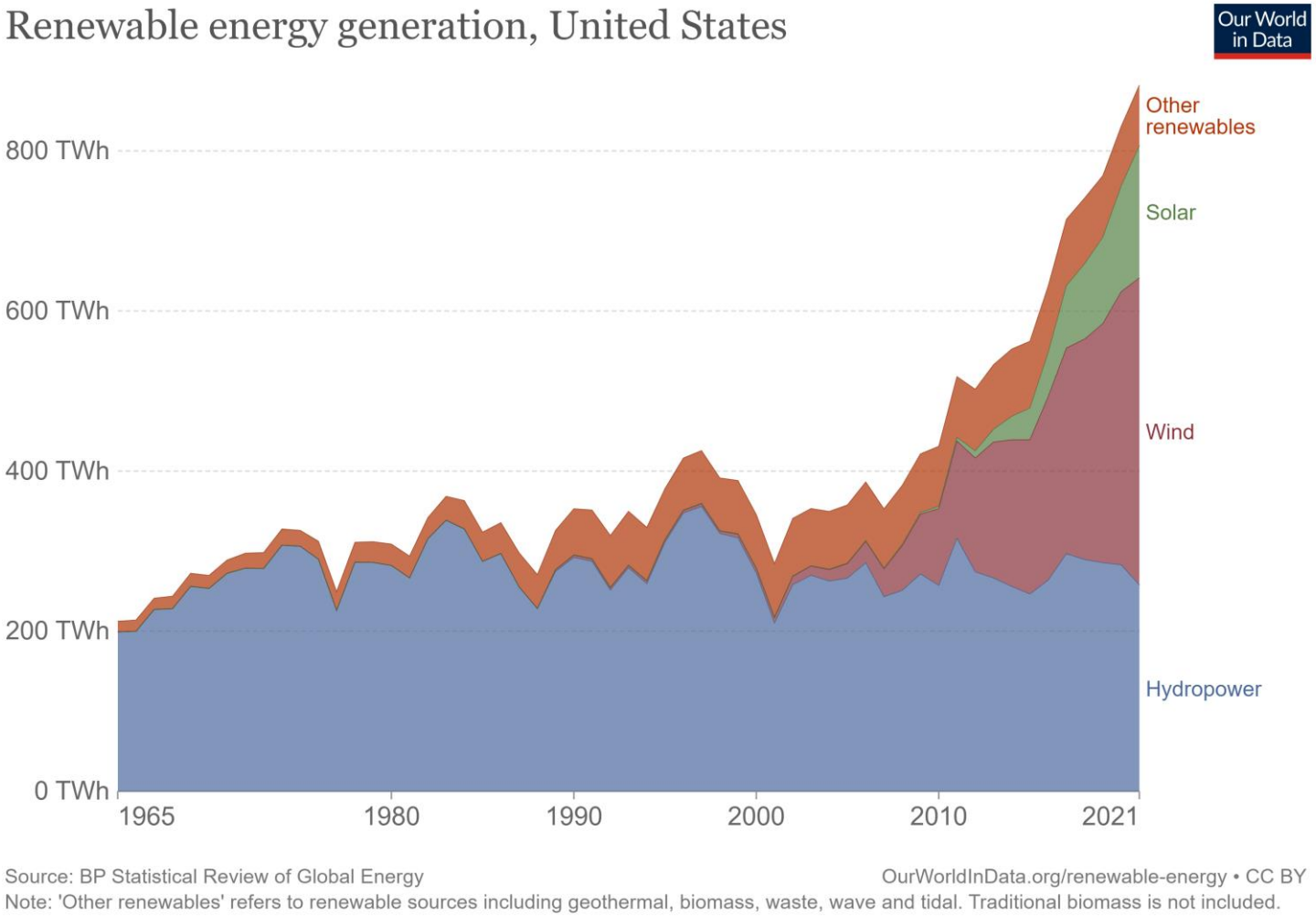
Energy Efficiency and Low Carbon Fuel

Electric Vehicles are Growing

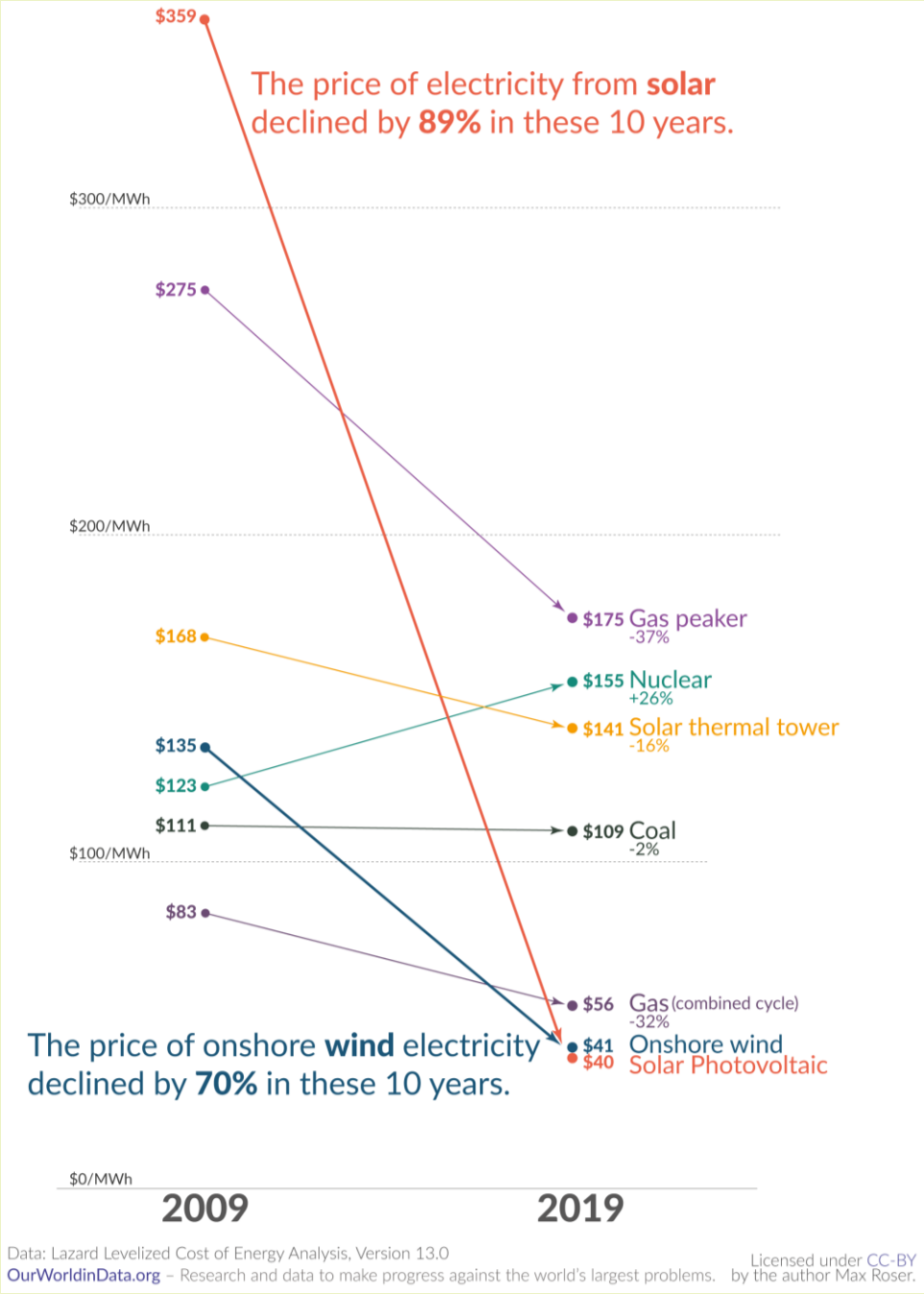


https://www.energy.gov/energysaver/articles/new-plug-electric-vehicle-sales-united-states-nearly-doubled-2020-2021

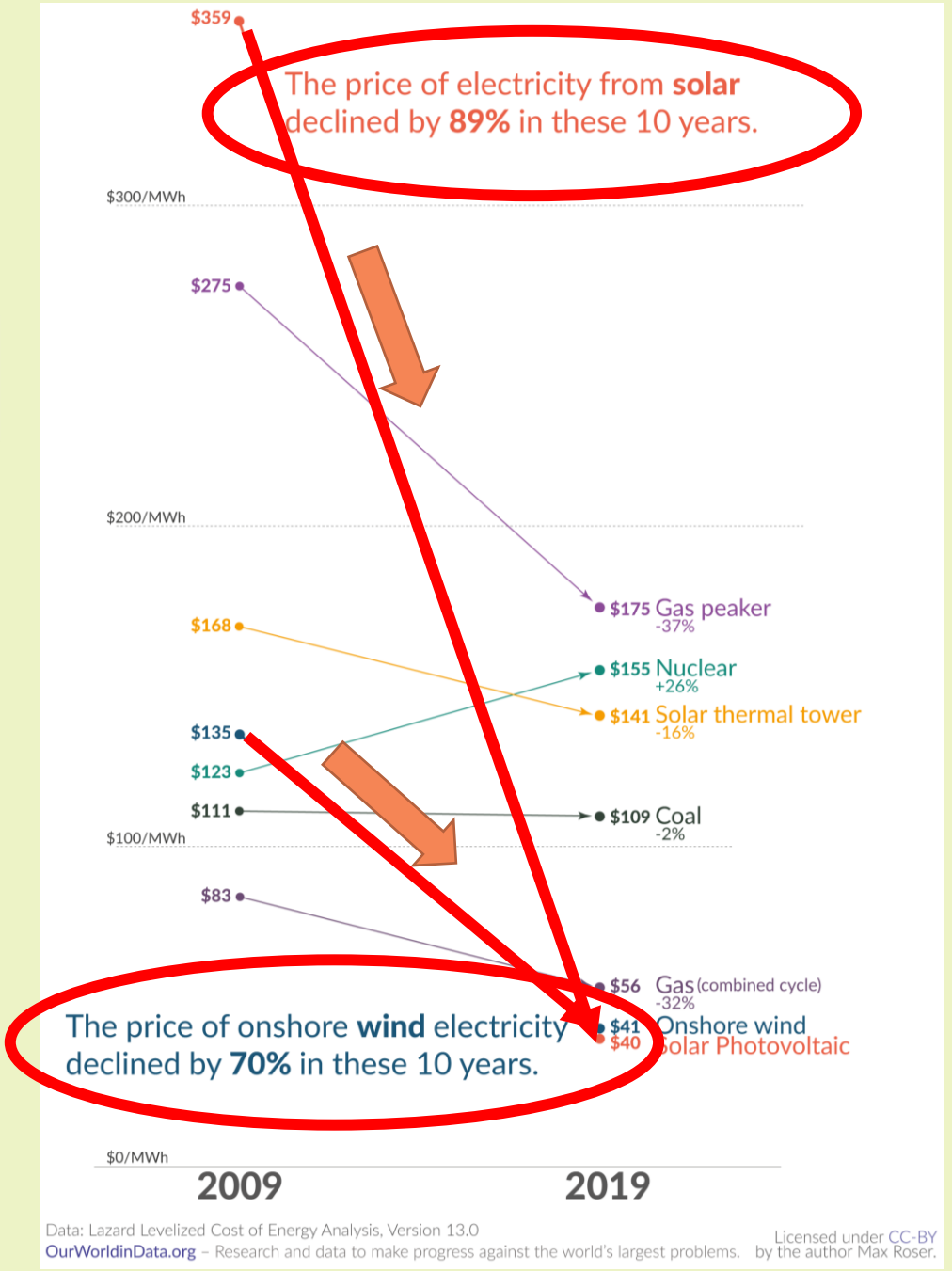
Renewables are Growing…



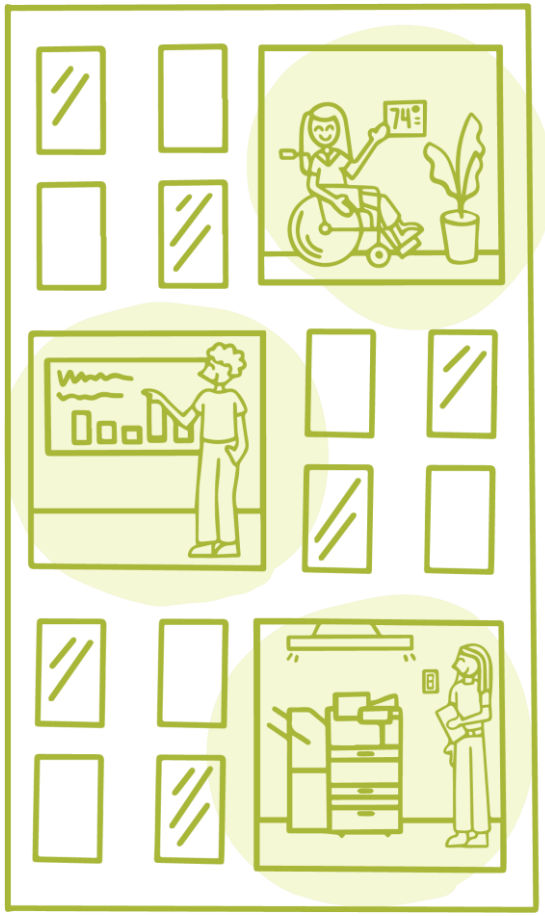
… And Getting Cheaper



… And Getting Cheaper



Connecting This All to Today's Workshop



Thank you!

Jeannette LeZaks
Slipstream
jlezaks@slipstreaminc.org

Your community energy company

Powering forward, reliably and sustainably

Rob Crain
Director - Customer Experience and Energy Services

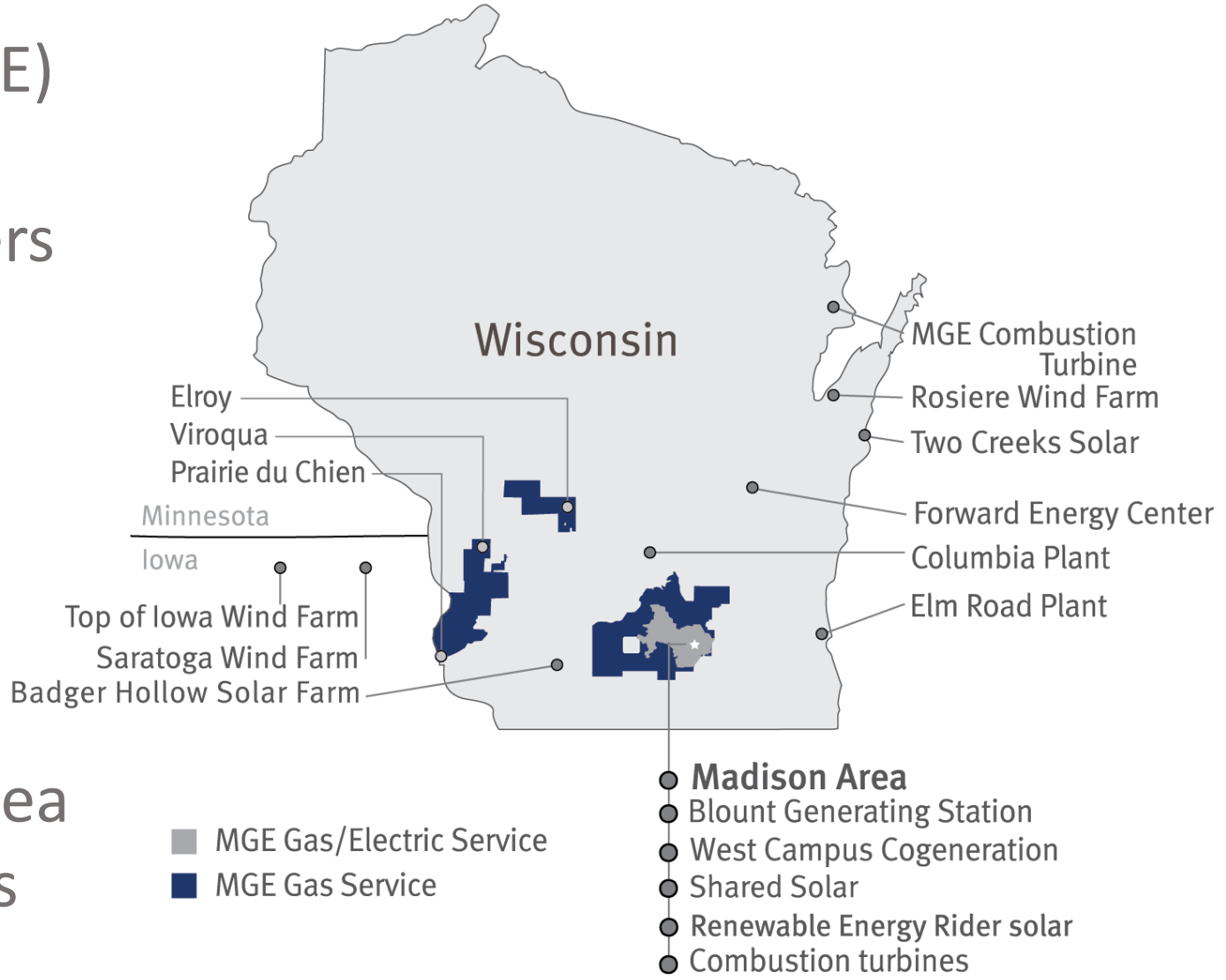
Building Decarbonization Forum

October 27, 2022

About MGE

Madison Gas and Electric (MGE) generates and distributes electricity to 157,000 customers in Dane County and purchases and distributes natural gas to 166,000 customers in seven south-central and western Wisconsin counties

MGE's roots in the Madison area date back more than 150 years



Safe, reliable energy

MGE is a national leader in electric reliability

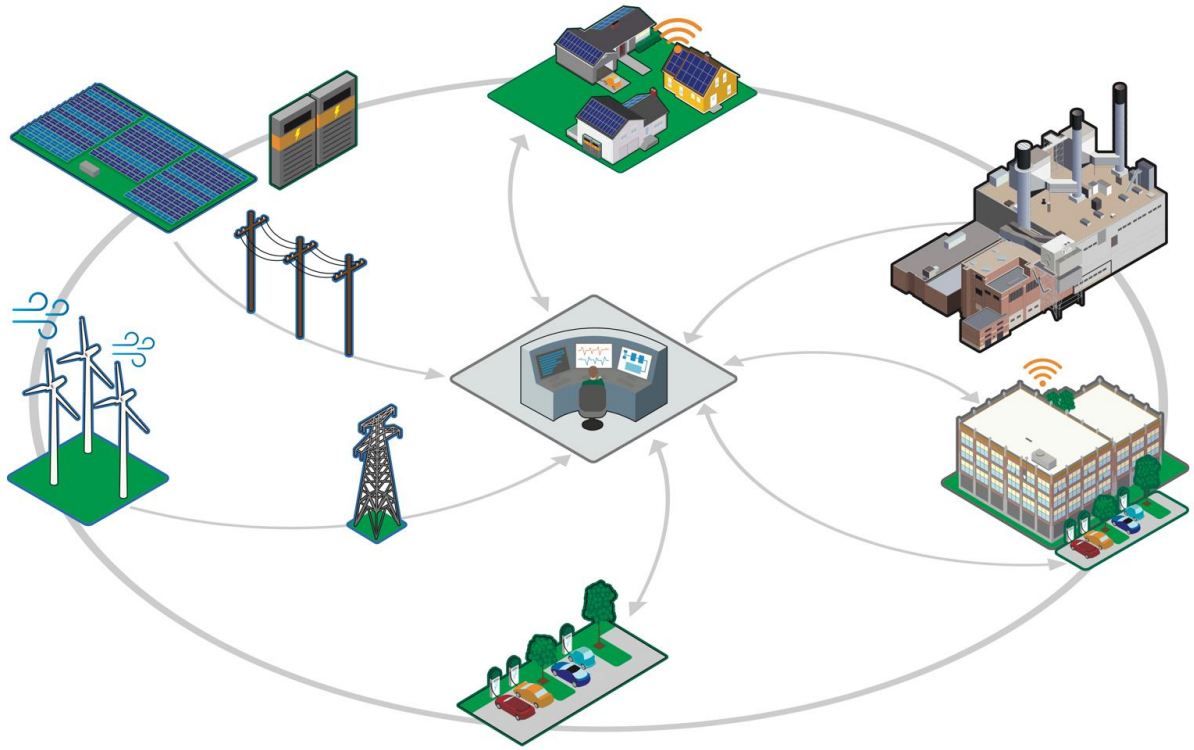
- Ranked in the top three utilities in the country for fewest number of outages for past 14 years
- Leading Indicator Safety Award – American Gas Association

MGE is committed to safe, reliable, affordable and sustainable energy

Utility of the future

MGE is building your community energy company for the future

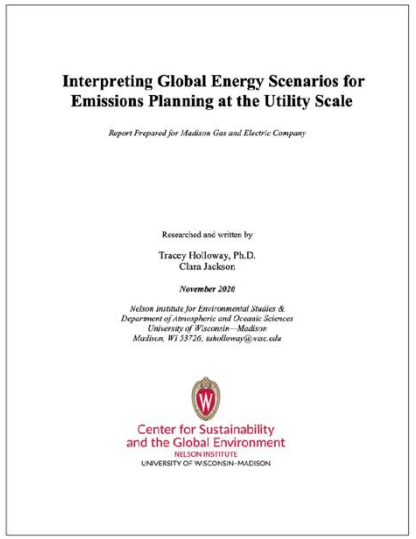
- Greater use of clean energy
- New technologies to benefit all customers
- New and innovative ways to work with our customers



Net-zero carbon electricity

- MGE was one of the first utilities to commit to net-zero carbon by mid-century
- Partnership with UW-Madison Nelson Institute for Environmental Studies
- Conducted analysis of net-zero carbon goal
- Expected 80% carbon reduction by 2030.

Net·Zero
CARBON ELECTRICITY BY 2050


Interpreting Global Energy Scenarios for Emissions Planning at the Utility Scale

Report Prepared for Madison Gas and Electric Company

Researched and written by

Tracey Holloway, Ph.D.
Clara Jackson

November 2020

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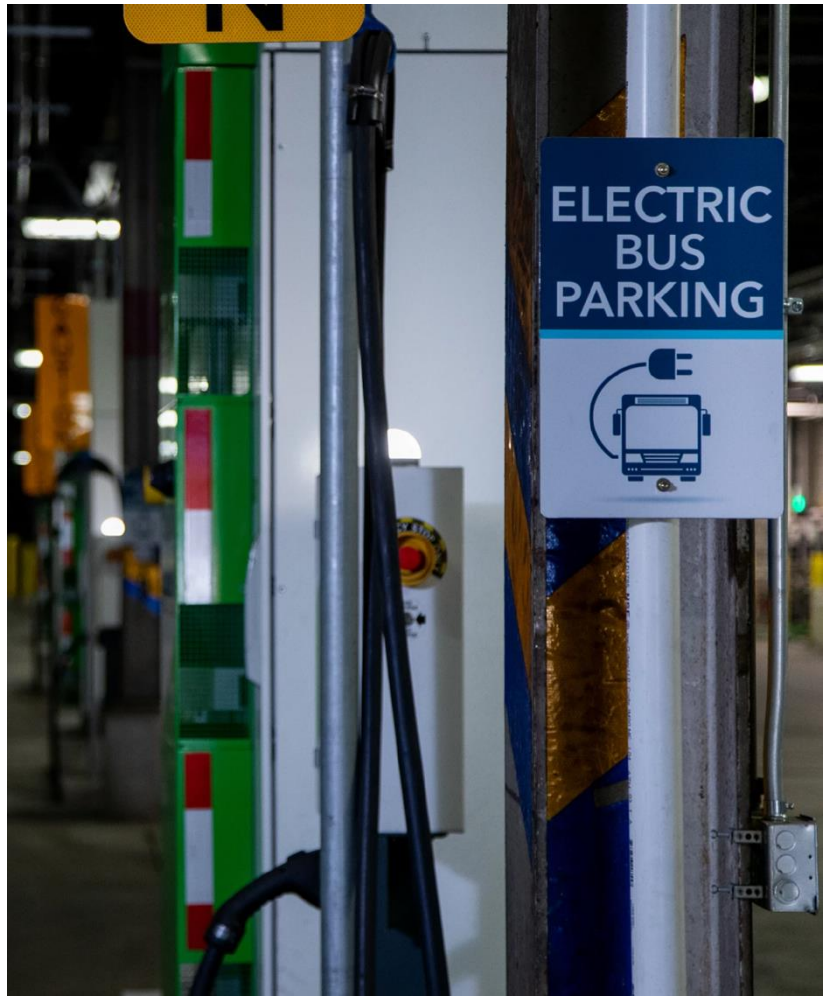
Department of Atmospheric and Oceanic Sciences
University of Wisconsin–Madison
Madison, WI 53726, taholloway@wisc.edu

Center for Sustainability and the Global Environment
NELSON INSTITUTE
UNIVERSITY OF WISCONSIN-MADISON

Strategies to achieve net-zero carbon

- Decarbonize our energy supply mix
- Engage customers around energy efficiency
- Electrify transportation and other end uses



Same strategies identified by the IPCC and in our Energy 2030 framework

End coal use by 2035

- Announced early retirement of the coal-fired Columbia Energy Center
  - Retirement is almost 15 years earlier than expected (retirement by 2030)
- Announced plans to transition Elm Road Generating Station to natural gas

Clean energy transition

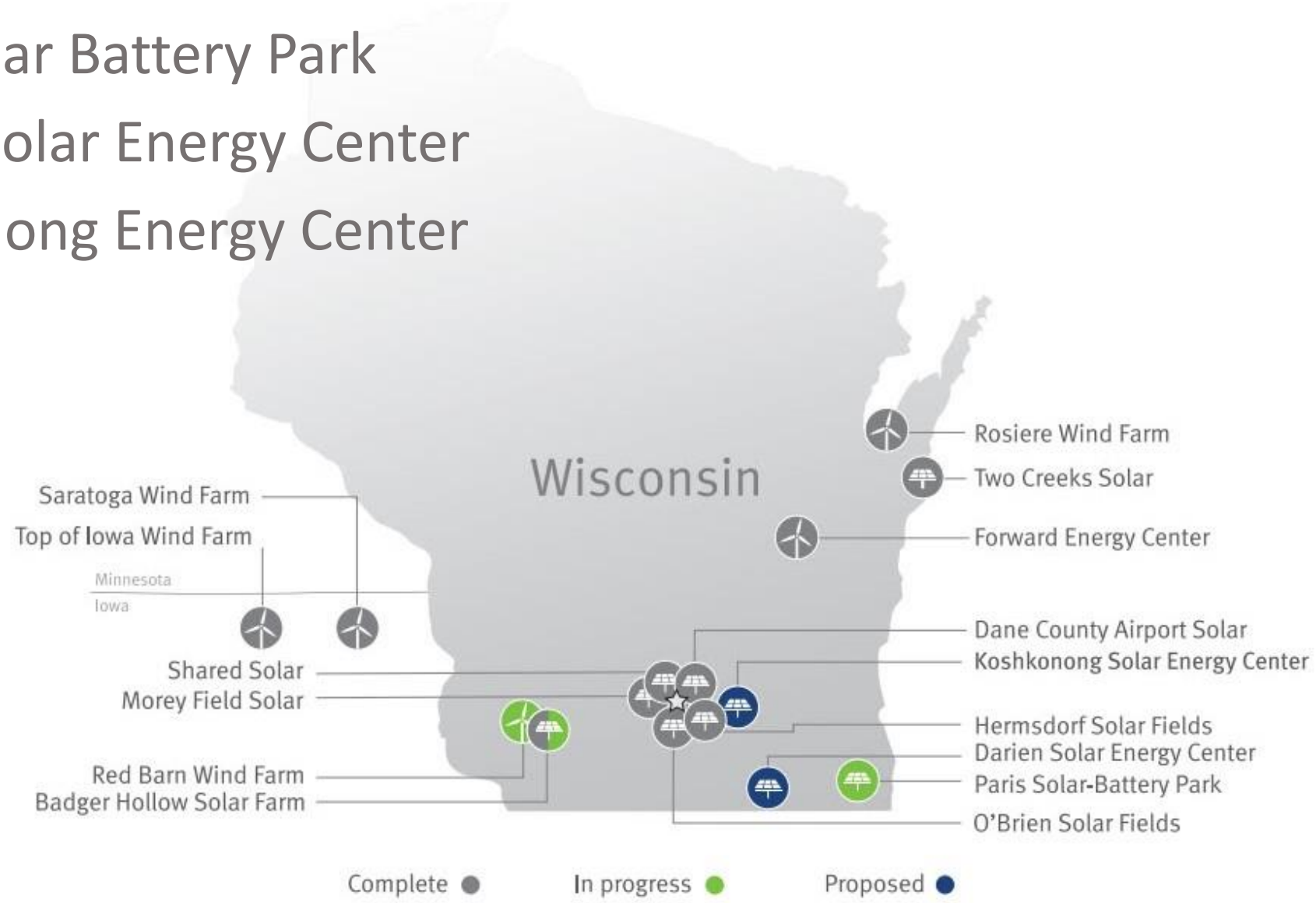
Investment	Project costs	Nameplate capacity	In-service date
Forward Wind	$22M	18MW	2018
Saratoga Wind	$108M	66MW	2019
Two Creeks Solar	$65M	50MW	2020
Morey Field Solar	$8M	5MW	2020
Dane County Airport Solar	$15M	9MW	2020
O'Brien Solar Fields	$32M	20MW	2021
Badger Hollow Phase I	$65M	50MW	2021
Hermsdorf Solar Fields	$15M	8MW	2022
Badger Hollow Phase II	$65M	50MW	Q2 2023 (est.)
Red Barn Wind Farm	$17M	9.2MW	Q4 2022 (est.)
Paris Solar-Battery	$43M	31MW	Q2 2023 (est.)
Darien Solar-Battery*	$45M	32.5MW	Q4 2023 (est.)
Koshkonong Solar-Battery*	$65M	46.5MW	2024 (est.)
Total:	**$565M**	**395.2MW**	

MGE's clean energy projects will grow our owned renewables capacity by more than 9x by investing an estimated $565M in wind, solar and battery storage

*Pending regulatory approval

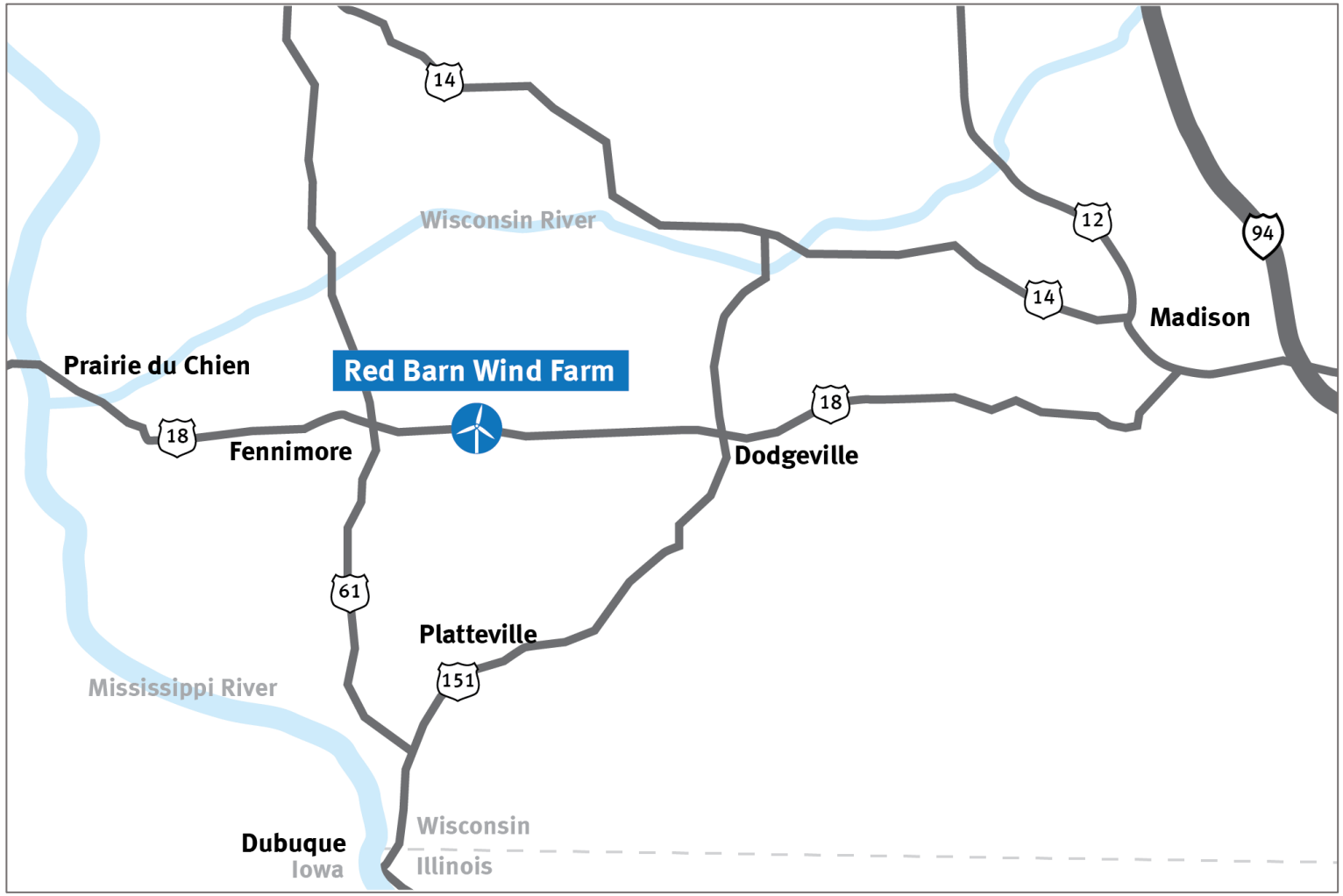
Solar and battery storage

- Paris Solar Battery Park
- Darien Solar Energy Center
- Koshkonong Energy Center



Wind energy

- Red Barn Wind Farm
- 92 MW
- MGE to own 10% share
- Online end of this year



Clean energy partnerships

- Renewable Energy Rider program
  - Cost-effective, clean energy in our community
- O’Brien Solar Fields: 20 MW to serve large customers under RER agreements
- Hermsdorf Solar Fields: 8 MW to serve City of Madison, Madison school district
- Dane County Airport Solar: 9 MW serves Dane County
- Morey Field Solar: Serves Middleton-Cross Plains area schools, the City of Middleton

Shared Solar

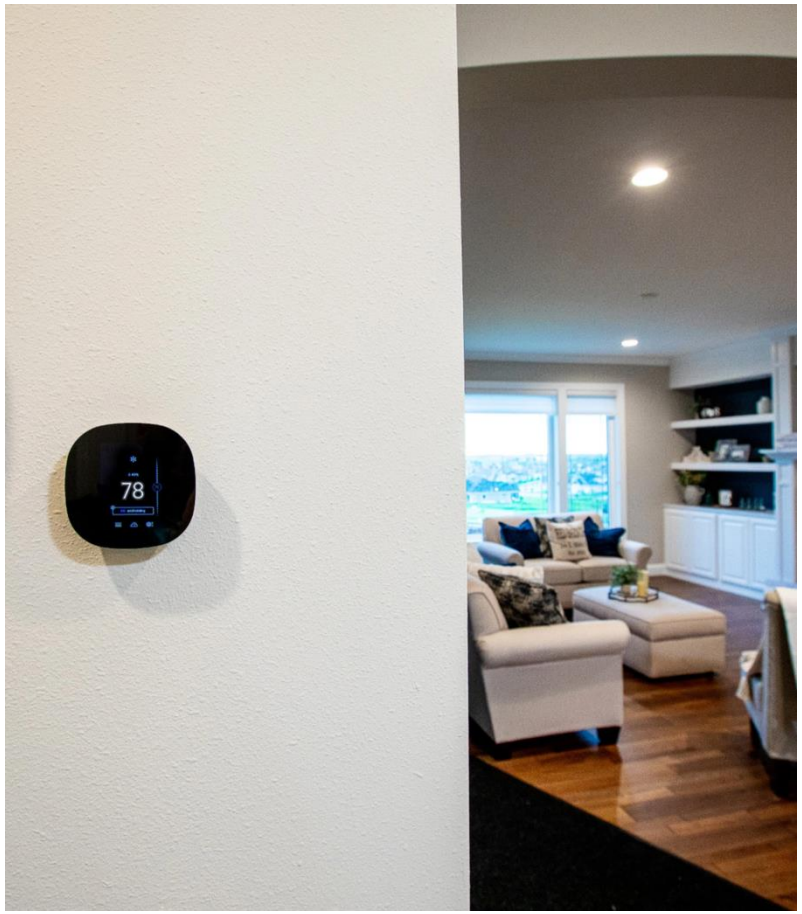
- Serves residential customers, including renters, and small businesses
- Two arrays in Middleton
- Also is serving two lower-income apartment buildings operated by the City of Madison Community Development Authority.

Green Power Tomorrow

- MGE's green pricing program serves more than 10,000 customers
- Penny more per kilowatt-hour
- Easy and effective way for customers to support renewable energy, offset their greenhouse gas emissions
- Largely powered by our wind resources in the region

MGE CONNECT®

- Smart thermostat program
- More than 3,500 customers participated in 2022
- MGE adjusts residential thermostats to manage peak demand.
- Many events reduced usage by nearly 3 MW, which is equal to:
  - Power from 8,700 solar panels, or
  - Usage of about 850 MGE households in summer



Low Income Smart thermostat partnership

- Install smart thermostats in lower-income households at no cost
- Objective is to help ensure all customers benefit from clean energy transition

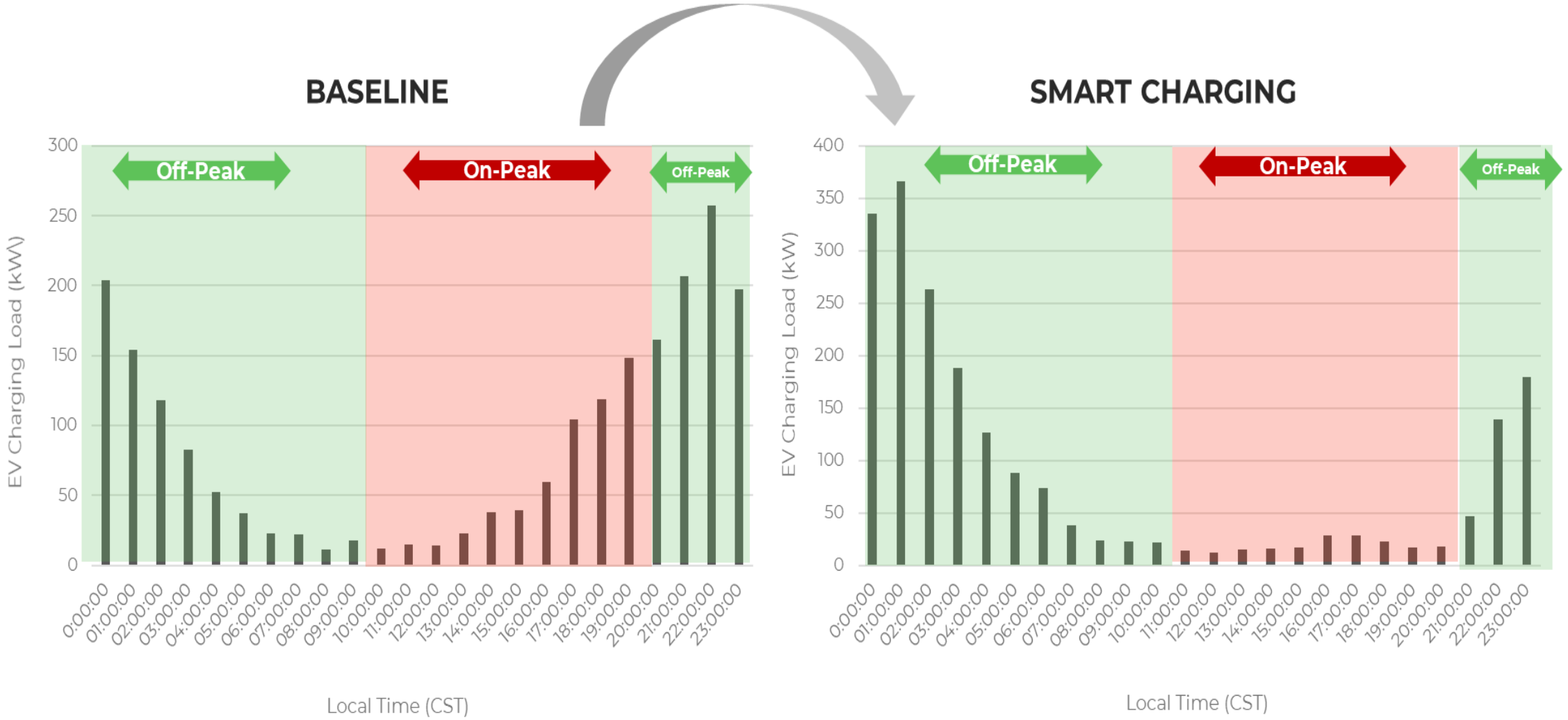
Electric vehicles

- Transportation accounts for almost 30% of greenhouse gas emissions in the U.S.
- The electrification of transportation is a key strategy for reducing carbon emissions
- We are working with customers, stakeholders, municipalities and other community partners to grow the use of electric vehicles (EVs) and to facilitate charging options

Managed EV Charging

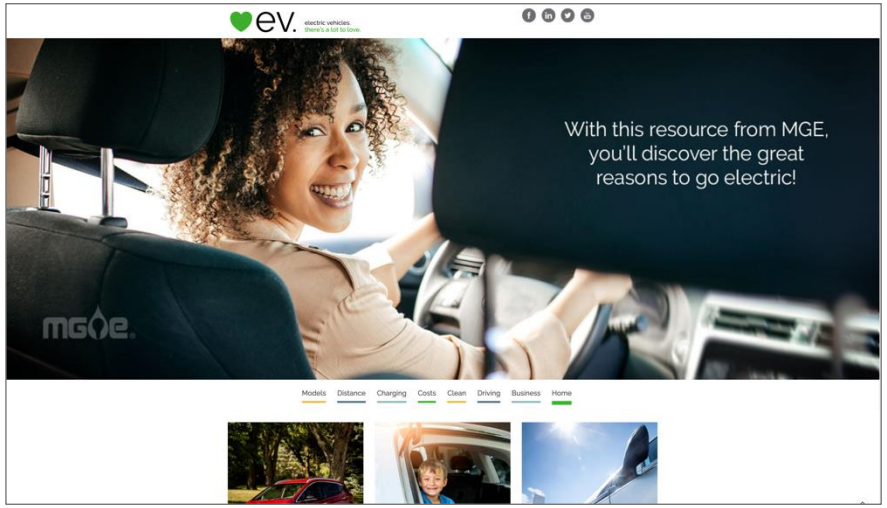
- Charge@Home
  - Level 2 chargers for a low monthly fee
  - Easy, maintenance-free charging
- Charge Ahead
  - Set it and forget it
  - Pilot expansion
- Gives MGE the opportunity to manage customers' EV charging and its impact on our community grid

Managed Charging in Theory

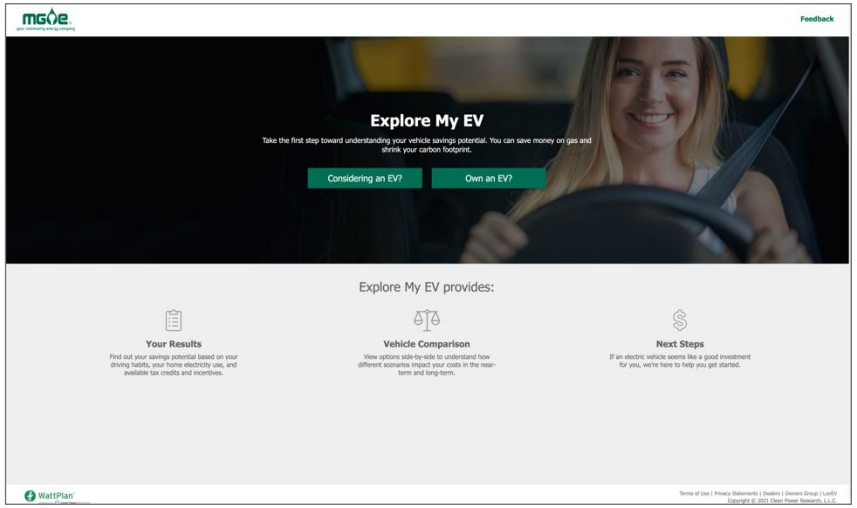


Public charging network

- Robust public charging network powered by clean energy
- Innovative customer programs to support growing number of EVs on the road
- Web resources to help customers evaluate EV options, connect with dealerships and learn about charging



mge.com/LovEV



mge.com/ExploreMyEV

Electric vehicle charging hub

- Capitol East District – East Washington Avenue and South Livingston Street
- Some of the fastest charging stations in the Midwest
  - Serves residents, commuters, fleets, taxi and ride-sharing services
  - 15 charges including 8 Tesla superchargers

City of Madison partnership

- The City of Madison is adding three all-electric buses
- MGE assisted Metro in securing a $1.3 million federal grant for the zero-emission buses and contributed 100% of the required local matching funds for charging infrastructure
- Provided fast-charging for electric fire truck, which began serving Madison's east side in 2021

Workplace charging

- Helps employers conduct employee survey to gauge interest
- Helps business customers understand how EV charging may affect their electric bills
- Assists with EV charging infrastructure and evaluating charging equipment options


Working together with our customers
and partners to build a cleaner, smarter,
more sustainable energy future.

Thank you

mge2050.com
mge.com

Bayview

Bayview's Mission

The Bayview Foundation supports its culturally diverse, low-income families in realizing their aspirations by providing affordable housing, fostering cultural pride, and building community through the arts, education, and recreation.

“Bayview is my heart and soul. This is my community. I always come back.”

Apartments built in 1971

Community Center built in 1985

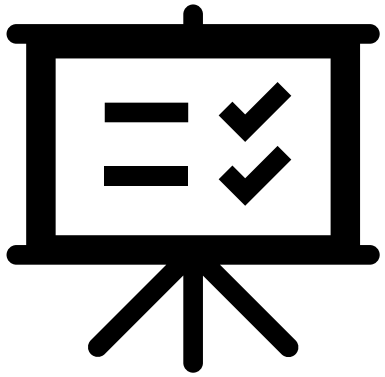
Creating a Bayview-specific definition of sustainability

- Lower utility bills
- Increase health and wellness
- Easy access to nature and beauty
- High-achieving energy efficiency
- Renewables
- Stormwater management
- Subsistence agriculture
- Cultural preservation
- Protecting the environment
- Education and awareness and education
- Interdependence and shared responsibility
- Social justice and anti-racism

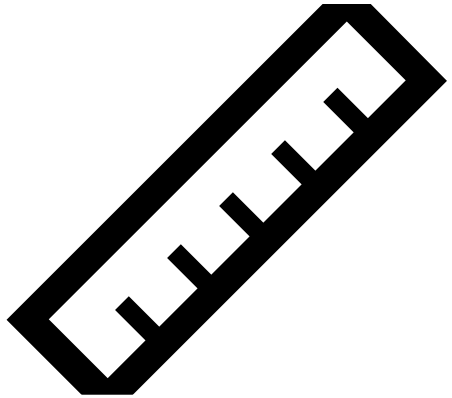

Regent St.
West Washington Ave.
La Mariposa Lane

Bayview's redevelopment:
Net zero for all

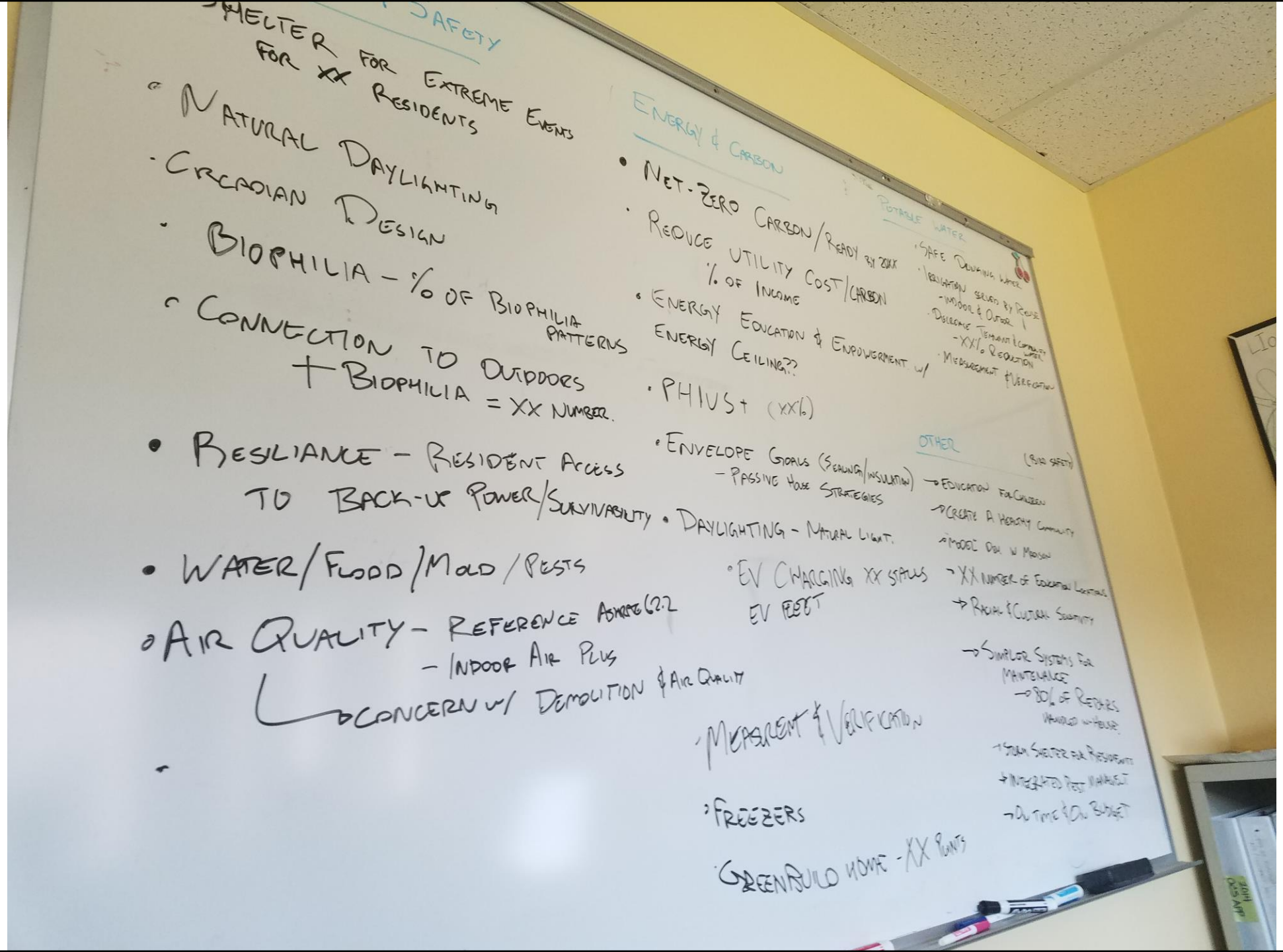
Accelerate Performance



Goal Setting



Measurement and Verification


SAFETY
SHELTER FOR EXTREME EVENTS
FOR XX RESIDENTS
NATURAL DAYLIGHTING
CIRCADIAN DESIGN
BIOPHILIA - % OF BIOPHILIA PATTERNS
CONNECTION TO OUTDOORS + BIOPHILIA = XX NUMBER.
RESILIANCE - RESIDENT ACCESS TO BACK-UP POWER/SURVIVABILITY
WATER/FLOOD/MOLD/PESTS
AIR QUALITY - REFERENCE ASHRAE 62.2
- INDOOR AIR PLUS
CONCERN W/ DEMOLITION & AIR QUALITY
ENERGY & CARBON
NET-ZERO CARBON/READY BY 20XX
REDUCE UTILITY COST/CARBON % OF INCOME
ENERGY EDUCATION & ENPOWERMENT W/ ENERGY CEILING??
PHIUS+ (XX6)
ENVELOPE GOALS (SEALING/INSULATION) - PASSIVE HOUSE STRATEGIES
DAYLIGHTING - NATURAL LIGHT.
EV CHARGING XX STALLS EV FLEET
MEASURENT & VERIFICATION
FREEZERS
GREENBUILD HOME - XX POINTS
PORTABLE WATER
SAFE DRINKING WATER
IRRIGATION SEPERATE BY HOUSE - INDOOR & OUTDOOR
DELUGE TENANT COMMUNITY SPACE - XX% REDUCTION
MEASUREMENT VERIFICATION
OTHER
(BUILDING SAFETY)
EDUCATION FOR CHILDREN
CREATE A HEALTHY COMMUNITY
MODEL DBH W MASON
XX NUMBER OF EDUCATIONAL LEARNING
RACIAL & CULTURAL SENSITIVITY
SIMPLER SYSTEMS FOR MAINTENANCE
80% OF REPAIRS HANDLED IN-HOUSE
YOUTH SHELTER FOR RESIDENTS
INTEGRATED PEST MANAGEMENT
DOWNTIME & DOWNBUDGET

Goals List

Prioritize Goals

Measurable Outcomes

December 11, 2019

Bayview Redevelopment – Goal Setting

The following memo provides an outline for potential development performance goals for the Bayview Redevelopment focused on energy, water, occupant health and wellbeing.

Performance Goal Categories

- ■ Mission Critical
- ◪ Highly Desirable
- ☐ If Possible

Bayview Sustainability Vision

Bayview is committed to its stewardship of sustainability and attaining high-achieving energy efficiency goals for the redevelopment that reduce energy demand and usage while generating balance through renewables.

Bayview will also work to achieve these quality of life goals for residents:

- lower energy bills
- increase health and wellness through the following: air quality, eliminating pests in housing, reducing exposure to chemicals and contaminants, promoting active lifestyle, increasing connection and easy access to nature and beauty
- ensure safety during serious weather events including flooding, excessive heat and cold, loss of power, tornados
- Create awareness of energy usage and its environmental impacts

Mission Critical

These are deemed critical to project success.

- ■ Net-Zero Energy Ready:
  Design buildings to include Space and infrastructure for future installation of solar PV be net-zero carbon ready per the Green Built Homes Net-Zero Ready Certification.
  - ○ Design Buildings to use energy less than 30 kbtu/gsf-yr.
  - ○ Utility bills for households will be less than their current utility bill.

- ■ Passive Envelope:
  - ○ Certify all buildings with ENERGY STAR New Homes / Multi-family
  - ○ Achieve a maximum air leakage 0.15 cfm50/sf (blower door test) for all dwelling units.
  - ○ Design and build envelope to meet EUI target of 30 kbtu/sf/yr.

NET-ZERO READY

EUI less than 30.0

Utility bills less than current bill

PASSIVE ENVELOPE

Blower door test less than 0.15 cfm_{50}/sf

INDOOR AIR QUALITY

Meet standard of care for ASHRAE 62.2-2016

MEASUREMENT AND VERIFICTION

Create M&V plan for energy.

DESIGN AND CONSTRUTION BUDGET

$210/sf GMP not to exceed

NET-ZERO CARBON

Site energy GWP is zero or negative

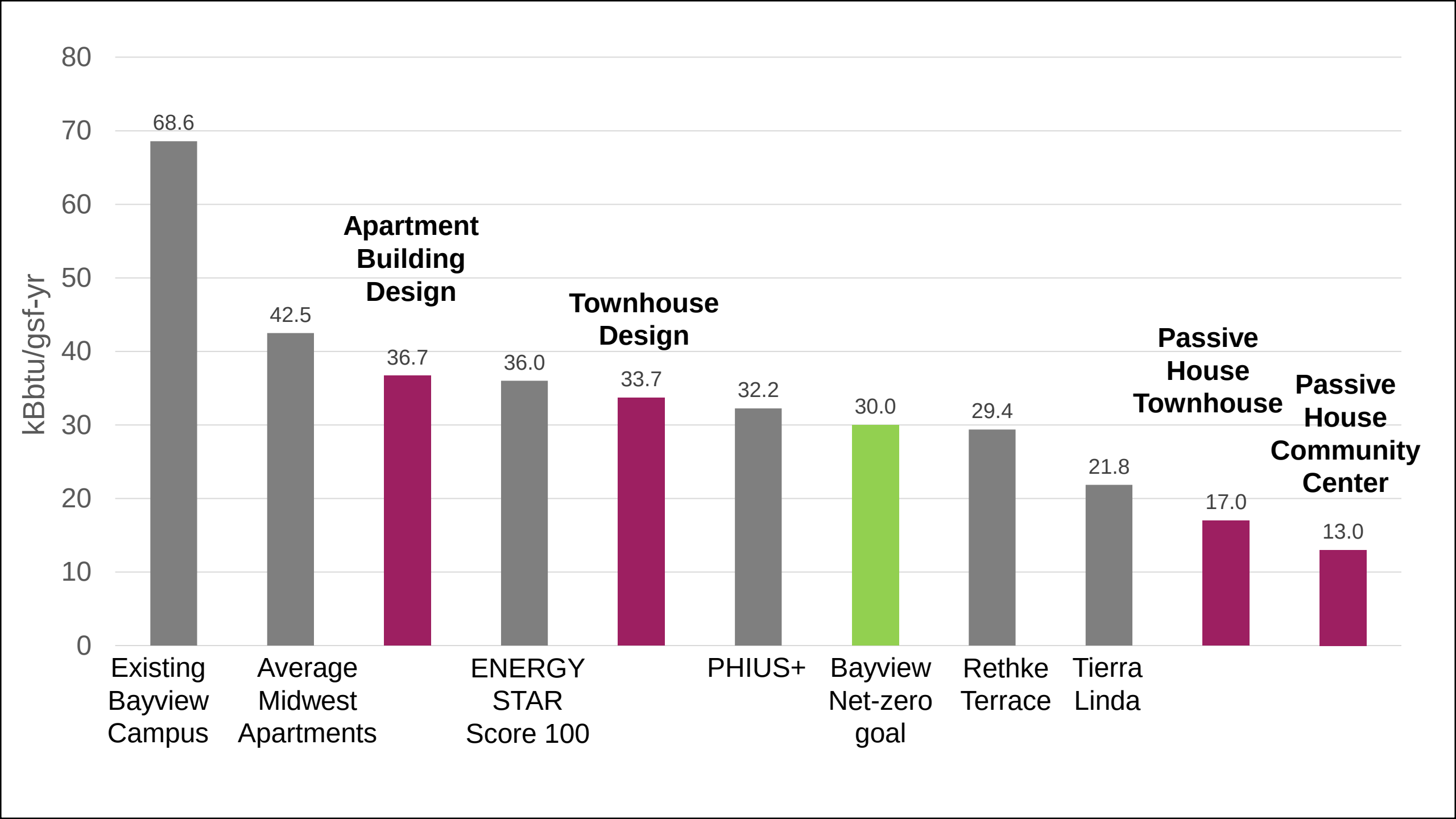
Passive House Institute US


Thank you to our design & consulting partners
Bayview
HORIZON
Develop • Build • Manage
TkWA
The Kubala Washatko Architects
SMITHGROUP
SPIRE ENGINEERING
DESIGN ENGINEERS
precipitate
ARCHITECTURE PLANNING RESEARCH
ECO ACHIEVERS
Building Wisdom
slipstream
mgoe
your community energy company
Kevin Frost

Bayview Redevelopment - Sustainability Goals Checklist

Updated 10/5/2020

#	Goal #	Bayview Design Development Goal	Description	Responsible Party	DD Progress Update
1	MC1	Net-Zero Energy Ready	Design buildings so building energy use intensity is less than 30 kbtu/sf-yr	Precipitate	Community Center: 13 kbtu/ft2-yr. Buillding 11 (7-unit Townhouse): 17 kbtu/ft2-yr.
2	MC1	Net-Zero Energy Ready	Utility bills for households will be less than their current utility bill	TKWA	Presume yes but would need existing energy data to confirm and evaluate after new construction occupancy
3	MC1	Net-Zero Energy Ready	Install enabling work for all buildings to install future solar panels	DE	Not in current design. Design Engineers to update their design narrative to include infrastructure for future solar panel installation.
16	MC2	Passive Envelope	Achieve Energy Star HOMES Certification for all buildings		In process to complete. Will not know final results until buildings are constructed.
17	MC2	Passive Envelope	Achieve a maximum air leakage of 0.15 cfm50/sf (blower door test) for all dwelling units	Precipitate	Community Center and Building 11 (7-unit Townhouse) are on track to be certified Passive House and a maximum air leakage of 0.15 cfm50/sf.
18	MC3	Maintenance	Design building systems so that the majority (75%) of maintenance and repairs can be handled by in-house staff	DE	In current design
23	MC4	Indoor Air Quality	Meet the standard of care for ventilation for multifamily residential spaces per ASHRAE 62.2-2016	DE	In current design
24	MC4	Indoor Air Quality	All kitchen hood exhaust ducted out of the building.	DE	In part of current design for Community Center, not in current design for townhomes/apartments. Slipstream note: Kitchen will have small ducted exhaust per ASHRAE 62.2, meeting intent of the requirement to have exhaust in the kitchen.
25	MC4	Indoor Air Quality	Continuous bathroom exhaust for adequate ventilation	DE	In current design for Community Center, apartments, and townhomes. Townhomes will have booster fans as well.
	MC4	Indoor Air Quality	Only install direct vent or power vented combustion appliances	DE	In current design. Townhome furnaces will be direct vented. Apartment/Community Center boilers and water heaters will be direct vented.
26	MC5	Low VOC Materials	Use low VOC materials finishes per EPA Indoor airPlus certification low-emission materials requirements.	TKWA	To be reviewed. Is indoor airPlus a certification Bayview is looking to achieve? Is a third party verifier on board? (EcoAchievers?) Slipstream note: Per design team meeting discussion, intent is to follow requirements of EPA Indoor airPlus low-emission materials requirements, not achieve certification.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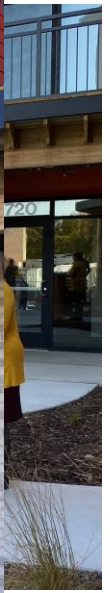
32.2
30.0
29.4
21.8
17.0
13.0
Apartment Building Design
Townhouse Design
Passive House Townhouse
Passive House Community Center
Existing Bayview Campus
Average Midwest Apartments
ENERGY STAR Score 100
PHIUS+
Bayview Net-zero goal
Rethke Terrace
Tierra Linda

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Bayview

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DESIGN ENGINEERS
MECHANICAL & ELECTRICAL CONSULTANTS

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ARCHITECTURE | PLANNING | RESEARCH

ECO ACHIEVERS
Building Wisdom

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Standard Imaging

Building Decarbonization Forum

Ed Neumueller, CEO

Standard Imaging Background

- Standard imaging is a 33-year old medical device manufacturing business in Middleton.
- We develop, manufacture, and distribute devices and software products that are used for radiation measurement and quality assurance in the field of radiation therapy for cancer treatment.

Standard Imaging Background

- We are an international business that caters to the Medical Physics community in hospitals, clinics, research centers and government agencies.
- Our business is heavily regulated in GMP by groups such FDA, Health Canada, EU, Japan, China and most of the countries in the world where we sell our products.

Personal environmental commitment

- My personal commitment to sustainability began in the mid-70s when I became familiar with the negative environmental effects associated with carbon-based fuels and other types of pollution.
- My wife and I began to adjust our personal lives in many ways to address our footprint on the environment around us.
- In 1979 we installed passive solar collection panels on the south wall of our first house and eliminated the use of oil and gas for our heating and cooling.

Personal environmental commitment

- 20 years ago, when we built our current passive solar home, we were early adopters in the application of geothermal systems for our HVAC and switched to Hybrid automobiles for transportation.
- This interest in doing our part in sustaining a healthy environment, was eventually carried into the business of Standard Imaging Inc, which I co-founded and have led since 1989. My partners brought similar values to the business, so sustainability was naturally woven into our operation.

Quality Policy of Standard Imaging

Advancing Radiation QA

We advance the use of radiation by health care professionals with radiation quality assurance solutions that are innovative, effective, valued, compliant and “eco-friendly”.

Standard Imaging's facility

- Our current 15 year old facility sports many ecologically beneficial attributes, including 4 dual axis 11.9 kW solar tracking solar panels, geothermal heating/cooling, energy efficient air recovery ventilation, passive solar construction, production area sky lights, energy efficient lighting and foam-in-place insulation.
- Additionally, the landscaping incorporates water runoff retention ponds and water gardens. Plantings were placed to support heating and cooling efficiency.

Geothermal HVAC

Standard Imaging's facility

- Standard Imaging also participates in MGE's Shared Solar program, purchasing locally generated solar energy from a 5-megawatt solar array at Middleton Municipal Airport.
- The energy produced from the onsite arrays and Shared Solar equates to approximately 27% of Standard Imaging's electric use. It eliminates about 200,000 pounds of carbon dioxide emissions annually.
- Our company also participates in MGE's Green Power Tomorrow program, which allows customers to purchase electricity generated by MGE's wind and solar resources. Standard Imaging purchases green power equivalent to 10% of its electric use.

Regulation Compliance, Green Citizenship

- Standard Imaging strives to be a “green” citizen.
- It complies with the European Union WEEE (Waste Electrical and Electronic Equipment and RoHS (Restriction of Hazardous Substances) directives addressing the design, recycling and disposal of equipment.
- The company has a certification to ISO 14001, the international environmental management standard. In addition, the company is certified in the ISO 26000 standard addressing Corporate Social Responsibility.

WI DNR Green Tier I Certification

- In 2009, Standard Imaging became Green Tier I certified by the Wisconsin DNR.
- Standard Imaging was the first medical device manufacturer in the state to obtain this certification.
- Green Tier certification encourages voluntary environmental performance that exceeds minimum standards, enhances cooperation with communities and industries, and provides an improved legal standing for this cooperation.

Environmental Metrics

- Standard Imaging holds quarterly management team meetings, where all business goals and metrics are reviewed, including environmental metrics.
- These metrics currently address the following environmental related operations and activities:

Environmental Management System (EMS) Metrics		
Specific Area	**Specific Metrics**	**Rolling 12 Month Trend**
Plasticizer Reduction	Products with DEHP >0.1% w/w Products with BPA	▼ –
Radiation Exposure	Finger Exposure of Bunker Employees Background Measurements Outside Bunker	▼ –
Solar Energy Project	Generated Electricity Pounds of Coal and CO2 Saved	▲ ▲
Paper Reduction	Printer and Copy Paper Cases Used UW-ADCL Paperless Calibration Reports	▼ ▲
Geothermal HVAC Project	Electricity Savings Maintenance Costs	▲ ▼
Use of Local Suppliers	% based in Dane Co. % based in WI	▲ ▲
Management Team	Initiated Corrective/Preventive Actions Operating Procedure Revisions	– ▲

Local Sourcing

- Maintaining local ties and commitments has always been a priority of Standard Imaging and we use local suppliers, where applicable.
- Nearly 70% of the company's key strategic suppliers are based in Wisconsin, with 35% located in Dane County.
- This is important to the company because suppliers are convenient for service and support, in addition to being vested in the success of the product.
- These local relationships also significantly reduce travel and shipping, times and costs, while reducing energy consumption

Sustainability Awards

- Standard Imaging was the winner of the **2008 Wisconsin Business Friend of the Environment Award** for Environmental Stewardship in the Small Company Category.
- In 2010, the company won the **Sustainable Small Business of the Year Award** from In Business and Sustain Dane.
- In 2011, Corporate Report Wisconsin presented us with the **Corporate Citizenship Award**.
- This year the company was awarded a **Dane County 3 Star Climate Champion in the Building Energy** Use Category.

Standard Imaging has established Good Corporate Citizenship and respect of the environment as core beliefs

TRIBE 9 FOODS

IMPROVING LIVES THROUGH FOOD

About Us

Tribe 9 Foods creates delicious, nourishing, and functional food to improve the lives of others. We take a collaborative approach to our relationships, knowing that when our customers succeed, we succeed. Our portfolio includes grain-free foods, gluten-free foods, nut butter, and traditional pasta.

B Corp & Sustainability

Tribe 9 Foods is committed to implementing sustainable practices to our business operations. With a specific focus on conservation of resources and reduction of waste, we will continually strive to improve our business model to reflect our obligation to conserving the planet. We make it a habit to maintain sustainable practices and support other organizations with the same ambitions.

Certified B Corporation™

Quick History

2017

With the dedication and commitment of five entrepreneurs, Tribe 9 Foods was founded in Madison, Wisconsin from the merger of three fast growing companies: RPs Pasta, Yumbutter, and Ona.

2017

A new state of the art manufacturing facility was created in order to further support growth in Tribe 9 Food's co-manufacturing, private label, retail and foodservice businesses. Capabilities at this new facility include extrusion, IQF, form-fill seal, flow-wrap packaging, nut butter milling, and gluten-free flour blending.

2018

Tribe 9 Foods became a certified B-Corporation demonstrating a commitment to use business as a force for good and to improve its practices to further benefit workers, customers, suppliers, community and the environment.

2018

Believing that everyone deserves to experience the richness of good food, Tribe 9 Foods launched the Taste Republic brand focused on delivering delicious gluten-free food that doesn't compromise on quality, taste or texture.

2020

To support rapid growth, Tribe 9 Foods commissioned a second location to increase production capabilities across all product lines and expand co-manufacturing and private label capacities.

2021

Tribe 9 Foods acquired Connecticut-based Carla's Pasta expanding its products and capabilities by adding Carla's offerings in traditional pasta with existing leadership in nontraditional pasta. Through the acquisition, production capabilities were increased significantly via the addition of a new manufacturing location.

Our Facilities

2901 PROGRESS ROAD, MADISON WI
77,801 SQUARE FEET

Capabilities Include:
- Mixing
- Extrusion
- IQF
- Form-fill seal
- Nut butter milling
- Dedicated gluten-free production facility
- GFSI Certified

2558 ADVANCE ROAD, MADISON WI
46,970 SQUARE FEET

Capabilities Include:
- State of the art frozen storage

50 TALBOT LANE, S. WINDSOR, CT
190,000 SQUARE FEET

Capabilities Include:
- Mixing
- Extrusion
- IQF products including filled Ravioli, Tortellini, Sacchettini, Lasagna
- Steam bag entrees, all frozen and packed into polyethylene film
- Prepared pesto sauces packed into sealed plastic tubs and pouches
- Dual inspected facility (FDA / USDA) handling meat and poultry meats
- GFSI Certified

Our Businesses

Co-manufacturing

Private Label

Ingredient Sales

Retail

Foodservice

Our Brands

TASTE REPUBLIC

yumbutter
world changing nut butters

RP's PASTA COMPANY MADISON WI

CARLA'S PASTA
EST. 1978

B Corporation

B Corp Certification

- Designation that a business is meeting high standards of verified performance, accountability, and transparency
- Factors range from employee benefits and charitable giving to supply chain practices and input materials

As a B Corp, Tribe 9 Foods continuously works to

- Improve our environmental impact
- Decrease food waste
- Support our communities by donating food, money, volunteer time
- Reduce inequality and inequity
- Create high-quality jobs with dignity and purpose
- Increase access to nourishing food to improve people's lives
- Create positive impact for our **employees**, **communities**, **customers** and the **environment**

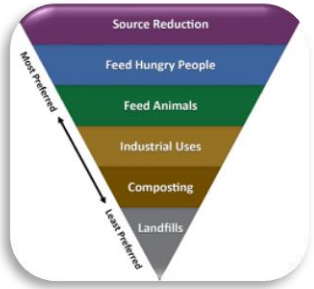
Environment / Sustainability

Through our partnership with MG&E, in 2021, our Madison Facilities became 100% powered by renewable energy!

Environment / Sustainability – Ongoing Efforts

More Energy Efficient
Manufacturing Solutions

Monitoring Resource Consumption
Implement Reduction Goals



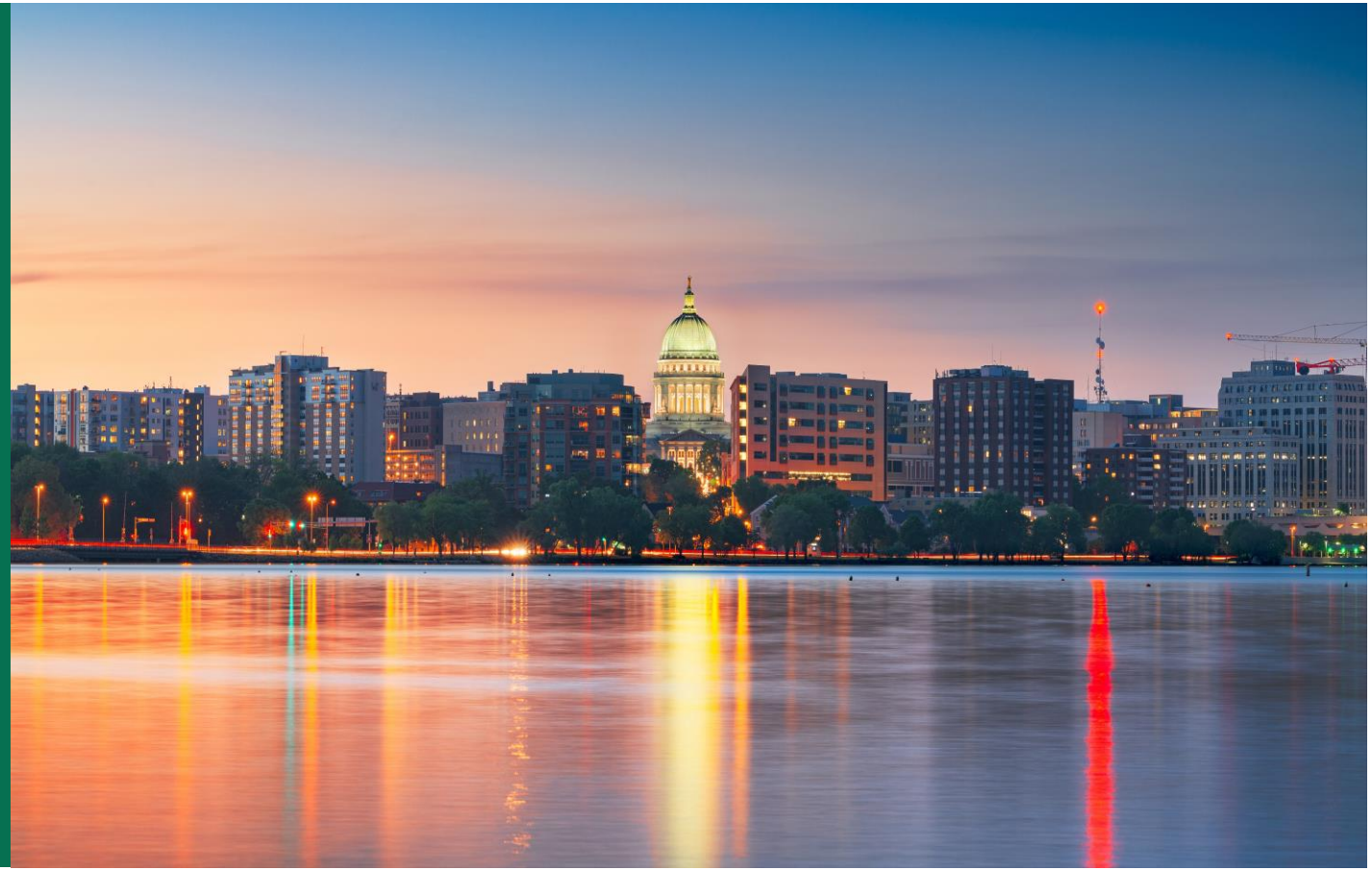
Continuous Efforts
to Reduce Scrap

LT Goals to Influence our Supply Chain
to Greatly Leverage Our Impact

Building Decarbonization Forum

Thursday, October 27, 2022
8 am–11:30 am

The Goodman Community Center
Madison, Wisconsin



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Tools for Electrification and Electrification Technology

10/27/22

slipstream

Kevin Frost, PE

Energy Engineer
kfrost@slipstreaminc.org

Tools for Electrification

- Goal Setting
- Benchmarking
- Building Certifications
- Energy Modeling
- Solar Energy

Electrification Technologies

- Heat Pumps
- Heat Pump Water Heaters

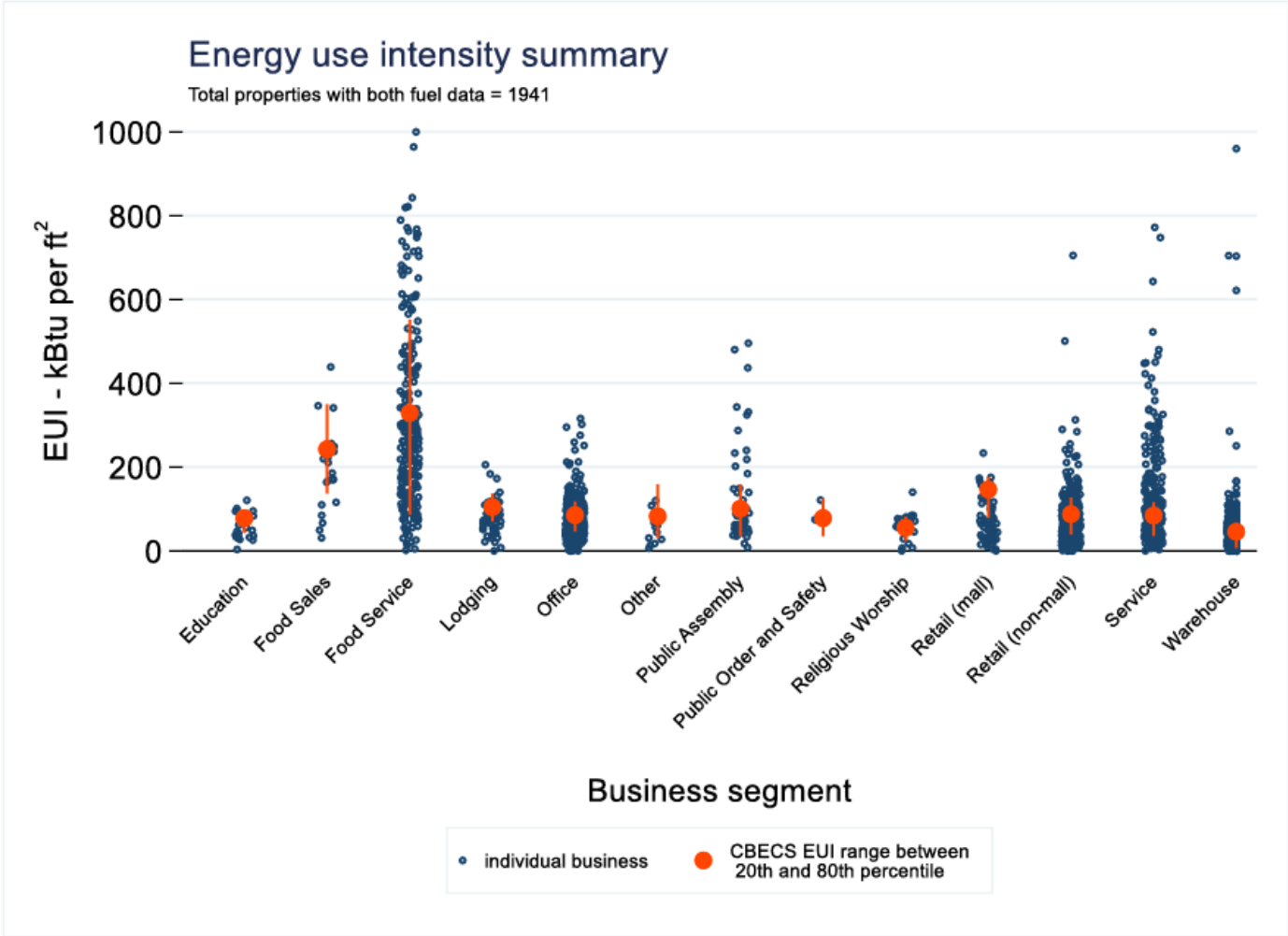
Tools for Electrification: Goal Setting

- Clearly define project outcomes
- Set measurable targets
- Plan for measurement and verification

Tools for Electrification: Goal Setting

Outcome	Metric
No Fossil Fuel use on-site	Zero fossil fuel use on-site
Low annual energy use	Building site Energy Use Intensity (EUI) is 30 kbtu/sf/yr or less
Reduced tenant energy bills	Tenant energy bills are 10% lower than current energy bills.
On-site renewable energy generation	Generate minimum of 4.7 kWh/sf/yr (about 15 kbtu/sf/yr) of on-site energy.
Low energy carbon emissions	Net-zero energy carbon emissions.

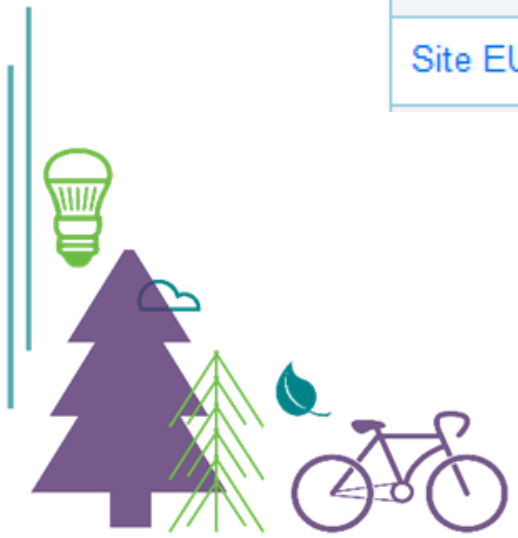
Tools for Electrification: Benchmarking



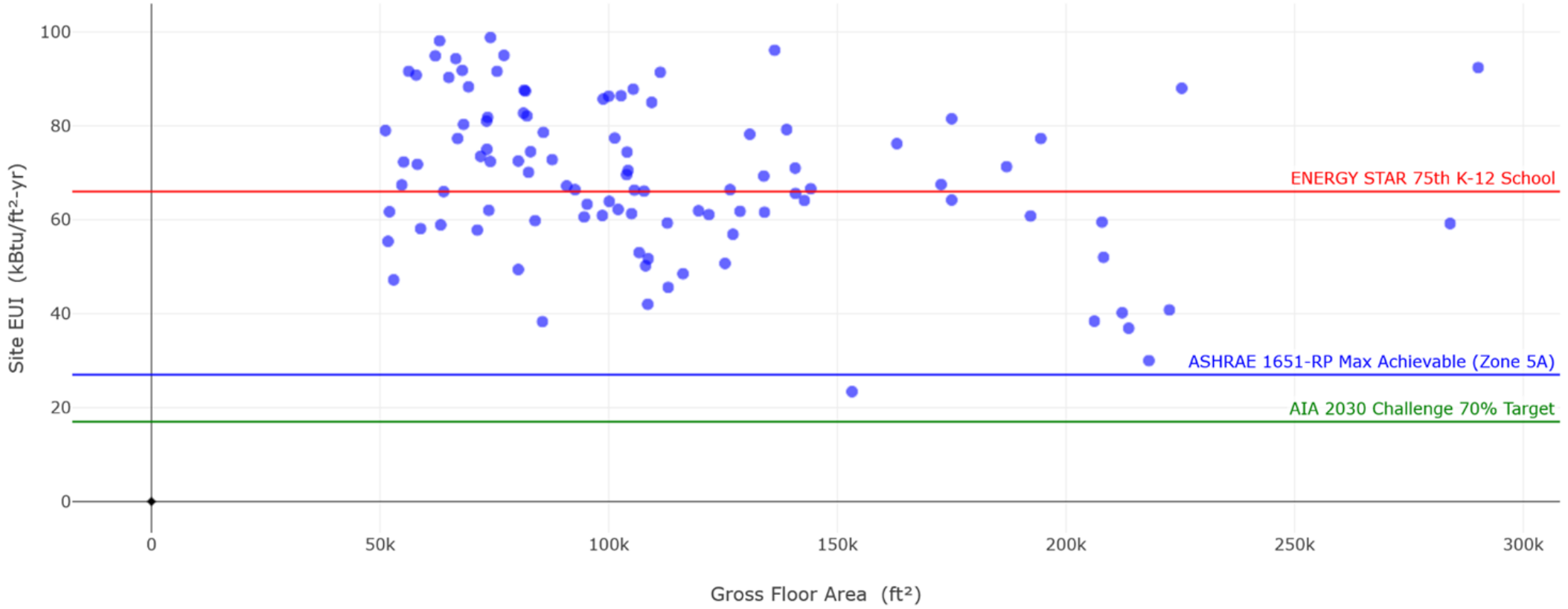
Tools for Electrification: Benchmarking

Property Use Detail	Value
Gross Floor Area	* 128,500 Sq. Ft.
High School	No Use a default
Number of Workers on Main Shift	70 Use a default
Student Seating Capacity	430 Use a default
Months in Use	
Weekend Operation	No Use a default
Number of Computers	224.88 Use a default
Cooking Facilities	Yes Use a default
Gross Floor Area Used for Food Preparation	10000 Sq. Ft. Use a default
Number of Walk-in Refrigeration/Freezer Units	1.29 Use a default
Percent That Can Be Heated	All of it - 100% Use a default
Percent That Can Be Cooled	90 Use a default

Metric
ENERG
Source
Site EU



Tools for Electrification: Benchmarking



EUI Analyzer

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Tools for Electrification: Building Certifications

Tools for Electrification: Early Energy Modeling

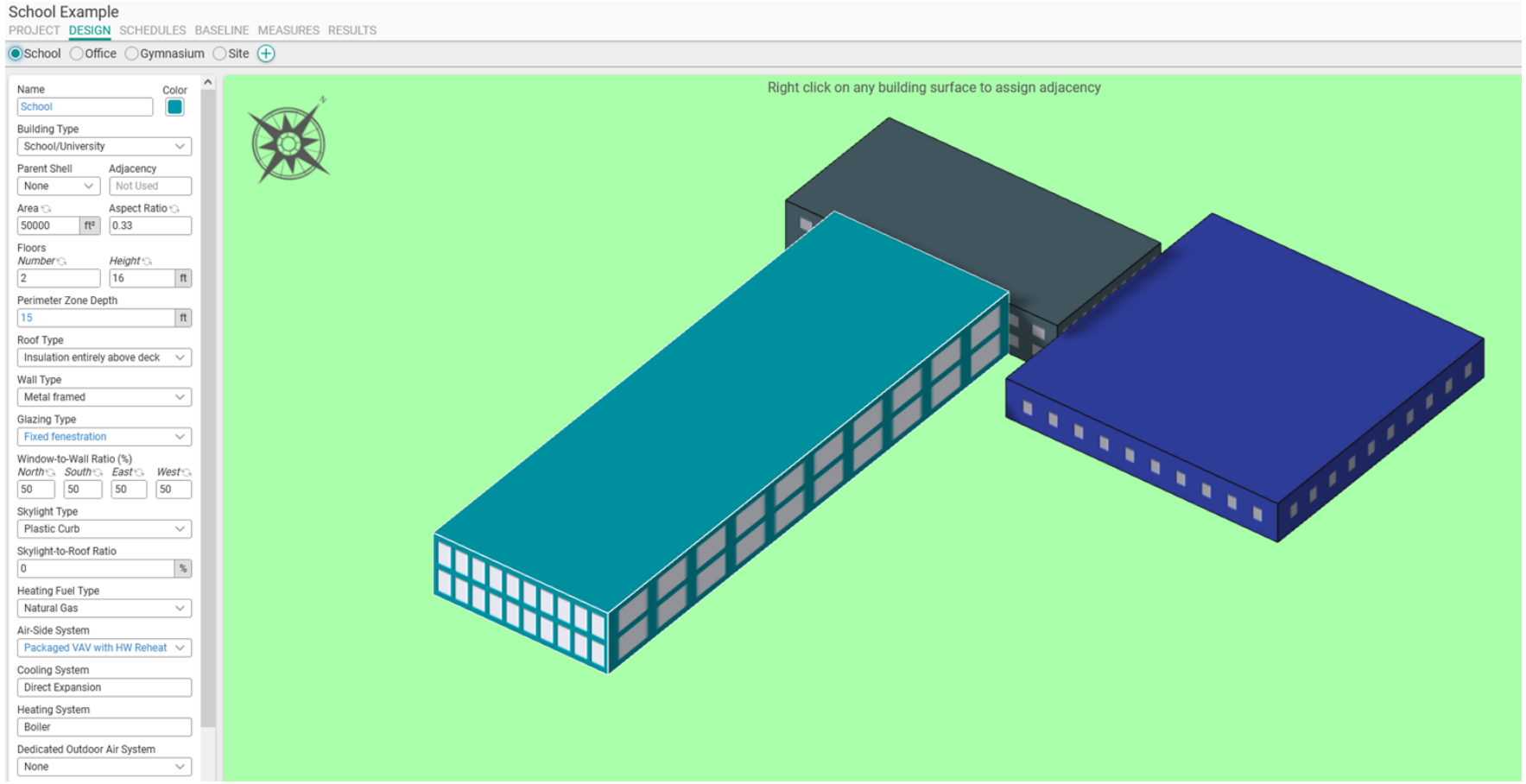
eQuest
Quick Energy Simulation Tool

eQUEST

EnergyPlus

IES

Tools for Electrification: Early Energy Modeling



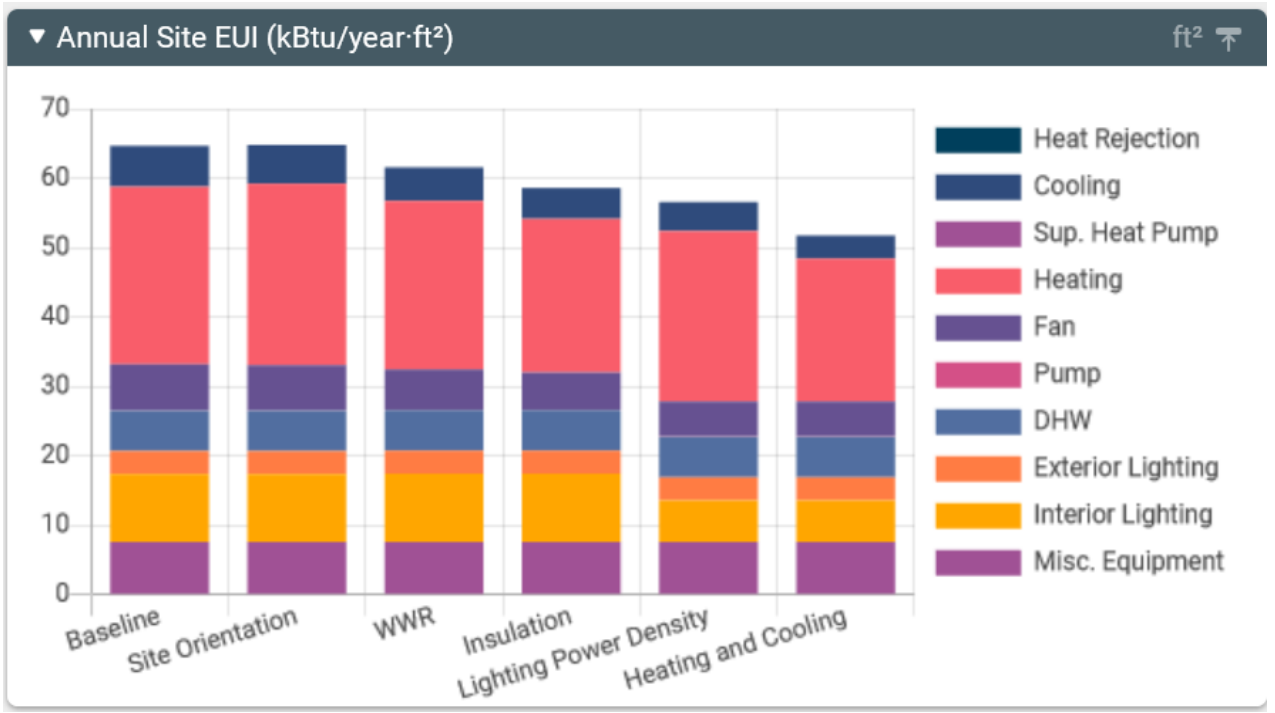
https://slipstreaminc.org/sketchbox

slipstream

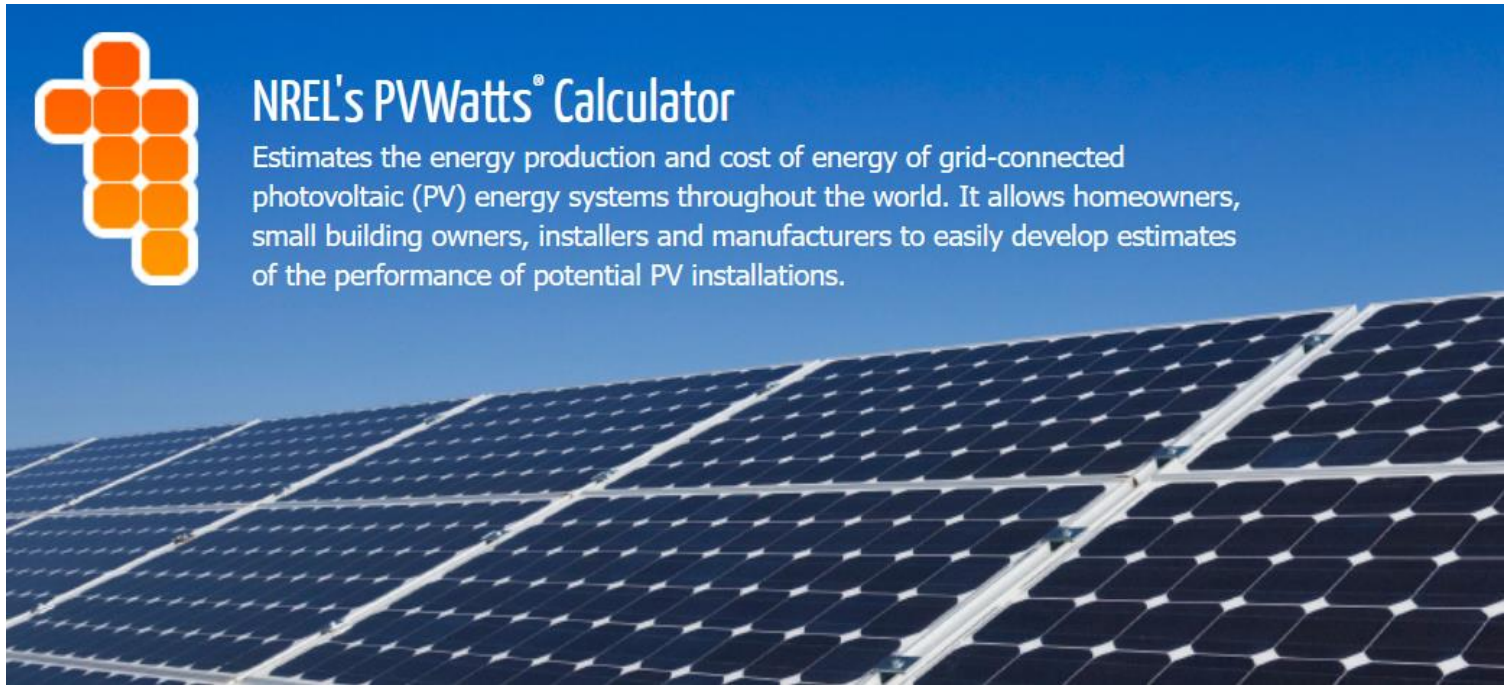
Tools for Electrification: Early Energy Modeling

Annual Summary ft²

	Baseline	Proposed	Absolute Savings	Relative Savings
Energy Cost ($)	111,711	86,433	25,278	23%
Electric Consumption (kWh)	875,907	667,006	208,901	24%
Natural Gas Consumption (therm)	28,288	23,795	4,493	16%
Site EUI (kBtu/ft²)	64.6	51.7	12.9	20%
Source EUI (kBtu/ft²)	126	98.6	27.4	22%
CO_2 Equivalent (kg of CO_2e)	704,379	548,330	156,049	22%



Tools for Electrification: Renewable Energy



Tools for Electrification: Renewable Energy

Customize Your System To Your Roof

On the map below, click the corners of the desired system. Note that the roof tilt and azimuth cannot be automatically determined from the aerial imagery, and consequently the estimated system capacity may not reflect what is actually possible.

System Capacity: 1406.9 kWdc (9380 m2)

RESULTS

Print Results

806,780 kWh/Year*

System output may range from 755,388 to 855,510 kWh per year near this location.
Click HERE for more information.

Month	Solar Radiation (kWh / m^2 / day)	AC Energy (kWh)
January	2.30	39,965
February	3.19	48,679
March	4.32	70,041
April	5.05	77,615
May	5.76	88,972
June	6.58	95,473
July	6.51	95,758
August	6.01	88,374
September	4.99	73,755
October	3.46	54,685
November	2.50	39,288
December	2.00	34,175
Annual	4.39	806,780

Electrification Technology

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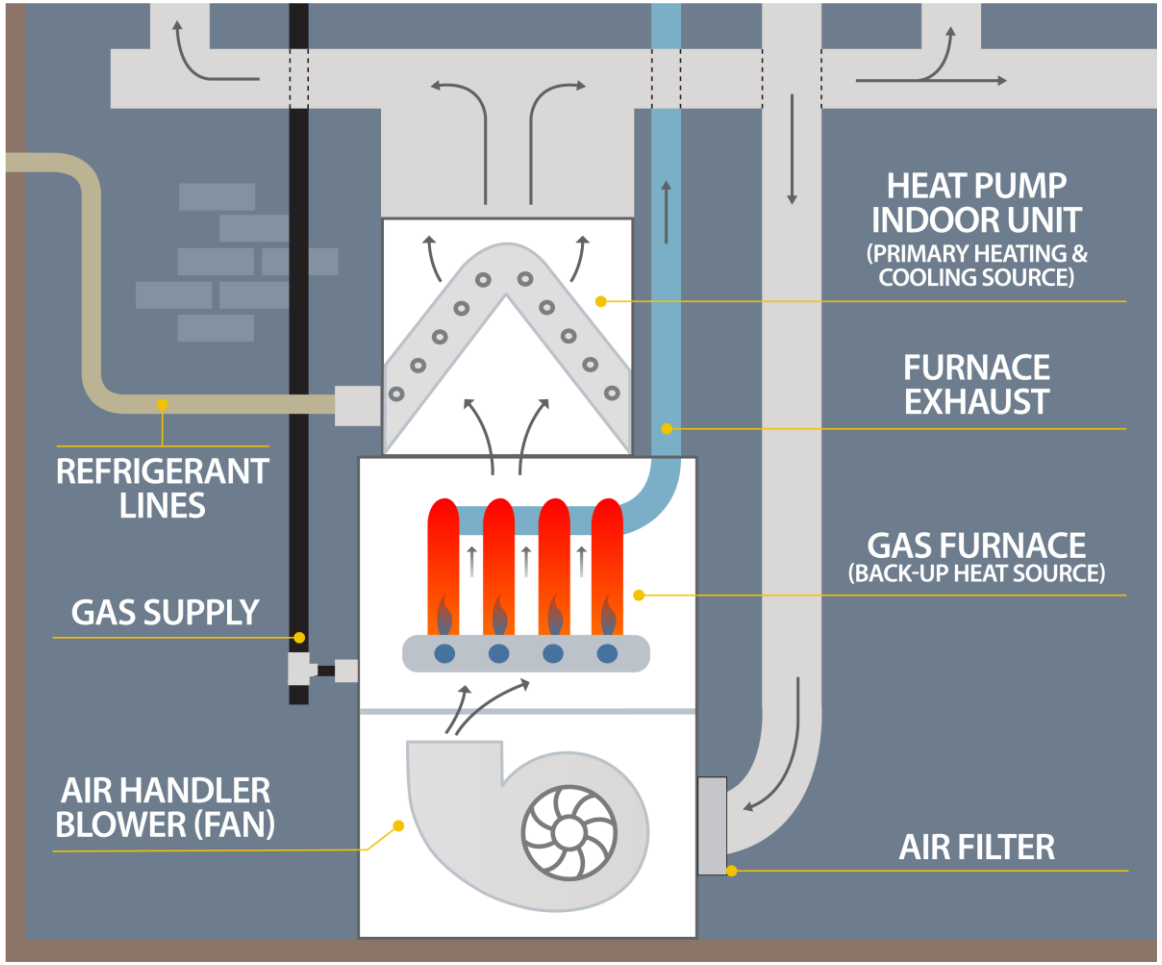
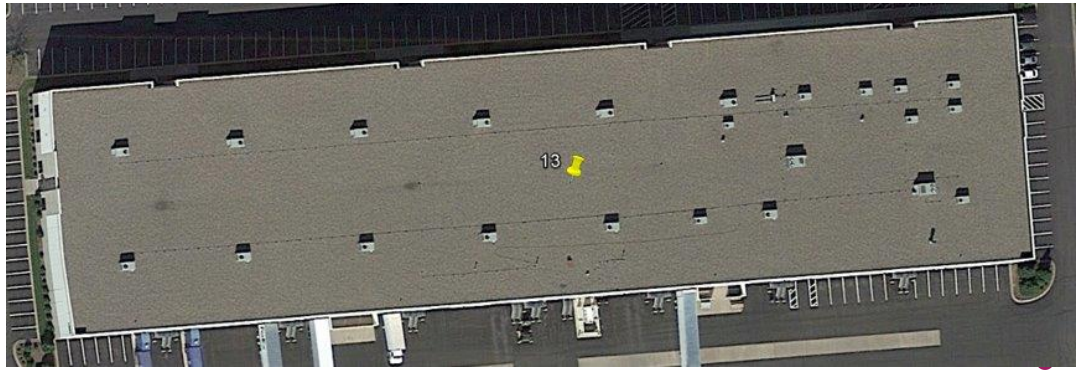
Packaged and Split System Heat Pumps

Dual-Fuel Heat Pumps



Rooftop Unit Retrofit

- Packaged RTUs serve approximately 34% of US commercial building area
- 95%+ of existing Midwest RTUs use natural gas for heating
- Electrification options
  - Heat Pump RTU
  - Dual Fuel RTU

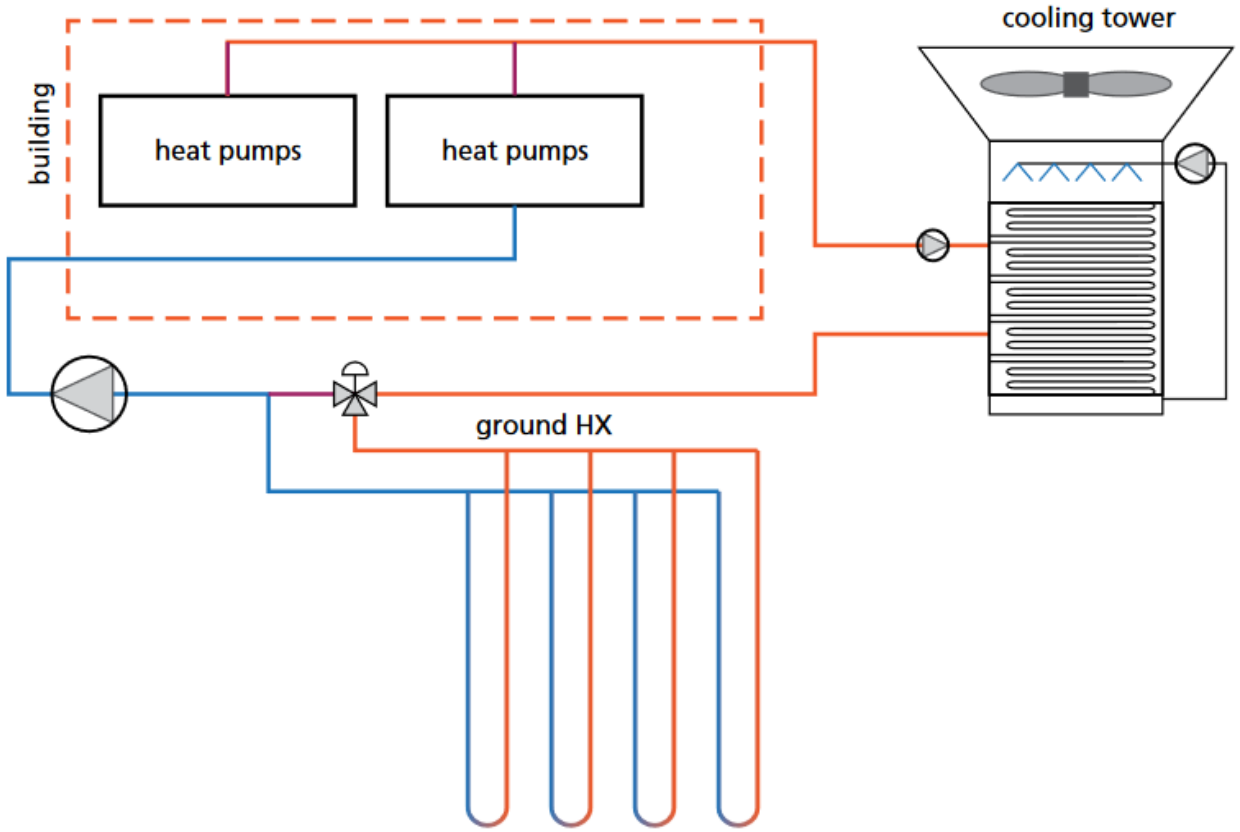


Air-Source VRF

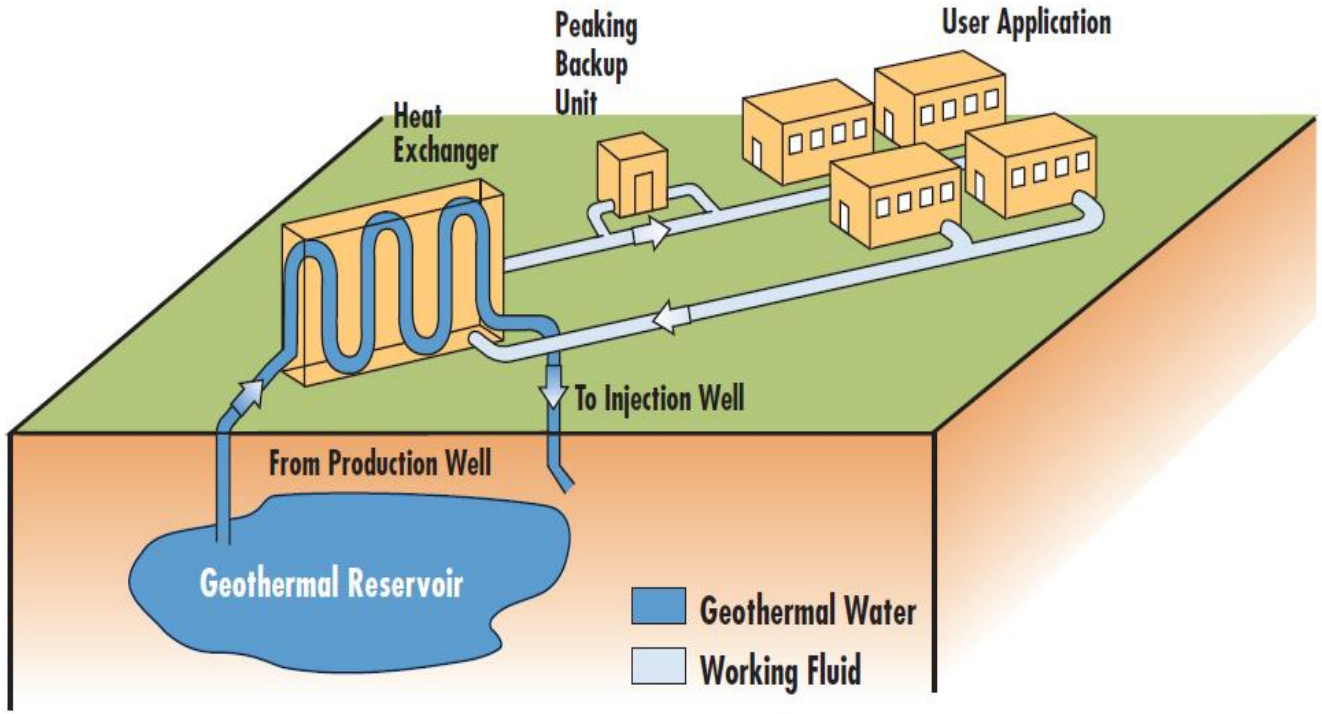
Large Air-to-Water Heat Pumps

Ground-source (geothermal) Heat Pumps

Figure 1—A TYPICAL HYBRID SYSTEM



Community Geothermal System



Community geothermal system diagram courtesy of U.S. Department of Energy

Commercial and Multifamily HPWHs

- Residential-style and Small-commercial
  - AO Smith 120-gallon model rated COP of 4.2.

- Central
  - SanCO2 achieving 3.3 COP in Pacific Northwest
  - Mitsubishi $Heat_2O$ has CO_2 refrigerant
  - Increased availability of skid-mounted design

Source: AO Smith CHP-120

Thank You

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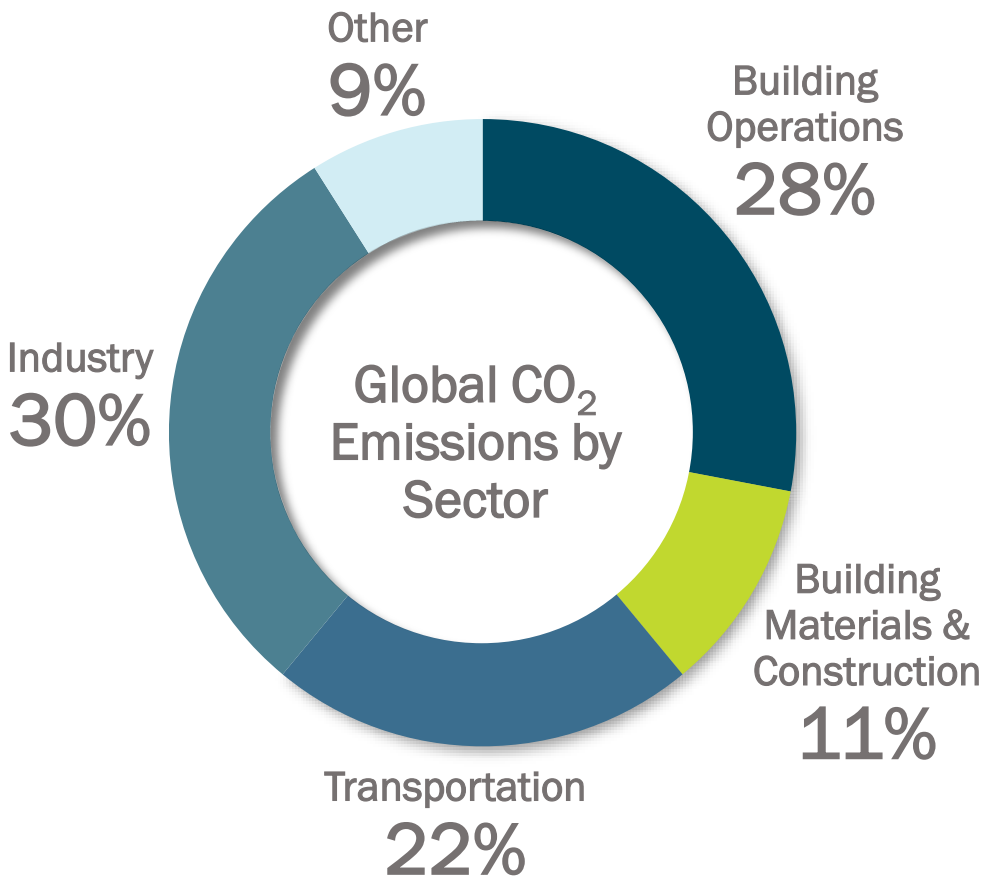
BUILDING DECARBONIZATION FORUM

Stephen Pipson

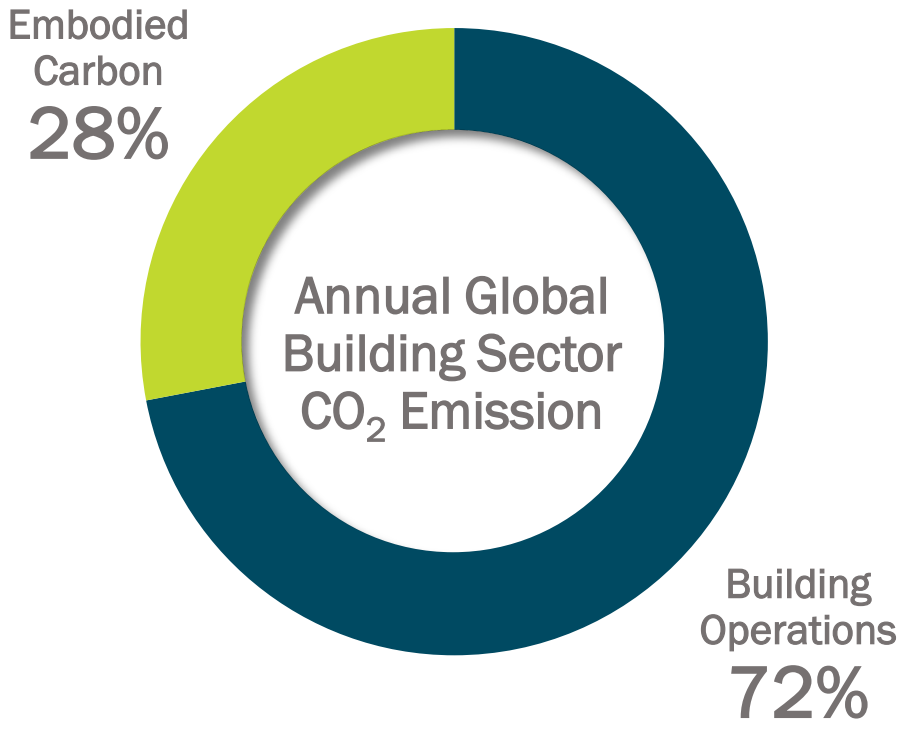
focus on energy®

Partnering with Wisconsin utilities

ENERGY EFFICIENCY KEY TO BUILDINGS' CARBON EMISSIONS

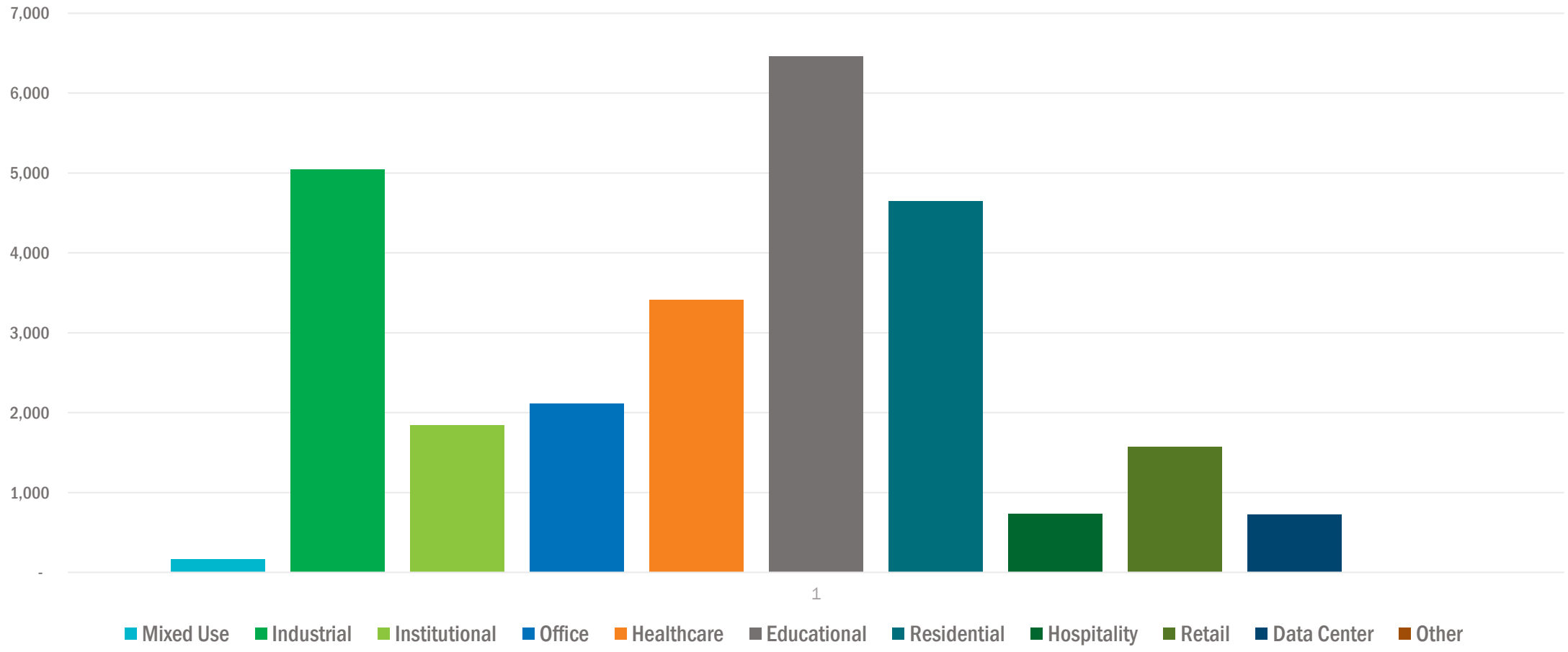


Source: Architecture 2030, Data Sources: UN Environment Global Status Report 2017; EIA International Energy Outlook 2017



Source: Architecture 2030, EPA International Energy Outlook

2021 FOCUS ON ENERGY NEW CONSTRUCTION OFFERING CO_2 REDUCTION (TONS)



BAYVIEW APARTMENTS
CO_2 REDUCTION - 107 TONS

Savings highlights:

- Lighting power reduction – all areas
- Parking - CO sensor control of ventilation
- Glazing - medium solar gain, non-metal frame
- Programmable thermostats

Energy Parameter	Baseline	Planned, As Modeled*	Planned, As Built
Building Results			
Energy Cost	$102,674	$87,851	$82,011
Energy Cost Savings		$14,823	$20,663
Percent Energy Cost Savings		14%	20%
Electric Demand (kW)	90.1 kW	80.5 kW	73.4 kW
Electric Demand Savings		9.7 kW	16.7 kW
Percent Electric Demand Savings		11%	19%
Electric Consumption	553,724 kWh	500,332 kWh	452,464 kWh
Electric Consumption Savings		53,392 kWh	101,260 kWh
Percent Electric Consumption Savings		10%	18%
Gas Consumption	29,452 Therm	19,939 Therm	21,514 Therm
Gas Consumption Savings		9,514 Therm	7,938 Therm
Percent Gas Consumption Savings		32%	27%
Total Results			
Total Incremental First Cost		$142,172	$128,845
Electric Incentive			
Gas Incentive			
Total Incentive			
Simple Payback with Incentive		**8.6**	**5.3**

** The figures in the "As modeled" column above are reprinted from the February 16, 2022 Bundle Requirements Document for this project, which were the basis for the original energy savings projections.*

WHOLE BUILDING ANALYSIS BENEFITS

- Initial assessment of energy savings and incentive potential from Online Tool
- Energy models help building owners make informed decisions about the building systems impacting energy consumption
- Customized for each building type
- Timely results, matched to customer's design schedule
- Incentives available for building owners investing in improved energy performance and design professionals to help offset resource investments

ANALYSIS – NET ENERGY OPTIMIZER (NEO®)

Timeline: typically, three to four weeks

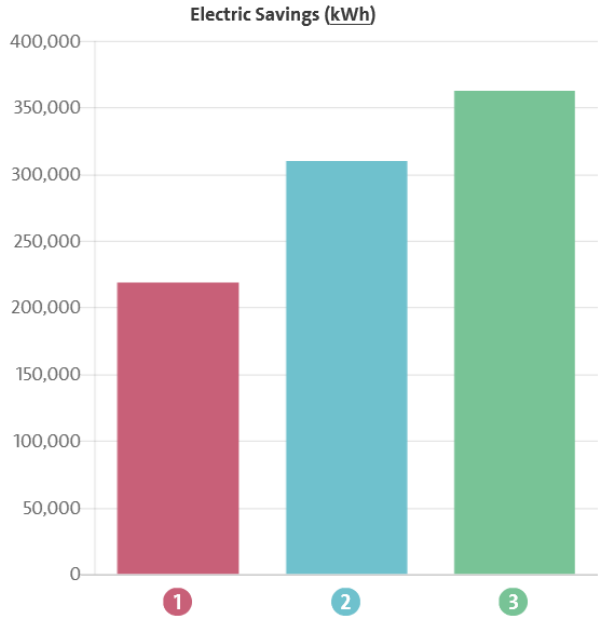
focus on energy
Partnering with Wisconsin utilities

Building — HVAC — Bundling

Save | MENU

A Scenario A

Savings vs Baseline	1 Bundle 1	2 Bundle 2	3 Bundle 3
Energy Cost Savings	$31,324 17 %	$41,929 23 %	$47,871 26 %
Peak Electric Savings (kW)	68.0 16 %	108.1 26 %	129.1 31 %
Electric Savings (kWh)	218,405 15 %	310,023 21 %	362,517 24 %
Gas Savings (Therm)	12,968 35 %	14,306 38 %	14,855 40 %
Incremental First Cost	$235,536	$468,653	$583,115
Projected Incentive	$27,363	$33,344	$36,481
Net Incremental First Cost	$208,173	$435,309	$546,634
Payback with Incentive (yr)	6.6	10.4	11.4
Energy Use Intensity (kBtu/ft²/yrs)	48.4	45.2	43.5



FOCUS ON ENERGY OFFERINGS

Business Offerings

New Construction & Renovations
- Design Assistance

Equipment Replacement
- Prescriptive Rebates

Operations & Maintenance
- Building Optimization and Equipment Tune-ups

Renewables for Businesses

Special Offerings
- Rural Business and Propane Offerings

Residential Offerings

Heating and Cooling

Insulating & Air Sealing

Free Energy-Saving Packs

Smart Thermostats

Water Heating Discounts

Solar for Homes

Lightbulb Discounts

New Home Certification

DIY Insulation & Air Sealing

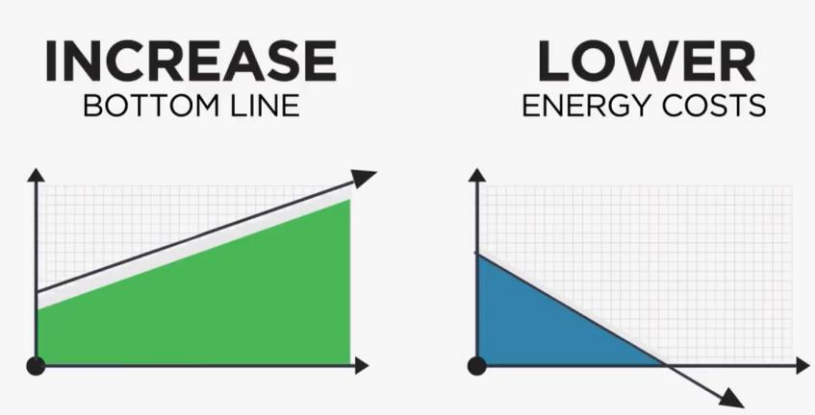
CONTACT INFORMATION

Visit the Focus on Energy table today

www.focusonenergy.com

focus on energy®
Partnering with Wisconsin utilities

C-PACE is a property tax-assessment financing mechanism for **energy & water efficiency and renewable energy improvements** to commercial properties.

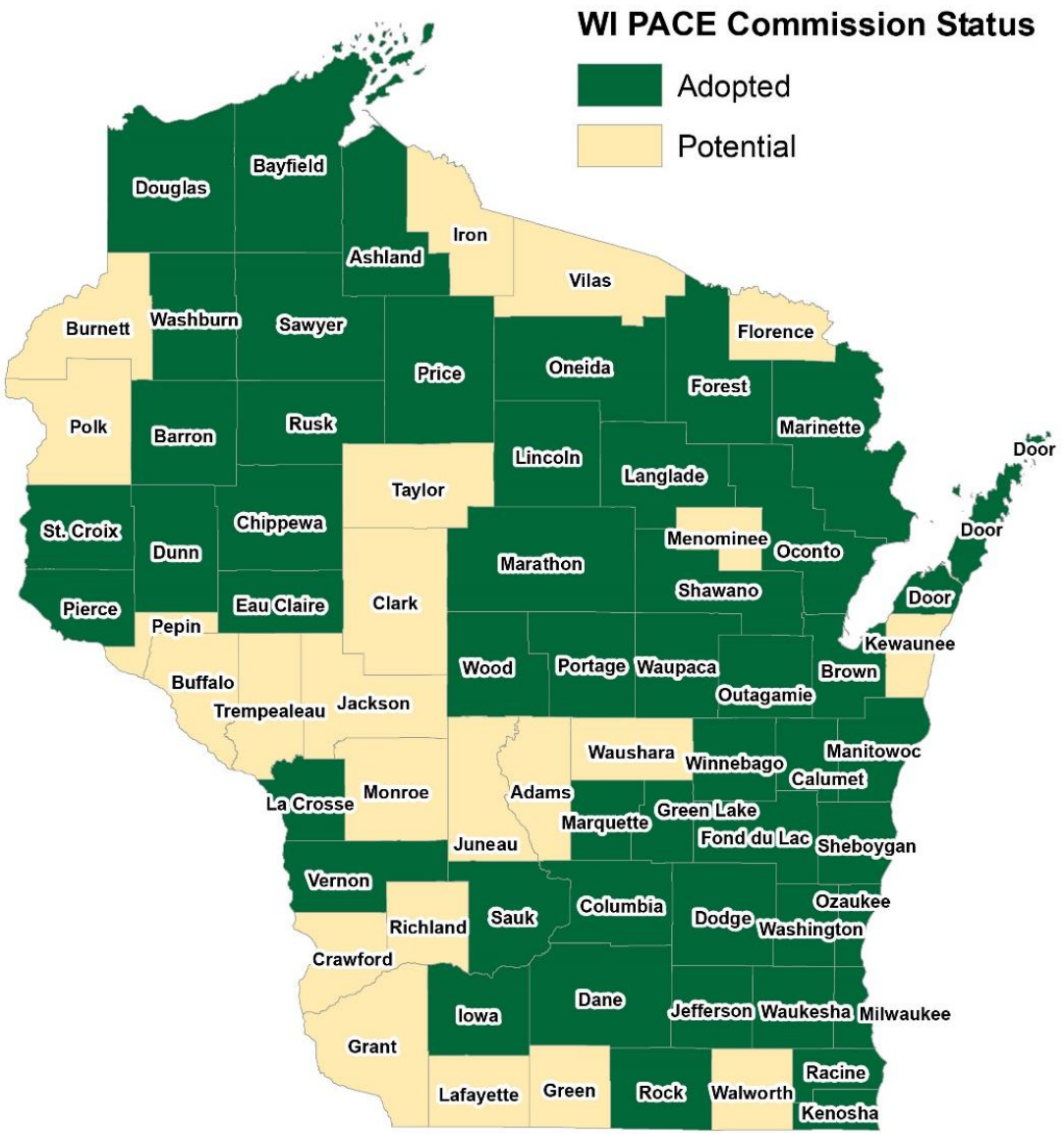


Benefits:

- Finance up to 100% of hard + soft costs
  - Non-recourse financing
  - Frees up equity for other priorities
- Fixed rate, long-term: 20 – 30 years
  - Yields positive cash flow
  - Boost Property Value
- Tenants share cost & savings
- Transfers to new owner upon sale
- Potential off-balance sheet treatment
- Reduce waste & improve experience

PACE
PACE WISCONSIN

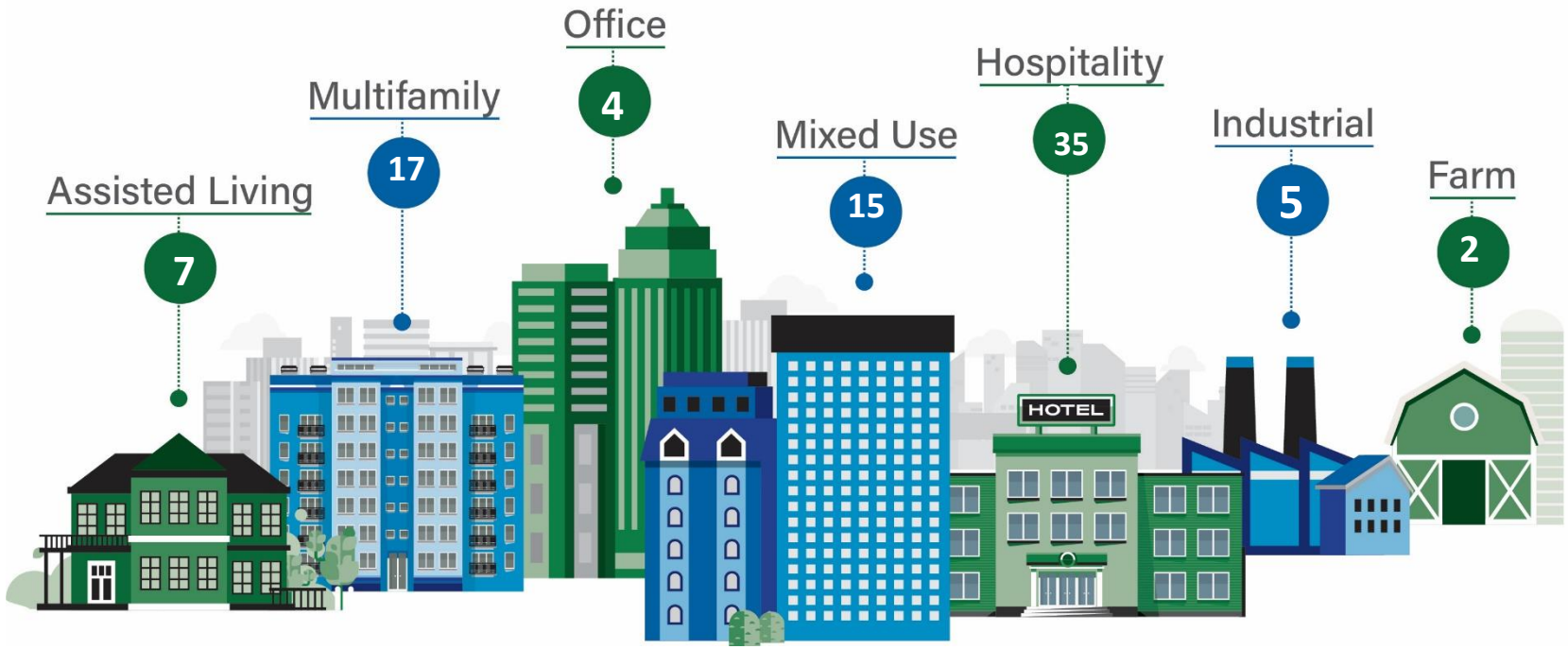
Available in 50 Counties



Project Costs Funded
$141,331,389

Projects
81

Project Type



PACE
PACE WISCONSIN

Eligible C-PACE Projects

Commercial Properties

Project Types

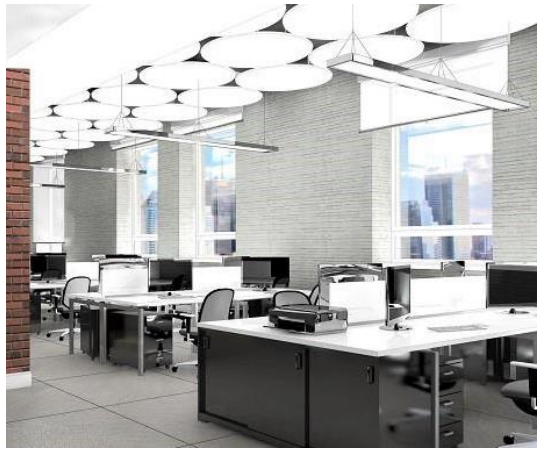
- Renovations
- New Construction
- Adaptive Reuse
- Refinance
- Equipment Installation

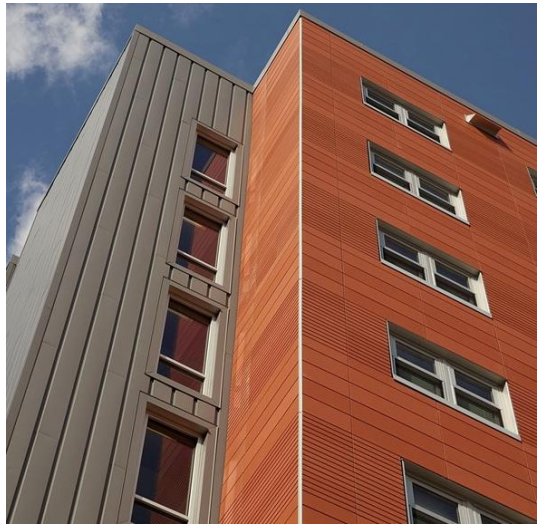
** Property located in member county*
** Does NOT work for residential (1-4 units) and government owned properties*

Eligible Improvements

Energy & Water Efficiency

- Lighting Systems
- Building Controls
- Building Envelope Improvements
- Furnaces, Boilers & Chillers
- Heat Pumps
- Pumps, Motors & Variable Speed Drives
- Low flow fixtures
- Heat Recovery
- Fuel Switching





Eligible Improvements

Renewable Energy

- Solar PV
- Battery Storage
- Biofuel
- Wind

Dane County - An Early Adopter

23 C-PACE projects in multiple market sectors have closed in Dane County.

Hidden Creek 2 Residences

PACE Financing: $1,436,400
Annual Estimated Savings: $149,238
Improvements: Building Envelope, Roof, Wall and Window Upgrade, Interior LED Lighting, Packaged Terminal Air Conditioners, Low Flow Fixtures, High Efficiency DHW
Lender: **One Community Bank**

Hotel Indigo

PACE Financing: $1,500,000
Annual Estimated Savings: $89,832
Improvements: HVAC, Windows, Building Shell, Lighting
Lender: **Greenworks Lending**

The Emerson

PACE Financing: $500,000
Annual Estimated Savings: $68,305
Improvements: Building shell, HVAC, HVAC controls, LED lighting, renewable energy
Lender: **State Bank of Cross Plains**

The Masters Residences 2

PACE Financing: $1,500,000
Annual Estimated Savings: $78,243
Improvements: Building Shell, HVAC, HVAC Control, LED Lighting, Water Conservation
Lender: **One Community Bank**

The Edge

PACE Financing: $1,420,000
Annual Estimated Savings: $54,763
Improvements: Roof Insulation, Wall Insulation, Window Upgrades, LED Lighting, Garage DCV
Lender: **One Community Bank**

Oakmont Senior Living

PACE Financing: $2,250,847
Annual Estimated Savings: $108,918
Improvements: Wall Insulation, Windows, Interior/Exterior LED Lighting, HVAC, Low-flow Fixtures, DHW Heater
Lender: **Twain Financial**

Inflation Reduction Act Highlights

Building Decarbonization Forum

10/27/22

slipstream

Inflation Reduction Act (IRA) Overview

- Signed into law by President Biden August 16, 2022
- Designed to reduce the federal deficit and lower inflation while investing in climate, domestic energy production, & health
- Expected to raise $737 billion, require investments totaling $437 billion, and reduce the deficit by more than $300 billion
- It is a scaled back version of what was called Build Back Better in 2021
- Like IIJA, part of broader opportunity to lift up and realize environmental justice

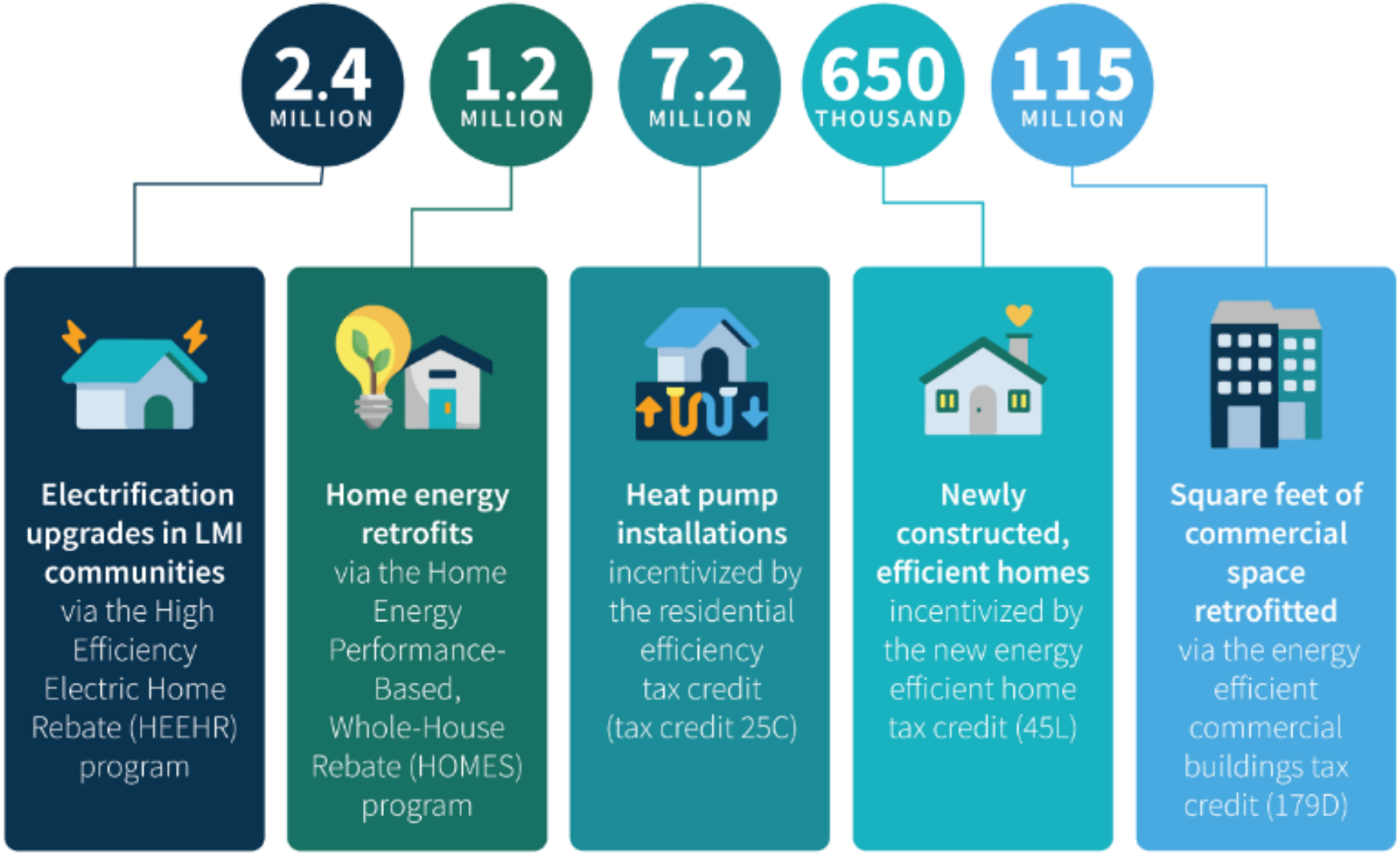
Climate, Energy, & EJ Investment

- IRA is the single largest Congressional climate investment in history
- More than 100 programs will invest $369 billion in climate action, clean energy jobs, & environmental justice
- Estimated impacts of legislation:
  - reduce greenhouse gas emissions by a billion metric tons by 2030 (that's about 40% below 2005 levels)
  - avoid up to 3,900 premature deaths and 100,000 asthma attacks annually by 2030 by reducing particle pollution from fossil fuels
  - lower the national deficit by $300 billion, and
  - create 9 million family supporting jobs
  - accountability via funding to track labor, equity, & environmental outcomes

Climate, Energy, & EJ Provisions

- Electricity
- Transportation
- Buildings
- Manufacturing
- Environmental Justice & Community Resilience
- Lands
- Agriculture

Buildings - Impact



[144] Graphic Credit: RMI

High-Efficiency Electric Home Rebates (HEEHR)

- Consumer-facing
- $4.5 billion through FY2031—allocated to SEOs
- Funding available in 2022, but implementation will take time
- Point-of-sale rebates up to $14,000 for LMI households that install new, electric qualified electrification projects (QEPs)
- Administered by State energy offices & Tribes
- Project costs covered:
  - 100% for households <80% AMI
  - 50% for households 80-150% AMI
- Max qualified electrification project (QEP) rebate levels:
  - $8,000 for heat pumps
  - $1,750 for heat pump water heaters
  - $840 for heat pump clothes dryers
  - $840 for electric or induction stoves
  - $4,000 for electrical panel upgrades
  - $2,500 for rewiring
  - $1,600 for basic weatherization
- Multifamily buildings also qualify if ≥50% of occupants are LMI
- Contractors can receive up to a $500 incentive
- DOE will likely issue program rules and guidelines

Home Owner Managing Energy Savings Rebates (HOMES)

- Consumer facing
- $4.3 billion—allocated to SEOs
- Direct rebates for home energy efficiency retrofits
  - Modeled approach: $2,000 for 20% savings; $4,000 for 35% savings
  - Measured approach: 15% savings threshold and rebate is calculated per kilowatt hour or kilowatt-hour equivalent saved, based on a state-specific energy use formula.
  - Capped at 50% of project cost over 80% AMI
- Rebates double for LMI households up to $8,000 & capped at 80% of project cost
- Can’t double dip with HEEHR or other federal grants or rebates for the same measure (can stack with tax credits and state rebates)
- Single family and multifamily

State Based Home Energy Efficiency Contractor Training Grants

- $200 million
- Grants to states energy offices for efficiency and electrification contractor training
- DOE will provide specific guidance
- Program previously called Home On-Line Performance-Based Energy Efficiency Contractor Training Grants (HOPE)

25C Residential Energy Efficiency Tax Credit

- Extended through FY2031; new version of 25C starts in 2023
- Provides 30% tax credit for residential efficiency and electrification upgrades up to $3,200 per year
- Annual credit for heat pumps and heat pump water heaters capped at $2,000
- Annual credit for other upgrades capped at $1,200
- $600 for electrical panel if installed with other electrification measures
- $1,200 for weatherization
- $150 for energy audit
- $600 for energy properties other than HP/HPWH
- Covers purchase and installation
- Annual credit limit resets every year
- Energy properties must meet Consortium For Energy Efficiency's (CEE) highest efficiency tier
- Nonrefundable

25D Residential Clean Energy Credit

- First made available in 2006 as the Residential Energy Efficient Property Credit (also known as the Investment Tax Credit, or ITC)
- Extends the tax credit by 10 years to 2034
- 30% discount (requires tax liability)
- 30% tax credit for systems installed by the end of 2032, a 26% credit for those installed in 2033, and a 22% credit for those installed in 2034 before it expires (score if you were slow to sign a contract this year like me!)

179D Commercial Buildings Energy Efficiency Tax Deduction

- Wage and apprenticeship requirements
- Tax exempt entities may allocate deduction to other party

Site EUI Reduction	W/O Prevailing Wage	With PW and Apprenticeship
25% Min	$0.50/SF	$2.50/SF
+1%	$0.02/SF	$0.10/SF
50% Max	$1.00/SF	$5.00/SF

45L New Energy Efficient Homes Credit

- Effective January 1, 2023
- Stackable with LIHTC without reducing basis
- Applies to new construction and major renovations
- Applies to units acquired after December 31, 2022

Energy Performance	Prevailing Wage	Multifamily	Single Family*
EPA's Energy Star New Construction	No	$500/dwelling unit	$2,500/dwelling unit
DOE's Zero Energy Ready Homes	No	$1,000/dwelling unit	$5,000/dwelling unit
EPA's Energy Star New Construction	Yes	$2,500/dwelling unit	$2,500/dwelling unit
DOE's Zero Energy Ready Homes	Yes	$5,000 dwelling unit	$5,000/dwelling unit

*Detached SF, duplex, townhomes, manufactured homes

Energy Efficiency, Water Efficiency, & Climate Resiliency for Affordable Housing

- HUD administers
- Eligible recipients are owners and sponsors of privately-owned, HUD-subsidized properties that agree to an extended period of affordability
- $1 billion through September 2028:
  - $837.5 million for the cost of providing grants and direct loans, including to subsidize up to $4B in direct loans
  - $120 million for program administration
  - $42.5 million to benchmark energy and water use for eligible properties
- Eligible Uses:
  - Low-emission technologies, materials, or processes, including zero-emission electricity generation, energy storage or building electrification
  - Improve energy or water efficiency, indoor air quality or sustainability
  - Climate resilience
  - Energy and water benchmarking

Building Energy Codes Implementation

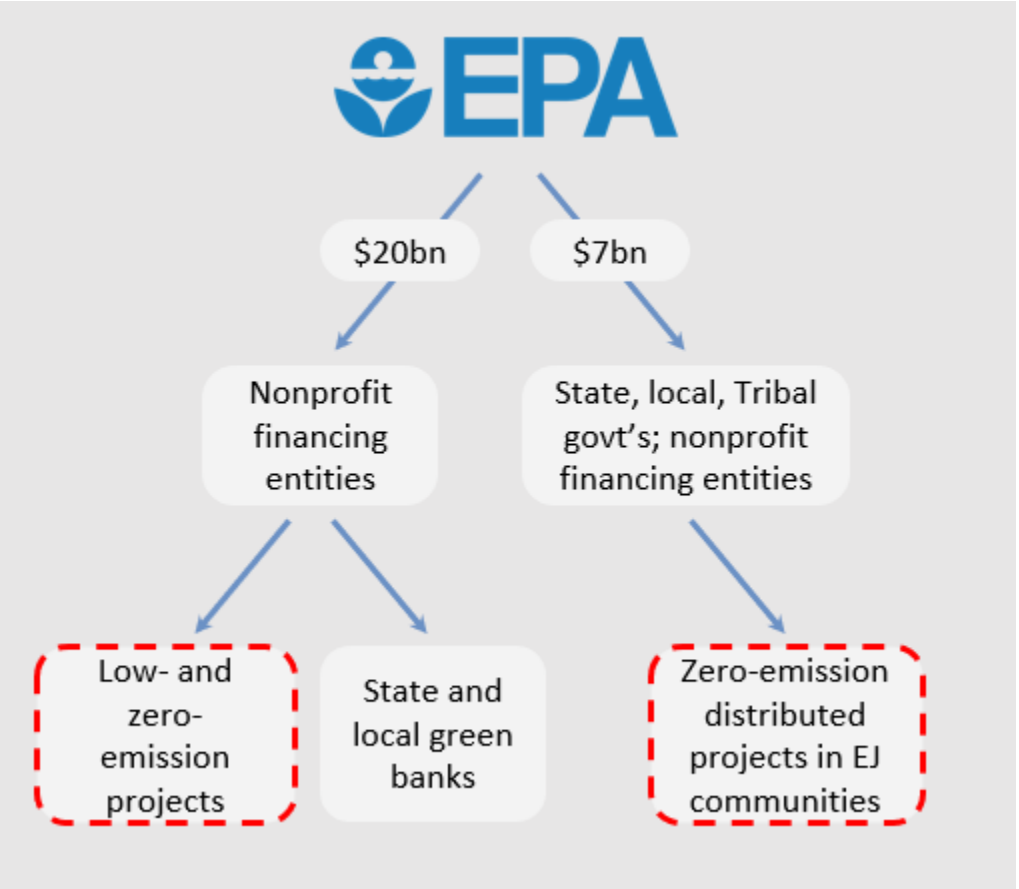
- $1 billion
  - $330 million for 2021 IECC (residential)/ASHRAE 90.1-2019 (commercial or better
  - $670 million for adoption of zero energy provisions of 2021 IECC or equivalent stretch code
- Jurisdictions must have a compliance plan addressing
  - Training
  - Enforcement
  - Annual measurement of compliance rates

Greenhouse Gas Reduction Fund

- FKA Clean Energy and Sustainability Accelerator or National Climate Bank
- $27 billion administered by EPA
- Purpose is to facilitate rapid deployment of low and zero emissions tech with innovative financing
  - $12 billion for the general fund (administered by nonprofits)
  - $8 billion for the environmental justice fund (administered by nonprofits)
  - $7 billion for zero-emissions distributed technologies in environmental justice communities (administered by state/local/Tribal govt's and nonprofits)
- Funding will flow to the recipients listed above, who then provide.
  - Direct investment in low- and zero-emissions projects
  - Indirect investment to state and local green banks
- Funds to be disbursed by February 2023 (request for comments released last week)

Greenhouse Gas Reduction Fund (continued)

- Direct investment can include:
  - A wide range of financing tools, including low- or zero-interest loans
  - A wide range of projects, as long as they reduce or avoid GHG emissions
  - Individual (i.e., household) projects, community-scale projects, aggregated projects, and so on; recipients have broad flexibility in the types of projects they finance



Environmental Justice Block Grants

- $3 billion
- EPA for grants of up to three years
- Eligible recipients are local governments, universities or community-based nonprofits (or partnerships of those entities)
- Eligible activities include community-led pollution monitoring, prevention, and remediation; low- and zero-emission resilient technologies and related infrastructure; workforce development tied to GHG reduction; mitigating climate and health risks from urban heat islands; climate resiliency and adaptation; and reducing indoor air pollution

Nonprofit Highlights

- Eligible for program funding
- Direct pay– a way to monetize the tax provisions for nonprofits and entities without tax liability like local governments, tribal nations, faith organizations, and cooperative and municipal utilities
  - Electric vehicles: up to 30% of cost of qualified commercial vehicles put in services between January 1, 2023 and January 1, 2033; capped by weight at $7,500 under 14,000 pounds and $40,000 above 14,000 pounds
  - Renewable energy systems: if project is financed 100 percent with tax-exempt debt, the direct pay amount will be reduced by the lesser of 15% or the portion of the qualifying project that has been financed with tax-exempt debt. ITC & PTC.

Tribal Citizen/Government Provisions

- $75 million for the Tribal Energy Loan Guarantee Program
- $235 million for Tribal Climate Resilience
- $150 million for the Tribal Electrification Program
- Provision of electricity to unelectrified Tribal homes through zero-emissions energy systems
- Transitioning electrified Tribal homes to zero-emissions energy systems
- Associated home repairs and retrofitting necessary to install the zero-emissions energy systems authorized under sections (1) and (2)

Department of Energy Provisions

- Loan Programs Office
  - $40 billion for loans under Section 1703 of the Energy Policy Act of 2005
  - To support commercial deployment of cutting-edge clean energy technologies
  - Available until 2026
- Defense Production Act
  - $500 million to support manufacturing of clean energy technologies (heat pumps)
  - Available until Sept. 30, 2024

Embodied Carbon Provisions

- $2.15 billion to GSA through 2026 to acquire and install low-embodied carbon materials and products for use in the construction or alteration of GSA facilities. Defines low-embodied carbon materials as those defined by EPA as having substantially lower levels of embodied carbon as compared to estimated industry averages.
- $250 million for the EPA to support the development, standardization, and transparency of environmental product declarations (EPDs), along with $5 million for similar efforts around corporate climate commitments.
- $100 million for the EPA to work with DOT and GSA to develop a program to identify and label low-embodied carbon construction materials and products.

Addressing Air Pollution in Schools

- $37.5 million in grants and other activities through EPA to monitor and reduce air pollution and greenhouse gas emissions at schools in low-income and disadvantaged communities

- $12.5 million in technical assistance to schools to address environmental issues, identify and mitigate ongoing air pollution hazards, and develop school environmental quality plans that include standards for building, design, construction, and renovation

- Funding through September 2031

Transportation-Tax Credits

- New EV Tax Credit
  - Sec. 13401: Clean vehicle credit
  - Dollar amount: $7.541 billion
- Biodiesel Tax Credits
  - Sec. 13201: Extension of incentives for biodiesel, renewable diesel, and alternative fuels; Sec. 13202: Extension of second-generation biofuel incentives
  - Dollar amount: $5.625 billion
- Commercial EV Tax Credit
  - Sec. 13403: Qualified commercial clean vehicles
  - Dollar amount: $3.583 billion
- Clean Fuel Production Tax Credit
  - Sec. 13704: Clean fuel production credit
  - Dollar amount: $2.946 billion
- EV Charging / Alt Fuel Tax Credit
  - Sec. 13404: Alternative fuel refueling property credit
  - Dollar amount: $1.738 billion
- Used EV Tax Credit
  - Sec. 13402: Credit for previously owned clean vehicles
  - Dollar amount: $1.347 billion
- Aviation Fuel Tax Credit
  - Sec: 13203: Sustainable Aviation Fuel Credit
  - Dollar amount: $0.049 billion

Transportation - Other

- Neighborhood Access and Equity Grants
  - Sec. 60501: Neighborhood Access and Equity Grant Program
  - Dollar amount: $3.045 billion
- USPS Clean Fleet Investments
  - Sec. 70002: United State Postal Service Clean Fleets
  - Dollar amount: $3 billion
- Clean Ports Investments
  - Sec. 60102: Grants to reduce air pollution at ports
  - Dollar amount: $3 billion
- Zero-Emission Heavy-Duty Vehicle Investments
  - Sec. 60101: Clean Heavy-Duty Vehicles
  - Dollar amount: $1 billion
- Low-Emission Aviation Grants
  - Sec. 40007: Alternative fuel and low-emission aviation technology program
  - Dollar amount: $0.297 billion
- Biofuels Investments
  - Sec. 60108: Funding for Section 211(O) of the Clean Air Act
  - Dollar amount: $0.015 billion

Decarbonization in transportation

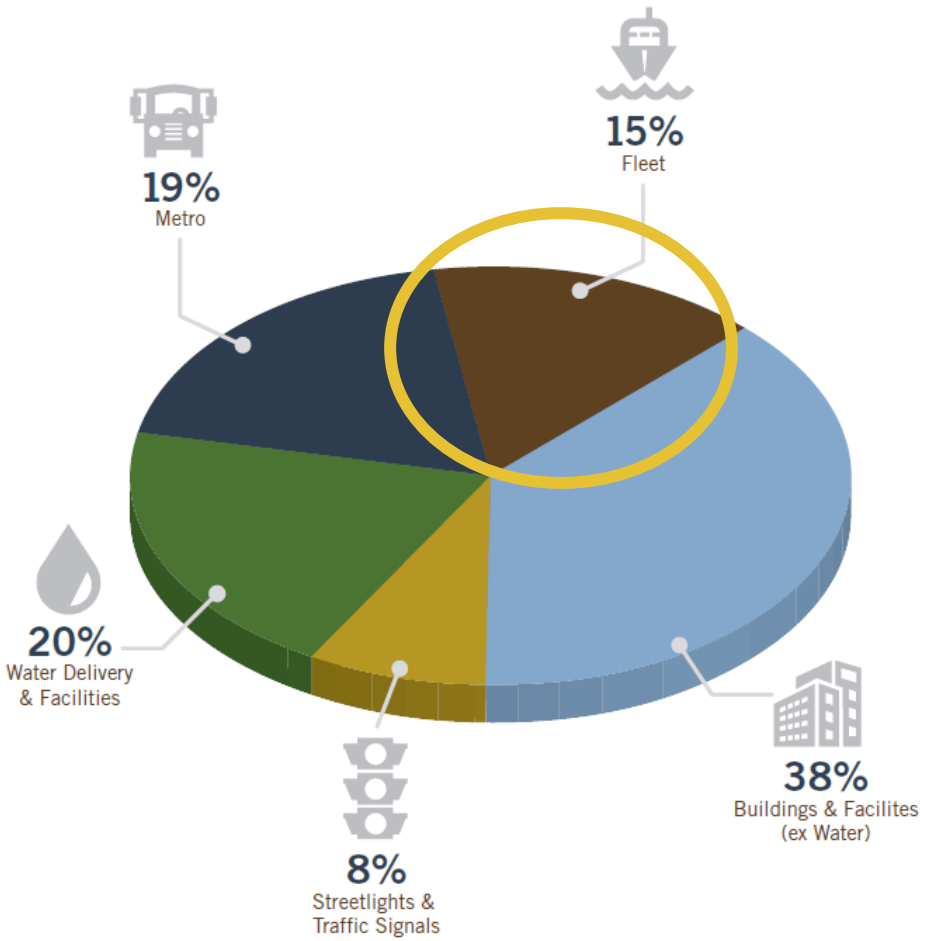
BUILDING DECARBONIZATION FORUM

10.27.2022

FLEET BY THE NUMBERS

- ✓ Acquisitions, Maintenance, Fueling, and Sale for **1,800** City vehicles
- ✓ **38** Full-Time Staff
- ✓ **10** Fuel Stations
- ✓ **3** Repair Garages
- ✓ **2** Shifts
- ✓ **4** Part-time Apprentices

FIGURE A-2. BASELINE CARBON EMISSIONS FOR CITY OPERATIONS BY CATEGORY*



**Excludes landfill, city employee commute, and City-owned housing emissions. Source: HGA based on ICLEI*

- Figure A-2 shows baseline city operations emissions were 81,141 tons CO_2 broken out by category.
- 15% of 81,141 = 12,171.15 tons CO_2

Emission Reduction Tracker

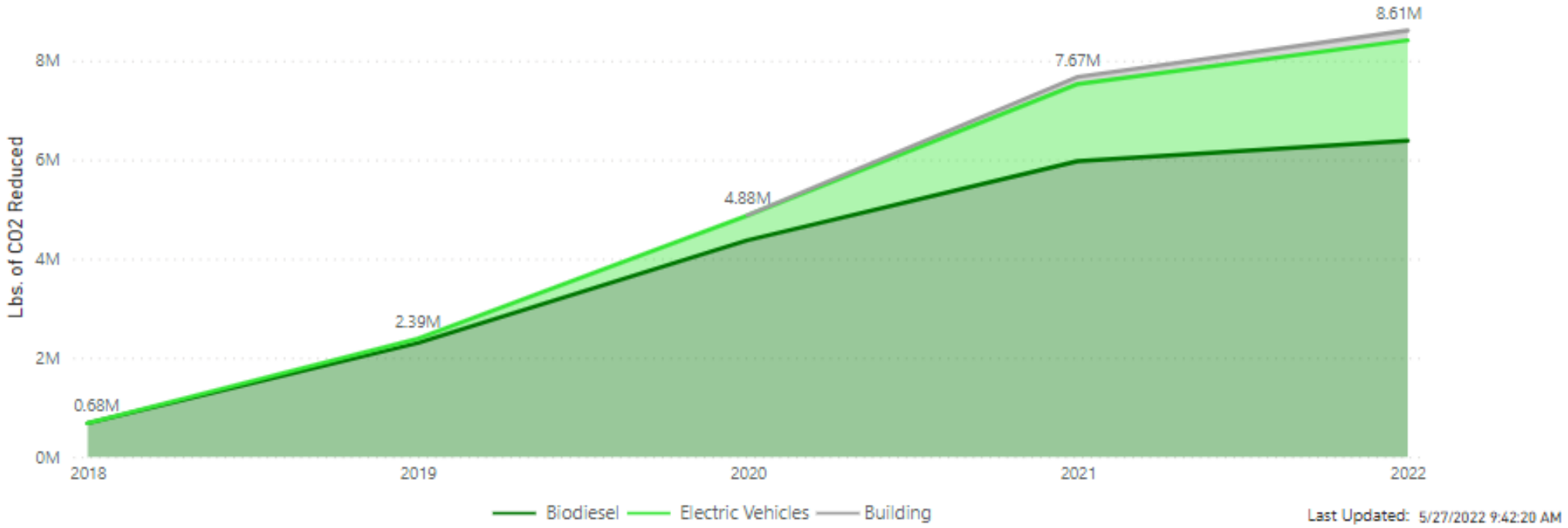
Since 2018

196.77K
LBS. OF CO2 REDUCED IN OUR MAIN FACILITY

2.03M
LBS. OF CO2 REDUCED BY ELECTRIC AND HYBRID VEHICLES

6.38M
LBS. OF CO2 REDUCED BY BIODIESEL

Cumulative CO2 Reductions by Type



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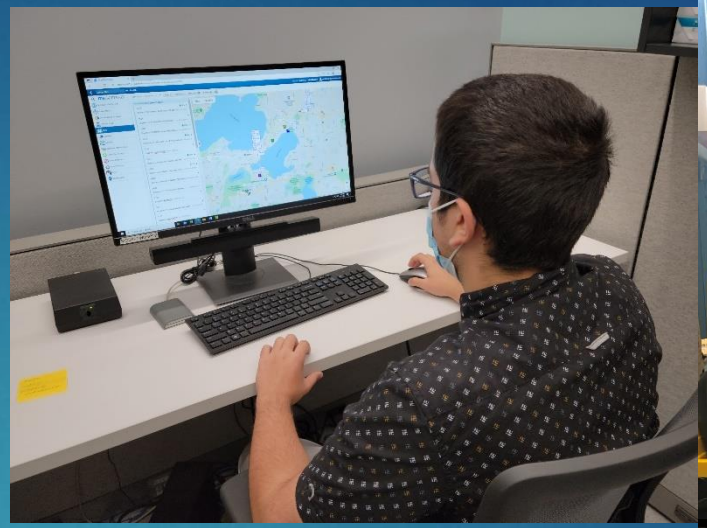
NEW FLEET HQ BUILDING

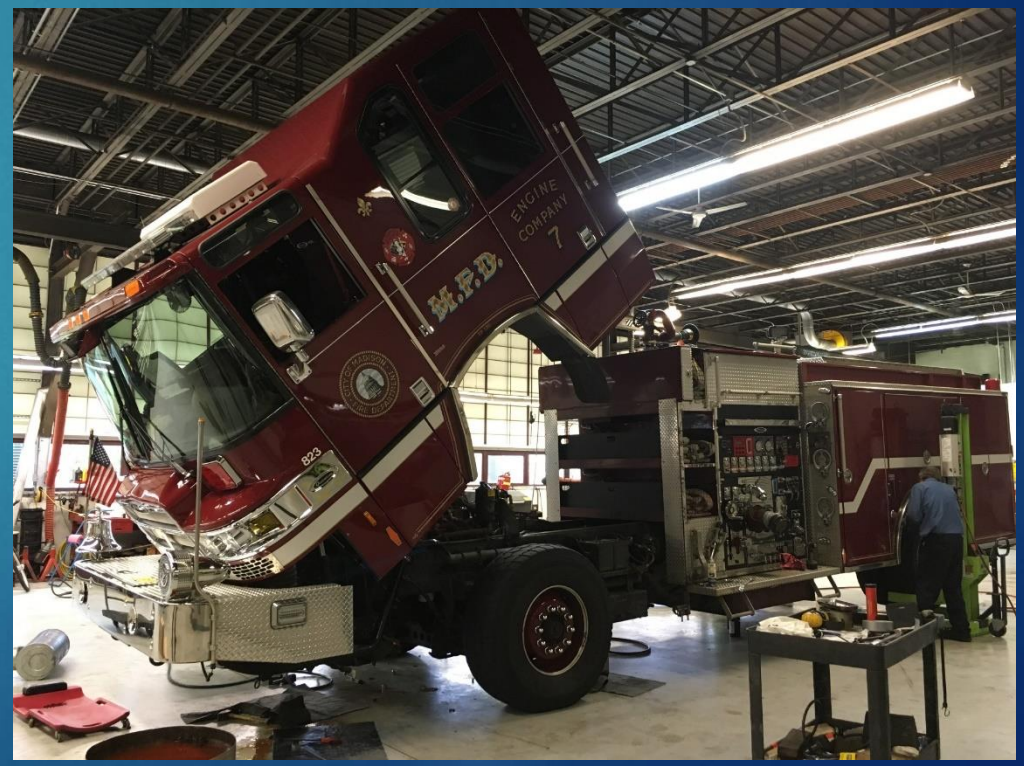
- FIRST LEED GOLD CERTIFIED CITY FLEET GARAGE IN NORTH AMERIC. Featuring: Solar power panels, solar water heating panels, solar heating wall for building, solar EV chargers, CNG repair bays, City EV chargers, Public EV chargers, employee EV chargers, gas/biodiesel fuel stations, natural lighting

APPRENTICES: THE NEXT GENERATION OF AUTOMOTIVE & ENGINEERING PROFESSIONALS



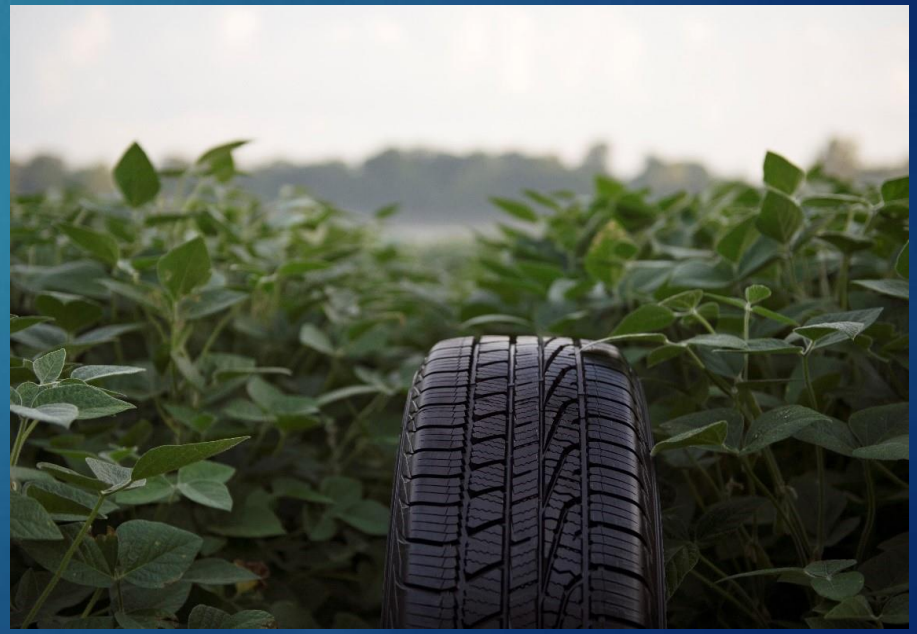
BIODIESEL

- ✓ Renewable energy source
- ✓ Largely soybean, agricultural waste and waste oil based
- ✓ Grown and processed in Midwestern states- supporting local economy including WI
- ✓ Reduces emissions and carbon footprint
- ✓ Reduces dependence on foreign oil and gas
- ✓ Blends up to 20% or B20 in warm months
- ✓ B100 pilot has commenced in 2022



TYPES OF EVs OWNED- CONT'D

150 HYBRID-ELECTRIC VEHICLES & 1000+ SOY TIRES, BIO FLUIDS



OUTREACH/PARTNERSHIP ACTIVITIES

mGE®
your community energy company

Transportation & Innovation Expo
A sustainable transportation, infrastructure, technology and fleet vehicle conference and expo
05.23 2019 EXPO
CITY OF MADISON FLEET SERVICE
Alliant Energy
WISCONSIN CLEAN CITIES 25 ANNIVERSARY

GOVERNMENT FLEET leadingfleets
APWA AMERICAN PUBLIC WORKS ASSOCIATION
Sponsored by
Ford | FORD FLEET

Québec

CONTACT

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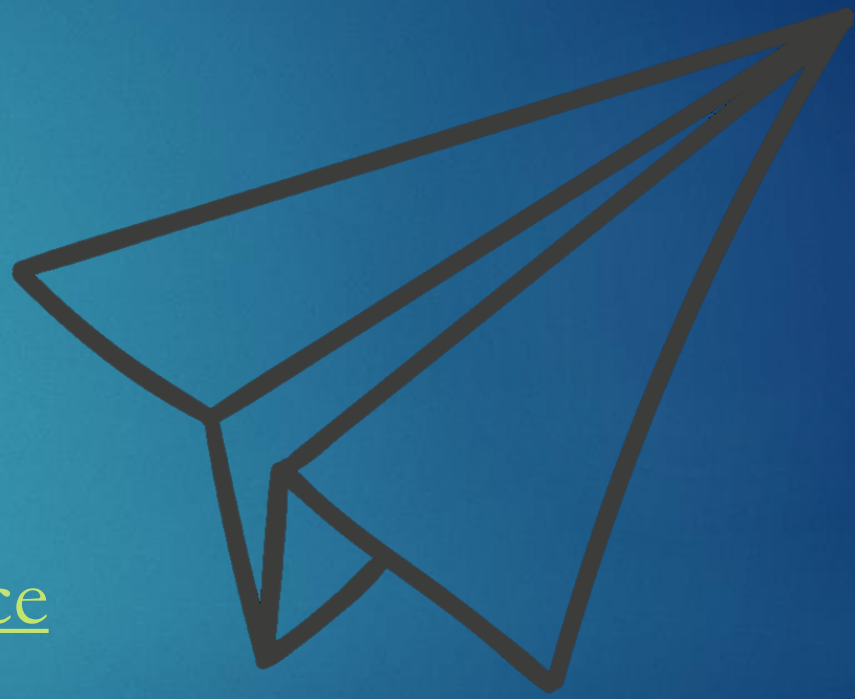
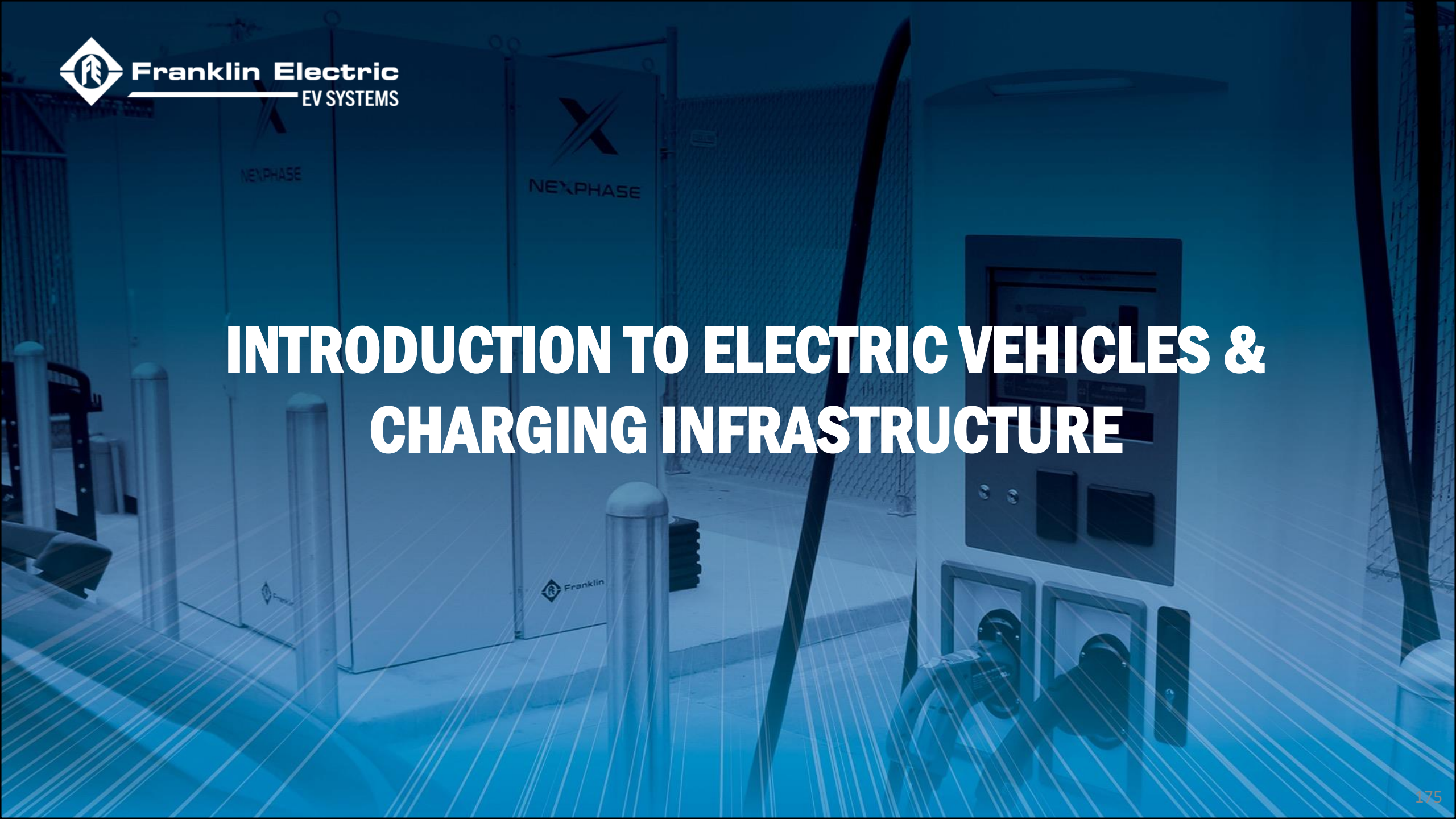
Fleet Superintendent

mjoishy@cityofmadison.com



www.cityofmadison.com/fleet-service

@MadisonWIFleet
@MadisonWIFleet

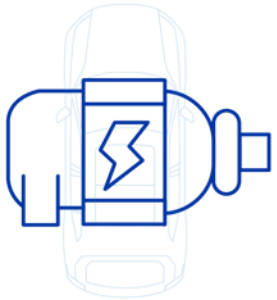


INTRODUCTION TO ELECTRIC VEHICLES & CHARGING INFRASTRUCTURE

Franklin Electric
EV SYSTEMS

HOW DO ELECTRIC VEHICLES (EVs) WORK?

EV TYPES



BEVs
Battery Electric Vehicles

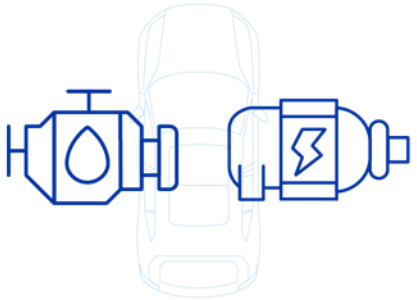
Battery-powered electric motor only.

Energy Source:

Battery Size:

EV Range:

200-300 miles



PHEVs
Plug-in Hybrid Electric Vehicles

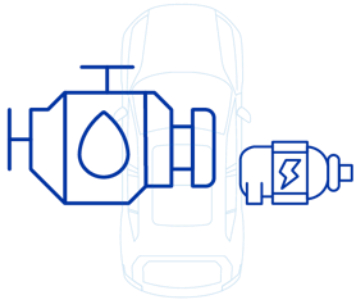
Battery-powered electric motor with gas-powered internal combustion engine.

Energy Source:

Battery Size:

EV Range:

50 miles



HEVs
Hybrid Electric Vehicles

Battery-powered electric motor aids gas-powered internal combustion engine.

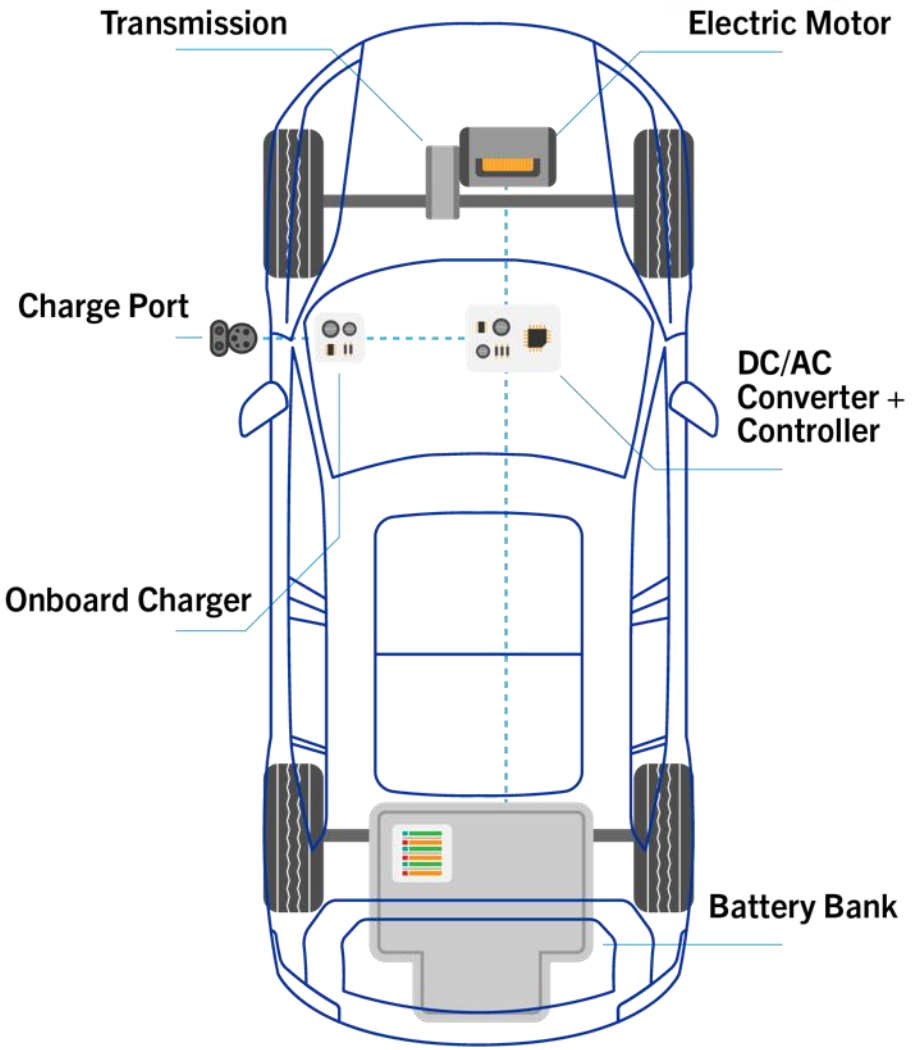
Energy Source:

Battery Size:

EV Range:

5 miles

EV OPERATION



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EV SYSTEMS

WHAT ARE THE DIFFERENT EV CHARGER TYPES?

LEVEL 1 (L1) CHARGING

RESIDENTIAL / GARAGE

Power: 120 VAC, 15A
Charger Cost: N/A

LEVEL 2 (L2) CHARGING

GROCERY / SHOPPING CENTER

Power: 240 VAC, 20-40A
Charger Cost: <$1,000 home-based, $5k-$15k stand-alone

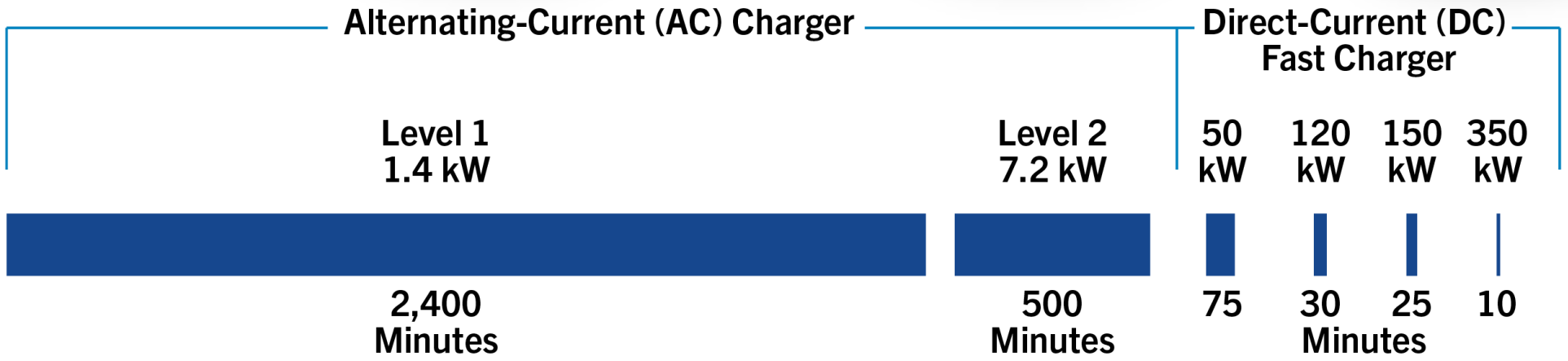
LEVEL 3 (L3) / DC FAST CHARGING

C-STORE / COMMERCIAL

Incoming Power: 480 VAC, 3-phase, up to 500A
Outgoing Power: 400-950 VDC, up to 350A
Charger Cost: $30K-$130k, plus major infrastructure and installation costs

HOW FAST DO EV CHARGERS CHARGE?

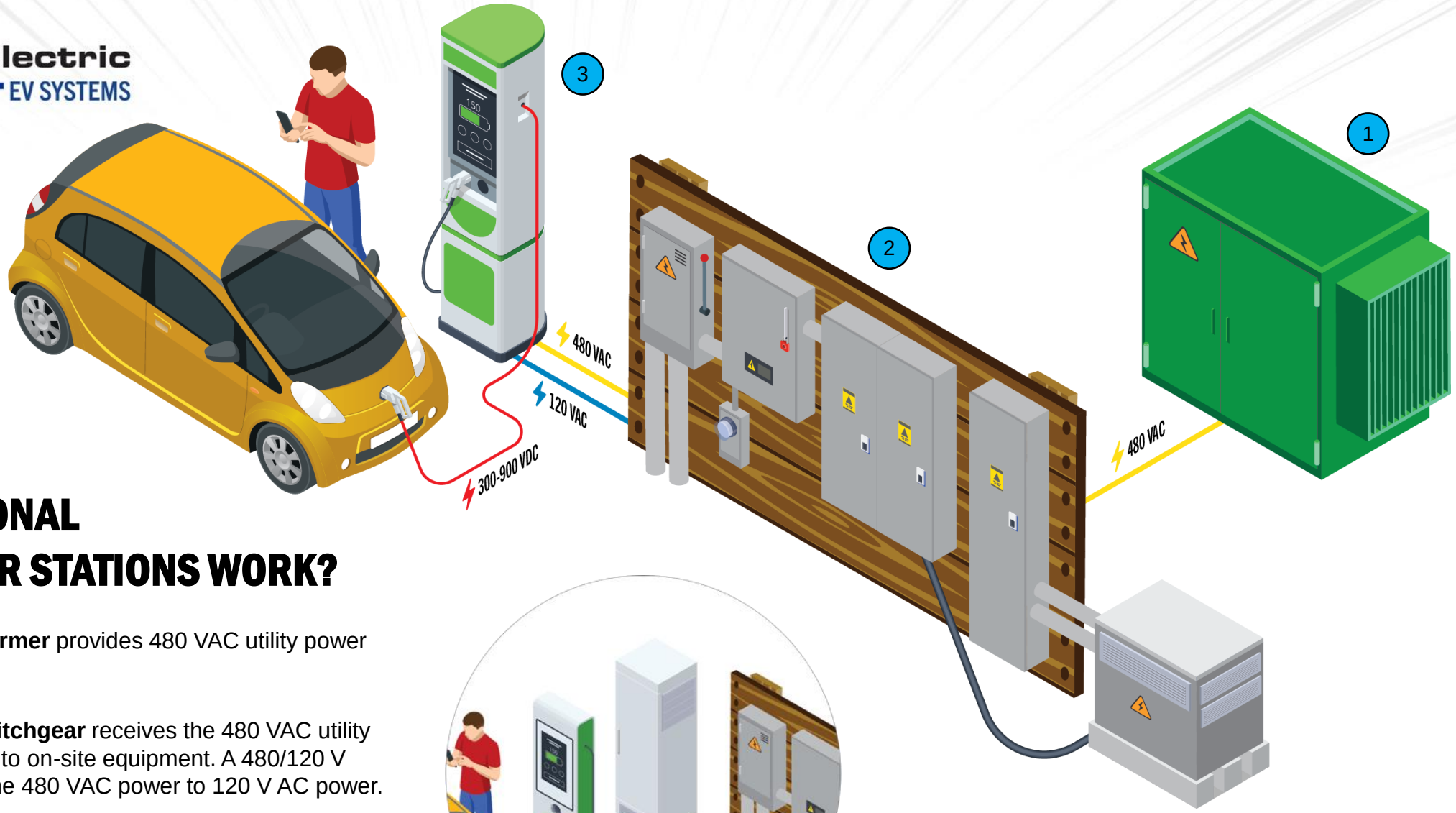
Time to "fill up" a 60kWh battery…



Note: (1) charging rates vary during charge cycle, the above noted times assume max rate the entire cycle, and (2) the charge rates for vehicles vary, the above assumes the vehicle can accept the higher rate of charge.

Source: McKinsey & Company

Franklin Electric
EV SYSTEMS



HOW DO TRADITIONAL DC FAST CHARGER STATIONS WORK?

1. A **Distribution Transformer** provides 480 VAC utility power to the site.

2. The **Post-&-Frame Switchgear** receives the 480 VAC utility power and distributes it to on-site equipment. A 480/120 V Transformer converts the 480 VAC power to 120 V AC power.

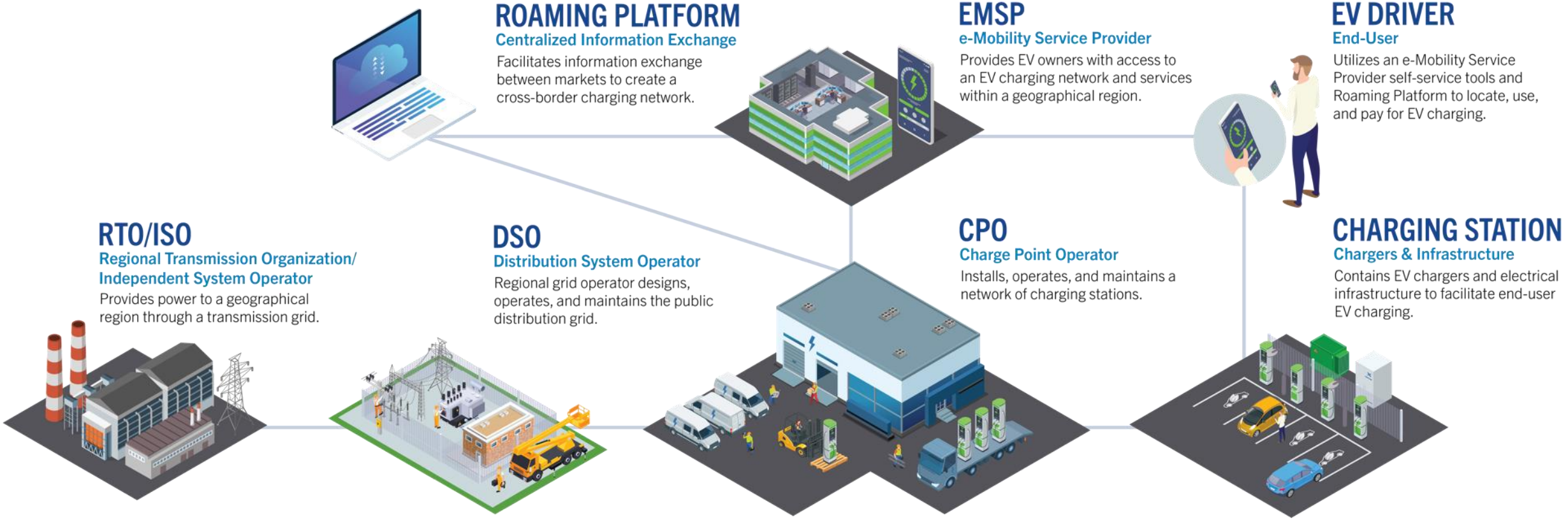
3. The **DC Fast Charger** receives both 480 VAC and 120 VAC power. The 120 VAC power is used to power the charger's electronics. The charger converts the 480 VAC power to DC power which is used to charge the EV.

EV POWER CABINET

Some DC Fast Chargers do not include integrated AC to DC power conversion capabilities. These chargers require an additional **EV Power Cabinet** to convert AC to DC power.

Franklin Electric
EV SYSTEMS

HOW DOES THE EV CHARGING NETWORK FUNCTION?



ROAMING PLATFORM
Centralized Information Exchange

Facilitates information exchange between markets to create a cross-border charging network.

EMSP
e-Mobility Service Provider

Provides EV owners with access to an EV charging network and services within a geographical region.

EV DRIVER
End-User

Utilizes an e-Mobility Service Provider self-service tools and Roaming Platform to locate, use, and pay for EV charging.

RTO/ISO
Regional Transmission Organization/ Independent System Operator

Provides power to a geographical region through a transmission grid.

DSO
Distribution System Operator

Regional grid operator designs, operates, and maintains the public distribution grid.

CPO
Charge Point Operator

Installs, operates, and maintains a network of charging stations.

CHARGING STATION
Chargers & Infrastructure

Contains EV chargers and electrical infrastructure to facilitate end-user EV charging.

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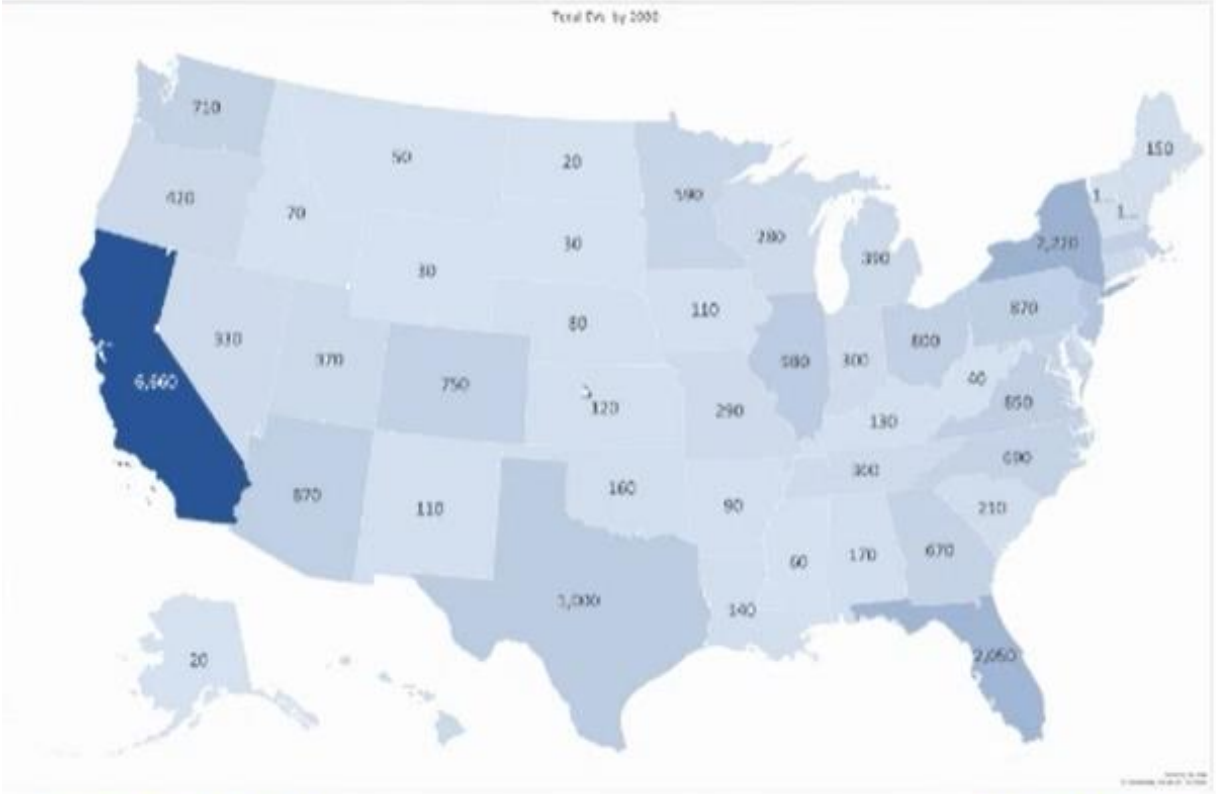
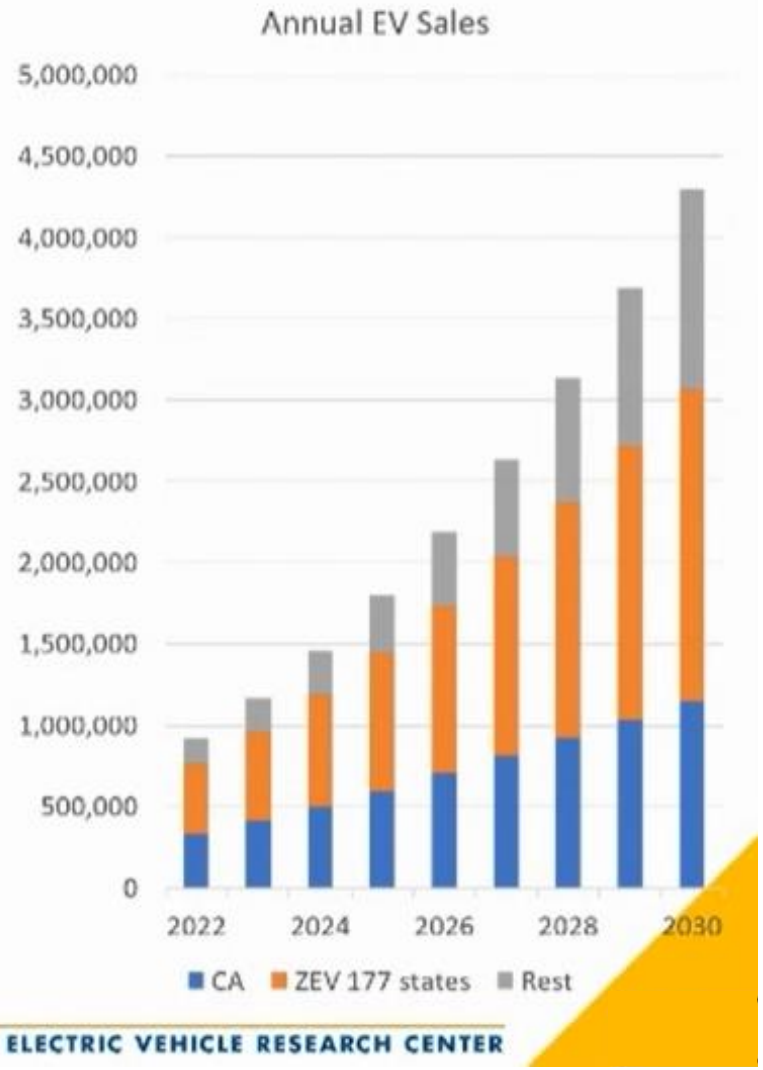
EV SYSTEMS

TOTAL EVs IN THE U.S. BY 2030
BASED ON U.S. MARKET SHARE OF 30%



ITS UCDAVIS INSTITUTE of TRANSPORTATION STUDIES



UCDAVIS PLUG-IN HYBRID & ELECTRIC VEHICLE RESEARCH CENTER

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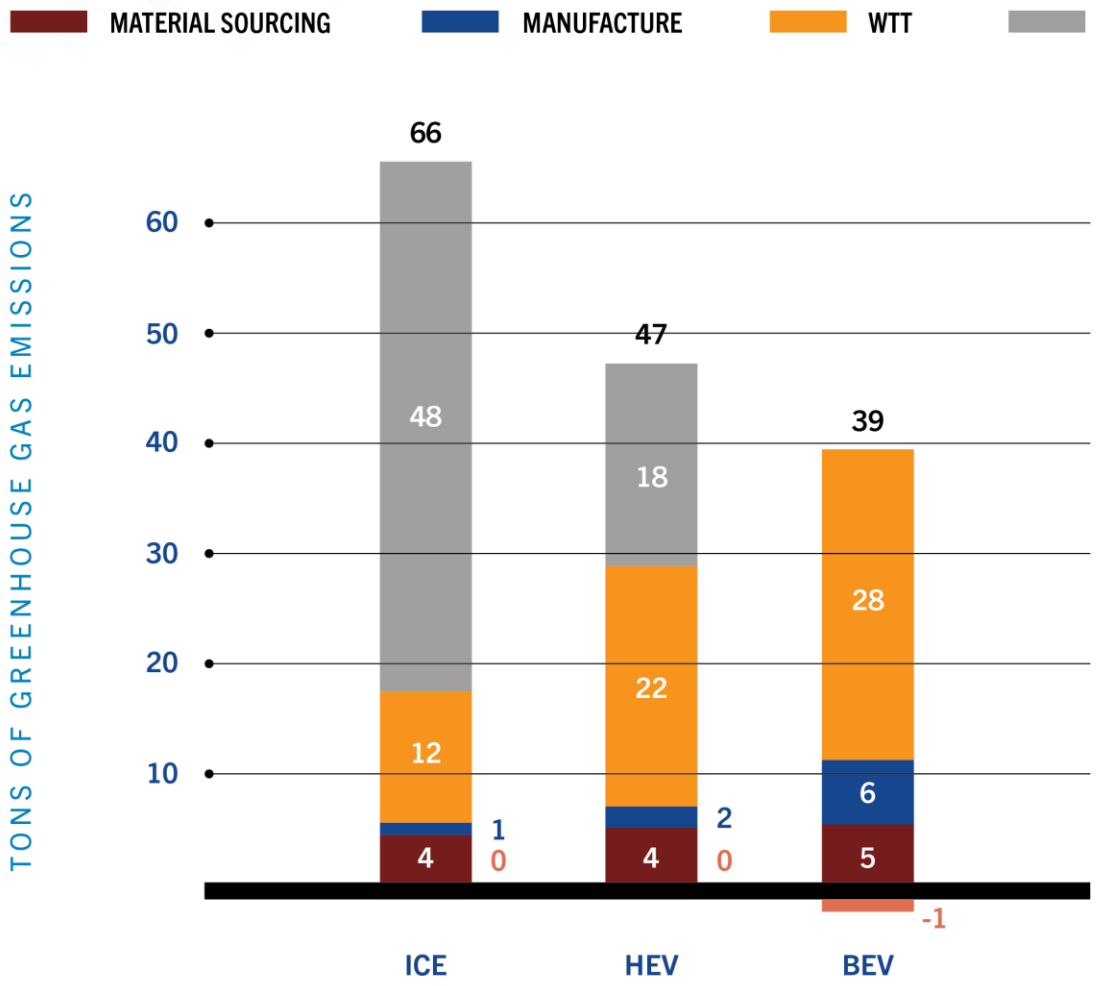
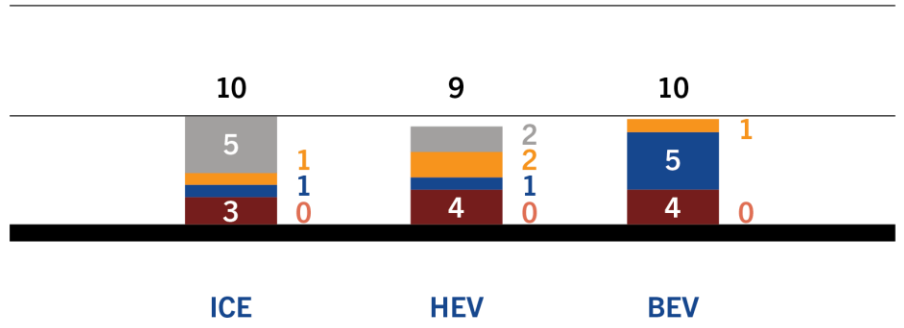
EV SYSTEMS



200,000 MILES
(AVERAGE U.S. ELECTRICITY MIX)

19,000 MILES



19,000 MILES
(STATES WITH LOW CARBON ELECTRICITY)

Based on current adoption trends & states where BEVS are operated, it is expected that **BEVS are less carbon intense than ICE vehicles after 19,000 miles of operation**

Source: *Life-Cycle-Analysis-Comparison.pdf (fuelsinstitute.org)*

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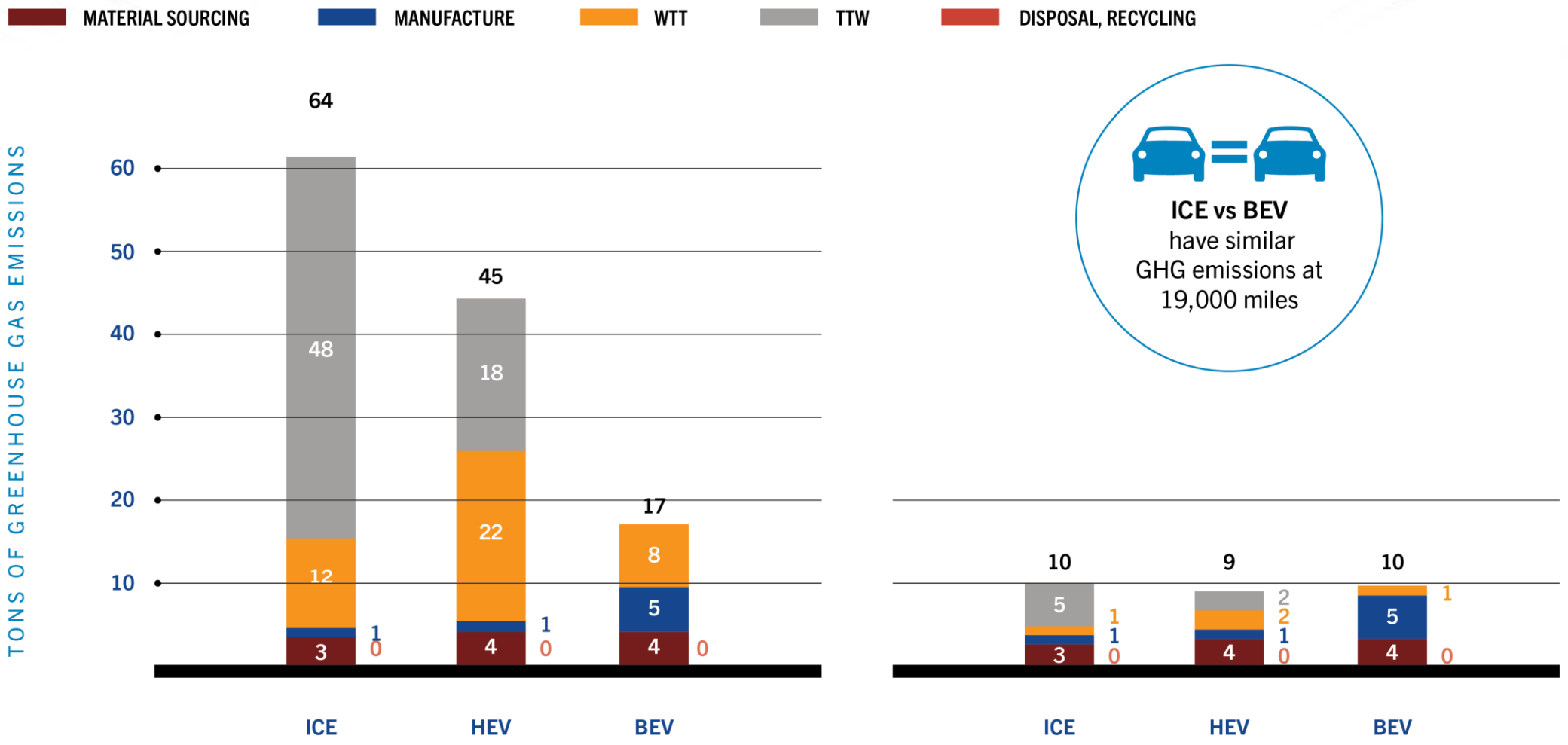
EV SYSTEMS



Source: [Life-Cycle-Analysis-Comparison.pdf (fuelsinstitute.org)]

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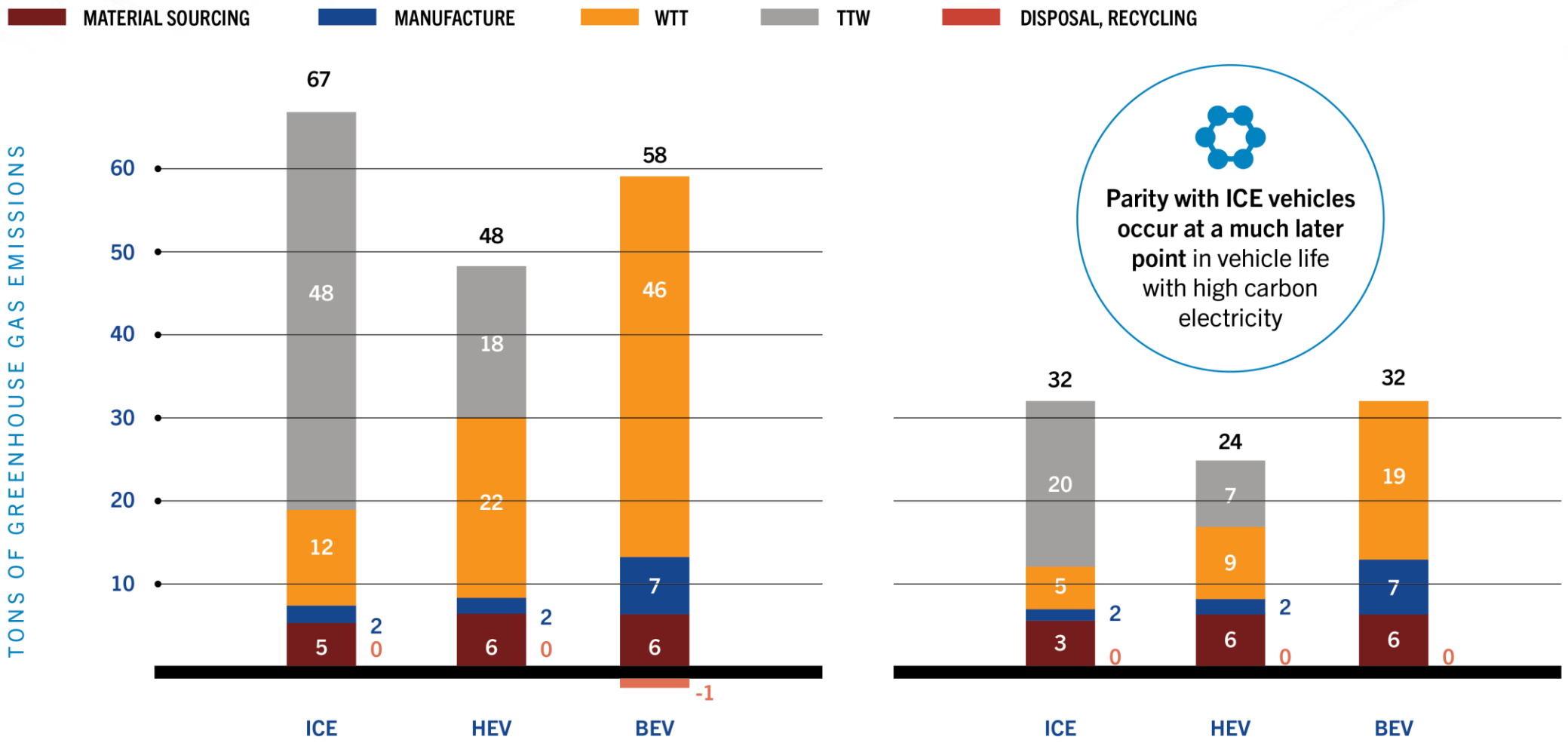


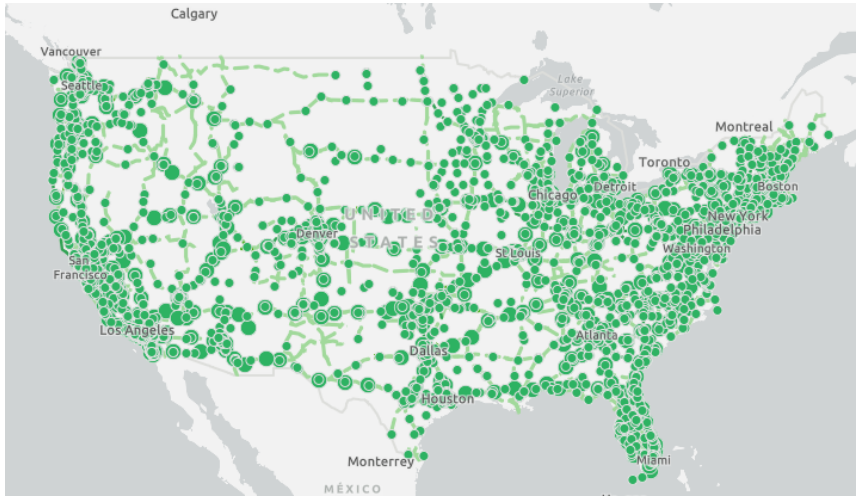
200,000 MILES
(AVERAGE U.S. ELECTRICITY MIX)

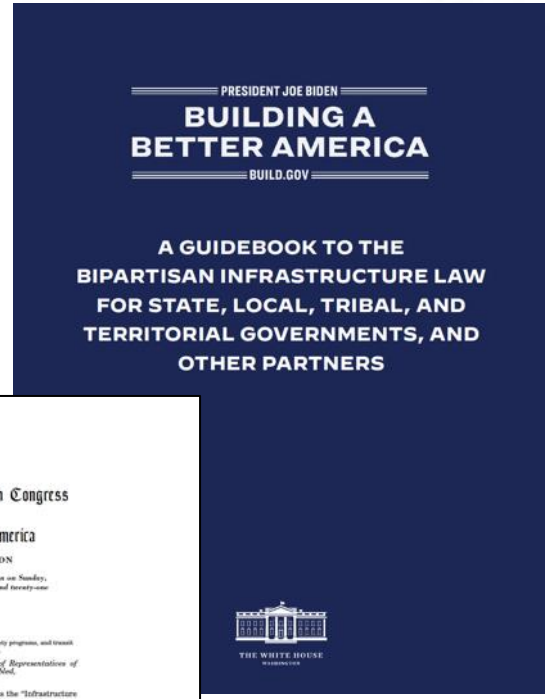
82,000 MILES
(STATES WITH HIGH CARBON ELECTRICITY)

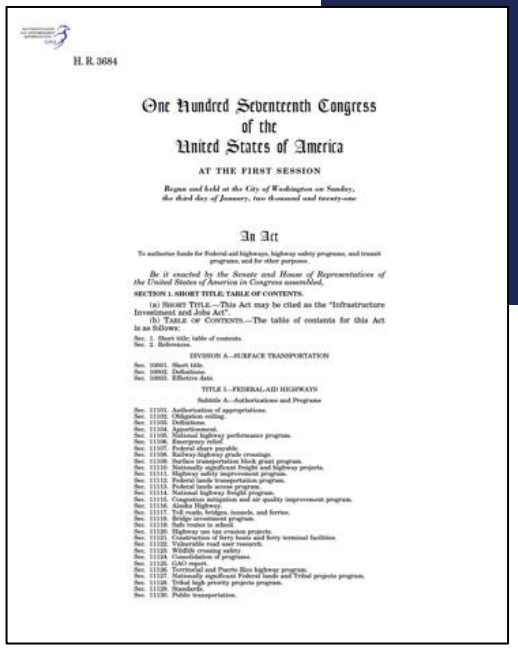
Source: *Life-Cycle-Analysis-Comparison.pdf (fuelsinstitute.org)*

NATIONAL ELECTRIC VEHICLE INFRASTRUCTURE (NEVI) FUNDING

- BIL (Bipartisan Infrastructure Law) signed into law in 2021 to provide funding for states in the US to strategically deploy electric vehicle charging infrastructure ($5B over 5 years)
- Each state defined the “alternative fuels corridor” in their area, this “corridor” will be the first to get funded
- The corridor is comprised of the main highways in each state, with the goal of having a charging station every 50 miles, no more than one mile from the highway






H. R. 3684

One Hundred Seventeenth Congress of the United States of America

AT THE FIRST SESSION

An Act

Source: Federal Highway Administration *NEVI Program Guide*, February 10, 2022

NATIONAL ELECTRIC VEHICLE INFRASTRUCTURE (NEVI) FUNDING

- Federal goal is to have 500k charging stations by 2030 nationwide to support the growing inventory of EVs
- 80% of charging is done at home
- The NEVI guidelines define a charging station as having **four 150 kW Direct Current Fast Chargers with the ability to maintain and provide reporting evidence of 97% operational uptime … current uptime is approx. 70%**
- Meant mainly to reduce range anxiety, which will quicken EV adoption

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EV SYSTEMS

COMPANY: AT A GLANCE

FOUNDED IN **1944**

Franklin Electric Co., Inc. is a global leader in the manufacturing and distribution of products and systems focused on the movement, management, and monitoring of critical resources, assets, and infrastructure.

CORPORATE HEADQUARTERS

FORT WAYNE, IN USA

2021 SUMMARY

$1.7 BILLION IN SALES

6,500+ EMPLOYEES

20+ COUNTRIES

MADISON, WI FACILITY

MANUFACTURING| ASSEMBLY| DISTRIBUTION

- Total Facility: **167,000 sq/ft**
- Warehouse/Manufacturing: **150,000 sq/ft**
- Office/Lab: **17,000 sq/ft**
- Production Employees: **190**
- Factory Service Employees: **75**
- Office Employees: **75**
- **~80%** of volume originates/flows through Madison
- **3** Shift Operation, **5** days per week

MOLDING | ASSEMBLY | ELECTRONICS | EXTRUSION

MADISON IS THE HOME OF

FUELING SYSTEMS

Complete retail and fleet refueling systems for the movement, containment, and monitoring of fuels, delivered with the utmost attention to safety and environmental security.

GRID SOLUTIONS

Sophisticated, high-value asset monitoring solutions for utility applications and advanced battery testing and monitoring for mission-critical standby power applications.

EV SYSTEMS

Fully integrated, ready-to-install switchgear solutions that minimize the complexity and effort required to install Level 3 DC fast charging station power supplies.

Franklin Electric
EV SYSTEMS

NEXPHASE™
SMART EV SWITCHGEAR

THE FIRST INTELLIGENT EV SWITCHGEAR

The NexPhase™ Smart EV Switchgear is an all-in-one switchgear enclosure containing the entire infrastructure required between the utility service and up to four 150 kW DC fast chargers.

Unlike any switchgear of its kind, the NexPhase™ Smart EV Switchgear features cutting-edge grid intelligence.

NexPhase™ provides additional monitoring, control, and uptime reporting that chargers alone do not offer.

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EV SYSTEMS

HOW DOES A NEXPHASE™ DC FAST CHARGER STATION WORK?

1. 480 VAC power is provided from a utility to the site through a **Distribution Transformer**.

2. The **NexPhase™ Smart EV Switchgear** provides the entire electrical switchgear infrastructure needed to support up to four 150 kW DC fast chargers in a single enclosure.

3. NexPhase™ securely communicates with the **UNITE™** user interface, providing user-friendly access to remotely monitor, troubleshoot, and control the switchgear and DC fast chargers.

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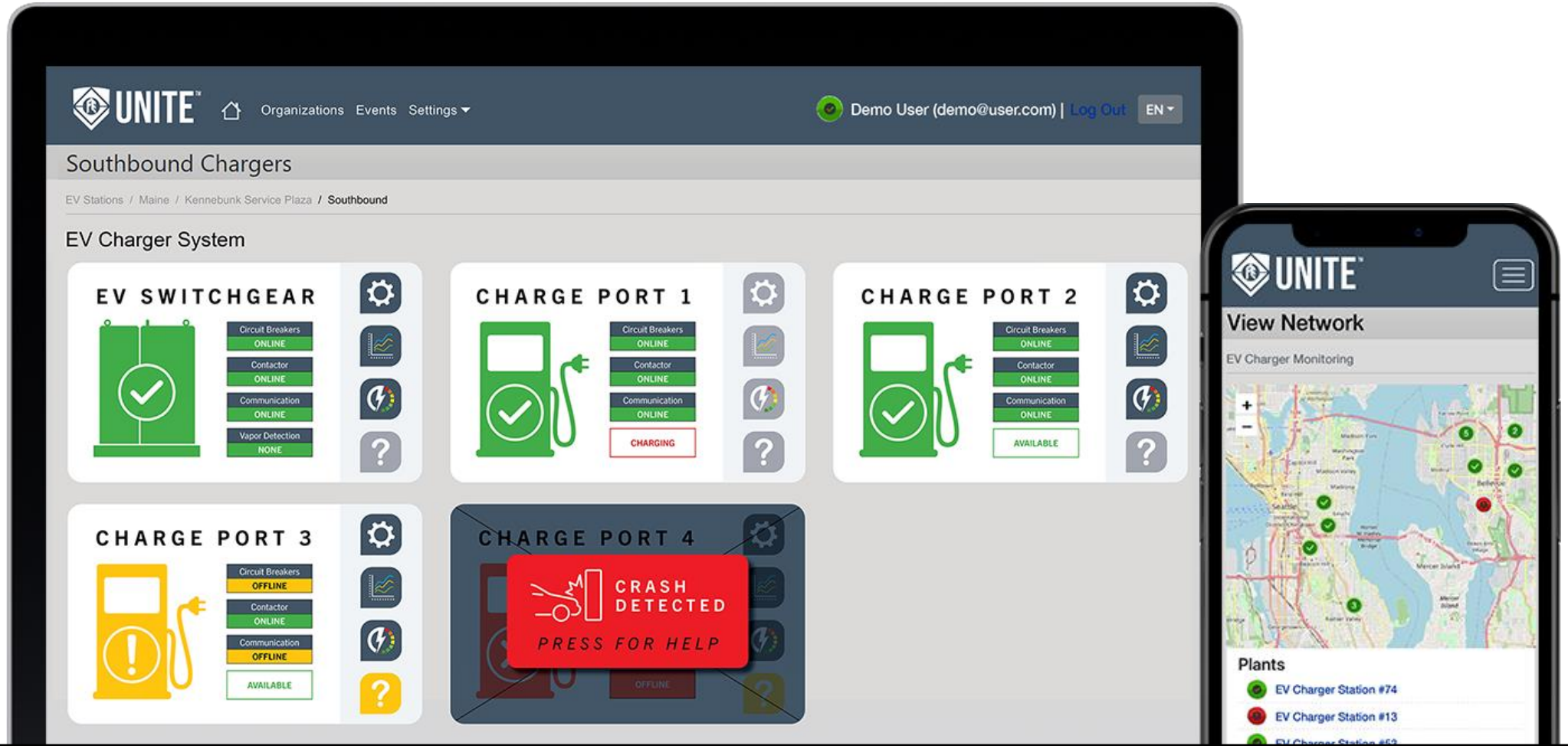
EV SYSTEMS

REMOTELY MONITOR, TROUBLESHOOT, & CONTROL EV CHARGER INFRASTRUCTURE

NexPhase™ securely communicates with the UNITE™ user interface, providing user-friendly access to monitoring information including transaction analysis, energy consumption, charge duration, EV charger state, utility power monitoring, and remote control capabilities. These data gathering and control capabilities may also be integrated into existing software platforms.

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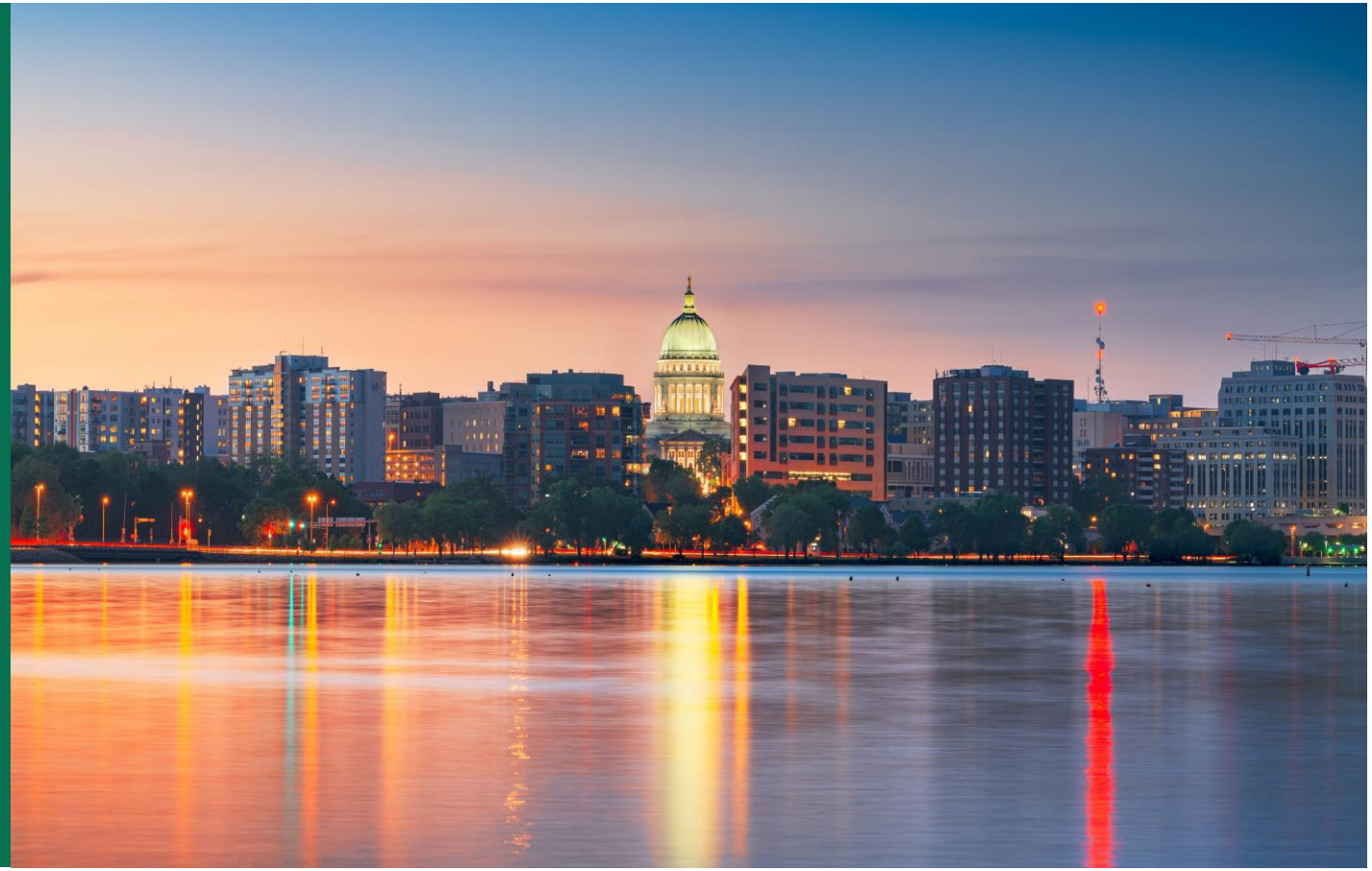
NEXPHASE
POWERING THE NEXT MOBILITY TRANSFORMATION.

Building Decarbonization Forum

Thursday, October 27, 2022
8 am–11:30 am

The Goodman Community Center
Madison, Wisconsin



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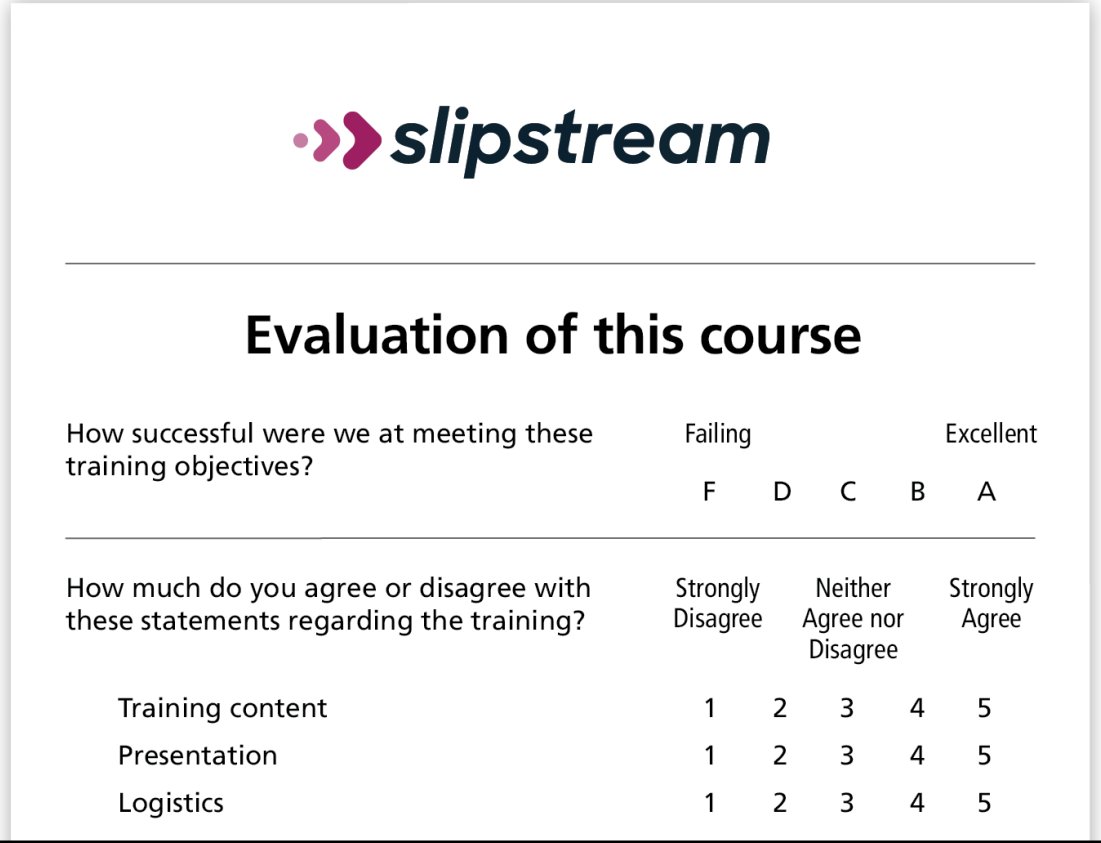
Your Feedback is Important

Please fill out an evaluation
to helps us better serve your continuing education needs.



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Evaluation of this course

How successful were we at meeting these training objectives?	Failing				Excellent
	F	D	C	B	A

How much do you agree or disagree with these statements regarding the training?	Strongly Disagree		Neither Agree nor Disagree		Strongly Agree
Training content	1	2	3	4	5
Presentation	1	2	3	4	5
Logistics	1	2	3	4	5

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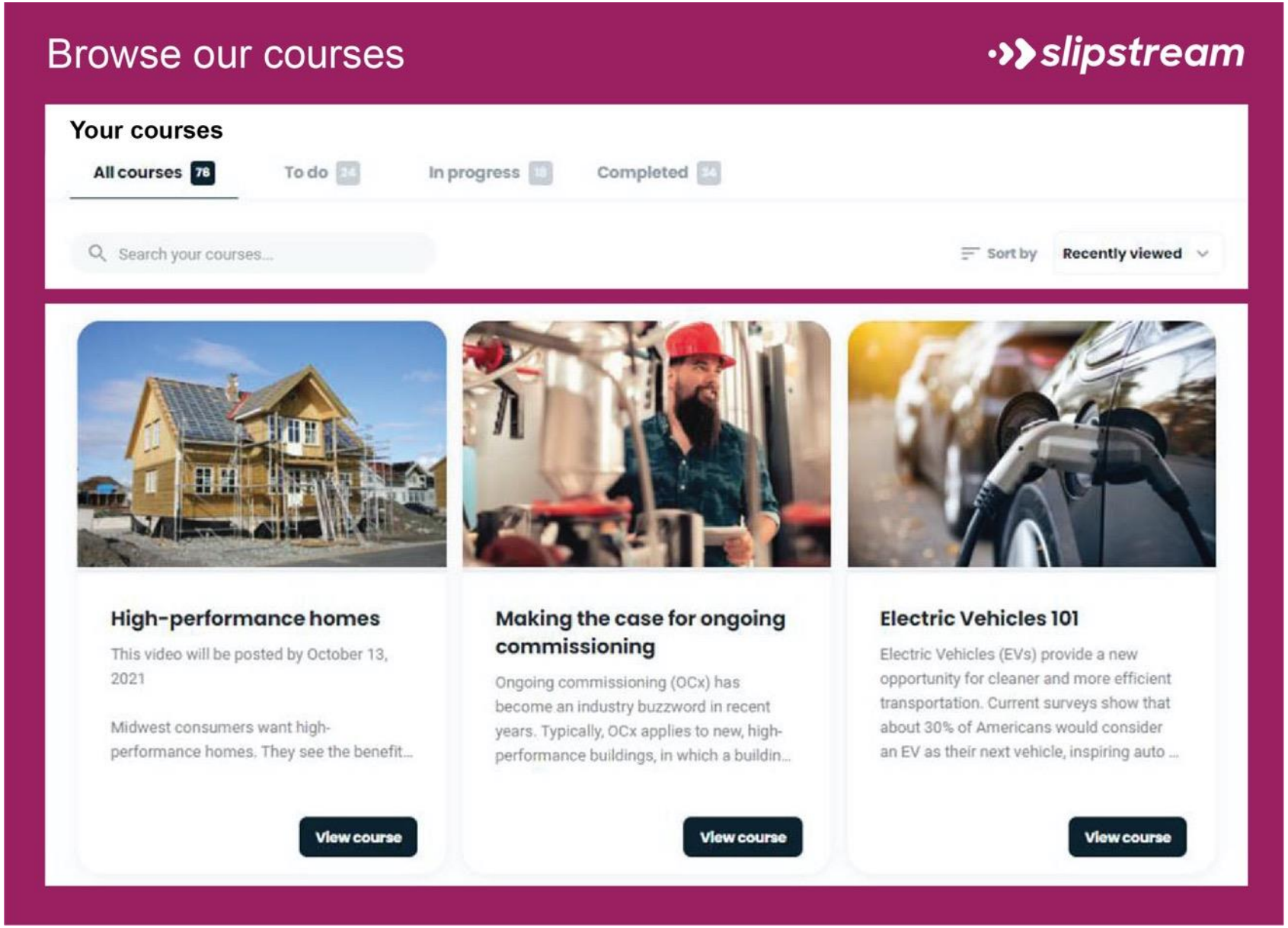

Improve your building's performance

Check out Maximize Your Facility for videos on fine-tuning your systems.

Browse courses:

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CLIMATE + CLEAN ENERGY SOLUTIONS | EDUCATION TO EMPOWER | THE CASE FOR ENERGY EQUITY | FAIR CLEAN ENERGY FINANCE | BLOG | NEWS | ABOUT

Maximize Your Facility

Looking to improve your building's performance?

Our videos are designed to help you learn proactive solutions to get the most out of your equipment and fine-tune your systems. If you are a building owner, operator, facility manager, maintenance professional, or just want to learn more about energy efficiency and reduce energy expenditures, you've come to the right place. We're glad you're here!

Do you want to:

- identify hands-on preventive maintenance strategies for your facility?
- discover how to reduce energy consumption by running your systems at peak efficiency?
- save energy and improve equipment life, as well as improve occupant comfort?
- save money and lower utility costs?

Featured Case Study: Meister Cheese

How has sustainability become a key part of Meister's business model? Learn how they achieve their goals through processes like generating electricity from their wastewater.

If you are nodding your head, then check out our videos for a variety of short tutorials and case studies of best practices in action.