

Electric Vehicle Implementation Guidance for Outagamie County

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Introduction

Motivation

The transportation sector is the largest contributor to greenhouse gas emissions (GHG) throughout the United States. Specifically, in 2020 it accounted for 27% of the total GHG emission, with the main contributors as cars, trucks, commercial aircraft, and railroads. This number is anticipated to keep growing in the upcoming years. At the same time, the nation has set out to reach a goal of net-zero emissions by no later than 2050.

The transformation from combustion engine vehicles to electric vehicles (EV) has the potential to reshape the transportation sector and aid the nation through its climate progress. However, some setbacks that have been affecting the EV industry are the availability of charging stations, vehicle compatibility, and charging time. Throughout the United States the average commute time is 27.6 minutes and most of the vehicle usage is directed towards going to work or nearby locations. Although long distance travel is not a part of the daily usage of vehicles according to the Bureau of Transportation Statistics nine out of ten long-distance trips were taken in a personal vehicle, such as cars, pickup trucks, or sport utility vehicles [1]. The charging infrastructure for EVs is still lacking in most states making it difficult for long-distance personal travel, which poses as a barrier for customers when considering buying an EV. Additionally, as more automotive companies enter the EV market there has been a variety of port models, which has caused a lack of vehicle compatibility from universal vehicle access to gas stations. Finally, there is the downside of charging speed. Compared to a regular gas station many EV charging stations are lacking behind in charging speed, with the level 3 fast chargers only being able to charge 80% of a battery within 30 minutes.

These shortcomings have propelled a movement towards building out the electric charging infrastructure in the United States. This movement has been recognized by governments at various levels from the federal level all the way to the county level. Outagamie County, located in northeast Wisconsin, is one of the counties that is looking at planning for EV adoption and encouraging a transition to an electrified transportation sector. This includes understanding future scenarios of EV use, infrastructure needs, energy consumption, state and local policies, and best practices. The results of this research will be used to facilitate policymaking and funding applications to accelerate EV adoption.

The US federal and Wisconsin state governments have the option to look toward UN Sustainable Development Goals (SDGs) to craft policy. SDGs consist of 17 goals and 169 targets for sustainable development while focusing on three core elements: economic growth, social inclusion, and environmental protection [2]. The direct positive impacts of implementing EV stations encourage a transition to low-carbon energy consumption, leading to federal and state goals for electric vehicle (EV) adoption. The direct positive impacts include 1. *Affordable and clean energy*, 2. *Industry, innovation, and infrastructure*, and 3. *Sustainable cities and communities*. As Outagamie prepares for more EVs, looking at the SDGs of EV implementation is necessary to craft policies that aim to help the community.

Report Layout

This report will highlight key considerations that the county will need to account for as they work towards building out their charging fleet as well as potential next steps that could be implemented. The first Section will outline the current layout of Outagamie County, specifically projected population growth, land use, housing infrastructure, and road use patterns. The second Section will present the work that is being conducted within the federal government and what are

potential funding resources that can be available to the county. The third Section will look at the entire state's EV patterns and transportation plan to highlight opportunities that Outagamie can work on to ensure they are complying with the overall Wisconsin goal. The fourth Section will zoom in deeper into the county's individual current EV outlook and governance structure, to supply potential charging station placement in the fifth Section. Finally, Sections six and seven will present plans that have been introduced in other parts of the state and the next steps for the County respectively.

Outagamie County Background

As Outagamie prepares to expand their EV charging it is important to understand trends and the makeup of the community. This includes population growth, different population densities within parts of the county, housing trends, and the layout of the local transportation infrastructure. This section will summarize this information and highlight trends that could guide and impact the implementation of charging stations based on Outagamie itself.

Population Growth

According to the 2020 census, Outagamie County had a population of 190,705. The county's population grew by 6.21% from 2010-2020 [3]. Figure 1 shows the projected population of Outagamie County towns, cities, and villages from 2015-2040. The areas with the greatest projected population growth rates were the Town of Buchanan (47%), the Town of Greenville (45%), and the Village of Combined Locks (40%) [3]. It is also important to note the municipalities with the largest changes in population because places with larger populations and more new residents could potentially have a higher demand for charging stations. The areas to note are the Town of Buchanan (3,245 increase in population), the Town of Grand Chute

(population increase of 7,361), the Town of Greenville (population increase of 5,087), the City of Appleton (population increase of 4,762), and the City of Kaukauna (population increase of 4,172) [3]. Overall, the population growth percentage and total population, are necessary to consider in the first phase of planning for the EV infrastructure to prepare for what municipalities might need more chargers than other areas or how much future total charging-energy demand will be necessary as adoption increases.

Municipality	2015	2020	2025	2030	2035	2040	Change, 2015-2040 Number	Percent
T. Black Creek	1,252	1,280	1,300	1,310	1,300	1,275	23	1.8%
T. Bovina	1,158	1,195	1,235	1,265	1,270	1,265	107	9.2%
T. Buchanan	6,935	7,600	8,605	9,280	9,795	10,180	3,245	47.0%
T. Center	3,463	3,625	3,765	3,900	3,960	3,975	512	14.8%
T. Cicero	1,106	1,110	1,115	1,120	1,105	1,075	-31	-2.8%
T. Dale	2,782	3,010	3,195	3,370	3,490	3,555	773	27.8%
T. Deer Creek	649	645	645	640	630	605	-44	-6.8%
T. Ellington	2,868	3,060	3,225	3,380	3,485	3,535	667	23.3%
T. Freedom	5,991	6,485	6,870	7,225	7,460	7,600	1609	26.9%
T. Grand Chute	21,909	23,980	25,700	27,320	28,500	29,270	7,361	33.6%
T. Greenville	11,303	12,450	13,650	14,800	15,710	16,390	5,087	45.0%
T. Hortonville	1,094	1,150	1,190	1,225	1,240	1,235	141	12.9%
T. Kaukauna	1,272	1,360	1,430	1,500	1,545	1,570	298	23.4%
T. Liberty	871	895	920	940	945	940	69	7.9%
T. Maine	878	910	940	960	970	965	87	10.0%
T. Maple Creek	605	590	580	565	540	510	-95	-1.6%
T. Oneida	4,711	4,965	5,165	5,345	5,435	5,455	744	15.8%
T. Osborn	1,205	1,295	1,370	1,445	1,495	1,520	315	26.1%
T. Seymour	1,202	1,205	1,215	1,215	1,200	1,170	-32	-2.7%
T. Vandenbroek	1,531	1,640	1,740	1,740	1,900	1,935	404	26.4%
Outagamie Co.	181,310	191,635	200,630	208,730	213,500	215,290	33,980	18.7%

Source: Wisconsin Department of Administration – Demographic Services Center, 2019.

Municipality	2015	2020	2025	2030	2035	2040	Change Number	Percent
V. Bear Creek	450	470	485	495	500	500	50	11.1%
V. Black Creek	1,321	1,385	1,435	1,480	1,500	1,495	174	13.2%
V. Combined Locks	3,477	3,855	4,170	4,475	4,705	4,870	1,393	40.1%
V. Harrison*	0	0	0	0	0	0	n/a	n/a
V. Hortonville	2,700	2,895	3,030	3,150	3,220	3,250	550	19.9%
V. Howard*	0	0	0	0	0	0	n/a	n/a
V. Kimberly	6,677	7,025	7,335	7,610	7,760	7,815	1,138	17.4%
V. Little Chute	10,778	10,740	10,950	11,100	11,070	10,900	122	1.1%
V. Nichols	271	260	250	245	235	220	-51	-18.8%
V. Shiocton	930	940	955	960	950	930	0	--
V. Wrightstown*	155	170	190	205	215	225	70	45.2%
C. Appleton*	60,838	62,800	64,500	65,850	66,200	65,600	4,762	7.8%
C. Kaukauna	15,848	17,120	18,120	19,050	19,680	20,020	4,172	26.3%
C. New London	1,623	1,690	1,745	1,790	1,810	1,800	177	10.9%
C. Seymour	3,436	3,535	3,610	3,680	3,680	3,640	204	5.9%
Outagamie Co.	181,310	191,635	200,630	208,730	213,500	215,290	33,980	18.7%

Figure 1: Projected Population Throughout Outagamie from 2015 - 2040. Taken from Outagamie's 2040 Comprehensive Plan [3]

Spatial Distribution

Outagamie County is in east central Wisconsin, north of Lake Winnebago and southwest of Green Bay, between latitudes 44°14' and 44°36' N. and longitudes 88°11' and 88°44' W [3]. The county is rectangular in shape and has an area of approximately 646 square miles [3]. It is comprised of 14 incorporated municipalities and 20 civil towns [3]. At an estimated 2017

population of 73,832, Appleton is the largest city and county seat [3]. The Fox River Valley, a roughly 40-mile-long riparian depression extending from Lake Winnebago to Green Bay, is the focal point for the Outagamie community, commerce, and culture. Figure 2 shows the layout of all of Outagamie's cities, towns, and villages. This map also shows the major roadways within Outagamie, the designated freeway/ interstate highway (USH), and the state trunk highway system (STH). Additionally, Figure 3 shows what the current land use for the areas is, while also showing the names of the municipals. The areas for land use in the county are residential, commercial, industrial, parks and rec, agriculture, and woodland areas. Understanding the layout of the county as demonstrated in Figures 2 and 3 is necessary for electric vehicle planning purposes. Specifically, combining the areas of travel within the cities, towns, and villages with the current land use allows the country to determine where potential charging stops might be best suitable.

Figure 3 highlights that most of the land in Outagamie is used for agriculture, woodlands, and residential purposes thus making EV planning for rural areas an obstacle. EV infrastructure planning in rural areas significantly differs from planning in urban areas because in rural areas many households will have access to home charging to meet their day-to-day charging needs [4]. Therefore, enhancing public charging infrastructure to support longer trips, such as stations along highways, may be a higher priority among rural communities [4]. Initial EV education and implementation efforts were primarily focused on urban areas, where early-market EVs with small battery capacities and shorter ranges were better suited to the shorter driving distances common in urban areas [4]. As a result, public awareness and exposure to EV technology have typically been lower in rural areas [4]. The guiding principles for planning and implementation

in more rural areas will be highlighted in the *Other Transportation Plans* Section and how Outagamie can best use this Toolkit to foster implementation.

The population density in Outagamie County is highlighted in Figure 4. The figure shows in darker blue what towns and cities within the County have a larger population per square mile. The area with the darker blue and with the largest population density by zip code is concentrated around Appleton. Lastly, figure 5 shows the population density for the nearby counties. Looking at these counties, the population density of Brown County, WI was 507 population per square mile in 2020 [5]. The population density of Fond du Lac County, WI was 144.7 in 2020 [5]. The population density of Outagamie County, WI was 299.1 in 2020 [5]. Lastly, the population density of Winnebago County, WI was 395.1 in 2020 [5]. In Figure 5 the counties with the reddish shading have a greater population density than the counties with the lighter shading, showing Outagamie County to have a higher population density than direct county neighbors. Figures 4 and 5 highlight the areas with the highest population per square mile since there is a higher population density in Brown and Outagamie County these areas could be more suitable for charging stations because areas with higher population density will need more charging infrastructure. The most suitable spots for charging infrastructure in Outagamie County will be highlighted later in the report.

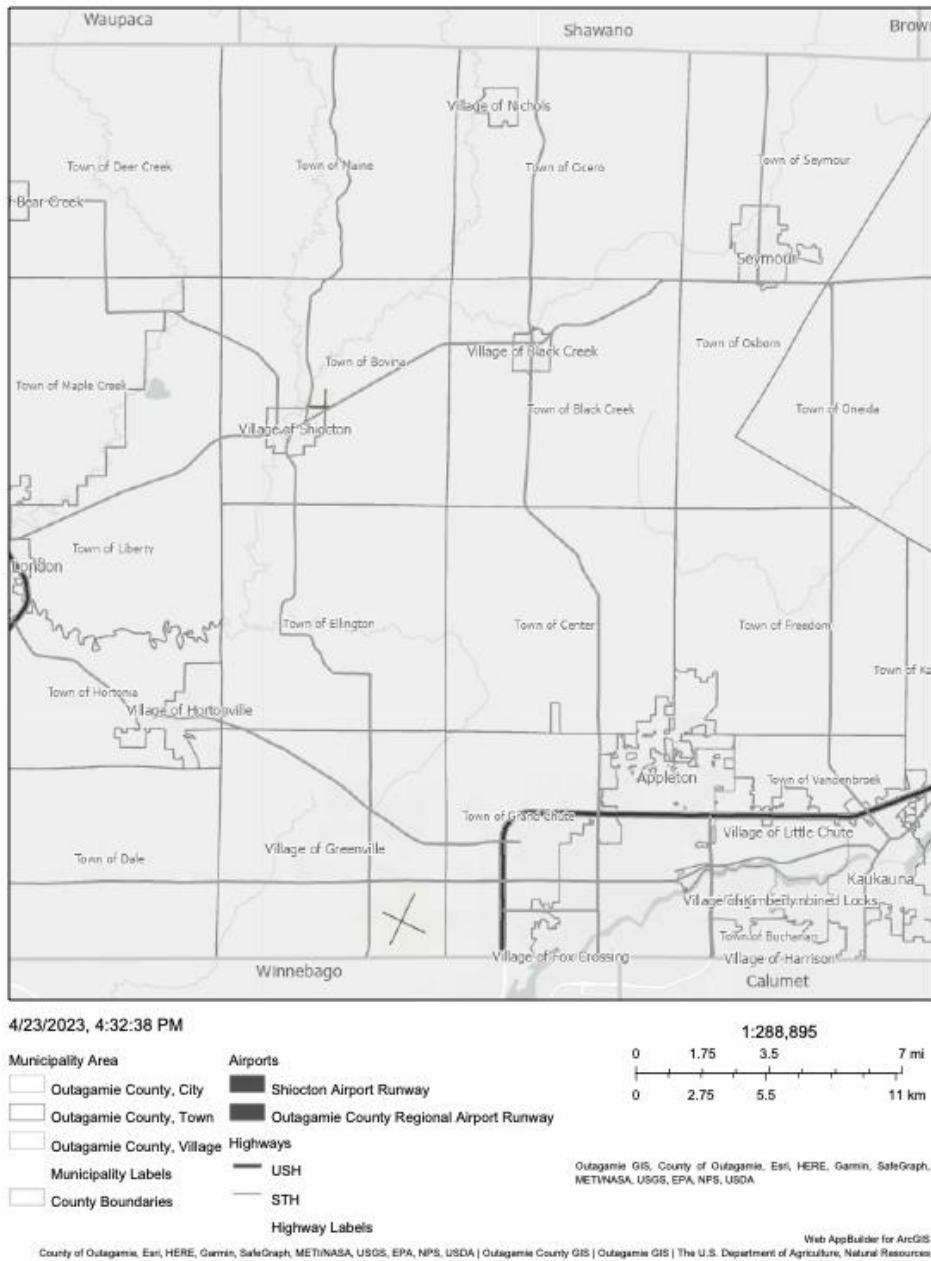


Figure 2: Outagamie County GIS Map, taken from [5]

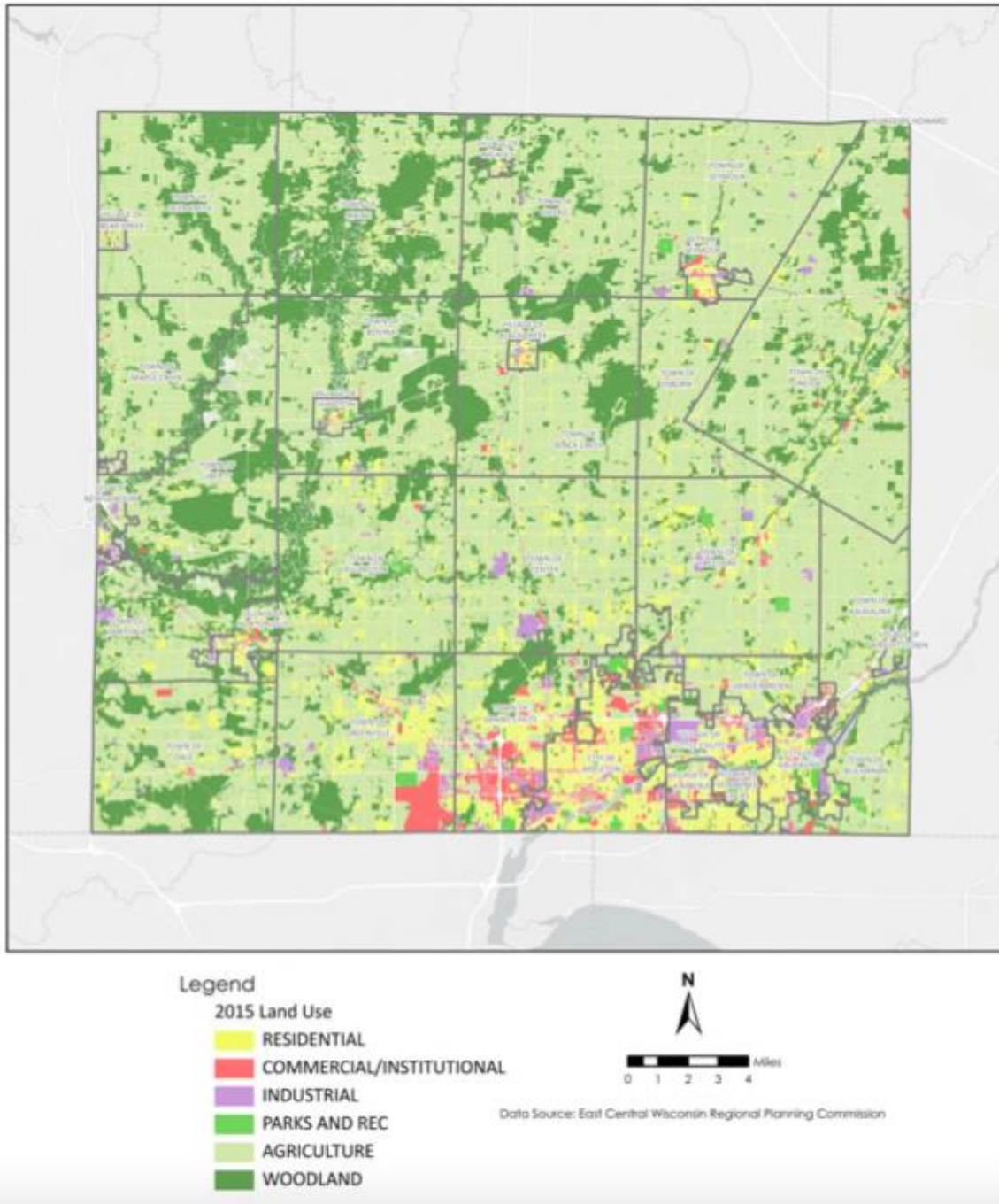
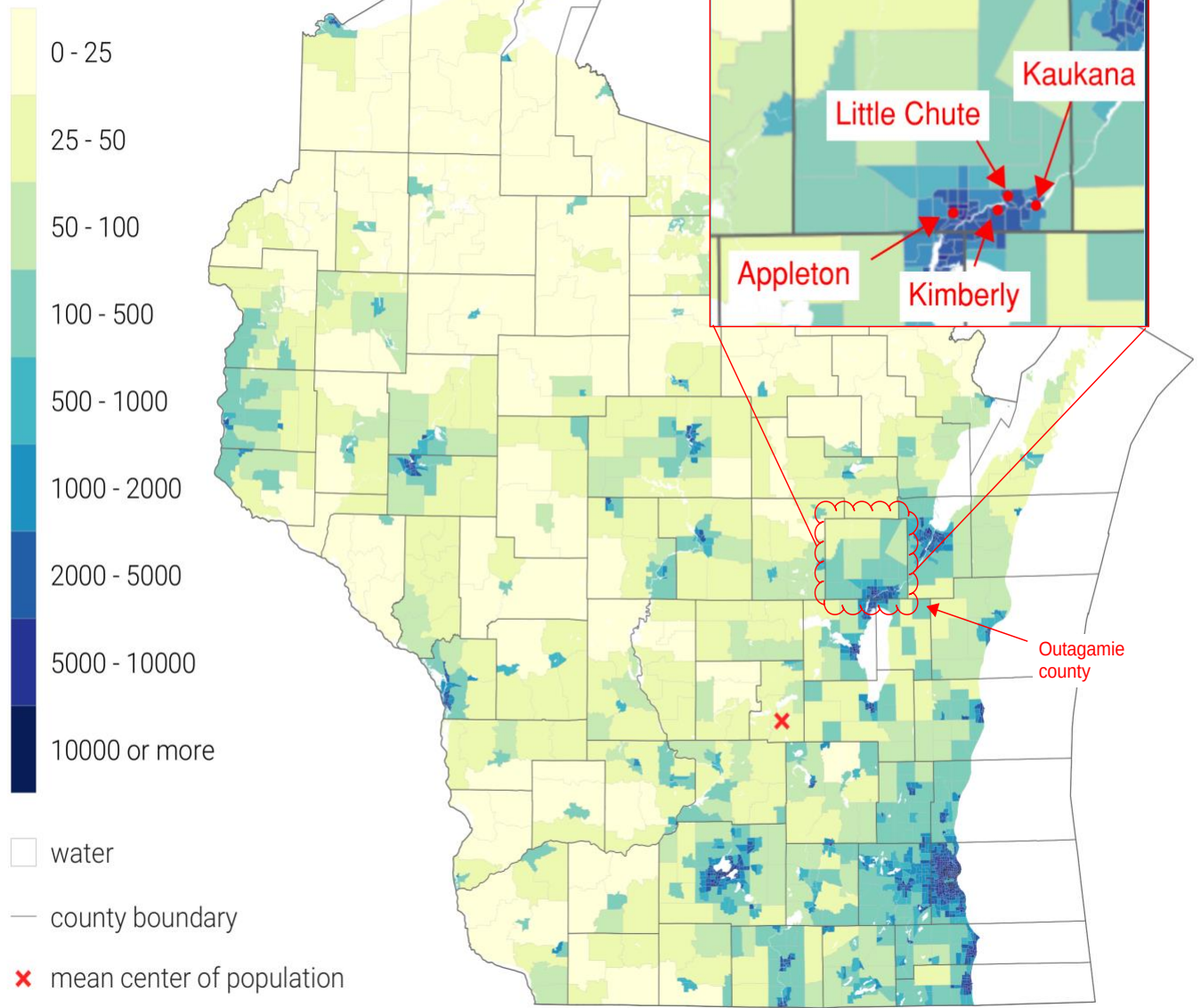


Figure 3: Outagamie County's existing land use as of 2015. Taken from the county's Comprehensive Plan [3]

People per square mile
by census tract



Source: United States Census Bureau, 2020 Census

Figure 4: Population within the state of Wisconsin and Outagamie County from the U.S. 2020 Census Bureau [5]

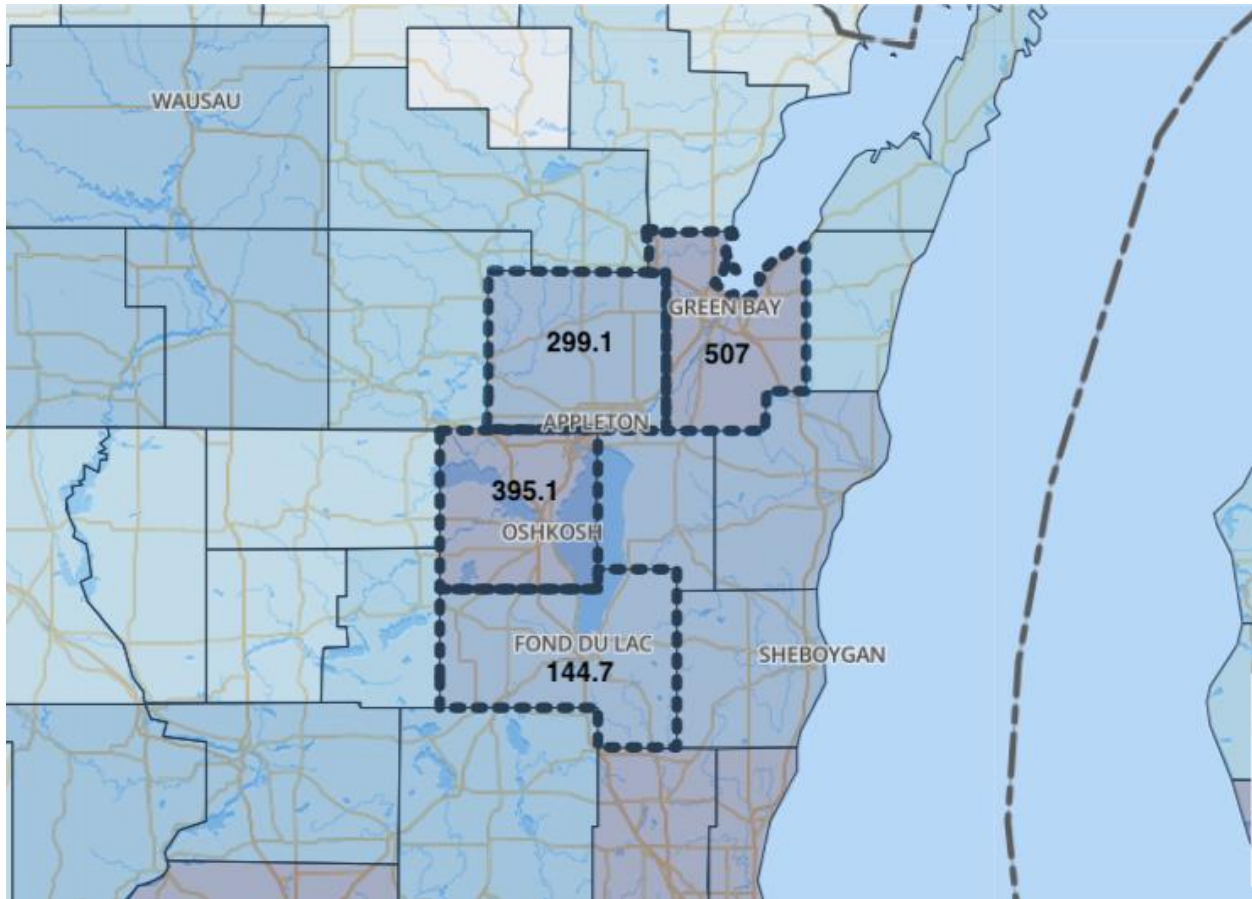


Figure 5: Population Density of neighboring counties [6]

Housing Information

According to the 2020 U.S. Census, Outagamie County has 79,131 total housing units and a homeownership rate of 70.4%, compared to the state of Wisconsin's rate of 68.1% [5]. The projected total number of housing units for 2040 is 92,586, meaning the county is projected to need 13,455 new units between 2020 and 2040 to accommodate household growth [5].

According to the American Community Survey, in 2021 the median household income in Outagamie was \$73,057, which is higher than the Wisconsin median income of \$67,125 [5]. Additionally, the median monthly household rent was \$850, compared to the state of Wisconsin at \$921 [5]. Noting the median income of the county is relevant when looking at EV adoption

because studies have shown that typically those with higher incomes have higher adoption rates of EVs and drive more generally [7]. The County is above the median household income of Wisconsin might potentially have a greater adoption rate if charging infrastructure is available. However, the government is trying to make EVs more accessible to all income levels through various incentives and tax credits with the Bipartisan Infrastructure Plan, which will be addressed later in the report.

Transportation Infrastructure, Assets, and Use of the Network

The average travel time to work in Outagamie is 19.1 minutes compared to the state average of 21.9 minutes for the average travel time to work [5]. About 48% of Outagamie County households own two personal vehicles; 34% own three or more; 16% own one; and less than 2% do not own a vehicle [5]. Figure 6 highlights the amount of time it takes for commuters to drive to work when they are driving alone. This graph compares the whole county commute to the State and County. Outagamie has majority of its travel time to be higher than the average for shorter commutes than the rest of the country and state. This could potentially alleviate range anxiety that drivers may have since their typical commute is less than other commuters.

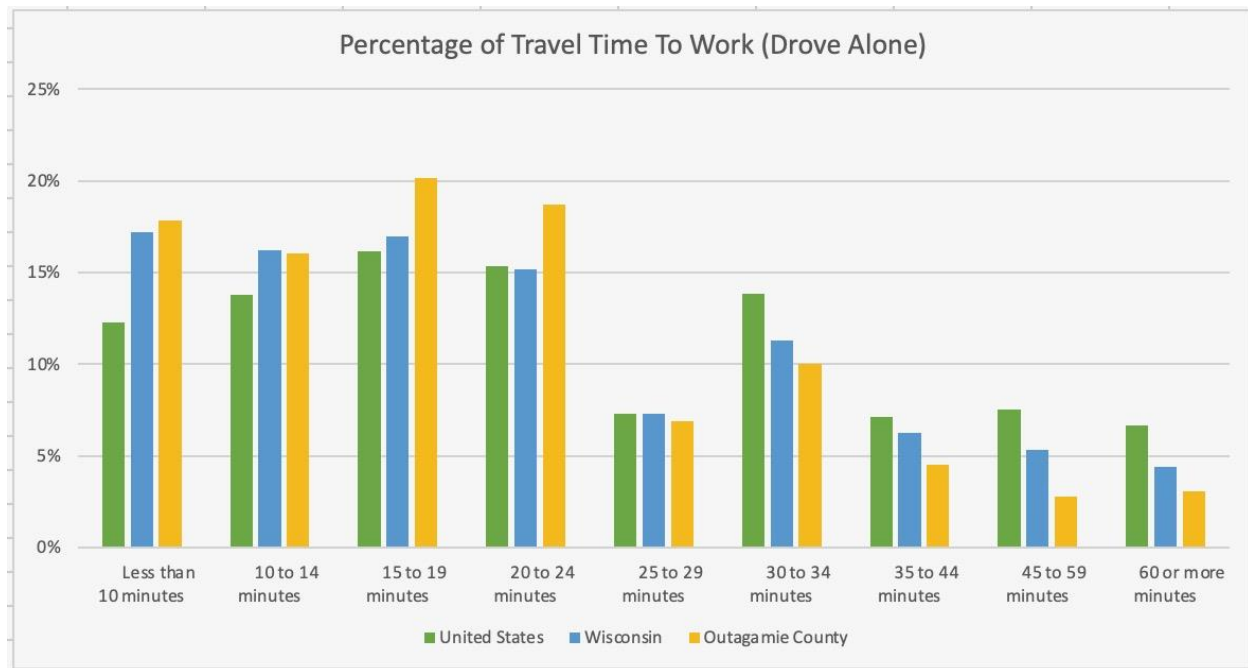


Figure 6: Percentage of Travel Time to Work

Highways and roads within Outagamie County consist of a combination of federal, state, county, and local roads. The Outagamie County Highway Department provides a connected highway network between the federal, state, and local road networks in rural, suburban, and urban communities. Outagamie County offers seniors and disabled residents in rural parts of the county specialized transportation through county- contracted service providers. Valley Transit is the public transit in the County that provides to Appleton, Kaukauna, Menasha, Neenah; the Villages of Fox Crossing, Harrison, Kimberly, and Little Chute; and the Towns of Buchanan and Grant Chute [3]. Figure 7 shows the various means of transportation in the county. Highlighting the railroads, interstate, highway, state roads, and county roads and all POI for potential charging stations. Figure 8 highlights that most of the traffic flow occurs in the southeastern portion of the county, within the “Fox Cities” metropolitan area [3]. The next largest area for traffic flow is experienced between New London and Grand Chute along the Hwy 15 corridor [3]. The daily

average traffic flow is highlighted in Figure 8; the red dots highlight areas with higher average daily traffic volumes. The red/orange areas in Figure 8 show areas where charging infrastructure might be needed the most since those are the roadways traveled the most within the County. The next section will discuss various funding opportunities that can be used for Outagamie while keeping in mind the current state of the County.

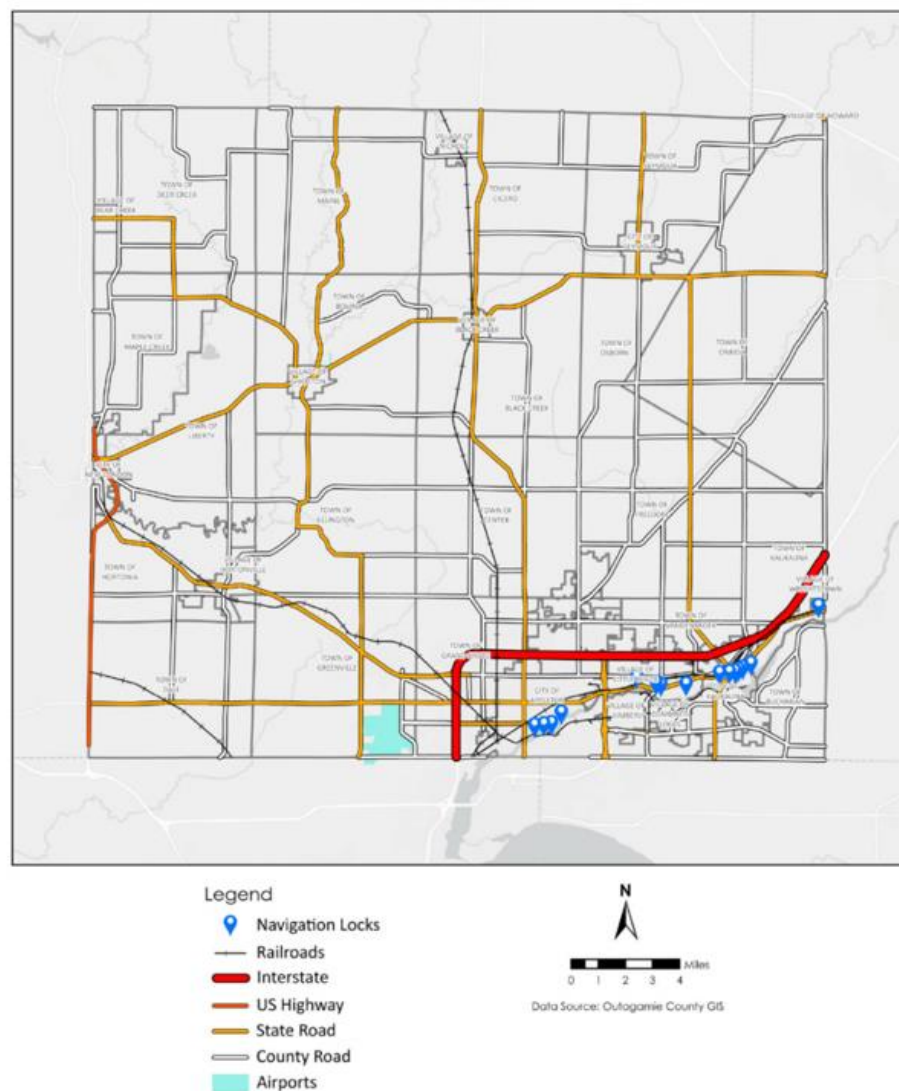


Figure 7: Outagamie's transportation map, highlighting railroads, interstates, highways, and local roads. Retrieved from Outagamie's 2040 Comprehensive Plan [3]



Federal EV Goals

Bipartisan Infrastructure Law

On November 15, 2021, President Biden signed the Bipartisan Infrastructure Law (BIL) into law. A \$550 billion infrastructure investment is meant to be distributed over fiscal years 2022 through 2026. Amongst the different infrastructure projects that the BIL is meant to cover, the expansion of EV charging is one of them. Specifically, the BIL invests \$7.5 billion in EV charging directly, \$10 billion in clean transportation, and over \$7 billion in EV battery components, critical minerals, and materials.

According to the U.S. Department of Transportation, one of the primary obstacles to the widespread adoption of EVs is the limited network of EV charging stations, specifically along highway corridors. As of April 2022, across the United States, there were approximately 150,000 gas stations and approximately 41,000 publicly accessible, non-Tesla EV charging stations (with approximately 89,000 charging outlets). For drivers taking lengthier trips along the country's interstates and highways, access to fast-charging EV charging stations is particularly critical, yet out of the 41,000 public charging stations, there are fewer than 4,800 fast charging stations nationally with approximately 9,800 charging outlets [8]. This is why, one of the main goals of the Bipartisan Infrastructure Law (BIL) is to promote the expansion of electric vehicle charging stations.

Consequently, the federal government introduced new investments in EV charging aiming to put the United States on a path to a nationwide network of 500,000 EV chargers by 2030 [9]. As demonstrated in Figure 9, several DOT funding and financing programs were introduced and are continuing to aid in constructing and implementing EV chargers, support

								
Construction and installation of EV charging infrastructure including parking facilities and utilities.	Workforce development and training related to EV infrastructure.	EV acquisitions and engine conversions - cars or trucks.	Planning for EV charging infrastructure and related projects.	Construction and installation of EV charging infrastructure to support operational, resiliency, national energy security, environmental, and community goals for freight transportation.	Installation of EV charging infrastructure as part of transit capital projects eligible under chapter 53 of title 49, United States Code.			
		FY 2022 ¹ AMOUNT						
FORMULA PROGRAMS								
National Highway Performance Program (NHPP)	\$28.4 B ²							
Surface Transportation Block Grant Program (STBG)	\$12.5 B ^{2,3}							
Congestion Mitigation & Air Quality Improvement Program (CMAQ)	\$2.5 B ²							
National Highway Freight Program (NHFP)	\$1.4 B ²							
State Planning and Research (SPR)	\$983.3 M ⁴							
Metropolitan Planning (PL)	\$438.1 M ²							
Carbon Reduction Program	\$1.2 B ^{2,5}							
National Electric Vehicle (NEVI) Formula Program	\$685 M ^{2,5,6}							
DISCRETIONARY PROGRAMS								
Rebuilding American Infrastructure with Sustainability and Equity (RAISE) (formerly known as BUILD)	\$1.5 B							
Infrastructure for Rebuilding America (INFRA) Grant Program	\$1.64 B ^{2,7}							
Advanced Transportation and Technologies and Innovative Mobility Deployment	\$60 M ²							
Discretionary Grant Program for Charging and Fueling Infrastructure	\$300 M ^{2,5}							
Rural Surface Transportation Grant Program	\$300 M ^{2,5}							
Reduction of Truck Emissions at Port Facilities Program	\$80 M ^{2,5,7}							
OTHER ALLOCATED PROGRAMS								
Federal Lands and Tribal Transportation Program (FLTTP)	\$1.3 B ^{2,8}							
Puerto Rico Highway Program (PRHP)	\$173 M ²							
Territorial Highway Program (THP)	\$46 M ²							
INNOVATIVE FINANCE PROGRAMS								
State Infrastructure Banks (SIBs)	Varies							

Figure 9 : A list of federal fundings categorized by the types of projects that they would cover.

Taken from [8]

workforce training for new technologies and integrating EVs as part of our daily lives. The deployment of EV chargers is the foundation of many electrification projects, which is why many of these funding programs will allocate money to construct new charging stations prior to focusing on their main target.

National Electric Vehicle Infrastructure (NEVI)

One of the key programs presented within the BIL that is specifically dedicated to the deployment of EV charging stations is a \$5 billion National Electric Vehicle Infrastructure (NEVI) Formula Program. The NEVI program aims to provide dedicated funding for states to strategically “deploy EV charging infrastructure and establish an interconnected network to facilitate data collection, access, and reliability” [10]. Currently, over 600 of the 4,800 fast charging stations within the country meet the NEVI Program criteria, the long-term goals are to increase this number. The funds within this program will be made available each fiscal year through FY 2026, and they are aimed to cover project costs that include:

- The acquisition, installation, and network connection of EV charging stations to facilitate data collection, access, and reliability.
- Proper operation and maintenance of EV charging stations.
- Long-term EV charging station data sharing.

To ensure that all states are starting with the same standards, the BIL required the establishment of a Joint Office in the Department of Transportation (DOT) and the Department of Energy (DOE) to develop the minimum standard and requirements for the NEVI program, as demonstrated in Table 1. These standards can be further enhanced if individual states create more stringent EV charging infrastructures.

Final Ruling	Summary
Procurement Process	- There needs to be transparency regarding the process of how EV charging prices will be determined.
Connection Details	- There needs to be at least four Direct Current Fast Chargers (DCFC) ports that simultaneously deliver up to 150kW - Each DCFC port must have a Combined Charging System (CCS) Type 1 connectors. - Each AC Level 2 port should be capable of providing at 6 kW per port simultaneously across all AC ports with an option to allow the customer to consent to accept a lower power level to allow power sharing or to participate in smart charge management programs. - All Level 2 chargers must be ENERGY STAR certified
Accessibility	- Charging stations along designated AFCs must be available 24 hours per day, 7 days a week. - Payment methods should accept major credit and debit cards. - Payment methods should be accessible to persons with disabilities and those that are limited English proficient
Security	- States are required to implement appropriate physical strategies for the station itself and cybersecurity strategies to protect customer data and disruption to the electrical grid.
Long-Terms Stewardship	- Chargers must stay in compliance with these regulations for at least 5 years
Qualified Technician	- The workforce installing, maintaining, and operating the chargers has appropriate licenses, certifications, and training.
Customer Facing	- The reporting mechanism must provide multilingual services and is compliant with American with Disability Act of 1990. - Stations must only gather personal information “strictly necessary” to provide charging service and must take all reasonable measures to safeguard data.
Use of Program Income	- Income derived from the real property and the operation of an EV charging facility are used for eligible transportation projects as specified by Title 23 of the U.S.C

Final Ruling	Summary
Charging Infrastructure	- Chargers must be designed to allow switching between charging network providers without the change of hardware
Traffic Control Devices Signs	- Charging stations must align with MUTCD and 23 CFR part 750 which highlights the guidance on the design and placement of on-premise traffic signs
Data Submittal	- Establishes quarterly and annual data submittal for all projects funded under the NEVI Formula Program.
Charging Infrastructure	- Establishes charging network connectivity: charger-to-charger-network communication, charging-network-to-charging-network communication, and charging-network-to-grid-communication. - Chargers must be designed to allow switching between charging network providers without any change to the hardware
Information on Public EV Charging Stations	- The regulations specify that these specific data fields that must be available, free of charge, to third party software developers.

Table 1: NEVI Standards and Requirements. Summarizing the ruling within [10]

In addition to the potential funding that this program will bring, the program requirements aim to establish a national standard for the installation, operation, and maintenance of EV charging stations. Prior to establishing some of the rules within the NEVI program, there were wide disparities amongst EV charging stations which include: operational practices, payment methods, display of price, speed of chargers, and information about the availability and functions of each station. The current variety of charging station operations leaves consumers with a learning curve every time they approach a new station. Therefore, having a consistent standard will aid in charging station accessibility and continue to increase the number of EVs on the road.

Additional National Programs

Throughout the BIL there were additional programs introduced that can be used to plan for and build EV chargers, as demonstrated in Figure 4. The BIL will provide funding to USDOT, DOE, and EPA for the deployment of various EV-related projects, such as the deployment of electric school buses and ferries, port electrification, a domestic supply chain for battery production, and battery recycling. Although not all programs are directly targeting the deployment of charging stations, they do offer funding opportunities for them throughout the way.

Some potential federal programs that may be of interest include:

- *Discretionary Grant Program for Charging and Fueling Infrastructure (CFI)* – This program provides \$2.5 billion throughout five years, starting from Fiscal Years (FY) 2022 and 2023 available fundings. The aim is to fund electric vehicle charging and alternative-fueling infrastructure within cities, counties, local governments, and tribes. This program is an extension of the NEVI Program. Specifically, this program is meant to fill in the gaps of the NEVI Program. The CFI will award competitive grants to specific projects throughout urban and rural communities, particularly in underserved communities and the designated alternative fuels corridors. According to the BIL 50% of the fund will be granted to the Community Program and the other 50% will be towards the Corridor Program. First-round **applications for CFI opened on March 14th, 2023 and are due May 30th, 2023**. For this round of funding, there will be up to \$700 million from fiscal years 2022 and 2023 funding available. Further funding windows will be available in the upcoming years. [11]
- *Congestion Mitigation and Air Quality Improvement (CMAQ)* – Starting in 1992, the CMAQ program provides funding sources for states and local governments to fund transportation

projects that will help reduce emissions and improve air quality. Per DOT requirements a CMAQ project must meet the following three criteria: it must be a transportation project; it must be in or benefit a nonattainment or maintenance area; and it must generate an emissions reduction. Additionally, all CMAQ projects must come from a State Transportation Improvement Plan or a Transportation Improvement Program, and it is up to the State DOT to distribute CMAQ funds. Outagamie County may be able to apply for CMAQ funding to support the installation of EV charging stations as part of its efforts to reduce emissions and improve air quality [12].

- *Low or No Emissions Vehicle Program:* This competitive program provides funding to state and local governments that are aiming to purchase or lease low-emission transit buses and supporting facilities. This includes construction of related equipment and new public transportation facilities. Although this application deadline has passed for fiscal year 2023, the DOT anticipates that there will be more windows within the next three years.
- *The Electric Vehicle Supply Equipment (EVSE) Rebate Program:* This program is administered by the Wisconsin Office of Energy Innovation and provides rebates of up to 50% of the cost of charging station, up to a maximum of \$70,000 per site, for the installation of Level 2 and DC fast charging stations. Outagamie County may be able to participate in this program to support the installation of EV charging stations. Additional state funding will be described further in Table 3.

Wisconsin's Work on EVs

Growth in EV Registration

Residents throughout the state of Wisconsin rely heavily on their personal vehicles to get around. Figure 10 shows that in 2021 73% of residents drive alone for their work commute; this is 5% more than the United States as a whole. Additionally, Outagamie County had a higher

percentage of solo commuters as the state (74%). Due to the high numbers of vehicles on the roads, amongst all the energy use throughout Wisconsin the transportation sector is the second largest energy user [13]. In 2022 alone 3.5 billion gallons of fuel [14] were consumed throughout the state for: manufacturing and distribution of goods, farming and distribution of produce, commercial air travel, commuting to work, leisure travel, marine sports, and other applications.

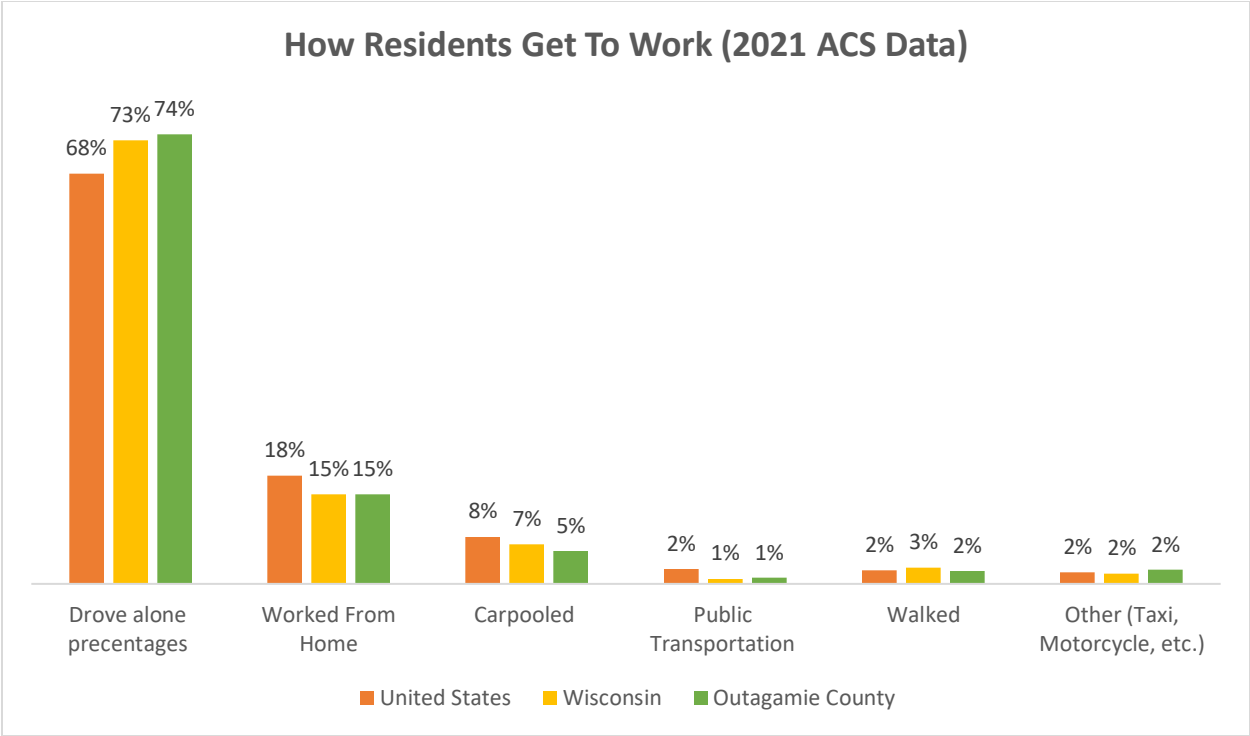


Figure 10: Data on how residents get to work comparing Outagamie, Wisconsin, and the United States. Retrieved from ACS [15]

Transportation facilities and networks have the power to shape development, influence property values, and determine a neighborhood's character and quality of life. In addition, the investment in the transportation sector is meant to grow in the next couple of years. To ensure that Wisconsin continues to work towards its energy goals there needs to be a push towards fuels-switching and efficiency gains within the transportation sector. Throughout the past years, EV registration and infrastructure have grown tremendously in Wisconsin. Figure 11 shows the

percentage increase in electric and hybrid vehicle registration from year to year since 2014. According to the [16], the combined registration of electric and hybrids rose by 132% from 2013 to 2021 (from 44,178 registrations to 102,492 registrations). For electric vehicles specifically, there were 9,039 registrations within the state, and 216 within Outagamie. Of the 216 registrations within Outagamie County, 146 were for automobiles, one for a motorcycle, and 69 for trucks [17].

Although their registration trends are on an upward trajectory, hybrid and electric vehicles still make up only 2% of the state’s total vehicle registration as demonstrated in Figure 10. Additionally, within these new fuel-source vehicles the trends demonstrated have been primarily driven by hybrid registrations, which tend to outnumber EVs by tenfold.

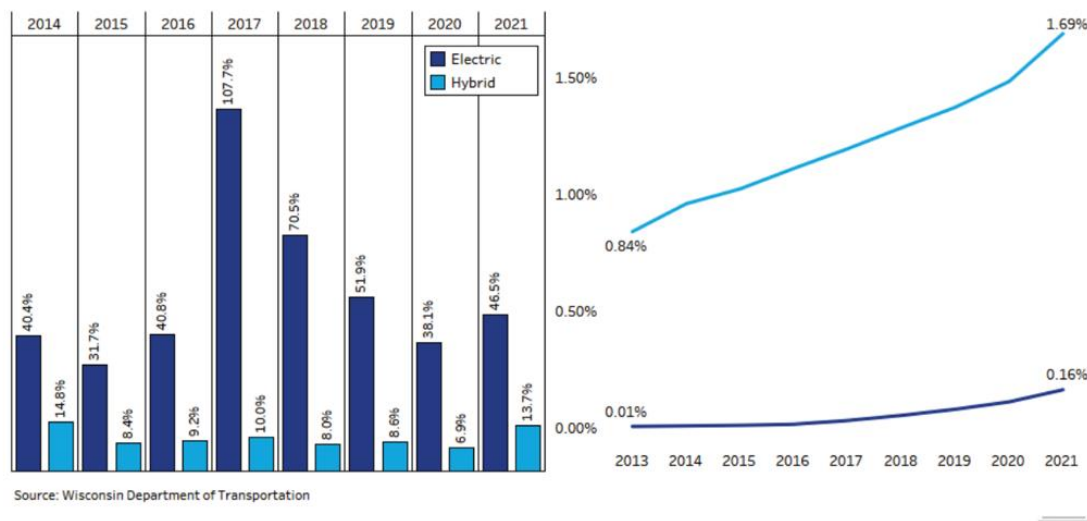


Figure 11: Trends from [16] on the growth of hybrid and electric cars from 2014-2021(left). Yet they are still a small portion of total registered vehicles(right)

Still, electric vehicle registrations in Wisconsin are expected to continue their dramatic growth trajectory. WisDOT projects EV registrations will increase from less than 10,000 in fiscal 2022 to more than 217,000 in 2027 – which would be a twenty-three-fold increase in just five

years. By 2050, WisDOT projects electric vehicles will account for nearly one-third of the state's total registered vehicle fleet. This increasing trend will continue to increase the demand for new transportation infrastructure such as fast and accessible charging stations for electric vehicles.

Current Plan

For states to be eligible for funding under the NEVI program they were required to prepare an EV Infrastructure Development Plan by August 1st, 2022. Through this, the State's Department of Transportation created the Wisconsin Electric Vehicle Infrastructure Plan (WEVI) [18]. The main vision of this work is to "Develop an interconnected electric vehicle charging network that facilitates the safe movement of people and goods throughout Wisconsin."

To stay accountable to this vision the WEVI highlighted the following Plan and Quantifiable goals [18]:

- Plan Goals
 - Establish a network of publicly accessible charging stations on Wisconsin's Interstates, Alternative Fuel Corridors (AFCs), and regional routes of significance.
 - Continue stakeholder collaboration to inform planning, deployments, program evaluation, and annual plan updates.
 - Integrate EV charging infrastructure across the state including urban, rural, and suburban areas and historically underserved communities.
 - Leverage funding and partnerships to adapt the state's transportation infrastructure to facilitate electrified transportation.
- Quantifiable Goals

- 100% of Wisconsin Interstates and AFCs fully built out to NEVI Program standards.
- 85% of the Wisconsin State Highway System within 25 miles of NEVI-compliant fast charging stations.

For these goals to be met, counties throughout the state should analyze where they are currently standing and work on areas that will individually push them toward these goals.

As of 2022, Wisconsin has a total of 306 publicly available charging stations, four of which are NEVI Compliant with two being near the Illinois and Minnesota borders. To work towards their goal of further developing more NEVI-compliant charging stations, Section 4 of the report demonstrates the potential deployment plan for future stations, highlights some approximate locations, and summarizes how local utilities will work towards paying these projects off. Wisconsin is currently aiming for new appropriations through federal, state, and local investments that would provide Wisconsin with greater funds related to charger

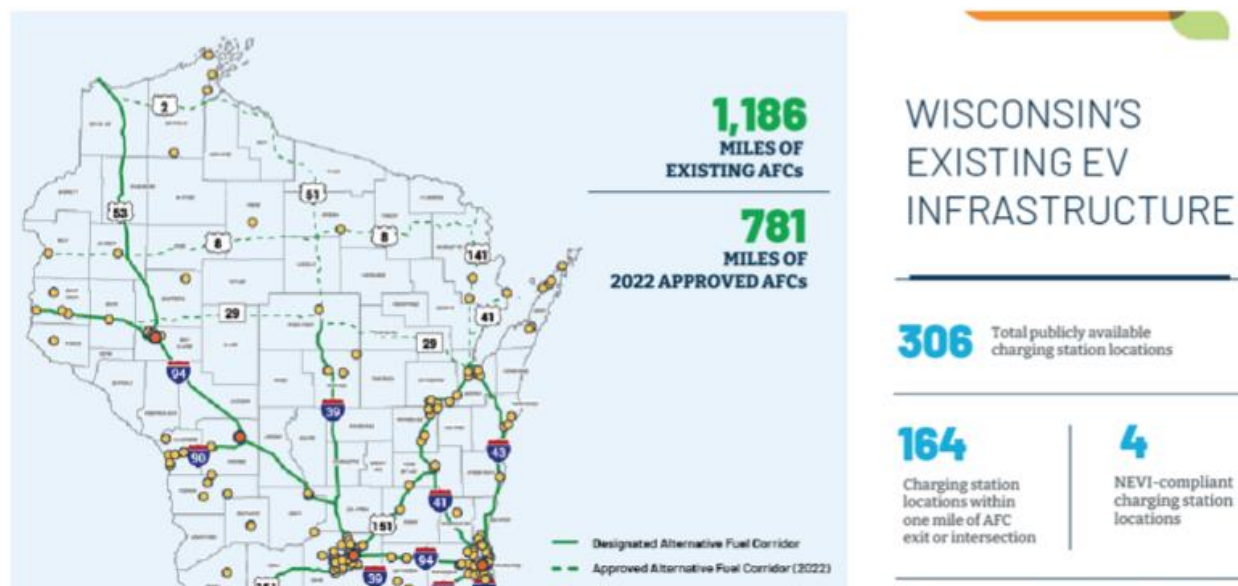


Figure 12: A Map of Wisconsin's Existing EV Charging and Corridors

implementation. The funds would be awarded through grants, administration, and management of the NEVI Program.

WisDOT created a plan for deployment mapping and a process to identify the approximate locations of chargers. The plan is as follows:

1. Identify existing NEVI-compliant Electric Vehicle Supply Equipment (EVSE)
2. Create a 25-mile buffer around existing NEVI-compliant EVSE
3. Identify all eligible exits within the charging station gap areas
4. Analyze eligible exits based on amenities and the likelihood of power
5. Identify all viable exits in gap areas resulting from step 4
6. Detail approximate locations to fully build-out NEVI compliant EVSE

This plan creates a preliminary analysis to identify approximate locations for the chargers. After this, further analysis will be conducted to aid in the selection process to find the best-suited sites by scoring factors such as: equity, proximity to other DCFSSs, tourism, freight and transit route, Annual Average Daily Traffic (AAFT), EV adoption, and more. Then Wisconsin will coordinate with local utilities for each of the viable locations to verify 3-phase power and available capacity. In addition to the deployment in the steps above, Wisconsin anticipates adding the following steps:

1. Coordinate further with utilities on power availability
2. Review and incorporate updates from U.S. DOT NEVI Program final rulemaking, as summarized in Table 1

3. Refine and update site prioritization criteria based on feedback from utilities, the public, and U.S. DOT
4. Review all eligible exits and interchanges based on updated criteria and considerations
5. Update the list of priority exits, and interchanges based on above
6. Publish all details for public review to accompany procurement solicitation
7. Establish a NEVI competitive procurement process

This process would be put in place to create a competitive procurement process for eligible applicants to identify the preferred site based on the site chosen. Based on their analysis, WisDOT identified 61 NEVI-compliant charger locations across all existing federal interstates being “corridor ready”. Some of which are within the borders of Outagamie County.

To effectively deploy EVSE throughout the state, WisDOT will work with local governments and regional planning to come up with the best goals. Focusing on local government WisDOT hopes to develop a community-based equitable charging plan with multi-unit dwelling, workplace, public and fleet charging. As well as identify locations, set up deployment goals, and enact best local policies to stimulate EV adoption. Implementing this requires looking at zoning laws, permitting, parking, signage, and other local codes that might impact the deployment of the chargers. The following section (Outagamie County EV Outlook) of the report will highlight some of these considerations that Outagamie County will have to focus on when building a new charging station.

To grow the number of NEVI-compliant stations, Wisconsin intends to create a competitive procurement program for charging station hosts. The WEVI report states that to cover 20% of the awarded hosts, the State aims to secure non-federal matching funds. Wisconsin anticipates

receiving \$78.65 million in federal NEVI Program funds through the lifespan of the program (the next five years). The funding mentioned will be in a form of a reimbursement program, that reimburses actual expenditures incurred by the project sponsor during the project's development. Project sponsors will be responsible for any project cost coverage beyond the award amount. Throughout all this, the federal cost-share for NEVI Program projects cannot exceed 80% and most importantly these funds must comply with existing state laws and agency rules. For Outagamie County to partake in these fundings and grow the number of charging stations within the community, it is important for the local government to continue monitoring the different programs that are offered, as demonstrated in the previous section (Federal EV Goals), and to understand whether the money is allocated by the federal or state government.

Governance of EV Charging Stations

Public Chargers vs Private Chargers

A 2020 Consumer Reports found that 71% of prospective EV owners would prefer to charge their electric vehicle at home [19]. Funding opportunities for installation of residential charging private charging are listed in Table 3; funding available to Outagamie County residents are highlighted. Residential charging installation data is difficult to find. Incentives are offered through a federal tax credit (similar to purchasing a qualifying electric vehicle), through the Wisconsin Public Service Commission, and through some regional electric utilities. Outagamie County's electric utility, Wisconsin Electric Power Company, has a pilot program to offer EV charging equipment and finance EV charging installation with utility bills. The Wisconsin PSC also offers incentives for charger installation by businesses.

Locations of public chargers are displayed on the US DOE Alternative Fuels Data Center website [20]. This site includes information about each charger such as its street address, charging network, payment methods accepted, and hardware. It is integrated with a tool for planning road trips near charging stations, since federal and state goals for constructing public charging stations focus on enabling long-distance travel with EVs. Incentives for public chargers are offered by the US Department of Transportation through NEVI, which will allocate funding through the Wisconsin Electrification Initiative. To be eligible for NEVI funding, new charging stations must be compliant with the criteria specified in the March 30, 2023, NEVI ruling by US Federal Highway Administration, section 680.106 [21]. As of April 2023, there are currently no compliant charging stations in Outagamie County.

Commercial property owners are eligible for financing EV charger installations through the Wisconsin program for Property Assessed Clean Energy (PACE) [22]. Outagamie County has adopted PACE commission status, which makes commercial property owners eligible for clean energy project loans, including for EV charger installation, at no cost to Outagamie County. Commercial properties include for-profit businesses, non-governmental, tax-exempt properties such as privately-operated community centers, and multi-family housing with more than five units.

Zoning and Permitting Examples

Governance of operating EV charging stations in Wisconsin is ambiguous. Currently only utilities are allowed to sell electricity in Wisconsin, including electricity sold through EV charging stations. State legislation last year failed to pass that would have lifted restrictions on other operators [23]. Current charging stations are operated under the assumption that legislation will eventually legalize non-utility operation of EV charging stations. Other municipal

governments (outside of Wisconsin) have made partnerships with utilities to construct and operate EV charging stations [24].

In addition to encouraging utilities to operate publicly accessible charging stations, Outagamie County can ease permitting for privately owned charging stations. PNNL provides sample language to explicitly encourage residential and commercial buildings to install EV charging stations [25]. Requirements to install charging stations would ensure that rental tenants are guaranteed access to charging stations. Outagamie County can also establish building codes or zoning regulations to encourage these actions. Grid connections and building wiring must meet a certain standard for installing level 2 EV chargers such as electrical panel capacity and space to support a minimum 40-ampere, 208/240-volt branch circuit for each EV parking space [25]. The Wisconsin Environmental Research and Policy Center has collected a list of example municipal codes that establish standards for EV infrastructure [24].

The US DOT offers a checklist for EV Infrastructure Project Planning [26]. This is not region-specific but offers advice for community planners on charging infrastructure project development. Governance is dependent on state and local laws, such as who is responsible for permitting. Attempts to clarify governance at the Wisconsin state level have not been successful, with public utilities still being the only service authorized to sell power. In the March 30, 2023, final revision of NEVI funding, FHWA officials have given state governments one year to clarify EV charging regulations [23].

Potential Charging Locations

GEM Model

A Geospatial Energy Monitor tool is supported by Argonne National Laboratory to help site renewable energy or low carbon projects in the US [27]. One feature of this tool is to identify potential EV charging locations. The tool uses six input layers from publicly available datasets to calculate the suitability of potential charging sites: whether the site is on a disadvantaged community (DAC) or tribal lands; distance from a FHWA designated EV corridor; population density; distance to a substation greater than 100 kV; distance to other non-Tesla EV charging stations; and road traffic density. Other datasets hosted by GEM can be added to these six layers, but new datasets cannot be uploaded by the user.

The GEM model weights these layers to calculate a score out of 100, where 100 means the location is optimal for an EV charging station. In Outagamie County, locations identified by GEM are close to the FHWA EV corridor I-41. Table 2 lists these locations in comparison with Outagamie County's future land use plans. Since most of the potential charging station sites identified by GEM are located in Outagamie County townships or incorporated municipalities, Outagamie County only has jurisdiction over five parcels of land with potential charging stations.

Maps and Land Use Data

Outagamie county maintains a public database of geospatial features of its land [28]. Relevant to public charging station location siting is the future land use layer, which displays development goals during the time horizon of Outagamie County's Comprehensive Plan. These future land use designations guide future growth and development patterns. We cross reference

these designations with the GEM model to identify which land parcels Outagamie County would have authority to install public charging stations. The table below lists the location where potential charging stations may be installed, its suitability score out of 100 in the GEM model, its current land use code [29], and its future land use code [30]. Locations with a score of at least 40 are included in Table 2; every other parcel of land in Outagamie County ranges from 8 (in the northwest corner) to 37 (near I-41). Locations that are under Outagamie County zoning jurisdiction or unincorporated are highlighted yellow: five locations are explicitly under Outagamie County jurisdiction and five are ambiguous. The highlighted locations in Table 2 correspond to the circled locations in Figure 13.

Table 2: Locations and scores of potential charging station locations identified by GEM model in Outagamie County

Location	GEM score (x/100)	Current land use code	Future land use code	Jurisdiction
Intersection of S County Line Rd. And E Frontage Rd. Where I-41 meets the eastern county line	75	No information	No information	No information
Windsong La and Twin Willows Dr, Appleton	70	RSF	SR	City of Appleton
Hickory Dr. and N. Freedom Rd., Vandebroek	67	AGD	ST	County
County Hwy JJ and Sleepy Hollow Dr., Kaukauna	67	CL, IND, RSF	CM, RR	Town of Vandebroek
N Meade St and E Apple Creek Rd.	67	AGD	SR, UI	City of Appleton
Block between E. Longview Dr., Fairchild Ct., E Pershing St., and N. Alexander St.	67	No information	UI	No information
800 block N. Perkin St., Appleton	63	Industrial	CI	City of Appleton
Southwest corner of Gordon Bubolz Nature Preserve	63	AGD	ST, AG	Town of Grand Chute
Peabody Park, Appleton	58	No information	UI	City of Appleton

Middle of Section Line Rd., Greiner Rd., McCabe Rd., Cty Tk UU	56	AED (Town), AGD (County)	AG	Town; County
510-516 N. Bennett St., Appleton	54	No information	UI	City of Appleton
Everglade Rd. and Sherwood Point Dr.	54	No information	UI	No information
Westgreen Dr. and Greenridge Dr, Greenville	54	No information	UI	No information
Northeast of Maloney Rd. and Lau Rd.	48	AGD	AG	County
West of County Rd. N and Lau Rd.	48	AGD, IND	AG	County
North of Countryside Golf Club	48	AGD	AG, ST	Town of Buchanan
Outagamie Rd. east of Feldkamp Rd.	48	AGD	AG	Town of Buchanan
East of I-41, south of 125, west of Bluemound Dr., Appleton	40	AGD, RSF, RTF, RMF, CL, CR	CM, SR	City of Appleton
Royal St. Patrick's Golf Course	40	No information	UI	No information
Large area south of Vandenbroek and north of Kaukauna (see figure X)	40	AGD, IND, RSF; IND, "Rural development" (town)	ST, CI, CM	Town of Kaukauna; County

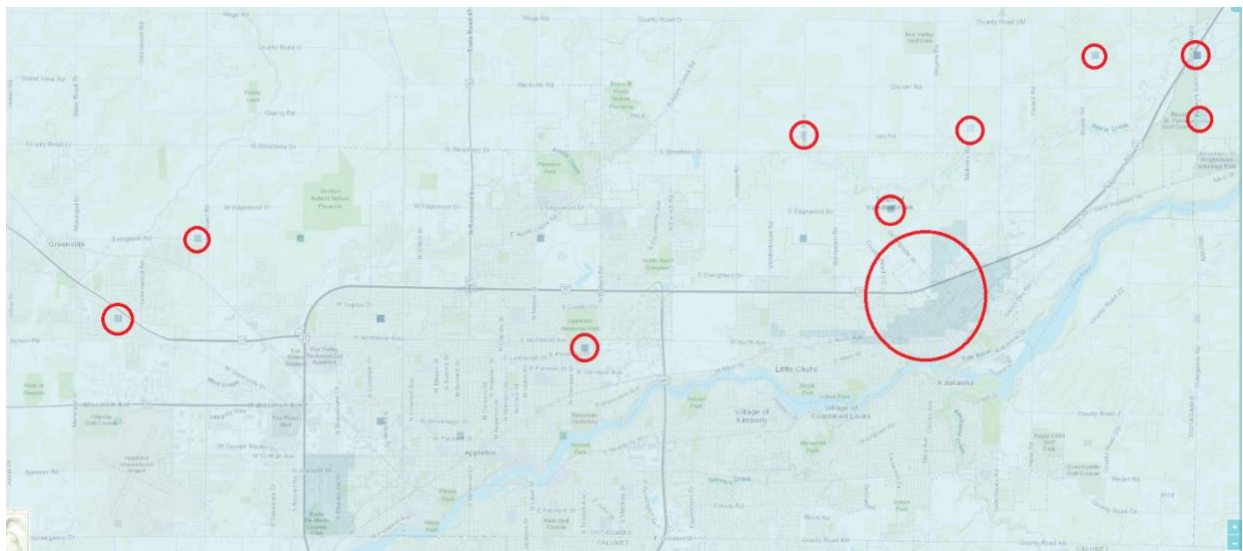


Figure 13: Map from GEM model of potential charging station locations, shaded blue. Locations circled in red are either unincorporated or explicitly under Outagamie County zoning jurisdiction (see Table 2). This map shows the southern part of Outagamie County, where I-41 passes through Appleton and crosses the eastern border near Green Bay.

Other Transportation Plans

Eau Claire Electric Vehicle Roadmap

The City of Eau Claire adopted a resolution to achieve community carbon neutrality by 2050 [31]. In this report there was a significant focus on transportation emissions which create this roadmap that aims to convert 10% of all vehicle miles traveled in Eau Claire to electric vehicles by 2030 [31]. This roadmap was done by establishing a team of stakeholders including City staff, Xcel Energy representatives, and regional transportation planning experts from the Metropolitan Planning Organization to collaborate and share essential resources that would lead to faster adoption [31]. The roadmap provides a detailed plan to demonstrate, lead, and support Eau Claire's transition to non-carbon transportation.

[Eau Claire's roadmap](#) included a list of priorities and three areas of focus [31]:

1. ***Model the way***, which addresses goals and strategies that municipal operations will prioritize and use to move forward with fleet and transit electrification as well as installation of necessary infrastructure to support operations. The target for this goal is by 2030, 15% of the City's fleet vehicles will be made up of EVs.
2. ***Building a strong foundation***, which focuses on guiding the City's efforts to develop a foundation for EV growth in the community. This is done through development, support, and partnerships to identify and boost the installation of publicly available charging infrastructure. The target for this goal is by 2030, 160 public charging stations will be operating in Eau Claire.
3. ***Sow the seeds for transition***, meaning supporting the increase in electric vehicle adoption by spreading awareness, education, and acceptance of EVs throughout the

community and surrounding areas. The target for this goal is 2030, at least 8,000 of the registered vehicles in Eau Claire will be EVs.

Eau Claire established other efforts to promote EV adoption such as programs to promote and accelerate the adoption of EVs through community education and outreach, as well as by municipal planning and feasibility research. Examples of some of the City's other efforts include [31]:

- **The *Ride and Drive* event**, which gives the community a way to experience EVs without feeling pressure from the outside. This is a good way to bring excitement to EVs in Eau Claire by letting people talk to EV owners and get rid of many misconceptions about EVs that prevent future growth.
- **Implementation of hybrid transit buses**, which allow Eau Claire to reduce air pollution in designated areas of bad air quality, such as under-served communities that are often impacted the most by poor air quality. Hybrid electric buses are estimated to reduce emissions by up to 75% compared to traditional diesel buses, which suggests that Eau Claire has reduced emissions from transit buses by 6% in 2019 and will reduce emissions by 9% in 2020 [31].
- **Development of the [Fleet Carma Study](#)**, conducted a telematics sustainability study through various partnerships to determine the best approach for transitioning to low-emission vehicles for the municipal fleet. Through this study, 20 vehicles, including light-duty trucks, full-sized vans, sedans, and SUVs in the municipal fleet, were considered for replacement with EVs [32]. Out of the 20 vehicles, Fleet Carma suggested

that by exchanging 5 of the light-duty vehicles with EVs, Eau Claire could save lots of money, CO2 emission, and fuel.

The City of Eau Claire is about half the size of Outagamie County, but this report can provide a good resource since they are using transportation to push toward this goal of carbon neutrality by 2050 for the benefit of current and future generations. This plan is also on the city level, but looking at this plan to give cities advice on EV fleets and their public transit might provide the best results for implementation given the jurisdiction at the county level.

Dane County Transportation Plan

The Dane County Office of Energy & Climate Change started working on its Climate Action Plan in 2017, working with representatives from 38 organizations and another 75 individuals from across the county to help research and develop a program, policy, and recommendations that would allow Dane County to reduce greenhouse gas emissions [33]. To achieve transportation goals at the county level Dane County made a plan to work with municipalities, utilities, and other stakeholders to implement programs that are designed to encourage the purchase of EVs. Figure 14 provides a list of the 38 organizations that make up the Dane County Council on Climate Change, which is the group that was made by the County Executive to bring diverse perspectives and give input on climate-related topics.

This effort has been a collaboration among the Office of Energy & Climate Change, the Dane County Climate Council, and other work groups. There are varying perspectives in this group and not all members support all the recommendations or views in the report, but acknowledging and working with the people in the county is the first step.

1000 Friends of Wisconsin	H & H Energy Services
Alliant Energy	Ho Chunk Nation
Azar Law LLC	Home Savings Bank
BIOFerm Energy Systems	IBEW Local 2304
Citizens Utility Board	Krupp General Contractors
City of Fitchburg	Madison Metropolitan Sewerage District
City of Madison	Madison Gas and Electric
City of Middleton	Nelson Institute for Environmental Studies
City of Monona	Public Health Madison & Dane County
City of Sun Prairie	RENEW Wisconsin
Clean Fuel Partners	Sierra Club
Clean Wisconsin	SunPeak
Capital Region Advocacy Network for Environmental Sustainability	Sustain Dane
Dane County Emergency Management	Urban League of Greater Madison
Dane County Office of Equity & Inclusion	UW Health
Derr Farms	Wisconsin Energy Institute
Exact Sciences	Wisconsin Initiative on Climate Change Impacts
Fiskars	WPPI Energy
Greater Madison Chamber of Commerce	YWCA Madison

Figure 14 : Dane Council on Climate Change Member Organization from Dane County's Climate Action Plan [33]

Dane County also partnered with Madison Gas and Electric (MGE) for electrifying transportation. This is done by working with residential, and commercial and fleet customers,

both public and private. Partnering with We Energies is a crucial step in the implementation of charging stations around the County.

The MGE program includes [33]:

- **Charge@Home** for at-home charging with no upfront cost. MGE will coordinate the installation of a Level 2 charging station in exchange for a monthly fee of about \$20 (64 cents per day), plus the cost of electricity. There is no upfront charge for standard installation, and MGE takes care of charger maintenance and repairs. MGE can manage charging sessions remotely, if needed, to better manage the electric grid.
- **Public and multi-family charging.** MGE began installing public charging stations in 2009. MGE's growing network includes more than 30 public charging stations, all powered by wind energy. Since 80% of charging occurs at home, MGE partners with developers and property managers to install chargers at multi-family properties.
- **Workplace charging** to enable employees to charge at work.

Also, partnering with customers to grow the use of EVs and awareness of their benefits such as:

- **The City of Madison** to electrify its buses and fleet vehicles.
- **Auto dealerships** to provide resources and education to sales staff.
- **Lyft**, the ridesharing company, to help EV drivers with Lyft share insights with riders.

MGE has an EV website, [LovEV](#), and an online feature called [EV Rider](#), that gives information on EVs and charging [33]. This helps customers who are considering an EV get up-to-date and accurate information about available models, driving range, costs, emissions, and charging opportunities. It's important for customers to know that even though more than half of

the electric generation in Wisconsin today is from coal (55%), the average EV purchased in Wisconsin today emits approximately 40% less carbon dioxide emissions than the average gasoline-fueled car [33].

Highlighting Dane County's efforts are important to note because they can be used as a place to start for Outagamie's Plan since there is the same level of jurisdiction over the area. The plan itself can give guidance for the making of potential community groups or working with the local utility company to foster growth at the county level.

Rural Electric Mobility Infrastructure

Given the land use map in Figure 3 Outagamie consists of many rural areas. Rural residents drive more than their urban counterparts, spend more on vehicle fuel and maintenance, and often have fewer alternatives to driving to meet their transportation needs [4]. Over the long run, EVs could help residents of rural areas reduce those costs and minimize the environmental impact of transportation in their communities [4]. The U.S. Department of Transportation created a [toolkit](#) for EV adoption in rural communities. This toolkit highlights the importance of identifying key partners that can assist in rural planning, funding, and implementing electric vehicle supply equipment. Some key partnerships to explore for Outagamie are:

- **Local and regional planning partners** can include Clean Cities coalitions that can help rural entities get started on installation and planning.
- **Electric utilities** for technical advice for connecting to the local power grid.
- **Charging networks** to give technical expertise.
- **Site hosts** to lead projects such as tourism destinations, local businesses, transportation facilities, and community sites.

Other Local Efforts

Other local efforts for a push towards EVs look in the form of tourism. St. Croix County recently secured a tourism grant from the St. Croix Economic Development Corporation for three new charging stations that will be strategically placed in order to encourage visits from EV owners [34]. St. Croix Electric Cooperative also has joined charging programs by offering level ZEF energy smart chargers for purchase to members [34]. Community members who use St. Croix Electric Cooperative are able to qualify for a \$400 rebate for a at-home charger installation [34]. Other local efforts to improve EV infrastructure is done by the city of Stevens Point by considering a new City policy that would require developers that receive taxpayer funds to install electric car charging stations in their parking lots. [34]. The total amount would depend on the current total of parking spots in the development, but this would increase the charging locations in Wisconsin.

The graph below shows the available rebates and incentive programs that businesses or individuals who live in a home are eligible to apply for. These programs are made with the intent that people prefer to charge at their homes and the utility companies are making this possible with various rebates. WE Energies is highlighted in yellow since that is the provider for Outagamie County. WE Energies started two pilot programs one focusing on residential EV chargers and the other focusing on businesses. The residential EV charger pilot program was put in place to help cover the costs of EV chargers and charging [32]. They provide the charging equipment and maintenance, then you have the option to install the charger yourself or have them install it, or pay for the charging equipment and installation upfront or monthly on your energy bill. The business EV charger pilot program was put in place to help offset the upfront costs associated with installing charging stations for your fleet, employees, customers, or public

use at the facility. The pilot program includes two parts: 1. Offset upfront costs by offering credits to help pay for customer costs and 2. Charging equipment may be purchased, installed, and maintained on their own or with the help of WE Energies through a monthly energy bill fee [32]. Overall, looking at other Wisconsin resources is always helpful to see various ways to foster greater EV implementation.

Source	Funding Opportunity	Description	Date/ Frequency
Barron Electric Cooperative (BEC)	Rebate for free Level 2 Charger	BEC offers residential customers rebates for the full cost of a Level 2 EVSE.	Ongoing
Bayfield Electric Cooperative	EV Chargers and other.	Bayfield Electric Cooperative offers rebates ranging from \$400 to \$800 on charging stations. The charging stations must be connected to Bayfield Electric Cooperative's load management system.	Incentives are in place through December 31, 2023.
Chippewa Valley Electric Cooperative (CVEC)	Electric Vehicle Charging Station Incentive	CVEC offers customers a \$400 rebate to purchase and install a new Level 2 EVSE. All rebate documentation must be submitted within three months of the EVSE purchase. Rebates are available on a first-come, first-served basis.	Incentives are in place through December 31, 2023
Clark Electric Cooperative (CEC)	Electric Vehicle Charging Station Incentive	CEC offers customers a \$400 rebate to purchase and install a new Level 2 EVSE. Rebates are available on a first-come, first-served basis.	Incentives are in place through December 31, 2023
Dunn Energy Cooperative	Electric Vehicle Charger	Dunn Energy Cooperative offers rebates ranging from \$400 to \$800 on charging stations.	Incentives are in place through December 31, 2023
East Central Energy (ECE)	Powering your EV	ECE offers a \$750 rebate to install a level 2 charger on either the time-of-use rate or off-peak storage rate.	Ongoing

Source	Funding Opportunity	Description	Date/ Frequency
Jackson Electric Cooperative (JEC)	Electric Vehicle Residential Charger Rebate	To receive an \$800 rebate, you must purchase a smart electric vehicle charging station with integrated metering from Jackson Electric. Must be installed on Jackson Electric's service lines.	Incentives are in place through December 31, 2023
Madison Gas and Electric (MGE)	Shift & Save	Electric vehicle (EV) drivers can save up to 40% on home charging costs by shifting vehicle charging and other electricity use to nights and weekends!	Ongoing
Madison Gas and Electric (MGE)	Charge@Home Program	MGE residential customers can pay \$20 per month for the installation and maintenance of a Level 2 EVSE. Participants must sign a five-year service agreement.	Ongoing
Pierce Pepin Cooperative Services (PPCS)	Electric Vehicle Charging Station Incentive	PPCS offers rebates ranging from \$400 to \$800 on residential charging stations. The charging station must be connected to PPCS' load management system.	Incentives are in place through December 31, 2023
Polk-Burnett Electric Cooperative	Renewable Energy: E-vehicle, Solar, Wind	Polk-Burnett offers an \$800 rebate on a 240V hard-wired residential charging station when purchasing the charging station from Polk-Burnett.	Ongoing
Price Electric Cooperative (PEC)	Electric Vehicle Charging Station Incentive	Price Electric Cooperative offers residential customers a \$500 rebate to customers who purchase and install a Level 2 EVSE. Rebates are available on a first-come, first-served basis.	Incentives are in place through December 31, 2023
RENEW Wisconsin	Electric Vehicle Charging Equipment Grant	\$500 grant for nonprofits installing a Level 2 (or higher) electric vehicle charger.	Ongoing
Riverland Energy Cooperative (REC)	Electric Vehicle Charging Station Incentive	REC offers residential customers a \$400 to \$800 rebate to purchase and install a Level 2 EVSE. Rebates are available on a first-come, first-served basis.	Incentives are in place through December 31, 2023
We Energies	We Energies Residential EV Charger Pilot Program	The program helps with the installation of chargers and pays for charging equipment upfront or as a monthly cost on the energy bill	Ongoing

Source	Funding Opportunity	Description	Date/ Frequency
We Energies	We Energies Business EV Charger Pilot Program	The program helps customers offset upfront costs or install and maintain the chargers, by paying for equipment and installation costs upfront through a monthly fee on the energy bill.	Ongoing
Wisconsin Public Service	WPS Residential EV Charger Pilot Program	Installation of Level 2 Charger; option to pre-pay or bundle costs on utility bill; opportunity to take advantage of new EV charging Time of Use rate; access to qualified, contracted installers.	Ongoing
Wisconsin Public Service	WPS Business EV Charger Pilot Program	The program offers credits to help pay for business customer costs of utility upgrades as well as provides possible rebates for customer facility electrical work. The optional ability for customers to purchase charging through the utility.	Ongoing

Table #3: Information from the Public Service Commission [35]

Next Steps for Outagamie County

Throughout the report, we have highlighted various potential opportunities for Outagamie County to grow its electric vehicle charging infrastructure given the specifics of the county. To grow EVs the County needs to take various steps given the current jurisdiction at the county level. A primary step to consider is talking to We Energies to offer a rebate program to their customers. Other utilities throughout the state offer rebate programs that incentivize charging stations at businesses and homes which has the potential to lead to more investment in EVs at the county level. Some ways that We Energies can do this is by providing a \$400-\$800 rebate to purchase chargers, or creating a long-term payment plan to pay off the installment of a new charger that spans a specific period. Additionally, as the number of electric chargers continue to grow the power sector will become a bigger player in supporting the transition by ensuring there is a secure supply of electricity for EV charging. To do so the county needs to work alongside

local utilities to assess and mitigate the impacts of EVs on the power grid and to create policies that will leverage the flexibility of EVs. Some potential considerations include assessing the grid impacts under different mobility scenarios, understanding the different electrification priorities for different types of vehicles, continuing to gather data on travel needs, and developing insights.

Electrification of transportation infrastructure will require cooperation among utilities and construction companies to ensure vehicles can be charged safely and reliably. Outagamie County can facilitate this by establishing building codes to standardize electrical equipment necessary for vehicle charging. Federal institutions such as the EPA and PNNL, and nonprofits such as the Great Plains Institute, have collected examples of energy code language to require that buildings are prepared to charge EVs. This language will also ensure that new charging stations are eligible for federal and state funding. Outagamie County's Future Land Use map identifies areas that can be governed.

Wisconsin Environment and PNNL provide sample language for zoning and building codes that reduce ambiguity for installing public EV charging stations [24] [25]. These codes specify installation and operational standards for charging stations and establish requirements for new charging capacity. Outagamie County can use this as a tool to craft their own language that would best aid EV preparedness. These documents list examples of municipal code that have charging standards and requirements as examples for Outagamie County. Including some of this language in Outagamie County's Code of Ordinances would help ensure that new charging stations are eligible for federal and state funding, residents and transient drivers can rely on public charging infrastructure, and new construction will be equipped to install EV chargers when desired.

Growing the number of charging stations throughout the county will require a substantial amount of funding. For this reason, it is important for Outagamie to keep up with different federal and state funding programs. Both [Federal](#) and [Wisconsin](#) offices maintain a list of ongoing funds within their websites. The Wisconsin DOT site has timelines for funding allocation through NEVI and WEVI as well as links to details about each plan [36]. The US DOT lists funding opportunities for various low emissions fuel programs across several federal agencies with links to rules and procedures for receiving funding [37]. The US DOT also maintains a checklist of steps for local governments to take when implementing EV infrastructure projects, including project scoping, utility planning, installation, and operation [38].

Next, the jurisdiction level of Outagamie County differs from local cities and villages located within the county. The County does not have jurisdiction over the cities and villages to enforce zoning or any policy that may be introduced, thus making Outagamie like Dane County. This is why we propose to look at Dane County's Climate Action Plan. The Climate Action Plan was created with the input of the Dane County Council on Climate Change. This Council was made up of business leaders, representatives of the University of Wisconsin Nelson Institute, local utilities, equity and environmental advocates, as well as local government officials from across Dane County (see page 36) [33]. Having a diverse groups allows for many diverse stakeholder perspectives in the implementation process and makes the process more inclusive to the whole County. This would make implementation a collaborative effort, but not force policy on any village or city that is not under county jurisdiction. This Council would allow for recommendations to areas outside the County jurisdiction with supporting evidence about why a bigger investment in EV infrastructure is the future. But, since Outagamie County's land use is

different than Dane County it is also important to look at the Rural EV Implementation Toolkit from the Wisconsin Department of Transportation. This Toolkit provides resources to locate key stakeholders such as a local and regional planner partners such as Clean Cities and RENEW Wisconsin. Focus on working with electric utilities, a site host, and making a charging network all in efforts to increase EV adoption across the whole County. Finally, other possible contacts we recommend are the Public Service Commission for potential future grant programs and ensuring responsible utility services for implementation.

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