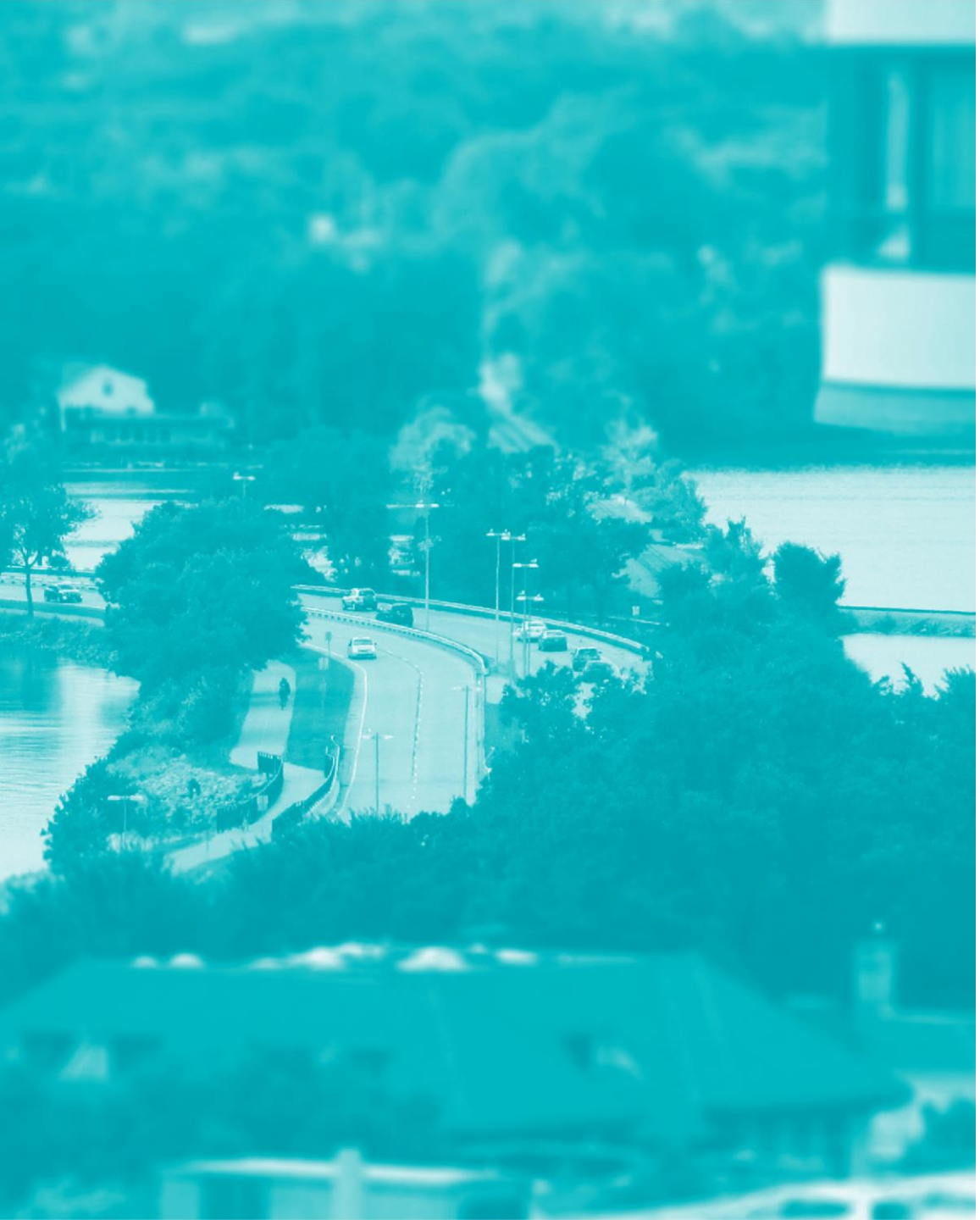

Expanding EV Charging Infrastructure in Dane County

A Joint Webinar of the Greater Madison MPO and Capital Area Regional Planning Commission

Speaker: Bill Holloway, Transportation Planner, Greater Madison MPO

March 21, 2024

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CAPITAL AREA rpc

Welcome & Housekeeping

1. This webinar is being recorded.
2. Everyone is muted.
3. The webinar supports **automated closed captions**. To start automated captions, select "Show Captions" from the menu bar at the bottom of your screen.
4. The presentation slides and recording will be sent out after the webinar.
5. Please put questions in the **Q&A**.
6. We love to see who's joining us—feel free to introduce yourself in the **chat**.

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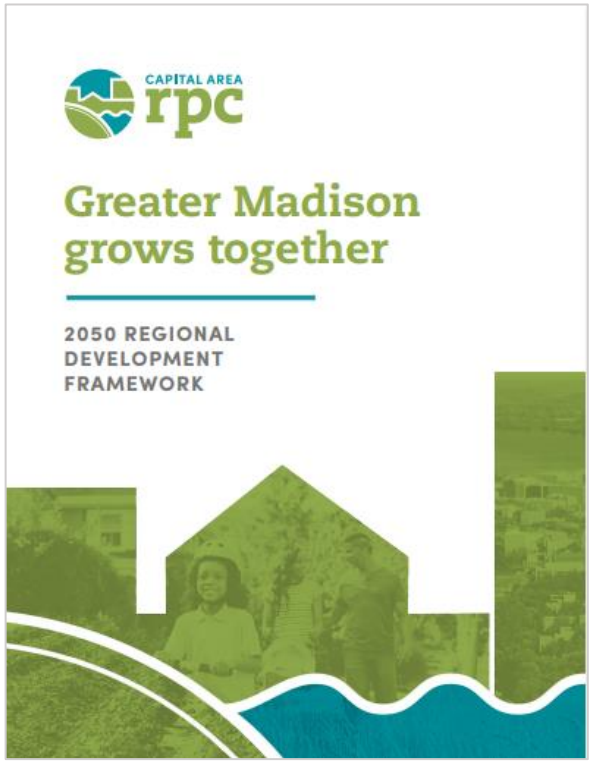
Poll 1

Who is with us today?

Greater Madison MPO

Capital Area Regional Planning Commission



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Poll 2

What are your most interested in learning about?

Dane County Electric Vehicle Charging Infrastructure Plan

Provides an overview of:

- Current and future trends in EV ownership and charging,
- Best practices to ensure that sufficient charging infrastructure for the increasing number of EVs in the county is available to everyone who needs it,
- The highest priority locations for different types of public charging infrastructure,
- Available grant-funding opportunities.

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Benefits of EVs

Public Health, Environment, & Economy

- Major reductions in lifecycle GHG and air pollutant emissions compared to internal combustion engine (ICE) vehicles.
- Lower fuel and operating costs compared to ICE vehicles.
  - Average fuel cost: EV = 3.66 ¢/mile
    ICE= 10.72 ¢/mile
  - Average operating cost: EV = 7.70 ¢/mile
    ICE= 9.55 ¢/mile
  - These lower costs are particularly important for ride-hail and delivery drivers, as well as rural residents who tend to drive longer distances than people in urban areas.

Charging Levels

Level One

Overview:

- Uses a standard 120-volt wall outlet.
- Typically residential.

Charge speed:

- 40-50 hours to charge a battery-electric vehicle (BEV) from empty and 5-6 hours to charge a plug-in hybrid-electric vehicle (PHEV) from empty.

Installation costs:

- $0 - $2k

Level Two

Overview:

- Requires 240-volt (residential) or 208-volt (commercial) service.
- Residential, workplace, public.

Charge speed:

- 4-10 hours to charge a BEV from empty and a PHEV from empty in 1-2 hours.

Installation costs:

- $700 - $2k (home)
- $2k - $10k (public)

Level Three

Overview:

- Requires 480-volt service.
- Typically public.

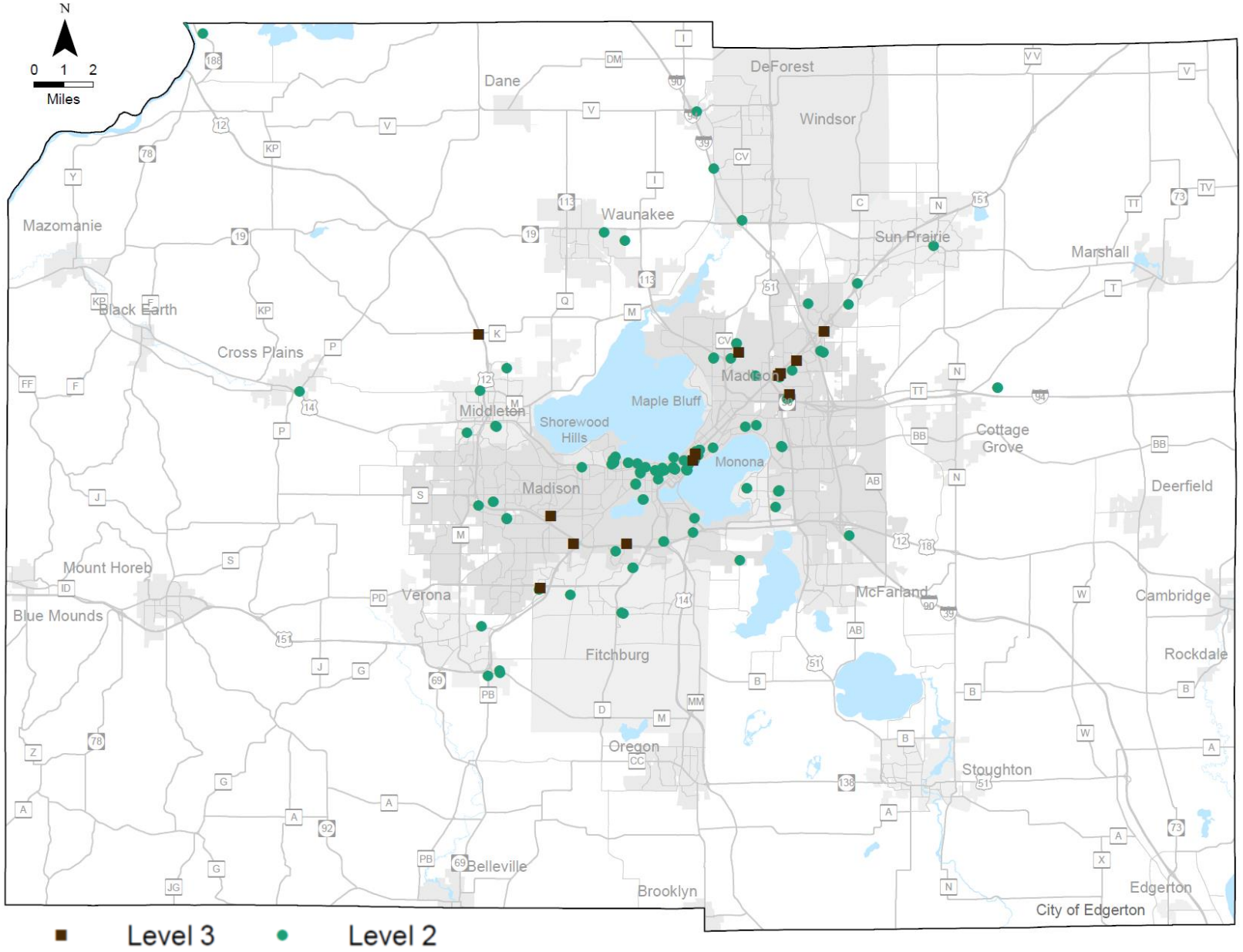
Charge speed:

- 20 minutes to 1 hour to charge a BEV to 80% from empty; most PHEVs currently on the market do not work with fast chargers.

Installation costs:

- $25k - $110k+

Public Charging Stations in Dane County



Charging Locations

Residences

- Level 1 and level 2.
- Nearly 90% of charging takes place at home.
- Current EV owners tend to have higher incomes and access to off-street parking where they can charge their vehicles.
- People living in multifamily housing and homes without off-street parking often lack the ability to charge their vehicles at home.

Employment Areas

- Normally level 2
- "Workplace charging" normally refers to charging at company-owned parking facilities for office workers. Employees with access these facilities normally have higher incomes.
- As more lower income workers , who may not be able to charge at home, adopt EVs, more charging will be needed in shared lots at shopping centers and elsewhere.

Corridors & Communities

- Level 2 and level 3.
- Charging infrastructure along corridors supports long distance travel in EVs.
- Community charging enables drivers to top off their charge as they take care of day-to-day needs, builds charging system resiliency, and offers a charging opportunity for people unable to charge at home.

Charging Needs in Dane County

How Many Chargers Do We Need?

- There were 3,397 registered EVs in Dane County in January 2023, 0.7% of all registered vehicles in the county.
- Projections suggest this will increase to:
  - 45,000-85,000 (13%-16% of registered vehicles) by 2030
  - 185,000-470,000, (32%-81% of registered vehicles) by 2050
- There are currently 55 DCFC ports and 229 level 2 ports available for public use in the county. US DOE recommends 3.4 level 3 ports (public) and 40 level 2 ports (public and workplace) per 1000 EVs.
- With 67 level 2 ports and 16 level 3 ports per 1000 EVs, Dane County currently exceeds these recommended minimums.
- Additional charging infrastructure will be required to meet growing demand.

Key Considerations

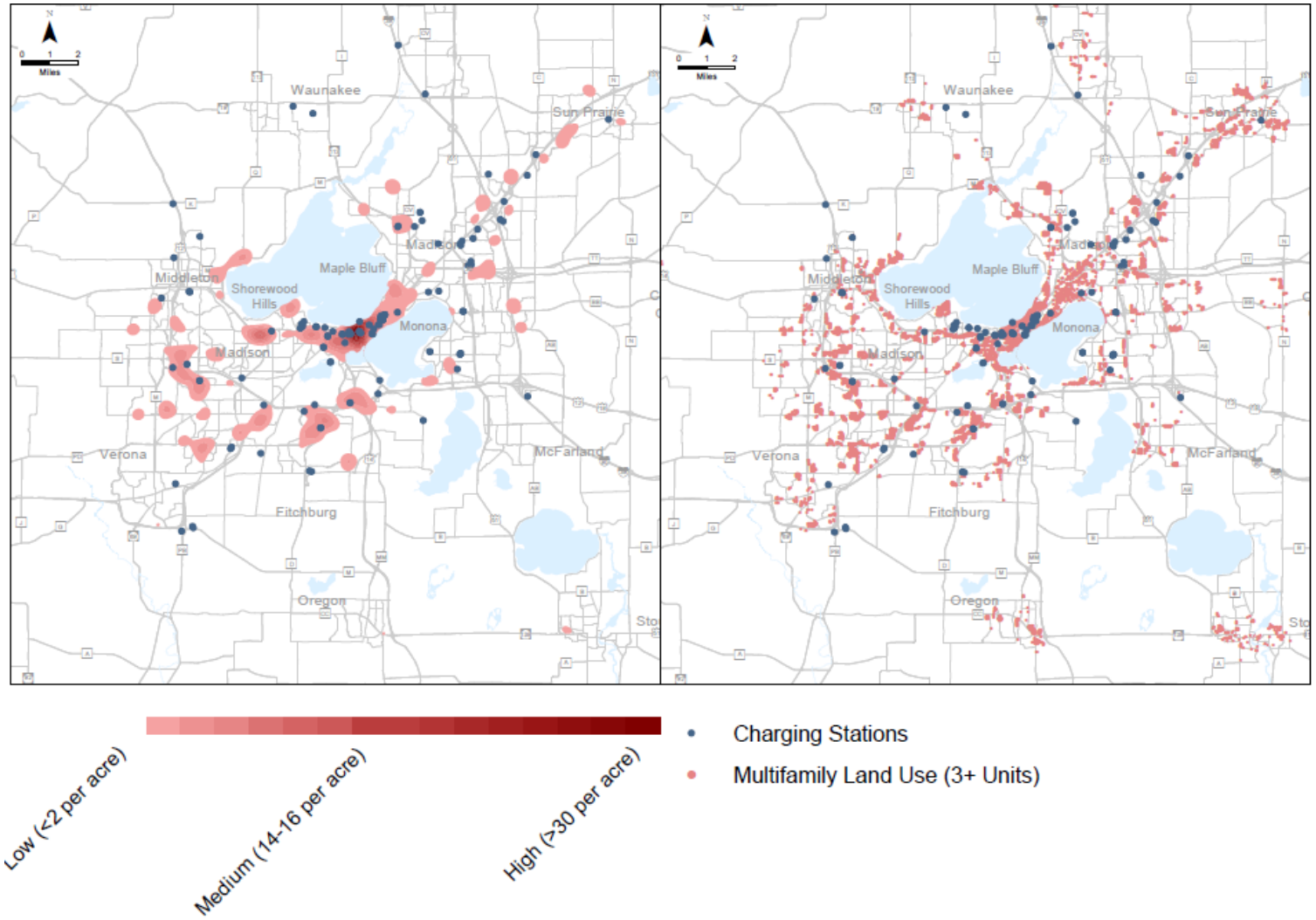
Many Dane County households lack a convenient place to charge an EV at home.

About half of Dane County households live in owner-occupied single-family homes.

People living in multifamily and rented homes, often lack a place to charge an EV at home.

Multifamily Housing Density (2016)

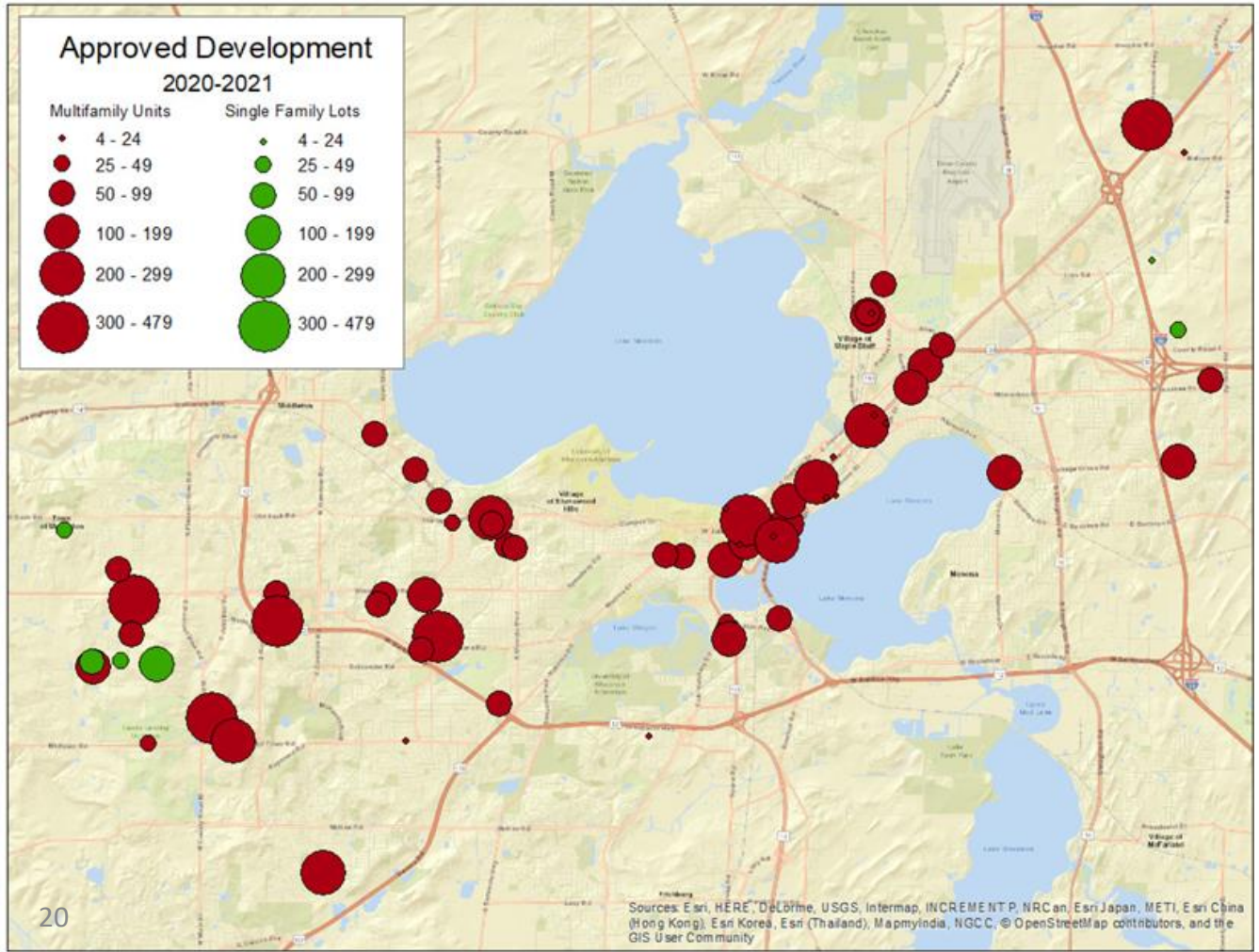
Multifamily Housing Land Use (2016)



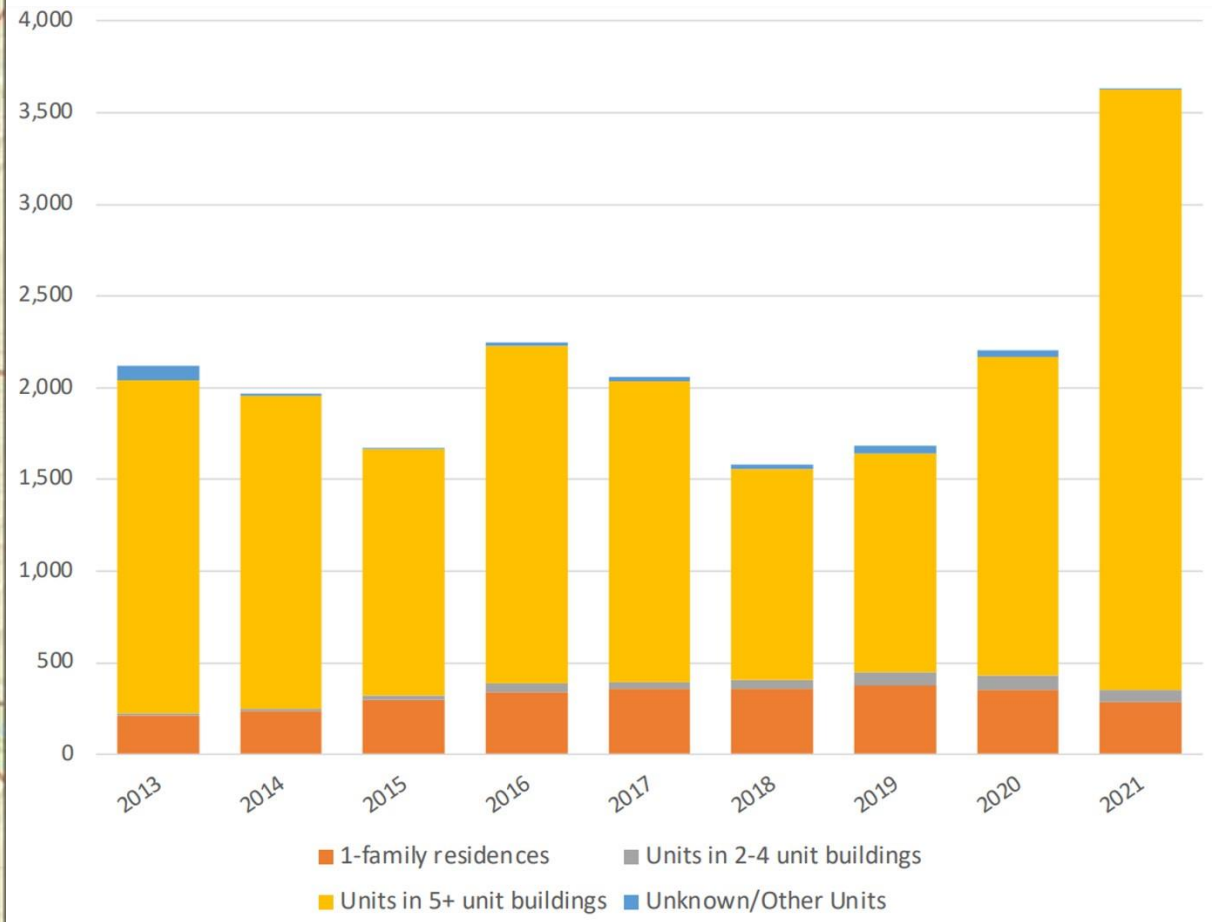
Key Considerations

Many Dane County households lack a convenient place to charge an EV at home.

Approved Housing Development, 2020-2021 (City of Madison)



Approved Housing Development, 2013-2021 (City of Madison)



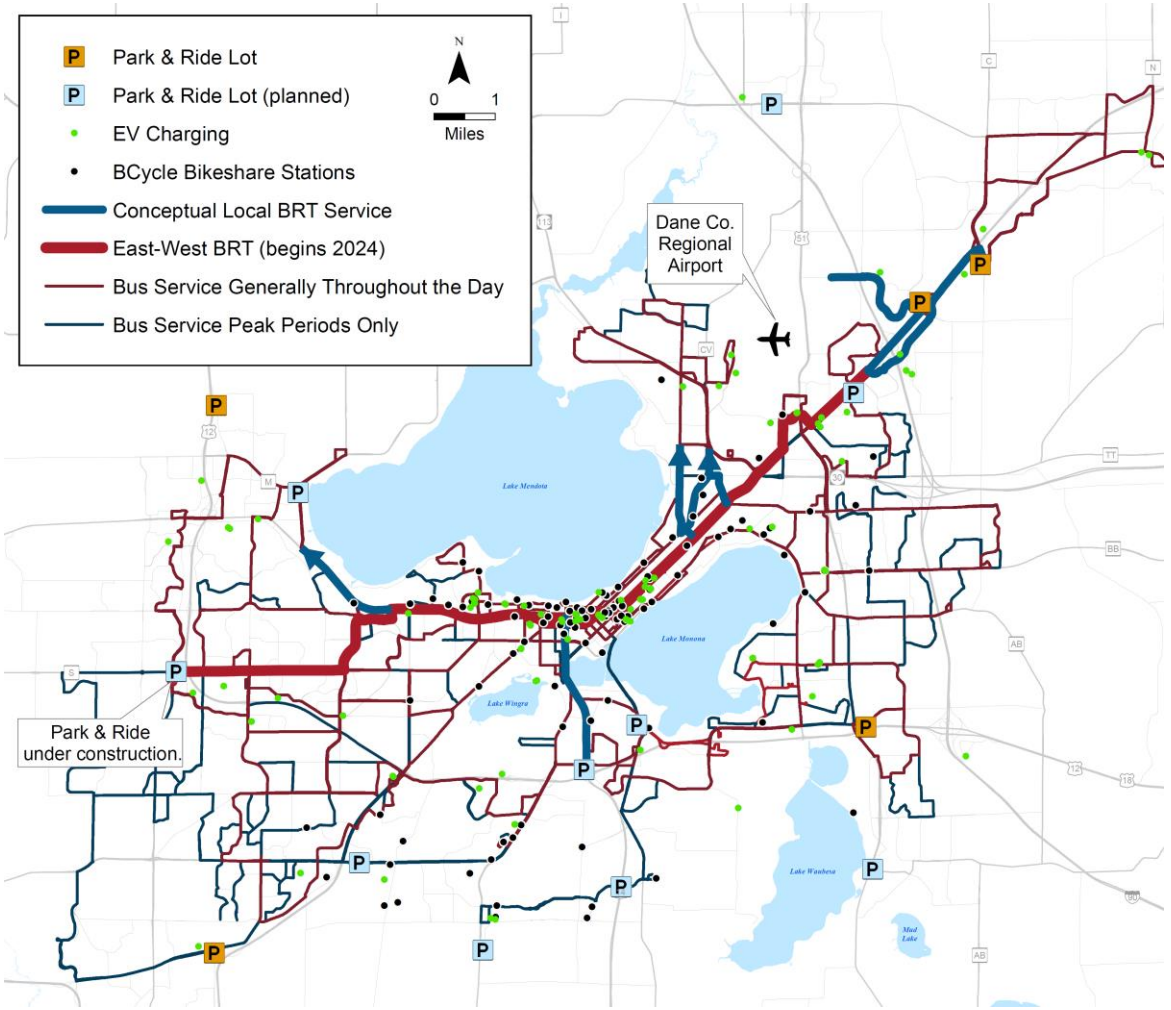
Source: 2022 City of Madison Housing Snapshot Report, https://www.cityofmadison.com/dpced/community-development/documents/2022%20Housing%20Snapshot%20Report%20-%208_4_22.pdf

Key Considerations

Charging infrastructure at other locations can help people unable to charge at home.

Level 2 charging infrastructure at locations where people park for extended periods provides affordable charging for people who cannot charge at home.

- Worksites
- Multimodal hubs
- Other destinations

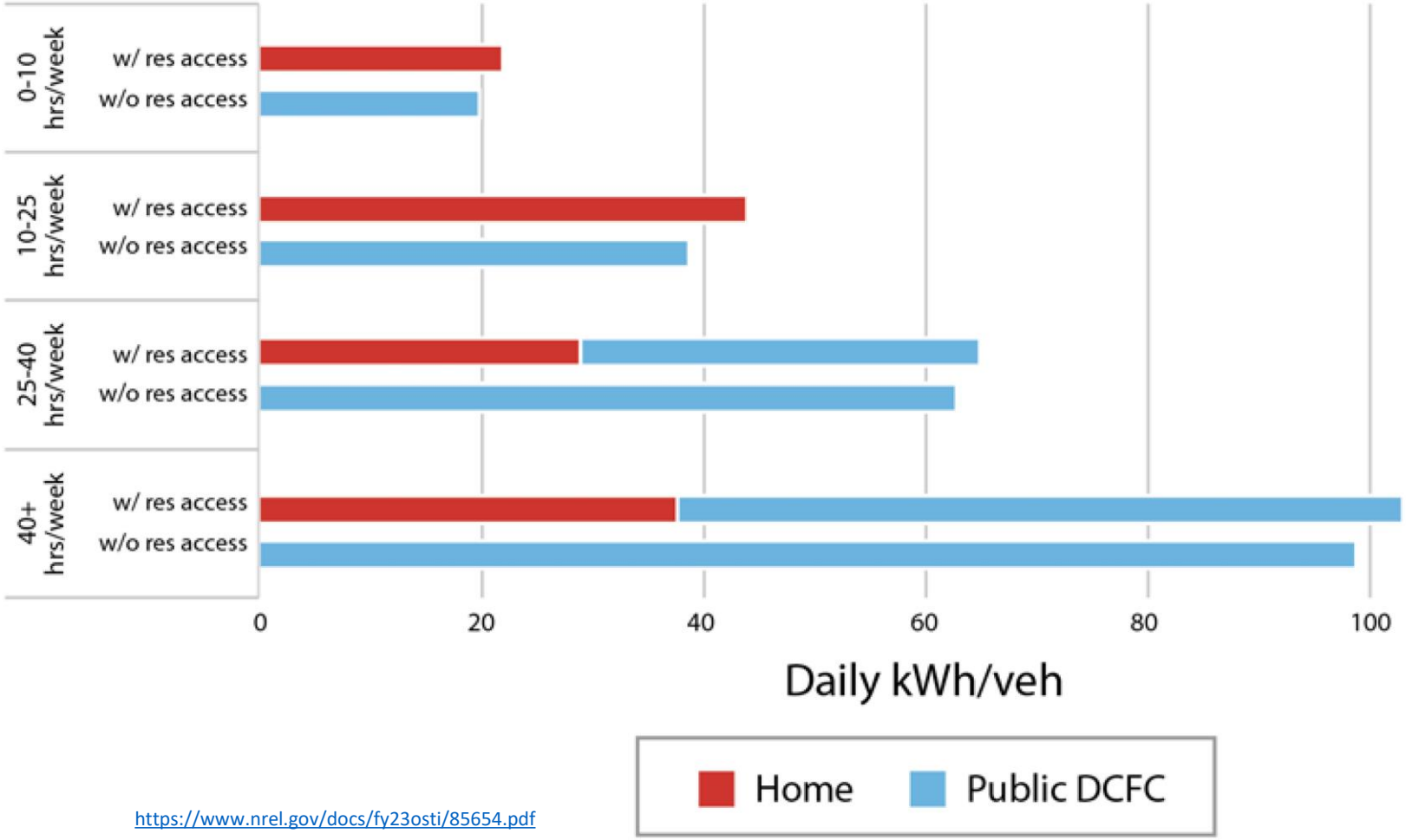


Key Considerations

Level 3 charging is critical to long-distance travelers, as well as local ride-hail and delivery drivers.

Ride-hail drivers are transitioning to EVs rapidly.

By 2030 they are expected to account for 20% of level 3 charging demand in the U.S.



https://www.nrel.gov/docs/fy23osti/85654.pdf

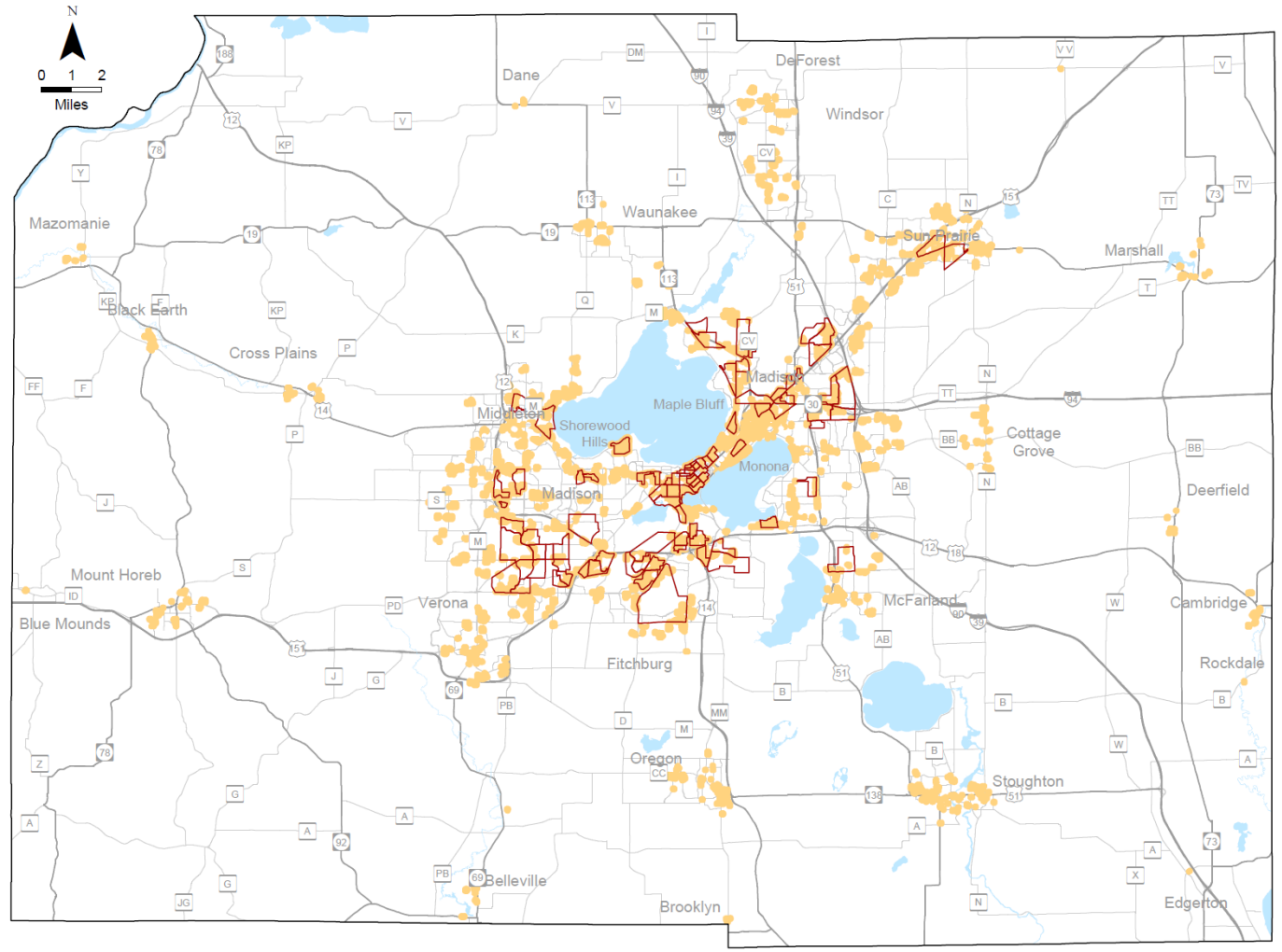
Primary Needs

Level 2 chargers serving:

- People without residential access to charging.

Level 3 chargers serving:

- Long-distance travelers.
- Ride-hailing and delivery drivers.



EJ Priority Areas

Multifamily EV Charging Zone*

*Area within 0.1 miles of a multifamily residential parcel that is more than 0.1 miles from an existing public EV charging facility.

Secondary Needs

- Worksites where employees leave their vehicles parked during their shift
- Multimodal hubs where drivers can leave their EVs charging as they travel to work or elsewhere by alternate modes
- Destinations where drivers park their vehicles while they attend to day-to-day activities
- Rural communities where there are few nearby charging locations

Priority Charging Locations

Level 2 – Priority Locations

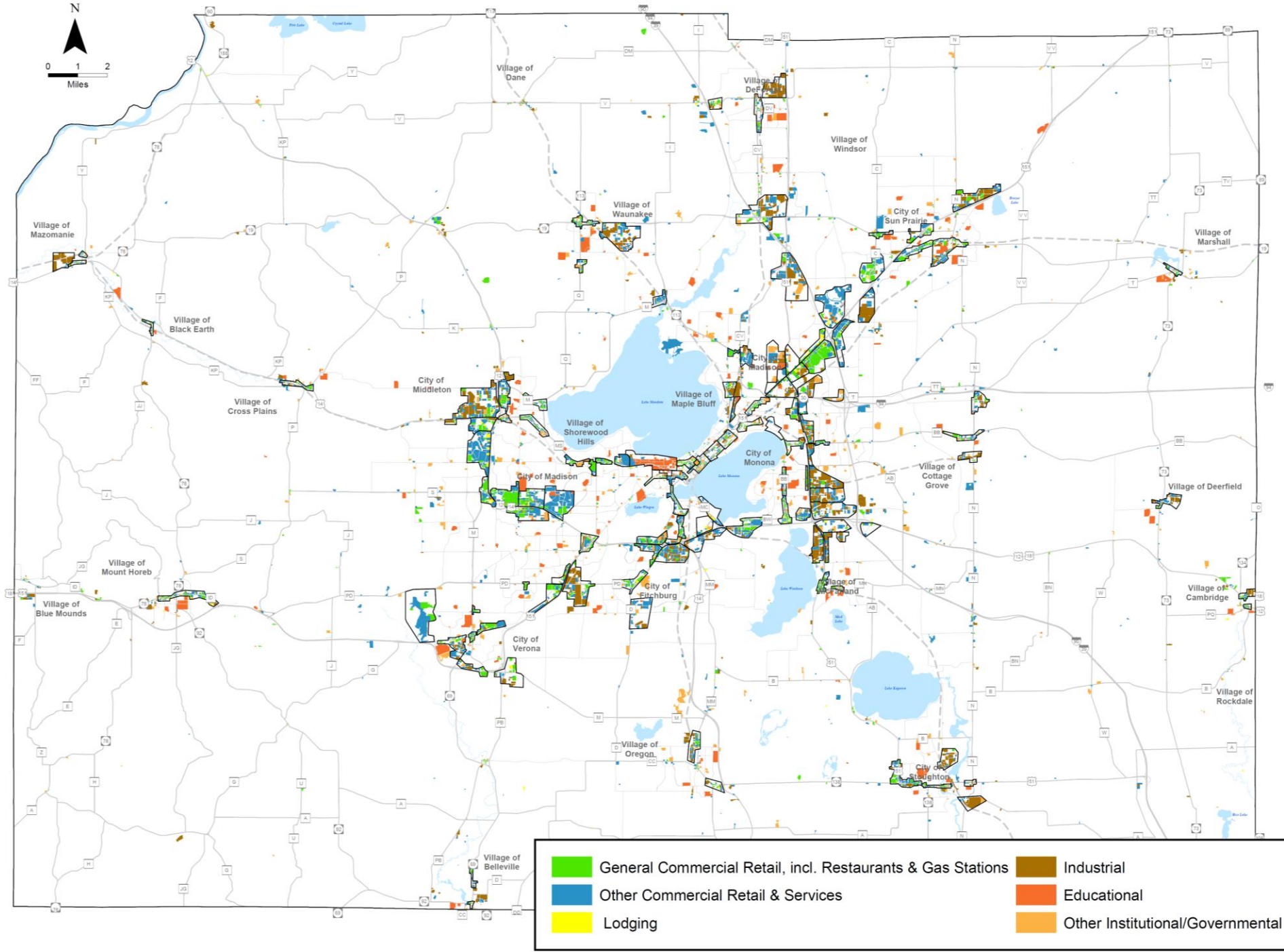
- Residential areas, where residents cannot charge their vehicles while they are home
- Employment areas, where employees park for the length of their workday

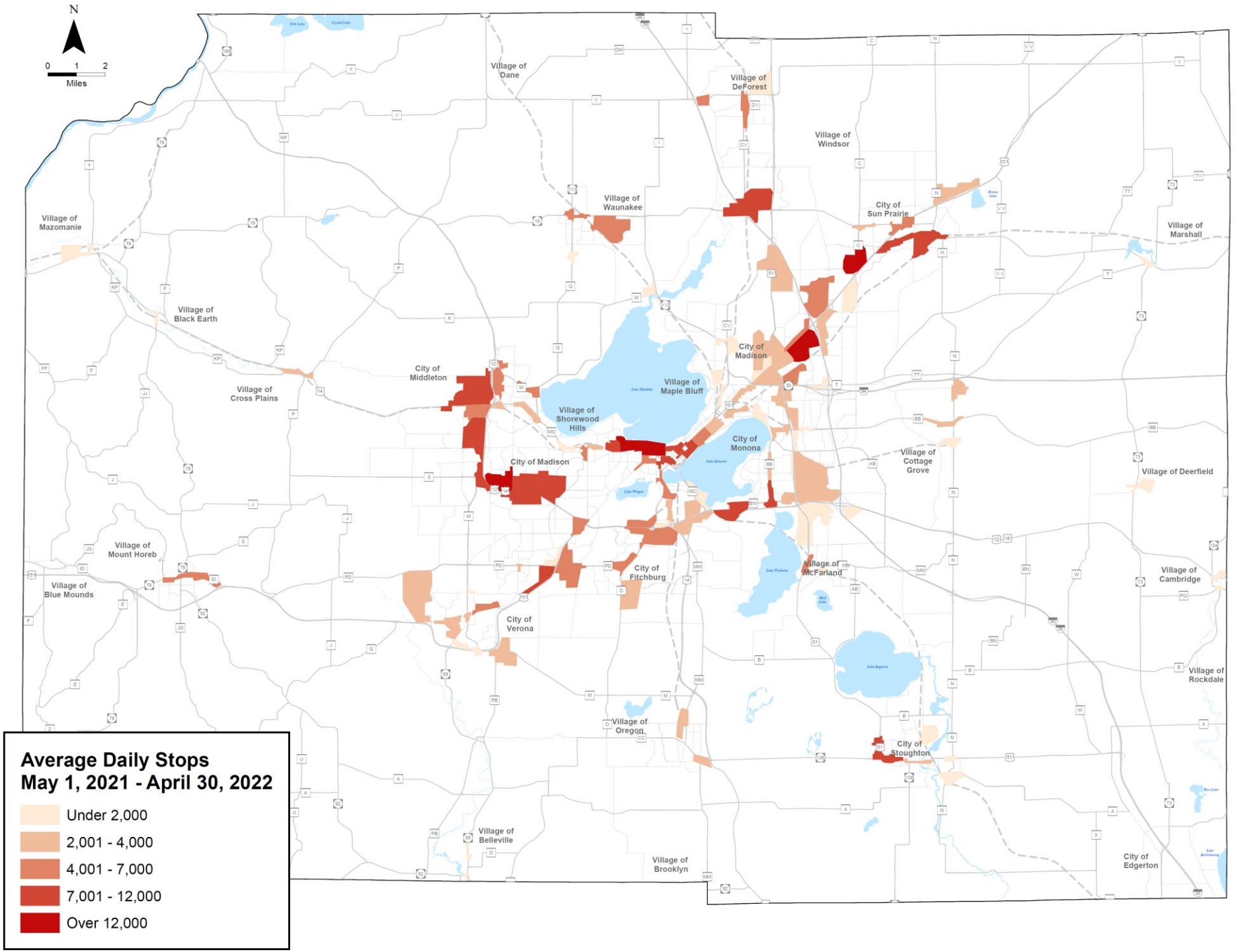
Level 3 – Zone Analysis

Identifying Priority Locations for Level 3 Charging Infrastructure

Key Measures-

- Stops per Day
- Trip Distance
- Pass-Thru Traffic
- Dwell Time
- Location

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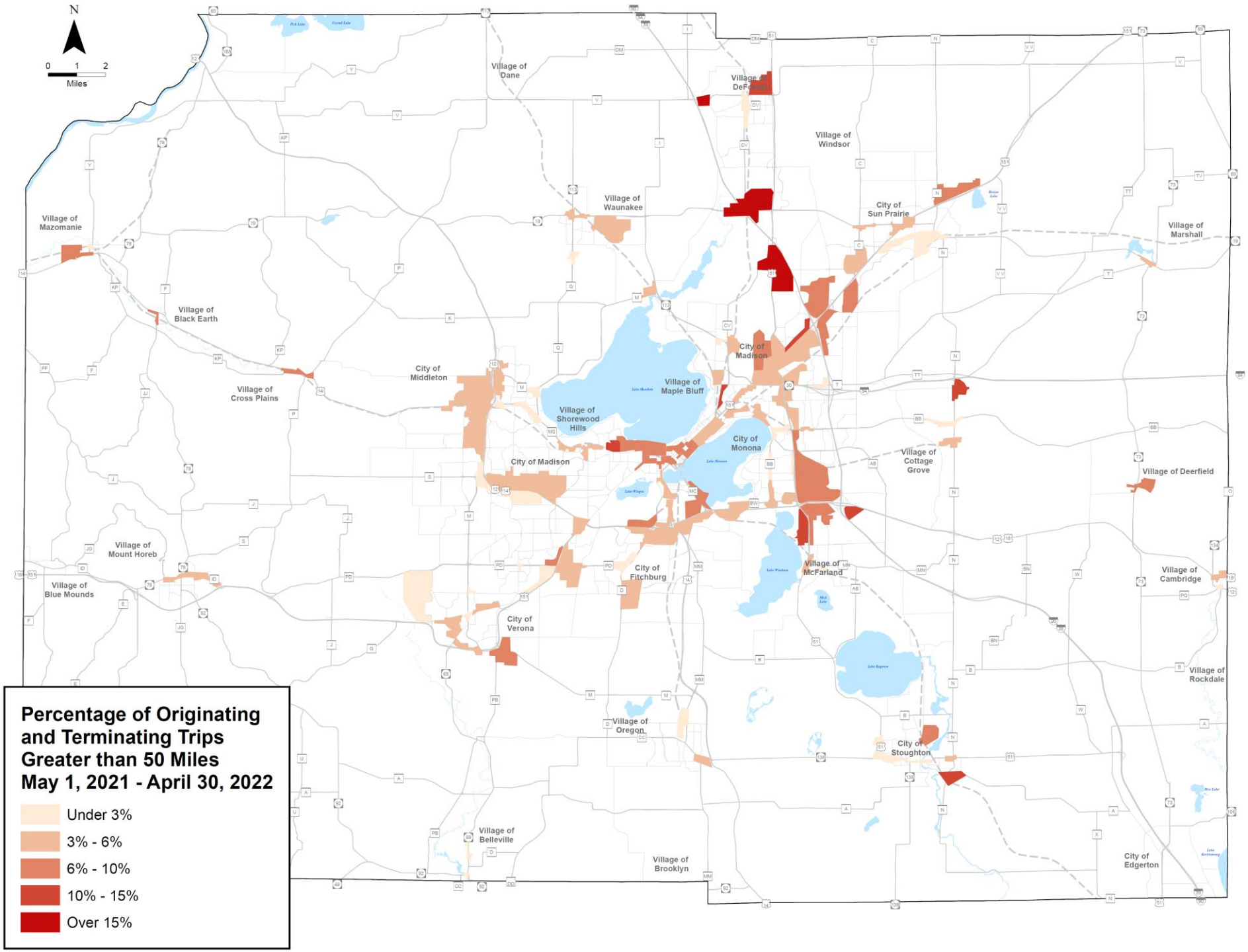
Miles
Village of Dane
Village of DeForest
Village of Windsor
Village of Waunakee
City of Sun Prairie
Village of Marshall
Village of Mazomanie
Village of Black Earth
City of Middleton
Village of Cross Plains
City of Madison
Village of Maple Bluff
Village of Shorewood Hills
City of Monona
Village of Cottage Grove
Village of Deerfield
Village of Mount Horeb
Village of Blue Mounds
City of Fitchburg
Village of McFarland
Village of Cambridge
City of Verona
Village of Rockdale
Village of Oregon
City of Stoughton
Village of Belleville
Village of Brooklyn
City of Edgerton
Average Daily Stops
May 1, 2021 - April 30, 2022
Under 2,000
2,001 - 4,000
4,001 - 7,000
7,001 - 12,000
Over 12,000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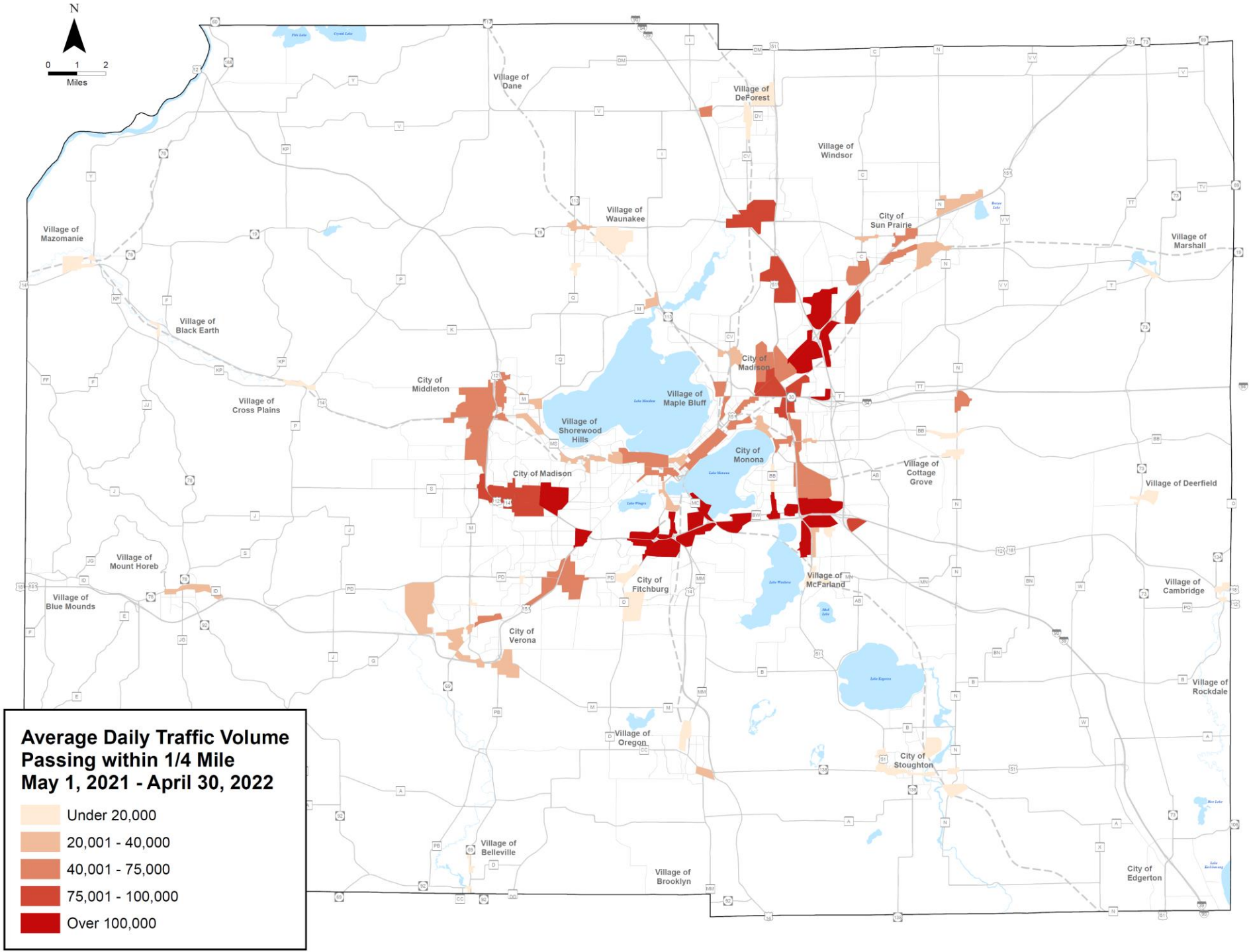
Village of McFarland
Village of Cambridge
City of Verona
Village of Rockdale
Village of Oregon
City of Stoughton
Village of Belleville
Village of Brooklyn
City of Edgerton
Percentage of Originating and Terminating Trips Greater than 50 Miles
May 1, 2021 - April 30, 2022
Under 3%
3% - 6%
6% - 10%
10% - 15%
Over 15%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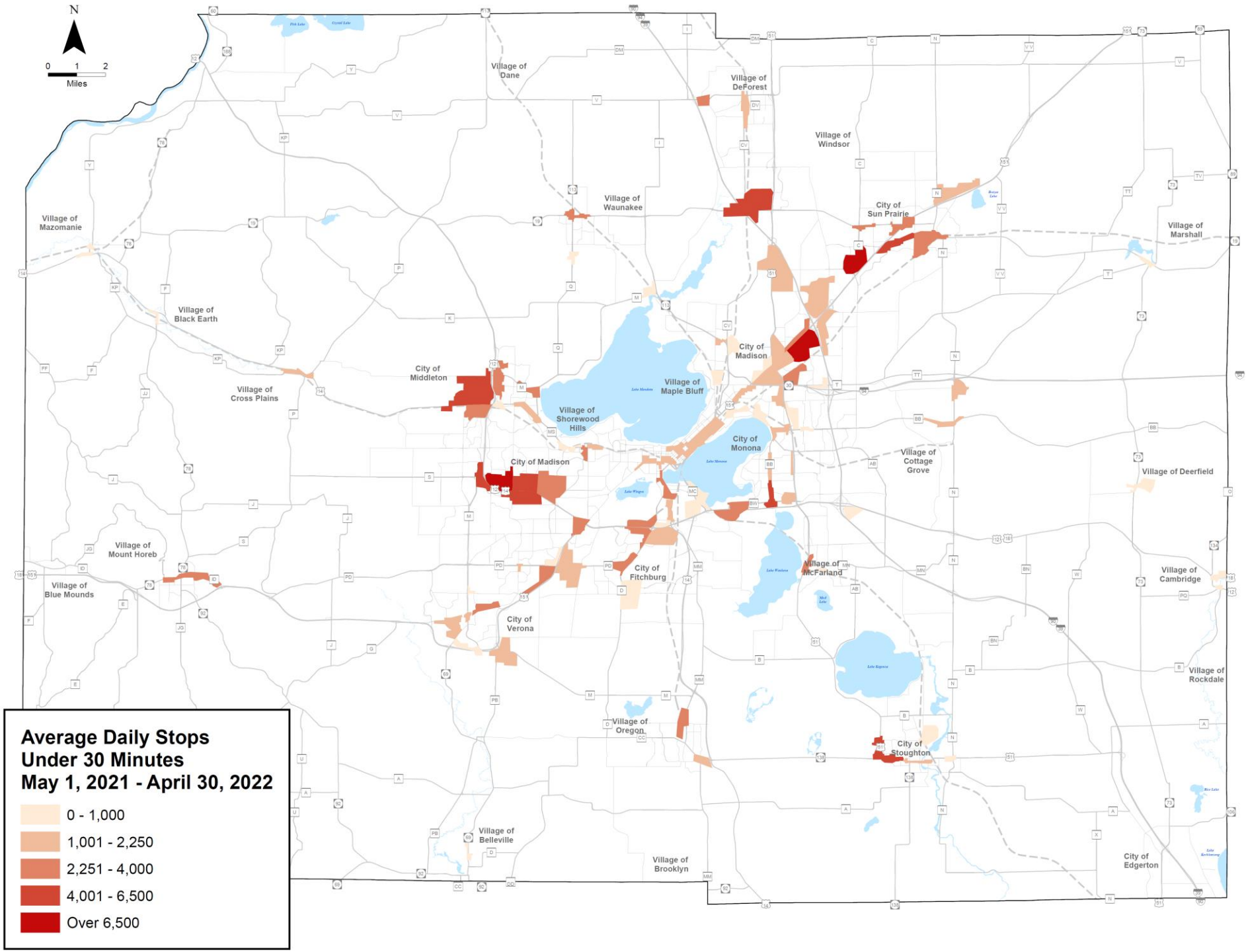
Village of McFarland
Village of Cambridge
City of Verona
Village of Rockdale
Village of Oregon
City of Stoughton
Village of Belleville
Village of Brooklyn
City of Edgerton
Average Daily Traffic Volume
Passing within 1/4 Mile
May 1, 2021 - April 30, 2022
Under 20,000
20,001 - 40,000
40,001 - 75,000
75,001 - 100,000
Over 100,000


N
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Village of Dane
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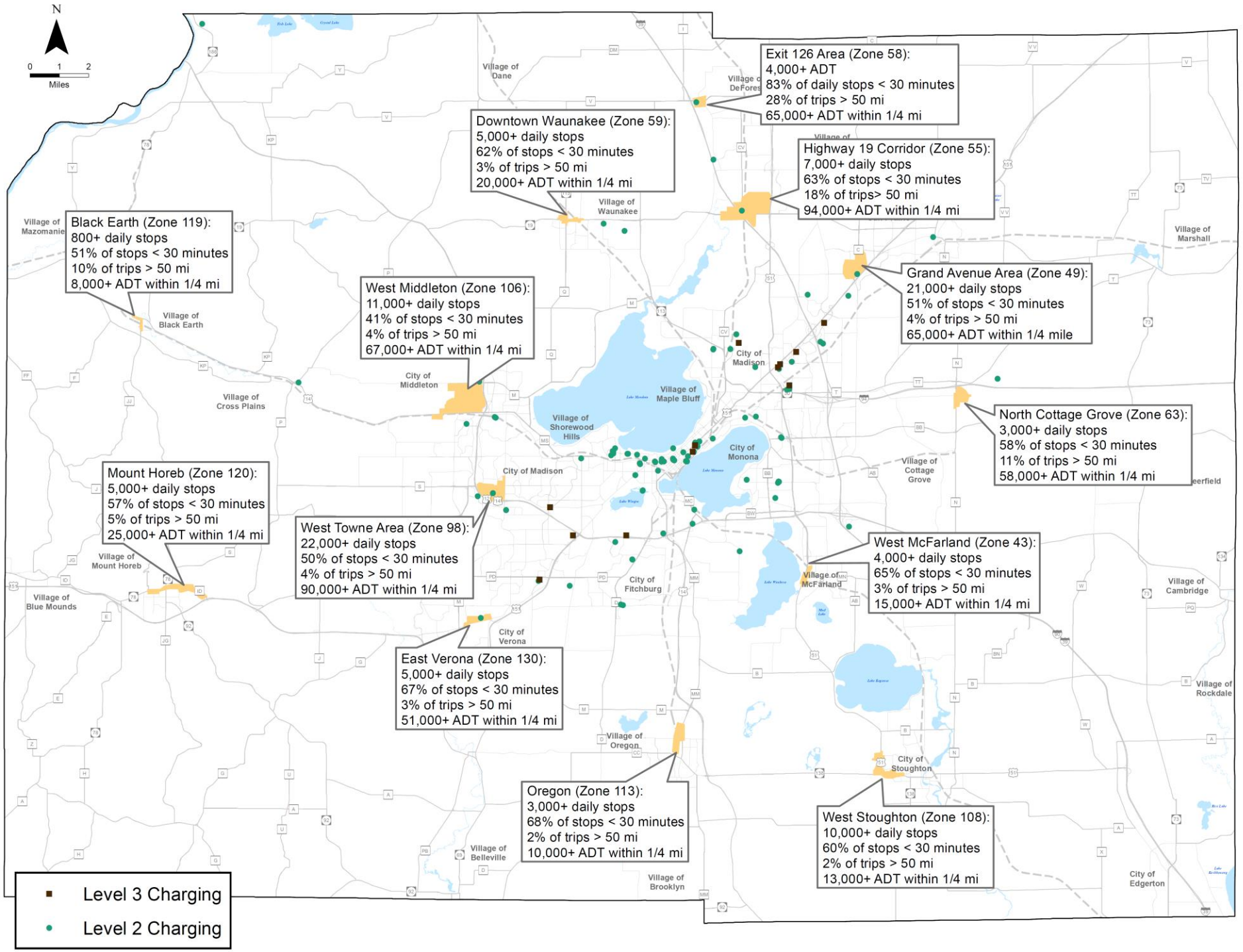
Village of Cambridge
City of Verona
Village of Rockdale
Village of Oregon
City of Stoughton
Village of Belleville
Village of Brooklyn
City of Edgerton
Average Daily Stops
Under 30 Minutes
May 1, 2021 - April 30, 2022
0 - 1,000
1,001 - 2,250
2,251 - 4,000
4,001 - 6,500
Over 6,500

Level 3 – Priority Locations



EV Charging Infrastructure

Networking

Charging networks may provide a wide variety of services related to building and operation charging stations.

Most commonly:

- Processing payments
- Providing site-owners with usage data
- Providing customer support.

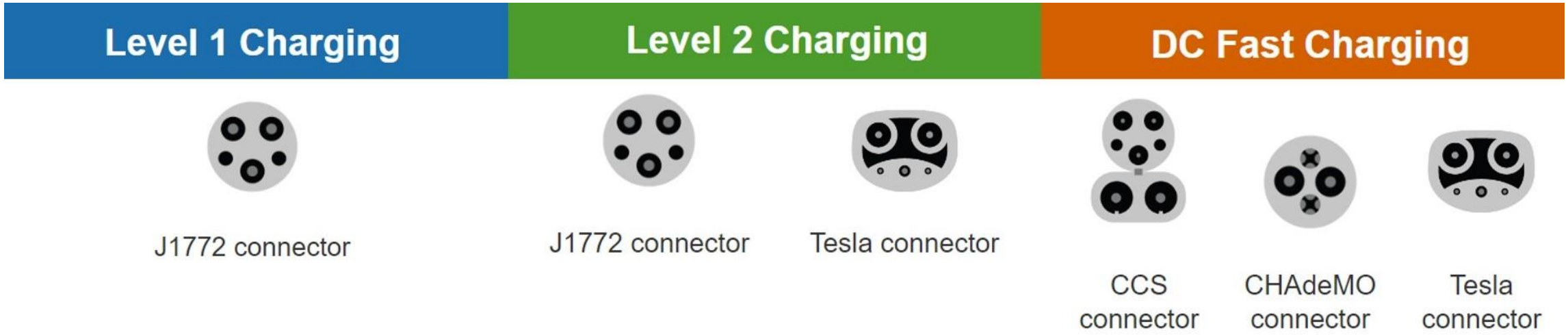
Maintenance

- Connectivity issues
- Wear and tear
- Vandalism/theft
- Design issues (e.g., cables too short)
- Shortage of replacement parts
- Lack of maintenance workers

Source: Kbb.com

Plug Types

For Different Charging Levels



Source: Alternative Fuels Data Center

Installation

The biggest drivers of the cost of installing public EV charging infrastructure are:

- The power rating of the chargers.
- The location of the chargers within the site.
- The existing grid power capacity at the site.

Source: Chargepoint.com

Ownership Model

- Supply and Operate
  - The contractor supplies the charging equipment and ensures that it is up and running before passing some operational and maintenance obligations to the site owner.
- Infrastructure as a Service
  - The Site owner rents charging infrastructure from the contractor who is responsible for installation and continuing maintenance and operational responsibilities.
- Own and Operate
  - The client provides space for the provider to install and operate charging stations. The provider handles operations and maintenance, and keeps the revenue generated from charging fees.
- Charging as a Service
  - Similar to "Own and Operate" arrangements but the site owner may receive a portion of charging station revenue.

Opportunities for Cost Reduction

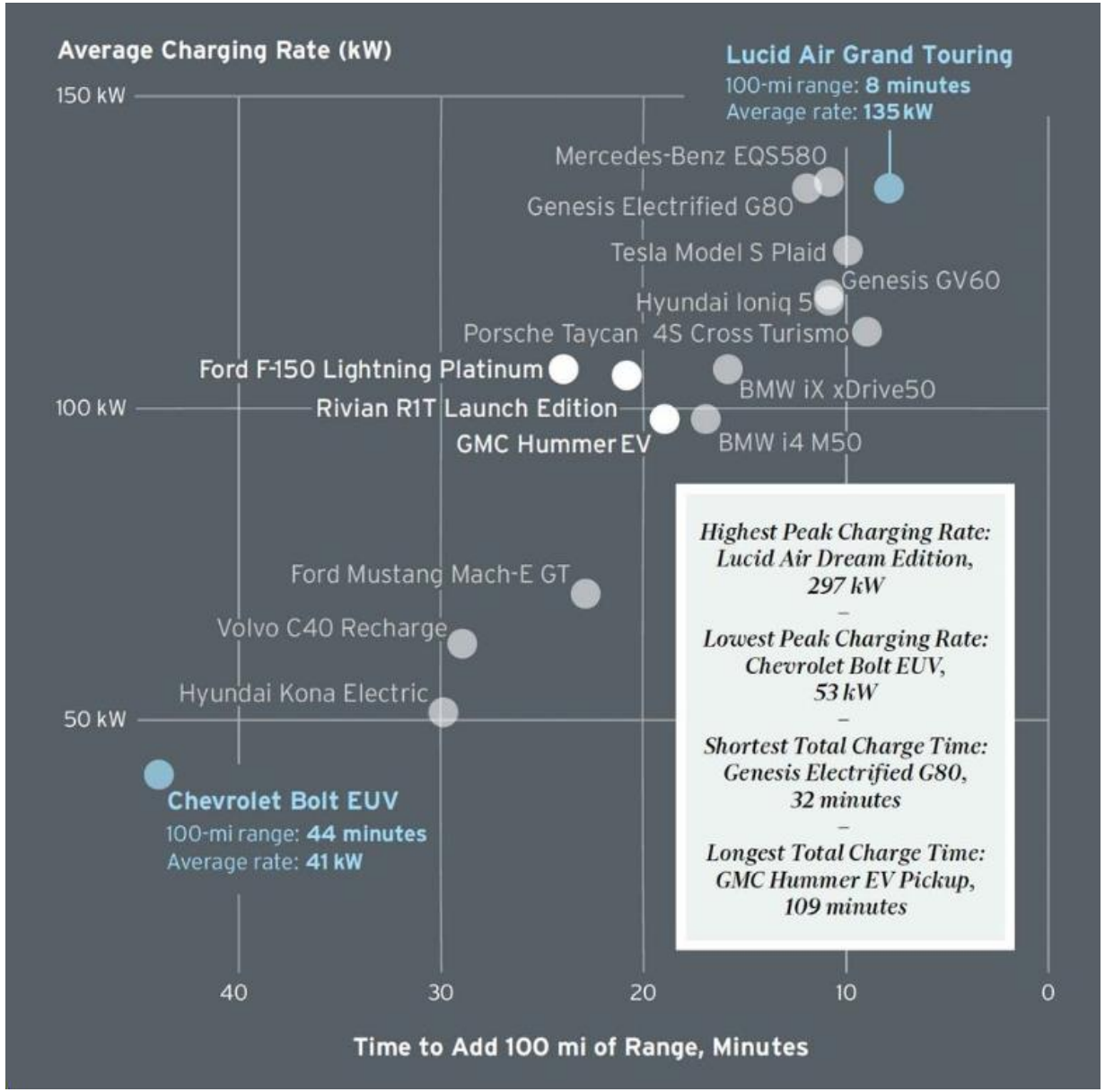
- Procure charging infrastructure in larger volumes.
- Consolidate charging sites.
- Carefully consider conduit runs.
- Plan for future infrastructure upgrades.
- Install charging infrastructure during construction.

Source: Perlo.biz

Charging Fees

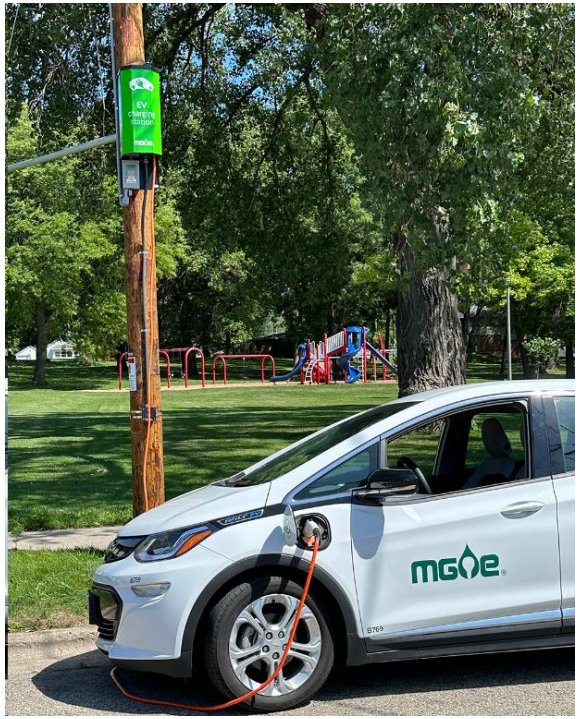
Fees based on time are inequitable because drivers pay much different prices for the same amount of power received.

Among new vehicles, the time required to add 100 miles of range varies from 8 to 44 minutes.



Source: Car and Driver

Curbside Charging



Source: MGE

Pole-Mounted

- 55-70% lower cost relative to ground-mounted chargers.
- Can be relocated fairly easily.
- Can be mounted on streetlight or utility poles.
  - Utility poles usually best because of higher electrical capacity.

Free-Standing

- Not dependent on streetlight/utility pole locations.
- Less coordination with utilities and others already using poles.
- Electricity can be supplied from adjacent buildings.

Source: Itselectric

Policy and Planning Tools

Comprehensive Plans

- Foundation of local transportation and land use decision making.
- Identifying EVs as a part of the local transportation strategy provides a basis for zoning and other local ordinances to be tailored to encourage the development of EV charging infrastructure.

Zoning

- Where charging stations are permitted, by right or conditionally.
- Charging power levels allowed in different locations.
- Requirements that parking areas be equipped with EV charging infrastructure or be EV ready.
- Site design guidelines—signage, lighting, accessibility, etc.
- Incentives for installation—density bonuses, relaxed parking minimums, etc.

City of Madison Zoning Requirements for EV-Ready and EV-Installed Parking Spaces

ELECTRIC VEHICLE CHARGING STATION REQUIREMENTS				
	RESIDENTIAL Spaces		NON-RESIDENTIAL Spaces	
YEARS	EV Ready	EV Installed	EV Ready	EV Installed
2021-2025	10%	2%	10%	1%
2026-2030	20%	4%	20%	2%
2031-2035	30%	6%	30%	3%
2036-2040	40%	8%	40%	4%
2041+	50%	10%	50%	5%
Application:	Where six or more parking spaces are being provided for residential uses		Where parking is being provided for certain uses where people park in excess of six hours	

ACCESSIBLE STATIONS	
Number of EV Installed Spaces Required	Minimum Accessible EV Installed Spaces
0-2	0
3-50	1
51-100	2
101+	3 +1 for each additional 50 spaces

Source: https://www.cityofmadison.com/development-services-center/documents/ParkingLotSitePlanApprovalPacket.pdf

Parking Regulations and Enforcement

- Parking restrictions and penalties for EV-designated spaces.
- EV parking space design and location.
- Legalizing the use of extension cords across sidewalks for level 1 charging.

Utility Driven Programs and Policies

Electric Utilities support the transition to EVs through a variety of programs:

- Promotional efforts to encourage customers to transition to EVs.
- Operating EV charging stations.
- Leasing or offering rebates for level 2 charger installations at home.
- Managed charging.

Funding Sources

The Role of Communities

Most of the funding for new charging infrastructure will come from individuals and the private sector.

Primary role of communities going forward:

- Remove unnecessary barriers to installation.
- If necessary, revise policies to promote charging in high priority locations.

Federal Funding Sources for EV Infrastructure

Three Programs included in the Bipartisan Infrastructure Law (BIL)

- National Electric Vehicle Infrastructure (NEVI) Program ($5 billion)
  - Primary goal is to ensure adequate charging capacity on key highway corridors (AFCs). The state will need about 60 new stations to ensure no more than a 50-mile gap between stations along AFCs.
  - Because there is a qualifying station at the Walmart on Nakoosa Rd, most of Dane County is not eligible for NEVI funding.
- Carbon Reduction Program (CRP) ($6.4 billion)
  - Although federal guidelines list EV charging infrastructure as an eligible expense, Wisconsin's Joint Finance Committee placed additional restrictions on its use in the state. EV charging infrastructure is currently not allowed.
- Charging and Fueling Infrastructure (CFI) Grant Program ($2.5 billion)

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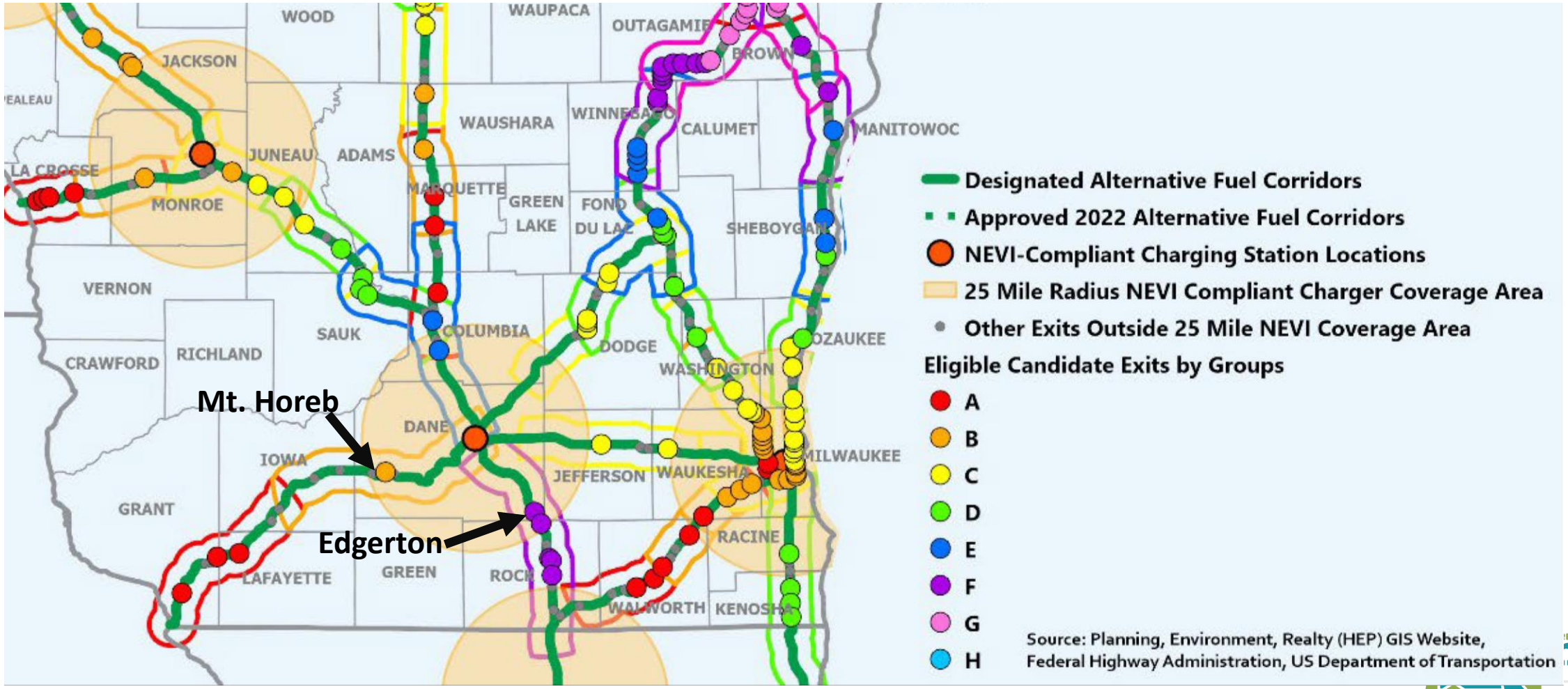
Wisconsin Full NEVI-Compliant EV Charging Station Build-Out Coverage Map



51

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52

Federal Funding Sources for EV Infrastructure

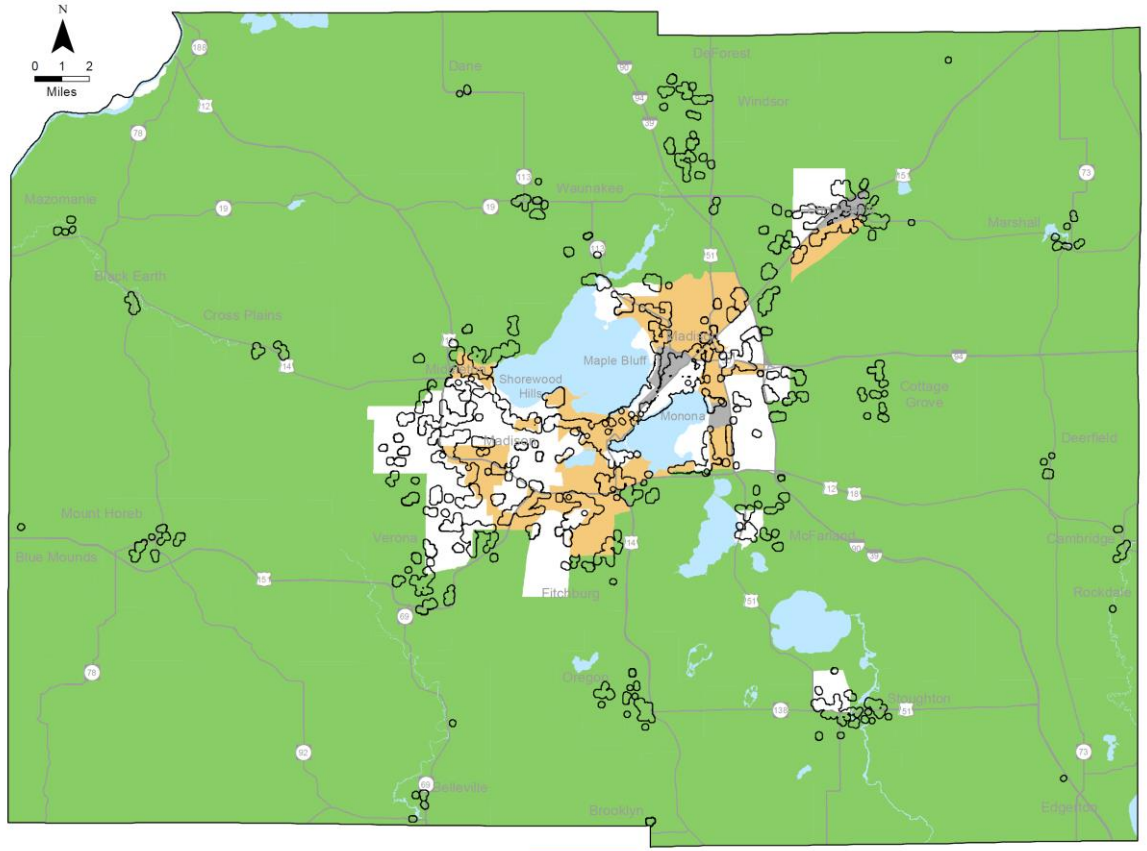
Inflation Reduction Act (IRA) Programs

- Alternative Fuel Infrastructure Tax Credit
  - Business tax credit of 30% of the cost of charging station installation (max. $100,000) in rural or low-income census tracts.
  - Individuals can receive a tax credit of up to 30% of the cost of EV charging infrastructure at home (max. $1000).
- Green and Resilient Retrofit Program ($1.47 billion)
- Neighborhood Access and Equity Grant Program ($3.2 billion)
- Climate Pollution Reduction Grant Program ($4.9 billion)
- Greenhouse Gas Reduction Fund ($27 billion)
- Environmental and Climate Justice Program ($3 billion)

53

Alternative Fuel Infrastructure Tax Credit Eligibility Areas

Near Multifamily Housing



Multifamily EV Charging Zone*

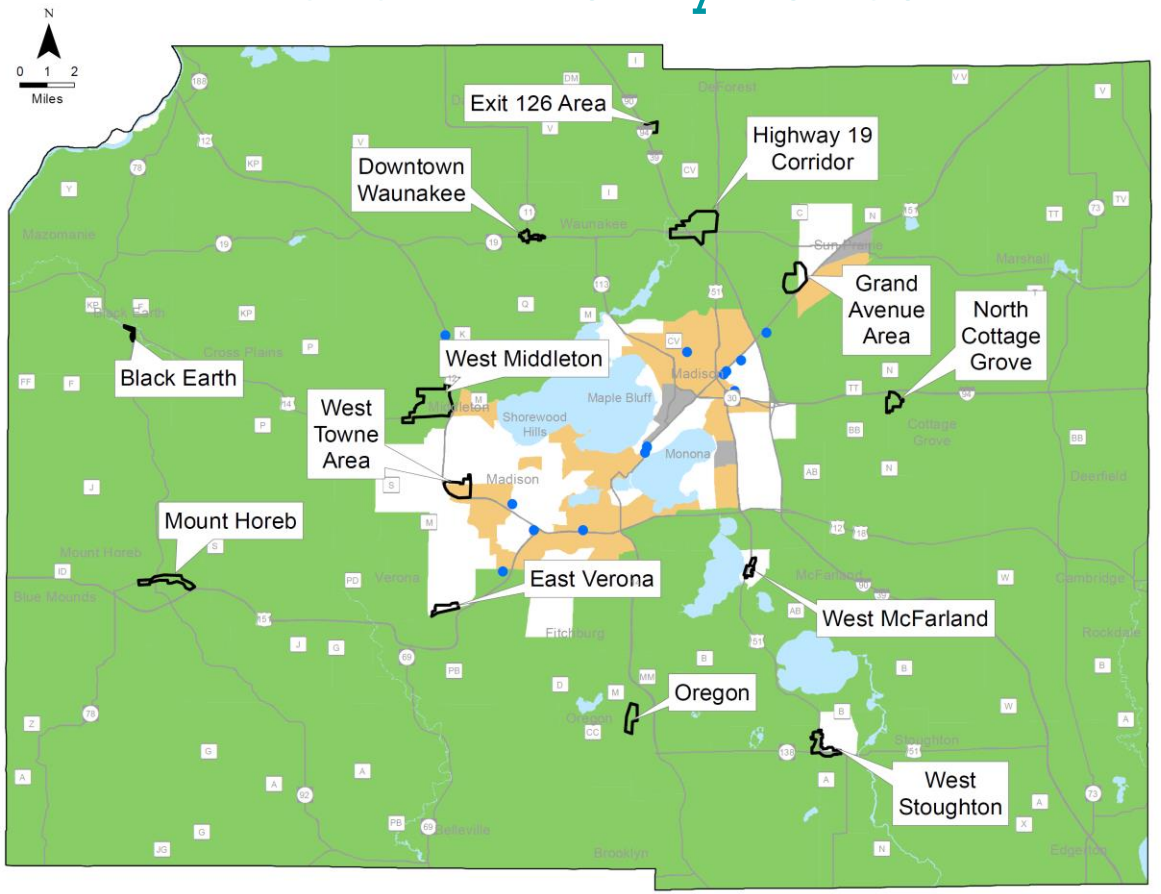
Eligible through 2029 (Low-Income)

Eligible through 2030 (Non-Urban)

Eligible through 2024 (Low-Income)

*Area within 0.1 miles of a multifamily residential parcel that is more than 0.1 miles from an existing public EV charging facility.

Level 3 Priority Zones



Public Level 3 Charging Stations

Eligible through 2029 (Low-Income)

Eligible through 2030 (Non-Urban)

Eligible through 2024 (Low-Income)

Thank You!