



COMMONWEALTH OF MASSACHUSETTS  
ELECTRIC VEHICLE INFRASTRUCTURE  
COORDINATING COUNCIL

**PRELIMINARY FINDINGS ON  
THE DRIVER EXPERIENCE**

JUNE 22, 2023

# CONSUMER PAIN POINTS

## Operations

- Chargers are sometimes down
- Some chargers do not have a consumer display to know you're charging
- Chargers are not permitted or regulated, which could lead to consumer safety issues
- There is confusion over responsibility for ongoing operations and maintenance
- ChargePoint service providers may offer service contracts, but avoid providing service

## Timing

- Speed of charging varies—wait time not always clear
- Charge times can also be affected by whether more than one vehicle is connected to the same charging unit

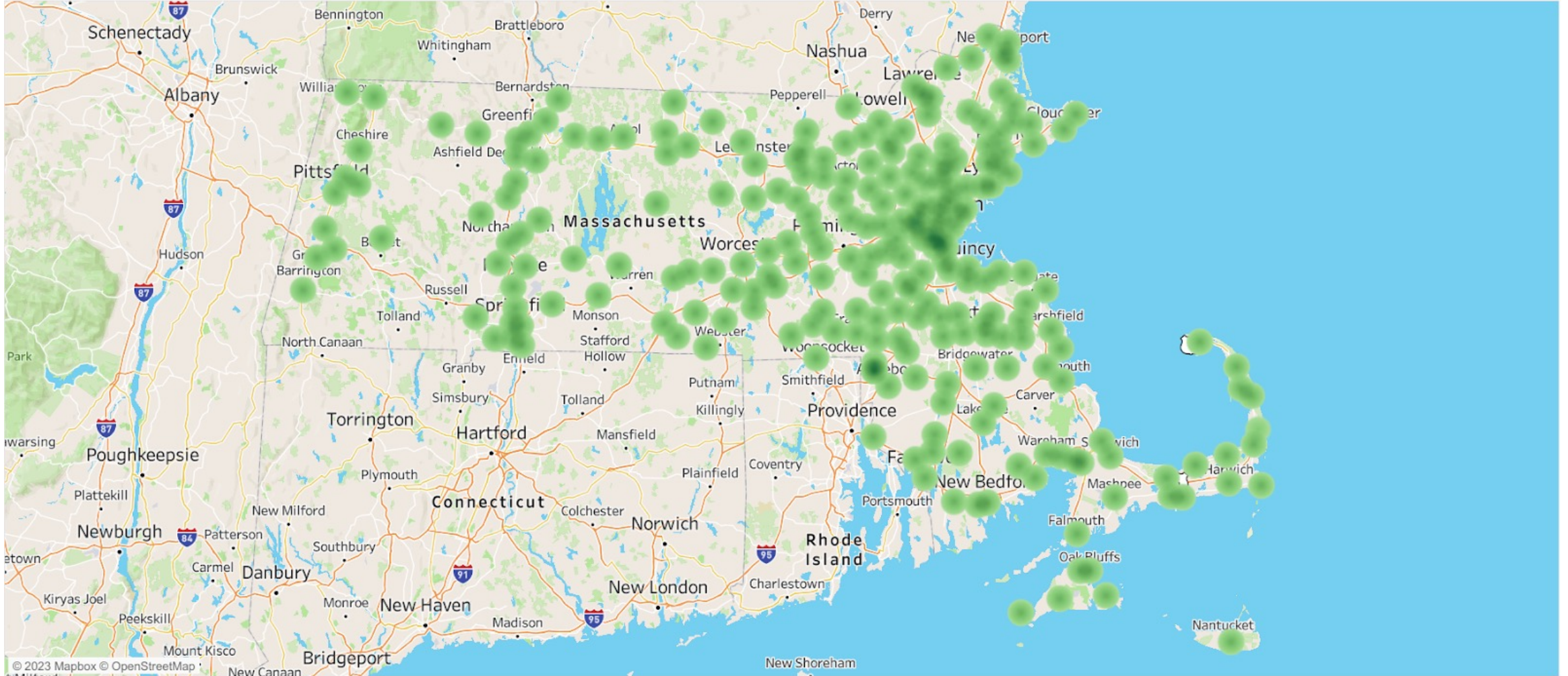
## Apps

- Information on point-of-sale apps (price, charging speed, functionality, availability, etc.) is inconsistent
- Price or equivalency of miles per kWh of charge is not translated into consumer-friendly language

## Charging locations

- Some chargers are hard to locate if they're in parking garages or on streets
- Charging does not work well for long-term (multi-day) parking

# EVSE LOCATIONS IN MASSACHUSETTS



Data from [Alternative Fuels Data Center: Alternative Fueling Station Locator \(energy.gov\)](https://energy.gov/alternative-fuels-data-center/alternative-fueling-station-locator)

# TOWNS WITHOUT EVSES IN MASSACHUSETTS

ACUSHNET	CHESTERFIELD	FLORIDA	HOLLISTON	MONROE	PELHAM	SHIRLEY	WASHINGTON
ADAMS	CHILMARK	GEORGETOWN	HOPEDALE	MONSON	PEPPERELL	SHUTESBURY	WEBSTER
ALFORD	CLARKSBURG	GOSHEN	HUBBARDSTON	MONTEREY	PERU	SOUTHAMPTON	WENDELL
ASHBY	CLINTON	GOSNOLD	HULL	MONTGOMERY	PETERSHAM	SOUTHWICK	WEST BOYLSTON
ASHFIELD	COLRAIN	GRANBY	HUNTINGTON	MOUNT WASHINGTON	PHILLIPSTON	STOW	WEST BRIDGEWATER
ASHLAND	CONWAY	GRANVILLE	LANESBOROUGH	NAHANT	PLYMPTON	SUNDERLAND	WEST BROOKFIELD
BERKELEY	CUMMINGTON	GROVELAND	LEVERETT	NEW ASHFORD	RANDOLPH	TISBURY	WEST STOCKBRIDGE
BERLIN	DOVER	HAMPDEN	LEYDEN	NEW BRAINTREE	REHOBOTH	TOLLAND	WESTHAMPTON
BERNARDSTON	DRACUT	HATFIELD	LUNENBURG	NEW MARLBOROUGH	RICHMOND	TOWNSEND	WESTMINSTER
BOYLSTON	DUNSTABLE	HAWLEY	MATTAPOISETT	NEW SALEM	ROWE	TYRINGHAM	WILBRAHAM
BRIMFIELD	EAST BRIDGEWATER	HEATH	MERRIMAC	NORTH BROOKFIELD	ROYALSTON	UPTON	WINCHESTER
BROOKFIELD	EAST LONGMEADOW	HINSDALE	MIDDLEFIELD	NORTHBRIDGE	RUSSELL	WALES	WINDSOR
BUCKLAND	EGREMONT	HOLBROOK	MIDDLETON	OAKHAM	RUTLAND	WARE	WINTHROP
CARVER	EVERETT	HOLDEN	MILLIS	OTIS	SAVOY	WARREN	WORTHINGTON
CHESTER	FAIRHAVEN	HOLLAND	MILLVILLE	PAXTON	SHEFFIELD	WARWICK	YARMOUTH

# EVSE FUNCTIONALITY

In 2022, researchers at the University of California Berkeley conducted a study to understand the uptime of charging stations in the San Francisco Bay Area.

- Of the 181 public DCFC stations studied, more than 25% of chargers were found to be nonfunctional when tested.<sup>1</sup>
- When 10% of the EVSEs were reassessed following the first assessment, there was no change in functionality, which negatively impacts the uptime reported by the service providers (95–98%).<sup>2</sup>

<sup>1</sup> Fred Lambert, “Study finds more than a quarter of charging stations were nonfunctional,” Electrek, June 16, 2022. From <https://electrek.co/2022/06/16/study-finds-more-than-fourth-charging-stations-were-non-functional/>, accessed June 12, 2023.

<sup>2</sup> David Rempel et al., “Reliability of open public electric vehicle direct current fast chargers,” SSRN Electronic Journal, April 7, 2022, [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=4077554](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4077554), accessed June 16, 2023.

# STRATEGIES TO IMPROVE UPTIME

- Improved data collection and transparency to know when systems are and are not functioning properly<sup>1</sup>
- A shared definition of and methodology to calculate uptime; i.e., a better understanding of downtime (time when a station is not operational) and excluded time (time when power is out or something similar)<sup>2</sup>
- A minimum requirement for charging stations uptime<sup>3</sup>
- An easy way for consumers to call in service malfunctions or systems in need of repair
- Identification of a responsible party for maintaining and repairing stations and EVSE<sup>4</sup>
- Communication to consumers and EV drivers when a station is not working<sup>5</sup>
- Monitoring and evaluation best practices by EV charging providers to improve uptime
- Maintaining a record of service outages and repair services<sup>6</sup>
- Mandating that repairs be initiated within 24 hours of the incident report<sup>7</sup>

1 Northeast Corridor Regional Strategy for Electric Vehicle Charging Infrastructure 2018–2021,” NESCAUM, May 16, 2018. From <https://www.nescaum.org/documents/northeast-regional-charging-strategy-2018.pdf/view>, accessed June 14, 2023.

2 *Ibid.*

3 Kathy Kinsey, Elaine O’Grady, and Jesse Way, “Building reliable EV charging networks: model state grant and procurement contract provisions for public EV charging,” Northeast States for Coordinated Air Use Management (NESCAUM), May 2019. From <https://www.nescaum.org/documents/model-contract-provisions-for-public-evse-5-24-19.pdf>, accessed June 12, 2023.

4 NESCAUM, 2018.

5 *Ibid.*

6 *Ibid.*

7 Kinsey, et al., 2019.

# MOST COMMON EVSE MALFUNCTIONS

- Disconnection to the electrical grid
- Software malfunctions
- Network failures
- Broken connectors
- Unresponsive screens
- Payment system failures
- Fraying cables
- Energy loss from transmission

All data from David Rempel et al., "Reliability of open public electric vehicle direct current fast chargers," SSRN Electronic Journal, April 7, 2022, [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=4077554](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4077554), accessed June 16, 2023.

# MAINTENANCE RECOMMENDATIONS

- Identify who is responsible for maintenance and repairs
- Establish a schedule for operational and functional checkups
- Estimate how often a charger should be updated, looked at, and replaced based on the number of uses, total charging time, and/or the climate impacts due to geographic location

Recommendations from Kathy Kinsey, Elaine O'Grady, and Jesse Way, "Building reliable EV charging networks: model state grant and procurement contract provisions for public EV charging," Northeast States for Coordinated Air Use Management (NESCAUM), May 2019. From <https://www.nescaum.org/documents/model-contract-provisions-for-public-evse-5-24-19.pdf>, accessed June 12, 2023.