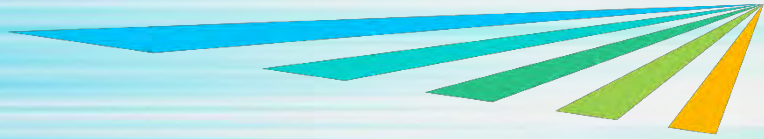


EVs2Scale 2030™



# Energy and Power Needs of Electrified Transportation and Bringing the Industry Together- *the eRoadMAP tool*

Jamie Dunckley, PhD

Electric Power Research Institute (EPRI)

[jdunckley@epri.com](mailto:jdunckley@epri.com)

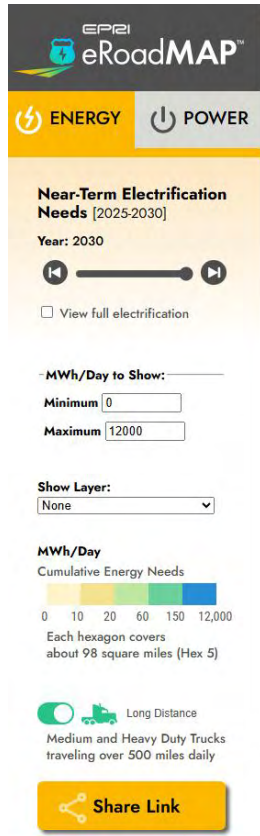
**EPRI**



[www.epri.com](http://www.epri.com)

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# What is eRoadMAP?



EPRI eRoadMAP

ENERGY POWER

Near-Term Electrification Needs [2025-2030]

Year: 2030

View full electrification

MWh/Day to Show:

Minimum 0

Maximum 12000

Show Layer: None

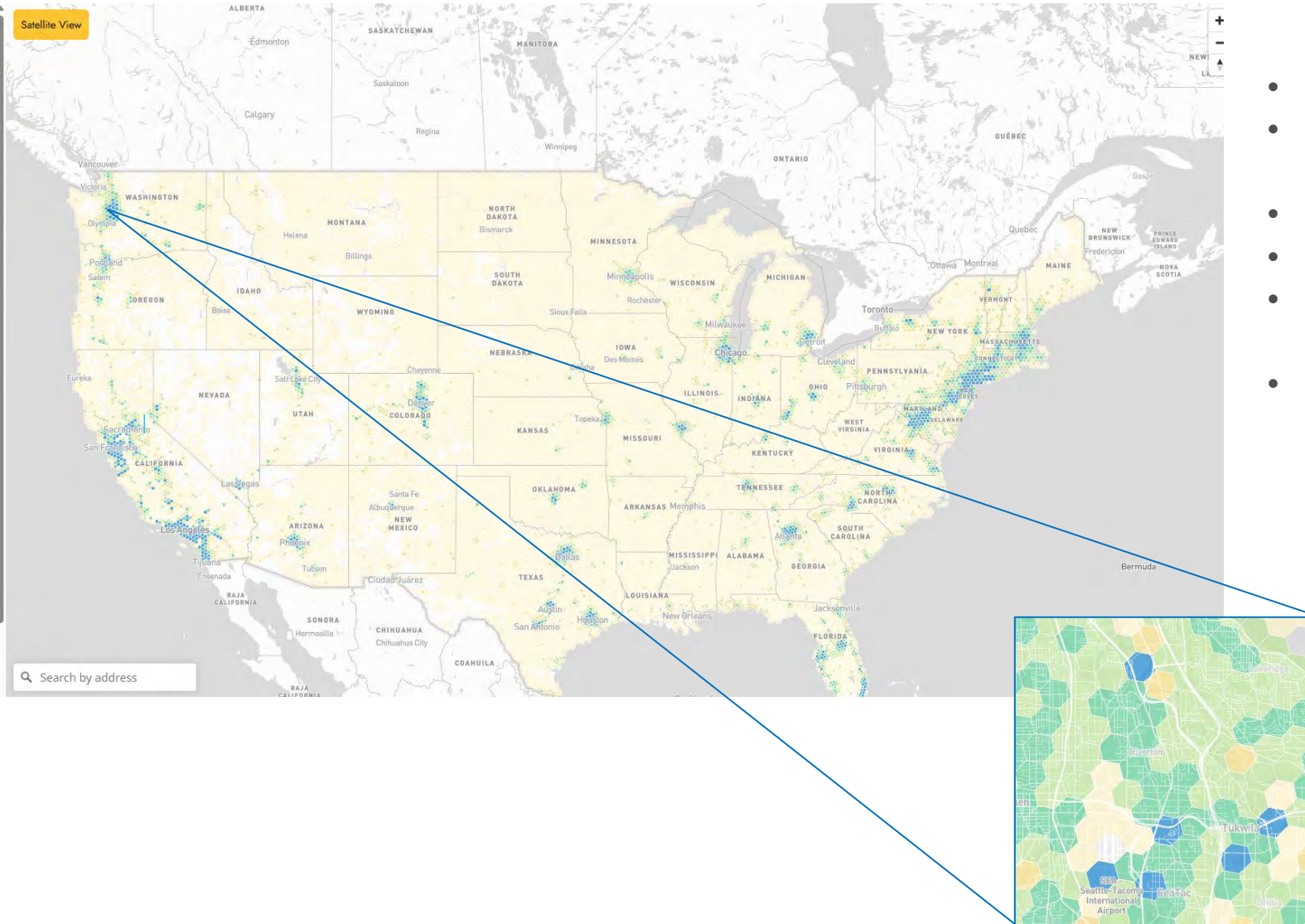
MWh/Day Cumulative Energy Needs

0 10 20 60 150 12,000

Each hexagon covers about 98 square miles (Hex 5)

Long Distance Medium and Heavy Duty Trucks traveling over 500 miles daily

Share Link



- Launched Nov 28, 2023
- Shows energy **and** power down to 0.28 sq miles
- Shows years from 2024-2030
- Has a 100% electrified option
- Units of Energy (MWh/day)- with filter
- Has additional layers:
  - Hosting Capacity (10 utilities)
  - Truck Stops
  - Justice40 communities
  - Air Quality of Concern
  - Transportation Disadvantage
  - Current EV charging stations
  - Utility service territories
  - **SOON:**
    - DOE freight Corridors

# Why did we build eRoadMAP?

- We need granular data from fleets themselves.
  - DMV registration data doesn't capture vehicle behavior.
  - Buying data sets doesn't present a complete picture.
  - County and census tract data isn't granular enough.
- Need a data set that shows where the vehicles are, and how they behave.

eRoadMAP and other EVs2Scale tools provide tools and data to build confidence and show clear signals for where and when EV load is coming.

# 4 Major EVs2Scale Deliverables Now Released

1



- 105 vendors and 750 products "listed"
- Vendors now have access to over \$1.8B in utility and state grant programs
- <https://www.epri.com/vpl>

2



- Visualization of planned/expected EV loads
- Cited in over 10 state proceedings to date
- <https://erodmap.epri.com/>

3

## GridFAST



- Industry portal for early project planning (and ultimately service requests)
- <http://GridFAST.com>

4

## 50-State GridREADY



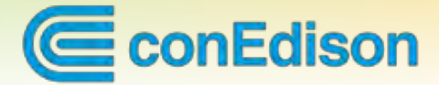
- Promotes a common data-based understanding of need for proactive grid planning
- Available to all NGOs and state leaders
- No state left behind
- [EPRi EVs2Scale2030 GridREADY | Powered by Box](https://www.epri.com/evs2scale2030/gridready)

# How did we build eRoadMAP?



# EVs2Scale 2030™

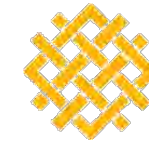
## PROJECT PARTNERS BROAD INDUSTRY SUPPORT



ANALYTICS



DATA



Also:



NATIONAL AUTOMOBILE DEALERS ASSOCIATION



Document Conventional Vehicle Behavior

REGISTRATIONS



TRAVEL AND DWELL BEHAVIOR



DAIMLER TRUCK



Convert to EV Energy Needs

Conversion Ratio:

LD VEHICLE ASSUMPTIONS

0.42 kWh/mi (2.38 mi/kWh)

MDHD VEHICLE ASSUMPTIONS

Class 3-5: 1.1 kWh/mi | Class 6-8: 1.8 kWh/mi

Energy Location Distribution:

Location types are assigned a probability of having a charger as well as a charger power level

Charging is assigned to the longest dwell time of the day.

Calculate Adoption to Meet 2030 Targets

Policy Compliant..... now likelihood to adopt

Add Fleet Electrification + Charging Plans

ELECTRIFICATION PLANS (ongoing)

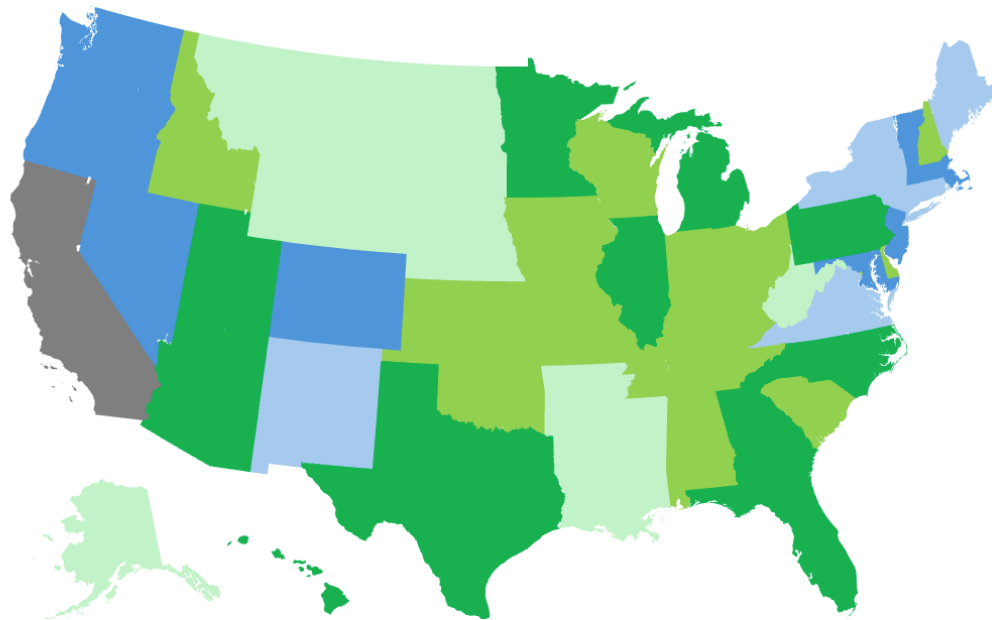


# Recent changes: Light-Duty EV adoption

## Assumptions:

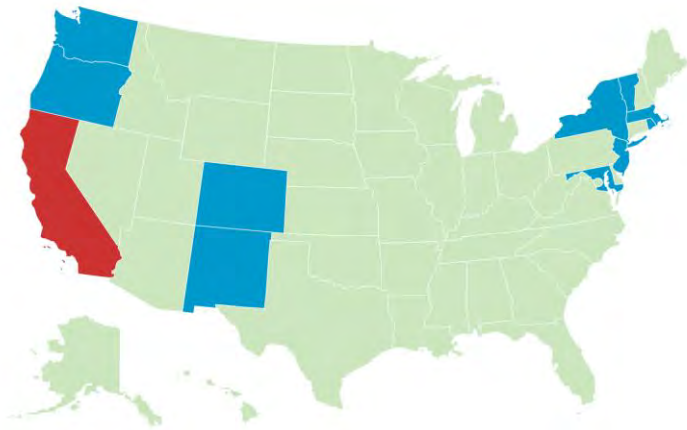
- Federal EV support continues to decline, but varying levels of state support continues
- EV charger growth continues and EVs gain traction along other technologies as costs fall and awareness grows.

**Factors considered:** Historical Sales (2018-2025), ZEV participation, NEVI funding, State Programs, External reports

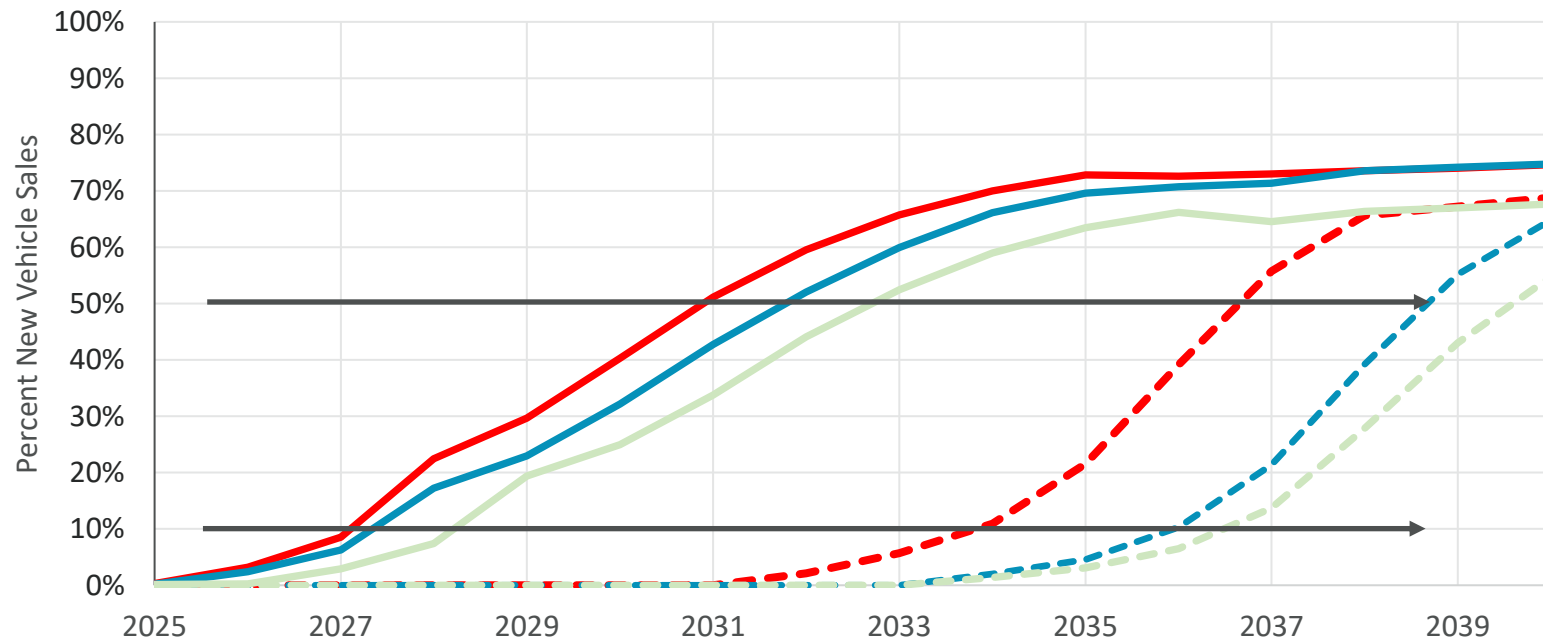


	50% EV sales in year		Delay (years)
	2024 Scenario	2025 Scenario	
California	2028	2029	1
ZEV High Sales	2029	2031	2
ZEV Other	2029	2036	7
Other Top 10	2050+	2050+	N/A
Other Mid	2050+	2050+	N/A
Other Bottom 10	2050+	2050+	N/A
<b>National</b>	<b>2039</b>	<b>2046</b>	<b>7</b>

# Recent changes: MDHD EV adoption



- California
- Former ACT States
- Remainder of the US



- California\_Light Commercial Truck
- - - California\_Combination Long-haul Truck
- ACT\_Light Commercial Truck
- - - ACT\_Combination Long-haul Truck
- Other\_Light Commercial Truck
- - - Other\_Combination Long-haul Truck

# eRoadMAP update New Loads

## Airports

- 50 Largest Airports. Includes ground support equipment such as airport buses and pushback tractors. Data from NREL\*.

## Ports

- 25 Top Container Ports by total tonnage. Covers 43% of total annual tonnage in the US (2022). Includes load from all electric cargo handling equipment. Data from NREL\*\*.

## Refuse Trucks

- Data from a large fleet that covers 15% of nationwide refuse truck behavior, scaled to cover full fleet.

## Update of adoption trajectory

- More details next slide

## Update of LD modeling (RMI)

- LD vehicles have a stronger preference for home and work.



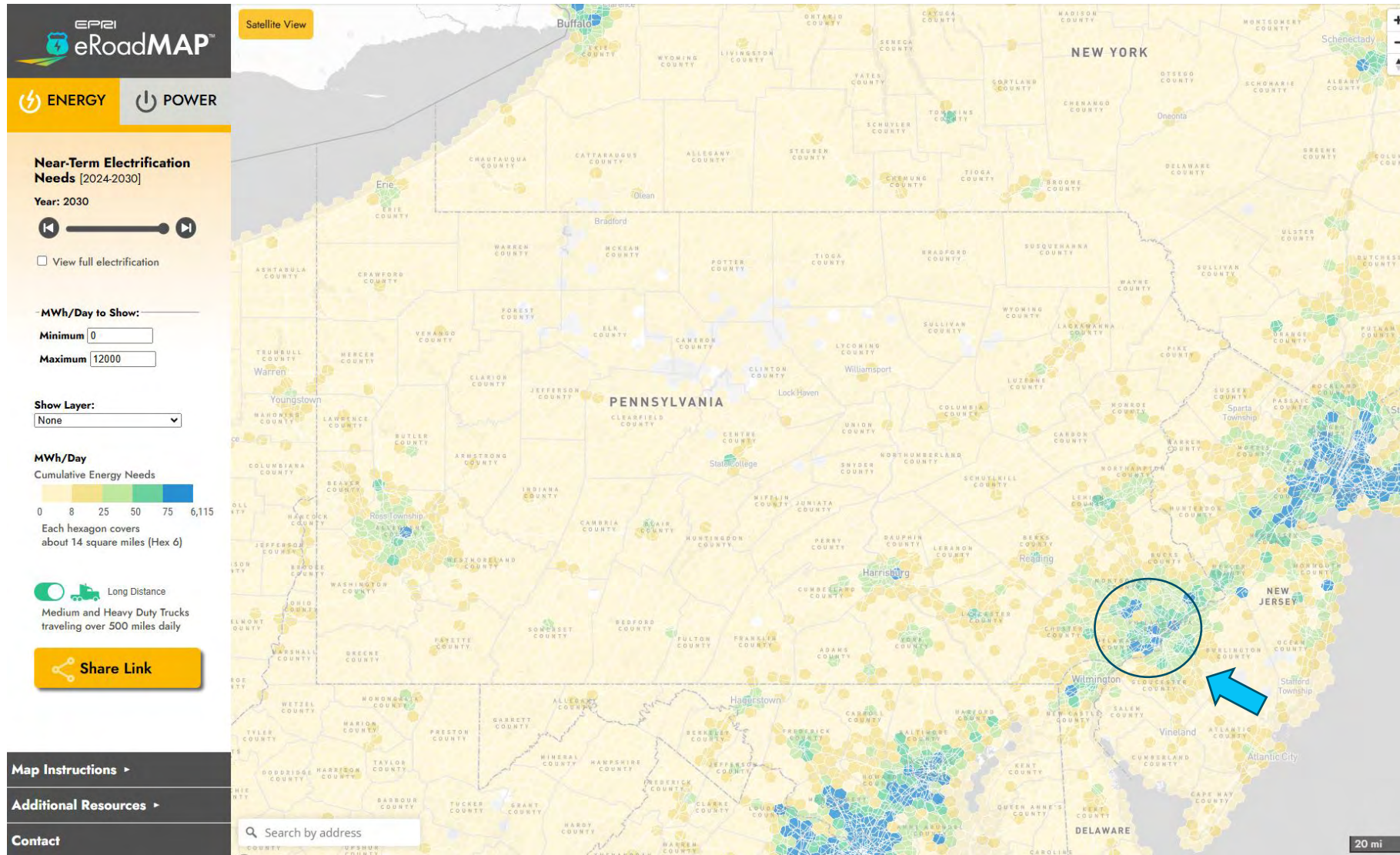
## Where we are going:

- Continue to gathering load capacity maps (feeder)
- Add layer on substation capacity
- Extend eRoadMAP out to 2040
- Add other data sets – public charging heat map

\* Liu, Bo, Kevin Robby, Jayaraj Rane, Adway Das, Kara Podkaminer, and Brennan Borlaug. 2025. **Modeled Electricity Demand for Electric Airport Ground Support Equipment in the United States**. Golden, CO: National Renewable Energy Laboratory. NREL/TP-5400-92139.

\*\* Polemis, Katerina, Andrew Kotz, Kara Podkaminer, and Brennan Borlaug. 2025. **Modeled Electricity Demand for Electric Port Cargo Handling Equipment in the United States**. Golden, CO: National Renewable Energy Laboratory. NREL/TP-5400-92141.

# Interactive Energy Map: Philadelphia Area (2030)



Hex 5 (98 mi<sup>2</sup>)

# Interactive Energy Map: Philadelphia Area

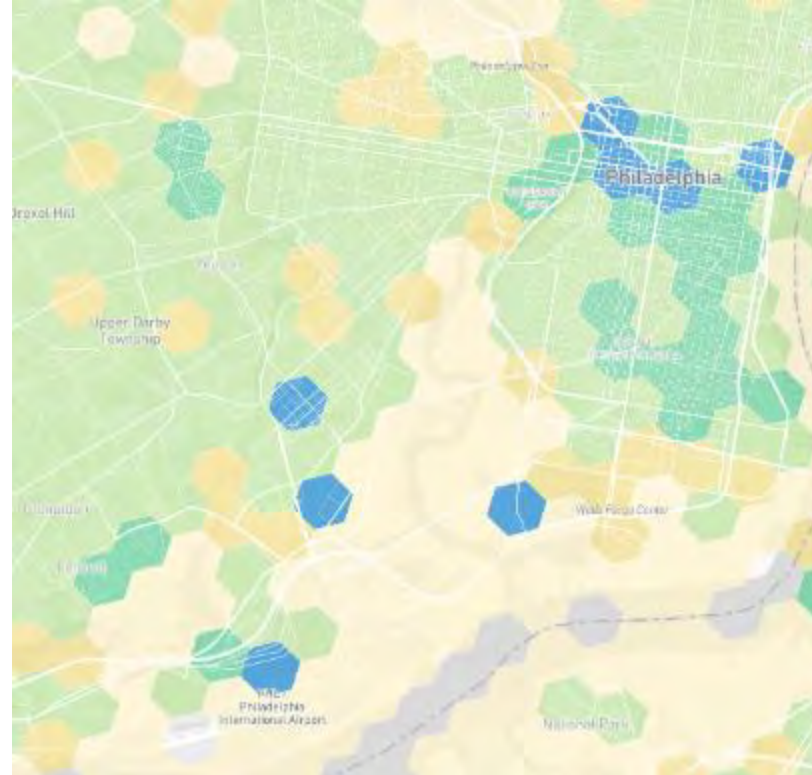
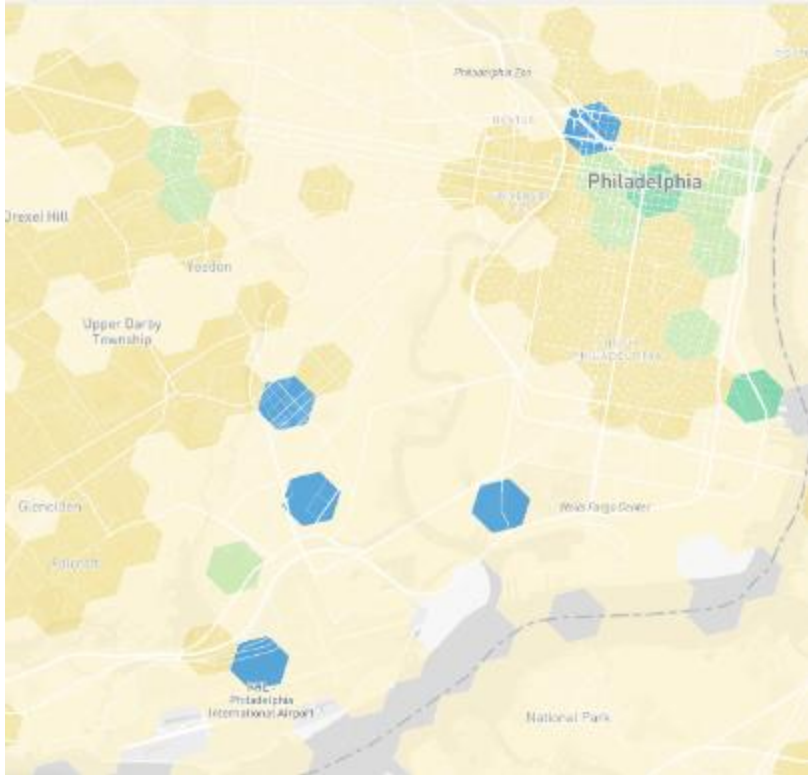
2026 to 2030 to Full Electrification Comparison



2026

2030

Full Electrification



Hex 8 (0.28 mi<sup>2</sup>)

# Interactive Energy Map: Philadelphia Area

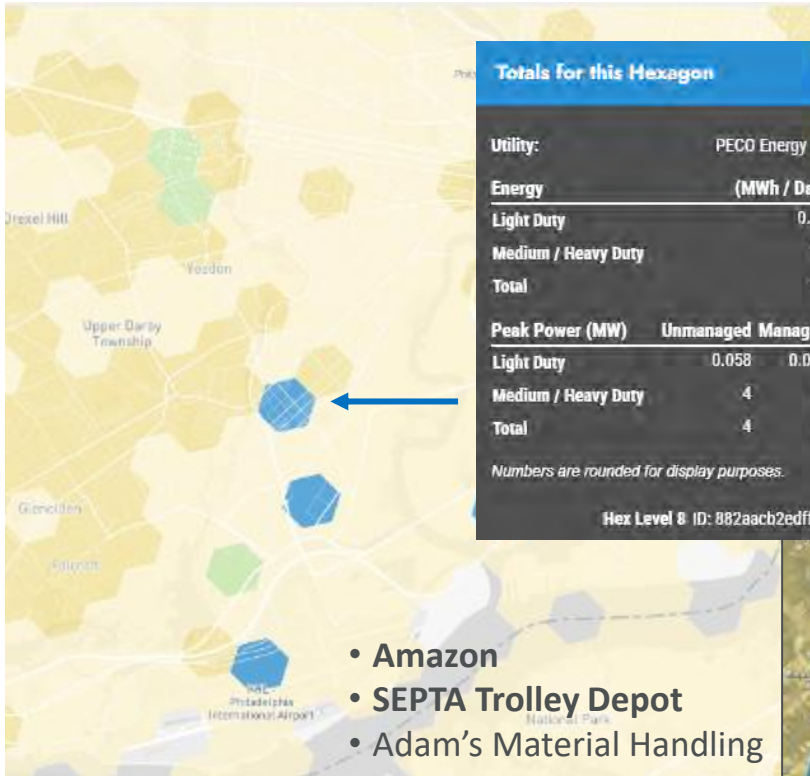
2026 to 2030 to Full Electrification Comparison



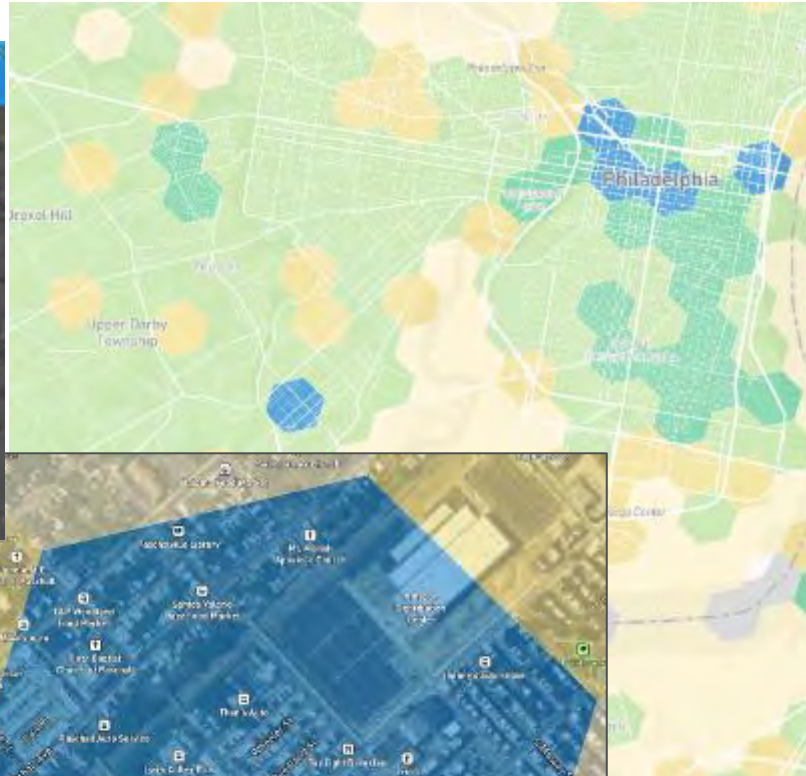
2026

2030

Full Electrification



Totals for this Hexagon	
Utility:	PECO Energy Co
<b>Energy</b>	<b>(MWh / Day)</b>
Light Duty	0.59
Medium / Heavy Duty	11
<b>Total</b>	<b>12</b>
<b>Peak Power (MW)</b>	<b>Unmanaged Managed</b>
Light Duty	0.058 0.037
Medium / Heavy Duty	4 4
<b>Total</b>	<b>4 4</b>
<i>Numbers are rounded for display purposes.</i>	
Hex Level 8 ID: 882aacb2edffff	



- Amazon
- SEPTA Trolley Depot
- Adam's Material Handling
- 5 Restaurants
- 4 Auto Repair Shops
- 3 Churches
- 3 Food/Drink Markets
- 1 Library

Hex 8 (0.28 mi<sup>2</sup>)



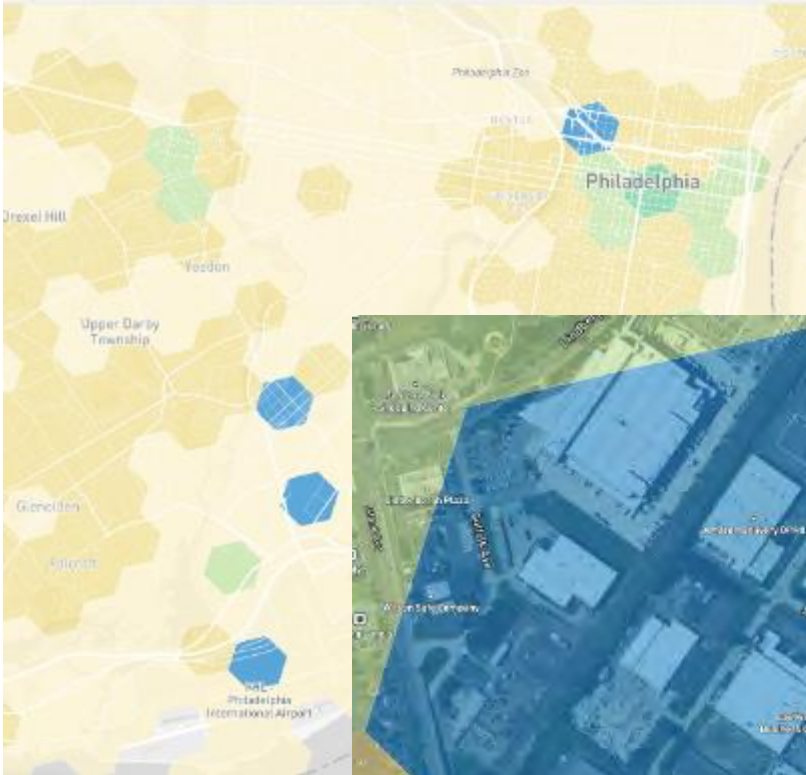
# Interactive Energy Map: Philadelphia Area

2026 to 2030 to Full Electrification Comparison

2026

2030

Full Electrification



Totals for this Hexagon

Possible utilities, sorted by area (largest first):

PECO Energy Co

Energy	(MWh / Day)
Light Duty	0.313
Medium / Heavy Duty	14
<b>Total</b>	<b>14</b>

Peak Power (MW)	Unmanaged	Managed
Light Duty	0.03	0.032
Medium / Heavy Duty	4	4
<b>Total</b>	<b>4</b>	<b>4</b>

Numbers are rounded for display purposes.

Hex Level 8 ID: 882aacb2e3ffff



- Amazon
- Pepsi
- USPS
- Airgas
- Sixt
- 5 other businesses
- (Enterprise just to the east)

Hex 8 (0.28 mi<sup>2</sup>)

# Interactive Energy Map: Philadelphia Area

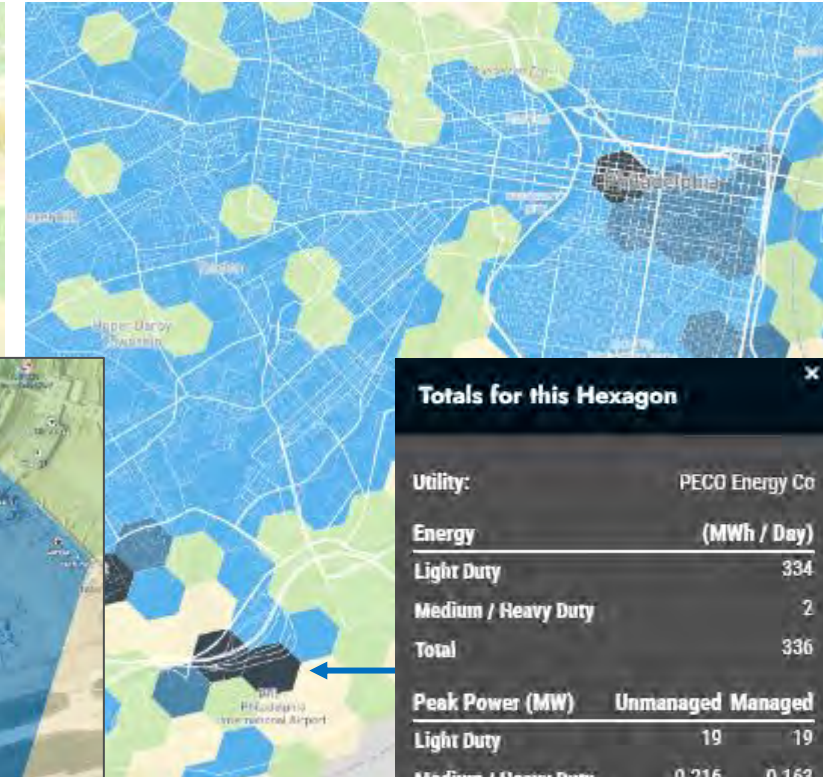
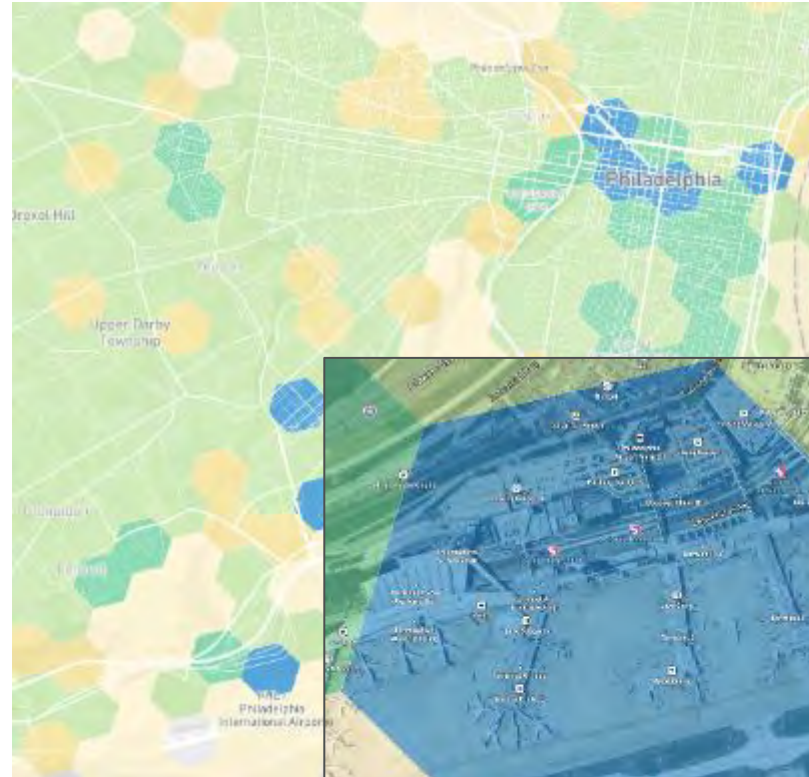
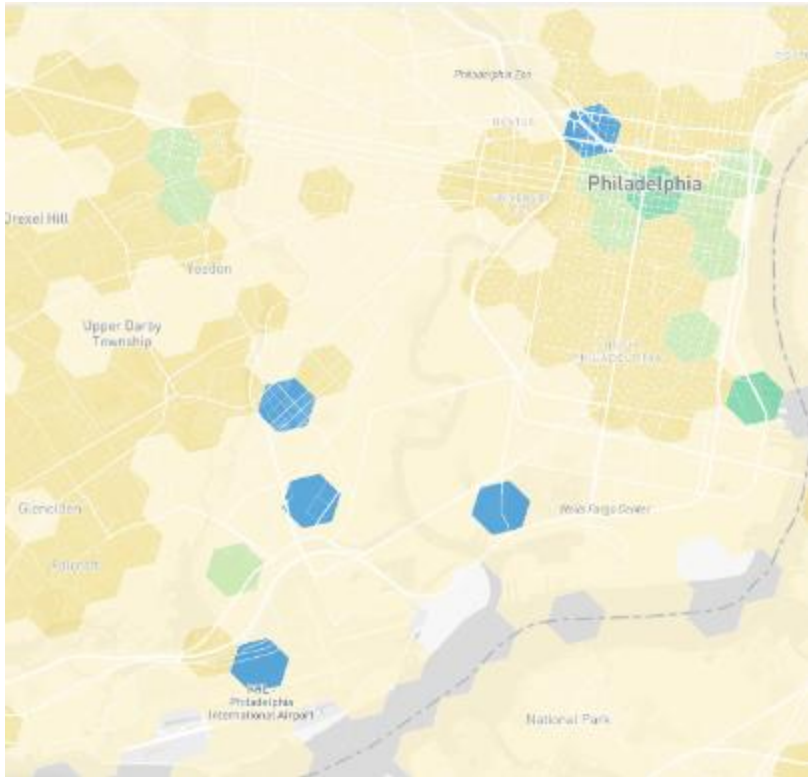
2026 to 2030 to Full Electrification Comparison



2026

2030

Full Electrification

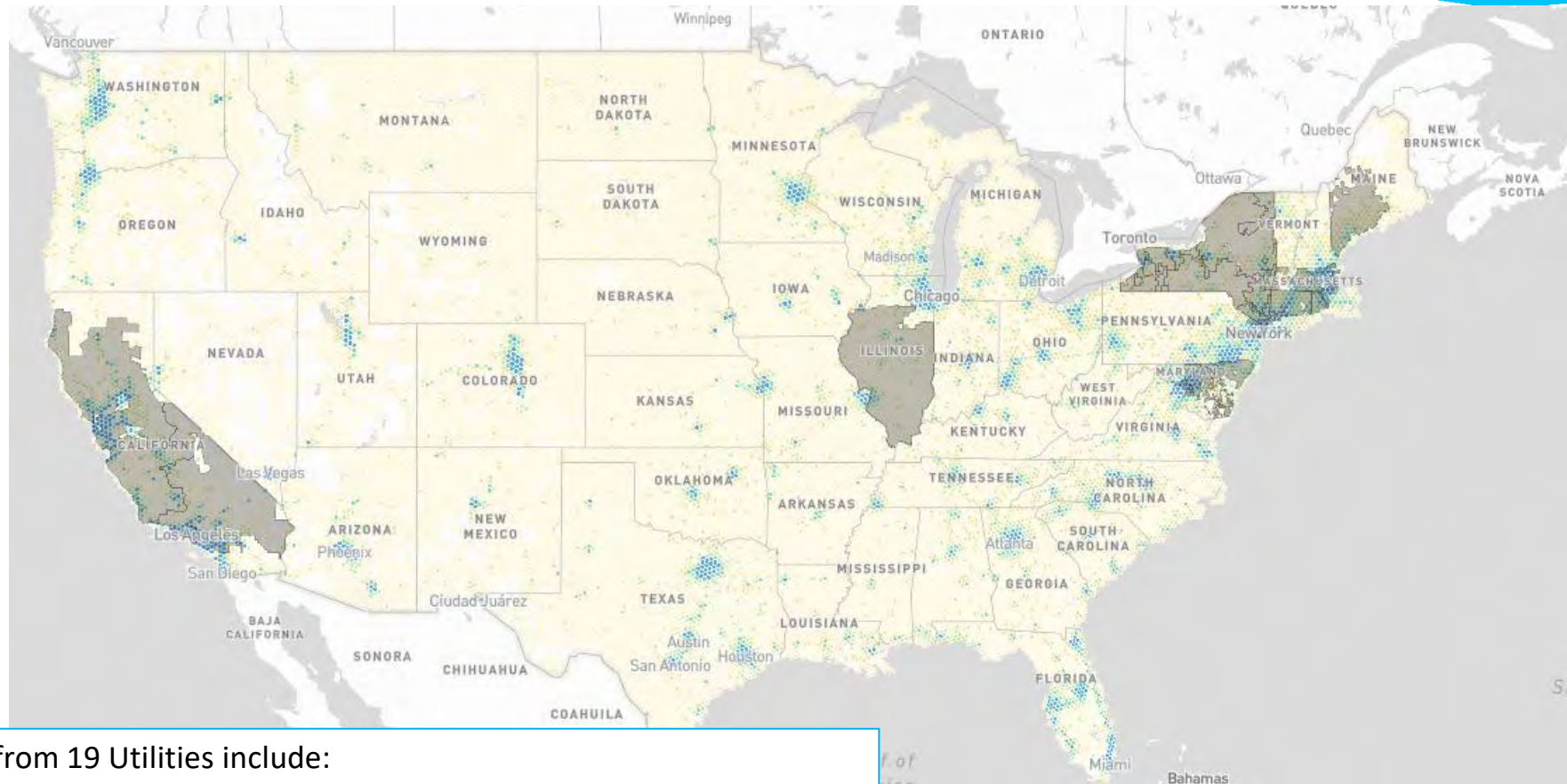


Totals for this Hexagon	
Utility:	PECO Energy Co
<b>Energy</b>	<b>(MWh / Day)</b>
Light Duty	334
Medium / Heavy Duty	2
<b>Total</b>	<b>336</b>
<b>Peak Power (MW)</b>	<b>Unmanaged Managed</b>
Light Duty	19 19
Medium / Heavy Duty	0.216 0.163
<b>Total</b>	<b>20 19</b>
<i>Numbers are rounded for display purposes.</i>	
Hex Level 8 ID: 882aacb2b5ffff	

- Enterprise
- Avis
- Budget
- Dollar
- Airport Parking

Hex 8 (0.28 mi<sup>2</sup>)

# eRoadMAP includes Utility Load Hosting Capacity Maps



## Load Capacity Maps from 19 Utilities include:

- **California:** PG&E, SCE, LADWP
- **Connecticut:** Eversource, United Illuminating
- **Delaware:** Delmarva
- **Maine:** Central Maine Power
- **Massachusetts:** National Grid
- **Maryland:** Pepco, Delmarva
- **New York:** National Grid, ConEd, Orange & Rockland, Central Hudson, NYSEG, and Rochester G&E
- **New Jersey:** Orange & Rockland, Atlantic City
- **Rhode Island:** Rhode Island Energy

# eRoadMAP includes Utility Load Hosting Capacity Maps

**eRoadMAP**  
ENERGY POWER

**Near-Term Electrification Needs [2024-2030]**  
Year: 2027

View full electrification

**MW to Show:**  
Minimum 0  
Maximum 200

**Show Layer:**  
Hosting Capacity

**MW Peak Power Needs**  
0 3 10 20 50 200  
Each hexagon covers about 98 square miles (Hex 5)

**Available Capacity for Load (MW)**  
Distribution Feeder Hosting Capacity  
0 1 1.5 2.0 35.93



**Line Capacity**

NJ11544  
**Load Capacity (MW): 2.7**

Data Source: PHI  
Updated by Utility: Unknown  
Retrieved by EPRI: Nov 13, 2024

**Hexagon Info**

Utility: Atlantic City Electric Co

Energy (MWh / Day)	
Light Duty	0.002
Medium / Heavy Duty	0.002
Total	0.004

Peak Power (MW)	Unmanaged	Managed
Light Duty	0	0
Medium / Heavy Duty	0.001	0.001
Total	0.002	0.001

Numbers are rounded for display purposes.

Hex Level 8 ID: 882aac1ebffff

## Load Capacity Maps from 14 Utilities include:

- **California:** PG&E, SCE, LADWP
- **Connecticut:** Eversource, United Illuminating
- **Delaware:** Delmarva
- **Maine:** Central Maine Power
- **Massachusetts:** National Grid
- **Maryland:** Pepco, Delmarva
- **New York:** National Grid, ConEd, Orange & Rockland, Central Hudson, NYSEG, and Rochester G&E
- **New Jersey:** Orange & Rockland, Atlantic City
- **Rhode Island:** Rhode Island Energy

# eRoadMAP includes Utility Load Hosting Capacity Maps

**eRoadMAP**

ENERGY POWER

**Near-Term Electrification Needs [2024-2030]**

Year: 2027

View full electrification

MW to Show:

Minimum 0

Maximum 200

Show Layer: Hosting Capacity

MW Peak Power Needs

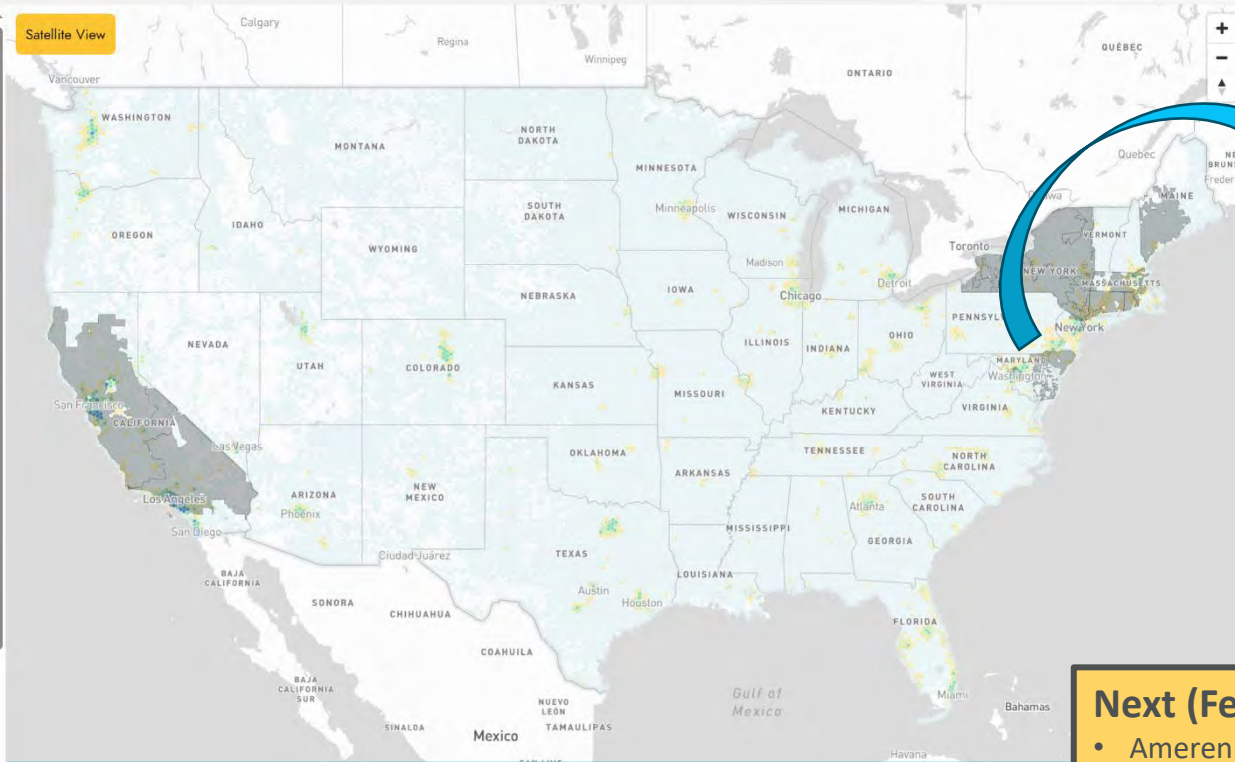
0 3 10 20 50 200

Each hexagon covers about 98 square miles (Hex 5)

Available Capacity for Load (MW)

Distribution Feeder Hosting Capacity

0 1 1.5 2.0 35.93



**Line Capacity**

NJ1554

**Load Capacity (MW): 2.7**

Data Source: PHI

Updated by Utility: Unknown

Retrieved by EPRI: Nov 13, 2024

**Hexagon Info**

Utility: Atlantic City Electric Co

Energy (MWh / Day)	
Light Duty	0.002
Medium / Heavy Duty	0.002
Total	0.004

Peak Power (MW)	Unmanaged	Managed
Light Duty	0	0
Medium / Heavy Duty	0.001	0.001
Total	0.002	0.001

Numbers are rounded for display purposes.

Hex Level 8 ID: 882aac1ebffff

## Load Capacity Maps from 14 Utilities include:

- **California:** PG&E, SCE, LADWP
- **Connecticut:** Eversource, United Illuminating
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- **New Jersey:** Orange & Rockland, Atlantic City
- **Rhode Island:** Rhode Island Energy

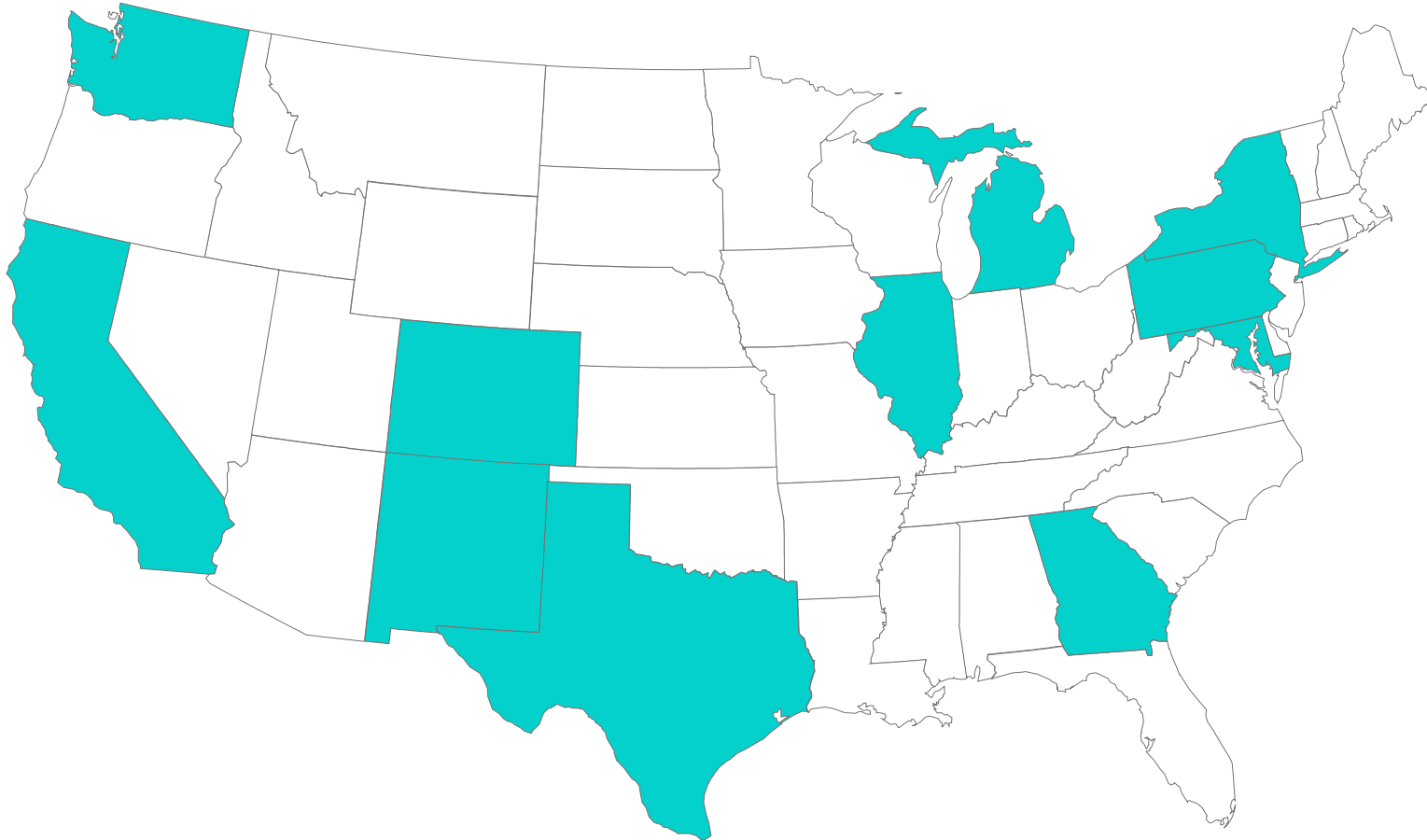
**Next (Feeder Level):**

- Ameren (IL)
- Dominion
- DTE
- Exelon (ComEd, BGE, PECO)
- FirstEnergy (JCPL)
- Hawaiian Electric
- NV Energy
- PSE&G (NJ)
- Seattle City Light

**Next (Substation Level)**

- Ameren (MO)
- Austin Energy
- CenterPoint
- FirstEnergy (All except JCPL)
- Great River Energy
- JEA
- Omaha Public Power District
- Portland General Electric
- Salt River Project
- SMUD

eRoadMAP has been cited in at least **14 state proceedings** (legislative and regulatory) to date in CA, WA, CO, NM, TX, IL, MI, GA, PA, MD, NY, as well as nearly a dozen external reports.



**Of note:**

- **NY:** in the proactive planning framework proposal from the Joint Utilities sent to the commission; used as a source of data and validation for projects (2024)
- **CA:** in SCE’s GRC as a source of validation for grid upgrade projects (2023)
- **CA:** in PG&E’s GRC to validate grid upgrade projects (2025)
- **WA:** in SCL’s Strategic TE Investment Plan as a source of data to validate TE loads (2025)
- **MI:** Consumers Energy mentioned their work with EVs2Scale in comments on their DCFC pilot and how they are preparing the infrastructure for these sites (2025)

# Other eRoadMAP use cases



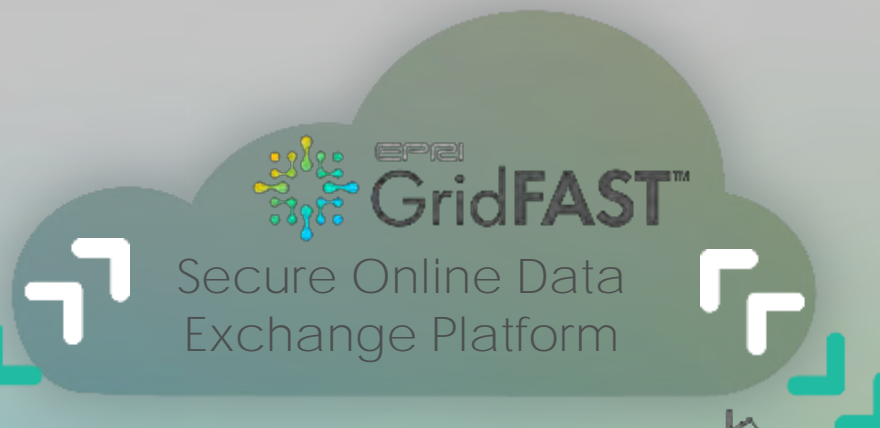
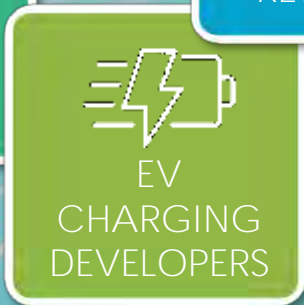
- Internal Utility forecasting (lots of load and no load)
- Internal Utility- early outreach where there are large co-located loads
- Fleets require eRoadMAP for initial site assessment (capacity available?)
- First check for other competing loads
- Fleets – utility service territory check

GridFAST.....

# GridFAST: Your central portal for utility collaboration on EV projects



EV customers get the right utility connections, capacity info (where available), and standardized information



Utilities get early insight into new EV loads coming, project readiness, and right-sized load estimates



Create your **FREE** account at <http://GridFAST.com>

Thank you  
[jdunckey@epri.com](mailto:jdunckey@epri.com)



# Helpful links



- eRoadMAP website: <https://eroadmap.epri.com>
- User guide: [https://eroadmap.epri.com/docs/eRoadMAP\\_user\\_guide.pdf](https://eroadmap.epri.com/docs/eRoadMAP_user_guide.pdf)
- Technical documentation: [https://eroadmap.epri.com/docs/eRoadMAP\\_technical\\_details.pdf](https://eroadmap.epri.com/docs/eRoadMAP_technical_details.pdf)
- Layer references: [https://eroadmap.epri.com/docs/eRoadMAP\\_layer\\_references.pdf](https://eroadmap.epri.com/docs/eRoadMAP_layer_references.pdf)