EVs2Scale™ 2030

AltWheels Fleet Day

7 October 2024

Britta K. Gross
EPRI, Director of Transportation

The Utility Challenge

- Government, Industry, and Fleets are increasingly aligning on aggressive 2030 vehicle electrification goals
- The pace of needed year-over-year action and investment to prepare charging sites and the grid is not clear
- Utilities (and regulators) must have confidence in when and where loads are coming

THIS TRANSITION IS UNPRECEDENTED AND COMPLEX. IT REQUIRES:

- Extraordinary collaboration and partnering across all the major EV stakeholder groups
- Stakeholders must "meet in the middle" with transparent electrification plans so early planning can occur and long-leadtime investments can be prioritized

Addressing the Barriers to Achieving EVs at Scale

A Three-Pillar Strategy to Address the Key Industry Gaps

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1 COALITIONS & ROADMAPS

Industry Forum Convenings
- Utility-OEM Forum
- Utility-Fleet Forum

National EV Driver Research Board

50-state eRoadMAP™ to 2030 outlining EV loads, grid impacts, leadtimes, workforce, costs

2 STRUCTURAL SYSTEM REFORMS

Charging Infrastructure
- Reliability: Benchmarking, Standards
- Charging Innovation & Affordability

Grid Readiness
- Streamlined Grid Interconnect
  - Expedited Interim Charging Solutions
- Managed Charging at Scale
- Interconnect Standards for V2H/V2B/V2G

3 UNIFYING TOOLS & PILOTS

- Approved Product List (APL)
- NEVI/NEHC Coordination with EEI
- GridFAST™ Online Data Exchange
- OEM/Utility V2H/V2B Pilot
- EV Resilience/Evacuation Pilot

Enabling Regulatory and Oversight Framework

Equity Blueprint & Workforce Development

Collaboration + Partnerships

Ongoing Engagement

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UTILITY INDUSTRY

EPRI
LPPC LARGE PUBLIC POWER COUNCIL
EEI
NRECA America's Electric Cooperatives
AMERICAN PUBLIC POWER ASSOCIATION
Alliance for Transportation Electrification
NASUCA
NARUC National Association of Regulatory Utility Commissioners

AUTO & TRUCKING INDUSTRY

Ford
Tesla
BMW
Audi
Toyota
Mercedes-Benz
VOLVO
PACCAR
gm
RIVIAN
DAIMLER
HONDA
ALLIANCE FOR AUTOMOTIVE INNOVATION
Volkswagen
NACFE
NADA

FLEET OPERATORS

amazon
FedEx Federal Express
Enterprise
US FOODS
DHL
Uber
Lyft
Walmart Save money. Live better.
PITT OHIO SUPPLY CHAIN • GROUND • LTL • TL
PENSKE
element
J.B. HUNT
NAFA FLEET MANAGEMENT ASSOCIATION
LeasePlan

CHARGING PROVIDERS AND FUELING RETAILERS

Circle K
electrify america
flo EV Charging
chargepoint
EVgo FAST CHARGING
bp
Shell

NGO & STANDARD-SETTING ORGANIZATIONS

NRDC
EDF ENVIRONMENTAL DEFENSE FUND
RMI
CHARIN
SAE INTERNATIONAL
ATLAS PUBLIC POLICY
Plug In America
Electric Vehicle ASSOCIATION

GOVERNMENT

- Joint Office of Energy & Transportation (JOET)
- US DOE
- US DOT
- National Labs
- FERC/NERC
- State DOEs, DOTs, DEQs
- State PUCs
- League of Cities
- Climate Mayors

EVs2Scale2030 Advisory Board

Chair: PG&E, Patti Poppe

Ameren, Mark Fronmuller

ComEd, Gil Quiniones

GRE, Jeff Haase

LCRA, Khalil Shalabi

National Grid, Rudy Wynter

SMUD, Rachel Huang (LPPC)

Southern Company, Chris Cummiskey

Xcel Energy, Emmett Romine

APPA, Paul Zummo

EEI, Kellen Schefter

NRECA, Angela Strickland

NARUC, Katherine Peretick (Michigan PSC)

ATE, Phil Jones

AAI, John Bozzella

Amazon, Sujit Mandal

Caterpillar, Rob Schueffner

Daimler Truck, Diego Quevedo

JOET, Rachael Nealer

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PROJECT PARTNERS

BROAD INDUSTRY SUPPORT

amazon

Ameren

AUSTIN ENERGY®

CATERPILLAR

CenterPoint Energy®

conEdison

Consumers Energy
Count on Us

exelon™

FirstEnergy®

GREAT RIVER ENERGY.

JEA
Building Community®

nationalgrid

New York Power Authority

Your Energy Partner
OPPD
Omaha Public Power District

PGE

PG&E®

Seattle City Light

SOUTHERN CALIFORNIA EDISON®

Southern Company

SMUD®

SRP

Xcel Energy®

eRoadMAP | Input Collaborators

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ANALYTICS

EPRI

RMI
ENERGY. TRANSFORMED.

U.S. DEPARTMENT OF ENERGY

NREL
NATIONAL RENEWABLE ENERGY LABORATORY

DATA

amazon

DAIMLER TRUCK

TESLA

WORLD RESOURCES INSTITUTE

PACCAR

NAVISTAR

Enterprise Mobility™

NADA NATIONAL AUTOMOBILE DEALERS ASSOCIATION

PITT OHIO
SUPPLY CHAIN • LTL • TL

VOLVO

MANHATTAN BEER DISTRIBUTORS

Also:

Experian

GEOTAB ITS

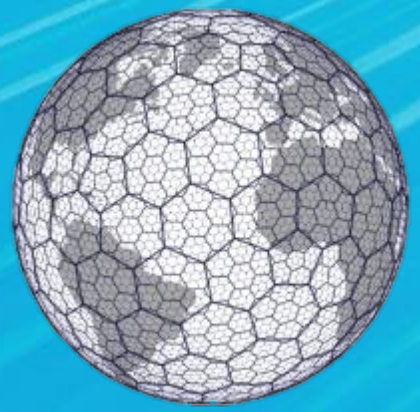
INRIX

REPLICA

1 Improved Data Resolution Techniques

Res	Average Hexagon Area (km^2)	Average Hexagon Area (mi2)
0	4,357,449.42	1,682,419.93
1	609,788.44	235,440.54
2	86,801.78	33,514.34
3	12,393.43	4,785.13
4	1,770.35	683.53
5	252.90	97.65
6	36.13	13.95
7	5.16	1.99
8	**0.74**	**0.28**
9	0.11	0.04
10	0.0150	0.0058
11	0.0021	0.0008
12	0.0003	0.0001

Where Hex8 ~ 1 or 2 feeders



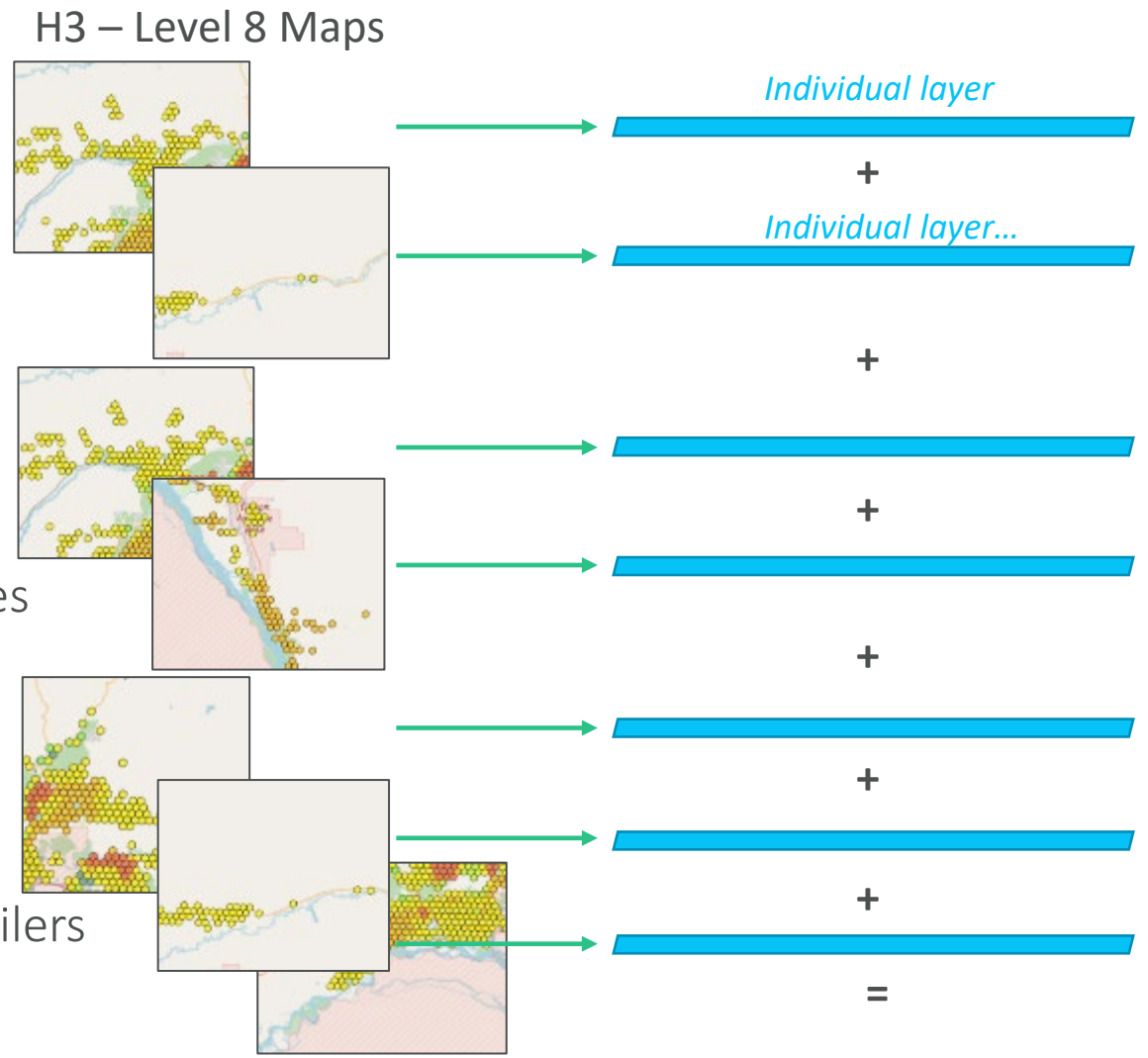
2 LAYERED DATA APPROACH

LD Vehicles
- Registrations
- Travel Models

MDHD Vehicles
- OEM data
- Fleet data
- Travel Data

Other Vehicle Sectors
- Transit/School Buses
- **Government Fleets**
- Ports/Airports
- Vocational Fleets

Other Load Data
- EVSPs/Fueling Retailers

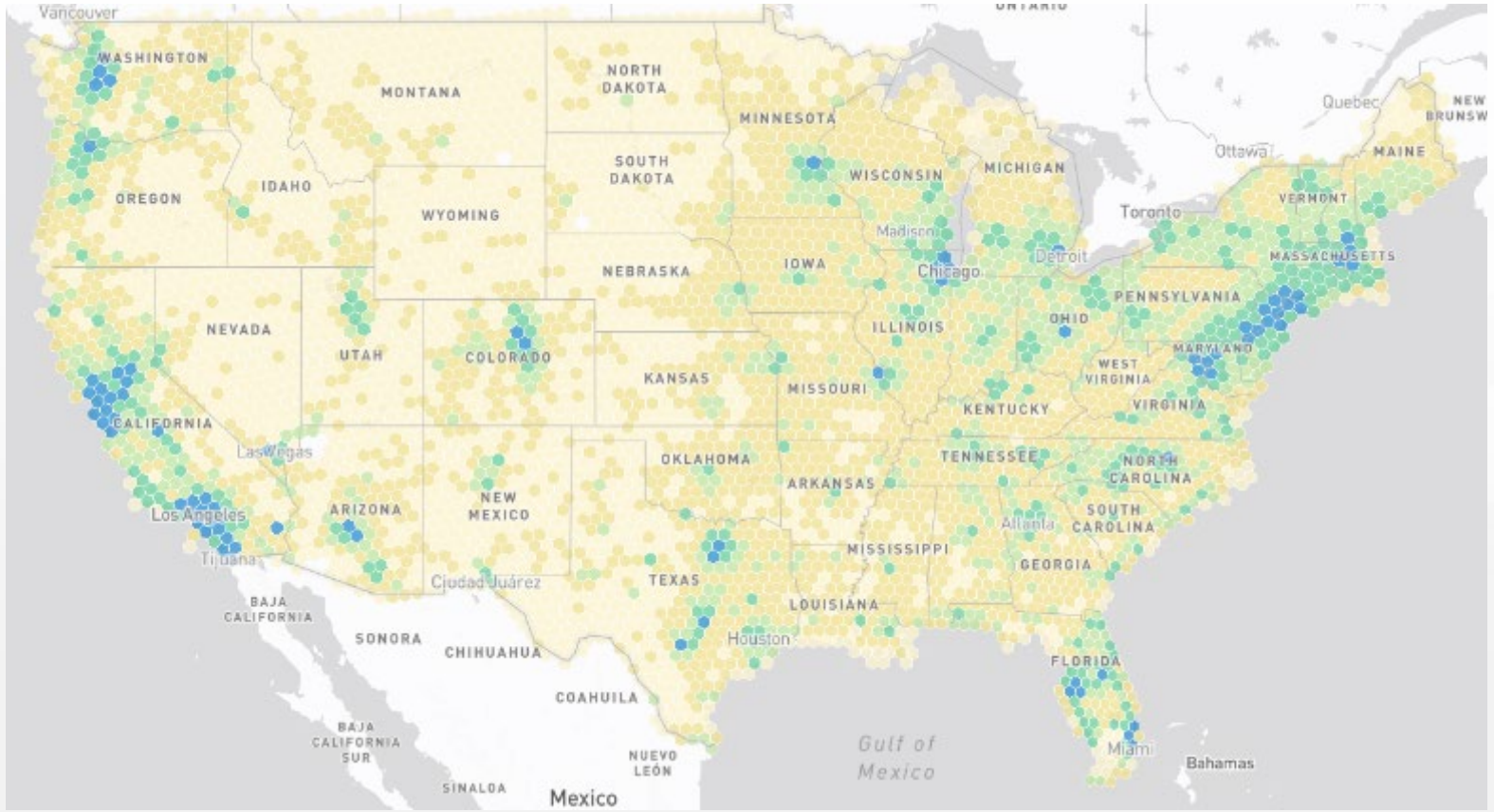


One map with energy + power needs

General Problem to be Addressed

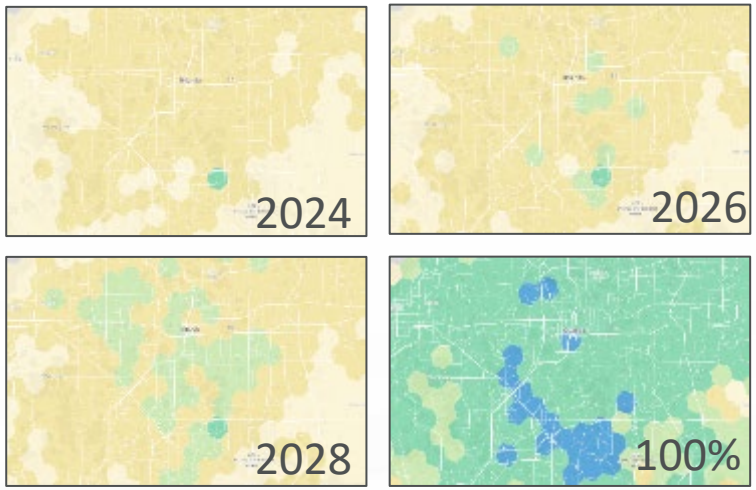
Where and when will loads appear on the grid?

https://eroadmap.epri.com/



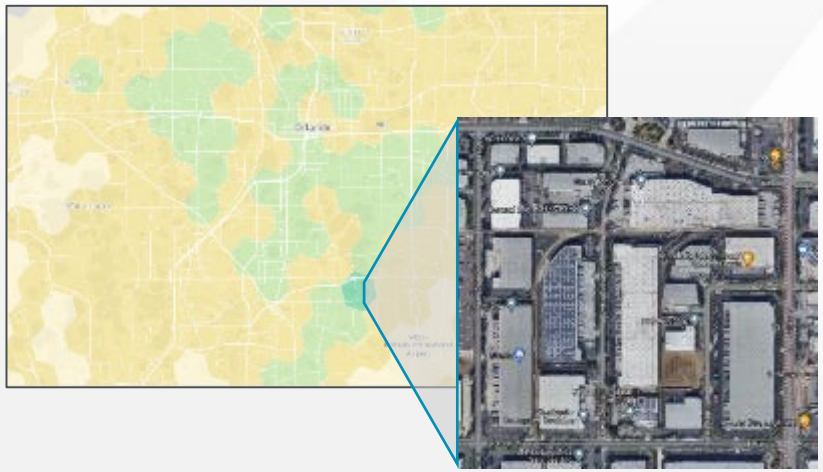
eRoadMAP: Interactive Load Map to Hex8 Resolution (0.28 mi^2)

Fleet Electrification Over Time

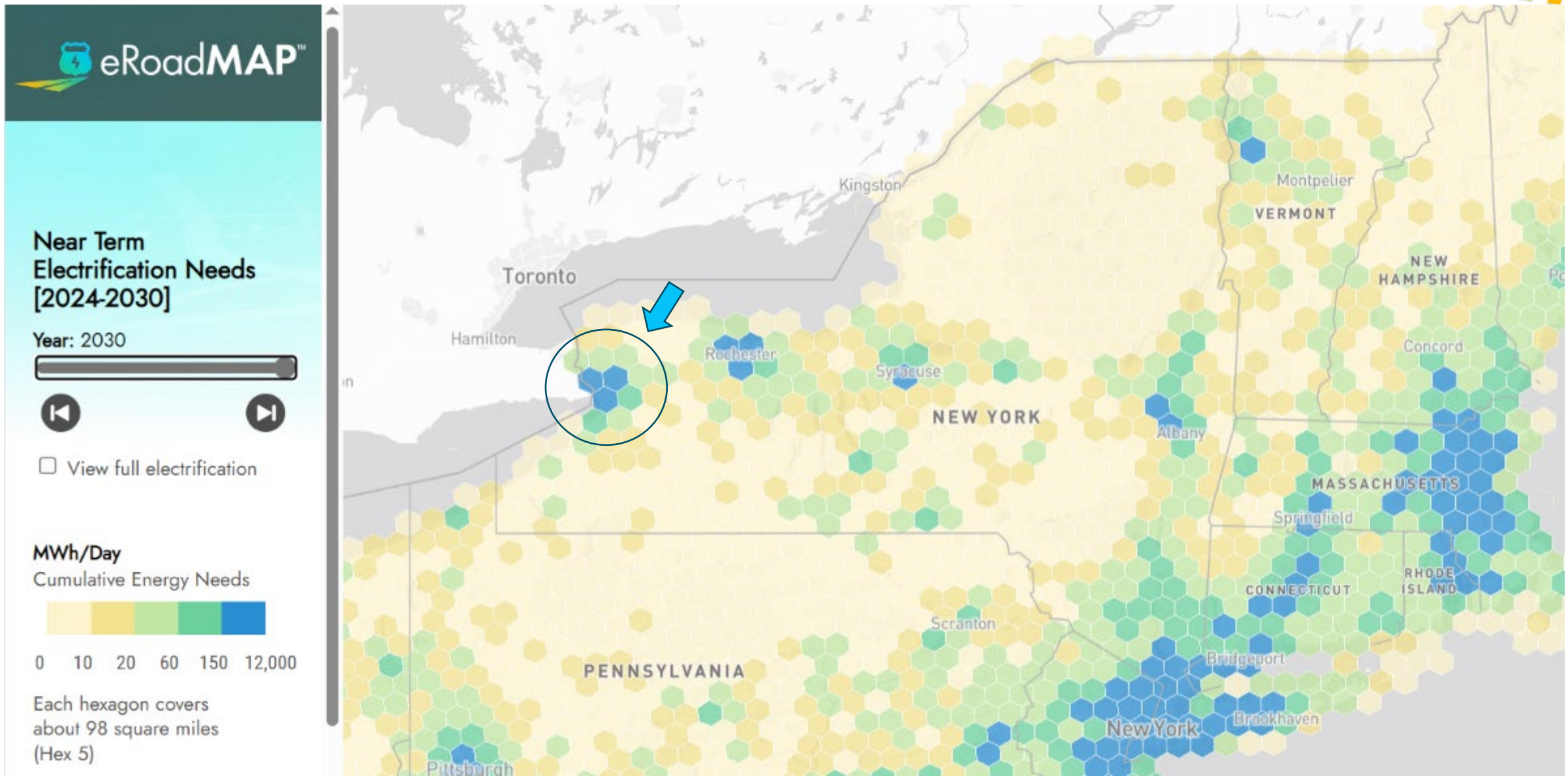


Fleet activity aggregated to Hex8 Level

(protects proprietary fleet data)



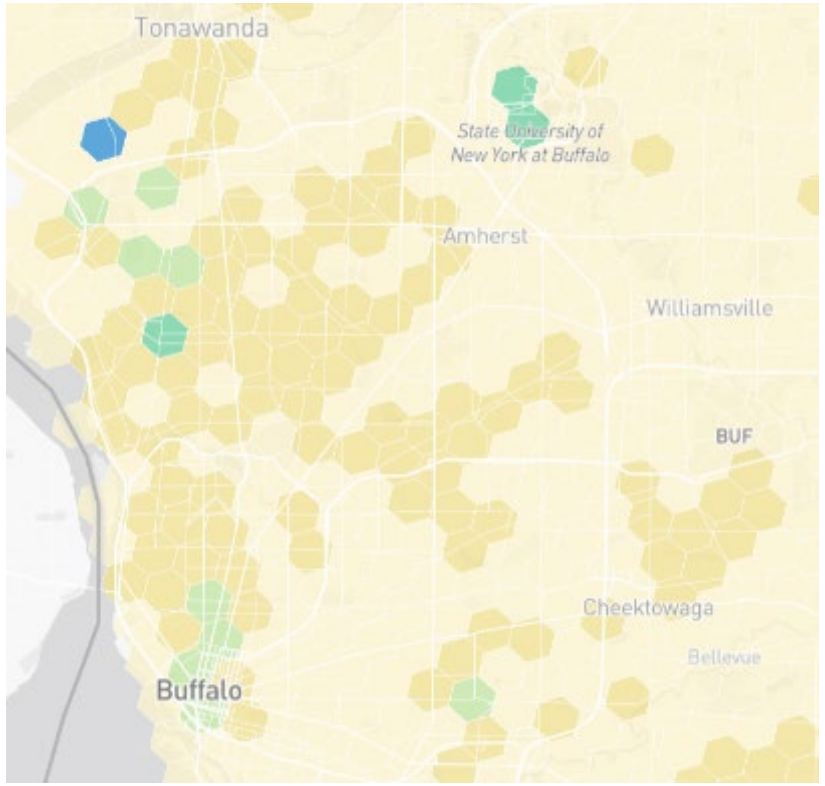
Interactive Energy Map: Northeast States (2030)



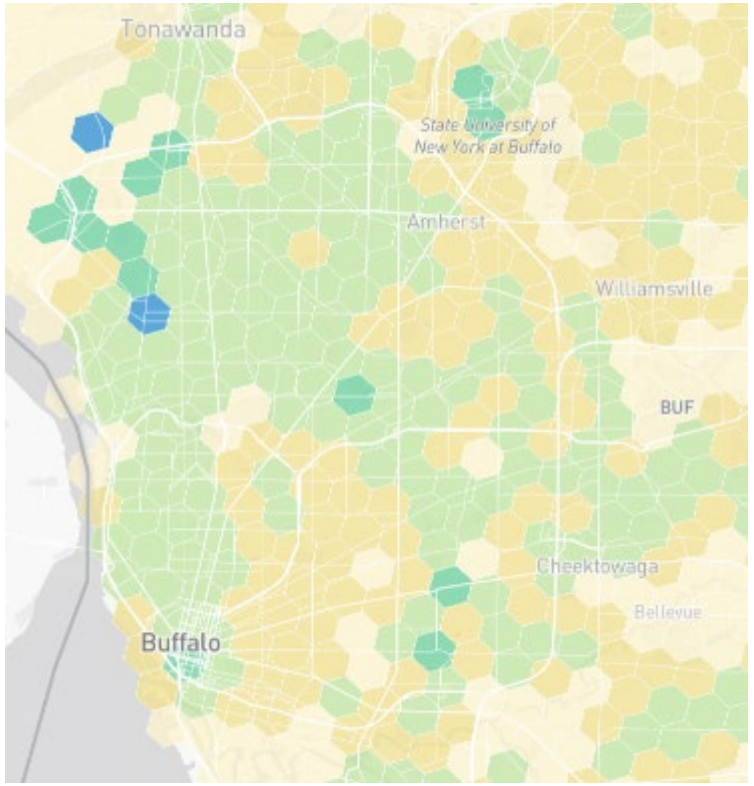
Interactive Energy Map: Buffalo Metropolitan Area

2027 to 2030 to Full Electrification Comparison

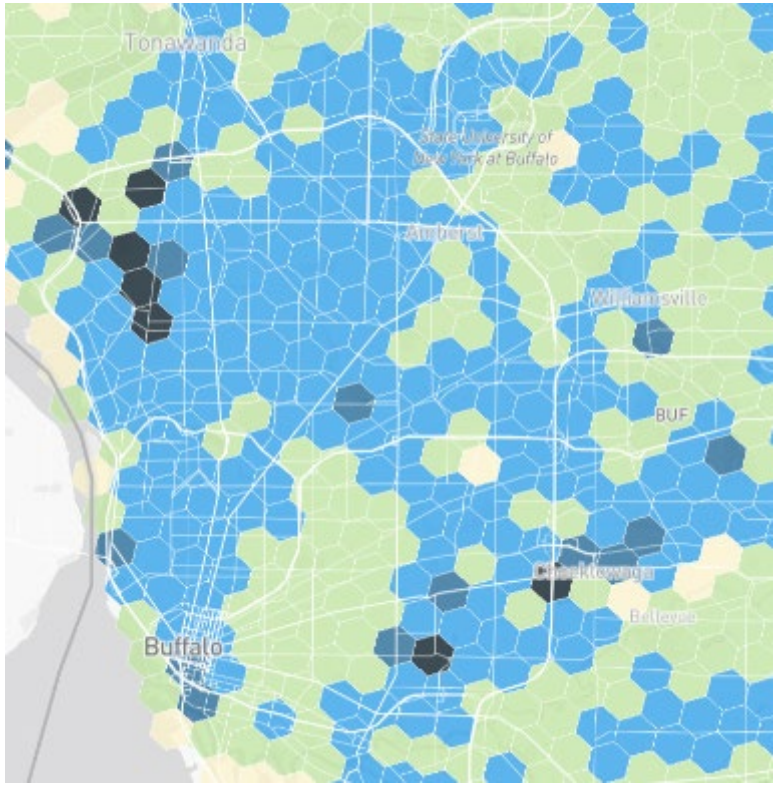
2027



2030



Full Electrification

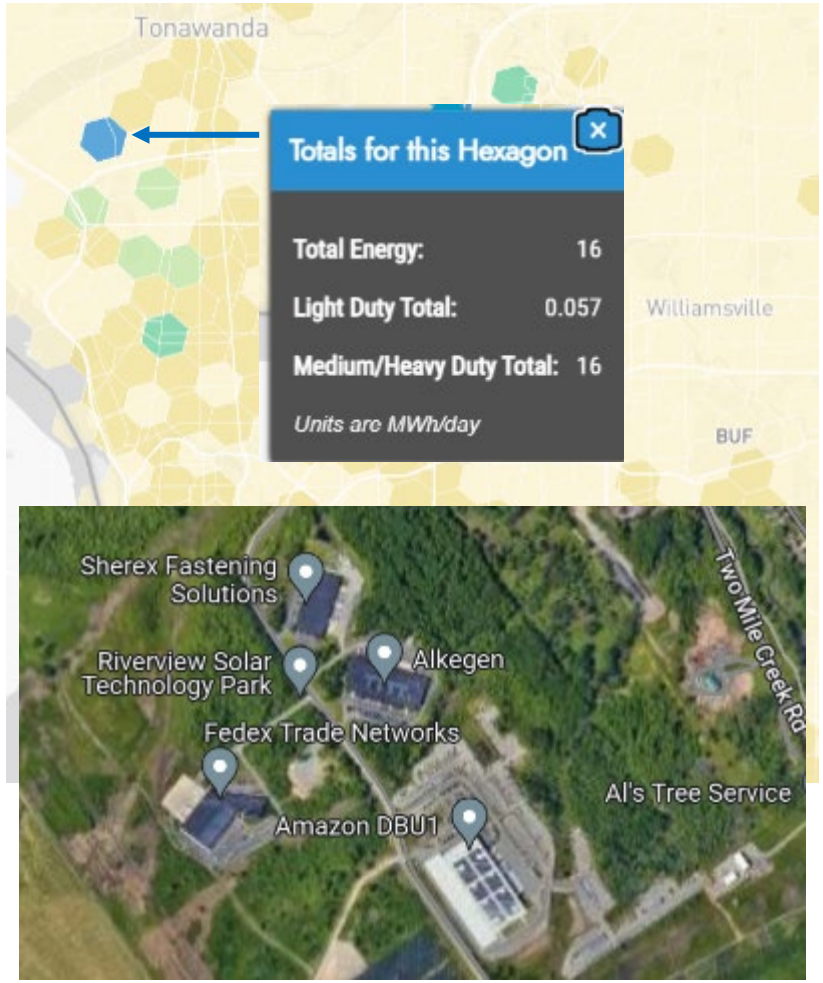


Hex 8 (0.28 mi^2)

Interactive Energy Map: Buffalo Metropolitan Area

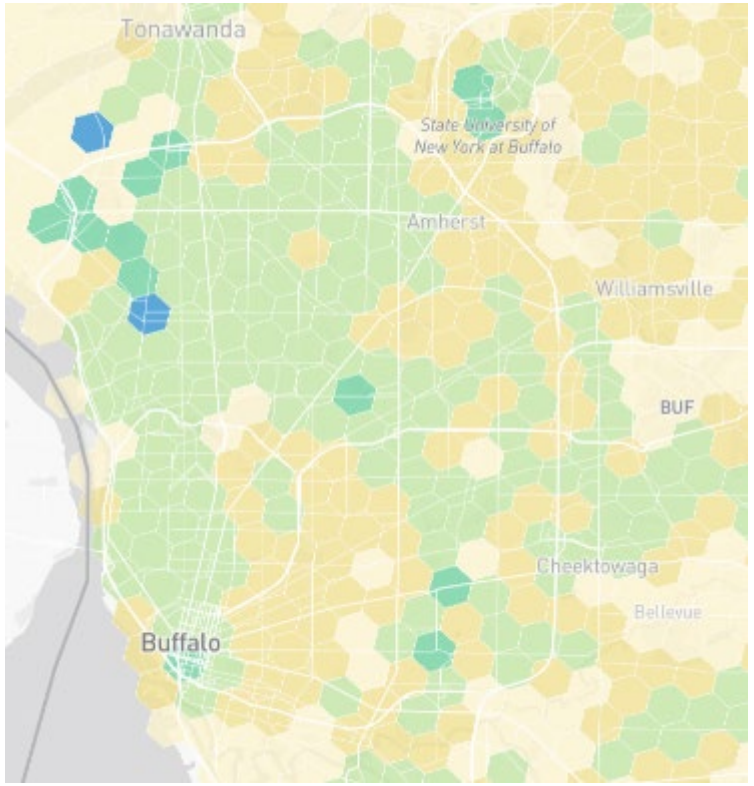
2027 to 2030 to Full Electrification Comparison

2027

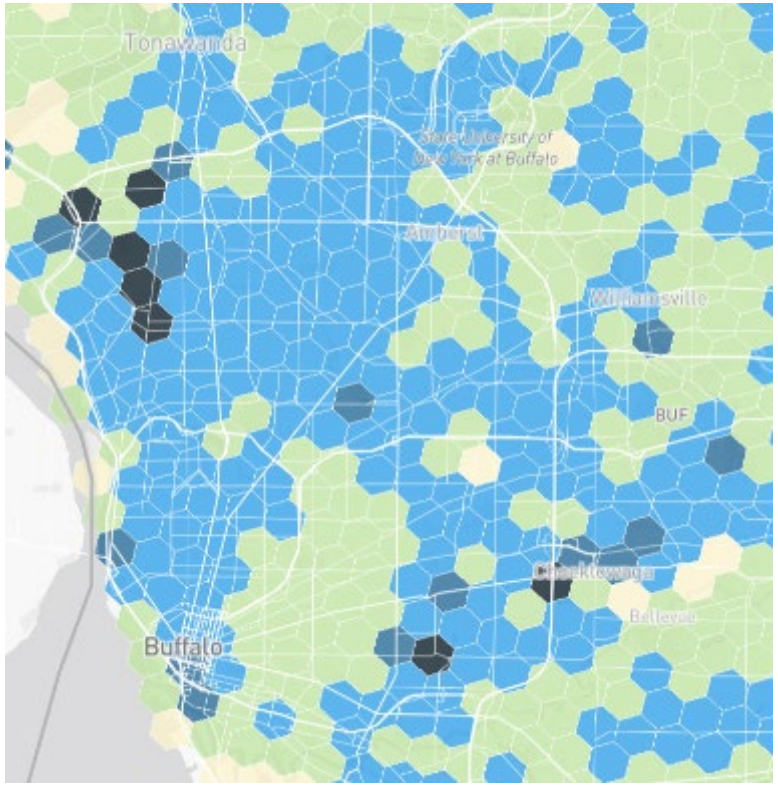


Hex 8 (0.28 mi^2)

2030



Full Electrification



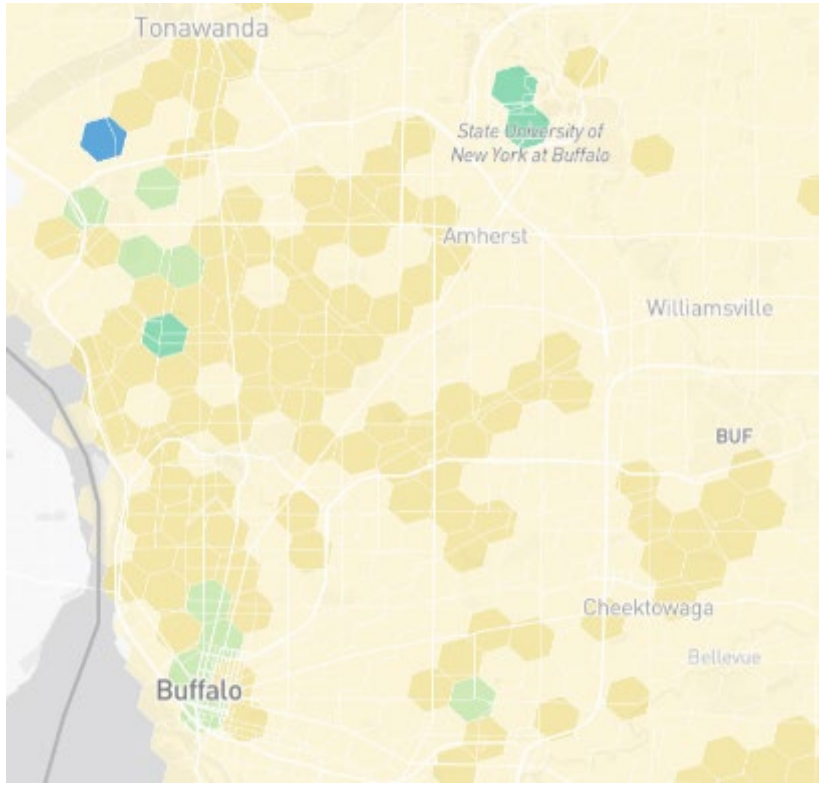
- Amazon
- FedEx
- Al's Tree Service
- Alkegen
- Sherex Fastening
- Solar Technology Park

Interactive Energy Map: Buffalo Metropolitan Area

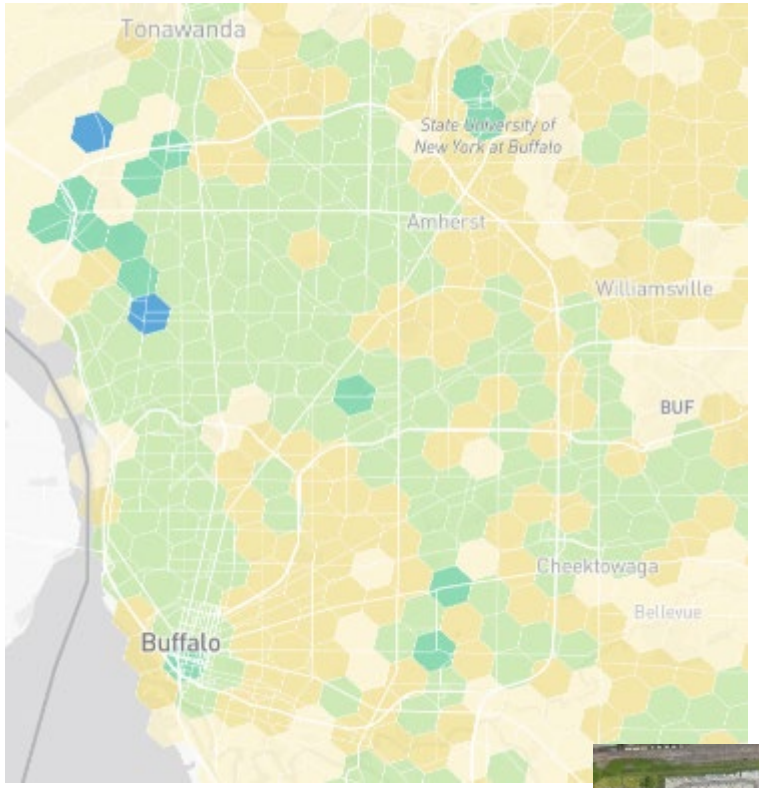
2027 to 2030 to Full Electrification Comparison

EVs2Scale 2030

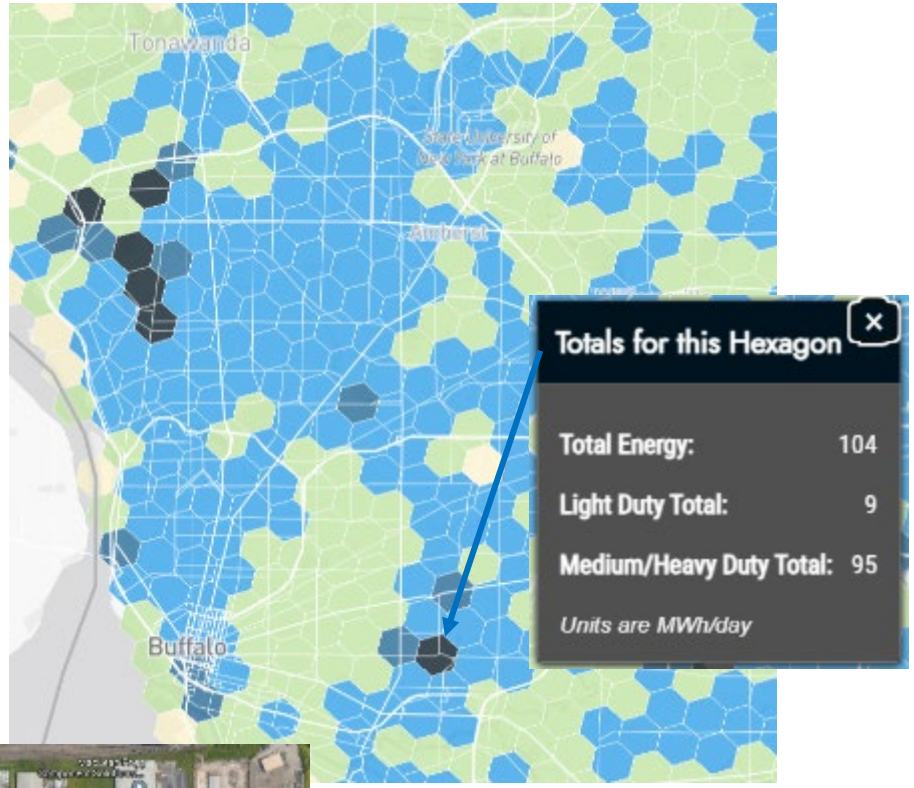
2027



2030



Full Electrification



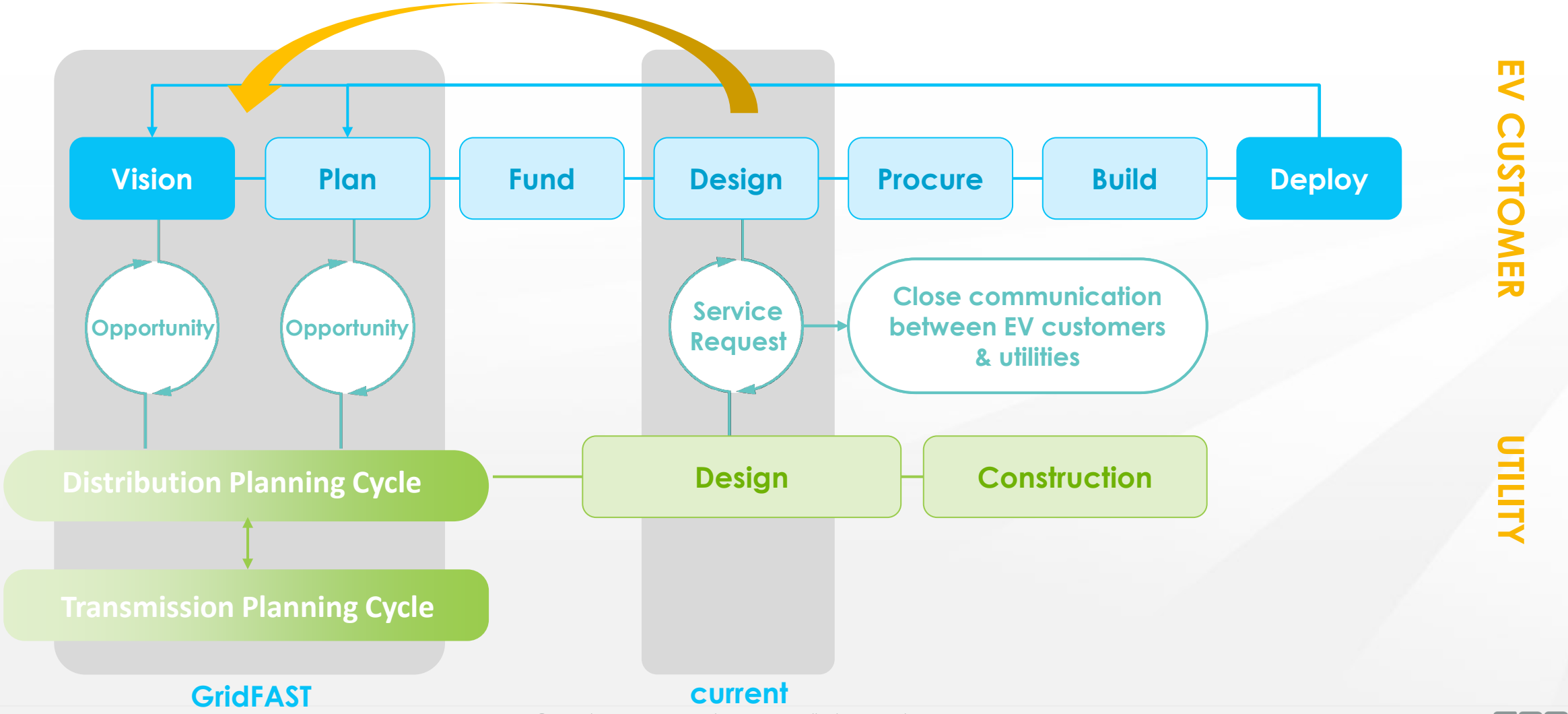
- UPS
- Big Lots
- Buffalo Games
- CVM Electric
- FeedMore
- MacLean-Fogg Components
- North Star Supply

Hex 8 (0.28 mi^2)

EPRI

Grid Interconnection Problem Statement

How might we help EV customers and utilities get ***actionable*** information ***earlier***?



GridFAST | Addressing 15 Pain Points in Grid Interconnection

EVs2Scale 2030

Vision & Strategy

Provide tools to educate fleets and **make the case for electrification**

Help fleets forecast where/when to electrify (beyond 2 years) to **drive more certainty in fleet plans**

Create a standard practice (across utilities) to gather fleet plans early so **utilities can incorporate into D&T planning**

Validate fleet plans so utilities can confidently invest in costly grid upgrades

Help smaller utilities establish EV processes so they can better support EV projects

Plan & Forecast

Kickstart fleet communications with the right utility/POC to **eliminate nonvalue-added fleet efforts**

Educate fleets on electricity and utility processes and programs to **eliminate nonvalue-added utility efforts**

Help fleets gain more accurate insights into grid capacity, upgrade timelines and costs, so they can **select more viable locations**

Help utilities provide real-time, updated feeder capacity data so fleets can **select more viable sites before submitting a formal request**

Help fleets model and calculate charging and power scenarios to **minimize costly and potentially unnecessary grid upgrades**

Provide fleets with smart, interactive tools to alleviate utility bottlenecks (e.g., staff shortages) **without having to wait for a utility engineer**

Funding

Help fleets understand how to qualify/apply for grant and incentive programs so they have **full transparency into the process ahead of time**

Design & Engineering

Create a standardized process for service requests across the utility industry to minimize time-consuming and repetitive workload

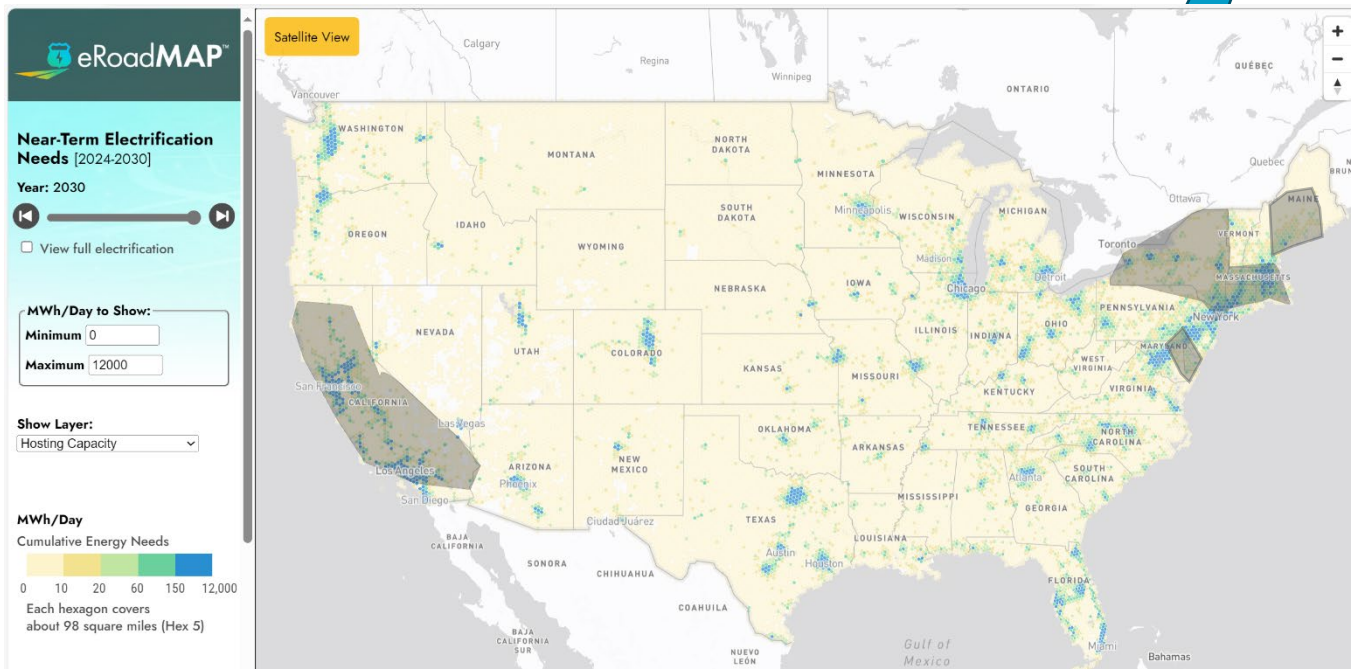
Help utilities provide more timeline transparency to fleets (e.g. supply chain delays, resourcing, permits, easements) so **fleets can account for it in their project planning**

Approvals & Procurement

Set a standard for fleet x utility best practices to **minimize back and forth and timeline delays**

EPRI

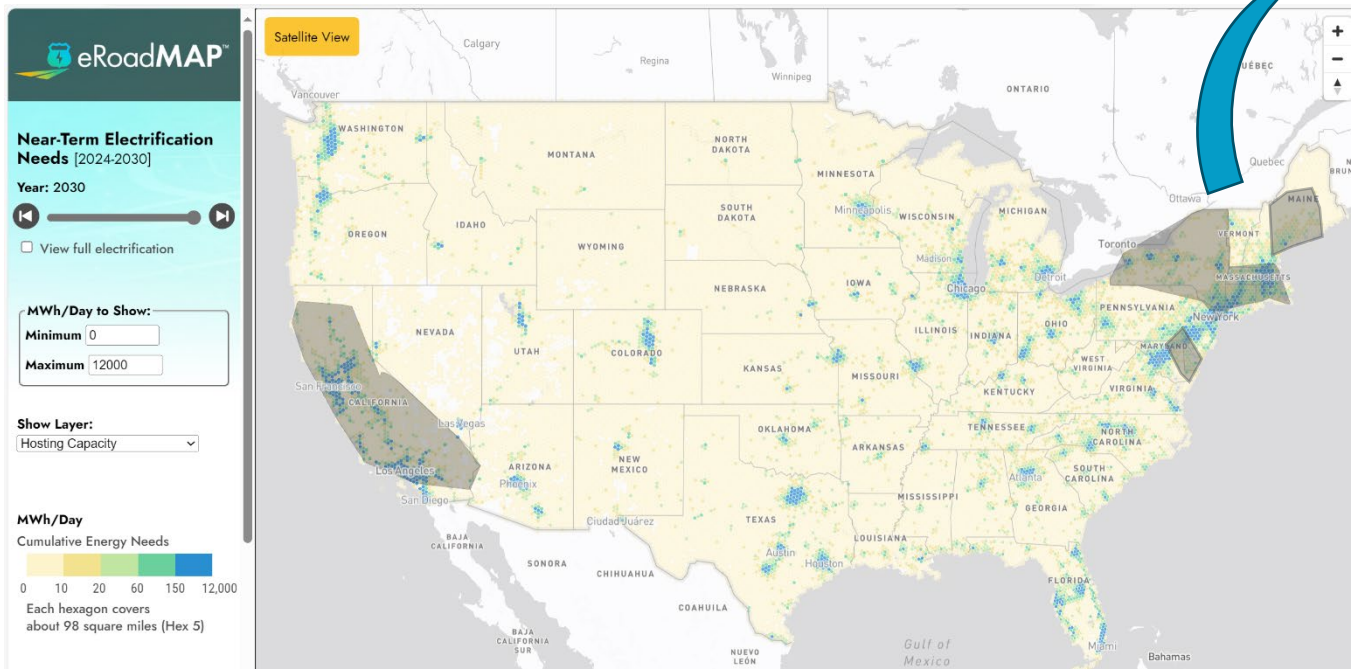
eRoadMAP | Grid Hosting Capacity Maps

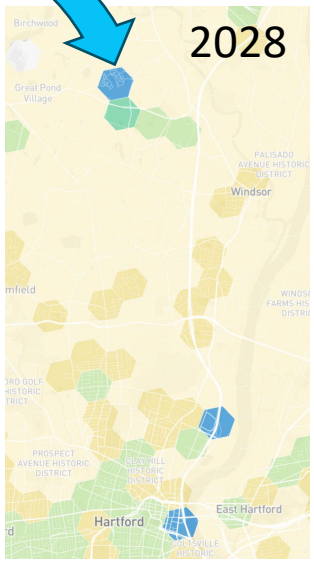


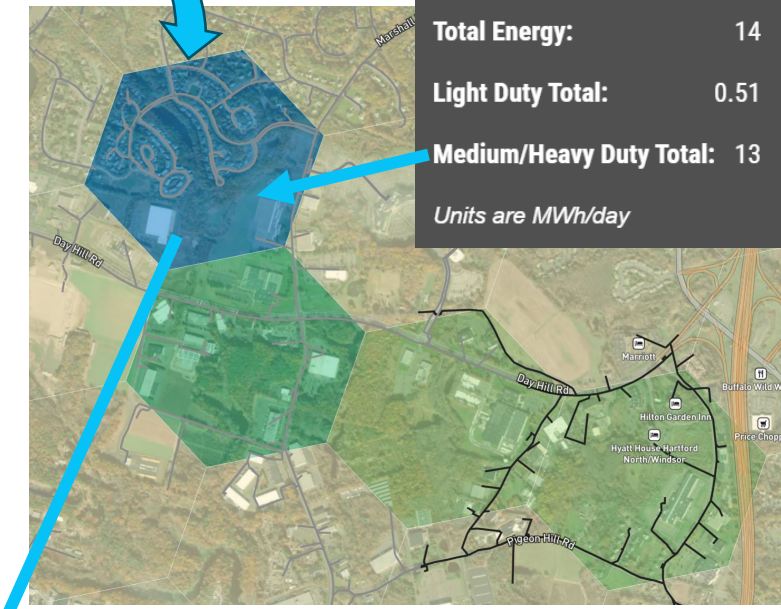
Load Capacity Maps from 14 Utilities include:

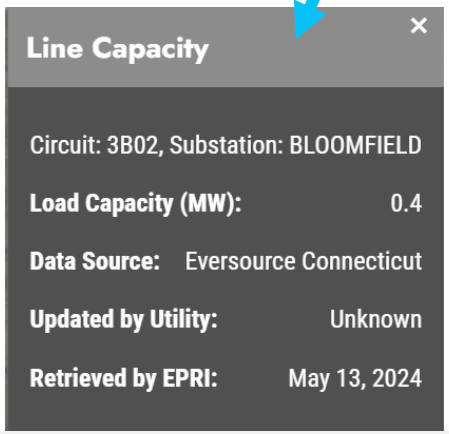
- **California**: PG&E, SCE, LADWP
- **Connecticut**: Eversource, United Illuminating
- **Delaware**: Pepco Holdings
- **Maine**: Central Maine Power
- **Massachusetts**: National Grid
- **Maryland:** Pepco Holdings
- **New York**: National Grid, ConEd, Orange & Rockland, Central Hudson, NYSEG, and Rochester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

eRoadMAP | Grid Hosting Capacity Maps









In 2028, 13 MWh (energy) forecast north of Hartford, CT; Eversource showing estimated 0.4MW (power) available. Note, major logistics provider in this area.

Grid Capacity Mapping | Status

Plan A – Feeder Capacity

Members

Con Edison
National Grid (NY & MA)
Orange & Rockland (NY & NJ)
Pacific Gas & Electric
Southern California Edison
Exelon (PHI)
Ameren (IL)
Exelon (ComEd, BGE, PECO)
FirstEnergy (JCPL)
Seattle City Light
Southern Company
Xcel Energy

Non-Members

Central Hudson
LADWP
NYSEG and RG&E
Rhode Island Energy
Eversource (CT)
Avangrid (UI and CMP)
Dominion Energy
DTE
Hawaiian Electric
NV Energy
PSE&G (NJ)
San Diego Gas & Electric

Integrated to eRoadMAP
Working on integrating to eRoadMAP
Not integrated into eRoadMAP for now

Plan B – Substation Capacity

Members

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

Majority seem to have preference for:

- Using hex map format to show substation capacity
- Creating internal versions of maps initially
- Varying preferences on access levels

GridFAST vision

EVs2Scale 2030

Improve transparency in EV charging planning to inform grid investments and accelerate grid interconnects

2024-2035 plans defining loads, locations, timing

TRUCKING FLEET OPERATORS
amazon
FedEx

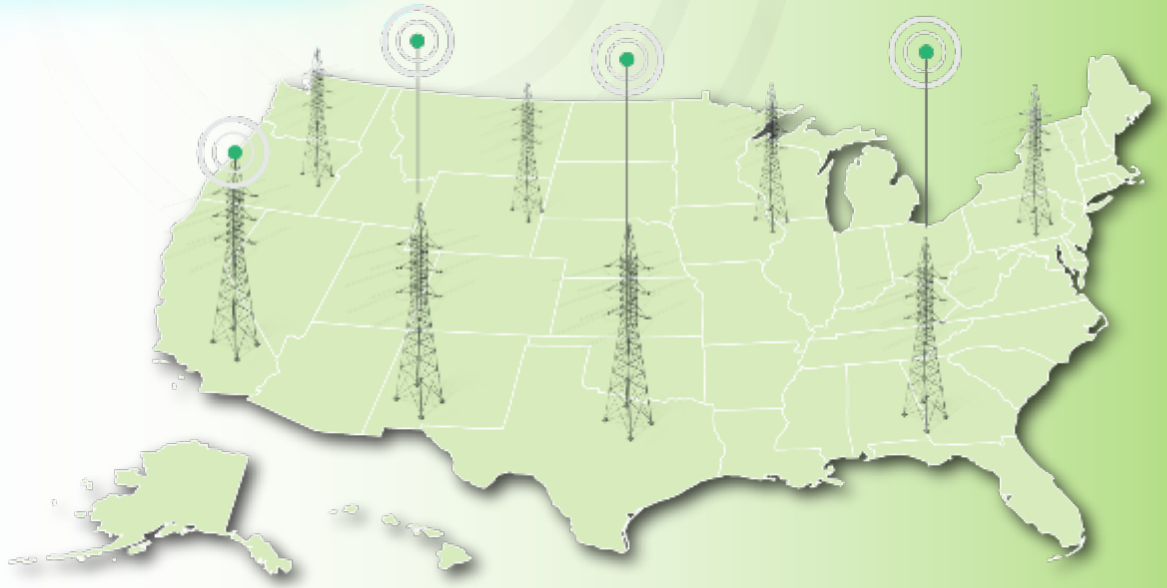
FUELING RETAILERS
bp

FLEET OPERATORS
Hertz

CHARGING SITE DEVELOPERS
TESLA

GridFAST
Secure online data exchange platform

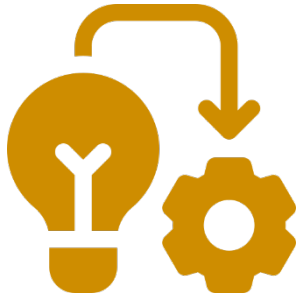
Utility hosting capacity indicating grid readiness, timing to support EV charging loads



EPRI

How GridFAST works

EVs2Scale 2030

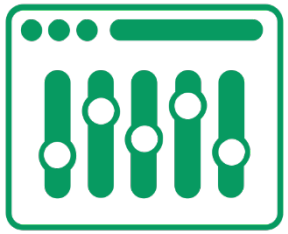


Project Input

EV customers enter their project concepts into GridFAST, and can view hosting capacity maps, if available

Utility Match

GridFAST matches EV projects to the relevant utility to start the exchange based on vetted information



Capacity Information Exchange

GridFAST is an easy and secure system for utilities to provide program and processes info to EV customers

Preparation of Service Request

EV customers finalize project details

Service Request

EV customer information in GridFAST submitted to utility when they're ready to move forward

EV Common Service Application Prototype

EVs2Scale 2030

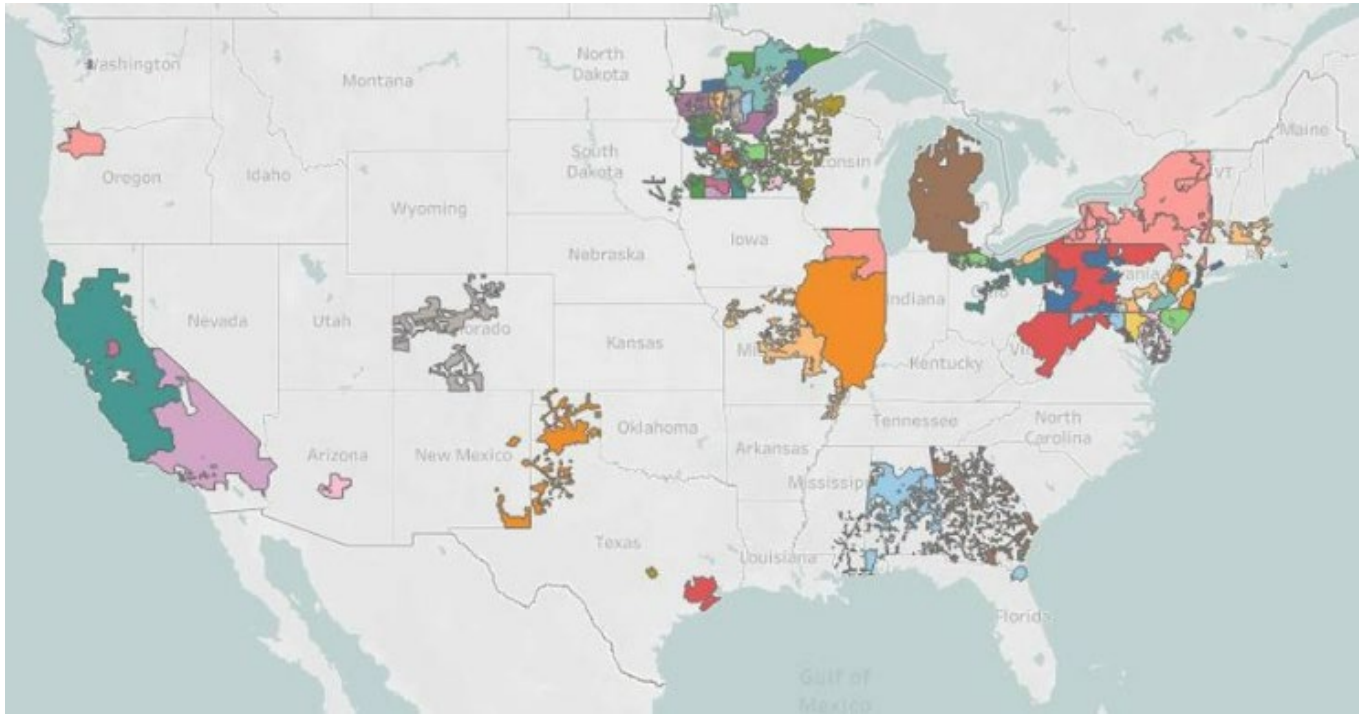
Common Utility Questions

- Customer Contact Info (primary, contractor, energy billing,…)
- Site Address
- Charging Characteristics (charger ownership,…)
- Service and EV Load Info (kW, voltage, panel size,…)
- Document Uploads (site plan,…)
- Project Delivery (ISD,…)

Custom Utility Questions

SCE	ConEd	SMUD	National Grid	PG&E	Exelon
• Meter access details • Total site square footage		• Overhead vs. underground service • Meter access details • On-site generation?		• Request due to natural disaster? • Desired electric rate • Pre-assessment needed? • Building Permit?	

Staged Rollout



Deployment

- Proactive campaign to utilities (onboarding resources, utility training, …)
- Staged campaign for EV customers, starting with leading EV customers first
- Continue to refine GridFAST based on user feedback

- Late 2024: Early Internal Access for EVs2Scale Member Utilities
- Early 2025: Phase 1 Operational Launch for EVs2Scale Members and leading EV customers
- General Rollout: TBD

Regulatory/Policy Outreach

COMING In OCTOBER:

A 50-State/National Outreach Package for regulators, legislators, consumer advocates, and federal agencies that leverages eRoadMAP™ and GridFAST™ to build a case for proactive grid investment that enables timely scale

- 13 states completed
  - AZ, CA, CO, FL, GA, IL, MA, MD, MI, NM, NY, PA, TX
- **Previewing with the task force and EVs2Scale members** on the best forums and key stakeholders to share with
- **Summarizes key messaging**
- **Coordinating with the EPRI-ATE proactive grid build task force**

Released Reports + Tools

1

EVs2Scale Website

[EVs2Scale2030 | EPRI](https://msites.epri.com/evs2scale2030) --
https://msites.epri.com/evs2scale2030

2

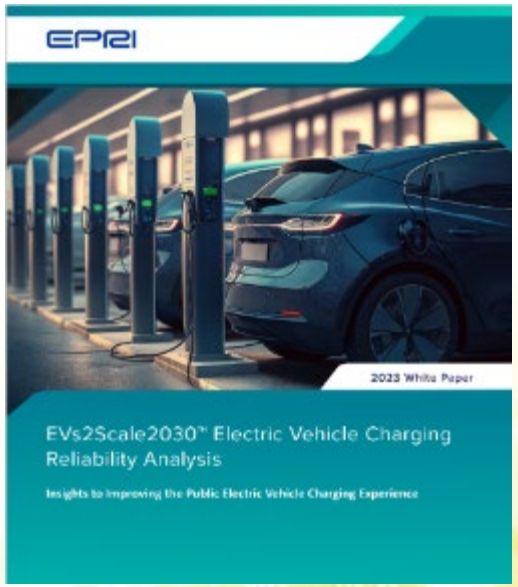
VPL (Vetted Product List)

3

Grid Primer

4

EV Charging Reliability Analysis



5

eRoadMAP™

6

EVs2Scale 2030

Thank You

www.epri.com

EPRI