eRoadMAP™

USER GUIDE

EPRI | EVs2Scale2030™

www.epri.com

eRoadMAP™ OVERVIEW

If You Can't Measure It, You Can't Manage It.

- A first-of-its-kind online interactive grid planning tool developed to help electric utilities and other stakeholders prepare to meet the needs of transportation electrification by identifying when, where, and how much load electric vehicles will represent across the entire U.S. electric grid.

- This public tool identifies the energy and power needs of an electrified transportation sector including light-, medium-, and heavy-duty (LD/MD/HD) vehicles in a quarter square mile area (roughly one feeder circuit).

- The tool allows users to explore how quickly vehicles in different areas are expected to electrify and identifies where they are likely to require electric power infrastructure and grid interconnections to support EV charging.

- This unprecedented level of detail will help utilities more confidently plan and prioritize "no regret" grid investments.

eRoadMAP™ Data Partners

ANALYTICS

EPRI

RMI
ENERGY. TRANSFORMED.

U.S. DEPARTMENT OF ENERGY

NREL
NATIONAL RENEWABLE ENERGY LABORATORY

DATA

amazon

DAIMLER TRUCK

TESLA

WORLD RESOURCES INSTITUTE

PACCAR

INTERNATIONAL

REPUBLIC SERVICES
Sustainability in Action

Enterprise Mobility™

NADA
NATIONAL AUTOMOBILE DEALERS ASSOCIATION

PITT OHIO
SUPPLY CHAIN • LTL • TL

VOLVO

MANHATAN
BEER DISTRIBUTORS.

eRoadMAP™ VERSION 2.2

What's Included in eRoadMAP™ Version 2.2

- Includes near-and mid-term transportation energy needs from a variety of sources through an anonymous, secure, and transparent data collection process.
- The tool reflects energy and power needs at approximately the distribution feeder level to better enable utilities to plan for grid impacts.
- Funding Partners will have access to the data behind the online tool down to the Hex 8 level. This data can be delivered as heat maps, .csv files, or shapefiles.
- The map shows the estimated year-over-year daily energy and power needs for transportation electrification between 2024-2030, as well as the future loads expected if 100% of on-road transportation is electrified. Additionally, the energy and power needs are broken down into light-duty and medium-/heavy-duty vehicle needs, managed and unmanaged charging scenarios and the option of the removal of long distance medium-/heavy-duty vehicle travel.

eRoadMAP™ UTILITY USAGE **GUIDANCE**

eRoadMAP is a Starting Point for Strategic Planning + Stakeholder Engagement

CUSTOMER ENGAGEMENT

- Assist key account representatives and fleet advisors to identify + prioritize key customers
- Facilitate strategic discussions with customers
- Help identify + prioritize system load pockets ('hot spots')

LOCAL GRID PLANNING

- Strategic Planning
- Early Load Projection Planning
- Load and Rate Forecasting
- Multi-Year Capital Planning
- Project Planning

STAKEHOLDER OUTREACH

- Facilitate proactive dialogue + engagement with critical external stakeholders, including:
  - Regulators
  - State legislators and government agencies
  - Local government officials

ENABLES EARLY UTILITY STRATEGY + LOAD PLANNING

Informs Capital and Project Planning

ELECTRIC UTILITY PLANNING STAGES

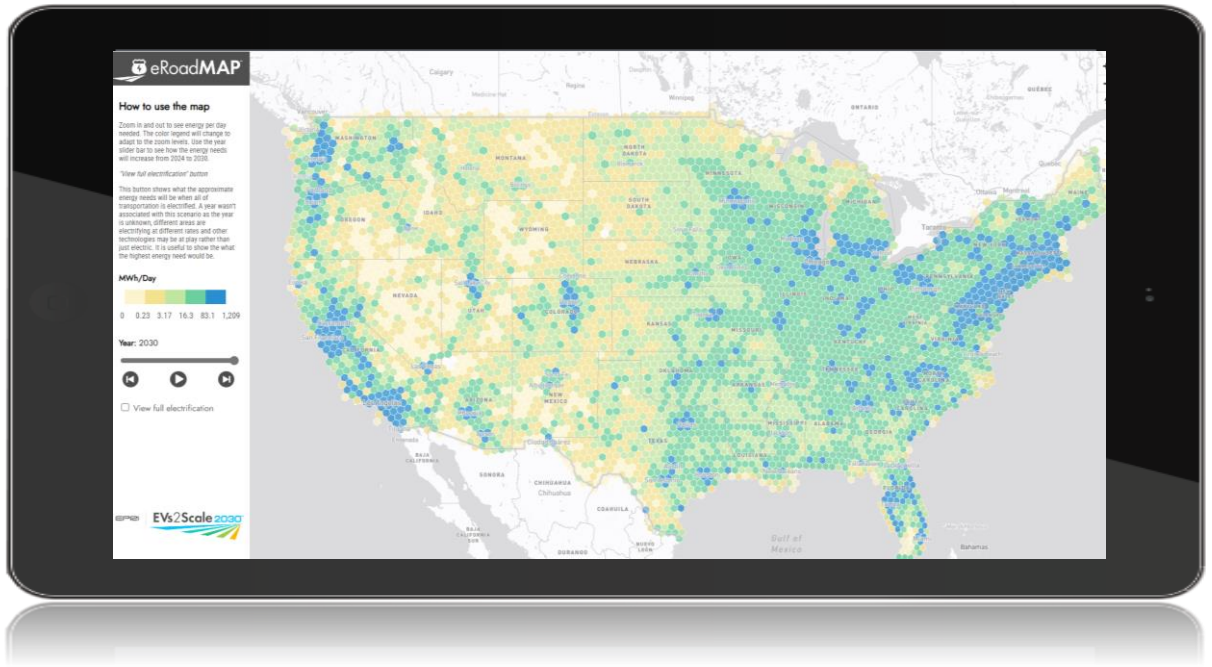
eRoadMAP™ | FUTURE FEATURES

Future Additions to eRoadMAP

- Additional vehicle sectors:
  - Transit buses
  - Federal, state, and municipal fleets

- Continued inclusion of additional fleet and OEM data over time

eRoadMAP™ FEATURES



ENERGY + POWER NEEDS ESTIMATES

- Light-, medium-, and heavy-duty electric vehicle energy and power need estimates
- Growing EV adoption from 2025 through 2030, plus a snapshot of a 100% electrified on-road transportation system
- Zoom out/in from hexagons of 684 sq miles down to 0.28 sq miles, for the entire U.S.
- Drop down layer data which includes; utility service territory, hosting capacity information, truck stops, justice 40 communities, existing public EV charging, transportation burden and air quality.

Methodology Used to Create **eRoadMAP**

1. **Adoption Timeline to**
   EPRI is monitoring vehicle sales, fleet adoption trends, policy developments, and multiple yearly EV forecasts. These are all incorporated into an adoption trajectory out to 2030. EPRI also includes a 100% electrification scenario to show what energy and power would be needed if all on-road transportation is electrified.

2. **Documenting Conventional (Gas and Diesel) Vehicle Behavior**
   EPRI collected data from travel models, OEMs, registrations, and other sources to document local daily miles traveled as well as where vehicles primarily dwell. Until now, this data set for conventional vehicles across the light-, medium-, and heavy-duty sectors didn't exist. Where vehicle data was missing, EPRI used weighting to represent the full behavior of the vehicle fleet.

3. **Conversion of Conventional Vehicle Behavior to Electric Vehicle Needs**
   EPRI used a vehicle energy conversion factor to convert from daily conventional miles driven to daily energy and power needed to meet policy goals. These conversion factors varied between light-, medium-, and heavy-duty vehicles. As more data is collected from electric vehicles on the road, these conversion factors will be updated to reflect real world data.

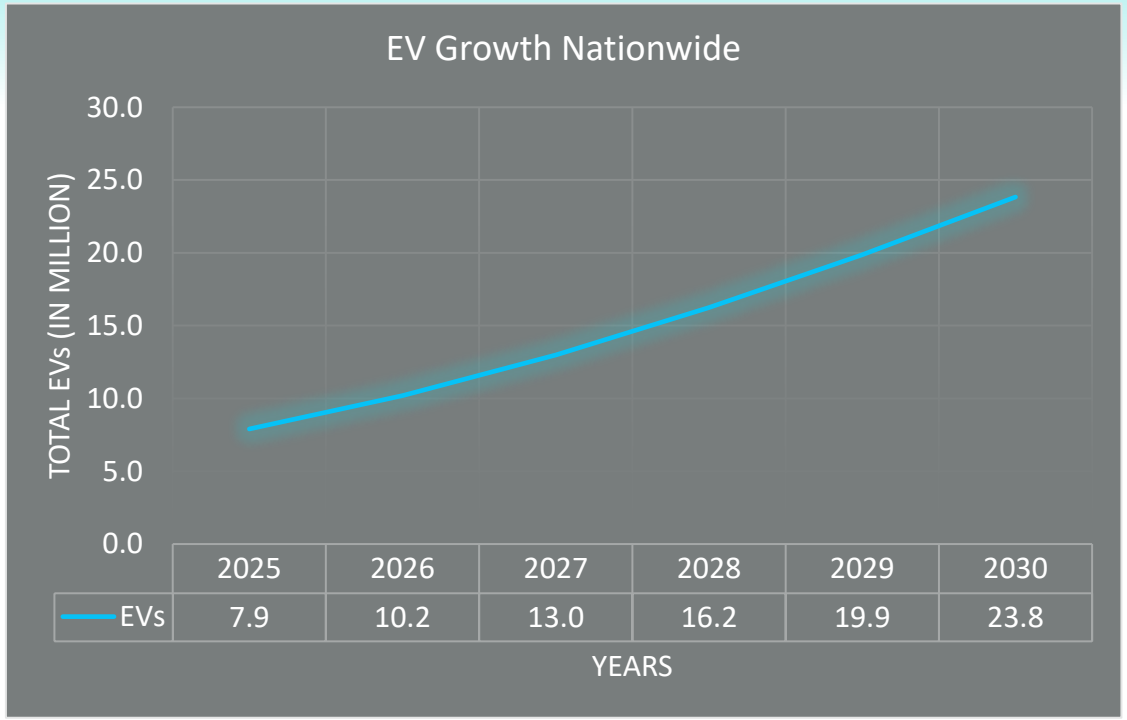
4. **Ongoing Addition of Fleet Electrification + Charging Infrastructure Plans**
   To the extent that fleet electrification and charging infrastructure plans are known, EPRI included these plans in developing the energy needs. Over time, more and more electrification plans will be included in eRoadMAP estimates, ensuring this tool becomes increasingly valuable to all planning stakeholders.

For more information about the assumptions behind eRoadMAP V 2.2 please see the technical document located at https://eroadmap.epri.com.

LIGHT-DUTY ADOPTION PROJECTION ASSUMPTIONS

EPRI adoption from 2025 to 2030

This scenario projects 24M EVs (out of ~243M total vehicles) in 2030. In 2030 87% of EVs were BEVs and 13% were PHEV.



Factors Influencing EPRI Assumptions:

- Adjustments to Federal EV Incentives and NEVI funding
- Individual State Propensity to Purchase EVs
- Additional EV Credits Available in Each State

(Note, EPRI plans to regularly review these assumptions over time to ensure they continue to accurately reflect consumer and market trends)

eRoadMAP™ MEDIUM + HEAVY-DUTY ADOPTION PROJECTION ASSUMPTIONS

EPRI Adoption Trajectory

For MDHD Adoption, States Were Divided Into Three Zones as Defined Below as Different Policies are Applicable for Each Category

California	ACT States	Rest of US
California has implemented a variety of policies and incentives to increase MCHC adoption. Even though ACT is currently withdrawn, California is expected to have higher adoption than other states.	10 other states have adopted the ACT rule. ACT adoption should significantly increase adoption.	In the rest of the U.S. there are a variety of incentives, goals, and market structure that will result in varying levels of adoption, but there are no formal wide-scale regulations.

National resolution NREL scenarios were used to guide adoption levels in the three policy zones. More details about the NREL scenarios used for the three categories above can be found in the technical document (https://eroadmap.epri.com).

The adoption trajectory is built on NREL modeling drawing on the 'Central', 'Advanced ICEV & HEV Technology' and 'NREL Conservative Electricity Price' for the different zones defined to the left.

ACT States: California, Oregon, Washington, Colorado, New Jersey, New York, Vermont, Massachusetts, Maryland, New Mexico and Rhode Island

Where EPRI has additional information on certain segments, those are individually tuned.

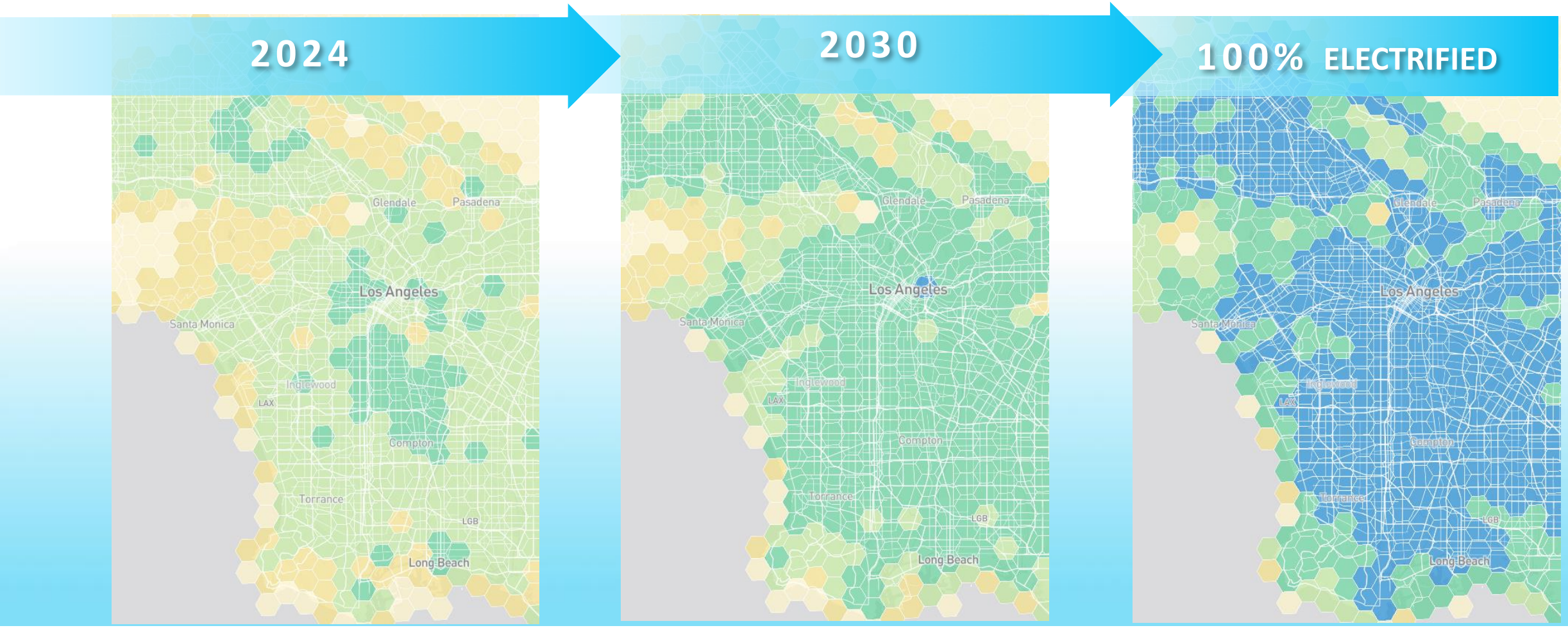
NREL MDHD Scenario Information: https://www.cell.com/iscience/pdf/S2589-0042(24)00606-0.pdf
Data Available at: https://data.nrel.gov/submissions/227

ENERGY NEEDS OVER TIME FOR ALL TRANSPORATION ELECTRIFICATION

eRoadMAP™

MWh/Day

Increasing Energy Need



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FOR QUESTIONS OR ADDITIONAL INFORMATION, PLEASE CONTACT:

eRoadMAP Team @
eRoadmap@epri.com

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