TENNESSEE VALLEY AUTHORITY

EV Evolution

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Signature Transformative Innovation Initiatives

Electric Vehicles…


calm waters?


or a tidal wave?

EV Manufacturing in the Tennessee Valley

Ford

Next-gen EV pickup
2024
Stanton, TN
$5.6B

$12B+
EV manufacturing investments

NISSAN

Nissan Leaf
2013
Smyrna, TN
$2B

gm

Cadillac Lyriq
2022
Spring Hill, TN
$4.2B

VW

VW ID.4
2022
Chattanooga, TN
$1B

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Powerful Forces are Driving EV Adoption

Policy, technology, and compelling EV options are driving consumer adoption

Policy, Legislation, Regulation

IIJA: $17.5B for EVs
IRA: EV tax credit reform
US: 2030 goal 50% EV sales
CA: 2035 ban on ICE cars

Technology "Tipping Points"

300k+ mile batteries
Long range, fast charging
Vehicle autonomy
V2H, V2G

Compelling Vehicles

Consumer Adoption

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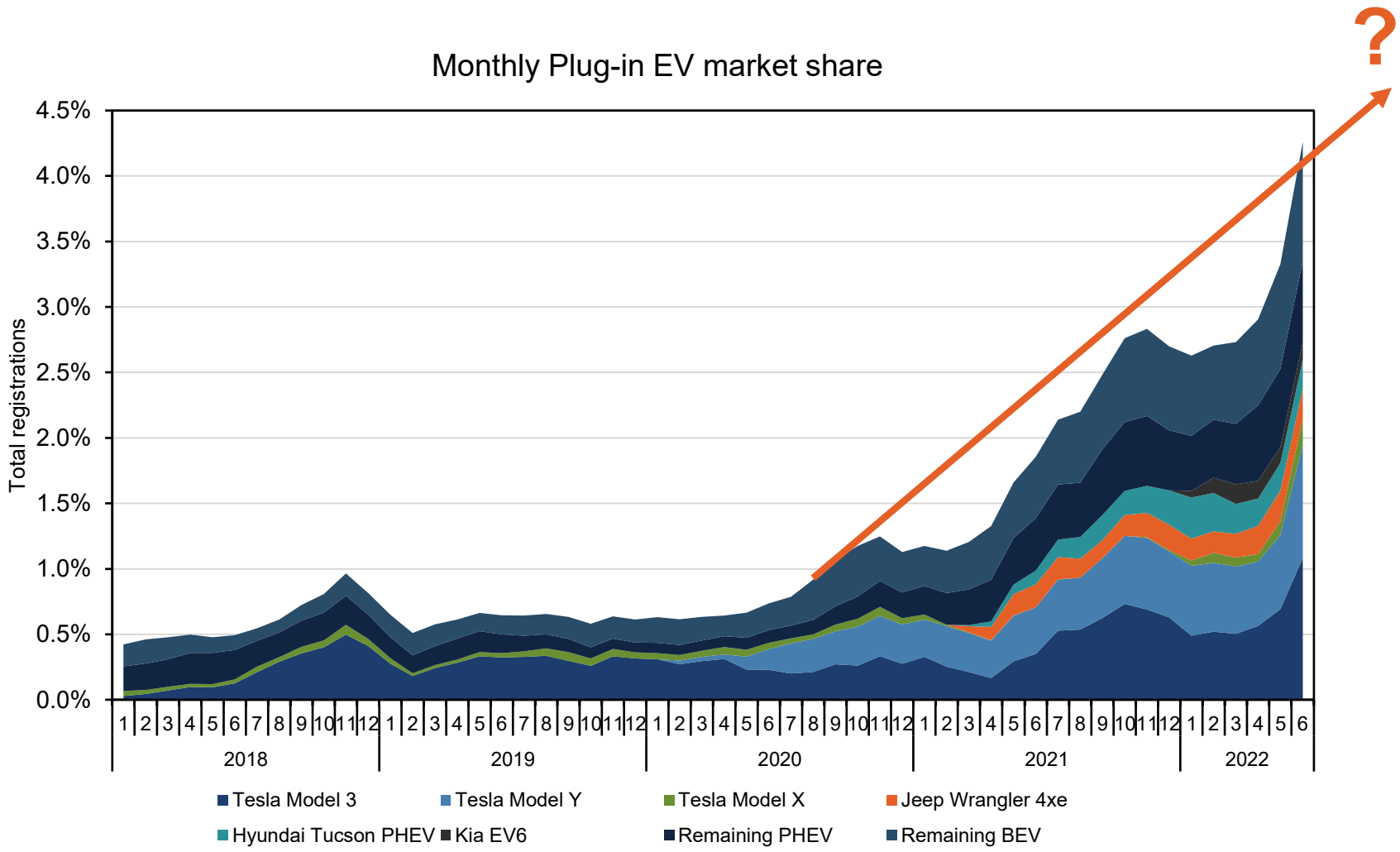
EVs are *accelerating* in the Tennessee Valley

Today:

- 31,000+ EVs on the road
- 50% YoY growth
- LPCs installing new DC Fast chargers



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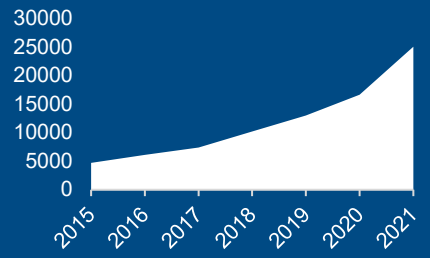
EV Metrics

EV Population

31.0k
EVs in TN Valley
(Q2 2022)

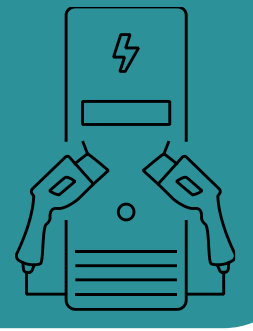


50%+
YoY Growth

Fast Charge Network

16.0%
Corridors covered
(DCFC every 50 mi)

4 / 8
Sites operational /
dispensers installed



TVA Vehicle Fleet

79
Number of Plug-in Electric Vehicles

53 BEVs

6.5%
to fleet goal of 1200 EVs by 2030

--
Electric miles driven (starting in Aug.)

150
Charging plugs installed at TVA facilities

Partner Engagement

30
Fast Charge Network Contracts Signed

48
LPCs requested or implemented EV rate

4.8B
Potential EV media impressions (FY thru Aug)

- LPCs
- Fleets
- Automakers
- Ext. Orgs.

Updated: 09/20/2022

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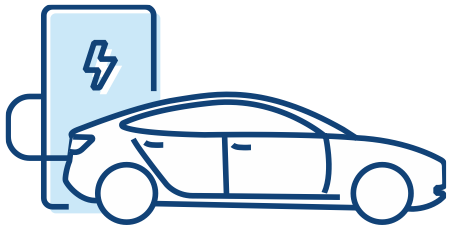
Addressing Four Market Barriers to EV Adoption



Charging Infrastructure Availability

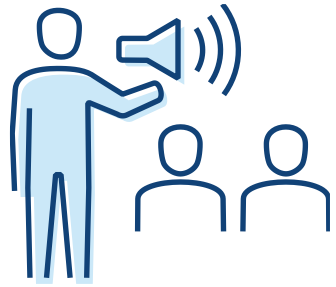
- Remove “range anxiety”
- **Foundational EV charging network**
- Partner with Local Power Companies (LPCs)

EV Availability and Offerings

- Partner with automakers and fleets
- Support making a wide range of EVs available

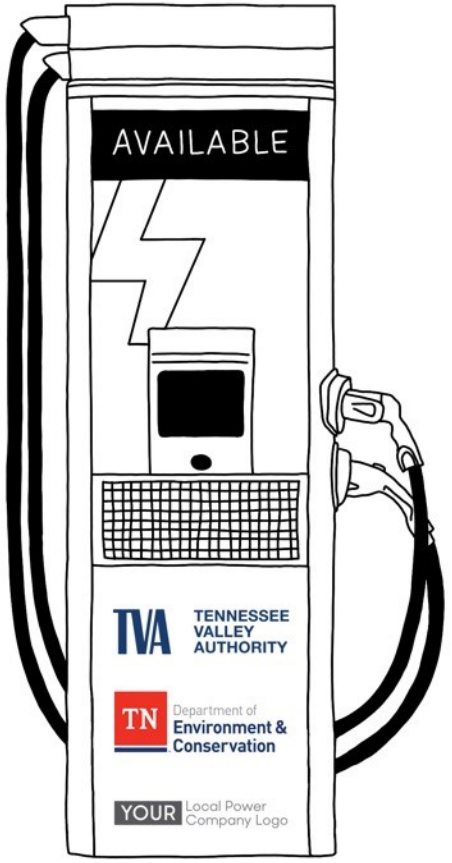
Innovative and Supportive Policies

- Remove utility policy or pricing barriers
- Craft policies and pricing that encourage investment and enable a market



Consumer Awareness

- Help consumers make sound choices
- Educate, inform, and promote while lifting TVA and LPC brands



Removing market barriers in key areas

TVA is working with stakeholders to realize these initiatives throughout the Valley

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Fast Charge Network – Program Overview

TVA and state agency partners are working with Local Power Companies (LPCs) to install, own and operate fast charging stations along interstates and major highway corridors at least every 50 miles

Eliminate Range Anxiety

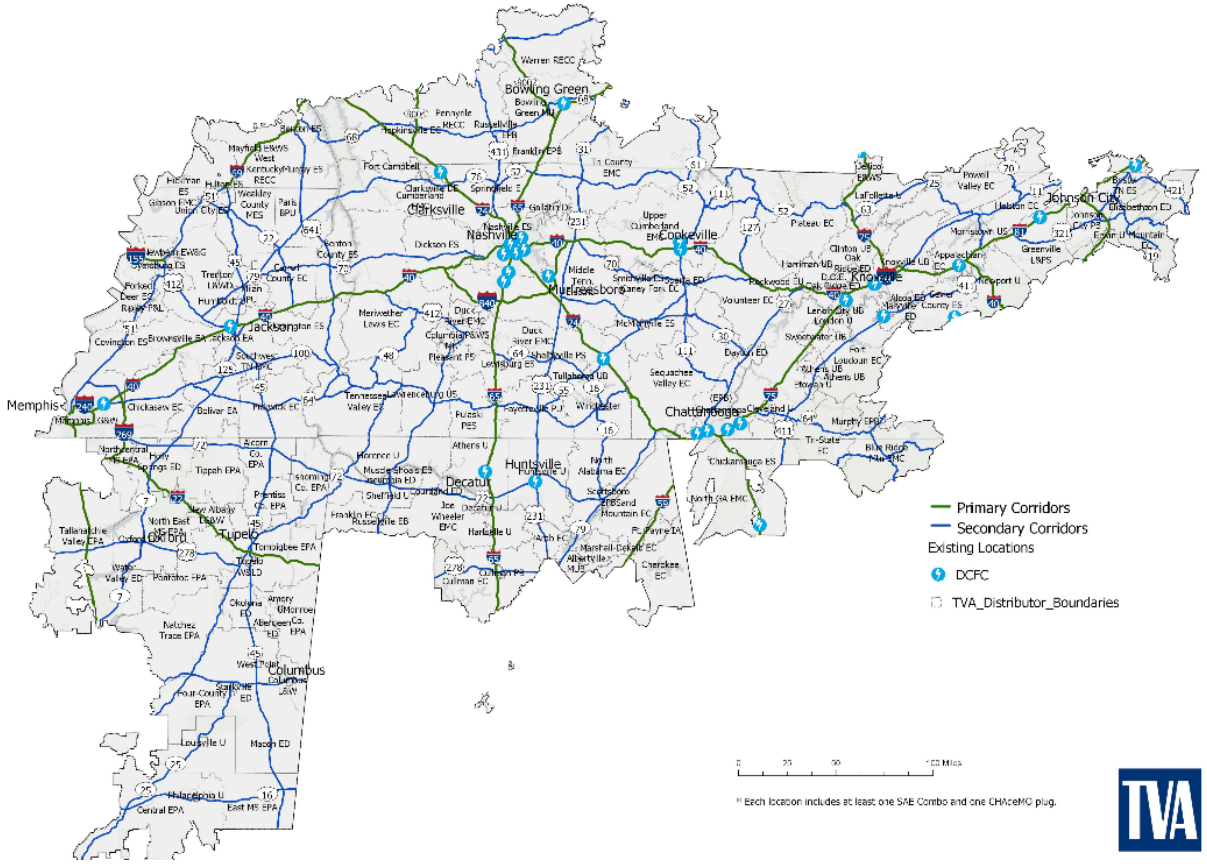
- Network of fast charging stations across the TVA region
- Ensure drivers can charge at least every 50 miles

LPCs Will Install, Own and Operate

- LPCs will secure the charging station site, design and install the station and operate and maintain equipment
- TVA will provide technical specifications and site development guidelines

TVA and Partners Provide 80% Funding

- Programs provide 80% reimbursement (up to $150,000 per charger) of eligible costs
- LPCs will provide at least 20% share of the total project cost



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New! Fast Charger in Martin, TN

WCMES installed two fast chargers through TVA's Fast Charge Network program

- Aug. 31st ribbon-cutting
- Coincided with TVA Board meeting
- 100+ attendees
- First site in TN, many more to come!

EV Fast Charger Location Installed At Martin, Tn.

Tuesday, August 30, 2022

Andrea Harrington, WCMES general manager, plugs in the charging unit for the first charge

The Weakley County (Tn.) Municipal Electric System announced on Tuesday that it is the first local power company in Tennessee to install a fast charger location (109 University Street, Martin, Tn.) as part of Fast Charge TN, a partnership between the Tennessee Valley Authority (TVA) and the Tennessee Department of Environment and Conservation (TDEC), and Seven States Power Corporation.

Chattanoogan.com

Research Focus Areas: EV Evolution

Fleet Electrification

Fleets represent 5% of vehicles, yet 25% of fuel consumption. Already deployed in last mile vans, buses.

Managed Charging / V2G

Managed charging to shift load
V2H, V2G demonstrations to understand potential benefits

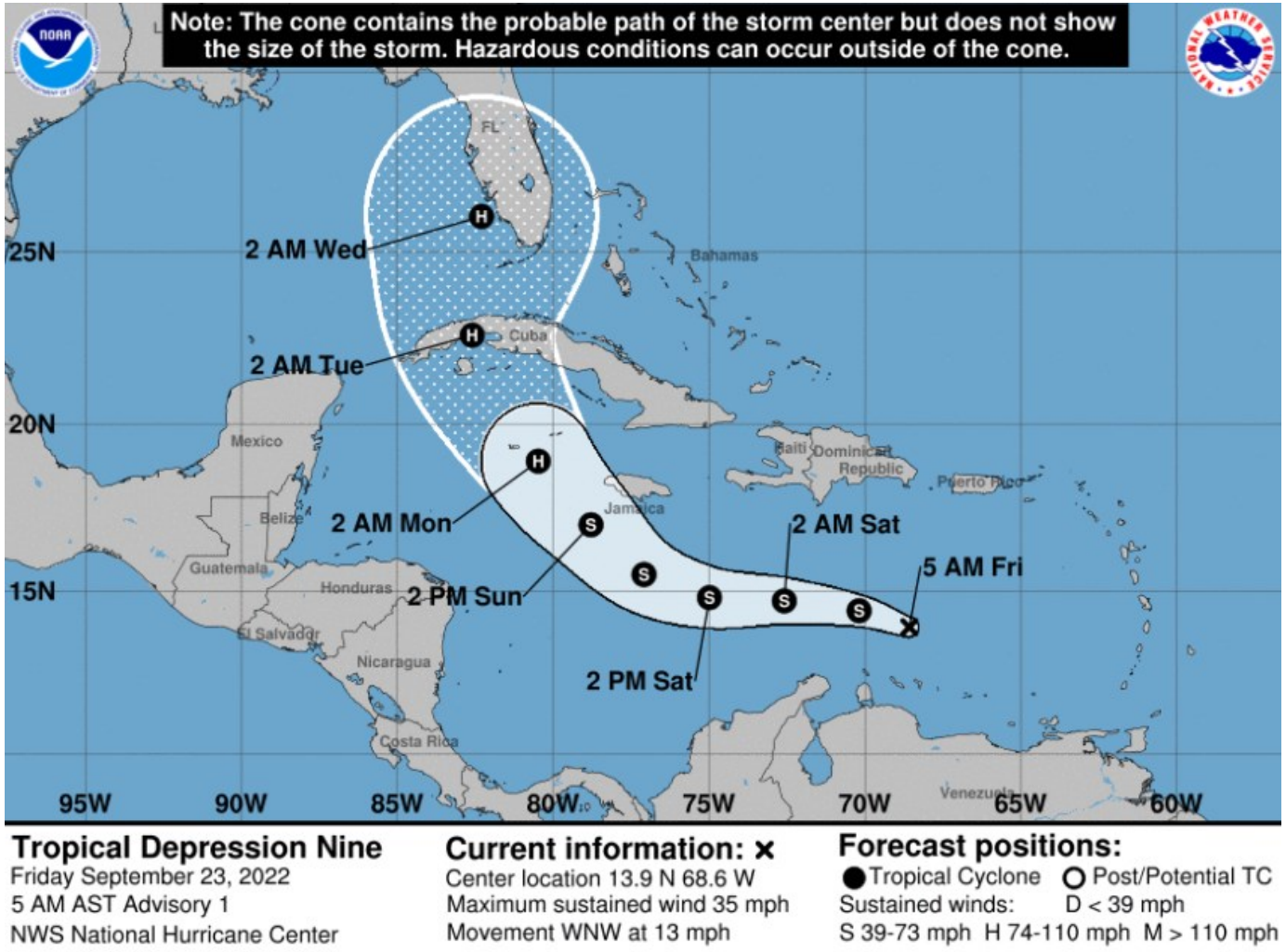
Innovation Ecosystem

Supporting LPC, state, regional partners to make TN Valley the EV epicenter for the US.

EV Adoption Forecasting

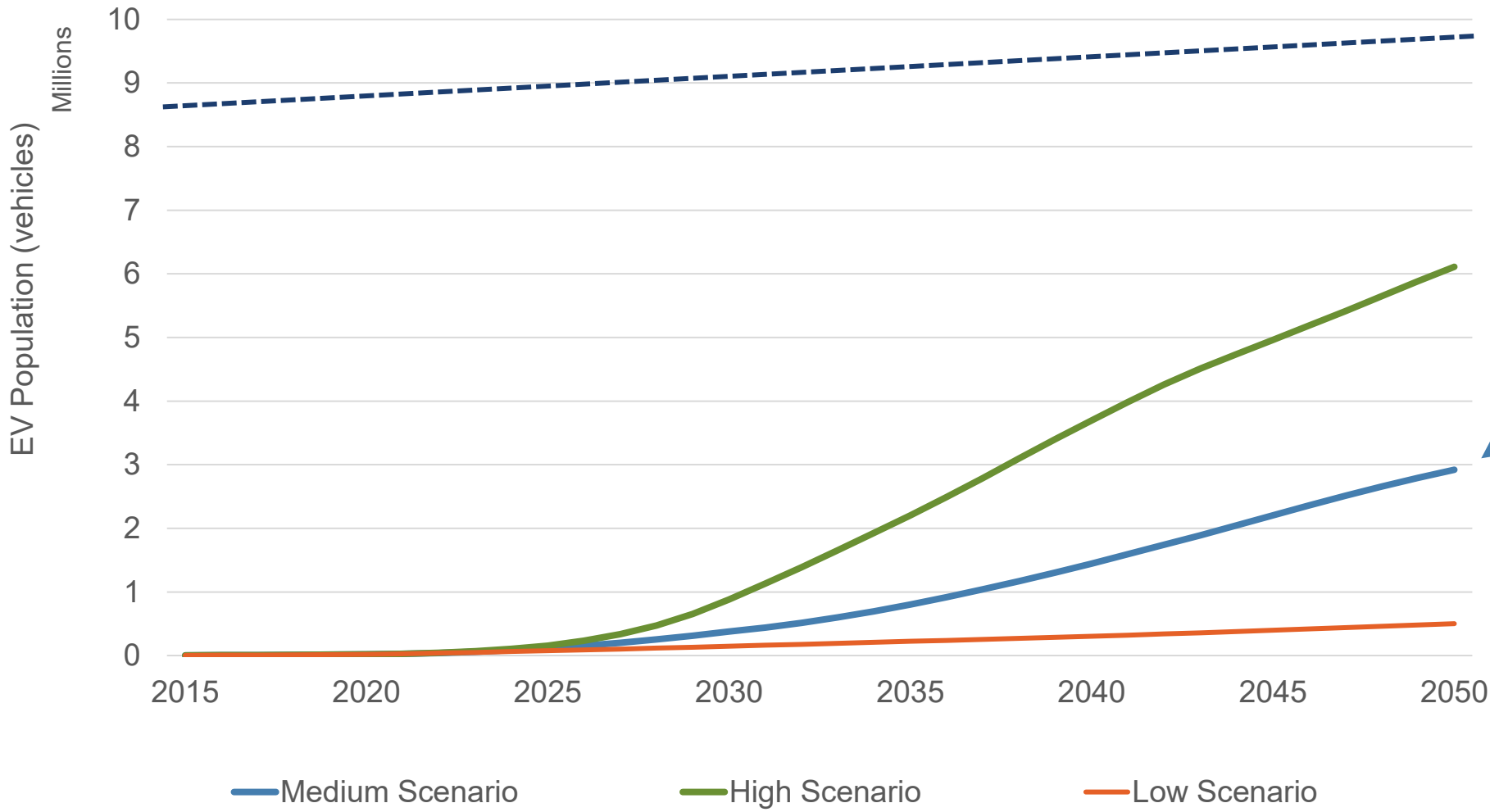
Monitor EV adoption and share load forecast with Enterprise Planning

EV (Hurricane) Forecasting



- Challenge: quantify a range of possible outcomes with rapidly changing conditions
- More clarity near term, less in the long term
- Multiple, disparate computer-modeled scenarios are combined to find alignment
- Greater alignment = more certainty
- “Hurricane hunters” continuously gather data: New data, new models

Long Term Scenario Comparison



Approximate 9M – 10M vehicles in the Valley

"Medium" scenario chosen for Enterprise Forecast

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Managed charging starts with understanding organic behavior

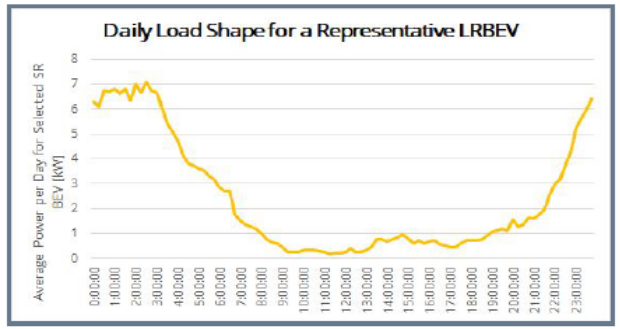
Previous EV Charging Program Provided Key Insights

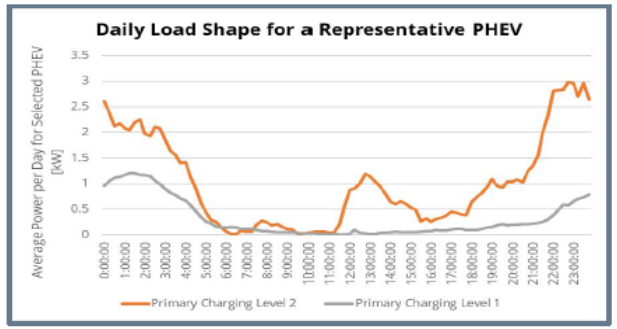
SmartCharge Nashville, provided valuable insights but was interrupted by COVID-19

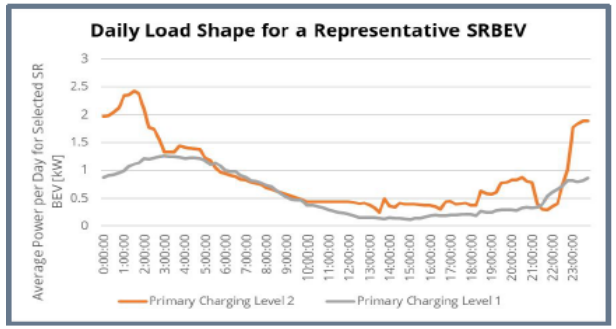
EV adoption has increased, driving patterns have changed, there are a variety of new models, and more rural communities are home to EVs

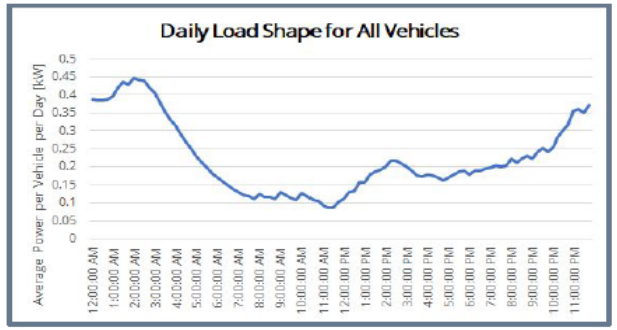
Additional Valley-wide research needed to understand the impact of EV harging on load and load shape

Load Shapes - Vehicle Segment









Examples from SmartCharge Nashville

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Where we're going: V2X

Ford

- V2H demonstration with TVA-owned Lightnings
- Potential for large-scale V2G demonstration under development

Electric School Buses: Community DER?

- Bi-directional charging summer peak: New DR opportunity
  - One district, 25 buses = 1 MW for 2 hours
- Valley-wide potential for up to 500 MW / 1 GWh
- Disaster response: potential as "mobile microgrids"

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Electric Fleets are coming

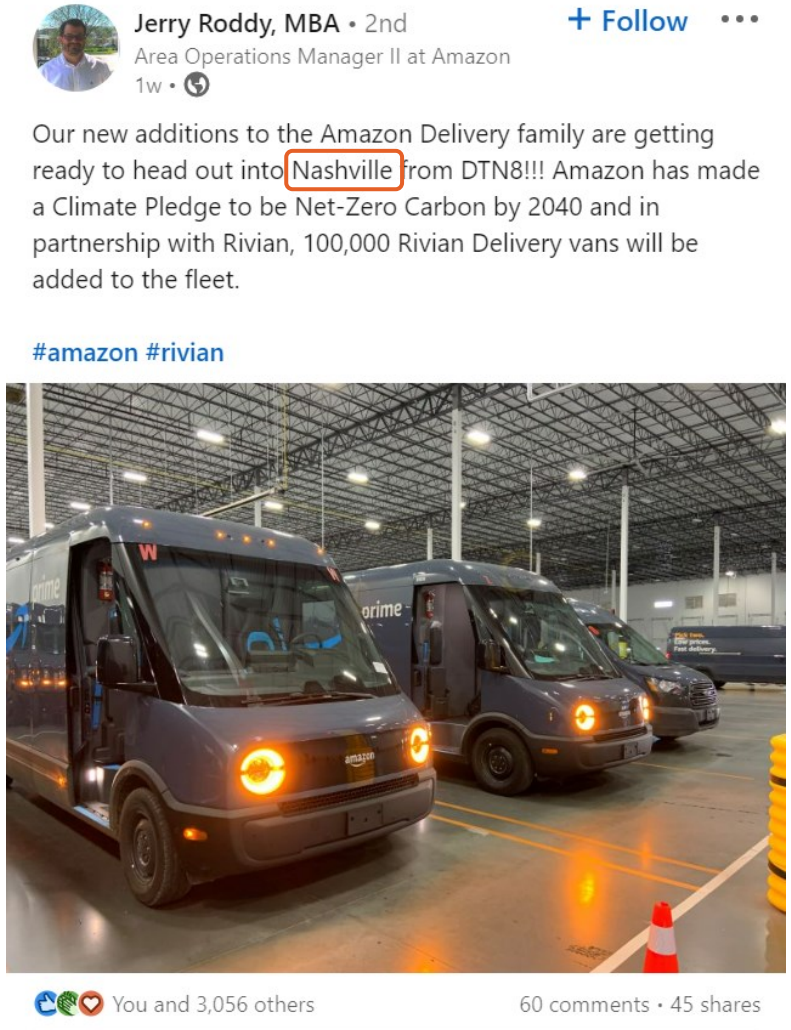
First movers (now):

- Last mile delivery
- Electric school buses

Coming soon:

- Semi tractors
- MW+ charging hubs

*Nikola Tre BEV Class 8 tractor **for sale** in Smyrna, TN (750 kWh battery)*



Nashville: New Amazon delivery vans from Rivian

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Fleet Example: Electric School Buses

With $5B from IIJA, EPA will replace diesel school buses with clean and electric buses over 5 years

Year 1 Applications

60+ TN Valley school districts applied (est.)

200+ electric school buses in applications (est.)

44% of TN's prioritized districts (high need, rural) applied for electric school bus funding

14 prioritized school districts attended TVA Office Hours over the summer

TN districts submitted **$50M** in applications for EPA funding

Tennessee's first electric school bus at Washington County Schools. Johnson City, TN

Next Steps

- Establish cohort group (schools + LPCs)
- Resume "office hours" for assistance
- Identify demonstration opportunities

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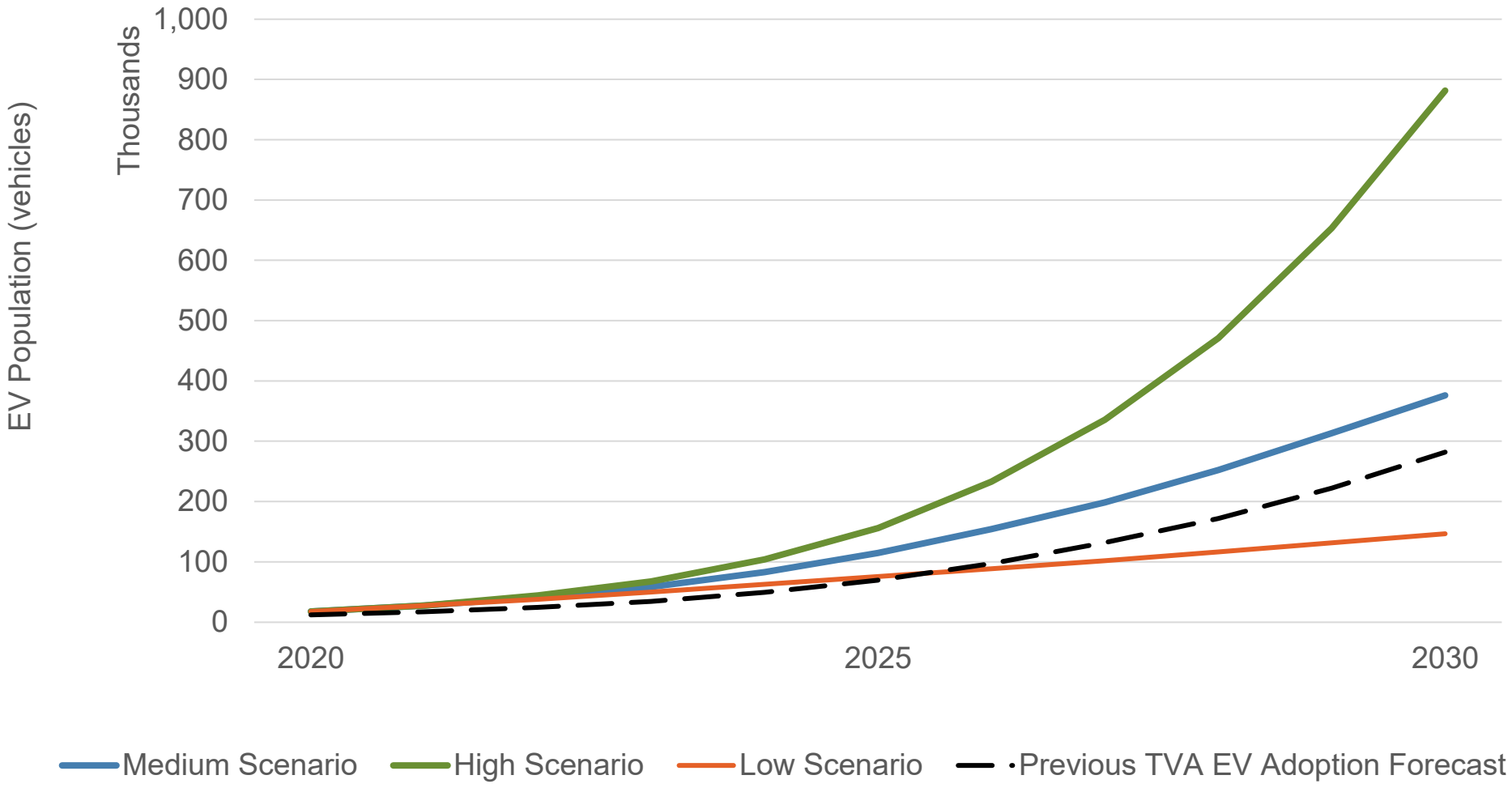
Appendix

EV Adoption Scenarios – Near Term



Medium forecast is slightly higher than previous EV adoption forecast

TVA's goal is **200k** EVs by 2028 (~0.5% of TVA's load)

Medium Scenario projects **252k** and High Scenario projects **471k** in 2028

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Siting a Fast Charge Station

Charging sites should follow Site Selection Guidelines provided by the program to ensure a positive consumer experience given the anticipated 20 to 30 minutes for EV charging (put your communities "best foot forward")

Access

- 24 / 7*
- Publicly accessible*
- No charge for entry*

Amenities

- Restaurants
- Shops
- Restrooms

Distance from Highway

- <1 mile preferred
- 5 miles max*
- 50 miles or less between stations

Power Supply

- Close proximity to 480V, 3 phase power
- Future upgradability

Safety

- Secure
- Well-lit
- Populated areas

Weather Protection

- Sheltered from elements desirable

*** Denotes Program Requirements**