

New Jersey Spotlight Roundtable: What's Next With Electric Vehicles?

Electric Vehicles In New Jersey

Opportunities and Challenges

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Electric Vehicles In New Jersey

- What Are They, and Why Are They Important?
- State Of The EV Market In New Jersey
- The Big Issues
- Closing Thoughts



Electric Vehicles: What Are They?

Plug-In Electric Vehicles (PEVs)



Hybrid

- Electrified
- **NO PLUG**

(Very Small Battery)



Plug-In Hybrid Electric Vehicle

- ICE Assist (Prius Prime)
- Range Extender (Volt)

(Small - Medium Battery)



Battery Electric Vehicle

- All Electric

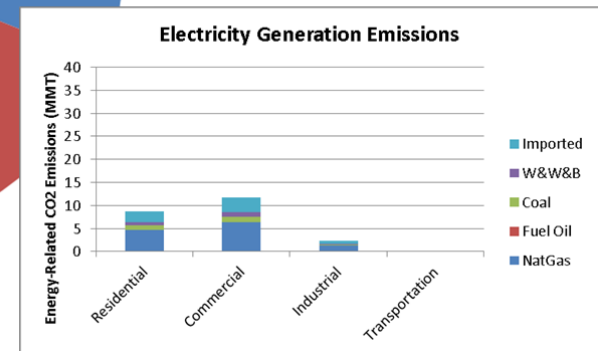
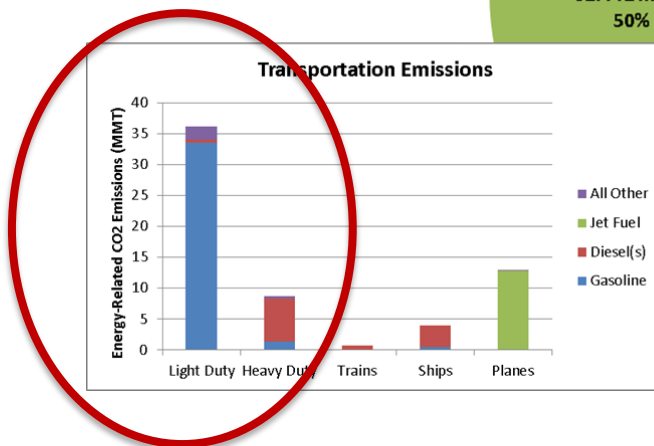
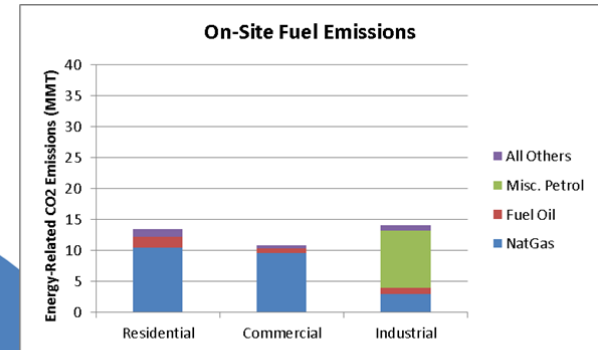
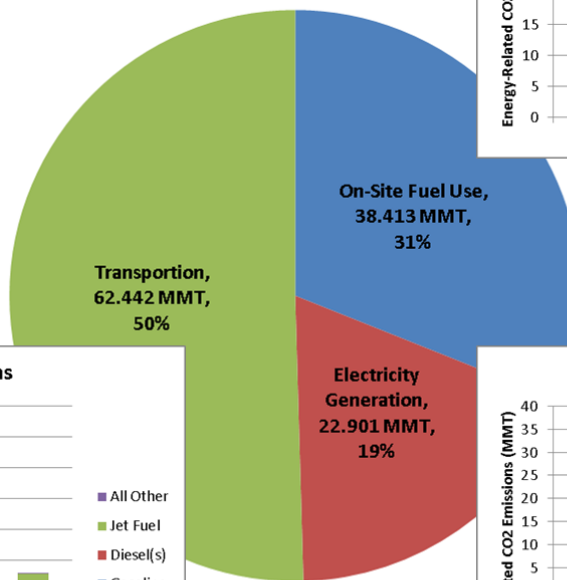
(Large Battery)

All PEVs are inherently more efficient than traditional vehicles and use a cleaner and more diversified “fuel” (electricity).

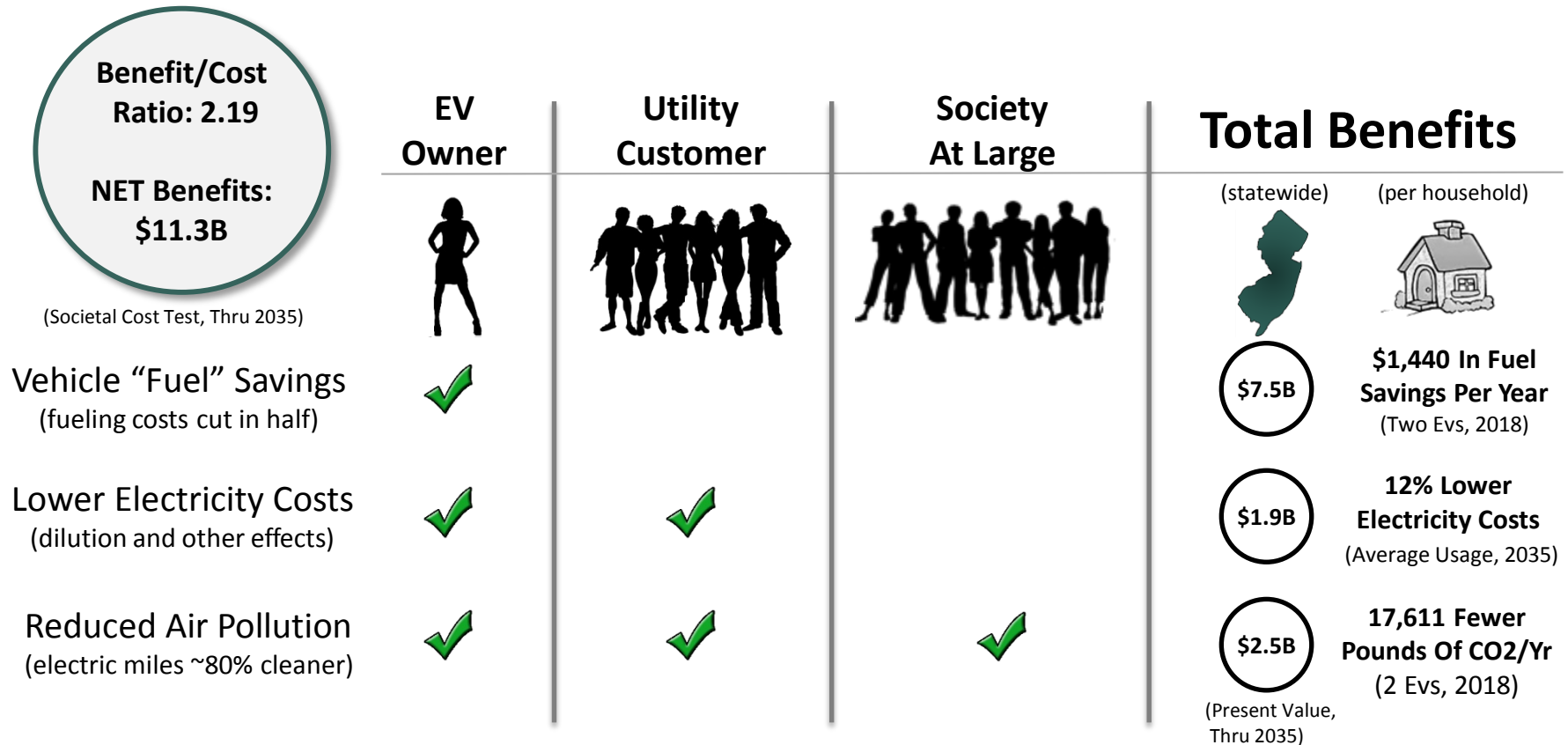
Electric Vehicles: Why Are They Important?

Displacing Petroleum Use In Vehicles With Electricity Is The Single Largest Opportunity For Improving Air Quality And Reducing GHG Emissions

NJ GHG Emissions (2012)



Electric Vehicles: Why Are They Important?



Published January, 2019. See www.ChargEVC.org For Full Study Results

State Of The New Jersey EV Market (2)

Progress To Date (Aspirations Of Market Leadership):

- Opt-In To the California ZEV Program, Joined the ZEV-MOU
- Sales Tax Exemption For BEVs
- Partnership To Plug-In (cross agency effort)
- VW Funding (RGGI and TCI coming soon)
- Strong Natural Market Interest In EVs

Where New Jersey Is Lagging Compared To Market Leaders:

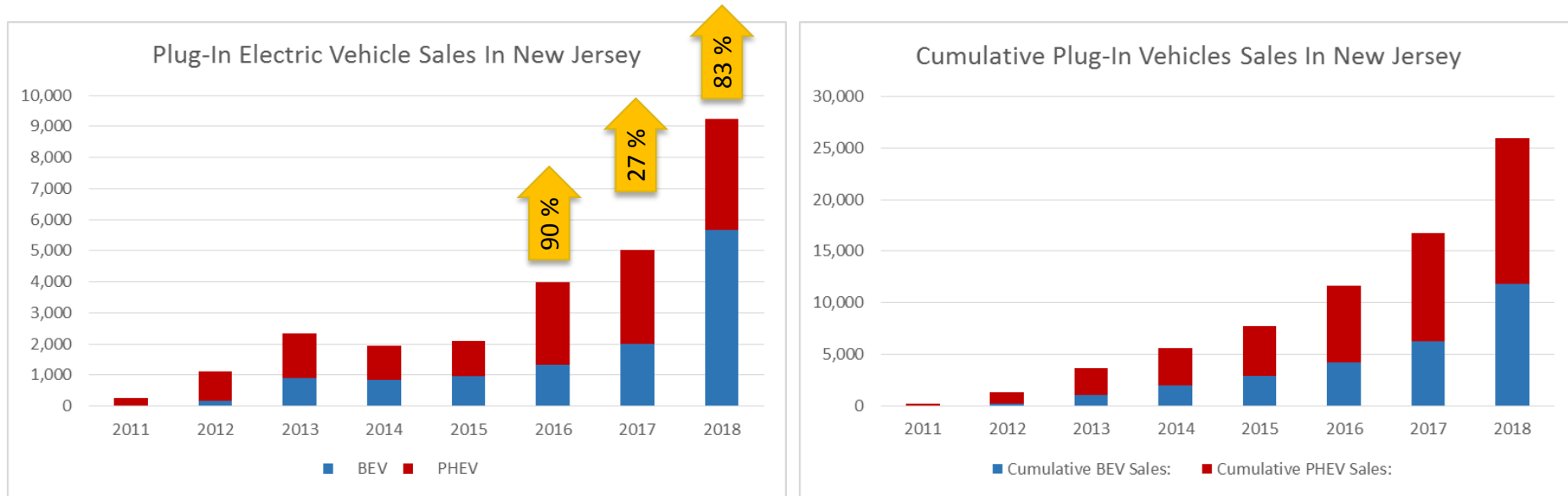
- Addressing Vehicle Affordability
- Addressing Consumer Range Anxiety (Public Charging)
- Universal Access To Routine Charging Infrastructure
- Improving The Vehicle Purchase Experience
- Consumer Awareness

Recent IEP Assumptions:

- 1) Vehicle electrification is crucial for achieving state goals, and makes the largest contribution towards attainment.
- 2) To make that happen, need to target 100% of vehicle sales are electrified by 2035.
- 3) Significant changes in current policies to make that possible.

Current Status: First Step Toward Market Leadership....

State Of The New Jersey EV Market (3)

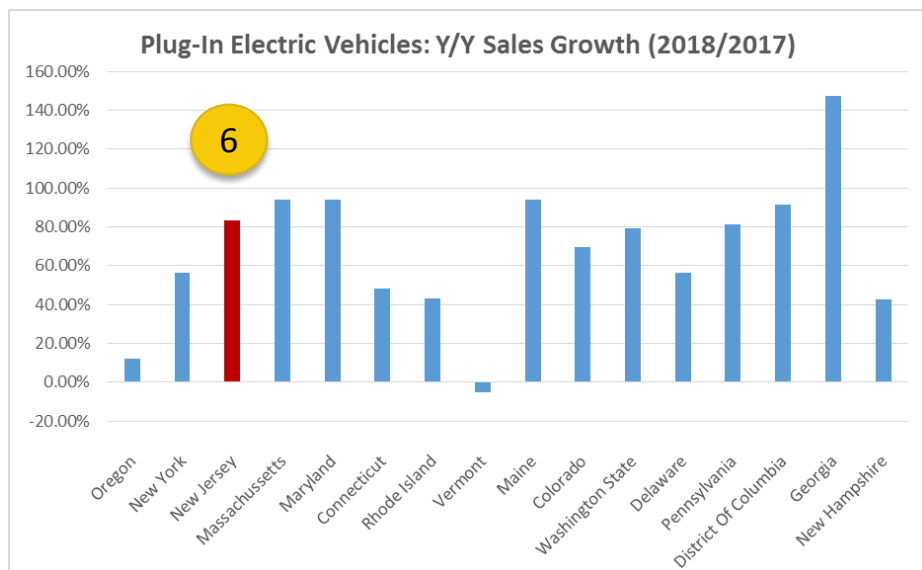


(exclusively light duty vehicles)

Projecting 33K - 35K PEVs On New Jersey Roads By YE-2019
BUT Sales Growth In 2019 Has Started To Slow

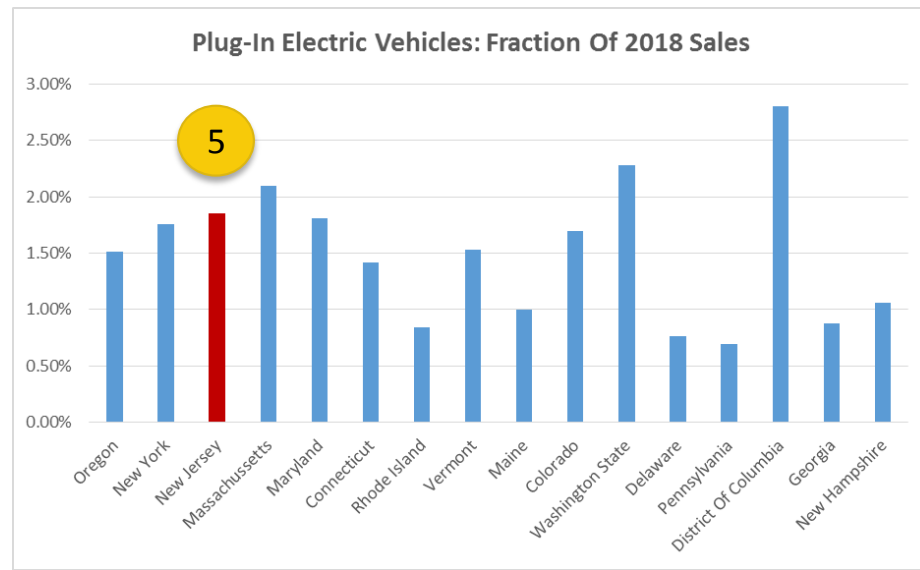
New Jersey Goal: 330K PEVs On The Road By 2025

State Of The New Jersey EV Market (4)



Y/Y Sales Growth Is A **Good Indicator Of Market Strength**, But These Are Early Market Conditions, So Growth Trends Are Somewhat Inconsistent.

2019 Results Suggest Recent Growth Not Sustainable Without Market Stimulation And Development

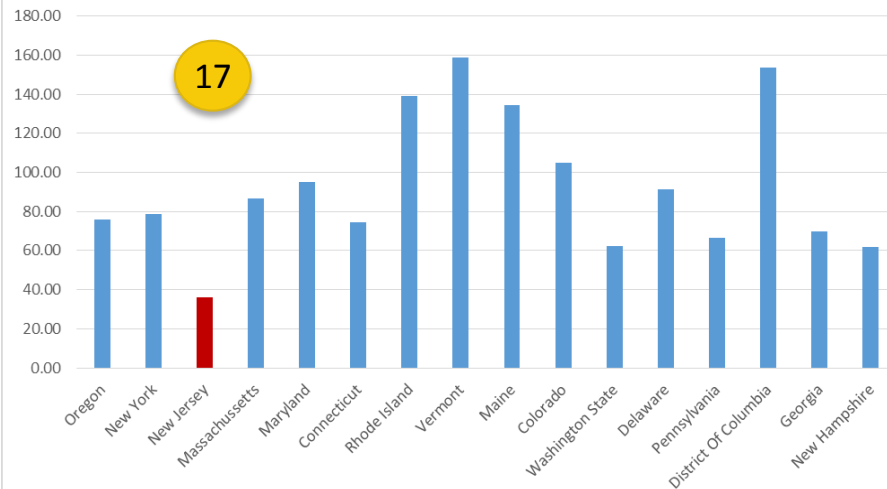


PEV Fraction Of Annual Sales Is **Good Indicator Of How Fast The Market Is Electrifying** At The Current Time.

Despite Limited Policy or Program Support, New Jersey Demonstrates Robust Sales To Date, Suggesting **Strong Natural Interest in PEVs**, And Probably **“Untapped Potential”**

State Of The New Jersey EV Market (5)

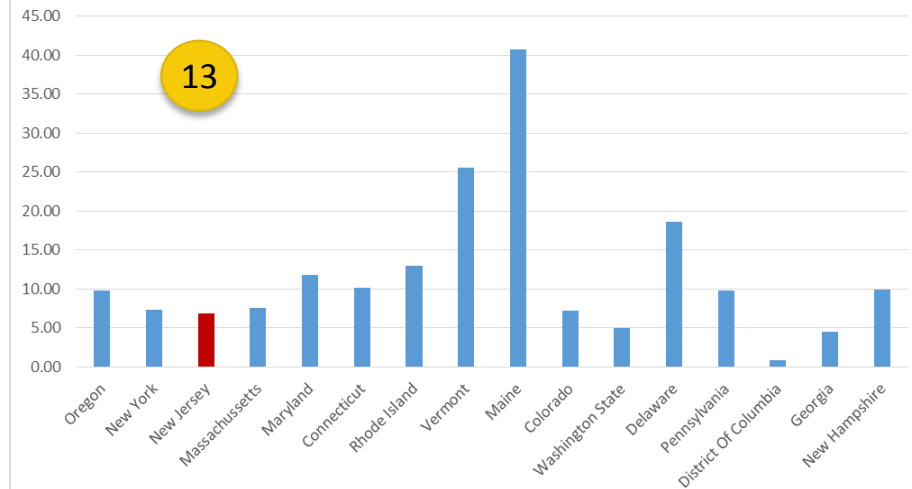
Chargers (of all types) PER 1000 PEVs



Chargers Per PEV Characterize The **Amount Of Charging Capacity Available** To Serve The EXISTING PEV Population. More granular view of different charger types relevant to understanding market position.

New Jersey Is Ranked In Last Place On This Metric.

DCFC Locations Per 1000 BEVs



This Metric Characterizes The **Extent Of Public Charger Coverage**, But It Focuses On DCFC Which **Has A Large And Direct Impact On Range Anxiety** (especially for BEV Drivers)

New Jersey Ranks Near The Bottom Of The Sample.

State Of The New Jersey EV Market (6)

Is There Sufficient Consumer Interest?

Recent Eagleton Poll Sponsored By Rutgers And The New Jersey Climate Change Alliance (April 2019):

- ~ Half of respondents intend to buy a new car over the next 5 years
- Approximately 38% would SERIOUSLY CONSIDER buying an EV
- EVs could represent ~19% of new car sales over the next 5 years
- ~53% of respondents WOULD NOT seriously consider an EV at this time
- For those respondents, their primary barriers were:
 - 56% identified “running out of power on the road” as a major concern
 - 44% listed “having a place to charge at home” as a major concern
 - 35% listed “vehicle cost” as a major concern, especially HH <\$100K
- Poll Sample: ~1000 adults residing in New Jersey

The Big Issues

- **What are the barriers, and what can we do about them?**
- **Will there be an impact on the electric grid?**
- **How can electric utilities help, and what should their role be?**

EV Adoption Barriers

• Electrified Vehicles That MAINSTREAM Consumers Want To Buy	Vehicle OEMs Addressing
• Electrified Vehicles That MAINSTREAM Consumers Can Afford	Improving, but...
• Eliminate “Range Anxiety” – Which Is Really “Charge Anxiety”	FAST Public Charging
• Universal Access To A ROUTINE Charging Solution	Solutions Available, but...
• A Supportive (and Encouraging) Vehicle Purchase Environment	Emerging, but...
• Consumer Awareness And Visible Market Presence	Marketing, Outreach, Etc
• Achieve High Levels Of Adoption Without “Breaking The Grid”	Managed Charging, Etc

Barrier Being Addressed

More Work Needed

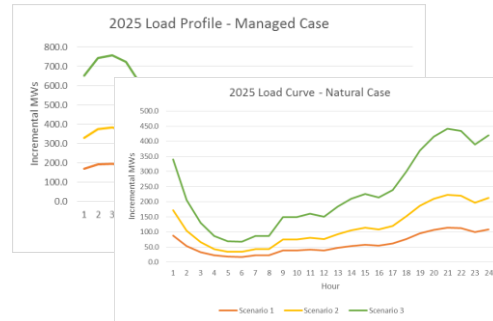
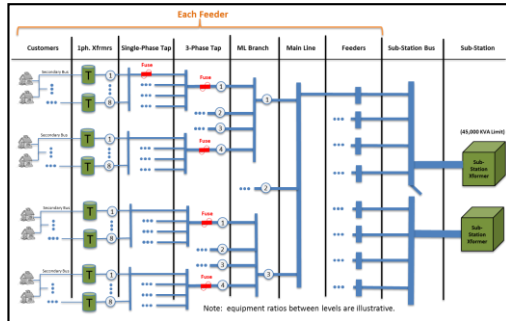
Major Initiatives Needed

Current EV Market Development Initiatives

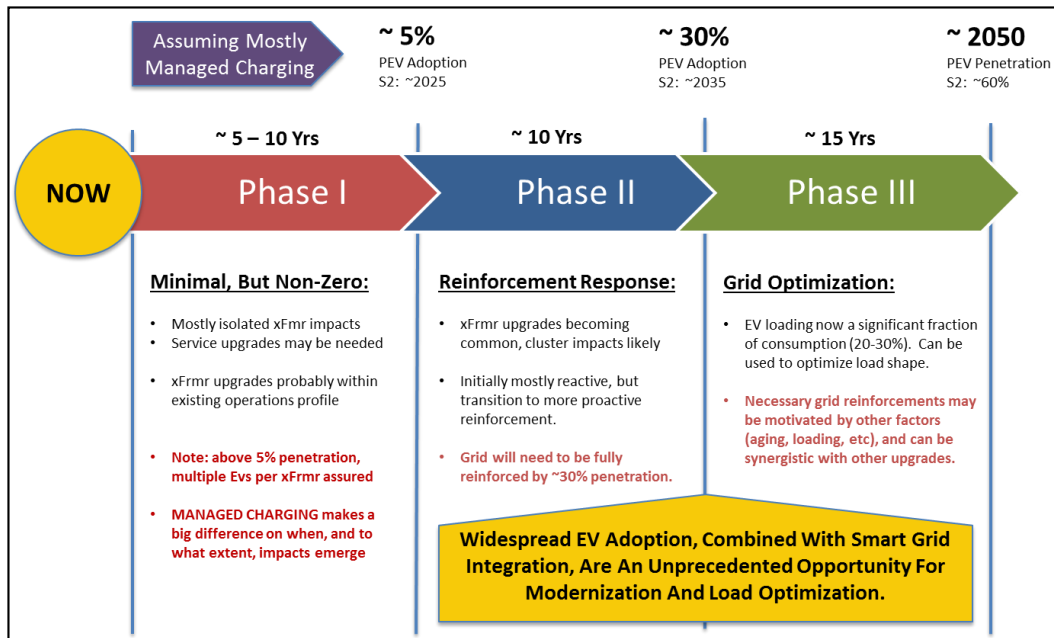
(partial list)

- **Planning, Organizing, Advocacy: ChargeVC, and numerous member efforts**
- **Formal Goal Setting: 330K PEVs by 2025, other goals under consideration**
- **Electrified Transportation part of EMP and IEP efforts**
- **Omnibus EV Legislation (S2252/A4634 – under consideration for lame-duck)**
- **Partnership To Plug-In (significant agency action needed)**
- **ZEV Framework, ZEV MOU, RGGI, TCI**
- **Vehicle Purchase Rebate (\$30M allocated, BPU program under development)**
- **Utility Filings (PS&EG and ACE Proposals, Market-Leading Initiatives, Pending BPU Action)**
- **Dealer Development (dealer certification program, NJCAR leadership)**
- **Consumer Awareness (very early stage efforts under development)**
- **Municipal Leadership (ordinances, EV fleets, public charging, etc)**

Will There Be An Impact On The Grid?



- Longer Term, ~30% Of Electricity Will Be Going Into Vehicles
- There Is A LOT Of Headroom In The Grid (generation, Transmission, Distribution) That Could Be Used To Absorb EV Load
- What Matter Is WHEN Charging Happens



Key Conclusions:

- + Minimal Impacts Short Term, Time To Start Planning
- + System Impact Emerge Quickly Once Number Of Evs Exceeds 1-Ph Transformers (~5-10% Penetration)
- + **Managed Charging CRITICAL** To Mitigating and Deferring Distribution Impacts, Maximizing Rate-payer Benefits In Rates, Avoiding C&T Impacts
- + Distribution Reinforcement Will Be Needed, But Longer Term And Also Motivated By Other Needs And Also Delivering Additional Benefits
- + **EV Charging Can Ultimately Be A Powerful Grid Optimization Tool**

Utility Role In EV Market Development

Motivations For Utility Engagement:

- 1) Ensuring RESPONSIBLE Grid Integration Of Vehicle Charging Loads
- 2) Addressing Challenges/Barriers Utility Uniquely Able To Address, Especially Rate-Design
- 3) Helping To Address Un-Met Needs & Policy Priorities, Stimulate Private Investment
- 4) Reliability, Equity, Maximizing Public Benefit, Increased Rigor (standards, security, etc)

Emerging Trends (with a focus on charging infrastructure):

- 1) Residential Chargers and **Managed Charging** Programs
(TOU rates/incentives, “coordinated charging”, V2G longer term)
- 2) **Public Fast Charging – Especially Through Supportive Rates/Incentives**
- 3) Multi-Family L2 Charging
- 4) Other L2-Segments That Accelerate Adoption (workplace, fleet)
- 5) Pilots For Community Mobility & M/H-Duty Electrification

Electric Utilities Can Help Build A “Charging Ecosystem” That Leverages And Stimulates Private Investment In Charging Infrastructure, While a) Meeting Policy Goals, b) Avoiding Grid Harm, c) Maximizing Benefits For All Ratepayers

Closing Thoughts

THIS IS BIG:

- Transformation of the two of the largest industries (transportation and electricity)
- To completely displace one of the other biggest industries (petroleum)
- Single largest contribution to the State's clean energy objectives
- A MAJOR improvement in public health for New Jersey Residents
- Highly SYNERGISTIC with increased renewable energy use
- New Jersey has huge potential, and a good start – but it won't happen on its own



We Are Continually Faced With Great Opportunities Brilliantly Disguised As Unsolvable Problems.

- Benjamin Franklin