



NEVADA DIVISION OF
**ENVIRONMENTAL
PROTECTION**



Nevada Department of
**CONSERVATION &
NATURAL RESOURCES**

Nevada Division of Environmental Protection

Clean Cars Nevada

On the Road to a Cleaner Nevada

June 15, 2021

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ZEV ECONOMIC IMPACTS OF OWNERSHIP AND SMALL BUSINESS IMPACTS

JUNE 15, 2021 @ 9:00 TO 10:00 AM



Presentation Outline

- Introduction
- Economic Impacts of ZEV Ownership vs. Conventional ICE Vehicles
- Small Business Impacts
- Q&A Session



Clean Cars Nevada is Proposing the Evaluation and Potential Adoption of Two New Regulatory Programs



Low Emission Vehicle (LEV) Program - Meet emission requirements that reduce greenhouse gases, criteria air pollutants, and hazardous air pollutants.



Zero Emission Vehicle (ZEV) Program - Introduction of clean vehicle technology in Nevada.



The goal of today's webinar is to

Share NDEP's literature review of the economic impacts of ZEV ownership, including initial purchase cost, depreciation fueling costs, maintenance and repair costs.

Understand the small business impacts that may result from the adoption this regulation.

ECONOMIC IMPACTS OF OWNERSHIP - COSTS AND SAVINGS

Economic Impacts of Ownership – Sources of Information

- Environmental Advocacy Groups
- Automobile Enthusiast Magazines and Organizations
- Consumer Advocacy Groups
- Government and Academic Research Organizations

Economic Impacts of Ownership – Topics of Focus

- Initial Purchase Cost
- Depreciation
- Fueling Costs
- Maintenance and Repair Costs
- Key Findings of ZEV Ownership Costs

ECONOMIC IMPACTS OF OWNERSHIP - COSTS AND SAVINGS

Initial Purchase Cost

- Initial purchase price of BEVs and PHEVs is greater than comparable ICE vehicles
- As battery pack costs drop to approximately \$104/kWh in 2025 and \$72/kWh in 2030, electric vehicle cost parity with conventional vehicles is likely to occur between 2024–2025 for shorter-range and 2026–2028 for longer-range electric vehicles (International Council on Clean Transportation)
<https://theicct.org/publications/update-US-2030-electric-vehicle-cost>
- Applies to cars, crossovers, and SUVs – pickups will take longer
- Federal Tax Credits are currently in place – but for how long? (Credits have expired for Tesla and GM due to reaching 200,000 sales)

ECONOMIC IMPACTS OF OWNERSHIP - COSTS AND SAVINGS

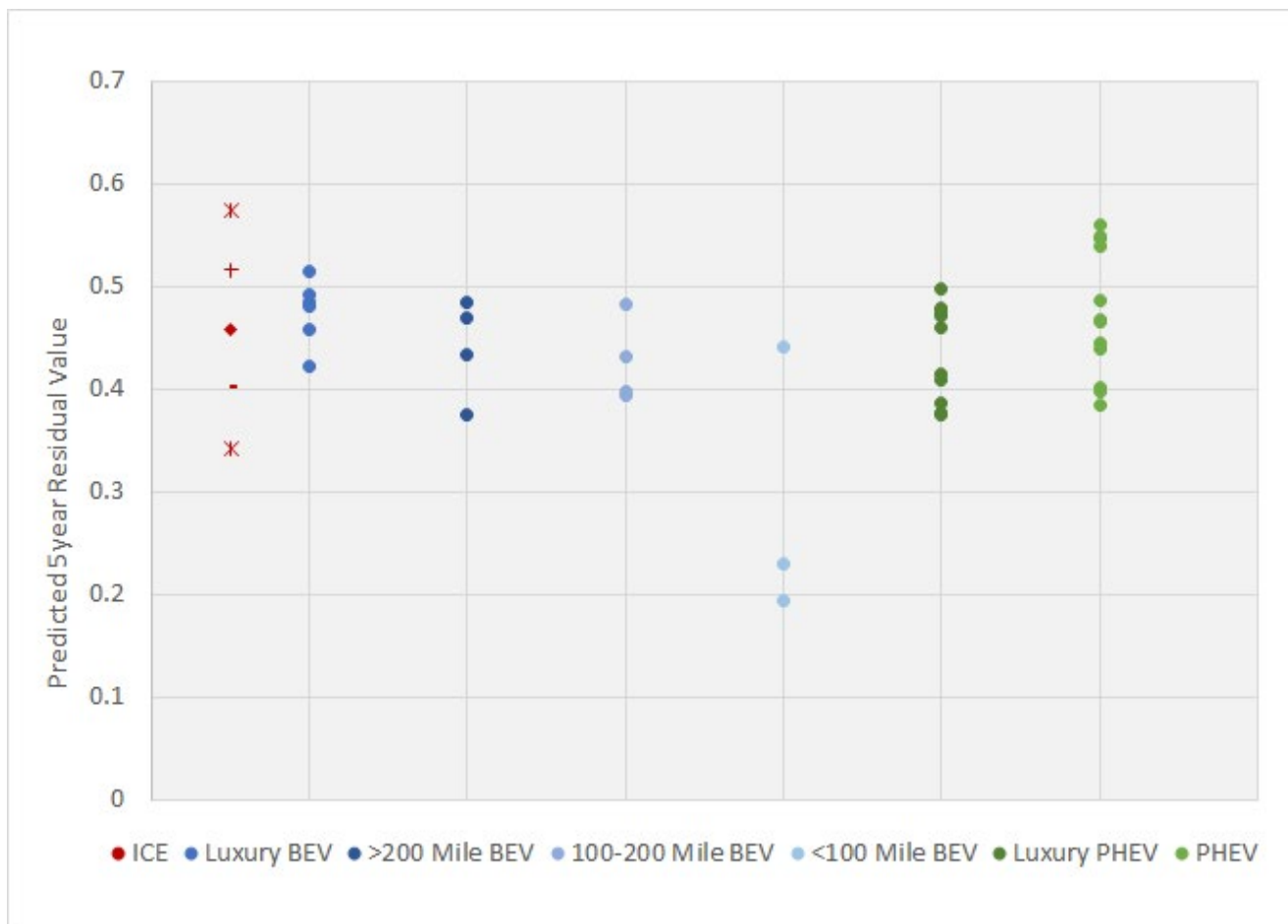
Depreciation

- Initial EVs had higher depreciation
- Residual values have increased as vehicle range has increased
- Federal and state purchase incentives play an important role
- Depreciation rates for ZEVs are expected to be on par with ICE vehicles



ECONOMIC IMPACTS OF OWNERSHIP - COSTS AND SAVINGS

Depreciation (continued) Scatter Plot of Predicted 5-Year Residual Values for EVs by Type and Range Adjusted for Federal Tax Credit



ECONOMIC IMPACTS OF OWNERSHIP - COSTS AND SAVINGS

Fueling Costs

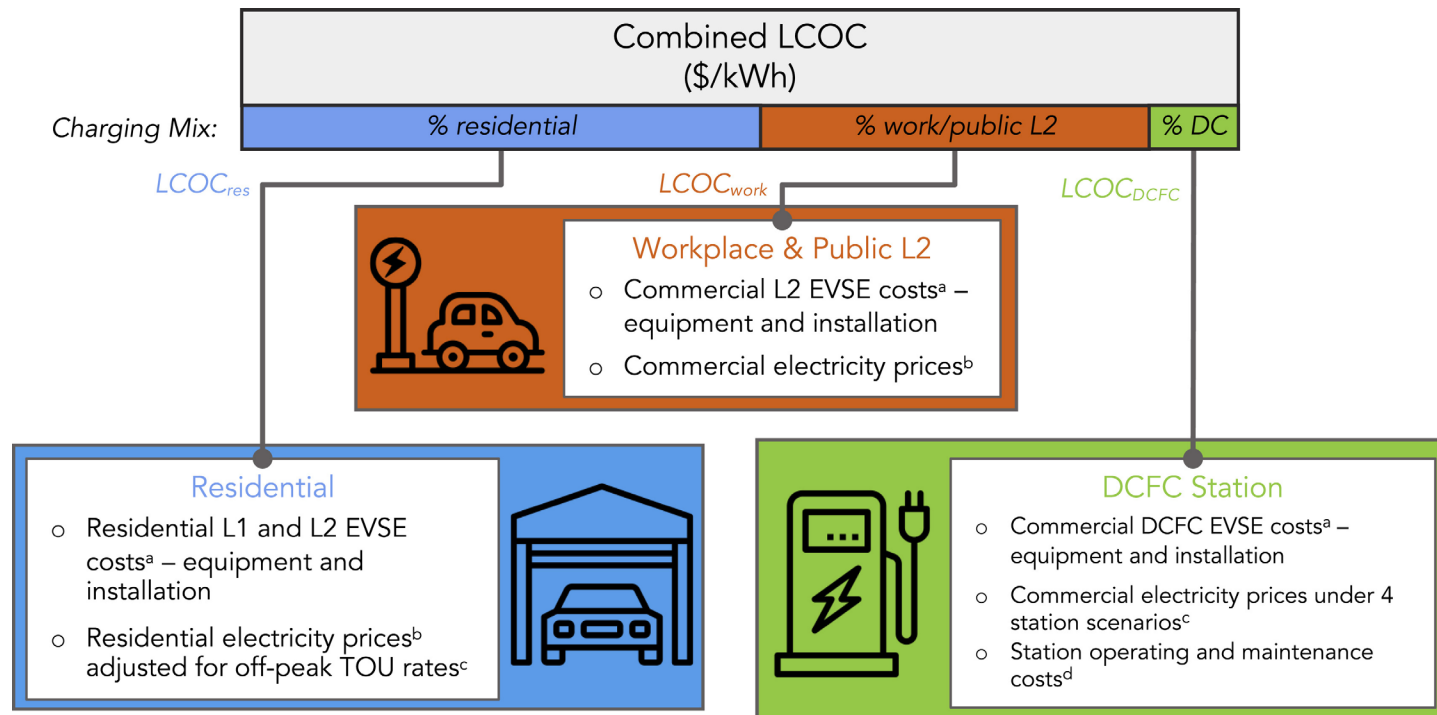
- Factors Effecting Fueling Costs:
 - ✓ Annual vehicle mileages traveled
 - ✓ Driving conditions (city, highway, mountainous, cold/hot weather)

- Electric Charging Costs
 - ✓ Costs depend on How, Where, and When you charge your ZEV
 - ✓ Costs increase for Level 1 vs. Level 2 vs. DC Fast Charging (highest)
 - ✓ Following slides taken from “Levelized Cost of Charging Electric Vehicles in the United States” by Brennan Borlaug, et al., Published in *Joule*, ARTICLE | VOLUME 4, ISSUE 7, P1470-1485, JULY 15, 2020

ECONOMIC IMPACTS OF OWNERSHIP - COSTS AND SAVINGS

Fueling Costs (continued)

- The study estimated the Levelized Cost of Charging (LCOC) national averages for electric charging of \$0.15/kWh for BEVs and \$0.14/kWh for PHEVs, but ranges from \$0.08/kWh to \$0.27/kWh (assumes a charging mix of 81% residential, 14% workplace and/or public L2, and 5% DCFC)



^a Real-world EVSE data

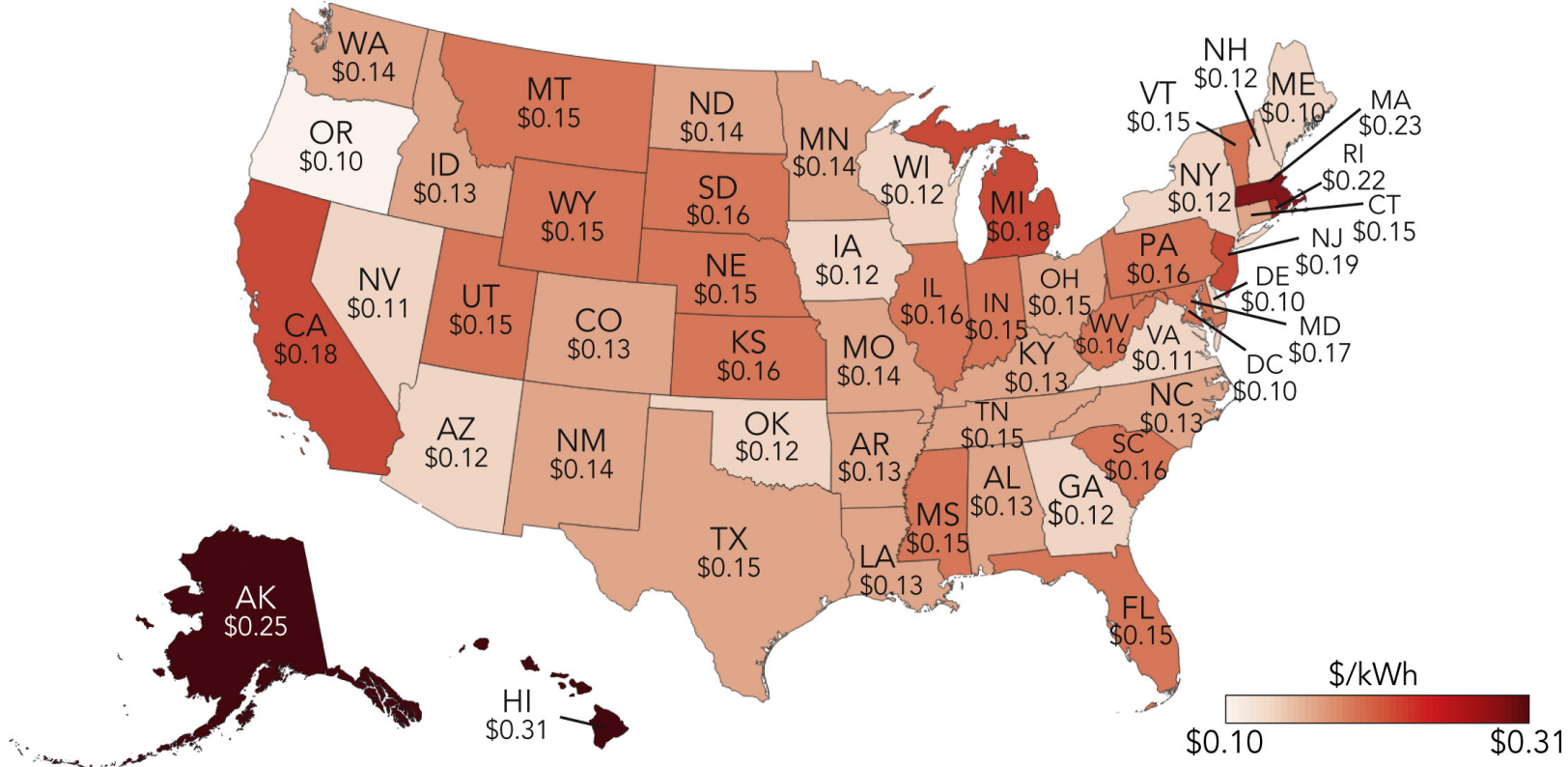
^b EIA²⁸

^c Utility Rate Database²⁹

^d EV station Financial Analysis Scenario Tool

ECONOMIC IMPACTS OF OWNERSHIP - COSTS AND SAVINGS

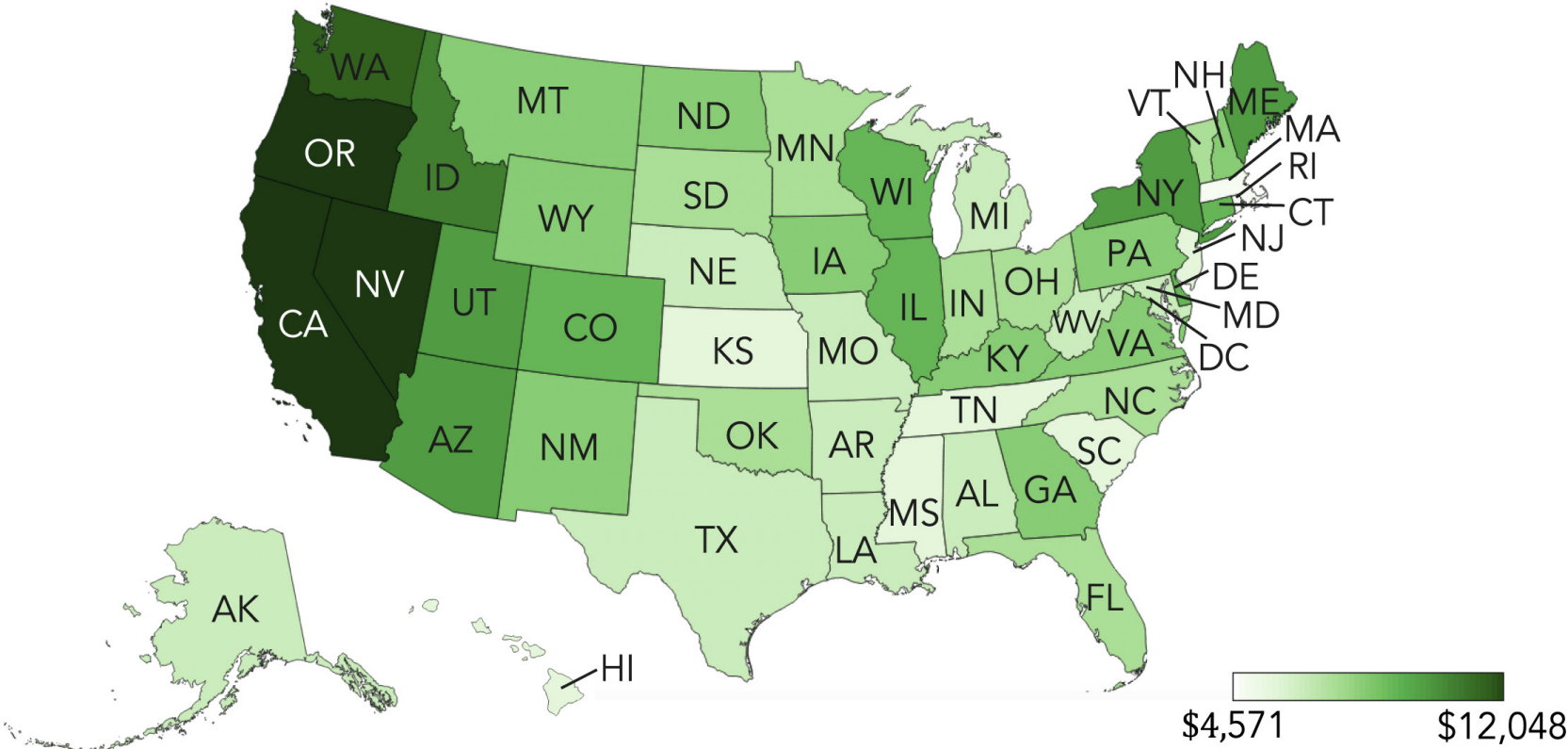
Nevada's levelized cost of charging is relatively inexpensive at \$0.11/kWh



State-Level Variability in Levelized Costs for BEVs

ECONOMIC IMPACTS OF OWNERSHIP - COSTS AND SAVINGS

Nevada's lifetime fuel cost savings for ZEVs are considerable, because relatively high petroleum fueling costs would be replaced by the relatively low levelized cost of electric charging



State-Level Variability in Lifetime Fuel Cost Savings for BEVs

ECONOMIC IMPACTS OF OWNERSHIP - COSTS AND SAVINGS

Fueling Costs (continued)

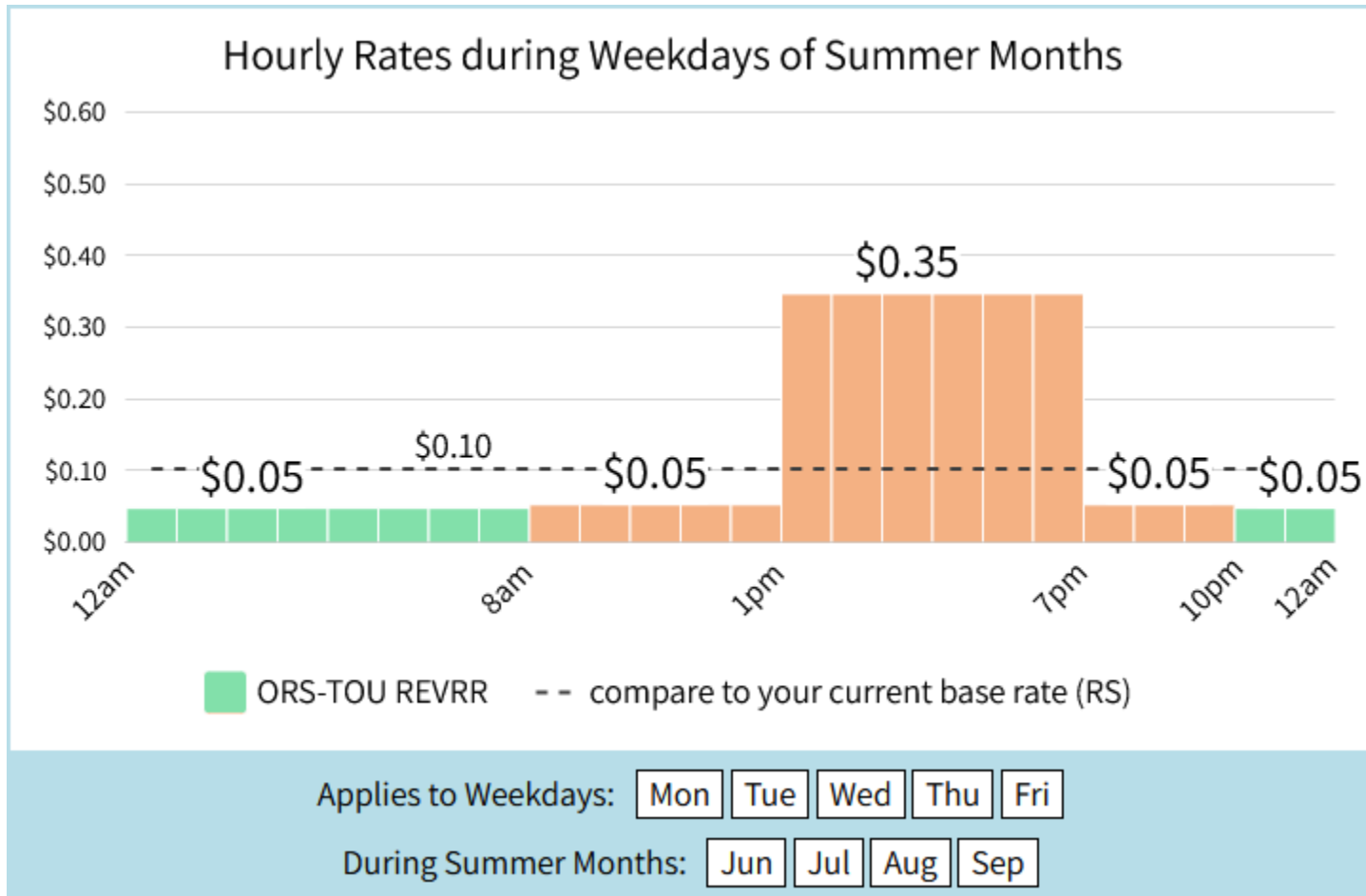
- Approximate NV Energy Residential Single-Family Rates –
Northern NV: \$0.09/kWh, Southern NV: \$0.11/kWh
- NV Energy offers special Electric Vehicle Time-of-Use rates that allows customers to pay a discounted rate if they charge the vehicle during the utility's electric vehicle charging period
- This topic receives more extensive treatment in other forums; costs are shown for comparison purposes



Photo by CHUTTERSNAPE on Unsplash

ECONOMIC IMPACTS OF OWNERSHIP - COSTS AND SAVINGS

NV Energy Optional Residential Single-Family Electric Vehicle Time-of-Use Rate for Southern Nevada



ECONOMIC IMPACTS OF OWNERSHIP - COSTS AND SAVINGS

Fueling Costs (continued)

- Lifetime Fuel Cost Savings for Nevada ranges from \$10,000 to \$12,000 with 15 year lifespan (Borlaug et al. study)
- Savings from an Average BEV vs. an Average ICE per 15,000 Miles of Driving in Nevada is \$961 for a car and \$1582 for a pickup (20% better than national average) reported in “Electric Vehicle Ownership Costs: Today’s Electric Vehicles Offer Big Savings for Consumers” *Consumer Reports*, October, 2020



Photo by John Cameron on Unsplash

ECONOMIC IMPACTS OF OWNERSHIP - COSTS AND SAVINGS

Fueling Costs (continued)

- At present, ZEVs do not pay fuel taxes that support highway construction and roadway maintenance.



Ford Mustang Mach E, Photo by Ford Motor Company

ECONOMIC IMPACTS OF OWNERSHIP - COSTS AND SAVINGS

Maintenance and Repair Costs

- BEVs require less maintenance and repair. Their electric motors and other drivetrain components have fewer moving parts than internal combustion engines, and they don't require fluid and filter changes.
- Data on long-term reliability of BEVs and PHEVs is limited; *Consumer Reports* reviewed their 2019 and 2020 car reliability surveys and compiled the repair data.

Under the hood of a Chevy Bolt



ECONOMIC IMPACTS OF OWNERSHIP - COSTS AND SAVINGS

Maintenance and Repair Costs (continued)

Estimated Per-Mile Repair and Maintenance Costs by Powertrain

Powertrain Type	0-50K Miles	50K-100K Miles	100K-200K Miles	Lifetime Average
BEV	\$0.012	\$0.028	\$0.043*	\$0.031
PHEV	\$0.021	\$0.031	\$0.033	\$0.030
ICE	\$0.028	\$0.060	\$0.079	\$0.061

* low sample size

Lifetime Maintenance Costs by Powertrain

Powertrain Type	Lifetime Maintenance and Repair Cost	Lifetime Savings vs. ICE
ICE	\$9200	
PHEV	\$4600	\$4600
BEV	\$4600	\$4600

Figures taken from, "Electric Vehicle Ownership Costs: Today's Electric Vehicles Offer Big Savings for Consumers"
Consumer Reports, October, 2020.

ECONOMIC IMPACTS OF OWNERSHIP - COSTS AND SAVINGS

Key Findings

- BEVs and PHEVs are projected to reach initial purchase price parity with ICE vehicles within the next 5-7 years
- BEVs and PHEVs depreciate at similar rates as ICE vehicles
- Maintenance and repair costs for BEVs and PHEVs are lower compared to ICE vehicles
- **Given Nevada's higher average gasoline prices, fuel cost savings for BEVs and PHEVs are significant compared to ICE vehicles**

SMALL BUSINESS IMPACTS

Nevada Revised Statutes requires that a notice to adopt a regulation must determine whether the proposed regulation is likely to:

- Impose a direct and significant economic burden upon a small business; or
- Directly restrict the formation, operation or expansion of a small business.

Clean Cars Nevada would result in a direct economic impact to auto manufacturers by requiring them to deliver for sale in Nevada Low Emission Vehicles and increased numbers of Zero Emission Vehicles, and to prepare and submit associated compliance reporting.

SMALL BUSINESS IMPACTS

- **The proposed regulation would not impose a direct and significant economic burden upon small businesses, and would not directly restrict the formation, operation or expansion of a small business.**
- The impacts on small businesses are indirect.
- NDEP has prepared a qualitative assessment of small business impacts presented below

SMALL BUSINESS IMPACTS

Impacts to Automotive Dealerships

- Revenue from new vehicle sales will depend more on sales of ZEVs and profit margins per vehicle for ZEVs may be less certain
- Gradual decline of repair and maintenance revenue
- Costs of installing EV charging infrastructure
- Marketing, advertising, and purchase incentive costs

Impacts to Used Car Retailers

- Installation of charging infrastructure
- Remaining battery life on ZEVs difficult to assess at the present time, creating greater uncertainty in assigning value to used ZEVs for customers and in the used car wholesale market

SMALL BUSINESS IMPACTS

Impacts to Automotive Repair and Maintenance Shops

- Less mechanical components in ZEVs = fewer repairs
- Greater electronic complexity = need for better diagnostics and technician training
- No required fluid and filter changes = decline in maintenance revenue

Impacts to Automotive Parts Shops and Suppliers

- Fewer mechanical replacement parts will be needed for ZEVs

SMALL BUSINESS IMPACTS

Impacts to Collision Repair Industry

- Better diagnostics and training needed to service new lighter-weight automotive materials and innovative ZEV designs
- Collision damage to batteries and associated electronic hardware presents new challenges requiring new repair methods

Impacts to Retail Fuel Providers, Fuel Suppliers, and the Smog Check Industry

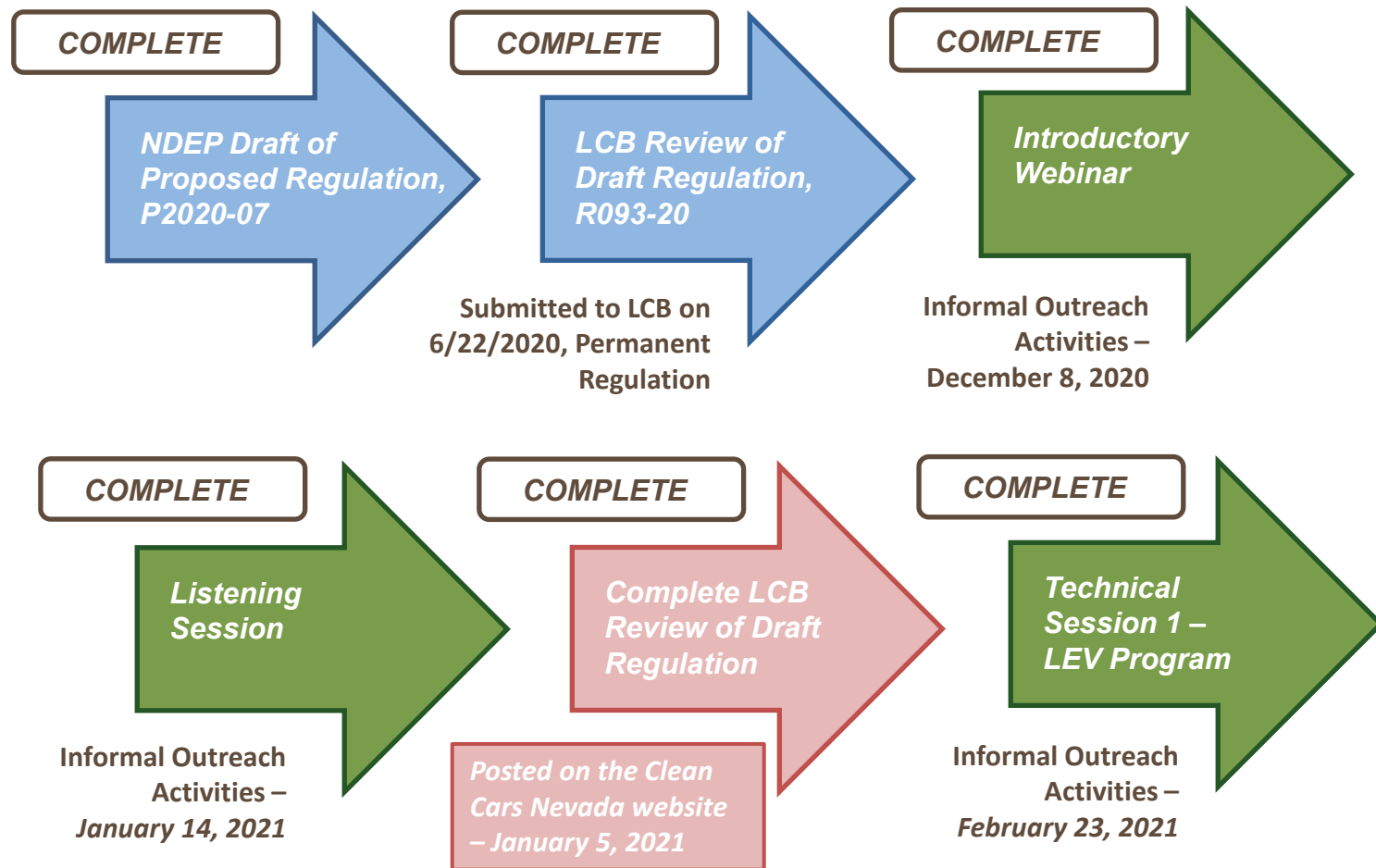
- Decreased fuel sales
- Business model for convenience stores may change
- Smog checks performed at smog check stations will decline

SMALL BUSINESS IMPACTS

Summary of Small Business Impacts

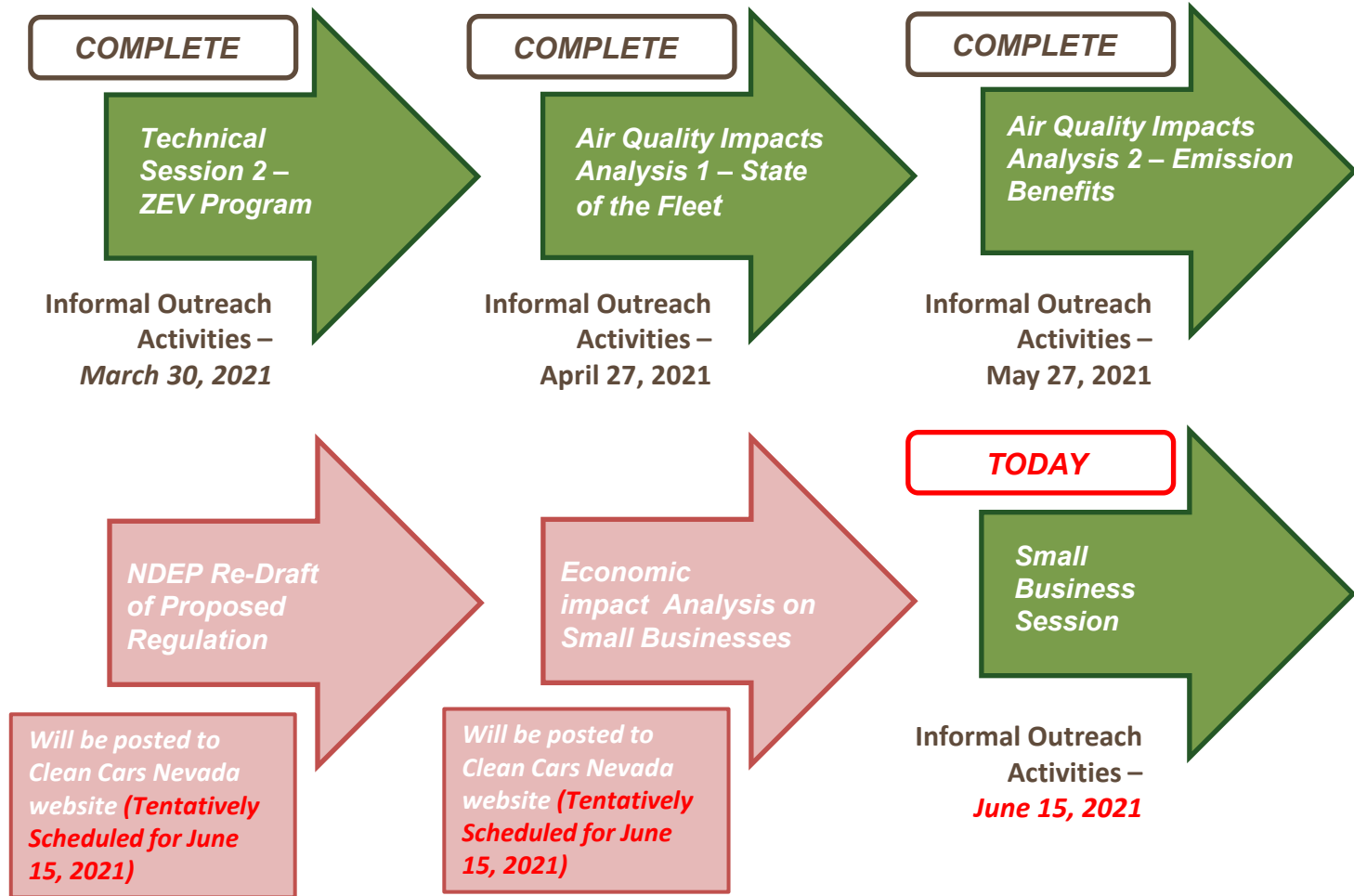
- Dealer uncertainty over consumer acceptance of ZEVs, and how to market and sell ZEVs
- Decline in revenue for maintenance of ZEVs
- Capital costs for charging infrastructure, new diagnostic equipment and updated training
- Decline in fossil fuel sales and associated businesses

THE REGULATORY PROCESS AND OPPORTUNITIES FOR PUBLIC INPUT AND PARTICIPATION



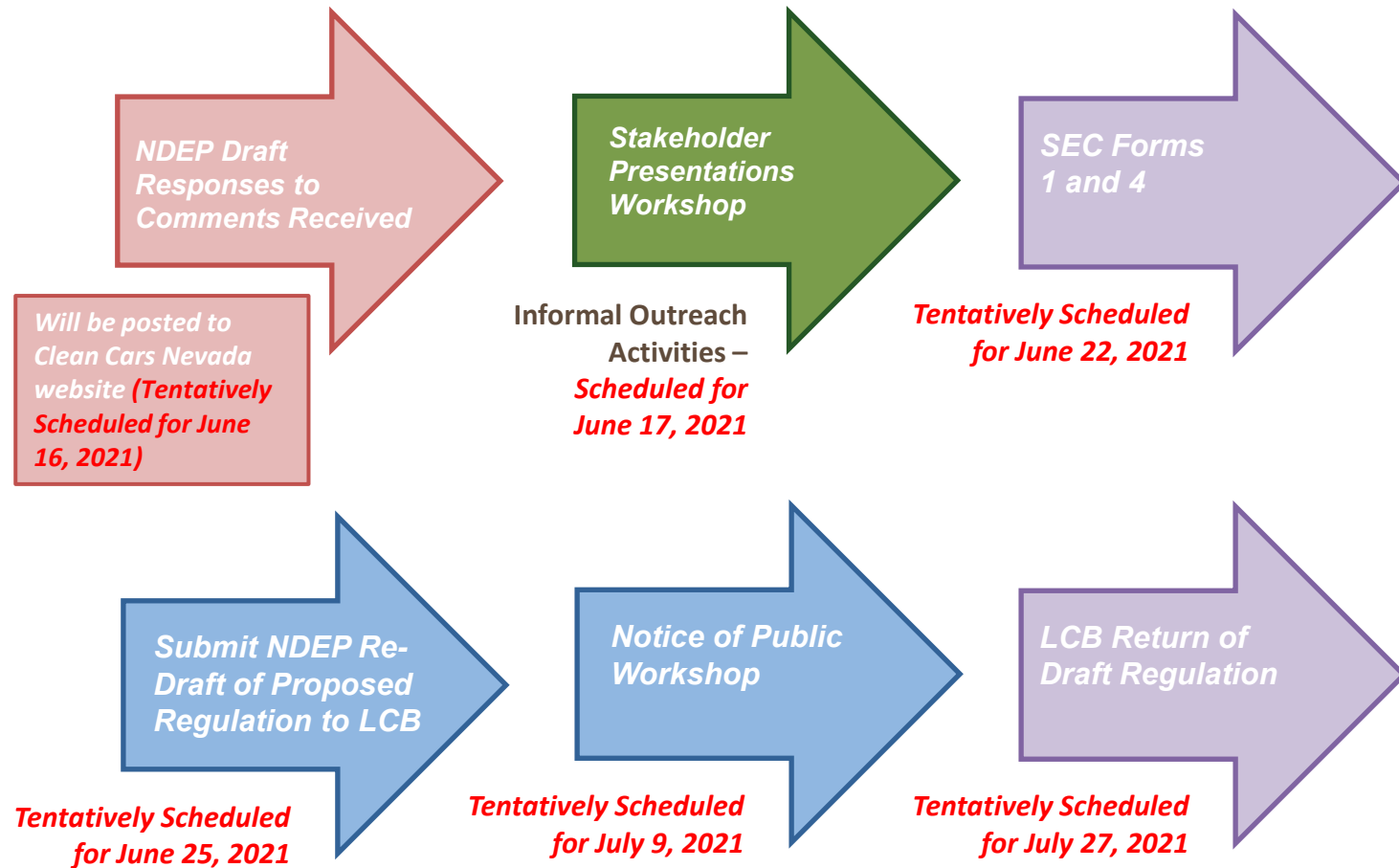
Note: **BLUE** = Regulatory Step; **GREEN** = Informal Activity; and **RED** = Data/Analysis Step

THE REGULATORY PROCESS AND OPPORTUNITIES FOR PUBLIC INPUT AND PARTICIPATION (CONTINUED)

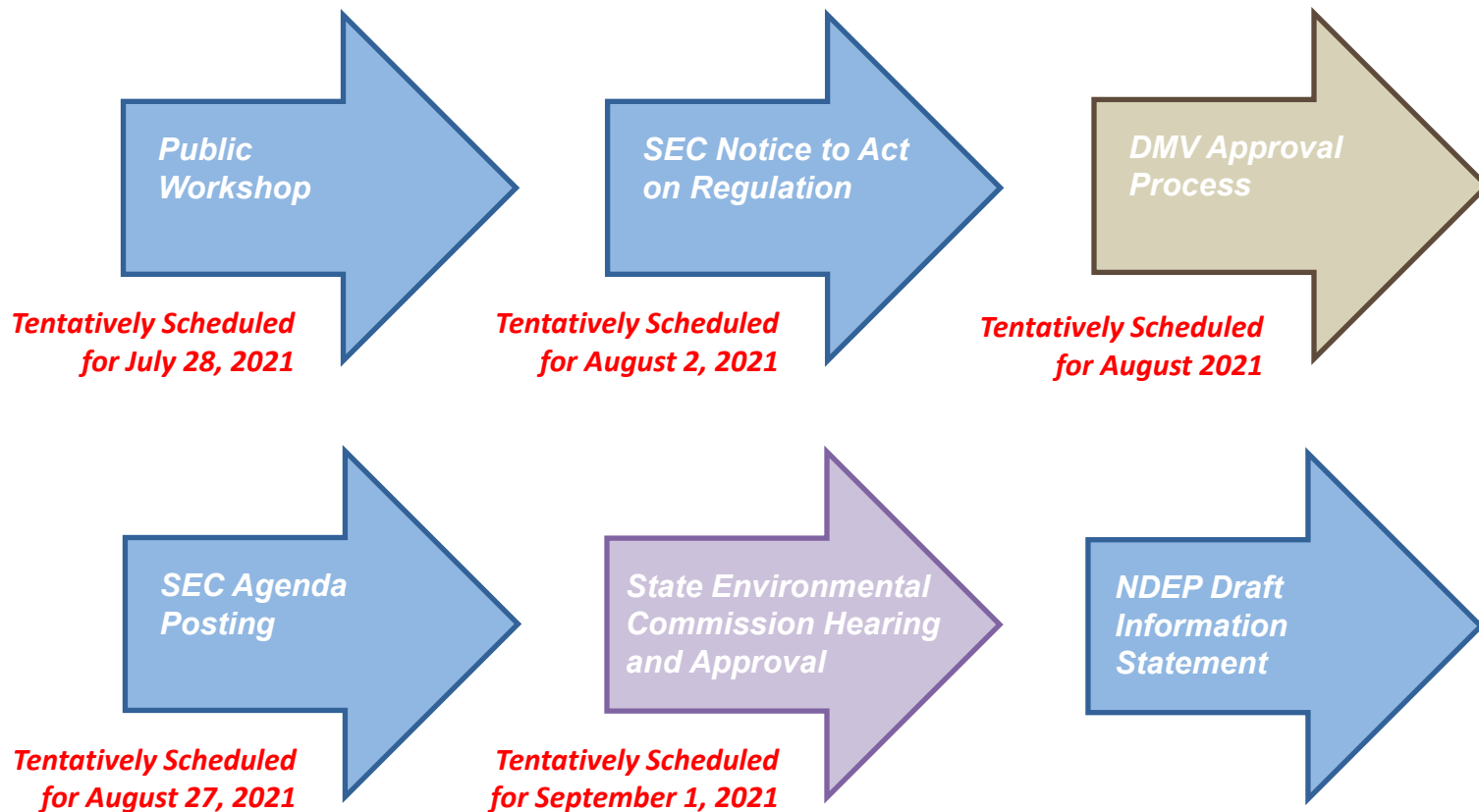


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THE REGULATORY PROCESS AND OPPORTUNITIES FOR PUBLIC INPUT AND PARTICIPATION (CONTINUED)

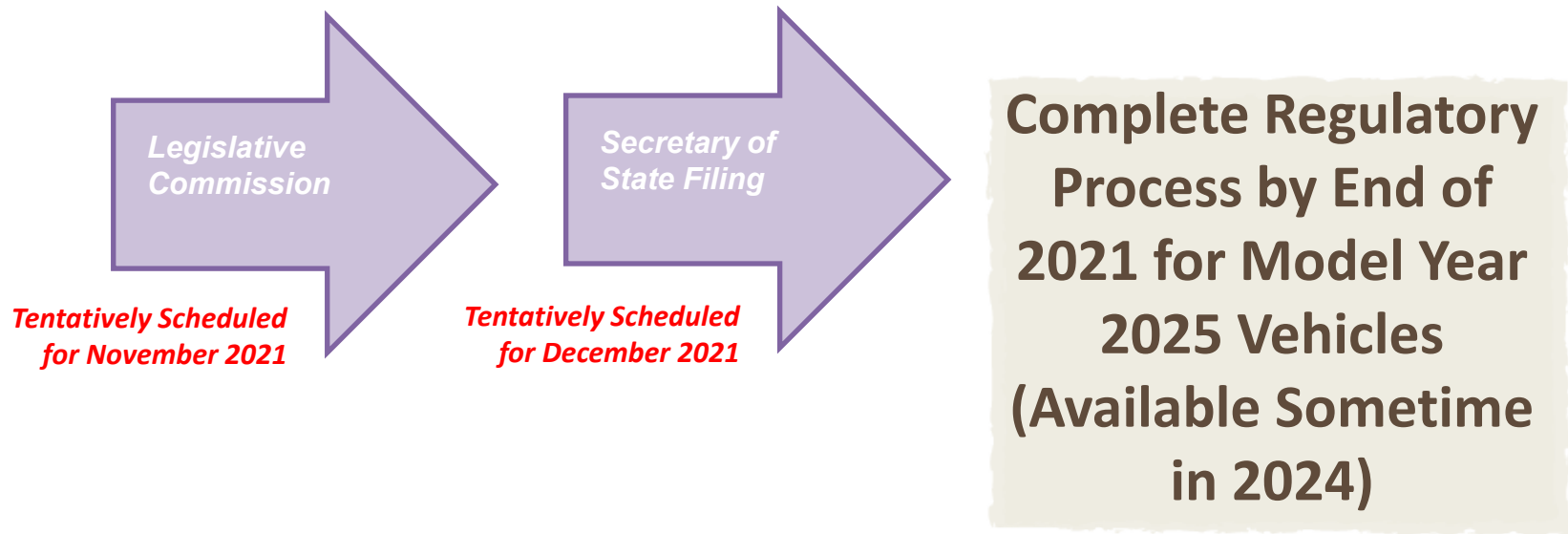


THE REGULATORY PROCESS AND OPPORTUNITIES FOR PUBLIC INPUT AND PARTICIPATION (CONTINUED)



Note: BLUE = Regulatory Step; PURPLE = Approval Process; and BROWN = DMV Process

THE REGULATORY PROCESS AND OPPORTUNITIES FOR PUBLIC INPUT AND PARTICIPATION (CONTINUED)



WHERE TO FIND OUT MORE



Visit NDEP Clean Cars Website for updates
<http://ndep.nv.gov/air/clean-cars-nevada>



E-mail at CleanCarsNevada@ndep.nv.gov



Sign up for Clean Cars Nevada listserv on NDEP Website

Join a program-specific email list to follow NDEP's regulatory actions and public notices

GET NOTICES >

Select a topic below for program-specific news and updates.

Board for Financing Water Projects

VW Settlement - Nevada Mitigation Fund

Nevada Recycling Program

Nevada Brownfields Program

Air Quality Info and Notices

Nevada Federal DOE Facility Oversight

Environmental Outreach & Education

Clean Cars Nevada

NDEP is posting all public comments received by email or letter on-line

<https://documentviewerpublic.ndep.nv.gov>

An account is required to access the comments, but it can be created right away by signing up.

Once signed in, select the category 'Public Comments For Clean Cars Nevada'

You can then search for public comments by name, organization and submission date



NDEP will be hosting Stakeholder Presentations Workshop

Scheduled for June 17, 2021

More details to follow.

Questions?



Contact



Visit NDEP Clean Cars Website for updates
<http://ndep.nv.gov/air/clean-cars-nevada>



E-mail at
CleanCarsNevada@ndep.nv.gov



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