### Ski New Hampshire

#### Annual Conference

#### June 6, 2023



# EV'S & EV CHARGING INFRASTRUCTURE WHAT YOU NEED TO KNOW TODAY

Chris Skoglund Director of Energy Transition Clean Energy NH

# **ABOUT CLEAN ENERGY NH**



New Hampshire's leading clean energy advocate (501(c)3 Nonprofit), dedicated to:



Learn more & become a member at: <u>http://www.cleanenergynh.org</u>

## **Dessert First - Closing Thoughts**

- Electric vehicles are a small part of on-road fleet
- Numbers expected to grow by more than **5000 percent** in coming decade in New England.
- New Hampshire and the other New England states are actively planning for this growth
- NH Has Fallen Behind on EV adoption and Public Charging Roll Out.
- Decisions Made Now Will Influence NH's Economy, Communities, and Environment for Decades to Come.
- Policies and Programs Are Needed At State Level to Keep Up with Surrounding States.



## **Types of Electric Vehicles (EVs)**

**Battery Electric Vehicles (BEVs)** powered solely by an electric battery; 110 - 520 miles of range

**Plug-in Hybrid Electric Vehicles (PHEVs)** powered by both an electric motor and a gasoline engine; 20 - 126 miles electric range; 50+ mpg

Both BEVs and PHEVs are considered Plug-in Electric Vehicles (PEVs) and require electricity to charge (or "fuel") the electric battery.

## **Plug-In Hybrid-Electric Vehicle**



**Conventional engine for longer trips** 



## **Battery-Electric Vehicle**





## **Battery-Electric Vehicle**



# Why Do EVs Matter?

- MUCH more efficient use ¼ energy of gas/diesel vehicles
- Less air pollution healthier IMMEDIATELY
- Less greenhouse gases reduced climate impacts
- More economic cost less right now to buy + maintain + fuel

# Main Reason Many Buy Them Better Value



*"It's like a smartphone that can tow 10,000 pounds."* 

Jim Farley Ford CEO

# Main Reason Adoption Rates Will Increase Prices Coming Down

#### **Batteries**

- 2007 \$1000/kW-h
- 2017 < \$200/kW-h
- 2022 < 120/kW-h
- 2024 < 100/kW-h

Decrease in battery price + Increase in miles/charge = Convenient and Affordable



## Global Passenger EV Sales New Record in 2022



#### **Peak ICE Is Behind Us**

Global passenger vehicle sales by powertrain



Source: BloombergNEF Long-Term Electric Vehicle Outlook 2022 Note: Electric vehicles include plug-in hybrid vehicles

**Bloomberg Green** 

#### **Peaking This Year**

Global fleet of passenger vehicles running only on ICE stops growing



1.25B passenger vehicles

Source: BloombergNEF Long-Term Electric Vehicle Outlook 2022

Bloomberg Green<sup>13</sup>

#### Global EV fleet sizes by segment and market



2025

U.S.

#### Electric car registrations and sales share in selected countries and regions, 2018-2022



#### Monthly new electric car registrations in the United States, 2020-2023



■BEV ■PHEV

#### How Fast Is the Switch to Electric Cars?

19 countries have reached the 5% tipping point-then everything changes



#### **Original Equipment Manufacturer Announcements Related To Electric Light-duty Vehicles**



June 6, 2023 Source: IEA (2021), Global EV Outlook 2021, https://www.iea.org/reports/global-ev-outlook-2021

#### Adoption of EVs **Consistent with Previous Transitions**



Image Credit: **Tony Seba** 

#### Adoption of EVs Consistent with Previous Transitions



Source: Tony Seba

## **Travel & Tourism Industry Impact on NH**

#### Travel & Tourism is the #2 Industry in NH

- In 2021, destination spending generated \$6.3 Billion
  - > 14.3 million "person trips"
  - > 5.7 million "party trips"





Source: New Hampshire Travel Barometer – Impacts, Dean Runyan Associates <u>https://www.travelstats.com/qimpacts/newhampshire</u><sup>21</sup>

# **Travel & Tourism Industry Impact on NH**



## **Travel & Tourism Impact - Mountains**

What do people think of when it comes to traveling to NH?





Source: "Image Perception Research, Summary of Findings" by Strategic Marketing & Research Insights for NH Travel & Tourism, November 2016

Photos: Ski NH photo archives





# **Ski Industry Impact on NH**

According to Ski NH's "Economic Contribution of the Ski Industry in New Hampshire" study<sup>1</sup>, between May 2017 and April 2018,

- Economic impact estimated to be \$507.8 million (direct, indirect, and induced spending)
- Ski industry supported approximately 6,000 year-round jobs.
- During the winters months employed between 7,100 (2015/16) to over 10K (2017/18).
- In the winter months, the ski industry goes from being the fifth largest employer in the state's northern & western most counties to being the **fourth largest employer**.

Average Skier Visits (last 10 years)<sup>2</sup>:

- Total 2.3 million visits/winter
- Alpine skiers account for most visits (avg. ~93%)
- Spring/Summer/Fall visits most recent data 17/18<sup>1</sup> over 700,000 (= an increase from just over 400,000 in 2009/10)

Sources:

<sup>1</sup>*Economic Contribution of the Ski Industry in New Hampshire*, by Daniel S. Lee, Plymouth State University, May 2019 <sup>2</sup>Ski NH skier visit data, aggregated

# **Visitor Traffic**

How do our skiers/guests arrive at our ski areas? THEY DRIVE!

- 52% of skier visits come from MA; ~60% come from New England<sup>1</sup> (not including NH)
- Not a lot of bus traffic and no more rail...
- Even for those tourists who fly here, most need a rental car or some other way to travel around the state

Total toll traffic<sup>2</sup> in FY2022 – 2,481,421 FY 2021 - 2,536,933 (Counts tolls in Dover, Rochester, Hampton, Hooksett, Bedford)



#### Sources:

<sup>1</sup>NSAA & RRC Associates survey data, 2014/15 through 2017/18 <sup>2</sup>NH Department of Fransportation, Bureau of Turnpikes, NH Turnpike System Daily Traffic By Method of Payment, Fiscal 2022

## Deeper Look at EV Adoption New England

EV Sales by Year in New England Projections 2022-2031



June 6, 2023

Data Source: ISO-NE CELT REPORT 2022; Figure Credit: Clean Energy NH

# EVs are Coming April 2022 Projections



NH 5K  $\rightarrow$  50K in a decade. NE 50K  $\rightarrow$  1.5 M

# EVs are Coming Faster than Projected April 2023 Projections



#### NH 5K $\rightarrow$ 50K+ in a decade. NE 50K $\rightarrow$ 2.1M in 11 Years

## Personal Light-Duty EV Adoption



2020

2030

2040

Full Electrification

2050

····· CELT 2022







----- CELT 2023

#### Annual Incremental Increase in EV Stock

Year	СТ	MA	ME	NH	RI	VT	NE
2023	20,844	48,107	4,634	2,251	5,461	4,604	85,901
2024	27,146	72,081	9,218	4,801	7,165	5,748	126,159
2025	33,759	93,651	13,758	8,006	8,773	7,095	165,043
2026	40,468	116,072	19,036	11,115	10,414	8,601	205,706
2027	47,110	138,446	25,066	14,385	12,403	10,267	247,676
2028	53,768	160,595	32,035	17,830	14,418	12,097	290,742
2029	61,258	182,196	39,262	21,371	16,470	14,082	334,639
2030	68,898	203,904	45,314	24,946	18,577	16,089	377,727
2031	77,764	227,216	49,894	28,655	20,756	18,366	422,651
2032	87,919	251,736	52,854	32,593	22,643	20,935	468,679
10-year total (2023-2032)	518,934	1,494,004	291,071	165,953	137,080	117,884	2,724,923
Previous 10- year total (2022-2031)	369,920	530,755	258,273	58,524	96,652	207,673	1,521,796
Change	+149,014	+963,249	+32,798	+107,429	+40,428	-89,789	+1,203,127

## Climate Change Policy Universal in NE States (and CAN) New Hampshire is an Outlier



The five OTHER New England states are aggressively pursuing efforts aimed at increasing renewable energy generation and reducing carbon emissions.

Data Source: ISO-NE CELT REPORT 2022

# Energy/Climate Policy in NE States Supporting EV Adoption



### <u>Vehicle Charging</u>: Different Chargers Different Costs and Benefits



Most, if not all, EVs come with Level 1 charging equipment that can be plugged into a standard 120V household outlet.

 2-5 miles of range per hour of charging (depending on the size of the battery)



- A Level 2 charger requires a 240V service (ex. Residential clothes-dryer plug). The cost of Level 2 equipment and installation can range from \$1,000 \$20,000, depending upon the location and whether or not there are existing circuits.
- 10-20 miles of range per hour of charging



A Level 3, DC Fast Charger costs can range from \$25,000 to well over \$100,000

• 60-80 miles of range per 20 minutes of charging

# **Types of Charging**

#### Level 1

2 to 5 miles of range per hour of charging (full charge in 11-20 hrs.)

Standard 120v AC Wall Outlet

1.4 kW – 2.4 kW



#### Level 2 (J1772)

10 to 25 miles of range per hour of charging (full charge in 8 hrs.)

Requires 240v outlet and dedicated 20- to 80-amp circuit – the same kind used by a clothes drier or stove

#### 3 kW to 19 kW (Avg 9.6 kW)



#### DCFC

60 to 80 miles of range per 20 minutes of charging\*

Generally requires three-phase 480v AC electric circuit

Needs to be mounted on an equipment pad

50 kW – 150 kW – 350 kW





## **DC Fast Chargers**

#### DCFCs range from 50 to 350 kilowatts

There are three different plug types that are used by different vehicle manufacturers:



SAE Combined Charging System (e.g., BMW, GM, VW)



• CHAdeMO (i.e., Nissan Leaf)



Tesla (used exclusively by Tesla)

Most new non-Tesla chargers come equipped with both SAE CCS and CHAdeMO plugs.

https://afdc.energy.gov/files/u/publication/EV\_Charger\_Selection\_Guid e\_2018-01-112.pdf

# EV "Fueling" Won't Be Same Model





Up to 80% of NH EV drivers' energy needs could be met by home charging.

# EV "Fueling" Won't Be Same Model



# EV "Fueling" Won't Be Same Model



It's A Fundamentally Different Technology Differentiation from ICE Vehicles is Needed

# PUBLIC EV "Fueling" is Needed Can Include the Old Model



Traditional Fueling Stations WILL Play a Role Engaged Already

# PUBLIC EV "Fueling" is Needed Won't Be Same Model



Charging is Can Be Placed Across Communities To Allow Slower Charging During Long Stops

# PUBLIC EV "Fueling" is Needed Won't Be Same Model



Charging Can Be Co-Located with DERs to Mitigate Grid Impact Co-Locate with Solar and Storage

# PUBLIC Charging is Needed Won't Be Same Model



Public Charging Can Be Placed Throughout Communities as Electric Power is Already Ubiquitous (And NON EXPLOSIVE)

#### **Publicly Available Electric Vehicle Supply Equipment**

**MARCH 2021 - Limited** 



#### Total Number of Level 2 & Fast Charging Units per State with Share of Fast Charging Units March 2021 518 296 27% 22% 736 8% 3,672 6,478 10% 215 2,212 1,733 16% 1,842

June 6, 2023

18%



Current data as of 11/02/22 Source: https://afdc.energy.gov/stations/#/find/nearest

### Level 2 EVSE in NH

There are currently **135 Level 2 charging locations in NH** (*147 including Tesla*) and over 47,000 universal level 2 locations in the US.

For reference, charging infrastructure in neighboring states:

- Vermont 265 locations
- Maine 308 locations
- Massachusetts 2,117 locations



Current data as of 11/02/22 Source: https://afdc.energy.gov/stations/#/find/nearest

#### **DCFC** Infrastructure in NH

There are currently **17 universal DCFC locations** in New Hampshire (*28 including Tesla*), and nearly 5,000 universal DCFC locations in the US, with billions of dollars of planned investment.

For reference, DCFC infrastructure in neighboring states:

- Vermont 38 locations
- Maine 42 locations
- Massachusetts 90 locations



# Benefits & Challenges: EV Charging Infrastructure at Ski Areas

Benefits	Challenges
Service for EV-driving guests (numbers to grow significantly)	Costs to install EVSE; slow (if ever) ROI
Helps with range anxiety, esp. in winter	How to deal with demand charges? Who pays for the electricity?
Shows a ski area's commitment to sustainability	Are valets needed in an already difficult labor market?
Reduces ski area's GHG emissions	Where to site chargers? In prime parking areas?

#### WHAT PEV POLICIES ARE MOST EFFECTIVE?

TIE	R 1	Vehicle Purchase Incentives     Vehicle Adoption Standards
τı	ER 2	<ul> <li>EVSE Installation Support</li> <li>Non-Residential Rates</li> <li>Streamlined Permitting, Building Codes, Zoning, and Ordinances</li> <li>Transportation Sector Carbon Pricing</li> </ul>
Т	IER 3	<ul> <li>Education and Awareness Campaigns</li> <li>HOV Lane, Parking, and Other Preferred Access Transportation Policies</li> <li>Residential PEV Rates</li> <li>Fleets</li> <li>Dealership Programs</li> <li>PEV and EVSE Planning</li> <li>PEV Fee Penalty</li> </ul>

March 2021 | Cassie Powers (CPowers@NASE0.org) & Geoff Morrison (Geoffrey.Morrison@CadmusGroup.com)

### Funding for Electric Vehicle Supply Equipment Limited





Source: Jessica Wilcox, EBC Presentation and <u>https://afdc.energy.gov/stations/#/find/nearest</u> Current data November 1, 2022 June 6, 2023

## Limited Public Funding for Electric Vehicle Supply Equipment

Funding Source	Quantity	Timing
VW Mitigation Trust	\$3 Million	Q4 – 2023
Eversource Make Ready	\$2 Million	Q4 - 2023
Unitil Make Ready	\$4 Million	DENIED
National Electric Vehicle Initiative	\$17 Million	2023-2027





#### Current Funding MIGHT Reach The Backbone BUT Just a Few of the Bones in The Body



# **Volkswagen Trust Funds: NH Mitigation Plan**

- Approximately \$31 million 15% (~\$4.6 million) dedicated to EVSE
- Lead Agency: NHDES
  - September 2021– DCFC Request for Proposals (RFP) *Closed 02/25/22* 
    - Eligible Costs: up to 80%, or up to 100% for EVSE located on state or local gov-owned property
      - NHDES received 30 proposals from 14 applicants for 53 proposed EVSE deployment options ... 43 of the proposed deployment options - representing 35 sites across 25 NH towns and cities - met the minimum qualifications of the RFP.
      - These proposals have been formally evaluated by a Scoring Committee comprised of reps from NHDOE, DOT & DES, and are in the contract negotiation process – they are confidential until contracts are awarded!
- For Reference: NHDES Volkswagen Mitigation Trust Webpage:
- https://www.des.nh.gov/business-and-community/loans-and-grants/volkswagen-mitigation-trust

## **BIL: EV & Infrastructure Programs**

- National Targets: EVs are 50% of new car sales + 500,000 EV chargers by 2030
- BIL invests a total of \$7.5 billion in clean transportation infrastructure
  - \$5 billion NEVI formula funding
    - \$1 billion per year for 5 years beginning FY 2022 (Oct 1)
      - NH 5-year formula funding = \$17,271,581
        - Cost-share: 80% federal 20% private or state funds (NHDOT expects most from private sector)
  - \$2.5 billion discretionary grant funding divided between corridor & community charging/fueling (H2, LPG, NG) national, finite Focus: rural + access in underserved/overburdened/disadvantaged communities

# BIL: NATIONAL ELECTRIC VEHICLE INFRASTRUCTURE (NEVI) PROGRAM

- Lead Agency = NHDOT Project Manager = Mike Mozer
- Funding priorities for the installation, operation, and maintenance of EV charging infrastructure <u>FHWAs NEVI Program Guidance Document</u>
  - Locations = FHWA-designated alternative fuel corridors
    - Interstate and National Highway System
  - **Publicly accessible** rural, underserved, and disadvantaged communities
  - **DCFC every 50 miles and within 1 travel mile from the highway** (*unless waiver granted*)
    - ≥ four 150 kW DC output fast chargers with CCS ports capable of simultaneously charging four EVs

Once national network is fully built out, funds can be used on any public road or other publicly accessible location – flexibility to determine type and location

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# **NH NEVI Plan**

#### NHDOT's NEVI Plan - Approved by FHWA September 14, 2022

- NHDOT intends to implement the Plan within 5-year federal funding cycle
- Waiting on final rules to be released (ref: NEVI NPRM in Federal Register)
- Hiring a Consultant to assist with program
- Initial Interstate Focus: DCFC on I-93, I-95, and I-89
  - Then: NH-9, NH-12, NH-101, NH-9/US-202 from I-89 to Keene, NH-11, US-4/NH-9, NH-16, US-302 & US-2
- FY 2023: First Interstate RFP + nominate US-3 (from US-2 to Canada)
- FY 2024: RFPs for remaining locations. Construction of awarded locations expected to begin and continue thru FY 2025
- FY 2026: By FY-end, all EV Charging Station anticipated to be operational & ready for use



6. New Hampshire Existing AFC's

# **BIL: Discretionary Grant Program**

- \$2.5 billion discretionary grant funding divided between corridor & community charging - *competitive program*
  - \$1.25 billion Corridor Charging Grant Program
    - Publicly accessible EVSE, H2, LPG & NG fueling infrastructure along designated AF Corridors
  - \$1.25 billion Community Charging Grant Program
    - Publicly accessible EVSE, H2, LPG & NG fueling infrastructure in communities
    - Priorities: rural areas, LMI neighborhoods, and communities with a low ratio of private parking spaces.

## **NH Legislature Asking For Information**

<u>SB52</u>	Timothy Lang (R- Sanbornton)	relative to the regulation and operation of electric vehicle charging stations.	Started in Senate Transportation Rather Than Energy Natural Resources;
			Amendment passed House 5/4/23
<u>HB111</u>	Kristina Schultz (D- Concord)	establishing a committee to study electrical vehicle charging for residential renters.	Referred to Senate Transportation, Passed on 4/13/23 with Amendment.
<u>HB412</u>	Mark McConkey (R- Carroll County)	re-establishing a commission to study revenue alternatives to the road toll for the funding of improvements to the state's highways and bridges and their resulting improvements	Referred to Senate Transportation. Passed out of committee.
<u>SB191</u>	David Watters (D- Dover)	relative to road toll registration surcharges for electric vehicles.	Passed with <u>Amendment.</u> Passed out of Senate 2/22/23; Retained in the House Moving into HB2 - Possibly

# **PUC Asking for Information**

PUC Docket No. <u>IR 22-076</u> - Investigation of Whether Current Tariffs and Programs are Sufficient to Support Demand Response and Electric Vehicle Charging Programs

- Initial Comments from all participants March 28, 2023
- Reply Comments from all participants
   May 9, 2023
- Final Comments from all participants
   June 13, 2023
- Status Conference June 15, 2023, at 9:00 a.m.

## **Dessert First - Closing Thoughts**

- Electric vehicles are a small part of on-road fleet
- Numbers expected to grow by more than **5000 percent** in coming decade in New England.
- New Hampshire and the other New England states are actively planning for this growth
- NH Has Fallen Behind on EV adoption and Public Charging Roll Out.
- Decisions Made Now Will Influence NH's Economy, Communities, and Environment for Decades to Come.
- Policies and Programs Are Needed At State Level to Keep Up with Surrounding States.

• Policy makers need to hear how this transition relates to your June 6, 2023 industry.

#### **Contact Info**

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