EVERYBODY IN
APPROACHING THE EV TIPPING POINT

Elaine Buckberg
Chief Economist

November 5, 2021
ESG AT THE CORE OF OUR BUSINESS

ACCELERATED
Carbon neutral in global products and operations by 2040; eliminating light duty emissions by 2035

VALIDATED
SBTI approved scope 1, 2 and 3 emissions targets

INVESTED
$25 million climate equity fund

COMMITTED
Source 100% renewable energy to power U.S. facilities advanced to 2025

GM VISION: ZERO CRASHES, ZERO EMISSIONS, ZERO CONGESTION
CONSUMERS WANT A NO COMPROMISES EV TO GROW THE EV MARKET, ADDRESS FOUR PRIORITIES

- **Cost:** Competitive with ICE Engine
- **Comparable Range:** With ICE Engine
- **Ubiquitous, Convenient, and Fast Charging**
- **Broad Body Style Choice**
New CR survey finds the majority of consumers are interested in getting an electric vehicle

In a nationally-representative survey of American adults with a valid drivers license conducted from July-August of 2020, 71% said they had at least some interest in getting an electric vehicle (EV) at some point; a total of 31% said they would consider getting an EV for their next lease or purchase.

- **27%** will consider an EV for next purchase
- **4%** "Definitely" plan to get an EV for their next vehicle
- **29%** uninterested in ever getting an EV
- **40%** have some interest in getting an EV in the future, but not for next purchase

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**EV INTEREST BY GENERATION**

- **78%** of Millennial drivers are interested in getting an EV at some point.
- **70%** of Gen X drivers are interested in getting an EV at some point.
- **66%** of Baby Boomer drivers are interested in getting an EV at some point.
- **58%** of Silent Generation drivers are interested in getting an EV at some point.
FORECASTS OF U.S. EV ADOPTION RANGE WIDELY BUT CENTER AROUND ~30% IN 2030

US BEV Penetration

<table>
<thead>
<tr>
<th>Forecast Source</th>
<th>2025</th>
<th>2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>UBS (10/20)</td>
<td>11%</td>
<td>35%</td>
</tr>
<tr>
<td>BCG (4/21)</td>
<td>11%</td>
<td>31%</td>
</tr>
<tr>
<td>BNEF (6/21)</td>
<td>10%</td>
<td>31%</td>
</tr>
<tr>
<td>Goldman Sachs (12/20)</td>
<td>15%</td>
<td>30%</td>
</tr>
<tr>
<td>EV-Volumes.com (4/21)</td>
<td>11%</td>
<td>29%</td>
</tr>
<tr>
<td>Morgan Stanley (10/20)</td>
<td>10%</td>
<td>25%</td>
</tr>
<tr>
<td>Navigant (5/21)</td>
<td>8%</td>
<td>25%</td>
</tr>
<tr>
<td>LMC (5/21)</td>
<td>8%</td>
<td>20%</td>
</tr>
<tr>
<td>IHS (5/21)</td>
<td>11%</td>
<td>16%</td>
</tr>
</tbody>
</table>

Median
BATTERY COSTS HAVE DECLINED ~20% PER YEAR WHILE EV RANGE IS INCREASING

**Volume-weighted average battery pack cost**
Real 2020 $/kWh

**U.S. Electric Range, Miles**

Source: Bloomberg New Energy Finance

Source: Fuel economy.gov
**US: NUMBER OF EV ENTRIES INCREASING EXPONENTIALLY**

**Total U.S. EV Entries**

- 2020: 24 entries
- 2022: 69 entries
- 2025: 153 entries

**Top EV Segments in U.S.**

- **Car**
  - 2020: 4 entries
  - 2022: 9 entries
  - 2025: 7 entries

- **SUV/Crossover**
  - 2020: 4 entries
  - 2022: 15 entries
  - 2025: 16 entries

- **Lux Car/Sports**
  - 2020: 7 entries
  - 2022: 16 entries
  - 2025: 29 entries

- **Lux SUV/Crossover**
  - 2020: 6 entries
  - 2022: 22 entries
  - 2025: 54 entries

- **Pickup**
  - 2020: 0 entries
  - 2022: 7 entries
  - 2025: 9 entries

Sources: General Motors, IHS VPaC May 2021
CHINA: NUMBER OF EV ENTRIES IS INCREASING

Total China EV Entries

- 2020: 242
- 2022: 345
- 2025: 433

Top EV Segments in China

- Car: 78 (2020), 93 (2022), 106 (2025)
- SUV/Crossover: 95 (2020), 150 (2022), 179 (2025)
- Lux SUV/Crossover: 12 (2020), 24 (2022), 49 (2025)
- Pickup: 10 (2020), 12 (2022), 13 (2025)

Sources: General Motors, IHS VPaC May 2021
A BEV SAVES ~$1K IN FUEL COSTS PER YEAR
ASSUMES RESIDENTIAL PRICES WHICH VARY BY STATE

<table>
<thead>
<tr>
<th>Battery Electric Vehicle</th>
<th>Internal Combustion Engine</th>
</tr>
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<tbody>
<tr>
<td><strong>Miles per year</strong></td>
<td>12,416</td>
</tr>
<tr>
<td><strong>Electricity ($/kWh)</strong></td>
<td>$0.14</td>
</tr>
<tr>
<td><strong>Miles per kWh</strong></td>
<td>3.1</td>
</tr>
<tr>
<td><strong>Fuel cost per year</strong></td>
<td>$561</td>
</tr>
</tbody>
</table>

| **Miles per year**       | 12,416                      |
| **Gasoline ($/gallon)**  | $3.27                       |
| **Miles per gallon**     | 23.6                        |
| **Fuel cost per year**   | $1,720                      |

1 Annual miles per vehicle according to *Highway Statistics 2000; fhwa.dot.gov*
2 US average residential cost of electricity per kWh, Jul 2021; eia.gov
3 US average retail gasoline price (all grades, all formulations), Sep 2021; eia.gov
4 Median efficiency of 2021 MY electric vehicles is 104 mpge (or 3.1 mi/kWh); fueleconomy.gov
5 Median fuel economy of 2021 MY gasoline vehicles; fueleconomy.gov
EARLY ADOPTERS WILL DO MAJORITY OF CHARGING AT HOME OR WORK

U.S. Energy demand, home-centered scenario
% of kilowatt-hours

Source: McKinsey, Charging ahead: electric vehicle infrastructure demand
HOWEVER, AREAS WITH HIGHER EV ADOPTION TEND TO HAVE MORE PUBLIC CHARGING INFRASTRUCTURE

CY 2019 EV share of new vehicles and public chargers per million pop.
For the 200 most populous U.S. metro areas

Source: ICCT, Update on electric vehicle adoption across U.S. cities, Aug. 2020
CALIFORNIA CITIES HAVE MORE PUBLIC CHARGERS, HIGH MODEL AVAILABILITY, AND MANY OTHER INCENTIVES

Source: ICCT, August 2020
U.S.: GROWTH IN FAST CHARGING IS ACCELERATING

DC Fast Charging Stations*
U.S. Public and Private

*All DC Fast Charge Stations, including Tesla.
Tesla has a fifth of all DC Fast stations (locations) and half of all DC Fast charging outlets.
Source: Alternative Fuels Data Center

GM Confidential
ICCT PROJECTS NEED FOR 180,000 DC FAST CHARGERS
2.4M TOTAL CHARGERS BY 2030 TO SUPPORT EV MARKET

Charging Infrastructure Needed

Associated investment needed to support U.S. EV market through 2030

Source: ICCT, Charging Up America, July 2021
EVS IN THE BIDEN ADMINISTRATION

1. **Point of sale rebates and tax credits to buy U.S.-made EVs**

   House draft of budget reconciliation bill provides for consumer EV tax credits up to $12,500 for 10 years; tax credit for commercial EV purchases; and used EV tax credit.

2. **Public investment in charging stations (500K additional chargers by 2030)**

   Funding included in Bipartisan Infrastructure Package and Budget Reconciliation bill.

3. **Issued draft regulations tightening GHG and fuel economy standards**

4. **EVs included in $35 billion for climate focused R&D**

5. **Executive orders call for electrifying federal fleet, using tools to shift state/local/tribal fleets to zero emission.** Budget reconciliation bill provides $3B in funding for federal fleet.

## ICE PHASE-OUT DATES

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<tr>
<th>Phase-Out Year</th>
<th>Market</th>
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<tr>
<td>2025</td>
<td>Norway</td>
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<tr>
<td></td>
<td>Iceland</td>
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<td></td>
<td>Sweden</td>
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<tr>
<td></td>
<td>Taiwan</td>
</tr>
<tr>
<td>2040</td>
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Source: INTERNATIONAL COUNCIL ON CLEAN TRANSPORTATION; June 2021
THANK YOU