## History of EVs

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>1832</td>
<td>First EV Prototype</td>
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<tr>
<td>1880</td>
<td>First EV in the US</td>
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<tr>
<td>1887</td>
<td>NYC pilots first Electric Taxis</td>
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<tr>
<td>1912</td>
<td>ICVs become more popular than EVs</td>
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<tr>
<td>1935</td>
<td>EV’s all but gone</td>
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<tr>
<td>1960-79</td>
<td>High oil prices, Arab Oil Embargo of 1973 spark renewed interest</td>
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<tr>
<td>1997</td>
<td>Toyota Prius</td>
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<td>2006</td>
<td>Tesla</td>
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<tr>
<td>2021</td>
<td>3.5% of all new vehicle sales are EV or PHEV</td>
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</tbody>
</table>

### What is Fueling the Drive Toward EVs

- [Image of a car charging station]
- [Image of a child using a smartphone]
- [Image of a road with a sunset]

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What we’re going to hear

Vehicle Manufacturer Perspective
Brian Marshall - Haldex

Power Grid Perspective
Rusty Hartman, PE - Olsson

Municipality Perspective
Alex McElroy - SEMPO

Electric Vehicles
AN INDUSTRY PERSPECTIVE

Ambitious Goals on EVs

<table>
<thead>
<tr>
<th>Electric Vehicle Technology</th>
<th>2020</th>
<th>2021</th>
<th>2022</th>
<th>2023</th>
<th>2024</th>
<th>2025</th>
</tr>
</thead>
<tbody>
<tr>
<td>Battery Electric (BEV)</td>
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<tr>
<td>Plug-In Hybrid Electric (PHEV)</td>
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<tr>
<td>Fuel Cell Electric (FCEV)</td>
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<tr>
<td>Other EV Technologies</td>
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</tbody>
</table>

- Automotive
- Commercial Vehicles
- Transit
Technical Opportunities

battery efficiency

Total Vehicle Cost

Quality/Reliability

Legislation & Incentives

- EPA Regulations
- Vehicle Purchase Rebates
- Energy Cost Incentives
- Renewables

Consumer/Owner Influence

- Vehicle Range
- Psychology of Change
- Customer Perceived Value
- Customer Perceived Quality
- Ownership Models
The Future of the Grid
Rusty Hartman, PE

Aging Grid
And Infrastructure
• Average Utility Infrastructure Age Nationwide Beyond Life Cycle
• Aging Workforce to Design/Maintain/Replace
• Case in Point - 1948 Allis Chalmers Transformer Removed from Service in 2020.

Distributed Generation
Can We Support It?
Can We Utilize The Power?
• Rooftop Solar
• Community Developments
• Becoming More Cost Effective Everyday for Individual Investment
• Battery Storage – The Great Unknown (10 Year Lifespans Currently)
EV Commitments From Different Automotive Manufacturers

EV Commitments From Fleet Operators

Charging Stations
- Home Based
- Conventional Gas Stations
- Rest Areas
- Long Highway Stretches
- Alternative Technologies
  - Inductive Charging
  - Rapid Charge Stations
  - Quick Change Battery Solutions (e.g., GM's Ultium Platform)
  - Autonomous Vehicles
Back To The Grid Itself

- How do we handle a greater demand load with a longer “peak” time?
- New transformers will not see the “cool down” or “de-excitation” times that previous units did.
- Utility substation transformers have a 25-to-40-year service life historically.
- New lean manufacturing techniques coupled with cost savings measures are yielding a 10–20% decrease in that life span.
Integrating home charging stations in 90% of the homes in the U.S. by 2035 and the demand model based on those installs alone increases approximately 300%

More integrated charging in parking garages, lots, airports and beyond during working hours

Contact
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rhartman@olsson.com
417.483.2275
Geographic Area

- Southeast Missouri
- Small MPO
- Urbanized Area Pop. 54,854
- Consists of:
  - City of Cape Girardeau
  - City of Jackson
  - Portions of Cape Girardeau County, MO
  - Portions of Scott County, MO
  - Portions of the Village of East Cape, IL
  - Includes SEMPO Port and Cape Girardeau

Background

- 2021 – 2045 Metropolitan Transportation Plan
- Unified Planning Work Program
  - Electric Vehicle Readiness Plan
  - Research
  - Established Steering Committee
  - Developed a Request For Proposal
    - Scope/Goals/Deliverables
Electric Vehicle Readiness Plan

• Scope:
   Stakeholder Outreach: Utilities, Charging Infrastructure Companies, Car Manufacturers and Dealers, Policy Makers, Local EV Enthusiasts, etc.
   Assessment: Development Codes, Existing Conditions, Critical Barriers and Gaps, Key Needs, Potential Programs and Partnerships, EV Infrastructure, Trends, etc.
   Equity Analysis: Access to traditionally underserved such as multifamily housing residents, renters, lower-income, communities of color, non-English speakers, etc.

Electric Vehicle Readiness Plan cont..

• Scope:
   Strategic Locations: Locations based on current demand, anticipated growth, Existing Grid Capabilities, Distinction between Public/Private, Appropriate Level Charger, Cost Estimates, etc.
   Needed Programs & Policies: Barriers and Methods to increase EV usage, Fleet Electrification, Grid Optimization, Innovative Charging Options such as curbside, streetlight, solar, and wireless.
   Strategy & Recommendations: Implementation Plan, Key Partnerships, Necessary Legislation; Recommendations on infrastructure, services, policies, programs.
   Funding Guidance: Funding Opportunities, Incentives, Rebates, Grants, Funding Sources (local funds, private funds, public grants, other options...)

RFP Solicitation

• July/August Solicitation
• Solicited 23 firms directly
• Zero Proposal Responses
• Surveyed Firms – 12 responses
• Regrouped, Trying Again
Thank You!