2020 Webinar Series
Hosted by South Shore Clean Cities

Community Electric Vehicle Charging
July 7, 2020 1 p.m. CDT
Planning for Electric Vehicle Infrastructure

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Environmental Planner

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Basic Terminology

**EV** – Electric Vehicle

**EVSE** – Electric Vehicle Supply Equipment

**ICE** – Internal Combustion Engine

Graphic from: Evolution Tool – Argonne National Laboratory, [https://evolution.es.anl.gov/](https://evolution.es.anl.gov/)

Image from PlugShare, Potato Creek State Park
Plugging In

**AC Level 1 Charging**
2 to 5 miles of range per 1 hour of charging

**AC Level 2 Charging**
10 to 20 miles of range per 1 hour of charging

**DC Fast Charging**
60 to 80 miles of range per 20 minutes of charging

https://afdc.energy.gov/fuels/electricity_infrastructure.html
Current Charging Availability

Destination Charging Availability (Level 2)

Alternative Fuels Data Center – Station Locator, https://afdc.energy.gov/stations
Investments in Fast Charging

- Volkswagen Environmental Mitigation Fund $5.5M
- Electrify America network (UP Mall in Mishawaka)

*Photo from plugshare.com*
*Map: Alternative Fuels Data Center – Station Locator, [https://afdc.energy.gov/stations](https://afdc.energy.gov/stations)*
Regional Electric Vehicle Growth

Growth in Plug-In Vehicles in Michiana Region
*St. Joseph, Elkhart, Marshall, Kosciusko Counties*

![Line graph showing the growth in plug-in vehicles from 2014 to 2018. The graph compares the number of registered vehicles across all MACOG counties and St. Joseph/Elkhart counties.]

![Pie chart showing the distribution of vehicle types in Michiana. The chart contrasts All-Electric vehicles with Plug-In Hybrid vehicles.]

*Indiana Bureau of Motor Vehicles Data, 2014-2018*
Why Electric Vehicle & Infrastructure?

Environment
- *Reduce local emission of air pollutants*
- Lower carbon emissions

Energy Independence
- Domestic energy security
- Pair with local clean energy

Economics
- Technology
  - Increased range
  - Rapid decrease in battery prices
  - Manufacturer investments: increased choices
- Lower cost of “fuel,” volatility
- Federal Tax Credit up to $7,500 Utility incentives, etc.
Electricity is getting cleaner…

Indiana’s electricity portfolio is changing… and it is about to change rapidly.

I&M (2017): Only 32% coal. I&M IRP calls for enough wind and solar to power 400,000 (20 year plan).

https://afdc.energy.gov/vehicles/electric_emissions.html
www.nipsco.com/our-company/about-us/regulatory-information/irp
Why Electric Vehicle & Infrastructure?

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**Economics**
- Technology
  - Increased range
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- Federal Tax Credit up to $7,500 Utility incentives, etc.
Why improve local charging infrastructure?

Role of “destination” charging (Level 2)
- Address “Range Anxiety” to encourage adoption
- Awareness & education

Business Case for destination charging
- 2-4 hour dwell time
- Support business districts, downtowns, restaurants
- Amenity for customers, tenants, employees

Photo: Charging station available on University of Notre Dame campus
How Your Organization Can Support EV Adoption

- Share information about EVs (i.e. incentives)
- Connect with Department of Energy Clean Cities
  - South Shore Clean Cities
  - Greater Indiana Clean Cities
- Attend Ride & Drive Events – Display & Test Drives
- Install or lease destination charging stations (Level 2)
- Pilot Electric Vehicles in Your Fleet or Personal Vehicle
  
  Examples
  - The Center at Donaldson (Ancilla College) – PHEV and BEV with public charging
  - City of Goshen – 1 all electric vehicle for staff
  - Hobart, Merrillville – Parks & Event, Utilities (all-electric vehicles)
  - Chicago, Indianapolis, Bloomington – electric buses
Next Event: Friday, October 2\textsuperscript{nd} – National Drive Electric Week Event

*Find Events Near You (Sept 14 -22):* National Drive Electric Week, [https://driveelectricweek.org/](https://driveelectricweek.org/)
Survey: Electric Vehicle Infrastructure Interest

Click here to take the survey now!

Photos from Plug Share: Goshen College & Four Winds Casino
Indiana Bureau of Motor Vehicles Data, 2018
Note: This number is conservative. HEV and PHEV are not tracked separately for all vehicle models.
# Electric Vehicle Models Available - Midwest

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Name</th>
<th>Model</th>
<th>Photo</th>
<th>Seating</th>
<th>EV Type</th>
<th>SEAT</th>
<th>Base MSRP</th>
<th>Federal tax credit</th>
<th>Price after federal tax credit</th>
<th>Battery size (kWh)</th>
<th>Electric Range (miles)</th>
<th>Total Range (miles)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chevrolet</td>
<td>Bolt EV</td>
<td></td>
<td><img src="https://www.pluginconnect.com/mnpevmodels.html" alt="Bolt EV" /></td>
<td>5</td>
<td>BEV</td>
<td>FWD</td>
<td>$37,495</td>
<td>$3,750</td>
<td>$33,745</td>
<td>60</td>
<td>238</td>
<td>238</td>
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<tr>
<td>Chevrolet</td>
<td>Volt</td>
<td></td>
<td><img src="https://www.pluginconnect.com/mnpevmodels.html" alt="Volt" /></td>
<td>4.5</td>
<td>PHEV</td>
<td>FWD</td>
<td>$33,170</td>
<td>$3,750</td>
<td>$29,420</td>
<td>18.4</td>
<td>53</td>
<td>420</td>
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<tr>
<td>Chrysler</td>
<td>Pacifica Hybrid (PHEV)</td>
<td><img src="https://www.pluginconnect.com/mnpevmodels.html" alt="Pacifica Hybrid" /></td>
<td>7</td>
<td>PHEV</td>
<td>FWD</td>
<td>$42,000</td>
<td>$7,500</td>
<td>$34,500</td>
<td>16</td>
<td>33</td>
<td>570</td>
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<tr>
<td>Ford</td>
<td>Fusion Energi</td>
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<td>PHEV</td>
<td>FWD</td>
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<td>$4,007</td>
<td>$30,588</td>
<td>9</td>
<td>26</td>
<td>610</td>
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<tr>
<td>Honda</td>
<td>Clarity PHEV</td>
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<td><img src="https://www.pluginconnect.com/mnpevmodels.html" alt="Clarity PHEV" /></td>
<td>5</td>
<td>PHEV</td>
<td>FWD</td>
<td>$33,400</td>
<td>$7,500</td>
<td>$25,900</td>
<td>17</td>
<td>48</td>
<td>340</td>
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<tr>
<td>Jaguar</td>
<td>I-PACE</td>
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<td><img src="https://www.pluginconnect.com/mnpevmodels.html" alt="I-PACE" /></td>
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<td>BEV</td>
<td>AWD</td>
<td>$69,500</td>
<td>$7,500</td>
<td>$62,000</td>
<td>90</td>
<td>234</td>
<td>234</td>
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<tr>
<td>Mitsubishi</td>
<td>Outlander PHEV</td>
<td></td>
<td><img src="https://www.pluginconnect.com/mnpevmodels.html" alt="Outlander PHEV" /></td>
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<td>PHEV</td>
<td>AWD</td>
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<td>$5,836</td>
<td>$28,759</td>
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<tr>
<td>Nissan</td>
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<td>BEV</td>
<td>FWD</td>
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<td>$7,500</td>
<td>$22,490</td>
<td>40-62</td>
<td>150-226</td>
<td>150-226</td>
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</table>

Updated May 2019: [https://www.pluginconnect.com/mnpevmodels.html](https://www.pluginconnect.com/mnpevmodels.html)
Evolution – What are the benefits and costs of owning an electric vehicle?

<table>
<thead>
<tr>
<th>Powertrain #1:</th>
<th>2019 TOYOTA PRIUS [4cyl 1.8L Auto(AV)]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Powertrain #2:</td>
<td>2018 TOYOTA Prius Prime [4cyl 1.8L Auto(AV)]</td>
</tr>
<tr>
<td>Conventional Car:</td>
<td>2019 TOYOTA CAMRY [6cyl 3.5L Auto(SB)]</td>
</tr>
</tbody>
</table>
Evolution – What are the benefits and costs of owning an electric vehicle?

<table>
<thead>
<tr>
<th>Model</th>
<th>MSRP</th>
<th>MPG(ge) City</th>
<th>MPG(ge) Highway</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOYOTA PRIUS</td>
<td>$23,475</td>
<td>54</td>
<td>50</td>
</tr>
<tr>
<td>TOYOTA Prius Prime</td>
<td>$27,100</td>
<td>55</td>
<td>53</td>
</tr>
<tr>
<td>TOYOTA CAMRY</td>
<td>$34,050</td>
<td>22</td>
<td>33</td>
</tr>
</tbody>
</table>

Cumulative Total Cost of Ownership per Year

First year cost includes a down payment of 10%, for PHEVs and BEVs the federal tax incentives are taken out of the initial cost. After the first year, there is a 5-year loan with 6% interest. Annual costs include insurance, license and registration, tires and maintenance, and fuel costs. Read more about assumptions here.

https://evolution.es.anl.gov/
- **Level 1** – Just a regular outlet.

- **Level 2** – 208 or 240 V
  - Destination charging
  - Locate near amenities:
    - *Shopping, restaurants, public services, workplaces.*

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Plug-In Electric Vehicle Handbooks

Level 3: DC Fast Charging

- **Level 3** – 480 V AC
  - Significant investment
  - Short dwell times
  - Different plug types

Electrify America station in Mishawaka, IN: [https://www.plugshare.com/location/178370](https://www.plugshare.com/location/178370)
Networked versus Non-Networked

Networked “Smart”

- Accept payment
- Limit access – multi-unit housing or workplaces
- Track usage - # unique drivers, dwell time
- Real-time station status
- Fees for long dwell times

Non-networked

- Lower cost
- Low usage anticipated or free electricity
Finding Stations

Alternative Fuel Data Center: https://afdc.energy.gov/stations
PlugShare (Crowd-sourced): https://www.plugshare.com/
NIPSCO Around Town Program

Public:
- City of Gary
- City of Hobart
- City of LaPorte
- City of Valparaiso
- Town of Beverly Shores
- Michigan City
- City of Portage
- Town of Westville
- Indiana Dunes State Park
- Potato Creek State Park
- Lake County Solid Waste Management District

Higher Education:
- Goshen College
- Grace College
- IU Northwest
- Purdue Calumet

Others:
- Kohl’s – Angola, Portage, Highland, Valparaiso
- Horseshoe Casino
- PNC Bank
- Methodist Hospital – Gary, Merrillville
- Arcelor Mittal
- Ozinga

NIPSCO’s free and discounted energy pilots resulted in 80% of EV charging shifting to preferred “off-peak” time.

Indiana Michigan Power has proposed a three-year pilot program with rebate incentives, in addition to an updated electric vehicle tariff in their pending rate case.

- Residential
- Small Commercial
- Multi-unit dwelling
- Commercial / Industrial / Workplace
Partner with local EV driver groups

Rachel’s family is driving one of the very first Chrysler Pacifica plug-in hybrid electric vehicles in the region. Finally, a larger family-sized EV option!

“My kids are very concerned about pollution and climate change. My 6th grader made me promise that we would get an EV as soon as there was a minivan option, and I’m thrilled that I got to keep that promise a few months ago.”

South Bend – Elkhart Region: https://www.facebook.com/MichianaEV/
Indianapolis: https://www.facebook.com/hoosierEVA/
Install Level 2 Stations to Reduce Range Anxiety

City of South Bend, 2018
MACOG Northern Indiana Green Fleet Program

Improving the environmental performance of business and governmental vehicle fleets through diesel retrofits, alternative fuels, advanced vehicles and other strategies.

Contact:
Ryan Lisek
(219) 644-3690
rlisek@southshorecleancities.org
https://southshorecleancities.org/
Goshen: Making Room for EV
Trees Planted along US 33 Bypass

City Solar Array at Waste Water Treatment Plant

Main Street Redesign – Downtown Goshen

The City Forester partnered with IU’s Environmental Resilience Institute to collect and analyze energy consumption data, leading to the first-ever emissions inventory.

The City of Goshen Department Heads and the Mayor proposed the Dept. of Environmental Resilience with the first project being to pioneer Resolution 2019-19.
Goshen City Hall EV Charging Station
EV station costs for Goshen City Hall installation:

- $5563.00  Materials EV equipment
- $190.00   Shipping of the station
- $1664.00  Labor Electrical Contractor
- $2000.00  Goshen Utility Department Site Prep
- $200.00   Signage

Total: $9,617.00

Clipper Creek Level 2 Charging Station
240 volt / 40 amp, serves 2 vehicles simultaneously
2-4 hour charging time, Wi-Fi ready for future credit card operation
<table>
<thead>
<tr>
<th>Date</th>
<th>Units Used</th>
<th>Approximate KWH - EV only</th>
<th>$0.15 per KWH</th>
<th>NIPSCO Customer Charge (per meter)</th>
<th>Indiana Sales Tax</th>
<th>Approximate Utility Taxes (1.4%)</th>
<th>EV - Approximate Total Charge - incl. $30 customer charge per electric meter</th>
<th>Approximate Cost of EV ONLY – Charge Not Including the $30 meter charge</th>
</tr>
</thead>
<tbody>
<tr>
<td>6/24/2020</td>
<td>395</td>
<td>325.6</td>
<td>48.8361</td>
<td>$30.00</td>
<td>5.52</td>
<td>1.10</td>
<td>85.46</td>
<td>$52.94</td>
</tr>
<tr>
<td>5/26/2020</td>
<td>303</td>
<td>233.6</td>
<td>35.0361</td>
<td>$30.00</td>
<td>4.55</td>
<td>0.91</td>
<td>70.50</td>
<td>$37.98</td>
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<td>4/27/2020</td>
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<td>21.6861</td>
<td>$30.00</td>
<td>3.62</td>
<td>0.72</td>
<td>56.03</td>
<td>$23.51</td>
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<td>3/26/2020</td>
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<td>359.6</td>
<td>53.9361</td>
<td>$30.00</td>
<td>5.88</td>
<td>1.18</td>
<td>90.99</td>
<td>$58.47</td>
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<tr>
<td>2/26/2020</td>
<td>530</td>
<td>460.6</td>
<td>69.0861</td>
<td>$30.00</td>
<td>6.94</td>
<td>1.39</td>
<td>107.41</td>
<td>$74.89</td>
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<td>1/28/2020</td>
<td>361</td>
<td>270.0</td>
<td>40.5042</td>
<td>$30.00</td>
<td>4.94</td>
<td>0.99</td>
<td>76.43</td>
<td>$43.91</td>
</tr>
<tr>
<td>TOTAL YTD</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>486.82</td>
<td>$291.70</td>
</tr>
</tbody>
</table>
NIPSCO’s preferred generation mix as denoted by their Integrated Resource Plan in 2018 showing a retirement of coal plants in 2023 and 2028 and an addition of wind and solar resources alongside demand side management (DSM).
Environmental Justice = Social Justice
and vice versa

What can we do to make EV for EVeryone?
City-Sponsored EV Charging in South Bend

Therese Dorau, Director
South Bend Office of Sustainability
July 7, 2020
The Need

- **Climate Action Plan**
  - Reduce emissions from cars
  - Passenger travel = 2/3 of transportation GHGs

- **Existing EVSE not convenient**
  - Suburbs
  - Tesla
  - Car dealers

- **Normalize EV Ownership**
  - Exposure to variety of EVs
  - Positive press
  - Visibility of chargers
  - Create community
Location/Siting Considerations

- Destination
- Visibility
- Convenience
- City right-of-way
- City electrical service
  - Meter/rate
## Equipment Considerations

### Technical
- Networked/non-networked
  - Connection type
- Payment
- Who can access
- Utility communications
- User interface
- Data collection and viewing
- Warranty & service

### Physical
- Mounting type
- Number of ports
- Connector type
- Charging cable length
- Cable management
- Durability
- Consistency across town
- Branding
On-street parking = Board of Works
  - 2-hr time limit
  - Must be plugged in

Enforcement = DTSB Ambassadors

Signage
  - Visually match other parking restrictions

Education
  - 1st ticket waived
  - Leaflets in ticket envelope and in Clerk’s office
Informal specifications
  • [https://driveevfleets.org/evse-solutions/](https://driveevfleets.org/evse-solutions/) & ZEF Energy

Local installer (commercial electrician)

Costs

<table>
<thead>
<tr>
<th>Description</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Un-networked Clipper Creek (2017) (Pedestal, 2 Chargers, Shipping)</td>
<td>$2,106</td>
</tr>
<tr>
<td>Non-Networked Installation (2017)</td>
<td>$3,210</td>
</tr>
<tr>
<td>Networked ZEF Energy (Clipper Creek) (2019) (Pedestal, 2 Chargers, Shipping, 5 year data/warranty/cloud software)</td>
<td>$4,949</td>
</tr>
</tbody>
</table>

2020-4 new installs planned for parking garages and recreation center
Excitement-Building

• Ribbon-cutting
• Local drivers’ groups
• Mini case studies
• Ride n’ Drive events
• Standardized branding
• Support local dealers
• Support potential charging station hosts
• Advocate utility for EV programs

Rachel’s family is driving one of the very first Chrysler Pacifica plug-in hybrid electric vehicles in the region. Finally, a larger family-sized EV option!

“My kids are very concerned about pollution and climate change. My 6th grader made me promise that we would get an EV as soon as there was a minivan option, and I’m thrilled that I got to keep that promise a few months ago.”
• Jefferson “Dumb” Charger
  • Extra 684 kWh/mo (average)
  • Extra $91/mo (ave)
  • Created new demand charges
• Powered 27,360 miles in a year!
• Avoided 5,444 kg CO2e/year
• Dozens of different users
• Several regulars
• Parking enforcement
• Transition to paid charging
Contact the Office

Therese Dorau
Director, Office of Sustainability
(574) 235-9323
tdorau@southbendin.gov

www.southbendin.gov/sustainability
www.facebook.com/sustainsb
Twitter: @SustainSB
About South Shore Clean Cities
Northern Indiana Green Fleet Program

- SSCC manages the Northern Indiana Green Fleet Program including fleets within the MACOG territory (Elkhart, Marshall, Kosciusko & St. Joseph Counties).

- **Goal of the program:** To improve the environmental performance of public, private and nonprofit vehicle fleets in Northern Indiana.

- SSCC currently guides over **32 MACOG municipal, county, school & university member fleets** to help mitigate barriers associated with sustainable transportation adoption while creating policies supporting vehicle emission & petroleum use reductions.
How does the Green Fleet program work?

- Educational opportunities including fuel & technology workshops, trainings & seminars
- Recognition & certification for fleet leaders taking steps to improve environmental performance & efficiency
- Branding & promotional tools to help fleets leverage earned certification status
- Informational resources including current technology options, market conditions, laws & incentives
- Connections with vendors offering sustainable transportation options
- Funding assistance with grant opportunities and other state and federal incentive programs
- Professional consultation including a Green Fleet audit and emissions quantification.
Partnerships & Grant Acquisitions
Questions? Contact Us!

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South Bend Office of Sustainability
Therese Dorau
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574-235-9323
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South Shore Clean Cities
Ryan Lisek
Project Manager
219-644-3690
rlisek@southshorecleancities.org
Coming Up…

Thursday, July 9, 2020 1 p.m. CDT

Visit www.southshorecleancities.org/event/ for details