

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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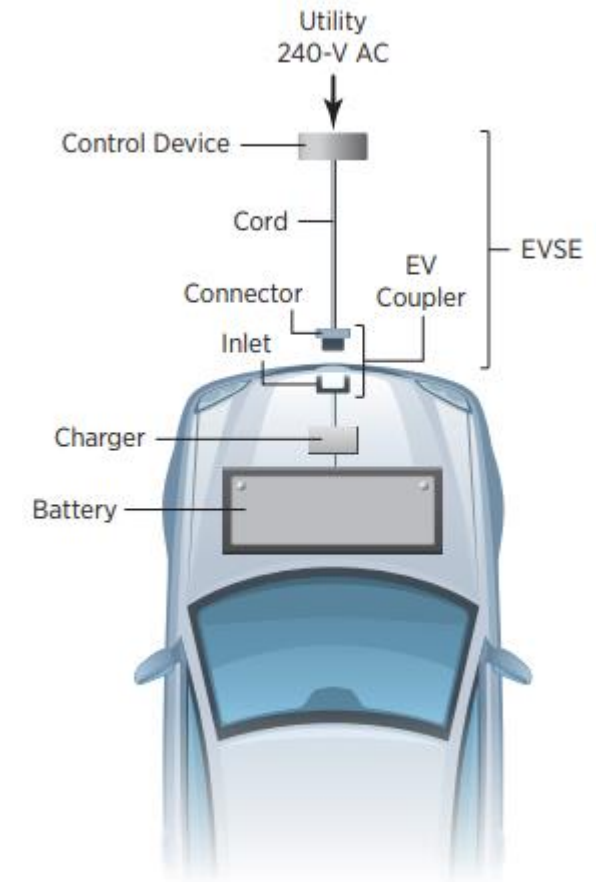


Basic Terminology

EV – Electric Vehicle

EVSE – Electric Vehicle Supply Equipment

ICE – Internal Combustion Engine



Graphic from: Evolution Tool – Argonne National Laboratory, <https://evolution.es.anl.gov/>

Image from PlugShare, Potato Creek State Park

Plugging In

AC Level 1 Charging

2 to 5 miles of range per
1 hour of charging



J1772 charge port

AC Level 2 Charging

10 to 20 miles of range per
1 hour of charging



J1772 charge port

DC Fast Charging

60 to 80 miles of range per
20 minutes of charging



J1772
combo



CHAdeMO

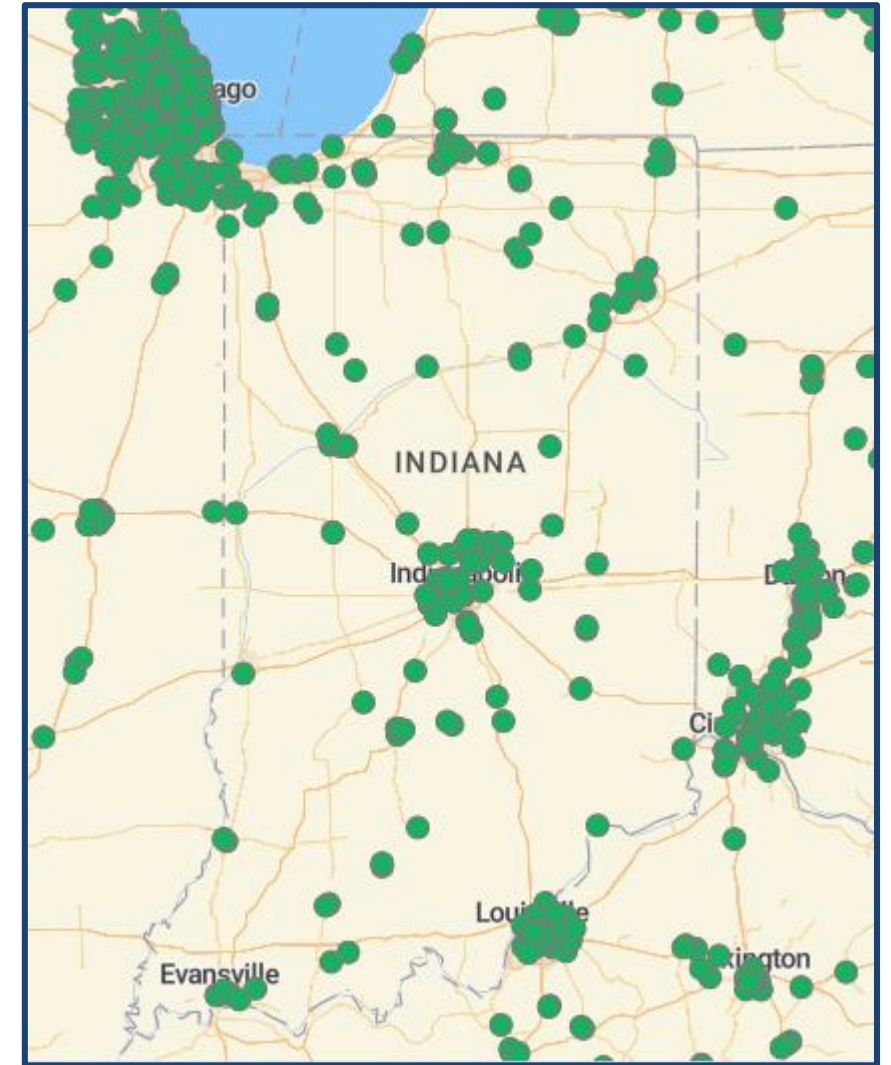
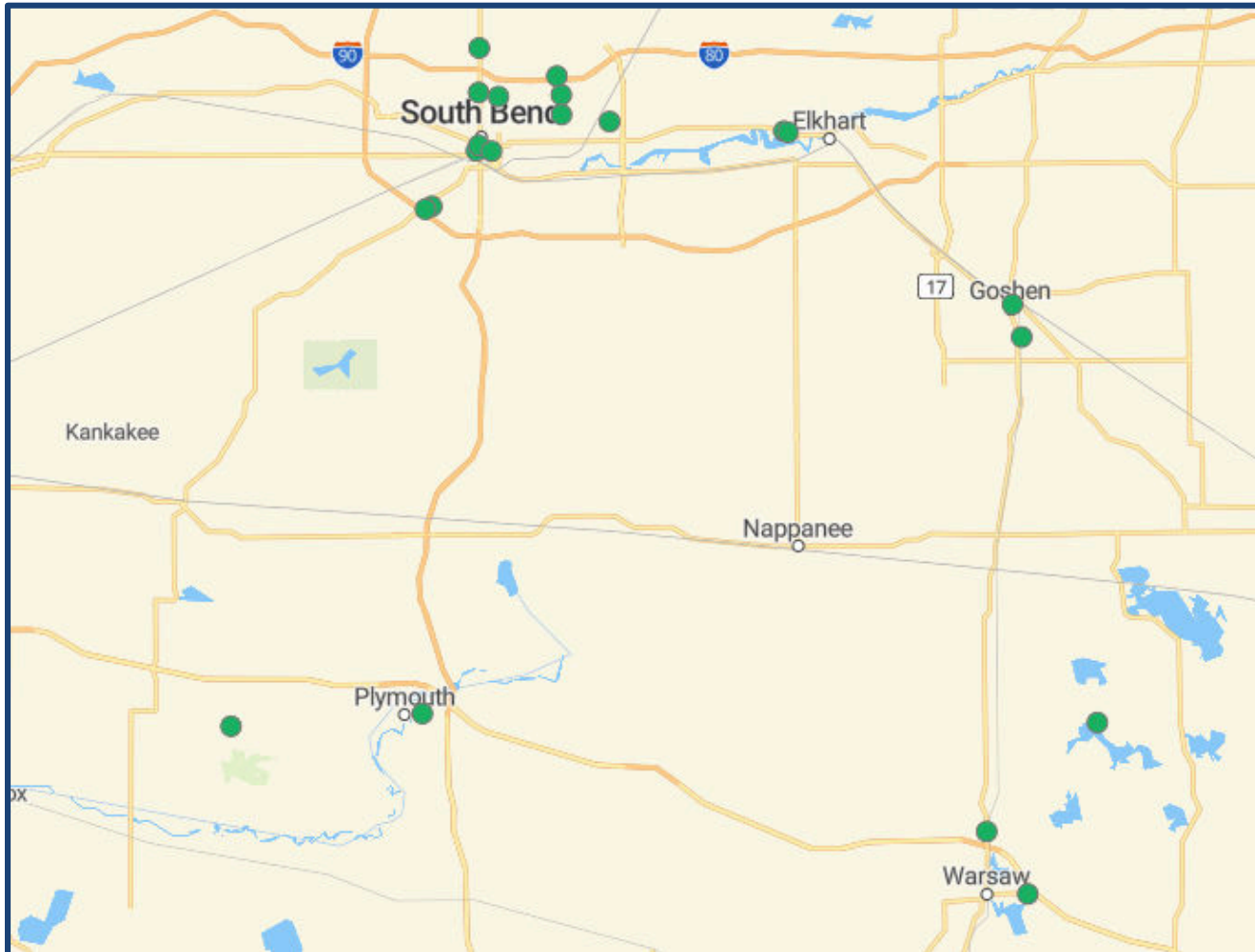


Tesla
combo



Current Charging Availability

Destination Charging Availability (Level 2)



Alternative Fuels Data Center – Station
Locator, <https://afdc.energy.gov/stations>

Investments in Fast Charging

Fast Charging Availability



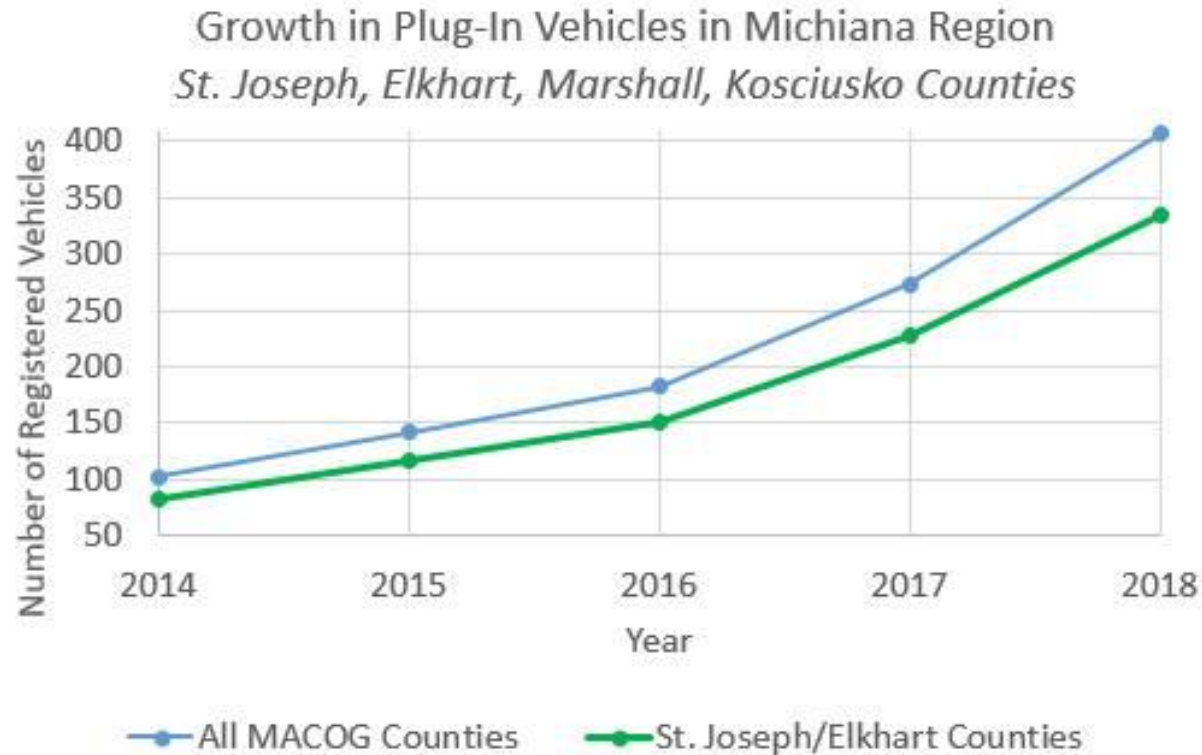
- Volkswagen Environmental Mitigation Fund \$5.5M
- Electrify America network (UP Mall in Mishawaka)



Photo from plugshare.com

Map: Alternative Fuels Data Center – Station Locator, <https://afdc.energy.gov/stations>

Regional Electric Vehicle Growth



Plug-In Vehicle Type in Michiana



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

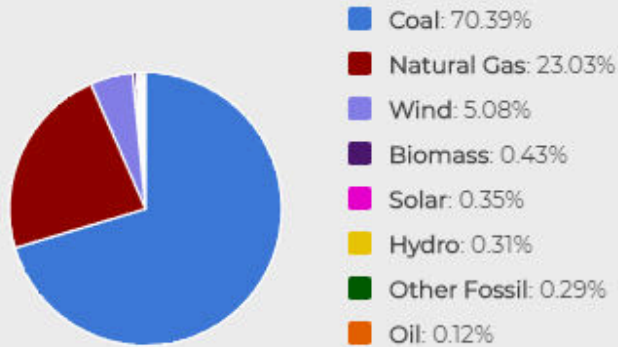
- Technology
 - Increased range
 - Rapid decrease in battery prices
 - Manufacturer investments: increased choices
- Lower cost of “fuel,” volatility
- Federal Tax Credit up to \$7,500
- Utility incentives, etc.



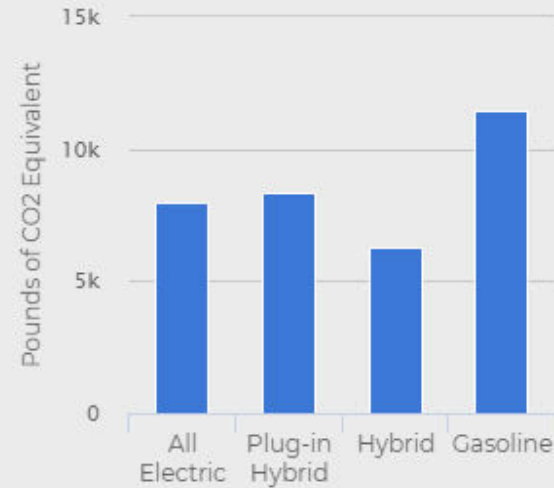
Electricity is getting cleaner...

State Averages for Indiana

Electricity Sources

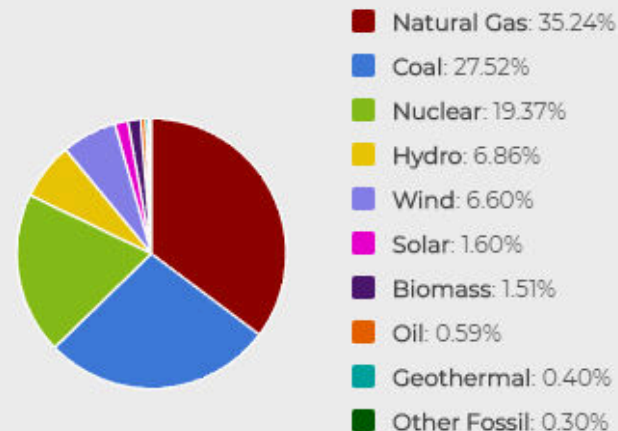


Annual Emissions per Vehicle

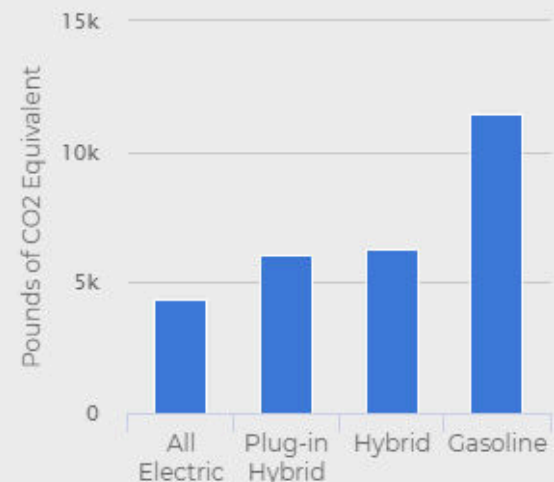


National Averages

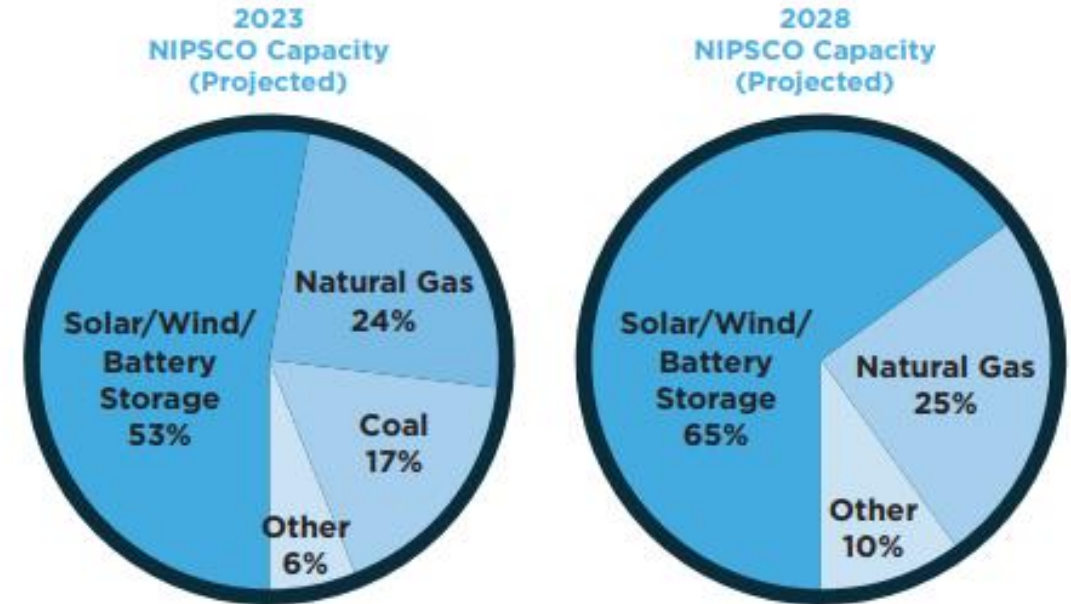
Electricity Sources



Annual Emissions per Vehicle



*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
<https://www.indianamichiganpower.com/info/news/cleanpower/>

Why Electric Vehicle & Infrastructure?

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- Lower carbon emissions

Energy Independence

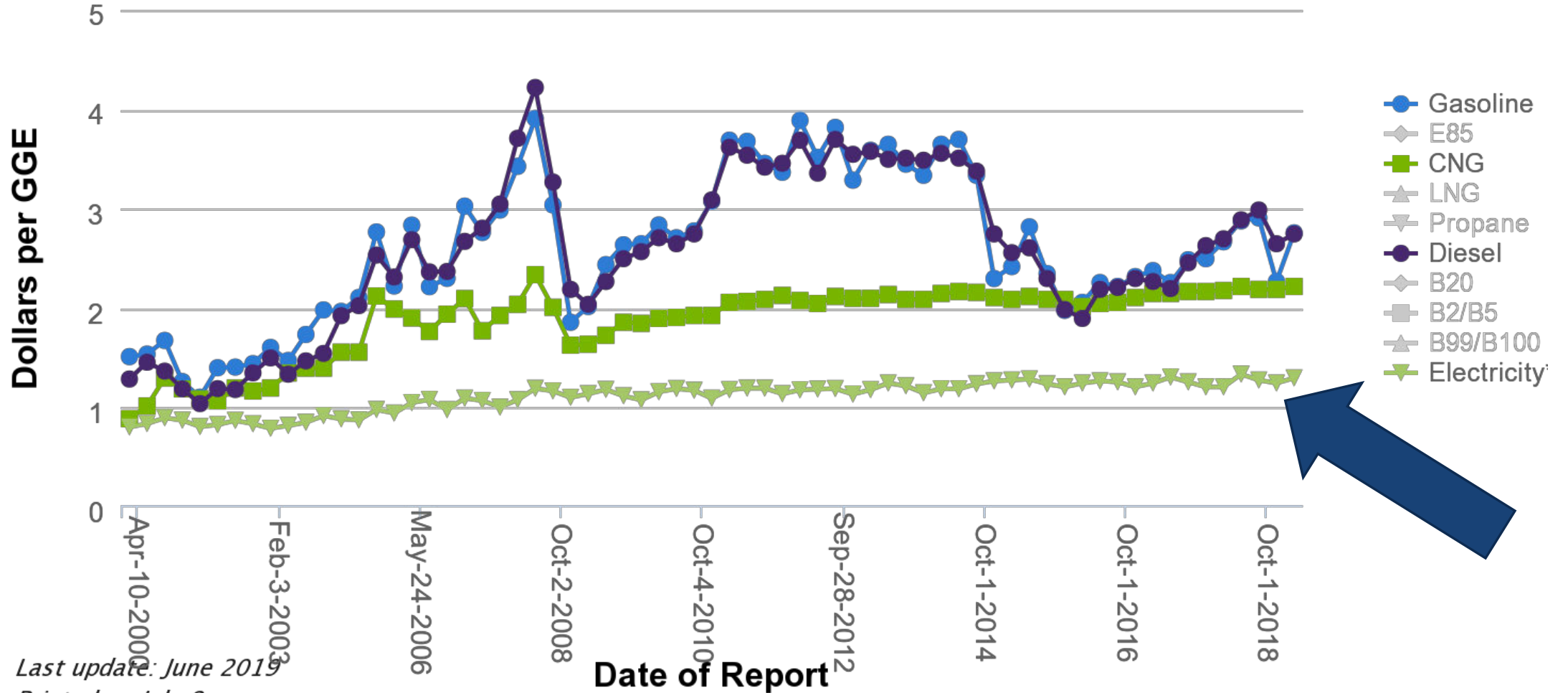
- Domestic energy security
- Pair with local clean energy

Economics

- Technology
 - Increased range
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- Lower cost of “fuel,” volatility
- Federal Tax Credit up to \$7,500
- Utility incentives, etc.



Average Retail Fuel Prices in the U.S.



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*



Ride & Drive Education Events

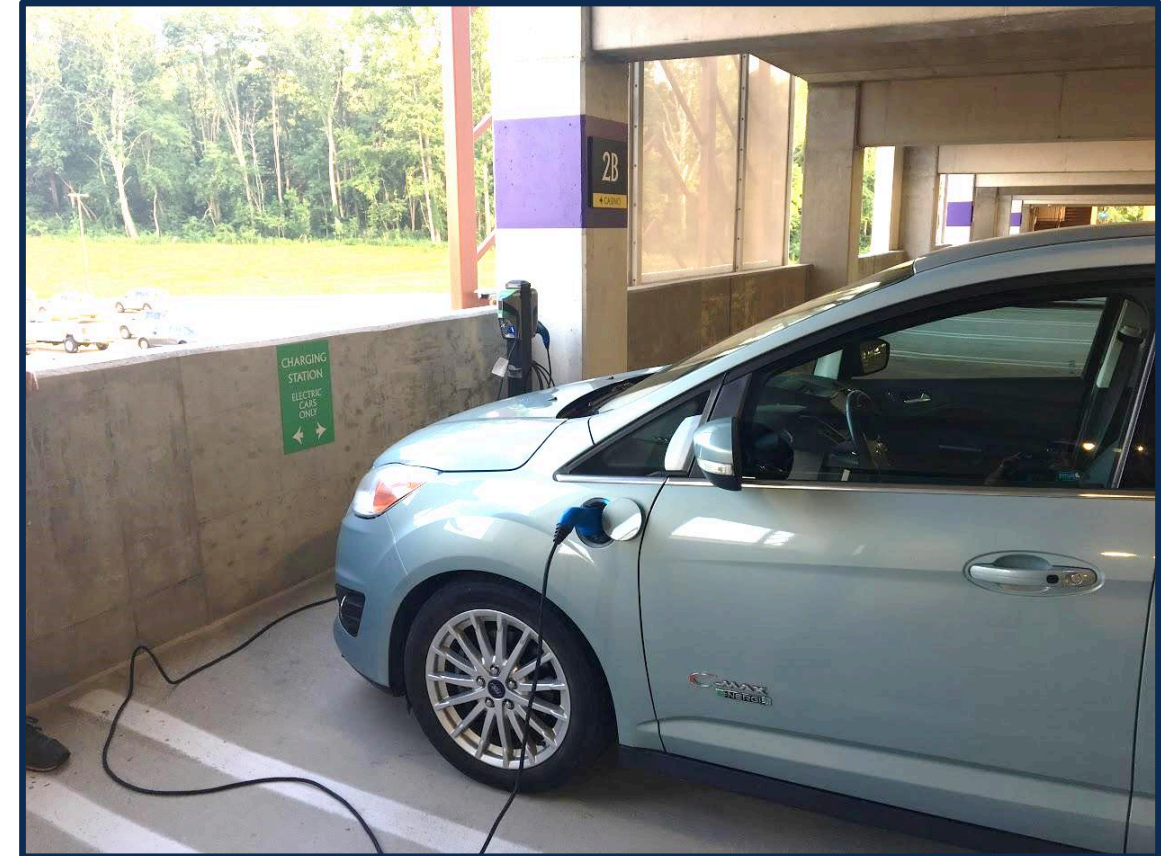


Next Event: Friday, October 2nd – National Drive Electric Week Event

Find Events Near You (Sept 14 -22): National Drive Electric Week, <https://driveelectricweek.org/>

Survey: Electric Vehicle Infrastructure Interest

[Click here](#) to take the survey now!

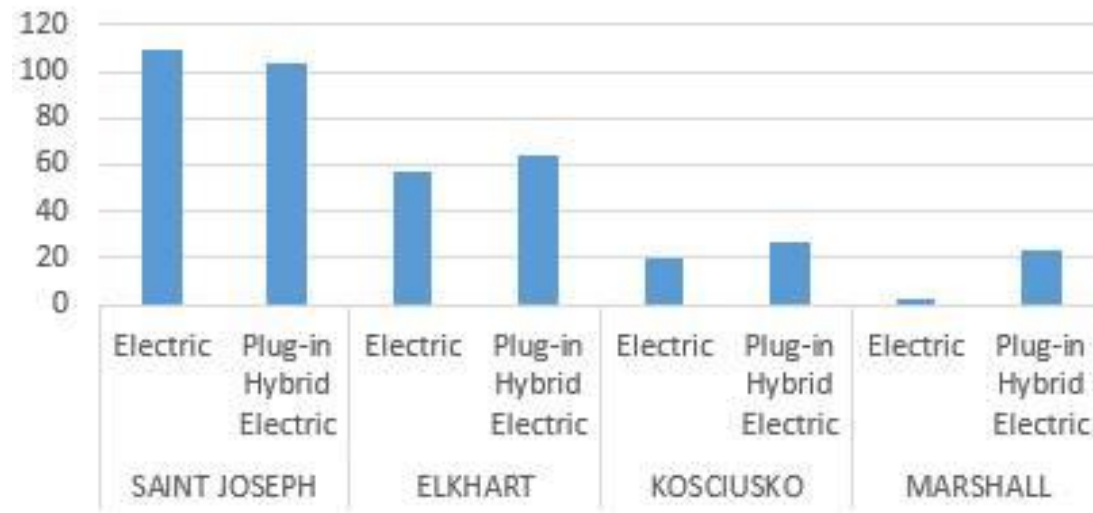


Photos from Plug Share: Goshen College & Four Winds Casino

Appendix



Plug-In Vehicle Type by County











Top 13: Plug-In Vehicle Registrations in Michiana Area, by Model



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

Manufacturer			Range								
Name	Model	Photo	Seating	EV Type	FWD/ RWD/ AWD	Base MSRP	Federal tax credit	Price after federal tax credit	Battery size (kWh)	Electric Range (miles)	Total Range (miles)
Chevrolet	Bolt EV		5	BEV	FWD	\$37,495	\$3,750	\$33,745	60	238	238
Chevrolet	Volt		4.5	PHEV	FWD	\$33,170	\$3,750	\$29,420	18.4	53	420
Chrysler	Pacifica Hybrid (PHEV)		7	PHEV	FWD	\$42,000	\$7,500	\$34,500	16	33	570
Ford	Fusion Energi		5	PHEV	FWD	\$34,595	\$4,007	\$30,588	9	26	610
Honda	Clarity PHEV		5	PHEV	FWD	\$33,400	\$7,500	\$25,900	17	48	340
Jaguar	I-PACE		5	BEV	AWD	\$69,500	\$7,500	\$62,000	90	234	234
Mitsubishi	Outlander PHEV		5	PHEV	AWD	\$34,595	\$5,836	\$28,759	12	22	310
Nissan	Leaf		5	BEV	FWD	\$29,990	\$7,500	\$22,490	40-62	150-226	150-226

Evolution – What are the benefits and costs of owning an electric vehicle?



EVOLUTION
EDUCATION ON
E-DRIVE VEHICLES

Powertrain #1:

2019 TOYOTA PRIUS [4cyl 1.8L Auto(AV)] ▼



Powertrain #2:

2018 TOYOTA Prius Prime [4cyl 1.8L Auto(AV)] ▼



Conventional Car:

2019 TOYOTA CAMRY [6cyl 3.5L Auto(S8)] ▼

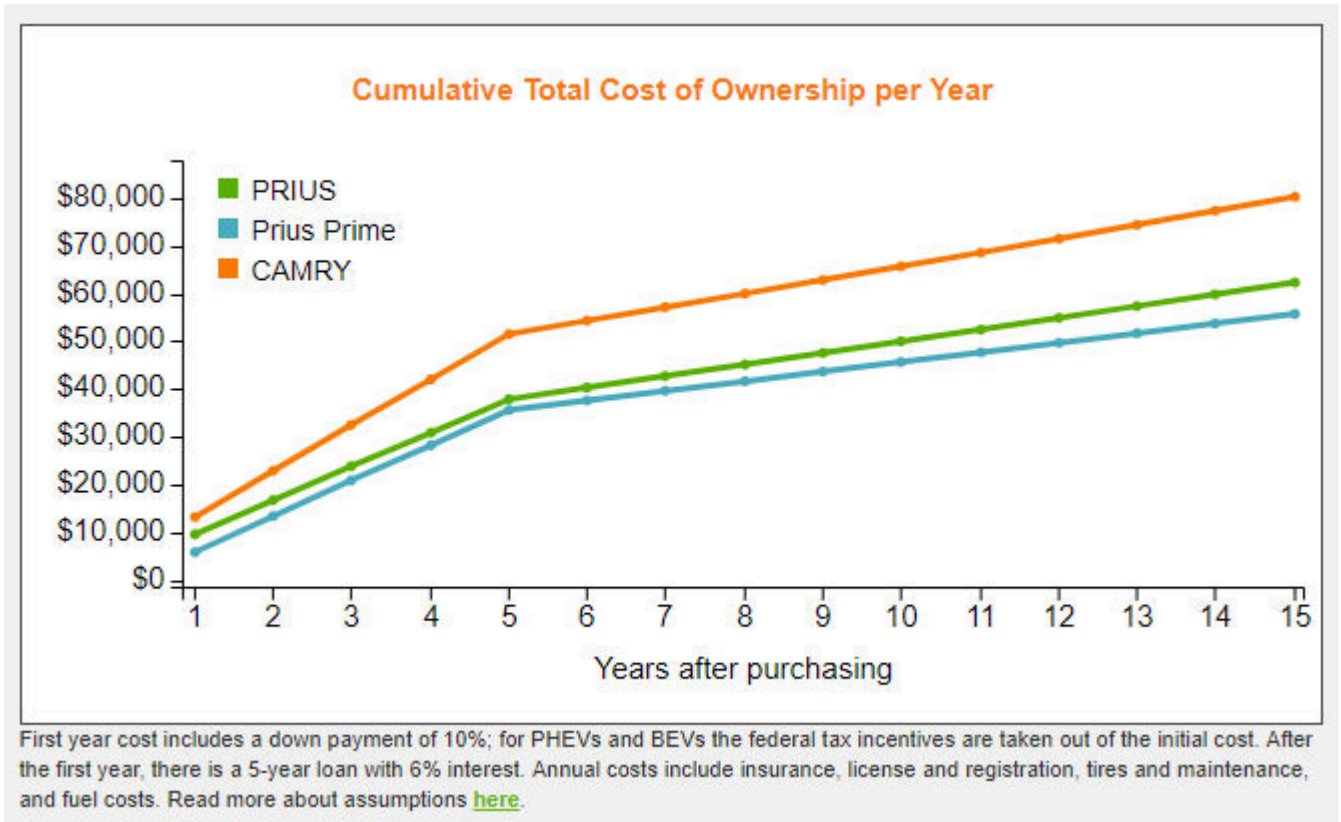


Evolution – What are the benefits and costs of owning an electric vehicle?



EVOLUTION
EDUCATION ON
E-DRIVE VEHICLES

<u>Model</u>	<u>MSRP</u>	<u>MPG(ge)</u> <u>City</u>	<u>MPG(ge)</u> <u>Highway</u>
TOYOTA PRIUS	\$23,475	54	50
TOYOTA Prius Prime	\$27,100	55	53
TOYOTA CAMRY	\$34,050	22	33



Charging Stations / EVSE

- **Level 1** – Just a regular outlet.
- **Level 2** – 208 or 240 V
 - Destination charging
 - Locate near amenities:
Shopping, restaurants, public services, workplaces.



Plug-In Electric Vehicle Handbooks

- *Public Charging Hosts*, <https://afdc.energy.gov/files/pdfs/51227.pdf>
- *Workplace Charging Hosts*, https://afdc.energy.gov/files/u/publication/pev_workplace_charging_hosts.pdf

Level 3: DC Fast Charging

AC Level 1 Charging

2 to 5 miles of range per
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Tesla
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- **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>

Networked versus Non-Networked

Networked “Smart”

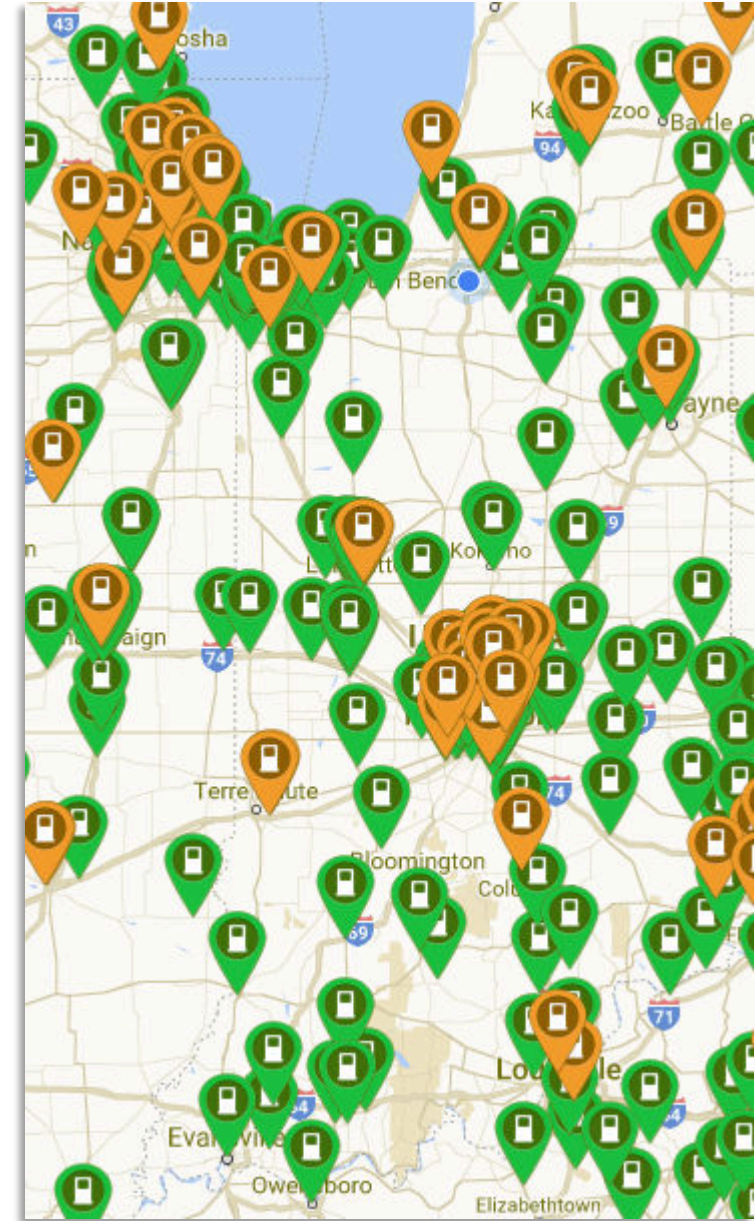
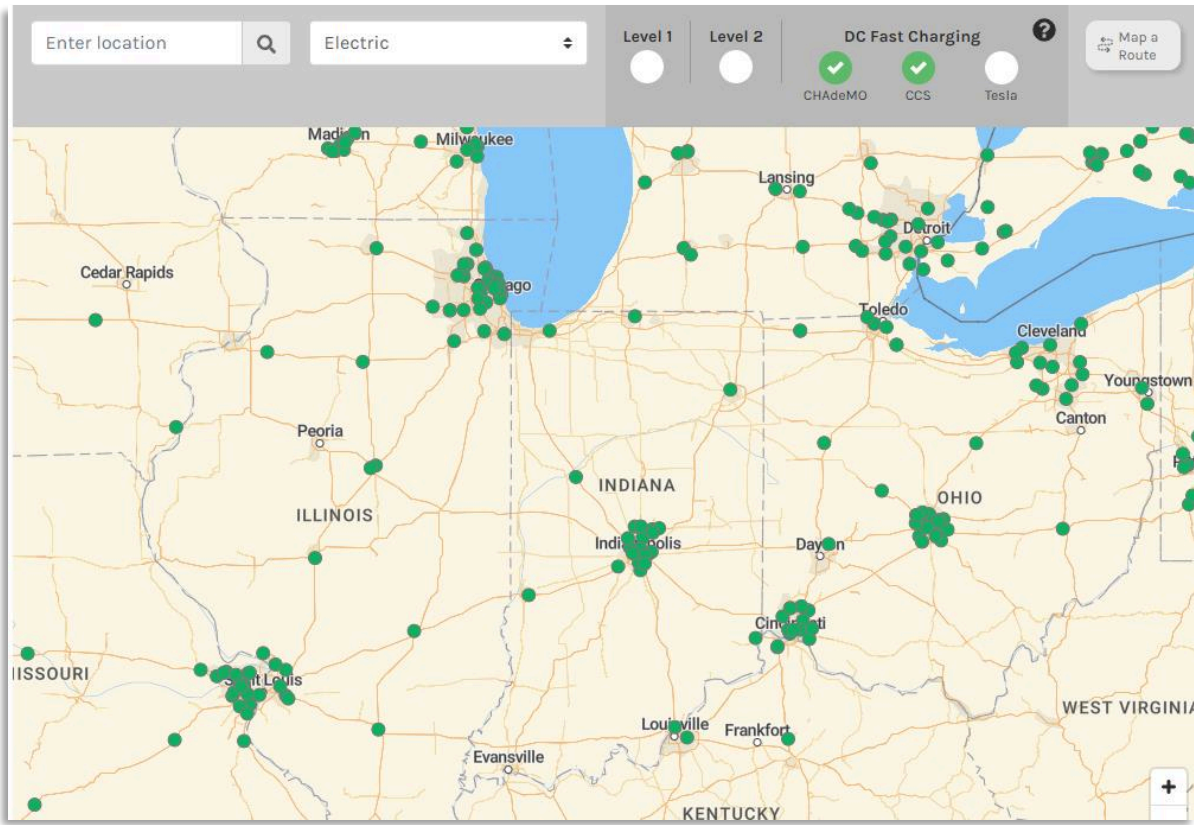
- Accept payment
- Limit access – multi-unit housing or workplaces
- Track usage - # unique drivers, dwell time
- Real-time station status
- Fees for long dwell times

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

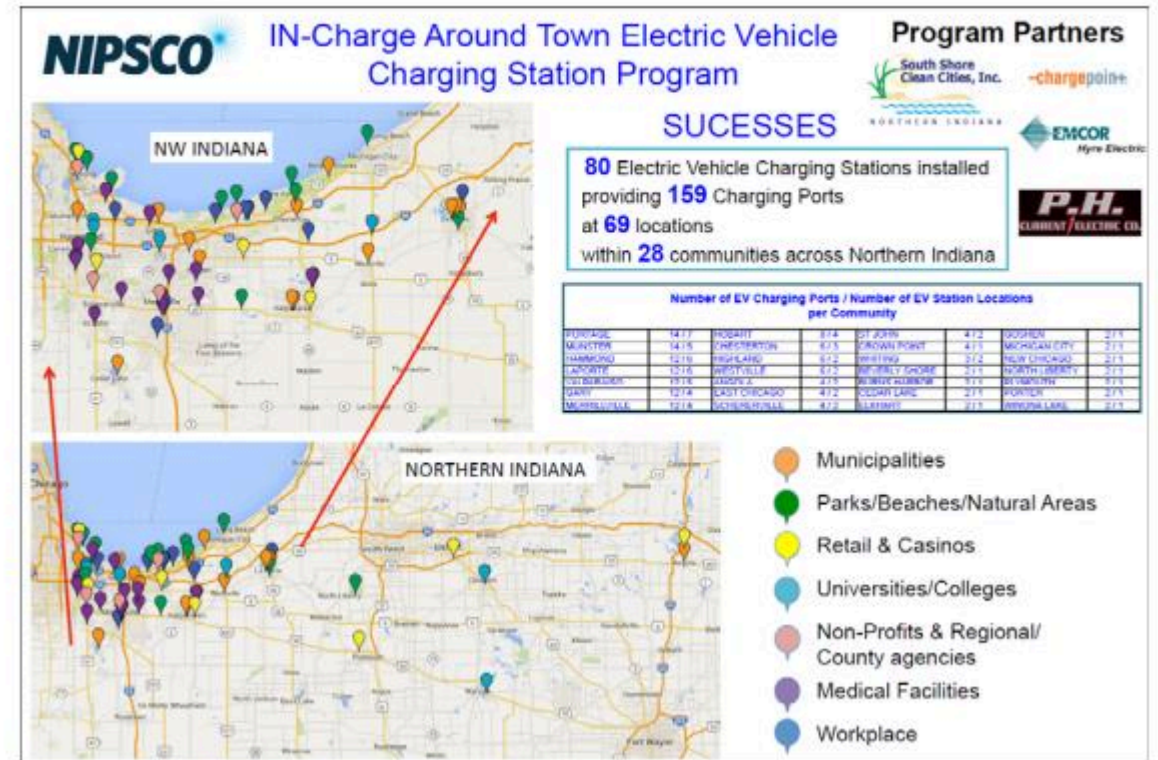
Public:

- 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

Figure 10-3: Station Locations and Application Status



Others:

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

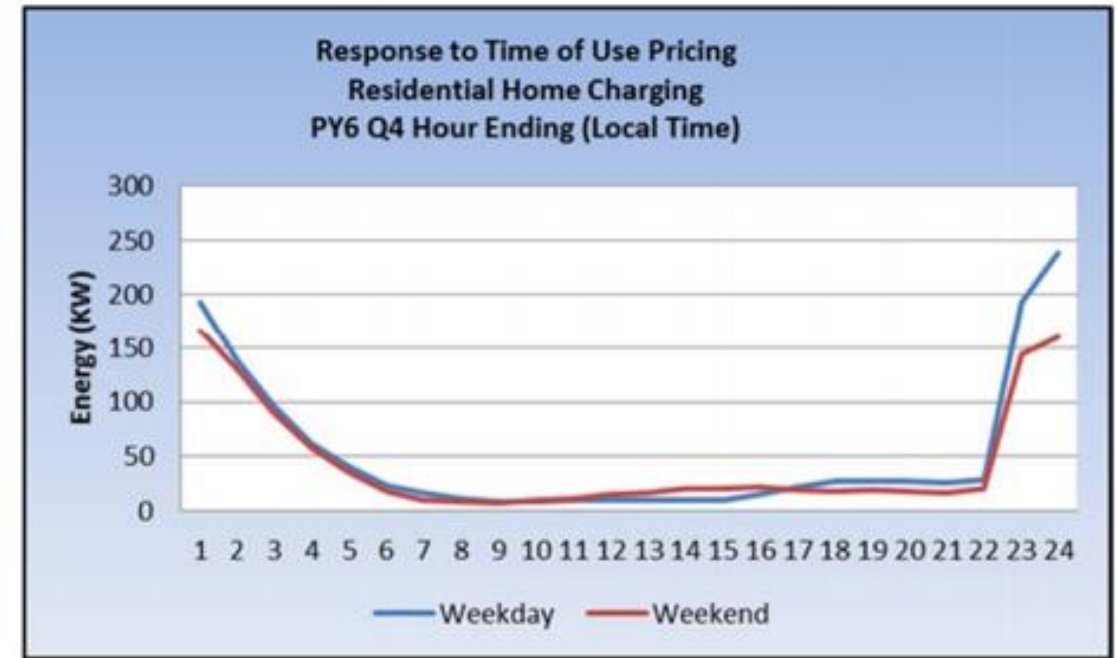
Utility Incentives, Special Rates

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

Figure 10-2: Response to Time of Use Pricing



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:

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<https://southshorecleancities.org/>

Goshen: Making Room for EV



Comments from Mayor Jeremy Stutsman





City Solar Array at Waste Water Treatment Plant



Main Street Redesign – Downtown Goshen



Trees Planted along US 33 Bypass

Background

4/30/19



Mayor's Environmental Advisory Committee created. The Common Council and Mayor Stutsman passed Resolution 2019-19 to **"create and implement a Climate Action Plan by 2021."**

Summer `19



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

8/15/19



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



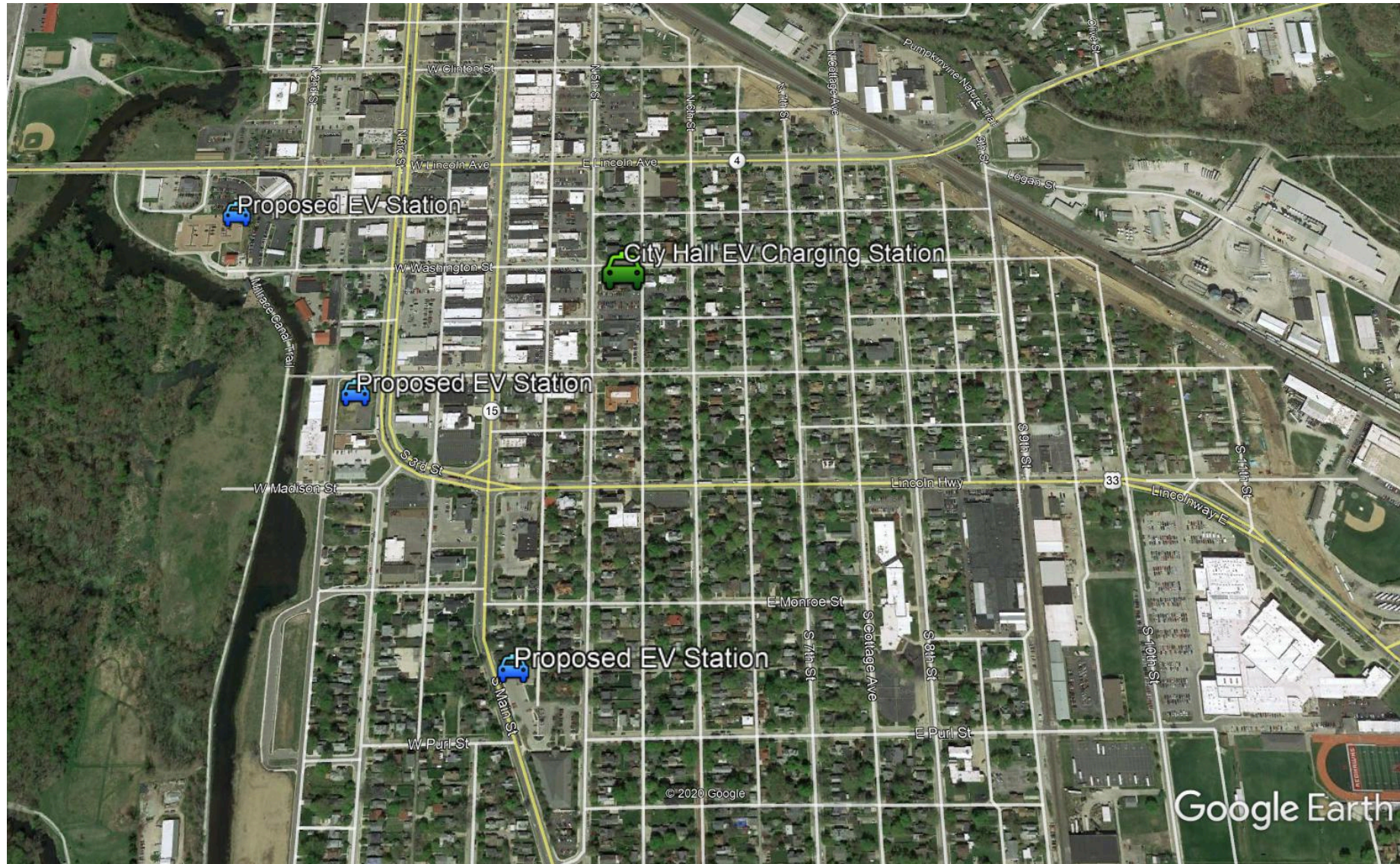


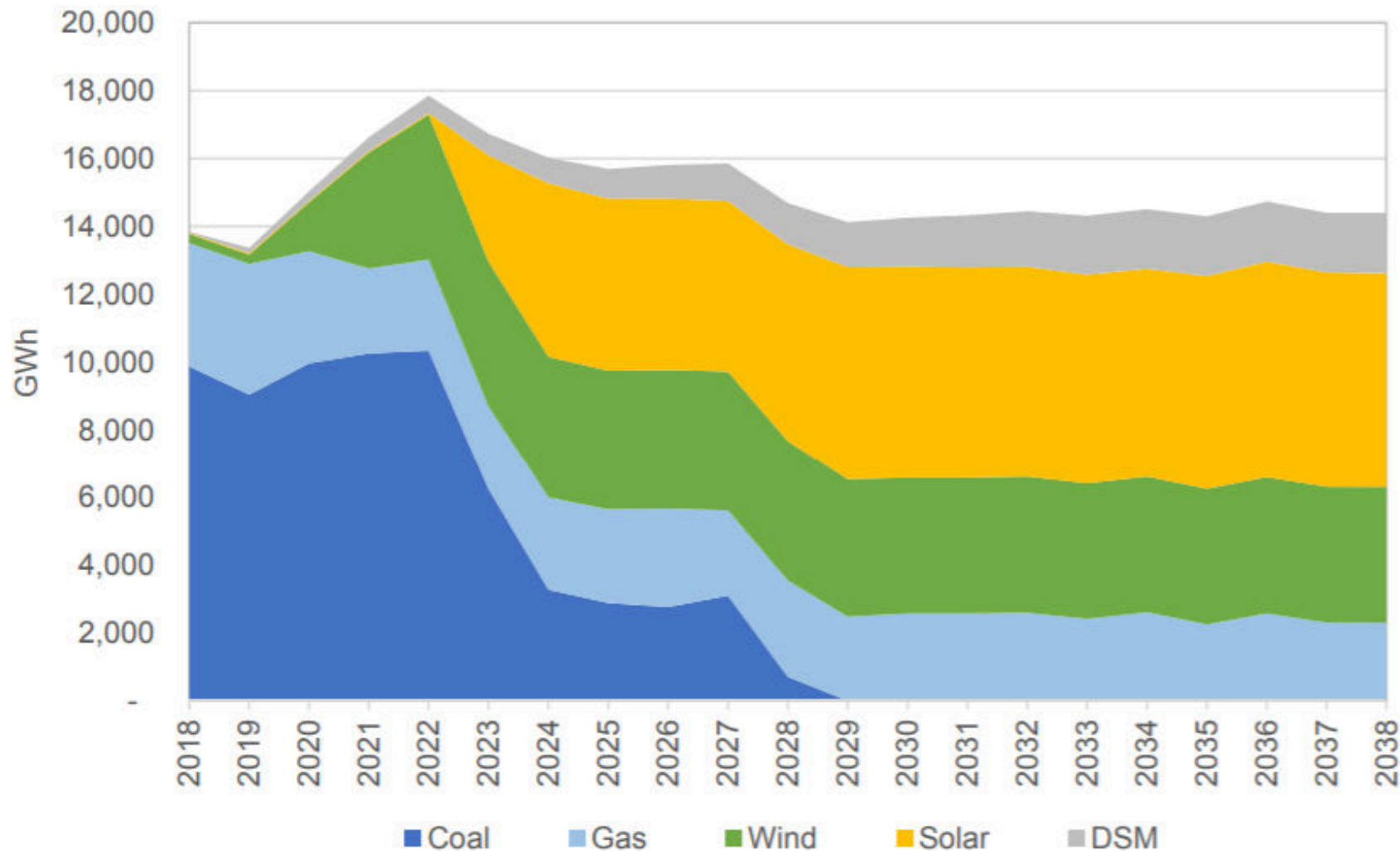
EV station costs for Goshen City Hall installation:

\$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
\$9,617.00	Total

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

Other Proposed Sites for EV Stations in Downtown Goshen





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 **EV**eryone?

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

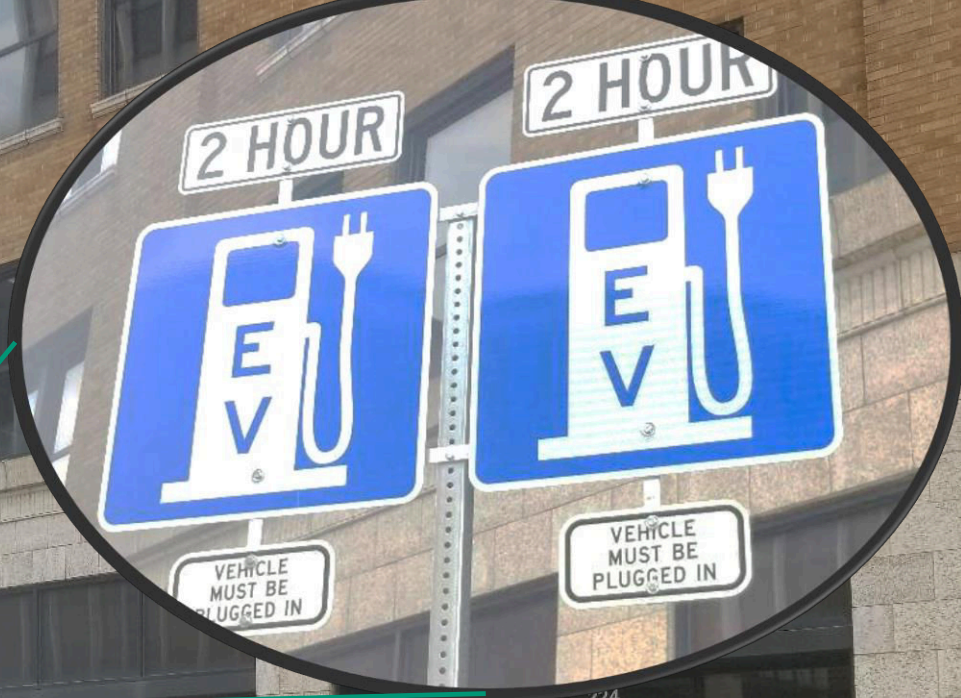
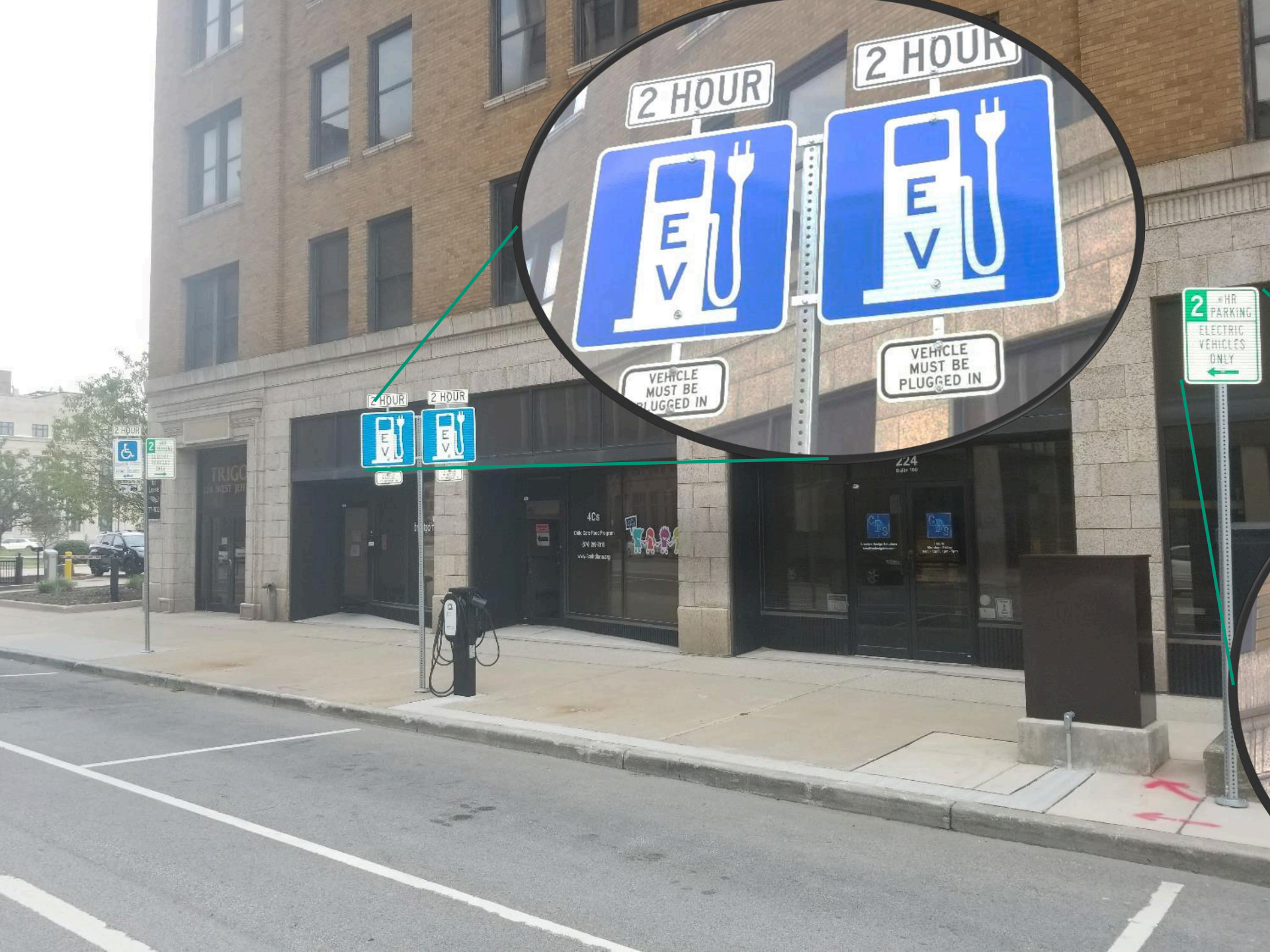
Physical

- Mounting type
- Number of ports
- Connector type
- Charging cable length
- Cable management
- Durability
- Consistency across town
- Branding

Parking and Use Considerations

- 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





Procurement

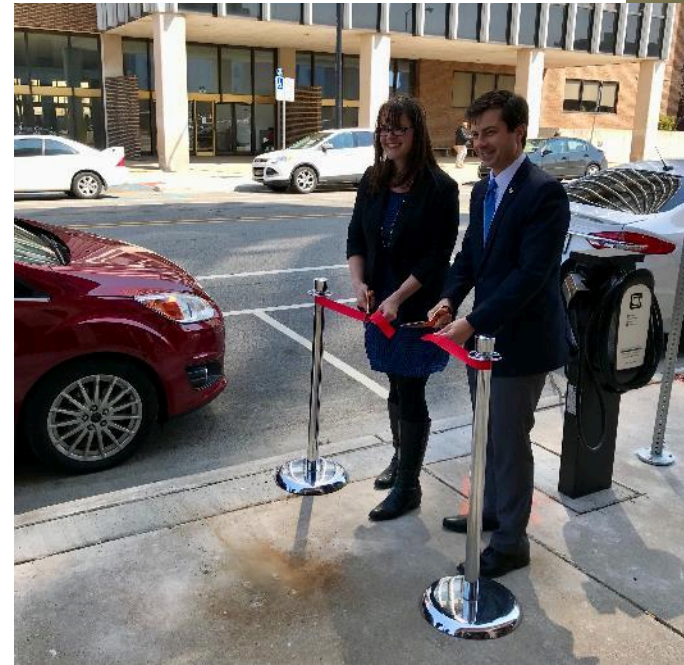
- Informal specifications
 - <https://driveevfleets.org/evse-solutions/> & ZEF Energy
- Local installer (commercial electrician)
- Costs

Un-networked Clipper Creek (2017) <i>(Pedestal, 2 Chargers, Shipping)</i>	\$2,106
Non-Networked Installation (2017)	\$3,210
Networked ZEF Energy (Clipper Creek) (2019) <i>(Pedestal, 2 Chargers, Shipping, 5 year data/warranty/cloud software)</i>	\$4,949

- 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



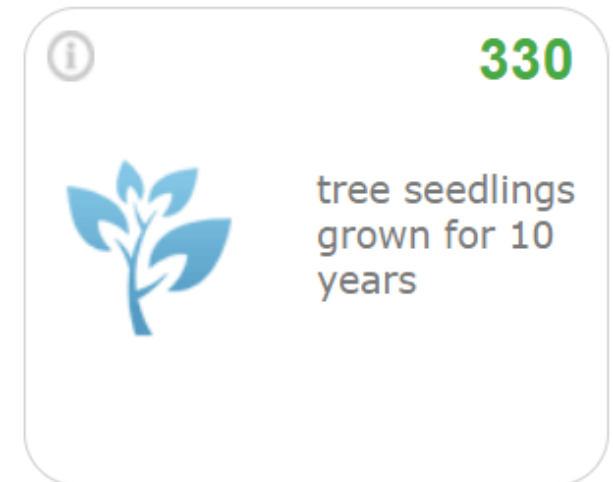
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"My kids are very concerned about pollution and climate change. My 6th grader made me promise that we would get an EV as soon as there was a minivan option, and I'm thrilled that I got to keep that promise a few months ago."



Results

- 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

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[www.southbendin.gov/
sustainability](http://www.southbendin.gov/sustainability)

[www.facebook.com/ sustainsb](http://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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Aaron Sawatsky-Kingsley
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South Shore Clean Cities
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Coming Up...

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



Visit www.southshorecleancities.org/event/ for details