

PREPARING FOR AN **ELECTRIC** FUTURE

COMED'S APPROACH TO TRANSPORTATION ELECTRIFICATION

MONDAY, APRIL 17
12 PM - 1 PM CST





IACT

**ILLINOIS ALLIANCE FOR
CLEAN TRANSPORTATION**

National Network of Clean Cities Coalitions

More than 75 active coalitions covering nearly every state with thousands of stakeholders

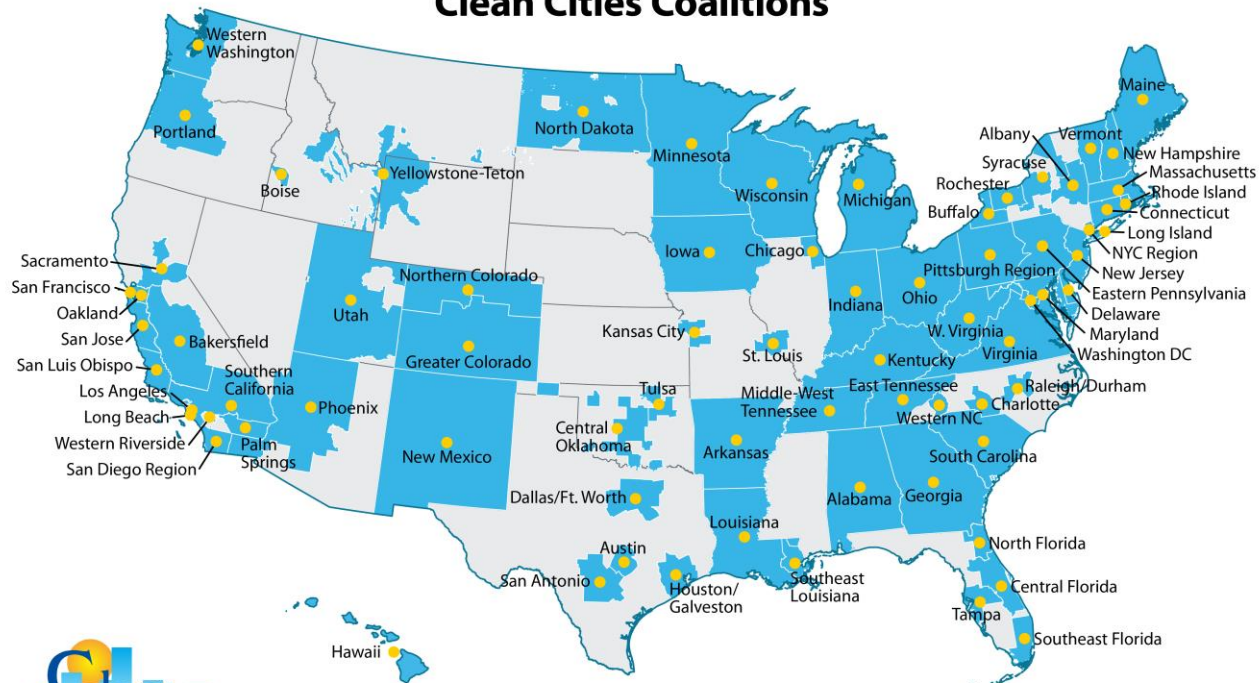


IACT
ILLINOIS ALLIANCE FOR
CLEAN TRANSPORTATION

IL-ACT.org

Who We Are

Clean Cities Coalitions



U.S. Department of Energy

Map Date: 3/8/23

Thank You Annual Sponsors



Funded by the Illinois Soybean Association checkoff program.



Today's Webinar Agenda

Samantha Bingham

**Chicago Dept. of
Transportation**

**Clean Transportation
Program Director**

Pat Arns

ComEd

**Director of
Distribution
Planning & Smart
Grid**

Kevin Happ

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**Manager
Capacity Planning
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Community of the
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ComEd

**Manager of New
Product Development
Technology &
Development Dept.**

Participating Via Zoom

- Participants are in listen-only mode
- Post your questions at any time in Q&A
- Event recording and slides available via email & IACT's website
- Please complete post event questionnaire



April 17, 2023

Distribution Planning for Electrification

Kevin Happ | ComEd Capacity Planning

Agenda

1. A Step Back - Planning the Grid
2. A New Landscape - The Variability and Complexity of Our Evolving Grid
3. Collaboration in Planning
4. Research and Iterate

1

A Step Back - Planning the Grid

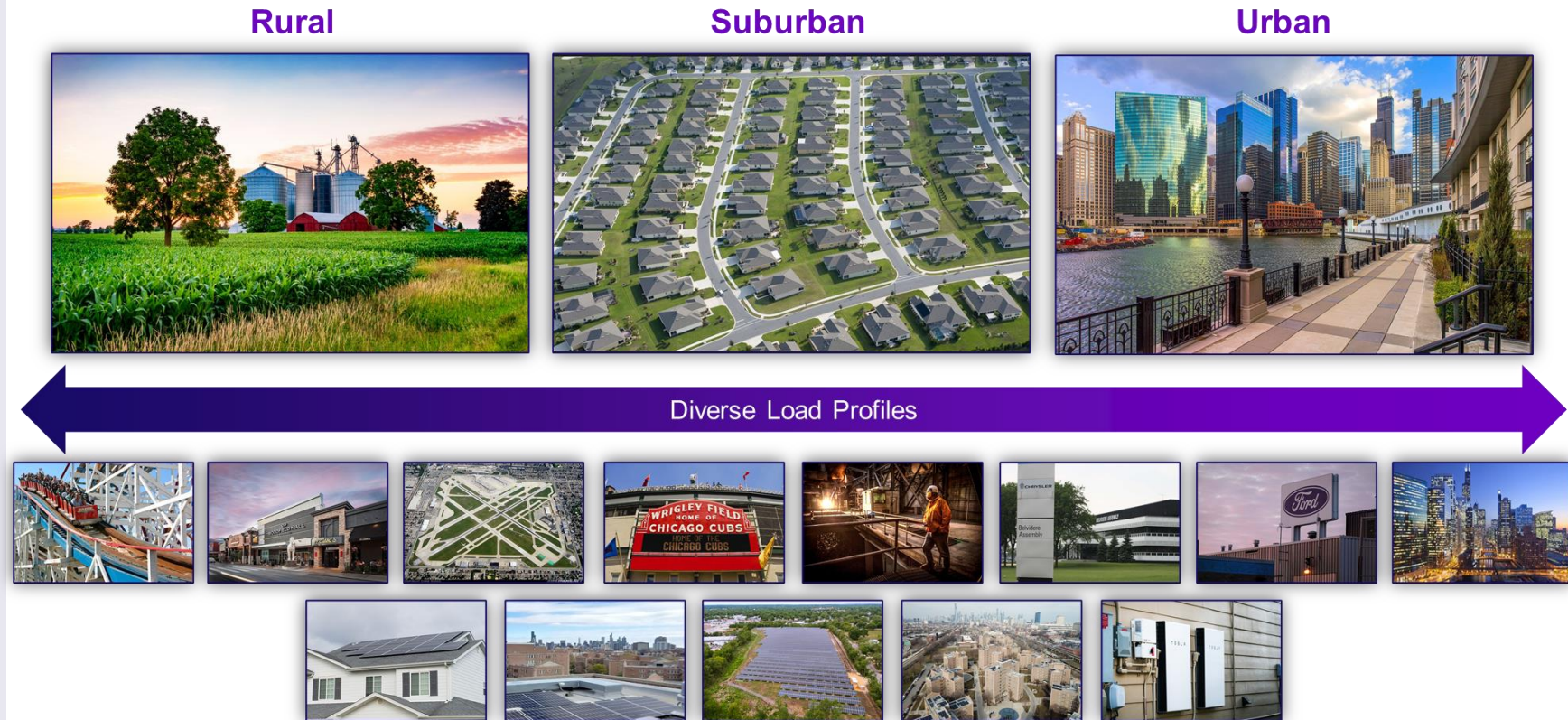
Planning the Grid

Ensuring the grid is designed to meet customer capacity requirements

- The planning process is an ongoing, granular component level analysis of more than 5,600 feeders, 1,700 substation transformers, and over 800 distribution substations
- Each feeder has different load characteristics based on the type of customers connected to that feeder and their usage behavior
- ComEd works closely with our customers to understand their needs and ensure their capacity needs are met

One System with Varying Needs

Every circuit has unique customer needs and evolving load profiles



2

A New Landscape - The Variability and Complexity of Our Evolving Grid

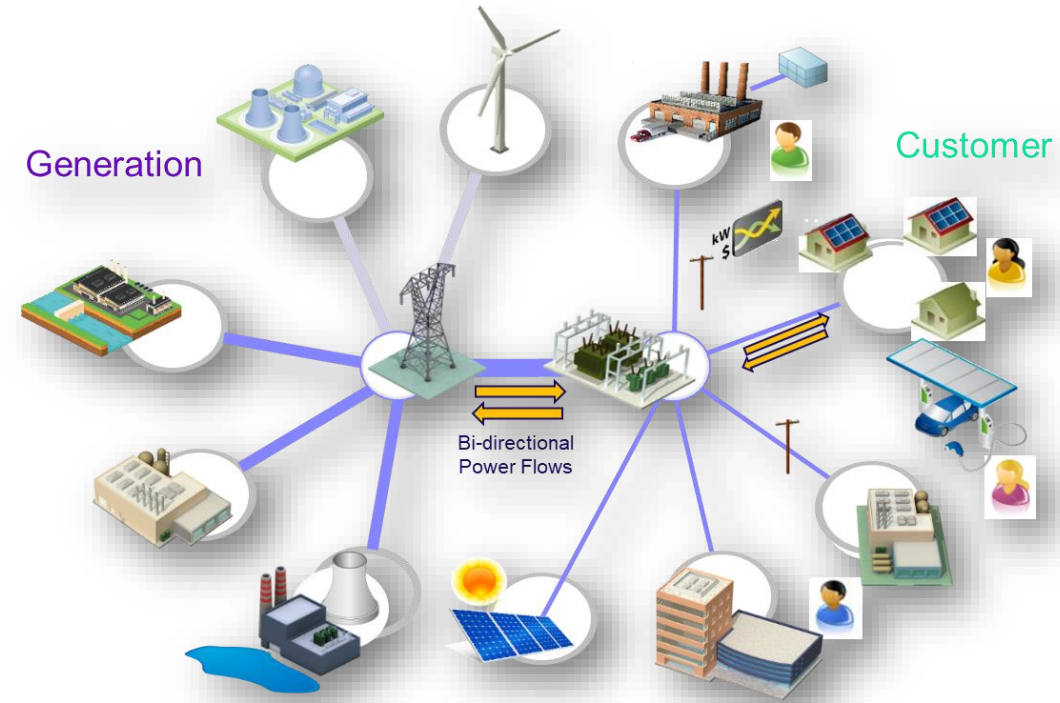
The Variability and Complexity of Our Evolving Grid

Traditional grid planning manages gradual change:

- The (“RCI”) mix of residential, commercial, and industrial customers to design system capacity
- Designed based on historical weather
- Gradual and planned load changes

Evolving grid planning manages dynamic change:

- Intermittent generation varying with weather
- Electric Vehicle charging varying with behavior, seasonality, and adoption
- Changing commercial and industrial loads as customers use electricity to decarbonize
- Increased use of electric heat pumps changing the seasonality of demand
- New customer classes like data centers



- Energy storage systems
- Demand response
- Targeted energy efficiency

The Grid Impacts of EV Growth

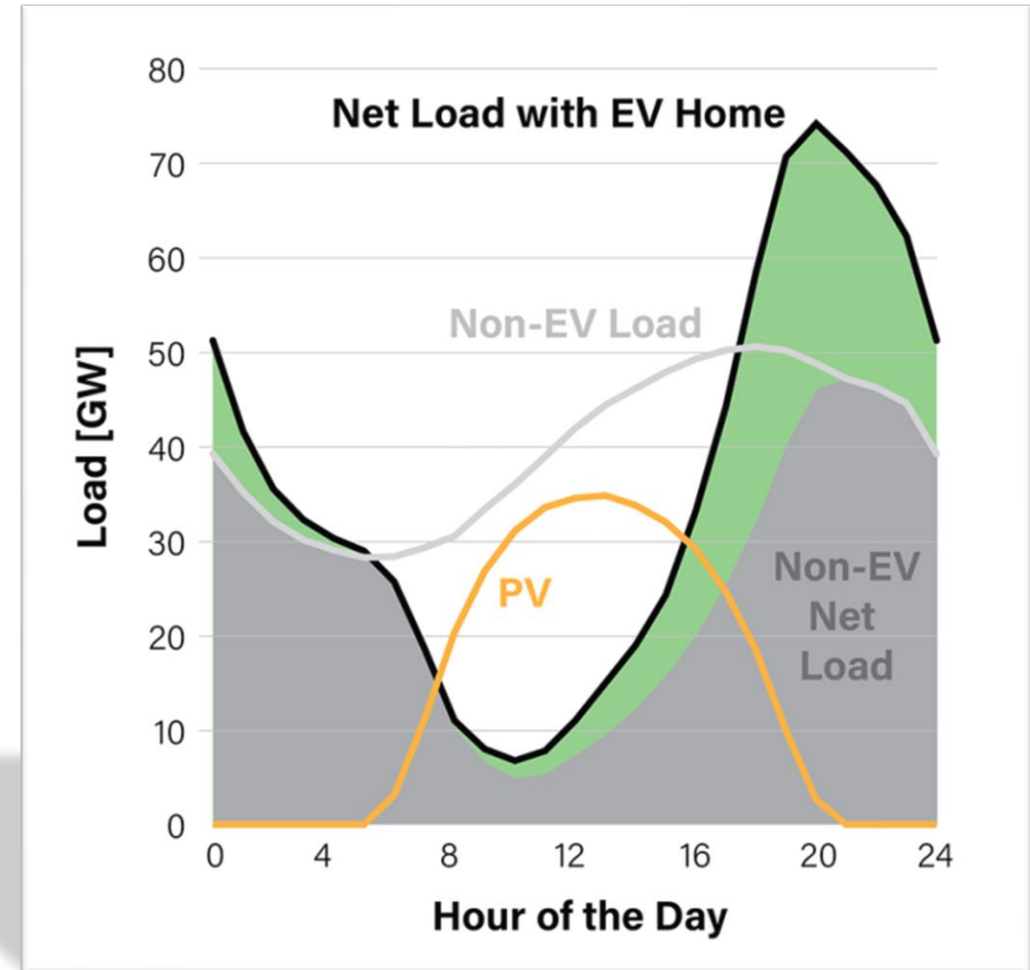
Increased EV adoption is likely to change the time, location, and amount of energy that the grid needs to deliver

Changing load profiles

- Potential extended peak durations
- Higher peaks
- Increased minimum loading
- Changing Load Factor

EV load impact needs to be evaluated together with other grid changes

Increased Resilience needed as the transportation sector becomes more reliant on the grid



EV Charging can impact grid planning and operations, particularly with high shares of variable renewable energy [Muratoni, Mai, 2021].

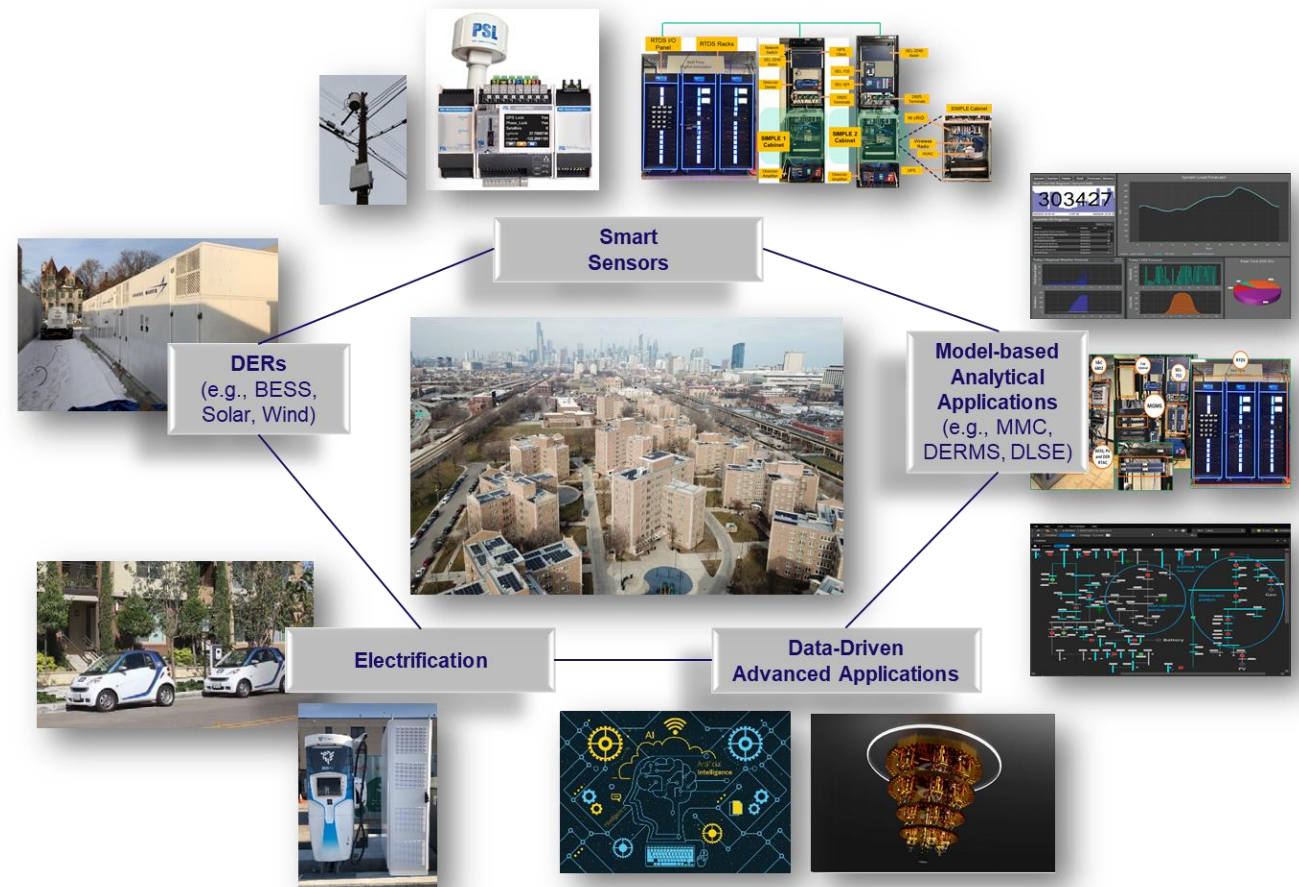
Figure shows one of many possible scenarios, which depend on charging location (e.g. work, home), charger type (L1, L2,..), solar PV output, etc

Solutions for an Evolving Grid

Clean energy technologies introduce significant complexity to grid planning and operation.

Sustaining the level of reliability and performance that customers expect requires advanced:

- Monitoring
- Protection
- Automation
- Controls
- Communications
- Software applications & analytics



3

Collaboration in Planning

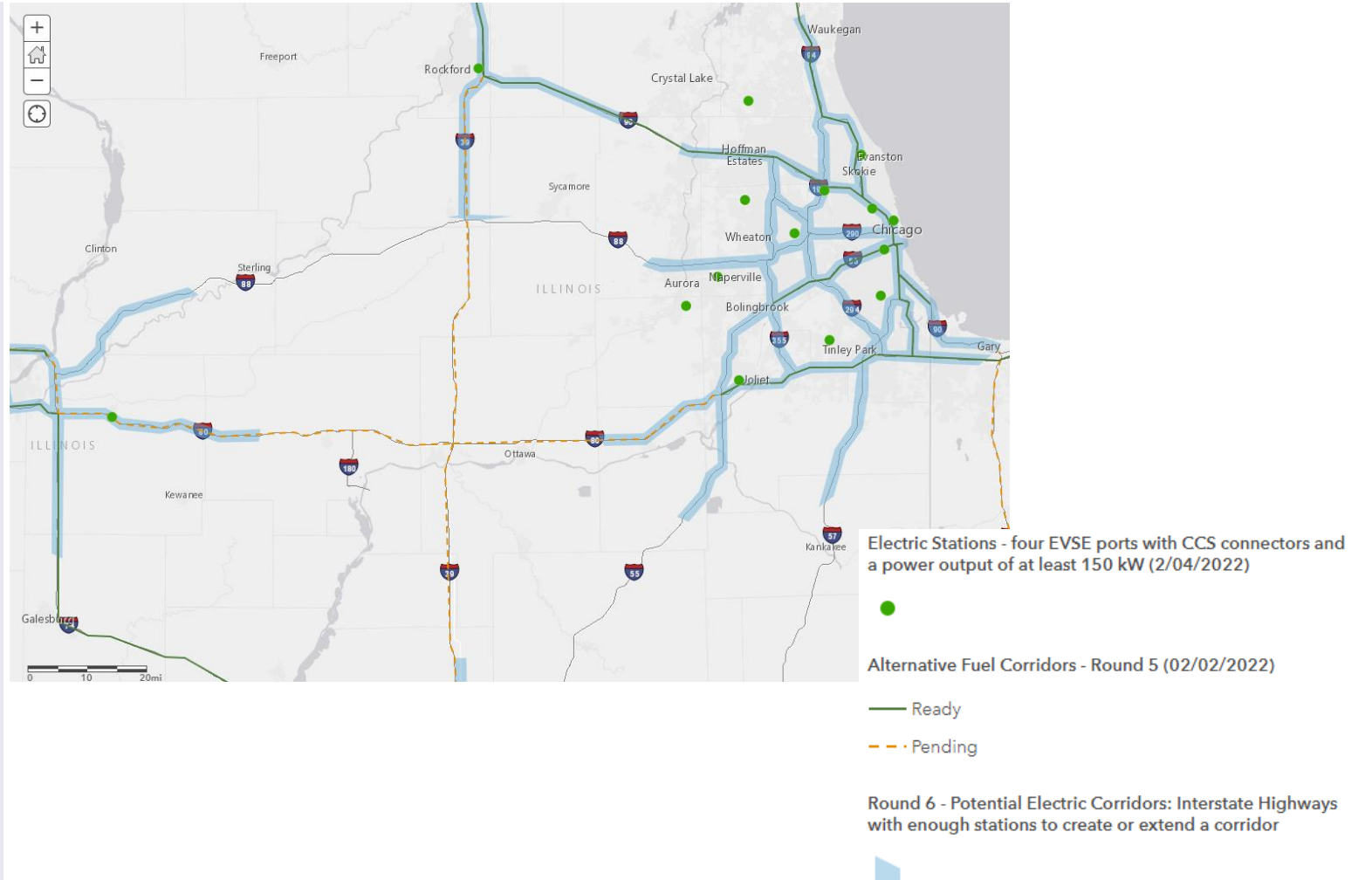
NEVI and Alternative Fuel Corridors

NEVI (National Electric Vehicle Infrastructure) Formula Program

- Federal funding to States to deploy EV charging infrastructure
- Focus on building out Alternative Fuel Corridors for EVs along the interstate highway system

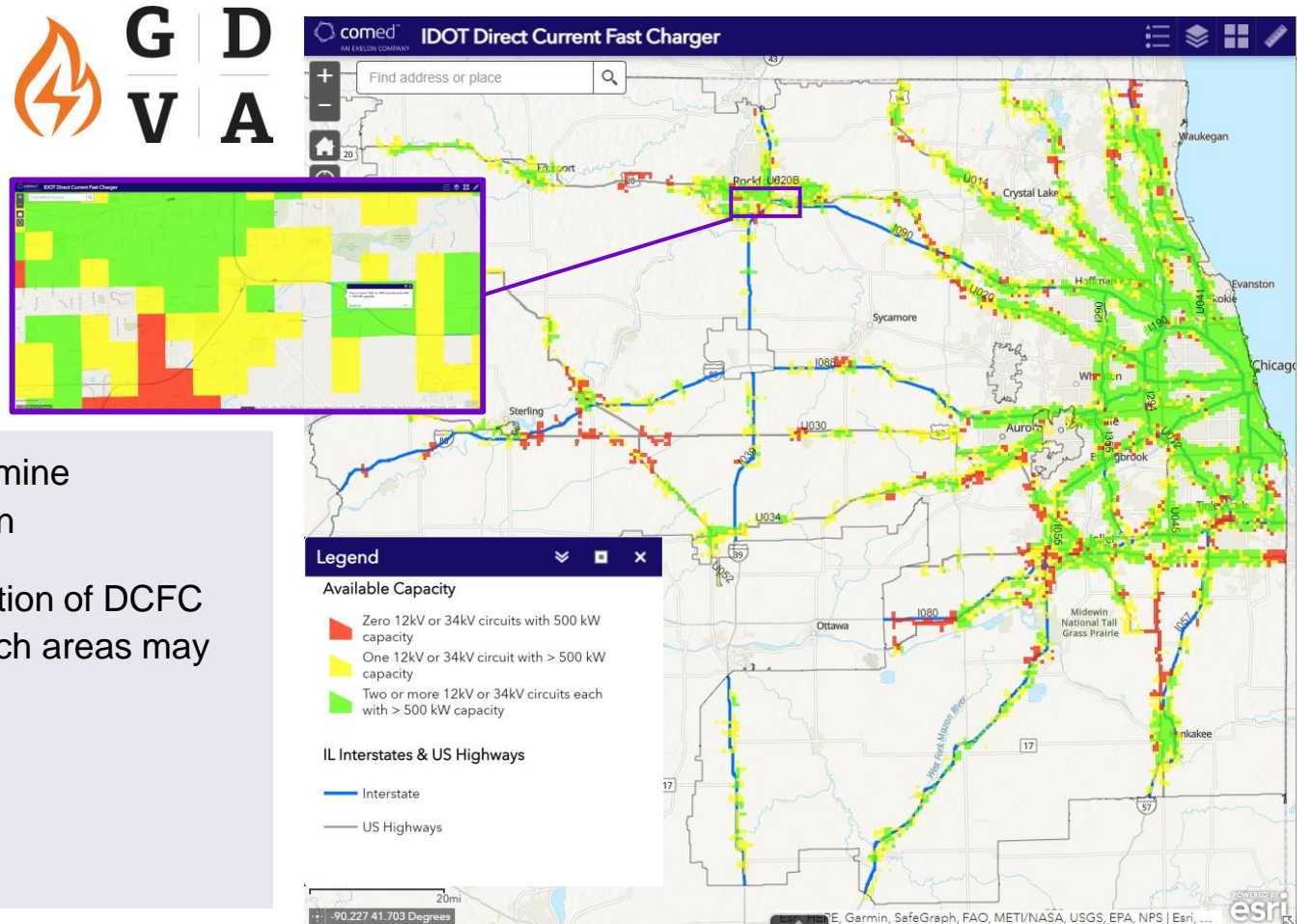
Alternative Fuel Corridors - “Fully built out”:

- EV charging stations installed every 50 miles along State’s portions of the Interstate Highway
- Installed within 1 travel mile of the interstate
- At least four 150kW Direct Current (DC) Fast Chargers with Combined Charging System (CCS) ports
- Minimum station power capability of 600kW



ComEd DCFC Hosting Capacity Map for IDOT

- Map created to support the Illinois Electric Vehicle Infrastructure Deployment Plan – draft plan submitted by IDOT 8/1/2022
- Plan contains links to ComEd and Ameren interactive online maps
- ComEd map utilizes GIS data to determine 12kV & 34kV circuits within 1 mile of highways
- Circuit and substation capacity information added to determine Red/Yellow/Green characterization for each quarter section
- Hosting Capacity data from map to be considered in selection of DCFC sites to be built using NEVI funds and is suggestive of which areas may be more favorable from a power availability standpoint



Additional collaboration efforts

In addition to IDOT, ComEd has been collaborating with:

- Public transportation (Pace and CTA)
- Large fleets
- Public schools
- Municipalities

Early engagement with these groups are critical to

- Ensure we can meet customer timelines
- Learn how we can support our customers in their electrification journey
- Gain insight into long-term customer plans to inform our forecasts and long-range plans
- Learn how our customers plan to operate/charge their fleets in order to evaluate electrification impacts to planning tools and practices

4

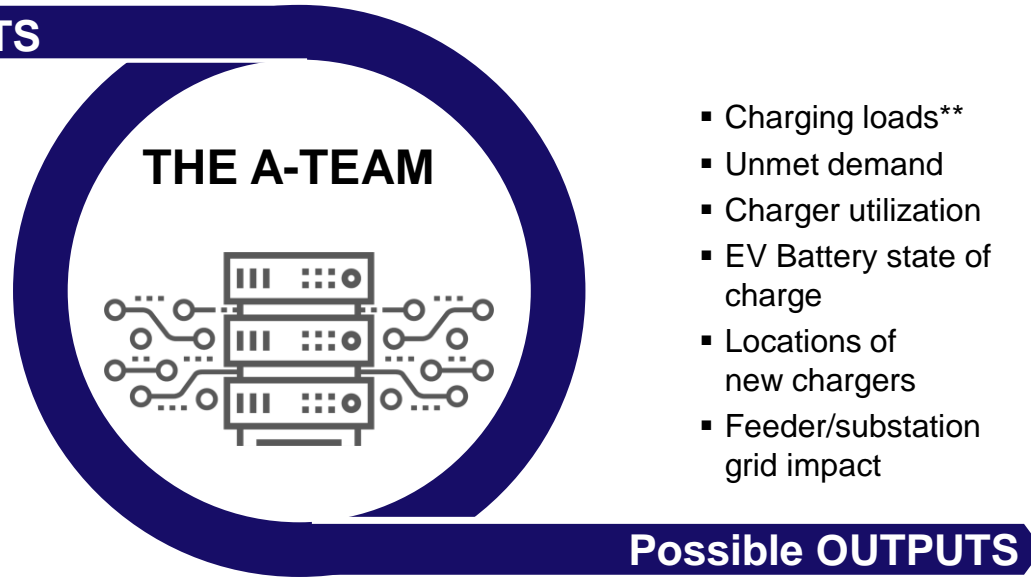
Research and Iterate

Planning for the Grid Impact of Beneficial Electrification (Argonne)

The new energy law targets 1 million EVs in Illinois by 2030

Possible INPUTS

- Vehicle registrations
- Vehicle efficiency
- Census tract characteristics
- Household characteristics
- EV projections *
- Chargers by type
- Travel demand
- Charging behavior
- New energy law / Federal Infrastructure Bill



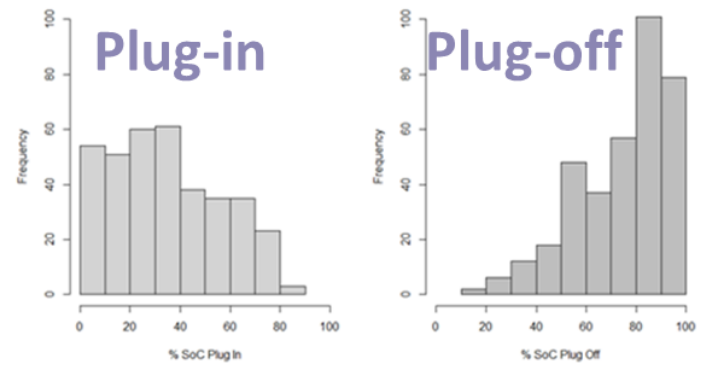
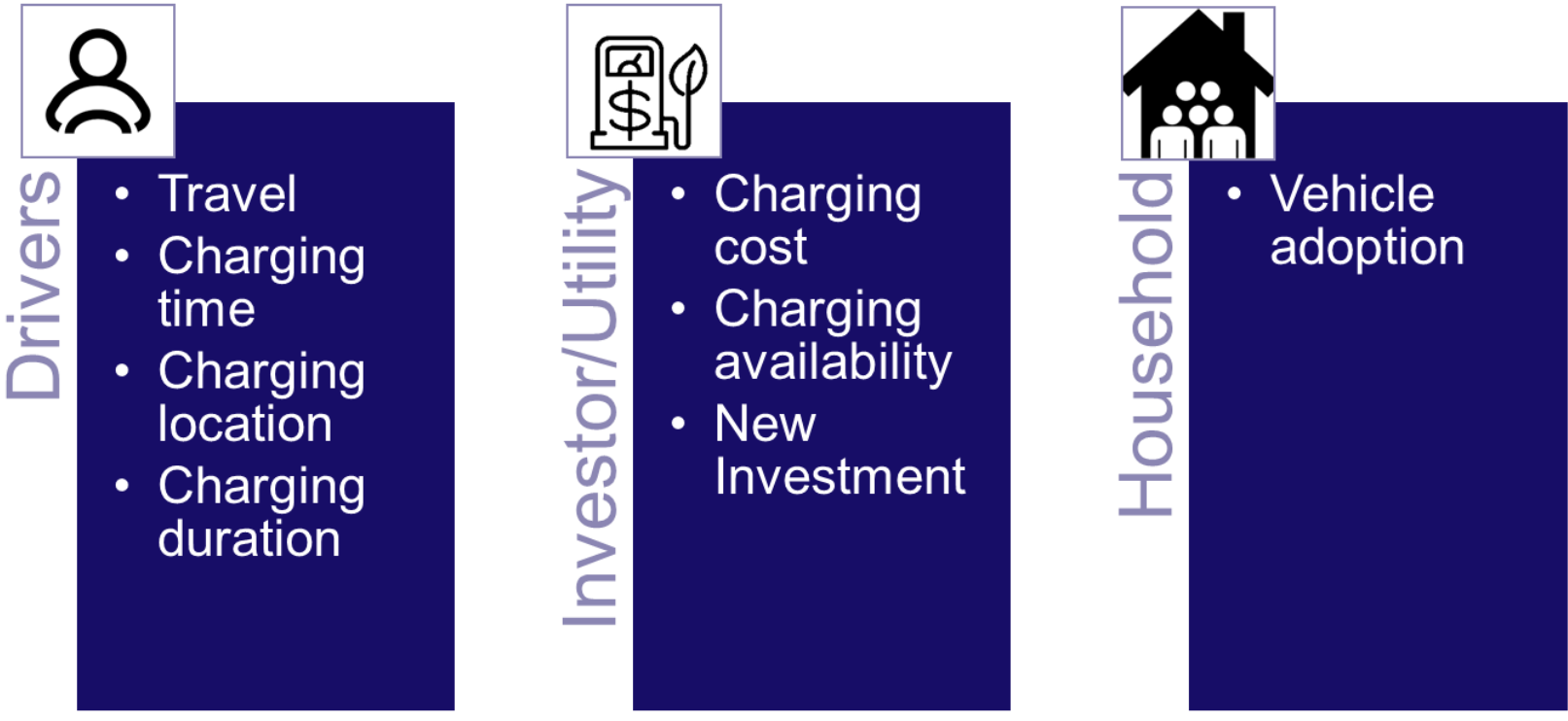
Possible OUTPUTS

- Charging loads**
- Unmet demand
- Charger utilization
- EV Battery state of charge
- Locations of new chargers
- Feeder/substation grid impact

* Currently input; can be output upon full implementation
** by census tract

- Where will they be charged?
- How will system load change as a result?
- How can our programs best ensure that EV adoption is inclusive and efficient?
- Building on two previous projects between Exelon and Argonne, we are developing a scope of work to answer these questions with a new tool.

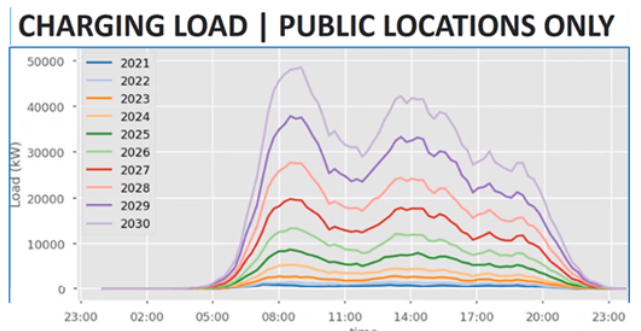
Interactions Between Agents Produce Charging Loads for Grid Analysis



←
Real-world
Charging Behavior



↳
Modeled
Charging Behavior

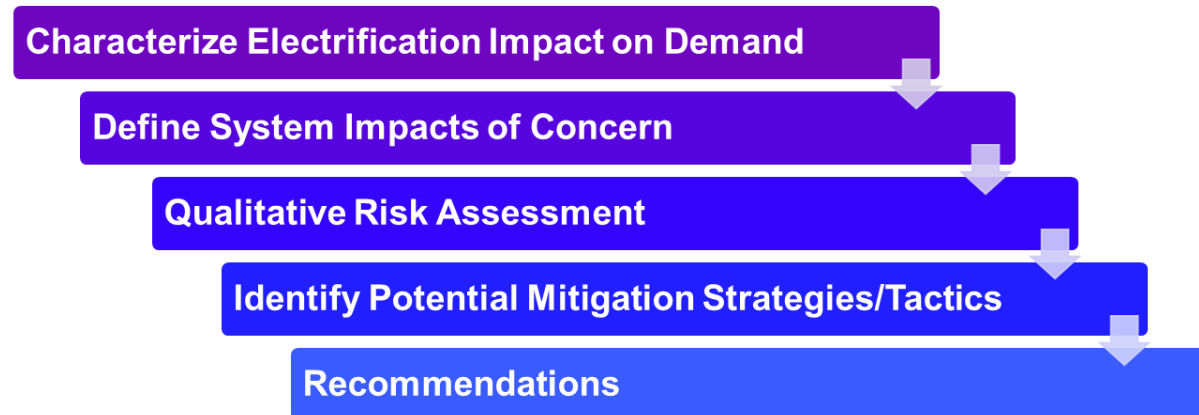


ComEd/ EPRI Assessment of Future Electrification Distribution Impacts

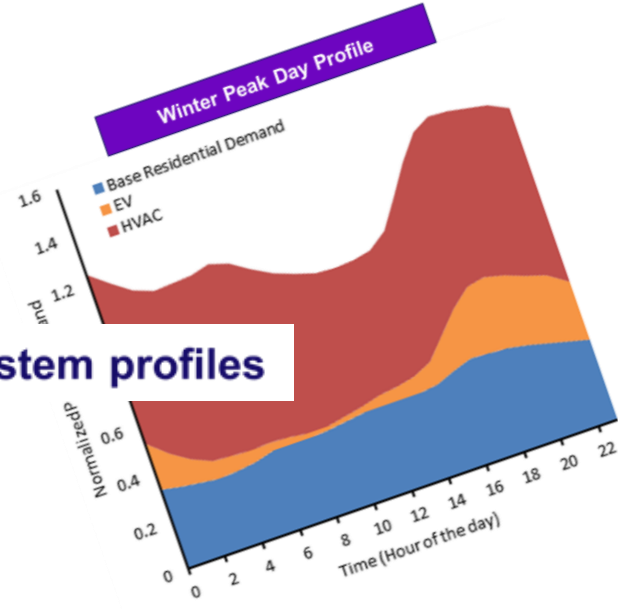
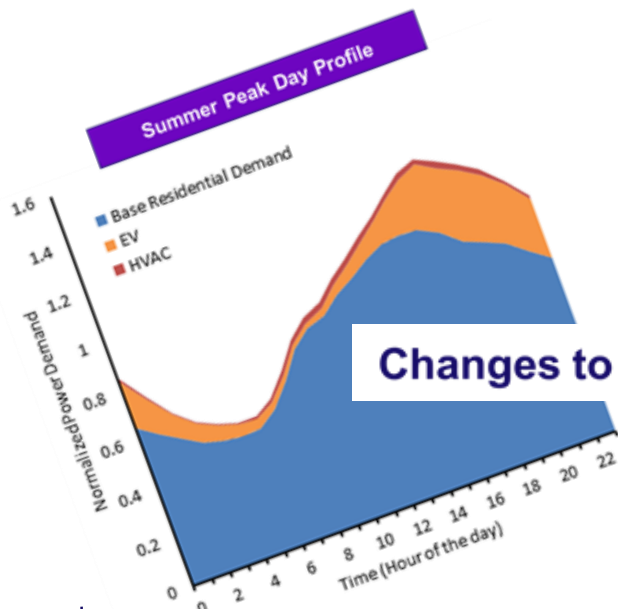
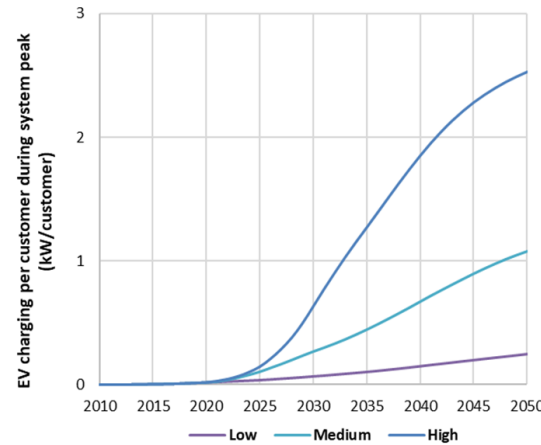
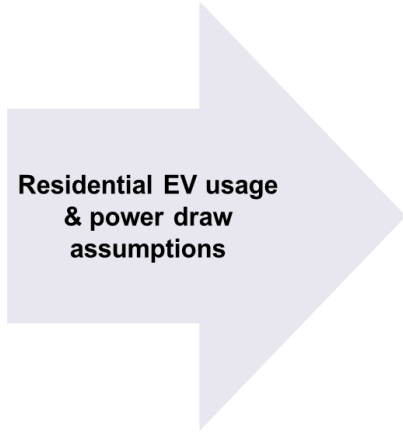
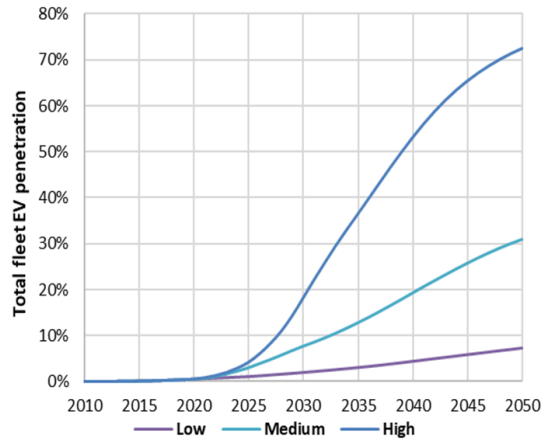
Project Objectives:

- Identify electrification scenarios that may impact ComEd's distribution systems.
- Qualitatively assess distribution system impacts, including capacity and resilience impacts, associated with increased electrification.
- Identify mitigation options and their associated considerations.
- Evaluate subsequent strategic planning studies needs and recommendations

Project Steps:



ComEd/ EPRI Assessment of Future Electrification Distribution Impacts



Changes to system profiles

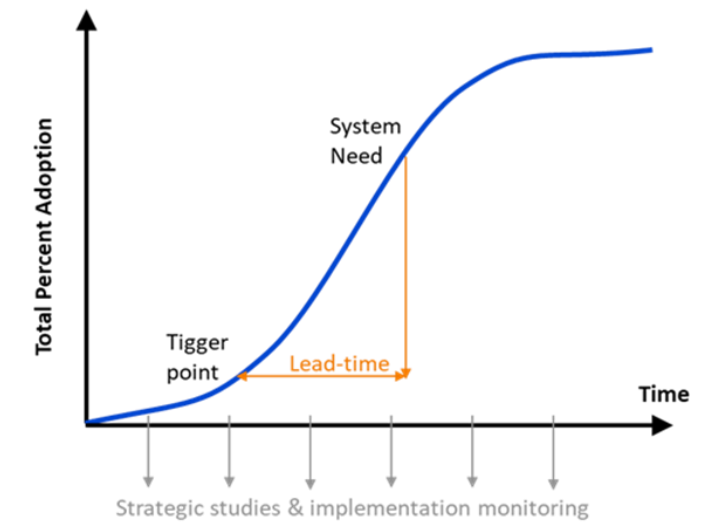
Issue	Risk Level
Service Transformer and Secondary Thermal Impact	High
Substation Transformer Thermal Impacts	High
EV Fleet Service Reliability and Resilience	Medium-High
Medium Voltage Equipment Thermal Impacts	Medium-High
Limited System Reconfigurability	Medium
Voltage Criteria Violations	Medium
Residential Customer Reliability and Resilience Considerations	Medium-Low
Power Quality (Harmonics) Impacts	Medium-Low
Voltage Regulation Asset Lifetimes	Low-Medium
Sensitivity to Power Quality Events	Low

ComEd/ EPRI Assessment of Future Electrification Distribution Impacts

Engineering enhancements and actions

Topic Area	Progression of Recommended Actions →			
System Design and Planning Process Changes	✓ ✓ ✓	✓ ✓ ✓	✓ ✓ ✓	✓ ✓ ✓
Electrification Modeling & Forecast Enhancements	✓ ✓ ✓	✓ ✓ ✓	✓ ✓ ✓	✓ ✓ ✓
Service Transformer Management	✓ ✓ ✓	✓ ✓ ✓	✓ ✓ ✓	✓ ✓ ✓
System Capacity Assessment	✓ ✓ ✓	✓ ✓ ✓	✓ ✓ ✓	✓ ✓ ✓
EV Planning	✓ ✓ ✓	✓ ✓ ✓	✓ ✓ ✓	✓ ✓ ✓
Reliability and Resilience Planning	✓ ✓ ✓	✓ ✓ ✓	✓ ✓ ✓	✓ ✓ ✓

Identifying trigger points for tactical deployment

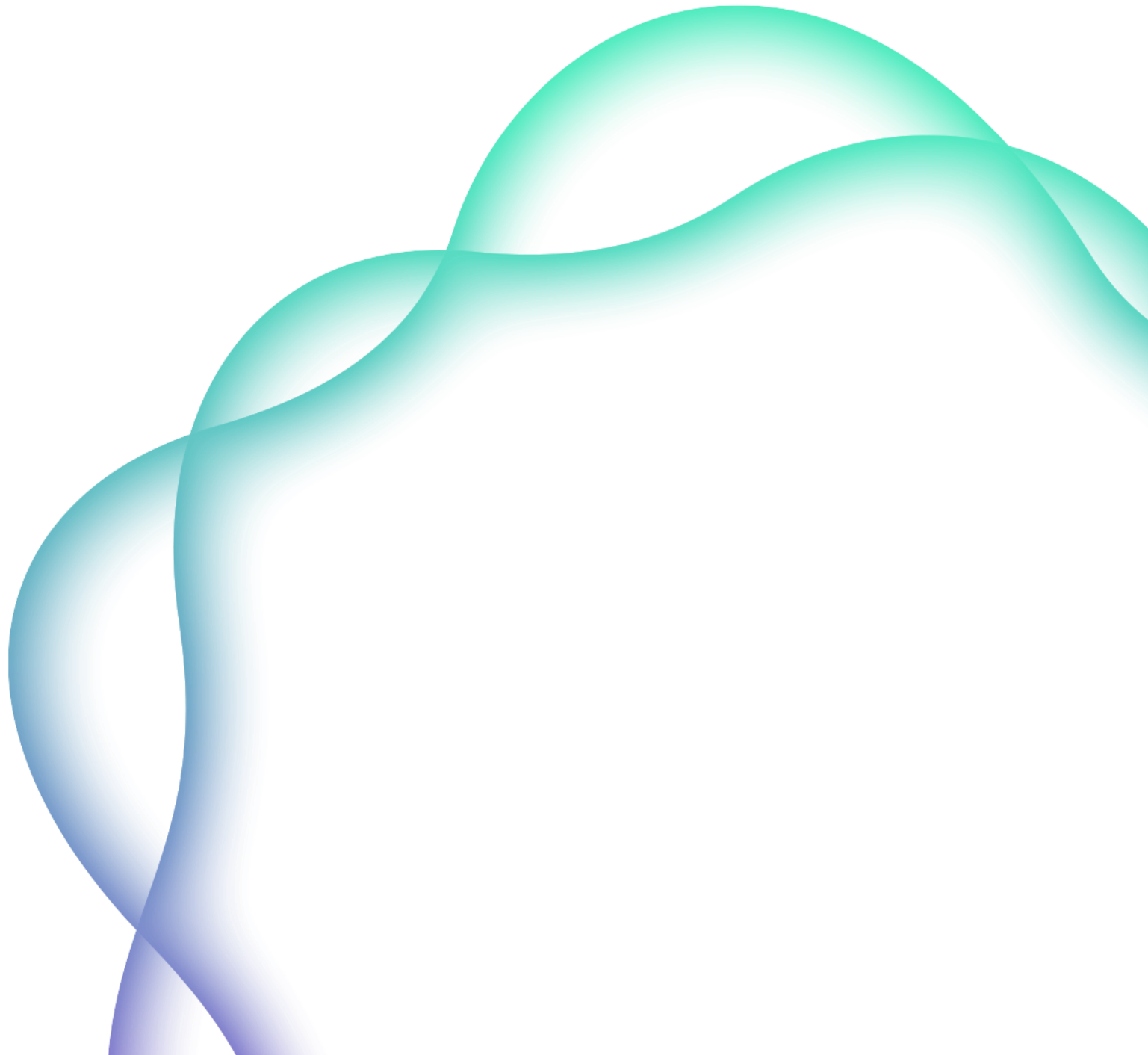




comedSM

AN EXELON COMPANY

Thank you





April 17, 2023

Multi-Unit Dwelling Electric Vehicle Charging Webinar

Community of the Future | ComEd

Agenda

1. Introduction
2. Community-Based Location Planning
3. Lessons Learned from First Installation
4. 43rd and Calumet Charging Data
5. Post-Study Transfer of Ownership
6. Conclusion

Introduction to MUD EV Charging

- The electrification of the transportation sector is one of the most effective ways to reduce carbon emissions and mitigate climate change
- EV adoption has been much slower among households in multi-unit dwellings (MUDs) than households in single family residences.
 - Due to a lack of convenient and accessible charging in or near MUD residences, more so in disadvantaged communities.
 - Recent legislation aims to promote equity during the energy transition and increasing EV adoption in disadvantaged communities is an area of particular interest.
- ComEd was the subrecipient of a grant awarded to the Center for Sustainable Energy (CSE) from the DOE to study the impact of charging solutions on EV adoption.
 - CSE was developing a replicable multi-unit dwelling Charging Toolkit.
- A special tariff was granted from the Illinois Commerce Commission (ICC) under the condition that the utility would study the impact of different pricing scenarios on usage, provide periodic reports, and transfer ownership of the chargers by 2024.



Community-Based Location Planning

Location 1

- The first location was chosen because it is near a new 99-unit MUD development at the NE intersection of 43rd and Calumet Ave: 1 charger with 2 total ports were installed at this location.
 - The MUD developer Phil Beckham worked closely with ComEd on this proposal
- Installation was completed on April 20th, and on April 28th the project team successfully commissioned the BTC Power dual port pedestal charger EV charger location at Location 1.
 - The charging ports are currently free to use, to gauge the initial usage of the charger without a cost barrier to customers.

Location 2

- The second location was in the vicinity of multiple MUDs: 3 chargers with 6 total ports were proposed for this location.
 - Construction at Location 2 began on April 6, 2022, but was halted because of an unforeseen problem with the site location

Location 3

- The third location (Bee Library) has been identified as an ideal location for a charger due to its proximity to the Illinois Tech campus as well as new MUD buildings.

Table 1: Sites and Proposed EVSE Installation

#	Location	# of Chargers	Total ports
1	Curbside site near 99-unit MUD development	1	2
2	Curbside site near a school and multiple MUDs	3	6
3	Parking lot across the street from large MUD development	1	2



Lessons Learned



What went well

- Community partnerships and planning
- Curbside design which met community needs
 - In communities where vehicle owners were reliant on street parking at their place of residence, curbside EVSE would be a critical enabler of EV adoption

What didn't go well

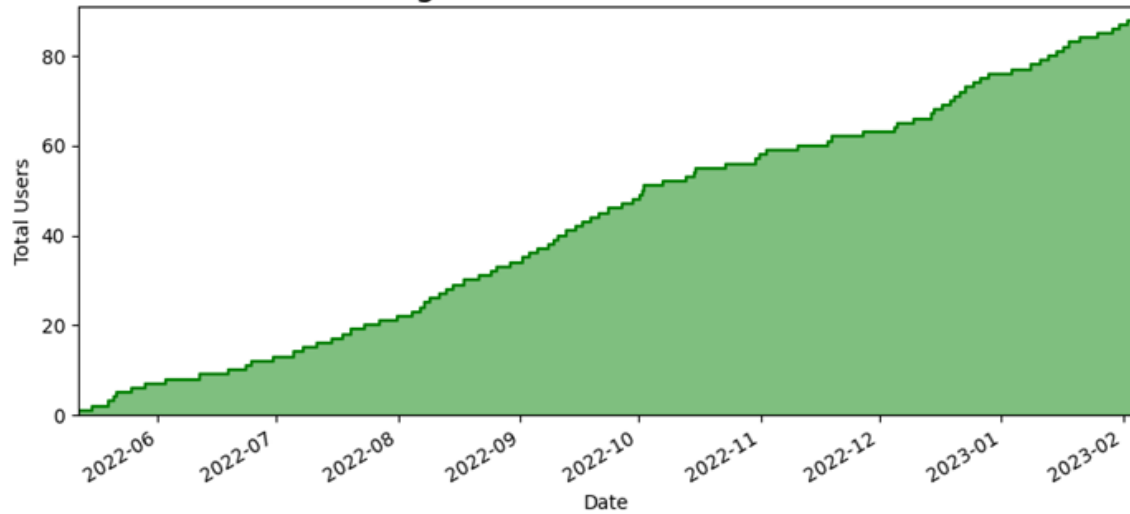
- Needed multiple in person walk downs of site #2 before breaking ground
 - Pandemic affected in person meetings
- Needed written commitments so all parties approve design and location

What needs improvement

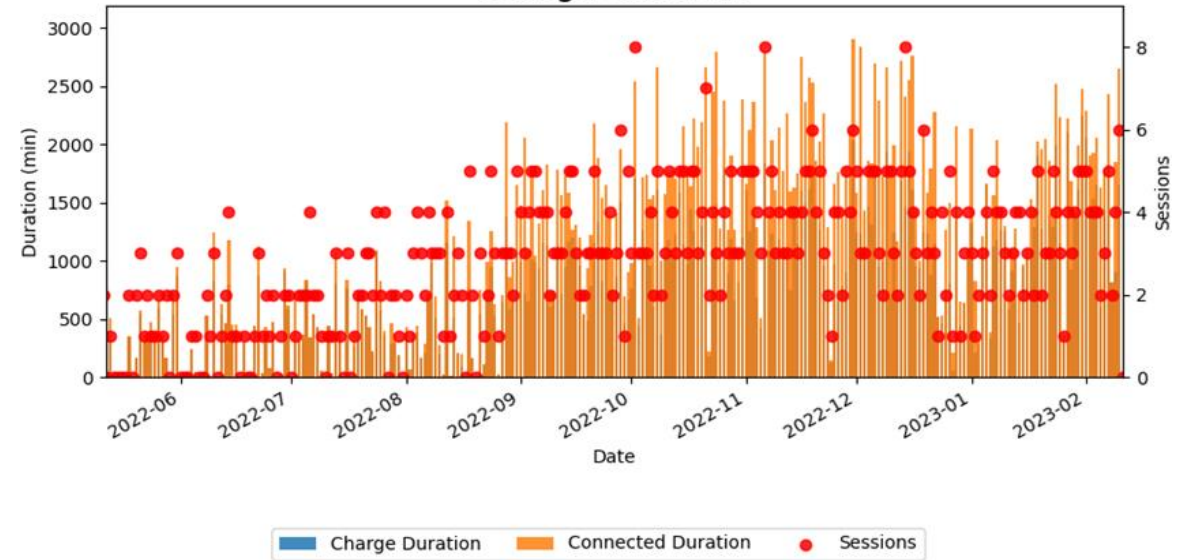
- Utility partnership with City of Chicago permitting (especially for curbside sites)
- Increased public and private coordination
- EV parking enforcement
- Engagement with stakeholders at multiple points of the design process
- Need to create multiple design proposals

43rd and Calumet Charger Data

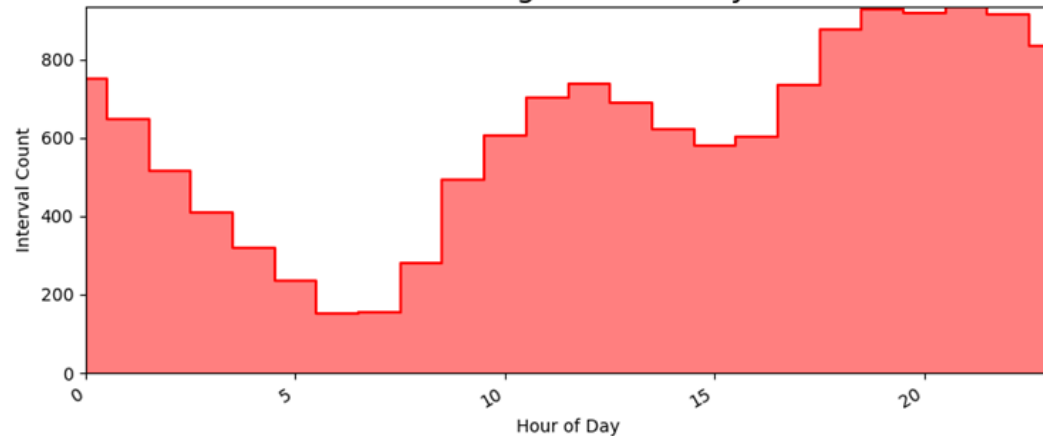
Registered Users over Time



Charge Sessions



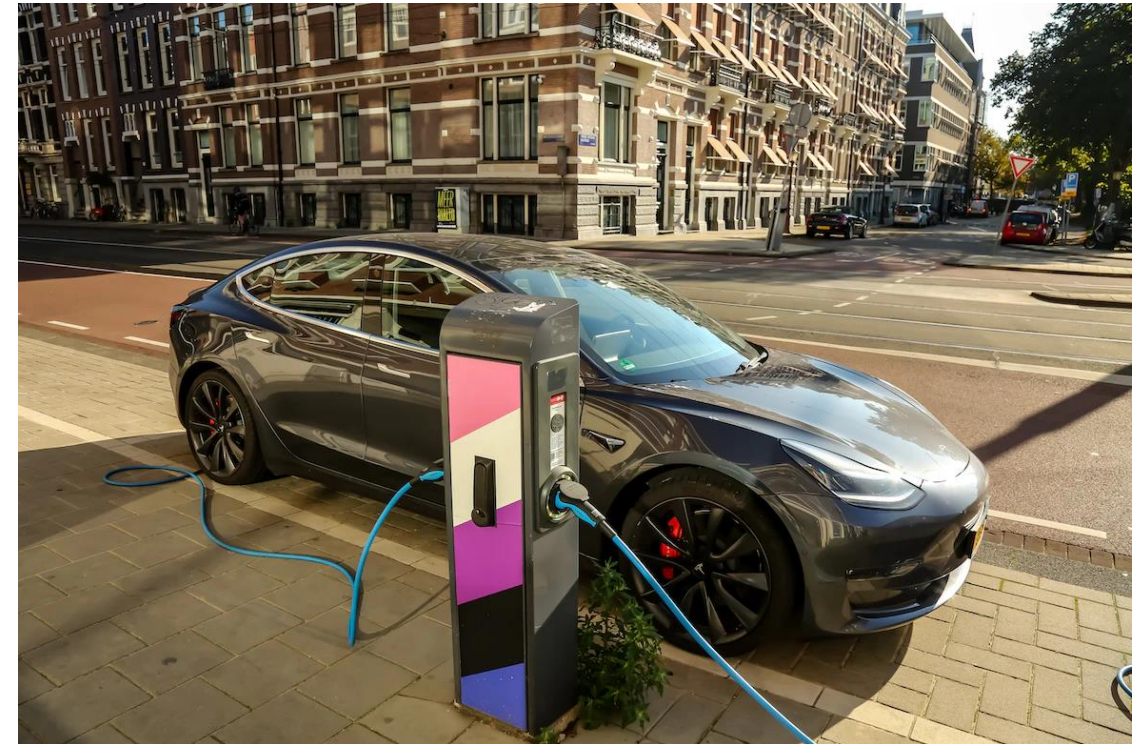
Count of Charge Intervals by Hour



- Registered users have increased to 90 over the past 9 months
- Charge Sessions show that most remain plugged in well past their vehicle being at max charge
- Peak time for charging comes in the evening as expected

Post Study Transfer of Ownership

- ComEd agreed to take reasonable efforts to sell the chargers to a third-party owner or community partner by the end of 2024, per the special tariff approved by the ICC.
- Potential partners seem to be most concerned about the impact the energy used from the chargers could have on their bills.
- While the new owner is allowed to charge for usage, concerns about the time and staffing needed to make decisions about rates have made potential partners hesitant to fully commit to taking ownership without the security of having ComEd as a resource should they encounter issues.





Thank you



April 17, 2023

Navigating the Journey to EVs: Using ComEd's EV Toolkit!

ComEd's EV Toolkit



- Whether you're already an EV driver or considering buying an EV, our ComEd EV Toolkit serves an all-in-one resource to prepare consumers no matter where you are in the journey.
- Explore your options at [ComEd.com/EV](https://www.comed.com/ev)

How do I know if an EV is right for me?

Explore our tools and resources to review your options and make an informed decision



Savings, Benefits & Incentives

Discover the environmental and health benefits related to EVs, and calculate your personalized fuel cost savings. [Learn More](#)



Find Vehicles and Chargers

Review the latest EV brands, models and charger options. [Learn More](#)



Search for Public Charging

Find a public charging station near you or wherever you may go. [Learn More](#)



Explore your options at ComEd.com/EV

Calculate your personalized fuel cost savings estimate

Calculate your potential fuel cost savings when switching from a gas vehicle to an EV – using current fuel and market costs:

- Price for a gallon of gas near you
- Gas vehicle you currently own
- EV that you are interested in
- Number of miles you personally drive each year on average
- Current electric rate

The calculator estimates:

- How many more miles you can drive an EV for the price of a gallon of gas vs. your gas vehicle
- How much you potentially could save in fuel costs annually and over 5 years

[Learn more](#)

Savings Calculator | Commute Savings | EV Benefits & Facts | Savings & Benefits

Estimate your Potential Savings

How far does **\$4.35** drive your car?

Select the rate that applies to the time you will charge.

- Rate BES (ComEd default fixed-price rate)
\$.115/kWh*
- Rate BES-H (Hourly Pricing 24-hr avg price)
\$.111/kWh**
- Rate BES-H (Hourly Pricing overnight avg price)
\$.074/kWh***

EV gets you this many more miles for the price you pay for a gallon of gas.

185 mi

Gas: 24 miles | EV: 209 miles

Local fuel price/gallon	Est. MPG of gas vehicle	Est. mile/kWh for EV	Utility kWh rate*
\$ 4.35	24.00	3.560	\$ 0.0740

2015 | 2022 | Honda | Chevrolet | Accord - Automatic (56) | Bolt EV (3.56 mi/kWh) | [RESET ALL](#)

How much should it cost to drive **15,000** miles per year?

A year of driving, a year of saving.

Average annual driving estimates vary across the US, but the EPA and DOE use 15,000 miles/year as the average for most fuel use estimates. This estimate is based on the above inputs.

Switch to EV and save big on fuel. Estimated annual savings:*

\$ 2,406

Find an All Electric or Plugin Hybrid EV that's right for you

- **Enter your search priorities** in order of importance
- **Review the list of EV models** that may be appropriate for you
- **Receive information** on price, range, and currently available Federal Tax Credits by model

[Learn more](#)

All-Electric Models Plug-In Hybrid Models EV Chargers

All-Electric Vehicle Model Information

This list is intended to provide general information about electric vehicle models. These prices are only estimates, actual prices may vary significantly based on dealership, geographic location and vehicle option packages. This list may not include all available electric vehicle models and does not include hybrid electric vehicles (HEV) or plugin hybrid electric vehicles (PHEV). Please consult local dealerships and manufacturer websites for additional information.

Year 2020 2021 2022 2023 2024

Manufacturer	Price Range*	Range per Charge	Battery Capacity (KWH)
All Brands	Lower to Higher	Longer to Shorter	Lower Capacity

Sort Order ? 1 2 3 4 1 2 3 4 1 2 3 4


Efficiency (kWh/Mi)

More Efficient

1 2 3 4

2023 Chevrolet Bolt EV
Estimated Price: **\$20,000 to \$30,000**
Technology: **All-Electric EV**
Range: **259 miles/charge**
kWh Consumption/100 miles: **28.1**


New Vehicle Federal Tax Credit*
If purchased/delivered before 8/16/2022:
No tax credit available
If purchased/delivered 8/17/2022-12/31/2022:
No tax credit available
If purchased/delivered after 1/1/2023:
Up to **\$7,500**



source: gm media

2023 Chevrolet Bolt EUV
Estimated Price: **\$20,000 to \$30,000**
Technology: **All-Electric EV**
Range: **247 miles/charge**
kWh Consumption/100 miles: **29.4**

New Vehicle Federal Tax Credit*
If purchased/delivered before 8/16/2022:
No tax credit available
If purchased/delivered 8/17/2022-12/31/2022:
No tax credit available
If purchased/delivered after 1/1/2023:
Up to **\$7,500**



source: gm media (2022 Model Shown)

Find an EV Charger that's right for you

- **Enter your search priorities** in order of importance
- **Review the list of EV Charger models** that may be appropriate for you
- **Receive information** on estimated price, charger type, plug type, and if it is WiFi Enabled by model
- **Select models** are available for purchase directly on the ComEd Marketplace

[Learn more](#)

All-Electric Models Plug-In Hybrid Models **EV Chargers**

Level 2 Charger Information

We're providing basic information about electric vehicle Level 2 240-volt charger models to help you understand the various performance attributes to consider when making a purchase. We try to keep the information up to date, but models and attributes change frequently. Please refer to manufacturers for additional details.



Manufacturer	Price Range*	Amperage	WiFi Enabled
All Brands	Higher to Lower	Higher to Lower	Yes


Sort Order 1 2 1 2

ENERGY STAR Certified

ENERGY STAR Certified



ChargePoint Home Flex
Charger Type: **Level 2**
Estimated Price: **\$1,000 to \$1,500**
Plug Type: **SAE J-1772**
Voltage: **240**
Amperage: **50**
Primary Use: **Residential**
Connectable/WiFi Enabled: **Yes**
ENERGY STAR: **Yes**


 

 ChargePoint

[PURCHASE](#)

Autel MaxiCharger Home 50
Charger Type: **Level 2**
Estimated Price: **\$400 to \$700**
Plug Type: **SAE J-1772**
Voltage: **240**
Amperage: **50**
Primary Use: **Residential**
Connectable/WiFi Enabled: **Yes**
ENERGY STAR: **Yes**

 Autel

Ready to hit the road?

Find a public charger near you

- Our tool allows you to **find public chargers by zip code**
- **See locations** on a map and individual listings

Learn more

60604 Go

Leaflet | Map data © OpenStreetMap contributors, CC-BY-SA, Imagery © Mapbox

CHARGER LEVEL: **Level 1** Level 2 DC FAST: **CCS** CHAdeMO Tesla

Showing 1 - 25 of 152

PREV **1** 2 3 4 5 6 7 NEXT Search here..

MILLENNIUM GRGS

5 S Columbus Dr
Chicago, IL, 60601
888-758-4389

ACCESS: Public
NETWORK: [ChargePoint Network](#)
PLUG TYPES: NEMA520
PRICING: Free
HOURS: 24 hours daily

INTERPARK

17 E Adams St
Chicago, IL, 60603
888-758-4389

ACCESS: Public
NETWORK: [ChargePoint Network](#)
PLUG TYPES: J1772, NEMA520
PRICING: Free
HOURS: 24 hours daily

I've purchased an EV – now what?

Get the most out of your EV with our available resources.



Prepare for Charger Installation

Review the checklist to help make sure your charger installation goes smoothly. [Learn More](#)



Find the Right Rate for You

Explore available rate options and see what works best for you. [Learn More](#)



Register Your EV

Register your vehicle with ComEd to help us assess your electric service needs and maintain the reliability of electric service in your community. [Learn More](#)



Thank you

Visit: www.comed.com/ev



GREEN DRIVES **CONFERENCE & EXPO**

THURSDAY, MAY 18 • NIU CONFERENCE CENTER



QUESTIONS?



How to Stay Connected



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Illinois Alliance for Clean Transportation



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