

Applying a Framework for Addressing Cost-Effectiveness and Distributional Equity in Distributed Energy Resource Investment Decisions

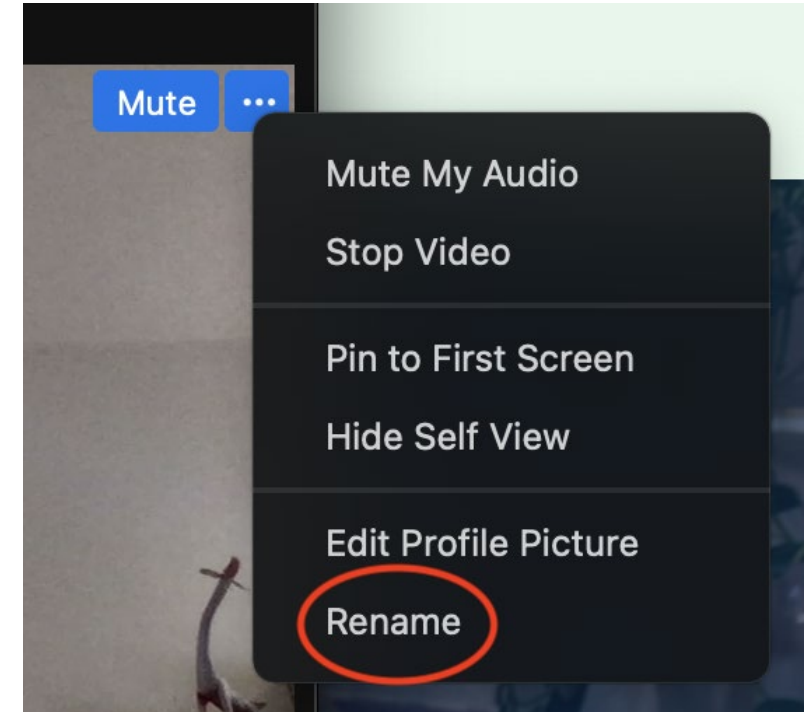
Illinois Work Group Sixth Meeting

March 13, 2025

Alice Napoleon, Tim Woolf, and Ida Weiss, Synapse Energy Economics
Greg Ehrendreich and Natalie Newman, Midwest Energy Efficiency Alliance
Julie Michals, E4TheFuture

Housekeeping

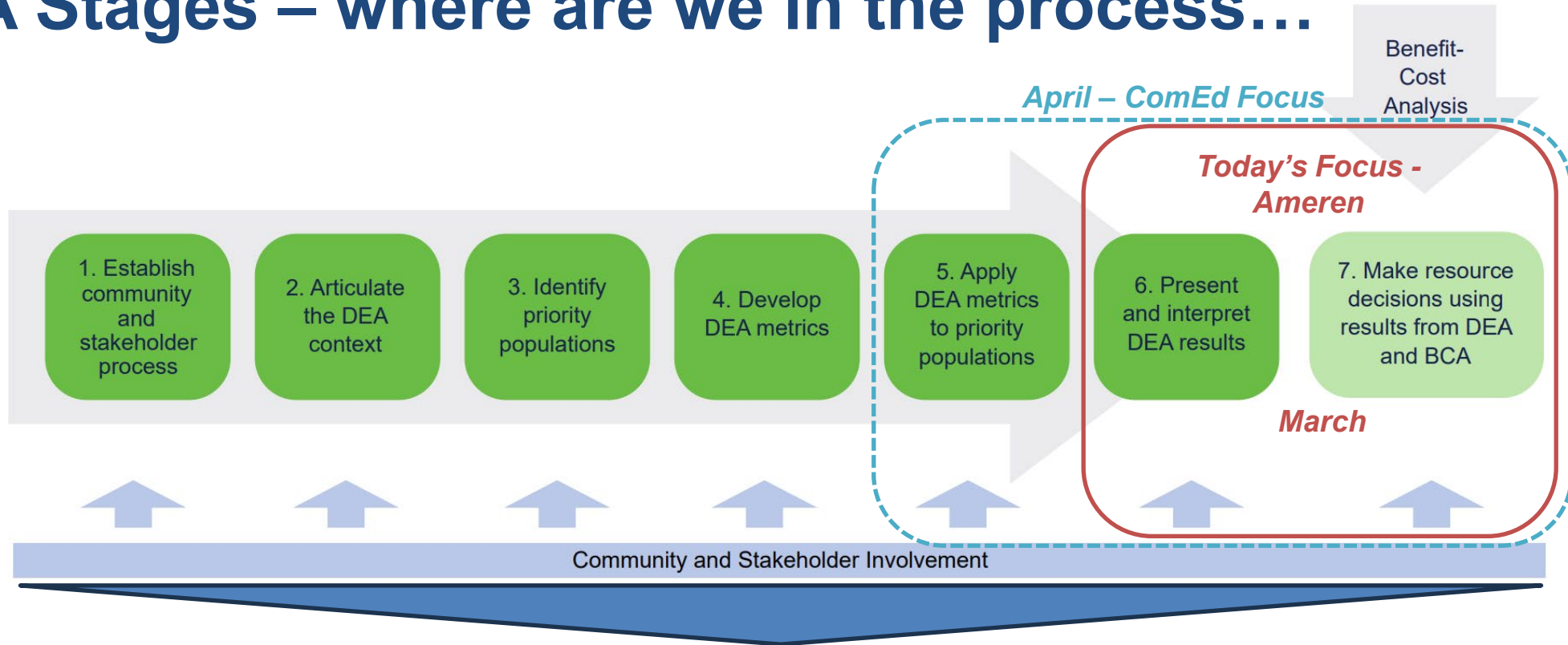
- Please add your affiliations and pronouns to your Zoom name.
- Please mute yourself when you are not speaking.
- If you have a comment or question, please raise your hand or use the chat.
- We will be recording the session to share with DEA Work Group members that could not attend this call.



Agenda

1. Today's objectives
2. Stage 6: Review previously presented Ameren BE DEA results and present new results (for rate and bill impacts metrics)
3. Stage 7: Making resource decisions using BCA and DEA results
 - DEA and BCA results for ChargeSmart and ChargeReady
 - Recommendations
4. Project schedule and next steps

DEA Stages – where are we in the process...



Final report and final meeting - **June**

- Describe Ameren BE and ComEd EE case studies
- Present priority populations, metrics, analysis for DEA
- Present results of DEA in relation to BCA results
- Provide recommendations to inform future DEA case studies

Stage 6: Present DEA Results

Review of DEA results for key metrics from Meeting #5,
plus new results for Rate and Bill Impact metrics

Ameren BE Plan

Recap: Ameren's Beneficial Electrification (BE) Portfolio

Program type	Program	All other customers - Offering	EIEC/LI - Offering
Bill and delivery credits	ChargeSmart	Special energy rates for charging during peak/off-peak	Same as all other customers
	Residential Managed Charging	Bill credits to test managed EV charging	Same as all other customers
Charging infrastructure	ChargeReady	Charger infrastructure incentives	Coverage of charger costs and more support for charging infrastructure
	Driver Education	EV & charger incentives for schools	EV & charger incentives for high schools in EIEC/LI communities
Technical assistance & education	Community Engagement & Consultation	Highly specific assistance to individual communities	Special financial assistance
	Trade Ally & Customer Service	Connects customers to EV experts	Same as all other customers
	Fleet Assessment	Technical assistance for commercial customers	Same as all other customers
	EV-as-a-service pilot	Education program reducing barriers to owning an EV	Same as all other customers
Other	Home Ready	Home energy assessments	Fully covered assessments for income qualified customers
	EV School Bus Virtual Power Plant pilot	Electrifying school buses & virtual power plant demo	Same as all other customers

Recap: Ameren BE DEA case study

This DEA focuses on Ameren's ChargeReady and ChargeSmart programs (Ameren's BE Plan 2).

Proposal	Utility	DER	Programs	Priority Population	Perspective
Case Study #2	Ameren	BE Plan	ChargeSmart & ChargeReady	Equity Investment Eligible Communities/ Low-income (EIEC/LI)	Prospective

Recap: Ameren BE DEA – Programs

1. ChargeSmart

Purpose: to provide time-of-use rate discounts and charges to encourage customers to charge EVs during low-cost hours.

Residential offering: Participants receive electric bill credits for charging their EVs during a preferred charging period and electric bill charges for charging their vehicle during non-preferred hours⁽¹⁾

Residential program: same offerings for EIEC/LI and all other customers

2. ChargeReady

Purpose: to increase access to charging infrastructure.

Residential offering: Complete coverage of costs to install and purchase level 2 residential chargers

Residential program: available only to EIEC/LI customers (other customers not eligible)

Recap: Ameren BE DEA case study cont.

At the last meeting (#5), we presented DEA results for various metrics below. We will review these today, focusing on new results *bill impact* metric:

Metric	Data Sources
Participation	Metrics calculated using utility data from the benefit-cost analysis (BCA)
Utility program investment	
Emissions*	
Changes in rates (<i>new analysis being presented today</i>)	
Bill Impacts (<i>new analysis being presented today</i>)	
Workforce impacts*	Other reported utility data or calculated using external public data
Existing public EV charger access*	

**Metrics not carried through to the Step 7 – Making Resource Decisions Using BCA and TRC results due to data limitations.*

Customer sectors served by Ameren's BE Plan

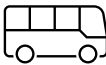
Ameren divides its portfolio offerings among different sectors:



Residential and multifamily



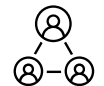
Fleets (businesses and municipalities)



Transit



Educational



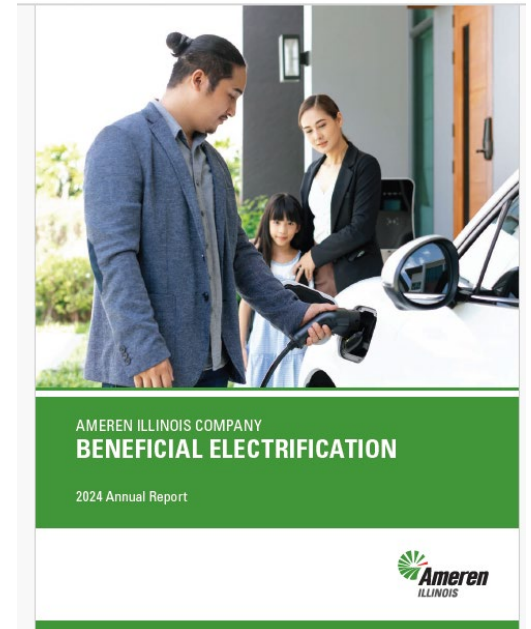
Public charging – available to all customers

Customer Sector Focus in the BE DEA

Metric	ChargeSmart	ChargeReady
Participation	All Sectors	All Sectors
Utility program investment	All Sectors	All Sectors
Emissions	All Sectors	All Sectors
Rate Impacts	<i>Residential</i>	<i>Residential</i>
Bill Impacts	<i>Residential</i>	<i>Residential</i>

Data sources and methods for DEA metrics

- Data sources
 - **BE Plan #1 and BE Plan #2** – program descriptions, benefit cost analysis, rate impact analysis data
 - **BE Plan Annual Report (July 2024)** - ChargeSmart data and program descriptions
 - **Ameren's BCA analysis** – underlying data for metrics
 - **Testimony from relevant dockets** – benefit cost analysis methods
 - Communication with Ameren staff (calls and emails)
- Calculation of metrics: sorting, filtering, and summarizing data in Ameren's BCA analysis workbook
 - Bill impacts: we used Ameren's assumptions and external, publicly available data about electricity rates, EV energy usage, and avoided gas costs



*Ameren Illinois Company -
BE Plan Annual Report
(July 2024)*

ChargeSmart DEA

Legend for Equity Implications

Benefits weighted more towards all other customers than EIEC/LI customers.

Benefits between EIEC/LI customers and all other customers are equivalent

Benefits weighted more towards EIEC/LI customers than all other customers.

Inconclusive benefits/not enough data to make a conclusion.

ChargeSmart Metric: Participation

Count of vehicles participating in special EV time-of-use rate programs

Projected ChargeSmart Participation (2026-2028 BE Plan)

ChargeSmart Participation	All Other Customers	EIEC/LI
Total vehicles participating (%)	74%	26%

<i>Ameren customer base (2023) ⁽¹⁾</i>	All Other Customers	EIEC/LI
Customers (%)	68%	32%

Equity Implication

Benefits weighted more towards all other customers than EIEC/LI customers.

(1) "Ameren Illinois' Refiled Multi-Year Integrated Grid Plan." Ameren Illinois Corporation (Mar 2024). Available at <https://icc.illinois.gov/docket/P2023-0082/documents/348085/files/607904.pdf>

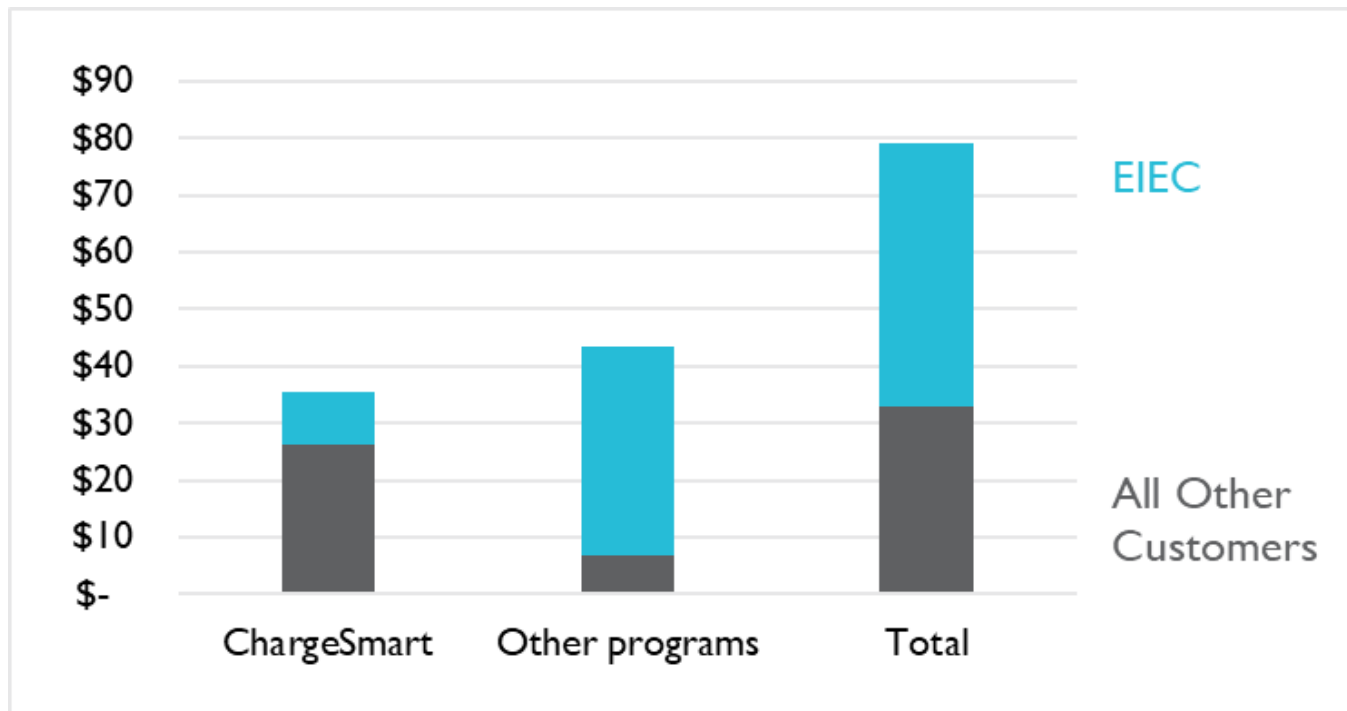
Participation data source: Derived from Ameren's BCA analysis

ChargeSmart Metric: Utility Investment

ChargeSmart represents roughly **45%** of the total BE Plan budget.*

- **26%** of the ChargeSmart budget is directed towards EIEC/LI customers

Ameren BE Portfolio Budget (2026-2028 BE Plan)



Equity Implication

Benefits weighted more towards all other customers than EIEC/LI customers.

* includes all incentive spending (including bill & delivery credits) and excludes any non-incentive spending (administrative, IT, and overhead costs).

Utility investment data source: Derived from Ameren's BCA analysis

ChargeSmart Metric: Emissions

Ameren's BE plan portfolio leads to **emissions savings*** from replacing gasoline and diesel vehicles with battery electric vehicles (BEV) and plug-in hybrid vehicles (PHEV).

Net Emissions Changes from ChargeSmart 2026-2028 (tons)

ChargeSmart	NO _x (short tons)		PM _{2.5}		CO ₂	
	EIEC/LI	All other	EIEC/LI	All other	EIEC/LI	All other
	-3.0	1.5	-0.08	0.08	-8,900	-26,750

However, emissions reductions from switching to EVs, lack a **spatial** component. We know *which* customer type is participating (EIEC/LI or other) but not *where* the emissions reductions are occurring.

For this reason, we chose to not include emissions as a metric to compare against BCA results.

Equity Implication

*Inconclusive
benefits/not enough
data to make a
conclusion.*

** Includes avoided emissions from replacing combustion vehicles, increased emissions from more energy generation, and avoided emissions from load shifting during peak periods.*

Emissions data source: Derived from Ameren's BCA analysis

ChargeSmart Metric: Changes in Electricity Rates

All customers

- The rate impact analysis from Ameren's BCA indicates that, on average, all customers will see lower rates from ChargeSmart.*
- This is due to a net reduction in electricity costs and an increase in electricity sales.

Participants

- Charging more efficiently, due to time-of-use rates, will have downward pressure on rates.
- Participants will see a reduction in rates due to the program.

Non-Participants

- Non-participants will experience lower rates because the rates for all customers are reduced.

Equity Implication

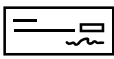
The rate changes for EIEC/LI customers and all other customers are equivalent

**Source: Derived from Ameren's BCA analysis*

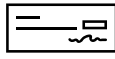
ChargeSmart Metric: Bill Impacts Overview

How customers see bill impacts from program participation.

Participant enrolls with a **new** EV....

- + Additional electricity consumption costs 
- ChargeSmart credits & charges 
- Avoided gasoline costs 
- + EV charger & installation costs 
- = Net Bill Impacts \$

Participant enrolls with an **existing** EV....

- ChargeSmart credits & charges 
- = Net Bill Impacts \$

ChargeSmart Metric: Participant Bill Impacts

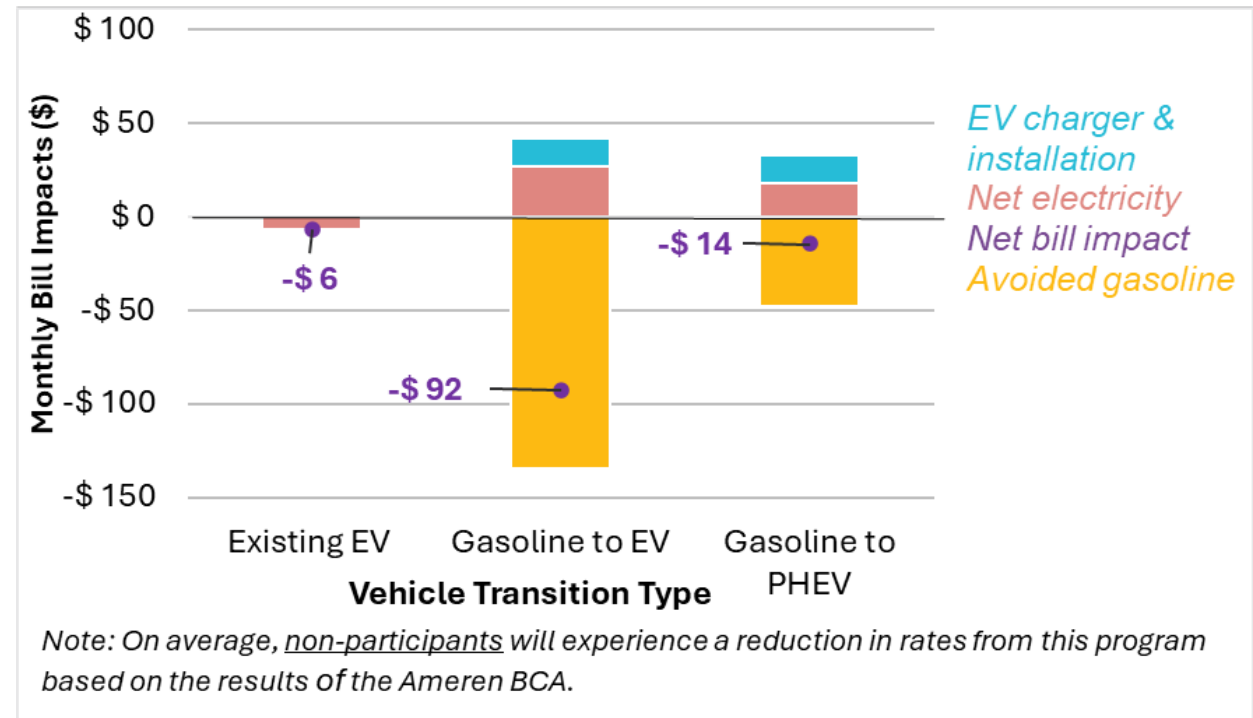
ChargeSmart participants will enroll in the program **with or without an existing EV**.

Participants that **replace** their **existing gasoline vehicle** with an **EV** will see the highest **net bill** savings.

Participants that replace their **existing gasoline vehicle** with a **plug-in hybrid electric vehicle (PHEV)** will see some **net bill savings**.

Participants that enroll with an **existing EV** will only see minor **net bill** savings due to the special EV rates and bill credits.

*First Year Monthly Bill Savings for ChargeSmart Participants**



Equity Implication

Benefits between EIEC/LI customers and all other customers are equivalent

Questions?

ChargeSmart Metric: Bill Impacts for all customer groups

All customers

- Lower rates and lower bills due to a net reduction in electricity costs and an increase in electricity sales.*

Participants

- Additional bill savings due to time-of-use rates and 1st year bill credit.

Non-Participants

- Slightly lower bills, as explained above.

Equity Implication

The bill impacts for EIEC/LI customers and all other customers are equivalent

*Source: Derived from Ameren's BCA analysis

ChargeSmart: Summary of DEA Results

Green – benefits weighted more towards EIEC/LI customers than all other customers

Yellow – benefits between EIEC/LI customers and all other customers are equivalent

Red – benefits weighted more towards all other customers than EIEC/LI customers

Gray – inconclusive benefits/not enough data to make a conclusion

Metric	Metric Unit	EIEC/LI Customers	All Other Customers
Participation	 % of participating vehicles	26%	74%
Utility investment	 % of program budget (\$)	26%	74%
Rate impacts (program-level)	\$ Relative change in rates	Rates reduced	Rates reduced
Bill impacts	 1 st year monthly bill savings	\$6-\$92/month	\$6-\$92/month

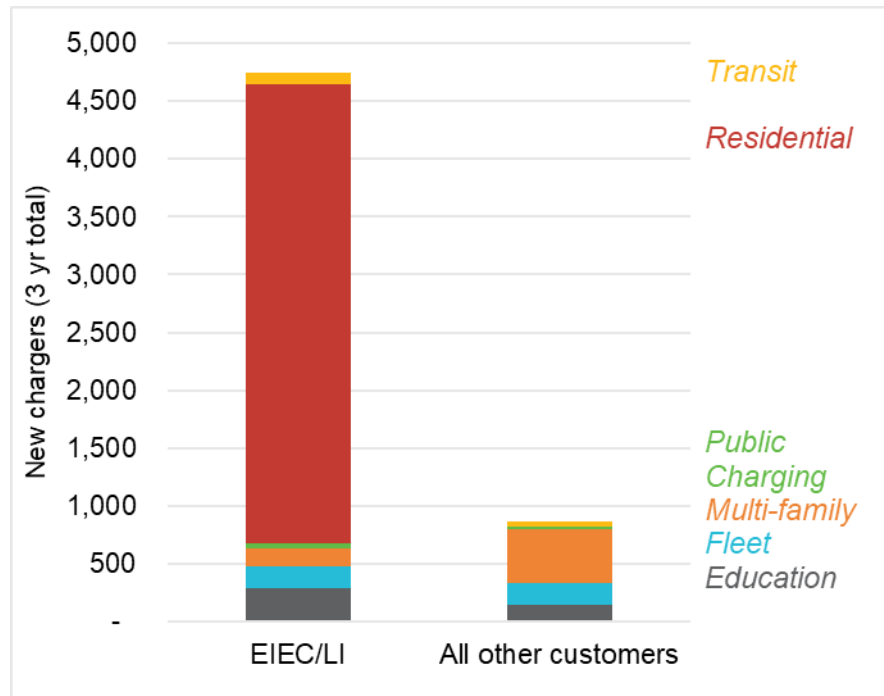
Questions?

ChargeReady DEA

ChargeReady Metric: Participation

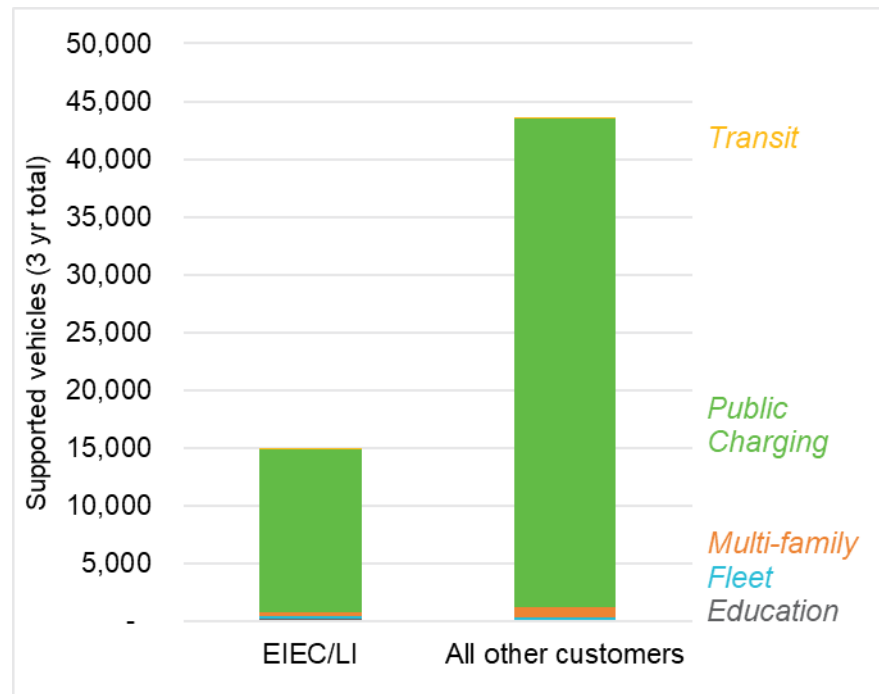
Participation is measured as: (1) number of chargers installed and (2) number of vehicles supported by chargers.

85% of all new chargers installed are planned for EIEC/LI customers.



Equity Implication
Benefits weighted more towards EIEC/LI customers than all other customers.

26% of all vehicles supported by new chargers are planned for EIEC/LI customers.



Equity Implication
Inconclusive benefits/not enough data to make a conclusion.

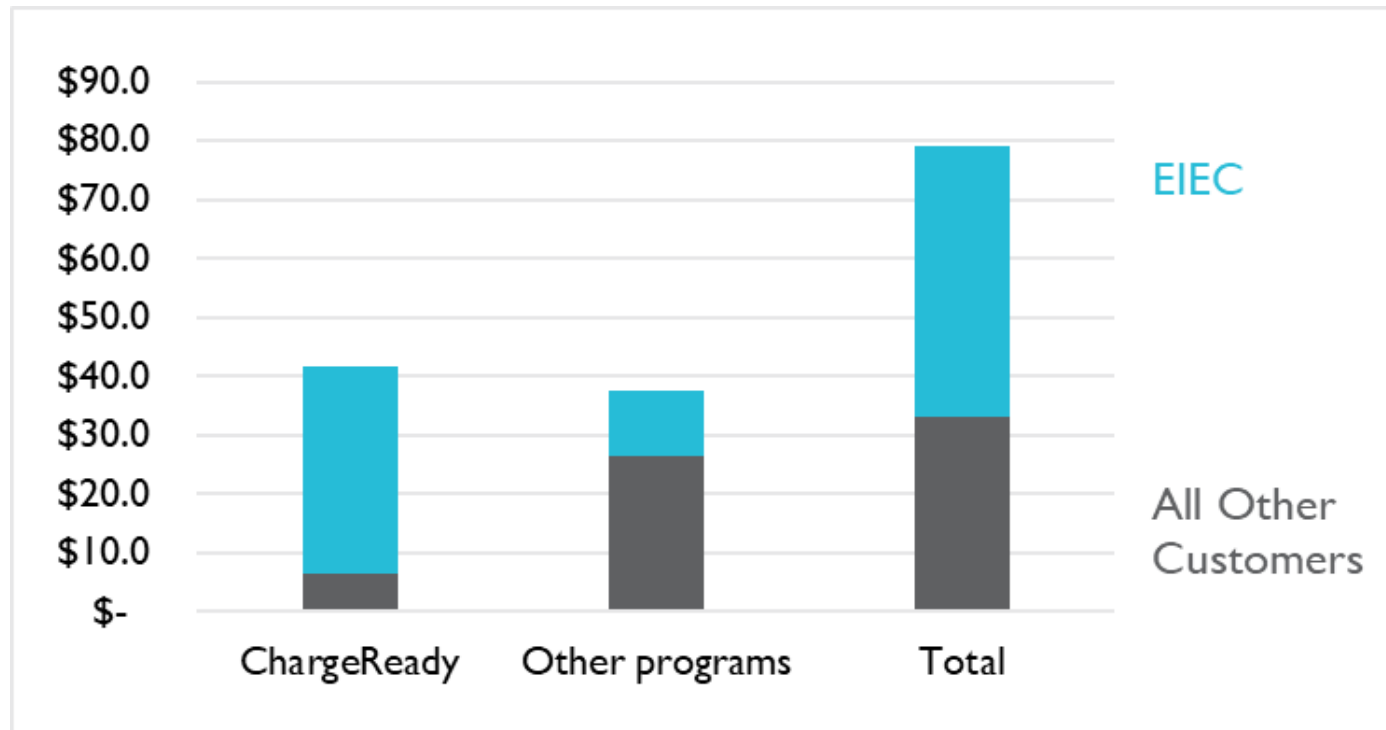
Participation data
source: Derived from
Ameren's BCA analysis

ChargeReady Metric: Utility Investment

Ameren's 3-year BE plan's electric incentive budget* is \$79 million.

84% of the ChargeReady budget is directed towards EIEC/LI customers.

Ameren BE Portfolio Budget (2026-2028 BE Plan)



Equity Implication

Benefits weighted more towards EIEC/LI customers than all other customers.

** includes all incentive spending (including bill & delivery credits) and excludes any non-incentive spending (administrative, IT, and overhead costs).*

Investment data source: Derived from Ameren's BCA analysis

ChargeReady Metric: Emissions

Ameren's BE plan portfolio leads to **emissions savings*** from replacing gasoline and diesel vehicles with battery and plug-in hybrid vehicles.

Net Emissions Changes from ChargeReady 2026-2028 (short tons)

ChargeReady	NO _x (short tons)		PM _{2.5} (short tons)		CO ₂ (short tons)	
	EIEC/LI	All other	EIEC/LI	All other	EIEC/LI	All other
	-48.1	-9.3	-0.23	0.19	-31,260	-34,750

However, emissions reductions from switching to EVs, lack a **spatial** component. We know *which* customer type is participating (EIEC/LI or other) but not *where* the emissions reductions are occurring.

For this reason, we chose to not include emissions as a metric to compare against BCA results.

Equity Implication

*Inconclusive
benefits/not enough
data to make a
conclusion.*

** Includes avoided emissions from replacing combustion vehicles, increased emissions from more energy generation, and avoided emissions from load shifting during peak periods.*

Emissions data source: Derived from Ameren's BCA analysis

ChargeReady Metric: Changes in Rates

All customers

- Higher rates from Charge Ready
- Due to a net increase in electricity costs despite an increase in electricity sales.*

Participants

- Required participation in ChargeSmart (time-of-use rates).
- Charging efficiently (during off-peak hours) will have downward pressure on rates for participants.
- It is unclear if the rate reductions will exceed the rate increases for participants.

Non-Participants

- Higher rates because the rates for all customers are increased, as described above.

Equity Implication

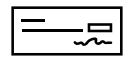
The rate changes for EIEC/LI customers and all other customers are equivalent

*Source: Derived from Ameren's BCA analysis

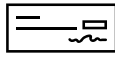
ChargeReady Metric: Bill Impacts Overview

How customers see bill impacts from program participation.

Participant enrolls with a **new** EV....

- + Additional electricity consumption costs 
- ChargeSmart credits & charges 
- Avoided gasoline costs 
- EV charger & installation costs 
- = Net Bill Impacts \$

Participant enrolls with an **existing** EV....

- ChargeSmart credits & charges 
- = Net Bill Impacts \$

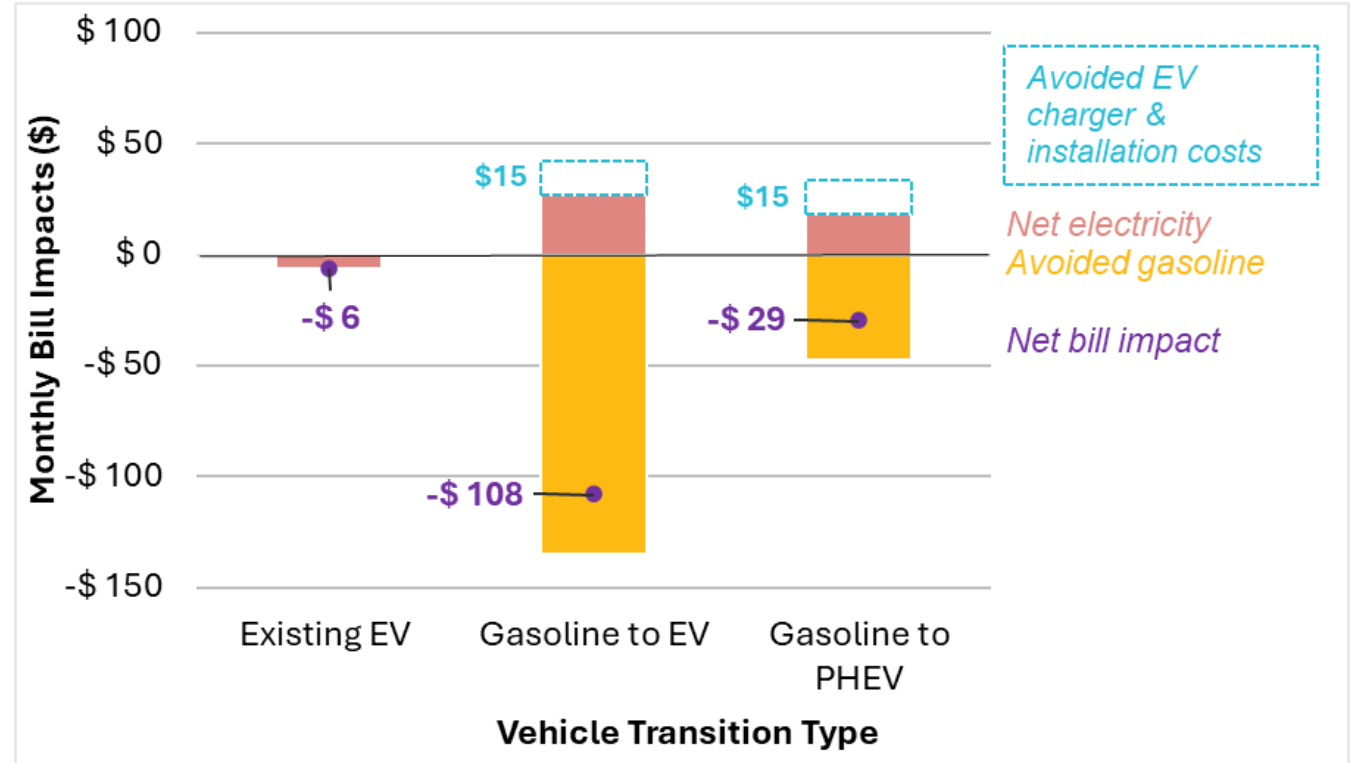
ChargeReady Metric: Participant Bill Impacts

ChargeReady's residential program covers EV charger purchase and installation costs 100% for **EIEC/LI customers**.

ChargeReady participants must **also participate in ChargeSmart**, so **increased energy costs**, delivery and bill credits, and **avoided gasoline bills** are the same as in ChargeSmart.

In sum, the EIEC/LI customers see an additional **savings of \$15** because they do not need to pay for the EV charger and installation costs.

First Year Monthly Bill Savings for ChargeReady Participants*



Equity Implication

Benefits experienced by EIEC/LI customers, but not by other customers.

Questions?

*Bill impacts data source: Derived from Ameren's BCA analysis

ChargeReady Metric: Bill Impacts for all customer groups

All customers

- Higher rates and slightly higher bills due to a net increase in electricity costs and an increase in electricity sales*

Participants

- Only EIEC/LI eligible to participate.
- Required participation in ChargeSmart (time-of-use rates).
- Lower bills due to ChargeSmart participation and ChargeReady program offerings (reimbursement for charger costs & installation).
- EIEC/LI customers see greater bill savings.

Non-Participants

- Slightly higher bills, as explained above.

Equity Implication

Benefits experienced by EIEC/LI customers, but not by other customers.

ChargeReady: Summary of DEA Results

Green – net benefits weighted more towards EIEC/LI customers than all other customers

Yellow – net benefits between EIEC/LI and all other customers are equivalent

Red – net benefits weighted more towards all other customers than EIEC/LI customers

Gray – inconclusive benefits/not enough data to make a conclusion

Metric	Metric Unit	EIEC/LI Customers	All Other Customers
Participation	 % of chargers installed	84%	16%
	 % of vehicles supported by these chargers	26%	74%
Utility investment	 % of program budget (\$)	84%	16%
Rate impacts	\$ Relative change in rates	Rates increased	Rates increased
Bill impacts	 1 st year bill monthly savings	\$6-\$108/month	-

Questions?

Stage 7: Making Resource Decisions using BCA and DEA Results

Ameren BE Plan

Key Considerations for DEA and BCA Results

- DEA case studies offer insights into distribution of BE program impacts to EIEC/Low income customers relative to other customers
- We don't have the full picture, as data gaps exist due to various factors: BE plan programs are new, and there are limitations on granularity of data (e.g., for geo-spatial mapping of metrics to Census data tracts)
- Results of BCA and DEA together can help inform decisions about program funding and program designs, where decision-making may involve more 'art' than 'science' in some cases.

Key Impacts in Benefit-Cost Analysis

Impacts included in the Total Resource Cost (TRC)

Impact Type	Impact Category	TRC Test
Utility System	Electric Energy	cost or benefit
	Electric Capacity	cost or benefit
	Program Incentives	cost
	EV Infrastructure	cost
	Program Administration	cost
Host Customer	EV Infrastructure	cost
	Gasoline	benefit
	State and Federal Tax Incentives	benefit
Emissions	CO ₂ , PM _{2.5} , NO _x , SO _x	cost or benefit

BCA answers the question:

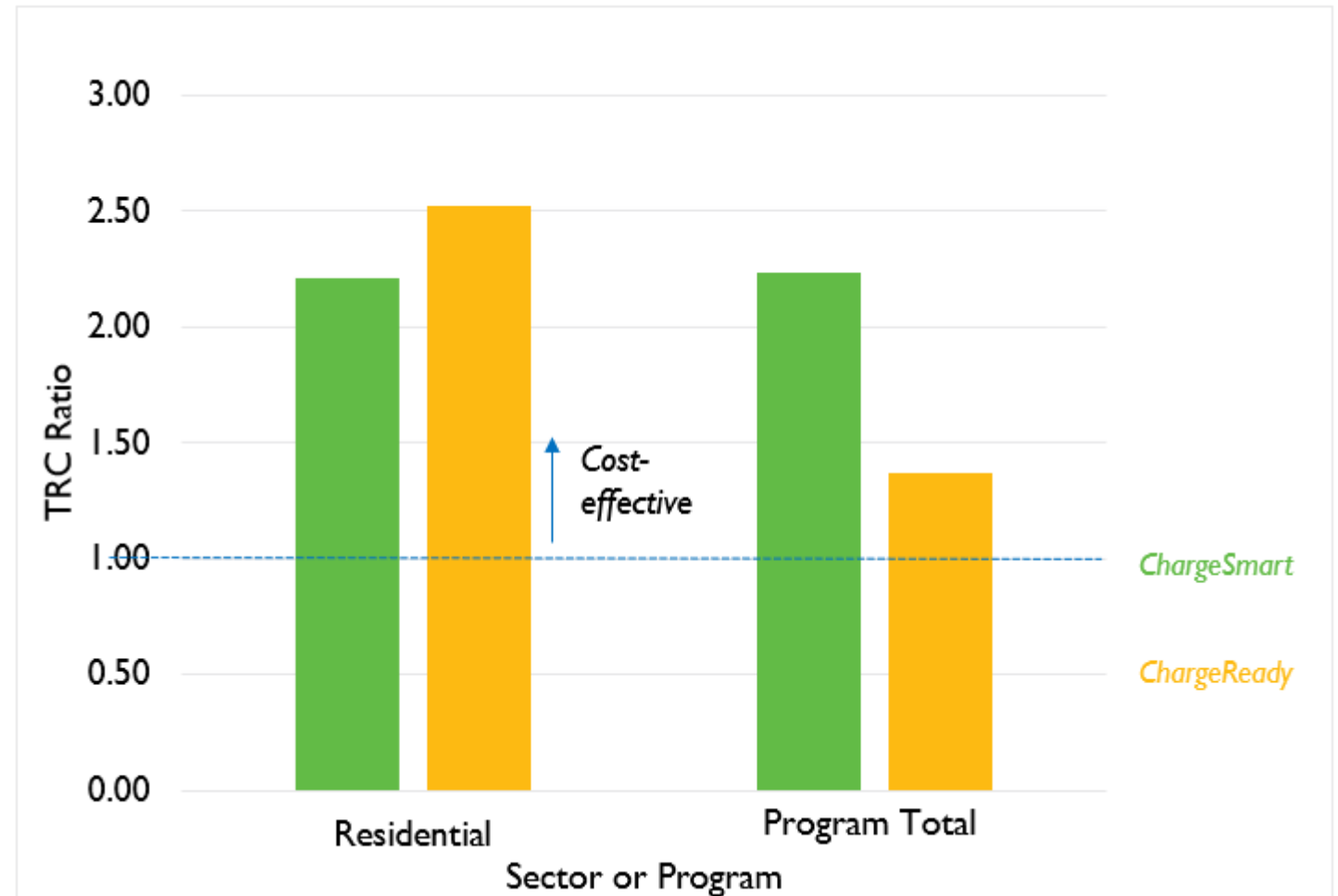
Does the DER investment bring more benefits than costs to the utility and ratepayers, as a whole?

Questions?

Ameren BE Plan – TRC test results

If **Benefits (\$)** / **Costs (\$)** ≥ 1 ,
the plan is cost-effective.

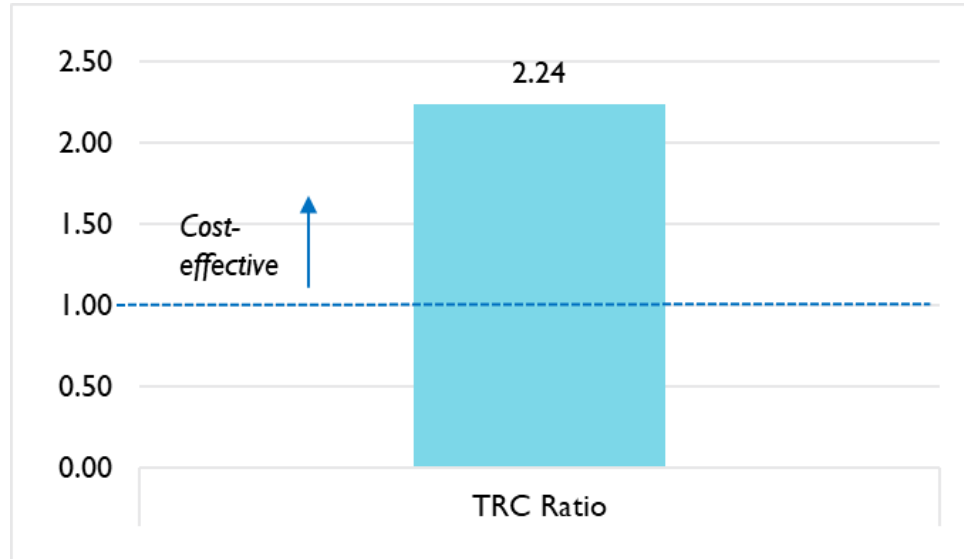
- All the ChargeSmart sub-programs are cost-effective



BCA and DEA Results

ChargeSmart: BCA and DEA Results

BCA Results



Conclusion:

ChargeSmart is cost-effective.

DEA Results

Metric		EIEC/LI	All Other
	Participation (<i>vehicles</i>)	26%	74%
	Utility investment	26%	74%
	Rate impacts (program-level)	rates reduced	rates reduced
	1 st Year Monthly Bill savings	\$6-\$92	\$6-\$92

Green – net benefits weighted more towards EIEC/LI than other customers

Yellow – net benefits between EIEC/LI and other customers are equivalent

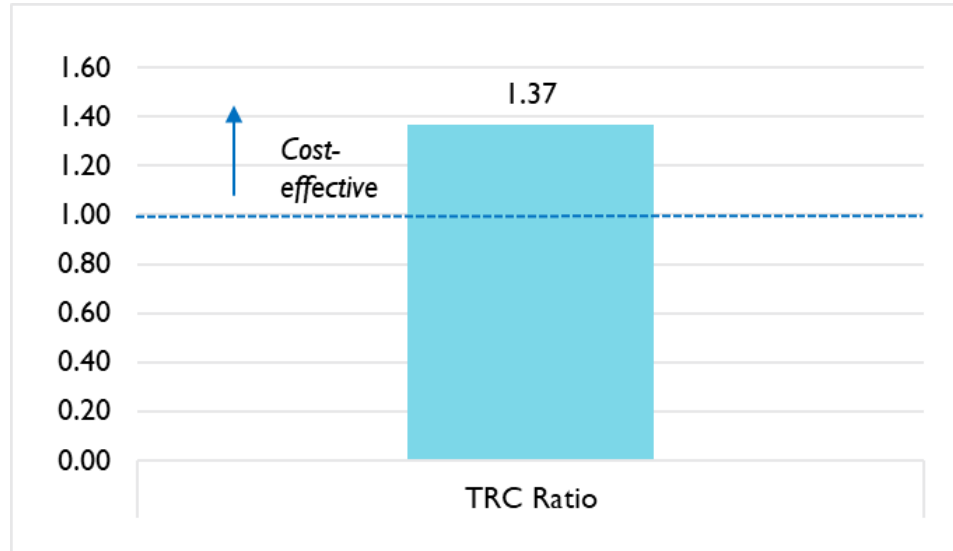
Red – net benefits weighted more towards other customers than EIEC/LI

Gray – inconclusive benefits/not enough data to make a conclusion

Questions?

ChargeReady: BCA and DEA Results

BCA Results



Conclusion:

ChargeReady is cost-effective.

DEA Results

Metric	EIEC/LI	All Other
 Participation (chargers)	84%	16%
 Participation (vehicles)	26%	74%
 Utility investment	84%	16%
 Rate impacts (program-level)	rates increased	rates increased
 1 st Year Monthly Bill savings	\$6-\$108	-

Green – net benefits weighted more towards EIEC/LI than other customers

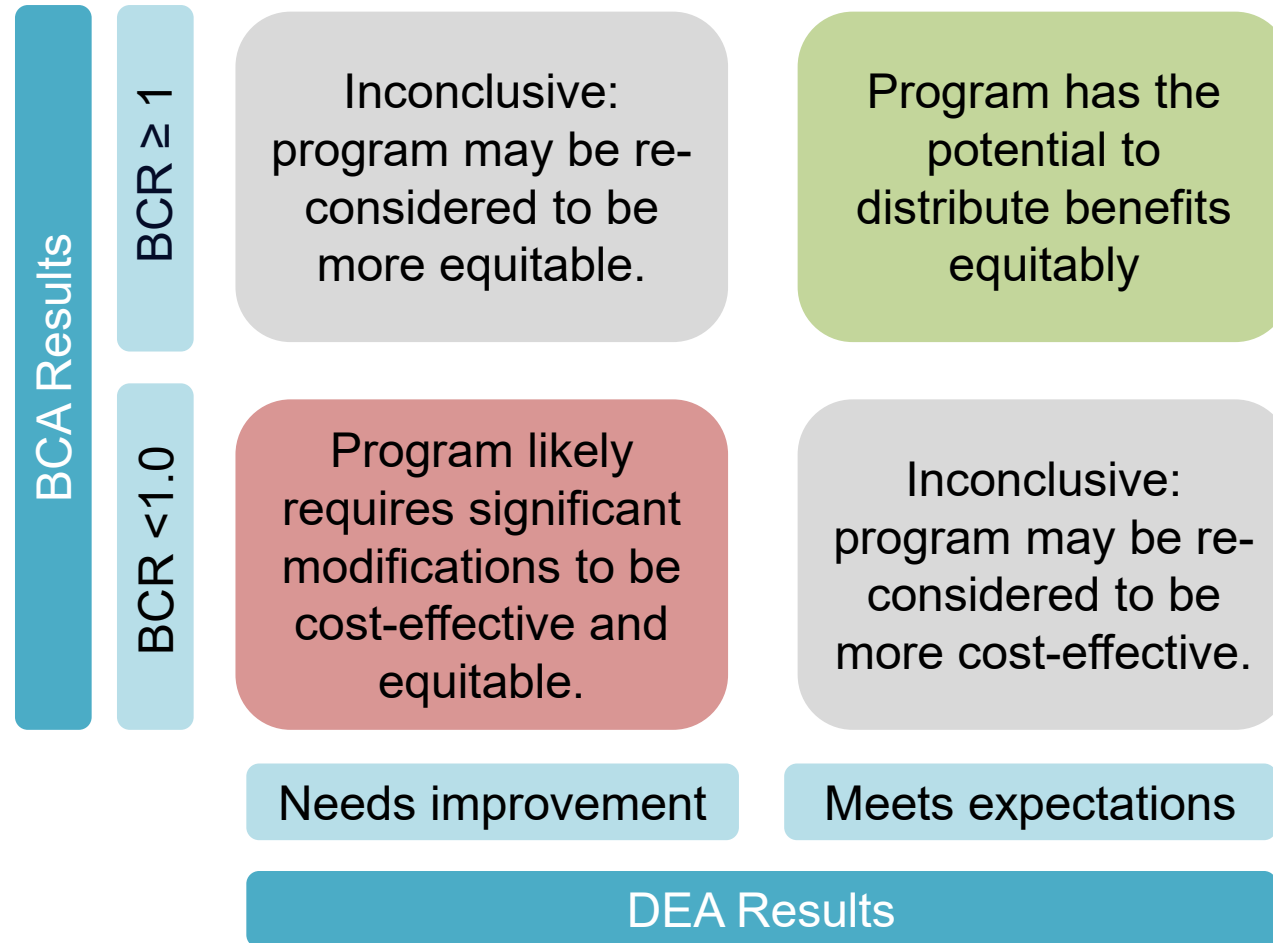
Yellow – net benefits between EIEC/LI and other customers are equivalent

Red – net benefits weighted more towards other customers than EIEC/LI

Gray – inconclusive benefits/not enough data to make a conclusion

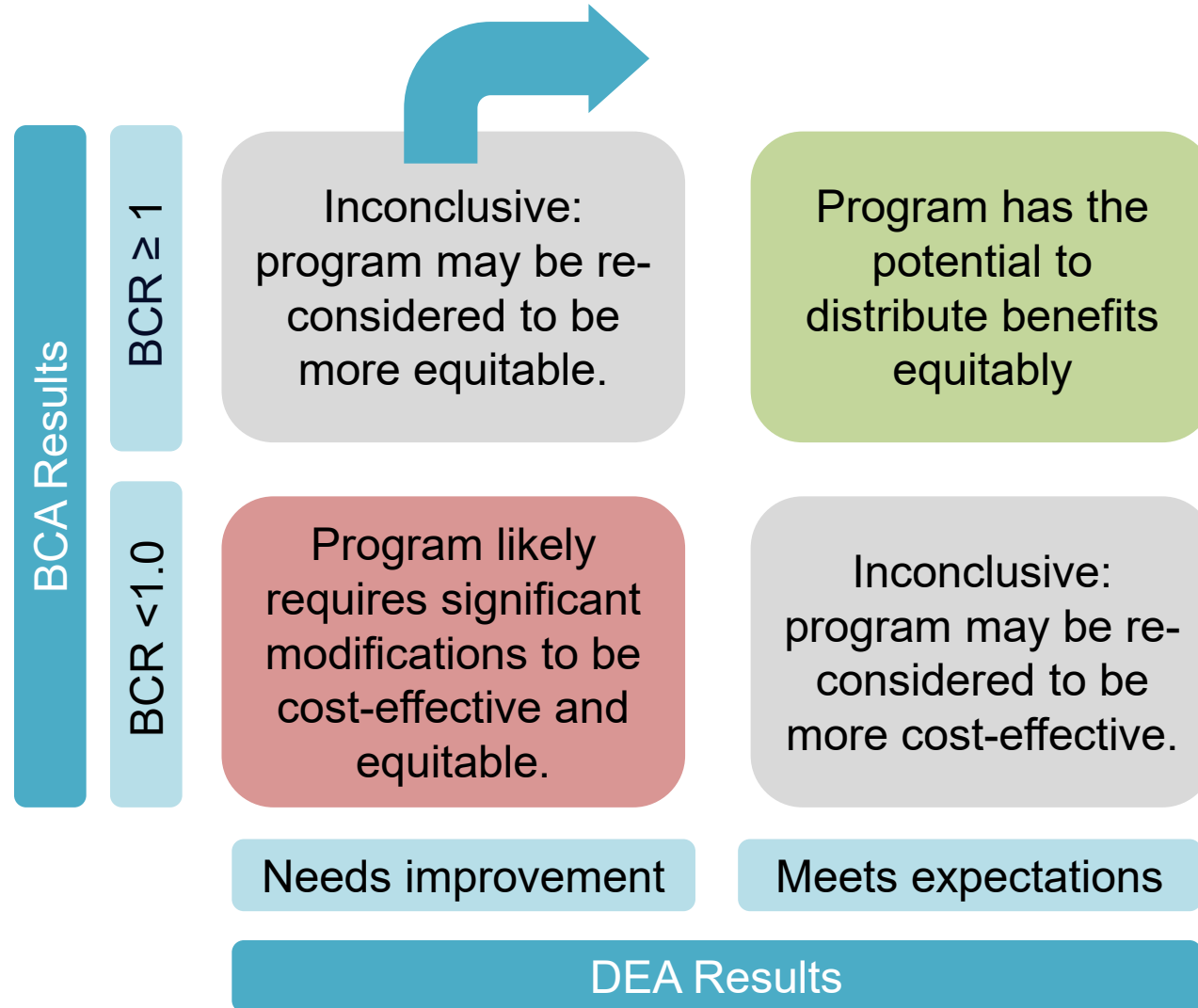
Questions?

Stage 7. Decision-Making



On the next slides, we will present our findings for where the ChargeSmart and ChargeReady programs fall in this figure.

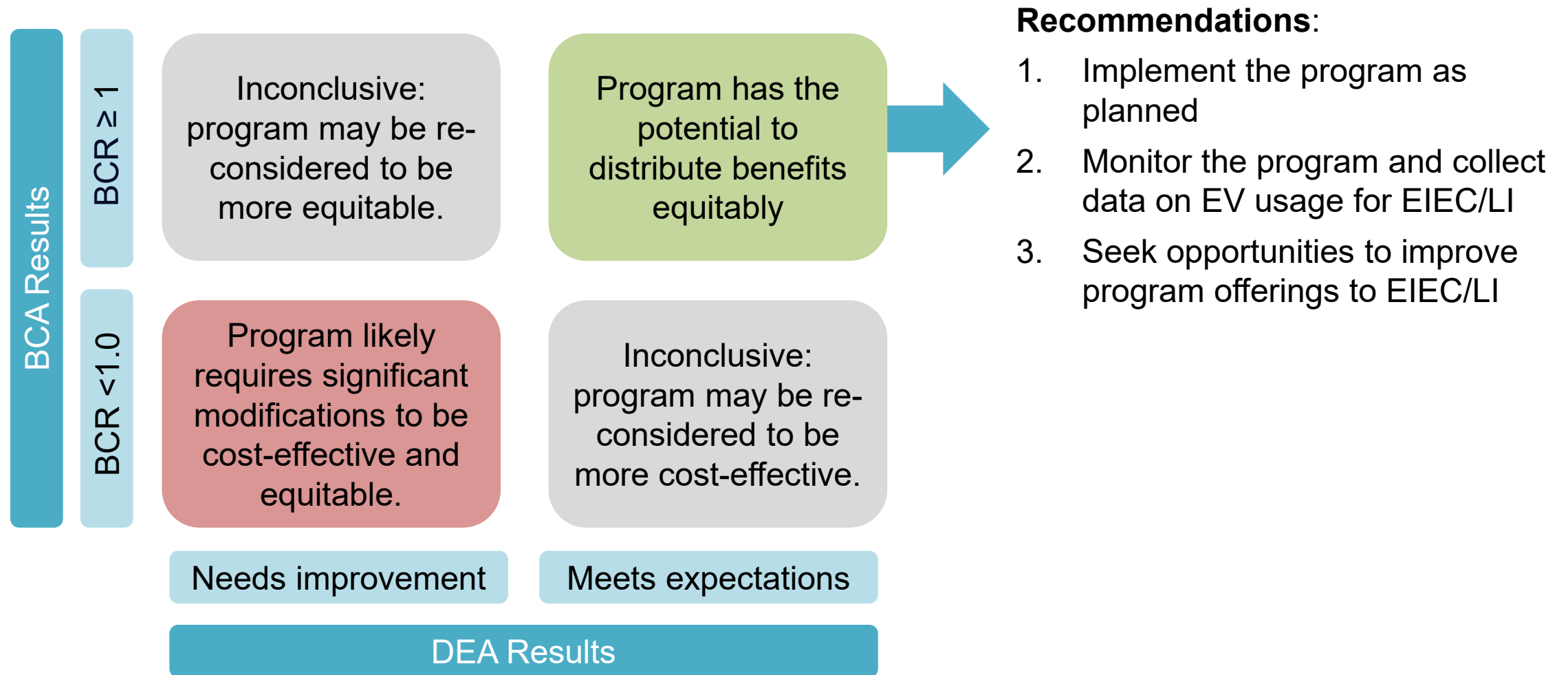
ChargeSmart



Recommendations:

1. Increase EIEC/LI participation
 - Actual participation (2023): **15.5%**
 - Assumed participation (2026-2028): **25%**
 - **32%** of Ameren's customers are EIEC/LI
2. Seek opportunities to improve program offerings to EIEC/LI

ChargeReady



Recommendations for Improving DEA

Recommendations

Research study	Overarching		Research EV usage rates and EV adoption barriers for EIEC/LI customers
Data analysis	ChargeReady		Map existing EV charger distribution and analyze charger access
Reporting	Program-level		Report participation rates for EIEC/LI customers and other customers
	ChargeSmart		Track and report EV characteristics (new, existing, PHEV, BEV)
Evaluation	Program-level		Evaluate program performance in comparison to BE Plan objectives
	Portfolio-level		Conduct a DEA on the entire Ameren BE portfolio in 2026 using actual reported program data and results
Program design	ChargeSmart		Ensure program targets full EIEC/LI EV participation potential, and implement effective education and outreach on TOU rates

Discussion: What other recommendations for data analysis, research studies, program design or evaluation do you have?

Project Schedule and Next Steps

Estimated Project Schedule and Work Group Meetings

Work Group Meeting	Approximate Date
#1 - Introduction to process, relevant policies	March 6, 2024
#2 – Proposed Case Studies & DEA Context	May 10, 2024
#3 – Priority Populations and DEA Metrics	July 24, 2024
#4 – DEA Metrics	Oct 9, 2024
#5 –Ameren BE DEA – Results I	Dec 13, 2024
#6 – Ameren BE DEA – Results II	March 13, 2025
#7 – ComEd EE DEA – Results	Late April 2025
#8 – Presentation of draft report	June 2025

Next Steps

- Our team will present ComEd data metric results at the next Work Group meeting (**late April 2025**).
- Please reach out to team with any questions/comments following this meeting (see next slide)
 - Project Coordination: Julie Michals at jmichals@e4thefuture.org
 - Lead Work Group contact: Greg Ehrendreich at gehrendreich@mwalliance.org

Thank you!

Contact Information



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Check out [NESP Events](#) for NSPM and BCA webinars

Stay informed with [NESP News](#)

Background Slides

Case Study Objectives

1. Show ICC and stakeholders **how to conduct a DEA** using existing definitions for priority populations and metrics based on statute and utility plans.
2. **Identify gaps and limitations** and options to address gaps going forward.
3. Develop stakeholder understanding on **how to use map-based resources and spatial tools** to visualize DEA metrics for priority populations.
4. Using analysis results, **demonstrate the use of DEA, alongside BCA, to guide decision-making** on DER resource investments that accounts for impacts on priority populations.

Reminder: Work Group Role and Meeting Guidelines

- Work Group Role
 - Participate in Work Group meetings – input is critical to project and is encouraged (via chat box, verbal input, follow-up emails, and/or subgroup phone calls)
 - Provide comments on DEA key methodologies, inputs, and assumptions
 - Review and comment on DEA and BCA results and draft/final case studies report
- Agendas and meeting materials will be sent in advance of meetings
- Meeting notes will be shared with Work Group
- Chatham House rule will apply
 - i.e., input shared in our meetings will not be assigned to or associated with any Work Group member or representative outside of the Work Group meetings

All Materials Posted to DEA Case Study Project Website:

DEACaseStudy.org

Project Team

Midwest Energy Efficiency Alliance

Liaison and facilitation



Gregory Ehrendreich
Manager



Natalie Newman
Sr. Policy Associate

E4TheFuture

Project management



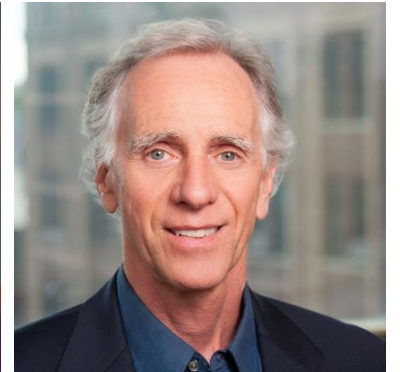
Julie Michals
Director

Synapse Energy Economics

Research and analysis



Alice Napoleon
Principal Associate



Tim Woolf
Senior VP



Recommendations: Research and data analysis

Action Type	Relevant Program(s)	Recommendation
Conduct research study	Overarching	Research current EV ownership rates
Conduct research study	Overarching	Study IL-specific EV adoption barriers for EIEC/LI customers
Data analysis	ChargeReady	Map EV Charger distribution
Data analysis	ChargeReady	Study charger access vs. charger use for publicly installed chargers

Recommendations: Evaluation and data reporting

Action Type	Relevant Program(s)	Recommendation
Evaluation/Data reporting	ChargeReady & ChargeSmart	Evaluate program performance in comparison to BE Plan objectives
Data reporting	ChargeReady & ChargeSmart	Report actual participation rates for EIEC/LI customers, other customers for each BE program and subprogram for 2023 and 2024.
Data reporting	ChargeSmart	Track and report the number of PHEV vs. BEV vehicles participating
Data reporting	ChargeSmart	Track and report the number of new EVs vs. existing EVs participating
Data reporting	ChargeReady	Track and report charger installations in urban vs. rural communities
Data reporting	Portfolio	Continue to report on workforce development initiatives
Evaluation/Data reporting	Portfolio	Track and report the participation in and impact of community outreach and customer education programs

Recommendations: Program design

Action Type	Relevant Program(s)	Recommendation
Recommendations	ChargeReady	Work to improve charger access for rural areas
Recommendations	ChargeSmart	Consider how to design program so that EIEC/LI customer participation more closely aligns with the share of EIEC/LI customers in Ameren territory
Recommendations	ChargeSmart	Use the results of research studies to ensure ChargeSmart targets full EIEC/LI EV participation potential
Recommendations	ChargeSmart	Ensure EIEC/LI customer education and outreach on time-of-use rates and available programs