Re: 20-NOI-03

To Jim Zolnierek:

Thank you for the opportunity to comment on the Notice of Inquiry 20-NOI-03 relating to transportation electrification and the impact of electric rate design.

We represent the advocacy group, The Climate Reality Project - Chicago Chapter, with the ultimate goal of decarbonization across all sectors of society. Climate change is an urgent issue that must be addressed, and our window of opportunity to avoid the worst impacts is closing quickly - within the next nine years. And as you know, transportation is now the top source of greenhouse gas emissions in the US according to the US EPA.

Though there are a number of other technologies for zero carbon transportation, the most readily available option is electric vehicles (EVs). Therefore, it is essential to incentivize rapid adoption of EVs using all possible tools, including electric utility rate design. Replacing internal combustion engine (ICE) vehicles with EVs also reduces air pollution in our communities, and is all the more reason to encourage EV adoption.

The below text outlines our responses to the questions in the NOI. The key points we would like to highlight are:

1. Electric rate design should incentivize users to adopt EVs and EV charging technology.
2. Electric rate options that help encourage EV adoption can include critical peak pricing, TOU pricing, and hourly pricing.
3. Public and private customers should have options available for rate-basing charging stations and charging infrastructure associated with the stations.
4. Charging stations and EVs should have options for interacting with the grid to provide energy and services that can improve resiliency and decrease prices.

Sincerely,

Members of the Climate Reality Project - Chicago Chapter - Vehicle Electrification Task Force

Detailed Responses

A. Rate Design Impacts on Electric Vehicle Adoption and Use

1. EV Adoption and Use by Residential Customers Living in Single-Family Housing

a. Do current electric rate designs prevent residential customers living in single-family housing from adopting and using EVs? If so, how?

Current electric rate designs in Illinois prevent residential customers generally from adopting and using EVs for a number of reasons. First, there are no specific EV rates, so consumers pay the normal cost of electricity even as they use more electricity. This could cause significant increases in electric bills, depending on the EV usage. Similarly, there is no way for EVs to interact with the grid and utilize the EV battery while it is sitting in a garage. Second, many EV owners would prefer to have time-of-use pricing to take advantage of cheap electricity hours for charging. However, the only broadly available option now is hourly pricing, which should be an option but can be more complicated for many consumers than simpler TOU pricing. Based on a recommendation from "Best Practices for Commercial and Industrial EV Rates" by Synapse Energy Economics, tiered TOU pricing can be better for end consumers due to the lower volatility and simplicity. Finally, there are no options for rate-basing the cost of vehicle chargers and infrastructure, so EV drivers are left with that large up-front cost in addition to the cost of the vehicle. This cost is often a large deterrent in driving EV adoption by many single family homes.

b. Should electric rate designs be used to encourage residential customers living in single-family housing to adopt and use EVs? Why or why not?

As mentioned in the cover letter, vehicle electrification is a key aspect of decarbonization, and we need to use every tool available, including rate design, to encourage more EV adoption. Using flexible rate design and rate-basing infrastructure can both help make EVs much more accessible to single family homes and hence significantly increase adoption.

c. If you are in favor of providing incentives through electric rate design, what specific electric rate designs can be used to motivate residential customers living in single-family housing to adopt and use EVs?

First, there should be options for EV-specific charging rates. Having a separate meter / rate for an EV charger would allow for separate EV rates, but also for options that would allow EV batteries to provide energy and services to the grid. If EV owners could be paid for these services by having separate EV rates, it could incentive EV adoption. As an example,

California's PG&E has TOU rate options for separate meters or combined meters.

Second, there should be multiple options considered and available to consumers for time-of-use pricing, including:

- Hourly pricing that is already available from ComEd and Ameren
- Peak pricing, which is also currently available from ComEd and Ameren
- Expanded options for time-of-use pricing. Currently ComEd is in a pilot phase for a 3-tier (off-peak, peak, super-peak) time-of-use pricing structure, but it is capped at a small number of people for multiple years. This option should be expanded to more consumers sooner.

Third, there should be options to rate-base the EV charging infrastructure. This could be at 100% rate or split between the rate base and the charging infrastructure owner. The cost of installing an EV charger can be significant - up to a few thousand dollars - so allowing a consumer to rate-base some or all of that cost can help incentivize them to make the EV purchase. This includes rate-basing the upgraded electric service required to install the charger. Although outside the scope of rate base, policies should be implemented to require new construction to have electric infrastructure for EVs in garages, as that will lessen the requirement to fix electric service after the fact.

d. How do electric rate designs used to encourage single-family residential customers to adopt and use EVs affect the affordability of electric service for other electricity users?

The cost of rate-basing charging infrastructure is spread over other electricity users, but can be relatively minor. For example, in Maryland in 2018, utilities proposed rate-basing 24,000 charging stations, at a cost of roughly 25 to 42 cents per ratepayer per month. In addition, if EVs can be used to provide demand response and grid services, that could provide cost reductions in overall electricity costs for other users. Finally, if EV adoption gets large enough and electricity use grows accordingly, it distributes fixed costs over more kWh, which has the ability to reduce costs across the board for all other consumers. This is especially true if EV users are incentivized to charge during off-peak times with TOU rates. As an example, a study done by Synapse Energy Economics showed that between 2012 and 2019, EV drivers in California paid $806M more in revenues than cost of service, which reduced rates for all other customers.

2. EV Adoption and Use by Residential Customers Living in Multi-Family Housing
    a. Do current electric rate designs prevent residential customers living in multi-family housing from adopting and using EVs? If so, how?

        Current electric rate designs do prevent residential customers in multi-family housing from adopting and using EVs. The same concerns above with regard to TOU pricing and interaction with the grid apply. Additionally, many customers living in multi-family housing are renters and their landlords have little incentive to install expensive charging infrastructure. Also, as renters, they may move around often, and having an electric car significantly reduces options.

    b. Should electric rate designs be used to encourage residential customers living in multi-family housing to adopt and use EVs? Why or why not?

        Yes. A significant portion of Illinois residents live in multi-family homes, but still own cars. Again, EV adoption is a critical aspect of electrification and decarbonization and can't only be a choice for those who can afford to live in single family housing. Though other policies are also required to encourage EV adoption, electric rate designs are important as well.

    c. If you are in favor of providing incentives through electric rate design, what specific electric rate designs can be used to motivate residential customers living in multi-family housing to adopt and use EVs?

        Similar incentives should apply to multi-family housing as single-family housing. Time-of-use rates should be easy and accessible, and it should be possible for electric vehicles to interact with the grid and receive payment for that service. In addition, rate-basing charging infrastructure would make it possible for landlords and developers to install chargers without significant cost. There may need to be additional meters installed, depending on how electricity is billed, but this could also be rate-based in certain situations. If enough multi-family housing units pursued this strategy, especially in larger towns and cities, it could over time remove concerns by renters about purchasing electric vehicles.

    d. How do electric rate designs used to encourage multi-family residential customers to adopt and use EVs affect the affordability of electric service for other electricity users?

        See answers above. Rate-basing charging infrastructure would minimally raise costs, and over time additional EV adoption would reduce rates for everyone.

3. EV Charging by Employees at the Workplace
    a. Do current electric rate designs prevent businesses from installing EV charging infrastructure for their employees or employees from charging EVs at their workplaces? If so, how?

        In general, we would expect a small number of drivers would need to charge EVs at the workplace. An NREL study in Colorado showed that with the average EV charging load profile, only 2-6% of drivers would charge at the workplace. As a result, specific rate structures (i.e. TOU) have less of an impact on how employees would choose to charge at work.

        That being said, allowing rate-basing for charging infrastructure at businesses under certain conditions could help alleviate that cost for businesses and allow them to install charging infrastructure as requested by their employees.

    b. Should electric rate designs be used to encourage businesses to install charging infrastructure and for employees to charge EVs at their workplaces? Why or why not?

        Yes, though it will have a smaller impact on overall EV adoption. Making EV charging easier across the board is important for higher long-term EV adoption.

    c. If you are in favor of providing incentives through electric rate design, what specific electric rate designs can be used to motivate businesses to install charging infrastructure and for employees to charge EVs at their workplaces?

        Specific rate designs aren't as important, but the ability for utilities to rate-base charging infrastructure can eliminate likely barriers for workplaces to install the infrastructure, especially smaller businesses.

    d. How do electric rate designs used to incent businesses to install charging infrastructure and for employees to charge EVs at their workplaces affect the affordability of electric service for other electricity users?

        This will impact affordability in ways similar to above. However, since charging at work is typically during the day, this charging may happen at peak times and cost more to supply, slightly driving up cost. This is expected to be a small portion of the time, as mentioned above.

e. Provide examples of rate designs employed in other states or jurisdictions that successfully incentivized business to install charging infrastructure for employees and/or customers.

We didn't find any specific examples in our research.

4. EV Fleet Adoption and Use by Businesses

a. Do current electric rate designs prevent business customers from adopting and using EV fleets? If so, how?

Yes, EV fleet adoption by businesses is typically a cost decision. There are some opportunities to optimize cost by utilizing hourly pricing, but having more options to monetize EV assets would cause more businesses to adopt EV fleets.

b. Should electric rate designs be used to encourage business customers to adopt and use EV fleets? Why or why not?

Electric rate designs should not necessarily encourage businesses to adopt and use EV fleets; however, as EV technology becomes more prevalent it behooves electricity utilities to design rates so that they can control loads, prevent critical peaks, and shape customers' demand response. Electric rate design that achieves these aims also encourages EV fleet adoption.

c. If you are in favor of providing incentives through electric rate design, what specific electric rate designs can be used to motivate business customers to adopt and use EV fleets?

Electric rate design for EV fleets should incorporate dynamic pricing models such as TOU, critical peak pricing, and hourly pricing. EV fleets have some flexibility regarding their charging schedule and can coordinate with TOU pricing to charge when loads are lower. In this way, the electricity utility can avoid critical peaks and high demand periods. Additionally, if EV fleets could receive payment for these services, it would help businesses to adopt.

d. How do electric rate designs used to incent business customers to adopt and use EV fleets affect the affordability of electric service for other electricity users?

Dynamic electric rates allow utilities to better control demand response and prevent critical peaks in load and cost that would otherwise occur. Also, increasing fixed costs across more load has the effect of reducing costs for other users, if charging is done at low-cost times.

5. EV Charging Station Deployment by Businesses for Customer Use

    a. Do current electric rate designs prevent businesses from deploying charging equipment for customer use? If so, how?

    Similar to workplace charging, a small amount of EV charging would be expected to happen in public. An NREL study in Colorado showed that with the average EV charging load profile, only 4-11% of drivers would charge at public charging stations, which would include chargers at businesses for customer use. As a result, specific rates structures (i.e. TOU) have less of an impact on how employees would choose to charge at work.

    b. Should electric rate designs be used to encourage businesses to deploy charging stations for use by their customers? Why or why not?

    Public charging provided by businesses for customers is such a small portion of EV charging that electric rate designs will have little effect on end-user charging behavior.

    Other factors have a greater effect on a business' motivation to provide EV charging for customers. How long a customer will be on the premises, the distance a customer is from home, and whether the access to a charging station while on business premises will encourage more customers will be more important motivators to a business than electric rate design.

    c. If you are in favor of providing incentives through electric rate design, what specific electric rate designs can be used to motivate businesses to deploy charging stations for use by their customers?

    No comment at this time.

    d. How do electric rate designs used to incent businesses to deploy charging stations for the use of their customers affect the affordability of electric service for other electricity users?

    No comment at this time.

6. EV Charging Station Deployment by Units of Government

    a. Do current electric rate designs prevent units of government from deploying charging equipment for public use? If so, how?

Yes, current electric rate designs prevent units of government from deploying charging equipment for public use by having an inefficient rate structure that makes calculating the cost of the electric service difficult. Rate structures based on demand pricing and TOU pricing are ineffective for public charging equipment and prevent their implementation.

b. Should electric rate designs be used to encourage units of government to deploy charging equipment for public use? Why or why not?

   Yes, electric rates should be designed to provide incentives to encourage units of government to deploy charging equipment for public use. Units of government have an imperative to make decisions that are best for their constituents. In this case, providing charging equipment for public use has multiple benefits. Increased opportunities to charge an electric vehicle leads to a shift to more EVs, reduced air pollution, and improved public health.

c. If you are in favor of providing incentives through electric rate design, what specific electric rate designs can be used to motivate units of government to deploy charging equipment for public use?

   In this case, charging equipment designed for public use would be best incentivized with as stable a rate as possible. Dynamic rates such as TOU pricing, hourly pricing, and critical peak pricing lead to difficulties in determining the cost to the public and will make public charging equipment unattractive to EV owners as their pricing structure would be too complicated. Also, the capital cost of the charging infrastructure is often a large barrier for governments pursuing charging station deployment. Therefore, a flat electric rate that recovers the cost of the charging infrastructure and equipment is the best motivation to deploy charging equipment for public use.

d. How do electric rate designs used to incent units of government to deploy charging equipment for public use affect the affordability of electric service for other electricity users?

   The flat rate design may cause electric service to be less affordable for other electricity users if their electric rate is based largely on demand charges. However, by recovering the costs of the electrical infrastructure in the flat rate of public charging stations, other electricity users can see their portion of the infrastructure costs reduced.

7. EV Adoption by Units of Government

a. Do current electric rate designs prevent units of government from adopting EV fleets (e.g., school buses, mass transit) for public use? If so, how?

Yes, current electric rate designs prevent units of government from adopting EV fleets. EV fleet adoption is currently financially infeasible due to its large upfront costs. Governments have financial difficulty both purchasing electric fleets and at the same time providing the upfront cost of the charging infrastructure.

b. Should electric rate designs be used to encourage units of government to deploy EV fleets (e.g., school buses, mass transit) for public use? Why or why not?

Electric rate designs should be used to encourage units of government to deploy EV fleets for public use. Incentives through electric rate design would lower barriers of entry for lower income municipalities and save taxpayer money. EV fleets should be deployed by units of government for their social and environmental benefits: lower levels of air pollution that lead to respiratory illnesses.

c. If you are in favor of providing incentives through electric rate design, what specific electric rate designs can be used to motivate units of government to deploy EV fleets (e.g., school buses, mass transit) for public use?

Dynamic pricing such as TOU, critical peak, and hourly pricing would be attractive for units of government because EV fleets such as school buses, postal service vehicles, and public transit vehicles are driven at a set schedule. EV fleets can adjust their charging schedule to coincide with off-peak periods. Rate-basing the charging infrastructure that would be used for these public EV fleets would lower the capital cost burden and remove a barrier to fleet electrification.

d. How do electric rate designs used to incent units of government to deploy EV fleets (e.g., school buses, mass transit) for public use affect the affordability of electric service for other electricity users and the affordability of public transit.

Electric rate designs used to incent units of government to deploy EV fleets makes public transit more affordable by reducing operating costs of EV fleets. By rate-basing transit charging infrastructure, this helps ease

the burden of large capital costs and can allow transit agencies to focus on transitioning to lower cost electric fleets more quickly. Getting to electric fleets more quickly means lower fuel and maintenance costs, which are direct savings that can be passed on to public transit riders.

They also make the electric service for other electricity users more affordable by offering incentives to reduce peak loads on the system. As EV fleets become more common, these incentives will be essential in reducing critical peak pricing and ensuring electric service remains affordable for other electricity users.

8. Commercial Charging Station Providers (used: Best Practices for Commercial & Industrial EV Rates)
    a. Are current electric rate designs a barrier to the deployment of public EV charging by commercial charging station providers? If so, how?

       Demand charges present a significant barrier to the deployment of public EV charging stations. Studies suggest that demand charges can significantly affect the pace of build-out for commercial charging station providers.

       An NREL study estimates that the average load factor in existing fast charging stations in Colorado is 2%. Highly utilized stations in California have estimated average load factors of 15-20%, and only a few have average load factors of >50%. At low utilization and at current rate designs, demand charges dominate the monthly utility bills.

    b. Should electric rate designs be used to encourage the deployment of public EV charging by commercial charging station providers? Why or why not?

       Yes, electric rate designs should encourage the deployment of public EV charging by commercial charging station providers. EVs are limited in their range by their battery size, and cannot compete with ICE vehicles without access to public EV charging. However, EVs are a growing portion of the vehicle market and electric rate designs need to adapt as they become more common. Early adaptation of rate design will enable better demand control as electricity usage grows in conjunction with EV usage.

    c. If you are in favor of providing incentives through electric rate design, what specific electric rate designs can be used to motivate the deployment of public EV charging by commercial charging station providers?

As discussed in 6c, a flat rate would be the best rate design for commercial charging station providers. Electric rates need to be structured in such a way that enables end users to modify their behaviors based on the pricing. Dynamic pricing does not allow businesses to do this- they have very little control over when their station is used or by how many people. Dynamic pricing creates unnecessary complications in assessing the cost of operating a commercial charging station, and is not popular with EV owners as they prefer stable and predictable prices. Therefore, TOU, hourly pricing, or critical peak pricing should be minimized as much as possible.

As EV owners are currently less common, commercial charging stations create less load than the infrastructure they require is equipped to handle. Therefore, the largest expense in commercial charging stations is the cost of the infrastructure and equipment. Therefore, designing a rate that is largely based on a fixed rate that covers the cost of infrastructure is the best incentive for commercial charging stations.

Examples of stable rate structures for commercial charging stations can be found in different areas of the country. The Village of Akron and PSEG Long Island have chosen an energy-only rate with monthly energy consumption thresholds (PSEG Long Island's threshold is <2,000 kWh while the Village of Akron's is <7,500 kWh). Hybrid rates with peak power threshold classes (50, 60, 75, 100, or 200 kW) and monthly energy consumption threshold have also been adopted, and a rate limiter with maximum allowable rate that customers can be charged has been adopted in California. These rate structures allow commercial charging station providers to predict monthly electricity bills and will encourage charging station use while controlling demand peaks.

d. How do electric rate designs used to incent the deployment of public EV charging by commercial charging station providers affect the affordability of electricity service for other electricity users?

Electric rate designs that require commercial charging stations to pay a larger percentage of the necessary infrastructure and equipment would decrease the flat rate for infrastructure for other electricity users. For many years before EV technology becomes more prevalent, commercial charging stations will account for a smaller portion of the electric load and will have little impact on the affordability of demand rates.

9. Low to Moderate Income Customer EV Adoption and Use

a. Do current electric rate designs present a barrier to the adoption or use of EV technology by low to moderate income citizens? If so, how?

Yes, currently all the upfront cost of purchasing an electric vehicle charger for your home and the cost of the electric vehicle would all land on the consumer. Even though the total cost of ownership of electric vehicles can often be less than a typical ICE vehicle, low to moderate income consumers often make decisions based on the up-front sticker price. The cheapest electric vehicles on the market are $30,000. Even with the $7500 federal tax credit, which low to moderate income consumers may be less likely to be able to take advantage of, the ultimate cost would be $22,500. Adding in the hassle and the cost of the vehicle charger, which could cost anywhere from $1000 - $10,000 depending on electrical upgrades required, encourages low-income consumers to stay with ICE vehicles.

Additionally, low / moderate income citizens often live in multi-unit buildings, where they would not necessarily be able to easily install their own EV chargers as mentioned in section 2.

b. Should electric rate designs be used to encourage the use of EV technology by low to moderate income citizens? Why or why not?

Ultimately, yes. But, in general, the electric rate designs should be used to encourage the use of EV technology more broadly. This could help lower the cost of these technologies, inspire new business models, and generally expand installations of the required infrastructure (i.e. public charging). This would then open the door for more mass-market electric vehicle access in the future.

Also, see above for multi-unit buildings. If utilities install charging infrastructure, there should be defined requirement for inclusion in low-income and multi-unit buildings to provide universal access.

Additionally, electric rate designs could be used with the regional transit organizations (i.e. CTA, PACE) to electrify public transit. Low to moderate income citizens are often take advantage of public transit. Having a less polluting form of public transit available provides a benefit to low / moderate income citizens even if they can't afford to own their own electric vehicle at this time.

c. If you are in favor of providing incentives through electric rate design, what specific electric rate designs can be used to motivate the use of EV technology by low to moderate income citizens?

Again, electric rate designs don't necessarily need to target low to moderate income citizens, but they should make EVs more accessible overall and encourage adoption of electric public transit.

In addition, if charging infrastructure is rate-based, infrastructure should be made available to low and moderate income neighborhoods in the same way it would be in high income neighborhoods.

One specific shorter term option could be to give utility bill credits to low-income households that charge an EV. This could help increase EV accessibility and encourage low to moderate income citizens to adopt EV technology.

d. How do electric rate designs used to incent use of EV technology by low to moderate income citizens affect the affordability of electric service for other electricity users?

   See answers above.

e. Are there other ways to provide benefits from EVs to low to moderate income citizens?

   In general, EVs can provide benefits by reducing air pollution and noise in the areas they are driven. Often, low to moderate income neighborhoods are the ones most heavily trafficked by polluting vehicles. Encouraging EV adoption will in turn decrease overall pollution and noise in these areas. Directing EV adoption specifically at businesses that operate in these neighborhoods (i.e. warehouse operators) can provide more pointed benefits for low to moderate citizens.

10. Environmental Impacts of EV Use

a. Do current electric rate designs prevent customers from using EVs in a manner that has a positive environmental impact? If so, how?

   Hourly and TOU rates tend to encourage usage during off-peak times, when the historically more efficient generating units are operating, indirectly having a positive environmental impact. This will ultimately depend on specific grid resource make-up (i.e. as solar gets more common, peak and off-peak prices may shift around).

b. Should electric rate designs be used to encourage customers to use EVs in a manner that has a positive impact on the environment? Why or why not?

Yes. They should be used to encourage customers to charge EVs during low-demand / low cost times, or even incentivize EV owners to make their batteries available for grid services when charging. That encourages the use of EVs without significantly raising cost or strain on the grid. This has the effect of shifting use to lower emission sources (i.e. baseload nuclear and excess solar) and preventing more polluting peaking plants from turning on.

c. If you are in favor of providing incentives through electric rate design, what specific electric rate designs can be used to motivate customers to use EVs in a manner that has a positive impact on the environment?

   See above examples.

d. How do electric rate designs used to incent customers to use EVs in a manner that has a positive impact on the environment affect the affordability of electric service for other electricity users?

   See above. TOU and hourly pricing, or grid services incentives should encourage use at lower cost times, which should not have a significant impact on affordability of electricity, until a much larger penetration of EVs where more capital investments from the utility may be required.

11. EV Use Impacts on Grid Costs

a. Do current rate designs incent customers to use EVs in a manner that reduces grid costs (e.g., distribution costs, transmission costs, capacity costs)?

   TOU and hourly pricing from ComEd help reduce costs by more efficiently utilizing the existing infrastructure - generation, transmission, and distribution.

b. Should electric rate designs be used to incent customers to use EVs in a manner that reduces grid costs? Why or why not?

   Yes, this should be the goal, to encourage EV adoption without causing significant cost increases for others. Poorly designed TOU pricing and significant EV penetration could cause a 2nd peak in the middle of the night which could have a negative impact on grid costs and environmental effects. TOU pricing would need some delay or variability amongst customers to not encourage this behavior.

Building out charging infrastructure and rate-basing could increase costs, but in the long run it should reduce costs by spreading those costs out over a larger amount of load.

c. If you are in favor of providing incentives through electric rate design, what specific electric rate designs can be used to encourage customers to use EVs in a manner that reduces grid costs?

   See above. All previously mentioned variable pricing, grid interactions, and build-out of charging infrastructure all have the net long-term effect of reducing grid costs.

d. How do electric rate designs used to incent customers to use EVs in a manner that reduces grid costs affect the affordability of electric service for other electricity users?

   Reducing grid costs should generally have a positive benefit.

12. EV Use Impacts on Reliability and Resiliency

a. Do current electric rate designs prevent customers from using EVs in a manner that has a positive reliability and resiliency impact on the grid? If so, how?

   There aren't currently any options for using EV batteries to provide regulation or demand response on the grid.

b. Should electric rate designs be used to encourage customers to use EVs in a manner that has a positive reliability and resiliency impact on the grid? Why or why not?

   Yes, rate design has the potential to improve grid reliability and resiliency without significant additional costs.

c. If you are in favor of providing incentives through electric rate design, what specific electric rate designs can be used to motivate customers to use EVs in a manner that has a positive reliability and resiliency impact on the grid?

   Chargers installed by the utility should be able to automatically interact with the grid under certain circumstances (if rate-based). Or, if you install a charger, you should be able to receive a bill credit for access and services provided by the EV battery.

d. How do electric rate designs used to incent customers to use EVs in a manner that has a positive reliability and resiliency impact on the grid affect the affordability of electric service for other electricity users?

If EVs are used to help provide regulation or energy services, that can help offset expensive power that would get on the grid and can reduce costs for other electricity users.

13. EV Rate Design Principles

a. Are there examples of rate design principles or rate designs, not addressed above, that would result in EV adoption or use in a manner that would be in the public interest? If so, please explain.

The rate designs and principles we are aware of are discussed above.

b. Are there examples of other mechanisms that may be used in conjunction with rate designs (e.g., pairing load management with rate design) that would result in EV adoption or use in a manner that would be in the public interest? If so, please explain.

Pairing load management with rate design would be the ideal situation. Allowing EV batteries to interact with the grid for a fee would improve the value proposition of EVs and encourage more adoption. This would be applicable across all categories of EV users.

c. Please provide examples of rate designs employed in other states or jurisdictions that might serve as best practices with respect to EV adoption or use in Illinois.

- According to an NREL presentation for the Colorado Public Utilities Commission, TOU rates nationally that are “opt-out” have >90% participation, whereas “opt-in” programs have <20%. A shift to “opt-out” programs can drastically expand TOU pricing across the state.
- Toronto Hydro completed an EV pilot where EVs could interact with the grid and was successful in using batteries to reduce demand and provide grid flexibility. Level of participation depended on how consumers set their opt-out preferences early on.
- Eversource in Massachusetts completed an EV pilot where they were able control charging rates for various EVs on the system. A rebate was provided to EV owners for providing this service, which was a key portion of the program. People were generally willing to allow control of their batteries and there were very few overrides.

- As mentioned above, California PG&E has multiple TOU rate options for both standalone EV systems and combined EV & home meters.
- Many other utilities have pilots or full programs, including Southern California Edison (CSE), San Diego Gas & Electric (SDG&E), Xcel in Colorado, Pepco in Maryland, and Coned in New York.

C. Rate Design Implementation

1. Please identify any rate design changes that you would recommend be adopted in Illinois, including the rate design changes addressed above.

    - Expand use of TOU pricing outside of the pilot program
    - Rate-basing charging infrastructure for public use and certain situations for private customers
    - Separate EV charging station pricing
        - Minimize demand charges
        - Opt-out TOU pricing for EVs
    - Ability for utilities to utilize EV batteries for load control in exchange for lower rates or bill credits
    - Locational pricing to help minimize inequity from one location to another

2. For any rate design change you recommend be adopted, please explain the process required to adopt such rate design change (e.g., requires a change in law, requires a change in Commission rules, requires a tariff change, etc.).

    As we don't have the background to comment on all the procedural and legal specifics of the potential policies, the focus of our submission is to emphatically support rate design as a key tool in encouraging EV adoption across Illinois and provide some examples of how it may work. Similar policies to what we have mentioned have been enacted in other states, so we believe everything we have recommended is easily within reach.

3. Please identify how your recommended rate design changes may affect low to moderate income citizens.

    As mentioned above, these changes should reduce overall electricity costs in the long-term. Charging infrastructure should be made available equally to multi-family homes and low to moderate income neighborhoods to make sure EVs can be accessible to all. Increased EV adoption and incentives to charge using cleaner energy have the potential to reduce pollution that affects lower income neighborhoods.

If EV adoption comes without any changes to the electricity grid, overtime it may increase electricity use and in turn fossil fuel energy use, which often occurs in lower income neighborhoods. This highlights the need for other changes in policy and regulation to simultaneously incent green / renewable electricity production, though that is outside the scope of this submission.