Illinois EE Stakeholder Advisory Group
Non-Energy Impacts Working Group

Thursday, October 20, 2022 Meeting
10:00 – 11:30 am
Teleconference

Attendees and Meeting Notes

Meeting Materials

- SAG Non-Energy Impacts Working Group Webpage
- Posted on the October 20 meeting page:
  - October 20, 2022 Non-Energy Impacts Working Group Agenda
  - Opinion Dynamics Presentation: Ameren Illinois Income Qualified Participant Non-Energy Impacts
  - Opinion Dynamics Presentation: Non-Energy Impacts for Ameren Illinois Non-Residential Programs
  - Guidehouse Presentation: Pairing Energy Benefits with Non-Energy Impacts in ComEd's Cost-Effectiveness Tests

Attendees (by webinar)
Celia Johnson, SAG Facilitator
Greg Ehrendreich, Midwest Energy Efficiency Alliance (MEEA) – Meeting Support
Adriana Kraig Opinion Dynamics
Andrew Cottrell, Applied Energy Group
Andrey Gribovich, DNV
Andy Vaughn, Leidos
Arlinda Bajrami, MEEA
Blaine Fox, CMC Energy
Bridget Williams, Guidehouse
Chris Neme, Energy Futures Group, representing NRDC
David Brightwell, ICC Staff
Elizabeth Horne, ICC Staff
Jared Policicchio, City of Chicago
Jason Fegley, Ameren Illinois
Jayden Wilson, Opinion Dynamics
Jim Fay, ComEd
Jordan Folks, Opinion Dynamics
Karen Lusson, National Consumer Law Center (NCLC)
Kevin Dick, Litebill
Kevin Grabner, Guidehouse
Liz Kelley, ILLUME
Marissa Strassel, MUSE Community Design
Mary Ellen Guest, Chicago Bungalow Association
Molly Graham, MEEA
Omayra Garcia, Peoples Gas & North Shore Gas
Patricia Plympton, Guidehouse
Randy Gunn, Mondre Energy
Randy Opdyke, Nicor Gas

Sam Dent, VEIC (IL-TRM Administrator)
Seth Craigo-Snell, SCS Analytics
Shannon Stendel, Slipstream
Stacey Paradis, MEEA
Sy Lewis, Meadows Eastside Community Resource Org
Thomas Manjarres, Peoples Gas & North Shore Gas
Victoria Nielsen, Applied Energy Group
Zach Ross, Opinion Dynamics

Opening and Introductions

Celia Johnson, SAG Facilitator

Purpose of Meeting: For the Ameren Illinois evaluator (Opinion Dynamics) and ComEd evaluator (Guidehouse) to share updates on non-energy impact (NEI) research.

SAG Facilitator Introduction:

- This is the first time the NEI Working Group has met since 2020.
- This Working Group started in 2018, to review draft evaluator NEI research plans and methodologies.
- At this point, the Working Group meets as needed to discuss NEI research results and next steps.
- The next meeting is anticipated to be summer 2023, to discuss NEI evaluator research results.
- As noted in the email circulated to the Working Group, there were a few questions raised during the October IQ TRM Working Group about how NEIs are currently being accounted for in utility EE portfolios. Evaluators were asked to include this information when presenting today.

Ameren Illinois Non-Energy Impacts Update

Jaden Wilson, Adriana Kraig and Jordan Folks, Opinion Dynamics

Final Results from 2021 Business Non-Energy Impact Research

- NEIs in non-res are diverse and the magnitude of the impacts in dollar value. Fuel costs, parts and supplies, contractor calls – some of those are more measurable and quantifiable. Health and safety and productivity are “squishier.”
- NEI impacts will impact other things besides energy usage for customers. Besides cost-effectiveness and TRM uses, they are a tool for engagement and outreach. Reframing program participation – “here are the benefits for all the other things besides your bill.” Powerful tool for participation increases.
- Research for AIC was to characterize and monetize select NEIs for select business segments.
    - Proof of concept research, for key business segments. Not designed to be statistically rigorous.
    - The three tasks:
        - 1 -Lifecycle cost analysis to estimate O&M NEIs
        - 2- In depth interview with past participants for non-O&M NEIs
        - 3- Leverage both for segment specific cut sheets for program outreach.
    - Looked at annual equipment repair and maintenance and replacement costs over time to calculate the NEI. For task 2, revenues, production/loss prevention.

- Task 1: LCC analysis – measure sample. Picked measures with a handful of criteria. Marginally or barely cost-effective to customer – where NEIs could have a participation impact. Also selected measures with robust third-party cost data. Measures likely to have positive O&M savings – because of marketing perspective. Mostly HVAC and VFDs as well as LED and compressed air.
    - Example of cost data from third party compiled sources. Repair and replace costs for a condenser water pump with and without VFD. How often it occurs, what the labor hours and material costs, any equipment needed and hours to be used for. All of the data was for Springfield IL. Wage data for union and non-union.
    - Example of analysis graph – cumulative NPV of the stream of costs of the measures. For this measure, the efficient case has a higher periodic maintenance and repair cost – now it is pump and VFD maintenance. But then at year 18, that's the replacement of the baseline pump. There are assumptions like discount rate that make a big difference. We used 4.91% as a customer perspective discount rate. Analysis length also matters. Where we cut it off can have a big impact on the final calculation. We are using efficient case EUL as our analysis period and then when we have a case where the baseline is replaced, at the end we will take the residual value that is left over and discount that back as a credit – the dotted line on the graph.

  [Chris Neme] Usually when I see NPV is for a time period, but this is for each year along the way, to illustrate that the replacement year changes things – that's where the lines cross.

  [Jaden Wilson] This is an illustration to show how we draw the line, isn't exactly how the analysis was done.

  [Chris Neme] This is a customer perspective, rather than a societal perspective. That raises issues if we use it in the TRC – we would want a societal discount rate like everything else.

  [Zach Ross] The primary purpose was proof-of-concept and customer messaging, so that discount rate made sense. We haven't recommended yet that they be used anywhere else; we will have to look at that discounting.

  [Chris Neme] That makes sense from that perspective. If we start to use it for cost-effectiveness, then we will need a societal discount rate.

    - Excerpt of the results for the manufacturing segment
        - We annualized them to compare with energy savings. In context with the annual savings for the measures and the incentive amount and payback period.
        - For some of the measures – LED fixtures or 20HP water pump – the NEIs are large compared to savings. But for many of the others they are small.

  [Chris Neme] Were there other NEIs like productivity, reduced waste, other things that can be important depending on the measure?

[Jaden Wilson] We looked at non-operation & maintenance in task 2 during interviews. In Task 1 (engineering analysis) we only looked at the ones we could measure this way and have the cost data.

- In Task 2 we did in depth interviews with past participants
    - Changes in facility or operations since completion. 5 health care, 4 manufacturing and industrial, 1 retail. Reviewed top 2 end uses, or advanced lighting controls discussion if they only had 1 end use. To help inform outreach and marketing.
    - For standard NEIs, we asked about changes related to things like revenue, comfort, health and safety, etc. – to try to monetize them. Or follow up with probing questions to help us monetize them – this was the most typical. For example, lighting warm up time compared to instant on – so we would ask about staff time waiting for lights to build out equations on our end to monetize.
- Task 2 marketing cut sheets example
    - Big NEI was reduced downtime, and overpowered shut off metal halides. Lighting upgrades made the space more comfortable.
    - Comfort was big in health care – not needing to respond to as many calls to rooms. One hospital figured $8-12k a year.
    - Predictive maintenance was important and asset tracking – being able to track specialized equipment in the hospital for instance.

[Chris Neme] Going back to the marketing cut sheet slide. Did you have a way of estimating the magnitude of the value of the NEIs when you tried to quantify?

[Jaden Wilson] We tried to. The sample size makes it difficult to put it into context beyond that specific site. Especially in health care – offices vs hospitals are a big difference.

[Chris Neme] Interested in the range and the median of those – as a % of energy savings. To show customers that there is a range and some of the benefits can be substantial, "it will be site specific and you should consider it."

[Jaden Wilson] We didn't do that as part of this research, which isn't to say we couldn't. If we can't monetize all the NEIs, we might be undervaluing because of the things put in as zeros.

[Chris Neme] Even undervaluing as a conservative estimate is more than the zero value being used now.

[Jaden Wilson] That's something we can take a look at.

Residential Participant NEI Update – IQ Single Family

- Currently evaluating participant NEIs for the Ameren Illinois IQ initiative.
- Goals are to estimate safety, comfort and economic metrics – estimate and monetize. Designed to build off of previous research that screened for NEIs.
- Early research suggested that programs were reaching customers we expected were being helped. Especially HVAC and insulation. Lower income households may need

more shell repairs – suboptimal indoor conditions. We would expect to see bill improvements as well as other measures of wellbeing.

- Goals were to measure safety, comfort and economic. The specific topics were to look at how they differ from other customers in household characteristics, bill concerns, strategies, conditions and health levels.
- Methods were designed to survey two groups – treatment of 2021 participants and comparison of 2019 participants. Both were surveyed twice – prior to treatment group participation and 1 year later. Both surveyed before and well after participants participated. Compare the change to that of a control – comparison group is the control. The change in treatment group is expected to be larger. If we measure comfort of a home for customers – pretreatment groups say it is hot, posttreatment they may say it is still hot. We could conclude "no effect" but with the comparison group who says their home was comfortable pre-period but they too are very hot post-survey. May be due to the summer, rather than the initiative. This is similar to a 2018 study by another group. 25% response rate for the pre-survey.

  [Chris Neme] Rationale for comparison groups makes sense. Question is why would the comparison group be previous participants rather than non-participants?

  [Adriana Kraig] We took that into consideration. We felt with a non-participant group, the customers would be different than customers who would choose to participate in a program – want to improve their conditions, knowledge a program exists. Previous participant was what we went with. We also compared the demographics of the groups. We felt this was a better comparison than non-participants – more open ended and not a strong a response pool.

  [David Brightwell] Do you have any way to check that you have parallel trends between the groups? How are you quantifying "it was hot and now it is not?"

  [Adriana Kraig] As one of the last results we look at indoor conditions. There is a scale we looked at. We'll get into that on a later slide. We haven't performed a conception equivalency, but we have looked at equivalency across a multitude of demographics.

  [Jordan Folks] We would expect minimal change also for the treatment group – the treatment had been applied years prior. Any change in the comparison group would be equally felt on the treatment side because of the exogenous factors that affect them both. We have not finished fielding or analyzing the second group of surveys.

  [David Brightwell] You are using probability modeling for the quasi-experimental comparison?

  [Jordan Folks] The populations are small. They are demographically equivalent, we'll show that.

  [Karen Lusson] In the decision to use 2019 and 2021 participants – these are both groups people who have received weatherization upgrades?

  [Adriana Kraig] 2019 two years prior and 2021 right before they received their upgrades. "Post" will be after they both participated.

- As expected the key demographics were similar. Home ownership, low income, employment levels. Did not look into conception equivalency yet. But we think the groups are comparable.
- Treatment group customer use different strategies and they differ by income level. How does household pay? Didn't differ on most factors except public assistance – driven by low income respondents. Low income treatment group compared to treatment group tended to reduce energy use and use program assistance. Less likely to cut off spending or use savings. Moderate income used savings or a credit card more often. We would expect to see that in the treatment group post-survey.
- Next big finding was treatment group were less comfortable in the pre-survey than the comparison group respondents. Treatment group rated warmer in summer and colder in winter. We expect to see them shift to a more 'comfortable' after treatment. Treatment group are the 2021 group PRIOR to participation.
- We also found treatment group respondents had more health, safety and comfort issues than the comparison group. Despite this, didn't find statistical difference in health status – physical or mental.

NEI Research Next Steps

- Finish fielding the post-period survey
- Perform literature review for NEI monetization
- Compare results from pre and post-period surveys

[Karen Lusson] What have we learned here so far? Isn't it intuitive that pre-treatment customers are going to have more issues, and post treatment will reduce it.

[Adriana Kraig] These are early results – just the pre-period survey. Presenting this is to show that, yes this is what we expect and it gives us something to build from for the post-period survey. Then monetizing and more participant response will give us more meat in the end.

[Zach Ross] This is a multi-year study and it's been a long time since the evaluators shared an update, so we thought it would be useful to present these interim findings – point is to actually quantify in the treatment group and monetize so we can have real estimates. We're still in progress on the post-survey, expect the results next year will really be the big takeaway.

[Chris Neme] I think what we will end up with here – this is what we expected from the preliminary results and confirms what we are saying. The finished work will try to actually quantify and turn in to dollar values. I think that is useful. Back to the point on the health and safety – suggested statistically significant differences in how often they identified problems with mold, mildew, moisture – you said even though they reported you weren't able to tie that to health outcomes.

[Adriana Kraig] That surprised me at first as well. We did find huge differences in conditions but didn't find significant difference in asthma or days missed of work. Which isn't to say we won't see something post. It wasn't significant but it was slight. Might see more in the post-survey.

[Chris Neme] Measuring missed days at work and what else?

[Adriana Kraig] Adult and child asthma, missed school days, and a handful more.

[Thomas Manjarres] Sick home syndrome is a very real thing. Perhaps there are better ways to get at that. Maybe somebody is not actually staying home from work, but their productivity has taken a hit because they are sick, tired, etc. I think we collectively need to come up with better ways to quantify this.

[Adriana Kraig] We are trying to triangulate across other questions like trips to ER, days you felt "under the weather," and other questions.

[Zach Ross] Guidehouse probably has comments too. Getting self-reported measurements of these things is challenging. We had a lengthy process on the survey instrument. But we had to pick something to design a study and do it. We are going to get some benefits of measurement here that are more rigorous than before but there will always be opportunities to do it better in the future.

[Karen Lusson] Are these findings statewide? Is the hope here to monetize it, in support of that, but I don't want it to be just Ameren focused. What do we hope to do with the results?

[Zach Ross] ComEd and Ameren Illinois are doing their studies. The final results are not yet completed / have not been applied yet.

[Karen Lusson] Are the gas utilities participating in the ComEd work?

[Patricia Plympton] Those are good questions and some of that is still work ahead of us that we haven't addressed yet.

ComEd Non-Energy Impacts Update

Patricia Plympton and Bridget Williams, Guidehouse

Agenda for Presentation

- Background on Illinois Non Energy Impacts research and including NEIs in cost effectiveness tests
- Preliminary findings for income qualified multifamily participant NEI research with building owners and managers
- Residential participant NEI update single family and multi family
- NEI research next steps

ComEd NEI Research

- ComEd asked Guidehouse to start the research back in 2015. Meetings held to discuss the approach.
- Started reporting economic impacts in 2018. Then societal health in cost-effectiveness for TRCs with and without societal NEIs in 2020.
- Pandemic slowed us down, started participant surveys in 2021 and those are ongoing. Undertook pre- and post-interview with owner/operators of MF buildings.

Non-Energy Impact Overview

- Societal health – cleaner outside air
- Societal economic – jobs

- Participant – household health and productivity
- We are looking for reduced medical costs to correlate with increases in insulation and air sealing and HVAC upgrades
- Once we have monetized it, we can add it to the TRC

Preliminary Findings – Participant NEI Research

- For IQ Multifamily Participant NEI research with building owners/operators
- ComEd is trying to impact a large group of income eligible customers – 1M of their 3M customers. Neighborhoods represented by the Chicago Bungalow Association represent about 1/3 of the single family stock. Double the energy burden of average households.
- Chicago is a large part of the ComEd service territory. Harmful environmental conditions – warmer urban heat island effect, asthma symptoms in IE households, air quality days with ground level ozone.
- Guidehouse is conducting research for income eligible program participants – three comprehensive programs. SF, MF and Public Housing. Living space upgrades, HVAC systems, everything on the slide.
- Still surveying participants – baseline and then 1-year changes.
    - Trying to survey at time of upgrade, starting a year ago.
    - Anticipate impacts and resulting monetary impacts over time.
    - Asthma, arthritis, heat and cold illness, missed work. Expect monetary results of reduced need for care, increased affordability for prescriptions and etc.
    - Also wrapping up owner/operator interviews for the multifamily to get a baseline and quantify impacts in those buildings. Same representatives 12 months later. 10 interviews completed. Building resiliency, building characteristics, and quantify how often they get heat/cold/mold/pest complaints.
- First category of preliminary results is resilience
    - This study looked at frequency and impact of extreme weather on building. After EE in 2021, IE MF buildings had 20% major repairs, 10% minor repairs and 20% water damage reductions. Decrease in tenant complaints and pest infestation following the improvements. Found that 50% reduction in hot complaints but 10% increase in complaints about cold. It was significant for the pest and heat, less significant for mold, low significance for cold stress. Looking at how these go with weather trends. Received Operation & Maintenance costs and collected annual pest and mold numbers from territory experts.
    - Goal is to provide a range of average costs for the NEIs and also segment the MF buildings from 2-4 to small apartments to big apartments – very different structurally. Hope to bucket those to provide more accurate ranges by the household category.
    - Currently still collecting data in the field – analysis is underway.
    - Note – error in the slides about tenant complaints, should say increase, not decrease.

[Chris Neme] Are there heat complaints in the winter too or is it all seasonal?

[Bridget Williams] We're looking at that right now, these are averages. We may go back to them for more information on that.

[Karen Lusson] You might all contact Dr. Megan Sandell in MA – expert on children's health and housing and could have monetization ideas. In terms of the reported 10% increase in complaints of cold – I'm going to theorize it could

be associated with deprivation due to unaffordable gas rates. Unaffordability is a huge issue.

[Chris Neme] Energy prices have changed a lot even in 12 months. There might be a 40% increase for non-participants. Wondering if you have a control group aspect here to look at?

[Patricia Plympton] That's a significant difference in methodology between us and ODC. We were trying to find wait lists of properties that were qualified but weren't scheduled and it was impossible to get those lists. We pivoted to a simple pre- and post- with the information that was available. To Chris's point, and this is a sensitive area of course, but we're going to look at whether there were changes in setpoints during the heating season to reflect fuel costs as well.

[Thomas Manjarres] I like the idea of having a control group and I wonder if there is a way to do that now. I am worried that the responses you get from the landlords and operators – will be hard to get and then wonder how many would own up to neglecting tenants by turning down their heat.

[Patricia Plympton] Guidehouse has focused on the income eligible households because that is ComEd's priority. We could do non-residential customer research, also could take the results from the Springfield research and apply it to non-residential buildings. We can have that conversation.

- Residential participant NEI update – SF and MF
    - This is a snapshot of the SF survey data to date. Guidehouse has not analyzed or monetized yet. Still fielding SF pre-surveys. Data not yet analyzed for the SF post surveys. MF pre-survey started in July 2022 – was complicated to get it started.

ComEd NEI Research Next Steps

- Using newest AVERT and COBRA models.
- *Single Family Surveys:* Guidehouse will continue collecting pre and post-survey data until quotas are reached, anticipated in CY2023. Will go back to our participants for follow up – 10 or 11 interviews. We're continuing the MF surveys and wrapping up SF surveys in 2023.
- *Multi-Family Surveys:* Guidehouse will continue collecting pre and post-survey data until quotas are reached, anticipated in CY2024.
- *Multi-Family Interviews:* Guidehouse will continue collecting data from building owners and property managers to monetize NEIs.
- *Societal Health Annual Calculation:* Guidehouse estimates societal health NEIs to include in annual cost effectiveness test report due June 28.
- *Societal Economic Annual Calculation:* Guidehouse estimates economic NEIs for annual report due April 30.

How Non-Energy Impacts are Currently Utilized for ComEd and Ameren IL

- ComEd
    - *Societal Health Annual Calculation:* Guidehouse estimates societal health NEIs to include in annual cost effectiveness test report due June 28.

    - *Societal Economic Annual Calculation:* Guidehouse estimates economic NEIs for annual report due April 30.
- Ameren Illinois
    - Societal NEIs are currently being used by Ameren as well – the public health from EE programs due to generation. That's been discussed in depth in the past. They are quite significant at the portfolio level and are included in the plans and the cost-effectiveness testing. Income qualified NEIs are not included at this time due to ongoing research.

[Sam Dent] This is a long multi-year exercise to get final results. Is it possible to use a "non-zero" adder in the meantime, that could be applied to income qualified?

[Celia Johnson] There were conversations at SAG years ago about using a broad adder for NEIs, and that was rejected in favor of Illinois-specific research. We could follow up at our next NEI Working Group meeting in mid-2023, or consider it for the next planning process.

[Chris Neme] Can you remind us the basis for the criteria pollutant societal benefits and how those are adjusted over time for the greening of the Illinois grid from CEJA?

[Patricia Plympton] Marginal generation becomes cleaner – PM2.5 is the biggest impact. That is adjusted in the AVERT and COBRA models and we look at a ComEd marginal generation mix from our wholesale markets group.

[Zach Ross] ComEd updates annually, Ameren plans to update once a plan cycle. We had some assumptions about the grid changes and we got buy in on the one we chose. We do need to revisit on some cadence and adjust for the grid changes over time.

[Chris Neme] Agree; this group should discuss that and the options sometime. Not urgent.

[Thomas Manjarres] How are we accounting for low carbon fuels in the utility fuel supply?

[Zach Ross] For Ameren, we do have localized natural gas societal health estimates – different than the electric side. I don't think we have any assumptions in the context of the gas network in that model, could think about that as we update that research next.

Closing and Next Steps

Follow-up items:

- Gas utilities to review whether they will use the NEI research results.
- In the future, discuss criteria pollutant societal benefits and whether adjustments are needed.
- In the future, discuss whether a "non-zero" adder should be considered due to pending income qualified NEI research results