Illinois Energy Efficiency Stakeholder Advisory Group
Large Group Meeting: Ameren IL Potential Study Results

Wednesday, September 2, 2020

10:00 am – 12:00 pm
Teleconference Meeting

Attendee List and Meeting Notes

Meeting Materials:

- Available on September 2 meeting page: https://www.ilsag.info/event/wednesday-september-2-sag-meeting/
- Wednesday, September 2, 2020 SAG Agenda
- AEG Presentation: Ameren Illinois Market Potential Study Preliminary Potential Estimates

Attendees (by webinar)

Celia Johnson, SAG Facilitator
Greg Ehrendreich, Midwest Energy Efficiency Alliance (MEEA) – Meeting Support
Matt Armstrong, Ameren Illinois
Bob Baumgartner, Leidos
Brady Bedeker, ComEd
Rick Berry, Guidehouse
Carmen Best, Recurve
Charles Bicknell, Nexant
Shonda Biddle, Walker-Miller Energy Services
David Brightwell, ICC Staff
Brielle Bushong, Applied Energy Group
Ben Campbell, Energy Resources Center, UIC
Craig Catallo, Franklin Energy
Katie Chiccarelli, Applied Energy Group
Andrew Cottrell, Applied Energy Group
Mark DeMonte, Whitt-Sturtevant, on behalf of Ameren IL
Leanne DeMar, Nicor Gas
Atticus Doman, Resource Innovations
Julie Drennen, Center for Energy & Environment
Deb Dynako, Slipstream
Wael El-Sharif, 360 Energy Group
Katherine Elmore, Community Investment Corp.
Lance Escue, Ameren Illinois
Jim Fay, ComEd
Jason Fegley, Ameren Illinois
Scott Fotre, CMC Energy
Julia Friedman, Oracle
Jenny George, Ameren Illinois
Jean Gibson, Peoples Gas & North Shore Gas
Jon Gordon, Enervee
Randy Gunn, Guidehouse
Amir Haghighat, CLEAResult

Brian Hedman, Cadmus Group
Dave Hernandez, ComEd
Travis Hinck, GDS Associates
Daniel Jamison, Aiqueous
Cheryl Johnson, People for Community Recovery
Kevin Johnston, Green Homes Illinois
Lalita Kalita, ComEd
Haley Keegan, Resource Innovations
Jonathan Kleinman, Aiqueous
Larry Kotewa, Elevate Energy
Ryan Kroll, Driftless Energy
John Lavallee, Leidos
Bruce Liu, Nicor Gas
Marlon McClinton, Utilivate
Samarth Medakkar, MEEA
Tim Melloch, Future Energy Enterprises
Cheryl Miller, Ameren Illinois
Abigail Miner, IL Attorney General's Office
Bruce Montgomery
Fernando Morales, Ameren Illinois
Chris Neme, Energy Futures Group, representing NRDC
Fuong Nguyen, Applied Energy Group
Lorelei Obermeyer, CLEAResult
Randy Opdyke, Nicor Gas
Stacey Paradis, MEEA
Michael Pittman, Ameren Illinois
Beatrice Quach, Resource Innovations
Ingrid Rohmund, Applied Energy Group
Alberto Rincon, Future Energy Enterprises
Zach Ross, Opinion Dynamics
Andrea Salazar, Michaels Energy
Kristol Simms, Ameren Illinois
Ramandeep Singh, ICF
Holly Spears, SEEL
Tristan Stamets, SEEL
Mark Szczygiel, Nicor Gas
Chris Townsend, CJT Energy Law
Desiree Vasquez, Franklin Energy
Andy Vaughn, Leidos
Ted Weaver, First Tracks Consulting, on behalf of Nicor Gas
Shelita Wellmaker, Ameren Illinois
Heidi Wendland, Agentis Energy
David Whittle, Leidos
Ken Woolcutt, Ameren Illinois
Grace Wroblewski, Applied Energy Group
Fred Wu, Aiqueous
Angie Ziech-Malek, CLEAResult
Joel McManus, TRC Companies
Christina Pagnusat, Peoples Gas & North Shore Gas
Arvind Singh, DNV-GL
Sara Wist, Cadmus Group

Opening & Introductions
Celia Johnson, SAG Facilitator

Purpose of meeting: To discuss draft Ameren Illinois Market Potential Study Results.

Ameren Illinois Market Potential Study Results
Shelita Wellmaker, Ameren Illinois
Ingrid Rohmund, Applied Energy Group

- [Shelita Wellmaker] Today's meeting will focus on preliminary draft MPS results for Ameren Illinois. Feedback from last study taken into account. In process of developing EE plan filing, so lots of internal collaboration to align this with the plan – this will be guidance for the plan. These are preliminary and we will be looking for more feedback. Should be finalized by the end of the year. Looking forward to input.
- [Ingrid Rohmund] Will start with overview and analysis approach, then summarize results. Then we will go into each of the sectors. Will walk through Residential more, and less time on Commercial and Industrial because we already went through the details.
- MPS will provide guidance to the plan, but they are fundamentally different. The MPS will be under simulated marketing conditions. It's a forecast, as opposed to the plan which is an action plan. Defining characteristics are that it is an unbiased assessment over 9 years, representing customer adoption. Agnostic to CPAS goals, etc. under Illinois objectives. Considers all measures that are feasible and available. Plan has to balance CPAS goals etc. over 4 years to optimize portfolio. Assumptions in plan will deviate from MPS in a number of ways. They work well together but the plan will ultimately end up being different from what the potential study says per se.
- Steps: Market research; Market characterization; Measure characterization; Baseline projection; Potential estimation. Feedback along the way from sub-steps. Appreciate the participation and continued participation.
    - Market research: Did surveys for Ameren. Helps segment the market for the analysis and idenfity saturation and intensities. Use per sq. ft for commercial sector. Occupancy and dwelling characteristics. Mail-to-web approach for residential sector. C&I used two approaches – mail-to-web with follow-up & onsite with large customers. C&I surveys both were implemented in Feb-March, cut off in April because of businesses shutting down. Fewer completions than targeted, depending on segment. Referred back to previous study results where needed. Very confident in what information was gotten from current studies.
    - In addition to surveys, used other data sources – Ameren, TRM, secondary data sources (Census, EIA, AEG database). Plan is to complete study with TRM 8, but that could be point of discussion.
    - Market characterization – highest level. Electricity sales by segment by sector. Res & Com are 90% of sales. Ind is 10%. Excluded customers >10MW. Segmented by income level, LI status, building type for Res. Comm by building type. Ind by major industrial types. Then we drill down into those segments by end use and technology.
    - Next step was to characterize measures. Got good feedback from stakeholders. Final measure list for study fully characterized using IL TRM and supplemental sources for costs of measures and other assumptions not in TRM. For equipment measures we incorporate into baseline projection. End use forecasting approach with a stock turnover engine built in to turn over measures based on their characteristics. Baseline includes appliance standards, building codes, and

naturally occurring efficiency. Aligns well with load forecast from Q2. Load forecast doesn't include future EE savings.

- Review of levels of potential – technical, economic, achievable. Technical potential phases in over time. Most efficient regardless of cost. Economic assumes only cost-effective measures. Achievable accounts for likely measure adoption in the market. Requires adoption rates.
- Developing adoption rates – variety of approaches that AEG uses. First is to use previous program accomplishments to inform future adoption rates – what will savings be if we keep doing what we are doing to deliver and evolve programs? Second is to estimate using program interest questions from surveys – what do customer preferences imply for adoption rates under various economic and delivery approaches? (This is what we used in the past, not well received, did different approach this time). Third, prescribed adoption rates – what are potential if we use rates used in planning in other regions? Fourth, benchmarking with other utilities – how do we compare with peer utilities and can/should that inform adoption rates? Finally, hybrid approach to answer more than one of those questions.
- For Ameren, combined previous program accomplishments and some benchmarking with peer regional utilities. Looked at savings from 2018-2019 and compared with technical potential for 2022. Less than 10% adoption rates set to minimum of 10% except in a few cases. Compared that achievable potential against previous Ameren accomplishments – how does our projection compare with the past – and compared with what other utilities have been able to achieve. That guided refinements to the potential. That step is still in progress, which is why this is still preliminary. Also interested in any additional feedback from SAG.

  [Chris Neme] Is it fair to say that the definition of "Achievable" is at spending levels consistent with historical spending as opposed to maximum achievable?

  [Ingrid Rohmund] Not exactly. We don't know the cost of the potential we are about to present. We do know the spending in the past but not what is implied by the measures in the current potential.

  [Chris Neme] If historical adoption rates under 98.6 million budget cap, except to the extent that you have included new measures not previously used or dropped past measures, it seems like it is largely an assessment of the potential of what Ameren would achieve as if it had operated under budget caps they have had in the past.

  [Ingrid Rohmund] Adoption rates, past adoption rates are influenced by budget caps but future rates are not necessarily constrained by that. We evolve those through the benchmarking to see if there are opportunities for additional savings. Not a fully unconstrainted achievable if budgets were unlimited, that's true.

  [Chris Neme] Which peer utilities?

  [Ingrid Rohmund] We will show that in a few minutes.

  [Ingrid Rohmund] Adoption rates minimum of 10% for all measures except for two. For some there are pretty aggressive adoption rates. They increase over time at a rate depending on the measure. Between 3-5% per year.

- Summary of potential estimates. First year savings all sectors, all potential levels shown. About 1.6% achievable in 2022, decline slightly due to baseline condition changes largely but not exclusively driven by lighting. Baseline is generally becoming more efficient.
- Closer look at achievable compared to historical achievement. 2020 and 2021 can be brought in to inform this, and this might change. So far, comparison shows future savings are likely to be in fairly good alignment with past achievements. First year slightly higher with a little bit of a ramp-down. Split between Res and Comm is consistent.
- Benchmarking with peer utilities: MN, WI, MI and IN utilities. Lower left hand, Ameren compared with group of regional peers. Excluded very small utilities not comparable. Welcome feedback on keeping/adding these utilities shown. Average is a simple average, no weighting.

  [Randy Gunn] Interesting that ComEd isn't on the benchmarking.

  [Ingrid Rohmund] ComEd is such a big utility compared to Ameren and is different in composition.

  [Chris Neme] I would argue that Indiana is not a good comparison – not even close to what is being pursued in IL and MI [from a policy perspective]. ComEd differences are less important than the differences with the policy environment in Indiana.

  [Ingrid Rohmund] Will note that feedback.

  [Chris Neme] Consistent with what was achieved in the past seems like circular reasoning – not surprising that if you start with past achievement that the results are similar to it.

  [Ingrid Rohmund] The benchmarking helps to show how the utilities stack up, and Ameren is outperforming many of these utilities and is above average in both years. Can look at the data and exclude this or that utility, but will still compare pretty favorably.

  [Chris Neme] You could compare with Kansas and it would look really good. Policy environment also needs to be compared. It would be more useful to look at the market potential rates in jurisdictions that have taken other market approaches. Looking at the portfolio level doesn't tell you anything except that MI has more aggressive policies than Indiana.

  [Ingrid Rohmund] I disagree with that. The idea of looking at other utilities is a good question to answer. The answer is that Ameren is outperforming on savings compared to utilities in the region. I agree that there are differences that aren't taken into account here. Programs and specifically heat pump water heaters is coming later. Real challenges with data from other studies. We will continue to look deeper. First look says Ameren is not fundamentally off base.

  [Randy Gunn] I'm a fan of using benchmarking. It's a good look at whether it is realistic. I agree that it isn't the final answer but it's a good reality check.

[Chris Neme] Not suggesting benchmarking total portfolio level savings has no value. I just don't think it has potential study value. Level of ambition and performance relative to others. But it doesn't tell you anything about whether the estimates of achievable potential are reasonable. A utility could achieve a lot more and spending a lot more. Or achieving less but also spending a lot less, e.g. Indiana.

[Ingrid Rohmund] Still at a very high level. Benchmarking results by sector. Red is residential, blue is C&I. Compared to group, Ameren is outperforming many and above average. C&I is stronger because of the emphasis Ameren has placed on that sector.

- Top 10 measures in Achievable by sector. Scale for commercial is much larger than scale for residential and industrial. Top 10 are the majority of savings in each sector. Top 30 (10 per sector) are 73% of all-sector achievable. Lighting is still top in all sectors. Various other measures. Will dive deeper into each sector results.
- Commercial sector. Achievable potential, as well as Econ and Technical. Achievable is very large portion of the Economic potential.

[Andrea Salazar] Can you clarify what exterior lighting PV installation is, is that a PV powered light with a battery?

[A: yes]

[Ingrid Rohmund] If there is no orange shown, like in top bar, then all potential is cost-effective.

- We use this as a diagnostic to make sure we've got the measures that should be here. If anything jumps out as missing, we would look into that. Some measures only have technical potential; those aren't shown here. You see heat pump water heater adoption here in the commercial sector, about halfway down the list.
- Residential sector, top 20 measures are 85% of achievable potential. Some measures have a considerable amount of economic potential with relatively small achievable. We will be looking deeper at those. Perhaps something from other utilities in peer group can inform that. E.g. compare and drill down and decide we could achieve a higher adoption rate; we want to learn from that.

[Chris Neme] On residential side, is there a measure of electric resistance baseboard heat replaced with mini-splits or envelope improvements? I see converting central electric systems to ground source. And I see supplement central with mini-split. Is there also electric resistance baseboard replacement? Also is there anything on building envelope besides the one insulation on the bottom?

[Ingrid Rohmund] Team is responding to me on that. These are aggregated at the measure level. I can confirm we do have a conversion to ductless mini-splits. Might be a measure that isn't' in the top 20.

[Rick Berry] Will ductless mini-split have an electric baseboard baseline? Would that suggest baseline is not a ducted unit? The word Central throws me off a little bit.

[Ingrid Rohmund] Will have to get back on that one. It's hard to summarize all of the measures. Question is noted and we will respond.

[Ingrid Rohmund] Industrial sector. No separate "custom" category, instead have modeled measures in the sector that would fall under an industrial program. Aggressive adoption rate for those measures. Customers <10MW so not the big industrials. Nevertheless, a good amount of potential.

[Zach Ross] Curious in getting more information on how you modeled SEM – behavioral and custom. Would like a better understanding of that.

[Ingrid Rohmund] I have some notes on that. We used information from NW Power Planning Council 2021 plan – they did a deep dive and research on SEM. We broke out the two pieces based on that analysis. That's the Cliff Notes version.

[Bruce Montgomery] I'm interested in the SEM source.

- Summary of potential all sectors. Cumulative savings through 9-year period. Achievable is bout 8.5% of reference baseline in 2030. About half of the economic potential.
- Preliminary key takeaways: Compare favorably with regional peers. Indicates similar potential will continue to be available in future market. Are NOT estimating the costs associated with those savings – cost changes could have implications. That's the job of the planning process to optimize with respect to cost. Will be doing a deeper dive into the program level benchmarks and the issues Chris outlined about which utilities to include. Will also be considering the savings expected from 2020 and the plan for 2021 to influence adoption rates. Not all measures will help optimize the plan, and some measures not cost-effective here could still land in programs.

  [Chris Neme] First, I assume Voltage Optimization is not part of this?

  [A: Correct].

  [Chris Neme] Is it fair to say that you didn't look at early retirement measures?

  [Ingrid Rohmund] We did look at early retirement particularly with respect to lighting as a system approach.

  [Chris Neme] How did you treat low income portion of residential sector with historic participation based mostly on budget? Will that be called out?

  [Ingrid Rohmund] It's broken out as a segment by housing type and fuel delivery. Can vary the adoption rates for each segment. Will have to verify what we did with them. We can go segment by segment.

  [Chris Neme] Historically, 2018 at least, the vast majority of low income households treated have been gas heated. It's also possible to target market electric heated low income homes for Weatherization. If your potential looks at historical rates, does it assume then there is no change in target market strategy?

  [Ingrid Rohmund] Will have to look into that.

[Chris Neme] Previous Potential Study had broken out tables comparing low income and non low income. Will that be included?

[A: Yes, we have that information.]

- Residential sector analysis. High level characterization. Table breaks out number of households and sales and use. We used the survey data and the LIHEAP rules to determine the designation of low income. Relied primarily on survey data, as well as billing and forecasting data.
- End use breakdown – by end use and broken down by segments and building type. Single family homes use more than multifamily homes. LI use more than non-LI counterparts. Appliances are the highest, followed by space heating. Lighting is down due to efficiency already taking place.

  [Chris Neme] Intensity graph would be more insightful and useful if there is one for electric heated and one for gas heated. Would be useful to see that impact if it could be broken up.

  [Ingrid Rohmund] Aggregated up to single family and multifamily totals. Collapsed the income dimension and fuel delivery dimension. Overall usage has declined from 2012 study. Mix of end uses has changed. Lighting has decreased, appliances have decreased. Space heating has increased because TRM has changed over time. Water heating has decreased due to lower household occupancy and TRM changes. Appliances use a market baseline that has evolved. No real surprises here. Don't have the relative weather values in hand, but that is figured in.

- Will develop a baseline projection for each technology. Summary of the types of measures included in the sector, and a longer list is available.
- Results of baseline projection for residential sector. Fairly flat through 2030. Customer growth is pretty flat. Some electrification in space heating and some conversion of room units to central AC. Significant drop in lighting over period due to change in baseline and natural adoption of LED lamps that is well underway.

  [Chris Neme] Is growing saturation of central AC also reflected in the model of how many units are available for each year, not just stock turnover?

  [A: Yes.]

  [Ingrid Rohmund] Adoption rates for residential sector in context of baseline. Adoption compared to technical potential. We are looking at water heating because of heat pump water heater successes elsewhere.

- Summary of compressed residential sector results. First year savings on the left. 146-130 GWH per year achievable. Cumulative on right, cumulative about 9% by 2030. Uptick between 2025 and 2030 – longer term measures contributing. Outside of scope of plan years but might have implications for planning.
- Between 2025 and 2030, savings from lighting are pretty stable. Dual baseline. Late period savings are lower than early savings and eligible market is reducing. Bigger in first 4 years, not as much a contribution in next 5 years. In contrast, ES thermostats potential increases substantially. Central AC as well. Could accelerate some of the non-

equipment measures as we move forward. Will have a narrative for each of these measures in the final study.

[Randy Gunn] Refrigerator recycling jumps out here. We've been doing this for a long time.

[Ingrid Rohmund] I think it is because people will continue to buy new refrigerators and recycle the ones they have. I think that's where it comes from. Available market is about 50%. But the point is well taken and it's worth another look.

[Chris Neme] On earlier slides, market adoption rates. I'm puzzling over where the electric heating savings are – it's close to 20% of the end use - but the technical potential for Wx is only a low technical potential number. Where do heat pumps displacing electric resistance heat come in here? Is that part of HVAC?

[Ingrid Rohmund] For weatherization – we are phasing in the technical potential over time. Some slides at end show the assumption about that phasing in over 20 years. Regarding second question, it is captured under HVAC.

[Chris Neme] Retrofit for baseboard replacement, are you assuming those spread over 20 years as well?

[Ingrid Rohmund] 10 years for heat pump conversion.

[Chris Neme] Still seems like an intuitively low number, can we follow up afterward?

[A: Yes]

[Randy Gunn] On previous slide, water heating adoption rate is 0.1%. Why so low?

[Ingrid Rohmund] Very low historical uptake of heat pump water heaters. Is likely to increase, that's the 2018-2019 success rate.

[Chris Neme] Ameren's experience with downstream water heater rebates isn't quite the same as other jurisdictions. A mid-stream approach can drive a much higher adoption rate.

[Ingrid Rohmund] Mix of savings changes over time (Slide 33). Cooling increases over time. Lighting becomes a much smaller share. Turnover and adoption plays out over a longer term.

[Tim Melloch] Slide 29 indicated an increase in space heating due to electrification. What is the electrification? Moving from propane and NG to heat pump? What goes into that number going up?

[Ingrid Rohmund] There is an efficiency improvement happening. Growth factors have to do with variables in the forecast like income, persons per household, some electrification that is going on. A variety of factors influence that baseline and end use forecast. Load forecasting team based on an EPRI electrification study, can provide some more detail.

- Commercial sector market characterization. Market divided into segments based on building type. Billing system, customer surveys, and secondary sources.
- Overall intensities by building type and end use. Lighting is still largest use in segment, then cooling and ventilation and refrigeration. Logical that there is refrigeration in grocery and restaurant, food prep is isolated to those segments. All have lighting, cooling and heat.
- Comparison to this study and the previous study: Some differences between the two studies. Reconciled to make them make sense. More space heating, based on TRM changes.
- Summary/sample of measures used in the commercial study. Equipment and non-equipment measures. Combined for C&I sectors.
- Baseline projection for commercial sector. Overall use/sales declining over time as the result of improved efficiencies across all measures. Expect that customer numbers are also declining. Aligns well with load forecast. Expect a return to normal by 2022. Have not taken COVID into account.
- Data for 2018-2019 provided adoption rates, will try to compare with program savings from peers. Chillers are big.
- Totals for Comm sector are 241 GWh in 2022, going down in later years. Baseline reductions.
- Comparison of cumulative savings between 2025 and 2030. Can see the effect of changing baseline on lighting cumulative savings, Strong for first 4 years, less potential in out years. HVAC stock turnover, & water heaters.
- Progression over time for Commercial. Both absolute and relative. Lighting is ¾ of cumulative savings in first years of study. Still a lot of non-LED lighting out there.

  [Chris Neme] On previous slide, comparison between 2025 and 2030. Interior lighting shrinks. Are those numbers incremental annual savings potential in 2025 and 2030?

  [Ingrid Rohmund] No it's cumulative savings through those years.

  [Chris Neme] Why would cumulative go down?

  [Ingrid Rohmund] It's counterintuitive – baseline is changing and market is getting smaller. Not all savings are counted in later years as the baseline changes.

  [Chris Neme] So if stock turns over every year, the fact that the baseline is changing it only affects the savings in the year the bulb is sold, right?

  [Ingrid Rohmund] If you install a lamp in 2022 and it saves "100" then it isn't "100" every year because of the baseline changes.

  [Chris Neme] if there had been an early replacement of that fixture of that 2022 installation, that has to be how you can interpret this?

  [Ingrid Rohmund] We can take this offline and provide a concrete example. It is confusing, there is no doubt. It is counterintuitive, but we can illustrate that with an example.

- Industrial sector analysis. Similar to what you have already seen. Breakdown by industry type. Smaller industrial customers <10MW. A lot of small segments lumped into "Other".

- Motors are most use. Then processes. Breakdown by building type is quite variable in motors vs process.
- End use projection for industrial sector is pretty flat. Declining just slightly by 2030. Heavily dominated by motors, process and lighting.
- In terms of percentages, just under 1% savings per year. Not large numbers but a decent showing compared to economic potential.
- Comparison of cumulative savings in 2025 and 2030. Lighting phenomenon shows up here as well.
- Key takeaways reviewed. We welcome additional feedback and questions. We will be doing a deeper dive into program data.
- Comparison with program level benchmarking to peers. Will be doing a deeper dive to understand difference with regional peers and the implications for adjusting.

  [Chris Neme] These graphs are interesting. To me what this says is that whether you are above or below average. It would be useful to look at the ones that are much higher than Ameren – what are they doing differently and how much does it cost. Worse is more likely due to other regions. Focus on the highest performers.

  [Ingrid Rohmund] I agree. Also agree with what you said about behavioral.

- There are supplemental slides SAG participants can review at your leisure.

  [Chris Neme] You indicated you will take a look at the feedback from today and follow up. In the topic we talked about recently about how is the cumulative lighting savings going down, that would he helpful that is sooner rather than later.

  [Ingrid Rohmund] Let's have a side conversation about that. Thanks everyone for your participation and feedback. It has been very valuable as we finish up this study.

Closing & Next Steps
Celia Johnson, SAG Facilitator

- AEG will follow-up with responses to questions raised today.