

**Illinois EE Stakeholder Advisory Group
Large Group SAG Meeting**

Tuesday, August 13, 2024
10:00 am – 12:00 pm
Teleconference

Attendees and Meeting Notes

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Meeting Materials

Posted on the [August 13 meeting page](#):

- [Tuesday, August 13 SAG Agenda](#)
- [SAG Facilitator Introduction to August 13 Meeting](#)
- [GDS Associates Presentation: Illinois 2023 Baseline and Potential Study – Key Observations and Draft Results](#)

Attendees

Name	Company or Organization
Celia Johnson	SAG Facilitator (Celia Johnson Consulting)
Jane Anderson	SAG Meeting Support (Inova Energy Group)
Abigail Miner	IL Attorney General's Office
Alisa Garcia	ICF
Amy Jewel	Elevate
Andrew Braatz	Franklin Energy
Andrew Cottrell	ScottMadden
Andy Vaughn	Leidos
Anu Shree	Bidgely
Babette Washington	Ameren Illinois
Ben Cheah	Verdant Associates
Bill Risley	Franklin Energy
Brady Bedeker	Walker-Miller Energy Services
Britney Blankenship	Energy Solutions
Cam Seeley	Walker-Miller Energy Services
Cassidy Kraimer	Community Investment Corp.
Chad Balthazor	Cascade Energy
Cheryl Watson	Equitable Resilience & Sustainability
Chris Neme	Energy Futures Group, representing NRDC

Name	Company or Organization
Chris Vaughn	Nicor Gas
Clayton Schroeder	Resource Innovations
Crystal Warner	Michaels Energy
Danish Murtaza	Peoples Gas & North Shore Gas
Darren McRoy	Walker-Miller Energy Services
Dave Kilgore	Ameren Illinois
Denise Munoz	ComEd
Dr. Crystal Davis	Walker-Miller Energy Services
Elder Calderon	ComEd
Elizabeth Horne	ICC Staff
Eljona Fiorita	CLEAResult
Erin Daughton	ComEd
Erin Stitz	Applied Energy Group
Fernando Morales	Ameren Illinois
Greg Ehrendreich	MEEA
Gregory Norris	Aces 4 Youth
Hannah Collins	Leidos
Heidi Gorrill	Slipstream
Hilary Snover	CLEAResult
Ian VanArsdall	Nicor Gas
Jake Thomas	GDS Associates
Jamie Ricks	Walker-Miller Energy Services
Jarred Nordhus	Peoples Gas & North Shore Gas
Jason Fegley	Ameren Illinois
Jeffrey Carroll	DNV
Jeffrey Huber	GDS Associates
Jes Rivas	Illume Advising
Jill Rolstone	Franklin Energy
Jim Fay	ComEd
Joe Mays	Cascade Energy
John Lavallee	Ameren Illinois
Jooh Sharon	ComEd
Jorge Medina Zambrano	Inova Energy Group
Josh Ramos	Nicor Gas
Julia Friedman	Opower
Kanchan Swaroop	Resource Innovations
Karen Lussen	National Consumer Law Center (NCLC)
Kari McCue	Nicor Gas
Kari Ross	NRDC
Katharine Larsen	Bidgely
Kathryn Brewer	CLEAResult
Keely Hughes	The JPI Group

Name	Company or Organization
Ken Parker	Community Investment Corp.
Kevin Johnson	DNV
Kim Brown	ComEd
Kim Janas	IL Attorney General's Office
Kim Swan	ComEd
Kit White	MEEA
Lance Escue	Ameren Illinois
Larry Kotewa	Elevate
Laura Agapay-Read	Guidehouse
Lee Ringo	Energy Infrastructure Partners
Leyah Williams	ICC Staff
Lilieric Florez Monroy	Peoples Gas & North Shore Gas
Lisa Fennell	Bidgely
Louis Bartlett	Energy Solutions
Marilla Yaggie	Illume Advising
Mark Hamann	ComEd
Mark Mandolini	Honeywell
Mark Szczygiel	Nicor Gas
Mary-Hall Johnson	BrightLine
Matt Armstrong	Ameren Illinois
Melissa Helpingstine	Primera Engineering
Mia Berrios	People for Community Recovery
Michael Pittman	Ameren Illinois
Michael Collins	Franklin Energy
Michele McSwain	Sustainable Environmental and Economic Development Solutions
Molly Graham	MEEA
Nick Moshage	Walker-Miller Energy Services
Nick Warnecke	Ameren Illinois
Nicole Popejoy	IL Association of Community Action Agencies
Nikki Pacific	Ameren Illinois
Noah Purcell	ICF
Omayra Garcia	Peoples Gas & North Shore Gas
Patrick Burns	Brightline Group
Paul Higgins	Abacus Energy Works
Paula McGuire - Rowe	Elevate
Pauline Marcou	Bidgely
Philip Mosenthal	Optimal Energy, representing NCLC
Randy Opdyke	Nicor Gas
Rashaan Keeton	Center for Energy & Environment
Rich Hasselman	GDS Associates
Rick Tonielli	ComEd

Name	Company or Organization
Ronna Abshure	ICC
Salina Colon	CEDA
Sam Stahl	Ameren Illinois
Samuel Morris	The Will Group
Sanjyot Varade	Resource Innovations
Sara Castleberry	Resource Innovations
Seth Craigo-Snell	SCS Analytics
Sharie Greif	Michaels Energy
Shawn Haas	Peoples Gas & North Shore Gas
Shivana Shrestha	Walker-Miller Energy Services
Shonda Biddle	Center for Energy & Environment
Steve Baab	DNV
Steven LaBarge	ComEd
Tamika J. Cole	Walker-Miller Energy Services
Tara Cunningham	Rinnai
Ted Weaver	First Tracks Consulting, representing Nicor Gas
Tina Grebner	Ameren Illinois
Travis Hinck	GDS Associates
Valencia Roner	Energy Infrastructure Partners
Victoria Nielsen	ScottMadden
Wade Morehead	Morehead Energy
Walid Guerfali	ICF
Warren Hirons	GDS Associates
Wisit Kumphai	Resource Innovations
Zach Obert	Franklin Energy
Zach Ross	Opinion Dynamics
Zachary Froio	AEG

Opening and Introductions

Purpose of August 13 meeting:

- To discuss draft baseline and potential study results for Ameren Illinois, ComEd, and Nicor Gas.

SAG Facilitator Presentation:

[SAG Facilitator Introduction to August 13 Meeting](#)

Ameren Illinois, ComEd, and Nicor Gas Baseline and Potential Study Results

Rich Hasselman and Jeffrey Huber, GDS Associates Inc.

Project Team: Michaels Energy, CADMUS, BrightLine Group, Mad Dash Field Services

Agenda

- Study Overview
- Baseline Study Results

- Potential Study Framework
- Potential Results
- Next Steps

Study Objectives (Summarized)

- Develop baseline and efficiency program potential for the utilities:
 - ComEd (electric)
 - Nicor Gas (natural gas)
 - Ameren Illinois (electric and natural gas)
- Collect data and develop analyses on:
 - Energy utilization by residential, commercial, and industrial customers
 - Collect survey data to understand equipment efficiency saturations
 - Looking to understand how people are using equipment, whether in residential, commercial, etc.
- Estimate total achievable potentials for multiple scenarios
- Provide data, summaries, and documentation
- Offer independent opinions on future potential
- Work collaboratively with utilities and stakeholders
- Outcomes will inform 2026-2029 plans for long-term opportunity for energy efficiency plans to 2045
 - Final plans may look different than in scenarios—this is an independent opinion

The Study Process

- Kick-off August 15, 2023
- Formed a Working Group, met weekly to address different topics
 - Utilities: ComEd, Nicor Gas, Ameren Illinois
 - Independent stakeholders
 - Illinois Commerce Commission Staff
 - Illinois Attorney General's Office
 - Natural Resources Defense Council
 - National Consumer Law Center
 - GDS Team: GDS Associates, Michaels Energy, Cadmus, Brightline Group
 - Working Group was invaluable in going through questions on approaches, policy, modeling considerations
- Initial focus on the Baseline Study data collection. Discussed customer contact information, sampling, etc.
 - Received data from utilities for sampling, customer contacts

The Study Process and Timeline

- Fall 2023
 - Focus on baseline data collection
 - Developed sampling approach, drew samples with available data
 - Developed survey instruments with input from Working Group
- Winter 2023/2024
 - Finalized data collection instruments
 - Received final utility customer data in late February
 - Launched online survey in March 2024
- Spring 2024
 - Field work - conducted online surveys and site visits for nested samples
 - Across residential and nonresidential sectors:

- 6,300 online baseline survey responses from combined residential and non-residential sectors
 - 1,027 willingness to participate survey responses
 - 739 site visits
 - Engaged working group on potential modeling topics
 - Began model development
 - Goal is to include baseline survey into the potential model – get a sense of the marketplace
 - Onsite data collection completed in late June 2024
- Summer 2024
 - Summarization of online survey results, discussion w/ Working Group
 - Summarization of onsite results (still underway)
 - Finalization of baseline results (reconciliation of online and onsite) – manual process so takes time
 - Finalizing all potential scenarios (in-process)
 - Final report (forthcoming)

Approach Summary: Baseline Study

- Started with online data collection effort using utility customer databases
 - Focused on those who had email contacts for
 - Purpose of online survey: Collect general information about the homes and buildings for key end uses
 - Confirm appropriate segmentation by building type
 - Collect household size and income information to confirm income qualified (IQ) status
 - Important because the basic data isn't there with utility records
 - Used this as a process to recruit for onsite data collection
- Collect "Willingness to Participate" data to inform potential modeling
 - For major end uses (space heating, water heating), likelihood to participate in a program based on:
 - Residential - focused on utility incentive share of cost
 - Non-residential - simply payback or rate of return
 - Focused more on core energy economics to get an understanding on what's the sensitivity for non-residential to adopt measures
 - Advanced lighting controls decision tree (nonresidential)
 - Did not explicitly ask about lighting, but added a separate set of questions on lighting controls.
 - Disposition of LEDS in their facility, awareness of controls, etc. to look at marketplace for advanced controls
- Kept online study open to complete onsite recruitment or meet target goals
 - Nonresidential recruitment was a census of all available customers. Issued survey to everyone had data for. Worked with utilities for larger customers
 - Residential kept open to ensure IQ coverage and achieve onsite target count.
 - Had an ample sample

Approach Summary: Potential Study

- Utilize utility forecasts to develop baseline forecasts by customer segment and end-use
 - Looked at what share of that forecast is for space heating, air conditioning, water heating to help tell where efficiency can have an impact

- Apply end-use shares of consumption to equipment types. Used a variety of information for data to help get an understanding of how energy is being used and for what purpose by customer types
 - Energy Information Administration data
 - Baseline data collection results
 - Other information from utilities or research
- Develop measure characterizations, primarily using the IL TRM (V12)
 - To build out the engineering equation for what kind of savings you can get
- By end-use, segment savings opportunities, accounting for existing efficient shares
- Develop potential scenarios, focusing on incremental annual savings – data flows through the scenarios. Not trying to mimic CPAS (Cumulative Persisting Annual Savings Goal)—did not go down that line
 - Looking at the role of efficiency, electrification (newer element to IL Efficiency Marketplace) and fuel switching that can go on
 - Starting with Statutory Maximum, moving toward Stipulation and others
 - A big difference is the level of spending on Income Qualified
 - In all cases, estimate savings and annual program budgets

Karen Lusson: Can you share how utilities use these types of studies? To what extent will utilities be using these results in their planning for the next four-year plan?

- *Jeffery Huber: The studies should be viewed as a roadmap to the program plans. They give a sense of where the remaining potential are-is there enough in what current programs do? enough to continue on? do utilities need to start planning for a loss of a certain type of savings? Gives some guardrails for use in program planning in terms of how to monitor the savings, what levels can be achieved, where utilities may need to pivot.*

Karen Lusson: Do the potential study analysts look at how realistic the annual CPAS goals are required by the statute (Ex/ changing in the lighting standards?)

- *Answer: Yes, will get to that when we move into results. There's an eye towards if the levels can be sustained or are there potential issues with that, along with related types of the splits.*
- *Ted Weaver: Thanks for raising this – when Rich introduced this, he emphasized that this study informs both the short-term in the next plan cycle and long-term for electric utilities. Also different priorities—investing in low-income vs other markets; investing in residential vs business. Rich showed there are many scenarios, but not all. Results to be used to inform, but not predict. Also a different framework—potential study organizes the world around end uses and segments; the plans organize the world around programs and measures. While there is overlap, there is not a one-to-one correspondence. Difficult to use potential study as a point estimate. Allows us to open our eyes in terms of the past, helps strategically create course corrections perhaps.*
- *Rich Hasselman: View potential studies as a guardrail, gives boundaries. But there are ways to prioritize different things. A measure of a potential study may show up in different programs.*

Cassidy Kraimer: Did the studies take into account financing opportunities and incentives coming down the pike from federal sources?

- *Rich Hasselman: We have not explicitly brought that in because it's partly unsure of what we actually know what and how may those funding sources will be applied at a sector level. Tricky to put in theoretical programs, especially around electrification. We*

believe that there is an opportunity for leverage, but not explicitly saying that these programs from the fed or state government will have a specific effect. We see opportunities there but from a potential study standpoint, can't easily bake them in.

- *Chris Neme: It seems that one could take what one knows about incentives or tax credits available through the IRA and in scenarios of potential that are budget constrained, see how much budget will be freed up if leveraging those incentives. Are there not simple ways to make adjustments to some of the scenarios to provide ballpark estimates to that the potential may be?*
- *Rich Hasselman: On a simple level, yes. However, the IRA and tax credits or state programs for efficiency or electrification are not covering the entire forecast periods. There are ways we could say "what if"; however, don't know people's tax appetite vs direct utility incentives. Don't know how the state will be operating High-Efficiency Electric Home Rebate Act (HEEHRA) program and how it gets distributed around the state, the scale of spending, how much of the market can affect, etc. It is a big question mark.*
- *Phil Mosenthal: Did use willingness to pay survey, can model penetration rates. Can model what combined could be.*
- *Jeffery Huber: It's worth discussion on a potential scenario. Side research shows that tax credits valued less than incentives.*
- *Denise Munoz: Looking at potential scenario only works if there's a resolution on the savings.*
- *Chris Neme: Would have to address attribution.*
- *Rich Hasselman: Can take the other scenario option to the Working Group*

Karen Lusson: IL EPA has sent in its initial application to DOE for the HOMES rebate programs. While I know it needs to be approved, have the utilities seen the application? If so, those details should be shared with the SAG. I'm attempting to get a copy of the application, but haven't received it yet.

Baseline Study Results

Baseline Study Data Collection

- Three efforts for each of the residential and nonresidential:
 - Online baseline survey (as a starting point)
 - Willingness to participate
 - Site visits
- Residential
 - Segmented by single family and multi-family
 - Had an Income Qualified (IQ) quota. Use 80% AMI on the county level
- Non-residential
 - Industrial and agricultural, segmented into small and large for sampling--Used electric definition of <400 kW

Survey Response Outcomes (see slide 12 for data)

- Online Baseline
 - Residential - over 4,100 responses, mix of single and multi and IQ
 - Non-residential - Over 2,000 responses, most on the small electric side
- Site Visits
 - Residential – good mix of single family and multi-family
 - 45 mobile homes responding – part of the single-family category

- Non-residential - almost 400 site visits that covered all the building types.
- Willingness to Participate
 - Residential – good IQ mix of single family and multi-family
 - Non-residential – 282 completed that covered all the building types

Key Baseline Study Findings

- Nonresidential Snapshot: site visits, lighting.
 - Major question is what’s happening with non-residential linear lamps. Knew this was an important subject.
 - Linear LED Lamp Saturation Less than Expected. Thought it would be 50% LED, ended up being less than 40% LED for linear lamps.
 - An important point in where programs can go for next plan cycle – still see an opportunity.
 - HID LEDs show a similar share to linear
 - Ongoing opportunities for lighting retrofits
 - Education, Retail, and “Other” buildings sector > 50% linear LEDs – lots of opportunities
 - Industrial, Retail, and Warehouse > 65% LED HID use (seen in warehouses, high ceiling buildings). Site visits looking at use of LEDs in that context and compared to LED lighting
- Residential Snapshot – LEDs
 - Not including residential LEDs in the future potential. Asked about sockets in online survey - what’s the saturation of LEDs in homes?
 - Got a good blend – majority mostly LEDs (59%)
 - Looked at different housing types and income
 - Found that IQ single family and IQ MF are outpacing the market rate
 - Still a fair portion of the marketplace with non-LED sockets
- Snapshot – SF Blower Door Results
 - 69 completed
 - Blower door test: a blower door technician goes to a home and puts a big fan in a door and it depressurizes the house (sucks air out of the house)—they are pulling air in through all the cracks and openings that are a source of air leakage Test to see how well sealed a home is and an opportunity for doing air sealing
 - ACH50 is air changes per hour at the test pressure the BD are operating at. Indicator of how leaky the house is
 - Asked techs to give qualitative opinion on how well sealed the house is
 - Takeaways:
 - “Poor” sealing quality homes tended to test worse than “good” sealing quality homes
 - Saw a relationship in home size—smaller homes tended to test worse off than larger homes
 - Relationship in age of the homes—homes less than 20 years old have been built with modern building codes, they see better performance Homes 40+ years older, see quite a bit of variability with extreme cases.
 - Sweet spot for more air sealing is in older homes and smaller homes
 - Key highlight – if to target air sealing, go after the older homes and from a % of heating and cooling energy consumption, will do better with smaller homes

- 20-25% of improvement in air sealing is achievable. Once home is at 10 ACH, gets trickier for air sealing
- Snapshot – Residential Space Heating Energy and Equipment (from online responses)
 - Saw single family (SF) homes mostly use gas, SF less than 10% electric
 - Multi-family homes (MF) are about a third are electric
 - Different among utility service territories and electric heating electric utilities – Ameren had high share of electric heating – something to keep in mind in application of heat pumps
 - Furnaces dominate SF and MF
 - Electric side – largely electric furnace or baseboard heat
 - Saw use of small space heaters
 - Saw that those who said 2 or more heating sources said they had ASHP that were linked with gas furnaces
- Snapshot – Nonresidential Space Heating Energy and Equipment (from online responses)
 - Gas dominated (primary energy source)– 2% propane, 22% electricity
 - Furnaces dominated gas heating equipment – furnaces are important still – most respondents used a gas furnace
 - Electric side – a lot of electric furnaces, some heat pumps
 - Will be useful for downstream program planning and opportunities on customer level to engage things

Additional Baseline Work Underway

- Breakouts
 - Mobile Homes – haven't gotten to this yet
 - Statistical review of Large vs Small Nonresidential respondents
 - Recommended utility breakout vs aggregated
- Ongoing data review
 - Share of electric heating, multi-fuel analysis
 - Presence of HPWH (unlikely high shares) –
 - Site visit reconciliation with online results
- Equipment efficiencies and characteristics from site visits

Karen Lusson: In reference to slide 11, how did you determine the size of the 80% AMI population?

- *Rich Hasselman: In the survey, we asked household size and household income. The vast majority of the respondents gave those data points on the residential size, which allowed them to calculate the AMI of a particular respondent. We are trying to learn something about those that are IQ, not trying to reflect the total population.*
- *Karen Lusson: The numbers of IQ and non-IQ and household type were based on the survey, not percentage based on IQ households in Illinois, yes?*
- *Rich Hasselman: Correct. We got good representation across areas and plan to use Census data to scale it up to IQ homes.*

Chris Neme: On slide 16, residential space – these are statewide numbers, yes? There are significant differences in Ameren and ComEd territories.

- *Rich Hasselman: Correct. They were aggregated for simplicity. Biggest one is MF electric heating in Ameren territory.*

Chris Neme: On slide 17, electric heat – the biggest chunk is electric unit heater and electric furnaces. Has this been verified?

- *Rich Hasselman: No, have not verified this yet with site visits – this is the presence of equipment, not the share of energy consumption associated with a certain piece of equipment. From an overall electric resistance heating, a high share of it is electric residential heating.*
- *Philip Mosenthal: A lot of people think furnace means heating system. True electric furnaces are pretty rare.*
- *Rich Hasselman: Agree that there could be some potential terminology questions.*
- *Zach Ross: Question about slide 16 – chart on the right shows there's a high number of electric resistance furnaces. Would be great to gut check that compared to on-site—this has been a persistent and repeated finding in Illinois. If really tens of thousands of electric furnaces out there, then need to be dealing with it. Anything anecdotal in the report would be appreciated.*
- *Rich Hasselman: Agreed.*

Potential Study Observations

Context for the potential study results

- The potential study results are not EE program plans
- Multiple scenarios will be useful to understand the implication of possible program plans
 - May inform draft utility plans
 - Useful for stakeholders to consider the implication of stipulations
- Modeling assumptions and choices point to program opportunities and challenges
 - Addressing policy requirements or constraints
 - Balancing opportunities with finite resources
- Draft or final utility program plans will likely deviate from potential scenarios

Levels and Types of Potentials

- Technical Potential
 - Looking at world of efficiency and equipment and looking at just what is feasible, regardless of cost
 - Provides an upper bound on what might be possible over the forecast time period
- Economic Potential
 - Applying cost effectiveness test. Measures must pass cost-effectiveness test (TRC, with NEIs)
 - Is a subset of technical potential
- Maximum Achievable Potential
 - This case is a bit of a theoretical potential. Assume programs offer 100% of measure cost (whether incremental or full cost)
 - Start applying adopting curves and rates—utilize adoption curves based on WTP survey results
 - Apply typical program costs (i.e. general approach is to use the non-incentive costs per kWh or therm)
 - An upper bound on program opportunities
 - Subset of economic potential (includes program costs, NTG)
 - Not bounded by spending limitations or policy requirements – 100% incentives only
- Realistic Achievable Potential

- Apply typical utility incentives for different measures – sometimes 100%, often not the case though
- Apply typical utility program costs (\$ per unit energy)
- Adoption of measures informed by adoption curves
- A subset of maximum achievable potential
- What programs could do if not bounded by spending caps or other constraints – a step to model constrained potential scenarios
- Scaled things down but a bit more realistic
- Statutory Maximum Achievable Potential (SMAP)
 - Based on Illinois statutes, one form of constrained potential. Is constrained, does not reflect current stipulations.
 - Modeling choices to capture key elements of:
 - Statutory Requirements (e.g. minimum IQ spending. Applied that minimum level of IQ spending, know now that more is happening in the program)
 - Maximum electrification (net MWh), applied to electric utilities
 - Used to understand the possible impact of electrification under other constrained scenarios
 - Elected to say you are allowed to get 10% from 2026-2029; go big on electrification here. Where some ramp up or other choices are useful in alternative scenarios

Key Modeling Inputs and Observations

- Social Cost of Carbon (SCC), Criteria Pollutant NEI.
 - Working group provided GDS with SCC assumptions
 - Value per therm and per MWh across forecast period
 - Utilizes EPA SCC work and reflects changing emissions rates of electricity production
 - As the grid gets greener, as you save a unit of electricity, you get less carbon benefit. Gas is a fairly physical constant for emissions
 - Two choices looking at – will be showing sensitives as get to reporting. Now using assumed 1.5% real discount rate – means carbon has a higher value than if you have a steeper discount rate of the 2%

TRC B/C Ratio is Sensitive to SCC

- SCC value has a substantial impact
 - Measures and programs are very cost-effective
 - Electrification program cost-effectiveness is positive
 - Portfolio B/C results are sensitive to SCC assumptions
 - 70% of electricity benefits are SCC (average over 20 years)
 - 77% of natural gas benefits are SCC (average over 20 years)
 - Point is – SCC moves the needle for cost effectiveness

Electrification Observations and Considerations

- Illinois is early in the electrification process
 - Still in the evolving policy, program, and market discovery phase
 - Heavy natural gas use compared to states with greater experience – particularly in the northeast
- Statutes limit contribution of electrification
 - Natural gas sales likely to be impacted at the margins

- Limited impact on availability of natural gas energy efficiency
- Propane customers are limited, but show positive economic outcome
- Stipulation requirements for IQ spending, billing reductions
 - Places cap on possible non-IQ electrification
 - IQ electrification is generally more expensive to acquire
 - Determination of bill impacts can only occur after project initiation
- General incentives are lower than other jurisdictions w/ more aggressive electrification efforts

Electrification Opportunities, Assumptions

- Programs can leverage IRA over the next plan
 - Tax credits for homes
 - State HEERA (state's electrification program through the IRA) (IQ-focused, 10% multifamily)
 - Will be important if want electrification to grow. More of a policy question
 - Reduce acquisition costs, leverage funding, market pull
- Propane opportunities exist – not a huge source of energy consumption, is economic for the customer
 - Water heating, space heating, forklifts
 - Likely insufficient to “make a market”; difficult to specifically forecast
- Potential study assumes
 - Focused program efforts
 - No major change to incentives
 - Market acceptance will happen and continue
 - Capped at statutory limits (10% for Plan 7, then 15%) for statutory maximum scenario

Electrification: Energy Operating Costs

- Heat map of the relative costs per therm of fossil fuels vs electricity
- Storage water heater chart - If number in chart is positive, there is a bill reduction opportunity; if not positive, no opportunity

Abigail Miner: Clarification on slide 23 chart – is this assuming changes to the current fuel mix?

- *Rich Hasselman: The social cost of carbon one is assuming that there is changes to the electric supply mix, going towards a greener grid and towards to what are the marginal emissions that are out there. Factoring what is forecasted to change in the grid. The forecast came from the Department of Energy's Annual Energy Outlook. The Working Group put this together.*

Chris Neme: When you say 70% of energy benefits are social cost of carbon, that excludes value of avoided capacity and avoided T&D? If so, I think that is misleading. We should include all utility system benefits - energy, capacity, T&D - when making statements about how important GHGs are to cost-effectiveness.

- *Rich Hasselman: This is on purely energy components, not capacity.*

Chris Neme: Question on MAP. Why a HPWH with UEF of 2.6? You can't buy anything from Lowe's or Home Depot these days that has a UEF of less than 3.75.

- *Rich Hasselman: Happy to change it.*

Potential Study Results

Rich Hasselman and Jeffrey Huber, GDS Associates

General Notes

- Are 90% there with study results, some refinements need to be done
- Uses TRM
- Layered on a bit of emerging technologies – targeting major end uses. Made an assumption on what to do with equipment that is already efficient – if something is already 30% efficient, those can come back in
- The cost incentives and non-incentives were tied to recent historical levels

Overall Electric Summary - ComEd & Ameren Combined, Electric Energy Efficiency Only

- Cumulative annual savings over time
- Unconstrained by overall budgets
- Unconstrained RAP is 7% through 2029, over 20% by 2045

Residential End-use breakdown of RAP - ComEd & Ameren Combined, Electric Energy Efficiency Only

- Opportunities emphasize HVAC and DHW – Domestic Hot Water
 - Is without electrification
- Limited lighting (excludes EISA lamps)
- HVAC equipment shrinks over time
- Shell measures increase

Residential Breakdown of Achievable Potential (Housing/Income Type) - ComEd & Ameren Combined, Electric Energy Efficiency Only

- Shares in the marketplace held constant
- Ongoing opportunities for MR and IE
- Housing stock and savings dominated by single family
- Multifamily and IE are important shares

Nonresidential Breakdown of Achievable Potential (end use)

- Near-term significant lighting, decreasing over time
 - Phasing out the lamps themselves, not the network lighting controls. Still opportunities for lighting controls.
- Other end-uses grow to fill the gap
- Long-term EE opportunities across end-uses

ComEd – RAP to Statutory Maximum (SMAP) (General)

- 10 percent electrification may not be realistic (big step change from current)
- Serves as a contrast to other constrained potential scenarios - not a program plan
- Significant realistic achievable spending and savings
 - Demonstrates scaling effect of constrained budgets
- From an unconstrained standpoint, the impact of electrification is not impacting gas enough that it was needed to reconcile

ComEd Statutory Maximum (SMAP) – ComEd Electric Energy Efficiency and Electrification

- On an incremental annual look
- Residential MR and IQ savings constrained by funding
- Nonresidential spending close to RAP savings level

- Home Energy Reports at current levels
- No prioritization for lower cost measures
 - Scaled to RAP potential
 - Other scenarios will explore prioritization
- Budgets increase by rate of inflation
- Savings include converted claimed gas and electrification

Ameren Electric – RAP to SMAP

- 10% electrification not realistic (would require large program shift & ramp)
- Serves as a contrast to other constrained potential scenarios - not a program plan
- Demonstrates scaling effect of constrained budgets
 - Constraint being in residential and income qualified

Ameren Electric Statutory Maximum (SMAP)

- Residential MR and IQ savings constrained by funding
- Non-Residential spending close to RAP savings level
- No current Home Energy Reports
 - Identified in RAP
 - Scaled with other measures
- No prioritization for lower cost measures
 - Scaled to RAP potential
 - Other scenarios will explore prioritization
- Budgets increase by rate of inflation

Top Measures by Sector – RAP and SMAP, 2026-2029 Average

- Wide range of measures / end-uses in residential
- More lighting focus in Nonresidential
- Top 15 in Residential = 77% of residential opportunity
- Top 15 in Nonresidential = 65% of nonresidential opportunity

Overall Gas Summary – Nicor Gas and Ameren Gas Combined, Gas Efficiency

- 33% TP by 2045
- 19% RAP by 2045
- ~50% of RAP is non-low income residential, ~25% IQ, ~25% C&I

Residential End-Use Breakdown of RAP – Nicor and Ameren Combined, Gas Efficiency Only

- HVAC and Hot Water equipment show highest opportunities
- Hot water decreases over time
- Building shell increases over time

Residential Breakdown of Achievable Potential (Housing/Income Type)

- Shares in the marketplace held constant
- Ongoing opportunities for MR and IE
- Housing stock and savings dominated by single family
- Emerging tech important to achieve savings outcomes

Nonresidential Breakdown of Achievable Potential (End Use)

- HVAC Equipment is the major category
- Hot water and industrial process heat are also important

- Relative opportunities steady through forecast

RAP to SMAP – Nicor Gas (General)

- Substantial opportunity for savings – budget scaling only allows for capturing a portion
- Impact of electric utility electrification will not diminish remaining opportunities, given budgets
- Nonresidential able to achieve close to RAP savings level

Nicor Gas Statutory Maximum (SMAP)

- Higher savings due to higher expected overall budget (rises to \$60MM)
- IQ spending at full cost for measures
 - Constrains savings
 - Indicates higher acquisition cost
 - Other scenarios will use higher budgets for IQ
- Primary opportunities under statute
 - Nonresidential – lower acquisition cost
 - Market rate residential

RAP to SMAP – Ameren Gas

- Substantial opportunity for savings – budget scaling only allows for capturing a portion
- Impact of electric utility electrification will not diminish remaining opportunities, given budgets
- Nonresidential able to achieve close to RAP savings level

Ameren Gas Statutory Maximum (SMAP)

- Similar to current spending and savings
 - Similar acquisition costs in SMAP
 - Some variance due to SMAP IQ budget
- IQ spending at full cost for measures
 - Constrains savings
 - Indicates higher acquisition cost
 - Other scenarios will use higher budgets for IQ
- Primary opportunities under statute
 - Nonresidential – lower acquisition cost
 - Market rate residential
- Nicor budgets are higher and so see proportionally higher savings

Top Measure by Sector

- Heating equipment and controls are key opportunities in both sectors
- Water savings remains important source of savings
- Building shell (including emerging tech) important for residential
- Boiler and process measures important for nonresidential

Elder Calderon: In reference to slide 34 - Is this SMAP? This looks like the RAP profile?

Chris Neme: You show spending increasing by inflation within the next plan cycle, but they shouldn't. They only increase by inflation from one four-year plan cycle to the next. Within cycles, I believe budgets remain fixed at the same annual value for each year in the cycle.

Chris Neme: I suspect Ameren gas budgets should also be assumed to increase as they have also experienced higher gas prices. I don't think that's permitted. Statute sets annual budget for four-year cycles. Whatever is increased by is fixed for four-year cycle. A lot of the increase in the Nicor budget was clearing of gas.

Seth Craigo-Snell: Recognizing that there is not time today to take a deep dive into this question, I am really struggling to understand how the individual measures that are presented in slide 37 were chosen/identified. There are several of these measures on both the residential and nonresidential side that don't make sense to me as key measures (e.g., on the residential side: refrigerators, ground source heat pumps and on the non-res side: Advanced power strips). So, I guess my questions are: What are the driving parameters in the modeling for the development of these measure listings? Are these scenarios (RAP and SMAP) budget limited?

Karen Lusson: We should have a conversation about the quality and value of the current Home Energy Reports. The information provided to the customer is so minimal about what steps can be taken to improve their energy usage. I've received them (at all different levels of energy usage) and I'm always amazed at the lost potential to provide information to customers about energy usage and how to reduce it. And my own very anecdotal evidence of recipients' view of these is that their reaction is, "What are these and why are they telling me this?" In other words, they go directly to the bin.

- *Celia Johnson: I suggest we cover that question when the utilities present their draft EE Plans this fall*

Closing and Next Steps

Follow-up Questions on Key Baseline Study Findings:

1. Kari Ross – Do you know if the buildings involved in these visits had previously opted-into EE C&I programs or not?
2. Karen Lusson – Will you be presenting a slide on residential cooling potential?
3. Seth Craigo-Snell – Do we have any information from the study about heat delivery through the homes (forced air vs water vs steam)?

Follow-up Questions on Potential Study Results:

1. Seth Craigo-Snell: I am really struggling to understand how the individual measures that are presented in slide 37 were chosen/identified. There are several of these measures on both the residential and nonresidential side that don't make sense to me as key measures (e.g., on the residential side: refrigerators, ground source heat pumps and on the non-res side: Advanced power strips). So, I guess my questions are: What are the driving parameters in the modeling for the development of these measure listings? Are these scenarios (RAP and SMAP) budget limited?