IPL Resource Evaluation Study
IEC, ELPC, and Sierra Club Comments – Stakeholder Meeting 2
May 8, 2024

IEC, ELPC, and Sierra Club appreciate the opportunity to participate in the IPL Resource Planning process and to provide comments in response to the March 26th meeting and materials that IPL shared as part of that meeting. We write to share some recommendations to make this collaborative process work effectively and efficiently going forward.

I. IPL should rely on up-to-date resource cost and operational assumptions that are transparently calculated and unbiased.

First, IPL should clarify the source of its resource cost assumptions and how it calculated the values used in the model. In the capital costs provided to stakeholders, IPL cites IPL Market Analysis, EIA 2023 AEO, and the NREL ATB 2023 as references for new resource costs. But it's not clear how the values the company relied on were calculated based on these sources. For example, we could not locate or otherwise derive the resource costs for storage technologies from the reference indicated in the April 17th comment reply. Additionally, IPL forecasts an increase in resource costs in the year 2030. These cost increases are inconsistent with the learning rates provided by the NREL ATB 2022, or the NREL ATB 2023 and are not properly justified by IPL.

Second, IPL should eliminate the systematic bias against clean energy resources and in favor of gas, nuclear, and carbon capture and sequestration in its resource cost and assumptions and modeling constraints. The capital costs adopted by IPL for the Utility Scale Solar PV and Onshore Wind - IA are more expensive than the reference cost in the EIA 2023 AEO. Alternatively, the capital costs adopted for the Gas Peaker RICE and Nuclear SMR resources are less expensive than the reference cost. To explain this discrepancy between IPL's cost assumptions and industry benchmarks, IPL referenced Market Analysis and Alliant Energy's direct experience in soliciting and procuring potential projects in its service territory. In other words, the Company claimed that its technology costs were benchmarked to real world views and not just the EIA AEO. But this explanation is insufficient because:

1. While it is true that prices for renewable projects have been higher over the past few years, this trend is not expected to continue over the long term.
2. Renewables are not unique in facing supply chain and inflationary challenges - these forces have also affected conventional technologies including gas plants. And IPL provides no explanation for the significant discount it applies to gas and nuclear projects relative to industry sources.
3. It's unclear what direct experience IPL has related to SMR given that there are no SMRs deployed commercially by Alliant or any other electric utilities in the U.S. today.

Third, IPL should eliminate the resource build limits it is imposing in the IPL-Company modeling. IPL is limiting total resource builds to [redacted] for each resource type for solar, wind, and battery storage. The Company is also limiting annual additions for solar [redacted] wind [redacted] and battery storage (varies). The [redacted] annual limit for wind in particular is very concerning. By

limiting the amount of new renewables that the model can build both cumulatively and in each year, IPL is limiting the model's ability to deliver a truly optimized portfolio.

Fourth, IPL should clarify which tax credits and bonus adders it is eligible for and which it is not. This will make it clear why it has included certain ones in its analysis and omitted others. For example, we understand that IPL modeled the investment tax credits (ITC) and production tax credits (PTC) and included the energy communities adder. We are unclear about whether the possibility for additional tax credits for constructing projects with domestic content or in energy communities has been considered. Inclusion of either credit in a realistic manner will improve the Company's planning and help reduce costs for customers.

Fifth, it is our understanding that IPL could locate at least some of its new resources at the sites of existing assets, particularly assets that are candidates for retirement. Co-locating new resources at the site of existing resources can offer numerous benefits. By utilizing the same interconnection as an existing resource, IPL should be able to reduce costs by utilizing existing infrastructure. These projects should also be eligible for the energy communities adders (i.e. bonus tax credits) under the Inflation Reduction Act (IRA), as they are located at the site of an existing coal plant and are therefore located in an energy community. Additionally, projects at these sites are eligible for Energy Infrastructure Reinvestment (EIR) financing. IPL has submitted an EIR application to the Department of Energy that would include specific new resource proposals at the site of existing resources. In its response to data requests from ELPC, IEC, and Sierra Club on April 17, IPL has refused to disclose the application, and therefore RES participants are unable to understand, analyze, and incorporate IPL's current course of action into the planning process.

Sixth, IPL should evaluate its thermal capacity ratings and forced outage assumptions for its new and existing thermal units (and historical data on unit performance during extreme weather) to ensure its capacity accreditations adequately reflect correlated outages and the correlation between outages and temperature.

Seventh, IPL is relying on unrealistically optimistic deployment assumptions for advanced technologies, including carbon capture and sequestration (CCS) and hydrogen (H2) conversion. In the MISO-wide runs, IPL allows CCS to be deployed at existing coal plants as early as 2029 and CTs can be converted to operate on H2 as early as 2030 in the continuing industry change (CIC) runs. We consider it unrealistic to assume these technologies will be deployed at scale in the next 5-6 years, as neither are currently in commercial operation today at the utility scale. Additionally, IPL's modeling assumptions assume only a [redacted] capacity de-rating after CCS conversion, while EPA calculations estimate that capacity de-rating for CCS will be above 40 percent. IPLs' modeling of an optimistic timeline and capacity de-rating assumption leads to concerning and unrealistic portfolio results. Specifically:

- In the CIC scenario, the model installs CCS at an existing coal plant in 2029 and builds new coal with CCS later in the planning horizon (2042).
- In the aggressive decarbonization (AD) portfolio, IPL deploys CCS retrofits on [redacted] of coal and gas in 2028. By 2035 that number is up [redacted] for gas CCS retrofits and [redacted] of coal CCS retrofits.

The lack of transparency with renewable cost trajectories, the high renewable resource cost forecast, the treatment of renewable tax credits, and CCS assumptions together show a concerning trend of disadvantaging renewables in IPL's modeling. These factors, in addition to the constraints on thermal retirements that IPL imposes in some of its scenarios (discussed below), combine to systematically disadvantage non-emitting renewable resources while favoring expensive technologies and fossil fuels in IPL's modeling runs. This results in modeling results that are skewed and unrealistic.

Recommendations

1. IPL should clarify the source of its new resource cost assumptions, explain how it calculated the input cost assumptions used in the model, and provide stakeholders all of its resource cost workbooks.
2. IPL should explain the divergence in cost assumptions between industry sources and its own data, and adopt more realistic cost assumptions that are less biased against clean energy resources.
3. IPL should run scenarios with the annual and overall MW constraints on solar, wind and BESS eliminated.
4. IPL should model the domestic content adder under the ITC.
5. IPL should explore opportunities to co-locate clean energy replacement resources at the site of retiring fossil resources.
6. IPL should provide parties its complete EIR application so that all participants in the RES can analyze and understand how to model IPL's current plans at existing fossil fuel locations.
7. IPL should update its capacity ratings for its thermal plants to properly reflect the outage risks.
8. IPL should explain the basis of its CCS build assumptions, starting as early as 2028 in some scenarios, and model more realistic deployment of CCS .

II. IPL should model more DSM as part of a cost-effective resource portfolio.

IPL does not include demand side management (DSM) as a candidate resource in the MISO regional model. Instead DSM is included as a flat capacity resource over the study horizon for all zones. No growth in DSM is assumed during the study period.
Thus, IPL assumes that it will not deploy any new DSM incremental to what it invested historically (or only incremental DSM sufficient to replace expiring measures). Demand-side resources are a critical component of a least-cost resource mix. The optimal level of cost-effective DSM investment for IPL should be determined based on its load, its current supply side resource mix, and its current DSM programs – it should not be based on historical investment levels. And given that IPL has historically underinvested in DSM, there should naturally be substantial cost-effective DSM opportunities available to it. There are two approaches that IPL could take to evaluate how much cost-effective DSM is available to the Company:

1. IPL could perform a robust DSM potential study that identifies the cost-effectiveness of different DSM measures, evaluate how each cost effective DSM measure would impact load, and develop a load profile that incorporates all cost-effective DSM resources.

2. The Company could identify cost-effective demand-side measures, evaluate the cost and potential savings associated with each, and model specific DSM measures as selectable resources in its capacity expansion model.

III. IPL should rely on data and assumptions that are consistent between the MISO Aurora model and the IPL system modeling.

There are a number of differences between the modeling assumptions that IPL relied on for its MISO-wide and the Company-only modeling that are concerning and not clearly explained. These differences appear to make renewables look less attractive to IPL than they are across MISO more broadly, and to keep existing fossil resources on IPL's system for a longer period than in the MISO analysis.

First, IPL relies on different retirement dates assumptions for its MISO modeling than it uses in its company level modeling. Specifically, in Stakeholder Meeting 1, IPL presented one set of retirement dates for its thermal resources that differ from the retirement dates in the MISO-wide Aurora modeling files provided by the Company. The table below shows the resource depreciation years as indicated in the RES Stakeholder Meeting 1 presentation and the modeled retirement years in the MISO Aurora Model. When asked about this in discovery, IPL indicated that the MISO model was designed to provide a regional perspective and the IPL one a utility specific perspective. But that does not answer the question of why the Company is not using consistent retirement dates for its resources in both pieces of analysis.

Resource	RES Meeting 1 Depreciation Year	Model Resource End Year
Prairie Creek 1&3	[redacted]	[redacted]
Neal 3	[redacted]	[redacted]
Neal 4	[redacted]	[redacted]
MGS CC	[redacted]	[redacted]
Marshall Town CT 1-3	[redacted]	[redacted]
Lime Creek 1&2 (oil)	[redacted]	[redacted]

Second, the Company's new resource cost assumptions appear to be different, across the regional and utility-specific modeling, and its assumptions around whether resource costs are expected to decline are not aligned between the MISO wide and IPL specific modeling. For example, for the MISO-wide modeling, IPL assumed that solar costs are currently just over [redacted]. For the IPL modeling, on the other hand, the Company assumes that solar costs will start at above [redacted] for the entire study period. A similar trend is displayed for wind and battery storage costs and trajectories. These are significant differences in cost assumptions. Once again, IPL attributes its

cost assumptions and the differences in its assumptions between MISO and IPL modeling to Alliant's direct experience in soliciting and procuring potential projects in its service territory. But this doesn't explain why IPL is relying on different costs and different cost trajectories. IPL's current assumptions will result in fewer renewables being deployed in IPL's service territory than across MISO more broadly.

Recommendation

1. IPL should rely on cost and operational assumptions that are consistent across its modeling, or else robustly justify the differences.

IV. IPL should remove unnecessary constraints in the model and allow the Aurora model to identify an optimized resource portfolio.

The Aurora model, which IPL is using for the current resource planning exercise, has two main functions: a capacity expansion function, which is designed to optimize resource portfolio decisions, and a production cost function, which is designed to optimize the dispatch and operation of the selected resource portfolio.

The capacity expansion model identifies the most economic resource portfolio available to meet system load and demand, subject to reliability, operational, and environmental constraints. It does this by looking at the economics of all existing and potential new resources and identifying unit retirements and resource additions that minimize system costs.

1. For unit retirements, the model should look at the full forward-going costs required to operate each unit, system needs, and new resource options. The model should then determine whether the most economic way to meet system needs is for the utility to continue relying on the unit or retiring it and replacing it with alternatives.
2. For new resource options, the model should look at the cost to build and operate a new resource relative to the cost of other new resources, as well as the avoidable cost of continuing to rely on existing resources.

The Aurora model can only make optimized retirement and resource build decisions if it is allowed to do so. This means that the model needs to be allowed to both make (unconstrained) resource retirement decisions and resource addition decisions.

Optimize unit-level retirement decisions

IPL must allow the Aurora model to make economic retirement decisions in both the MISO-wide regional capacity expansion and in at least one scenario for IPL's own system. When IPL performs capacity expansion for its own system, it should allow economic retirement of any coal plant owned or co-owned by IPL. Even for plants that IPL does not operate, the IRP should be a tool to explore opportunities to exit or retire these units earlier than planned to save money for ratepayers. Our understanding is that IPL does not intend to allow the model to make an economic retirement decision for either Neal 3, Neal 4, or Louisa, and is providing a very limited retirement window for the model to optimize the retirement of Ottumwa (between 2030 and 2034). This is concerning.

While it is reasonable for a utility to model scenarios with specific retirement dates programmed in, it is best (and standard) practice in an IRP for a utility to also run a fully optimized scenario where the model is allowed to select economic retirement dates for its existing resources and be relatively unconstrained with its new resource additions. While the optimized portfolio often deviates from the Company's ultimately selected Preferred Portfolio, modeling an optimized portfolio provides essential information on the resource procurement decisions the Company should be pursuing. For example:

1. If the model deploys 1 GW of new solar in 2026, that is telling IPL that it is economic to procure a large quantity of solar PV as soon as possible. While there may be logistical reasons why it's challenging to deploy that quantity over that timeframe, the Company now knows that limiting solar deployment, below 1GW in 2026 in this example, is an uneconomic, suboptimal path to portfolio expansion.
2. If the model retires a coal plant in 2026, that is telling IPL that this plant is not economic, and the Company should prioritize the procurement of replacement resources to retire the plant as soon as possible. Even if the Company cannot bring replacement resources online by 2026, it at least knows that its lowest-cost option is near-term replacement.

Optimize resource addition decisions

It is also critical for IPL to allow the model to make relatively unconstrained resource addition decisions. That means removing or minimizing constraints on individual resource additions as well as system-wide resource constraints. And any constraints that are in place should be made clear. Otherwise, the model is likely to produce a result that is driven by IPL-imposed constraints and not resource economics.

For example, the "aggressive decarbonization" (AD) scenario includes a carbon emissions cap and a higher load forecast than the "continuing industry trends" (CIC), or reference scenario. Both of these factors should lead to the deployment of more renewable generation capacity in AD portfolios. However, in the AD scenario, the resulting portfolio has only about 10 percent more wind and 20 percent more solar than the CIC scenario. At the same time, the model installs almost 17 GW of carbon capture and sequestration on coal and gas plants in the AD portfolios. This overreliance on an emerging technology is concerning, especially in light of the final Clean Air Act section 111 rule that requires emissions level equal to 90 percent carbon capture for coal plants that want to operate beyond 2039.

This result is driven by a [redacted] MW annual economic retirement limit in the capacity expansion model's settings in the AD scenario. While this limit is incremental to the planned retirements in the model, which average over [redacted] per year, these planned retirements are heavily front loaded. With such limited opportunity for economic retirements, especially further out in the planning horizon, the model is selecting CCS when retirement and replacement of thermal resources is likely the lower-cost option. MISO is a large region that currently has approximately 114,000 MW of coal and gas capacity in total. Restricting economic retirements to [redacted] a year, which is just over [redacted] of MISO's total installed capacity, will unnecessarily increase costs in an aggressive decarbonization scenario. MISO as a whole will realistically be able to replace much more than [redacted] of retired capacity per year. In the CIC scenario, the retirement limit is relaxed to [redacted] per year.

Recommendations

1. Model a fully optimized scenario where the Aurora model is allowed to select plant retirement dates based on the full forward-going costs of continuing to operate each unit relative to alternatives.
2. Program in the full, avoidable, forward-going costs required to operate existing units, inclusive of sustaining capital costs, projected environmental capital costs, fixed O&M, variable O&M, fuel, and all other non-avoidable costs.
3. Model specific retirement scenarios separately from the fully optimized model runs, including the scenarios suggested below.
4. Remove annual constraints on thermal retirements in MISO, or else use an annual constraint that is justified by MISO reliability analysis.
5. Provide the reference output database (.xdb) so the parties can better understand what IPL is modeling.

V. IPL should evaluate the economics of the co-owned Neal and Louisa units (in addition to Ottumwa) in its Aurora modeling.

IPL operates and has a majority ownership share at Ottumwa. This plant is included in the Aurora modeling, and IPL proposed modeling early retirement of Ottumwa in 2034, along with Neal 3 and 4, in only the Advanced Decarbonization Scenario.

The Company is also a minority co-owner of the Neal 3, Neal 4, and Louisa plants, which are operated by MidAmerican Energy Company. For these plants, IPL did not provide any modeling cost projections or other inputs on the plants operated by MidAmerican. IPL has indicated its intention to model early retirement of Neal 3 and Louisa in one of its scenarios to match the one retirement scenario that MidAmerican proposed to model.

While it's reasonable for IPL to be informed by MidAmerican's data and analysis on Neal 3, Neal 4, and Louisa, this decision to defer to MidAmerican's analysis is concerning for a number of reasons.

First, MidAmerican has a different system than IPL, therefore the economics of the plant for MidAmerican are likely much different than the economics for IPL. IPL must examine how well the co-owned coal plants fit with its own resource mix and justify its decision to continue relying on the plants to serve its native load.

Second, as mentioned above, MidAmerican is planning to model early retirement of only two units (Neal 3 and Louisa) in one of its scenarios. This scenario provides an extremely limited view on the economics of continued reliance on the co-owned coal fleet. Especially since MidAmerican's own 2019 internal study identified two units as uneconomic, as did a separate study conducted on its behalf, which provides a strong justification for IPL to evaluate alternative retirement scenarios, especially if MidAmerican will not expand its retirement analysis.

If neither IPL or MidAmerican perform comprehensive retirement analysis as part of the RES process, then it falls to intervenors and stakeholders to do the modeling. This modeling is work

that IPL is obligated to do and should do, as a regulated monopoly. For example, ELPC, IEC, and Sierra Club requested data on forward-going costs of all the company's coal plants, including the MidAmerican operated plants. IPL responded by stating that stakeholders should contact the operator of the plant. *See* IPL responses to IEC, ELPC, and Sierra Club questions from April 17. IPL's modeling will be more accurate if it incorporates this information into its modeling, and as a co-owner, IPL should have access to this information from MidAmerican. Similarly, MidAmerican's RES will benefit from using IPL's forward-going costs for Ottumwa as the best available information on costs related to that plant. IPL should provide that information to MidAmerican for its RES or, at a minimum, allow ELPC, IEC, and Sierra Club to use that information in our modeling in that process.

While the Company and its shareholders may have an obligation to the other plant owners, IPL's ratepayers do not. From a resource-planning perspective, resources that are co-owned must be modeled to understand how they fit with the rest of the Company's portfolio. If co-owned resources are uneconomic, IPL should work with the co-owners to develop a retirement or transition plan. If the co-owners are unwilling to retire the plants, IPL should consider selling its shares or transferring them to an unregulated arm to remove the economic burden from ratepayers. If there are barriers to retirement, such as an undepreciated balance, IPL should work to understand if there are ways to address that barrier.

IPL should consider how existing programs and regulations could address barriers and otherwise impact retirement. The Department of Energy's Energy Infrastructure Reinvestment (EIR) loan program could help finance the transmission, generation, and other infrastructure needed to retire its coal plants. The EIR will provide up to $250 billion in loans for companies to invest in infrastructure that reduces emissions. IPL should thus include a discussion of the potential benefits to customers from EIR loans, especially those that help replace uneconomic thermal plants with non-emitting energy. In addition, the final greenhouse gas rules under section 111 of the Clean Air Act will impact the cost and viability of operating the Company's coal units beyond 2030. These are factors that IPL must consider in conducting its resource planning and retirement analysis.

Recommendations

1. Evaluate the retirement of Ottumwa no later than 2027.
2. Evaluate the retirement of Ottumwa, and the Company's share of Neal 3, Louisa, no later than 2027/2028 or another similar year under a staggered retirement schedule.
3. IPL should request forward-going costs from MidAmerican to incorporate into its modeling in the RES.
4. IPL should provide its forward-going costs for Ottumwa to MidAmerican and allow stakeholders to use that information in their modeling in the MidAmerican RES.
5. Evaluate how existing rules, such as the final greenhouse gas rules under section 111 of the clean air act impact retirement analysis.
6. IPL should evaluate whether the EIR program provides value and benefits to ratepayers in retiring Ottumwa, and include those benefits in its modeling.

VI. IPL should include all final environmental regulations in its base and alternative scenarios.

On April 24, the U.S. EPA finalized its proposed greenhouse gas rules under section 111 of the clean air act. This rule will affect the economics of IPL's coal plant operations, as well as any decisions to add new gas capacity. Specifically:

For coal plants:

- If planning to operate beyond 2039, a plant will be required to meet a standard based on 90 percent capture of CO_2 by January 1, 2032.
- If planning to operate beyond 2032 but retiring before 2039, a plant will have to meet a standard based on 40 percent co-firing on natural gas by January 1, 2030.
- If planning to retire by January 1, 2032, nothing is required.
- Plant can also convert to operate entirely on gas instead and avoid 111d compliance altogether.

For new gas plants:

- If planning to operate above 40 percent capacity factor, a plant will be required to meet a standard based on 90 percent capture of CO_2 by January 1, 2032.
- If planning to operate between 20 and 40 percent capacity factor, standard will be based on efficient operation of a simple cycle turbine.
- If planning to operate below 20 percent, standard is based on low-emitting fuel.

Currently only the AD (aggressive decarbonization) scenario considers the 111 rules. Given that these finalized rules will affect the economics of all of IPL owned and co-owned coal plants, the Company should model the rule in all scenarios, including the CIC (continuing industry trends) scenario. As discussed above, right now the Company's AD scenario has strict constraints on the quantity of thermal resources that can economically retire each year in MISO ([redacted] Because of this unrealistic constraint, the resulting portfolio relies on a large quantity of CCS, including [redacted] of coal and gas retrofits by 2028 and over [redacted] of new gas with CCS and [redacted] of coal with CCS retrofits by 2035. This is not a reasonable assumption for the timeline of economic deployment of CCS. The final rules further underscore the importance of removing the retirement constraint. Retirement can be the most economic way to comply with new rules and that should not be arbitrarily constrained in IPL's modeling.

Recommendations:

1. IPL should update its modeling and include the 111 rule in all its scenarios, not just the AD scenario.

Respectfully submitted this 8th day of May 2024.

/s/ Joshua T. Mandelbaum

Joshua T. Mandelbaum
Environmental Law & Policy Center
505 5th Avenue, Suite 333
Des Moines, Iowa 50309
P: (515) 244-0253
jmandelbaum@elpc.org

/s/ Michael R. Schmidt

Michael R. Schmidt
Iowa Environmental Council
505 5th Avenue, Suite 850
Des Moines, Iowa 50309
P: (515) 244-1194 x212
schmidt@iaenvironment.org

/s/ Sunil Bector

Sunil Bector
Joshua Smith
Sierra Club
2101 Webster, Suite 1300
Oakland, CA 94612
Sunil.Bector@sierraclub.org
Joshua.smith@sierraclub.org