# Renewable Energy Policy Recommendations for the Indiana Utility Regulatory Commission

## A Scenario Evaluation Approach

PREPARED FOR

**INDIANA UTILITY REGULATORY COMMISSION**

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PROPOSED BY

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# 1.0 ABSTRACT

This capstone investigation evaluates policy tools that the Indiana Utility Regulatory Commission (IURC) could possibly utilize to facilitate an equitable and efficient increase in the amount of renewable energy sources in Indiana's electricity generation portfolio. The investigation explores the policy actions that could be used to incentivize the deployment of more renewables and examines the challenges associated with implementing such approaches. Because the integration of renewable energy resources into Indiana's grid should take place without sacrificing energy efficiency and transmission effectiveness, reliability and cost effectiveness were also examined.

To accomplish the overall goal of this evaluation, a series of objectives is completed. First, an initial investigation is performed that assesses the context in which any possible changes could take place. Within this context, various factors and their relationships are identified. Second, an evaluation of the historical and current trends in the development of renewable energy sources is completed and the select factors that have influenced these trends prioritized. Third, based on these findings, three policy tools, or "levers", that the IURC could use to enact and/or facilitate enhancements to the level of renewable penetration are explored. These levers include: the relationship between the IURC and MISO (Midcontinent Independent System Operator), engaging with stakeholders, and enhancing Integrated Resource Planning. The effects of the factors on the proposed policy levers were analyzed through a series of scenarios. The analysis explores the degree of influence of the primary factors as well as their possible interactions along with their probability of occurrence.

Results of the analysis indicate that within the context of Indiana's current energy portfolio and regulatory system, it was determined that the IURC could employ additional policy levers to promote the development of renewables as a core component of the state's energy portfolio.

# 2.0 INTRODUCTION

## 2.1 Purpose

This purpose of this evaluation was to investigate a suite of policy tools and provide the Indiana Utility Regulatory Commission (IURC) with a set of recommendations that they could potentially employ to increase renewable market penetration into Indiana's Energy generation portfolio. This evaluation employs a scenario approach to assess important factors that could influence a set of defined policy tools.

## 2.2 Objectives

This evaluation is conducted by masters-level graduate students as part of a final practicum in the degree program (V600 capstone course) at the O'Neill School of Public and Environmental Affairs, Indiana University - Bloomington. This solution-focused evaluation allows the students to apply their academic training to address a real-world policy problem with an actual client, the IURC. The report is compiled to assist the IURC in assessing a renewable energy future that is sustainable through practical regulatory solutions. Using a multi-disciplinary approach that incorporates tools and techniques from public policy analysis, economic assessment, business management, and natural science—the report explores the challenges and possible solutions of increasing Indiana's renewable energy generation portfolio. The objective of this investigation was to develop a suite of recommended policy actions, (termed "levers"), that could be used to help the Commission facilitate the transition of Indiana's generation portfolio to be more diverse and less fossil fuel based. An assessment of the potential effectiveness of employing these levers is based upon various considerations or "factors" that influence their functionality. The evaluation employs a scenario analysis to assess the influence of selected factors on the proposed policy levers. The results of this scenario analysis provide the IURC with recommendations regarding what policy levers could be employed and how effective they might be toward incentivizing the enhancement of renewables in the state. The evaluation generates a report that is the product of both the O'Neill students and representatives of the client, the IURC.

## 2.3 Organization

This evaluation is centered on one key research question: how can the IURC implement various policy tools, including rules, regulations, and practices to further promote the diversification of Indiana's generation portfolio? To answer this question, the capstone team surveys the technical, economic, policy, and stakeholder landscapes, determines national trends and relationships concerning renewable energy generation, and then examines these factors in the state of Indiana. Of particular importance was the determination of what other state regulatory entities have done and are currently doing to address this objective. Of interest is the discernment as to which policy solutions are implemented in changing political, economic, and technical landscapes. The result of this contextual research is outlined in Section 3.0. The factors and circumstances that are determined to be important were then used to develop a suite of policy tools or levers. To assist in this process, a series of case studies of actions involving other public service commissions is investigated. This analysis process is described in Section 4.0 of the report. Determining which of the factors investigated would be crucial in facilitating the success of a given lever was assessed through qualitative scenario analysis. The results of the qualitative scenario analysis are described in Section 5.0. This is followed by a discussion section which describes the limitations and assumptions used in the analysis (Section 6.0). Lastly, the results are synthesized, along with recommendations to the IURC in Section 7.0 and 8.0. While the conclusions of this investigation are preliminary, it is hoped that aspects of them could be built upon in the future, and that they will be useful for enriching the conversation about regulatory approaches for promoting the deployment of renewable energy generation resources in Indiana.

# 3.0 BACKGROUND & CONTEXT: Renewable Energy in Indiana

The landscape in which renewables are being developed within the United States was examined to contextualize potential policy actions that the IURC could employ. The analysis was divided into four categories: policy, technological, economic, and stakeholder interests. Research was conducted on each category to understand how the factors and circumstances within each of these domains could impact proposed policy actions for the commission. These policy actions are hereafter referred to as "levers." Within these landscapes, there are a number of factors that will influence the potential functionality of the proposed levers. Some of these factors are common within two or more of the explored landscapes, including technological innovation and collaboration between the government and private parties. Factors include renewable technology development, renewable energy pricing, legislative makeup and action, and stakeholder involvement.

## 3.1 Indiana State and Regional Energy Development

The electricity-generating sources of Indiana have mainly consisted around the use of fossil fuels. The U.S. Energy Information Administration (EIA) released a profile of energy use showing a dominant use of coal and natural gas in Indiana, although coal use has decreased in recent years. Even with these decreases, Indiana remains the nation's eighth largest coal producer and second largest coal consumer (by volume), after Texas (US EIA, 2019). Most of Indiana's coal production is used for industrial purposes within the state, with the remaining industrial need primarily supported by natural gas. In recent years, natural gas has increased as a share of total energy generation (by source) in Indiana. The increase of natural gas energy generation is due to its relatively low cost and increasing environmental regulations regarding coal use. **Figure 1**, found below, displays energy generation within Indiana by source as a percentage for both 2008 and 2017.

### 3.1.1 Indiana's Energy Sources Breakdown

Natural gas has increased its market share in Indiana by 6% between 2016 and 2020, largely at the expense of coal. In fact, natural gas usage In Indiana for electricity generation has increased five-fold in the last decade from 35,576 to 225,699 million cubic feet (US EIA, 2019). Many energy companies nationally have begun to phase out coal powered plants, reducing the amount of coal on the grid (Carbon Brief, 2019). A couple of reasons for reduction in coal energy generation have been directives from environmental legislation and pressure from interest groups, as well as the proliferation of low-cost natural gas. An example of this circumstance is Virginia, where new legislation, combined with environmental activism, has caused the state government to begin phasing out all coal electricity plants by 2024 (Schneider, 2020), with the goal of being carbon free by 2050.

While the development of renewable sources of energy in the State of Indiana has increased, renewables represent only a small fraction of Indiana's energy portfolio. As of 2020 wind is the most developed renewable energy resource within Indiana, representing 5% of total net electricity generation (US EIS, 2019). It should be noted, however, that many counties in Indiana have recently prohibited the construction of wind turbines within their borders. The main reasons for these restrictions have been land use conflicts, noise pollution concerns, and aesthetic qualities. Much of the land suitable for wind turbine construction is agricultural, and many farmers do not want to relinquish viable agricultural land for wind farms, despite the fact that farm fields can still be used with wind farms on the land (Haggerty, 2019). Within Indiana, however, most of the pushback has actually not come from farmers, but from homeowners who see wind farms as a threat to property value and overall quality of life (Bangert, 2019). Solar energy resources, facing similar land requirement constraints, are developing at a relatively slow rate, with much of the production coming from the Southern regions of Indiana. This is also the area where solar potential is the greatest. Other sources of renewable energy, including hydropower and geothermal, represent a very small share of Indiana's energy portfolio. It should be noted that the US Department of Energy recently identified two non-power dams along the Ohio River as being in the top five locations for potential capacity of hydroelectric power in the country. As major rivers have historically served as state borders, both the selected dams straddle the border(s) between Kentucky and Indiana, so Indiana could benefit if these dams are ever outfitted for hydropower (DOE, 2012).

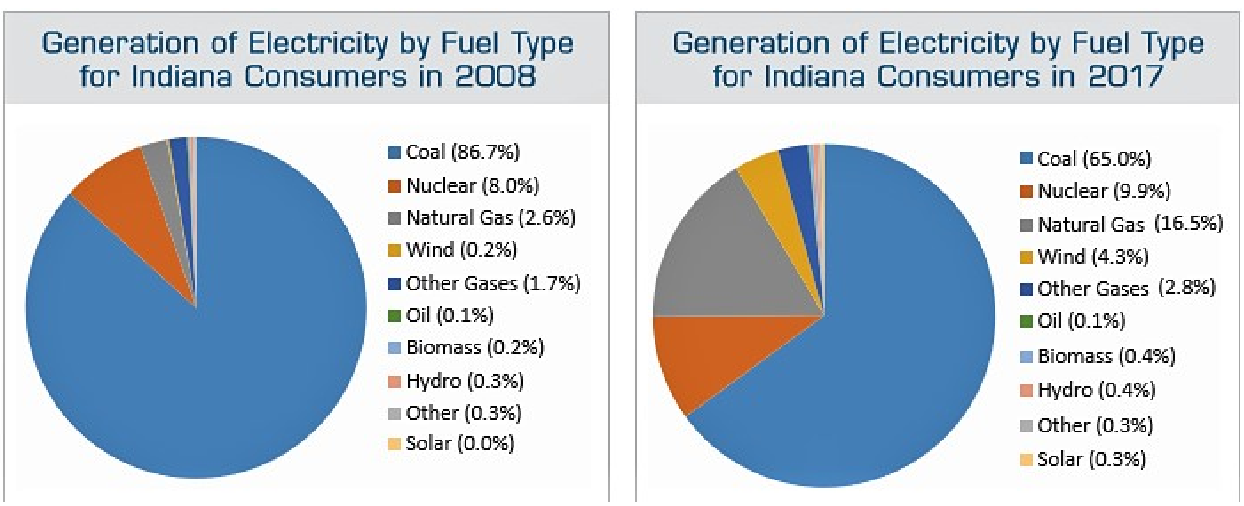


**Figure 1:** Indiana Generation of Electricity - Fuel Type
Source: IURC Annual Report (2018)

Indiana's total energy generation has decreased over the past decade. In 2019, the Energy Information Agency indicated that ten percent of Indiana's electricity supply came from other states (US EIA, 2019). This percentage possibly underestimates the amount of electrical energy imported from other states. Facilities such as the Cook Nuclear plant in Michigan, which generates power outside of the state, do still serve Indiana customers. This is primarily done through the two interstate power grids that serve Indiana, the PJM Interconnection, and the Midcontinent Independent System Operator (MISO), which will be explained more in the following section. While the state's electricity generation has decreased during the period that coal production has decreased, total electricity consumption from all sectors in the state is in the top 25% of all US states (US EIS, 2019). In this sense, Indiana is still behind other states in terms of reducing total generation. One reason for this is that Indiana houses several energy intensive industries that could skew the total energy consumption higher than other states with lower industrial output.

### 3.1.2 MISO Energy Supply Sources

MISO is a non-profit Independent System Operator (ISO) servicing portions of 15 states, including Indiana, and the Canadian province of Manitoba. MISO covers the vast majority of Indiana, although the state is also covered by PJM LLC, which serves Indiana Michigan Power. ISO's operate through the creed of supplying interconnected areas with reliable and efficient energy deployment while looking forward to the greater system needs with respect to transmission and generation integration to the operational grid. MISO's overall generation mix includes significantly greater renewables penetration than that observed within Indiana. While coal and natural gas still represent more than half of MISO's active generation, over 20% of its 175,000 MW of nameplate capacity is supplied by carbon emission free and renewable resources (Figure 2).

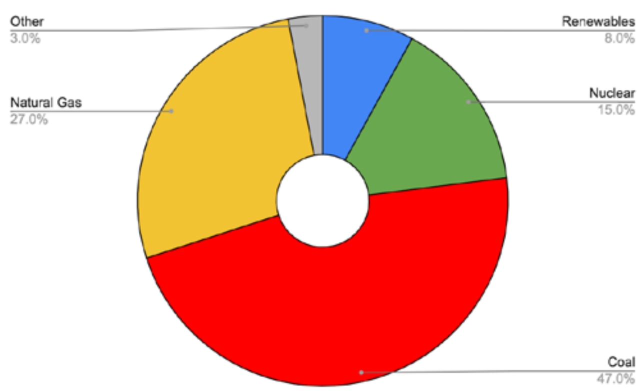


**Figure 2:** MISO Deployable Energy Generation by Fuel Type in 2018
Data: MISO Forward Report (2018)

While the larger service area of MISO allows for a more diverse generation mix than that possible for the smaller geographic area contained within Indiana alone, MISO still has barriers to overcome to increase renewable penetration. These barriers fall into many categories–technical, economic, legislative, and cultural–and not all are directly managed by

MISO. While much of the technical and some of the economic barriers are within the scope of MISO action, the legislative and cultural barriers are much harder for RTO and ISO's to address.

One of the technical hurdles MISO is currently seeking solutions for is that of renewables market penetration. Current (December 2018) MISO estimates in the Renewables Integration Impact Assessment (RIIA) suggest that a renewable market penetration of 40% or greater would result in systematic and structural grid failure. While MISO's current generation mix is far from this 40% threshold (it has not yet crested 15% of MISO's resource mix, as seen on Figure 3), policy projections suggest that legislative and regulatory mandates may push for 30% or more renewables penetration within MISO by 2033 (MISO (WPTF), 2019). To prevent grid failure, MISO has opted to delay or altogether halt some renewable build-out projects within its service area until transmission infrastructure can adequately support market penetration of renewable electricity-generating systems over their modeled 40% threshold (MISO (RIIA), 2019). Advancements in existing or new technologies can also help overcome this barrier.

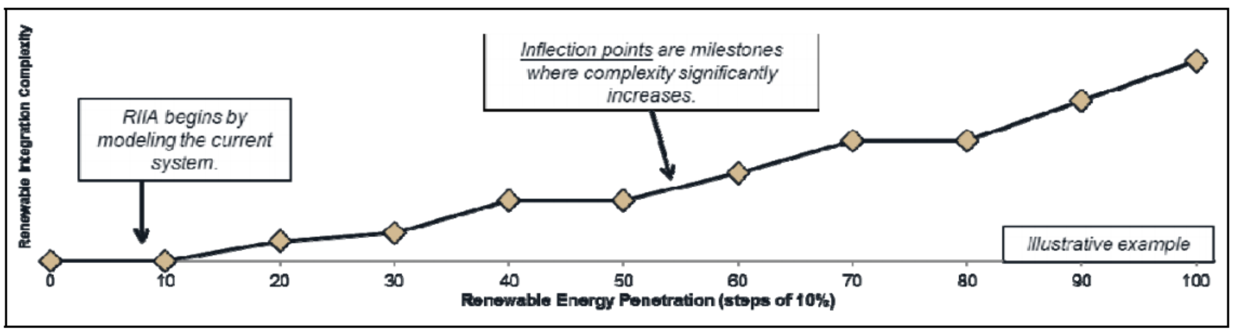


**Figure 3**: Renewable Energy Penetration vs. Renewable Integration Complexity
Source: MISO, RIIA (2019)

This does not mean MISO is not approving renewables build out altogether. While MISO is being more wary than is perhaps desirable, they have not halted renewables implementation completely. For Indiana specifically, there are nearly 13 GW of renewables queued (proposed by utilities and private actors) for study and potential approval. Geographically there is significant focus on solar build out in southwestern Indiana, pending transmission considerations accounted for by MISO in reports like RIIA (Kuzman, 2020).

The technical hurdles MISO must overcome regarding renewables integration is not limited to market penetration. Transmission infrastructure poses a complicated set of concerns. Everything from the transmission planning process to cost allocation strategies (discussed in detail in a subsequent section of this report) to bottlenecks inherent in geographic resource availability plague the system. While areas in the West are blessed with solar potential and much of the Great Plains have incredible wind potential, should the generation infrastructure be built to capture such resources there is simply no way to transmit the generated energy to the areas where it is so desperately needed.

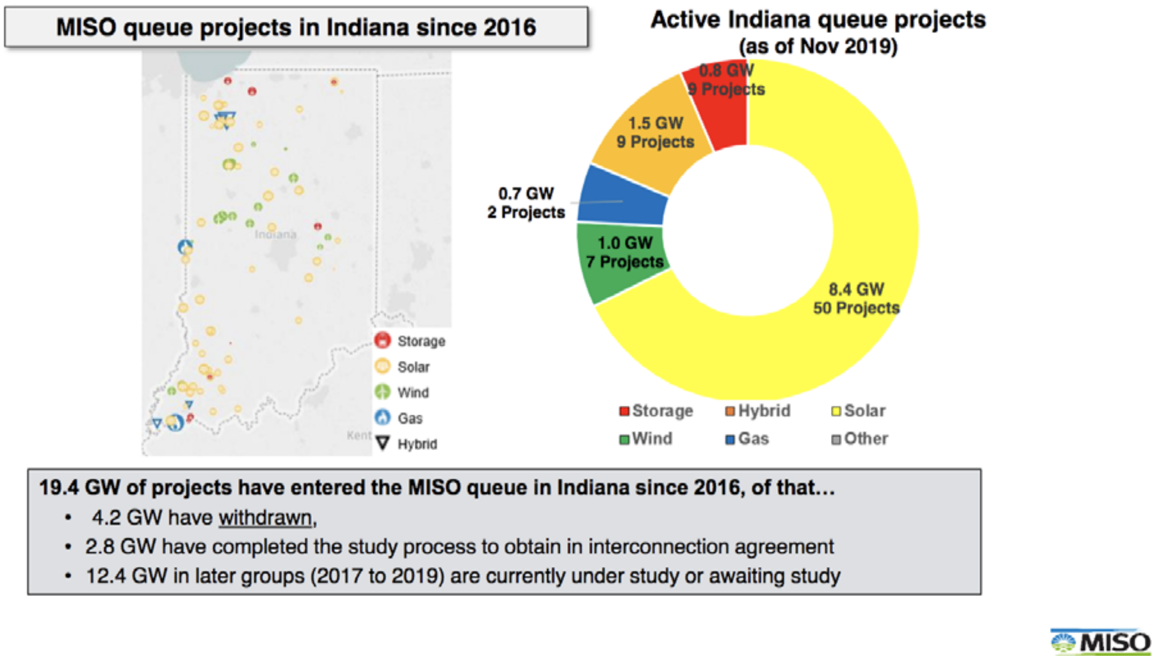


**Figure 4**: MISO Projects (In Queue) Within Indiana from 2016-2020
Source: Bob Kuzman, MISO (2020)

MISO's current resource interconnection protocol requires a six-month notice for resource retirement and a two to three-year outlook period for resource additions. Meanwhile, effective transmission planning for substantial upgrades and transmission facility additions typically requires a ten-year gap between the transmission planning itself and the actual, tangible transmission need. So, if the goal is to have 30-40% renewables market penetration within MISO in 2033, the transmission planning process needs to be completed within the next three years (MISO (MISO's Transmission Expansion Planning Process 19), 2019). These temporal mismatches present in the planning process does not allow for reliable foresight into how the grid would need to be structured to meet future demands.

Bottlenecks also pose frustrating complications to RTO's like MISO. The geographic areas served by MISO can only produce so much in terms of renewable energy and given existing technologies. There are vast amounts of untapped resources that are not in close proximity to transmission facilities to make deliveries currently cost-effective. However, other areas of the country, like Missouri and Kansas, have the potential of generating enough wind to share. Transmitting that sharable power, however, has proven difficult. Long distance, high voltage Direct Current (DC) transmission lines from Missouri to Indiana have been proposed, begun, and hobbled by litigation and difficult interstate policy differentiations (Tomich, 2019).

Currently the focus of MISO has been on resources *within their service area* for renewables expansion as opposed to bringing renewables into their grid from states outside of their service area.

## 3.2 State and Regional Regulatory Trends

### 3.2.1 Renewable Portfolio Standards

In 2009, the Obama administration set the goal that twenty-five percent of the nation's energy requirements would need to be met by renewable energy sources (National Research Council, 2011). At the same time, President Obama called for the United States to double its domestic production of renewable energy in three years (National Research Council, 2011). In response to this national goal, many states have used a number of regulatory approaches or policy tools to incentivize the build-up of renewable energy technology. An early and successful tool was the renewable portfolio standard.

Beginning several decades ago, a regulatory trend permeating much of the country's legislative landscape is the implementation of state-mandated amounts of renewables to be developed by a given date; these are known as Renewable Portfolio Standards (RPS). Implemented on a statewide basis by the states themselves, RPSs are flexible command and control policy tools which mandate percent amounts of generation capacity and/or use to come from renewable resources (National Research Council, 2010). The intent of this policy tool is to increase the share of energy use that comes from renewable sources, to foster energy security, grid flexibility and an overall reduction in greenhouse gas emissions. A federal RPS policy passed in the U.S. House of Representatives in 2007 but the bill failed in the Senate by a narrow majority. Overall, RPS have tended to favor wind power generation, with 93% of new renewable energy capacity in RPS states coming from wind power from 1998-2007 (Wiser, Barbose, 2008).

Within the past 10 years, there have been solar-specific RPS in states such as Arizona, New Mexico, and North Carolina. In the absence of federally mandated standards, a wide variety of heterogeneous methods and goal stringency have been set for each state electing to utilize an RPS. While most RPS programs are binding, several states, including North Dakota, Missouri and Virginia, have implemented non-binding programs, while others have some combination of the two. Enforcement techniques vary in structure and severity and usually come in the form of Alternative Compliance Payments (ACP). Compliance waivers, which can release companies from RPS requirements, are available in many states, sometimes with "good cause" being the only criteria (Cory and Swezey, 2007). In terms of the program structure itself, David Hurlbut of the National Renewable Energy Laboratory writes in "State Clean Energy Practices: Renewable Portfolio Standards" that "Variations exist in terms of the renewable energy purchase targets and timeframes, which renewable energy technologies are eligible, and whether existing projects can qualify" (Hurlbut, 2008). The policies also vary significantly depending on the state goals (10 to 30 percent) and the type of renewable energy source that is highlighted in the program (National Research Council, 2011). **Figure 5**, below, shows the different goals and timeframes for RPS programs around the country.

The effectiveness of RPS in increasing renewable energy penetration is inconsistent because States can simply repeal and/or change the legislation. In one sense, states that have implemented an RPS have a significant uptick in renewable energy proliferation. Wiser and Barbose write in their 2008 assessment of RPSs report that, "over 50% non-hydro renewable capacity additions in the U.S. from 1998 through 2007 occurred in states with active, mandatory RPS policies, totaling roughly 8,900 MW. In 2007 alone, approximately 76% of all non-hydro renewable capacity additions came from states with active RPS programs." (Wiser and Barbose, 2008). While these numbers seem positive, the most glaring inconsistency is that it is hard to definitively observe if the outcomes were due directly to the RPS policies or if they were due to other external factors, such as financial incentives or ongoing technological development. Furthermore, they concluded that states with RPS policies often also have strong renewable potential, so it is not surprising that a substantial fraction of renewable development is occurring in these areas.

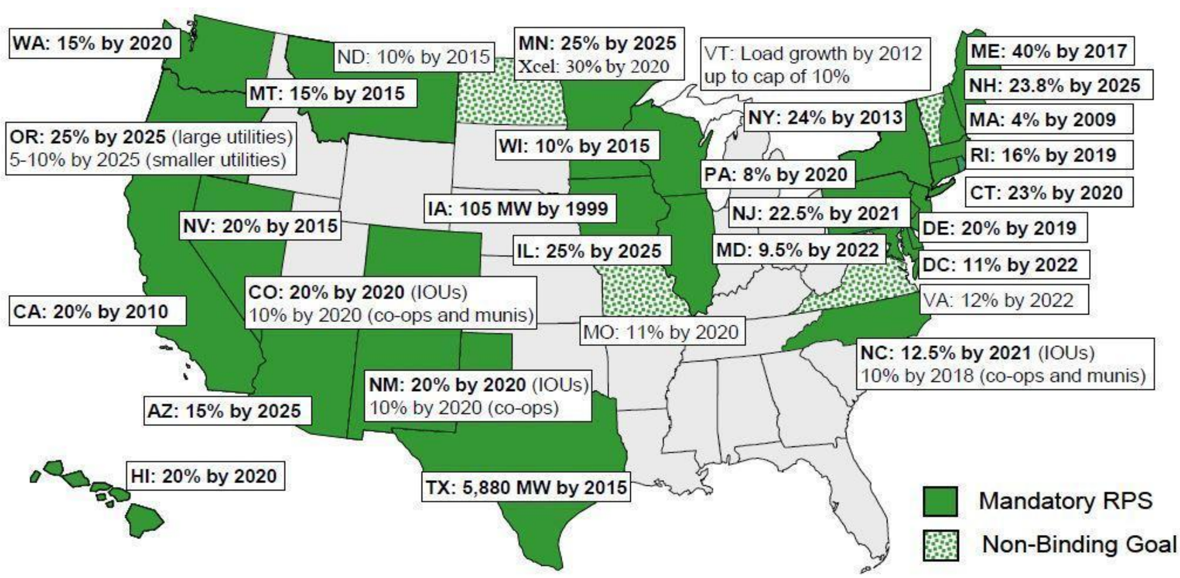


**Figure 5:** RPS Programs by State and Renewable Percentage with Year
Source: Renewable Portfolio Standards in the States: Balancing Goals and Implementation Strategies (2011)

While RPS were initially very successful, their effectiveness has not been as efficient, in terms of cost per MW increase in renewable energy (Wiser, Barbose, 2008), through 2007. More recent data has not been found, but the trend would most likely continue or even accelerate due to reasons explained below. There are several contributing factors for the diminishing effectiveness of RPS. When states first implement RPS programs, it is relatively easy to make early adjustments that would increase renewable energy proliferation. As these easy steps were completed, the remedies available to the states became more difficult to implement, leaving only drastic changes to the state's energy systems as available tools to increase the state's renewable energy penetration. In fact, the mere presence of an RPS no longer matters as a lever to increase renewable energy; the stringency is making the difference (Carley, 2018).

Another recent change in the economic landscape has been the price decrease of renewables, both in comparison to fossil fuels and independently. RPS, along with other renewable policies, were initially meant to make renewable energy more price competitive with incumbent energy sources through financial incentives and an expanding market. As this economic landscape has changed, RPS initiatives became less impactful in many states while in some states, the increased compliance cost for newly adopted RPS programs will hit in-state electricity firms and ratepayers harder (Hollingsworth and Rudik, 2018). This shift is interrelated with technological improvements in renewable generation sources, making them more efficient and reliable.

Additionally, many states relied on only RPS to increase renewable energy without having other supplementary infrastructure, such as large renewable generation sources and transmission capabilities, in place. As the National Energy Laboratory explains, "some states that have not significantly increased renewable capacity despite having an RPS for several years have identified inadequate transmission as one of the main contributing factors." (Hurlbut, 2008). Related to this, Hurlbut states that available technological resources and transmission capacity are the two biggest driving factors in the success of RPS programs. Regional coordination, in terms of sharing technological resources and renewable sources, is also important if neighboring states have different renewable energy programs, as is the case with Indiana.

Finally, actual compliance with the policies is an obvious key to ensuring a successful program. Most states have been able to comply with their programs, with a 94% compliance rate in 14 states in 2006 (Wiser and Barbose, 2008). This trend has continued, at least with these states, through 2019 and Hawaii, Delaware, Iowa and Arizona have all achieved 100% compliance (Wiser and Barbose, 2019). None of Indiana's neighboring states were in this list of most compliant, although Iowa, Minnesota and Wisconsin all had compliance levels above 80% in 2006 (Wiser and Barbose, 2008). Indiana currently does not have a binding RPS in place and instead, enacted a voluntary, non-binding Clean Energy Portfolio Standard, called the Comprehensive Hoosier Option to Incentivize Cleaner Energy (CHOICE) in January of 2012. This program provides incentives to the state's utilities to voluntarily increase the amount of clean energy resources in their respective electricity portfolios. Electric utilities that opt-in to the program agree to provide an average of 4% percent of their total electricity supplied to their customers from clean energy sources from 2013 to 2018. Beginning in 2019, this average was set to increase to 7%, and in 2025 it will rise to 10% (OED, 2012). No companies have since agreed to participate in this program. An important part of the CHOICE law was that any participating utilities could not charge retail customers more than the utility would have without the use of renewables. At the time of passage, renewables were a lot more expensive than traditional sources. As renewables have become cheaper, the law has lost much of its value. In addition, the utilities' lack of participation in these voluntary programs illuminates an important issue facing renewables: political will. Creating an appropriately binding, non-voluntary RPS in Indiana would be very difficult politically. A study done by Hongtao Yi (2020), concluded that citizen ideology and renewable interest groups are important determinants for the deployment of renewable energy. A Penn State study also found that conservative governments are more responsive to lobby activities from industrial sector interest groups, who have advocated strongly against renewable development both in the legislatures and in the courts (Cao, 2012). This would especially apply to Indiana, which has a high rate of industrial development in comparison to other Midwest states. In addition, coal has a history in Indiana of providing a low-cost energy resource that drove industrial activity in the state for many years. For political and technological reasons, an RPS in Indiana will not be considered within this report but, none-the-less, remains an important discussion point within broader evaluation of tools to further promote renewable energy proliferation.

In addition to renewable portfolio standards, a suite of other policy tools and approaches have been used by various states with variable amounts of success. A list with a brief description of each has been compiled by the U.S. Environmental Protection Agency.

- **Public Benefit Funds**: Pools of resources that states can use to invest in clean energy products. These funds are created by levying an extra charge on customer's electricity rates (EPA, 2019).
- **Output-Based Environmental Regulations**: Implement emissions limits per unit of productive energy output of a stated process, with the goal of encouraging both renewable energy as a form of air pollution control, and fuel conversion efficiency (EPA, 2019).
- **Interconnection Standards**: Technical requirements that lay out how electric utilities in a state will treat renewable sources that require connection to the electric grid. These standard procedures can reduce delays and uncertainty that renewable systems encounter when trying to establish grid connection (EPA, 2019).
- **Net Metering**: Enables commercial or residential customers who generate their own renewable energy to receive compensation for that generated electricity. This required the customers to accurately track how much energy they use or return to the grid (EPA, 2019).
- **Feed-In-Tariffs**: Obligate electric utilities to pay pre-established above-market rates for renewable power entering the grid. These variable tariffs provide renewable generators with a set amount of income for their projects. States that have recently implemented this program include California, Hawaii, Vermont and Washington (EPA, 2019).

- **Properly Assessed Clean Energy (PACE):** Attaches the obligation to repay the renewable energy/efficiency retrofit costs to a residential property rather than an individual borrower. This encourages property owners to invest in clean energy even if the period of payback is longer than the owner plans to own the property (EPA, 2019).
- **Financial Incentives**: Grants, loans, tax credits, rebates provided to encourage renewable energy development (EPA. 2019).

### 3.2.2 MISO Cost Proposal to FERC for Transmission Development

MISO has petitioned the Federal Energy Regulatory Commission (FERC) to restructure how transmission projects are built out, shifting the cost of transmission build out more fully or entirely to those who will directly benefit from the additional build out. MISO submitted an initial compliance filing in 2016 and FERC responded with a need for clarification from MISO concerning their compliance filing or if they would offer tariff revisions to interregional economic transmission projects operating above 100 kV but below 345 kV. MISO opted to propose tariff revisions and this was submitted in February of 2019 (MISO, 2019). Later in that year, the proposition was rejected by FERC entirely based on a small attribute of MISO's filing: the local economic project category in MISO's proposal was inconsistent with FERC's cost-causation principle.

As the pricing structure currently stands, "Market Efficiency Projects" (which include transmission infrastructure) are cost allocated by attributing 20% of the cost in a "postage stamp" approach across MISO's entire grid operations, with the remaining 80% of costs allocated proportionally to the savings garnered in individual service zones who reap benefits from the project (FERC, 2011). In this instance, "postage stamp pricing" refers to a uniform payment amount across all consumers, regardless of location. So, with respect to MISO, individuals within the entire service area will pay a small piece of the 20% of the cost allocated for a project, regardless of whether those consumers would receive a direct benefit. To qualify as a "Market Efficiency Project," proposed transmission must cost at least $5 million, be composed of infrastructure capable of transmitting 345 kV or higher and have a cost-benefit ratio of 1.25 to 1.

In 2016, MISO was ordered by FERC to clarify compliance filings for transmission cost allocation for infrastructure transmitting *less* than 345 kV. MISO filed clarifying documents, which stated their desire to apply a more precise and transparent beneficiary specified cost allocation for such projects. Furthermore, MISO added a second tier of cost-benefit ratios under which Local Economic Projects would have to meet (1.25 to 1 in each *zone* in which the project is located, not just the project as a whole). Finally, MISO proposed that 100% of the costs be allocated to the zones in which these "local" economic projects are located (MISO, 2016).

In June 2019, FERC denied MISO's Local Economic Project pricing strategy, stating it was neither just nor reasonable. While FERC approved of the additional benefit allocation and assessment strategy proposed by MISO, the 100% cost allocation to individually benefitting zones was ultimately denied (Marshall, 2019). Furthermore, since the tariff restructure was proposed to FERC as a comprehensive package, despite a large portion of the proposal being broadly accepted by FERC, FERC was forced to reject the entire proposal.

Most notable of FERC's "accepted" ideas present in the proposal was their support in removing the 20% postage stamp cost allocation for the larger Market Efficiency Projects (>345 kV projects). Further tariff amendments proposed by MISO and other RTO's are likely to include the removal of such cost allocation strategies. Such removal would place an undue cost burden on a zone desperate for the benefits of renewables without the monetary capability of financing the infrastructure required for such benefits to be garnered. (Marshall, 2019)

## 3.3 Legislative Landscape

Political support for renewable energy, especially at the Indiana state-level, is complicated by Indiana's traditionally fiscally conservative ideals. Much of the time, questions of passing legislation in support of renewables ultimately devolves to a question of funding. In an analogous manner to federal funding for renewable energy related projects, Indiana state funding could come from a variety of sources such as a production or investment tax credit. For state renewable energy projects, funding has traditionally come in the form of subsidies as tax credits or rebates. Indiana's political history and contemporary circumstances (e.g. the COV19 pandemic) suggest that pursuing subsidies as a primary avenue to funding is unlikely to be successful. This behavior is demonstrated in the recent legislative actions of Indiana– Senate Enrolled Act 309. This legislative action reduces compensation for energy sold back to the grid generated by residential generators (net metering) such as those with solar arrays.

Indiana has not historically funded renewable energy with taxpayer dollars, but instead the state has favored energy efficiency-oriented projects. While these two facets of the state's energy portfolio are not mutually exclusive, the legislature has recently recognized that there is an increasing need to diversify Indiana's energy resource portfolio to ensure energy reliability (HB 1414). In 2019, the legislature passed HB 1278 which required that state study the issues associated with energy transitions that are taking place in the state in two different and related investigations; one by the IURC and the other by the 21$^{st}$ Century Energy Policy Development Task Force. The goals of the 21st Century Task Force are to; "examine the state's existing policies regulating electric generation portfolios, examine how possible shifts in electric generation portfolios may impact the reliability, system resilience, and affordability of electric utility service and evaluate whether state regulators have the appropriate authority and statutory flexibility to consider the statewide impact of the changes described in subdivision" (Indiana Legislative Services Agency, 2019). The overall goals of the bill and the IURC study are to "assess statewide impacts of transitions in fuel sources and other electric generation resources, as well as the impacts of new and emerging technologies impacting electric generation and distribution infrastructure, on electric generation capacity, system reliability, system resilience, and the cost of electric utility service for consumers." (Indiana General Assembly, 2019). While the work of these studies is ongoing (due July 1 and December 31, 2020 respectively), of value for consideration is the work being completed by the State Utility Forecasting Group on trends in generation and capacity requirements and the work by Lawrence Berkeley National Laboratory on distributed energy resources, which in many cases are renewables sources of power (LBNL, 2020).

However, the principal driving forces for renewables development and other changes in Indiana's electric energy resource mix have historically emanated and are likely to continue prospectively to emanate from the private, not the public sector. In particular, the dramatically changing perspectives of the financial and insurance industries on the investment and business risks of climate change are rapidly transforming the comparative availability of investment capital for the life extension or new construction of fossil fuel resources versus their replacement by newer, lower carbon technologies. Notably, the financial community's rapid disinvestment from coal mining and generation and its reluctance to commit to large investments in combined cycle natural gas and syngas replacement generation, combined with rapidly improving renewables and storage technologies the costs of which have been steeply declining, are dramatically changing the investment climate for electric utilities in Indiana. See, e.g., NIPSCO's most recent 2018 IRP, as well as more recent Morgan Stanley financial perspectives on Duke and AEP.

## 3.4 Technology Landscape

The variety of technologies used in energy generation and transmission are changing, disrupting the traditional structures associated with central station generation and transmission, and improving at a rapid rate. These include a number of distributed energy resources at the distribution level of the grid, as well as more cost-efficient utility-scale renewable power generation facilities, improvements in battery storage, and increased demand for electric vehicles. The consequences of these changes are all challenges that the IURC will need to face in the short term. To handle these new electricity demands on the system, enhancing transmission capacity is crucial. In addition, other factors influencing the technological landscape include external funding, interstate collaboration and company-level energy policy. This report is not meant to emphasize technical aspects of this topic and therefore, this section will remain general and not comprehensive.

### 3.4.1 Renewables & Transmission

The adaptation of renewables into the greater MISO transmission system makes regional coordination of transmission capacity a significantly more critical issue than it has been in the past. Historically, the transmission system (until RTOs) was primarily built to meet each utility's expected need. With traditional power generation, each utility and, by extension, each state generates electrical capacity equal to their localized needs with the location of coal, nuclear, or natural gas power plants being driven by political, economic, and social concerns, sometimes to great ethical repercussions.

Renewables, unlike their incumbent counterparts, are more geographically sensitive. The map (Figure 6) shows that wind speed is unevenly distributed across the MISO region, with the areas of greatest generation in the Dakotas and Iowa and the areas of lowest generation in Arkansas, Louisiana, and Mississippi. The highest solar potential in the MISO region is in Louisiana, Mississippi, and South Dakota.  In many cases, Indiana's wind and solar resources are both now considered economically competitive essentially throughout the State.

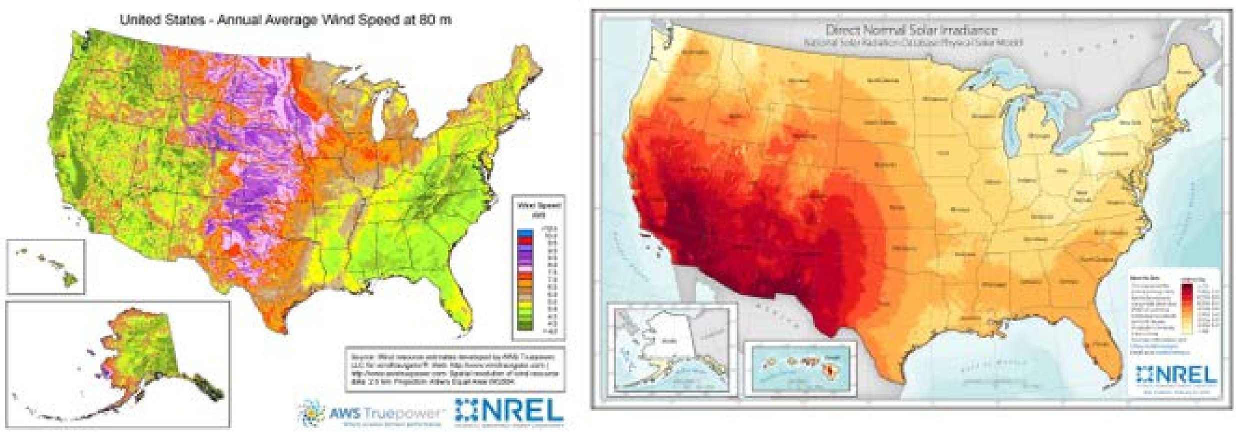


**Figure 6**: Wind and Solar Potential in Contiguous 48 States
Source: US Energy "Where is Wind Harnessed" (2017) and NREL "Solar Resource Data" (2018)

There are two main concerns regarding transmission should renewable technologies be developed at an accelerated pace. First, is the risk of increased congestion and its associated mismatch between peak loading times and peak renewable production periods. This is represented by the popular "duck curve" showing that most renewable generation occurs when net load (total load - output of renewable energy) is low. An example of this curve, representing net load in California, is shown in **Figure 7.**

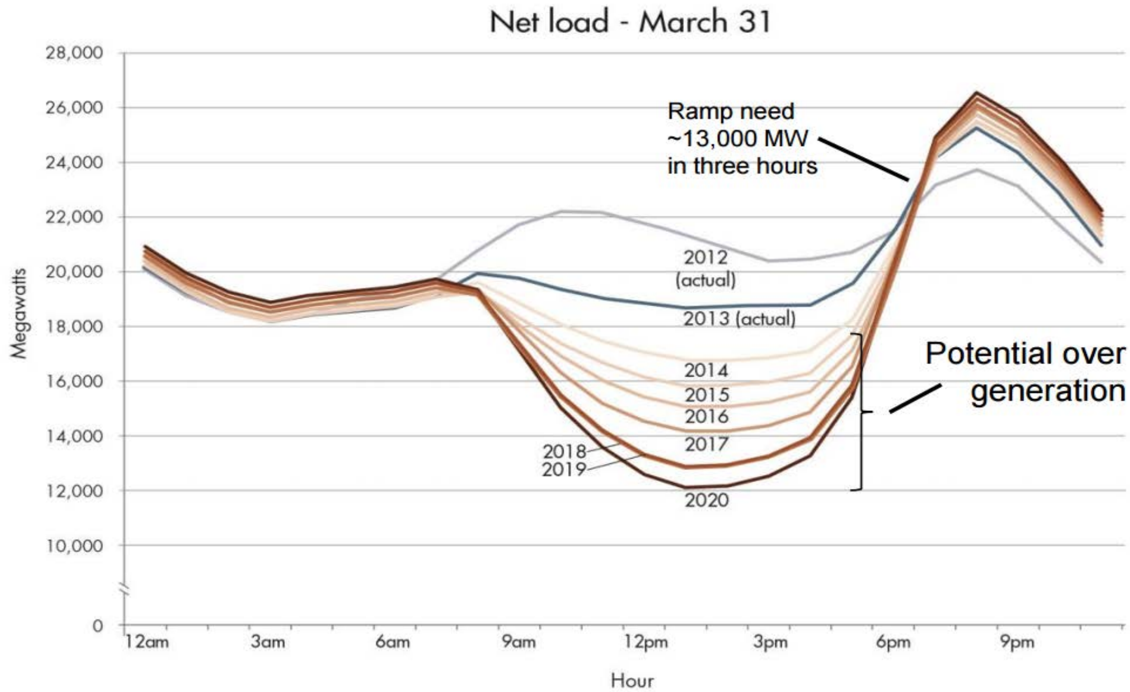


**Figure 7**: Duck Curve Example
Source: California Independent System Operator (2013)

While increased energy storage is the favored solution to this concern, storage is not currently a viable option in Indiana nor the rest of the U.S. due to significant technological, scaling, and cost constraints, though technology globally is improving due to different types of batteries becoming available (International Renewable Energy Agency, 2017). With regard to the cost of renewable sources, some issues include the energy rates associated with renewables and the large investment of capital required for the construction of new projects. Many renewable projects are not built in Indiana because the cost of incorporating them into the grids would be too high (Kuzman, 2020). Furthermore, due to the large land requirements associated with renewables technology, most renewables are constructed in sparsely populated areas, adding to the cost of transmission.

The challenge will be to incorporate renewables into the grid without jeopardizing the system's current performance. At around 40% renewable energy penetration, the MISO system would experience systematic structural failure (Kuzman, 2020; as discussed in 3.1.2 of this report). While such a technical and management hurdle is not a "hard stop", any technological development needed to overcome this obstacle would need to happen in close coordination with MISO, state PUCs, and energy utilities. The goal of such effort would conceivably lead to a more decentralized, time-managed, digitally controlled two-way grid that will facilitate the addition of more than 40% renewables.

### 3.4.2 Electric Vehicles

The role of electric vehicle (EV) usage in Indiana merits recognition in terms of its effect on the overall energy system. In Indiana, like in every state, EV's are becoming more widespread. Indiana currently has over 200 EV charging stations (US Department of Energy, 2020). This number of stations, however, would not be enough to make EVs more accessible, with a combination of public and private charging stations being optimal. Public funding may not be as effective for funding private and public charging stations. In addition to public and private charging, the type of charging station is also important. There are currently three main types: AC (the slowest), DC (the fastest) and wireless. Wireless charging is not widespread, and AC will most likely be the most popular choice for the next few years due to its lower price and increased accessibility in households (Hauke Engel, et al 2018). Indiana would have to research what types of chargers and the availability of each that would work best for the state.

One recent development that could aid the expansion of charging stations is the Volkswagen settlement. This 2016 settlement came as a result of a lawsuit filed against Volkswagen, accusing them of violating Clean Air Act standards. Part of the stipulations from the settlement was that VW provide over $2 billion to the U.S., with money going to each state and Native American tribe. This settlement will provide $9.83 million for Indiana. The Indiana Department of Environmental Management (IDEM) is currently calling for grant proposals to disburse this money. The funds have been designated solely for "equipment and vehicle repowers and replacements with newer, cleaner alternatives of various fuel types" (IDEM, 2019). While this would primarily replace diesel fueled vehicles, it could also apply to the development of the EV charging infrastructure in a more limited role (EPA, 2019).

With more charging stations, however, brings the challenge of integrating them into the existing electrical infrastructure. Like other renewable infrastructure, the stations could disrupt the current peak loading rate. Additionally, there is a point where the EV charger market could become oversaturated, especially in a state like Indiana that has been slower to develop EV technology when compared to states like California or Washington. While Indiana is not a separate market like California, it falls in the greater Midwest market which has seen a slower adoption of EV infrastructure. This, however, is more of a market driven issue that is separate from IURC policy, and it is unsure whether an overbuild would occur if there were public subsidies rather than market driven development

A national study found that while added direct current chargers would be projected to raise EV sales and lower greenhouse gas emissions (GHG), there is a point of diminishing marginal returns where the amount of EV sales and lowered emissions per additional chargers decreases (Levinson, West, 2018). Expanding the current capacity of EV infrastructure could also generate other benefits. A study by the Indiana Energy Association (IEA) found that by 2050, the use of EV in the state could save consumers almost $3.6 billion (IEA, 2016). This would mostly be from reduction in driving costs, but $500 million would also come from a decrease in the consumers' electricity bill. The lowered electricity bill would be the result of more public charging stations, which could replace private charging, providing a net benefit to consumers. These trajectories were done using the current moderate increase in usage projected by the Energy Information Administration. Overall, increases in EV usage would yield positive benefits for the state and for consumers, but there are grid-related consequences that would need to be addressed before such benefits would be felt. Any major grid changes would have to be made without making Indiana's electrical customers pay billions of dollars to re-invent the total infrastructure, which could lead to significant economic disruptions, thus disincentivizing businesses to remain in the state.

### 3.4.3 Battery Storage

As of May 2019, the U.S. had approximately 31.2 GW of rated power in energy storage present within the national generation mix. Of this 31.2 GW of energy storage, however, only 0.74 GW is represented by lithium ion technologies. Over 96% of the energy storage currently present on the greater US grid is through pumped hydroelectric storage. Hydroelectric energy storage facilities have long operational life spans and operate at high levels of efficiency (70-85%). Unfortunately, they are extremely geographically dependent and require environmentally degrading damming to function. Thus, with respect to mass utility scale energy storage deployment, other technologies hold greater appeal (Center for Sustainable Systems, 2019). Batteries have long been the desired technology, but until recent years had been considered much too costly (Cole and Fraizier, 2019). However, with technologies improving, spearheaded primarily by electric vehicle development, there has been a steady decline in costs and greater market penetration of battery storage is expected in the future.

While these declines in costs have been universal across battery storage technologies, there are differing magnitudes of reduction across battery types (Cole and Fraizier, 2019). There are long-duration and short-duration systems available for deployment. Total installed system costs are lower in the short-duration systems (typically 4 hours systems meant to offset peaking or mitigate impacts of short term outages) than that of the long-duration systems (meant to offset the entire energy load of a household, firm, or small geographic area). However, when cost-per unit energy considerations are used, the opposite is true, with long-duration systems having lower normalized costs than that of short-duration systems (EIA, 2018).

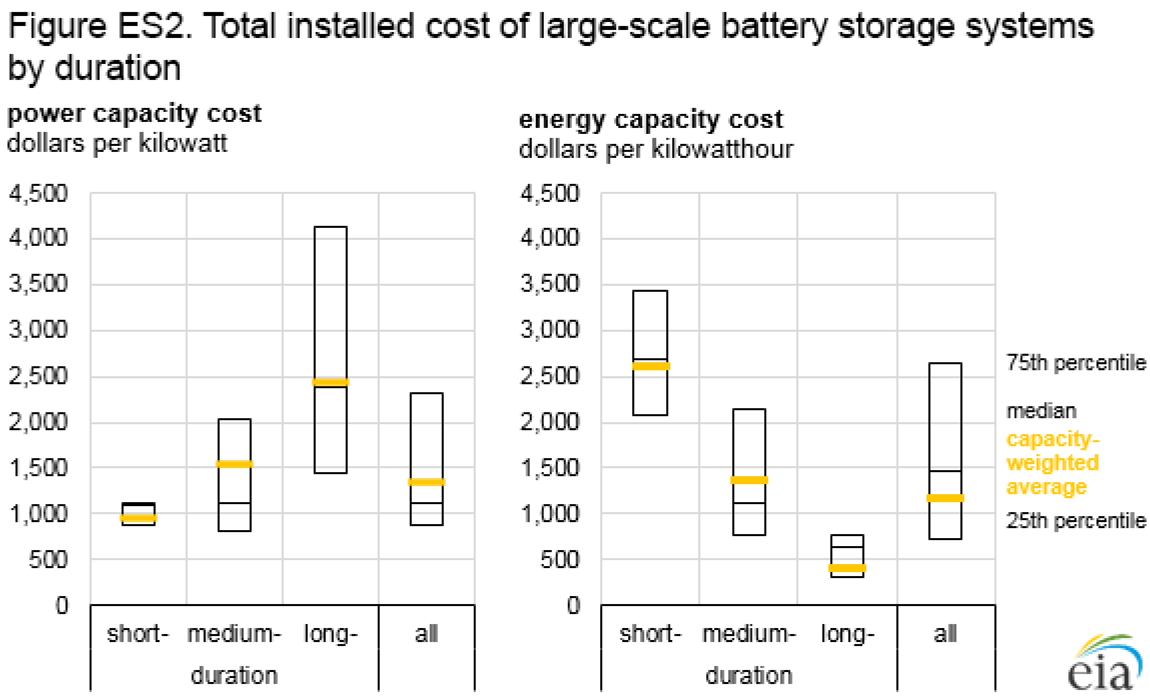


**Figure 8**: Large Scale Battery Installation Costs
Source: EIA: US Energy Storage Market Trends (Year)

Much of how we determine the costs of integrating these new technologies into our existing infrastructure depends on what role it is expected for these technologies to take–peak shaving or complete generation offsets.

How these technologies are classified within the greater grid operation also has a significant influence on its incorporation into the established energy system. As storage has various applications, such as fast ramping deployment and peak loading depression, how these assets are characterized, financed, and regulated has large impacts on how they are funded, and their costs subsequently allocated. Much of these technical classifications have been spearheaded by ISOs/RTOs and state-level regulators, not federal level regulators (EIA, 2018). MISO, for example, has been studying the potential ramifications of energy storage being classified as transmission for mass deployment through its Energy Storage Task Force (ESTF). These niche intricacies, inherent in integrating novel technologies into incumbent systems, pose very real challenges to large, utility scale integration of battery storage into our greater energy mix, but the potential benefits and steadily decreasing costs have incentivized innovation which the states should be poised to take advantage of.

## 3.5 Energy Prices

Indiana has historically had low cost electricity generation. When comparing Indiana to the rest of the U.S by sector, electricity prices are generally lower, with the average across all sectors being 0.77 cents cheaper per kWh than the average U.S. price. Even within its geographic region the average electricity price is 0.40 cents cheaper per kWh than the average for all East North Central states. Indiana has had a history of cheap electricity prices, and a reliance on fossil fuels.  These historically cheaper than average energy rates attract business to the state, though prices are less competitive than they have been. (Brewer and Yoon, 2019). The IURC has also detailed this trend in its annual reports. In the report, the IURC notes Indiana's rates were seen as the 4th lowest in 2002, but only 23rd lowest in 2018. While Indiana still has favorable rates compared with neighboring states, it has fallen behind nationally (IURC, 2019).  The predominant reasons for this include timing of rate cases, environmental requirements, fluctuations in cost of fuel and required investments to maintain infrastructure (IURC, 2019). Manufacturing is also the most energy intensive end use consumer. The industrial and agricultural sector accounts for roughly 46% of the energy consumption within Indiana (EIA, 2019). This history puts pressure on state regulators to keep prices low to maintain the status quo for all sectors of the Indiana economy. There is risk when transitioning to alternative generation sources, in the form of rising prices that have the potential of significantly raising the price of electricity for consumers in the short term, thus serving as a barrier to renewable generation support within the state. This short-term price increase, however, is juxtaposed with avoidable costs and realizable benefits in the future. Renewables will be cheaper than massive amounts of coal and gas technology within five years, erasing any price detriments that are currently present (Sweeney, 2020). This cost swing would be even more swift if there was strong federal commitment to burden some of the costs. In this sense, utilities often have a narrow focus on immediate cost to themselves and consumers rather than long term price outcomes.

| | Residential | Commercial | Industrial | Transportation | All Sectors |
|---|---|---|---|---|---|
| Indiana | 11.91 | 10.74 | 6.59 | 9.95 | 9.52 |
| East North Central | 12.94 | 9.90 | 6.51 | 6.99 | 9.92 |
| U.S. | 12.79 | 10.28 | 6.3 | 9.6 | 10.29 |
| Rank | 27 | 35 | 28 | 20 | 26 |

**Table 1:** Electricity Prices by Sector for Indiana, the East North Central States Average Illinois, Indiana, Michigan, Ohio, and Wisconsin and the U.S. average. Price is in cents per kWh (real prices). Source: EIA Electric Power Monthly (2020)

## 3.6 Stakeholder Landscape

Stakeholders of the Indiana energy market are varied in size, interest, and local. A stakeholder is a general term for anyone with an interest in the IURC. Voting members, market participants, and members of the general public are all considered stakeholders related to the IURC, as each is impacted by IURC authority and rulings. Local, state, and regional entities all have an important role to play in giving the IURC feedback concerning energy policy and technology. The most prominent stakeholders by geographic scale are listed below.

Local Stakeholders

- Individual Utility Customers
- Investor-Owned Utilities
    - Duke Energy Indiana, Inc.
    - Indiana Michigan Power Company
    - Indianapolis Power & Light Company
    - Northern Indiana Public Service Company
    - Vectren Energy Delivery of Indiana, Inc.
- Municipal Utilities (IURC Jurisdiction)
    - Anderson Municipal Light & Power Co.
    - Auburn Municipal Electric Utility
    - Crawfordsville Municipal Electric
    - Frankfort Municipal Light & Power
    - Kingsford Heights Municipal Electric Utility
    - Knightstown Municipal Electric
    - Lebanon Municipal Utilities - Electric
    - Richmond Municipal Power & Light
    - Tipton Municipal Electric
- Wholesale Utilities
    - Commonwealth Edison Co. of Indiana
    - Hoosier Energy Rural Electric Coop., Inc.
    - Indiana-Kentucky Electric Corp.
    - Indiana Municipal Power Agency
    - Wabash Valley Power Association, Inc.

State Stakeholders

- 350.org Indiana - Indianapolis
- Citizens Action Coalition of Indiana (CAC)
- Hoosier Environmental Council
- Indiana Coal Council, Inc.
- Indiana Conservative Alliance for Energy
- Indiana Distributed Energy Alliance
- Indiana Energy Association
- Indiana Industrial Energy Consumers (INDIEC)
- Indiana Office of Utility Consumer Counselor (OUCC)
- Indiana State Conference of the NAACP

- Indy Green Congregations
- Sierra Club Hoosier Chapter

Regional Stakeholders

- Alliance Coal, LLC
- Alliance for Industrial Efficiency
- Clean Grid Alliance
- Midcontinent Independent System Operator (MISO)
- Midwest Cogeneration Association
- Sunrise Coal, LLC
- Valley Watch, Inc.

# 4.0 ANALYTICAL APPROACH

## 4.1 Lever Introduction: Policy Levers Available to the IURC

To identify and analyze potential policy tools and enhancement of practices that the IURC could use to assist in the development of renewable energy sources, some basic concepts were considered. The first of these being that, historically, the state prefers a more hands-off approach to governance and, in many cases, Hoosiers consider less government to be better governance. Market forces are oftentimes preferred to regulatory mandates and guidance. Secondly, it is understood that the commission needs to operate within both its initial mandate contained in the Public Service Commission Act as well as within the mandates prescribed by the federal acts, such as the PURPA, and in congruence with evolving policies promulgated by the FERC. And lastly, the use of existing state rules and regulation, including such things as the IRP process and the voluntary RPS need to be considered. Therefore, it is understood that these factors need to be strategically accommodated in any recommendations that are proposed for the IURC to consider implementing.

Based on these considerations and the contextual research, three sets or categories of policy actions, termed "levers'' were selected that could assist the IURC to positively impact Indiana's electricity system. These levers were chosen from research conducted on the state of Indiana's electricity system and generation portfolio, as well as methods that other states have used to invigorate their renewable energy market. Within these levers, there are "sub-levers" that can facilitate the application and improve the efficacy of the primary levers. In some ways, these sub-levers would be easier for the IURC to implement due to their smaller scale. Overall, it is not expected that all three levers will be implemented fully within the medium term [scope of our evaluation]. With this expectation, it was important to identify ways the IURC could facilitate the use of these levers while keeping to its primary goal "to make decisions in the public interest to ensure the utilities provide safe and reliable service at just and reasonable rates" (IURC, 1987).

**Lever 1 |** Enhancing ISO Relationship – Transmission as Reliability

The development of a robust transmission system is critical to the future expansion and implementation of renewable energy technologies. Transmission limitations, both technical and political, are some of the largest barriers to the development of new renewable energy projects. The IURC could continue to take action, making their stance known to federal regulators, concerning PUCs and associated utilities as to their interest and commitment to move toward a stronger renewable energy mix for the state of Indiana.

**Lever 2 |** Enhancing Integrated Resource Planning (IRP)

Under Indiana Administrative Code § 8-1-8.5-3(e)(2), the IURC requires that jurisdictional electric utilities submit an Integrated Resource Plan (IRP) every three years. IRPs describe how an electric utility intends to deliver safe, reliable, and efficient electricity at just and reasonable rates. An IRP must be in the public interest and consistent with state energy and environmental policies. The basic content of an IRP includes how a utility will use current and future energy resources to meet consumer demand, alternatives for generating capacity, information on transmission and distribution lines, energy efficiency programs, scenario or sensitivity analyses of external variables, and more. Utilities must consider potential future conditions and select a combination of energy resources that would provide reliable service in an efficient and cost-effective manner ("IURC: Integrated Resource Plans" 2020). This IRP policy lever will focus on how the IURC can use its legislatively mandated authority over this resource planning process to improve IRP stakeholder engagement, enhance its own utility IRP review process, and approach IRPs from a statewide, holistic perspective to promote renewable energy proliferation.

**Lever 3 |** Developing a Multi-Year Stakeholder Initiative

Ensuring the transparent dissemination of information between the IURC and energy market stakeholders is of great importance for increasing renewable energy proliferation in Indiana. While not explicitly required, stakeholder engagement is a great asset when attempting to understand the public perception of IURC actions. This policy lever will focus on how the IURC and stakeholders can inform and respond to one another in a meaningful way while still advancing IURC goals and objectives.

## 4.2 Methodology

While it is understood that the actual implementation of some of the proposed policy actions will be a complex process involving many interactions and reviews of the potential implications, to assess in a general sense the implication, a scenario analysis approach was conducted. The effects of the factors on the proposed policy levers were analyzed through a series of scenarios. Each of the scenarios is framed using what are predicted to be the most important factors and circumstances that have the potential to arise within the medium term (5 years) in each of the policy tool domains or levers. Within the levers, there are a set of factors that could influence how effective a lever is at impacting renewable energy proliferation, either in a positive or negative way. Each of these factors are qualitatively evaluated based on both their likelihood and impact on the respective lever. In addition, factors have been sequenced based on precedent, meaning that for one factor to happen, another factor might need to occur first. This is integral to understanding how each factor will influence the levers and scenarios. Additionally, several of the factors can transcend multiple levers and can also vary based upon importance relative to a given outcome. For each scenario, the respective applicable policy levers will be evaluated, as well as the IURC's level of influence on these levers while maintaining their goals. While some factors may interact with each other, this was not taken into account in this analysis.

## 4.3 Scenario Analysis of the Factors Impacts on the Levers

Identifying and assessing the impact of the factors is a key part of this analysis because factors are the root of each lever and can also impact more than one lever. To determine how the factors could potentially impact the levers, and the overall scenario outcomes, two elements of the factors were assessed. The first was to grade them on both their likelihood of occurrence and magnitude of impact in correspondence to a particular lever. Likelihood in this case relates to both the likelihood of the factor occurring and its likelihood of impacting the lever. The grades are on a 5-point scale (1 - very low, low, medium, high, 5 - very high). The grades were assigned based on the current electricity generation landscapes in Indiana, as well as future projects that may be implemented.

Second, the order of implementation or effect of the factors were "sequenced" within each lever, defining which factor or action needed to take place prior to another so that the other factor could occur. This assignment of order revealed that the factors occur as a series of events that facilitate each other. This chain of events was also evaluated to assess whether it would lead to a stronger or weaker impact on the overall success of the lever and renewable proliferation as a whole.

### 4.3.1 Lever 1: Transmission & Battery Storage

This lever explores the actions the IURC can take to promote transmission development to assist renewables proliferation, as well as what actions can be taken to best prepare to integrate battery storage into Indiana's energy mix once technological and cost constraints are alleviated. While much of the transmission and generation project proposal process is outside of the immediate and direct purview of the IURC, there are actions the IURC could take to assist in these all-important areas of concern. One is the development of a robust, flexible, interconnected transmission system, which is critical to the future expansion of renewable energy production. Transmission limitations, both technical and political, are some of the largest barriers to the development of new renewable energy projects.

**Sub-Lever 1-1 |** IURC Petitioning the Federal Energy Regulatory Commission (FERC) to Maintain Postage-Stamp Transmission Pricing

The What: The IURC should publicly comment on their support or dissent for proposed alterations in transmission pricing structures, like the "postage stamp" revisions proposed by MISO. To promote a more interconnected and comprehensive transmission infrastructure, the IURC should lead the way toward a more reliable, flexible, and diverse generation mix for Indiana and the greater RTO's in which it participates.

The Why: Transmission restraints pose one of the most significant burdens to increased renewables integration into our greater national grid. These transmission concerns also directly affect Indiana's renewables integration as MISO will not approve renewable build out without proper transmission infrastructure to support it. Projects like the Grain Belt Express have been plagued with stakeholders bemoaning their cost burden compared to their lack of tangible benefits, stalling the much-needed long distance transmission with a seemingly endless series of lawsuits and petitions (Tomich, 2019). Such project stagnancy could be solved by broadening the definition of garnered benefits outside of its current, rigid economic definition. Grid flexibility and the associated increased reliability such flexibility can yield can be integrated into the equation when considering potential project benefits.

Connection to Renewables: Currently, the assessments of these benefits associated with transmission build out are not necessarily comprehensively assessed, nor are they necessarily equitable. In an enormously integrated grid structure like those present in RTO's, assessing *who* exactly benefits from transmission and how those benefits are felt can be difficult to ascertain. Increased grid reliability and flexibility benefits every single consumer within a RTO's service area, and a more robust, interconnected transmission infrastructure is the way to accomplish such increases in reliability and flexibility. However, as the benefit assessment structure currently stands, the only benefit being directly assessed and attributed to the all-important cost benefit ratios are monetary ones.

**Sub-Lever 1-2 |** Interstate Public Utility Commission (PUC) Collaboration

The What: The Commission could reach out to public utility regulatory commissions in Michigan and Illinois to see if those state commissions are interested in coordinating a more cohesive and efficient electricity transmission system.

The Why: Collaboration between state PUCs sets a precedent of collaboration needed to move towards best practices in renewable development. While entities like MISO and PJM Interconnection already work across state lines, each state's public utility commission has a more precise understanding of the wants, needs, and attitudes of its citizenry, local governments, and state economy.

Connection to Renewables: A growing reliance on renewables does not necessitate that each state be able to generate their electrical demands through in-state production. Indeed, it would be very expensive and difficult for some states in the MISO region to increase substantially their renewable production because they do not have a high level of potential in inexpensive renewable generation.

Instead, as is already happening to some degree, the way forward for increased renewable generation is to promote collaboration between states with high renewable potential and states with low renewable potential to develop the transmission capacity to send renewable energy generated from where it is economically efficient to regions where it is not as easily generated. This fulfills the state public utility commissions' mandate of getting reliable energy at the lowest cost.

**Sub-Lever 1-3 |** Statewide Assessment of Potential Battery Storage Deployment

The What: The IURC can instigate a statewide assessment of what areas would best accommodate "hybrid" generation–renewables paired with battery storage. MISO has already begun a service area assessment of where hybrid assets would be best deployed within their broader MTEP (MISO Transmission Expansion Plan) Reliability Study. Therefore, an Indiana specific, IURC-led study would likely better ascertain additional, localized, potential Distributed Energy Resources (DER) deployable applications of hybrid (renewables directly paired with storage technology) resources that could benefit smaller, more localized communities that would otherwise be omitted from larger scale deployment studies.

The IURC has subcontracted with the State Utility Forecasting Group (SUFG) and the U.S. Department of Energy National Laboratory, Lawrence Berkeley (LBNL) to conduct a study as part of House Enrolled Act 1278. As part of this study, the Commission is working with the SUFG, which is studying transitions in fuel sources, primarily modeling future scenarios and the LBNL, which is studying new and emerging technologies, including the potential impact of such technologies on local grids or distribution infrastructure.

The Why: Taking a proactive step towards large-scale storage integration, even in something as simple as generating a plan, telegraphs an interest and willingness to invest political and financial capital towards a more renewables-centered energy future. As the process currently stands, utilities are encouraged to include battery storage planning in their IRP process, but assessments made by the Energy Storage Association are critical of the process as it currently stands (Energy Storage Association, 2018). Taking the suggestions made by ESA into account, a state led assessment would paint a more comprehensive picture of storage deployment potential.

Connection to Renewables: Additionally, having an integration plan at the ready means the moment storage technology becomes technically and economically viable for scaled deployment, Indiana will be able to move forward with hybrid asset integration quickly and efficiently, potentially turning Indiana into a renewable technology leader to which other states can strive.

Moving forward, storage represents the best available solution to the intermittency concerns surrounding renewable energy technology. Having a plan in place to apply this solution allows Indiana to act with expediency and efficiency when the time comes.

### Contributing Factors

The six factors detailed below are those expected to be the most directly impactful, are the most likely to occur and are immediately tangible to Lever 1 and its associated sub levers. This list is in no way considered comprehensive.

| | Factor Name | Description |
|---|---|---|
| **Factor 1** | IRP Additions | Integrate Transmission and Distribution Planning in the state IRP process |
| **Factor 2** | Interdisciplinary Coordination | Instigate cohesive coordination and goal setting by PUC's, RTO's and utilities in Indiana bordering states |
| **Factor 3** | Interstate Transmission Goal Setting | Prioritization of enhanced interstate transmission development |
| **Factor 4** | Transmission Cost Allocation | FERC Order 1000 amendments to transmission pricing eliminates "Postage Stamp" cost allocation approach |
| **Factor 5** | Storage Technology Improvement | Renewables technology development- Improved battery storage technology, lowered cost at scale |
| **Factor 6** | Storage Classification | Battery Storage classification upon deployment-generation or transmission |

### Scenario Analysis

Below, each of the contributing factors are evaluated with respect to the likelihood of occurrence and the degree to which the impact positively or negatively affects the lever.

The following charts have been color-coded for easy analysis of their impact, mitigated by their likelihood. The box with an "X" is our analysis where this specific factor has been ranked in impact and likelihood.

| **Factor 1:** **T&D in IRP** | | **Impact** | | | | |
|---|---|---|---|---|---|---|
| **Likelihood** | | Very Low | Low | Medium | High | Very High |
| | Very High | | | | | |
| | High | | | | | **X** |
| | Medium | | | | | |
| | Low | | | | | |
| | Very Low | | | | | |

This factor is discussed in detail in Lever 2: Integrated Resource Planning. However, with a more state focused focus on Transmission and Distribution Planning, broadened more efficient applications of localized renewable resources (DER) can be assessed and implemented. This aids in renewables proliferation as the state has access to more holistic resources and assessments than smaller, private actors typically pursuing DER projects.

| **Factor 2:** **Coordination Between PUC's** | | **Impact** | | | | |
|---|---|---|---|---|---|---|
| **Likelihood** | | Very Low | Low | Medium | High | Very High |
| | Very High | | | | | |
| | High | | | | | |
| | Medium | | | | | |
| | Low | | | | **X** | |
| | Very Low | | | | | |

Of the two Indiana border states within MISO's operational territory, Michigan is the most forward looking towards the integration of renewables and smart grid technology. Illinois has publicly come out against MISO's plan to change how excess capacity auction revenue is distributed among load-serving entities (LSEs).

A goal of the MI Power Grid initiative is to increase the reliability of the grid through a workgroup tasked with developing predictive theories of probable future technological advances in electric distribution systems. The MPSC's goal is to create "rule changes that are flexible and responsive to changing technology and that ensure safe, reliable electric service." (MPSC Optimizing Grid Performance, 2020).

The Illinois Commerce Commission oversees Illinois's electricity grid, though it has other duties beyond the scope of the IURC. It disagrees with MISO on the proposed revisions to the Historic Unit Considerations plan on how to price transmission upgrades. Their argument to FERC is that excess capacity auction revenue "should be allocated first to LSEs that fund transmission upgrades that increase zonal import capabilities into a constrained zone." (ICC, pg. 5). The Illinois strategy better aligns with this report's premise that incentivizing the development of transmission capacity is highly necessary to further the penetration of renewable energy in the market. While the ICC does not have public plans to innovate their transmission strategy or develop new rules to take into account battery and renewable innovations, it is possible the ICC would be willing to work with the IURC to develop strategies for reliable transmission development. Illinois is an important bridge between Indiana and Iowa and the Dakotas, which are some of the prime regions for wind-powered electricity

| **Factor 3: Transmission Prioritization** | | **Impact** | | | | |
|---|---|---|---|---|---|---|
| **Likelihood** | | Very Low | Low | Medium | High | Very High |
| | Very High | | | | | |
| | High | | | | | **X** |
| | Medium | | | | | |
| | Low | | | | | |
| | Very Low | | | | | |

A greater reliance on wind and solar energy without pairing such resources with robust storage infrastructure creates higher variability in output at the state level, since renewable output is based on variable and potentially volatile local weather conditions. Increased transmission capacity is fundamental to creating reliability in an electricity distribution system that is substantially based on renewable energy, and state public utility commissions have a strong role to play in collaborating among and between their states to encourage and incentivize that transmission development to move renewable generated energy from areas of bottleneck to areas in need of greater generation diversity.

| **Factor 4:** **FERC "Postage" Repeal** | | **Impact** | | | | |
|---|---|---|---|---|---|---|
| **Likelihood** | | Very Low | Low | Medium | High | Very High |
| | Very High | | | | | |
| | High | | | | | |
| | Medium | | | | **X** | |
| | Low | | | | | |
| | Very Low | | | | | |

Should amendments to FERC Order 1000 (transmission pricing) eliminate the "postage stamp" cost allocation approach to large scale transmission build outs, the prioritization of transmission infrastructure may see a shift from areas that need it most to areas that can afford it. Since, without the "postage stamp" strategy, those with the "direct benefits" will be required to "foot the bill," there is less likelihood of poorer, less cost efficient energy generating areas being able to afford transmission projects they so desperately need. While the "postage stamp" approach calls into question a concern of "fairness"–citizens paying for a portion of infrastructure from which they will not feel direct benefits–this idea of fairness is more a failure of assessing benefits than a failure of ethical cost allocation. Such amendments to transmission cost allocation could drastically hinder renewables in the long run, leaving transmission bottlenecks as a primary hurdle to renewables proliferation.

| **Factor 5:** **Battery Technology** | | **Impact** | | | | |
|---|---|---|---|---|---|---|
| **Likelihood** | | Very Low | Low | Medium | High | Very High |
| | Very High | | | | | **X** |
| | High | | | | | |
| | Medium | | | | | |
| | Low | | | | | |
| | Very Low | | | | | |

Continued improved battery storage technology will support the trend of lowering costs of utility scale deployment of this essential technology. As discussed throughout this report, pairing renewable generation with battery storage (hybrid assets) is a viable potential tool to overcome the mismatch of peak renewables generation times and peak demand times. This peak shaving ability that battery storage presents is enormously valuable. Continued advancements in battery storage technology make renewables an even more appealing asset, dispelling much of the demand concerns present in conversations about increasing renewables penetration.

| **Factor 6:** **Battery Classification** | | **Impact** | | | | |
|---|---|---|---|---|---|---|
| **Likelihood** | | Very Low | Low | Medium | High | Very High |
| | Very High | | | | | **X** |
| | High | | | | | |
| | Medium | | | | | |
| | Low | | | | | |
| | Very Low | | | | | |

How battery storage is ultimately classified upon deployment (generation or transmission) has huge ramifications for how those assets will be integrated into the energy market, funded, and regulated. MISO's MTEP Reliability Planning process, in its current stance, is to classify battery storage as a transmission asset. This, paired with potential reforms to FERC Order 1000 can have substantial effects on how utility scale battery storage is planned, funded and implemented. Clarity on the potential repercussion of differing classification schemes is necessary for proper stakeholder involvement as MISO moves forward with its proposed classification. As battery storage is such an essential tool for increased renewable market penetration, such classification repercussions can have an enormous impact on the ability of states to expand their renewables assets.

### Factor Sequencing

When considering the most directly impactful factors, factor precedent plays an important role because one factor might have to come before another for another factor to occur. The Factor Precedent Sequencing table demonstrates this.

Note: Factor 1 has additional interactions with Lever 3, which will be detailed in the Lever 3 write up.

| Sequence | Effect (Weaker or Stronger) | Sub-Lever | Notes |
|---|---|---|---|
| **1&2 →3&4** | Stronger | 1-2 | Greater coordination and teamwork across various stakeholders will ensure broader prioritization and send signals to federal regulators that regional actors want better transmission build out strategies and planning. |
| **4 →2&3** | Weaker | 1-1 | Localized cost barriers in socioeconomically less fortunate areas can hinder the political will to collaborate |

**Sequence 1:** IRP T&D Additions + Interdisciplinary Coordination, then Interstate Transmission Goal Setting +Transmission Cost Allocation

Adding the prioritization of transmission and distribution in state level IRP's in conjunction with interdisciplinary coordination between stakeholders like PUC's, utilities and RTO's sets the stage for expectations and goal setting to be harmonious amongst invested parties. When this precedent of harmonious goal setting is set, approaching surrounding states with this collaborative framework and collectively petitioning to FERC to maintain long-term beneficial cost allocation structures could prove to be an effective, systematic approach to encouraging expanded renewables transmission, albeit in an indirect way.

**Sequence 2:** Storage Technology Improvement, then Interdisciplinary Coordination + Interstate Transmission Goal Setting

Should improved battery storage technology come before collaborative efforts or goal setting, it is likely that states will act with immediate internal needs prioritized rather than broader, big picture, maximized interstate efficiency infrastructure pursued. While some hybrid asset integration is better than none at all, larger scaled technology integration planning would likely yield a more efficient allocation of capital and political will.

### 4.3.2 Lever 2: Integrated Resource Planning

This IRP policy lever will focus on how the IURC can use its legislatively mandated authority over this resource planning process to improve IRP stakeholder engagement, enhance its own utility IRP review process, and approach IRPs from a statewide, holistic perspective to promote renewable energy proliferation.

**Sub-Lever 2-1 |** IRP Stakeholder Engagement Process & Stakeholder Committees

The What: To improve the IRP stakeholder engagement, it is recommended that the IURC complete a more in-depth analysis of the incorporation of stakeholder comments into IRP content. We analyzed 16 stakeholder meetings for the most recent IRPs from Duke, IPL, and NIPSCO. Stakeholder comments with specific recommendations were flagged and located in the IRP.

Steps that could be taken include a more transparent inclusion of stakeholder comments in the IRP and higher quality stakeholder comment records. Outside of NIPSCO's IRP sign-in sheets, it is difficult to analyze who is attending these stakeholder meetings across all utilities, and more specifically what parties are making specific recommendations to the utilities' IRPs. Accessibility to stakeholder meetings are an issue in the IRP process. Out of the sixteen meetings analyzed, zero meetings were outside of normal working hours. This creates a significant access barrier in the IRP stakeholder meeting process, especially for concerned private citizens and other stakeholders outside of industry personnel. Stakeholder comments are integrated inconsistently throughout the IRPs examined for this analysis. Some stakeholder recommendations are easily located and are incorporated into the final IRP while others have not been found or do not appear to be mentioned.

Additionally, to improve the IRP stakeholder engagement process, it is recommended that the IURC facilitate the development of stakeholder committees for each utility during the IRP process. Another option would be for the IURC to revise IRP rules and regulations and have them require a stakeholder committee to be a part of the utility's IRP process. A stakeholder committee would consist of retail and wholesale customers, independent power suppliers, marketers, interest groups, and other interested entities in the service territory (Michigan Public Service Commission, 2017). The stakeholder committee would generate a Stakeholder's Report before the utility IRP is due to the IURC that contains detailed comments organized by topic as well as IRP process evaluations (EAI, 2018). Stakeholder Report topics could include, but are not limited to, the stakeholder process, modeling deficiencies, transmission, renewable energy, energy storage, coal, energy efficiency, etc. The Stakeholder Report would be developed alongside the IRP so that comments and information can be shared between the utility and committee throughout the IRP development process. Moreover, the utility and committee members would clearly establish their separate roles in the IRP process and set practical deadlines. In response to the Stakeholder Report, utilities should provide concise, clear documentation revealing how they integrated stakeholder report comments into the final IRP that is submitted to the IURC.

The Why: This in-depth analysis would allow the IURC to understand if the utilities are treating the stakeholder process as procedural or if it is truly influencing the methodology and content of the IRPs. Utilities have a duty to service its stakeholders' needs and consider their comments.

While the current IRP stakeholder engagement process is fairly robust, implementing the stakeholder committee recommendation would further enhance the process. The process gives stakeholders an opportunity to organize a committee and establish how they want to positively contribute to the IRP process. The reason for stakeholder involvement is to open up the planning process and give an opportunity for others with an interest in the planning process to provide input. This input acts as a check on utility decisions and reasoning during the development of an IRP (Michigan Public Service Commission, 2017). The state of Arkansas implemented this Stakeholder Committee approach and stakeholders contributed substantially to the submitted IRP. It should be noted that this recommendation is connected to the Stakeholder Engagement Process policy lever recommendation, and this recommendation would further improve upon the issues discussed in that policy sub-lever.

Connection to Renewable Proliferation: Utilities that treat stakeholder engagement as more than procedural are likely to understand the needs of their constituents better and integrate these needs into an IRP. In terms of renewable energy proliferation, increasing public demand for renewables can drive this and would likely be found in IRP stakeholder feedback. Moreover, developing stakeholder committees would support the proliferation of renewable energy resources by giving renewable energy stakeholders, such as concerned customers, consumer advocacy groups, environmental organizations, renewable energy producers and solar developers, grid and distribution operators, and others an impactful environment where they can voice their concerns and recommend IRP improvements that are essential to renewable energy proliferation in the state of Indiana.

**Sub-Lever 2-2 |** IURC IRP Review Recommendations

The What: Other state Public Utility Commissions (PUC) in the Midwest are taking a more aggressive approach in requiring renewable energy integration in utility resource planning. The state of Michigan planning process requires utilities to account for the costs and benefits of renewables and efficiency and programs to reduce power demand and it requires companies to justify fossil fuel investments (Balaskovitz, 2020). Michigan's IRPs have all shown that renewables are currently cost-competitive with fossil-fueled generation and that renewables are often less expensive. Because utilities have an obligation to minimize costs to the consumer and renewables are cost competitive with fossil fuels, utilities should prioritize increasing the percentage of renewable energy resources in their preferred resource portfolios (Balaskovitz, 2020). Overall, IRP approval by the IURC should be more contingent on cost-minimization, in addition to other objective criteria, and note that renewables fulfill this cost criteria.

Additionally, while the IURC review process should be procedural, it should also focus on analyzing IRP content related to renewable resource deployment. Lastly, the IURC, similar to Michigan's PUC, should require robust proposals when utilities propose developing new natural gas plants and require the utility to explain why there are no other price competitive energy options, such as solar or wind, that the utility could use to supply energy to consumers.

The Why: The IURC should consider how to improve its process of reviewing utility IRPs based on the processes other states are using to support renewable energy integration in utility planning. There are advantages and disadvantages to taking a more binding content approach to renewables in integrated resource planning. It is clear that if the IURC tried to require IRP content to be binding, it is likely that this would place stress on utility companies and limit risk-taking. Additionally, utilities do not want to be held to a binding preferred resource portfolio because market conditions could change requiring integrated policy flexibility in case market changes are significant and negatively affect a utility's chosen generation resource mix, which would in turn impact consumers. Administering binding IRP content would be complex and difficult to implement as well. One might also question how seriously binding IRP would be taken by the IURC and utilities might not hold themselves as accountable for the binding content. Lastly, another disadvantage would be if the IRP content was binding, then it could remove the need for rate and capital development proceedings. The IURC can use a modular, incremental approach to phasing in renewable energy through utility IRPs. This approach would be particularly useful for utilities who do not plan on taking action to procure new resources in the near future, in turn hindering renewable proliferation. Moreover, the IURC would suggest that utilities ensure they have actionable requests for proposals for all resource types.

Connection to Renewable Proliferation - Utility IRPs play a significant role in determining the energy resource mix that will supply customers with electricity far into the future. It is critical that the IURC use the IRP review process as a tool to ensure that energy customers receive the energy through the most cost-effective and efficient method, and renewable energy sources will fulfill this statutory requirement. The IURC can use a modular, incremental approach to phasing in renewable energy through utility IRPs.

**Sub-Lever 2-3 |** State-Level Integrated Resource Planning

The What: The IURC could aggregate individual utility IRPs once they are complete and submitted to analyze how well the IRPs throughout the state work together holistically, in terms of supporting renewable energy proliferation. This would be informal research spearheaded by the IURC that reviews state-wide resource adequacy of the IRPs. A third party could use the utility's IRP scenario analyses to run an aggregated scenario analysis. This aggregated scenario would ensure state level resource adequacy. The IURC could hire a consultant to conduct such an analysis or have the SURG conduct such an assessment. This consultant group would examine issues common to all utility IRPs. In contrast to general information that the SUFG currently supplies the Commission, this new work would be more granular and detailed as to what could be the possible impacts of integrating all the IRPs.

The Why: The IURC reviews IRPs for specific utilities but not in aggregate. By running a separate analysis, the IURC can make informed decisions about the state-level resource mixes. The SUFG looks at resource adequacy within the state but does not focus on the type of future resources. One of the concerns is that the type of resources may be significantly different on a statewide perspective than they are for an individual utility. Another reason is that the SUFG needs to be resource agnostic so there is no perception they are biased toward a specific type of resource.  This modeling for state-level aggregation of IRP potential resource mixes, especially in cases with power purchasing agreements and renewables, can ensure cost minimization, reliability, and resource adequacy.

Connection to Renewable Proliferation: This policy lever is beneficial because it ensures, in aggregate, that the preferred or potential state energy resource mix is feasible. While it does not explicitly support renewable energy proliferation, it ensures appropriate state-level decisions relating to energy generation mix. Resource adequacy decisions have the potential to encourage renewable energy proliferation.

**Sub-Lever 2-4 |** House Bill 1414 IURC Interpretation

The What: While House Bill (HB) 1414 provides a short-term temporary (sunsets in 2020) energy policy position for the state of Indiana, more is expected as the Task Force completes its work. The current legislation reads, "the general assembly finds that it is in the public interest to support reliability, availability, fuel security, and diversity of electric generation capacity in Indiana for the purpose of providing reliable and stable electric service to customers of public utilities."

The Why: The IURC should take a more proactive and progressive policy position as it relates to this statutorily mandated language. The interpretation will inform the IURC's approval of any incoming IRPs based on reliability, availability, fuel security, and diversity of electric generating capacity.

Connection to Renewable Proliferation: The interpretation of HB 1414 can help the IURC amplify renewable energy proliferation throughout the state. More specifically, the language "fuel security" and "diversity of electric generation capacity" can be interpreted as a statutory mandate to maintain resource adequacy, which means renewable generation should be heavily pursued. Renewable energy technologies such as wind and solar provide fuel security because they rely on insolation and wind power, which are often available for electricity generation when it is needed in Indiana. Diversity can be interpreted as electricity generated by a variety of different generating sources with each source contributing a significant portion of total generation.

### Sub-Lever 2-5 | Integrate Transmission and Distribution (T&D) Assets into Integrated Resource Planning

The What: Transmission and Distribution planning is not yet included in the IRP review process. The IURC staff recognizes the need for a greater focus on the distribution system. This would widen the scope for the integrated resource planning process and allow for a more holistic approach to ensuring cost minimization and resource adequacy. This will guarantee that building out generation capacity is going to service the territory efficiently when there is necessary capacity buildout.

The Why: DG and DERs, in general, are on the distribution system. Once these resources have sufficient penetration, they can impact both the distribution system and the bulk power system, meaning the transmission and utility-scale generation. Thus, as DG and DER expand, they will impact RTO operation of the system and ultimately affect the types of resources added to the bulk power system.

Connection to Renewable Proliferation: Including the transmission and distribution planning can change the preferred resource mix for utility IRP planning. This will be a more holistic approach and guarantee resource adequacy in the state.

### Contributing Factors

Although not comprehensive, this section details the factors that are of particular importance to the advancement of Lever 2. Each will be evaluated with respect to the likelihood of occurrence and the degree to which the impact positively or negatively affects the lever.

Below, the factors considered are listed in from most influential to least influential:

| | Factor Name | Description |
|---|---|---|
| **Factor 1** | RE Prices | Renewable energy resource prices relative to natural gas |
| **Factor 2** | Technology Improvements | Renewable Technology Improvements (Battery storage, Solar Power Factors/Efficiency, Wind Turbine Improvements) |
| **Factor 3** | IN General Assembly | State General Assembly congressional makeup |
| **Factor 4** | HB1414 | HB 1414 Impacts and retiring coal-fired power plants |
| **Factor 5** | 21st-Century Energy Plan | Task Force Results and potential 2021 IN Energy Policy Development |
| **Factor 6** | Administration Burden | Utility Cooperation and IURC & Utility Administrative Adjustments |

### Scenario Analysis

Below, each of the contributing factors are evaluated with respect to the likelihood of occurrence and the degree to which the impact positively or negatively affects the lever.

The following charts have been color-coded for easy analysis of their impact, mitigated by their likelihood. The box with an "X" is our analysis where this specific factor has been ranked in impact and likelihood.

| **Factor 1: RE Prices** | | **Impact** | | | | |
|---|---|---|---|---|---|---|
| **Likelihood** | | Very Low | Low | Medium | High | Very High |
| | Very High | | | | | **X** |
| | High | | | | | |
| | Medium | | | | | |
| | Low | | | | | |
| | Very Low | | | | | |

The Renewable Energy prices factor highlights how competitive renewable energy resources are in price to natural gas and other fossil fuels. For factor 1, the magnitude of impact and likelihood of occurrence and impact on lever 2 are both very high. The sub-lever most affected by this factor includes sub-lever 2, IURC IRP Review, because if renewable energy prices tend to remain competitive with fossil fuel prices, then an argument can be made in support of renewables as a cost-minimizing energy source. Based on this assumption, this factor would have a positive impact on sub-lever 2. Another sub-lever impacted by this factor is sub-lever 4, Interpretation of HB1414. If renewables remain price competitive, then this would support the idea that renewables provide fuel security and support diverse electric generating capacity—two key phrases in HB1414. Based on this assumption, factor 1 would have a positive impact on sub-lever 4. It is expected that this factor will have a positive impact on renewable energy in Indiana.

| **Factor 2: Technology Improvements** | | **Impact** | | | | |
|---|---|---|---|---|---|---|
| **Likelihood** | | Very Low | Low | Medium | High | Very High |
| | Very High | | | | | |
| | High | | | | | |
| | Medium | | | | | **X** |
| | Low | | | | | |
| | Very Low | | | | | |

The Renewable Technology Improvements factor focuses on advancement of battery storage, solar power factors/efficiency, and wind turbine technologies. For factor 2, the magnitude of impact is very high while the likelihood of occurrence and impact is medium. This means that if renewable energy technology becomes more efficient and advances over time, it will have a significant, positive impact on the utility IRP process because utilities will be more compelled to invest in renewable generation systems. The likelihood of occurrence is medium because while renewable technology is improving it is unclear how quickly these improvements will unveil themselves in the next five years. This lever will indirectly impact some sub-levers and directly impact others.

| Factor 3: IN General Assembly | | Impact | | | | |
|---|---|---|---|---|---|---|
| Likelihood | | Very Low | Low | Medium | High | Very High |
| | Very High | | | | | |
| | High | | | | X | |
| | Medium | | | | | |
| | Low | | | | | |
| | Very Low | | | | | |

The Indiana General Assembly factor focuses on the distribution of political parties in the Indiana State House and Senate. For factor 3, the magnitude of impact and likelihood of occurrence are both high. This is because the Indiana General Assembly has a long-standing history of the Republican Party having a super-majority in both the State House and Senate, and so the likelihood of this having an impact on lever 2 and the Indiana Code IRP law is high. The magnitude is also high because the General Assembly creates policy that the IURC must adhere to through the implementation of its rules and regulations. This factor affects all of the sub-levers directly and indirectly. It is expected that this factor will have a dampening effect on renewable energy proliferation in Indiana.

| Factor 4: HB1414 | | Impact | | | | |
|---|---|---|---|---|---|---|
| Likelihood | | Very Low | Low | Medium | High | Very High |
| | Very High | | | | X | |
| | High | | | | | |
| | Medium | | | | | |
| | Low | | | | | |
| | Very Low | | | | | |

Factor 4 focuses on the impact of House Bill 1414 on renewable energy proliferation.  It is very likely to occur because HB 1414 has passed, with a very high impact because the bill has passed and the IURC adheres to this legislation. This impact could be positive or negative because elements of the bill support fossil fuel generation while other parts can help renewables. Lever 2 becomes very important because the policy position in House Bill 1414 will change how the IURC looks at various energy generation resources. In particular the language in the bill can be interpreted to support a diversification of assets within the state. This lever will indirectly impact some sub-levers and directly impact others.

| **Factor 5:** **21st-Century Energy Plan** | | **Impact** | | | | |
|---|---|---|---|---|---|---|
| **Likelihood** | | Very Low | Low | Medium | High | Very High |
| | Very High | | | | | |
| | High | | | | | |
| | Medium | | | | **X** | |
| | Low | | | | | |
| | Very Low | | | | | |

The 21st Century Energy Plan factor deals with the HEA 1278 energy study. These task force findings have a medium likelihood to have findings that change IURC actions. Findings that support renewable proliferation would increase the impact of the study. The impact of the study has the potential to have a positive effect on the lever's ability to help the IURC. Based on the findings, the IRP process becomes more important because the study will inform decisions made during the IRP review process. State level aggregation and T&D integration become less important because the study is aimed at similar questions about T&D, resource mix and resource adequacy; the IURC would only need to investigate changes. The interpretation of HB 1414 becomes less important because regardless of the policy position the IURC takes concerning HB 1414, this study will determine resource adequacy in the state.

| **Factor 6:** **Administrative Burden** | | **Impact** | | | | |
|---|---|---|---|---|---|---|
| **Likelihood** | | Very Low | Low | Medium | High | Very High |
| | Very High | | | X | | |
| | High | | | | | |
| | Medium | | | | | |
| | Low | | | | | |
| | Very Low | | | | | |

Factor 6 is focused on the administrative burden associated with various changes the IURC may change related to Lever 2. It is very likely to occur because all sub-levers will create additional administrative burdens, medium impact, because each sub-lever has variation in predicted administrative burden. The impact of the administrative burden would be negative because it can act to constrain implementing the levers because of constraints.

For the changes to the sub-levers, the administrative burden will be ranked on how much each one is expected to increase the administrative cost for the IURC:

- Sub-lever 2.1 | Stakeholder Engagement: The administrative burden is ranked as Med/High due to the IURC putting more robust requirements, which means more work for utilities to do—time, communication, and labor.
- Sub-lever 2.2 | IRP Review Process: The administrative burden is ranked as Med/High due to the more in depth review process, which will be more work for IURC in the form of time and labor.
- Sub-lever 2.3 | State level Aggregation and Modeling: The administrative burden is ranked as High because a consultant would have to be paid to do the more specialized work.
- Sub-lever 2.4 | HB 1414: The administrative burden is ranked as Medium because the interpretation of the policy may change the IURC goals/objectives, thereby resulting in a revision of IURC rules and regulations to align with the statute so that utilities are also in compliance with the new rules and regulations.
- Sub-lever 2.5 | T & D: The administrative burden is ranked as Low because T&D will need to be incorporated into IRPs eventually so this cost is unavoidable.

**Factor Sequencing**

When considering the most directly impactful factors, factor precedent plays an important role because one factor might have to come before another for another factor to occur. The Factor Precedent Sequencing table demonstrates this.

| Sequence | Effect (Weaker or Stronger) | Sub-Lever | Notes |
|---|---|---|---|
| 1 →2 & 5 →4 →6 | Stronger | 1,3,4 | IRP process helps proliferation |
| 3 →1 →2 & 4 →6 | Weaker | 1,2,4 | Strong legislative mandate forces utilities to RE (need for IURC changes less) |

**Sequence One |** Renewable Energy Prices Precede Technology Improvements, the 21st Century Plan, HB 1414, and Administrative Burden

First, would be the impact of renewable energy prices, which determine the demand for renewable energy resources. Contingent on these prices would be the technological improvements, along with the outcomes and findings associated with the 21st-Century Energy Plan for Indiana. The findings from the energy plan would influence the implementation and progression of HB 1414. Lastly, the outcomes and the law and regulatory would influence the administrative burden. It is expected that this amalgam of factors, assuming renewable energy prices remain competitive, will support renewable energy proliferation in Indiana.

**Sequence Two |** IN General Assembly Congressional Makeup Precedes Renewables Support, Prices, HB1414, and Administrative Burden

First, would be the State General Assembly congressional makeup, which determines the legislative backing for renewable energy resources. It is expected that the General Assembly, given its legislative makeup, will not pursue aggressive state involvement in determining generation capacity mix. This means that market forces, renewable energy prices will determine utility decisions for investment. Contingent on these prices would be the technological improvements to allow for flexibility in resources. These driving forces will influence the implementation and progression of HB1414. Lastly, the outcomes and the law and regulations would influence the administrative burden. It is expected that this amalgam of factors will lightly support renewable energy proliferation in Indiana but actions will be driven by market changes and not political forces.

### 4.3.3 Lever 3: Multi-Year Stakeholder Initiatives

This Lever examines a stakeholder engagement effort that considers the activity and influence of current stakeholders in Indiana's energy market and throughout the region. By taking action to engage stakeholders through a structured process, the IURC will be able to maintain transparency of current proceedings, and increasingly understand the needs, concerns, and limitations of private citizens and energy market entities. This transfer of consumer preference from stakeholders to the IURC is essential for the proliferation of renewable energy in Indiana. Although stakeholders are typically engaged through the IRP process, this Lever recommends that the IURC initiate its own measures to ensure connection with the public.

**Sub-Lever 3-1 |** Coalition Building

The What: To inform further the IURC rulemaking and policy process, it is recommended that the IURC enhance coordination efforts with stakeholders. Although the IURC provides stakeholders with the opportunity to comment on rules, studies, and analyses that the IURC has proposed or is legislatively tasked with, the IURC should advance more coordination with energy market stakeholders. The purpose of the IURC's engagement would be to encourage the flow of information for developing policies that incentivize the use of renewables.

The Why: By encouraging stakeholders to interact with the IURC and with one another, there would be a greater dissemination of information regarding the IURC's actions and the effects they could have on different entities and jurisdictions. By engaging in a collaborative effort with stakeholders, the IURC will be able to regularly inform those subject to its authority. These stakeholders can then take the information they learn and influence policy in their own jurisdictions, engaging with legislators to promote legislation that encourages the proliferation of renewable energy in Indiana.

Connection to Renewables: In engaging with stakeholders across the state, the IURC will have a better understanding of the degree to which communities are impacted by the growth of renewable energy, both positively and negatively in turn. Stakeholders may also be able to provide insight into proposed policy incentives for increasing the state's renewable mix.

**Sub-Lever 3-2 |** Generated Public Perception Surveys for Consumer Engagement

The What: Although larger stakeholder groups readily express interest surrounding the IURC's activity, there should also be a stronger focus on individual utility energy consumers. It is important for these customers to have an accessible outlet where they can voice their concerns and provide information about their energy use and renewable energy preferences. It is recommended that the IURC coordinate and facilitate discussions with utilities to conduct a series of perception surveys on customer preferences and concerns regarding energy resource options provided by utilities. The Morrison Institute for Public Policy at Arizona State University completed an Informed Perception Project, to gather the stated preferences of utility customers, or participants, with respect to willingness to pay to address energy issues, renewable energy development, reduced coal usage, and energy awareness among other metrics (Daugherty et. al, 2011).

The Why: In collecting information on the customer scale, the stated or revealed preferences can demonstrate the current and potential support for renewable energy proliferation throughout Indiana from a utility company perspective. The IURC would be able to understand consumer preferences on local, regional, and state levels. This information could be used as the groundwork for adapting legislation so that it is in congruence with public interest.

Connection to Renewables: With a better understanding of the public interest, the IURC and legislative bodies could use the results as grounding for increasing renewable energy resources throughout the state. These results would aid in the understanding of individual level impacts of transitioning the energy mix to a more renewable forward assemblage.

**Sub-Lever 3-3 |** Exploratory Studies and Renewable Pilot Program Benefits

The What: Along with the ongoing studies, such as the House Enrolled Act 1278 Energy Study, it is recommended that the IURC, as well as energy market stakeholders, encourage the investment in additional exploratory studies and pilot programs to understand better the impacts of renewable energy. Topics of interest may include the effects of increased renewables on distributed generation and microgrids, renewable energy storage, third-party owned community solar generation, and electric vehicle infrastructure. These research areas should be studied both through the lens of regional impacts and electric utility service for consumers.

The Why: Continuing to increase research about Indiana renewables and the different proliferation mechanisms through exploratory studies and implementing pilot programs will better inform policymakers and regulators.

Connection to Renewables: Exploratory studies will contribute to the broader understanding of renewable technology, storage, transmission, and distribution. By staying keyed in on technological advancements and the way renewable growth will impact Indiana, the IURC will be better equipped to advise on renewable energy policy and integration.

### Contributing Factors

Although not comprehensive, this section details the factors that are of particular importance to the advancement of Lever 3. Below, the contributing factors are listed from most influential to least influential:

| | Factor Name | Description |
|---|---|---|
| **Factor 1** | Legislative Policy | General Assembly Indiana Code (IC) guidance for IURC |
| **Factor 2** | IURC-Utility Relations | Relationship between IURC and utilities (communication, etc.) |

| | | |
|---|---|---|
| **Factor 3** | Customer Empowerment | Access to the engagement process; Utility customer engagement and awareness of customer preferences |
| **Factor 4** | Stakeholder Influence | The degree to which stakeholders have influence within their own jurisdiction and their relationship to the IURC or MISO |
| **Factor 5** | Study Prioritization | The degree to which utilities prioritize investment in exploratory studies/funding opportunities |

### Scenario Analysis

Below, each of the contributing factors are evaluated with respect to the likelihood of occurrence and the degree to which the impact positively or negatively affects the lever.

The following charts have been color-coded for easy analysis of their impact, mitigated by their likelihood. The box with an "X" is our analysis where this specific factor has been ranked in impact and likelihood.

| **Factor 1:** **Legislative Policies** | | **Impact** | | | | |
|---|---|---|---|---|---|---|
| **Likelihood** | | Very Low | Low | Medium | High | Very High |
| | Very High | | | | | **X** |
| | High | | | | | |
| | Medium | | | | | |
| | Low | | | | | |
| | Very Low | | | | | |

It has been determined that the Legislative Policy—General Assembly Indiana Code (IC) mandates for the IURC—is the most important Factor with respect to Lever 3. Both magnitude of impact and likelihood of occurrence are rated as Very High. As a result of its importance, it impacts all three sub-Levers. Because the IC dictates what actions the IURC can and cannot carry out, the current legislation as well as any considerations for change, will result in direct change to IURC operations. Title 8 of the Indiana Code only mentions the consideration of stakeholder once, and that mention is with respect to utility-specific stakeholders, not those that are interested in the IURC. However, in 2018, Indiana Code §8-1-8.5-3 was amended to include stakeholder requirements, including written comment, public hearing, and individual meeting procedures, with respect to mandated Statewide

Analyses. This legislation encourages stakeholders to engage with the IURC, resulting in a net-positive advancement of Lever 3.

| **Factor 2:** **IURC-Utility Relations** | | **Impact** | | | | |
|---|---|---|---|---|---|---|
| **Likelihood** | | Very Low | Low | Medium | High | Very High |
| | Very High | | | | | |
| | High | | | | | **X** |
| | Medium | | | | | |
| | Low | | | | | |
| | Very Low | | | | | |

The IURC-Utility Relations factor emphasizes the strength of the relationship between the IURC and the Utilities it oversees. Considerations for relationship include communication, response-timeliness, transfer of information, and communicated expectations. The impact of Factor 2 is Very High and the likelihood of occurrence is high. The most impacted sub-levers are sub-levers 2, Perception Studies, and 3, Exploratory Studies and Pilot Programs. For sub-lever 2, utilities would be responsible for conducting the surveys, therefore, it would be incumbent upon them to share any garnered results with the IURC. Likewise, the IURC can assist in guiding the utilities, and providing any ancillary support they may need. For Exploratory Studies, the rationale with regard to sub-lever 2 holds true—utilities would be conducting studies into technology pilot programs that are specific to their local area; however the IURC can act as a guiding agent of knowledge. It is expected that this Factor would have a net positive effect on the advancement of Lever 3 if relationships are strong.

| Factor 3: Customer Empowerment | | Impact | | | | |
|---|---|---|---|---|---|---|
| Likelihood | | Very Low | Low | Medium | High | Very High |
| | Very High | | | | | |
| | High | | | | X | |
| | Medium | | | | | |
| | Low | | | | | |
| | Very Low | | | | | |

The Customer Empowerment factor highlights a utility customer's access to both IURC and Utility processes, as well as the utilities awareness of customer preferences. The impact of Factor 3 on Lever 3 is high, and the likelihood of occurrence is also high. All sub-levers are impacted by this factor. For sub-lever 1, Coalition Building, by encouraging transparent rule making and study commenting periods, independent customers would have more opportunities to participate and be heard. For sub-lever 2, Public Participation Surveys, utilities would be empowering customers by showing direct interest in their preferences, using empirical data of market preferences to guide policy. For sub-lever 3, Exploratory Studies and Pilot Programs, utility customers would be empowered by the knowledge that would result from formal inquiries into the impacts of renewable technology. It is expected that this factor will have a neutral impact on renewable generation. By providing the avenue for customers to be heard, both positive and negative regard toward renewables is anticipated.

| **Factor 4:** **Stakeholder Influence** | | **Impact** | | | | |
|---|---|---|---|---|---|---|
| **Likelihood** | | Very Low | Low | Medium | High | Very High |
| | Very High | | | | | |
| | High | | | | | |
| | Medium | | | **X** | | |
| | Low | | | | | |
| | Very Low | | | | | |

The Stakeholder Influence factor highlights the degree to which stakeholders have influence within their own jurisdiction and their relationship to the IURC or MISO. The magnitude of impact of factor 4 on lever 3 is medium and the likelihood of occurrence and impact on the lever is also medium. The sub-levers most affected by this factor include sub-lever 1 and 2. For sub-lever 1, Coalition Building, this factor is directly connected because enhanced stakeholder influence would improve coordination efforts between the IURC and energy market stakeholders. For sub-lever 2, Public Perception Surveys, this factor would affect survey responses because the greater the stakeholder influence and connection to the issues, the more likely they will be to respond to and contribute significantly to surveys of this nature. Stakeholder influence and knowledge directly affects perception survey participation. It is expected that this factor will have a positive impact on renewable energy in Indiana if stakeholder influence and participation is high.

| **Factor 5:** **Study Prioritization** | | **Impact** | | | | |
|---|---|---|---|---|---|---|
| **Likelihood** | | Very Low | Low | Medium | High | Very High |
| | Very High | | | | | |
| | High | | | | | |
| | Medium | | | | **X** | |
| | Low | | | | | |
| | Very Low | | | | | |

The Study Prioritization factor highlights the degree to which utilities prioritize investment in exploratory studies/funding opportunities. This factor would impact sub-lever 3.3. For factor 5, the magnitude of impact on lever 3 is low and the likelihood of occurrence and impact is also low. This is because whether or not utilities prioritize exploratory studies and pilot programs for renewables does not have a significant, direct effect on stakeholder engagement. However, it will impact the success of sub-lever 3.3 because while the IURC and other energy market stakeholders can try to encourage utilities, the implementation of these studies is ultimately up to utility prioritization, funding, and decision-making. If utilities do prioritize exploratory studies for renewables, then factor five will have a positive impact on sub-lever 3.3.

### Factor Sequencing

When considering the most directly impactful factors, precedent demands special consideration due to sequencing: one factor might have to come before another for another factor to occur. The Table below demonstrates the factor precedent sequencing for Lever 3.

| Sequence | Effect (Weaker or Stronger) | Sub-Lever | Notes |
|---|---|---|---|
| 1 →2 | Weaker | 3.1, 3.3 | Conservative general assembly |
| 2 →3 & 4 | Stronger | 3.1, 3.2 | Assuming that the IURC and utilities have a robust relationship and are in good communication |
| 2 →5 | Stronger | 3.3 | Assuming that the IURC and utilities have a robust relationship and are in good communication |

**Sequence One |** Legislative Policy Precedes IURC-Utility Relations

It was determined that Factor 1 would need to precede Factor 2. This means that establishing and following General Assembly Indiana Code (IC) mandates for the IURC must occur before developing strong, guiding relationships between the IURC and energy utilities. As the Assembly legislated Title 8 of the Indiana Code, creating the IURC, this statement is influenced by the party make-up of the General Assembly and the governor in office. It is expected that this sequence of factors would weaken each of the sub-levers 3.1 and 3.3, as the IURC is an executive agency that carries out the initiatives and studies that the Indiana General Assembly tasks it with.

**Sequence Two |** IURC-Utility Relations Precedes Customer Empowerment and Stakeholder Influence

It was determined that Factor 2 would need to precede Factors 3 and 4. This means that strong IURC-Utility relationships must be evaluated prior to empowering customers and increasing stakeholder participation. This statement assumes that strong relationships between the IURC and the Utilities it regulates directly impact the knowledge and activity of individual utility customers and stakeholder groups. Because the primary mode of stakeholder communication is through utilities, good communication about expectations and local developments between the IURC and utilities is expected to strengthen both sub-levers 3.1 and 3.2.

**Sequence Three |** IURC-Utility Relations Precedes Study Prioritization

It was determined that Factor 2 would need to precede Factor 5. This means that strong IURC-Utility Relations must occur before exploratory study prioritization can exist. This statement relies on the underlying assumption that the IURC and utilities have a robust relationship and are in good communication. It is expected that this sequence of factors would strengthen sub-lever 3.3.

# 5.0 RESULTS

Using a systemic Scenario-Factor approach, the three policy Levers were tested in order to observe the Lever's efficacy in promoting renewable energy proliferation in Indiana. With respect to Lever 1, multi-stakeholder coordination and cooperation both within and outside the state is required in the creation of a more robust transmission infrastructure needed to assure the reliability of energy–renewable or otherwise–for the citizens of Indiana. This cooperation spans regulatory scales, from the federal level to smaller state and municipal level regulators and requires a great deal of interaction between and within states. The most influential factors contributing to the efficacy of this lever are Interdisciplinary Coordination (Factor 3), Interstate Transmission Goal Setting (Factor 4) and Battery Storage Technology (Factor 5). When considering Lever 2—using the IRP process to promote renewable energy proliferation—the most prominent factors are those that revolve around the pricing of renewables and the legislative agenda of the Indiana General Assembly. For Lever 3, the construction of policies that encourage and institutionalize stakeholder engagement prove to be the factors that are both the most impactful and the most likely to occur.

## 5.1 Synopsis of Scenarios

This section provides a brief synopsis detailing the efficacy of the levers based on the collective and potentially compounding influence of different factors. A collection of factors will either have a positive or negative influence on a given lever, with positive influences supporting the proliferation of renewables and negative influences forming additional barriers to this proliferation. The purpose of this section is to come to a rational, sequenced conclusion regarding the efficacy of each lever given the simultaneous application of factors present across levers. This is in an effort to recognize the near certainty that these factors do not occur in isolation, with the complex mechanics of stakeholder culture, policy and innovation moving in conjunction across many subsets of the energy organism. Examples of such interwoven factors are detailed below.

### Lever 1: Integrated Factors Scenario

Scenario 1 | IRP T&D Expansion, FERC Amendments, Technology, Asset Classified

It is important to note that, in reality, factors divided between levers will interact with one another *across* levers, and this interaction will result in a collective effect on the transmission lever as a whole. This collective impact drives the efficacy of the sub-levers, driving either a negative or a positive impact on renewables proliferation.  This scenario considers how integrating transmission and distribution into state IRP's, technology improvements, FERC Order 1000 amendments and storage asset classification could influence the efficacy of indirect transmission development actions taken by the IURC.

Even with state legislative and regulatory bodies taking steps to prioritize much needed infrastructure for renewables integration (T&D in IRP's) and continued technological improvements to battery storage, bigger players can still stifle renewables development. Should MISO classify battery storage as transmission assets and FERC decide to reclassify its transmission cost allocation structure to shift cost burdens of transmission build out to those who feel the narrowly defined "direct benefits'' of that build out, it is unlikely such technology will be broadly implemented. Utilities wishing to fulfill the expanded IRP requirements are likely to continue to find utility scale storage infrastructure too costly without "spreading the burden" of cost allocation across a base of consumers more broad than those who will be "directly" utilizing the energy such infrastructure would store. This combination of factors, even with the active effort of the IURC, will likely net a negative result for renewables proliferation.

**Scenario 2 |** Interstate Collaboration, Renewable Energy Prices, FERC Maintains, Technology

This scenario considers how prioritizing interstate PUC collaborations, renewable energy prices, FERC Order 1000 maintaining its current cost allocation strategies, and improvements in battery storage technology could influence the efficacy of indirect transmission development actions taken by the IURC.

Taking a proactive step to coordinate infrastructure and transmission planning sets the stage for expedient, efficient action when timely. As the state of renewable technology stands, the energy generated continues to be cost competitive, but much of the infrastructure still has higher than desirable capital costs. As renewables continue to produce cost competitive power, however, investment in renewable technology improvements will continue to increase. This has been observed with solar development over the past 10 years and more recently with battery storage. With carefully and mindfully constructed collaborative agreements between states, paired with continual cost efficiency in renewable technologies, maintained infrastructure cost allocation across a broader consumer base and utilities scale storage technology improvements, Indiana and surrounding states could be primed to move forward with complex hybrid renewable asset build outs at an impressively accelerated rate.

## Lever 2: Integrated Factors Scenario

**Scenario 1 |** Renewable Energy Prices, Technology, & HB 1414

It is important to note that in reality, these six important factors will interact with one another and this interaction will result in a collective effect on the IRP lever as a whole. This collective impact drives whether or not a certain sub-lever will be impactful and these factors can have either a positive and negative influence on the sub-levers. This scenario considers how renewable energy prices, technology, and HB 1414 will impact the IRP lever, collectively. First, it is clear that renewable energy prices will have a direct impact on technology improvements because as renewables become less expensive and are in higher demand, this will support research and development of renewable technologies. One could also argue that technological advancements will directly impact prices because they could lower the cost of renewables by improving their efficiency and capacity factors. These two factors both connect to HB 1414 impacts on the retirement of coal-fired power plants because this bill will make it more difficult for Indiana utilities to retire their coal-fired power plants. While renewable energy remains price competitive with natural gas and coal, this bill will limit the likelihood of utilities shifting from coal to renewable energy technologies at a faster rate. This collection of factors would likely have a negative impact on renewable energy proliferation in Indiana and it would not support renewables in the IRP process. This IRP lever will not be as effective if HB 1414 is implemented. However, if HB 1414 is removed from the equation, then the current state of the world with prices and technology advancements would support renewable energy in Indiana through the IRP process because coal-fired power plants would retire sooner and the utilities would need to compensate for that lost energy through new generating-systems.

**Scenario 2 |** IN General Assembly, Task Force, & Technology

Factors interact with one another, and this interaction will result in an effect on the IRP lever as a whole. This scenario considers how the makeup of the Indiana General Assembly, findings of the task force, & improvements in technology will impact the IRP lever, collectively. First, changes in technology will directly impact prices because they could lower the cost of renewables by improving their efficiency and capacity factors. This factor will be determined by the task force findings, because the findings will determine how viable renewables are and how technology will help with integration. If the Indiana General Assembly stays the same, then there is no expected push to change the resource mix away from fossil fuels and toward renewables. If the task force findings show renewable energy as price competitive with natural gas and coal, it will encourage utilities to invest in renewables at a faster rate. This collection of factors will likely have a positive impact on renewable energy proliferation in Indiana and it would support renewables in the IRP process. The IRP lever will be more effective based on the task force findings. However, if the findings are not positive for renewables, then the coal-fired power plants will retire later and the utilities will delay investment in renewables.

## Lever 3: Integrated Factors Scenario

**Scenario 1 |** Stakeholder Influence, Technology Improvement, Customer Empowerment

This scenario considers how stakeholder influence, technology improvement, and customer empowerment will affect Lever 3—Multi-Year Stakeholder Initiative. Stakeholder influence has the ability to directly impact technological advancement. This could come in the form of industry investment or independent research. Should stakeholders influence technology such that it advances renewable technology and makes it more accessible to utility customers, customer empowerment could increase. With access to renewable technology, individual customers may take advantage of the new technology and engage more, learning about energy sources and perhaps investing in the technology themselves. Likewise, stakeholders may also contribute to promoting the current energy mix as preferable, prolonging technological improvement.

**Scenario 2 |** Renewable Pilot Program Benefits, Petitioning FERC, Asset Classification

This scenario considers how conducting renewable pilot programs to assess potential benefits, how those benefits can then be used as a rationale to petition FERC to maintain its current cost allocation strategies outlined in Order 1000, and classifying battery storage as transmission assets can influence the proliferation of renewables in Indiana through the utilization of multi-year stakeholder processes. Much of the logic behind the amendments proposed to FERC Order 1000 is that of more "fairly" allocating costs to those who will be reaping the benefits of such transmission build outs. However, this "fairness" is assessed off an incomplete definition of benefits. Should the IURC conduct a more comprehensive assessment of the kinds of benefits–spanning both the traditional economic benefits and the more difficult to quantify benefits like resilience and flexibility–can inform state PUC's as to how to argue their case for maintained cost allocation structures. This maintained structure could be potentially instrumental for Indiana should MISO follow through with its current plan to classify battery storage as a transmission asset. More broadly defining benefits would give PUC's the logical fodder required to argue against potentially, and likely unintentionally, regressive top-down regulation.

## 6.0 DISCUSSION

The field of New Institutional Economics, as championed by Indiana University, advocates the idea that the efficacy of any multi-stakeholder agreement is only as strong as the weakest link, where parties are bound together by mutual interest and destabilized by the pursuit of individual self-interest. For agreements to be sustainable, otherwise destabilizing self-interests must be realized through the pursuit of mutual interest. This idea is undeniably present in the path towards a more renewable future. Throughout our analysis, this idea of interconnection, cooperation and mutual interest has found itself at the foundation of all our proposals–operating in good faith, reinforced by trust and reciprocity creating sustainable arrangements towards long term goals.

In our analysis, the factor which encourages this mutual trust and permeates each lever and scenario is stakeholder engagement. Stakeholder engagement allows legitimate concerns to be voiced and, more importantly, heard. These concerns can then be assimilated by acting parties into their goal setting, and actions taken–furthering the trust between the serviced and the servicers.

Part of this continued trust also relies on respecting history. Hoosiers have long preferred market solutions to regulators determining economic "winners" and "losers." Respecting that precedent is paramount to the success of actions taken by the IURC moving forward. While the goal of this study is to ascertain actions to assist in renewable energy proliferation, all actions are those within the actions outlined in the Public Service Commission Act guiding the IURC's actionable purview. While particular resource outcomes (increased renewables) was the focus of this study, the IURC must continue to respect a market driven approach to arguing the advantages of such increases in Indiana's energy market. With this in mind, the suggestions made in this study are those which increase the transparency in the costs and benefits associated with maintaining the status quo and moving to a more renewable generation mix. Everything from transmission cost allocation to the IRP process can include policy additions which better represent true market impacts of energy generation technologies, giving Hoosiers a more comprehensive picture of their energy market. Such was the goal of the suggested policy tools and engagement actions outlined in this study.

## 6.1 Assumptions and Limitations

Several assumptions were made in the creation of this report's levers and the scenario analyses that assessed them. This section identifies the major assumptions and explicitly lays out some of the limitations with the contextual information and the analysis of this data.

**Lever 1 |** Enhancing ISO Relationship – Transmission as Reliability

The primary limitation of Lever 1 is the expectation of effects. While the IURC can make small movements to accommodate transmission expansion and development, these movements have indirect effects at best. Since the "jurisdiction" of transmission development is outside of the purview of the IURC and is instead in the hands of MISO, the IURC can do little in terms of independent and direct action to influence transmission. Instead, the actions suggested in this study are indirect ones, small nudges to align Indiana's energy direction to that of MISO and the surrounding states to best utilize technology and infrastructure when it is made available.

Much of the assumptions present in Lever 1 are those of efficacy and presence of existing programs or coalitions. By way of efficacy, sub-lever 1-1 and sub-lever 1-2 depend heavily on factors outside the IURC's control for their intended effects to be felt. sub-lever 1-1 (Petitioning to FERC to maintain Postage Stamp Pricing) depends heavily on other PUC's likewise addressing FERC in support of this broader cost allocation strategy than that proposed by MISO. While the IURC can make a statement alone, its potential efficacy would likely be dependent upon other states joining the petition. This joint effort would be more likely should sub-lever 1-2 (Interstate Public Utility Commission (PUC) Collaboration) be achieved. However, like all joint efforts, the efficacy of this sub-lever depends upon that of unanimous decision making and mutual interests within the goal setting proposed by such a coalition. Such complicated integrated efforts across states has, historically, been notoriously difficult to accomplish.

A main assumption of sub-lever 1-2 is that Illinois transmission infrastructure funding strategy better aligns with this report's premise of incentivizing the development of transmission capacity as essential to further penetration of renewable energy into the energy market. While this study's assessment suggests this to be the case, there may be better incentivizing strategies available.

Sub-lever 1-3 (Statewide Assessment of Battery Storage) is under the assumption that such an assessment is not currently being pursued by the IURC. This assumption was undermined slightly upon being informed that the IURC had subcontracted with State Utility Forecasting Group (SUFG) and the U.S. Department of Energy National Laboratory, Lawrence Berkeley (LBNL) to conduct a study as part of House Enrolled Act 1278. As part of this study, the Commission is working with the SUFG, studying transitions in fuel sources, primarily modeling future scenarios and the LBNL, which is studying new and emerging technologies, including the potential impact of such technologies–including but not limited to battery storage– on local grids or distribution infrastructure. While this study *includes* battery storage, a battery storage focused analysis would likely still be useful for the IURC to pursue.

**Lever 2 |** Enhancing Integrated Resource Planning (IRP)

Lever 2 deals with actionable items the IURC can make, so a number of assumptions, and respective limitations, were made and observed with respect to the specific policy sub-levers. sub-lever 2-1 deals with stakeholder engagement, although it is anticipated that a more inclusive stakeholder process will show an increase in public support for increased renewable generation capacity, the stakeholder process improvements do not guarantee this. Therefore, the purpose is to better engage with as robust of a group of stakeholders as possible in order to gauge public support for renewables. Improvements to transparency of these meetings helps build a foundation of public support and trust in the IRP process. Especially important is the active effort to engage with members of the community who may otherwise be excluded from the process. A limitation of this sub-lever is that the IRPs chosen to analyze on engagement were only the newest filings from Duke Energy, IPL, and NIPSCO, assuming the newest IRP filings would have the most robust stakeholder processes. Many pieces of IRP material were assessed, but it is possible some parts of the stakeholder process were missed in this analysis.

Sub-Lever 2-2 deals with the IURC's IRP review process. An assumption of this section is that the cost of renewables continues to trend downwards, and as such, utilities should prioritize renewable energy resources as a future generating option. Overall, IRP approval by the IURC should be more contingent on cost-minimization. There is a recognition that moving from a procedural review to a content review for the IRPs is a difficult transition. As such, there are risks to making the IRP more binding, but feedback on specific content and resource adequacy could encourage utilities to think longer term about their generation portfolio. An assumption of this section is that the IRP Recommendations are based on a small number of case studies from other states. Furthermore, IRP changes can be contentious for the utilities submitting them, but the quality of the IRP is assumed not to change based on fluctuations in administrative responsibilities.

Sub-Lever 2-3 attends to state-level integrated resource planning. State level decisions by the IRP can help to ensure resource adequacy across various scenarios. A key assumption of this sub-lever is that the current studies by the SUFG are not enough, and that additional studies will be beneficial. Aggregating the IRP models and the preferred resource mixes can help the IURC make determinations on whether or not a utility's IRP achieves the IURC's legislative mandate to provide safe, reliable and low-cost energy. Another assumption playing a role in this idea is that modeling for resource adequacy could be completed relatively quickly following an IRP submission, ensuring expedient content feedback to utilities. It would be the responsibility of the IURC to assess the benefits and costs of these additional analyses to determine the functional utility of this sub-lever.

Sub-Lever 2-4 addresses the IURC House Bill 1414 Interpretation. This interpretation is contingent on the ability of the IURC to make a determination on what "fuel security" and "diversity of electric generation capacity" mean as policy positions for Indiana. If the determination is made that, in the larger context of the bill, it is meant to prevent coal based generation from being displaced by natural gas, then the IURC would likely face opposition interpreting this legislative language to promote increased renewable energy generation capacity.

Sub-Lever 2-5 deals with the Integration of Transmission and Distribution (T&D) Assets into the Integrated Resource Planning process. T&D is an important element when looking at electric generation and demand in the state. The assumption of sub-lever 2-5 is that limited T&D integration is happening currently. Some studies used by the IURC consider elements of T&D, but the need is for a holistic approach as DER and DS become a larger part of the energy mix.

**Lever 3 |** Developing a Multi-Year Stakeholder Initiative

Because Lever 3 is a less tangible policy mechanism compared to the preceding levers, a number of assumptions, and respective limitations, were made and observed with respect to the specific policy Sub-Levers. When considering Coalition Building (Lever 3-1) it was assumed there are no current coalition building efforts by the IURC in effect. It was also assumed that stakeholders in the Indiana energy market would be willing to participate, working together to impart their views on the IURC initiative. There is evidence of this cooperation in joint-stakeholder comments in response to IURC studies and annual Statewide Analysis documents, and it is assumed that this will continue. Additionally, the policy lever is suggested under the assumption that the IURC has the ability to institutionalize regular stakeholder engagement by way of public hearings, written comment procedure, and individual meetings. Should these conditions not be met, the sub-lever's efficacy should be reassessed.

Like Sub-Lever 3-1, Sub-Lever 3-2—Generated Public Perception Surveys for Consumer Engagement—operates within the baseline that there are no on-going Perception Surveys being conducted by Indiana Utilities. The major assumptions with respect to this Sub-Lever relate to resources. First, it is assumed that utilities have the resources and personnel to carry-out such an exercise. Second it is assumed that there would be an adequate response rate from utility customers to deduce their preference with respect to increasing renewable energy generation. Because it is unclear whether or not utilities have the ability to conduct a survey of this nature, the findings of this sub-lever are limited to the utility's capability.

The assumptions of Sub-Lever 3-3—Exploratory Studies and Renewable Pilot Program Benefits—are related to those of Lever 3-2 in that they focus on Utility resources. For this Sub-Lever, it is assumed that utilities have the resources and funding to carry-out exploratory studies and renewable pilot programs. It is also assumed that utilities have a genuine interest in the impact of renewables in their locales and would want to study it further. Lastly, it is assumed that renewables are feasible in a given utility's local, and pilot programs would be a productive measure to observe the efficacy of renewable energy proliferation. The findings of sub lever 3-3 are limited to these conditions; however, it should still be considered as a policy tool should they not be met.

## 6.2 Additional Factors to Consider

While an attempt was made to consider all relevant, critical factors in the individual lever scenario analyses, there are likely many other additional factors that were not taken into account that would significantly affect the implementation of the three levers. The following subsections aim to evaluate how some special current events could impact lever effectiveness and likelihood of implementation.

### 6.2.1 House Bill 1414

A recent piece of legislation that directly relates to the analysis is House Bill (HB) 1414, which was recently passed by the Indiana State Legislature. This law addresses the retirement of generation facilities, particularly coal fired power plants. The law states that a public utility cannot terminate a power agreement with a generation source without three years advance notice of termination with the IURC. In addition, retirement, sale, and transfer of generation sources may not occur before May 2020 unless the utility first provides written notice to the IURC and the IURC then conducts a public hearing regarding said change. This comes at a time when some coal plants have been retired or were being scaled back in usage. In fact, Northern Indiana Public Service Company (NIPSCO), a company with over 450,000 electrical customers, recently announced they will be retiring all their coal plans by 2028. The passage of the bill may temporarily slow the integration of renewable sources, although it is hard to see coal's decline in market share being slowed for very long considering the current cost of natural gas and cost trends for renewables.

### 6.2.2 House Enrolled Act 1278 - Energy Study

In 2019, the Indiana General Assembly, through House Enrolled Act 1278, tasked the IURC with "conducting a study of the statewide impacts of transitions in fuel sources and other electric generation resources, as well as the impacts of new and emerging technologies impacting electric generation and distribution infrastructure, on electric generation capacity, system reliability, system resilience, and the cost of electric utility service for consumers" (HRA 1278, 2019). The IURC is working with various stakeholders to develop a scenario planning process that could help satisfy this mandate. The results of this study could further develop the conclusions from this report and be used to project and identify key steps in the development of renewable energy in the state.

## 7.0 CONCLUSIONS

Safe, reliable, and low-cost energy is a trifecta. Although each entity of this combination can be rationalized and quantified in isolation, these elements interact in a dynamic, fluid environment. With different factors and circumstances creating scenarios that the IURC must respond to, this report suggests recommendations that acknowledge that dynamic interaction while considering the growing renewable energy market. The purpose of this study is to assess the ways in which the IURC can integrate renewable energy policy and technology to fulfill its legislative mandate to ensure the provision of safe, reliable, and low-cost energy by utilities. This report suggests that advancing three policy levers—updating and developing transmission and battery storage, adapting IRPs, and developing a multi-year stakeholder initiative—will help the IURC achieve this goal. With this in mind, the prominent factors that should be considered when assessing these policies are battery technology and classification, renewable energy prices, and legislative policies. The impact of these factors, and likelihood of occurrence suggest that they will have the greatest impact on whether or not each of these three policies is effective.

Through the examination of the policy levers, two common themes have been derived. First, in order for renewables to be integrated into the current energy system, greater collaboration with different stakeholders is necessary. To advance technology, coordination with neighboring states is essential. Stakeholders are considered at the utility level to ensure customer preference is considered and incorporated. Additionally, by the IURC creating the avenues for stakeholders to interact, more information can be transferred, resulting in more efficient energy markets. Second, the promotion of exploratory studies on technological, rule-making, and utility-specific fronts is crucial to examine the impact of renewables under the IURC's purview.

## 8.0 RECOMMENDATIONS

The following is a list of recommendations based on the outcomes of the scenario analyses, within the context of the circumstances and factors that have and will continue to influence the Commission's ability to potentially embrace any of these possible actions. The recommendations are listed in order of most important and most likely to be accomplished to those that are less so. There will be complex synergies that may promote, or inhibit, the execution of a given recommendation in the context of other suggested actions. Based on a consideration of these potential interactions, an estimation of which policy levers or actions should be embraced first is also incorporated into the ranking of the recommendations.

It is recommended that the IURC carryout the following action-items in the order in which they are presented:

- The IURC should consider expanding the IRP review process beyond methodology to content-specific recommendations and should consider having third-party organizations review IRPs in aggregate prior to approval.
- Suggest how utility companies can improve their interactions with stakeholders throughout the IRP process
- Consider expanding coordination efforts with stakeholders by initiating its own measures to ensure connection with the public and having institutionalized stakeholder engagement procedures
- Develop a statewide assessment of how the current and future energy policy language in the state of Indiana, such as HB1414 and task force findings, would support the proliferation of renewable energy resources
- Encourage investment by energy market stakeholders in additional exploratory studies and pilot programs to better understand the impacts of renewable energy and consumer preference
- Develop a statewide assessment of potential sites for renewables paired with battery storage, including smaller, more localized communities who would otherwise be omitted from larger scale deployment studies
- Initiate a program of systematic and consistent collaborative planning effort with neighboring states to enhance the state's interest in the development and funding structure of the regional transmission system

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