Indiana Michigan Power:
2021 Integrated Resource Plan
Public Stakeholder Meeting #1

March 9, 2021

Presented via GoToWebinar -> https://attendee.gotowebinar.com/register/6179953951330336780

Agenda

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Time		
9:30 a.m.	WELCOME AND INTRODUCTIONS	**Dona Seger-Lawson**, I&M Director of Regulatory Services
9:40 a.m.	MEETING GUIDELINES	**Jay Boggs**, Siemens Managing Director
9:45 a.m.	OPENING REMARKS	**Toby Thomas**, President and COO I&M
10:00 a.m.	I&M 2021 IRP PROCESS	**Greg Soller**, I&M Resource Planning Analyst, **Art Holland**, Siemens Managing Director, **Peter Berini**, Siemens Project Manager
10:45 a.m.	BREAK	
11:00 a.m.	OBJECTIVES AND MEASURES	**Art Holland**, Siemens Managing Director, **Peter Berini**, Siemens Project Manager
12:00 p.m.	LUNCH	
1:00 p.m.	SCENARIOS AND SENSITIVITIES	**Art Holland**, Siemens Managing Director, **Peter Berini**, Siemens Project Manager
2:00 p.m.	BREAK	
2:15 p.m.	BASE CASE INPUTS	**Greg Soller**, I&M Resource Planning Analyst, **Connie Trecazzi**, Fundamental Forecasts, **Chad Burnett**, Load Forecasts
2:45 p.m.	RESOURCE AND TECHNOLOGY UPDATE	**Holt Bradshaw**, Siemens Managing Director, **Jon Walter,** Manager EE & Consumer Programs
3:15 p.m.	STAKEHOLDER QUESTIONS	**Jay Boggs**, Siemens Managing Director
3:30 p.m.	NEXT STEPS AND CLOSING REMARKS	**Andrew Williamson**, I&M Director Regulatory Services
3:45 p.m.	ADJOURN	

WELCOME AND INTRODUCTIONS

Safety Moment

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IRP Team Introductions

I&M Leadership Team

Toby Thomas | President and COO

Dave Lucas | Vice President, Regulatory and Finance

Dona Seger-Lawson | Director, Regulatory Services

Andrew Williamson | Director, Regulatory Services

Marci Grossman | Director, Communications

Tammara Avant and Christen Blend | Legal

I&M IRP Planning Team

Kelly Pearce | Managing Director, Resource Planning and Strategy

Scott Fisher | Manager, Resource Planning and Grid Solutions

Greg Soller | Staff, Resource Planning and Grid Solutions

Jon Walter | Manager, EE & Customer Programs

I&M Transmission and Distribution Planning Team

Nick Koehler | Director, Transmission Planning

Carlos Casablanca | Managing Director Distribution Planning & Analysis

Subin Mathew | Director, Reliability and Grid Modernization

Siemens IRP Planning Team

Arthur Holland | Managing Director, Siemens PTI

Jay Boggs | Managing Director, Siemens PTI

Holt Bradshaw | Managing Director, Siemens PTI

Peter Berini | Project Manager, Siemens PTI

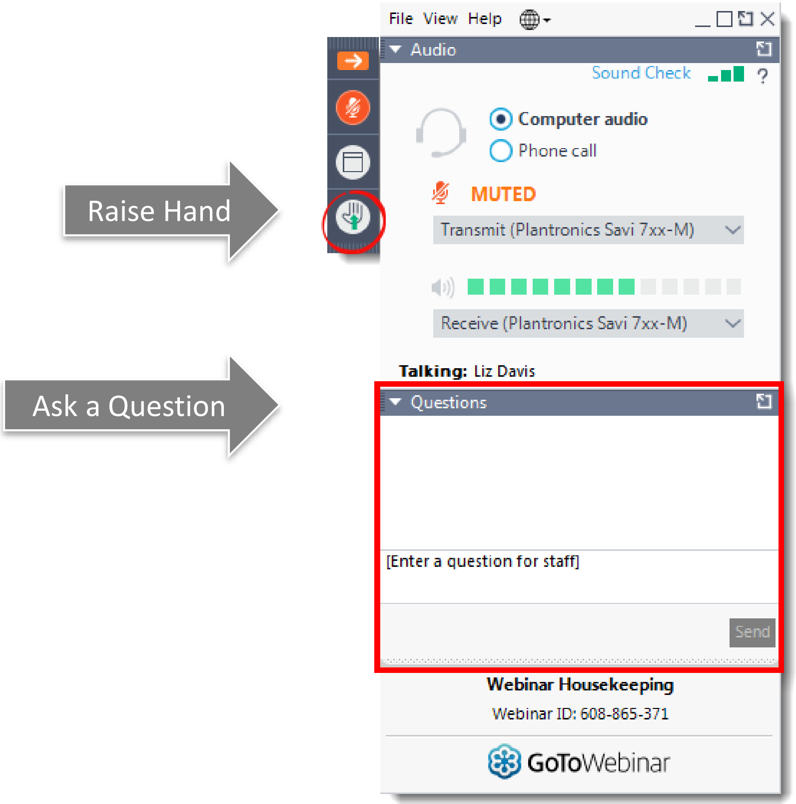
MEETING GUIDELINES

Questions and Feedback

The purpose of today's presentation is to explain the IRP process and collect feedback from stakeholders. Stakeholder feedback will be posted on the I&M website IRP portal and will be considered as part of the Final IRP.

If you have a question about the IRP process during this presentation:

- Type your question in the Questions area of the GoToWebinar panel
- During the feedback and discussion portions of the presentations, please raise your hand via the GoToMeeting tool to be recognized
- Time permitting, we will address all questions and hear from all who wish to be heard
- Any questions that cannot be answered during the call will be addressed and posted on the website above



If you would like to make a comment or ask a question about the IRP process after the presentation has concluded:

- Please send an email to I&MIRP@aep.com
- Stay informed about future events by visiting the I&M IRP Portal located at www.indianamichiganpower.com/info/projects/IntegratedResourcePlan

Guidelines

1. Due to the number of participants scheduled to join today's meeting, all will be in a "listen-only" mode by default.

2. Please enter questions at any time into the GoToWebinar portal. Technical questions related to the GoToWebinar tool and its use will be addressed by the support staff directly via the chat feature.

3. Time has been allotted to answer questions related to the materials presented. Unanswered questions will be addressed after the presentation and posted in accordance with the Questions and Feedback slide.

4. At the end of the presentation, we will open-up the floor for "clarifying questions," thoughts, ideas, and suggestions.

5. Please provide feedback or questions on the Stakeholder Meeting #1 presentation within ten business days of the conclusion of the meeting.

OPENING REMARKS

Indiana Michigan Power Overview

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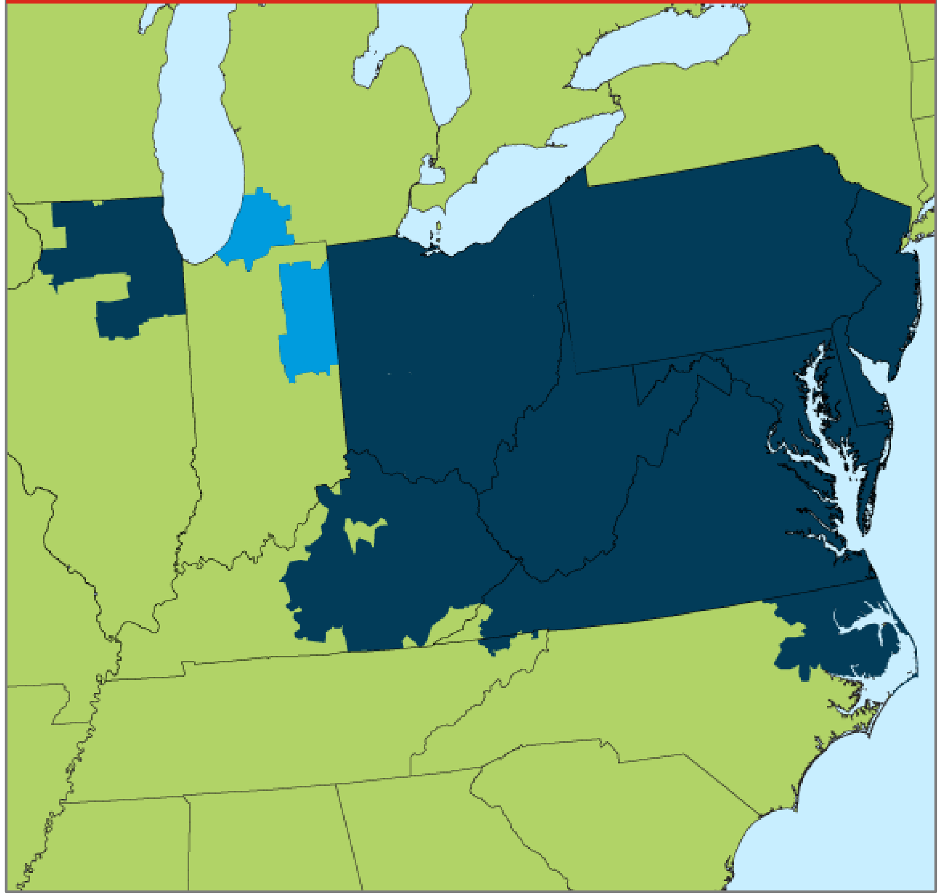
PJM Interconnection



Overview of Indiana Michigan Power

Headquartered in Fort Wayne, IN and part of the American Electric Power system

Multi-jurisdictional entity with more than 600,000 retail customers in IN and MI and over 390 MW in long-term wholesale generation contracts

- Indiana: ~470,000 customers
- Michigan: ~130,000 customers

Serves 23 counties and includes cities such as Elkhart, Fort Wayne, Marion, St. Joseph, Muncie & South Bend.

Fully Integrated Electric Service Provider

- Generation ~ 5,400 MW
- Transmission ~ 5,300 Line Miles
- Distribution ~ 20,500 Line Miles

Indiana Michigan Power Resource Diversity

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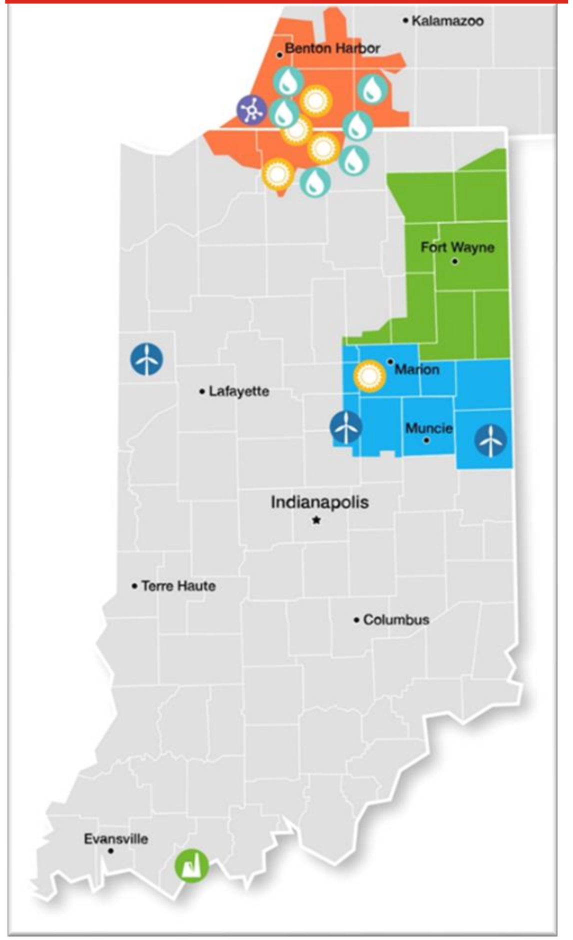
I&M Service Territory



I&M has a diverse set of Generation Resources and PPAs, including:

- 2,278 MW Cook Nuclear Plant
- 2,223 MW Rockport Coal Plant
- 22 MW of Hydroelectric Power
- 35 MW of Universal Solar
- 450 MW of Wind Power under PPA;
  - 150 MW from the Fowler Ridge Wind Farm in Benton County, IN
  - 100 MW from the Wildcat Wind Farm in Madison County, IN
  - 200 MW from Headwaters Wind Farm in Randolph County, IN

80+%

Carbon-free Generation In 2020

I&M Energy Efficiency and Demand Response Programs:

- Since 2010 I&M sponsored EE programs have saved ~ 1,400 GWh of energy or approx. the annual usage of 10,500 average homes
- During 2020 I&M sponsored EE programs saved ~ 14MW of demand or approx. 2,800 average homes peak usage
- ~ 300 MW of Interruptible and Demand Reduction programs
- Additional AMI-related demand response programs are expected

I&M Transformation Strategy

COMPANY TRANSFORMATION AND CUSTOMER RELATIONSHIPS

Generation Transformation	Modernizing the Grid	Expanding Customer Choices	Embracing New Technology	Developing a Work-force of the Future
Evaluate transition of generation resources to all emission free resources	Deploy smart grid technologies to optimize reliability, operability, and bi-directional grid flow	Implement a portfolio of customer programs that provide a more personalized experience	Identify, develop, and implement new business technologies and deliver customer benefits	Leverage data analytics and mobility to optimize operations for a better employee and customer experience

2021 Integrated Resource Plan

- ❑ Load changes across customer classes
- ❑ Enhanced coordination of generation and energy delivery planning
- ❑ Diversification of resource profiles
- ❑ Updated resource pricing
- ❑ Updated Market Potential Study
- ❑ AMI deployment & technology integration
- ❑ New customer program choices
- ❑ Planning for distributed resources and EV expansion
- ❑ Avoided or deferred T&D cost evaluation

AEP D&I Roadmap to 2025

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I&M 2021 IRP PROCESS

IRP Overview

The purpose of the IRP is to provide a roadmap at a point in time that utilities and load serving entities use as a planning tool when evaluating resource decisions necessary to meet forecasted electric energy demand in an approach that balances affordability, reliability, and sustainability for customers and stakeholders.

There are two main components in creating an IRP: **Development of a Portfolio** and **Stakeholder Engagement**

Development of a Portfolio

- The end goal of the IRP is to develop a preferred resource portfolio (set of supply and demand-side resources) that can be used as a roadmap designed to inform future resource actions for electric energy demand to serve load
- I&M has partnered with Siemens PTI to create a set of Candidate Portfolios based on a series of Conditions that are informed by Scenarios and Sensitivities
- The Conditions will be tested, analyzed and used by I&M management to determine the preferred resource portfolio

Stakeholder Engagement

- The IRP will take into consideration stakeholders and public feedback in the analysis that will help inform the preferred resource portfolio recommendation

Enhancement Opportunities

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I&M has received excellent feedback and input into its ongoing IRP process from numerous stakeholders, including the Indiana Utility Regulatory Commission (IURC) and Michigan Public Service Commission (MPSC), which will be incorporated into the IRP and/or subsequent IRP filings. As a starting point to the 2021 IRP, we are planning the following:

Stakeholder Engagement:

- Enhance stakeholder process and improve remote accessibility of stakeholder meetings
- Dedicate one stakeholder meeting to energy efficiency and demand response
- Work with stakeholders to review and define new scenarios and modeling inputs for the IRP

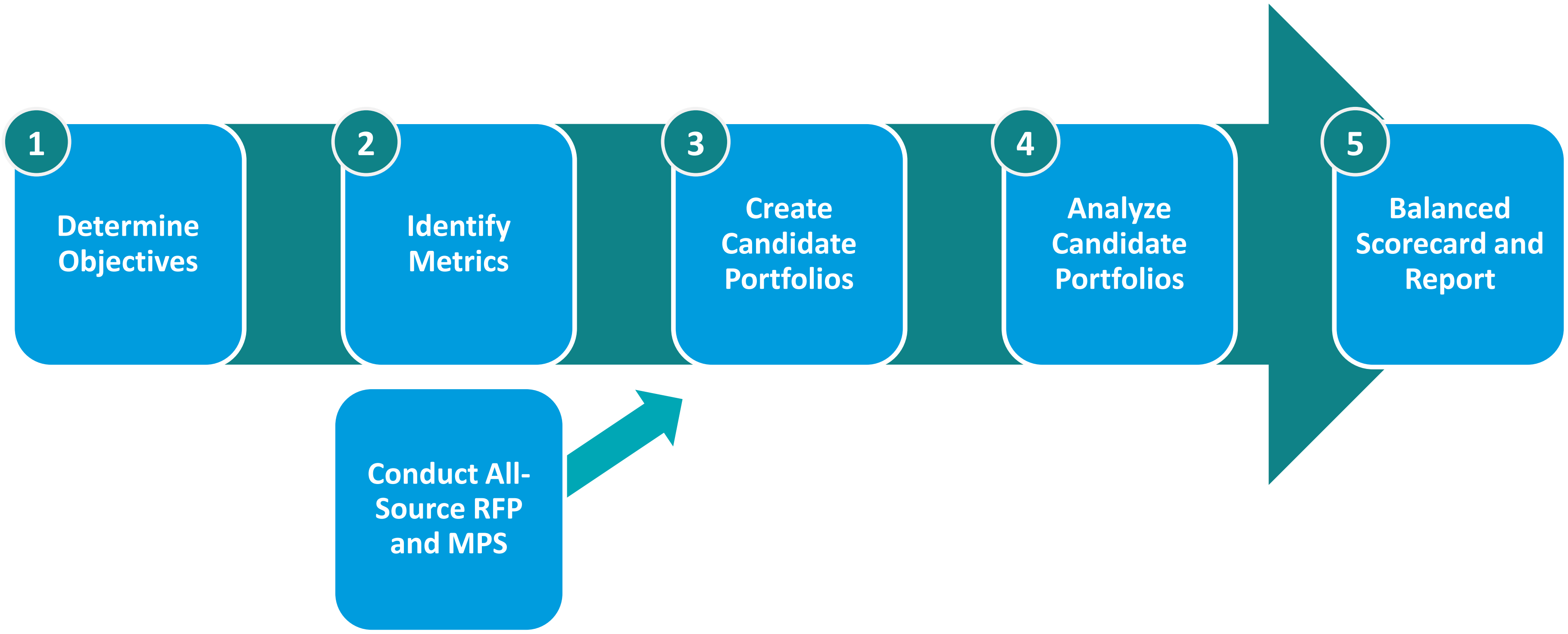
Model Inputs

- Conduct a new Market Potential Study (MPS) specific to each of I&M’s retail jurisdictions, including evaluation of demand response (DR) and distributed energy resources (DER)
- Conduct and incorporate an all-source RFP to inform capital cost and performance of all qualifying facilities
- Expand resource options to include both owned and purchased renewable resource options
- Improve coordination among resource, transmission and distribution planning processes

2021 IRP Process

The 2021 IRP Process, detailed below, has been administered by Siemens PTI across the country.

Siemens PTI: Approach to Integrated Resource Plan Modeling



Key Vendors

As part of the 2021 IRP Process, I&M has engaged several vendors.

Integrated Resource Plan

- Siemens PTI IRP Team
  - Moderation of Stakeholder Meetings
  - Management of IRP Modeling and Report
  - Testimony Support

All-source RFP

- Siemens PTI RFP Team
  - Draft RFP Language
  - Solicit Stakeholder Input on RFP Language
  - Management of RFP Process
  - Conversion of results into modeling inputs

Market Potential Study

- GDS Associates
  - Kicked off in Q4 2020
  - Assess EE/EWR, DR, DER and AMI Consumer Programs & Technology
  - I&M Indiana and I&M Michigan over 30-year planning horizon
  - Conversion of results into modeling inputs

Stakeholder Process

I&M has established a stakeholder engagement process to encourage questions, make suggestions and provide data. As part of the IRP process, I&M will seek stakeholder participation throughout the IRP development process. At the core of the process is a series of four workshops.

March 9, 2021	April 14, 2021	July 14, 2021 (tentative date)	September 14, 2021 (tentative date)
2021 IRP Process	DSM IRP Inputs and Modeling	Draft Candidate Portfolios	Probabilistic Modeling Results
Objectives and Metrics	EE/EWR, DR and DER Results	All-Source RFP Results	Review of Preferred Portfolio
Proposed Scenarios	2021 IRP Update	Stochastic Modeling Approach and Assumptions	Other(s)
Base Case Inputs			

In addition, an Aurora Technical Conference and an invite to provide input on the RFP process will be provided to stakeholders

All-Source RFP Stakeholder Process

- TBD: Draft RFP Available
- Early April: RFP Stakeholder Meeting
- Mid April: Issue RFP
- Late May: Responses Due

Feedback and Discussion

OBJECTIVES AND MEASURES

Determine Objectives

The purpose of the IRP is to develop a preferred resource portfolio that starts with I&M's current resource portfolio and evaluates a range of alternative future portfolios that can meet the customers' capacity and energy needs in an affordable, reliable and sustainable manner.

A critical first step in the IRP Process is the determination of objectives in which portfolios will be evaluated against.

Portfolios are evaluated in terms of Affordability, Reliability and Sustainability objectives.

Metrics are assigned to the objectives to allow the analysis to compare portfolio performance across diverse scenarios

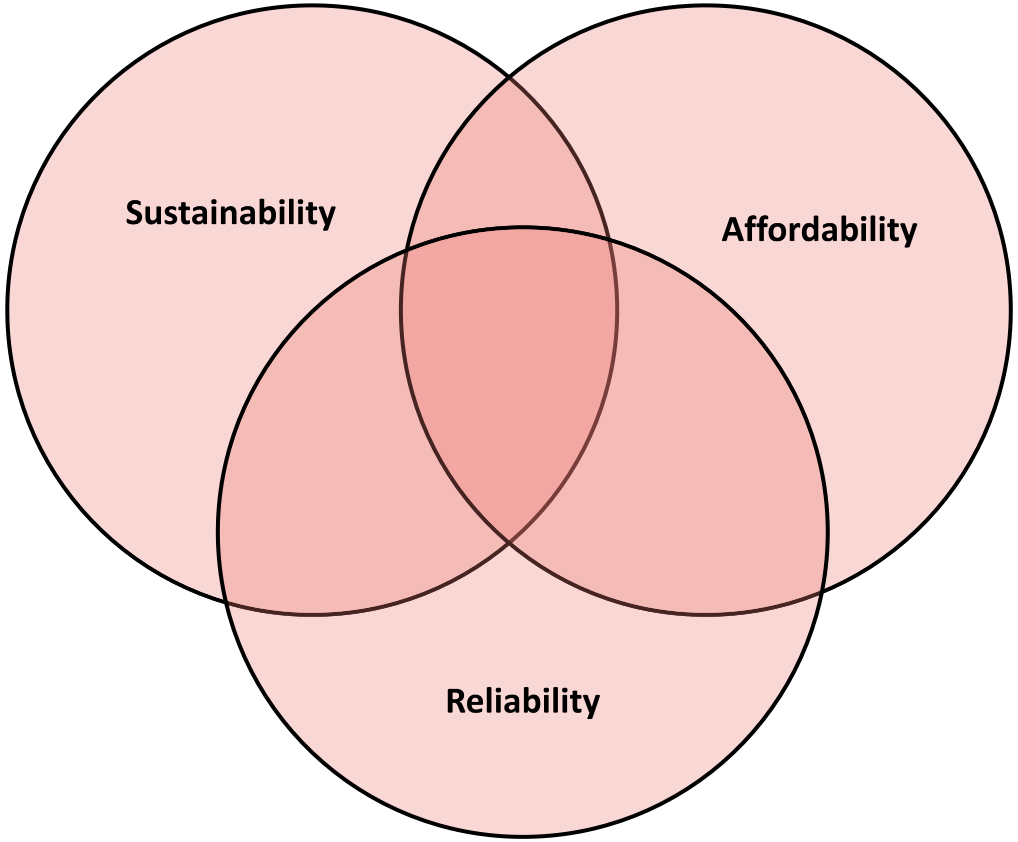
IRP Objectives
Affordability
Rate Stability
Sustainability Impact
Market Risk Minimization
Reliability
Resource Diversity

Identify Tradeoffs

An IRP is centered on providing electric service in a way that balances:

- ***Affordability***: meet energy and demand requirements of our customers at an affordable cost with price stability
- ***Reliability***: effectively meet customer energy and capacity requirements
- ***Sustainability***: meet customer energy requirements in a way that addresses environmental concerns

Each set of stakeholders may have a different set of priorities when examining IRP objectives.



Assign Metrics

For each portfolio, objectives will be tracked through identified metrics that will be used to measure and evaluate performance of the Candidate Portfolios.

IRP Objectives	IRP Metric
Affordability	NPV-RR
Rate Stability	95^{th} percentile value of NPV-RR
Sustainability Impact	CO2 Emissions
Market Risk Minimization	Spot Market Exposure (Purchases/Sales)
Reliability	Reserve Margin
Resource Diversity	Mix of Adequate Resources

Balanced Scorecard (Illustrative)

The preferred resource portfolio will incorporate each of the objectives and measures through a balanced scorecard that weighs attributes in accordance with stakeholder needs, economic and load growth projections, I&M input and practical considerations.

Balanced Scorecard (Illustrative)

	Affordability	Rate Stability	Sustainability Impact	Market Risk Minimization	Reliability	Resource Diversity
Candidate Portfolios	NPV RR	95th Percentile Value of NPV RR	CO_2 Emissions	Purchases as % of Generation	Reserve Margin	Mix of Resources
Reference Case	$92.0	$115.0	-62.0%	10.0%	15%	5
Portfolio #1	$94.0	$138.0	-39.0%	15.0%	15%	4
Portfolio #2	$108.0	$145.0	-50.0%	18.0%	15%	6
Portfolio #3	$81.0	$123.0	-38.0%	24.0%	15%	4
Portfolio #4	$97.0	$146.0	-42.0%	42.0%	15%	4
Portfolio #5	$101.0	$167.0	-54.0%	34.0%	15%	5
Portfolio #6	$87.0	$113.0	-64.0%	41.0%	15%	3
Portfolio #8	$102.0	$172.0	-40.0%	34.0%	15%	5
Portfolio #9	$120.0	$198.0	-90.0%	24.0%	15%	6
Portfolio #10	$99.0	$210.0	-84.0%	12.0%	15%	5

Poll Question

Please Rank Order the Proposed Objectives

Feedback and Discussion

LUNCH

PROPOSED SCENARIOS

Scenario Development

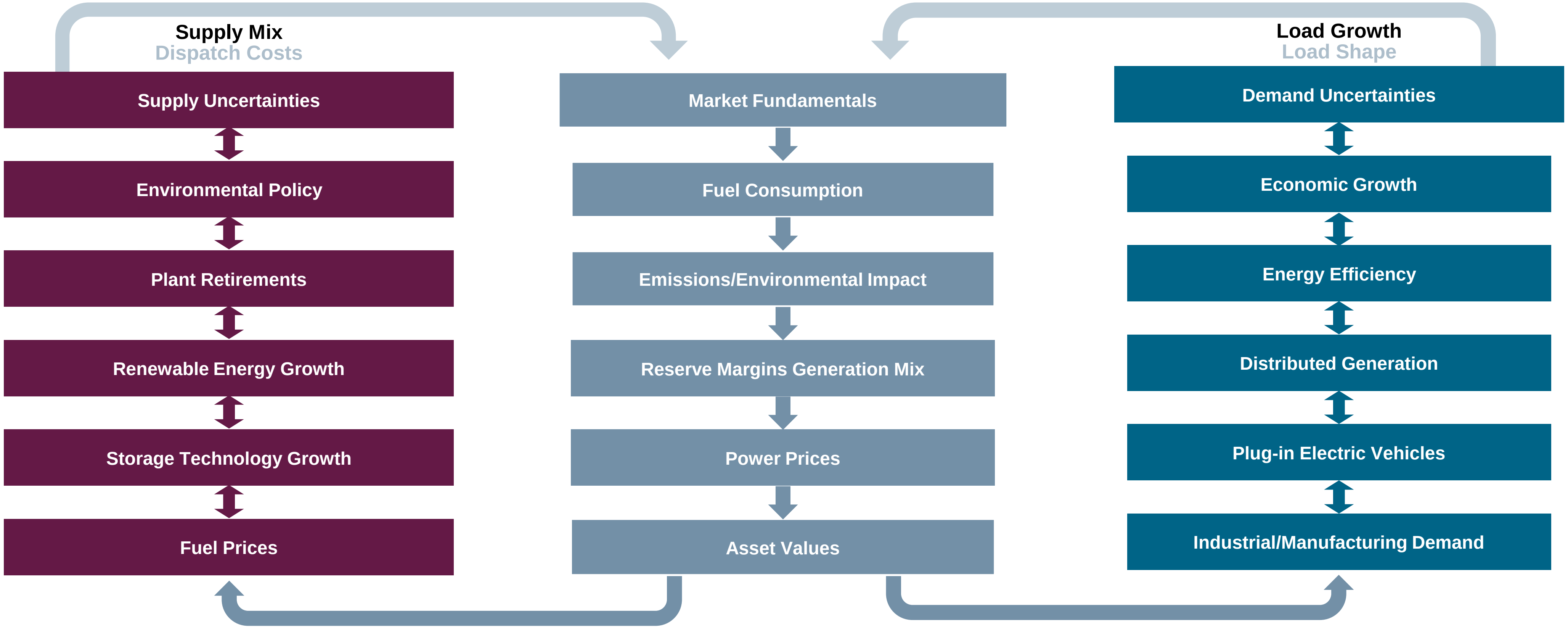
I&M and Siemens have developed **a Reference scenario** and **four alternative scenarios** to implement a scenario- and sensitivity-based approach to create Candidate Portfolios and test which portfolios perform the best over a wide range of future market and regulatory conditions. The development of scenarios considered I&M strategic decisions, stakeholders and Indiana and Michigan filing requirements.

As part of the IRP Development Process:

- Portfolios are constructed based on a range of scenarios to create a series of **Potential Candidate Portfolios** that are important to management and stakeholders alike.
- Each **Potential Candidate Portfolio** will be developed from the Scenarios and will include a selection of sensitivities aimed at providing further depth in the analysis.
- **Candidate Portfolios** are then subjected to stochastic risk analysis to measure performance across many future scenarios. The stochastic process will produce hundreds of internally consistent simulations that can provide a more realistic understanding of the potential variation in future scenarios.
- The Scenarios include a Rapid Technology Advancement scenario, a Net Zero Carbon by 2050 scenario, a Market Driven Electrification scenario, an Enhanced Regulation scenario and other potential Stakeholder scenarios.

Key Market Drivers

In order to frame Scenario Development, it is important to consider how various market drivers impact the supply mix and load growth of I&M and the surrounding region.



Overview of Proposed Scenarios

I&M will use a scenario- and sensitivity-based approach to construct future market and regulatory environments. The Reference scenario is the most expected future scenario and includes the base case inputs described herein. The changes in the alternative scenarios are shown relative to the Reference scenario.

Scenario	Load	Gas Price	Coal Price	CO2	Renewable and Storage Costs	EE / DR Cost
Reference	Base	Base	Base	Base	Base	Base
Net Zero by 2050	Base	Base	Base	Net Zero	Base	Base
Rapid Technology Advancement	Base	Base	Base	Base	Low	Low
Market Driven Electrification	High	High	High	Base	Base	Base
Enhanced Regulation	Base	High	High	High	Base	Base
Other(s)						

The directional basis of the Scenario drivers are as compared to the Reference scenario.

Scenario Narrative: Reference Scenario

Scenario	Load	Gas Price	Coal Price	CO2	Renewable and Storage Costs	EE / DR Cost
Reference Scenario	Base	Base	Base	Base	Base	Base

The Reference Scenario

The Reference scenario is the most expected future scenario that is designed to include a consensus view of key drivers in power and fuel markets. The existing generation fleet is largely unchanged apart from new units planned with firm certainty or under construction. All other scenarios reference the Reference scenario.

In the Reference scenario, major drivers include:

- Coal prices remain relatively flat over the forecast horizon in constant dollars consistent with EIA reference
- Natural gas prices move upward in real dollars to 2050 consistent with EIA reference
- Energy and Demand decrease moderately through 2050
- Capital costs are downward sloping for fossil and wind resources, and decline significantly for solar and storage resources
- Carbon regulations limiting CO2 emissions will commence in 2028 and remain in effect throughout the forecast horizon

Scenario Narrative: Net Zero Carbon by 2050

Scenario	Load	Gas Price	Coal Price	CO2	Renewable and Storage Costs	EE / DR Cost
Net Zero by 2050	Base	Base	Base	Net Zero	Base	Base

Net Zero Carbon by 2050

The Net Zero Carbon by 2050 scenario assumes increased carbon reduction to achieve net zero in electric sector and will highlight incremental goals through the 20-year IRP planning period. Increased renewable and storage additions are driven by renewable portfolio standards and goals, economics, and prevailing best practices to meet carbon regulations while maintaining reliability.

In the Net Zero Carbon by 2050 scenario, major drivers include:

- Non-carbon dioxide emitting resources will be increased to meet Net Zero requirements
- Nuclear units are assumed to have license renewals granted and remain online
- Thermal generation retirements are driven by unit age-limits and announced retirements, consistent with Reference scenario
- Technology costs for thermal units remain consistent with the Reference scenario
- Fundamental drivers (load and commodity prices) remain constant to the Reference scenario

Scenario Narrative: Rapid Technology Advancement

Scenario	Load	Gas Price	Coal Price	CO2	Renewable and Storage Costs	EE / DR Cost
Rapid Technology Advancement	Base	Base	Base	Base	Low	Low

Rapid Technology Advancement

The Rapid Technology Advancement scenario assumes technological advancements, favorable regulation and overall economies of scale that impact renewable resources. The scenario assumes technology costs for supply- and demand-side renewable resources decline over time, resulting in up to 35% reductions in technology costs; significantly faster than in the Reference scenario.

In the Rapid Technology Advancement scenario, major drivers include:

- Technology cost reductions for renewables and storage result in lower capital costs
- Technological advancement and economies of scale contribute to greater potential for energy efficiency and demand response
- Carbon regulations limiting CO2 emissions will commence in 2028 and remain in effect throughout the forecast horizon
- Thermal generation retirements are driven by unit age-limits and announced retirements, consistent with Reference scenario
- Fundamental drivers (load and commodity prices) remain constant to the Reference scenario

Scenario Narrative: Market Driven Electrification

Scenario	Load	Gas Price	Coal Price	CO2	Renewable and Storage Costs	EE / DR Cost
Market Driven Electrification	High	High	High	Base	Base	Base

Market Driven Electrification

The Market Driven Electrification scenario assumes an increase in economic activity drives load and commodity prices higher than the Reference scenario, resulting in increased energy market prices. As a result, commercial and residential customers accelerate the transition to full electrification and continued installation of demand side resources.

In the Market Driven Electrification scenario, major drivers include:

- High energy and demand scenario driven by customers drive to electrification
- Natural gas and coal prices are increased to support economic growth and improve viability of alternative technologies
- Technology costs for thermal and renewable units remain consistent with the Reference scenario
- Thermal generation retirements are driven by unit age-limits and announced retirements, consistent with Reference scenario
- Carbon regulations limiting CO_2 emissions will commence in 2028 and remain in effect throughout the forecast horizon

Scenario Narrative: Enhanced Regulation

Scenario	Load	Gas Price	Coal Price	CO2	Renewable and Storage Costs	EE / DR Cost
Enhanced Regulation	Base	High	High	High	Base	Base

Enhanced Regulation

The Enhanced Regulation scenario assumes increased environmental regulations covering natural gas, coal and CO_2. Illustrative examples include a potential fracking ban and increases of carbon reduction targets.

In the Enhanced Regulation scenario, major drivers include:

- Natural gas, coal prices and CO_2 prices are increased to reflect enhanced regulation
- Technology costs for thermal and renewable units remain consistent with the Reference scenario
- Thermal generation retirements are driven by unit age-limits and announced retirements, consistent with Reference scenario
- Carbon regulations limiting CO_2 emissions will commence in 2028 and remain in effect throughout the forecast horizon

Stakeholder Scenarios

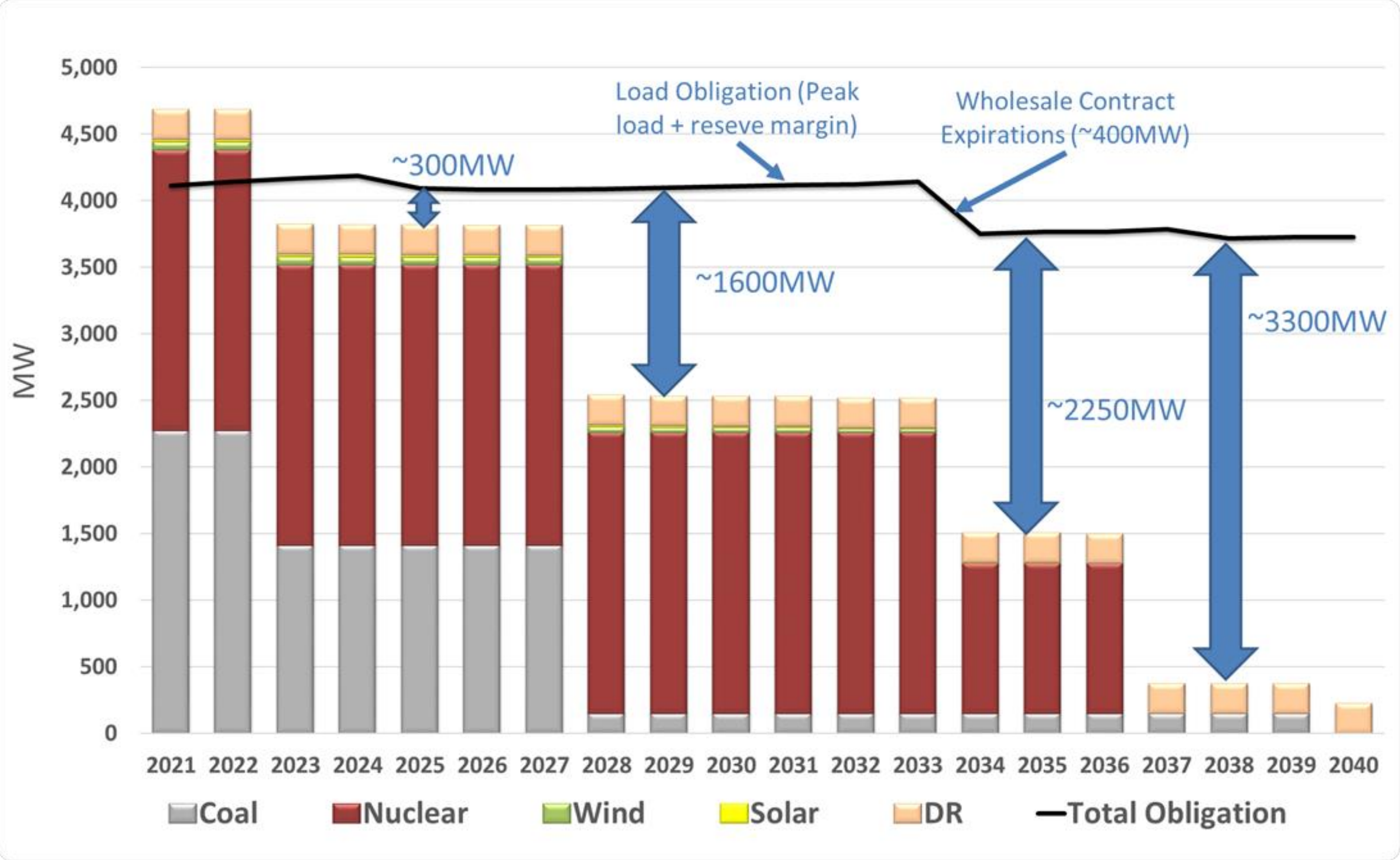
Scenario	Load	Gas Price	Coal Price	CO2	Renewable and Storage Costs	EE / DR Cost
Reference	Base	Base	Base	Base	Base	Base
Net Zero by 2050	Base	Base	Base	Net Zero	Base	Base
Rapid Technology Advancement	Base	Base	Base	Base	Low	Low
Market Driven Electrification	High	High	High	Base	Base	Base
Enhanced Regulation	Base	High	High	High	Base	Base
Other(s)						

Feedback and Discussion

BREAK

PRELIMINARY BASE CASE INPUTS

Going-in PJM Capacity Position – (UCAP MW)



Reference Scenario Inputs

I&M developed a set of base case assumptions, including the following key drivers:

Key Market Drivers:

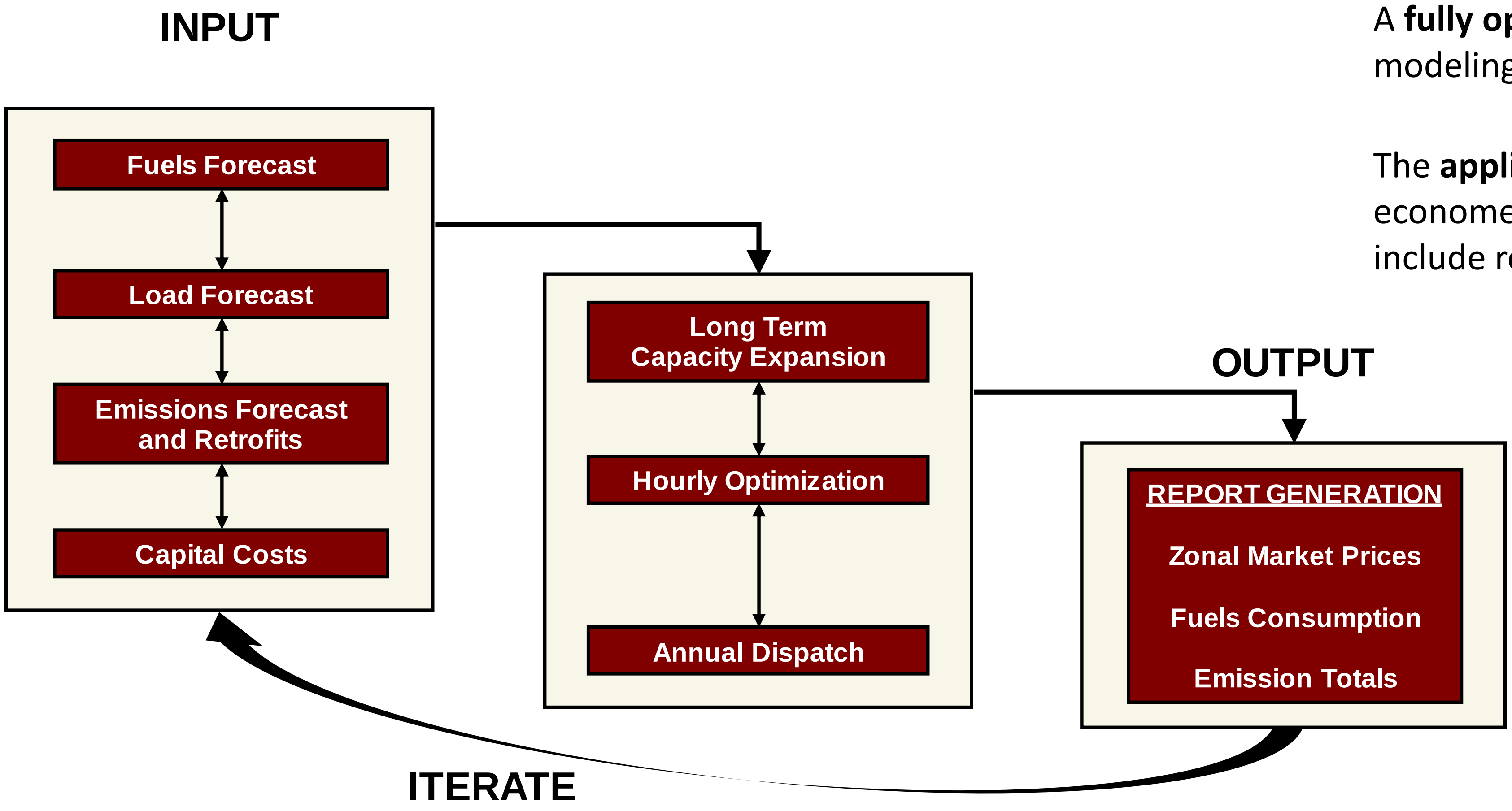
- I&M and PJM energy and demand
- Henry Hub natural gas prices
- PRB Coal Prices
- Capital Costs for various generation technologies

It is important to note that on- and off-peak power prices and capacity prices are an output of the scenario assumptions

Fundamentals Forecast

- Base Case: Reflects EIA Reference scenario with no carbon price assumption
- Base Carbon Case: Includes a $15/metric ton carbon price beginning in 2028, escalating at 3.5% annually thereafter
- High Case: Includes Base Case assumptions with high fuel prices (1 standard deviation) and higher loads
- Low Case: Includes Base Case assumptions with low fuel prices (1 standard deviation) and lower loads

Fundamental Forecast Process



A **fully optimized** forecast requires iterative modeling to satisfy all relationships

The **application of constraints** takes an econometric model output and shapes it to include real world limitations.

Linkage Between Forecast Zones

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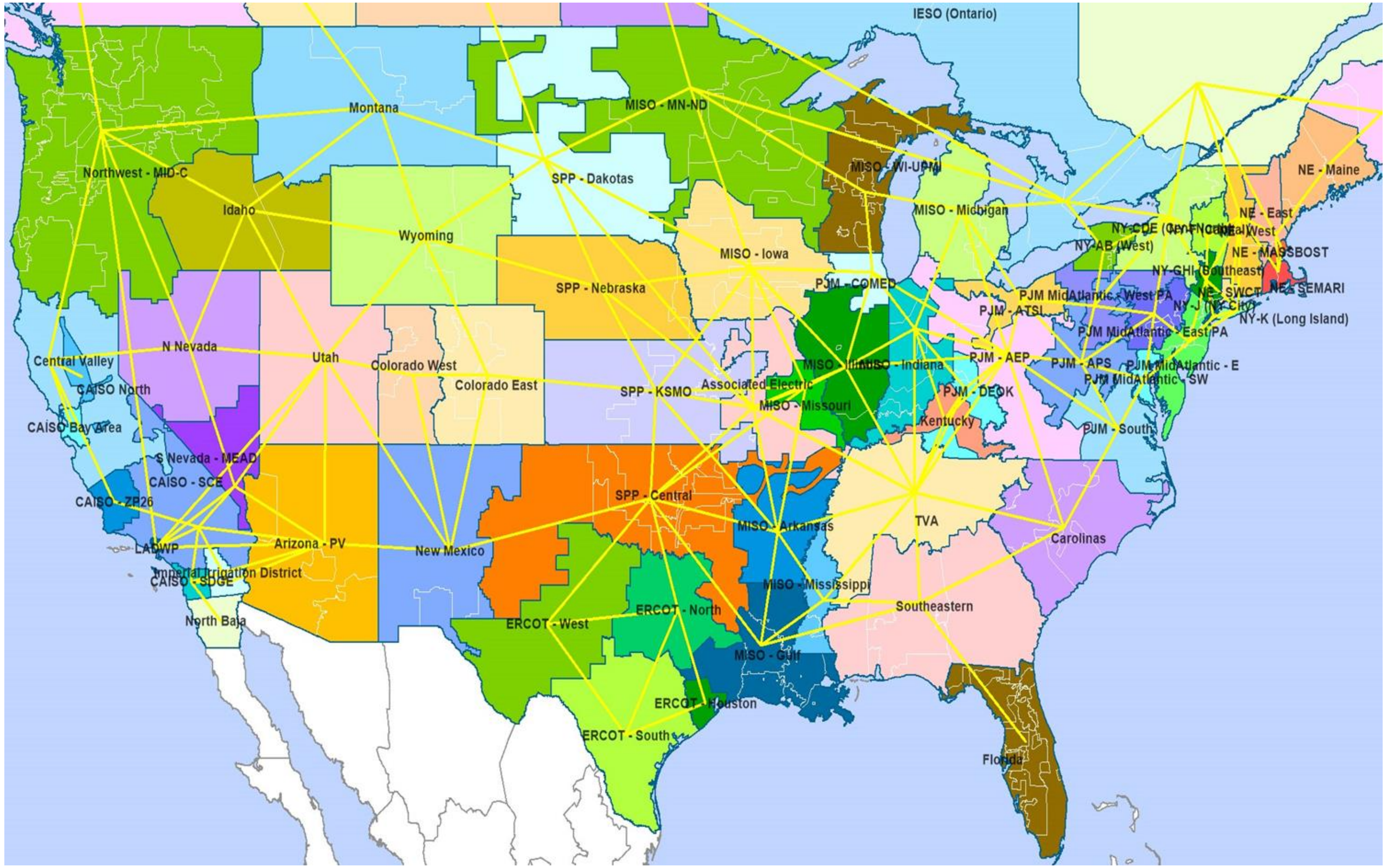
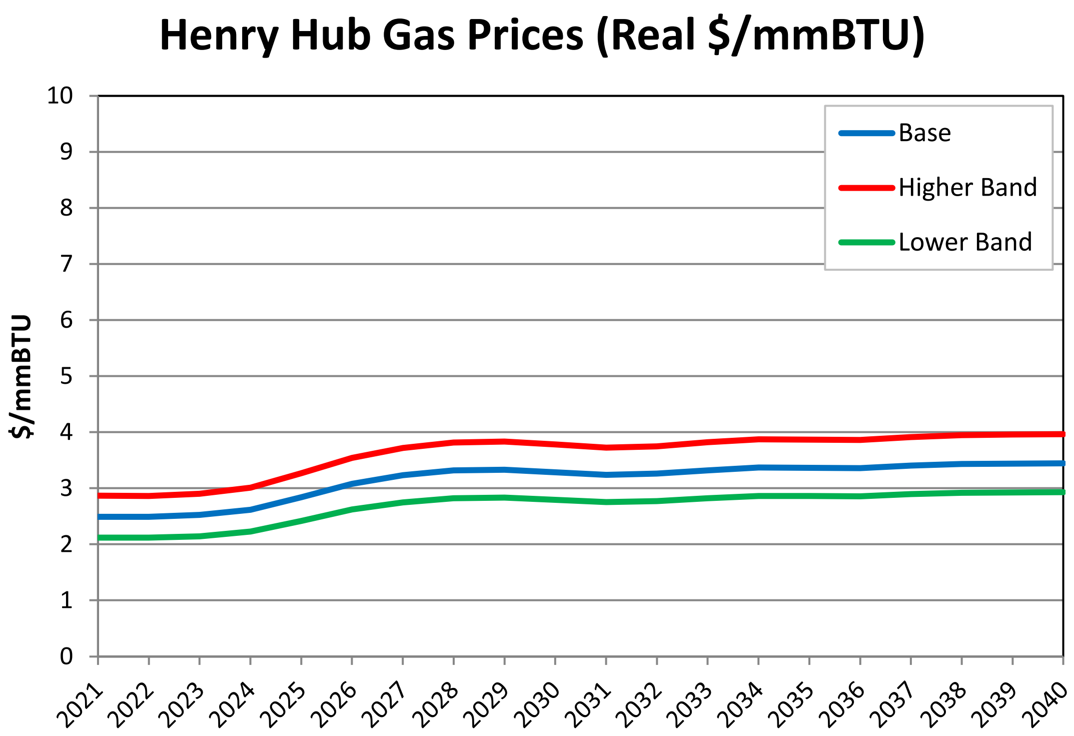
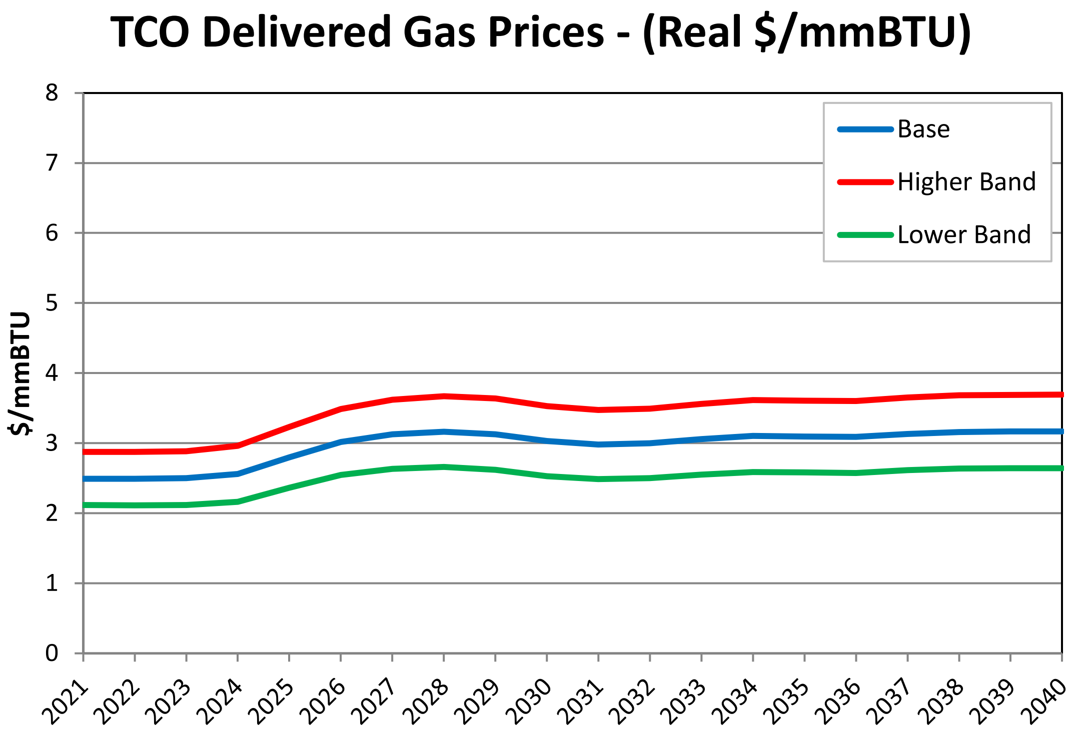


Base Case Fuel Forecast: Henry Hub

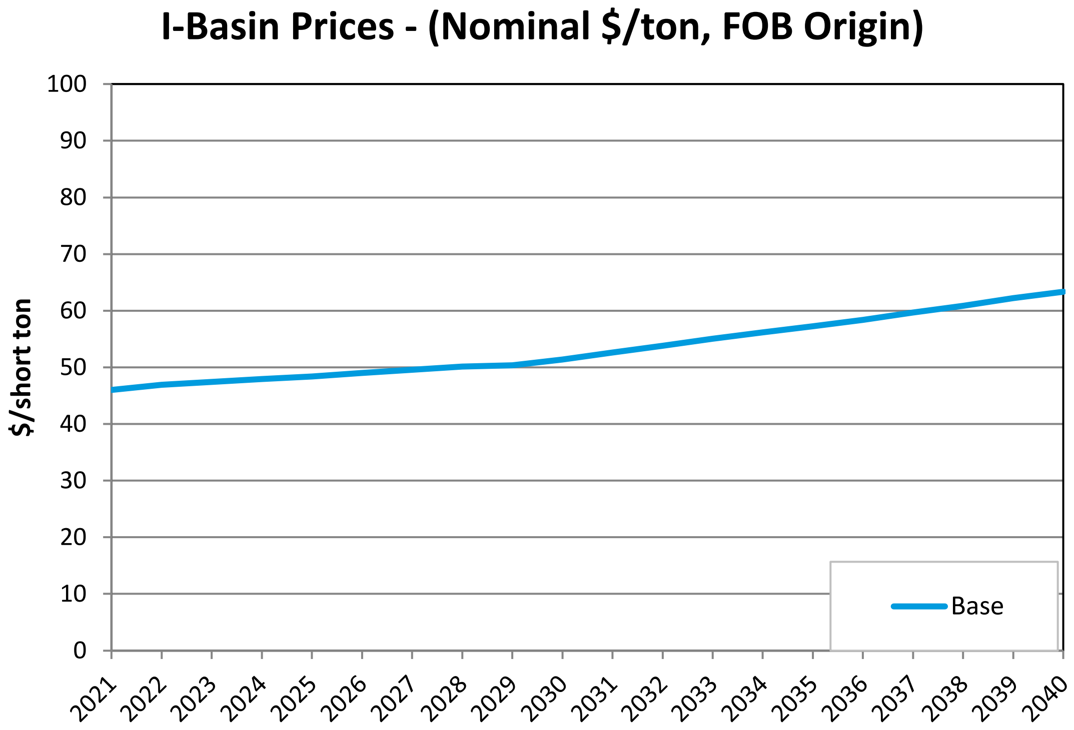
2020 H2 Fundamental Forecast

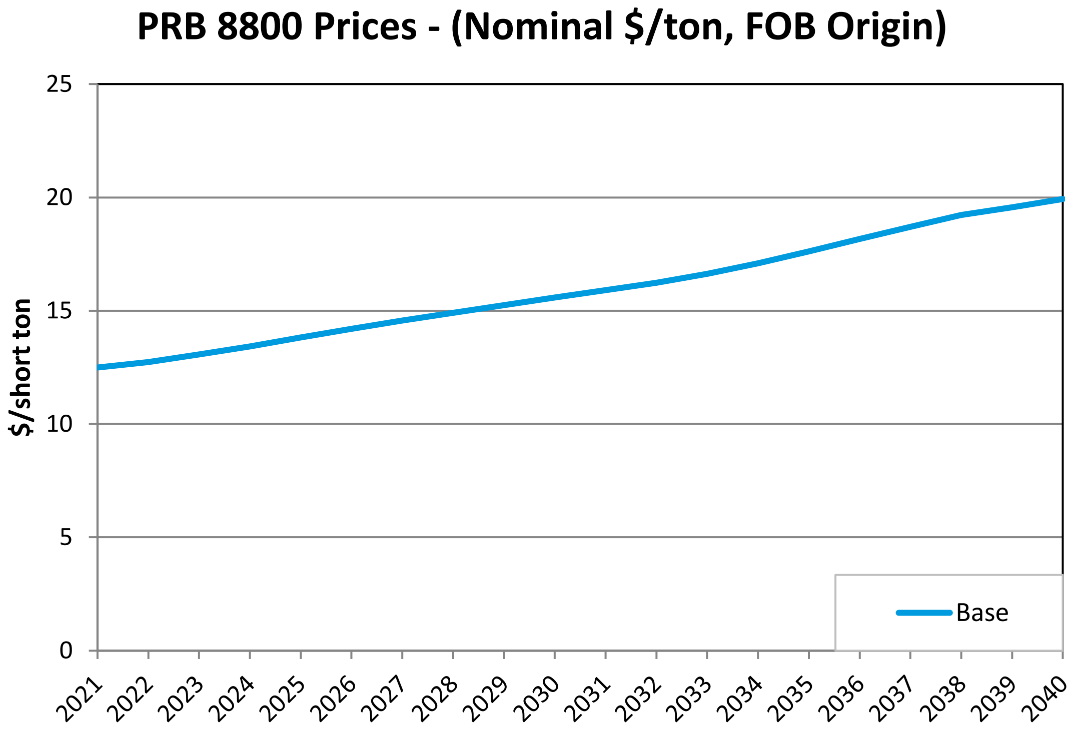




Base Case Coal Forecast: I-Basin and PRB

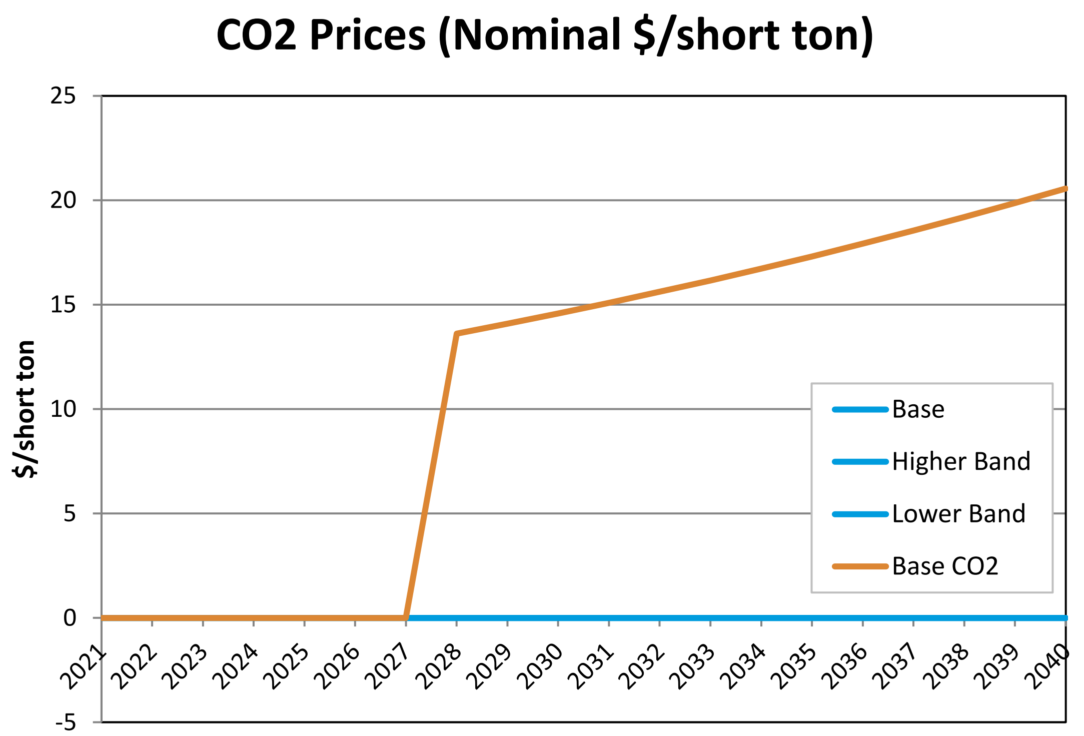
2020 H2 Fundamental Forecast



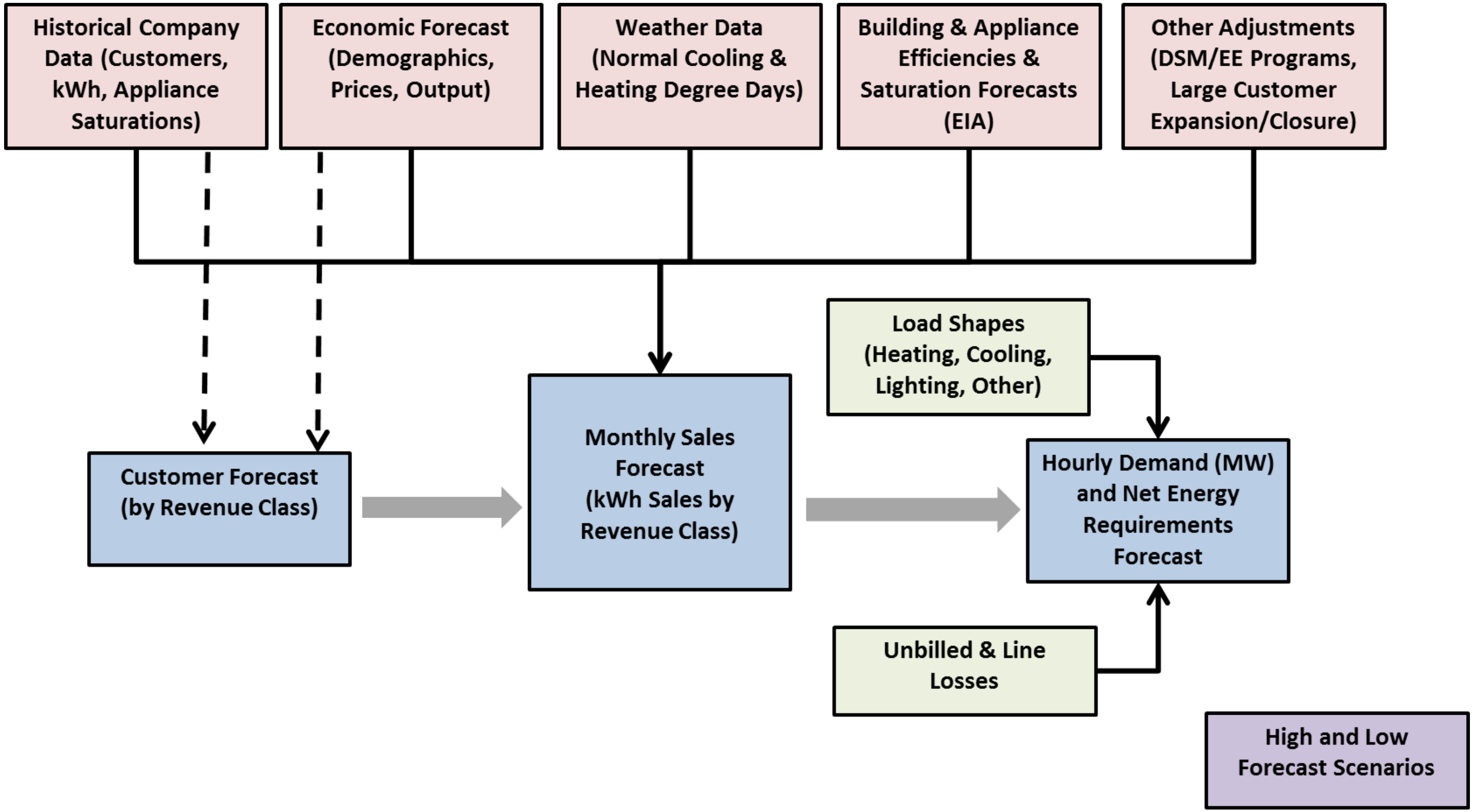


Base Case CO2 Forecast: National CO2 Price

2020 H2 Fundamental Forecast



Load Forecast Process



Load Forecast Drivers

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Residential
- Regional Economic Variables (Employment, Income)
- Demographics (Population, Households)
- Gross Regional Product
- Electricity Price
- State Natural Gas Price
- Mortgage Interest Rate
- Heating & Cooling Degree Days
- Prior period kWh and Customer count
- Appliance saturation
  (surveyed every 3-4 years)
- Appliance efficiency standards & trends
- Building standards & trends

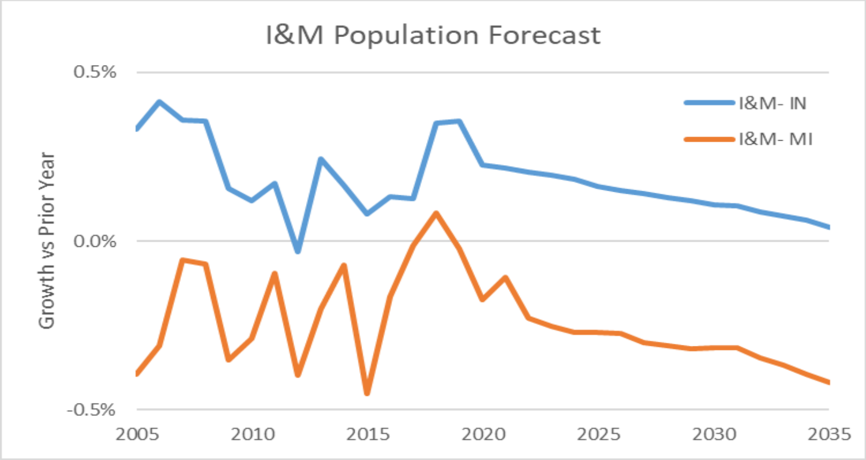
Other Ultimate
- Regional Economic Variables (Employment)
- Heating & Cooling Degree Days
- Prior Period kWh

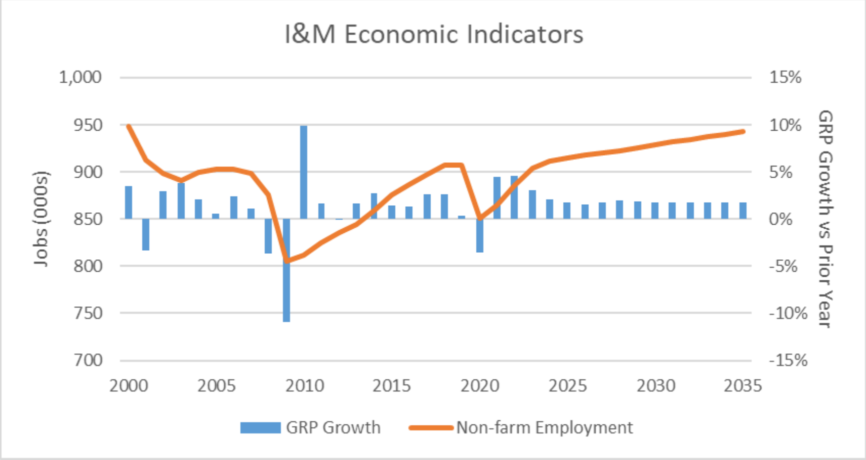
Commercial
- Regional Economic Variables (Employment, Income)
- Commercial Gross Regional Product
- Electricity Price
- State Natural Gas Price
- Heating & Cooling Degree Days
- Prior period kWh and Customer count
- Appliance saturation
- Appliance efficiency standards & trends
- Building standards & trends

Industrial
- FRB Industrial Production Indices (Selected)
- Regional Economic Variables (Employment)
- Regional Coal Production
- Manufacturing Gross Regional Product
- Electricity & Petroleum Prices
- State Natural Gas Prices
- Prior period kWh

(Economic data is provided by Moody's Analytics)

Economic Forecast Highlights





Economic Forecast Highlights: I&M Service Territory

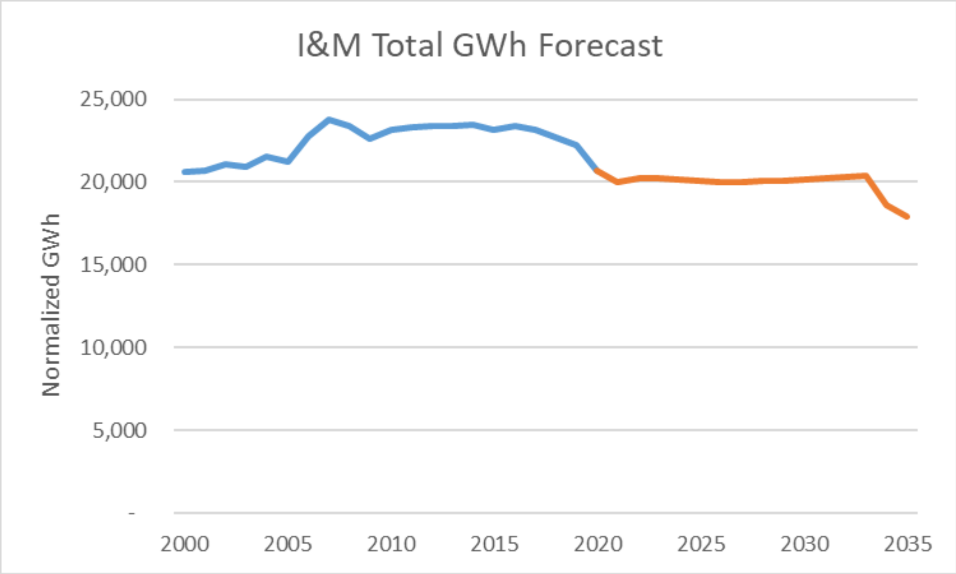
- I&M service territory population is expected to continue to slow. I&M MI population growth has been declining since the turn of the century.
- The COVID-19 pandemic and recession in 2020 had a significant impact on I&M's regional economy.
- It will take years before the gross regional product and non-farm employment reach their pre-pandemic levels.
- According to Energy Information Administration (EIA) Annual Energy Outlook for 2021, "US energy demand takes until 2029 to return to 2019 levels".

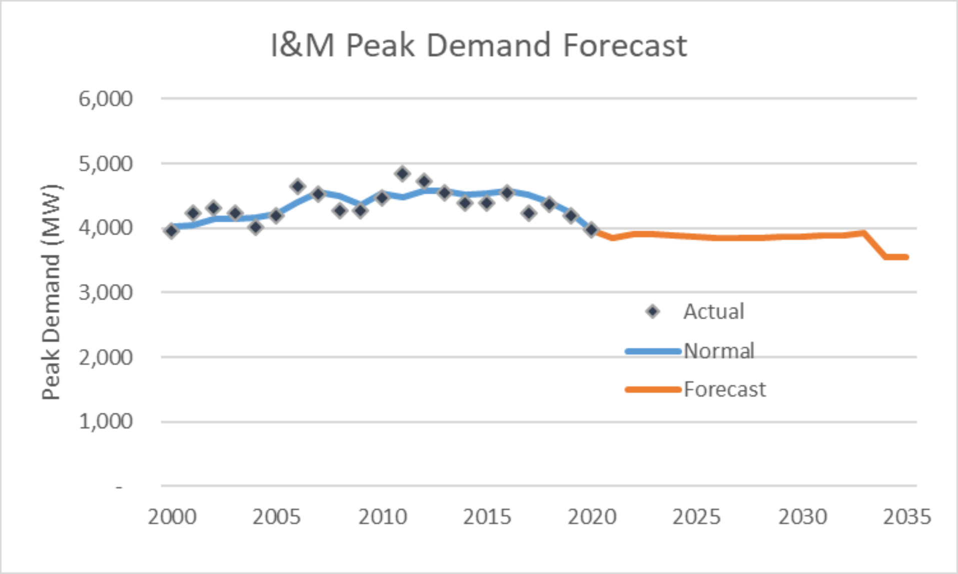
Energy and Peak Demand

Forecast Currently Being Updated, Expected June 1

I&M Load and Peak Energy Forecast

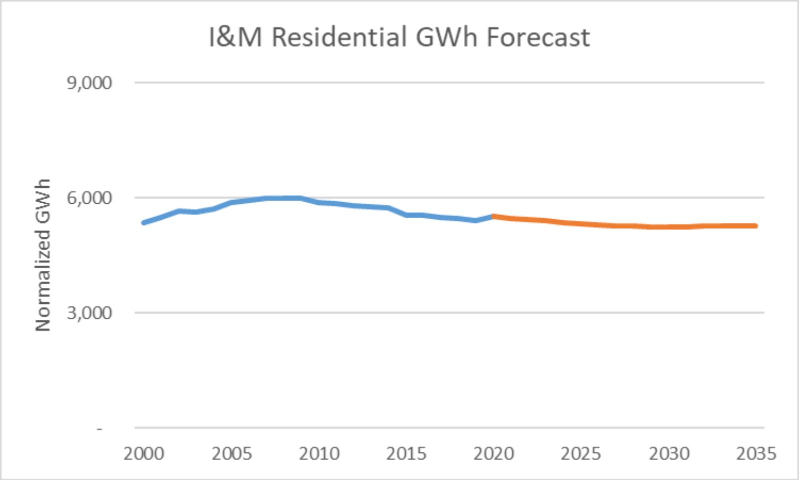
- I&M's weather normalized load never reached its pre-pandemic levels
- I&M's peak demand forecast (and capacity load obligation) is relatively flat for the planning horizon.
- The combination of slower demographics, recovery from a historic pandemic/ recession, increasing saturations of energy efficient technologies, and the expiration of some key wholesale contracts all combine to create significant headwinds for load growth into the future.

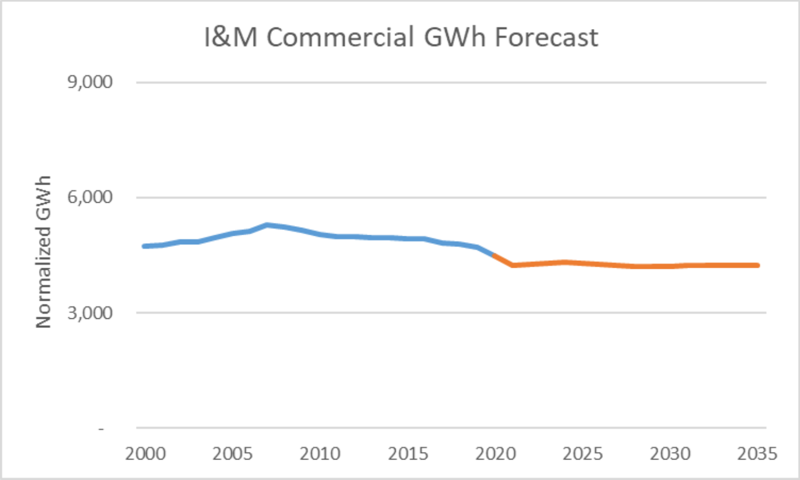


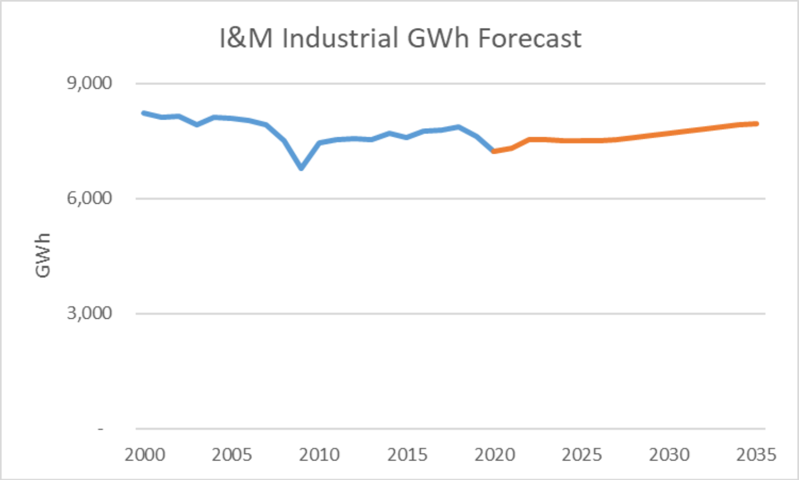


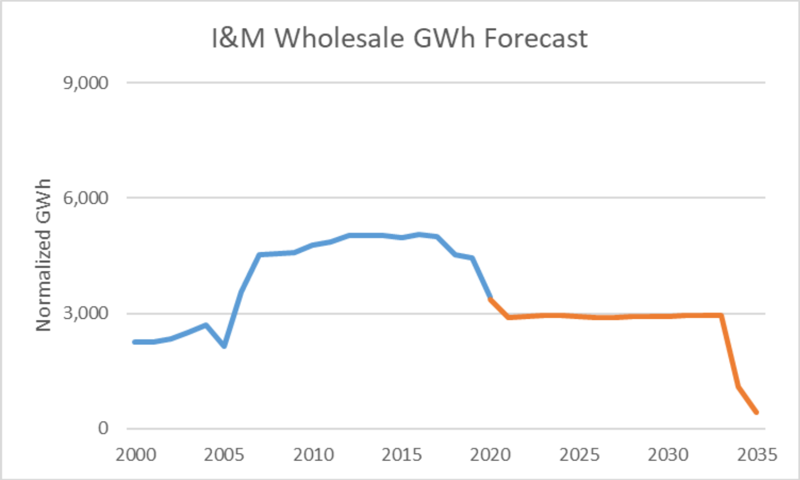
Load Forecast by Class

An AEP Company



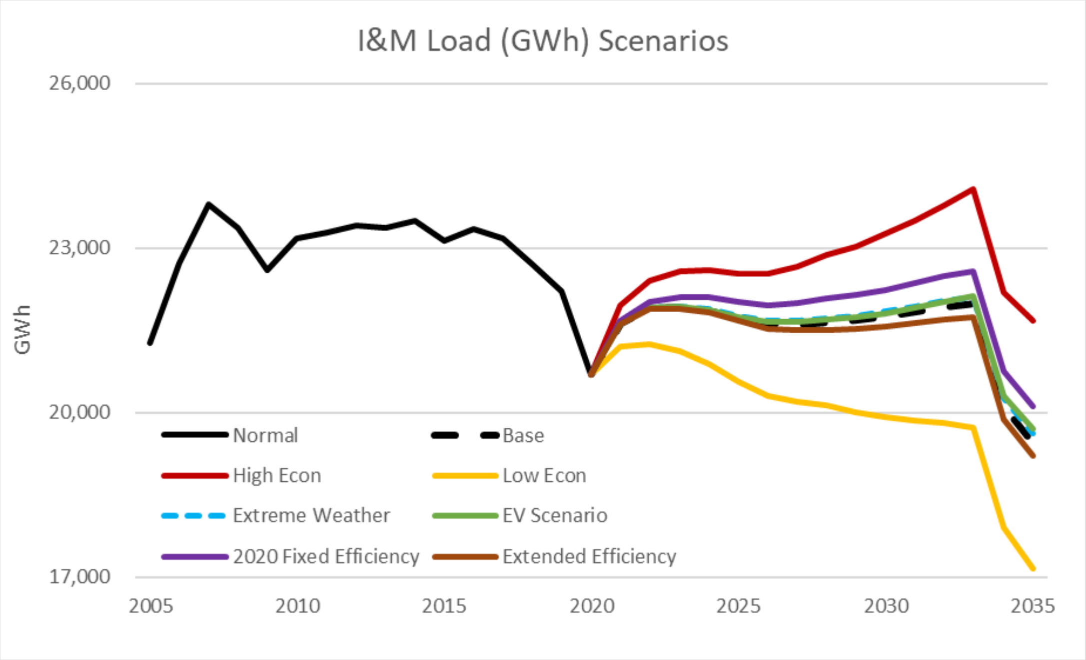






Load Forecast Scenarios

INDIANA MICHIGAN POWER
An AEP Company



Compound Annual Growth Rate (2020-2035)

Base	-0.4%	The baseline forecast (highest probability outcome)
High Economic	0.3%	Forecast under much stronger economic conditions than assumed in baseline
Low Economic	-1.2%	Forecast under much weaker economic conditions than assumed in baseline
Extreme Weather	-0.4%	Assuming extreme warming trend in temperatures (Purdue study)
EV Scenario	-0.3%	Base EV adoption scenario assuming 33% average growth per year
2020 Fixed Efficiency	-0.2%	Forecast assuming current technology efficiencies are fixed at current levels.
Extended Efficiency	-0.5%	Assuming additional energy efficiency standards are implemented in future

I&M Load Forecast Scenarios

- In addition to the Base load forecast, a number of additional load scenarios are developed for use in the IRP optimization modeling.
- While multiple load forecast scenarios are developed, only the highest and lowest are generally utilized in the optimization to understand how the optimal resource mix would be impacted by any of the potential load scenarios.

Feedback and Discussion

RESOURCE AND TECHNOLOGY

Available Technologies

INDIANA MICHIGAN POWER
An AEP Company

Siemens regularly estimates generation technology costs and performance for typical alternatives.

Fuel	Technology	Description
Natural Gas	Advanced 2x1 Combined Cycle	2x1, H/G/J/HA, no DF, wet
	Advanced 1x1 Combined Cycle	1x1, H/G/J/HA, no DF, wet
	Advanced 1x1 Combined Cycle w/ CCS	1x1, H/G/J/HA, no DF, wet
	Advanced Simple Cycle Frame CT	1x0, G/H/J/HA
	Conventional Simple Cycle Frame CT	1x0, F/FA
	Small Aero Simple Cycle CT	1x0, LM6000
	RICE	6x0 Wartsila 18V50SG
	RICE	4x5.6MW
Coal	SCPC w/ CCS	Ultra-Supercritical
Nuclear	Large Nuclear	AP 1000
	Small Modular Reactor	NuScale
Green Hydrogen	Advanced 1x1 Combined Cycle	1x1, H/G/J/HA, no DF, wet
	Conventional Simple Cycle Frame CT	1x0, F/FA
	Fuel – Third Party Purchase	
	Fuel - Derived synthetic natural gas	

Fuel	Technology	Description
Renewable	Utility Solar PV - Single Tracking	100 MW Single Tracking
	Utility Solar PV - Single Tracking + BESS	100 MW Single Tracking, 33 MWx4hr BESS
	BTM Solar PV - Single Tracking	5 MW Single Tracking w/ 1x2 Storage
	BTM Solar PV - Single Tracking	5 MW Single Tracking w/ 1x4 Storage
	BTM Solar PV - Single Tracking	5 MW Single Tracking w/ 1x8 Storage
	Onshore Wind	100-300 MW
	Offshore Wind	Fixed Bottom
Storage	Lithium-Ion Batteries	Li-Ion, Utility Scale, 4 hr
	Pumped Hydro	300-1,200 MW
	Compressed Air Storage	Underground, 16h RTE = 52%
	Flow_Battery Storage	Various Chemistries

Other Requested Technologies: Small CCs, Conventional CCs, Floating OSW, LFG, RNG, Biomass, Cogen, CAES, Fuel Cells, PHES, Hydro, RoR Hydro, Geothermal, Various Fuel/ Technology Conversions, Different Technology Capacities

Overview of Technology Forecasting Approach

Current technology costs and performance based on RFP; forecasted using Siemens' technology shapes.

Conduct new all-source RFP → Apply Siemens technology forecast shapes to project capital costs for each year → Review and combine forecasted RFP results → Consider technologies to screen out

Technology metrics may include, but not limited to

1. Technology Risk (immature)
2. Capital Risk (capex spread)
3. Levelized Cost of Energy (LCOE)
4. Appropriate Capacity (available capacity suits utility load forecast)
5. Support Requirements (land and water needs)

All-in Capital Cost Curves, 2020$/kW (Illustrative)

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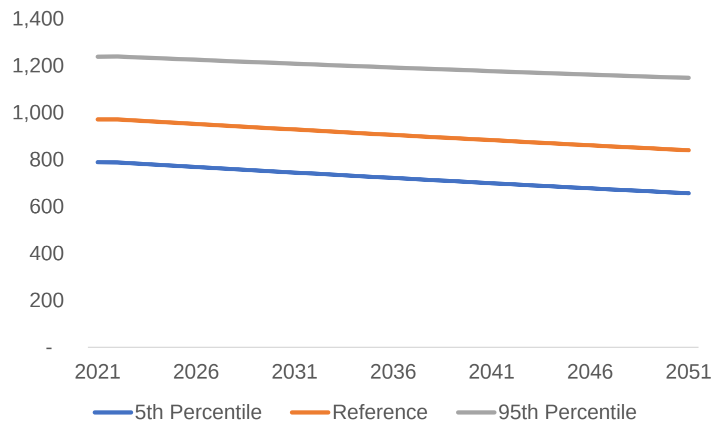
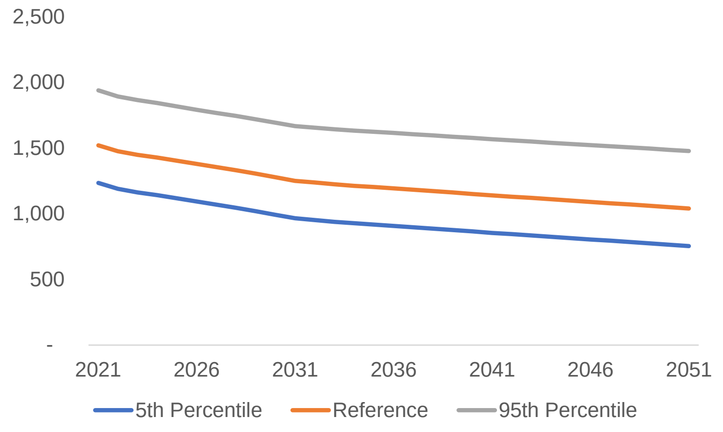
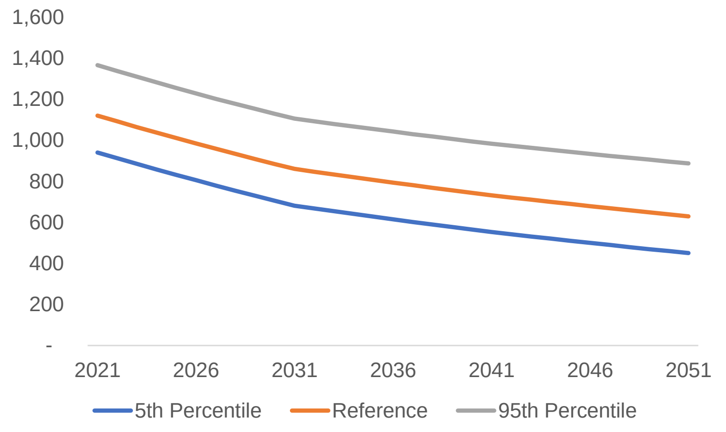
Advanced 2x1 Combined Cycle



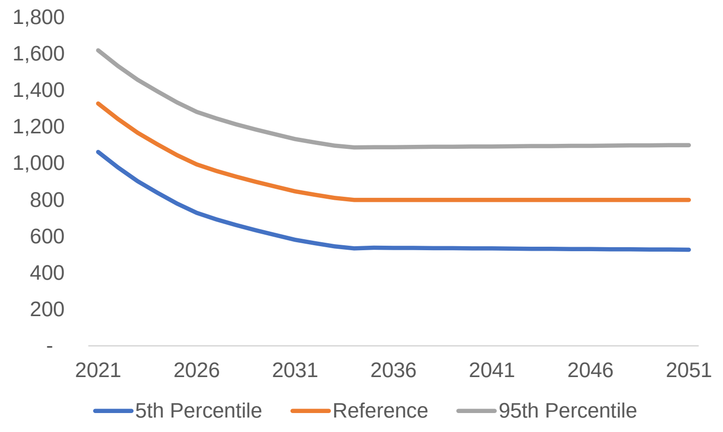
Onshore Wind



Solar PV, Single Axis Tracking



Li-Ion Battery Storage, Utility Scale, 4 hr



Market Potential Study Approach

State	Completes - Baseline Questions
BUSINESS CUSTOMER SURVEY *(Stratification by: state, small / large)*	
Indiana	504
Michigan	218
Total	*722*
RESIDENTIAL CUSTOMER SURVEY *(Stratification by: state, single / multi-family, and income qualified / market rate)*	
Indiana	1,085
Michigan	1,114
Total	*2,199*

Biz WTP Modules	Completes
EE – Refrigeration	102
EE – HVAC	345
EE – Water Heating	126
EE – Lighting	170
DR – Central AC	307
DR – Critical Peak Pricing	477
DER – Solar Purchase	85
DER – Solar Lease	86

Res WTP Module	Completes
EE – HPWH	274
EE – Heating System	1,726
EE – Building Shell	1,351
EE – Appliances	1,316
DR – Central AC	400
DR – Water Heating	403
DR – Electric Vehicles	375
DR – Time of Day Pricing	338
DER – Solar Purchase	1,371

Building/Equipment Baseline Research

Sampling Objective: 90% confidence, 10% relative precision (90/10) at strata-level for all questions

Response Outcome:

- Business survey: 90/10 at strata level for baseline questions; at state level for other questions
- Residential survey: 90/10 for all strata except multi family

Willingness-to-Participate Research

Surveys included “modules” to investigate barriers, awareness, and adoption rates for different EE technologies, DR offerings, and PV.

Response Outcome:

- Biz: 90/10 at the state level across all modules, by strata (state) for others
- Res: 90/10 at state level and income-status for most modules

Market Potential Study Status Update

Stakeholder engagement is currently ongoing

MPS Stakeholder Engagement	Status
Kickoff Meeting	Complete
Market Research Survey Instruments Feedback	Complete
Measure Lists Feedback	Complete
Study Methodological Decision Points Feedback	In Process

I&M and GDS are currently working through MPS load forecast development, stakeholder questions and concerns, and MPS outputs to be used as IRP inputs

May 1, 2021 Study completion with final report

Feedback and Discussion

STAKEHOLDER PROCESS AND Q&A

Stakeholder Timeline

March 9, 2021	April 14, 2021	May TDB, 2021 (tentative date)	July 14, 2021 (tentative date)	September 14, 2021 (tentative date)
2021 IRP Process	DSM IRP Inputs and Modeling	AURORA Technical Workshop	Draft Candidate Portfolios	Probabilistic Modeling Results
Objectives and Metrics	EE/EWR, DR and DER Results		All-Source RFP Results	Review of Preferred Portfolio
Proposed Scenarios	2021 IRP Update		Stochastic Modeling Approach and Assumptions	Other(s)
Base Case Inputs				

If you would like to make a comment or ask a question about the IRP process after the presentation has concluded:

- Please send an email to I&MIRP@aep.com
- Stay informed about future events by visiting the I&M IRP Portal located at www.indianamichiganpower.com/info/projects/IntegratedResourcePlan

Feedback and Discussion

CLOSING REMARKS

APPENDIX

Definitions

Term	Definition
Aurora	Electric modeling forecasting and analysis software. Used for capacity expansion, chronological dispatch, and stochastic functions
Condition	A unique combination of a Scenario and a Sensitivity that is used to inform Candidate Portfolio development
Deterministic Modeling	Simulated dispatch of a portfolio in a pre-determined future
Renewable Portfolio Standards	Renewable Portfolio Standards (RPS) are policies designed to increase the use of renewable energy sources for electricity generation
Portfolio	A group of resources to meet customer load
Preferred Portfolio	The portfolio that management determines will performs the best, with consideration for cost, risk, reliability, and sustainability
Probabilistic modeling	Simulate dispatch of portfolios for several randomly generated potential future states
Reference Scenario	The most expected future scenario that is designed to include a current consensus view of key drivers in power and fuel markets (reference case, consensus case)
Scenario	Potential future State-of-the-World designed to test portfolio performance in key risk areas important to management and stakeholders alike
Sensitivity Analysis	Analysis to determine what risk factors portfolios are most sensitive to