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VECTREN PUBLIC STAKEHOLDER MEETING

AUGUST 15, 2019

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WELCOME, INTRODUCTION TO CENTERPOINT, AND SAFETY SHARE

LYNNAE WILSON

INDIANA ELECTRIC CHIEF BUSINESS OFFICER

SAFETY SHARE

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Know your exits

- Whenever you are entering a public area or a guest in a facility such as this, always know your exits. Take note of the signs
- There are two emergency exits, immediately behind me, Additionally, there are exit doors directly behind you – once through the door, to the left is the main entrance into the building. Should the main entrance be blocked there is an exit to the right of this room through a set of doors leading to the loading dock area

Visualize for safety

- When you enter a new space, visualize that an emergency – like a fire, bad weather, or an earthquake – could happen there and consider how you can respond
- The best way is to prepare to respond to an emergency before it happens. Few people can think clearly and logically in a crisis, so it is important to do so in advance, when you have time to be thorough

Fire

- Evacuate the building and move to the back of the Vectren parking lot, near the YWCA

Bad Weather

- During a tornado warning, stay away from windows, glass doors, and outside walls
- Move in an orderly fashion to the stairwell, just outside of the lobby in the main entrance way

Earthquake

- Move under the desk where you are sitting, facing away from glass, and cover your head and face
- Once shaking has subsided, move in an orderly fashion towards the nearest exit and move to the back of the Vectren parking lot, near the YWCA

OUR BUSINESSES

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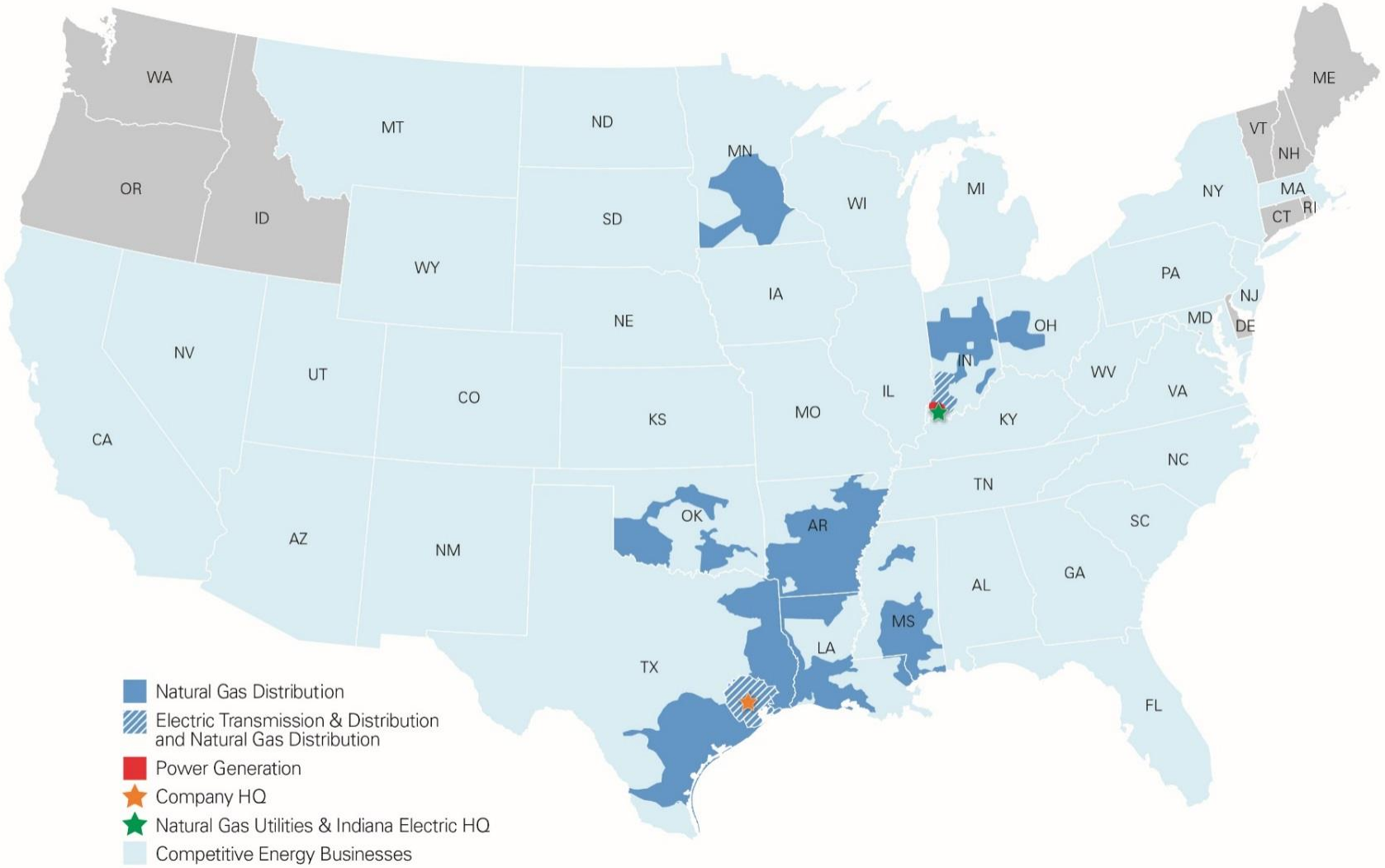

AGENDA

Time		
9:00 a.m.	Sign-in/Refreshments	
9:30 a.m.	Welcome, Safety Message	Lynnae Wilson, CenterPoint Energy Indiana Electric Chief Business Officer
9:45 a.m.	2019/2020 IRP Process	Matt Rice, Vectren Manager of Resource Planning and Gary Vicinus, Managing Director for Utilities, Pace Global
10:35 a.m.	Break	
10:45 a.m.	Objectives & Measures Workshop	Gary Vicinus, Managing Director for Utilities, Pace Global
11:30 a.m.	Lunch	
12:15 p.m.	All-Source RFP	Matt Lind, Resource Planning & Market Assessments Business Lead, Burns and McDonnell
1:00 p.m.	Environmental Compliance Update	Angila Retherford, CenterPoint Energy, Vice President Environmental Affairs and Corporate Responsibility
1:35 p.m.	Break	
1:45 p.m.	Draft Base Case Market Inputs and Scenarios Workshop	Gary Vicinus, Managing Director for Utilities, Pace Global
2:30 p.m.	Stakeholder Questions and Feedback	Moderated by Gary Vicinus, Managing Director for Utilities, Pace Global
3:00 p.m.	Adjourn	

MEETING GUIDELINES

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1. Please hold most questions until the end of each presentation. Time will be allotted for questions following each presentation. (Clarifying questions about the slides are fine throughout)
2. For those on the webinar, we will open the (currently muted) phone lines for questions within the allotted time frame. You may also type in questions via the chat feature. Only questions sent to 'All-Entire Audience' will be seen and answered during the session.
3. At the end of the presentation, we will open up the floor for "clarifying questions," thoughts, ideas, and suggestions.
4. There will be a parking lot for items to be addressed at a later time.
5. Vectren does not authorize the use of cameras or video recording devices of any kind during this meeting.
6. Questions asked at this meeting will be answered here or later.
7. We will do our best to capture notes but request that you provide written feedback (concepts, inputs, methodology, etc.) at IRP@CenterPointEnergy.com following the meeting. Additional questions can also be sent to this e-mail address.

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2019/2020 IRP PROCESS

MATT RICE

VECTREN MANAGER OF RESOURCE PLANNING

DIRECTOR'S REPORT FEEDBACK

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Improvement Opportunities	Positive Comments
Include lower and higher boundary scenarios to create a wider range of portfolios	Significant improvements in all aspects of the IRP
Model a wide range of portfolios	Use of state-of-the art models
Strategist model did not consider enough options simultaneously	A collegial stakeholder process with a concerted efforts to broaden stakeholder participation
Update risk analysis methodology to be less qualitative and more encompassing of known risks	Appropriate use of short, mid, and long term breaks in forecasts
Explore other options for modeling EE cost options and make greater use of a Market Potential Study (MPS)	Being credible and well-reasoned, with narratives that were clear
More consideration given to Warrick unit 4 in scenario development	Maintaining optionality in the plan
Clearly define risk analysis methodology	Commendable use of multiple fuel prices
Clearly define Energy Efficiency Methodology	Top management participation

ADDITIONAL DIRECTOR'S REPORT GUIDANCE

The director had five specific requests of all utilities that should be incorporated into IRPs

- Greater use of tables
- Easier comparisons for scenario assumptions
- List of technical modeling constraints
- Expanded use of graphics
- Solicit stakeholder inputs and improve the exploratory nature of IRPs

IURC ORDER 45052

- Vectren selected a Combined Cycle Gas Turbine (CCGT) that was too large for a small utility
  - Did not adequately consider flexibility to change paths, adding stranded asset risks
  - Did not consider fuel or geographic diversity
- Risk analysis did not consider the full range of portfolios
  - Did not fully explore options at the Brown plant (conversion or scrubber alternatives)
  - Need to more fully consider customer-generator opportunities
  - Did not fully consider energy and capacity purchases
  - Did not consider smaller gas plant options in the risk analysis
- Vectren's analysis disadvantaged renewable resources
  - Vectren did not make a serious effort to determine the price and availability of renewables
  - The RFP was too restrictive
- Vectren did not fully respond to the Director's report critiques in updated CPCN analysis
  - Did not update the risk modeling
  - Did not consider the full range of gas prices (including methane regulation)

Other Items to Note

- Acknowledged that Vectren needs to act swiftly to develop our 2019 IRP to meet the 2023 constraints
- DSM was compared on a consistent and comparable basis with supply side alternatives

VECTREN COMMITMENTS FOR 2019/2020 IRP

- Will strive to make every encounter meaningful for stakeholders and for us
- Will provide a data release schedule and provide modeling data ahead of filing for evaluation
- The IRP process informs the selection of the preferred portfolio
- Utilize an All-Source RFP to gather market pricing & availability data
- Use one model for consistency in optimization, simulated dispatch, and probabilistic functions
- Attempt to model more resources simultaneously
- Will include a balanced, less qualitative risk score card. Draft to be shared at the first public stakeholder meeting
- Work with stakeholders on portfolio development
- Will test a wide range of portfolios in scenario modeling and ultimately in the risk analysis
- Will conduct a sensitivity analysis
- Exhaustive look at existing resource options
- The IRP will include information presented for multiple audiences (technical and non-technical)

KEY DIFFERENCES FROM 2016 APPROACH

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2016	2019/2020
Utilized technology assessment information	All-Source RFP, supplemented with technology assessment information
Discussed objectives, risks, and provided example of potential metrics. Showed scorecard and final metrics in the last stakeholder meeting	Will show objectives, metrics, and gather feedback on scorecard early in the process
Built 15 portfolios for the risk analysis, including continuing use of coal plants, least cost portfolios, diversified portfolios, and stakeholder portfolios	Work with stakeholders to build a wide range of portfolios to be tested in the risk analysis. Utilize models to develop least cost portfolios for various portfolio strategies
Other than the continue coal portfolio, alternatives such as gas conversion or repower options did not ultimately make it into the risk analysis	More exhaustive look at viability of existing units, and include in the risk analysis
Utilized scenario modeling to create computer generated portfolios. Essentially used as a screening tool for the risk analysis	Utilize scenarios to evaluate regulatory risk, with simulated dispatch for a wide range of portfolios
No sensitivity analysis	Will include a sensitivity analysis on various risks, utilizing data from probabilistic modeling. EE Sensitivity.
Modeled 8 blocks of EE up to 2% of sales. Costs based on EIA penetration model. EE selection was binary (selected for full period or not)	Will model EE bins of varying sizes and timeframes. Ties directly to MPS with costs based in empirical data and historical experience
Did not provide modeling data until after IRP was filed	Will provide modeling data throughout the process
Utilized two IRP models (Strategist & Aurora)	Moving to Aurora for all IRP modeling

PROPOSED 2019/2020 IRP PROCESS

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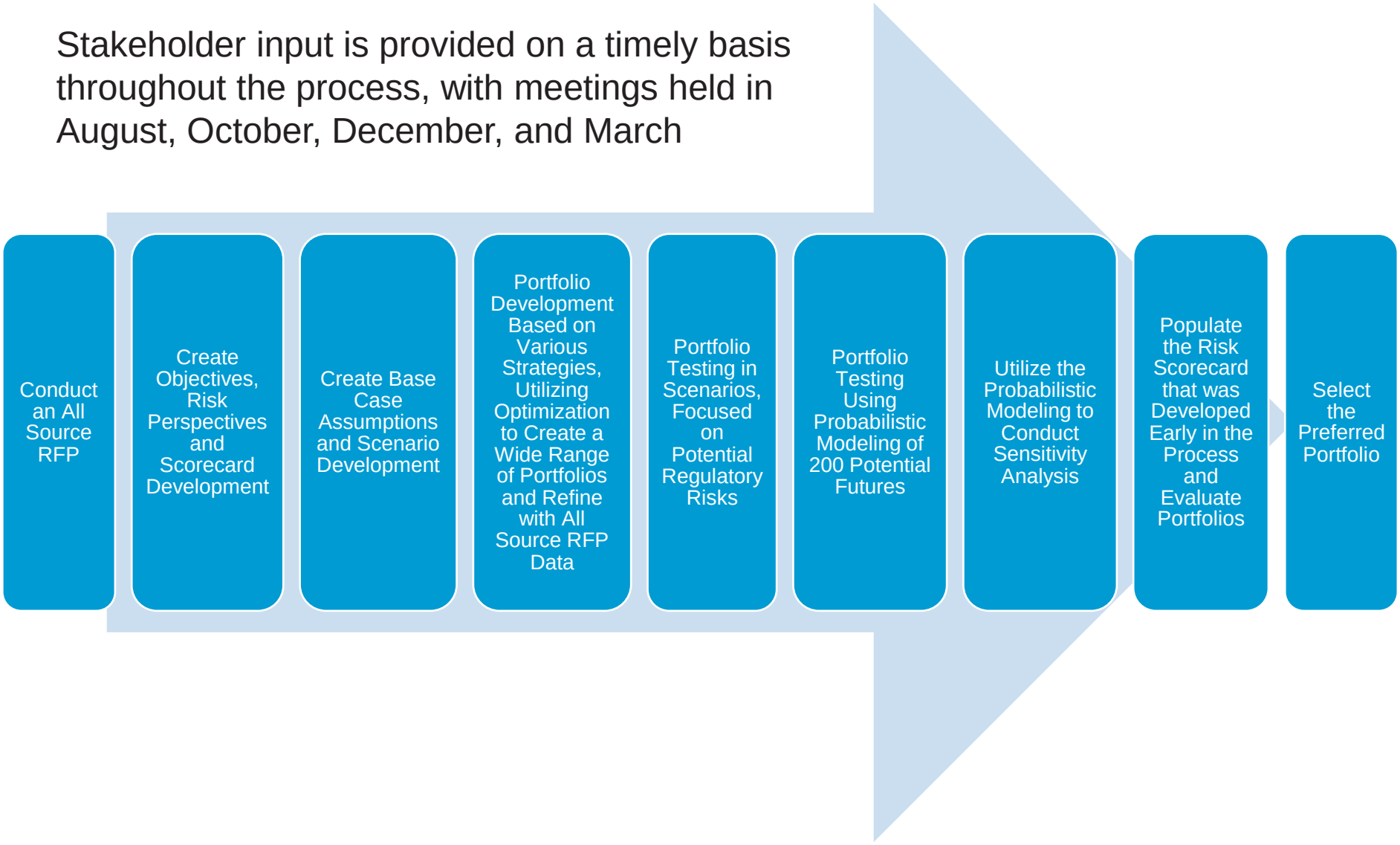
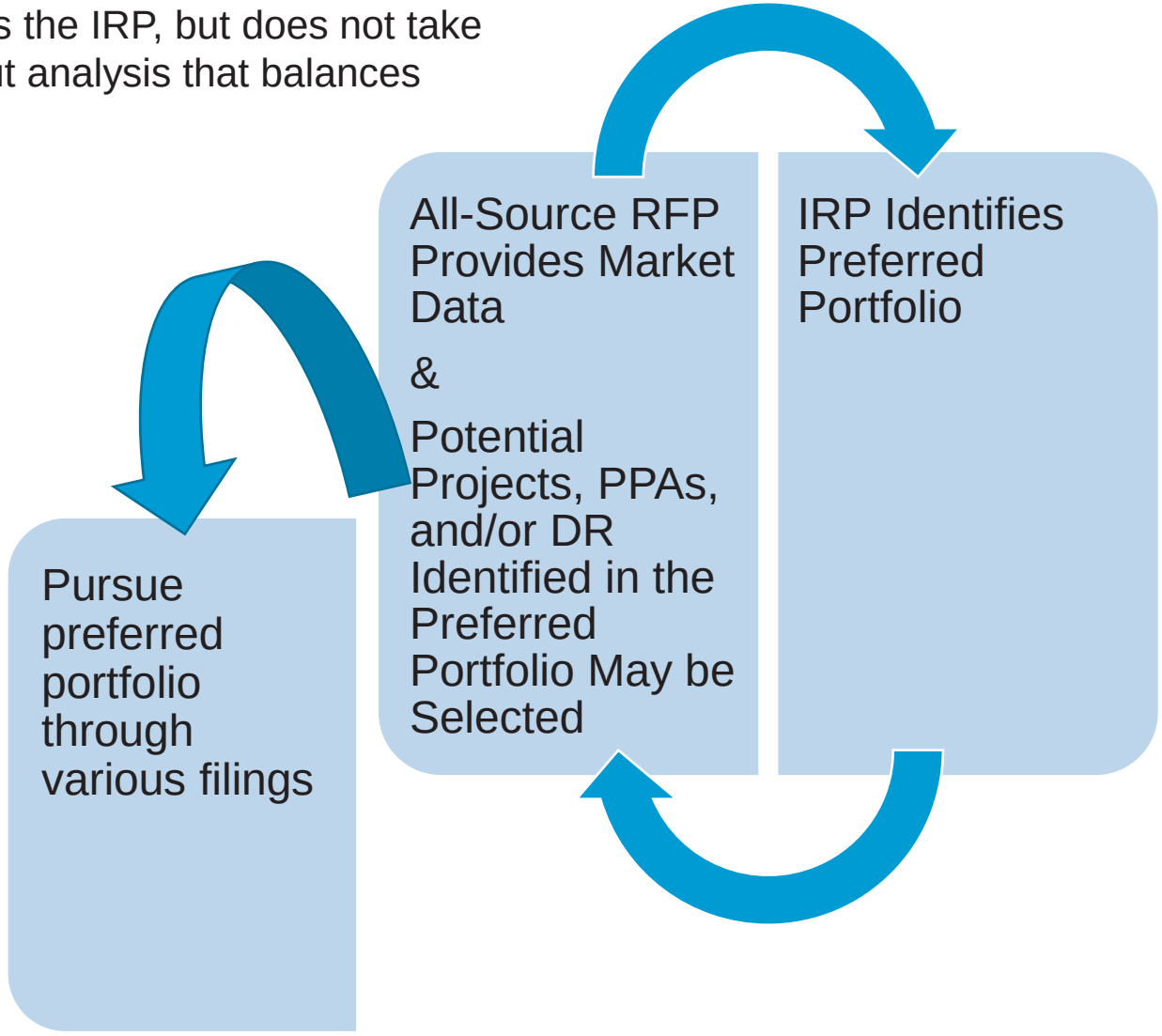
Stakeholder input is provided on a timely basis throughout the process, with meetings held in August, October, December, and March



ROLE OF THE ALL-SOURCE RFP

The All-Source RFP informs the IRP, but does not take the place of well thought out analysis that balances multiple objectives

- Average delivered cost by resource will inform modeling
- Resources to be modeled on a tiered basis
- The full IRP analysis, including risk analysis, will test a diverse set of resource mixes and will ultimately identify a preferred portfolio
- Vectren will pursue resources consistent with those identified in the preferred portfolio



KEY VENDORS

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RFP

- Burns and McDonnell
  - Draft RFP
  - Post
  - Interpret and align bids
  - Bid risk assessment
  - Convert into modeling inputs
  - Further evaluation on viable projects
  - Transmission analysis where needed

IRP

- Pace
  - Moderation of stakeholder meetings
  - Strategy (assist with stakeholder engagement, scenario, portfolio, objectives, & metrics development)
  - Deterministic modeling (determined scenarios)
  - Probabilistic modeling
  - Sensitivity analysis
  - Risk assessment and scorecard

File May 1, 2020

2019/2020 STAKEHOLDER PROCESS

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August 15, 2019	October 10, 2019	December 12, 2019	March 19, 2020
• 2019/2020 IRP Process • Objectives and Measures • All-Source RFP • Environmental Update • Draft Base Case Market Inputs & Scenarios	• RFP Update • Draft Resource costs • Sales and Demand Forecast • DSM MPS/ Modeling Inputs • Scenario Modeling Inputs • Portfolio Development	• Draft Portfolios • Draft Base Case Modeling Results • All-Source RFP Results and Final Modeling Inputs • Probabilistic Modeling Approach and Assumptions	• Final Base Case Modeling • Probabilistic Modeling Results • Risk Analysis Results • Preview the Preferred Portfolio

FEEDBACK AND DISCUSSION

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OBJECTIVES & MEASURES

GARY VICINUS

MANAGING DIRECTOR FOR UTILITIES, PACE GLOBAL

IRP OBJECTIVES & MEASURES

The purpose of the IRP is to evaluate Vectren's current energy resource portfolio and a range of alternative future portfolios to meet customers' electrical energy needs in an affordable, system-wide manner

In addition, the IRP process evaluates portfolios in terms of environmental stewardship, market and price risk, and future flexibility, system flexibility to provide backup resources, reliability, and resource diversity

Each objective is important and worthy of balanced consideration in the IRP process, taking into account uncertainty. Some objectives are better captured in portfolio construction than as a portfolio measure

The measures allow the analysis to compare portfolio performance and potential risk on an equal basis

Quantitative IRP Objectives
Affordability
Environmental Risk Minimization
Price Risk Minimization
Market Risk Minimization
Future Flexibility

Qualitative IRP Objectives
Resource Diversity
System Flexibility

EACH PORTFOLIO WILL HAVE TRADEOFFS

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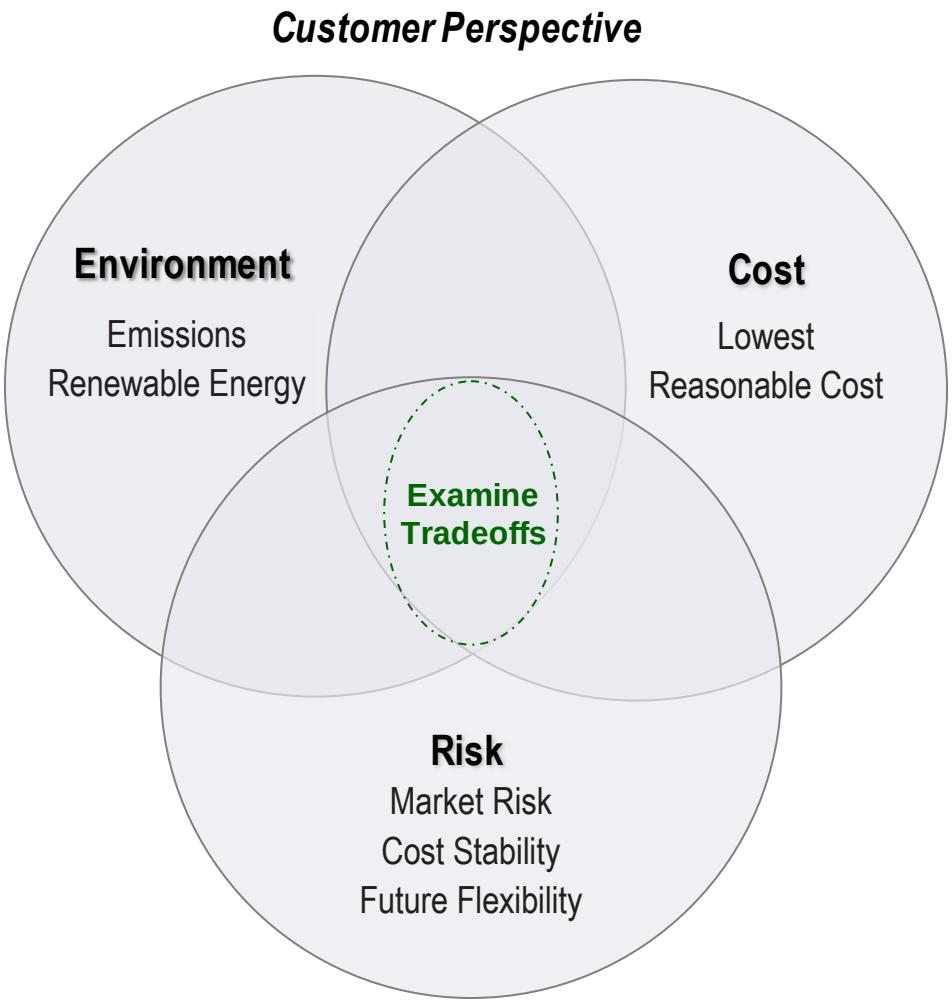

IRP OBJECTIVES & MEASURES

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For each resource portfolio, the objectives are tracked and measured to evaluate portfolio performance in the base case, in four alternative scenarios, and across a wide range of possible future market conditions. All measures of portfolio performance are based on probabilistic modeling of 200 futures

Objective	Measure	Unit
Affordability	20-Year NPVRR	$
Price Risk Minimization	95th percentile value of NPVRR	$
Environmental Risk Minimization	CO_2 Emissions	tons
Market Risk Minimization	Energy Market Purchases or Sales outside of a +/- 15% Band	%
	Capacity Market Purchases or Sales outside of a +/- 15% Band	%
Future Flexibility	MWh of impairment by asset	MWh

SCREENING PORTFOLIO PERFORMANCE

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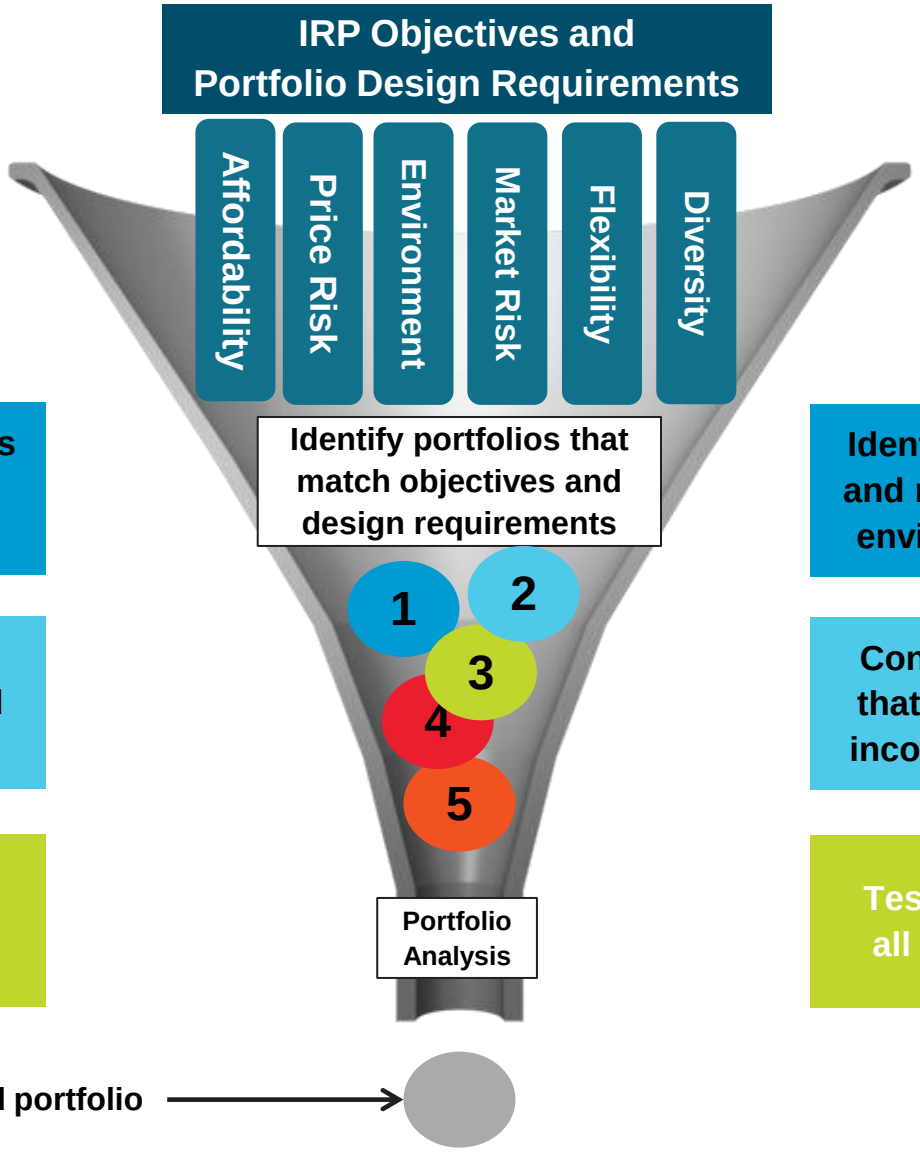

Task

Screen portfolio options for objectives and design requirements

Combine individual options into integrated portfolios

Perform risk analysis

Approach

Identify design requirements and rank options by cost and environmental performance

Construct portfolio options that meet requirements and incorporate strategy options

Test each portfolio against all objectives & measures

FEEDBACK AND DISCUSSION

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ALL-SOURCE RFP UPDATE

MATT LIND,

RESOURCE PLANNING & MARKET ASSESSMENTS BUSINESS LEAD, BURNS AND MCDONNELL

OVERVIEW

- 2016 IRP:
  - Identified capacity and energy shortfall beginning in 2023
  - Potential need of ~700 MW accredited capacity
- 2019/2020 IRP:
  - Must examine existing resources alongside alternatives
  - Potentially a similar need
- 2019 All-Source RFP:
  - Feed IRP inputs
  - Identify potential cost effective resources

ALL-SOURCE RFP KEY DATES

Event	Anticipated Date*
All-Source RFP Issued	Wednesday, June 12, 2019
Notice of Intent (NOI), All-Source RFP NDA, and Respondent Pre-Qualification Application Due	5:00 p.m. CDT Thursday, June 27, 2019
Respondents Notified of Results of Pre-Qualification Application Review	5:00 p.m. CDT ~~Wednesday, July 3, 2019~~ Friday, July 12, 2019
Proposal Submittal Due Date	**5:00 p.m. CDT** **~~Wednesday, July 31, 2019~~** **Friday, August 9, 2019**
Initial Proposal Review and Evaluation Period	August - September 2019
Interconnection Evaluation	August - October 2019
Congestion Evaluation	4th Quarter, 2019
Inputs to IRP	4th Quarter, 2019

*Negotiation schedule for smaller projects can be expedited at Vectren's discretion

TIMELINE

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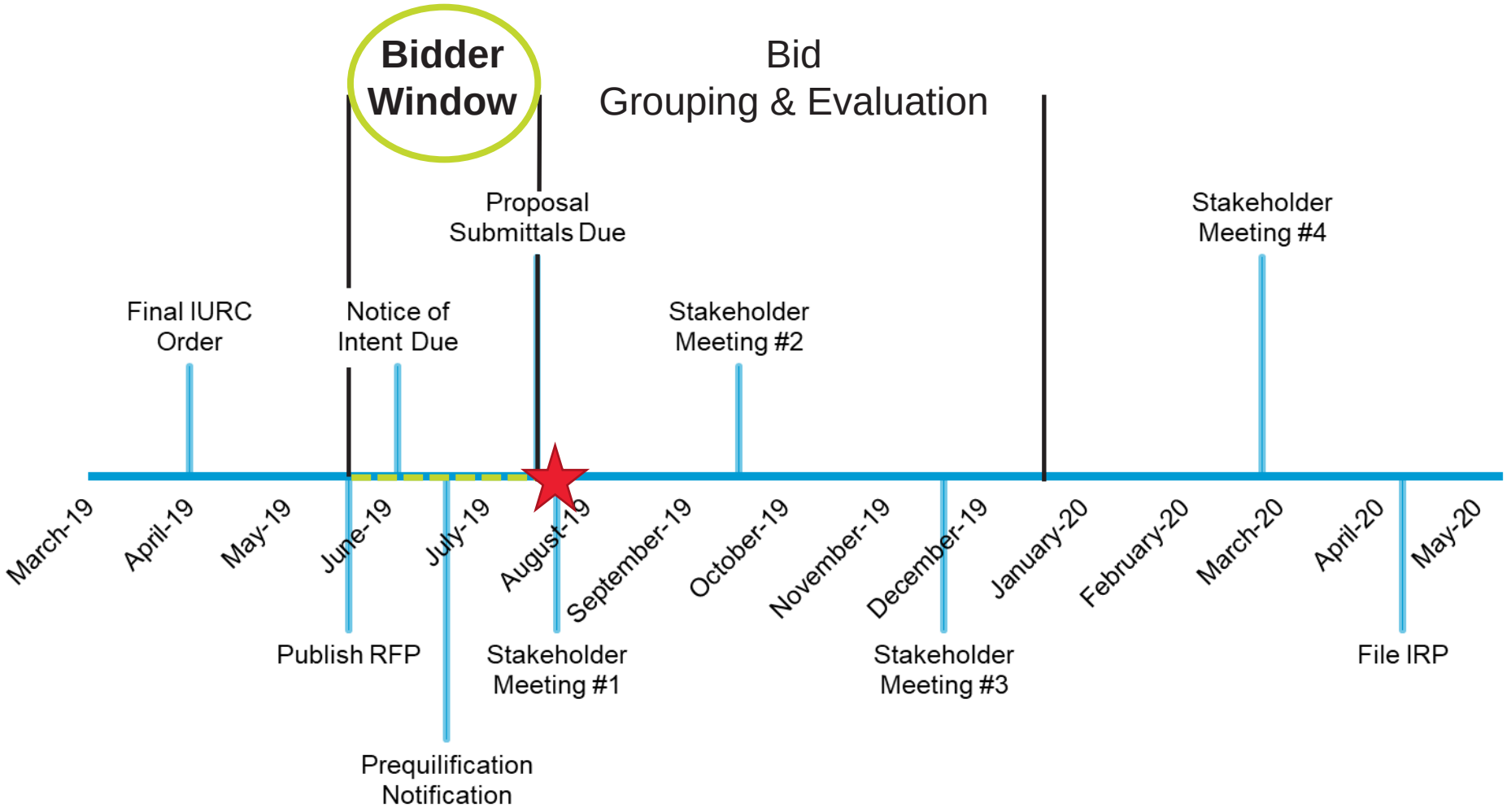
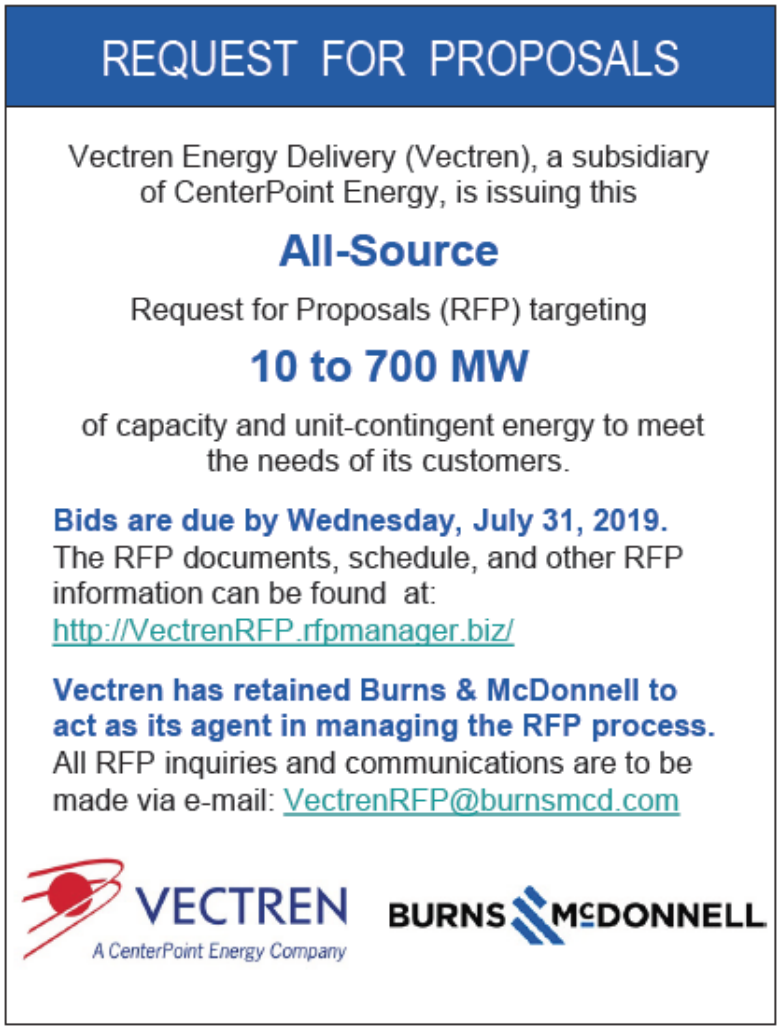


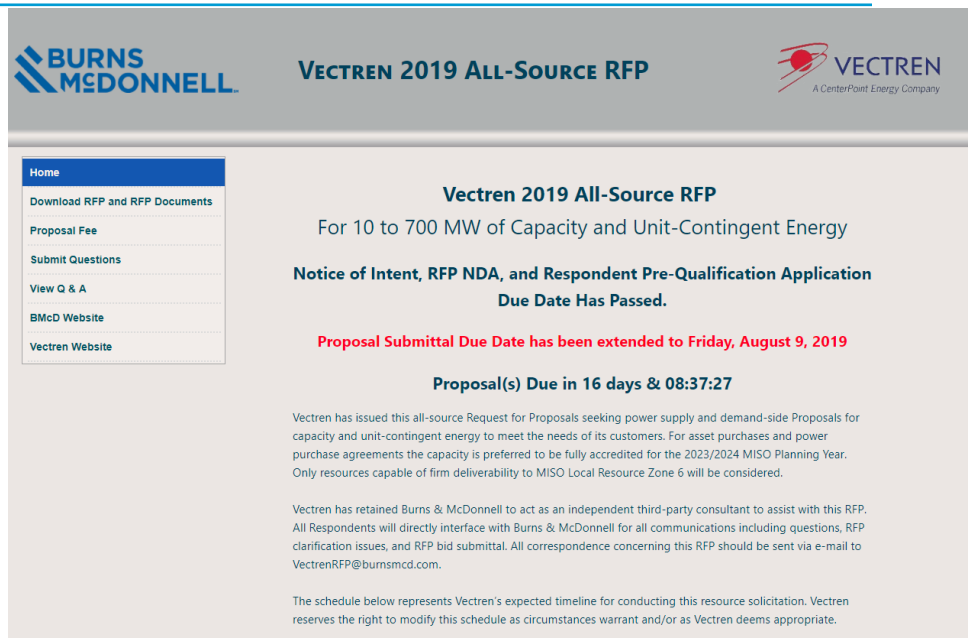
ALL-SOURCE RFP PUBLICATION & DISTRIBUTION

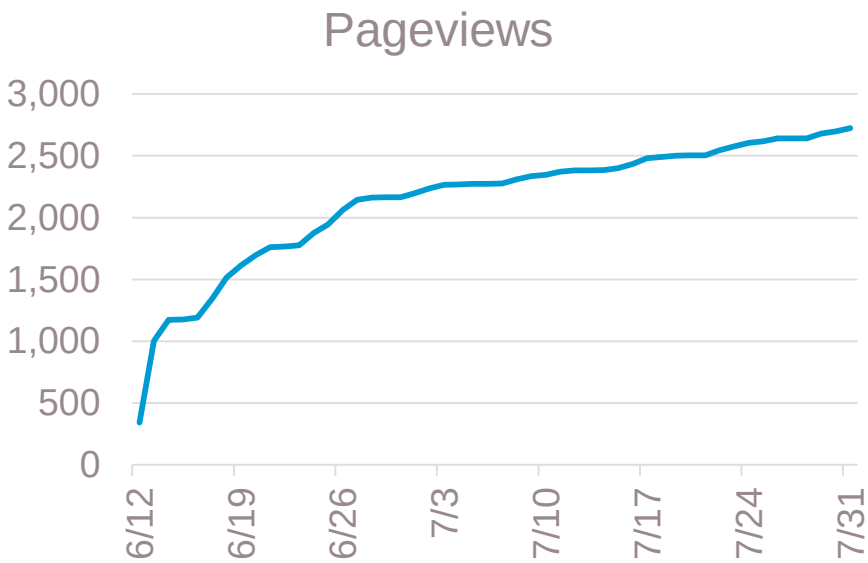
- Ad published in Megawatt Daily (~20,000 recipients)
- North American Energy Markets Association (NAEMA) distribution (150 members)
- Published in June 2019 Midwest Energy Efficiency Alliance (MEEA) Minute (161 members)
- Included on Vectren.com
- Sent to participants in Vectren's 2017 RFP
- BMcD RFP contact list (>450 industry contacts)
- Vectren stakeholders & industry contacts
- Interviews with Evansville Courier & Press



WEBSITE: HTTP://VECTRENRFP.RFPMANAGER.BIZ/

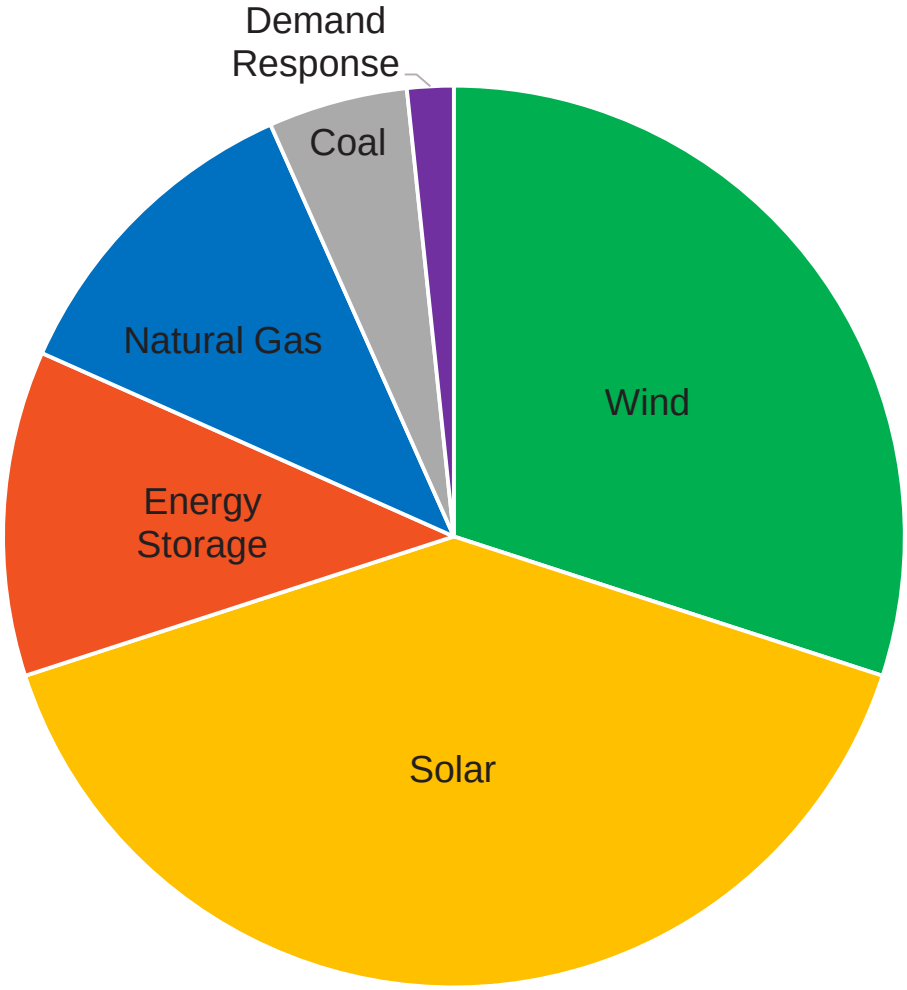
- RFP document downloads
  - 142 unique people
  - 107 companies
- Website visits (June 12th-July 31st)
  - ~800 users
  - ~3,000 pageviews
- Question & Answers posted





ALL-SOURCE RFP PARTICIPATION

- 32 companies submitted Notice of Intent (NOI)



TYPES OF RESOURCES CONSIDERED

- Open, non-limiting All-Source RFP
  - Asset purchase or power purchase agreement (PPA)
    - Existing or planned dispatchable generation
    - Existing or planned utility scale renewable resources
    - Existing or planned utility scale storage facilities, either stand-alone or paired with renewables
  - Load modifying resource (LMR)/Demand Resource (DR)
    - In Local Resource Zone 6 (LRZ6)
    - Proposals outside of Vectren's service territory are only eligible for capacity

PROPOSAL REQUIREMENTS

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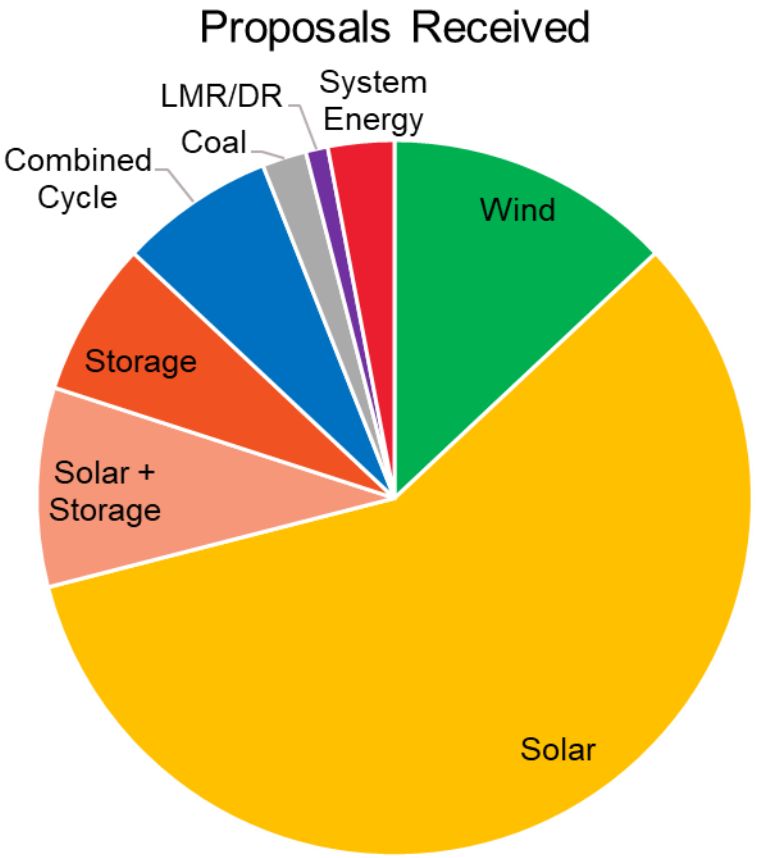
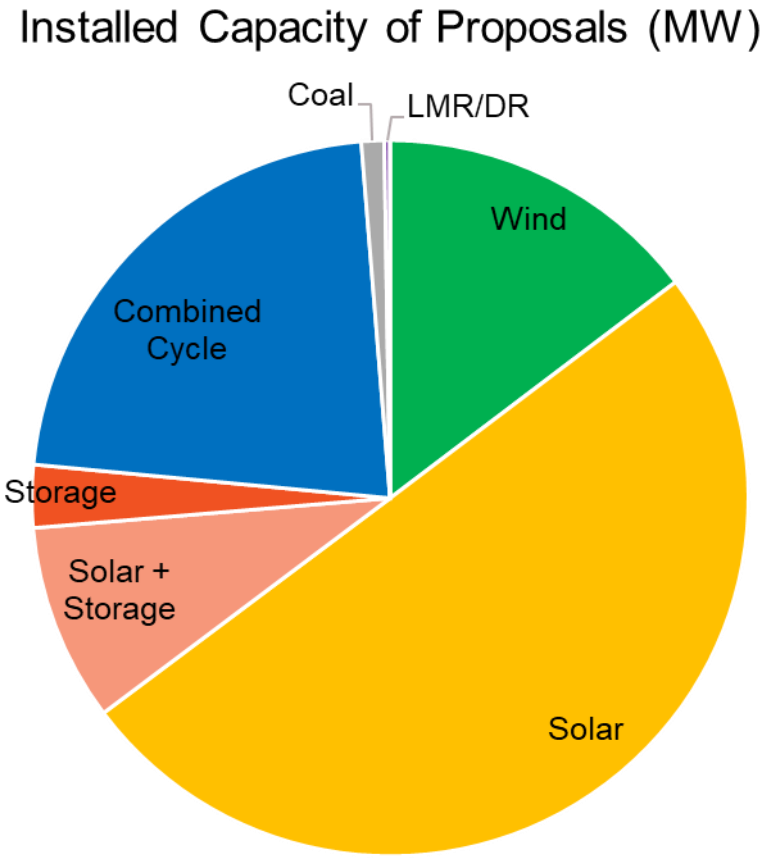
- MISO accredited or accreditable capacity (including Zonal Resource Credits) of no less than 10 MW to MISO LRZ 6
- Submittal forms (NOI, NDA, Pre-Qualification Application)
- 1-year pricing guarantee (from Proposal Submittal Due Date)
- Credit worthy bidders
- Respondent information and experience
- Facility information (Appendix D)
- Remaining life of at least 5 years from acquisition date for asset purchase

PRELIMINARY* RFP STATISTICS

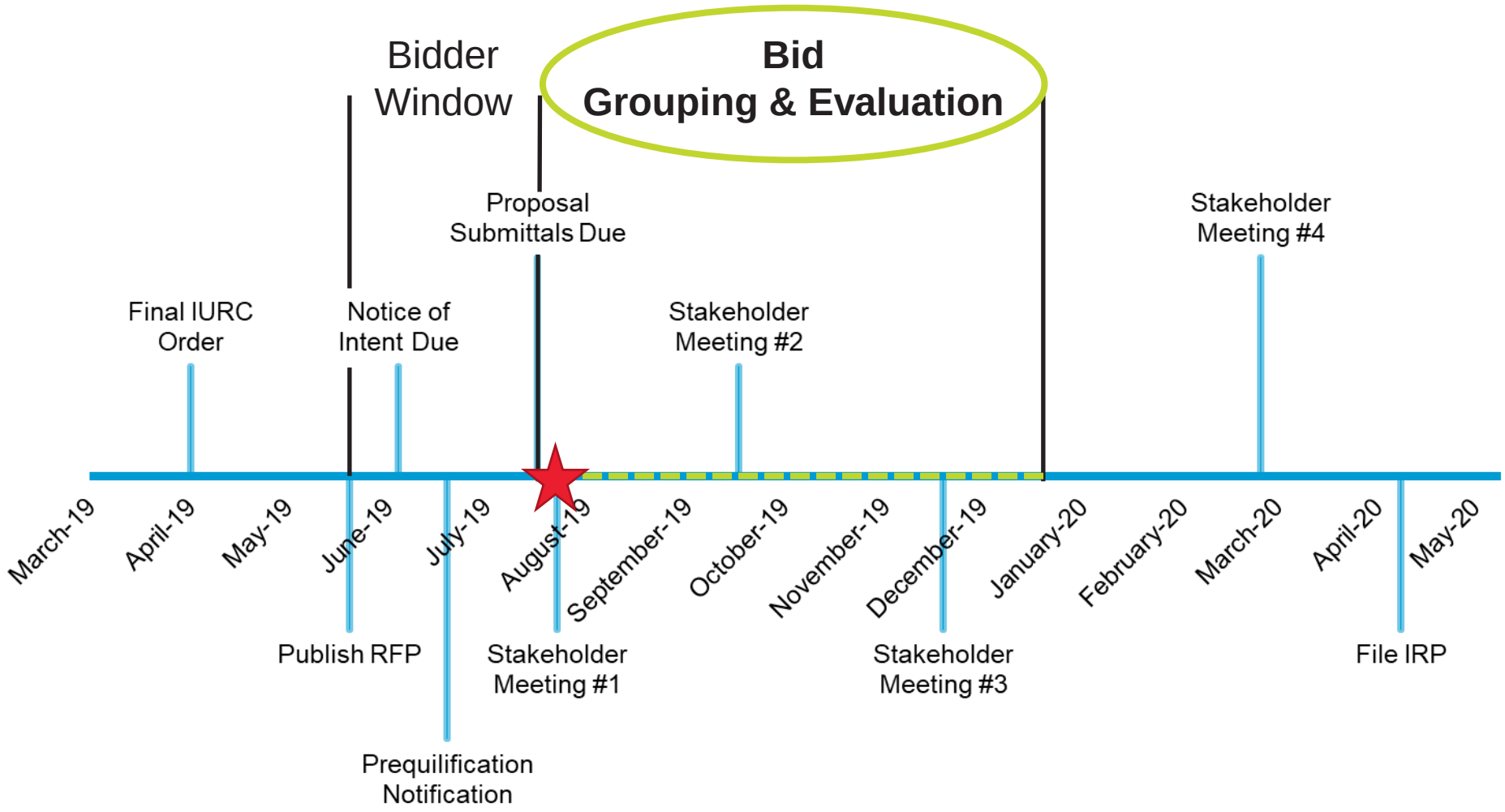
- 100 Proposals from 22 Respondents (4/5 in Indiana, 2/3 are PPA)





*Proposals received 4 business days ago. Follow-up and clarification process with respondents is ongoing.

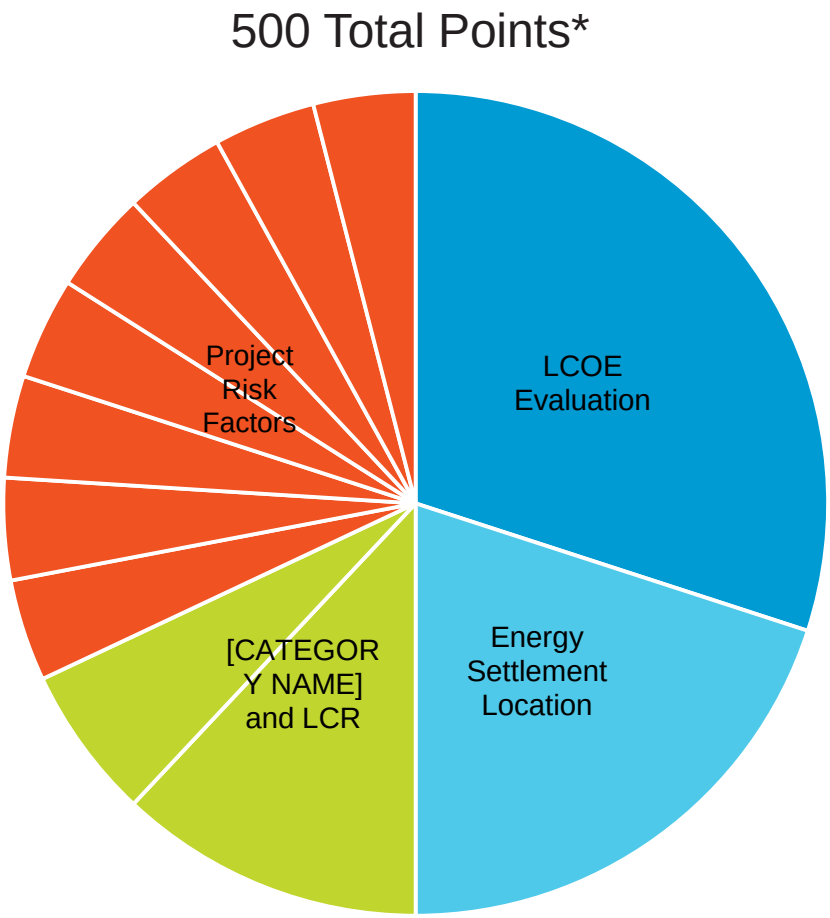
TIMELINE


Bidder Window
Bid Grouping & Evaluation
Proposal Submittals Due
Stakeholder Meeting #4
Final IURC Order
Notice of Intent Due
Stakeholder Meeting #2
March-19
April-19
May-19
June-19
July-19
August-19
September-19
October-19
November-19
December-19
January-20
February-20
March-20
April-20
May-20
Publish RFP
Stakeholder Meeting #1
Stakeholder Meeting #3
File IRP
Prequilification Notification

PROPOSAL EVALUATION

- Proposals will be grouped with similar proposals and scored relative to other bids within the same grouping
  - The preferred resource mix will be identified by the IRP analysis
  - All-Source RFP evaluation will rank order available resources within each grouping

Rank	Illustrative Resource Groupings						
1	Solar	Wind	Storage	Coal	Gas	Demand Response	etc.
2							
3							
4							
5							
6							
7							
8							



*Vectren reserves the right to add up to 100 points to Proposals located in Southern Indiana (generally defined as the following counties within Vectren's service territory; Dubois, Gibson, Pike, Posey, Spencer, Vanderburgh, and Warrick), as local resources provide multiple benefits: VAR support, economic development, less future congestion risk, etc.

EVALUATION SUMMARY

Scoring Criteria Name	Points		Scoring Method	Definition	Importance
LCOE Evaluation	150		Curve	$/MWh calculation within asset class	An LCOE evaluation comparing similar resource groups will help to show which Project(s) may provide lower cost energy to Vectren's customers.
Energy Settlement Location	100		Binary	Proposals that include all costs to have energy financially settled or directly delivered to Vectren's load node (SIGE.SIGW)	Having financial settlement or direct delivery to Vectren's load node provides Project's true resource cost to Vectren's customers, eliminating risks/costs associated with the delivery of energy.
Interconnection and Development Status	60		Binary	Executed a pro-forma MISO Service Agreement and Interconnection Construction Services Agreement (12 points) Completed a MISO Facilities Study (12 points) Completed a MISO System Impact Study (12 points) Achieved site control and completed zoning requirements (12 points) EPC Contract awarded (12 points)	These points are for completion of various critical milestones in the interconnection and development process. Projects which are further through the interconnection and development process will receive more points as cost certainty improves.
Local Clearing Area Requirement	30		Binary	Physically and electrically located in LRZ 6	Being located in LRZ 6 provides greater certainty that asset capacity can be deliverable to Vectren and fall within LCR requirements through entire life or contract term.

EVALUATION SUMMARY

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Scoring Criteria Name	Points		Scoring Method	Definition	Importance
Credit and Financial Plan	20		Curve	Vectren will be reviewing the credit rating and financing capabilities in relation to a Bidder's Project	Projects which lack the financial wherewithal to ensure development pose a significant risk to Vectren and their customers.
Development Experience	20		Curve	Scored based on 1,500 MW of relevant development experience	Relevant technology experience is important when looking at asset purchases or PPA's for facilities which are not in service. A Bidder's track record of project completion is a benefit to the Project's scoring.
Sole Ownership/ Partial Owner	20		Binary	Being a sole owner would allow full site and dispatch rights/preferences	Being able to solely own, operate, and maintain a Project lowers risks for Vectren and their customers.
Ownership Structure (Purchase/PPA)	20		Binary	Vectren has a preference for ownership	Owning an asset and having control with regards to dispatch, maintenance, and operation of the facility lowers risks for Vectren and their customers.
Operational Control	20		Binary	Dispatch parameters used for the scheduling of energy into MISO and approval for maintenance outage periods	Operational control provides the ability to make prudent operational decisions when it makes economic sense for Vectren's customers.
Fuel Risk	20		Binary	Sites having firm and reliable fuel supply	Having fuel restrictions or a lack of reliable fuel could effect the operation of the Project and be a risk to the owner/off taker.
Delivery Date	20		Curve	For each year prior or after MISO PY 2023/2024, 25% of the points will be deducted	To the extent resources are brought on-line before potential Vectren unit retirements, Vectren customers could pay for duplicative capacity and/or energy; while there may be reasons to proceed with such projects, in recognition of their incremental costs, it is appropriate for such projects to not score as well in terms of timing.
Site Control	20		Binary	Proper rights to the site in which the facility will be located	Without proper permitting and permissions from the owner, there is a risk that the project may not move forward or could experience significant delays.

LMR/DR - PROPOSAL EVALUATION

- Proposals will be grouped with similar proposals and scored relative to other bids within the same grouping
  - The preferred resource mix will be identified by the IRP analysis
  - All-Source RFP evaluation will rank order available resources within each grouping

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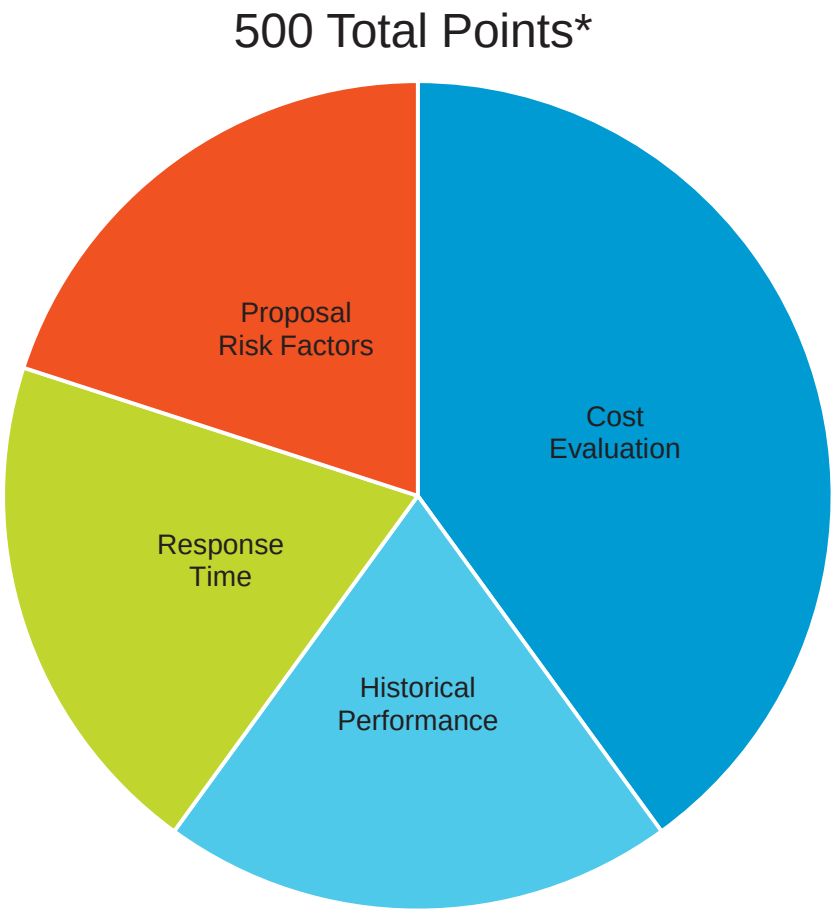

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LMR/DR - EVALUATION SUMMARY

Scoring Criteria Name	Points		Scoring Method	Definition	Importance
Cost Evaluation	200		Curve	$/MW calculation to determine scoring based on rank order	The cost of the Project will have the most impact on Vectren's ability to provide low cost energy to its customers.
Historical Performance	100		Range	Scored based on the length of time the Project has provided demand response services without receiving a non-performance penalty	Historical data can show a track record of performance which can be a benefit to the Project's scoring.
Response Time	100		Range	Scored based on the time it takes the LMR/DR to reach load reduction target after receiving notification	Fast response time allows the LMR/DR to take advantage of specific control signals
Proposal Risk Factors	100		Binary	Scored based on the amount of material risk identified	Risk factors may cause concern for the reliability or cost of delivery. Risks associated with a specific Proposal will be considered during the evaluation process.

FEEDBACK AND DISCUSSION

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ENVIRONMENTAL COMPLIANCE UPDATE

ANGILA RETHERFORD

VICE-PRESIDENT ENVIRONMENTAL AFFAIRS AND CORPORATE RESPONSIBILITY

REVIEW ENVIRONMENTAL CONTROLS

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Unit	In Service Date	Installed Generating Capacity	SO_2 Control	NO_x Control	Soot Control	Hg Control	H_2SO_4 Control
Culley 2*	1966	90 MW	Scrubber (1995)	Low NO_x (1995)	ESP (1972)	Organosulfide Injection (2015)	
Culley 3	1973	270 MW	Scrubber (1995)	SCR (2003)	Fabric Filter (2006)	Organosulfide Injection (2015)	Sorbent Injection System (2016)
Brown 1	1979	250 MW	Scrubber (1979)	SCR (2005)	Fabric Filter (2004)	Organosulfide Injection (2015)	Sorbent Injection System (2015)
Brown 2	1986	250 MW	Scrubber (1986)	SCR (2004)	ESP (1986)	Organosulfide Injection (2015)	Sorbent Injection System (2016)
Warrick 4	1970	150 MW	Scrubber (2009)	SCR (2004)	ESP (1970)	Organosulfide Injection	Lime Injection

COAL COMBUSTION RESIDUALS RULE

- Final Rule issued April 2015
- Allows continued beneficial reuse of coal combustion residuals
  - Majority of Vectren's fly ash beneficially reused in cement application
  - Scrubber by-product at Culley and Warrick beneficially reused in synthetic gypsum application
- Rule established operating criteria and assessments as well as closure and post-closure care standards
- Groundwater monitoring requirements are underway
- "Phase 1, Part 1" rule was published on July 30, 2018
  - Requires closure of surface impoundments effective October 2020 for impoundments that fail uppermost aquifer location restriction or groundwater protection standard

COAL COMBUSTION RESIDUALS RULE

- D.C. Circuit Court decision on August 2018 declared all unlined impoundments an unacceptable risk under CERCLA
  - IDEM interprets D.C. Circuit Court as requiring enhanced focus on mitigating and/or eliminating horizontal infiltration of groundwater through impounded ash
- Evaluating closure-by-removal for Culley East Ash Pond and planning for a closure-by-removal with beneficial reuse for Brown Ash Pond
- Timing for commencement of closure activities based upon results of groundwater monitoring, alternative disposal capacity, and construction of new impoundment or other water storage and treatment system
- Same closure strategy assumed under all scenarios

EFFLUENT LIMITATION GUIDELINES

- On September 30, 2015, the EPA finalized its new Effluent Limitation Guidelines (ELGs) for power plant wastewaters, including ash handling and scrubber wastewaters
- The ELGs prohibit discharge of water used to handle fly ash and bottom ash, thereby mandating dry handling of fly ash and bottom ash
  - Vectren has previously converted its generating units to dry fly ash handling, however we currently anticipate additional modifications to the existing dry fly ash handling system at Brown to comply with the ELGs
- ELG Postponement Rule published September 2017
  - Delayed initial compliance deadline for Bottom Ash Transport Water by two years, to November 2020
  - Compliance deadline for Fly Ash Transport Water remains November 2018, however the rule provides that utilities can seek an alternative compliance schedule through the water discharge permit renewal process

EFFLUENT LIMITATION GUIDELINES CONT.

- The ELG rules provide an alternative compliance date of December 2023 for generating units that agree to a more stringent set of discharge limits, which could include retirement
- While we continue to work on engineering solutions to reduce potential compliance costs, the following technologies are in process or being evaluated for ELG compliance for Vectren plants:
  - Culley
    - Includes dry bottom ash conversion, scrubber wastewater treatment and ash landfill construction
    - Converting to dry bottom ash Fall 2020
    - FGD Wastewater conversion to Zero Liquid Discharge (ZLD) estimated late 2022
  - Brown
    - Includes dry fly ash system upgrades, dry bottom ash conversion, an ash landfill and a new lined process pond or tank system
    - The existing Brown scrubbers are closed loop, and are not required to meet ELG wastewater discharge limits for scrubber wastewater discharges; Any new scrubber retrofits would be required to comply with applicable scrubber wastewater discharges

CLEAN WATER ACT 316B

- In May 2014 EPA finalized its Clean Water Act §316(b) rule which requires that power plants use the best technology available to prevent and/or mitigate adverse environmental impacts to fish and aquatic species
- The final rule did not mandate cooling water tower retrofits
- The Brown plant currently uses closed loop technology
- Vectren submitted the multi-year studies for F.B. Culley as required under the rule and the NPDES permit
- For purposes of IRP modeling, Vectren has assumed intake screen modifications for the Culley plant and assumed a 2024 deadline for compliance

AFFORDABLE CLEAN ENERGY (ACE) RULE

- Rule finalized in June 2019. Repealed & replaced the Clean Power Plan (CPP)
- Rule establishes standards for states to use when developing plans to limit CO_2 at coal-fired power plants
- Establishes heat rate improvement, or efficiency improvement, targets as the best system of emissions reductions for CO_2
  - These heat rate targets to be set on a unit by unit basis; Averaging not allowed
  - Vectren currently reviewing technology alternatives available for each unit
- State Implementation Plans are due September 2022 with compliance planned to begin within 24 months of submission
- For purposes of base case assumptions, Vectren assumed that ACE will be upheld upon judicial review

FEEDBACK AND DISCUSSION

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DRAFT BASE CASE MARKET INPUTS AND SCENARIOS WORKSHOP

GARY VICINUS

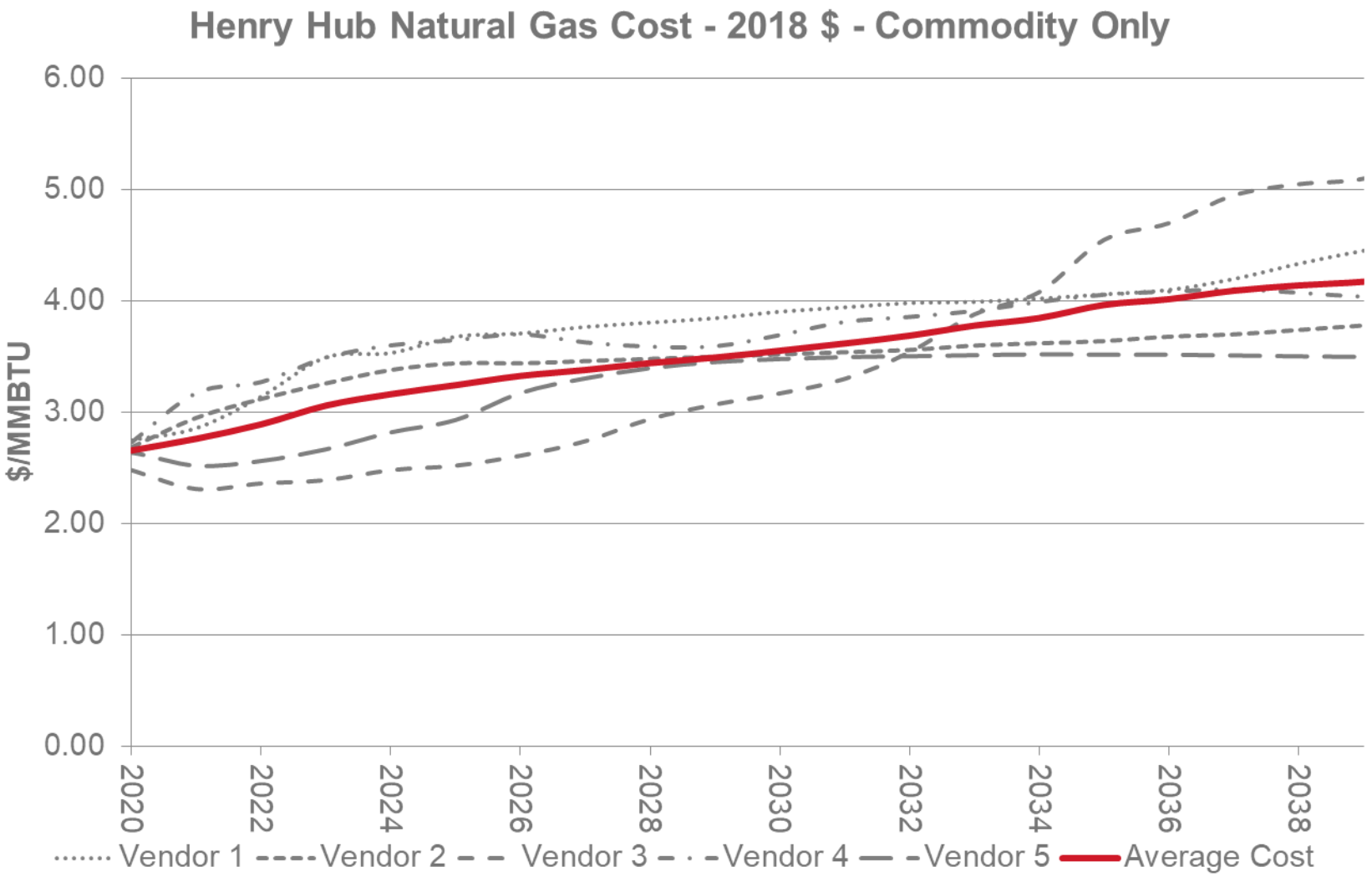
MANAGING DIRECTOR FOR UTILITIES, PACE GLOBAL

BASE CASE INPUTS

Vectren surveyed and incorporated a wide array of sources in developing its base case assumptions, which reflect a current consensus view of key drivers in power and fuel markets

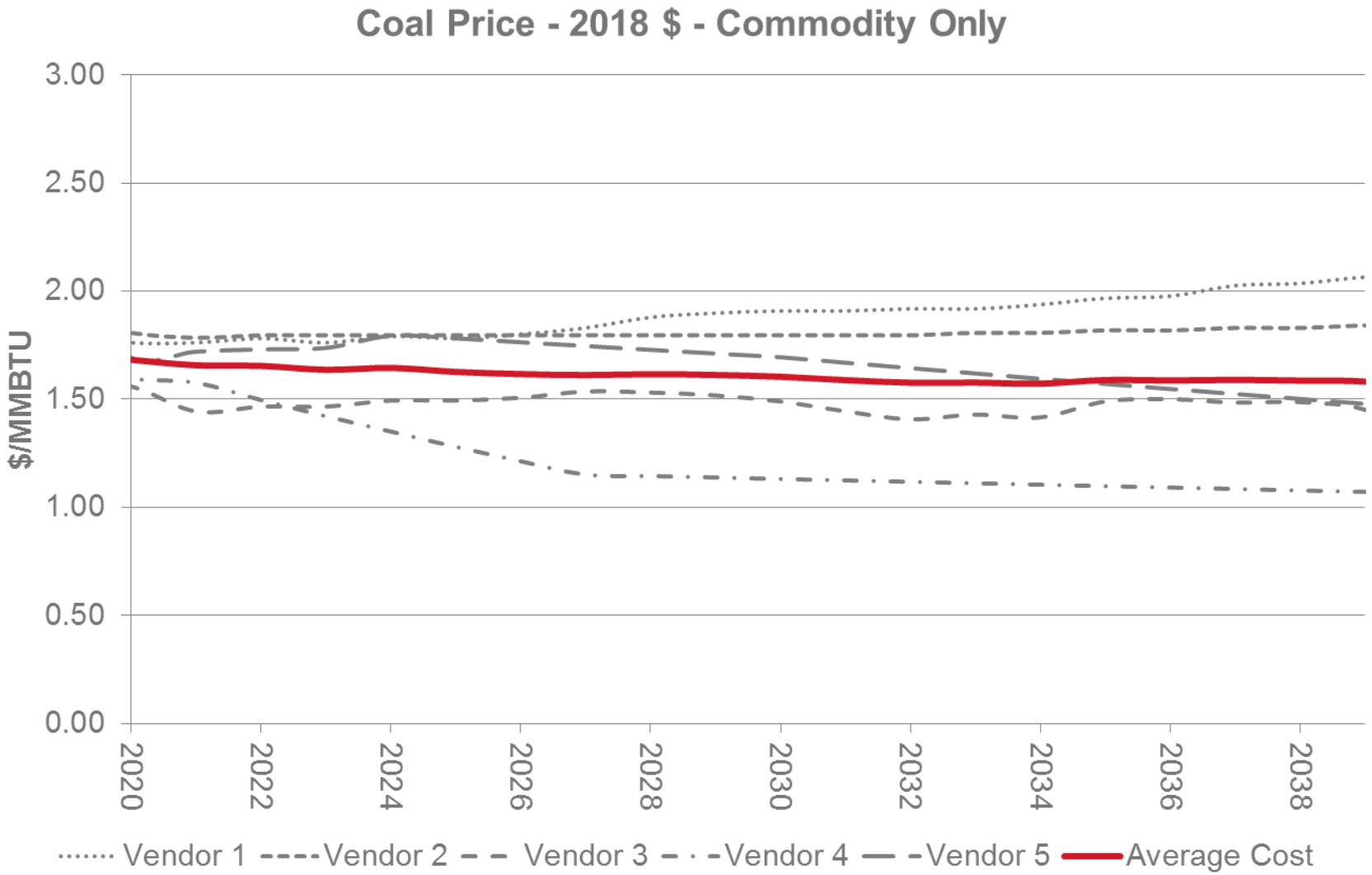
- Base case assumptions include forecasts of the following key drivers:
  - Vectren and MISO energy and demand (load)
  - Henry Hub and delivered natural gas prices
  - Illinois Basin minemouth and delivered coal prices
  - Capital costs for various generation technologies
- On- and off-peak power prices are an output of scenario assumptions
- Vectren uses a consensus base case view, by averaging forecasts from several sources where applicable

BASE CASE CONSENSUS FUEL FORECASTS



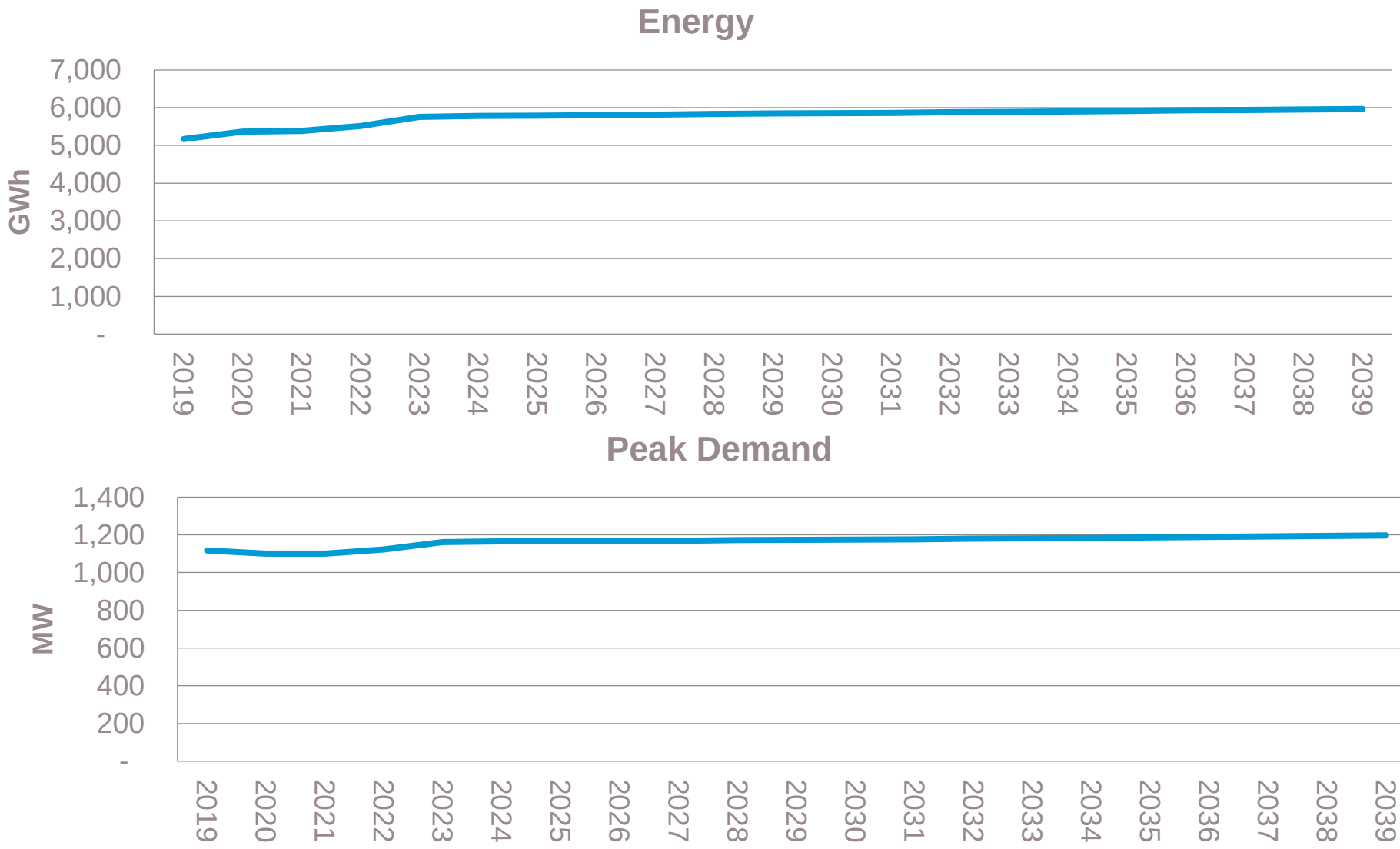
Note: Vendors used were PIRA, Wood Mackenzie, Pace, ABB, & EVA

BASE CASE CONSENSUS FUEL FORECASTS

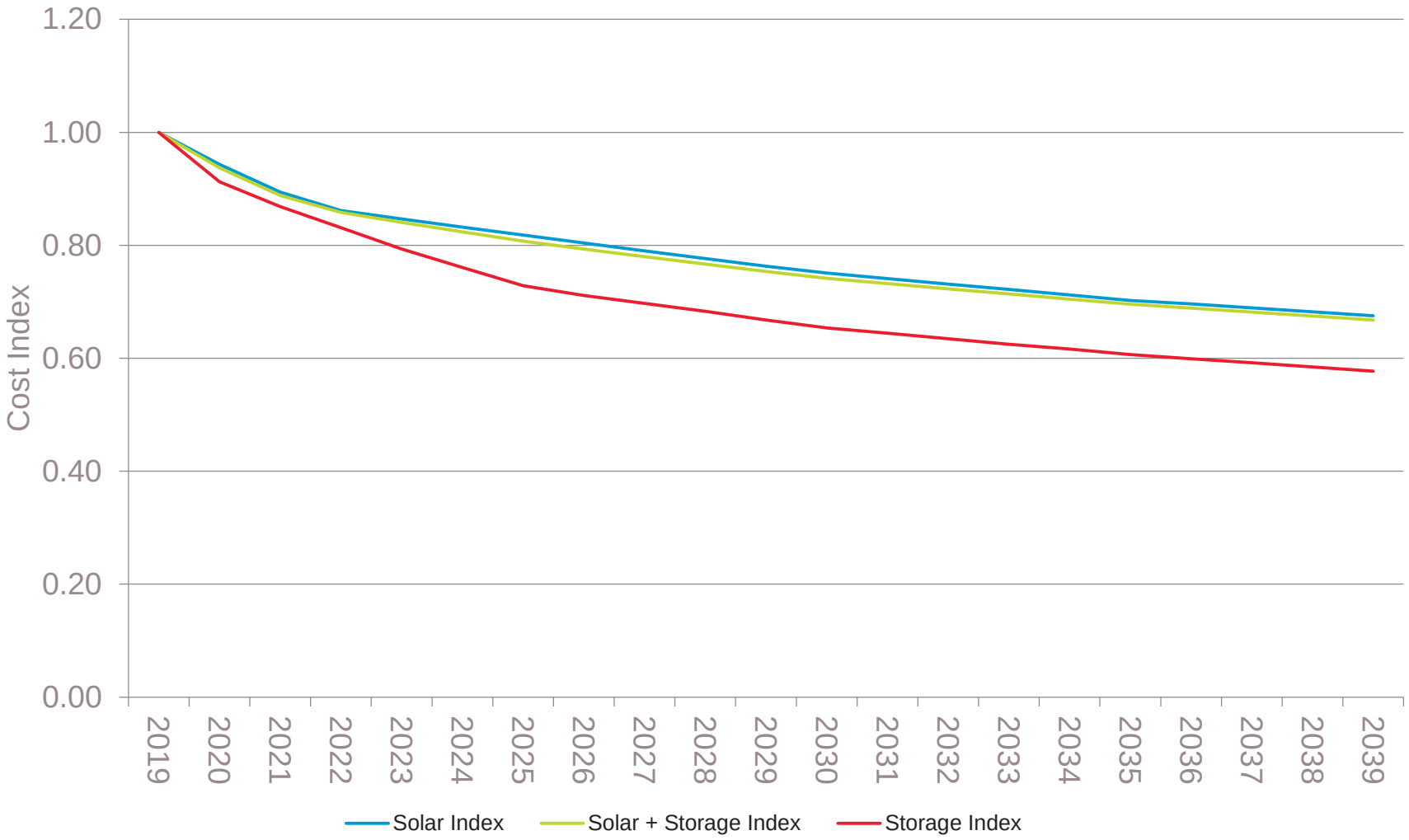


Note: Vendors used were PIRA, Wood Mackenzie, Pace, ABB, & EVA

BASE CASE LOAD (PRELIMINARY – FORECAST IS CURRENTLY BEING UPDATED)



BASE CASE RENEWABLES AND STORAGE LONG TERM COST CURVES



SCENARIO DEVELOPMENT

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Vectren worked with Pace to develop a base case and four alternative, internally consistent scenarios (potential futures), to test which portfolios are optimal over a wide range of future market and regulatory conditions.

- Subjecting portfolios to a range of deterministic scenarios can test portfolio performance in key risk areas important to management and stakeholders alike
- Portfolios would still be run through a stochastic risk analysis to measure performance across a large number of future scenarios
- Scenarios include a low regulatory case, a high technology case, an 80% CO_2 reduction by 2050 case, and high regulatory case. Each is described in the following pages with narratives of the major drivers that characterize the scenario
- The framework was developed to ensure internal consistency with the scenario by first developing directional changes for each variable (load, gas prices, coal prices, carbon prices, and capital costs) relative to the base case forecast in the near, mid and long term

RANGE OF BOUNDARY CONDITIONS

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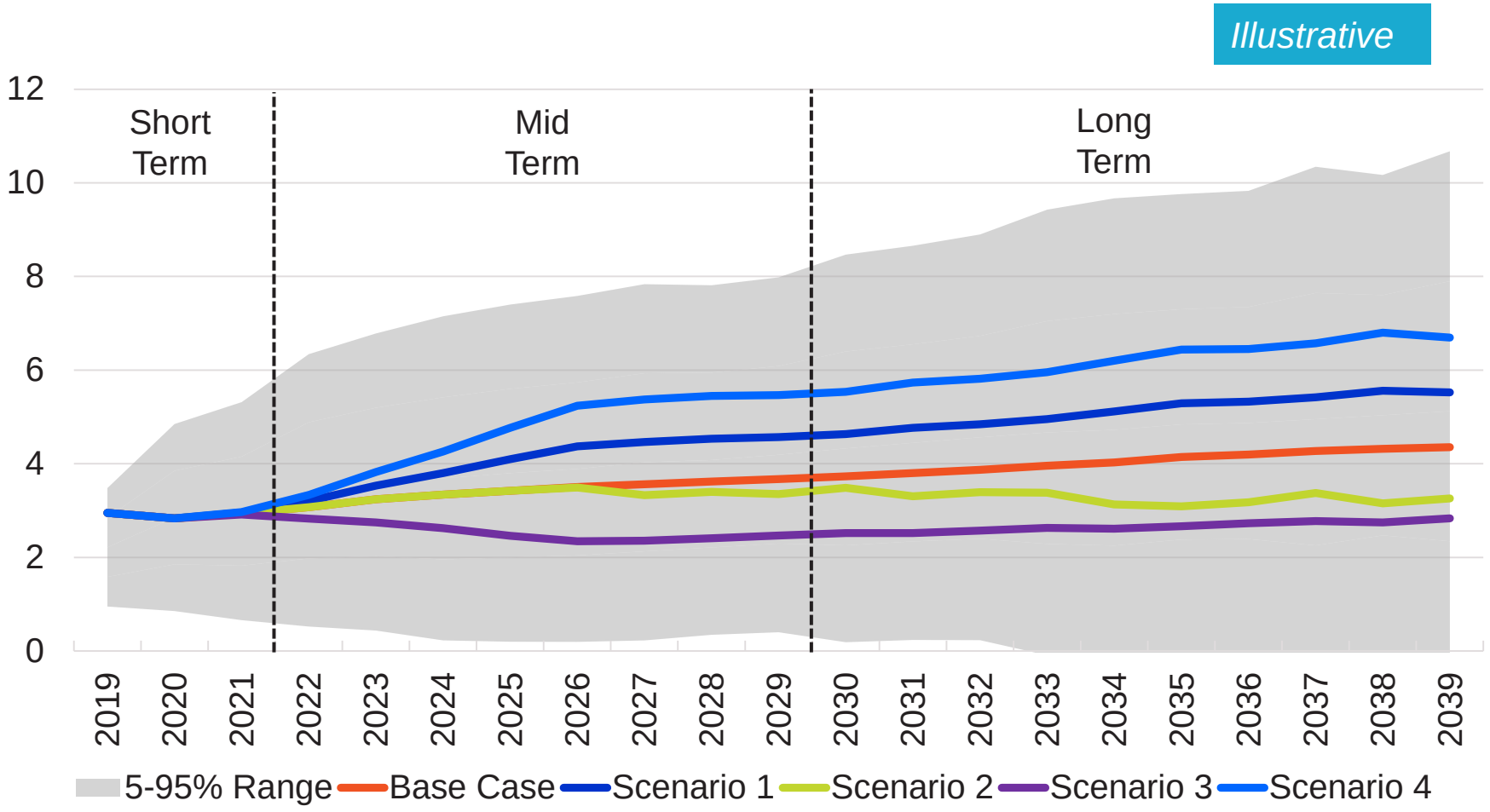

DRAFT SCENARIOS

Vectren will utilize scenario based modeling to evaluate various regulatory constructs. The base case is considered the most likely future. The alternative scenarios are shown as higher than, lower than, or the same as the base case.

Increasing Regulation

	CO2	Gas Reg.	Water Reg.	Economy	Load	Gas Price	Coal Price	Renewables and Storage Cost	EE Cost
Base Case	ACE		ELG	Base	Base	Base	Base	Base	Base
Low Reg.	ACE Delay**		ELG Light*	Higher	Higher	Higher	Base	Base	Base
High Tech	Low CO2 Tax		ELG	Higher	Higher	Lower	Lower	Lower	Lower
80% CO2 Reduction by 2050	Cap and Trade	Methane	ELG	Lower	Lower	Base	Lower	Higher	Higher
High Reg.	High CO2 Tax	Fracking Ban	ELG	Lower	Lower	Higher	Lower	Higher	Higher

*No bottom ash conversion required based on size of the unit and delay requirement for 2 years
**ACE Delayed for 3 years

SCENARIO NARRATIVES

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Base Case

- The base case is the “most likely” case, built with commodity forecasts based on industry expert averages
- Load forecast is being developed by Itron and will be submitted to MISO this fall
- The ACE (Affordable Clean Energy) rule, which was finalized as the replacement of the Clean Power Plan, has been promulgated and is included in the base case
- All other scenarios reference the base case (individual uncertainties are at the same levels or are higher or lower than the base case)
- In the base case:
  - Coal prices remain relatively flat over the 20 year forecast horizon in constant dollars
  - Natural gas prices move upward in real dollars to 2039
  - Energy and Demand increase moderately through 2039
  - Capital costs generally decline slightly for fossil resources and decline more for wind and approximately 35% or more for solar and storage resources

SCENARIO NARRATIVES

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Low Regulatory

- In the low regulatory scenario, there is a delay of the ACE rule for three years due to legal challenges, but ultimately remains in place. Indiana implements a lenient interpretation of the rule. ELG is partially repealed with bottom ash conversations not required for some smaller units and is delayed for two years (this does not apply to FB Culley 3)
- Fewer regulations lead to a better economy and higher load
- Gas prices edge up slightly with increased demand
- Coal prices continue to remain at base levels as demand for coal continues to decline nationally due to investor pressure and demand for cleaner alternatives
- Technology costs continue to decline at base case levels
- EE costs net to the base level. There is downward pressure with fewer codes and standards being implemented, leaving some low hanging fruit, but upward pressure with increasing load, netting to no change from the base level

SCENARIO NARRATIVES

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High Technology

- This scenario assumes that technology costs decline faster than in the base case, allowing renewables and battery storage to be more competitive
- A low CO_2 tax is implemented. The economic outlook is better than in the base case as lower technology costs and lower energy prices offset the impact of the CO_2 tax
- Increased demand for natural gas is more than met with advances in key technologies that unlock more shale gas, increasing supply and lowering gas prices relative to the base case
- Less demand for coal results in lower prices relative to the base case
- Utility-sponsored energy efficiency costs rise early in the forecast but ultimately fall back to below base levels due to technology advances, allowing for new and innovative ways to partner with customers to save energy
- As technology costs fall, customers begin to move towards electrification, driving more electric vehicles and higher adoption of rooftop solar/energy storage and trend towards highly efficient electric heat pumps in new homes

SCENARIO NARRATIVES

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80% CO_2 Reduction by 2050 (aka 2 degrees scenario)

- This scenario assumes a carbon regulation mandating 80% reduction of CO_2 from 2005 levels by 2050 is implemented. A glide path would be set using a cap and trade system similar to the CPP, gradually ratcheting down CO_2 emissions and driving CO_2 allowance costs up
- Load decreases as the costs for energy and backup power increase and as the energy mix transitions
- In this scenario, regulations on methane emissions initially drive up gas prices, but are partially offset by increased supply. The price of natural gas is slightly higher in the mid term, then decreases back to base levels by the end of the forecast
- There is less demand for coal, driving prices lower than the base case; however, some large and efficient coal plants remain as large fleets are able to comply with the regulation on a fleet wide basis
- Renewables and battery storage technology are widely implemented to help meet the mandated CO_2 reductions, increasing prices relative to the base case
- Market based solutions are implemented to lower CO_2. Innovation occurs, but is offset by more codes and standards with no incentives, energy efficiency costs rise as a result

SCENARIO NARRATIVES

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High Regulatory

- The social cost of carbon is implemented via a high CO_2 tax early in the scenario
- A fracking ban is imposed, driving up the cost of natural gas as supply dramatically shrinks
- Tighter regulations are implemented in all aspects coal production and use. As these costs are imposed, prices for coal decrease
- High regulation costs are a drag on the economy and load decreases relative to the base case
- As renewables and battery storage are widely implemented to avoid paying high CO_2 prices, prices are driven up
- Utility-sponsored energy efficiency costs are higher as more codes and standards are implemented, leaving less low hanging fruit

FEEDBACK AND DISCUSSION

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STAKEHOLDER PROCESS RECAP AND Q&A

STAKEHOLDER PROCESS RECAP

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August 15, 2019	October 10, 2019	December 12, 2019	March 19, 2020
• 2019/2020 IRP Process • Objectives and Measures • All-Source RFP • Environmental Update • Draft Base Case Market Inputs & Scenarios	• All-Source RFP Update • Draft Tech Assessment Forecasts • Sales and Demand Forecast • DSM MPS/ Modeling Inputs • Scenario Modeling Inputs • Portfolio Development	• Draft Portfolios • Draft Base Case Modeling Results • All-Source RFP Results and Final Modeling Inputs • Probabilistic Modeling Approach and Assumptions	• Final Base Case Modeling • Probabilistic Modeling Results • Risk Analysis Results • Preview the Preferred Portfolio

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Q&A

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APPENDIX

DEFINITIONS

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Term	Definition
ACE	Affordable Clean Energy (ACE) Rule, establishes emission guidelines for states to develop plans to address greenhouse gas emissions from existing coal-fired power plants
All-Source RFP	Request for proposals, regardless of source (renewable, thermal, storage, demand response)
Aurora	Electric modeling forecasting and analysis software. Allows for model consistency in capacity expansion, chronological dispatch, and stochastic functions
Base Case	The most expected future scenario that is designed to include a current consensus view of key drivers in power and fuel markets
Baseload	The minimum level of demand on an electrical grid over a span of time
Cap and Trade	Emissions trading program aimed at reducing pollution
Capacity	The maximum output of electricity that a generator can produce under ideal conditions (megawatts)
CCGT	A combined-cycle power plant uses both a gas and a steam turbine together to produce up to 50 percent more electricity from the same fuel than a traditional simple-cycle plant. The waste heat from the gas turbine is routed to the nearby steam turbine, which generates extra power
CERCLA	The Comprehensive Environmental Response, Compensation, and Liability Act (Commonly known as Superfund)
CO2	Carbon dioxide
CPCN	A Certificate of Public Convenience and Necessity is required to be granted by the Commission for significant generation projects
CPP	Clean Power Plan
Deterministic Modeling	Simulated dispatch of a portfolio in a determined future. Often computer generated portfolios are created by optimizing on cost to the customer

DEFINITIONS CONT.

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Term	Definition
DSM	Demand side management includes both Energy Efficiency and Demand Response programs to reduce customer demand for electricity
EE	Energy Efficiency
ELG	Effluent Limitation Guidelines are U.S. national standards for wastewater discharges to surface waters and publicly owned treatment works
Energy	Amount of electricity (megawatt-hours) produced over a specific time period
EPA	Environmental Protection Agency
GW	Giga watt (1,000 million watt), unit of electric power
Henry Hub	Point of interconnection of interstate and intrastate natural gas pipelines as well as other related infrastructure in Erath, Louisiana
Installed Capacity (ICAP)	Refers to generating capacity after ambient weather adjustments and before forced outages adjustments
Intermittent	An intermittent energy source is any source of energy that is not continuously available for conversion into electricity and outside direct control
IRP	Integrated Resource Plan is a comprehensive plan to meet customer load expectations
IURC	The Indiana Utility Regulatory Commission is the public utilities commission of the State of Indiana. The commission regulates electric, natural gas, telecommunications, steam, water and sewer utilities
LCOE	Levelized Cost of Energy, A measure that looks at cost and energy production over the life of an asset so different resources can be compared. Does not account for capacity value.

DEFINITIONS CONT.

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Term	Definition
LMR	Load Modifying Resource
Local Clearing Requirement (LCR)	Capacity needs to be fulfilled by local resource zone
LRZ6	MISO Local Resource Zone 6
Mine Mouth	At the mine location
MISO	Midcontinent Independent System Operator, an Independent System Operator (ISO) and Regional Transmission Organization(RTO) providing open-access transmission service and monitoring the high-voltage transmission system in the Midwest United States and Manitoba, Canada and a southern United States region which includes much of Arkansas, Mississippi, and Louisiana. MISO also operates one of the world's largest real-time energy markets
MPS	Market potential study - Determines the total market size (value/volume) for a DSM at a give period of time
MW	Mega watt (million watt), unit of electric power
Name Plate Capacity	The intended full-load sustained output of a generation facility
NDA	Non-Disclosure Agreement
NOI	Notice of Intent

DEFINITIONS CONT.

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Term	Definition
NPDES	National Pollutant Discharge Elimination System
OMS	Organization of MISO States, was established to represent the collective interests of state and local utility regulators in the Midcontinent Independent System Operator (MISO) region and facilitate informed and efficient participation in related issues.
Peaking	Power plants that generally run only when there is a high demand, known as peak demand, for electricity
Planning Reserve Margin Requirement	Total capacity obligation each load serving entity needs to meet
Portfolio	A group of resources to meet customer load
PPA	Purchase power agreement
Preferred Portfolio	The IRP rule requires that utilities select the portfolio that performs the best, with consideration for cost, risk, reliability, and sustainability
Probabilistic modeling	Simulate dispatch of portfolios for a number of randomly generated potential future states, capturing performance measures
RA (Resource Adequacy)	RA is a regulatory construct developed to ensure that there will be sufficient resources available to serve electric demand under all but the most extreme conditions
Resource	Supply side (generation) or demand side (Energy Efficiency, Demand Response, Load Shifting programs) to meet planning reserve margin requirements

DEFINITIONS CONT.

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Term	Definition
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
Strategist	Strategic planning software application typically used for IRP analyses
Technology Assessment	An analysis that provides overnight and all-in costs and technical specifications for generation and storage resources
Unforced Capacity (UCAP)	A unit's generating capacity adjusted down for forced outage rates (thermal resources) or expected output during peak load (intermittent resources)
VAR Support	Unit by which reactive power is expressed in an AC electric power system
ZLD	Zero Liquid Discharge