# Vectren Integrated Resource Plan (IRP) Stakeholder Meeting

*Gary Vicinus – Meeting Facilitator*
*Vice President and Managing Director, Pace Global*
*July 22, 2016*

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# Vectren Commitments for the 2016 IRP

- Will construct scenarios (possible future states) with coordinated data inputs with a well-reasoned narrative
- Will conduct a probabilistic risk analysis to explore the outer bounds of probability
- Future utility sponsored energy efficiency  will be modeled as a resource (not built into the load forecast)
- Will evaluate if retirement dates make sense for any of Vectren's existing coal generating units within the 20 year time frame under each scenario
- Will actively monitor Combined Heat and Power (CHP) developments and will include CHP as a resource option
- Will consider conversion of coal units to gas
- Renewable options will be fully considered in this analysis
- Update the IRP document format to be more readable

# First Meeting Recap (April 7th)

- Vectren IRP Process Overview
- Discussion of Uncertainties
- Long-term Energy and Demand Forecast
- Customer-Owned Distributed Generation
- 2016 IRP Technology Assessment Supplemental Studies Generation Retrofit Alternatives
- Energy Efficiency Modeling Discussion

# Agenda

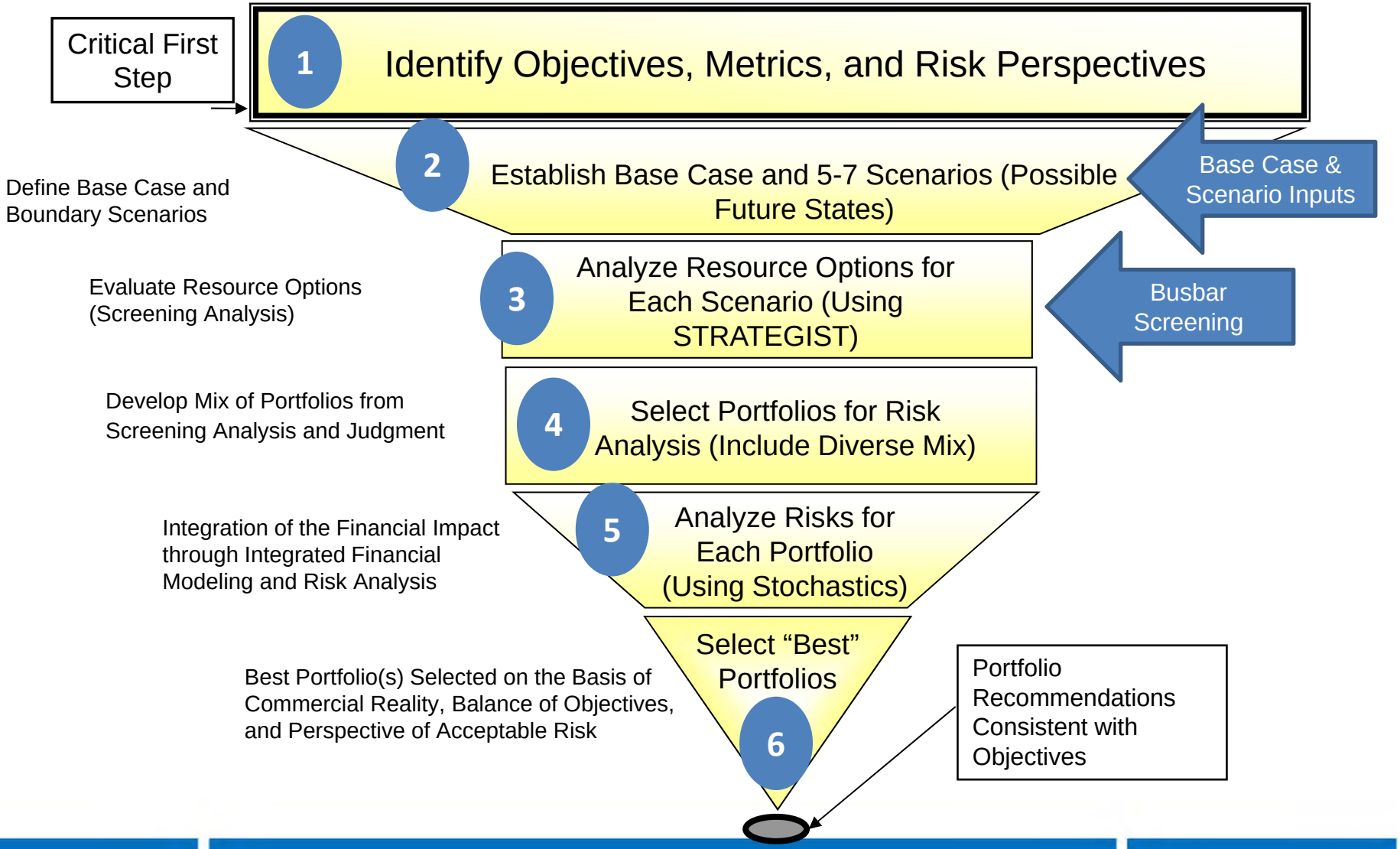
| | | |
|---|---|---|
| **1:00 p.m.** | Sign-in/ refreshments | |
| **1:30 p.m.** | Welcome | Carl Chapman, Vectren President and CEO |
| **1:40 p.m.** | Environmental Compliance (CCR, ELG, CPP) | Angila Retherford, Vectren Vice President of Environmental Affairs & Corporate Sustainability |
| **1:55 p.m.** | Base Case/Modeling Inputs | Gary Vicinus, Pace Global – Managing Director of Consulting Practice |
| **2:05 p.m.** | Busbar Analysis and Optimization Modeling | Matt Lind, Burns & McDonnell – Associate Project Manager |
| **2:40 p.m.** | Scenario Development/ Modeling Inputs (including risk assessment) | Gary Vicinus, Pace Global – Managing Director of Consulting Practice |
| **3:20 p.m.** | Break | |
| **3:30 p.m.** | Stakeholder Discussion and Portfolio Development Workshop | Led by Gary Vicinus, Pace Global – Managing Director of Consulting Practice |
| **4:20 p.m.** | Stakeholder Questions and Feedback | |
| **4:30 p.m.** | Adjourn | |

CCR = Coal Combustion Residuals
ELG = Effluent Limitations Guidelines
CPP = Clean Power Plan

# Meeting Guidelines

1. Please hold most questions until the end of the presentation. (Clarifying questions about the slides are fine throughout.) You may write questions on these topics or others using the cards at your table. We will collect them as we go and use to facilitate the discussion.
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.
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. Additional questions and suggestions may be sent to IRP@vectren.com for a period of two weeks after this meeting.
7. We will address most verbal questions here. Please allow up to two weeks for responses to written questions submitted to IRP@vectren.com or follow-up questions from this meeting.

# Vectren Is Following a Structured Approach



# Environmental Compliance (CCR, ELG, CPP)

*Angila Retherford, Vectren Vice President of Environmental Affairs & Corporate Sustainability*

CCR = Coal Combustion Residuals
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# Review - Environmental Controls

| Unit | In Service Date | Installed Generating Capacity | $SO_2$ Control | $NO_x$ Control | Soot Control |
|---|---|---|---|---|---|
| Culley 2 | 1966 | 90 MW | Scrubber (1995) | Low $NO_x$ (1995) | ESP (1972) |
| Culley 3 | 1973 | 270 MW | Scrubber (1995) | SCR (2003) | Fabric Filter (2006) |
| Brown 1 | 1979 | 250 MW | Scrubber (1979) | SCR (2005) | Fabric Filter (2004) |
| Brown 2 | 1986 | 250 MW | Scrubber (1986) | SCR (2004) | ESP (1986) |
| Warrick 4 | 1970 | 150 MW | Scrubber (2009) | SCR (2004) | ESP (1970) |

$SO_2$ = Sulfur Dioxide
$NO_x$ = Nitrogen Oxide
MW = Megawatt
SCR = Selective Catalytic Reduction
ESP = Electrostatic Precipitator (used for particulate removal)

# Recent Control Additions

- Mercury and Air Toxic Standards (MATS)
  - Set plant-wide emission limits for mercury and other air toxics
  - Compliance deadline:  April 2015
  - Installation of sorbent injection systems for MATS compliance
- Sorbent injection systems installed to address incremental increases in $H_2SO_4$ from installation of selective catalytic reduction technology (SCRs) for $NO_x$ control

$H_2SO_4$ = Sulfuric Acid
$NO_x$ = Nitrogen Oxide

# 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.
- Culley and Brown dams to meet new more stringent structural integrity requirements by October 2016
- Three years of groundwater monitoring commenced
- Reviewing close-in-place and clean-closure options
- Timing for commencement of closure activities based upon results of groundwater monitoring or unit retirement
- 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.
- The ELG compliance deadline is November of 2018, however, the rule provides that utilities can seek an alternative compliance schedule through the water discharge permit renewal process.

EPA = Environmental Protection Agency

# Effluent Limitation Guidelines (con't)

- 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 high-level, preliminary estimates for ELG compliance for Vectren plants will be used for IRP modeling purposes:
  - Culley $75M
    - Includes dry bottom ash conversion, scrubber wastewater treatment and ash landfill construction
  - Brown  $115M
    - Includes dry fly ash system upgrades, dry bottom ash conversion, an ash landfill and a new lined process pond
  - Warrick (Vectren's ½ of Unit 4) $40M
    - Includes dry bottom ash conversion, scrubber wastewater treatment and a new ash landfill

# Clean Water Act 316(b)

- 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 has commenced the multi-year studies required under the rule
- For purposes of IRP modeling, Vectren has assumed intake screen modifications in the range of $10-$12M for both the Culley and Warrick 4 plants combined and assumed a 2020 deadline for compliance

EPA = Environmental Protection Agency

# Future Air Regulations

- Phase II of the Cross State Air Pollution Rule (CSAPR) is effective January 2017
  - Compliance does not require additional controls
- Revised National Ambient Air Quality Standards (NAAQS) for ozone
  - Ozone standard lowered to 70 parts per billion
  - EPA proposing to update CSAPR $NO_x$ limits
    - Compliance does not require additional controls but does increase O&M
- One hour $SO_2$ Standard
  - Brown plant listed as a contributor of $SO_2$ in Posey County
  - Vectren agreed to voluntarily revise its operating permit for the Brown units to ensure that Posey County remains in attainment for the revised One Hour $SO_2$ air quality standard

$SO_2$ = Sulfur Dioxide
EPA = Environmental Protection Agency
$NO_x$ = Nitrogen Oxide
O&M = Operations and Maintenance

# Clean Power Plan

- Rule finalized August 2015. Rule establishes carbon dioxide ($CO_2$) emission standards for a state's electric generation fleet
  - States can set unit emission limits, or adopt a mass-based or rate-based allowance trading program
- Preliminary state implementation plans were to be due in September 2016, with an opportunity to request a 2 year extension, but implementation of the rule has been stayed by order of the US Supreme Court
  - Currently do not anticipate final orders on judicial review until 2017 at the earliest
- For purposes of base case assumptions, Vectren assumed that the CPP would be upheld by the US Supreme Court, but compliance would be delayed two years (2024) due to the implementation of the stay

# Base Case/ Modeling Inputs

*Gary Vicinus, Pace Global – Managing Director of Consulting Practice*

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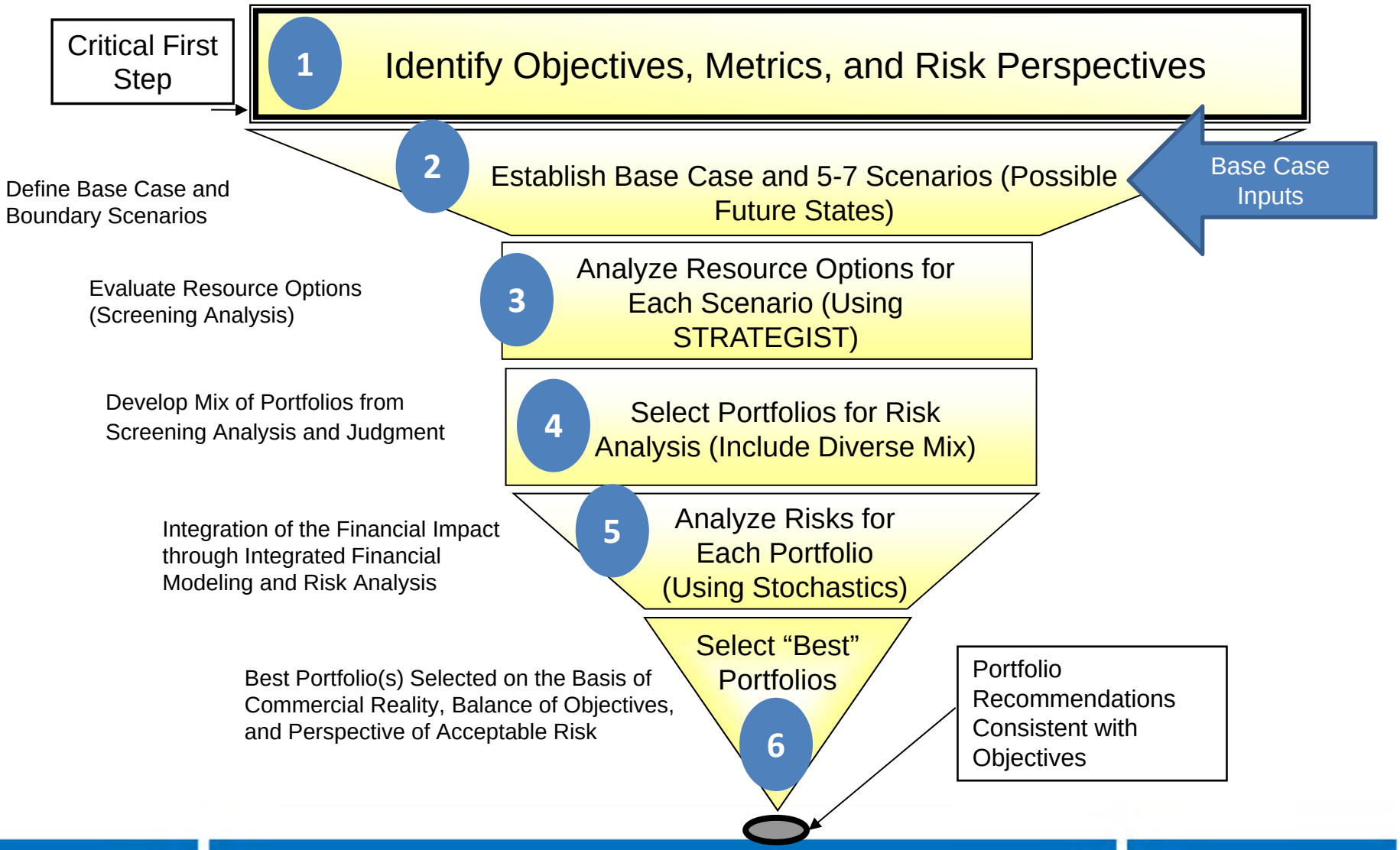


# Vectren's Base Case Assumptions

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.

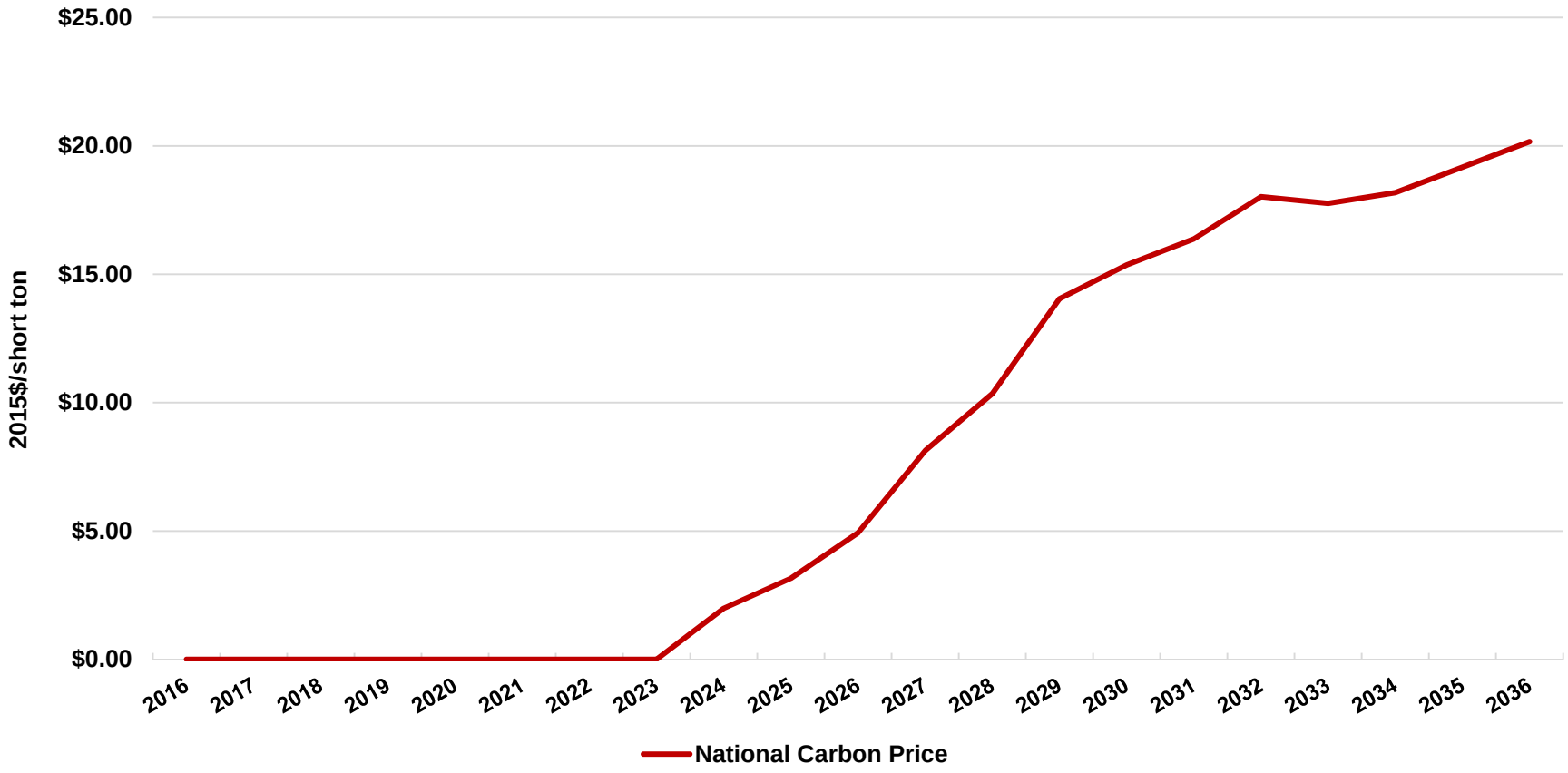
- Base case assumptions include forecasts of the following key drivers:
  - Vectren and MISO energy and demand (load)
  - Henry Hub and delivered natural gas prices
  - Illinois Basin minemouth and delivered coal prices
  - Carbon ($CO_2$) prices
  - Capital cost decline curves for various generation technologies
  - On- and off-peak power prices

- Vectren uses a "consensus" base case view by averaging forecasts from several sources, including recent forecasts from Pace Global, Ventyx, Wood Mac, PIRA, and EVA where available
  - This ensures that reliance on one forecast or forecaster does not occur

MISO = Midcontinent Independent System Operator

# Base Case Carbon Price Forecast

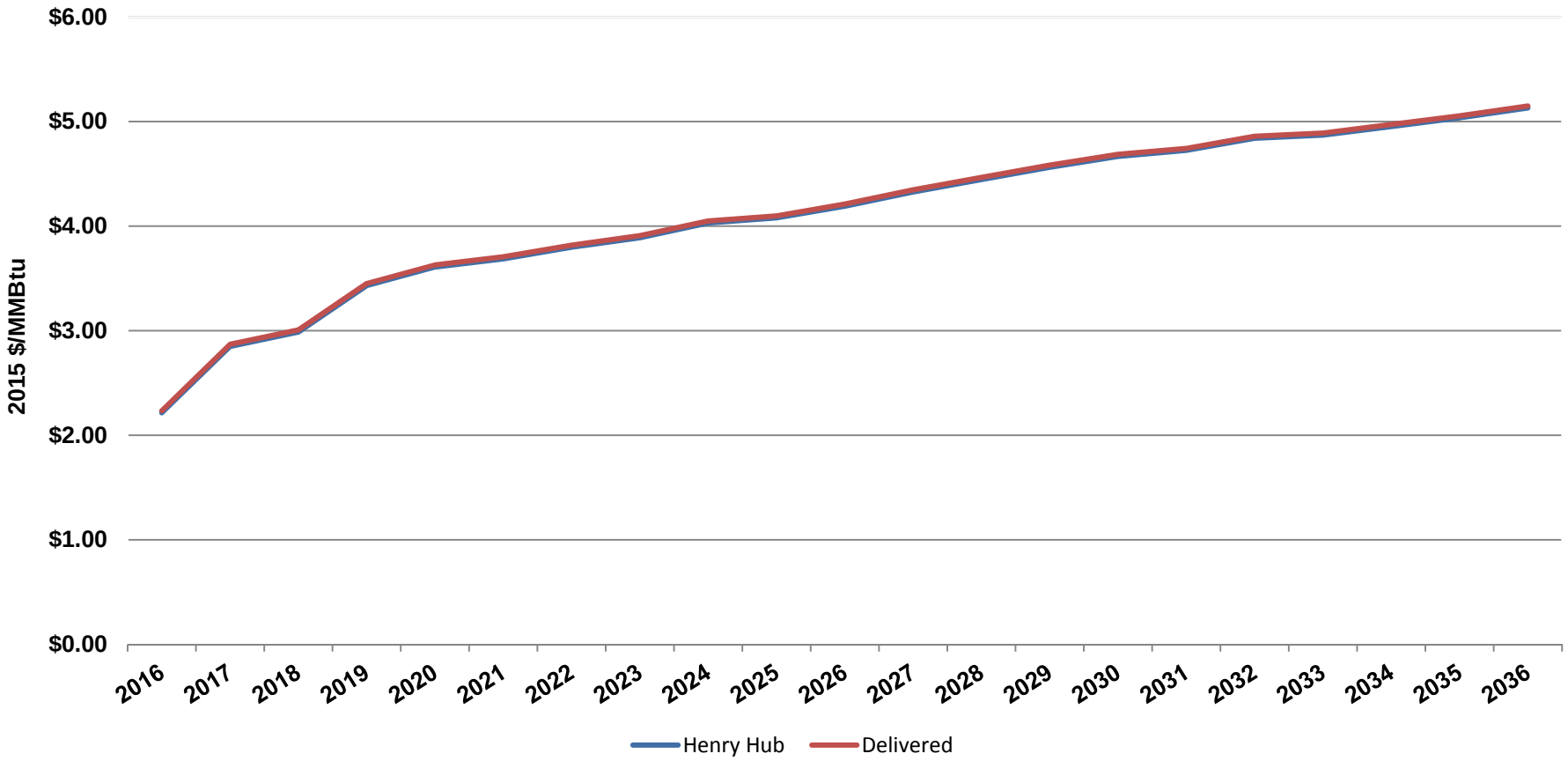
## $CO_2$ Price (2015$/short ton)




Note: Forecast assumes a two year delay in the implementation of the Clean Power Plan.

# Base Case Natural Gas Price Forecast

## Henry Hub and Delivered to Indiana (2015$/MMBtu)




Note: $0.02/MMBtu transportation adder over Henry Hub included in delivered gas price.

MMBtu = One Million British Thermal Units

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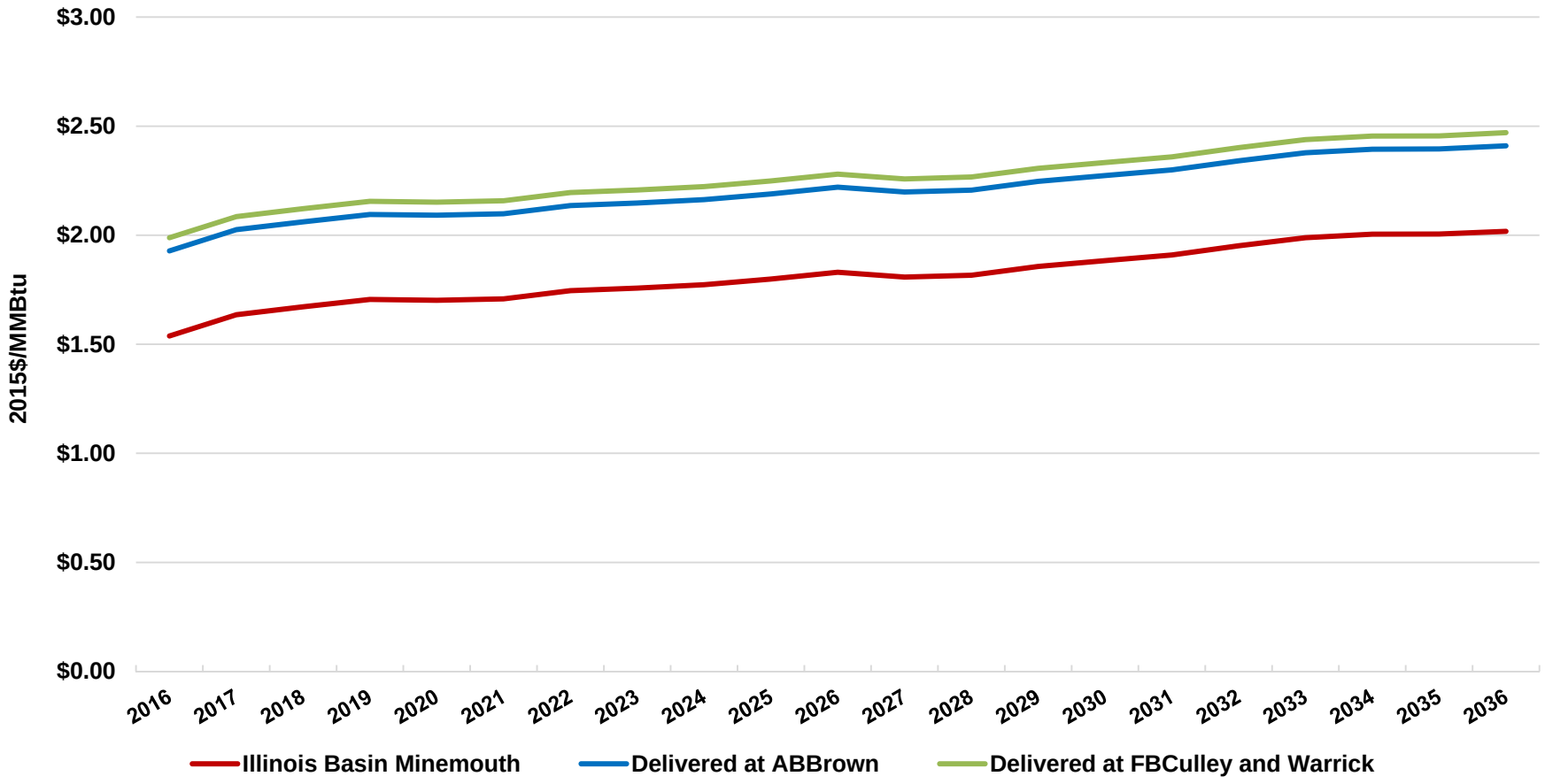
# Base Case Coal Price Forecast

## Illinois Basin Minemouth and Delivered (2015$/MMBtu)




MMBtu = One Million British Thermal Units

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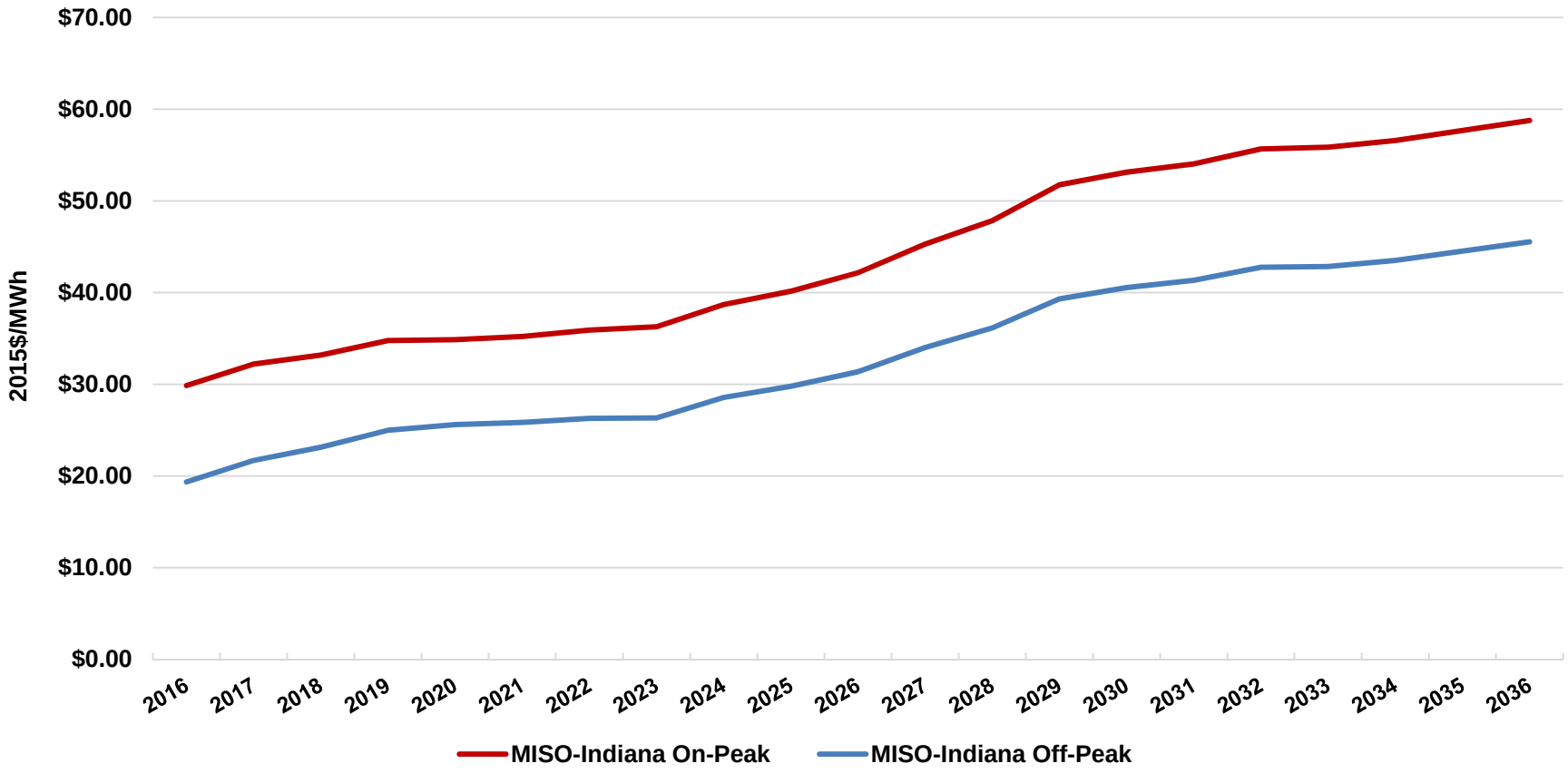
# Base Case Power Price Forecast

## MISO-Indiana On-Peak and Off-Peak (2015$/MWh)




Source: Pace Global
Note: Power price forecast is an output of Pace Global's AuroraXMP power dispatch model using the Base Case load, gas, coal, $CO_2$, and capital cost forecasts

MISO = Midcontinent Independent System Operator
MWh = Megawatt Hour
$CO_2$ = Carbon Dioxide

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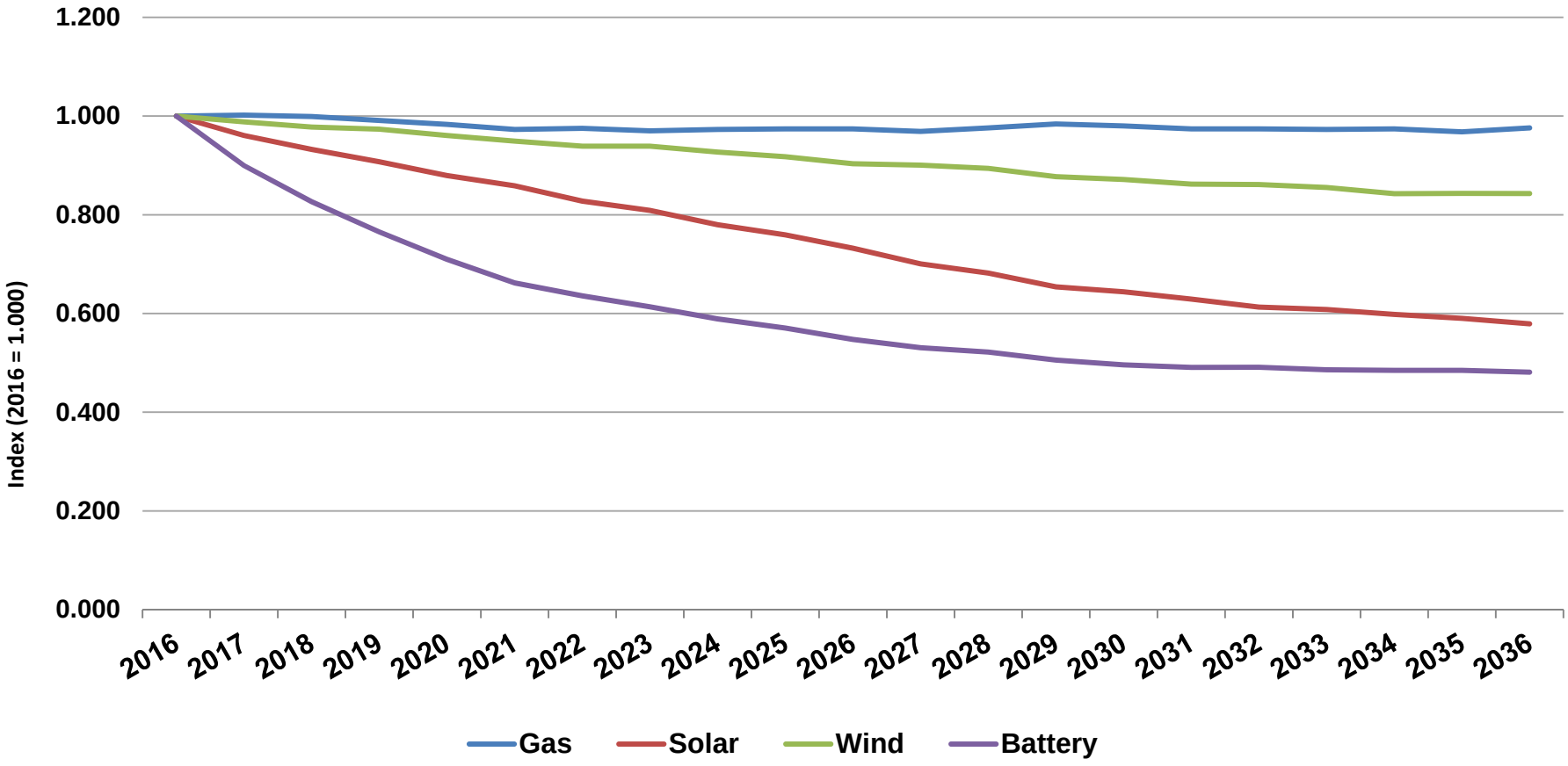
# Base Case Capital Costs

## All-In Capital Costs (Index: 2016=1.000)




Note: 2016 overnight capital costs provided by Burns & McDonnell. Capital cost decline curves to 2036 provided by Pace Global.

# Questions?

# Busbar Analysis and Optimization Modeling

*Matt Lind, Burns & McDonnell – Associate Project Manager*

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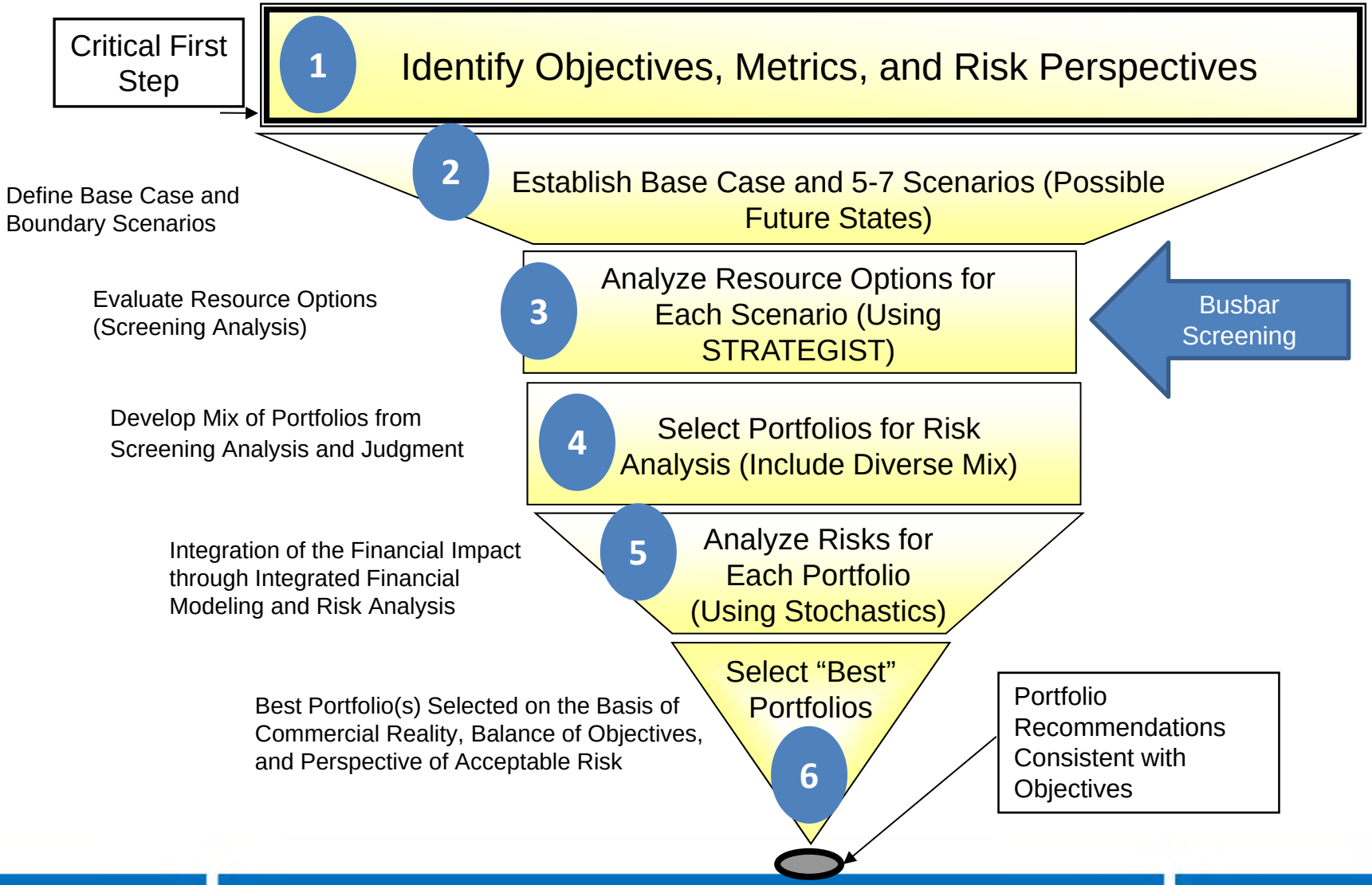
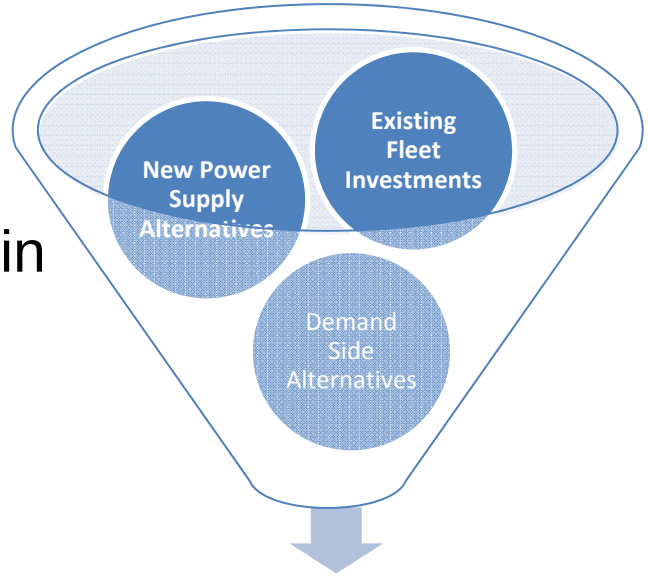


# Resource Modeling

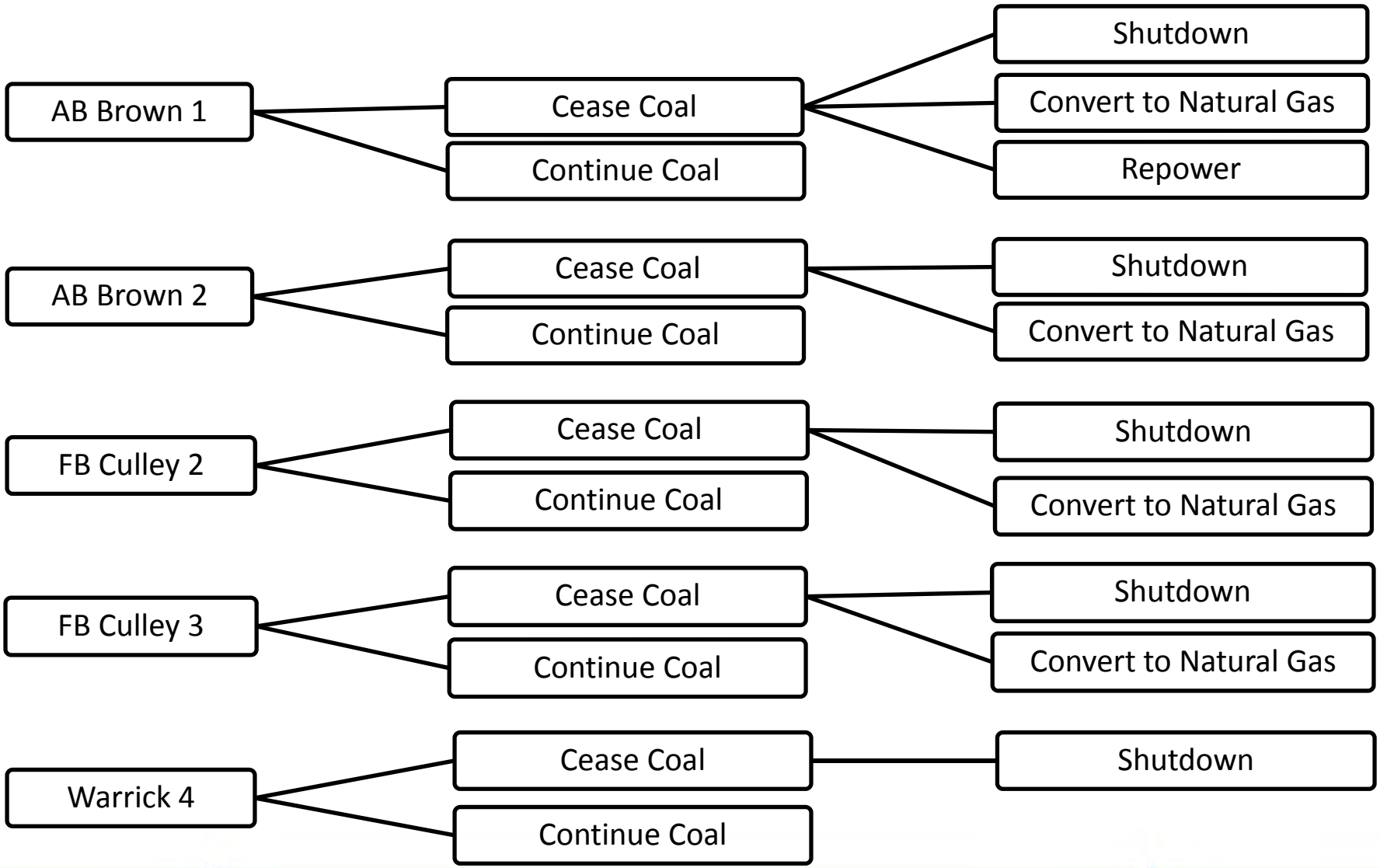
- **IRP Purpose**: To select a portfolio to best meet customers' needs for reliable, low cost, environmentally acceptable power over a wide range of future market and regulatory conditions

- Objectives:
  - Maintain sufficient capacity to satisfy planning reserve margin
  - Minimize power cost
- Inputs:
  - Existing fleet
  - New supply-side alternatives
  - Demand-side alternatives



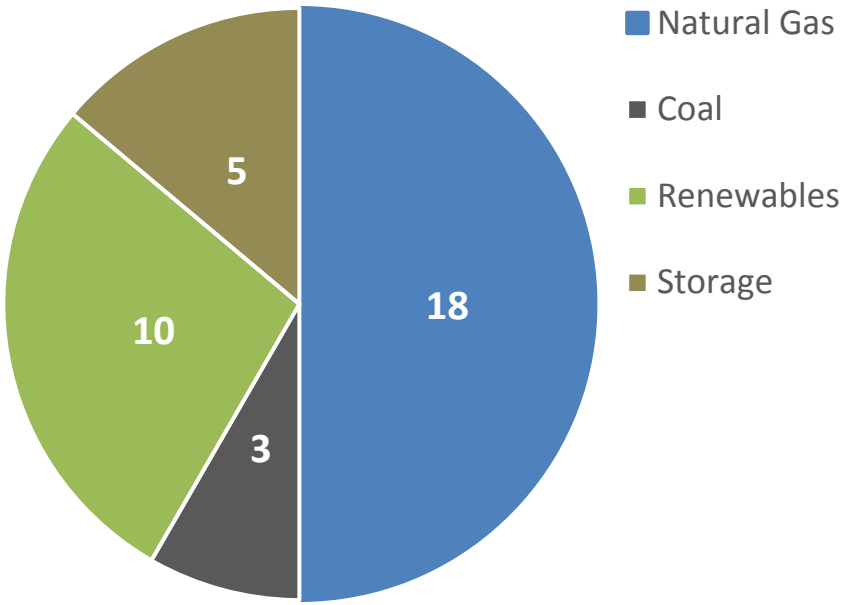

Portfolio Development

# Existing Unit Alternative Paths



# Busbar Screening

- 36 new power supply choices from Technology Assessment
- Must filter/screen the options to a smaller data set
- Will screen for each world view

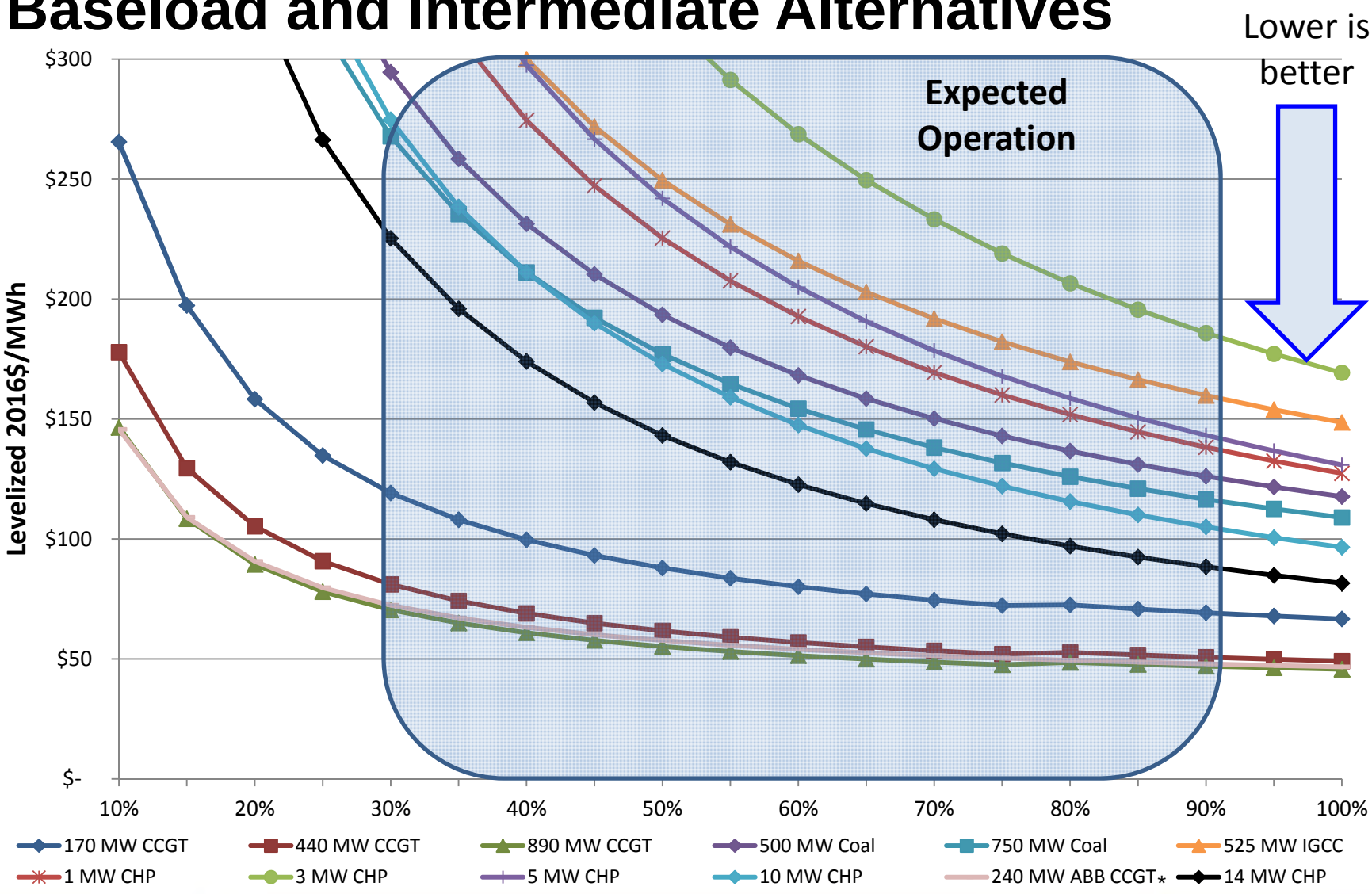


# Like comparing a mortgage when buying a home…

- Busbar or Levelized Cost of Electricity comparison common tool for screening cost to produce power
- Considers
  - Investment cost
  - Operation & maintenance cost (plant personnel, repairs, etc)
  - Fuel cost (natural gas, coal)
  - Emissions cost ($CO_2$)

$CO_2$ = Carbon Dioxide

# Baseload and Intermediate Alternatives




*240MW ABB CCGT option represents a one-time conversion of existing GT's to combined cycle operations

MW = Megawatt
ABB = AB Brown
CHP = Combined Heat and Power (gas turbine)
IGCC = Integrated Gasification Combined Cycle (coal)
CCGT = Combined Cycle Gas Turbine
MWh = Megawatt Hour

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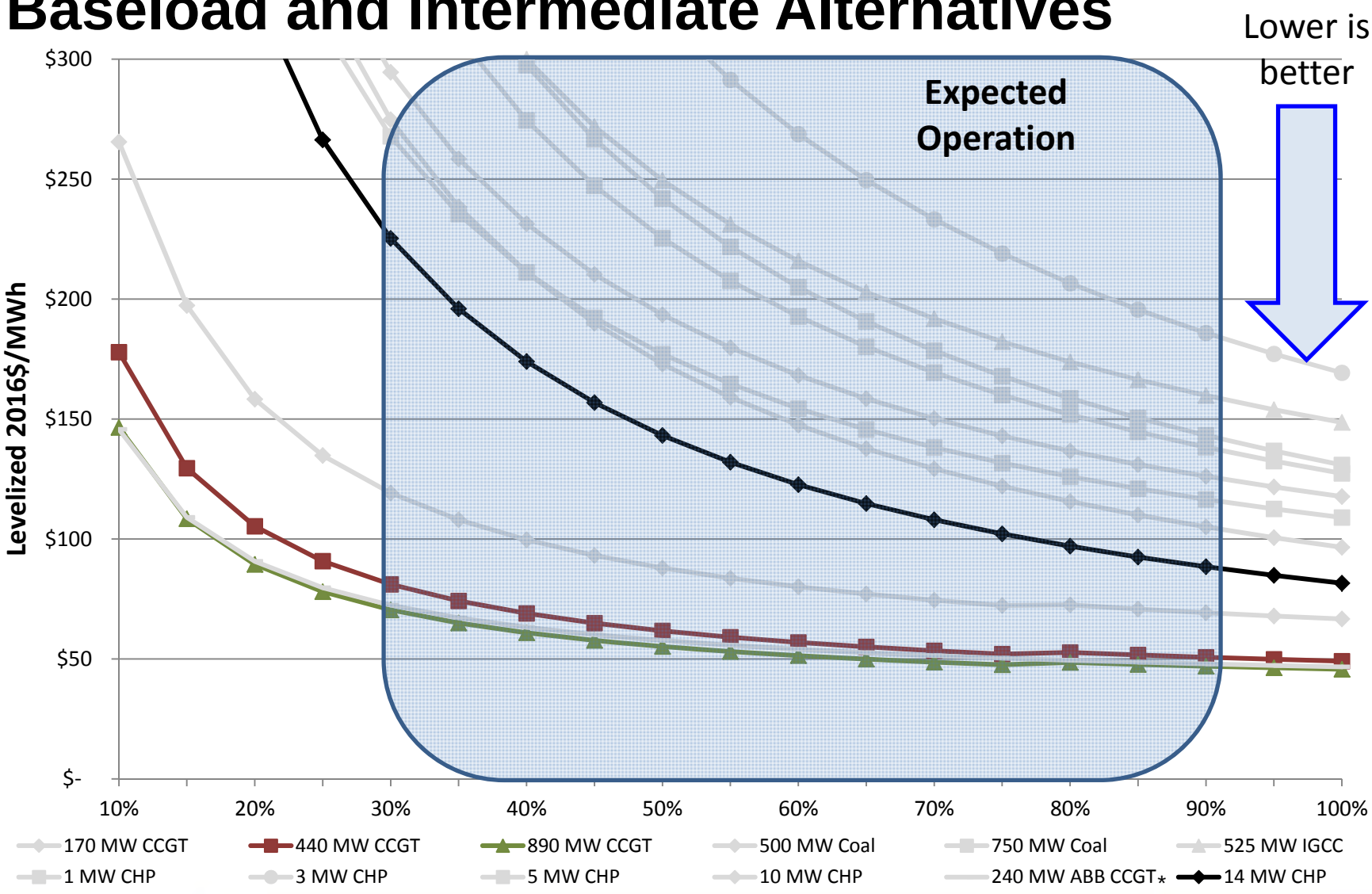
# Baseload and Intermediate Alternatives

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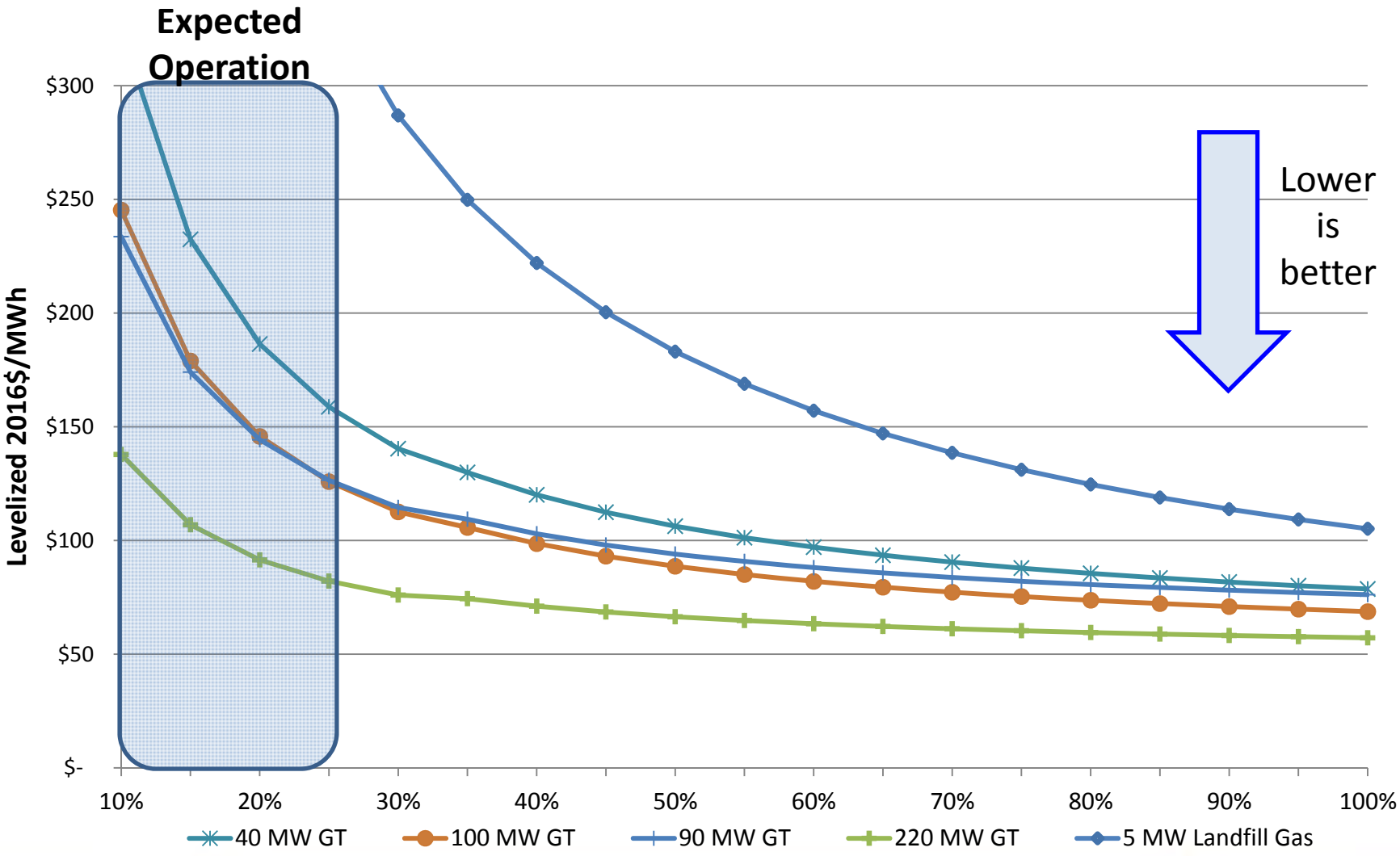
# Peaking Alternatives




MW = Megawatt
MWh = Megawatt Hour
GT = Gas Turbine

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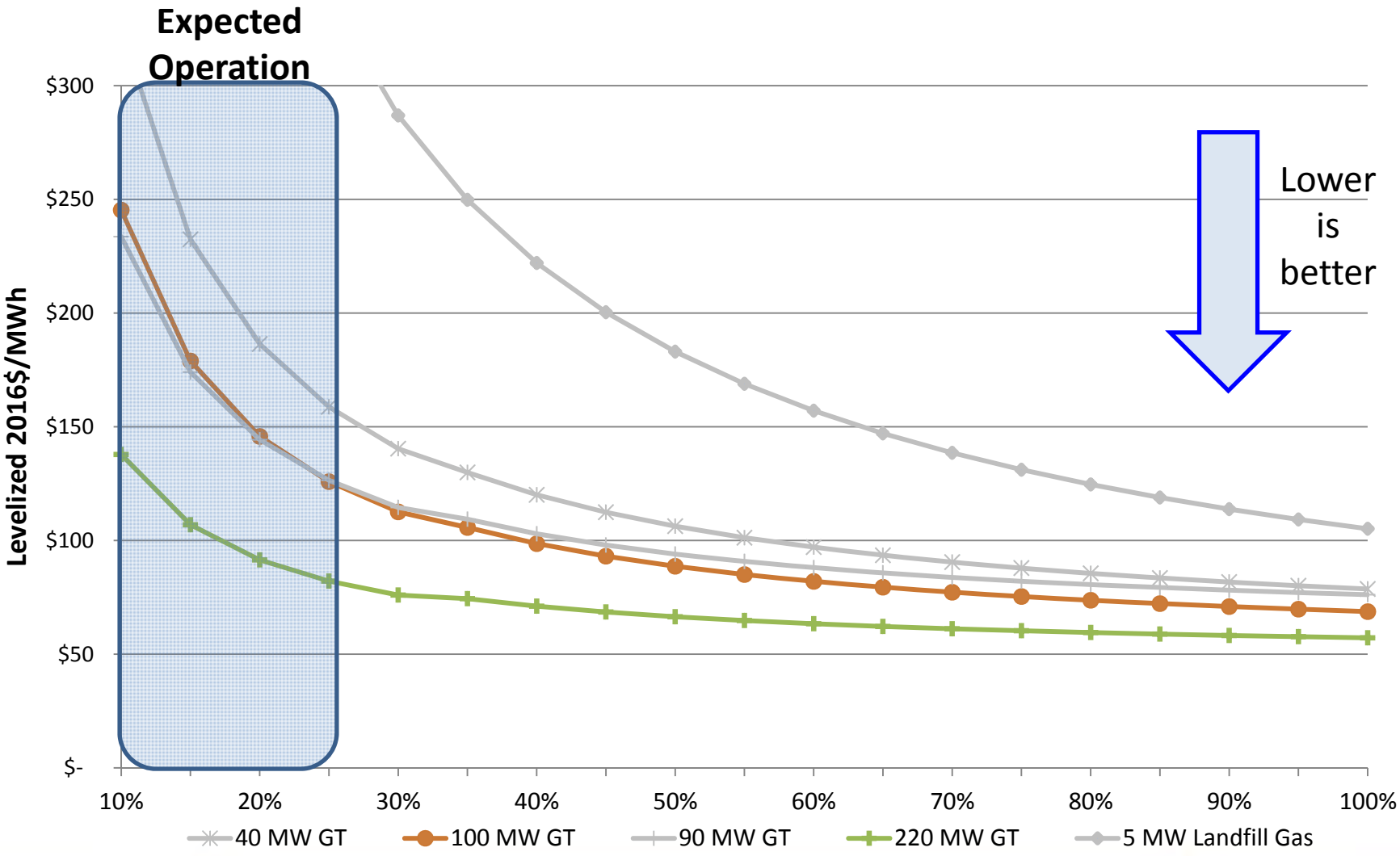
# Peaking Alternatives




MW = Megawatt
MWh = Megawatt Hour
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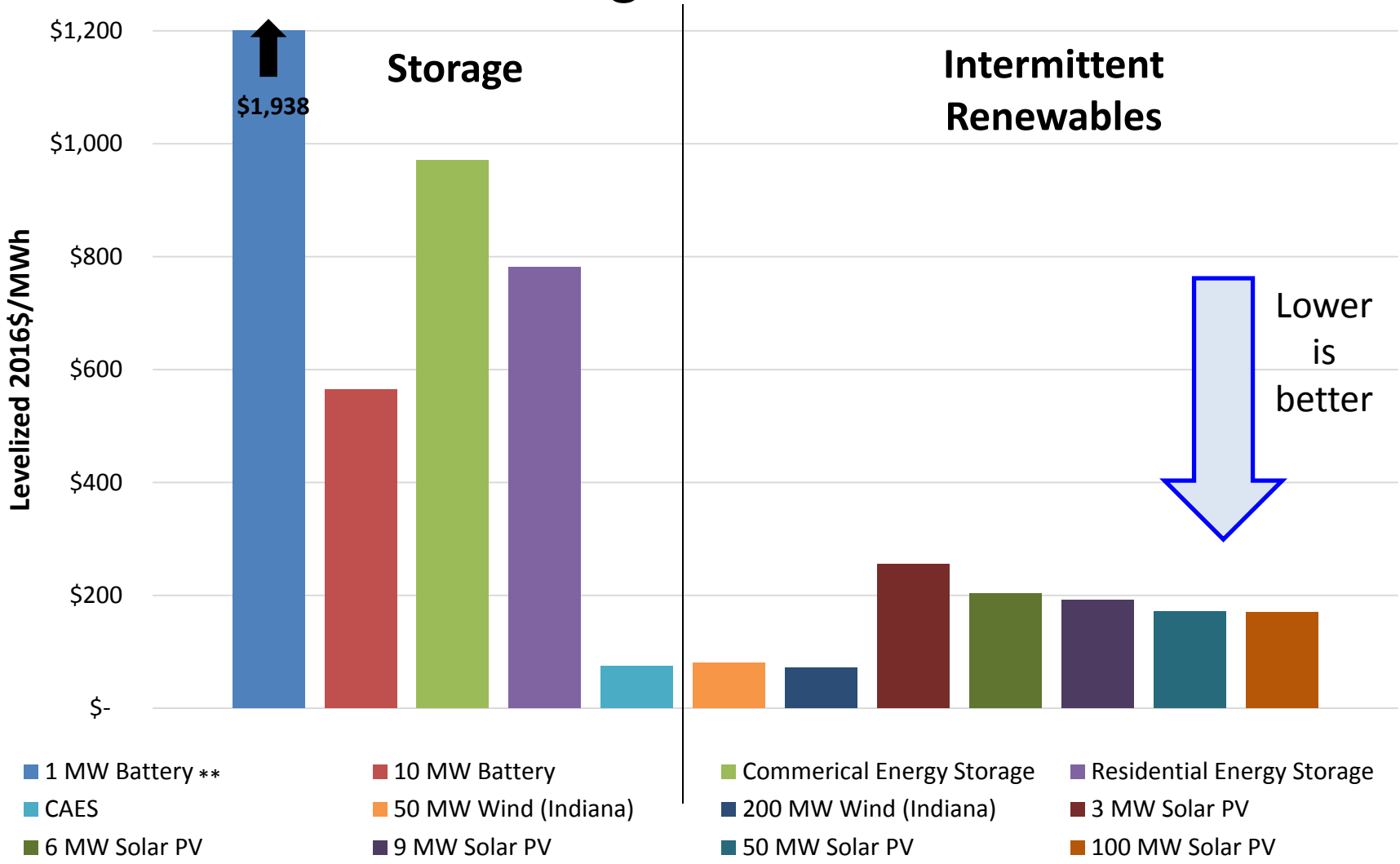
# Renewable and Storage Alternatives*




*Alternatives are shown on an indicative capacity factor based on technology potential and location

** 1 MW Battery / 1 MWh Discharge

MW = Megawatt
MWh = Megawatt Hour

CAES = Compressed Air Storage
PV = Photovoltaic

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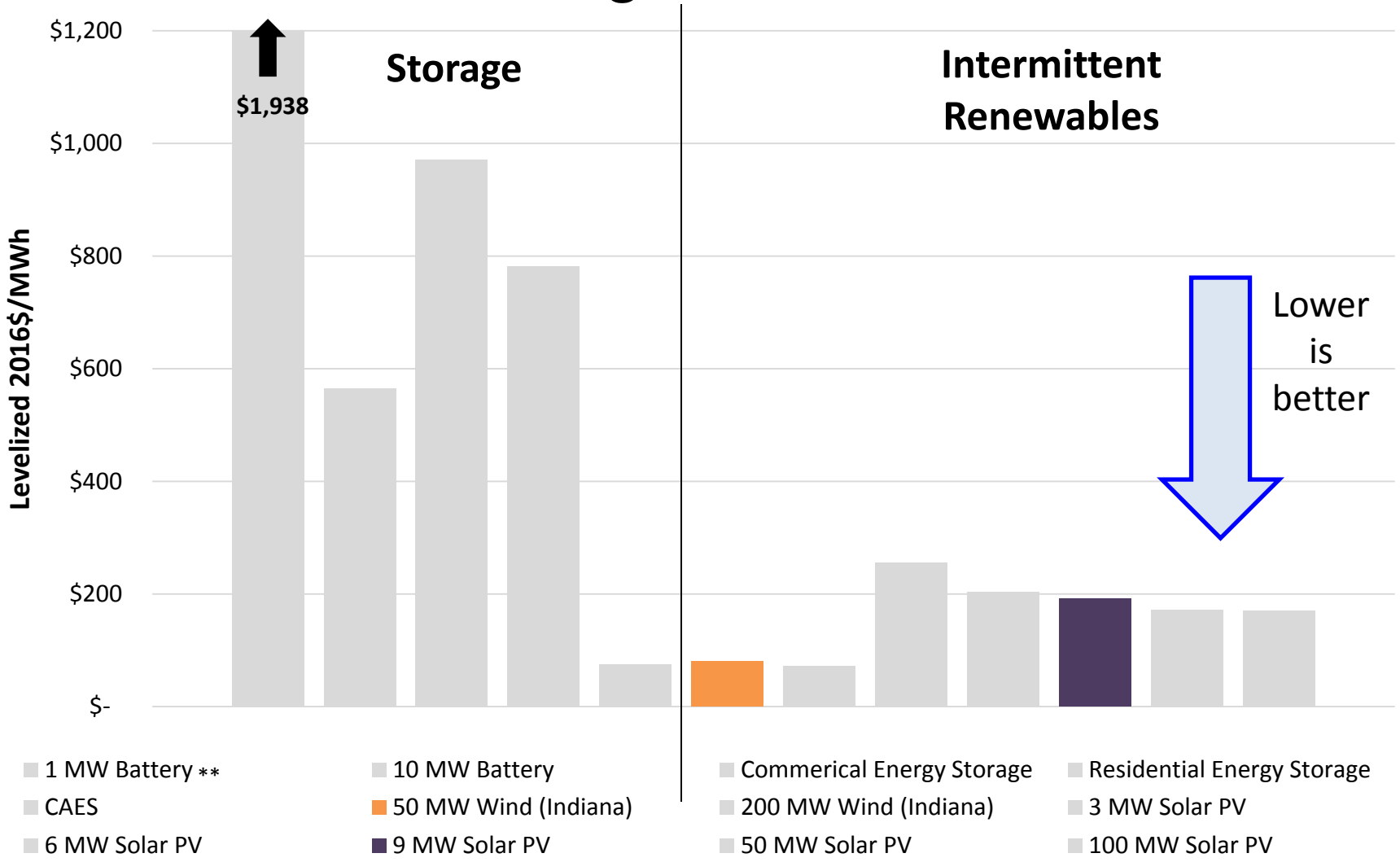
# Renewable and Storage Alternatives*

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** 1 MW Battery / 1 MWh Discharge

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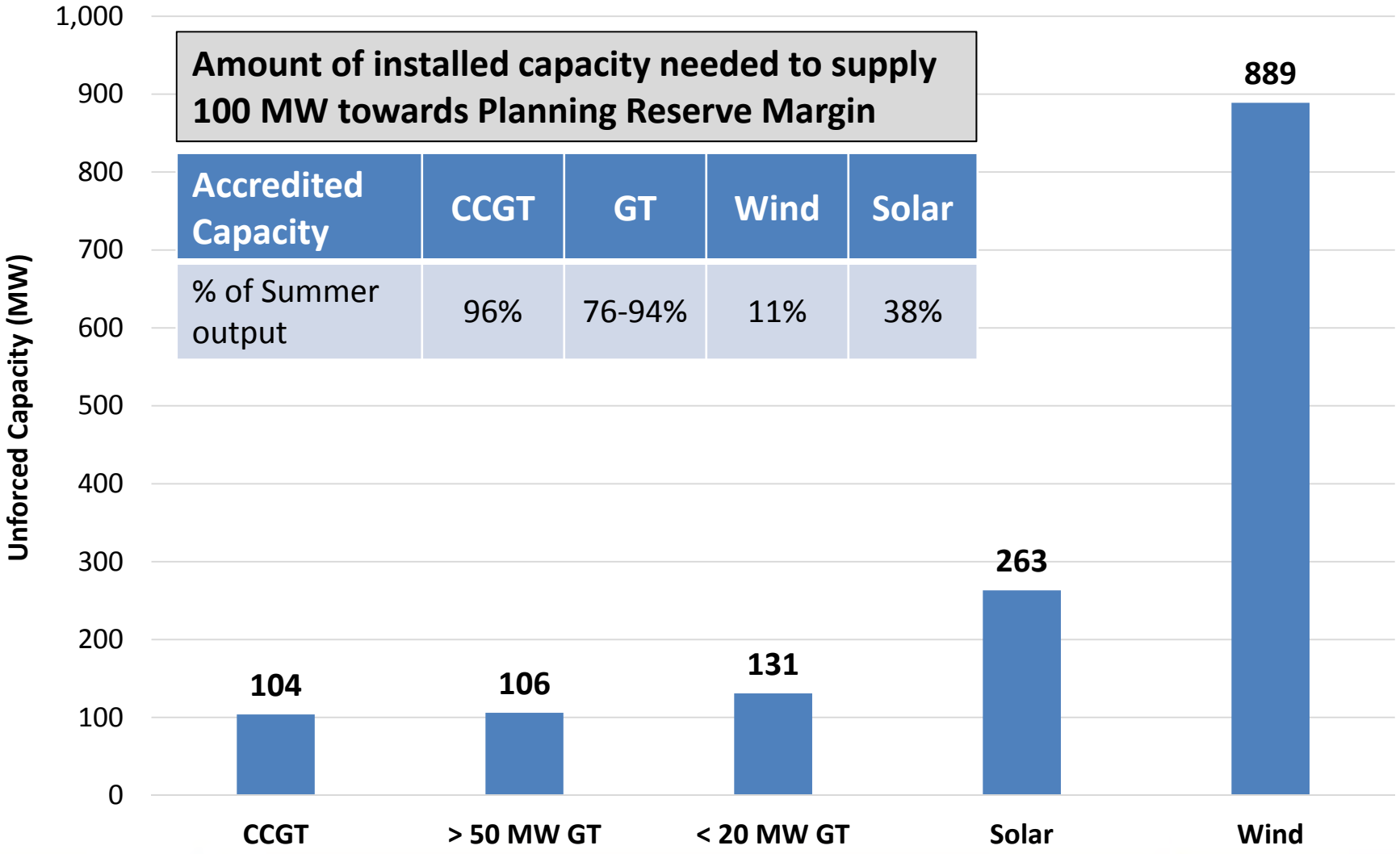
# Capacity – Another Portfolio Building Block

**Amount of installed capacity needed to supply 100 MW towards Planning Reserve Margin**

| Accredited Capacity | CCGT | GT | Wind | Solar |
|---|---|---|---|---|
| % of Summer output | 96% | 76-94% | 11% | 38% |




GT = Gas Turbine
CCGT = Combined Cycle Gas Turbine
MW = Megawatt

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# Filtered/Modeled Alternatives

## Existing Fleet

- Continue on Coal
- Convert to Natural Gas
- Repower CCGT
- Idle / Shutdown

## New Supply-Side

- 890 MW CCGT
- 690 MW CCGT
- 440 MW CCGT
- 340 MW CCGT
- 220 MW GT
- 100 MW GT
- 50 MW Wind (IN)
- 15 MW CHP
- 9 MW Solar PV

## Demand-Side

- Energy Efficiency
- Demand Response

GT = Gas Turbine
CCGT = Combined Cycle Gas Turbine
PV = Photovoltaic
IN = Indiana
MW = Megawatt
CHP = Combined Heat and Power

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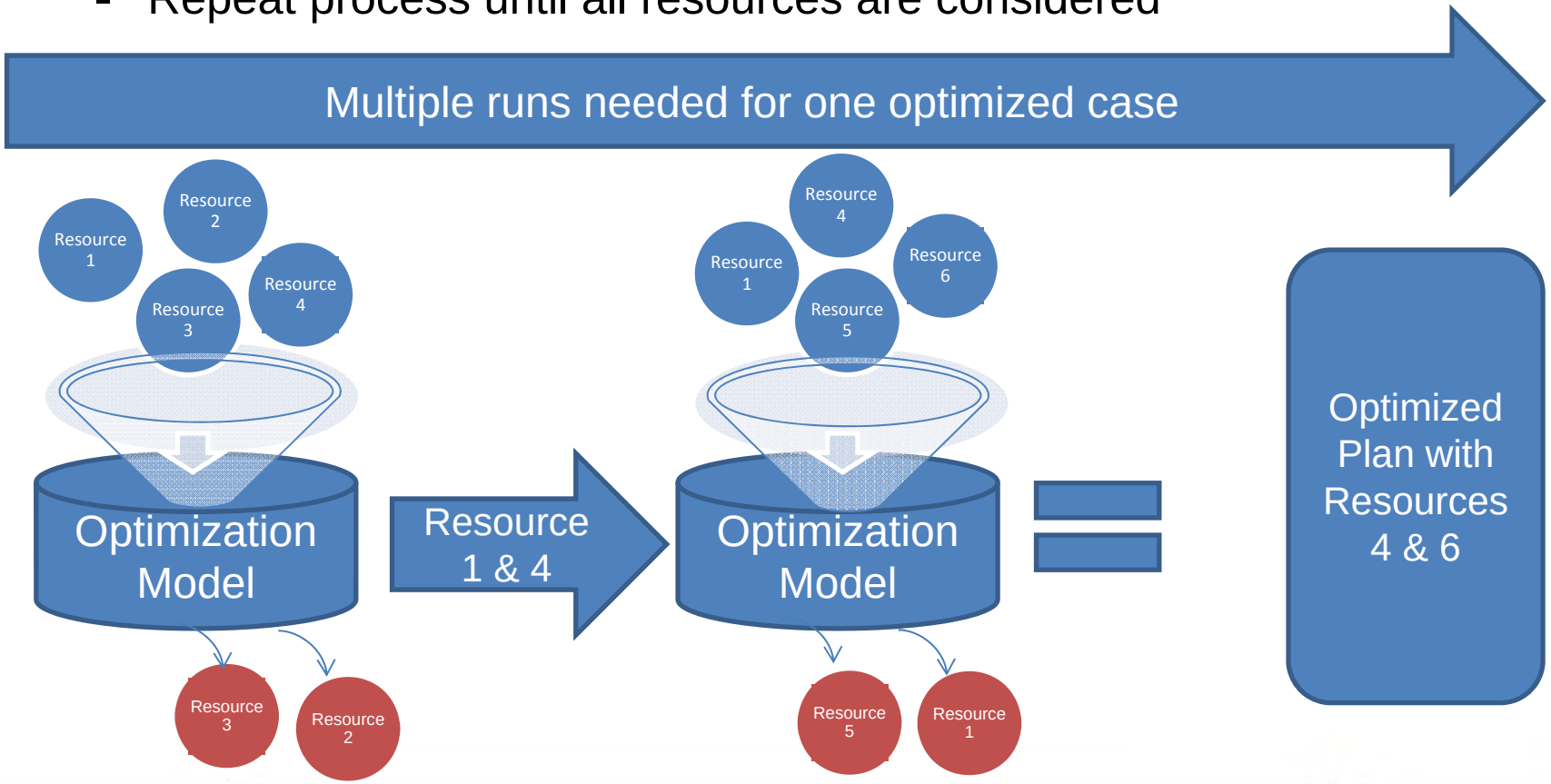
# Optimization Modeling Is an Iterative Process

- Still too many options to model at one time
  - Model several options to determine what is selected
  - Keep selected options, rotate in new alternatives
  - Repeat process until all resources are considered



# Questions?

# Scenario Development

*Gary Vicinus, Pace Global – Managing Director of Consulting Practice*

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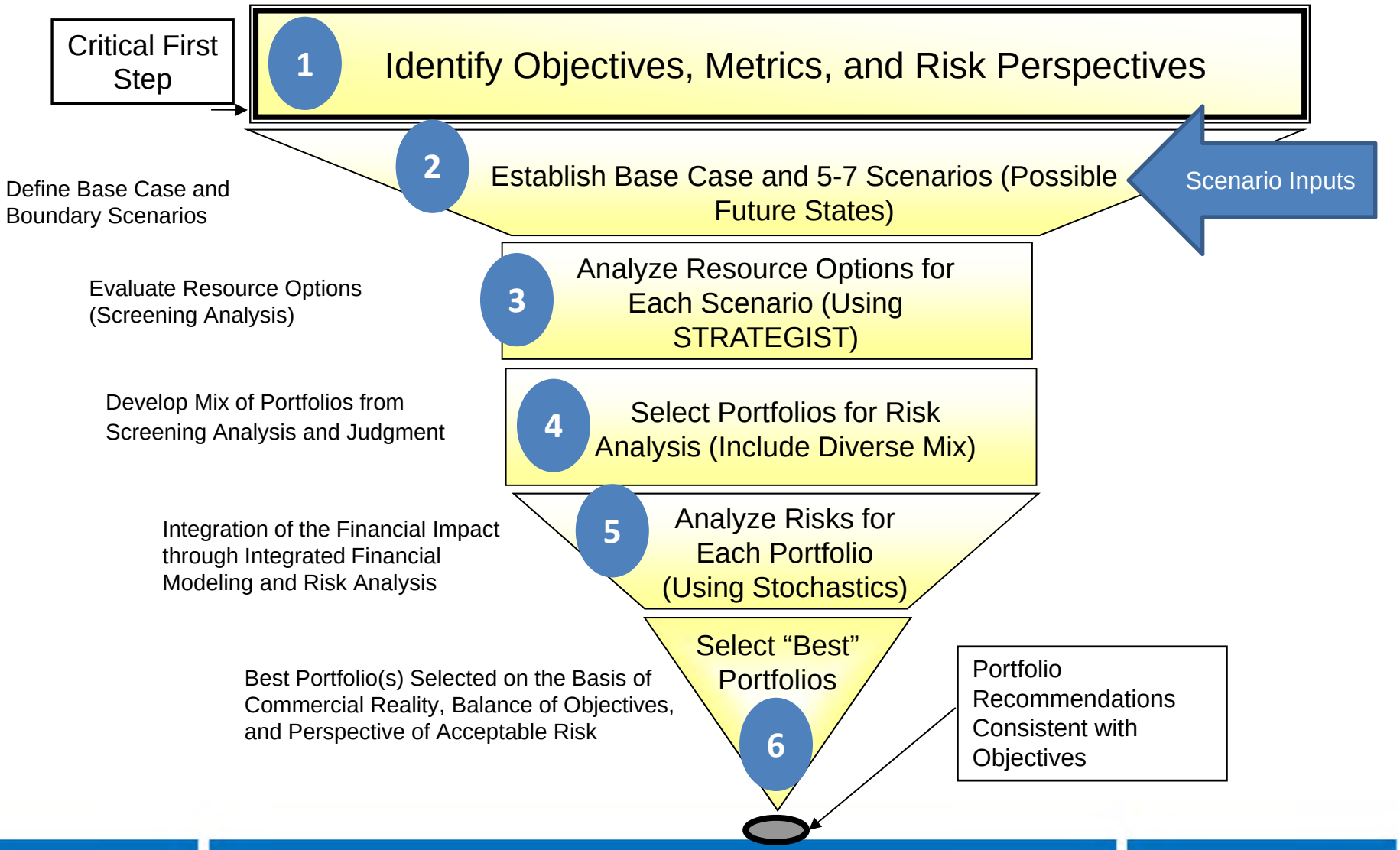


# Stakeholder Feedback From April 7th Uncertainty Workshop

The following topics were raised by stakeholders for consideration in scenario development:

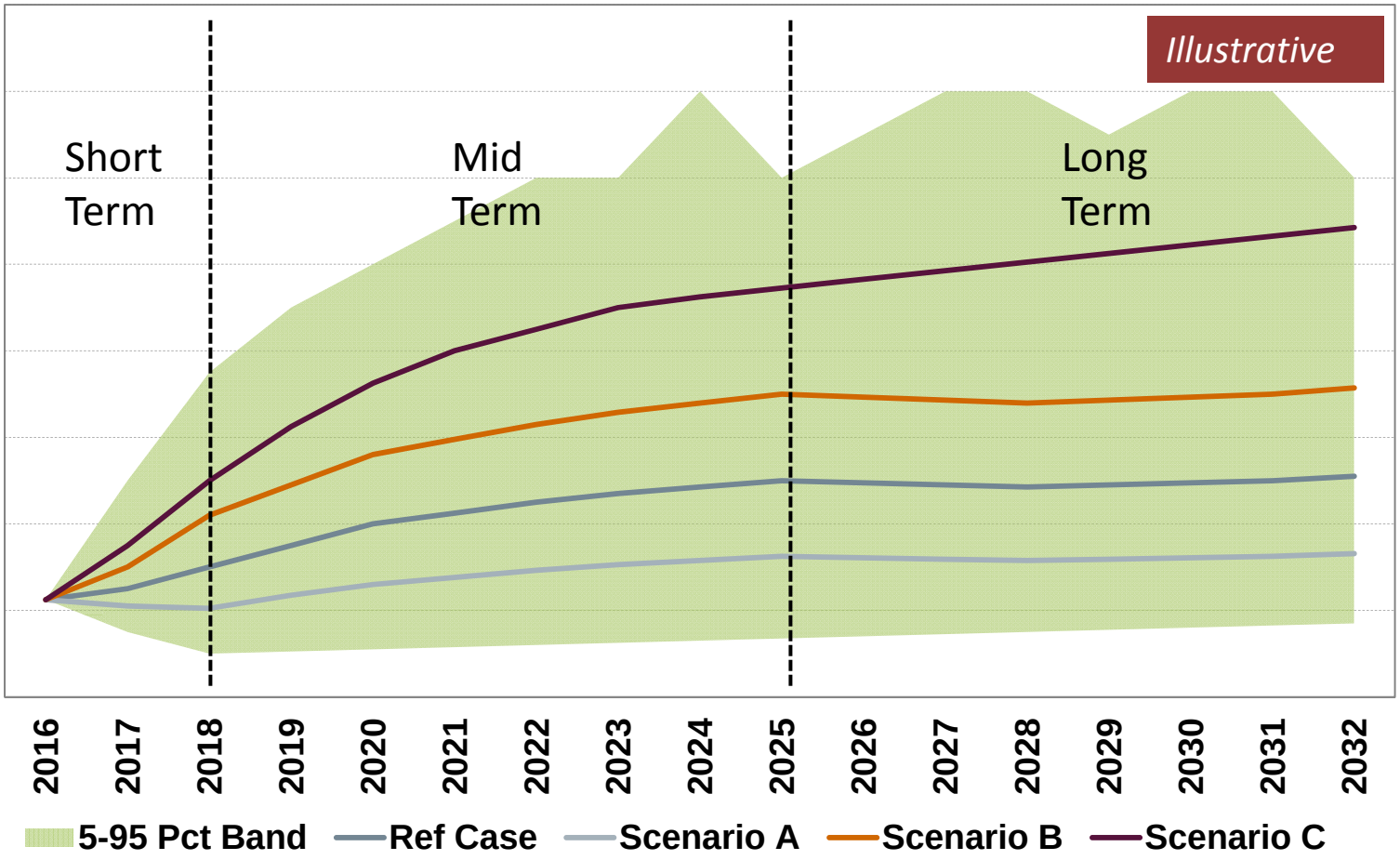
- Consider additional environmental regulations that have not yet been proposed
- Factor in the Clean Power Plan (CPP) compliance costs
- Consider how electric vehicle technology affects your plan
- Consider distributed generation risk
- Consider diversifying generation
- Consider political/regulatory risk
- Consider additional cogeneration being developed within the Vectren territory

# Purpose and Guidelines for Scenario Development

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

- Scenarios include a high and low regulatory case, a high and low economy case and a high technology case. Each is described in the following pages:
  - First with broad trends in the short term, mid term, and long term.
  - Then with defined paths with annual forecasts (and in some cases monthly forecasts).
- Inputs for key variables were developed to ensure that they were internally consistent with the scenario by first developing directional changes for each variable (load, gas prices, coal prices, carbon prices, power prices, and capital costs) relative to the base case forecast in the near, mid, and long term.
- Values were then selected for each scenario that reflect one standard deviation from the mean in the direction indicated, and in a few limited cases a ½ standard deviation or other larger variation.

# The Objective of this Analysis is to Find Portfolios that Perform Well Against a Range of Boundary Conditions



# The Base Case Scenario

- The Base Case is provided by Vectren. Key assumptions driving the Base Case are:
  - In the short-term (2016-2018), the Base Case assumes a business-as-usual perspective for all market drivers, consistent with market forwards.
  - It is assumed that most states, including Indiana, will opt for a mass-based CPP compliance path, effective in 2024 (a delay of two years from the original 2022 start date):
    - Easier to administer than rate-based
    - Retirements can be counted toward compliance
    - States will join to create most liquid trading market
  - Gas prices increase somewhat from current low levels beginning around 2018 as demand catches up to shale supply
  - Power prices move up with gas and as CPP compliance begins in 2024
  - Long term, gas and power prices tend to level out in real terms

Note: These scenarios describe the general market and may differ from specific outcomes for Vectren.

CPP = Clean Power Plan

# Scenario 1: The High Regulatory Scenario

- The High Regulatory scenario is characterized by a more heavily regulated CPP and shale gas (fracking limits, methane emissions) path and assumes (relative to the Base Case):
  - A generally higher CPP compliance cost. Less coordination among states results in a greater mix of rate-based and mass-based compliance. Several states do not opt in to a national EPA-backed program and in general more state-by-state command and control efforts for $CO_2$ emissions.
  - More renewable and less new gas generation adoption pushed through via mandates – greater coal retirements.
  - Additional regulations on carbon on the horizon post 2030 that are higher than in the Base Case.
  - Greater adoption of DER in the form of solar and CHP.
  - As the next target after coal, gas markets see restrictions on fracking and methane emissions that limit gas supply growth, drive up gas prices, and result in an additional push and economic case for renewable energy.
  - Overall regulations that dampen economic growth.

Note: These scenarios describe the general market and may differ from specific outcomes for Vectren.

CPP = Clean Power Plan
DER = Distributed Energy Resources
EPA = Environmental Protection Agency
$CO_2$ = Carbon Dioxide
CHP = Combined Heat and Power

# Scenario 2: The Low Regulatory Scenario

- The Low Regulatory scenario is characterized by:
  - Low regulatory restrictions as the CPP is delayed and with less aggressive targets, given legal challenges that result in changes to the final rule
  - No national carbon price
  - Less regulation that encourages greater economic growth in sector and load growth
  - Gas prices that sustain growth in the mid term (no fracking limits) but over time, renewable costs will tend to push down long term growth
  - Fewer coal retirements in the mid term, resulting in some increases in prices
  - Capital costs rise over time as economic growth and load result in new builds

Note: These scenarios describe the general market and may differ from specific outcomes for Vectren.

CPP = Clean Power Plan

# Scenario 3: The High Technology Scenario

- The High Technology Scenario is characterized by:
  - Significant (breakthrough) advances in solar, wind, and energy storage technology, resulting in greater renewable energy deployment, along with some improvement in high efficiency gas-fired generation, and also natural gas extraction productivity
  - Overall there are higher levels of DER and energy efficiency, which helps to mitigate the load growth that might otherwise be expected in a High Technology scenario with robust economic growth and adoption of electric vehicles
  - Storage breakthroughs in the mid term result in greater levels of renewable development without the need for back-up gas generation – reducing the effective cost of renewable and DER generation
  - There will be faster replacement of coal (low coal prices), stable gas prices, and lower power prices long term due to lower demand and higher supply
  - There could be higher interest rates with good growth, raising capital costs

Note: These scenarios describe the general market and may differ from specific outcomes for Vectren.

# Scenario 4: The High Economy/Market Scenario

- The High Economy/Market Scenario is characterized by:
  - A robust and growing U.S. economy that keeps upward pressure on all of the major market outcome categories, including load growth, fuel costs, power prices, and capital costs
  - This growth is in the absence of a major technological breakthrough
  - Existing generation resources are needed to maintain this economic expansion, limiting the number of retirements while accelerating the number of capacity additions, which favors gas in the near and mid term, but renewables will outpace gas in the long term
  - While this scenario shares many of the attributes of the previous “High Technology” scenario, the pace of technological innovation is not as dynamic and therefore not beneficial to keeping prices and costs in check
  - Regulations are similar to those in the Base Case

Note: These scenarios describe the general market and may differ from specific outcomes for Vectren.

# Scenario 5: The Low Economy/Market Scenario

- The Low Economy/Market Scenario is characterized by:
  - Sluggish economic growth both domestically and globally
  - While some conditions are favorable to the U.S. economy, including low fuel costs, most indicators point toward headwinds for growth in the GDP level
  - Low load growth restricts additions and keeps power prices on the low end of the scale, which in turn keeps capacity additions low
  - Market regulators have less latitude to implement new regulations, as the economy cannot afford them in this low economy scenario

Note: These scenarios describe the general market and may differ from specific outcomes for Vectren.

# Scenario Modeling Inputs

Testing of Portfolios against
Wide Range of Outcomes

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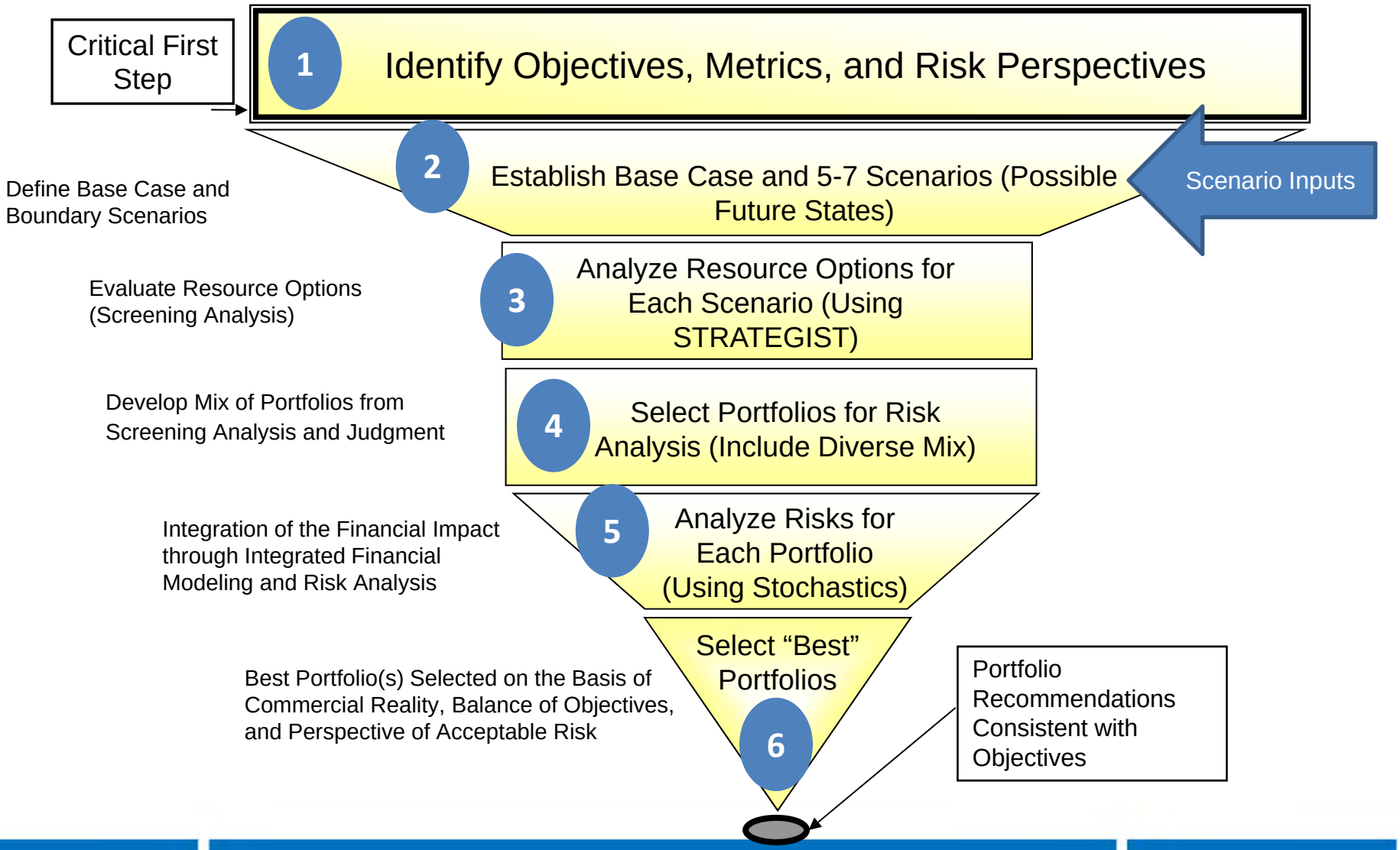
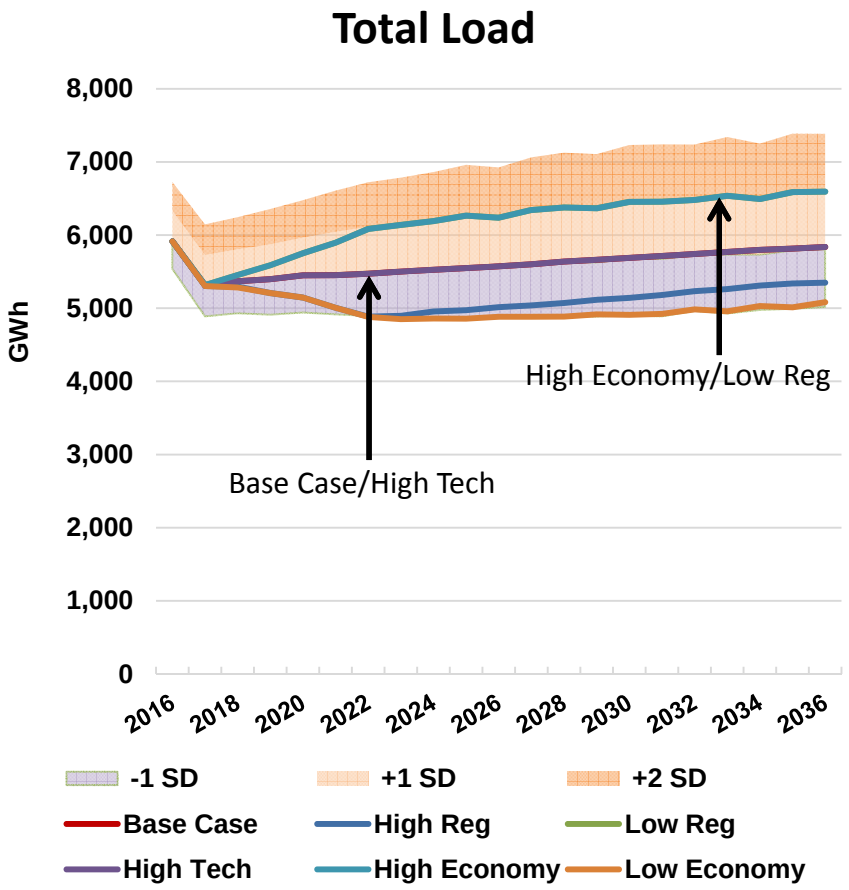
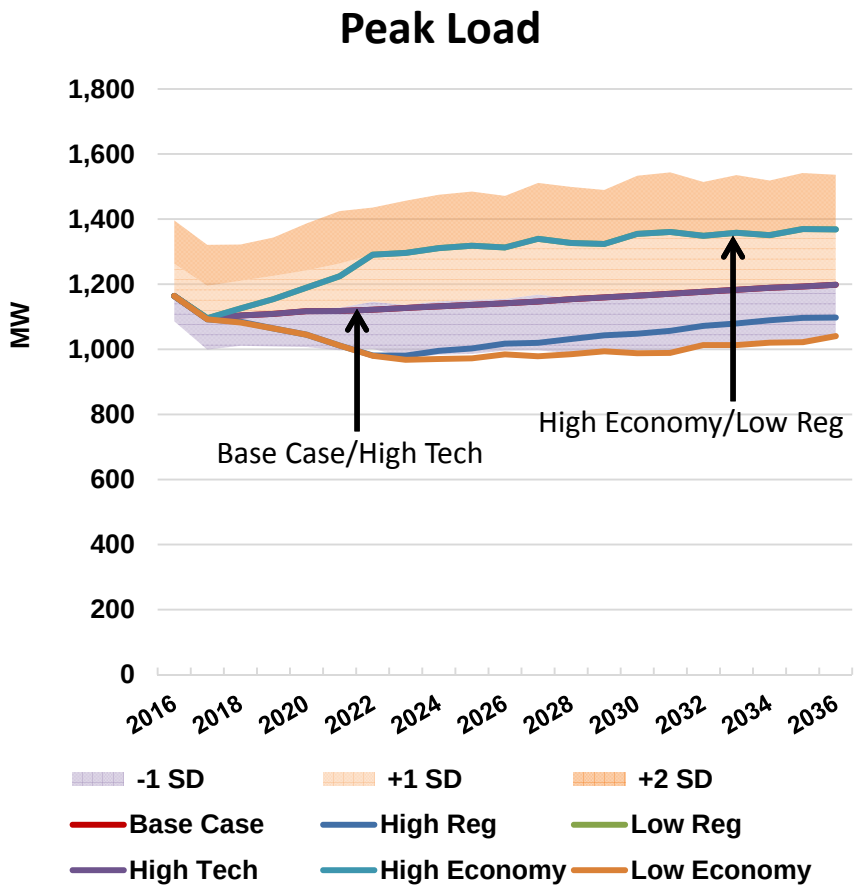
# Vectren Is Following a Structured Approach



# Vectren Total and Peak Load Scenarios

## GWh and MW




SD = Standard Deviation
MW = Megawatt

GWh = Gigawatt Hour

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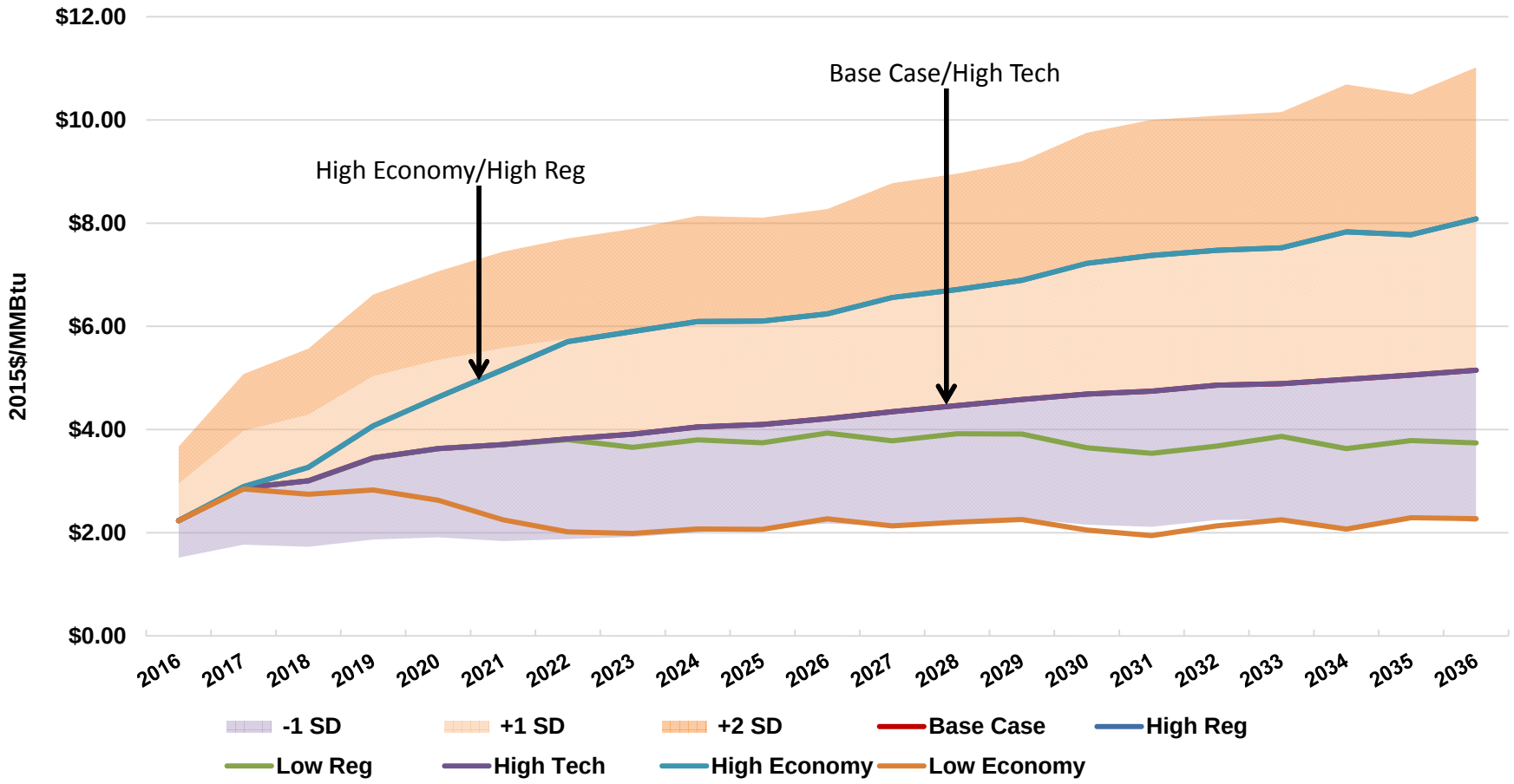
# Natural Gas Price Scenarios
## Delivered to Indiana (2015$/MMBtu)




MMBtu = One Million British Thermal Units

SD = Standard Deviation

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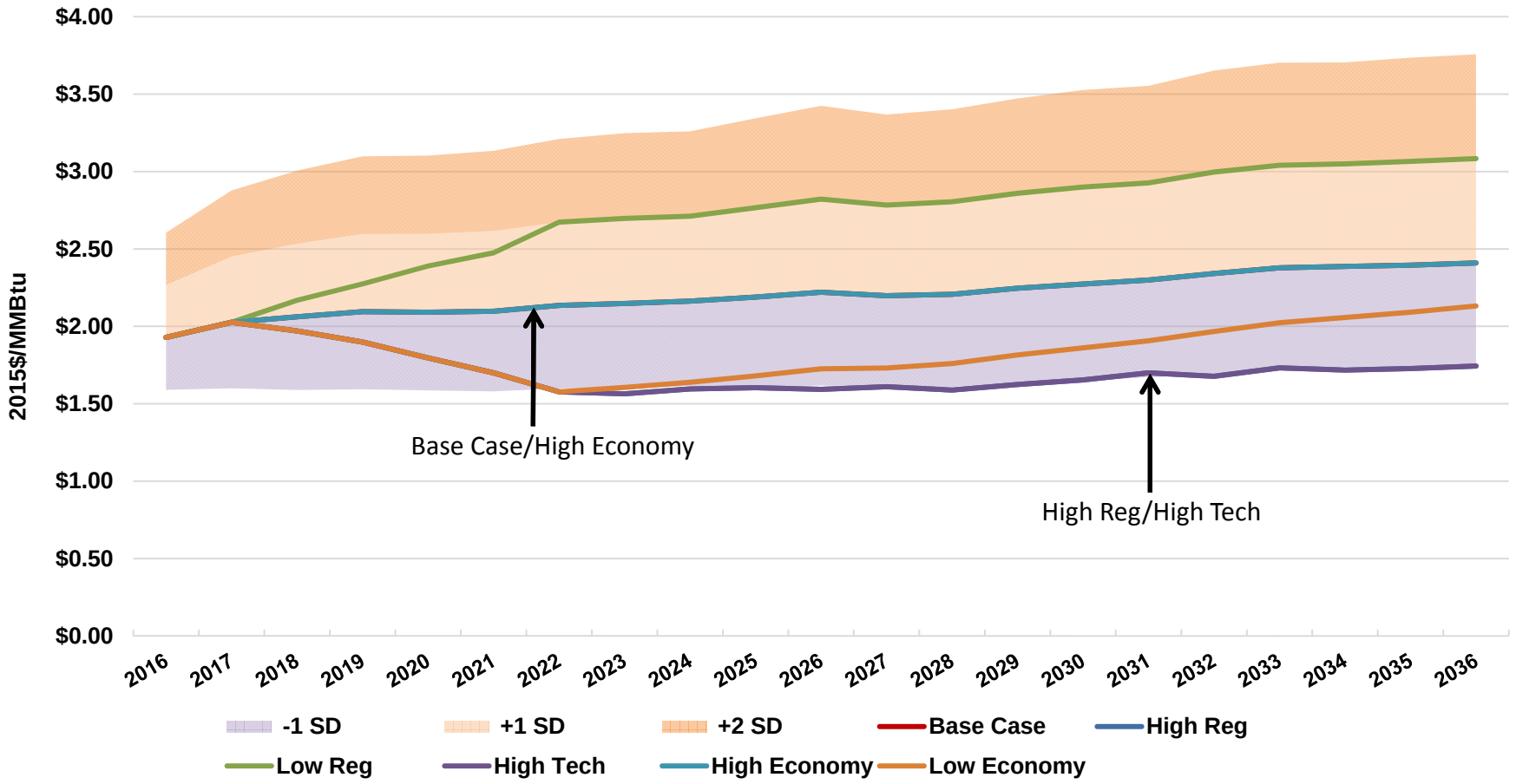
# Coal Price Scenarios

## Illinois Basin Delivered (2015$/MMBtu)




Note: Forecast reflects Illinois Basin minemouth price plus delivery to AB Brown.

MMBtu = One Million British Thermal Units SD = Standard Deviation

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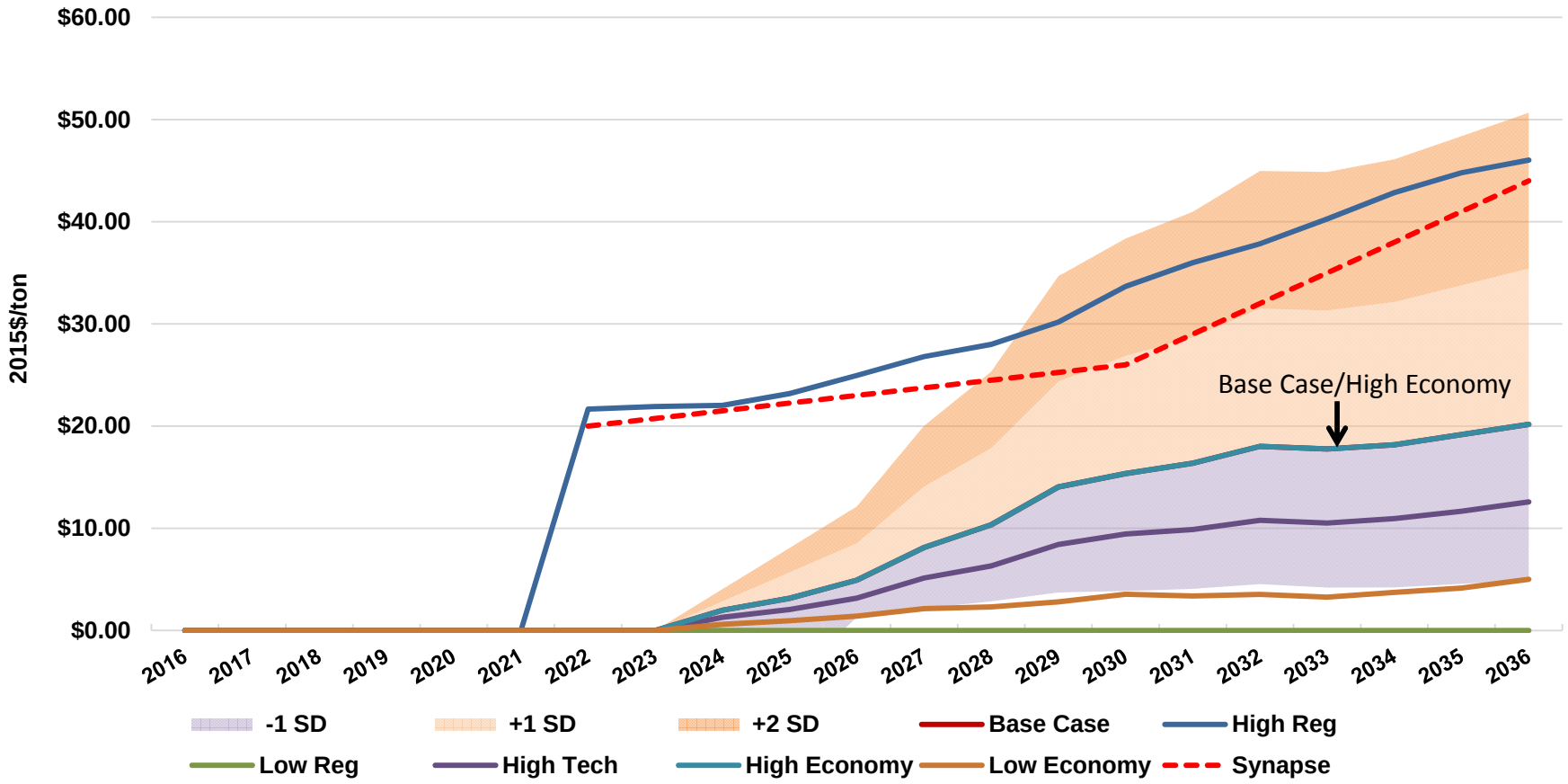
# Carbon ($CO_2$) Price Scenarios

## National Price (2015$/short ton)




Note: Synapse price from Synapse Energy Economics, Inc. report (dated 3/16/16) entitled "Spring 2016 National Carbon Dioxide Price Forecast " – Mid Case

SD = Standard Deviation

$CO_2$ = Carbon Dioxide

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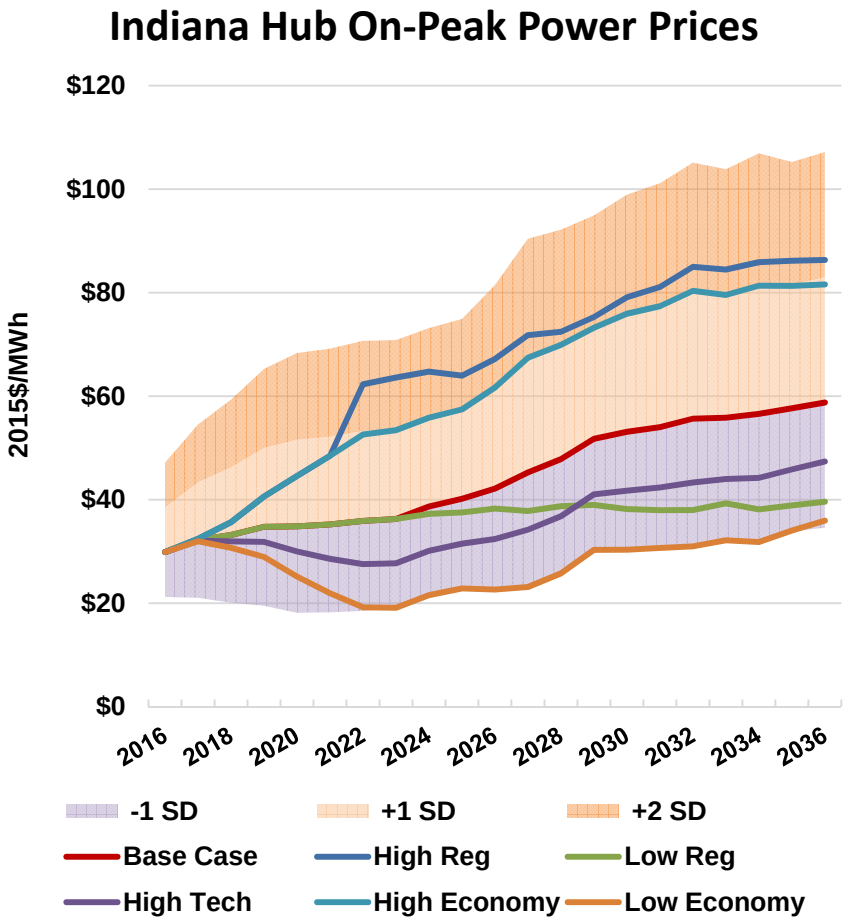
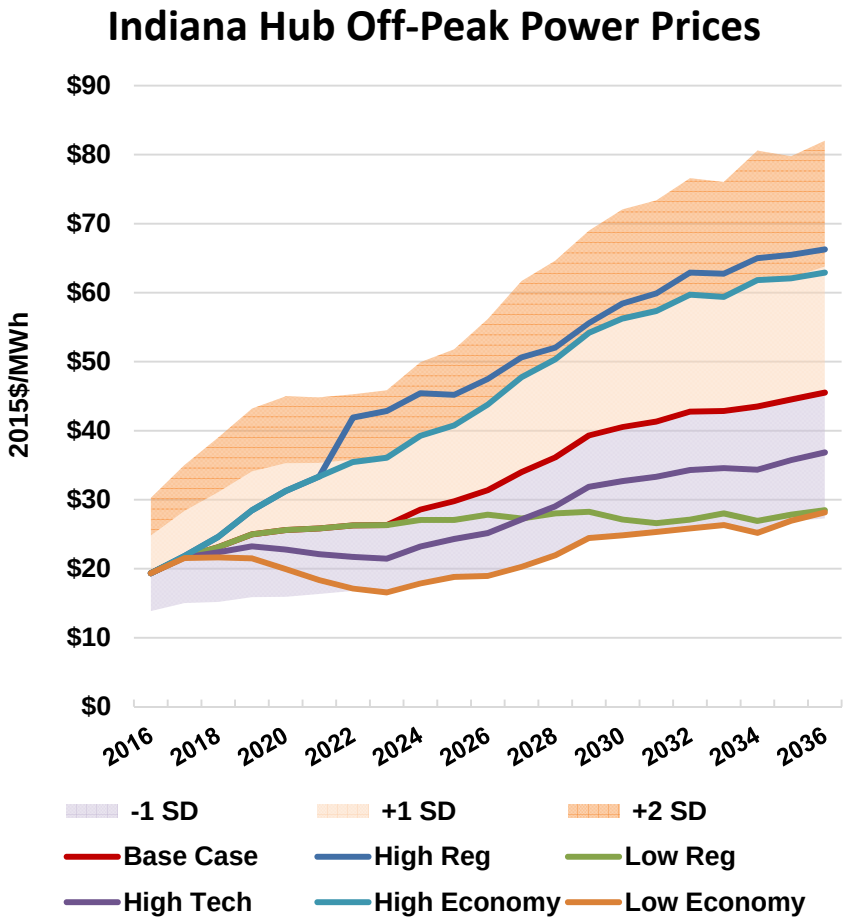
# Power Price Scenarios

## On-Peak and Off-Peak Vectren Hub Prices (2015$/MWh)




SD = Standard Deviation

MWh = Megawatt hour

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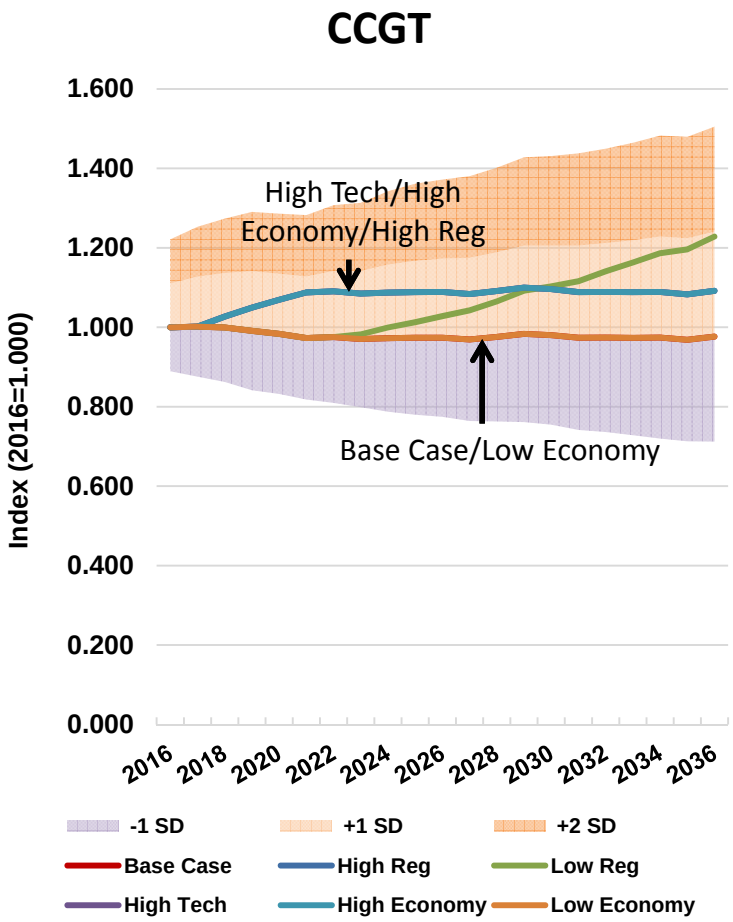
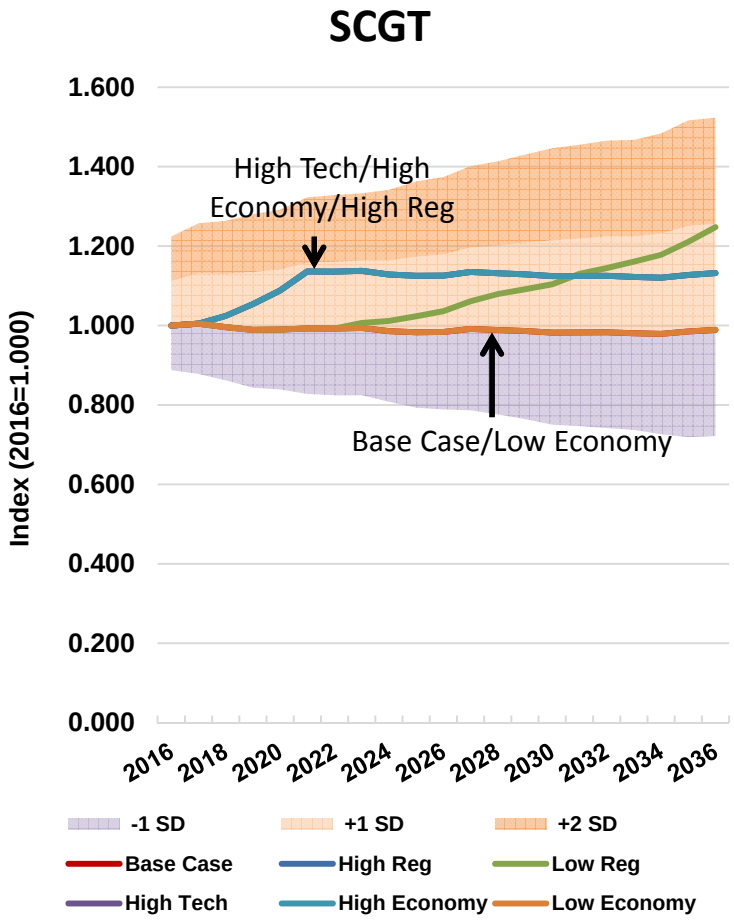
# Capital Cost Scenarios (1 of 3)

## Index Values (2016=1.000)




SD = Standard Deviation
SCGT = Simple Cycle Gas Turbine
CCGT = Combined Cycle Gas Turbine

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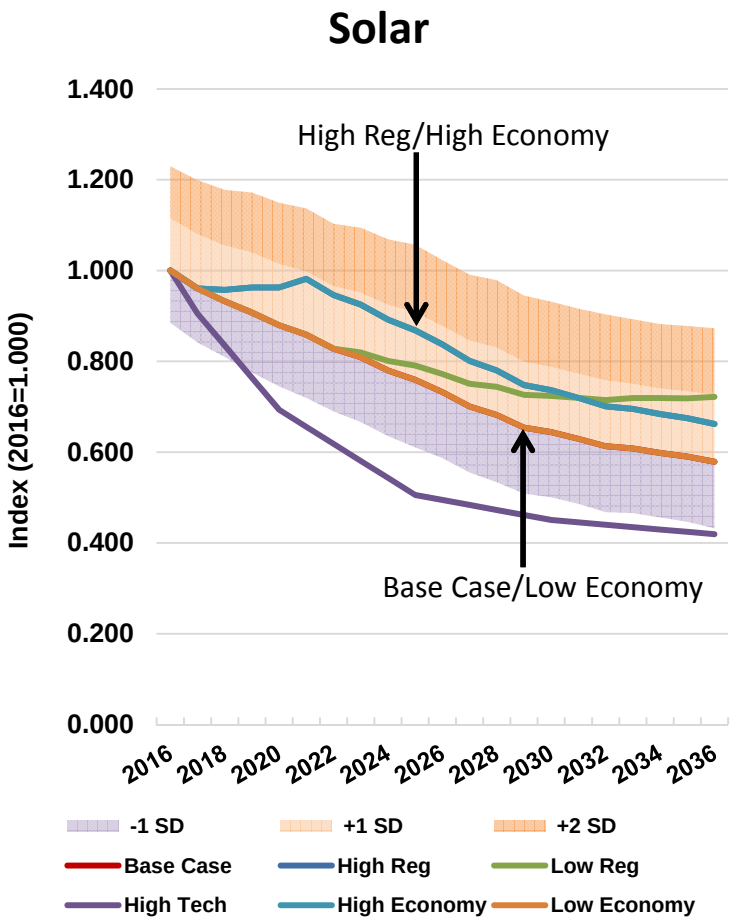
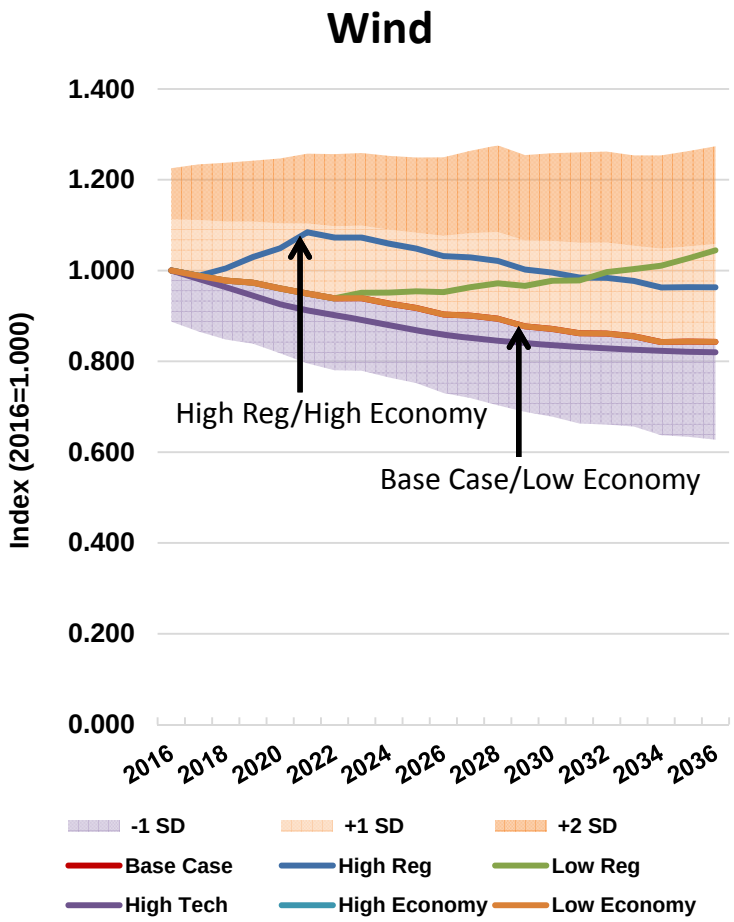
# Capital Cost Scenarios (2 of 3)

## Index Values (2016=1.000)




SD = Standard Deviation

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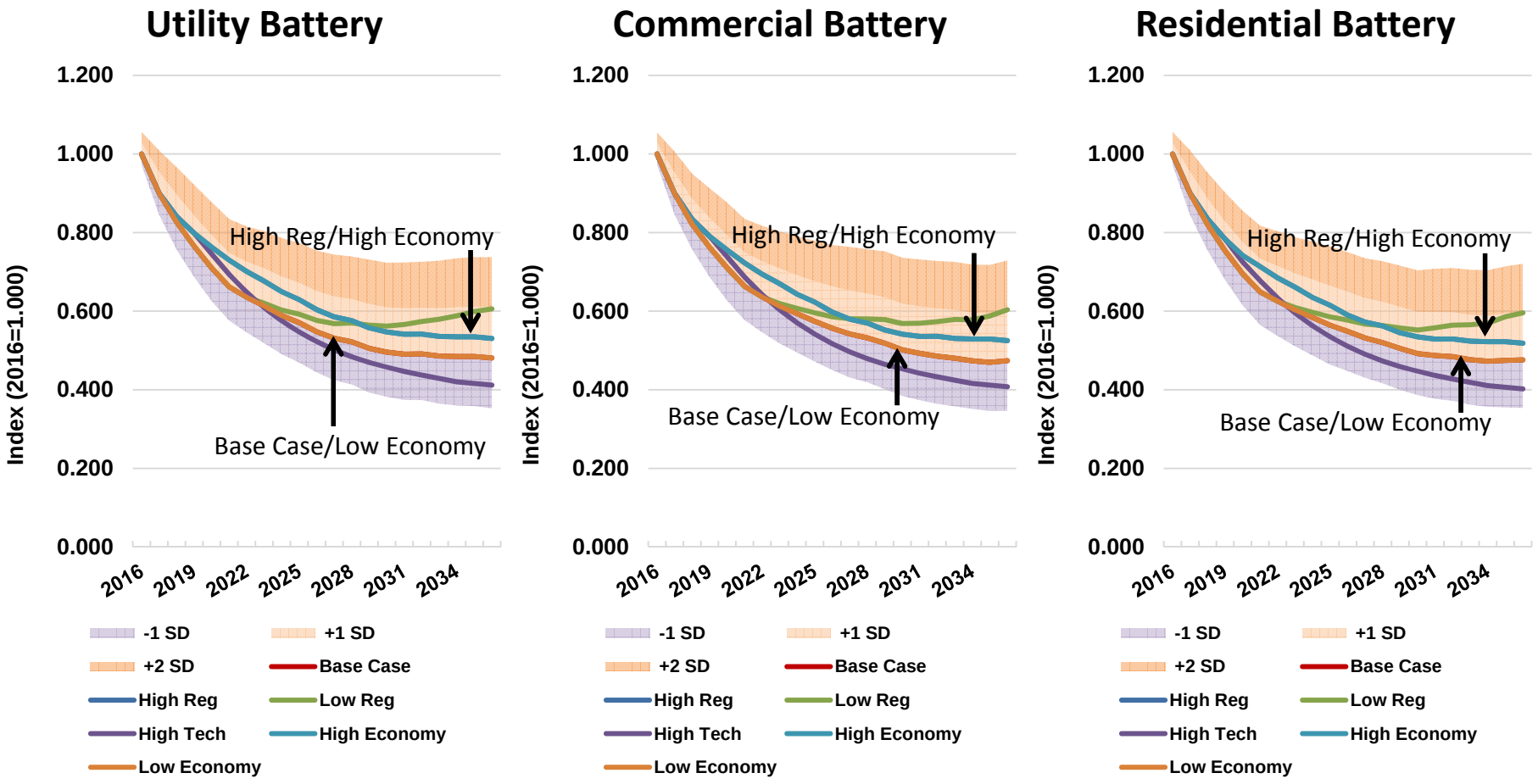
# Capital Cost Scenarios (3 of 3)

## Index Values (2016=1.000)




SD = Standard Deviation

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# Initial Screening Analysis of Resource Options for Each Scenario

Analysis using STRATEGIST Model

(Results Will Be Presented at Next Stakeholder Meeting)

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# Selection of Portfolios for Risk Analysis

Diverse Mix of Portfolios Developed from Screening Analysis and Judgment
(Will Be Presented at Next Stakeholder Meeting)

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# Stakeholder Input to the Portfolio Selection

Designed to Capture Options that Vectren May Have Missed that Stakeholders Would Like to See

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# Criteria and Selection of Stakeholder Portfolios

## Portfolio Selection

- The process to come up with 1-2 additional portfolios:
  - Stakeholder discussion
  - I will show three possible future energy mixes for comparison
  - Then I will break stakeholders into 3-4 groups and have them develop 1-3 portfolios per group
    - Combinations of coal, gas (CC or CT or CHP), renewables (solar or wind), EE/DR, storage
  - Next I will allow another 15-20 min for stakeholder groups to briefly speak on their preferences and reasons
  - Vectren will use input from this exercise to develop 1-2 additional portfolios for consideration
  - Vectren will post portfolios on www.vectren.com/irp within one week and will ask stakeholders to provide written comments for further input

CC = Combined Cycle
CHP = Combined Heat and Power
DR = Demand Response
CT = Combustion Turbine
EE = Energy Efficiency

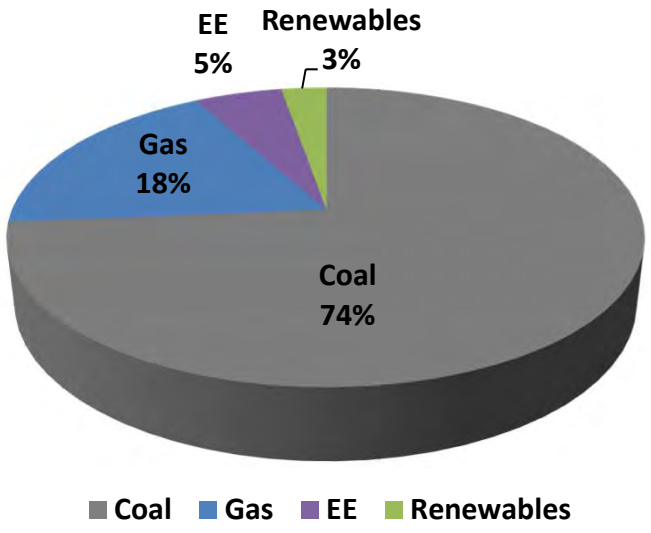
# Stakeholder Input for Preferred Portfolio

*Illustrative*

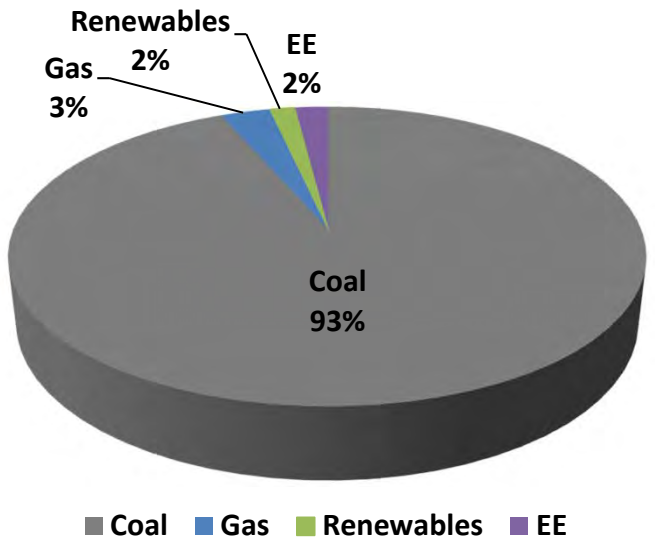
## Portfolio Input Gathering

- Possible Future Portfolio Alternative

**Generating Capacity Mix % MW**




**Energy Generated % GWh**




EE = Energy Efficiency
GWH = Gigawatt Hour
MW = Megawatt

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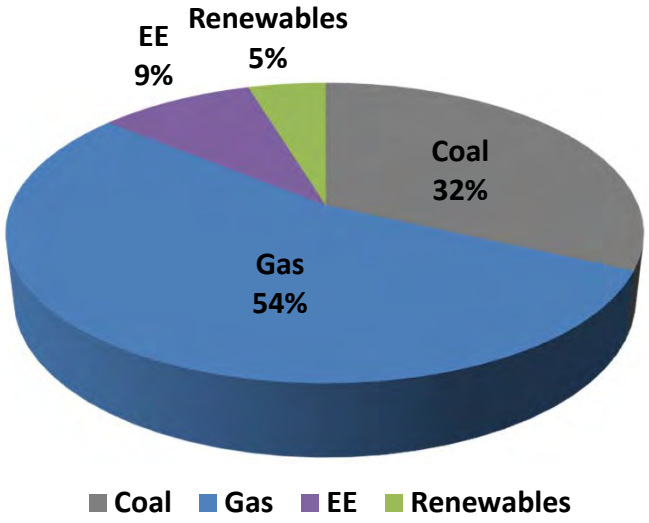
# Stakeholder Input for Preferred Portfolio

*Illustrative*

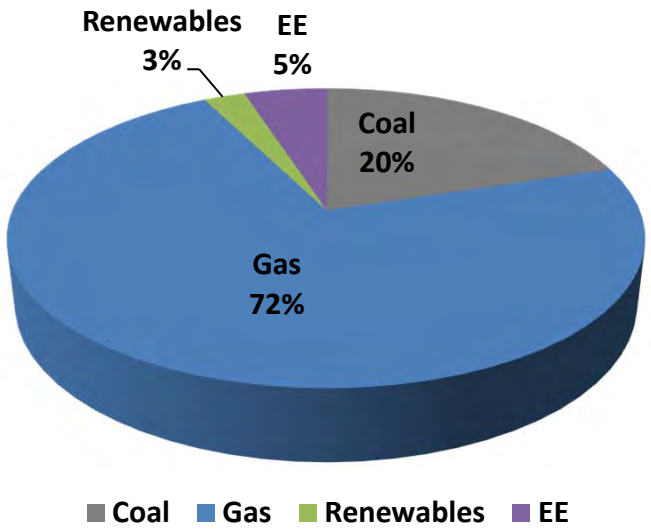
## Portfolio Input Gathering

- Possible Future Portfolio Alternative

**Generating Capacity Mix % MW**




**Energy Generated % GWh**

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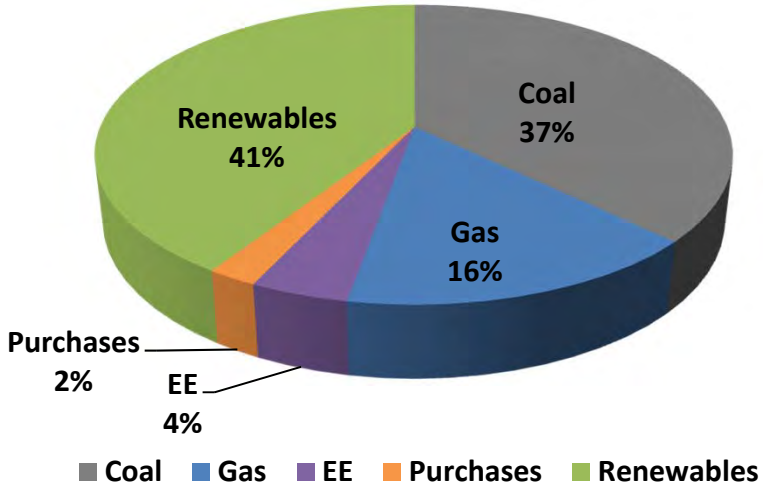
# Stakeholder Input for Preferred Portfolio

*Illustrative*

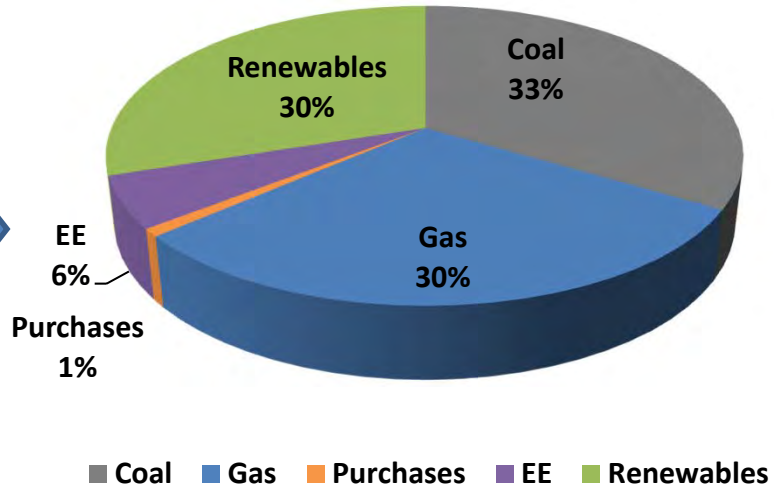
## Portfolio Input Gathering

- Possible Future Portfolio Alternative

**Generating Capacity Mix % MW**




**Energy Generated % GWh**




EE = Energy Efficiency
GWH = Gigawatt Hour
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# Stakeholder Input for Portfolios to Consider

| Portfolio Input % of Capacity Mix by 2025 | | | | |
|---|---|---|---|---|
| | **Group #1** | **Group #2** | **Group #3** | **Group #4** |
| Coal | | | | |
| Gas Combined Cycle | | | | |
| Gas Combustion Turbine | | | | |
| Gas Combined Heat & Power | | | | |
| Wind | | | | |
| Solar | | | | |
| Storage | | | | |
| Energy Efficiency/Demand Response | | | | |
| #Votes | | | | |

# Stakeholder Questions, Feedback, and Comments

*Gary Vicinus – Meeting Facilitator*

*Vice President and Managing Director, Pace Global*

*July 22, 2016*

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# Questions/Comments?

# Vectren's Next Steps

- At the third and final stakeholder meeting in late fall, Vectren will discuss and get comments on:
  - the selection of the portfolios for the risk analysis
  - the final results of the risk analysis, and
  - the preferred/recommended portfolio