IRP Stakeholder Meeting

October 19, 2020

evergy™

Agenda

- Update on IRP Development Progress
- Inputs & Assumptions
- Initial Alternative Resource Plans
- Uncertain Factors & Scenarios
- Preliminary Revenue Requirement Results
- Next Steps

Triennial IRP Development Timeline

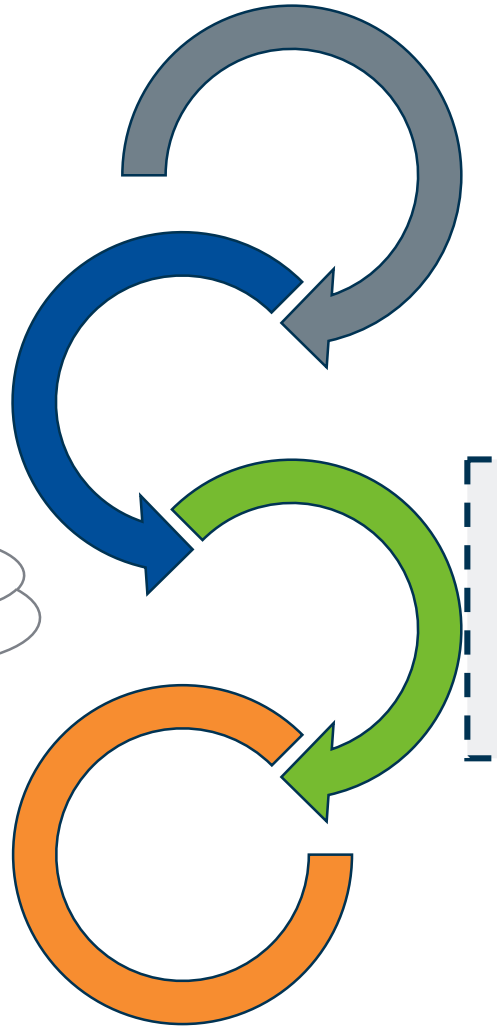
Gathering Input

July: Stakeholder meeting to discuss modeling assumptions / inputs

During and following July Stakeholder Meeting, received feedback which was considered in the process of creating today's new materials

Reviewing Results

Q1 2021: Review updated results including detailed review of inputs outlined in IRP rules



Refining Assumptions and Inputs

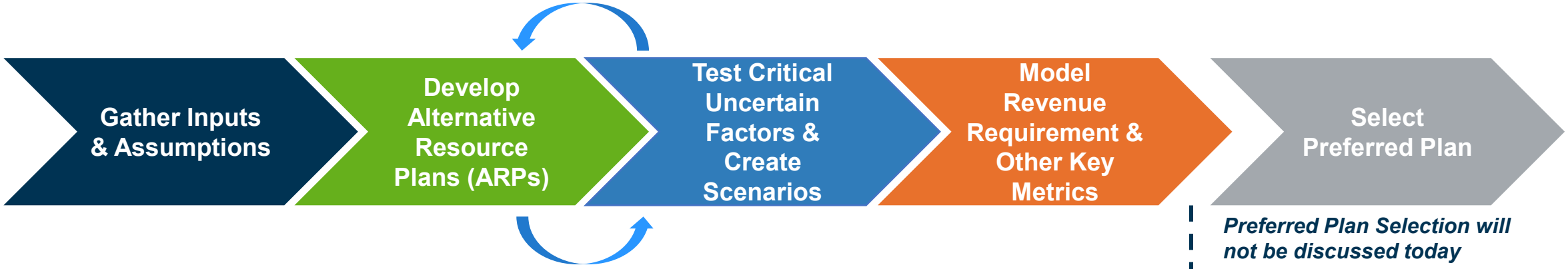
Early April: 2020 Annual Update Stakeholder Meeting to introduce process

Conducting Analysis

Late Q3 – Early Q1: Stakeholder meeting(s) to discuss preliminary results

- **October 19th:** Initial review of preliminary results
- **Early-December:** Additional stakeholder meeting to review next round of results
- **Late-December – Early Q1**: Demand-Side (Electrification, DSM, Behind-the-Meter solar & storage) Focused Discussion
- ***As Needed:*** Topical meetings with specific stakeholders on comments received

Overall Analytical Process



Preferred Plan Selection will not be discussed today

Load Forecasts
Low, Mid, High, Electrification

Fuel Forecasts
Nat Gas, Coal, Fuel Oil

DSM Forecasts
Maximum and Realistic Potential

New Generation
Capital, O&M, Operational info

Existing Generation
Capital, O&M, Operational info

ARPs include combinations of unit retirements, unit additions, DSM levels

Evergy Combined 12 Initial ARPs

Combinations of Critical Uncertain Factors analyzed – currently 27 total combinations:

Load
Low, Mid, High

Nat Gas
Low, Mid, High

CO_2
Low, Mid, High

20-Year Net Present Revenue Requirement (NPVRR) calculation of ARPs for each of the 27 scenarios

ARP providing lowest NPVRR across scenarios is generally selected as the Preferred Plan.

Higher NPVRR ARP can be selected but decision must be supported

Gather Inputs & Assumptions

Laura Becker
Al Bass
Tim Nelson

evergy™

Natural Gas Price Assumptions

- Similar to prior IRPs, testing three different gas price levels
- High and Mid forecasts based on a composite of external gas price forecasts
- Low forecast capped at 5-year historical average

CO_2 Tax Assumption

Carbon Price Forecasts - CONFIDENTIAL

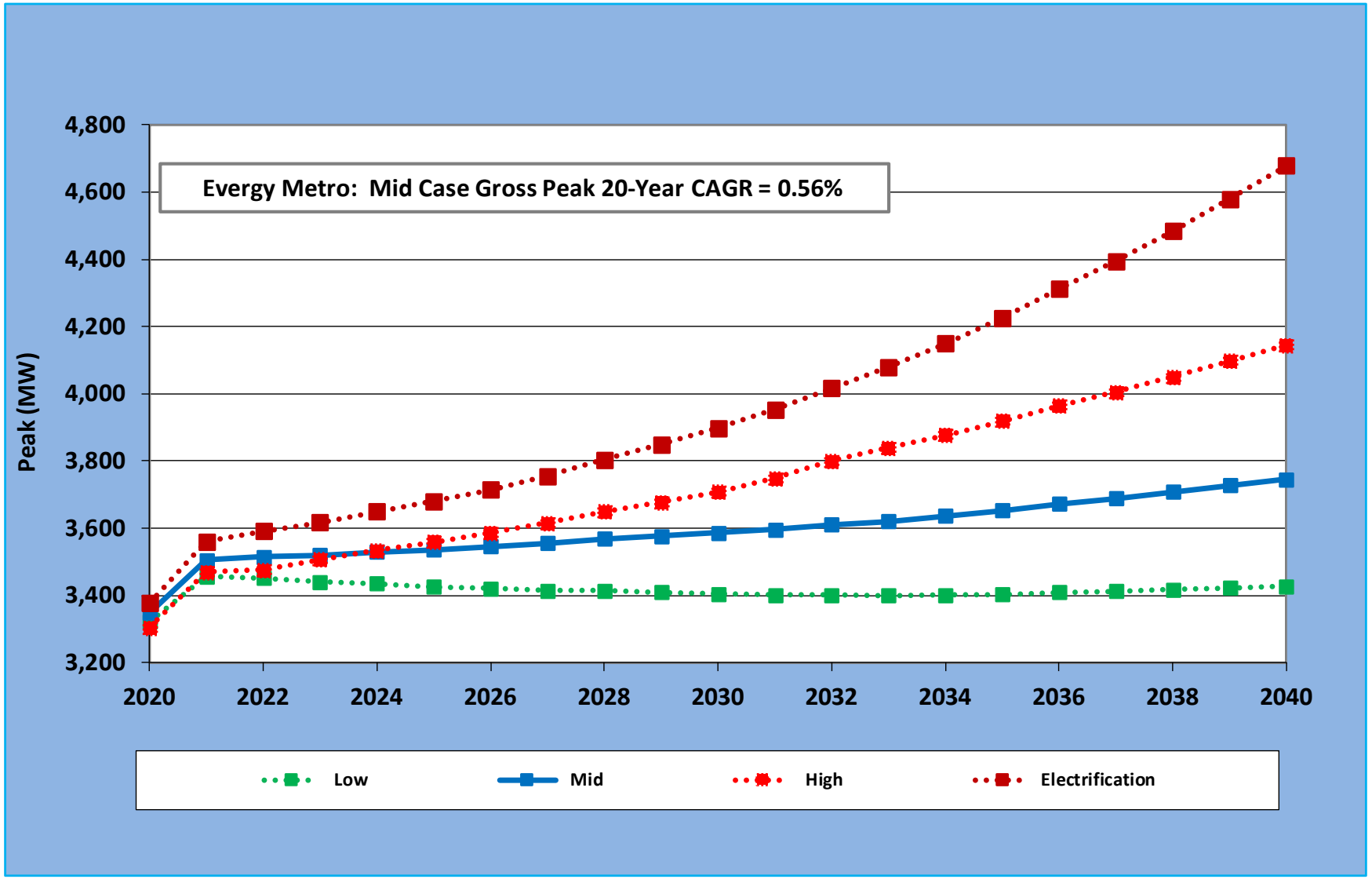
- Added an additional "High" CO_2 Price compared to 2020 Update
- Mid is based on a composite of external sources, while High is based on a single external source which provided a much higher forecast
- High case includes prices comparable to the EPA-estimated Social Cost of Carbon starting in 2030[1]

1) Stakeholder comments included a request to include CO_2 pricing consistent with prior federal government (i.e., EPA) estimates of the social cost of carbon; EPA estimates were provided in 2007 $ and inflated at 2.5% for this comparison

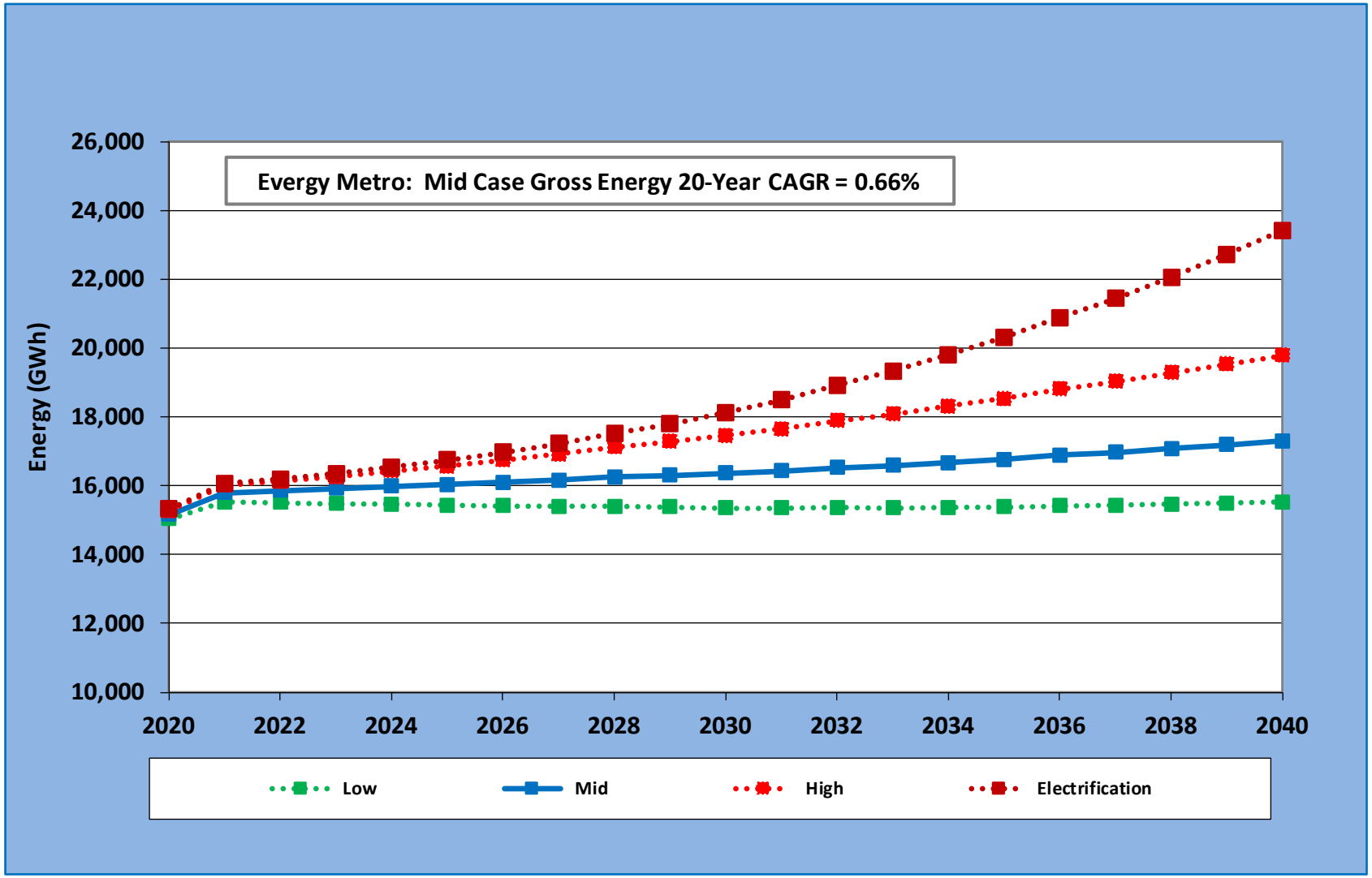
Changes in Inputs to Load Forecasting Models

- Historical data for customers, kwh and $/kwh: June 2020 vs June 2017
- DOE forecasts of appliance and equipment saturations and kwh/unit: 2020 vs 2017
- Class models in the 2021 Metro and MO West filing are the same as the 2018 filing: residential, small commercial, big commercial (medium, large, large power) and industrial. KS Central are based on residential, commercial and industrial.
- The Company also re-evaluated the output elasticity used in the commercial and industrial models and the elasticity used in the residential model. Adjustments made were to improve the model fit.
- EPRI electric vehicle adoption projections in the 2021 Triennial filing are updated from the 2018 filing.
- EIA West North Central end-use saturations were calibrated to the Metro, MO West, and KS Central 2020 potential study C&I saturation survey results.
- End-use intensity estimates from the EIA West North Central division were calibrated to the conditional demand outputs from the 2020 Metro, MO West, and KS Central potential study.
- An electrification adoption scenario was layered onto the high case energy and peak forecasts to produce an additional high case electrification scenario.

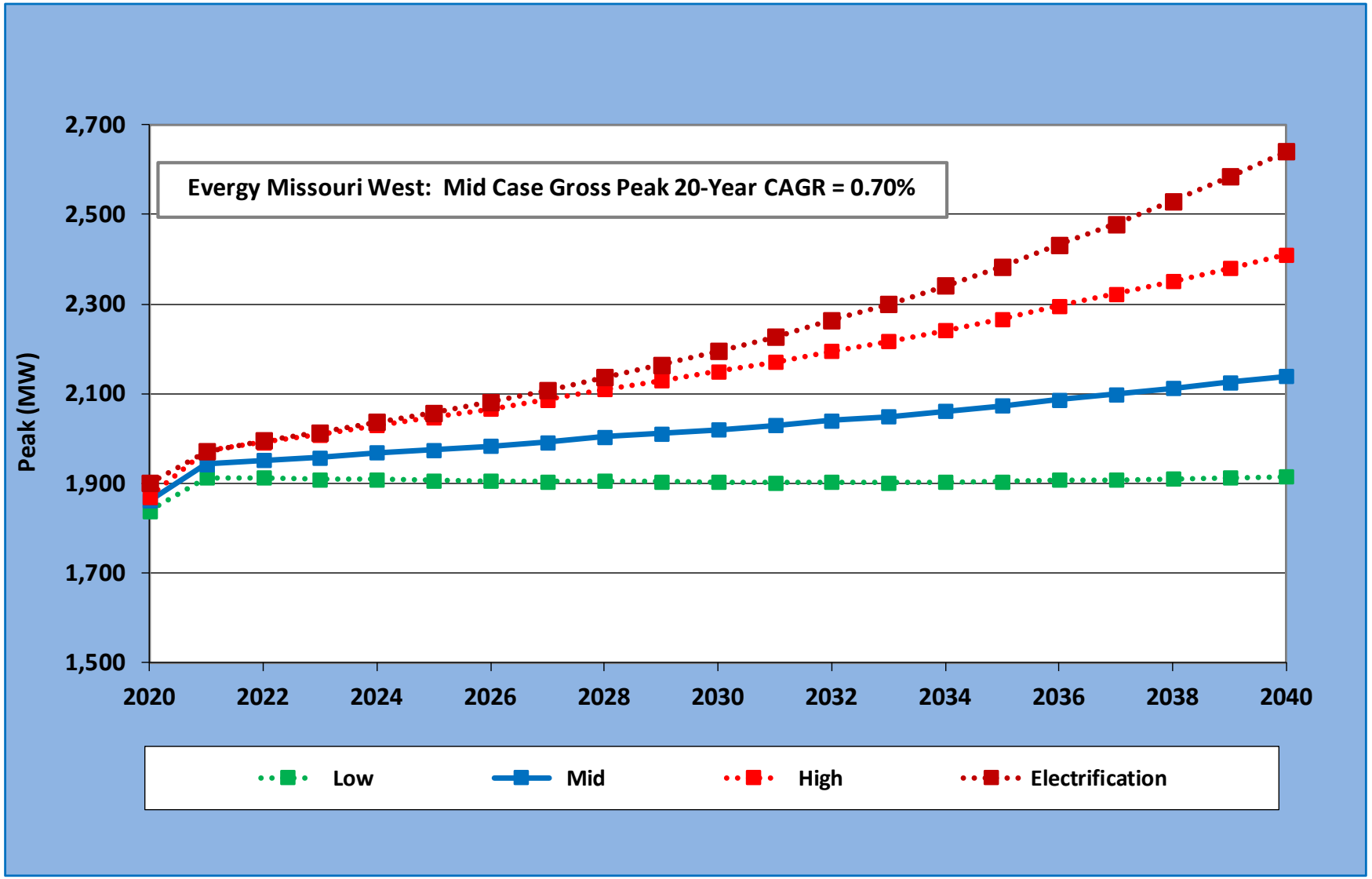
Peak Load Forecasts – Evergy Metro



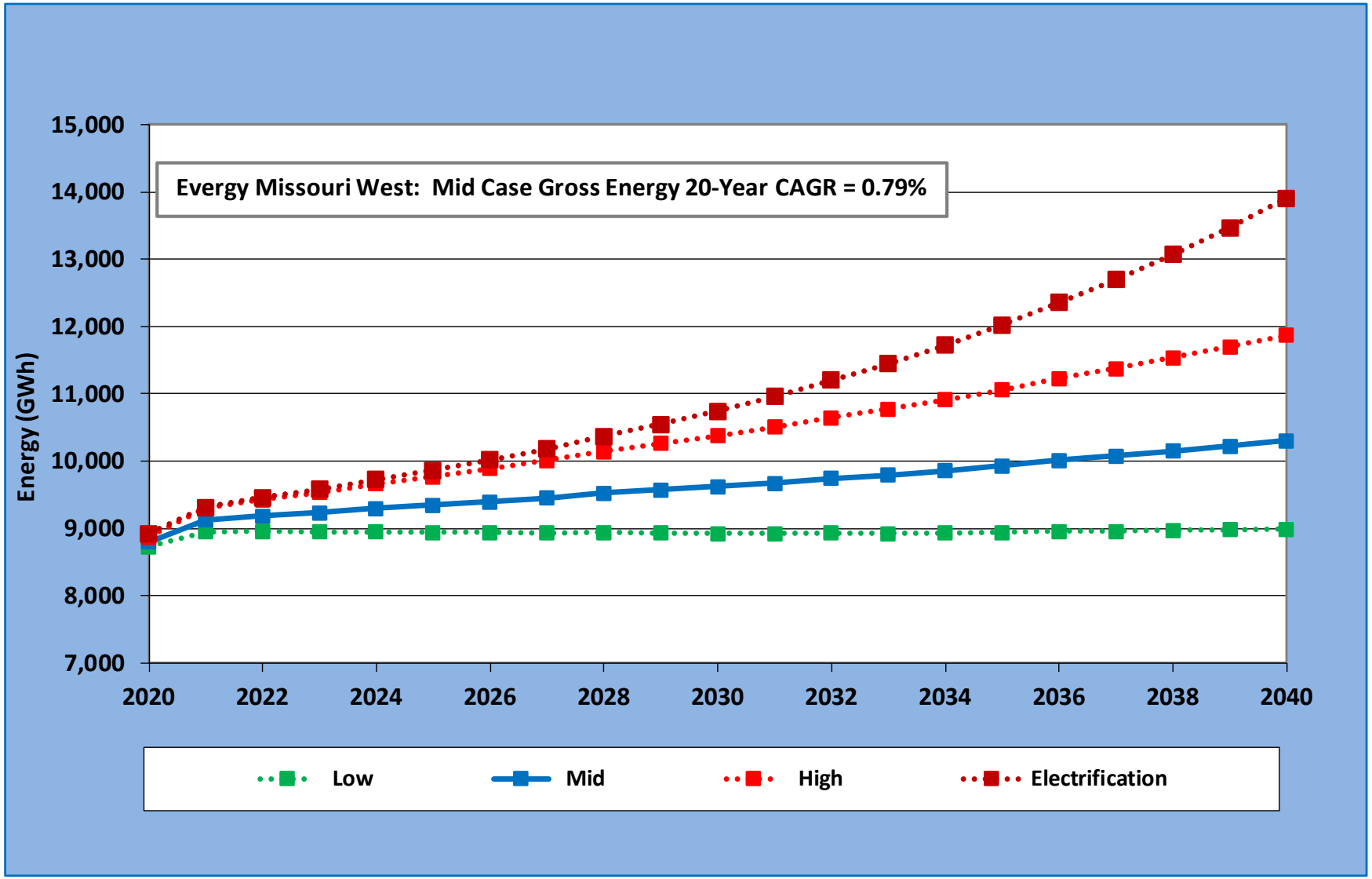
Load Forecasts – Evergy Metro - Energy



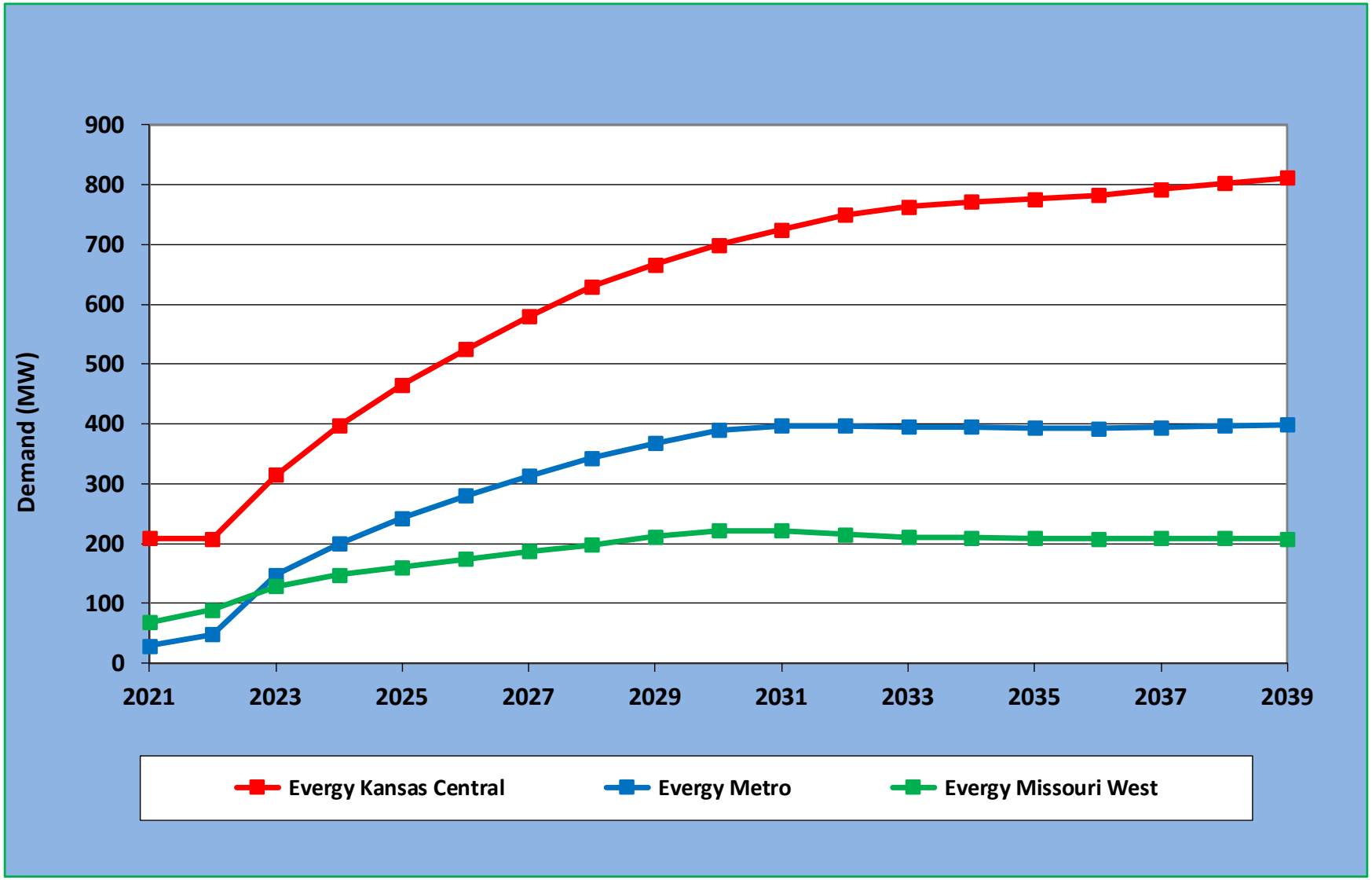
Peak Load Forecasts – Evergy Missouri West



Load Forecasts – Evergy Missouri West - Energy



DSM (RAP-)*



* Includes: Demand Response (DR), Energy Efficiency (EE), MEEIA-3, Demand Side Rates (DSR)

Electrification

- Engaged 1898 Co. to perform Electrification Market Assessment
- Assessed 40 technologies
- Evaluated the market potential of each technology (technical potential)
- Included the top 5 technologies (excluding light duty EVs) in the high load forecast
- Light duty EV forecast sourced from EPRI
- Focused discussion on Electrification will be covered in future meeting

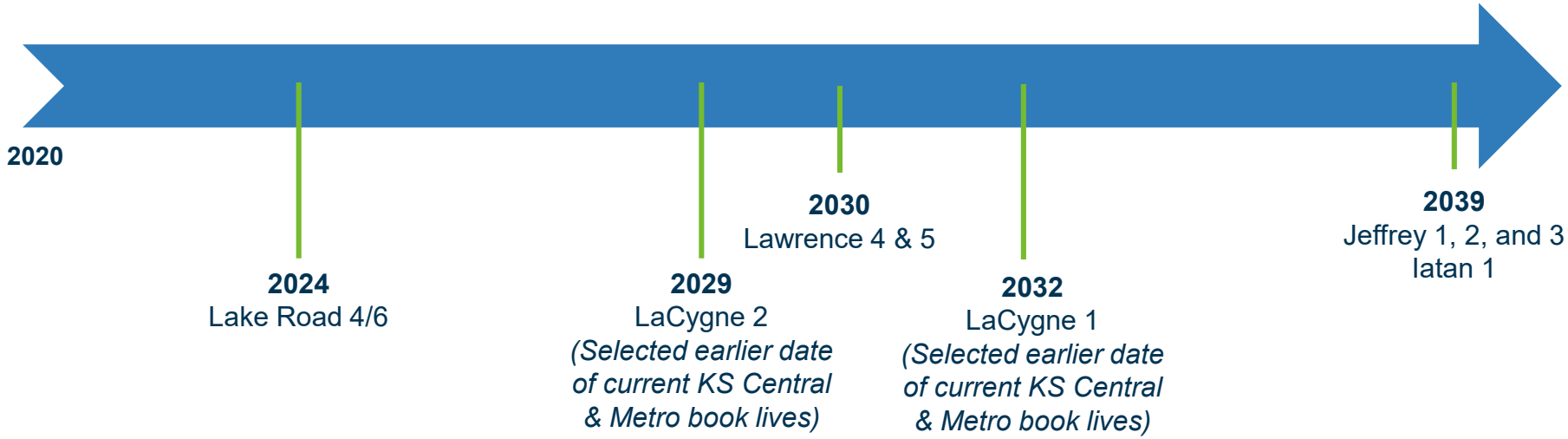
Develop Alternative Resource Plans

Laura Becker

evergy™

Alternative Resource Plans Evaluated To-Date

First ARP modeled is based on the current retirement date assumed in rates for each coal unit



In this initial plan, all replacement capacity is assumed to be natural gas combustion turbines

Note: Retirement dates included in rates for Hawthorn 5 and Iatan 2 are 2055 and 2070, respectively. Lake Road 4/6 retirement date based on 2020 IRP Preferred Plan

Alternative Resource Plans Evaluated To-Date

** Confidential **

Preliminary round of ARPs (all Evergy level) included the evaluation of incremental solar additions and the near-term retirement of individual coal units as well as some full stations[1]

Future rounds of ARPs will include individual utility-level plans, different combinations of replacement generation options, and more combinations of plant retirements building off this initial set

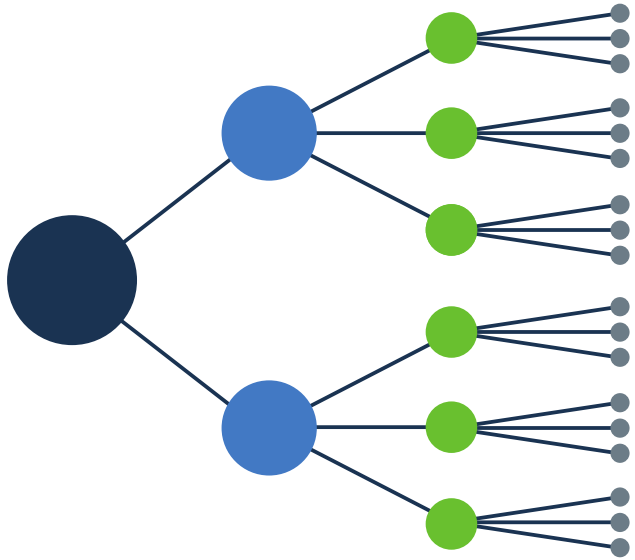
1) All plans currently include retirement of Lake Road 4/6 in 2024; 2) 900 MW modeled to-date includes 500 MW included in 2020 Preferred Plan

Test Critical Uncertain Factors & Create Scenarios

Laura Becker

evergy™

Critical Uncertain Factor Approach



Uncertain Factors
Analyzed individually to determine criticality (i.e., impact on Alternative Resource Plan ranking)

Scenarios
Constructed based on combinations of Critical Uncertain Factors (gas price, CO_2 pricing, load forecast, etc.)

List of Uncertain Factors Evaluated

Uncertain Factors: Commodities, events, costs, that can materially affect resource planning decisions

Future load growth range – low and high forecast cases
Future interest rate and other credit market condition effects on cost and access to capital
Future changes to legal mandates
Relative real fuel prices
New generation construction/permitting costs and schedule timing of new generations and/or transmission facilities
Purchased power cost, terms, availability, optionality, other benefits
Emission allowance pricing including sulfur dioxide, carbon dioxide, and nitrogen oxides
New and existing generation fixed and variable operations and maintenance costs
New and existing generation full and partial forced outage rates
Renewable penetration potential
SPP coal plant retirements
Demand-Side Management and Demand-Side Rates impacts on load
Demand-Side Management and Demand-Side Rates marketing and delivery costs
Behind the meter (BtM) solar and storage adoption
Any other uncertain factors that may be critical to the performance of the alternative resource plans

Preliminary Uncertain Factors Evaluation

Uncertain Factor	Evaluated?	Critical?	Comments
Load Growth	✓	✓	
Interest Rate	✓	✗	
Legal Mandates	✓	✗	
Fuel Prices	✓	✓	Only Nat. Gas prices critical
New Gen Construction / Permitting	✓	✗	
Purchase Power	✓	✗	
Emission Allowance Pricing	✓	✓	Only CO_2 Prices Critical
Gen O&M costs	✓	✗	
Force Outage Rates	✓	✗	
DSM / DSR Load Impacts	✓	✗	
DSM / DSR Costs	✓	✗	
SPP Renewable Penetration	✓	✗	
SPP Coal Retirements	✓	✗	
BtM Solar / Storage Adoption	○	TBD	
Other potential uncertain factors	TBD	TBD	

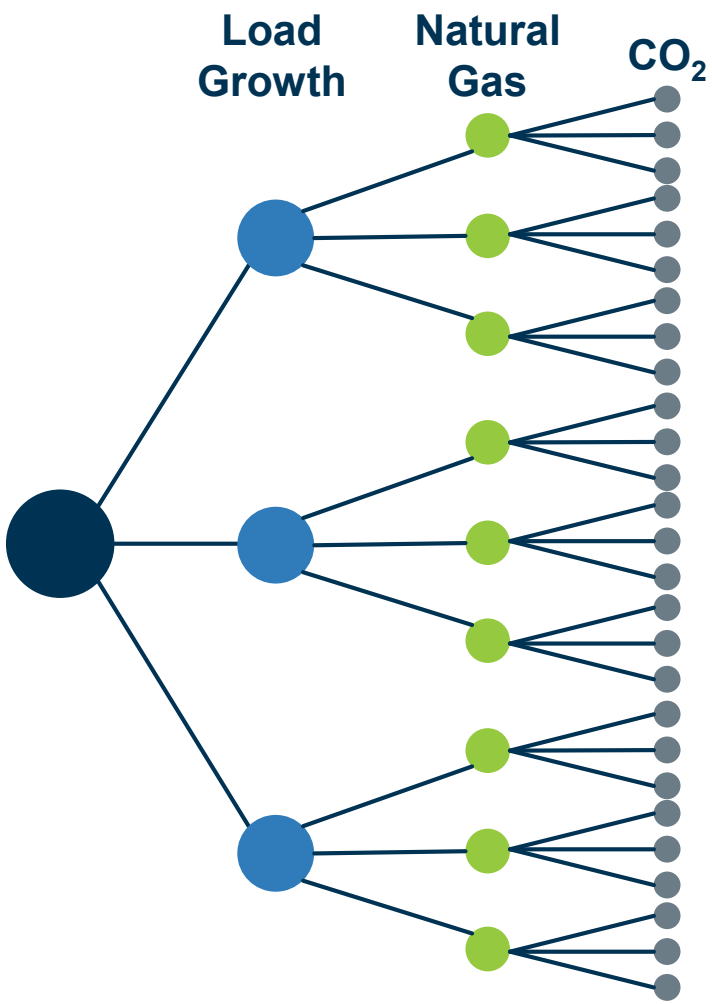
✓ **Evaluation complete**

○ **Evaluation planned, but not yet complete**

✓ **Currently considered "Critical"**

✗ **Not currently considered "Critical"**

Scenarios & Probabilities Modeled To-Date



Endpoint	Load Growth	Natural Gas	CO_2	Endpoint Probability
1	High	High	High	1.6%
2	High	High	Mid	3.1%
3	High	High	Low	1.6%
4	High	Mid	High	3.1%
5	High	Mid	Mid	6.3%
6	High	Mid	Low	3.1%
7	High	Low	High	1.6%
8	High	Low	Mid	3.1%
9	High	Low	Low	1.6%
10	Mid	High	High	3.1%
11	Mid	High	Mid	6.3%
12	Mid	High	Low	3.1%
13	Mid	Mid	High	6.3%
14	Mid	Mid	Mid	12.5%
15	Mid	Mid	Low	6.3%
16	Mid	Low	High	3.1%
17	Mid	Low	Mid	6.3%
18	Mid	Low	Low	3.1%
19	Low	High	High	1.6%
20	Low	High	Mid	3.1%
21	Low	High	Low	1.6%
22	Low	Mid	High	3.1%
23	Low	Mid	Mid	6.3%
24	Low	Mid	Low	3.1%
25	Low	Low	High	1.6%
26	Low	Low	Mid	3.1%
27	Low	Low	Low	1.6%

For each factor:
High – 25%
Mid – 50%
Low – 25%

Model Revenue Requirement & Other Key Metrics

Laura Becker

evergy™

Revenue Requirement Calculations

Combinations of Resource Retirements / New Generation / DSM over 20 years

Made up of Critical Uncertain Factors (e.g., may consist of different wholesale market prices)

Net Present Value of Revenue Requirement (NPVRR) results for **Individual Scenarios**

Expected Value of NPVRR across all Scenarios

Preliminary NPVRR Results – No CO_2 Restrictions

** Confidential **

LR 4/6: Lake Road 4/6 (97 MW/nat gas) H5: Hawthorn 5 (564 MW/coal) L4: Lawrence 4 (112 MW/coal) L5: Lawrence 5 (375 MW/coal) LaC1: LaCygne 1 (746 MW/coal) LaC2: LaCygne 2 (662 MW/coal) J1: Jeffrey 1 (663 MW/coal) J1: Jeffrey 2 (672 MW/coal) J1: Jeffrey 3 (669 MW/coal) J1: Iatan 1 (616 MW/coal)

Preliminary NPVRR Results – Mid-CO_2 Costs

** Confidential **

LR 4/6: Lake Road 4/6 (97 MW/nat gas) H5: Hawthorn 5 (564 MW/coal) L4: Lawrence 4 (112 MW/coal) L5: Lawrence 5 (375 MW/coal) LaC1: LaCygne 1 (746 MW/coal) LaC2: LaCygne 2 (662 MW/coal) J1: Jeffrey 1 (663 MW/coal) J1: Jeffrey 2 (672 MW/coal) J1: Jeffrey 3 (669 MW/coal) J1: Iatan 1 (616 MW/coal)

Preliminary NPVRR Results - High CO_2 Costs

** Confidential **

LR 4/6: Lake Road 4/6 (97 MW/nat gas) H5: Hawthorn 5 (564 MW/coal) L4: Lawrence 4 (112 MW/coal) L5: Lawrence 5 (375 MW/coal) LaC1: LaCygne 1 (746 MW/coal) LaC2: LaCygne 2 (662 MW/coal) J1: Jeffrey 1 (663 MW/coal) J1: Jeffrey 2 (672 MW/coal) J1: Jeffrey 3 (669 MW/coal) J1: Iatan 1 (616 MW/coal)

Preliminary NPVRR Results – Expected Value

** Confidential **

LR 4/6: Lake Road 4/6 (97 MW/nat gas) H5: Hawthorn 5 (564 MW/coal) L4: Lawrence 4 (112 MW/coal) L5: Lawrence 5 (375 MW/coal) LaC1: LaCygne 1 (746 MW/coal) LaC2: LaCygne 2 (662 MW/coal) J1: Jeffrey 1 (663 MW/coal) J1: Jeffrey 2 (672 MW/coal) J1: Jeffrey 3 (669 MW/coal) J1: Iatan 1 (616 MW/coal)

Next Steps

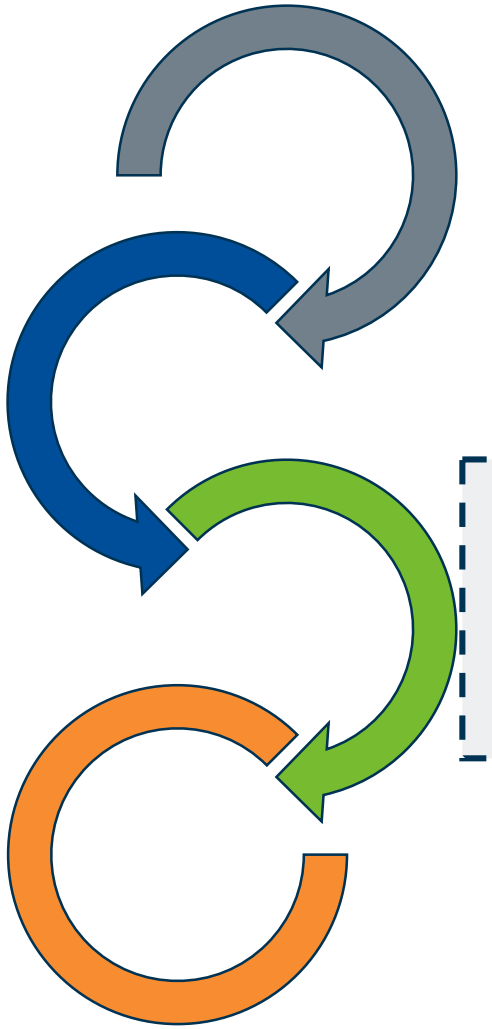
Triennial IRP Development Timeline

Gathering Input

July: Stakeholder meeting to discuss modeling assumptions / inputs

Reviewing Results

Q1 2021: Review updated results including detailed review of inputs outlined in IRP rules



Refining Assumptions and Inputs

Early April: 2020 Annual Update Stakeholder Meeting to introduce process

Conducting Analysis

Late Q3 – Early Q1: Stakeholder meeting(s) to discuss preliminary results

- **October 19 & 20th:** Initial review of preliminary results
- **Early-December:** Additional stakeholder meeting to review next round of results
- **Late-December – Early Q1**: Demand-Side (Electrification, DSM, BtM solar & storage) Focused Discussion
- ***As Needed:*** Topical meetings with specific stakeholders on comments received

Next Steps

Follow up via email with any specific comments to

Sarah.Gott@evergy.com

before October 30th