PNM 2023-2042 IRP: New IRP Rule, Gridworks Introduction, and Modeling Run Requests

PUBLIC ADVISORY GROUP MEETING #15
STEERING MEETING #12

MARCH 15, 2023

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MEETING GROUND RULES

THE FOCUS OF THE MEETING IS THE DEVELOPMENT OF THE 2023 IRP

01

- Questions and comments are welcome – one Person Speaks at a Time

02

- Reminder; today's presentation is not PNM's plan or a financial forecast, it is an illustration of the IRP process

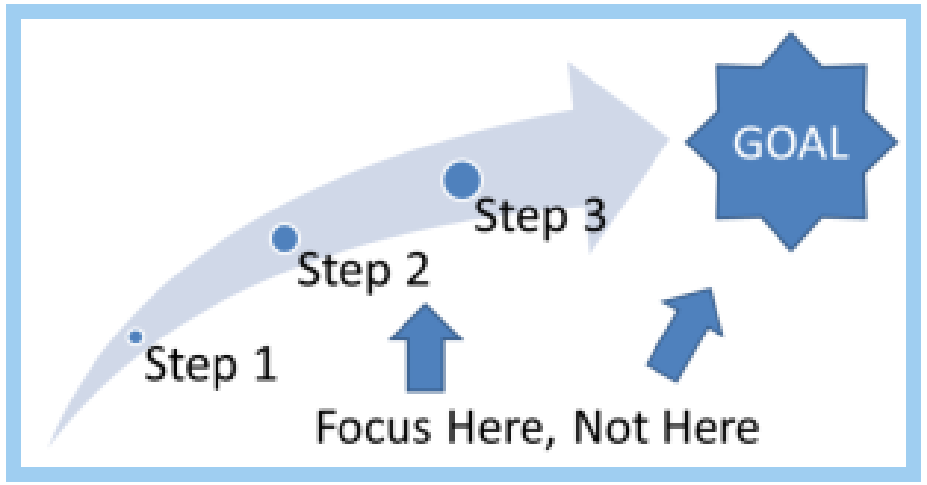
03

- When asking a question, please speak clearly and slowly as all questions will be logged and labeled with the person and organization responsible for asking the question

04

- These meetings are about the 2023 IRP, questions and comments should relate to this IRP. Any questions or comments related to other regulatory proceedings should be directed towards the specific filing.

THE FOCUS OF THE MEETING IS THE DEVELOPMENT OF THE 2023 IRP



The technical sessions are about discussing the advantages and disadvantages regarding the application of different technical methodologies within the IRP modeling framework.

We are not here to focus on the results or drive towards a specific result. **We all know where we are going: 100% Carbon Free by 2040. The focus in the IRP development is how do we get there in the best way possible for PNM's customers and New Mexico.**

MEETING AGENDA

- New IRP Rule
- Facilitated Stakeholder Process
- Discussion of Statement of Need and Action Plan
- Gridworks introduction
- Proposed Stakeholder engagement phases and tentative meeting schedule
- Invitation to participate and questions
- Discussion of modeling run requests

NEW IRP RULE AND THE PUBLIC PROCESS

- The PRC, through a rulemaking in Case No 21-000128-UT amended what is commonly referred to as the "IRP Rule" for Investor-Owned Utilities in the State of New Mexico (NMAC 17.7.3, which can be found here: https://www.srca.nm.gov/parts/title17/17.007.0003.html)
    - The new rule became effective on November 29, 2022, though there are appeals pending at the New Mexico Supreme Court
    - Under the new rule, PNMs IRP would have been due on September 1, 2023, rather than July 2023.
    - Section 17.7.3.9 describes a new Facilitated Stakeholder Process (FSP), which must start six months prior to filing the IRP
    - On February 17, 2023, PNM filed a motion seeking an extension on the IRP timeline
        - IRP filing date of December 15, 2023
        - Start the FSP on June 15, 2023
    - The PRC approved PNM's motion on March 1, 2023
- Over the next few months, we will transition from the Public Advisory Process begun under the old IRP rule to the new FSP
- We aim for the FSP to leverage all the Public Advisory work done so far, enhance outreach, and meet stakeholder expectations

FACILITATED STAKEHOLDER PROCESS (1 OF 2)

Key points related to the Facilitated Stakeholder Process outlined in 17.7.3.9

- The facilitator is appointed by the NMPRC – Gridworks has been selected
- The process commences 6 months prior to the filing of the IRP
- The goal is for the utility, commission utility division staff, and stakeholders to reach a potential agreement on a proposed Statement of Need (pursuant to 17.7.3.10 NMAC) and an Action Plan (pursuant to 17.7.3.11 NMAC)
- The NMPRC does not participate in the process, aside from the selection and appointment of the facilitator (though the NMPRC utility division staff are allowed to participate)
- The facilitator shall notify the commission and utility of any perceived or actual conflicts that arise during the facilitated process
- The utility shall provide commission utility division staff and other stakeholders who have signed a confidentiality agreement reasonable access to the same modeling software used by the utility on equal footing as the utility, and the utility shall share all modeling information.
    - The utility shall perform a reasonable number of modeling runs per staff or a stakeholder, if requested by staff or a stakeholder, in accordance with commission precedent
- The facilitator, in consultation with the utility, is to issue notice of facilitated stakeholder meetings, and to host and moderate facilitated stakeholder meetings, including but not limited to, preparing the agenda, and acting as the coordinator between the utility's presentation and the stakeholders' questions and comments

FACILITATED STAKEHOLDER PROCESS (2 OF 2)

- Not later than six months after the facilitated stakeholder process commences, the utility shall file the IRP with the commission, explaining all resolved and unresolved issues resulting from the facilitated process
- Written public comments may be filed within 30 days of the utility's filing of the IRP
    - Written public comments may include the commenter's own draft Statement of Need and Action Plan for commission review
    - Written public comments shall be made part of the utility's IRP as addendums
- The utility shall file, within 60 days of the utility's filing of the IRP, a written response to all timely filed written public comments, stating whether it adopts any of the written comments as amendments to the IRP and the reasons why or why not
- The commission's utility division staff shall consider the filed written public comments and the utility's written responses and shall file a statement with the commission within 90 days of utility's filing of the IRP as to whether the statement of need and action plan comply with the policies and procedures of this rule
- If the commission has not acted within 120 days of the filing of the IRP, the statement of need and action plan are deemed accepted as compliant with the IRP rule; if the commission determines that the statement of need or action plan do not comply with the requirements of the IRP rule, the commission shall identify the deficiencies and return it to the utility with instructions for re-filing

STATEMENT OF NEED

Statement of Need 17.7.3.10

- The statement of need is a description and explanation of the amount and the types of new resources, including the technical characteristics of any proposed new resources, to be procured, expressed in terms of energy or capacity, necessary to reliably meet an identified level of electricity demand in the planning horizon and to effect state policies.
- The statement of need shall not solely be based on projections of peak load. The need may be attributed to, but not limited by, incremental load growth, renewable energy customer programs, or replacement of existing resources, and may be defined in terms of meeting net capacity, providing reliability reserves, securing flexible resources, securing demand-side resources, securing renewable energy, expanding or modifying transmission or distribution grids, or securing energy storage as required to comply with resource requirements established by statute or commission decisions.

We want Stakeholders to start thinking about this now, as this is fundamental to the FSP

ACTION PLAN

Action Plan 17.7.3.11

- The utility's action plan shall:
    - Detail the specific actions the utility shall take to implement the IRP spanning a three-year period following the filing of the utility's IRP
    - Detail the specific actions the utility shall take to develop any resource solicitations or contracting activities to fulfill the statement of need as accepted by the commission
    - Include a status report of the specific actions contained in the previous action plan
- The utility shall update the commission by filing two reports describing the utility's implementation of the action plan. These reports shall be filed in the existing IRP docket one year after the filing of the IRP, and two years after the filing of the IRP, respectively
- An action plan does not replace or supplant any requirements for applications for approval of resource additions set forth in New Mexico law or commission regulations
- The utility shall promptly notify the commission and participants of material events that would have the effect of changing the results of the utility's action plan had those events been recognized when the action plan was developed
- In accepting the action plan, the commission shall take into consideration contractual obligations as between the utility and any regional transmission organizations or balancing authorities of which the utility is a member

The decarbonization of our economy is within reach, and more important than ever.

We convene, educate, and empower stakeholders working to decarbonize our economy.

GRIDWORKS

www.gridworks.org
GRIDWORKS is a non-profit organization.

GRIDWORKS' Team Members for New Mexico IRP Activities

Deborah Shields
Project Administrator

Amanda Ormond
Facilitator

Margie Tatro
Facilitator

Matthew Tisdale
Executive Director, Gridworks

Stakeholder Engagement Envisioned to Include Three Phases

March – May	June – August	Sept – Nov → IRP Dec. 15
March 28: 9-10:30 AM May 4: 9 – 3 workshop May 18, Tentative	June 1 and 15, Tentative June 29, possible workshop, Tentative July 13 and August 17, Tentative	Sept. 14, Tentative Oct 19, Tentative Dec. 19, Tentative
1: Grounding and Statement of Need	2: Model Runs and Produce Action Plans	3: IRP Reviews
Grounding Includes: System Requirements, Resource Options, and possibly Load Scenarios. Stakeholder engagement is intense and focuses on the big picture. Builds on 12 prior months of PNM's Public Advisory Process.	Stakeholder Modeling Subgroup runs own models or reviews and engages with utility modelers. Action Plans are developed. Engagement is intense for those with modeling interest/expertise.	Reviews monthly by all interested stakeholders for feedback, areas where utility needs input, etc. Stakeholder Engagement is less intense than previous two phases.

You are Invited to Participate as Stakeholders

- Stakeholders are expected to:
  - **Provide actionable feedback regarding Statement of Need, Action Plan, and IRP Drafts.**
  - Attend as many meetings as possible. Review meeting materials in advance. Review summaries from meetings, especially if a meeting is missed.
  - Work offline in subgroups, if interested.
  - Serve as respectful, active participants during discussions.
  - Consider views and input of other stakeholders.
  - Share experience and expertise, perhaps presenting to the group, as needed.
- Please let us know if there are stakeholders that you feel need to be represented in this process. The Gridworks team will invite any missing voices to participate.
- We look forward to our first Facilitated Stakeholder Engagement Meeting, **March 28, 9:00 – 10:30 AM**.

You will have the opportunity to state is important to you in this process, volunteer to work in subgroups on specific topics, provide feedback, and ask questions.

Questions?

Also, please feel free to contact Margie Tatro at:
mtatro@gridworks.org
505-205-0838

GRIDWORKS

PUBLIC ADVISORY PROCESS GOING FORWARD

- Going forward, we will begin the transition to the Gridworks facilitated process
- The PNM Public Advisory meetings scheduled for April and May will be replaced with meetings facilitated by Gridworks
- All further communications from PNM and Gridworks will be coordinated
- Our first meeting of the new process will be on March 28, 2023 – we hope you will attend

MODELING RUN REQUESTS

MODELING RUN REQUESTS

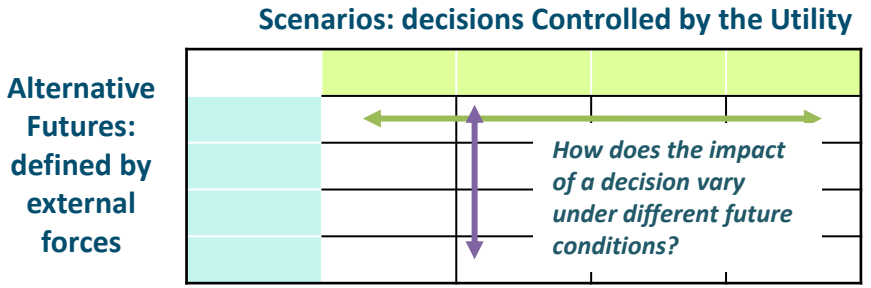
- We anticipate a modeling request sub-group that will work to develop modeling run requests within the Facilitated Process
- One of the deliverables from the modeling request sub-group will be identification of a consensus set of modeling runs for PNM to implement on behalf of all stakeholders
    - If a requested modeling run is not possible, PNM will provide a discussion of why such a run is not possible, and suggest a potential alternative to the requested run
- PNM will provide a list of modeling runs PNM intends to complete in the IRP analysis

Process for requesting a modeling run (not already conducted by PNM):

1. Create technological scenarios by grouping technologies to evaluate
2. Choose future
3. Choose one or more sensitivities to augment base future assumptions (optional)
    - If more than one sensitivity is selected, an examination must be conducted to make sure the sensitivities implied in the chosen future do not conflict with additional sensitivities

TERMINOLOGY AND MODELING FRAMEWORK

- A **scenario** describes potential key decisions made by PNM
- A **future** consists of a set of forecasts or conditions that describe a future state of the world; PNM generally has no ability to influence factors that determine which future becomes reality
- A **sensitivity** describes a change in a single element of a given future; sensitivity analysis is used to understand how sensitive the results are to the changed variable



Utility decisions;
future portfolio choices made by the utility to meet objectives
e.g., resources considered, plant retirements

Scenarios

Futures

External forces; certain or uncertain variables outside of utility's control that present risks
e.g., gas price, load forecast, technology prices

Variation of selected parameter or variable within a scenario in order to understand its impact on key metrics

Sensitivities

PNM SCENARIOS FOR PHASE 1 MODELING

Base technologies only

PNM relies on solar, wind, and storage (li-ion) to meet future need and carbon emission reduction goals

Modeling allows for additions of generic resources in the base case and across all scenarios:

- Solar (beginning in 2026)
- Wind (beginning in 2033 – to compare against the Base + Wind Exp.)
- Battery storage – 4-hr, with the option to convert to 8-hour (beginning in 2026)
- In other scenarios, additions of these resources are optimized around the addition of scenario resources

Base + long-duration Storage

PNM makes a commitment to add long-duration storage in the 2028-2033 timeframe

Allow model to optimize additions of long duration storage projects beginning in 2028 (earliest COD tied to RFI):

- 85% efficiency storage resource with long-duration/mid-ramp (70-hr) (i.e., PHS)
- Shorter duration variant
- ~40% efficiency storage resource with mid-duration/long-ramp (100-hr) (Form)

Base + natural gas

PNM allows new build of natural gas resources that will be converted to utilize hydrogen in 2040

Allow model to optimize additions of natural gas-fired projects beginning in 2026-2033:

- Generic gas project in any location
  - La Luz project (LM6000) /Pinion project (LM6000) – option to force addition if indicated by RFP analysis
- Linear generator units
- H2 conversion assumes H2 economy

Base + wind expansion

PNM seeks strategic transmission expansion in the late 2020's/early 2030s

Transmission project added in 2030-2032 timeframe:

- New transmission project reflects a new "pipe", with access to new "bubble" containing wind resources
- Allow for optimization regarding:
  - When to add the transmission line
  - The amount of new wind to add

Base + carbon capture

PNM relies on carbon capture and sequestration technologies to meet future capacity need

Allow model to optimize additions of carbon capture and storage technologies beginning in 2028:

- Existing CCGT fitted with Carbon Capture and Storage (CCS) technology
- New or existing CT with CCS
- Net Power Plant with CO2 transport and storage

Base + H2/early gas conversion

PNM pilots use of hydrogen before 2040 by creating green hydrogen via electrolysis for use in new or existing CTs

- A hydrogen facility will include electrolysis, on-site storage, and CT for combustion
- Hydrogen tax credits applied
- Allow model to optimize additions of hydrogen facilities starting in 2028:
  - Small project (250 MW), greenfield and brownfield options
  - Large project (500 MW), greenfield and brownfield options

2023 IRP CORE FUTURES

Key assumption	Current Trends & Policy	High Economic Growth	Low Economic Growth	National Carbon Policy (Carbon-free by 2035)
Load forecast	Mid	High	Low	High
BTM PV forecast	Mid	High	Low	High
EV adoption forecast	Mid	High	Low	High
Building Electrification Forecast	Mid	Mid	Mid	High
Economic development	Limited	Accelerated	Limited	Stable
Gas price forecast	Mid	Mid	Low	High
Carbon price forecast	Mid	Mid	Mid	High
Technology cost forecast	Mid	Mid	Mid	Low

2023 IRP SENSITIVITIES

	Sensitivity	Load forecast	Economic Development	BTM PV forecast	EV adoption forecast	Building electrification	Gas price forecast	CO2 price forecast	Technology costs	IRA tax credits & incentives
Load	High load	High	Limited ED	Mid	Mid	Mid	Mid	Mid	Mid	Extended
	Strong ED growth	Mid	Stable	Mid	Mid	Mid	Mid	Mid	Mid	Extended
	Very strong ED growth	Mid	Accelerated	Mid	Mid	Mid	Mid	Mid	Mid	Extended
	Extreme weather	P90 hot/cold	Limited ED	Mid	Mid	Mid	Mid	Mid	Mid	Extended
	Low load	Low	Limited ED	Mid	Mid	Mid	Mid	Mid	Mid	Extended
	TOU pricing	TOU shaping	Limited ED	Mid	Mid	Mid	Mid	Mid	Mid	Extended
BTM	High BTM PV	Mid	Limited ED	High	Mid	Mid	Mid	Mid	Mid	Extended
	Low BTM PV	Mid	Limited ED	Low	Mid	Mid	Mid	Mid	Mid	Extended
	No BTM PV	Mid	Limited ED	Zero	Mid	Mid	Mid	Mid	Mid	Extended
	High EV adoption	Mid	Limited ED	Mid	High	Mid	Mid	Mid	Mid	Extended
	Low EV adoption	Mid	Limited ED	Mid	Low	Mid	Mid	Mid	Mid	Extended
	High building electrification	Mid	Limited ED	Mid	Mid	High	Mid	Mid	Mid	Extended
	DERMS	Mid	Limited ED	High	High	Mid	Mid	Mid	Mid	Extended
Gas price	High gas price	Mid	Limited ED	Mid	Mid	Mid	High	Mid	Mid	Extended
	Low gas price	Mid	Limited ED	Mid	Mid	Mid	Low	Mid	Mid	Extended
Carbon price	IRP rule $40 CO2 price	Mid	Limited ED	Mid	Mid	Mid	Mid	$40/ton	Mid	Extended
	IRP rule $20 CO2 price	Mid	Limited ED	Mid	Mid	Mid	Mid	$20/ton	Mid	Extended
	IRP rule $8 CO2 price	Mid	Limited ED	Mid	Mid	Mid	Mid	$8/ton	Mid	Extended
	PNM high CO2 price	Mid	Limited ED	Mid	Mid	Mid	Mid	High	Mid	Extended
	PNM mid CO2 price	Mid	Limited ED	Mid	Mid	Mid	Mid	Mid	Mid	Extended
	PNM low CO2 price	Mid	Limited ED	Mid	Mid	Mid	Mid	Low	Mid	Extended
Technology costs	Fast technology advancement	Mid	Limited ED	Mid	Mid	Mid	Mid	Mid	Low	Extended
	Slow technology advancement	Mid	Limited ED	Mid	Mid	Mid	Mid	Mid	High	Extended
	IRA tax credits expire	Mid	Limited ED	Mid	Mid	Mid	Mid	Mid	Mid	Expire 2032-2034

TECHNOLOGIES BY SCENARIO

As defined:

Base technologies only

- Solar
- Wind (beginning in 2033)
- Battery storage (4-hr)
- *Additions of these technologies optimized in all scenarios*

Base + long-duration Storage

- Long-duration Pumped-hydro storage (70-hr)
- Shorter duration Pumped-hydro storage (8 to 12-hr)
- Long-duration iron-air storage (100-hr)

Base + natural gas

- Generic gas project (Combustion turbine)
- Linear generator units
- *All resources converted to burn Hydrogen in 2040*

Base + wind expansion

- New transmission project reflects a new “pipe”, with access to new “bubble” containing wind resources

Base + carbon capture

- Existing CCGT fitted with Carbon Capture and Storage (CCS) technology
- New or existing CT with CCS
- Net Power Plant with CO2 transport and storage

Base + H2/early gas conversion

- Hydrogen facility with on-site electrolysis, storage, and CT for combustion
  - Small project (250 MW), greenfield and brownfield options
  - Large project (500 MW), greenfield and brownfield options

Other technology options:

- Concentrated solar power with thermal energy storage
- Thermal energy storage (steam turbine)
- Flow battery (10-hr)
- Compressed Air storage
- Liquid air storage

- Option to add other resources to bubble in addition to/in place of wind

MODELING RUN CREATION BY STEP

Step 1: define scenario – choose technologies

- Base technologies
- Long duration storage
- Natural gas
- Transmission expansion
- Carbon capture & storage
- Early adoption H2

Step 2: Choose future under which to evaluate scenario

- Current Trends & Policy
- High Economic Growth
- Low Economic Growth
- National carbon policy

Step 3: Choose one or more sensitivities to augment base future assumptions (optional)

Load
- **High load**
- Strong ED growth
- Very strong ED growth
- Extreme weather
- Low load
- TOU pricing

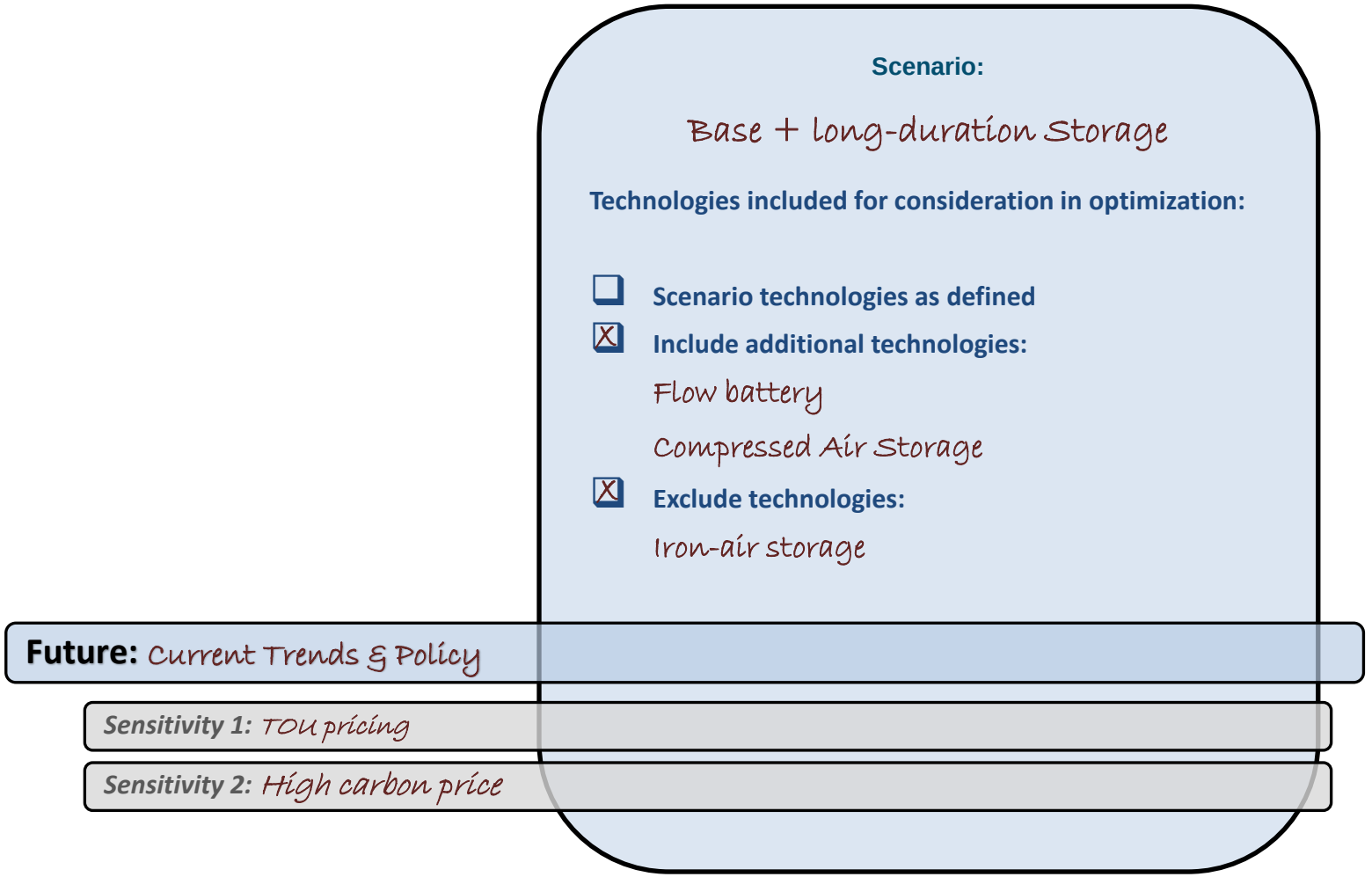
Technology costs
- Fast technology advancement
- Slow technology advancement
- IRA tax credits expire

Gas price
- High gas price
- Low gas price

Behind-the-meter
- High BTM PV
- Low BTM PV
- No BTM PV
- High EV adoption
- Low EV adoption
- High building electrification
- DERMS

Carbon price
- IRP rule $40 CO2 price
- IRP rule $20 CO2 price
- IRP rule $8 CO2 price
- PNM high CO2 price
- PNM mid CO2 price
- PNM low CO2 price

MODELING RUN EXAMPLE



NEAR TERM SCHEDULE

FUTURE MEETING TIME & LOCATION

When: March 28, 2023

Topics: Stakeholder Engagement kick-off

Start Time: 9:00 AM

Location: Virtual

Thank you