Best Practices in IRP: Stakeholder perspective

EPRI's 44th Annual Seminar on Resource Planning for Electric Power Systems

November 5, 2025

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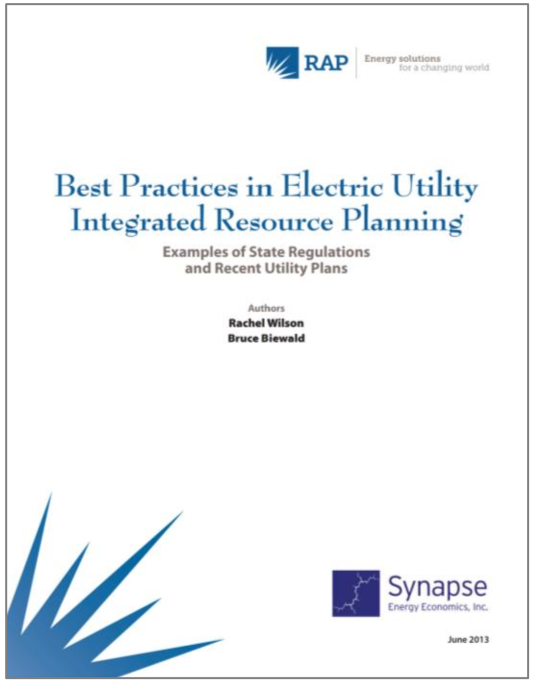
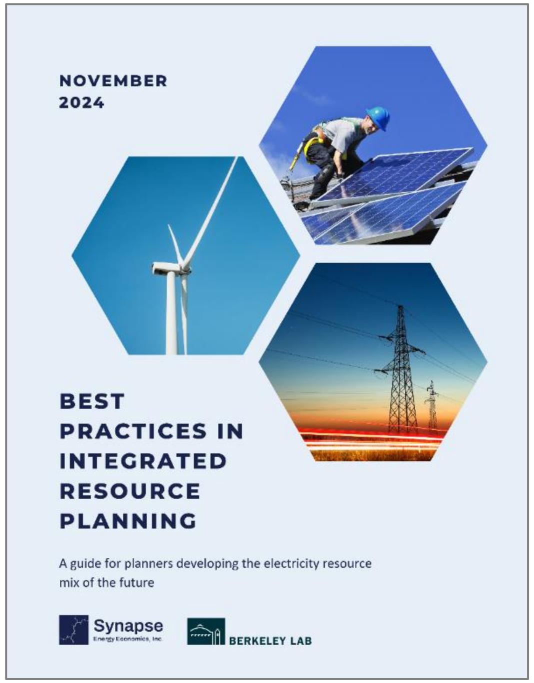
- Founded in 1996 by Bruce Biewald and Jean Ann Ramey
- Leader for public interest and government clients in providing rigorous analysis of the electric power and natural gas sectors
- Staff of 40+ includes experts in energy, economic, and environmental topics
- Authored two Best Practices guides for Integrated Resource Planning
  - 2013 with Regulatory Assistance Project
  - 2024 with Lawrence Berkely National Laboratory
- Experts regularly provide technical assistance (including independent modeling), support stakeholder participation, and file comments and testimony in IRP dockets around the country





Best practices in IRP

50 Best Practices Checklist

I. Stakeholder engagement

- **Best Practice 1:** Use an inclusive stakeholder process
- **Best Practice 2:** Engage technical stakeholders in IRP modeling

II. Resource adequacy

- **Best Practice 3:** Link resource adequacy assessments with resource planning
- **Best Practice 4:** Apply consistent accreditation frameworks to all resource types
- **Best Practice 5:** Use a regional perspective to plan for resource adequacy

III. Developing model inputs

- **Best Practice 6:** Use up-to-date inputs and assumptions
- **Best Practice 7:** Recognize historical data limitations

Load Inputs

- **Best Practice 8:** Develop a load forecast for the expected future
- **Best Practice 9:** Incorporate load flexibility into electrification forecasts
- **Best Practice 10:** Plan ahead for large growth
- **Best Practice 11:** Transparently represent distributed generation and storage

Supply-side resource inputs

- **Best Practice 12:** Use accurate assumptions for the costs of new resources
- **Best Practice 13:** Represent the full cost and risk of advanced technologies
- **Best Practice 14:** Include realistic assumptions about resource availability timing, without unnecessary constraints
- **Best Practice 15:** Limit renewable integration cost adders
- **Best Practice 16:** Model all avoidable forward-going resource costs
- **Best Practice 17:** Model battery energy storage options
- **Best Practice 18:** Be consistent in treatment of emerging technologies

Demand-side resource inputs

- **Best Practice 19:** Ensure thoughtful and consistent assumptions for demand-side resources
- **Best Practice 20:** Model and bundle demand-side resources carefully
- **Best Practice 21:** Ensure consistency with IRP scenarios
- **Best Practice 22:** Incorporate all relevant benefits for demand-side resources

Market inputs

- **Best Practice 23:** Use reasonable market interaction assumptions

Fuel and commodity inputs

- **Best Practice 24:** Model fuel supply limitations
- **Best Practice 25:** Evaluate the impacts of gas price volatility and coal supply constraints

Transmission inputs

- **Best Practice 26:** Consider transmission alternatives and infrastructure expansion
- **Best Practice 27:** Properly justify bulk power system interconnection costs and constraints

IV. Designing scenarios and sensitivities

- **Best Practice 28:** Model a base case that allows for easy comparison
- **Best Practice 29:** Design scenarios to evaluate uncertainty and risk
- **Best Practice 30:** Plan for and incorporate important regulatory factors

V. Running the models (and iterating)

- **Best Practice 31:** Thoughtfully select capacity expansion and production cost models
- **Best Practice 32:** Thoughtfully select a geographic model scale
- **Best Practice 33:** Thoughtfully define the appropriate study period
- **Best Practice 34:** Thoughtfully select the appropriate time granularity for production cost modeling
- **Best Practice 35:** Calibrate the production cost and capacity expansion models
- **Best Practice 36:** Let optimization models optimize
- **Best Practice 37:** Base power plant retirement decisions on forward-looking costs
- **Best Practice 38:** Use modeling parameters that capture the value of battery energy storage
- **Best Practice 39:** Use stochastic approaches for robust portfolio creation
- **Best Practice 40:** Use the models iteratively

VI. Evaluating portfolio results and communicating transparently to regulators and stakeholders

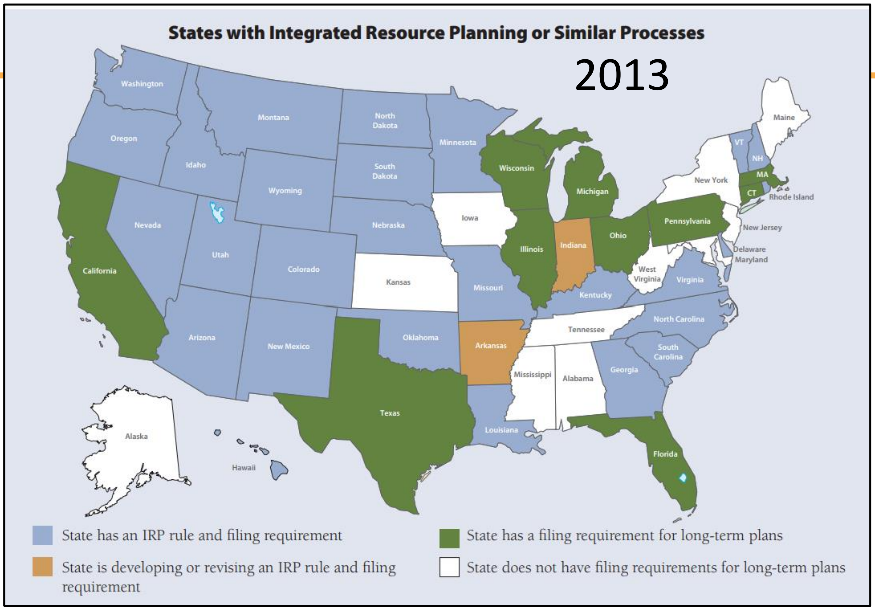
- **Best Practice 41:** Use appropriate metrics to evaluate IRP results
- **Best Practice 42:** Report results clearly
- **Best Practice 43:** Benchmark inputs and results to other utilities
- **Best Practice 44:** Select a preferred portfolio
- **Best Practice 45:** Model state goals and priorities in preferred portfolio

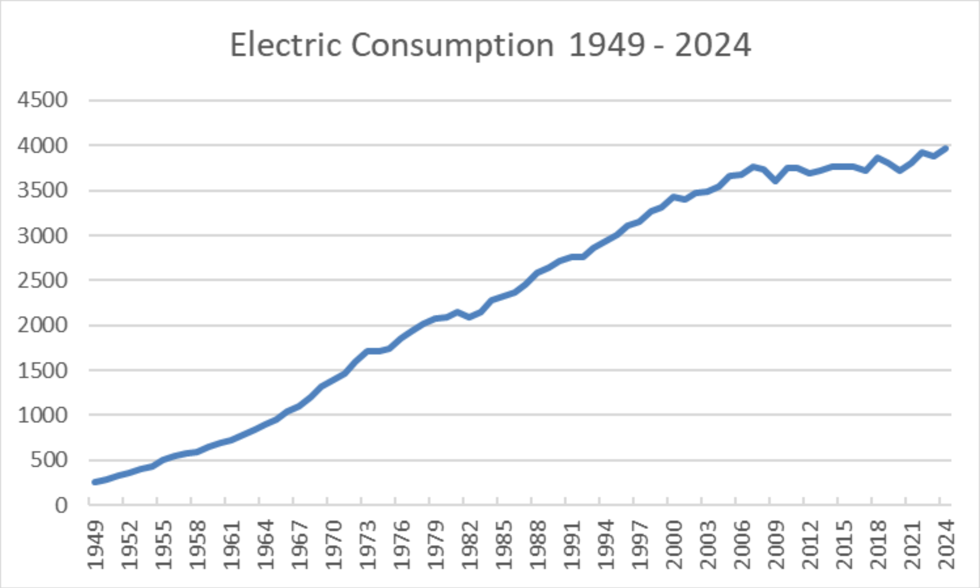
VII. Integrating the IRP process with other utility proceedings

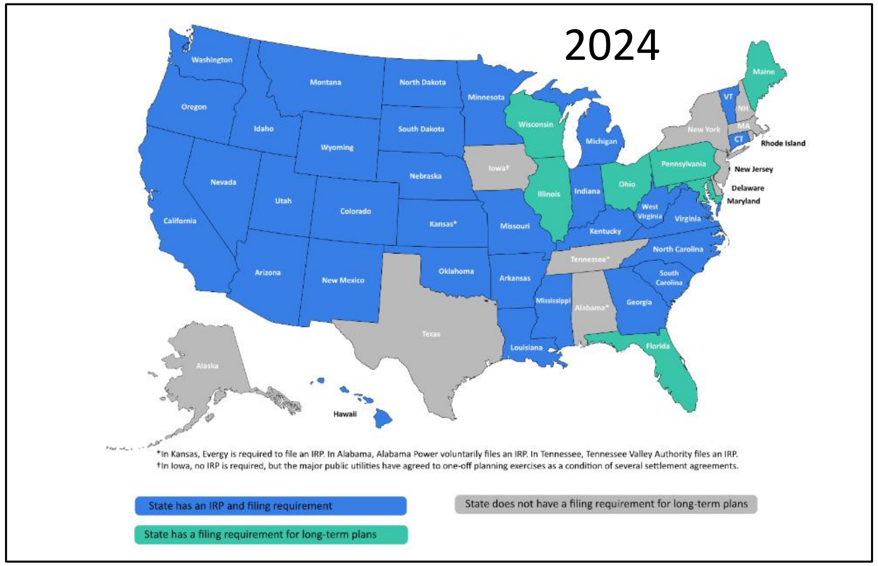
- **Best Practice 46:** Use IRP results to inform an Action Plan and utility procurement processes
- **Best Practice 47:** Use IRP results to inform other types of planning
- **Best Practice 48:** Evaluate bill impacts
- **Best Practice 49:** Consider energy justice comprehensively
- **Best Practice 50:** Consider the evolving natural gas distribution industry

How has resource planning changed?

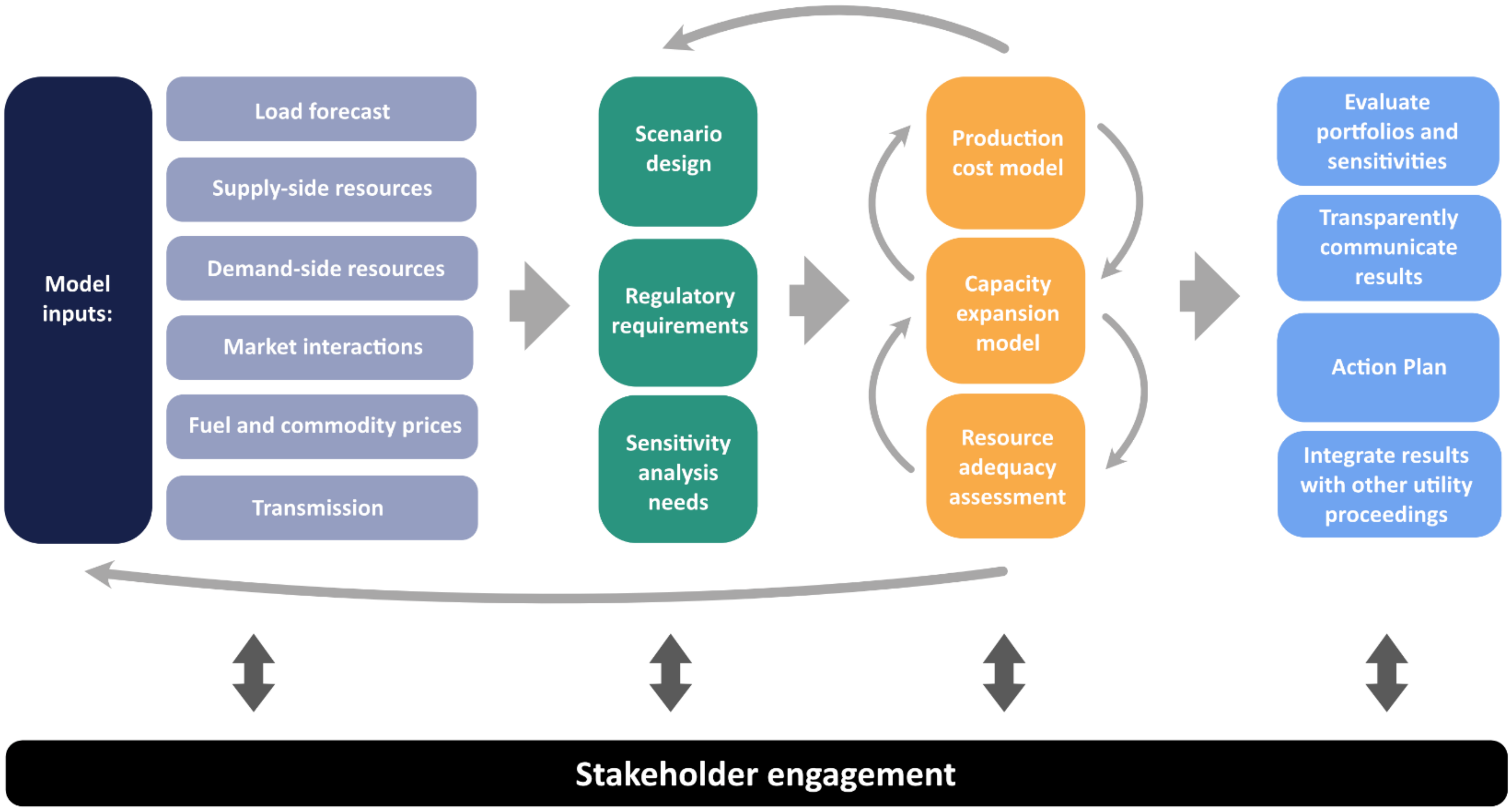
- Several states have added resource planning requirements
- Electricity consumption went from flat to rising again (large load)
- Pace of fossil retirements has slowed
- Resource supply chain, permitting, and interconnection constraints
- High deployment of renewables
- Regulatory uncertainty







Stakeholder engagement occurs throughout the entire IRP process



Engaging stakeholders: art vs science

	Stakeholder engagement should balance
Information access	Too little information with information over-load • *Sharing too little can inhibit oversight, but sharing too much can overwhelm stakeholder resources*
Time commitment	Time commitment of both the utility and stakeholders • *Too many meetings and time required can exhaust stakeholder resources and take away from utility planning and modeling time.*
Audience	Engagement of general public and leveraging of technical stakeholders • *Technical stakeholders will want more detailed information but the public will need digestible synthesis*
Stakeholder priorities	Stakeholder priorities and requests with utility priorities / obligations • *Cost, reliability, social and environmental impact*

Engaging stakeholders

Use an inclusive stakeholder process

- Design an inclusive process that balances access and transparency with reasonable time commitments
  - Intentionally establish process norms to collect and respond to feedback
  - Remove barriers to participation
  - Prioritize transparency
- Example
  - In 2022, the New Mexico Public Regulation Commission established rules to promote engagement and transparency. The rules mandated a facilitated stakeholder process, reasonable access to modeling software, and sharing of all modeling information.

Engaging stakeholders

Engage technical stakeholders in IRP modeling

- Provide modeling files and other information to allow technical stakeholders to replicate modeling outcomes and develop alternative portfolios
  - Input data
  - Explanations of how the utility used input data and values
  - Spreadsheets used for pre-processing and post-processing of inputs and results
  - Software licenses paid for by the utility
- Examples
  - As part of the Arizona Public Service 2023 IRP process, the commission required the utility to provide intervenors with software licenses, modeling files, and trainings with the model developer.

Encourage engagement and feedback in developing inputs and scenarios

Public input data

Public data on resource cost and resource assumptions

- *Request for proposals can be the best source of resource cost data but are often confidential. To the extent possible, use public data or benchmark results to public data.*

Public reports

Make input studies and reports public and solicit feedback

- *Any resource capacity accreditation, reserve margins, efficiency potential studies performed outside the IRP process should be public and participation/ feedback during these processes should be permitted.*

Base case

Model a base case(s) that allows for easy comparison

- *Develop base cases for all relevant scenarios and sensitivities (i.e. different loads).*

Stakeholder scenarios

Design scenarios with input from stakeholders

- *Offer stakeholders the option to model a reasonable number of stakeholder scenarios.*

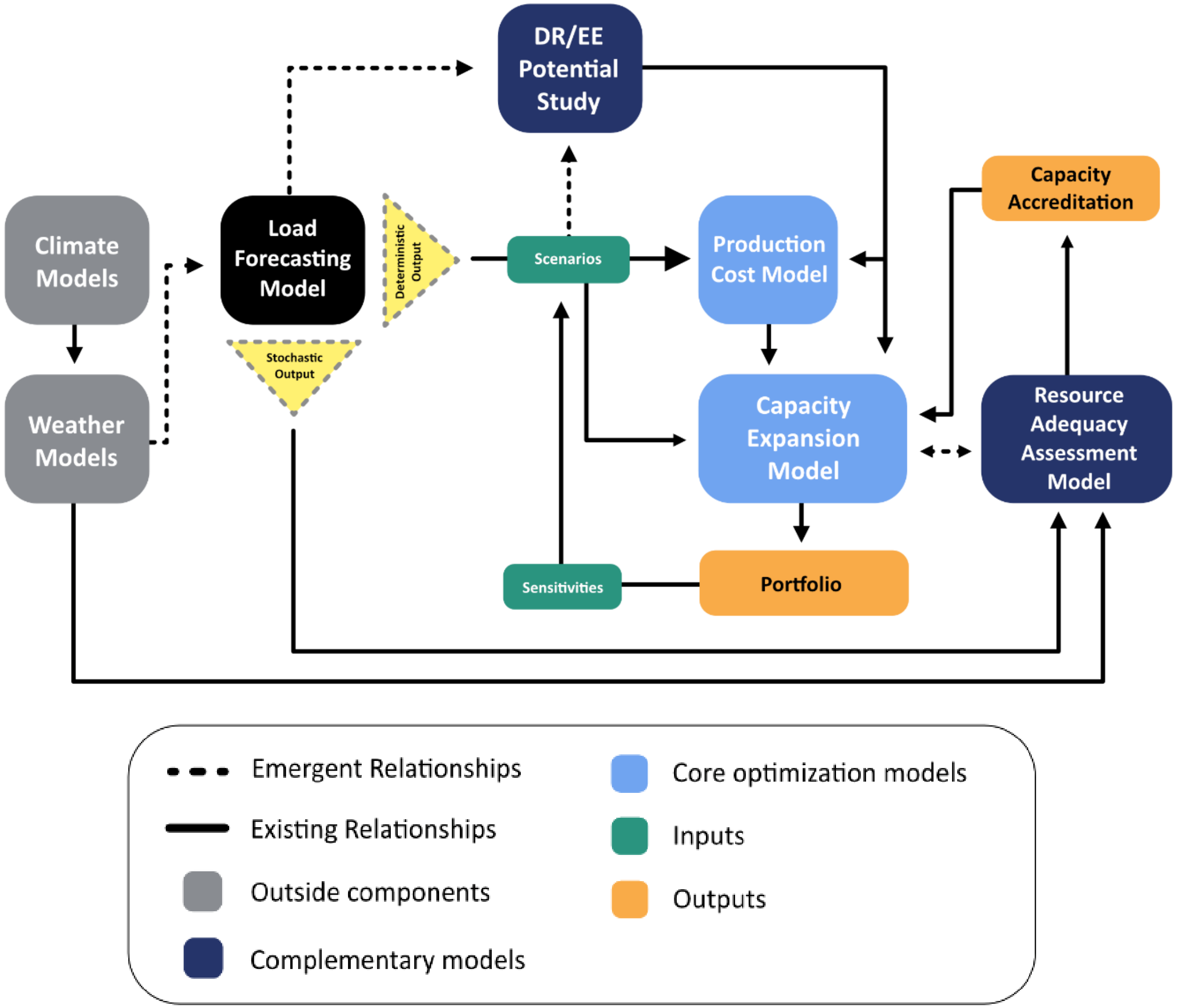
Risk and uncertainty

Model scenarios that evaluate real and likely futures

- *Model scenarios that clearly capture the biggest risks and uncertainties facing the utility even if the results are inconvenient to reconcile with preferred plans of action.*

IRPs modeling is complicated; stakeholders can provide valuable expertise across the IRP process

- Stakeholders can contribute expertise to distinct elements of the IRP process
  - Climate and weather modeling
  - Load, especially electrification, EVs
  - Demand-side management and energy efficiency
  - Production cost and capacity expansion modeling
  - Resource adequacy modeling
- Commissions and Staff often don't have the tools or technical staff across the full range of IRP modeling and planning
- Stakeholder expertise is valuable to resource planning



Evaluating and communicating results

Use appropriate metrics to evaluate IRP results

- At the outset of the IRP process, define core metrics that are aligned with region-specific needs and goals to avoid skewing results towards a predetermined outcome
- Collaborate with stakeholders and regulators when defining metrics

	Affordability	Environmental Sustainability						Reliability, Stability & Resiliency	Risk & Opportunity							Economic Impact	
	20-yr PVRR	*CO_2 Emissions*	*SO_2 Emissions*	*NO_x Emissions*	*Water Use*	*Coal Combustion Products (CCP)*	*Clean Energy Progress*	*Reliability Score*	*Environmental Policy Opportunity*	*Environmental Policy Risk*	*General Cost Opportunity **Stochastic Analysis***	*General Cost Risk **Stochastic Analysis***	*Market Exposure*	*Renewable Capital Cost Opportunity (Low Cost)*	*Renewable Capital Cost Risk (High Cost)*	*Generation Employees (+/-)*	*Property Taxes*
	Present Value of Revenue Requirements ($000,000)	Total portfolio CO2 Emissions (mmtons)	Total portfolio SO2 Emissions (tons)	Total portfolio NOx Emissions (tons)	Water Use (mmgal)	CCP (tons)	% Renewable Energy in 2032	Composite score from Reliability Analysis	Lowest PVRR across policy scenarios ($000,000)	Highest PVRR across policy scenarios ($000,000)	P5 [Mean - P5]	P95 [P95 – Mean]	20-year avg sales + purchases (GWh)	Portfolio PVRR w/ low renewable cost ($000,000)	Portfolio PVRR w/ high renewable cost ($000,000)	Total change in FTEs associated with generation 2023 - 2042	Total amount of property tax paid from AES IN assets ($000,000)
1	$ 9,572	101.9	64,991	45,605	36.7	6,611	45%	7.95	$ 8,860	$ 11,259	$ 9,271	$ 9,840	5,291	$ 9,080	$ 10,157	222	$ 154
2	$ 9,330	72.5	13,513	22,146	7.9	1,417	55%	7.95	$ 8,564	$ 11,329	$ 9,030	$ 9,746	5,222	$ 8,763	$ 9,999	99	$ 193
3	$ 9,773	88.1	45,544	42,042	26.7	4,813	52%	7.86	$ 9,288	$ 11,462	$ 9,608	$ 10,237	5,737	$ 9,244	$ 10,406	195	$ 204
4	$ 9,618	79.5	25,649	24,932	15.0	2,700	48%	7.90	$ 9,135	$ 11,392	$ 9,295	$ 9,903	5,512	$ 9,104	$ 10,249	74	$ 242
5	$ 9,711	69.8	25,383	24,881	14.8	2,676	64%	7.57	$ 9,590	$ 11,275	$ 9,447	$ 10,039	6,088	$ 9,017	$ 10,442	55	$ 256
6	$ 9,262	76.1	18,622	25,645	10.9	1,970	54%	7.95	$ 8,517	$ 11,226	$ 8,952	$ 9,629	5,136	$ 8,730	$ 9,909	88	$ 185

Example:

- AES Indiana developed the evaluation categories for its IRP scorecard based on a set of pillars for electric utility service defined by a task force created by the Indiana General Assembly

Evaluating and communicating results

Select a Preferred Portfolio and develop a near-term action plan

It is important to select a preferred portfolio to guide near-term actions such as procurement.

- Without a preferred portfolio, it is challenging for stakeholders and regulators to focus their feedback and oversight
- The utility's selection of a preferred portfolio does not necessarily tie the utility to that portfolio over the long term, especially if conditions change
- Develop a near-term (1-4 year) action plan that distinguishes between near-term action requiring immediate implementation and long-term planning

Best practices for selecting a preferred portfolio

- Justify substantial deviations from the optimized portfolio when selecting a preferred portfolio
- Avoid developing portfolios outside of the model that are not subject to the same level of sensitivity and risk analysis as the other scenarios
- Align the preferred portfolio with articulated state goals and priorities

Integrate the IRP results with other proceedings

Avoid planning in a silo from other utility proceedings and instead use IRP results to inform:

Procurement	Near-term CPCNs or RFPs • *Procurement processes and approval dockets should be informed by IRP results*
Transmission and distribution systems	Transmission and distribution planning • *Separate processes for each with large cost implications*
Bill impacts / cost allocation	Cost to existing and new customers • *Bill impacts of proposed resource portfolio, cost allocation for new large loads especially*
Energy justice	Energy justice stakeholders • *Engagement within IRP proceedings rather than in distinct environmental justice proceedings*
Natural gas system	Natural gas utility planning and system impacts • *Electric system and gas systems are linked in many ways*

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