2015 Integrated Resource Plan

IRPWG Meeting

Session 3

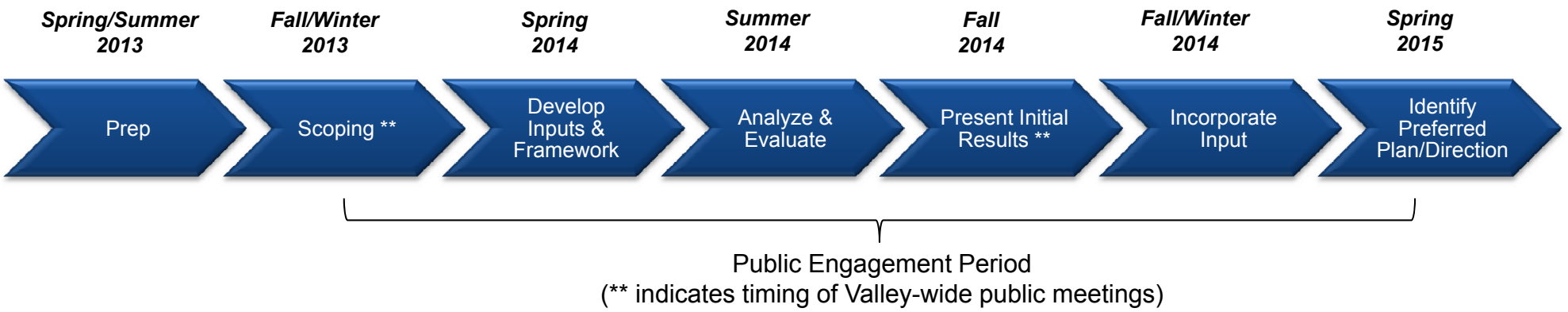
January 13, 2014

IRPWG Meeting – January Agenda

9:30	Welcome
9:45	IRP Benchmark: Scenarios and Key Uncertainties
10:00	2015 IRP Scenario Design: • Questions and Comments Received from the IRPWG • List of Critical Uncertainties • List and Description of Scenarios Being Proposed
10:45	*Break*
11:00	2015 IRP Scenario Design (Cont.): • Initial Scenario Ranking Results
12:00	*Lunch*
12:45	2015 IRP Scenario Design (Cont.): • Additional Scenarios Proposed by the IRPWG
1:45	*Break*
2:00	Concepts in Strategy Design
3:00	Next Steps
3:15	Wrap-up
3:30	Adjourn

2015 IRP Schedule: Major Project Phases and Milestones

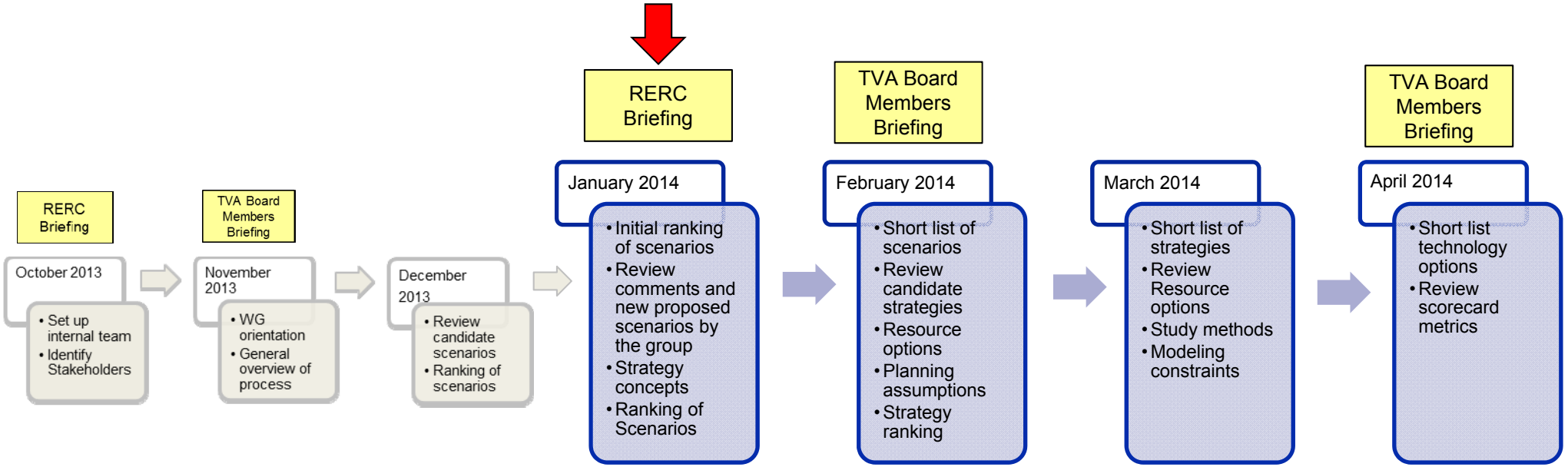
The 2015 IRP is intended to ensure transparency and enable stakeholder involvement.



Key tasks/milestones in this study timeline include:

- Establish stakeholder group and hold first meeting (Nov 2013)
- Complete first modeling runs (June 2014)
- Publish draft Supplemental Environmental Impact Statement (SEIS) and IRP (Nov 2014)
- Complete public meetings (Jan 2015)
- Final publication of SEIS and IRP and Board approval (exp. Spring 2015)

January 13th IRPWG Meeting Objectives



During today's meeting we aim to accomplish the following objectives:

- Share the comments and questions received from the group about the scenarios proposed during December's session as well as the answers from the TVA's team
- Review the current list of scenarios and discuss with the group the new ones being proposed by group members
- Provide an overview on the Strategy Design process
- Explain the next steps in order to finalize the ranking of the proposed scenarios by the IRPWG

Utility IRP Benchmarking

TVA is in the process of benchmarking the IRP filings of 8 comparable utilities. During this session we will review the findings surrounding scenarios and uncertainties

- The companies being benchmarked include:

Company	Filing Date	Planning Horizon
Duke Energy Carolinas (DEC)	Oct 2013	2014 - 2028
Florida Power & Light (FPL)	Apr 2013	2013 - 2022
Georgia Power Company (GPC)	Apr 2012	2013 - 2028
PacifiCorp (PCQ)	Apr 2013	2013 - 2032
Progress Energy Carolinas (PEC)	Nov 2012	2013- 2027
Dominion (DOM)	Aug 2013	2014 - 2038
Entergy (ETR)	Oct 2012	2012 - 2031
Arizona Public Service (APS)	Oct 2012	2012 - 2031

- These companies were selected based on the following characteristics:
  - Similar generation mix and size (nuclear, coal, gas, hydro, etc.)
  - Regional player (e.g., Georgia Power)
  - Recently completed IRP (late 2012 or 2013)
  - Inclusion in previous (2009-2010) TVA IRP benchmarking study

TVA Has Initially Selected Nine Critical Uncertainties

Uncertainty	Description
TVA Sales	◆ The customer energy requirements (GWh) for the TVA service territory including losses; it represents the load to be served by TVA
Natural Gas Prices	◆ The price ($/MMBtu) of the commodity including transportation
Electricity Prices into TVA	◆ The hourly price of energy ($/MWh) at the TVA boundary; used as a proxy for market price of power
Coal Prices	◆ The price ($/MMBtu) of the commodity including transportation
Regulations	◆ All regulatory and legislative actions, including applicable codes and standards, that impact the operation of electric utilities excluding CO2 regulations
CO2 Regulation/Price	◆ The cost of compliance with possible CO2 related regulation and/or the price of cap-and-trade legislation, represented as a $/Ton value
Distributed Generation Penetration	◆ National trending of distributed generation resources and potential regional activity by customers or third party developers (not TVA)
Nat'l Energy Efficiency Adoption	◆ An estimate of the adoption of energy efficiency measures by customers nationally; a measure of interest/commitment of customers in general to adopt EE initiatives
Economic Outlook (National/Regional)	◆ All aspects of the regional and national economy including general inflation, financing considerations, population growth, GDP and other factors that drive the overall economy

These Uncertainties Line Up Well With Other Utilities

Uncertainty	TVA 2015	DEC 2013	FPL 2013	GPC 2012	PCQ 2013	PEC 2012	DOM 2013	ETR 2012	APS 2013
Load Forecasts	✓	✓	✓	✓	✓	✓	✓	✓	✓
Gas Prices	✓	✓		✓	✓	✓	✓	✓	✓
CO2 Regulations/Costs	✓	✓		✓	✓	✓	✓	✓	✓
Policies and Regulations (excl. CO2)	✓	✓	✓		✓		✓	✓	
Nat'l EE Adoption and EE Costs	✓	✓	✓			✓			✓
Capital Availability, Costs, & Escalation				✓	✓	✓		✓	
Coal Prices	✓	✓			✓		✓		
Demand Side Mgt. Achievement		✓	✓	✓					
Technology Costs & Performance							✓	✓	✓
Renewables Requirements		✓	✓				✓		
Technology Game Changers		✓			✓				
Generation In-Service Delays			✓	✓					
Electricity Prices into TVA	✓								
Resource Selection Constraints					✓				
PPA Availability/Costs				✓					
Generating Unit Retirements							✓		
Regional Gen and Load Imbalance			✓						
Distributed Generation Penetration	✓								
Economic Outlook	✓								
Nuclear Challenges		✓							
Externalities (monetizing S02, NOX, etc.)									✓
Renewable Tax Credits									✓

- 6 of the 9 uncertainties are modeled by a majority of the utilities being benchmarked
- 1 of the uncertainties, *Economic Outlook*, is modeled by every utility within the econometric models that make up the load forecasts
- 1 of the uncertainties, *Electricity Prices Into TVA*, is uniquely TVA
- 1 of the uncertainties, *DG penetration*, while not seen as a separate uncertainty, is reflected by many utilities as a portion of the EE programs that are reflected in the load forecasts

TVA Has Initially Defined 9 Scenarios Grouped Around 5 Themes

A Declining Economy

- *Major Industry Leaves the Valley (DE1)*
- *Prolonged Stagnant National Economy (DE2)*
- *Stringent Environmental Regulations Lead to Weak Energy Sales (DE3)*

Economic Growth

- *Economic Boom (EG1)*
- *Game-Changing Technology Increased Load (EG2)*

Stringent Environmental Requirements

- *De-carbonized Energy Future (SE1)*
- *Southeast Hot & Dry (SE2)*

Changing Paradigm

- *Customer-Driven Competitive Resources (CP1)*

Other Possible Futures

- *Existing Coal Exploited (OF1)*

Most of the nine scenarios under consideration by TVA can be found in the IRPs being benchmarked

Company	DE1	DE2	DE3	EG1	EG2	SE1	SE2	CP1	OF1
Duke Energy Carolinas (DEC)						✓			
PacifiCorp (PCQ)		✓	✓	✓		✓	✓	✓	(**)
Progress Energy Carolinas (PEC)		✓		✓		✓			
Entergy (ETR)		✓		✓		✓			
Florida Power & Light (FPL)	◆ Florida Power and Light modeled a number of different scenarios through combinations of fuel prices and environmental compliance (CO2) costs (*)								
Georgia Power Company (GPC)	◆ Georgia Power Company built different scenarios through combinations of gas and carbon pricing (*)								
Dominion (DOM)	◆ Dominion examined three scenarios through combinations of fuel and carbon pricing and performed sensitivity analysis (*)								
Arizona Public Service (APS)	◆ Arizona Public Service analyzed two scenarios assuming that all major cost forecasts used in the base assumptions are too high or too low								

* Note: At TVA, the different combinations of fuel costs vs. environmental compliance costs are contained among all the proposed scenarios

** Note: PCQ is the only utility that analyzes scenarios targeting specific resources although not coal in particular

In Appendix A we have included a full description of the scenarios used by the utilities considered in the benchmark

* Note: Proposed scenario at TVA that simulates similar conditions

Uncertainties and Scenarios – Benchmark Conclusions

- TVA's list of uncertainties are aligned with those selected by other utilities
- Most of the nine scenarios under consideration by TVA can be found in one or more of the IRPs being benchmarked
- Load forecasts completed by each of the utilities are reflective of economic conditions, normalized weather, price impacts on usage, forecast of number of customers and usage by customers
- Majority of the utilities benchmarked have scenarios that are built around combinations of CO2 compliance costs (low, medium, high) and natural gas fuel prices (low, medium, high)
- The approach taken by most utilities is to simulate fewer scenarios than TVA and test variables through scenario sensitivity analysis

Questions and Comments Presented by the IRPWG

The following are the questions and comments presented by the group after the December session:

1. What about a scenario that presumes the waiver of the anti-cherry-picking portion of the Energy Policy Act (a modification of the TVA Act as well)? In this situation a Local Power Company could leave TVA, buy power elsewhere (or generate some), and use TVA transmission to wheel the power to that LPC
2. What if TVA is forced to zero carbon emissions?
3. Are micro-grids considered?
4. Should we consider adding transmission loading (transmission service across the TVA footprint) as an uncertainty?
5. Would it be appropriate to consider a scenario around grid/transmission expansion - for example, an HVDC line is built from the Midwest making lower cost wind energy available to the TVA?
6. Consider including a reference to economic factors in the high-level description for national EE adoption uncertainty
7. The OF1 scenario does not seem internally consistent:
    - Implausible for gas to be restricted but coal remains unchecked (methane regulations)
    - Would prefer this scenario be a “one-off” tested at the end of the study process
8. If storage is combined with DG options (solar), will that change the impact of that uncertainty on the scenarios?
9. Is coal price really a key uncertainty?
10. TVA should include climate change as a key uncertainty, perhaps by using heating and cooling degree days as a variable to represent the broader climate impacts
11. It seems it will be difficult to properly capture all the parts of the economic outlook uncertainty in modeling. Wouldn’t it be better to separate some of the component parts?
12. In Scenario DE1, should the regional economic outlook really remain the same when a major industry leaves the Valley?
13. Please provide additional details as to how the nine critical uncertainties were identified. Were there specific metrics that were used to determine the variability and potential impact?

TVA’s answers to these questions and comments have been posted in the file sharing site prior to the meeting

Feedback from the Working Group

- Other questions/comments?

During the December Session, TVA Proposed 9 Scenarios Grouped Around 5 Themes

A Declining Economy
- *Major Industry Leaves the Valley (DE1)*
- *Prolonged Stagnant National Economy (DE2)*
- *Stringent Environmental Regulations Lead to Weak Energy Sales (DE3)*

Economic Growth
- *Economic Boom (EG1)*
- *Game-Changing Technology Increased Load (EG2)*

Stringent Environmental Requirements
- *De-carbonized Energy Future (SE1)*
- *Southeast Hot & Dry (SE2)*

Changing Paradigm
- *Customer-Driven Competitive Resources (CP1)*

Other Possible Futures
- *Existing Coal Exploited (OF1)*

Critical Uncertainties

TVA Sales
Natural Gas Prices
Electricity Prices into TVA
Coal Prices
Regulations (non CO2)
CO2 Regulations/Price
Distributed Generation
National Energy Efficiency
Economic Outlook (National/Regional)

Final List of Critical Uncertainties

Uncertainty	Description
TVA Sales	◆ The customer energy requirements (GWh) for the TVA service territory including losses; it represents the load to be served by TVA
Natural Gas Prices	◆ The price ($/MMBtu) of the commodity including transportation
(*) **Wholesale Electricity Prices for TVA**	◆ The hourly price of energy ($/MWh) at the TVA boundary; used as a proxy for market price of power
Coal Prices	◆ The price ($/MMBtu) of the commodity including transportation
Regulations	◆ All regulatory and legislative actions, including applicable codes and standards, that impact the operation of electric utilities excluding CO2 regulations
CO2 Regulation/Price	◆ The cost of compliance with possible CO2 related regulation and/or the price of cap-and-trade legislation, represented as a $/Ton value
Distributed Generation Penetration	◆ National trending of distributed generation resources and potential regional activity by customers or third party developers (not TVA)
(*) **Nat'l Energy Efficiency Adoption**	◆ An estimate of the adoption of energy efficiency measures by customers nationally; a measure of interest/commitment of customers in general to adopt EE initiatives, recognizing the impacts of both technology affordability and electricity price on willingness to adopt efficiency measures
Economic Outlook (National/Regional)	◆ All aspects of the regional and national economy including general inflation, financing considerations, population growth, GDP and other factors that drive the overall economy

(*) Note: The name or the title of this uncertainty has been updated based on the feedback received by the IRWG in December

Revised Summary of the Proposed Scenarios

- Based on the feedback from the WG we have updated some of the scenarios presented in December

		Potential Scenarios								
		Major Industry Leaves the Valley (DE1)	Prolonged Stagnant National Economy (DE2)	Stringent Environmental Regulations Lead to Weak Energy Sales (DE3)	Economic Boom (EG1)	Game-changing Technology Increases Load (EG2)	De-carbonized Energy Future (SE1)	Southeast Hot & Dry (SE2)	Customer Driven Competitive Resources (CP1)	Existing Coal Exploited (OF1)
Uncertainties (Relative to Current Forecasts)	TVA Sales	Low	Very Low	Low	High	Very High	Low	Same	Low	Same
	Natural Gas Prices	Same	Low	High	High	Low	High	Same	Low	High
	Electricity Prices into TVA	Same	Low	High	High	Same	High	High	Low	Low
	Coal Prices	Same	Low	High	High	Same	Same	Same	Low	Same
	Regulations	Same	Low	High	High	Low	Same	High	Same	High
	CO2 Regulation/Price	Same	Zero	Very High	High	High	Very High	Same	Same	Low
	Distributed Generation Penetration	Same	Low	High	High	Same	High	High	Very High	Same
	Nat'l Energy Efficiency Adoption	Same	Low	High	High	High	High	High	Very High	Same
	Economic Outlook (National/Regional)	Same	Very Low	Same	High	High	Low	Same	Same	Same

Note: Four of the uncertainty values were modified as a result of stakeholder feedback:

- DE2 - CO2 price was changed from *Very Low* to *Zero*
- EG2 - CO2 price was changed from *Very High* to *High*
- SE1 - CO2 price was changed from *High* to *Very High*
- CP1 - Coal Prices were changed from *Same* to *Low*

In Appendix B, we have included the updated detailed description of the scenarios and uncertainties

Initial Ranking Results

- This color-coded table shows the rankings performed by the stakeholders and TVA of the 9 scenarios proposed during the December session
- The group was asked to rank the scenarios between 1 and 9, with 1 being the most preferred
- We received results from 25 participants (17 IRPWG and 8 TVA)

	DE1	DE2	DE3	EG1	EG2	SE1	SE2	CP1	OF1
1	9	8	1	3	6	5	7	4	2
2	9	5	2	6	3	8	1	4	7
3	2	1	7	6	4	9	5	8	3
4	9	4	2	5	8	1	7	3	6
5	6	5	8	4	7	2	3	1	9
6	6	5	8	4	7	2	3	1	9
7	7	1	9	2	8	5	4	3	6
8									
9	9	3	2	1	7	6	8	5	4
10	1	3	6	4	7	2	9	8	5
11	6	5	3	4	8	1	7	9	2
12	9	4	6	5	3	7	2	1	8
13	6	2	1	4	7	3	9	8	5
14	6	1	9	2	5	3	7	4	8
15	8	7	3	5	6	4	1	2	9
16	8	2	1	9	3	7	4	6	5
17	8	7	2	4	6	1	3	5	9
18	6	1	7	8	5	3	2	9	4
19	3	6	2	5	7	4	8	1	9
20	5	3	1	6	7	4	8	2	9
21	2	8	9	6	3	4	7	1	5
22	2	8	9	6	3	4	5	1	7
23	7	3	6	2	5	4	8	1	9
24	2	6	7	9	4	3	5	1	8
25	3	5	2	8	6	4	7	1	9
26	6	3	9	7	5	2	1	4	8

Initial Scenario Ranking Performed by the IRPWG and TVA

- The following histograms summarize the rankings performed by the stakeholders and TVA of the 9 scenarios proposed during the December session
- The maps report the number of occurrences of each rank for each of the initial scenarios - for example, in the IRPWG table, scenario DE1 was ranked #1 only once; it was ranked #6 six times, and was ranked last five times

Histogram Map – Sum of Occurrences by Rank Order (*)

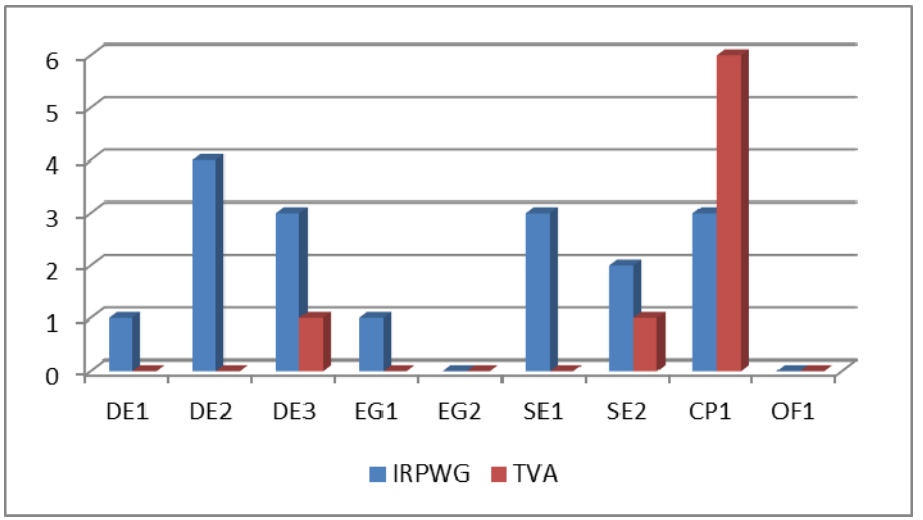
IRPWG

	DE1	DE2	DE3	EG1	EG2	SE1	SE2	CP1	OF1
1	1	4	3	1	0	3	2	3	0
2	1	2	4	2	0	3	2	1	2
3	0	2	2	1	3	3	3	2	1
4	0	2	0	6	1	1	2	3	2
5	0	4	0	3	2	2	1	2	3
6	6	0	2	2	3	1	0	1	2
7	1	2	2	0	5	2	4	0	1
8	3	1	2	1	3	1	1	3	2
9	5	0	2	1	0	1	2	2	4

TVA

	DE1	DE2	DE3	EG1	EG2	SE1	SE2	CP1	OF1
1	0	0	1	0	0	0	1	6	0
2	3	0	2	1	0	1	0	1	0
3	2	3	0	0	2	1	0	0	0
4	0	0	0	0	1	6	0	1	0
5	1	1	0	1	2	0	2	0	1
6	1	2	1	3	1	0	0	0	0
7	1	0	1	1	2	0	2	0	1
8	0	2	0	1	0	0	3	0	2
9	0	0	3	1	0	0	0	0	4

Distribution of Occurrences of Rank #1

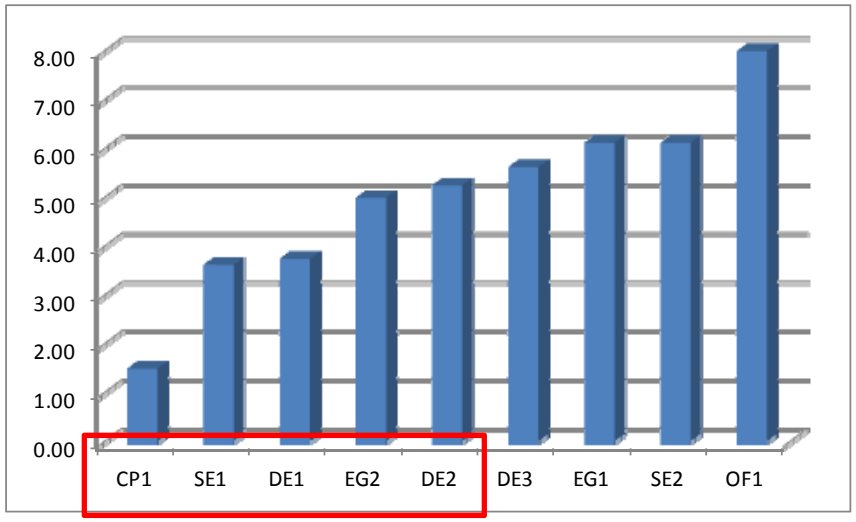


* Note: The IRPWG results are based on 17 of 18 members participating. The TVA results are based on all 8 members participating.

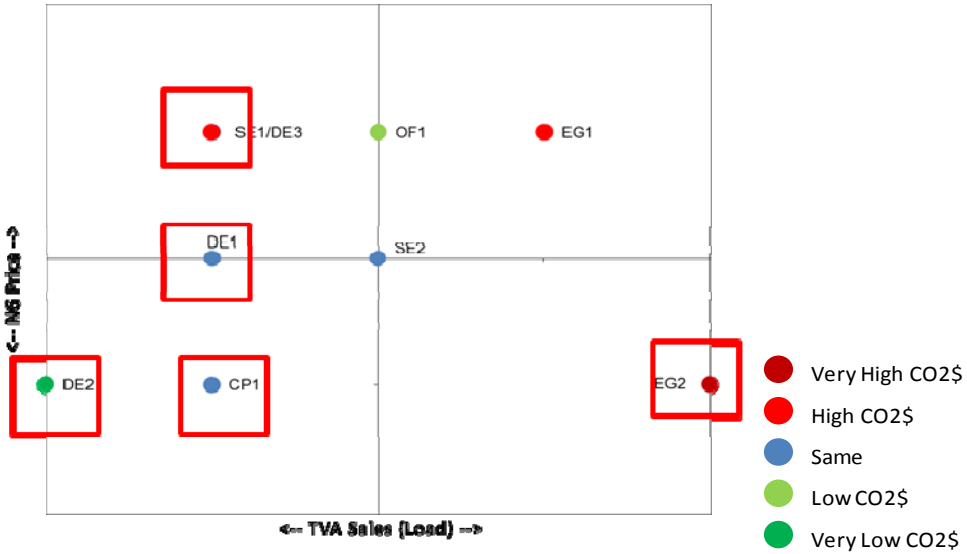
Initial Ranking Results by TVA

- The Average Rank Order is calculated as the sum of ranking values (between 1 and 9) received by a particular scenario divided by the number of people performing the ranking (8 in the case of TVA and 17 in the case of IRPWG)
- Since scenarios are ranked with values between 1 and 9, the lower the Average Rank Order reflects a higher preference for a particular scenario

Scenarios Average Rank Order



TVA Sales/NG$ with CO2 indicator

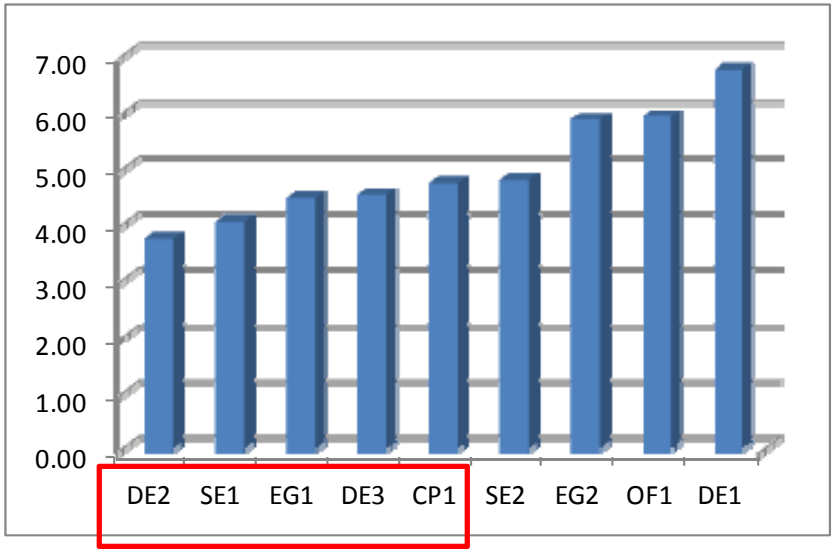


- Strong preference was shown for CP1 as the most critical future to be considered in the IRP
- There is a bias for lower TVA sales, and none of the top 5 include the combination of higher sales with higher natural gas prices

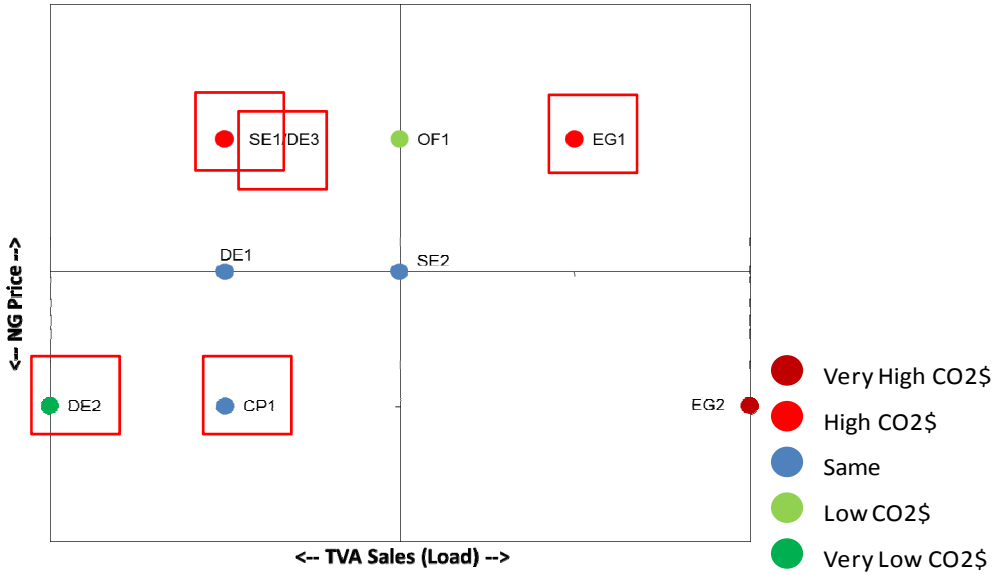
* Note: The IRPWG results are based on 17 of 18 members participating. The TVA results are based on all 8 members participating.

Initial Ranking Results by IRPWG

Scenarios Average Rank Order



TVA Sales/NG$ with CO2 indicator



- Scores are more uniform over the top 6 scenarios; EG2, OF1 and DE1 are clear outliers
- There is a bias for lower TVA sales, and none of the top 5 include the combination of higher sales with lower natural gas prices.

* Note: The IRPWG results are based on 17 of 18 members participating. The TVA results are based on all 8 members participating.

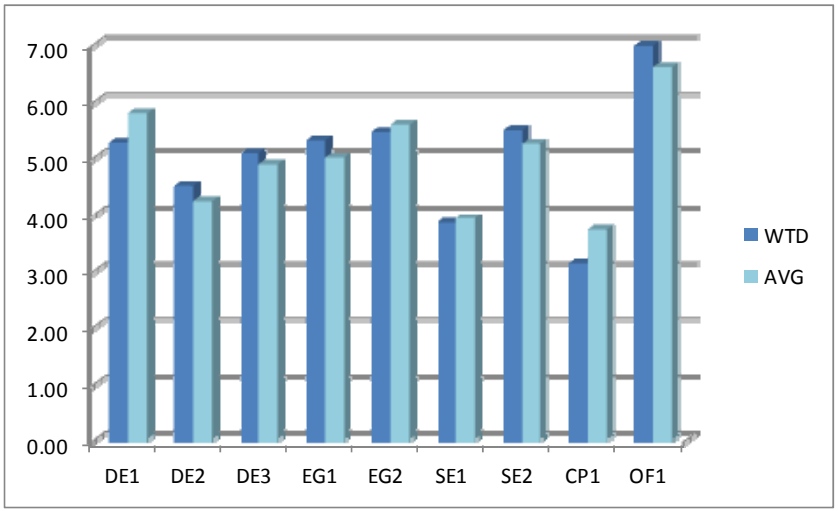
Initial Composite Ranking Results

- Histogram displays the composite results considering the rankings from the 25 participants (17 IRPWG and 8 TVA)
- The Average Rank Order is calculated as the sum of ranking values (between 1 and 9) received by a particular scenario divided by the number of people performing the ranking (25)
- The Average Weighted score is based on a 50/50 split between IRPWG and TVA

Composite Histogram Map – Sum of Occurrences by Rank Order

	DE1	DE2	DE3	EG1	EG2	SE1	SE2	CP1	OF1
1	1	4	4	1	0	3	3	9	0
2	4	2	6	3	0	4	2	2	2
3	2	5	2	1	5	4	3	2	1
4	0	2	0	6	2	7	2	4	2
5	1	5	0	4	4	2	3	2	4
6	7	2	3	5	4	1	0	1	2
7	2	2	3	1	7	2	6	0	2
8	3	3	2	2	3	1	4	3	4
9	5	0	5	2	0	1	2	2	8

Composite Average and Weighted Average

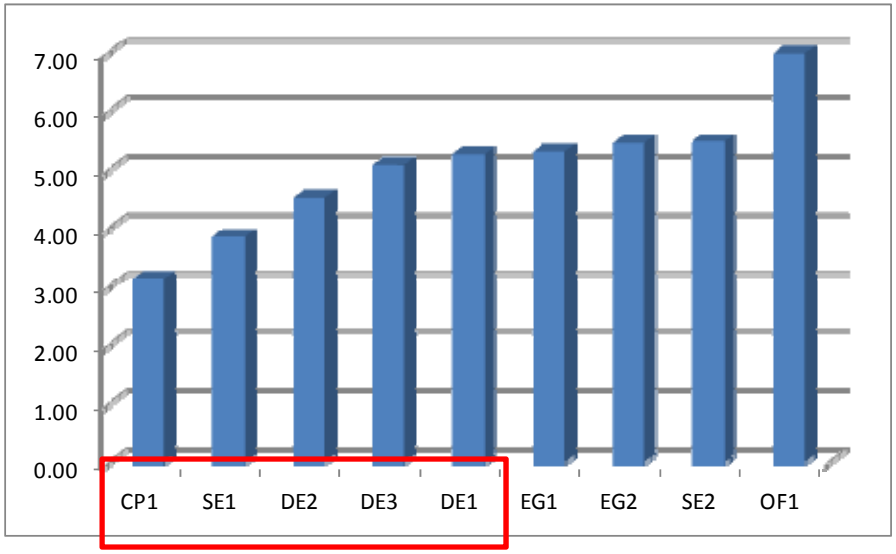


- There is some consensus around rankings for DE2, SE1, CP1 and OF1
- Strong preference for CP1 as the top ranked scenario

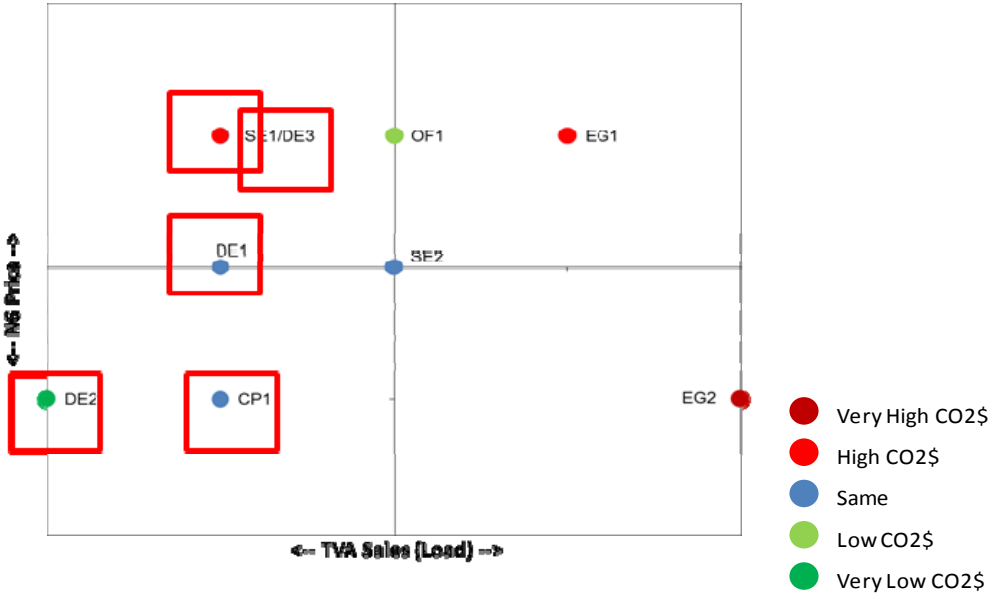
* Note: The IRPWG results are based on 17 of 18 members participating. The TVA results are based on all 8 members participating.

Initial Composite Ranking Results (Cont.)

Composite Weighted Average Ranking



TVA Sales/NG$ with CO2 indicator



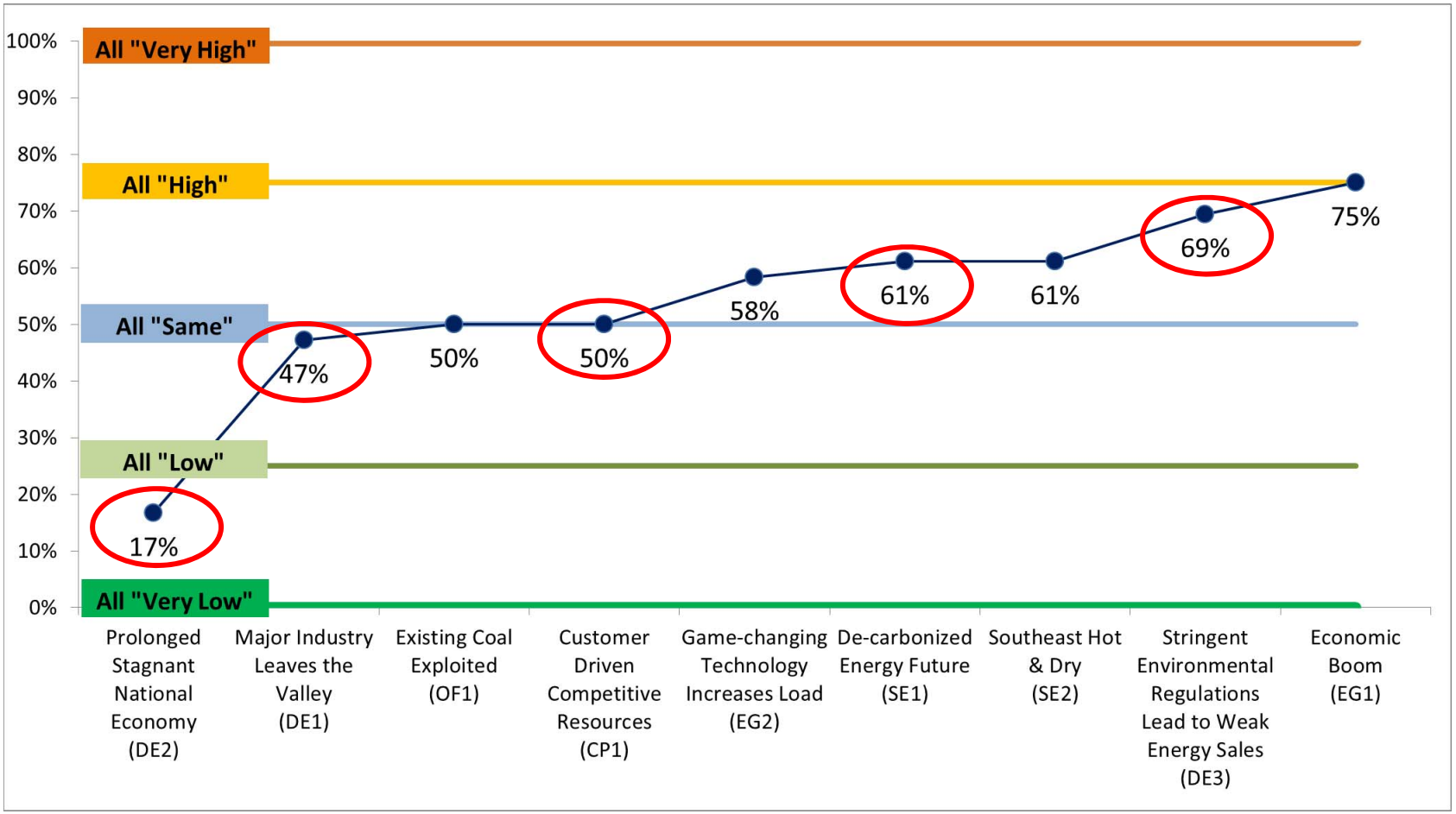
- The preferred scenarios based on the composite ranking are:
  - *Customer-Driven Competitive Resources (CP1)*
  - *De-carbonized Energy Future (SE1)*
  - *Prolonged Stagnant National Economy (DE2)*
  - *Stringent Environmental Regulations Lead to Weak Energy Sales (DE3)*
  - *Major Industry Leaves the Valley (DE1)*
- Composite results continue to show a bias for scenarios with lower sales, even though both IRPWG-only and TVA-only rankings included at least one scenario with higher sales

* Note: The IRPWG results are based on 17 of 18 members participating. The TVA results are based on all 8 members participating.

Initial Composite Ranking Results (Cont.)

- The Diversity Range value for a particular scenario is calculated as the total sum of the value of the uncertainties (Very Low = 1, Very High = 5) compared with the maximum (45) and minimum (9) potential values; the result is expressed as a percentage
- The results show that there is a good dispersion of values in the composite ranking results

Scenarios Diversity Range



* Note: The IRPWG results are based on 17 of 18 members participating. The TVA results are based on all 8 members participating.

Additional Scenarios Proposed by the IRPWG

Proposed Scenario	TVA Response
National Wholesale Energy Market Develops: growth in RE development, new power electronics/transmission technology, and impetus from FERC Order 1000 results in an increasing demand for wholesale transactions and balancing activity across the entire Eastern Interconnect	This scenario is under evaluation
Nuclear Moratorium: A major shift in public opinion leads to a federal mandate to close all nuclear generating facilities and halt development of nuclear power nationwide	The parameters for this scenario are under development (OF2)
Coal Retirements, Clean Energy Replacement, Aggressive Efficiency: This scenario represents a commitment by TVA to prioritize reliable power, affordable electric bills, environmental stewardship, resource diversity, economic development, and technological innovation	This scenario is actually a strategy, and will be revisited when strategies are presented to the stakeholders

Open Discussion on New Scenarios Being Proposed

- TVA is currently working on detailed descriptions of the scenarios being proposed
- The objective of the discussion is to obtain more clarity, from the stakeholders, around the scenarios being proposed by the WG so TVA can finalize the description of these scenarios
- Ground rules to facilitate the discussion:
  - The discussion will be time-boxed to 20 minutes for each scenario
  - Wait for your turn to speak, be respectful of others and refrain from interrupting while someone is speaking
  - Express your own views
  - Be succinct so that everyone has the opportunity to speak

Open Discussion:
Nationwide Nuclear Moratorium

Scenario Narrative (Draft)

- A major shift in public opinion leads to a federal mandate to close all nuclear generating facilities and halt development of nuclear power nationwide
- Shutdown is accomplished through a phased approach to lessen reliability concerns and minimize increases in the cost of power as replacement capacity is brought online

Questions to the group

- What do you think the schedule for the phase-out will be? What will be the final deadline?
- What will this scenario mean for regulations on fossil technologies?
- How will regulations related to transmission be affected?

What is the likelihood of this scenario occurring?

Open Discussion:
National Wholesale Energy Market Develops

Scenario Narrative (Draft)

- Growth in renewable energy development, new power electronics/transmission technology and impetus from FERC Order 1000 results in an increasing demand for wholesale transactions
- A new market develops balancing this activity across the entire Eastern Interconnect

Questions to the group

- What will be the driver behind this scenario? What will be the incentives?
- How quickly will this scenario develop from a technical, regulatory and market perspective?
- How will regulations about transmission siting be affected?

What is the likelihood of this scenario occurring?

Feedback from the Working Group

- Any additional thoughts about the proposed scenarios?
- Other comments?

Next Steps - Final Ranking of Selected Scenarios by the Group

- TVA will finalize the full description of the two new scenarios being proposed and post them in the file sharing site by the end of January
- TVA will schedule a Webinar with the IRPWG to explain the new scenarios in detail
- After that, we will ask the working group to individually select their five top scenarios (1st being their top selection) they recommend be used in the IRP study
- The working group needs to post their selection in the file sharing site before the February meeting
  - We will put a ranking sheet template in the file sharing site
  - Please download that template, enter your rankings, and then email to us
- Ranking criteria could include:
  - Potential impact of the scenario on TVA business
  - Intriguing future that should be analyzed by TVA

“Scenarios and Strategies” Establish the Planning Framework

Scenarios

- Describe potential outcomes of factors (uncertainties) outside of TVA’s control
- Represent possible conditions and are not predictions of the future
- Include uncertainties that are volatile and could significantly impact operations such as:
  - Commodity prices
  - Environmental regulations

Planning Strategies

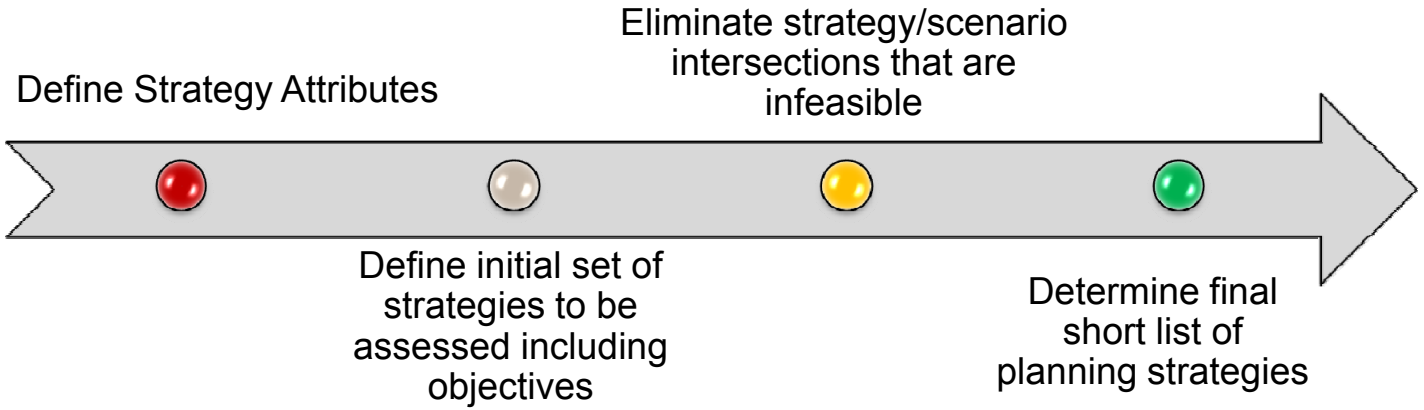
- Test various business options within TVA’s control
- Defined by a combination of resource assumptions such as:
  - EEDR portfolio
  - Nuclear expansion
  - Energy storage
- Consider multiple viewpoints
  - Public scoping period comments
  - Assumptions that would have the greatest impact on TVA long-term

A well-designed strategy will perform well in many possible scenarios

Strategies Help Identify A Flexible Business Plan

- Strategies are used to describe alternative business plans that are tested across multiple scenarios
  - Each alternative business plan is described by a unique combination of strategic objectives and/or constraints
- Objective is to identify a strategy (business plan) that provides stability & flexibility for an uncertain long-term future
- Strategies can be adjusted as future conditions change or become clearer
- Strategies are designed to test various business options TVA might consider, and are structured to evaluate certain key business choices, called "attributes"
  - Nuclear expansion
  - DSM (EE/DR) commitment
  - Contribution from renewable resources
  - Fleet reduction strategy
  - Level of market reliance
  - Utilization of gas-fired generation

Application of Strategies in the IRP Study



- Strategy attributes are used in capacity expansion planning software tools and frame the resources portfolio options:
  - The attributes of a planning scenario will define the "solution space" inside which feasible combinations of resources can be selected to make up the 20-year capacity expansion plan
  - These boundaries either represent modeling constraints, like how many CT/CC units we could add in any one year, or they represent a goal or preference on TVA's part that we want to be sure ends up in the resource plan, like a minimum level of EEDR to reflect commitments to the EPA
  - Boundaries can be firm/fixed or they can be min/max restrictions and sometimes, boundaries, can also be in the form of pre-defined options that will be chosen but not optimized by the model – the EEDR portfolios in the 2011 IRP study are an example of this type of attribute

- The intersection of the scenarios and strategies chosen for the IRP Study create a matrix of possible resource portfolios
  - Each portfolio is a 20-year capacity expansion plan that represents the least cost plan that conforms to the modeling constraints defined by each scenario/strategy combination

Selecting Potential Attributes

The key questions in developing our list of potential strategy attributes are:

- Is this attribute something we want to evaluate in this IRP?
- Is this attribute something we need to define? Or can this aspect of the resource portfolio be an outcome of the modeling?
- Does this attribute capture an existing policy of TVA?
- Does this attribute capture work done outside the IRP to meet goals or objectives of TVA?

Attributes are set by TVA and then shared with the stakeholders to help them understand and interpret the outcome of the modeling exercise

IRP Strategy Attributes: 2015 vs. 2011

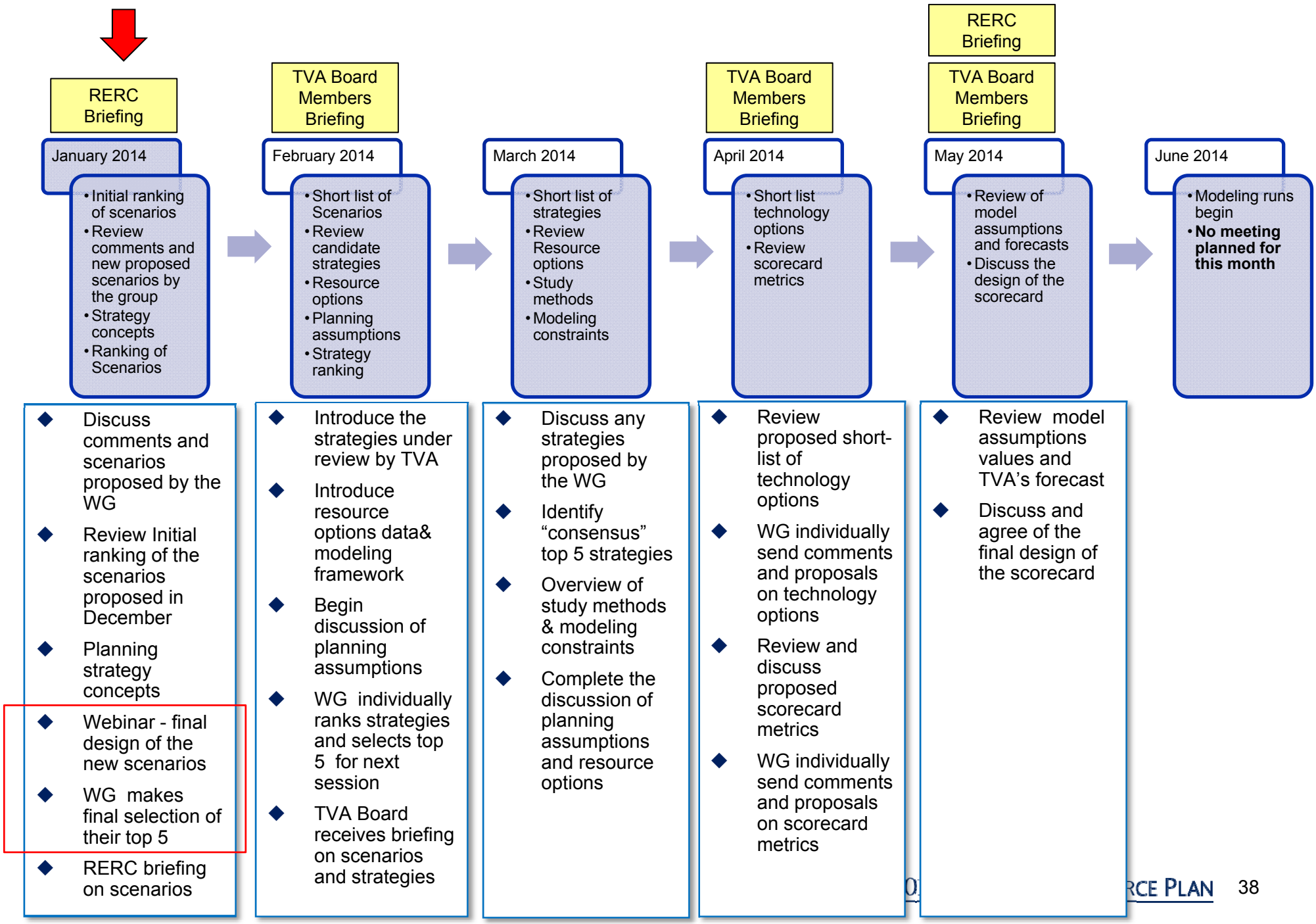
- In the 2011 IRP, some strategy attributes were developed outside the optimization process and were consider “fixed” parts of the portfolio
- In the 2015 study, we intend attributes to be selected dynamically as part of the capacity optimization modeling

Attributes from the 2011 IRP Study
EEDR portfolio
Renewable Additions
Fossil Asset Strategy
Energy Storage
Nuclear Expansion
Coal Technology
Gas-Fired Supply (self build)
Market
Transmission

“Fixed” parts of the portfolio

For more information of the 2011 IRP’s Strategy Attributes please refer to Chapter 6 of the 2011 IRP document

Meeting Objectives for IRPWG thru June 2014



Thanks

Utilities Selected for IRP Benchmarking

- Utilities in the study were selected on the basis of:
  - Similar generation mix and size (nuclear, coal, gas, hydro, etc.)
  - Regional player (e.g., Georgia Power)
  - Recently completed IRP (late 2012 or 2013)
  - Inclusion in previous (2009-2010) TVA IRP benchmarking study
- Utilities initially selected for benchmarking include:

Company	Filing Date	Planning Horizon
Duke Energy Carolinas (DEC)	Oct 2013	2014 - 2028
Florida Power & Light (FPL)	Apr 2013	2013 - 2022
Georgia Power Company (GPC)	Apr 2012	2013 - 2028
PacifiCorp (PCQ)	Apr 2013	2013 - 2032
Progress Energy Carolinas (PEC)	Nov 2012	2013- 2027
Dominion (DOM)	Aug 2013	2014 - 2038
Entergy (ETR)	Oct 2012	2012 - 2031
Arizona Public Service (APS)	Oct 2012	2012 - 2031

Scenarios Being Used By Other Utilities

DEC - 2013

Duke Energy Carolinas modeled two primary scenarios (under a 14.5% targeted reserve margin):

- **Base Case Scenario**
  - Summer peak demand and energy growth after the impact of EE averaged 1.5% through 2028
  - EE and DSM penetration and costs based on 2013 market potential study
  - C02 price 17 $/ton in 2020 increasing to 33 $/ton by 2028
  - Fuel prices based on Company's current fundamental price projections
  - Renewables requirement reflective of federal or state program starting in 2018 (3% by 2018; 12.5% by 2026
- **Environmental Focus Scenario**
  - Summer peak demand growth averaged 1.3%; energy growth 1.2% after EE through 2028
  - Higher (aspirational) EE and DSM penetration as defined in 2013 market potential study
  - C02 price 20 $/ton in 2020 increasing to 45 $/ton by 2028
  - Fuel prices reflect impact of different CO2, EE, and renewable requirements
  - Renewables double that in Base Case Scenario

FPL - 2013

Florida Power and Light modeled a number of different scenarios through combinations of fuel prices and environmental compliance (CO2) costs:

- **Fuel Prices**
  - Low
  - Medium
  - High
- **Environmental Compliance Costs**
  - Low
  - Medium
  - High

GPC - 2012

Georgia Power Company built nine different scenarios through combinations of gas and carbon pricing:

- **Low gas price with three views of carbon pricing**
  - Existing carbon pricing
  - Moderate carbon pricing
  - Substantial carbon pricing
- **Medium gas price with three views of carbon pricing**
  - Existing carbon pricing
  - Moderate carbon pricing
  - Substantial carbon pricing
- **High gas price with three views of carbon pricing**
  - Existing carbon pricing
  - Moderate carbon pricing
  - Substantial carbon pricing

PacifiCorp - 2013

PacifiCorp built 19 input scenarios , around 4 themes and applied them against 5 transmission scenarios:

- **Reference Theme**
  - 3 cases, each reflecting base case assumptions for market prices, EE penetration, and environmental policy
  - Gas prices at low case
  - Low const. escalation rates
  - 3 RPS views: no RPS, State Only RPS, State & Fed RPS
- **Environmental Policy Theme**
  - 5 cases reflect base case assumptions for Regional Haze
  - 6 cases reflect more stringent Regional Haze reqmts and vary assumptions for market prices (low, med, high), CO2 prices (zero, med, high), RPS reqmts (with and without State and Fed RPS), and energy efficiency
- **Targeted Resources Theme:** 4 cases targeting specific resources and their impacts:
  - Constrained CC and EE picks up
  - Geothermal PPAs meet RPS
  - Spike in power and gas prices
  - Clean energy resources
- **Transmission Theme:**
  - 1 case assuming 3rd party transmission can be purchased from newly built line

Scenarios Used by Other Utilities (Cont'd)

PEC - 2013

Progress Energy Carolinas utilized four primary scenarios:

- **Low Stress**
  - Carbon legislation at low price levels
  - Gas prices at low case
  - Construction escalation rates are at low end
- **Stringent Environmental**
  - Dramatic carbon tax or cap that drives high Nat'l gas prices
  - Demand for Nat'l gas increases; prices go up
- **Current Trends**
  - Current world scenario including CO_2 mid case
- **Economic Revival**
  - Economy picks up driving higher const. escalation rates, higher demand for Nat'l gas, and higher Nat'l gas prices
  - CO_2 legislation enacted at mid prices

Each of the portfolio plans are compared to one another using seven key attributes split into two general categories: Customer Cost and Environmental

DOM - 2013

Dominion examined one base case, three scenarios, and 13 sensitivities:

- **Base Case Scenario**
  - Used forecasted or expected base values for load growth, resources, and planning assumptions
  - Assumes C02 carbon tax legislation by 2023
- **No Carbon Cost Scenario**
  - No cost of carbon emissions in study period
  - Fuel and commodity prices were correlated appropriately to the effects of removing the modeled C02 market
- **High and Low Fuel Cost Scenarios**
  - Fuel prices, environmental allowance plans, market capacity and energy prices, and REC prices were adjusted to correlate with high and low fuel cost scenarios
- **Sensitivities included:**
  - High and low load growth
  - High and low const. costs
  - High and low T&D costs
  - Net metering
  - Electric vehicles
  - Zero or high REC sales
  - High case: high fuel, high const. costs, and high T&D
  - Low case: Low fuel, low const. costs, and low T&D

ETR - 2013

Entergy utilized four scenarios:

- **Reference Scenario**
  - Used reference load forecasts, reference gas pricing, and no CO2 costs
- **Economic Rebound Scenario**
  - Assumes US economy recovers and resumes expansion at relatively high rates
- **Green Growth Scenario**
  - Assumes a green agenda marked by subsidies for renewables, regulatory support for EE, and customer acceptance for higher green costs
- **Austerity Reigns**
  - Assumes sustained poor economic conditions in the U.S.

APS - 2013

Arizona Public Service created three distinct scenarios to demonstrate the impact of sensitivities on the portfolio alternatives:

- **Base Case Scenario**
  - Used forecasted or expected base values for load growth, fuel prices, construction costs, CO2 costs, etc.
- **Low Cost Scenario**
  - Models a "best case for future revenue reqmts" where all of the major cost forecasts used in the base assumptions are too high
  - Reflects 30% lower Nat'l gas price cure and 30% lower EE cost curve
  - Extends the PTC and ITC renewable credits
  - Reflects zero CO2 costs
- **High Cost Scenario**
  - Models a "worst case for future revenue reqmts" where all of the major cost forecasts used in the base assumptions are too low
  - Applies a 30% higher Nat'l gas price cure and a 30% higher EE cost curve
  - Reflects a high carbon forecast for C02

The Current View of the Future

Slow Load Growth Continues

Near-term peak growth remains relatively unchanged, with a compound annual growth rate of less than 1% for 2014-2024. Energy growth also remains below 1% as slow economic growth persists and energy efficiency programs (e.g., DOE efficiency standards) continue to reduce average energy usage.

Less Stringent Environmental Regulation Persist

Environmental requirements unchanged from previous projections; final MATS less stringent than draft, and reduced GHG penalties still expected (TVA penalty for carbon emissions cut in half from the FY13 Budget forecast).

Low Natural Gas Prices

Gas price forecast relatively unchanged compared to previous forecast. Seasonal patterns for gas seen in the past not expected in the current forecast. Long term gas prices grow faster than GDP deflator 2018-2033, reflecting the expectation that higher cost production will be required to meet future demand.

Significant Reductions in EEDR Contribution and Costs

Program growth scaled back to reflect expectations of reduced funding. Summer capacity benefit levels off around FY2020. Energy savings (GWh) continues to increase, albeit at a slower rate.

Bellefonte

BLN not included in the current base planning assumptions. Site spending will proceed (at a reduced rate) to maintain the expansion option. Analysis will continue, and the 2015 IRP will help determine the least cost approach to meet future demand.

Final List of Critical Uncertainties

Uncertainty	Description
TVA Sales	◆ The customer energy requirements (GWh) for the TVA service territory including losses; it represents the load to be served by TVA
Natural Gas Prices	◆ The price ($/MMBtu) of the commodity including transportation
Wholesale Electricity Prices for TVA	◆ The hourly price of energy ($/MWh) at the TVA boundary; used as a proxy for market price of power
Coal Prices	◆ The price ($/MMBtu) of the commodity including transportation
Regulations	◆ All regulatory and legislative actions, including applicable codes and standards, that impact the operation of electric utilities excluding CO2 regulations
CO2 Regulation/Price	◆ The cost of compliance with possible CO2 related regulation and/or the price of cap-and-trade legislation, represented as a $/Ton value
Distributed Generation Penetration	◆ National trending of distributed generation resources and potential regional activity by customers or third party developers (not TVA)
Nat'l Energy Efficiency Adoption	◆ An estimate of the adoption of energy efficiency measures by customers nationally; a measure of interest/commitment of customers in general to adopt EE initiatives, recognizing the impacts of both technology affordability and electricity price on willingness to adopt efficiency measures
Economic Outlook (National/Regional)	◆ All aspects of the regional and national economy including general inflation, financing considerations, population growth, GDP and other factors that drive the overall economy

Scenario Group 1: A Declining Economy

Major Industry Leaves the Valley

Scenario Narrative

- A major valley industry becomes obsolete or moves overseas (e.g. paper or chemical industries)
- Sales are reduced, but the national economy is largely unaffected
- TVA revenues are impacted, while commodity prices and GDP increase as planned
- Decreased capacity need leads to delayed expansion for new generation

Uncertainty	Level Of Impact (*)	Rationale
TVA Sales	Low	A major valley industry becomes obsolete or moves overseas, leading to lower TVA sales.
Natural Gas Prices	Same	Commodity prices and GDP increase as planned
Whole Sale Electricity Prices for TVA	Same	It will likely have an impact on the amount of electricity purchased by TVA but not on the price
Coal Prices	Same	Commodity prices and GDP increase as planned
Regulations	Same	Regulations evolve as planned
CO2 Regulation/Price	Same	Greenhouse regulation and CO2 prices evolve as planned
Distributed Generation Penetration	Same	No impact at national level and very limited (if any) at a regional level
Nat'l Energy Efficiency Adoption	Same	No impact at national level and very limited (if any) at a regional level
Economic Outlook (National/Regional)	Same/Lower	Regional economic outlook is lower due to loss of industry sector.

(*) Note: Compared to current view of the future

Scenario Group 1: A Declining Economy

Prolonged Stagnant National Economy

Scenario Narrative

- Prolonged, stagnant economy results in low to negative growth and delayed expansion of new generation
- Stringent environmental regulations are delayed due to concerns of adding further pressure to the economy
- Cost of capital is decreased, inflation increases

Uncertainty	Level Of Impact (*)	Rationale
TVA Sales	Very Low	Very low sales due to stagnant economy
Natural Gas Prices	Lower	Low natural gas prices due to low demand and less stringent environmental legislation
Whole Sale Electricity Prices for TVA	Lower	Lower demand creates lower commodity prices
Coal Prices	Lower	Low coal prices due to low demand and less stringent environmental legislation
Regulations	Lower	Economic downturn and decreased energy demand lead to less stringent environmental regulations
CO2 Regulation/Price	Zero	Economic downturn and decreased energy demand lead to delay of CO2 legislation beyond the forecast horizon
Distributed Generation Penetration	Lower	Traditional generation over-capacity decreases the interest of investing in these technologies
Nat'l Energy Efficiency Adoption	Low	Energy efficiency is not a priority due to sluggish economy and energy sales
Economic Outlook (National/Regional)	Very Low	Stagnant national and regional economy

(*) Note: Compared to current view of the future

Scenario Group 1: A Declining Economy

Stringent Environmental Regulations Lead to Weak Energy Sales

Scenario Narrative

- Stringent environmental regulations are passed and implemented quickly. Increased federal subsidies DG
- High cost of production, due to fracking and environmental legislation for gas and CO2 allowances, increase electricity prices significantly
- Federal renewable portfolio standards are implemented with new, more stringent MATS regulations
- U.S. based industry is non-competitive in global markets and leads to economic downturn

Uncertainty	Level Of Impact (*)	Rationale
TVA Sales	Low	Lower sales due to higher energy prices
Natural Gas Prices	High	Stringent fracking legislation leads to higher gas prices
Whole Sale Electricity Prices for TVA	High	Higher due to high commodity prices
Coal Prices	High	Higher due to stringent environmental legislation
Regulations	High	New, more stringent MATS regulations are passed
CO2 Regulation/Price	Very High	Very stringent CO2 legislation
Distributed Generation Penetration	High	Federal subsidies for solar distributed generation and increased energy costs result in higher penetration
Nat'l Energy Efficiency Adoption	High	Energy efficiency standards are increased
Economic Outlook (National/Regional)	Same	Higher inflation pressure due to higher energy costs is neutralized by lower energy demand

(*) Note: Compared to current view of the future

Scenario Group 2: Economic Growth

The Economic Boom

Scenario Narrative

- Rapid economic growth translates into higher than forecasted energy sales and energy expansion
- Increasingly positive public attitude toward adoption of energy efficiency programs and new technology
- Advances in electric vehicles make it cheaper to buy electric than gas cars
- Tightened environmental legislation with increased focus on cost-efficient energy efficiency choices and pressure for retirement of existing coal assets
- Ambient and water temperatures remain normal. Gas, oil, and coal are more costly due to regulations

Uncertainty	Level Of Impact (*)	Rationale
TVA Sales	High	Higher due to overall economic growth; similar to TVA experience in the 1990s
Natural Gas Prices	High	Higher due to increased demand and regulations
Whole Sale Electricity Prices for TVA	High	Electricity driven by NG prices and higher demand
Coal Prices	High	Higher regulations, but they do not overcome coal utilization in coal / gas tradeoff
Regulations	High	Prosperity as a regulatory driver…
CO2 Regulation/Price	High	Prosperity drives more stringent and earlier CO2 goals
Distributed Generation Penetration	High	This scenario focuses in the economic impact and the feedback of higher prices more than adoption of DG
Nat'l Energy Efficiency Adoption	High	Higher prices mitigated by greater energy efficiency (prices drive response)
Economic Outlook (National/Regional)	High	Overall economic growth is higher on both a TVA level and a National level similar to 1990s

(*) Note: Compared to current view of the future

Scenario Group 2: Economic Growth

Game-changing technology increases load

Scenario Narrative

- Technology driven growth-more plug-in's; flatter load shape enabled by storage, end-use technology, Hybrid/EV, renewables generation storage, smart-meters/appliances
- Moderately higher economic growth during and after the tech shift; expected growth in first 10 years
- Advances in electric vehicles make it cheaper to buy electric than gas
- Renewable generation technology cost becomes more competitive due to innovation in storage technology
- A neutral or tightened position on green house gases but other regulations remain neutral

Uncertainty	Level Of Impact (*)	Rationale
TVA Sales	Very High	Energy use increases as central station efficiency and load shape improves
Natural Gas Prices	Low	Storage technology and renewable competitiveness drives down demand
Whole Sale Electricity Prices for TVA	Same	Flatter load shape, higher cost and NG gas cost lead to neutral electricity prices
Coal Prices	Same	Regulations do not overcome coal utilization in coal / gas tradeoff
Regulations	Low	The presence of lower emissions through renewables and storage technology diminishes the impetus for more regulations
CO2 Regulation/Price	High	Prosperity is a driver but CO2 becomes a proxy replacement for other fossil fuel based regulations.
Distributed Generation Penetration	Same	Large scale storage technology improves; it Is not effectively scaled and is part of the driving force behind the improved load shape
Nat'l Energy Efficiency Adoption	High	Awareness and acceptance is high driven by technology breakthroughs, such as smart meters
Economic Outlook (National/Regional)	High	Economic growth is higher, but it is the technology growth that is the engine behind the sales growth

(*) Note: Compared to current view of the future

Scenario Group 3: Stringent Environmental Requirements

De-carbonized Energy Future

Scenario Narrative

- Increasing climate-driven effects create strong federal push to curb GHG emissions: new legislation caps and penalizes CO2 emissions from the utility industry and incentivizes non-emitting technologies
- Compliance with new rules increases energy prices and US based industry becomes less competitive; later in the decade, the US economy begins another downward turn and loads begin to decline
- Fracking regulations never materialize but gas contends with the CO2-adder
- New expansion units are necessary to replace existing CO2-emitting fleet and not to meet load growth

Uncertainty	Level Of Impact (*)	Rationale
TVA Sales	Low	CO2 penalties drive industry to non-emitting technologies; raising prices and leading to economic decline later in the decade
Natural Gas Prices	High	Demand for gas increases spiking prices
Whole Sale Electricity Prices for TVA	High	Rush to switch to lower-emitting/non-emitting technologies results in increase in energy prices
Coal Prices	Same	Demand decreases and keeps prices in current forecasted range
Regulations	Same	No additional coal requirements/controls
CO2 Regulation/Price	Very High	Stringent federal CO2 penalties
Distributed Generation Penetration	High	DG resources increase due to higher energy prices and CO2 penalties
Nat'l Energy Efficiency Adoption	High	Higher energy prices drive EE
Economic Outlook (National/Regional)	Low	Higher energy prices make US less competitive and economy downturns

(*) Note: Compared to current view of the future

Scenario Group 3: Stringent Environmental Requirements
Southeast Hot & Dry

Scenario Narrative

- Persistent drought conditions develop over the next decade, reducing output from TVA's hydro resources and the availability of water for cooling fossil and nuclear units.
- Steady load growth persists due to higher temperatures, with more constrained options to meet it
- TVA electric prices increase causing greater penetration of distributed energy resources.

Uncertainty	Level Of Impact (*)	Rationale
TVA Sales	Same	Steady load growth due to higher temperature
Natural Gas Prices	Same	Abundant gas supply continues
Whole Sale Electricity Prices for TVA	High	Dryer weather leads to less hydro and more derates on coal and nuclear generation. Prices increase as less economic assets are utilized and more energy is purchased.
Coal Prices	Same	Current forecasted trends continue. TVA's demand similar, may even decrease but barge transport limited
Regulations	High	Closed cycle cooling required on all new coal and nuclear and existing units on temperature sensitive rivers
CO2 Regulation/Price	Same	Current forecasted trends continue
Distributed Generation Penetration	High	Higher electricity prices drive development of DG
Nat'l Energy Efficiency Adoption	High	Higher electricity prices lead to increased customer EE
Economic Outlook (National/Regional)	Same	While electricity cost is higher in the Valley, cost from dryer weather nationally is not great enough to drive economic decline

(*) Note: Compared to current view of the future

Scenario Group 4: Changing Paradigm
Customer Driven Competitive Resources

Scenario Narrative

- Customers' awareness of growing competitive energy markets and the rapid advance in energy technologies produce unexpected high penetration rates in distributed generation (DG) and energy efficiency (EE)
- Utilities are no longer the only source of generation and multiple options are available to customers (solar, wind, hydro, Wal-Mart, Distributed Generation, First Solar, Solar City, Google…etc.), causing the load to diminish
- Growing implementation of DG and EE resources by customers lead to a continual decrease in supply-side generation sources and an increased need for transmission infrastructure and utilization planning.

Uncertainty	Level Of Impact (*)	Rationale
TVA Sales	Low	End use customers continue to find ways to control their energy demands and look to the utility to fill in the gaps
Natural Gas Prices	Low	Reduced energy demand lessens the dependency on CT/CC's
Whole Sale Electricity Prices for TVA	Low	Utilities are long on capacity
Coal Prices	Low	Nuclear and DG has coal only filling in the gaps when needed
Regulations	Same	Codes and standards for EE and renewables drive emissions lower, diminishing the impetus for more regulation
CO2 Regulation/Price	Same	CO2 goals are being met with the increased EE and DG
Distributed Generation Penetration	Very High	DG becomes an integral part of customers' energy supply
Nat'l Energy Efficiency Adoption	Very High	Codes and standards increases the adoption of EE
Economic Outlook (National/Regional)	Same	The economy continues to grow but, businesses will continue to work on process efficiencies to gain more market share

(*) Note: Compared to current view of the future

Scenario Group 3: Other Possible Futures

Existing Coal Exploited

Scenario Narrative

- Due to environmental issues and increased regulatory restrictions, fracking becomes increasingly costly and drilling is restricted. Supply diminishes and costs increase.
- Nuclear option requires increasing capital costs (e.g., storage issues, safety requirements) and permitting timeframes become excessive.
- CO2 regulations take a backseat to natural gas fracking and nuclear safety and storage regulations making existing coal the most viable and economic option

Uncertainty	Level Of Impact (*)	Rationale
TVA Sales	Same	Demand follows expected growth in the TVA region as electricity prices remain low compared to other areas
Natural Gas Prices	High	Fracking regulations decrease supply and increase NG prices
Whole Sale Electricity Prices for TVA	Low	TVA through existing coal assets keeps prices low Coal on margin
Coal Prices	Same	Coal demand doesn't increase national enough to drastically change price
Regulations	High	Fracking regulation increase and nuclear storage issues cause increased permitting timelines and higher capital costs
CO2 Regulation/Price	Low	CO2 regulations take a back seat to fracking regulations
Distributed Generation Penetration	Same	Forecasted trends continue
Nat'l Energy Efficiency Adoption	Same	Forecasted trends continue
Economic Outlook (National/Regional)	Same	Higher electricity prices cause economic slump nationally, but the Valley is able to fend off the effects

(*) Note: Compared to current view of the future

Summary of the Scenarios Being Proposed

		Potential Scenarios								
		Major Industry Leaves the Valley (DE1)	Prolonged Stagnant National Economy (DE2)	Stringent Environmental Regulations Lead to Weak Energy Sales (DE3)	Economic Boom (EG1)	Game-changing Technology Increases Load (EG2)	De-carbonized Energy Future (SE1)	Southeast Hot & Dry (SE2)	Customer Driven Competitive Resources (CP1)	Existing Coal Exploited (OF1)
Uncertainties (Relative to Current Forecasts)	TVA Sales	Low	Very Low	Low	High	Very High	Low	Same	Low	Same
	Natural Gas Prices	Same	Low	High	High	Low	High	Same	Low	High
	Electricity Prices into TVA	Same	Low	High	High	Same	High	High	Low	Low
	Coal Prices	Same	Low	High	High	Same	Same	Same	Low	Same
	Regulations	Same	Low	High	High	Low	Same	High	Same	High
	CO2 Regulation/Price	Same	Zero	Very High	High	High	Very High	Same	Same	Low
	Distributed Generation Penetration	Same	Low	High	High	Same	High	High	Very High	Same
	Nat'l Energy Efficiency Adoption	Same	Low	High	High	High	High	High	Very High	Same
	Economic Outlook (National/Regional)	Same	Very Low	Same	High	High	Low	Same	Same	Same