2015 Integrated Resource Plan

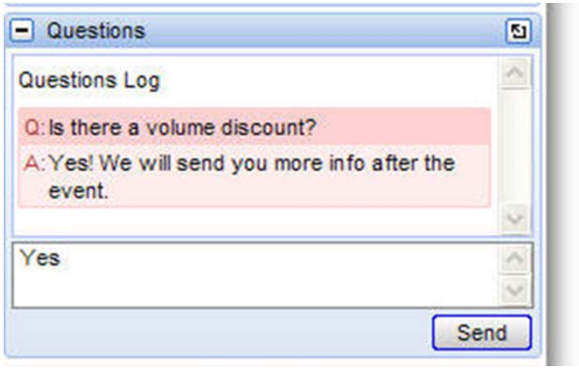
IRPWG Meeting

Session 12

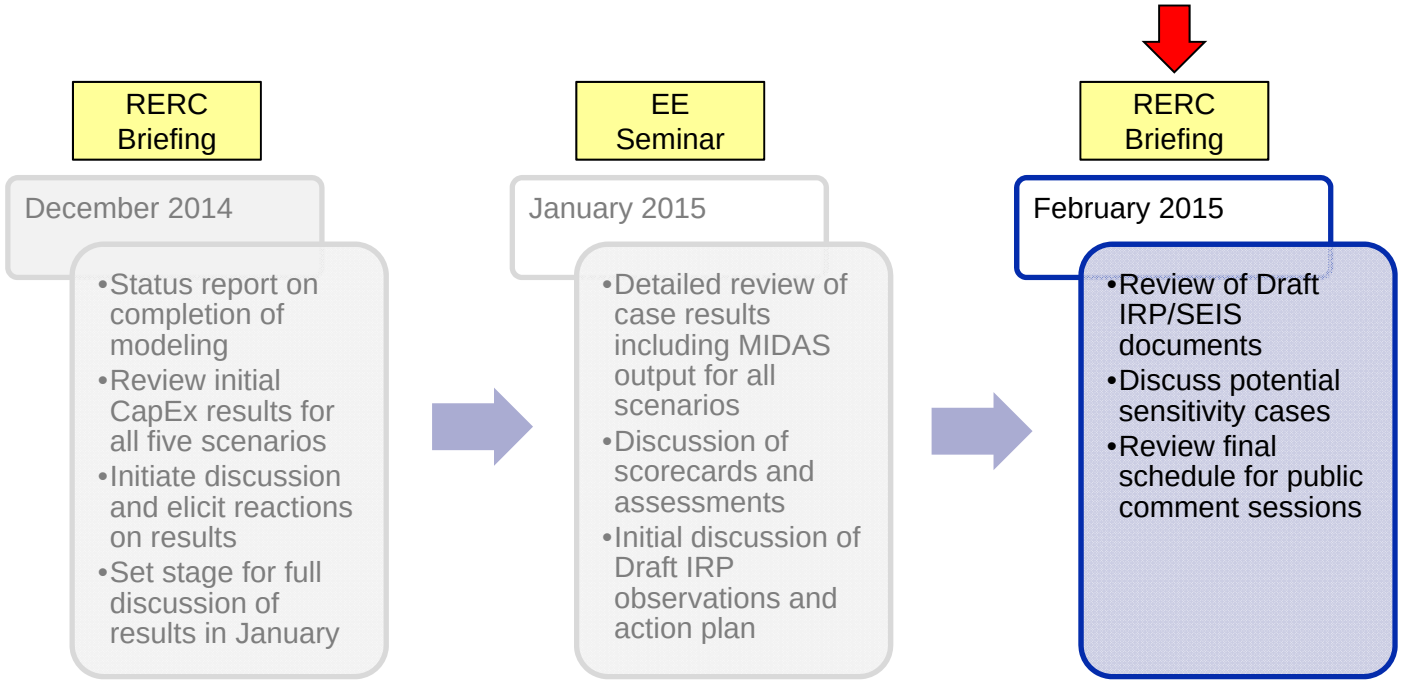
February 26

Webinar Protocol

- Participants are not muted in the webinar, so we ask that you please mute and un-mute yourself during the meeting.
- Please be courteous to other webinar participants and mute your phone when you are not speaking to eliminate background noise
- We plan to give frequent opportunities for participants to ask questions during the webinar; for example, at the end of each section of the presentation we will pause for questions/comments.
  - However, you may also ask a question while the presenter is speaking by un-muting your phone line
- Be succinct so that everyone has the opportunity to speak
- During the presentations you can also type your question and send it to the organizer (the question tool is shown to the right), but we prefer to receive questions verbally from participants. We will be maintaining a question log for this meeting.



February 26th IRPWG Meeting Objectives



During this meeting, we aim to accomplish the following objectives:

- Follow up on questions/comments from the January meeting
- Review draft IRP/SEIS documents
- Discuss potential sensitivity cases based on the input from the IRPWG and the EE Seminar
- Overview of public sessions content and schedule

IRPWG Meeting – February 26th Agenda

Time	Topic	Presenter
9:00	Welcome – Session Objectives	Randy McAdams
9:15	Recap of RERC Meeting	Joe Hoagland
9:45	Review of January IRPWG comments and suggestions	Gary Brinkworth
10:00	Recap of the Energy Efficiency Seminar	Gary Brinkworth
10:20	Break	
10:30	Overview of the SEIS Draft Document	Chuck Nicholson
11:15	Overview of the IRP Draft Document	Gary Brinkworth
12:00	Lunch	
1:00	Sensitivity Cases: From Draft to Final IRP	Tom Rice
	Alignment of Sensitivity Cases with RERC and IRPWG Suggestions	
	Feedback from Stakeholders	
2:00	Overview of public sessions and schedule	Gary Brinkworth
2:45	Next Steps	Gary Brinkworth
3:00	Adjourn	

RERC Meeting Agenda

Monday, February 2, 2015	
10:30	**Welcome**
10:45	**Meeting Purpose** - *Hoagland*
10:55	**RERC Overview and Meeting Protocols** - *Lavender* **Overview of Agenda**
11:05	**Environmental Policy Update** - *Brenda Brickhouse, VP, Environment & Energy Policy*
11:25	**Recap October 2015 Meeting** - *Gary Brinkworth SR Program Manager, IRP*
11:30	**IRP Status** – *Brinkworth*
noon	*Lunch*
1:00	**Preliminary IRP Results** - *Tom Rice, SR Manager, Capacity Planning & Fleet Strategy*
1:45	**IRP Report and Next Steps** - *Brinkworth*
2:30	*Break*
2:45	**IRP SEIS** - *Chuck Nicholson, NEPA Compliance Specialist*
3:05	**IRP Discussion** - *Lavender*
4:00	**Day 1 Closing Comments** – *Hoagland, VP, Stakeholder Relations*
4:15	**Meeting Adjourn**

Tuesday, February 3, 2015	
6:45 – 8:00	**Tour of TVA Systems Operations Center - Closed to Public** *(optional – also offered at 1:45 pm) TVA Missionary Ridge*
7:30	**Breakfast at Hotel**
7:30- 8:00	**Accept Public Requests to Comment**
8:30	**Welcome** - *Lavender*
8:40	**TVA Update** - *Hoagland*
9:00	**Public Comment Period**
10:00	*Break*
10:15	**Changing Utility Market Place and its Implications** – *Hoagland*
10:45	**Market Place Discussion** - *Lavender*
11:15	**Council Advice** - *Lavender*
12:00	*Lunch*
1:00	**Closing Comments, Next Steps** - *Hoagland* **Next Steps**
1:30	**Adjourn**
1:45 – 3:00	**TVA Systems Operation Center Tour (closed to public)** *optional* *TVA Missionary Ridge*

RERC Advice on the IRP *(February 3, 2015)*

- TVA has **analyzed a wide range of potential future scenarios** and included a broad range of conventional energy sources, renewables and energy efficiency in its 2015 IRP.
- Some areas of analysis, including **modeling energy efficiency and renewables as selectable resources,** have been **innovative and TVA has been a leader** in these areas.
- TVA has **involved a broad cross-section of stakeholders** in the IRP Working Group.
- TVA has **improved upon its 2011 IRP** with greater engagement of subject matter experts and extensive stakeholder involvement to form the inputs and support the process to develop the 2015 IRP.
- TVA has had **good transparency** and has been **responsive to stakeholder issues** during this process.
- **There are some areas that we would like TVA to consider for additional analysis**, before the IRP is finalized, e.g., further refinements to methodologies around certain energy efficiency and solar modeling model inputs, gas price forecasts, economic impacts including jobs, potential impacts of proposed legislation or regulation, availability/reliability of customer-owned energy resources.

  These areas should be considered with the IRP Working Group at the next session.

RERC Suggestions About Additional Analysis

In their advice statement, the RERC suggested that TVA consider additional analysis in the following areas before the IRP is finalized:

- EE and solar modeling inputs
- Gas prices forecasts
- IRP economic impact, in particular jobs in TVA's region
- Impact of proposed environmental legislation
- Availability/Reliability of customer-owned energy resources

We will be discussing planned sensitivity cases later in today's session, and how these suggestions map into those cases

Feedback Received From the IRPWG During January's Session

Observations About the IRP Results

- No major surprises on how strategies compare
- Load profile is the biggest driver of variation among the portfolios
- Cost and risk metric results are close together, there is a need to be cautious about making any big distinctions
- Results suggest TVA has some flexibility and time before next major decisions must be made
- Relationship between TVA, LPCs, and customers will be critical for the execution of the selected strategy
- Further analysis is warranted around some of the preliminary findings; several sensitivity cases are recommended, among others:
  - EE modeling assumptions (blocks costs, ramp rate, uncertainty factor)
  - Levels of demand-side resources in the plans

Additional Comments

- Some level of discussion on policy issues should be included in the IRP document , i.e.: cost shifting, level of emissions, asset ownership, etc.
- Rates and jobs are the most important factors to customers, therefore they should be addressed in the IRP, including some comments on the economic impact beyond the Valley Economic Impact metric
- There is a need for equity with respect to increased EE implementation
- Rates and how they impact vulnerable populations are important and should be addressed in the IRP
- Explicitly state that in the distributed marketplace scenario, TVA is not assuming backup supply to cover customer-installed resources
- Clarify that the de-carbonized future and the meet-an-emission-target strategy do not reflect any detailed analysis around EPA's proposed 111(d) rule
- Messaging and communication will be crucial

How We Are Using Input Received

- Messaging and presentation format/content suggestions are being worked into the draft and final IRP

- Presentation materials for public meetings will be shared (later today) with the IRP stakeholder group for feedback prior to public use

- Concerns and suggestions for additional analysis received from the IRP stakeholder group and RERC are being carefully considered as sensitivity cases are developed.

  — Some suggestions are already on our case list and work is underway (around assumptions for EE, solar and wind for example)

- Several comments and concerns are outside the scope of the IRP study. We are considering how to include clarification on this in the final IRP Report.

An Energy Efficiency Seminar Was Held 02/10/15

The purpose of the seminar was to review and get input on TVA's approach for modeling energy efficiency as a resource within its Integrated Resource Plan (IRP)

Agenda

Time	Topic	Speaker
10:00 – 10:15	Welcome and Introductions	Matt Murray / Joe Hoagland
10:15 – 10:30	Overview of TVA's IRP Process	TVA (Gary Brinkworth)
10:30 – 11:00	Industry Approach to Energy Efficiency Evaluation in Planning Studies	Navigant (Dan Bradley)
11:00 – 11:45	Energy Efficiency Block Design	TVA (Ed Colston)
11:45 – 12:15	**Working Lunch**	
12:15 – 1:00	IRP Model Execution and Selected Initial Results	TVA (Tom Rice)
1:00 – 1:15	Regional View of Energy Efficiency	SEEA (Mandy Mahoney)
1:15 – 1:45	Energy Efficiency Benchmarking	ScottMadden (Peden Young)
1:45 – 2:00	Views on Energy Efficiency Modeling Approach	SACE (John Wilson)
2:00 – 2:15	Assessment of the TVA Methodology	Navigant (Mark Klan)
2:15 – 2:30	**Break**	
2:30 – 3:30	Seminar Audience Q&A	ScottMadden (moderator)
3:30 – 4:00	Concluding Remarks and Close	TVA (Joe Hoagland)

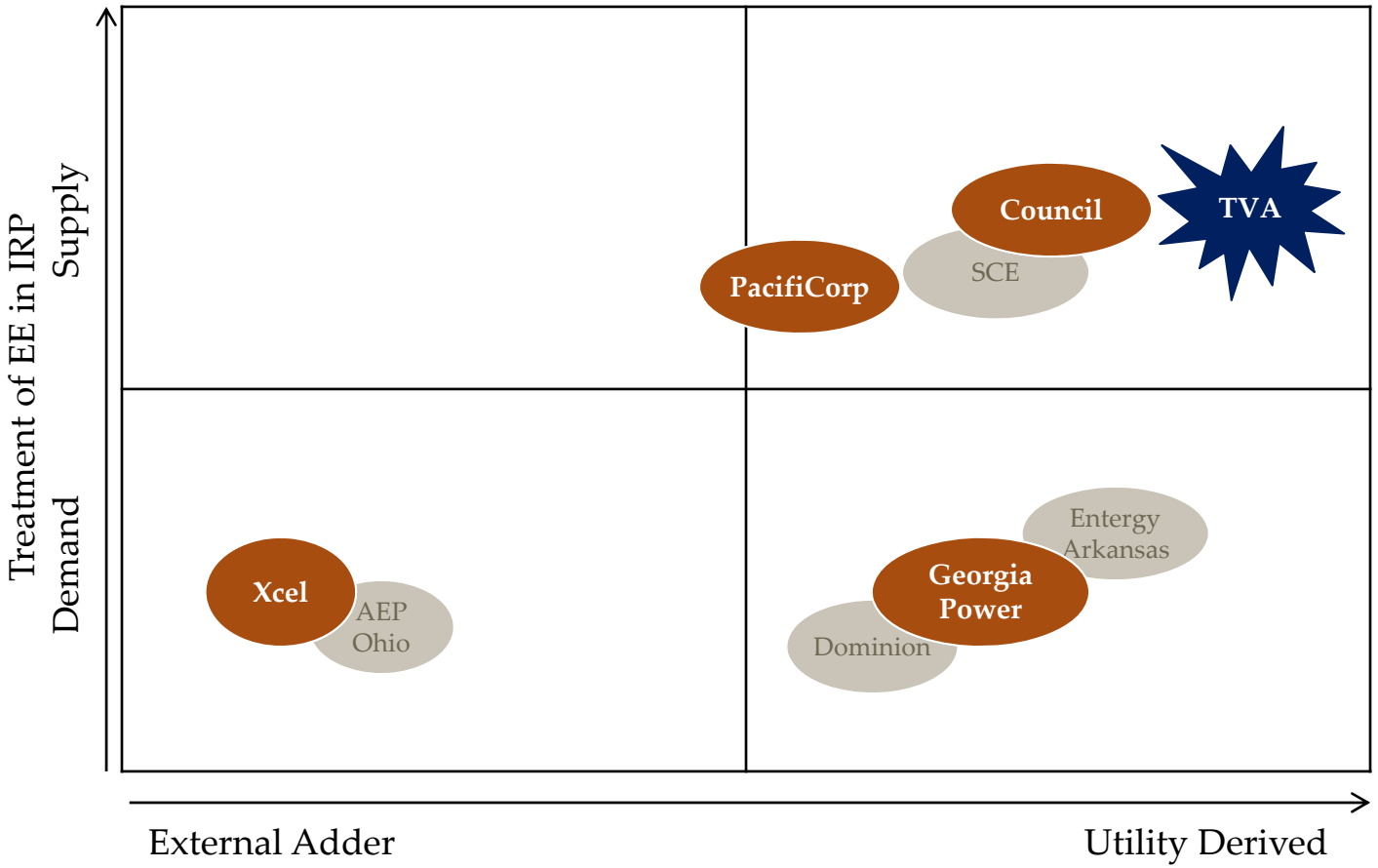
Key Goals and Takeaways

- Understand how TVA models energy efficiency as a resource within the TVA integrated resource planning approach
- Understand energy efficiency design parameters and impacts on resource planning results
- Convey different energy efficiency modeling approaches and results across the industry
- Share and vet additional energy efficiency resource modeling perspectives and concerns

Will the coffee still be there in the future?

- Will the coffee still be there in the future?
- With that same flavor/quality?
- In that same amount?

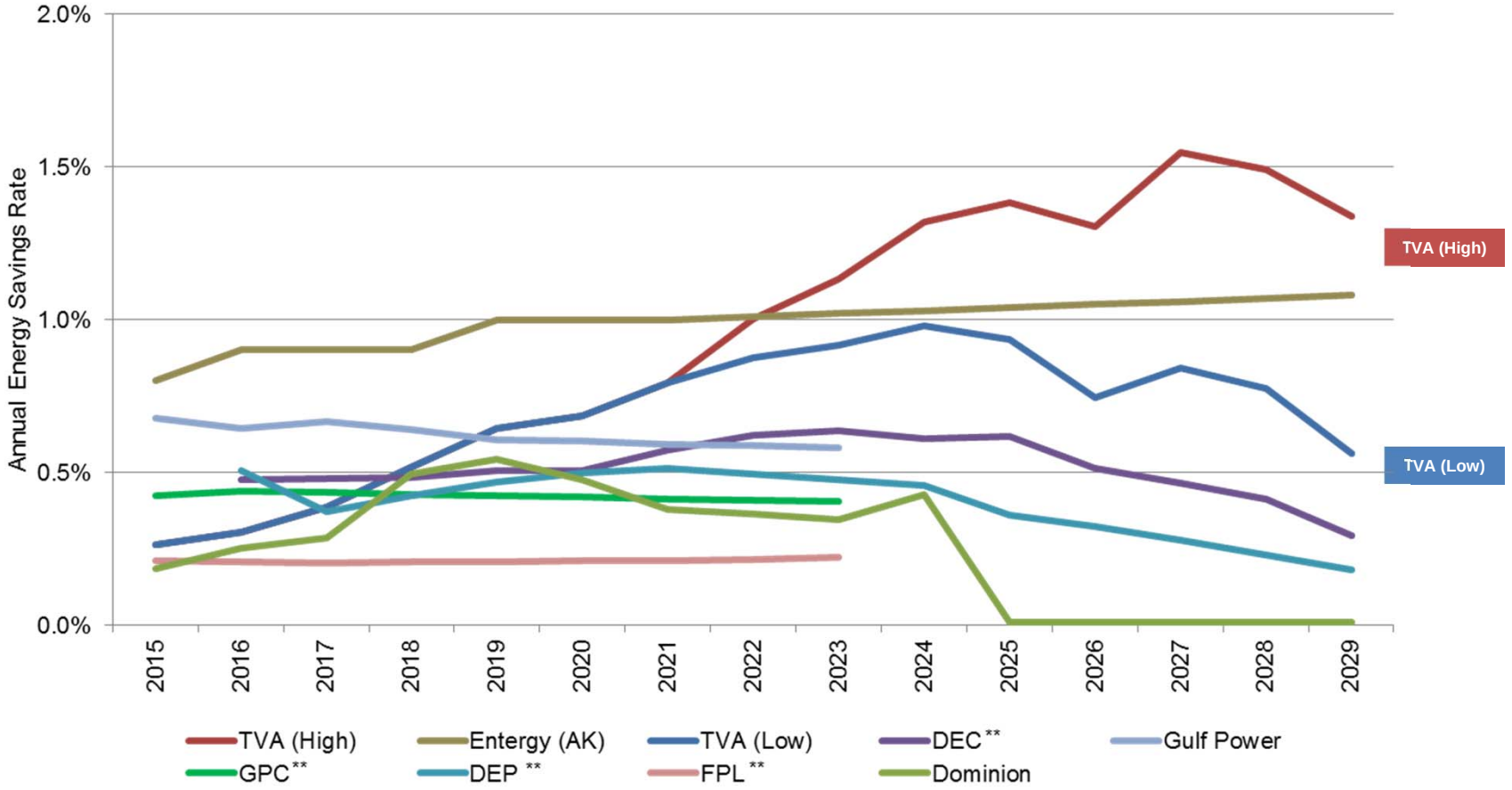
Comparative Illustration of Approaches Taken to EE in IRP



NAVIGANT ENERGY

Energy Efficiency Long-Term Projections

TVA and Regional Peers



Sources and notes:
State Energy Efficiency Standards: Policy Brief, ACEEE; Commission Filings and Orders; Utility IRPs
** TVA results are based on EE savings at the generator (net of free ridership) and end user sales. Data represents initial 2015 IRP results only. Figures do not represent a recommended direction or specific plan*
*** Duke Energy Carolinas (DEC); Duke Energy Progress (DEP); Florida Power & Light (FPL); Georgia Power Company (GPC)*
**** Extrapolations were made in some cases when exact data was not available.*

scottmadden
MANAGEMENT CONSULTANTS

Bottom-Line Observations

- On balance, TVA appears to be relatively well-positioned to introduce energy efficiency into IRP modeling as a model-selectable resource, as opposed to forcing in pre-set amounts at pre-determined times
- Strong Aspects of TVA Approach:
  - Detailed coordination between EE and Resource Planning groups to provide reasonable inputs and plausible outputs
  - Technical estimates of EE potential and market penetration
  - EE block creation for resource modeling purposes
  - Overall resource modeling methods and ability to evaluate strategies and scenarios
- Areas for Further Work:
  - Approach and preliminary results rely heavily on methods and assumptions that are not yet fully validated (but work is ongoing)
  - Building decay and end-of-measure life treatment
  - Ability to model incentive levels and associated program participation rates
  - Block-level cost structure, performance, and relationship between program costs and savings
  - EE persistence over time

Energy Efficiency Seminar Outputs

- There was a consensus that EE can be modelled as a selectable resource and that TVA's methodology is a reasonable initial approach
- There are different points of view with regards to some of the model parameters and assumptions; primarily ramp-rates, block costs, and uncertainty factors
- Additional comments/input:
  - Consider providing more detail for the first five years of the study
  - Consider whether future regulation, for example new EE codes and standards might reduce TVA program spend and/or be incorporated as a reduction in the load forecast
  - Consider various "ramp-rate" constraints via sensitivity analysis
  - Clarify in the IRP the energy efficiency net-to-gross factor and calculation by sector
  - Examine potential overlap between the net-to-gross ratio and the planning factor
- As with the IRPWG January meeting comments previously discussed, these comments/inputs will be considered through sensitivity analysis or in the drafting of the final IRP

BREAK TIME

Overview of Draft SEIS

The Draft SEIS is organized into ten chapters

Chapter	Contents
Chapter 1:	Introduction
Chapter 2:	Resource Planning Process
Chapter 3:	TVA Power System
Chapter 4:	Affected Environment
Chapter 5:	Energy Resource Options
Chapter 6:	Alternatives
Chapter 7:	Anticipated Impacts
Chapters 8-10:	Literature Cited, Preparers, Draft Document Recipients

Chapter 1: Introduction

Objective: Introduce the reader to TVA, the purpose and need for the action, the IRP process,	
1.1 Introduction 1.2 The Tennessee Valley Authority 1.3 History of the TVA Power System 1.4 Purpose and Need for Integrated Resource Planning 1.5 The Integrated Resource Planning Process 1.6 Scoping and Public Involvement 1.7 Statutory Overview 1.8 Other Relevant NEPA Reviews 1.9 EIS Overview	Key Messages/Content ◆ Introduce TVA and the history of the TVA power system ◆ Introduce integrated resource planning and explain why TVA is developing the IRP ◆ TVA is developing the IRP with extensive public involvement ◆ Several laws and regulations apply to TVA's resource planning and subsequent implementing actions ◆ Previous EISs and environmental assessments are relevant to this planning process

Chapter 2: TVA's Resource Planning Process

Objective: Briefly describe TVA's resource planning process

2.1 Introduction 2.2 Need for Power Analysis 2.3 Scenarios 2.4 Planning Strategies 2.5 Portfolio Development 2.6 Portfolio and Strategy Evaluation	Key Messages/Content ◆ The need for power analysis requires four steps: Estimate Demand, Determine Reserve Needs, Estimate Supply, and Estimate Capacity Gap ◆ Five scenarios have been defined to test a broad range of plausible future conditions ◆ Five strategies have been defined to test a range of planning directions ◆ Portfolios / capacity expansion plans are developed for each combination of scenario and strategy ◆ Portfolios are evaluated across five metric categories: Cost, Risk, Environmental Stewardship, Flexibility, Valley Economics

Chapter 3: The TVA Power System

Objective: Provide a detailed description of the TVA power system

3.1 Introduction 3.2 TVA Customers, Sales, and Power Exchanges 3.3 TVA-Owned Generating Facilities 3.4 Purchased Power 3.5 Demand-Side Management Programs 3.6 Transmission System	Key Messages/Content ◆ The TVA power system is large, robust, and diverse ◆ Most of the power TVA markets is sold to local power companies ◆ TVA owns the facilities used to generate most of the power it markets ◆ Purchased power is an important component, especially for renewable energy ◆ TVA has a large suite of demand-side management programs ◆ The transmission system is continually expanding

Chapter 4: Affected Environment

Objective: Describe the environmental resources potentially affected during implementation of the IRP

4.1 Introduction 4.2 – 4.17 Descriptions of environmental resources including: Climate and Greenhouse Gases Air Quality Water Quality Water Supply Biological Resources Land Use Cultural Resources Socioeconomics Solid and Hazardous Wastes Renewable Energy Potentials	Key Messages/Content ◆ Numerous environmental resources are affected by TVA's power system ◆ Effects to some resources widespread (GHG emissions, air quality, socioeconomics) ◆ Effects to other resources site-specific (biological and cultural resources, land use)

Chapter 5: Energy Resource Options

Objective: Describe TVA's existing generation sources, and identify potential energy resources available for selection in the planning process

5.1 Introduction

5.2 Options Evaluation Criteria

5.3 Options Excluded from Further Evaluation

5.4 Options included in IRP Evaluation

- 5.4.1 Fossil-Fueled Generation
  - Coal, Natural Gas, Petroleum – Existing and New Facilities
- 5.4.2 Nuclear Generation
- 5.4.3 Renewable Generation
  - Hydroelectric, Wind, Solar, Biomass
- 5.4.4 Energy Storage
- 5.4.5 Energy Efficiency and Demand Response

Key Messages/Content

- TVA identified a broad range of energy choices, and applied specific criteria to narrow expansion options
- New generation options include: new build, retrofit, EEDR, and PPAs
- Primary resource options include: nuclear, natural gas, solar, wind, hydro, energy efficiency, and demand response

Chapter 6: Alternatives

Objective: Describe and compare the alternatives to the proposed action

6.1 Introduction

6.2 Alternative Strategies and Associated Capacity Expansion Plans

- 6.3.1 Baseline Case – No Action Alternative
- 6.3.2 Strategy A – The Reference Plan
- 6.3.3 Strategy B – Meet an Emission Target
- 6.3.4 Strategy C – Focus on Long-Term, Market-Supplied Resources
- 6.3.5 Strategy D – Maximize Energy Efficiency
- 6.3.6 Strategy E – Maximize Renewables

6.4 Comparison of Alternative Strategies

6.5 Strategy and Portfolio Evaluation

6.6 Comparison of Environmental Impacts of the Alternatives

Key Messages/Content

- Describes the 6 alternatives and their associated capacity expansion plans
- Summary comparison of metrics for each alternative, including the No Action Alternative
- Summary comparison of environmental impacts of each alternative

Chapter 7: Anticipated Impacts

Objective: Provide detailed discussion and analysis of the Draft IRP results

7.1 Introduction

7.2 Facility Siting and Review Processes

7.3 Environmental Impacts of Supply-Side Options

7.4 Environmental Impacts of EEDR Programs

7.5 Environmental Impacts of Transmission Facility Construction and Operation

7.6 Environmental Impacts of Alternative Strategies and Portfolios

- 7.6.1 Air Quality
- 7.6.2 GHG Emissions and Climate Change
- 7.6.3 Water Resources
- 7.6.4 Fuel Consumption
- 7.6.5 Solid Waste
- 7.6.6 Land Requirements
- 7.6.7 Socioeconomics

7.7 Potential Mitigation Measures

Key Messages/Content

- TVA conducts comprehensive evaluation of potential impacts when planning capacity expansions
- Impacts described generically for each energy resource
- Impacts to 7 resource areas then quantified for each alternative
- Air pollutant and GHG emissions, water resource impacts, and solid waste largely dependent on future coal generation
- For most environmental resources, lowest to highest impact ranking is E, D, A-B-C, No Action
- Facility land requirements dependent on renewable expansion, particularly solar

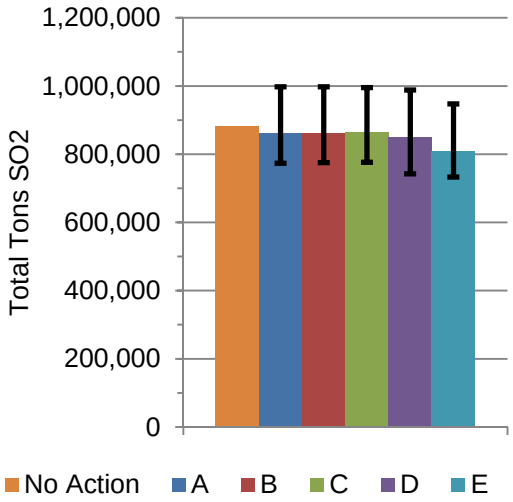
Chapter 7: Anticipated Impacts (Cont'd)

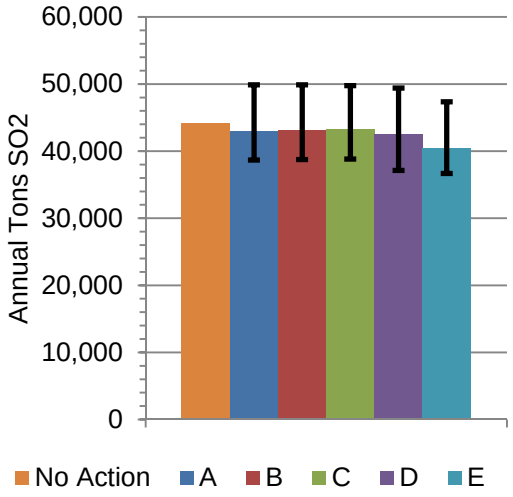
Environmental Characterization of Energy Resources

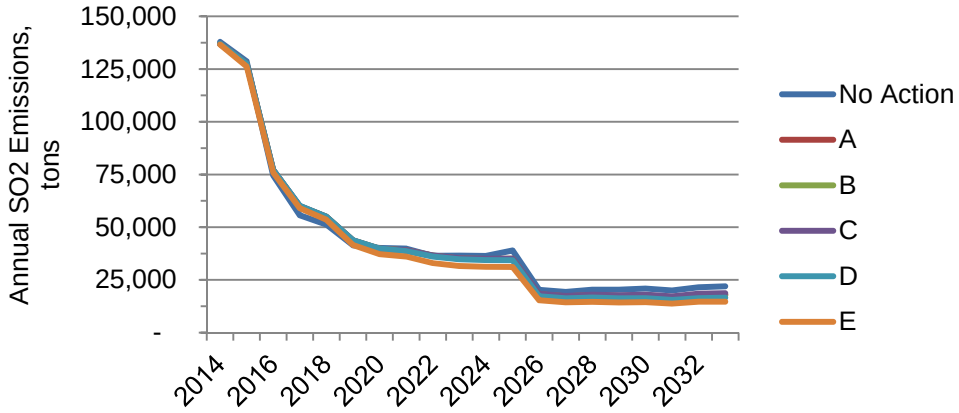
	Net Capacity - MW	Capacity factor - %	Heat rate - Btu/kWh	Fuel requirement	SO_2 emissions - lbs/MWh	NOx emissions - lbs/MWh	CO_2 emissions - tons/GWh
Natural Gas Fueled							
Combustion turbine 3 unit	590	2	10,132	9,845 ft^3/MWh	0	0.2588	588.2
Combustion turbine 4 unit	786	2	10,132	9,845 ft^3/MWh	0	0.2588	588.2
Combined cycle 2x1	670	40	6,946	6,777 ft^3/MWh	0	0.0120	404.7
Combined cycle 3x1	1,005	40	6,598	6,777 ft^3/MWh		0.0120	404.7
Renewable							
Hydro expansion – spill addition	40	50	n/a	n/a	0	0	0
Hydro expansion – space addition	30		n/a	n/a	0	0	0
Hydro - Run of river	25		n/a	n/a	0	0	0
Wind – MISO	200	40	n/a	n/a	0	0	0
Wind – SPP	200	40	n/a	n/a	0	0	0
Wind – TVA region	120	30	n/a	n/a	0	0	0
Wind – HVDC	200	55	n/a	n/a	0	0	0

Chapter 7: Anticipated Impacts (Cont'd)

SO_2 Emissions by Alternative

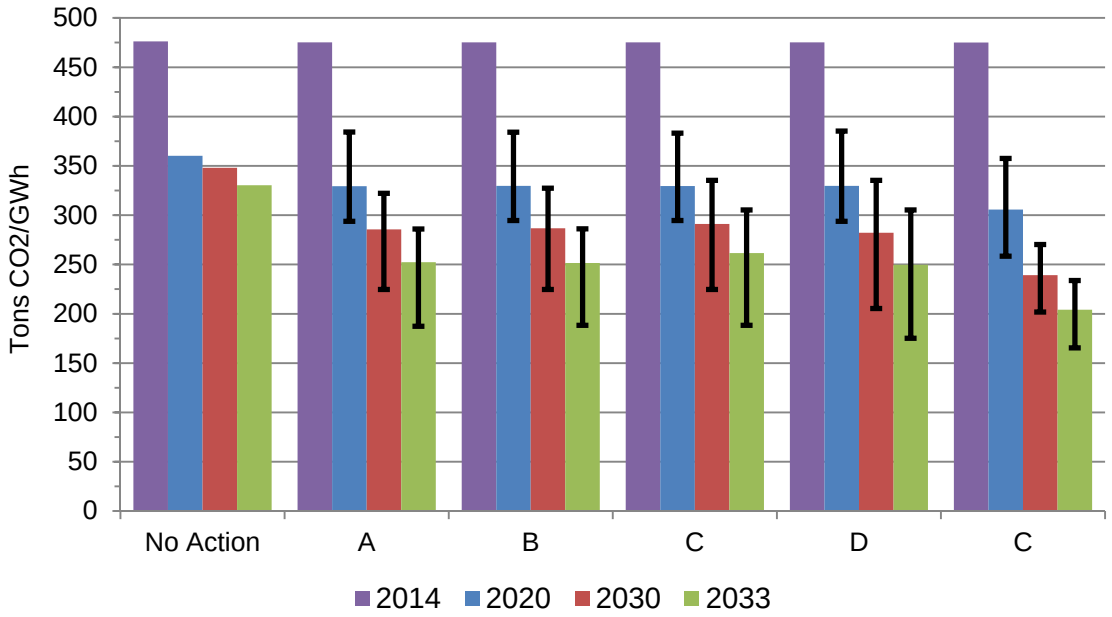


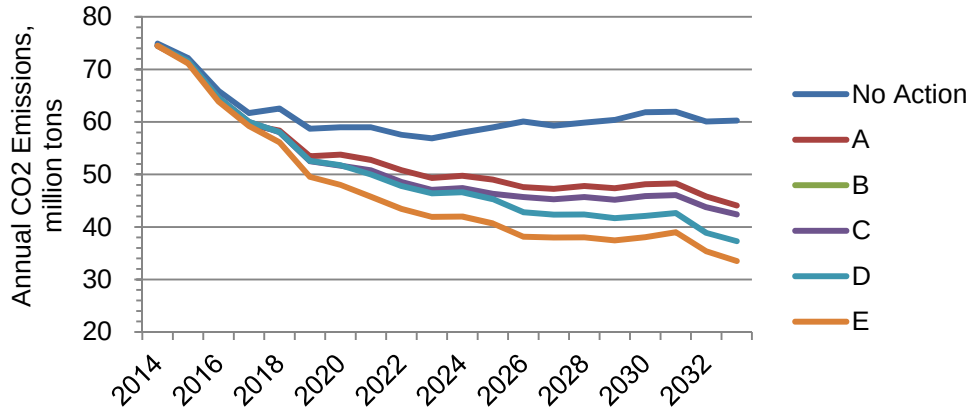




Chapter 7: Anticipated Impacts (Cont'd)

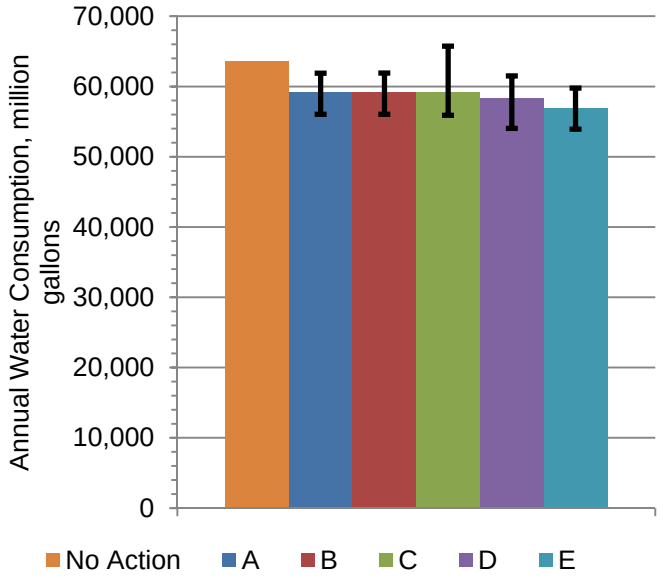
CO_2 Emissions by Alternative

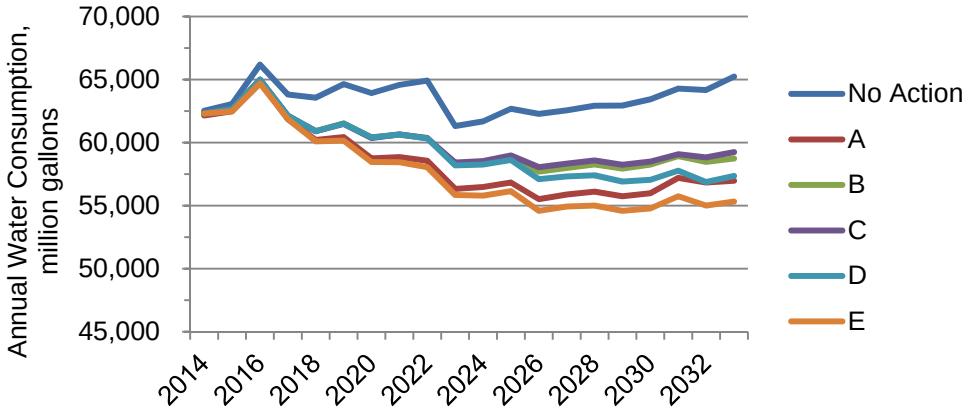




Chapter 7: Anticipated Impacts (Cont'd)

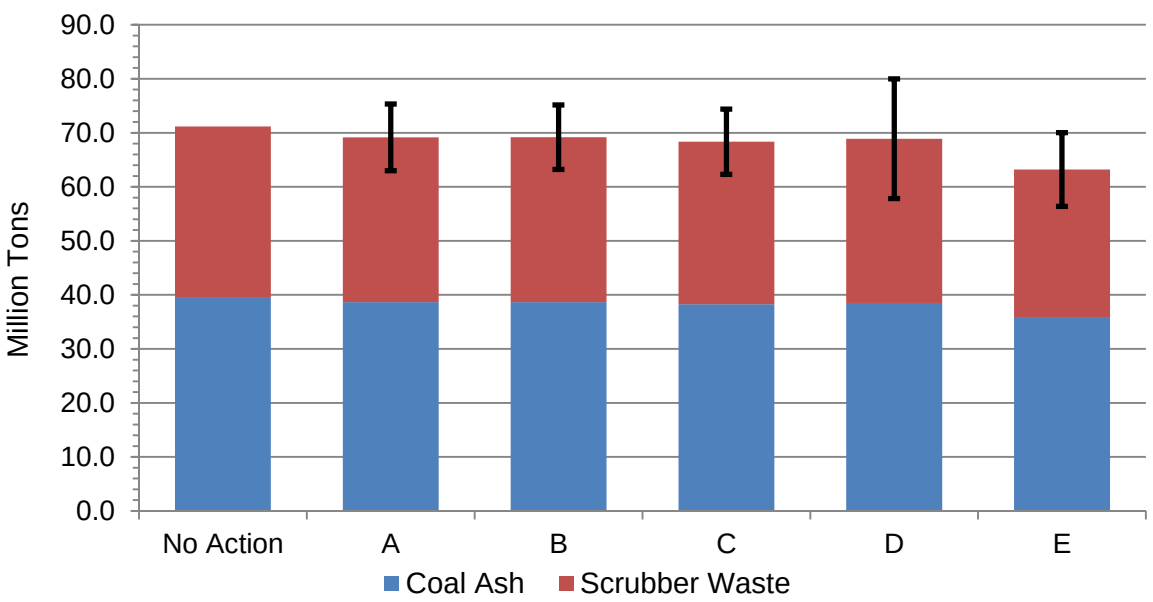
Water Consumption by Alternative

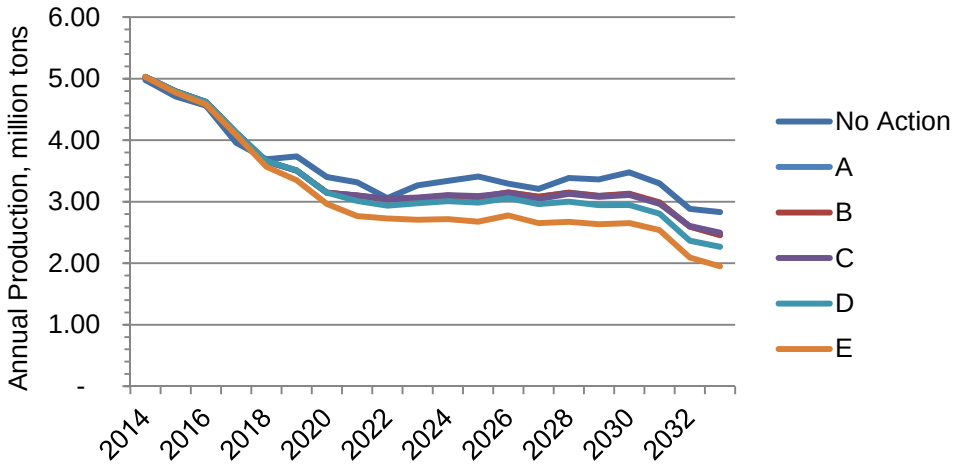




Chapter 7: Anticipated Impacts (Cont'd)

Coal Waste Production by Alternative

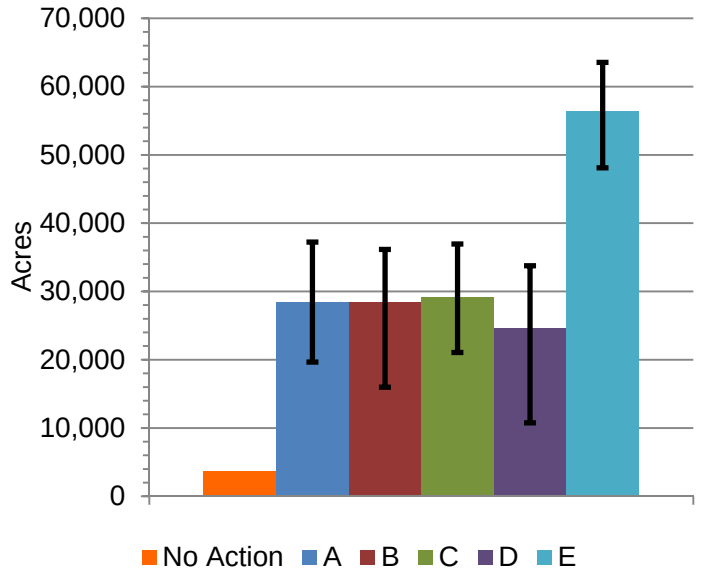




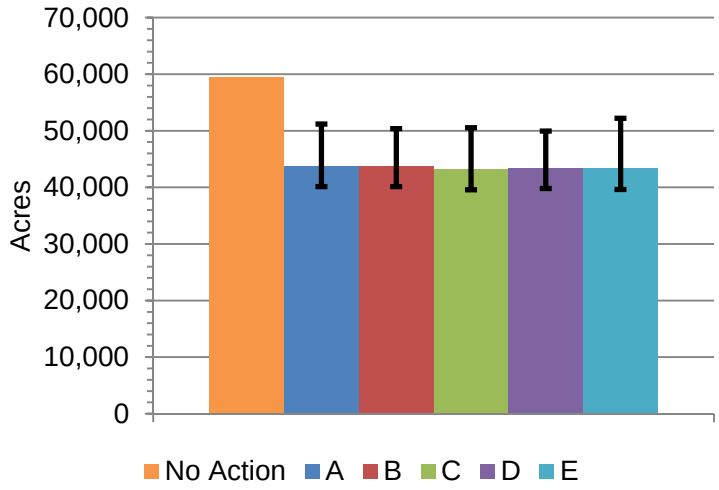
Chapter 7: Anticipated Impacts (Cont'd)

Land Requirements by Alternative

Capacity Expansion Land Requirements



Life Cycle Land Requirements for Nuclear and Fossil



IRP SEIS Process – Next Steps

- Issue draft IRP Report and SEIS for public review
- EPA publishes Notice of Availability of drafts on March 13, starting 45-day public review period
- Collect public comments submitted through the following channels: at public meetings, by web comment form, by email, and by mail
- Review comment submissions, consolidate similar comments, and assign consolidated comments to staff experts to prepare responses
- Compile consolidated comments and responses into indexed comment response report
- Make necessary edits and produce final IRP Report and SEIS
- EPA publishes Notice of Availability of finals no later than 30 days before August TVA Board meeting
- After the August TVA Board meeting, issue Record of Decision, completing the NEPA process

Overview of Draft IRP Document

The Draft IRP is organized into eight chapters

Chapter	Contents
Chapter 1:	Introduction
Chapter 2:	IRP Process
Chapter 3:	Public Participation
Chapter 4:	Need for Power Analysis
Chapter 5:	Energy Resource Options
Chapter 6:	Resource Plan Development and Analysis
Chapter 7:	Draft Study Results
Chapter 8:	Strategy Assessment and Next Steps
Appendices:	Detailed Data and Supplemental Information

Chapter 1: Introduction

Objective: Introduce the reader to TVA's mission and the IRP process

Chapter Table of Contents

Key Messages/Content

- Resource plan enables TVA to provide reliable, affordable electricity to the people we serve
- Process will lead to identification of a preferred planning strategy
- TVA's planning process takes into consideration TVA's unique position as a public power company
- The draft IRP presents the initial observations after the first round of simulations
- SEIS meets NEPA requirements and provides a more detailed analysis of the environmental impacts of potential planning directions

Chapter 2: IRP Process

Objective: Explain the steps in the IRP Process

Chapter Table of Contents	Key Messages/Content
2.1 Develop Scope 2.2 Develop Inputs and Framework 2.3 Analyze and Evaluate 2.4 Present Initial Results 2.5 Incorporate Feedback 2.6 Identify Recommended Planning Strategy 2.7 Approval of Recommended Planning Strategy	◆ The IRP analysis is based on a sound no regrets methodology ◆ There are seven distinct steps of the planning process from scoping to approval of a recommended strategy ◆ TVA's methodology involves defining strategies, scenarios, portfolios ◆ Metrics and modeling play an important role in the process ◆ The outputs of the draft IRP are initial observations ◆ The final IRP will consider comments received during the Public Comment Period

Chapter 3: Public Participation

Objective: Provide details of TVA's transparent and participatory public engagement process

Chapter Table of Contents	Key Messages/Content
3.1 Public Scoping Period 3.1.1 Public Meetings 3.1.2 Written Comments 3.1.3 Results of the Scoping Process 3.2 Analysis and Evaluation Period 3.2.1 IRP Working Group 3.2.2 Public Briefings 3.3 Draft IRP Public Comment Period 3.3.1 Public Meetings 3.3.2 Webinars 3.3.3 Written Comments	◆ The goal of public participation is to encourage people to share their views. ◆ TVA uses a transparent and participatory approach ◆ There are three distinct phases of public participation: Scoping Period, Inputs and Framework Period, Draft IRP and Public Comment Period ◆ Views and input received through public meetings and IRPWG sessions are incorporated into the IPR process ◆ Discusses the role of the IRPWG and identifies the members ◆ Provides dates and places of public meetings and summarizes content

Chapter 4: Need for Power Analysis

Objective: Ground the reader on TVA's current power supply capabilities, and explain the development of the energy gap

Chapter Table of Contents

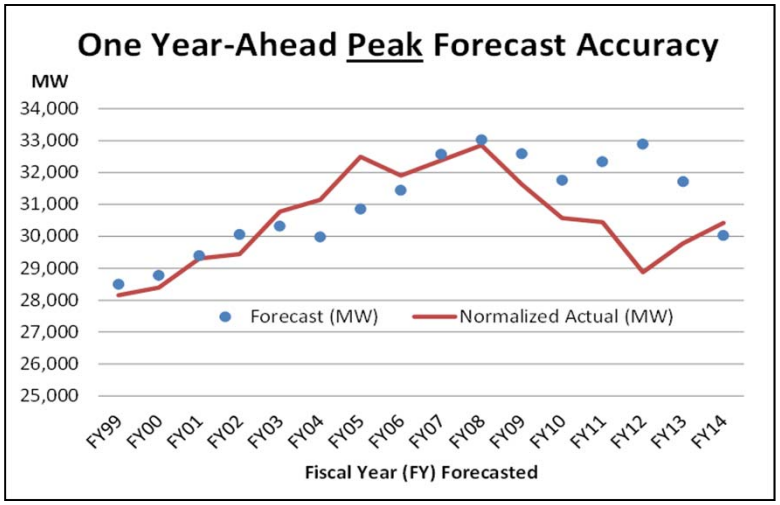
Key Messages/Content

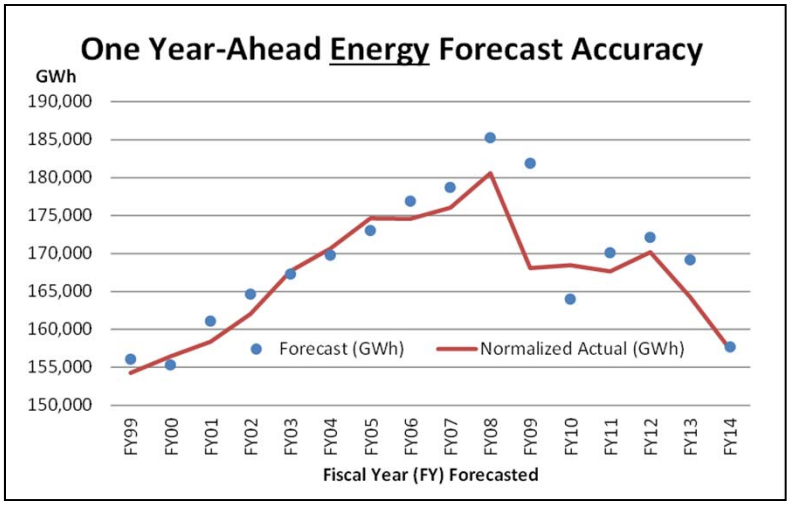
- Need for Power Analysis defines TVA's ability to meet projected demand with existing resources – defines the Capacity Gap
- Four steps are used to complete the analysis: Estimate Demand, Determine Reserve Needs, Estimate Supply, and Estimate Capacity Gap
- Highest and lowest peak demand and energy scenarios are illustrated and discussed
- Illustrates current capacity and generation portfolios
- Details 20 year firm capacity portfolio
- Depicts capacity and energy gap ranges

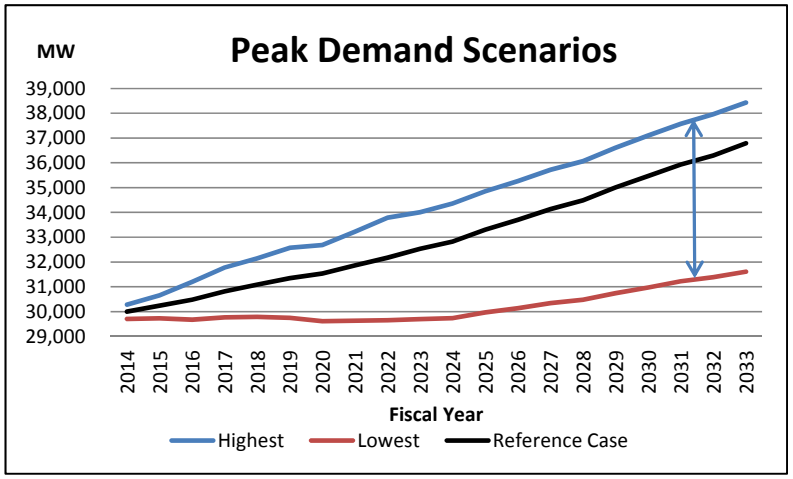
TVA's current firm capacity, demand and energy gap forecasts were reviewed during the May '14 IRPWG sessions

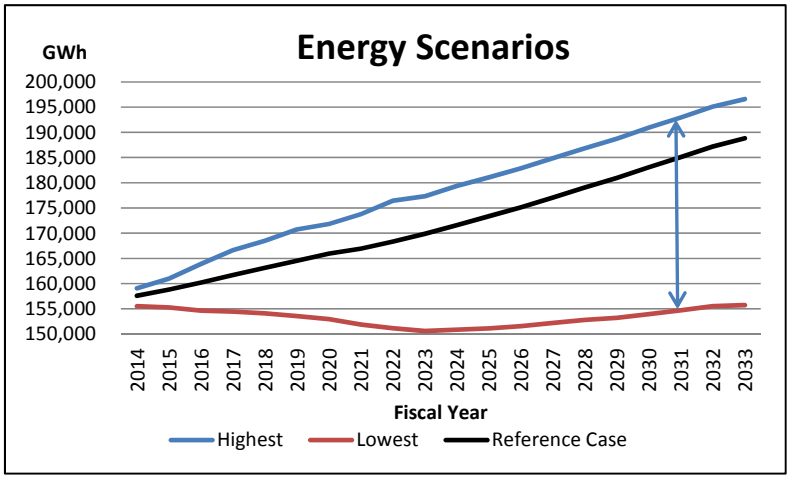
Chapter 4: Need for Power Analysis (Cont'd)

Development of the Load Forecast

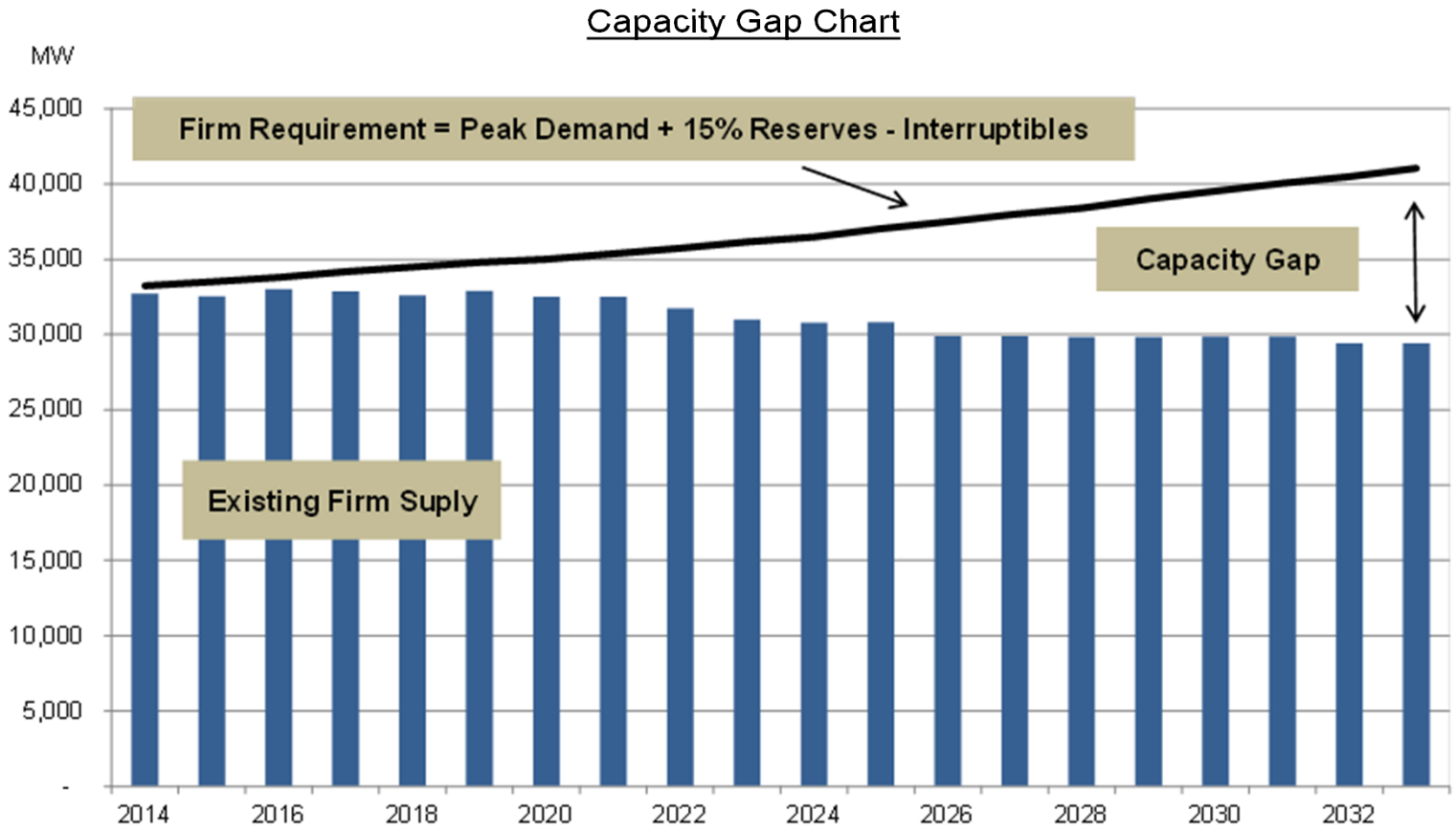








Chapter 4: Need for Power Analysis (Cont'd)



Chapter 5: Energy Resource Options

Objective: Describe TVA's existing generation sources, and identify potential energy resources available for selection in the planning process

Chapter Table of Contents

Key Messages/Content

- TVA identified a broad range of energy choices, and applied specific criteria to narrow expansion options
- New generation options include: new build, retrofit, EEDR, and PPAs
- Primary resource options include: nuclear, natural gas, solar, wind, hydro, energy efficiency, and demand response

Resource options were reviewed by the IRPWG during the March '14 session

Chapter 5: Energy Resource Options (Cont'd)

Resource Options Available for Model Selection

Nuclear

- **Pressurized water reactor (PWR)**
- **Advanced pressurized water reactor (APWR)**
- **Small Modular Reactor (SMR)**

Coal fired

- **Integrated Gas Combined Cycle (IGCC)**
- **Supercritical Pulverized Coal 1x8 (SCPC1x8)**
- **Supercritical Pulverized Coal 2x8 (SCPC2x8)**
- **Integrated Gas Combined Cycle with Carbon Capture and Sequestration (IGCC CCS)**
- **Supercritical Pulverized Coal 1x8 with Carbon Capture and Sequestration (SCPC1x8 CCS)**
- **Supercritical Pulverized Coal 2x8 with Carbon Capture and Sequestration (SCPC2x8 CCS)**

Natural Gas fired

- **Simple cycle combustion turbine (CT3x)**
- **Simple cycle combustion turbine (CT4x)**
- **Combined cycle two on one (CC2x1)**
- **Combined cycle three on one (CC3x1)**

Hydro

- **Hydro expansion project: Spill addition**
- **Hydro expansion project: Space addition**
- **Run of river**

Utility-scale Storage

- **Pumped-hydro storage**
- **Compressed air energy storage (CAES)**

Wind

- **Midcontinent Independent System Operator (MISO)**
- **Southwest Power Pool (SPP)**
- **In valley**
- **High Voltage Direct Current (HVDC)**

Solar

- **Utility-scale one-axis tracking photovoltaic**
- **Utility-scale fixed-axis photovoltaic**
- **Commercial-scale large photovoltaic**
- **Commercial-scale small photovoltaic**

Biomass

- **New direct combustion**
- **Repowering**

Energy Efficiency

- **Residential EE**
- **Commercial EE**
- **Industrial EE**

Demand Response

Chapter 5: Energy Resource Options (Cont'd)

Nuclear	PWR	APWR	SMR
Unit Characteristics			
Summer Net Dependable Capacity (MW)	1,260	1,117	334
Summer Full Load Heat Rate (Btu/kWh)	9,853	9,715	10,046
Unit Availability (Yr)	2026	2026	2026
Annual Outage Rate (%)	10%	10%	10%
Book Life (Yrs)	40	40	40

Solar	Utility tracking	Utility fixed	Commercial small	Commercial large
Unit Characteristics				
Nameplate Capacity (MW)	25	25	25	25
Summer Net Dependable Capacity (MW)	18	13	13	13
Unit Availability (Yr)	2015	2015	2015	2015
Annual Outage Rate	-	-	-	-
Book Life (Yrs)	25	25	25	25

Coal	IGCC	SCPC 1x8	SCPC 2x8	IGCC CCS	SCPC 1x8 CCS	SCPC 2x8 CCS
Unit Characteristics						
Summer Net Dependable Capacity (MW)	500	800	1,600	469	600	1,200
Summer Full Load Heat Rate (Btu/kWh)	8,000	8,674	8,674	10,000	10,843	10,843
Unit Availability (Yr)	2022	2025	2025	2028	2028	2028
Annual Outage Rate (%)	17%	10%	10%	18%	11%	11%
Book Life (Yrs)	40	40	40	40	40	40

Resource Unit Characteristics (Examples)

Chapter 6: Resource Plan Development and Analysis

Objective: Explain the IRP development process, scenario planning, and assessment methodology

Chapter Table of Contents

Key Messages/Content

- Scenarios and strategies are designed to test a wide range of plausible futures and planning directions
- Each strategy is modeled against each scenario creating 25 core cases or portfolios
- All cases are subject to additional rigorous stochastic analysis to further test the boundaries of each strategy
- TVA evaluates case results across five metric categories: Cost, Risk, Environmental Stewardship, Flexibility, Valley Economics
- Scorecards provide the actual results of all cases across nine evaluation metrics
- Strategy assessment results in observations and learnings about each strategy and how it performs relative to the other strategies

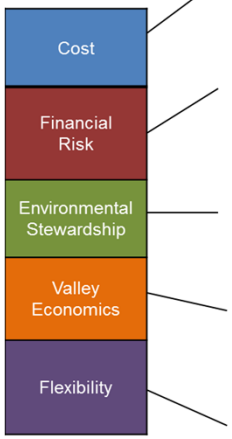
Chapter 6: Resource Plan Development and Analysis (Cont'd)

Scenarios	
1 - Current Outlook 2033:189 TWh	• Current outlook for the future TVA is using for resource planning studies
2 - Stagnant Economy 2033: 180 TWh	• Stagnant economy results in flat to negative growth, delaying the need for new generation
3 - Growth Economy 2033: 197 TWh	• Rapid economic growth translates into higher than forecasted energy sales and resource expansion
4 - De-Carbonized Future 2033: 172 TWh	• 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
5 - Distributed Marketplace 2033: 156 TWh	• Customers' awareness of growing competitive energy markets and the rapid advance in energy technologies produce unexpected high penetration rates in distributed generation and energy efficiency

Strategies	
X - Baseline Case	• Legislatively mandated, traditional least cost optimization, **EE/Renewables scheduled**
A - The Reference Plan	• Legislatively mandated, traditional least cost optimization, **EE/Renewables optimized**
B - Meet an Emission Target	• Resources selected to create lower emitting portfolio based on an emission rate target or level using CO2 as the emissions metric
C - Lean on the Market	• Most new capacity needs met using PPA or other bilateral arrangements • TVA makes a minimal investment in owned assets
D - Doing More EE	• Majority of capacity needs are met by setting an annual energy target for EE (e.g., minimum contribution of 1% of sales)
E – Focusing on Renewables	• Majority of new capacity needs are met by setting immediate and long-term renewable energy; includes hydro • Utility-scale approach is targeted initially with growing transition to distributed generation as the dominant renewable resource type by 2024

Scenarios and Strategies

IRPWG Reviewed Scenarios and Uncertainties in the December '13 and January '14 sessions. Strategies were developed and reviewed in the February '14 and March '14 sessions



Cost includes both the long-range cost of the resource plan (present value of customer costs) as well as a look at short term average system cost (an indicator of possible rate pressure)

Financial Risk measures the variation (uncertainty) around the cost of the resource plan by assessing a risk/benefit ratio and computing the likely amount of cost at risk; both of these indicators use data from probability modeling

Stewardship captures multiple measures related to the environmental "footprint" of the resource plans, like air emissions and thermal loading impacts

Valley Economics computes the macro-economic effects of the resource plans by measuring the change in per capita income compared to a reference case

Flexibility is a measure of how responsive the generation portfolio of each resource plan is by evaluating the type/quantity of resources and the extent to which this mix can easily follow load swings

Metric Categories

Metrics and evaluation categories were reviewed by the IRPWG during the April '14 session

Chapter 7: Draft Study Results

Objective: Provide detailed discussion and analysis of the Draft IRP results

Chapter Table of Contents

7.1 Analysis Results
- 7.1.1 Firm Requirements and Capacity Gap
- 7.1.2 Expansion Plans
- 7.1.3 System Energy Mix
- 7.1.4 Plan Cost and Risk

7.2 Selection Process
- 7.2.1 Scorecard Results
- 7.2.2 Ranking of Strategies
- 7.2.3 Sensitivity Cases
- 7.2.4 Other Strategic Considerations

7.3 Preferred Planning Strategies

Key Messages/Content

- Results show broad range of outcomes validating scenario and strategy constructs
- Chapter discusses themes coming out of results
- Details of firm requirements, capacity gap, energy mix, and expansion plans are discussed for each case
- Actual results for each strategy are presented in scorecard format

Draft IRP results were reviewed with the IRPWG during the December '14 and January '15 sessions

Chapter 7: Draft Study Results (Cont'd)

Strategy Scorecards

Strategy A

Real Values	Cost		Risk		Environmental Stewardship			Flexibility	Valley Economics
Scenarios	PVRR ($Bn)	System Avg Cost Years 1-10 ($/MWh)	Risk/Benefit Ratio	Risk Exposure ($Bn)	CO2 (MMTons)	Water (MMGallons)	Waste (MMTons)	System Regulating Capability (2033)[1]	Percent Difference in Per Capita Income[2]
1. Current Outlook	$132.74	$76.66	0.924	$140.43	57.0	61,843	3.458	28.7%	0.00%
2. Stagnant Economy	$125.86	$75.99	0.947	$132.83	51.8	59,448	3.495	28.0%	0.00%
3. Growth Economy	$139.55	$77.67	0.907	$147.54	59.7	61,899	3.716	27.1%	0.00%
4. De-Carbonized Future	$131.71	$80.97	0.997	$140.33	44.2	55,991	3.084	18.9%	0.00%
5. Distributed Market Place	$120.38	$77.27	0.989	$127.06	44.2	56,330	3.211	22.3%	0.00%

Strategy B

Real Values	Cost		Risk		Environmental Stewardship			Flexibility	Valley Economics
Scenarios	PVRR ($Bn)	System Avg Cost Years 1-10 ($/MWh)	Risk/Benefit Ratio	Risk Exposure ($Bn)	CO2 (MMTons)	Water (MMGallons)	Waste (MMTons)	System Regulating Capability (2033)[1]	Percent Difference in Per Capita Income[2]
1. Current Outlook	$132.70	$76.66	0.917	$140.38	57.0	61,860	3.459	29.9%	0.00%
2. Stagnant Economy	$126.03	$75.99	0.948	$132.99	51.8	59,451	3.495	27.9%	0.01%
3. Growth Economy	$139.54	$77.67	0.918	$147.62	59.7	61,912	3.712	26.2%	-0.01%
4. De-Carbonized Future	$131.73	$80.85	0.990	$140.31	44.3	56,046	3.096	19.7%	0.00%
5. Distributed Market Place	$120.38	$77.27	0.991	$127.06	44.2	56,331	3.211	22.3%	0.00%

Strategy C

Real Values	Cost		Risk		Environmental Stewardship			Flexibility	Valley Economics
Scenarios	PVRR ($Bn)	System Avg Cost Years 1-10 ($/MWh)	Risk/Benefit Ratio	Risk Exposure ($Bn)	CO2 (MMTons)	Water (MMGallons)	Waste (MMTons)	System Regulating Capability (2033)[1]	Percent Difference in Per Capita Income[2]
1. Current Outlook	$132.72	$76.30	0.863	$140.03	58.4	62,593	3.417	28.6%	0.00%
2. Stagnant Economy	$125.82	$75.49	0.912	$132.73	51.7	59,385	3.501	28.4%	0.01%
3. Growth Economy	$139.44	$77.67	0.899	$147.65	59.0	61,587	3.701	29.7%	0.03%
4. De-Carbonized Future	$131.46	$80.55	0.987	$140.10	44.1	55,912	3.091	21.6%	0.01%
5. Distributed Market Place	$120.47	$76.72	0.988	$127.42	45.1	56,573	3.254	20.8%	0.00%

Strategy D

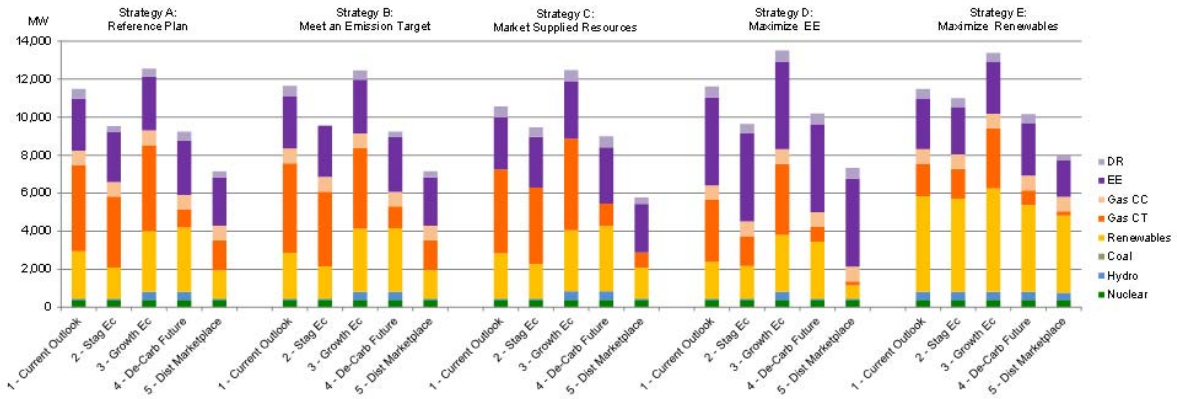
Real Values	Cost		Risk		Environmental Stewardship			Flexibility	Valley Economics
Scenarios	PVRR ($Bn)	System Avg Cost Years 1-10 ($/MWh)	Risk/Benefit Ratio	Risk Exposure ($Bn)	CO2 (MMTons)	Water (MMGallons)	Waste (MMTons)	System Regulating Capability (2033)[1]	Percent Difference in Per Capita Income[2]
1. Current Outlook	$134.40	$76.92	0.937	$142.37	56.2	61,505	3.445	27.7%	0.02%
2. Stagnant Economy	$127.90	$75.92	0.984	$135.35	50.7	59,008	3.441	22.3%	0.02%
3. Growth Economy	$141.34	$77.54	0.925	$149.71	57.6	61,246	3.733	26.4%	0.02%
4. De-Carbonized Future	$133.62	$81.05	1.025	$142.69	41.8	54,026	2.754	20.3%	0.02%
5. Distributed Market Place	$122.80	$77.26	1.004	$129.96	43.5	56,002	3.167	25.0%	0.02%

Strategy E

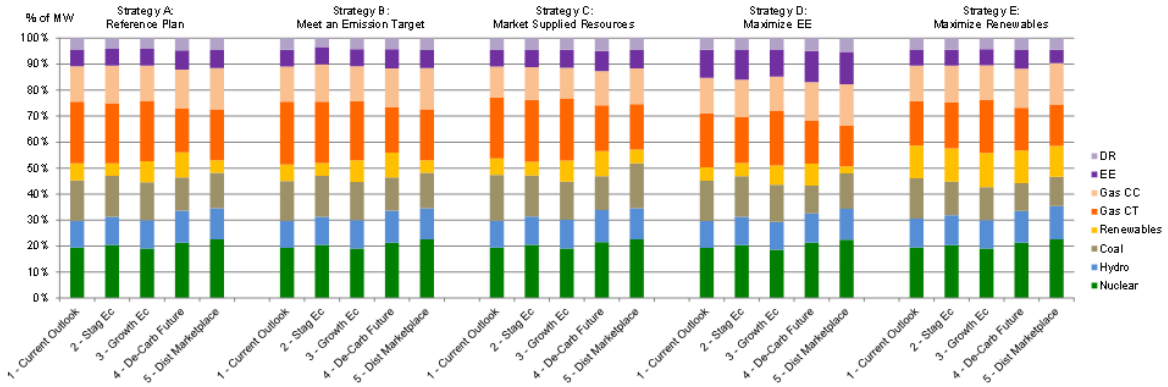
Real Values	Cost		Risk		Environmental Stewardship			Flexibility	Valley Economics
Scenarios	PVRR ($Bn)	System Avg Cost Years 1-10 ($/MWh)	Risk/Benefit Ratio	Risk Exposure ($Bn)	CO2 (MMTons)	Water (MMGallons)	Waste (MMTons)	System Regulating Capability (2033)[1]	Percent Difference in Per Capita Income[2]
1. Current Outlook	$136.24	$78.35	1.025	$145.11	52.2	59,685	3.160	20.9%	-0.01%
2. Stagnant Economy	$129.43	$77.33	1.040	$137.42	45.6	56,929	3.133	20.4%	0.00%
3. Growth Economy	$140.77	$78.46	1.035	$149.79	54.2	59,780	3.500	23.5%	0.00%
4. De-Carbonized Future	$132.83	$81.26	1.008	$141.69	41.6	53,921	2.755	18.8%	0.02%
5. Distributed Market Place	$123.45	$78.48	1.052	$130.93	39.9	54,483	2.931	16.0%	-0.01%

Chapter 7: Draft Study Results (Cont'd)

Incremental Capacity Additions



2033 Capacity and Energy Mix Charts



Chapter 7: Draft Study Results (Cont'd)

Themes Coming out of the Draft IRP Results

- There is a need for new capacity in every scenario being modelled
  - New natural gas unit additions in virtually every case; first unit could be added as early as 2020; in the majority of cases first self-build unit addition in 2023

- No additional significant baseload expansion indicated currently, beyond Watts Bar Unit 2 and Browns Ferry extended power uprates
  - Most of the variation in expansion plans is around CTs and Renewables

- Higher EE and Renewable levels than current budget in all cases
  - Solar showing up in mid 2020s; HVDC wind generally not until early 2030s
  - Seeing tradeoff between EE and gas resources
  - Generally selecting more CTs than CCs – EE is acting as an intermediate resource

Chapter 8: Strategy Assessment and Next Steps

Objective: Present the assessment results, identify potential sensitivity cases, and discuss next steps in the IRP Study process

Chapter Table of Contents

8.1 Strategy Assessments
- 8.1.1 Cost and Risk
- 8.1.2 Environmental Stewardship
- 8.1.3 Flexibility
- 8.1.4 Valley Economics
- 8.1.5 Summary of Initial Observations

8.2 Action Plan (Proposed Sensitivity Cases)

8.3 IRP Study Schedule

Key Messages/Content

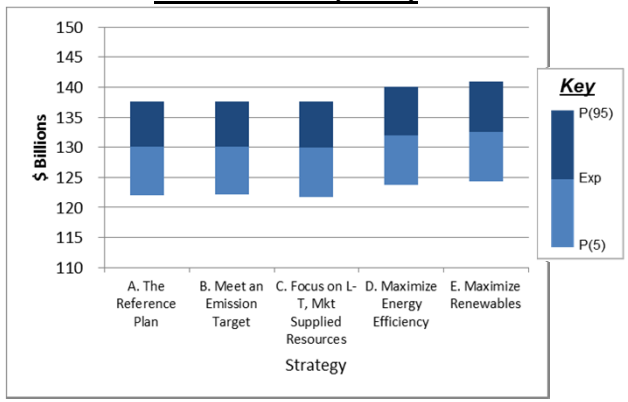
- Assessments look at overall strategy performance across all scenarios in the five evaluation categories
- Initial observations coming out of results will be discussed in detail
- Sensitivity cases will be run to further stress the results in specific areas based on the results of the Draft IRP
- The results of the additional analysis, along with input received during the public comment period, will inform the recommended planning direction established in the Final IRP document

Results of the stochastic analysis and the assessments were reviewed in the January '15 IRPWG working session

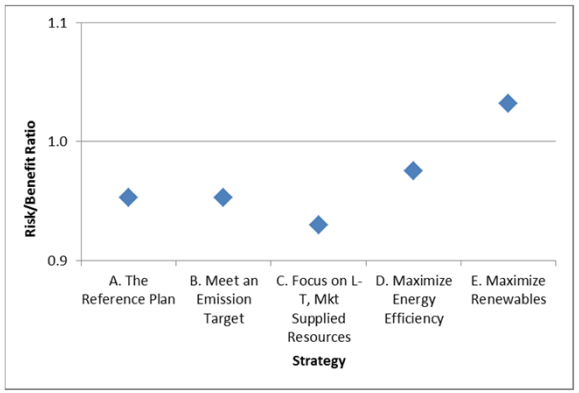
Chapter 8: Strategy Assessment and Next Steps (Cont'd)

Graphical Representations of Assessment Results

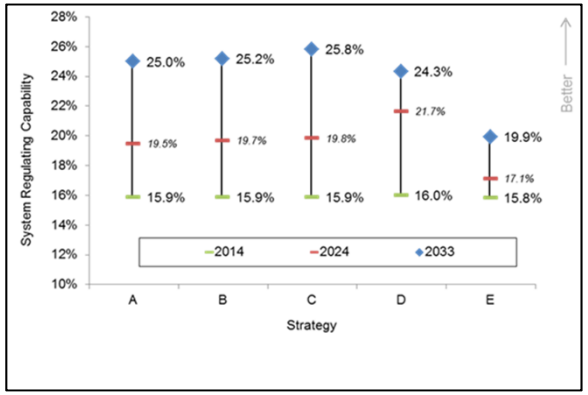
Total Plan Cost (PVRR)



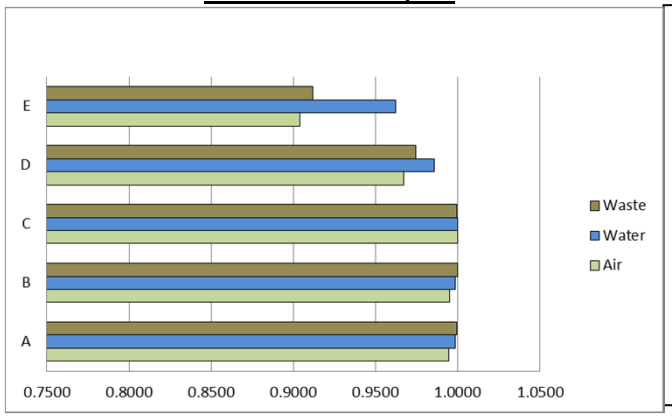
Risk Benefit Ratio



System Regulating Capability (SRC)

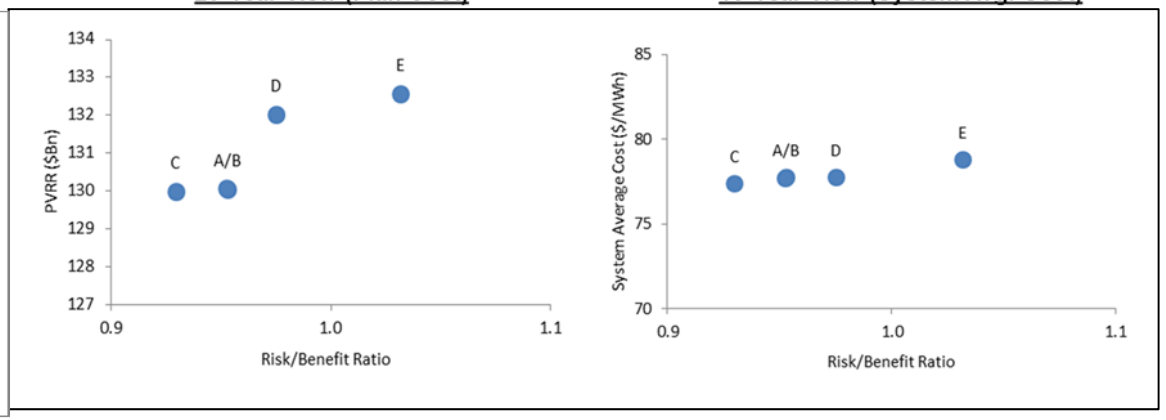


Environmental Impact



20-Year View (Plan Cost)

10-Year View (System Avg. Cost)



Chapter 8: Strategy Assessment and Next Steps (Cont'd)

Summary Observations Based on Assessment Results

- COST: The strategies have very similar total plan costs (20-year view), with the more extreme strategies (focusing on EE, renewables) slightly more expensive. On the basis of average system costs, all strategies are virtually identical over the first 10 years.

- FINANCIAL RISK: Risk scores are higher for the strategies that emphasize either significant investment in EE or renewables.

- ENVIRONMENTAL STEWARDSHIP: All strategies show improvement in air (CO2), water and waste categories compared to the performance of the current resource portfolio. The strategy to maximize renewables shows the best performance in this metric.

- FLEXIBILITY: The ability of the system to respond to load uncertainty is most limited in the strategy that maximizes renewables. The strategy that maximizes EE investment appears to have a good flexibility score as a result of reduced loads.

- VALLEY ECONOMICS: The strategies seem to have essentially the same very low impact on macro-economics in the Valley as measured by per capita income. There is a somewhat higher impact for the strategy that seeks to maximize EE (higher % of investments remain in the Valley).

Appendices

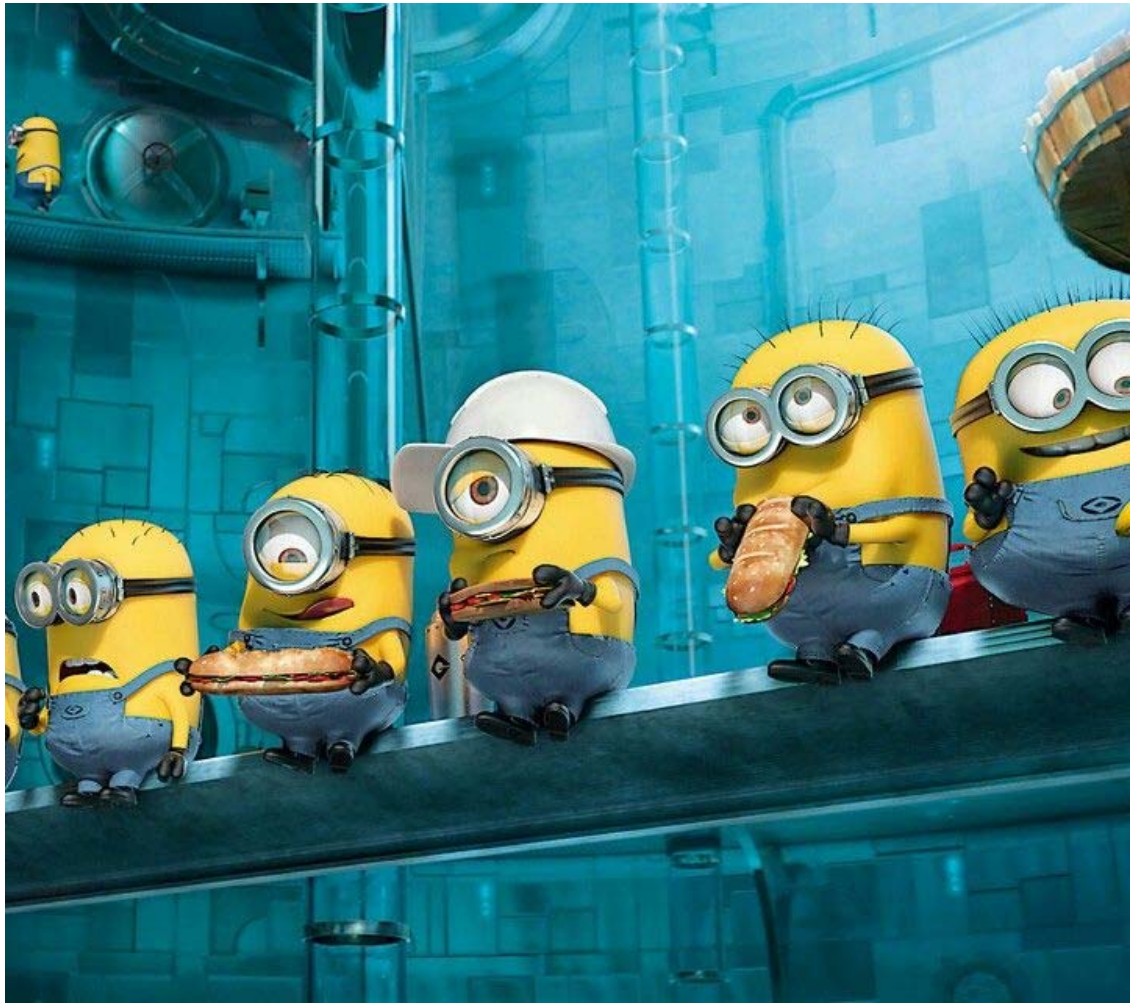
Objective: Provide details and backup to support the document

Appendix Table of Contents	Key Messages/Content
◆ Navigant Summary Letter on Generating Technologies ◆ Assumptions for Renewables (wind/solar) ◆ Methodology for EE Modeling ◆ Development of DG Assumptions for Scenario Modeling ◆ Capacity Plan Summary Charts ◆ Method for Computing the Valley Economic Impact Metric ◆ Method for Computing the Environmental Metrics	◆ Includes discussion of methodologies and formulas referenced in the body of the report ◆ Provides more detailed information to help facilitate inquiry by reviewers (capacity plans)

Feedback from the Working Group

Questions/comments from the group?

Lunch Break?



Development of Sensitivity Cases

- Sensitivity analysis is used to identify modifications that would improve the analysis. Sensitivity cases are run off of the reference plan (case 1A)
- TVA is developing a number of sensitivity cases based on internal discussions and input from the IRPWG during the December and January working sessions, along with advice received from the RERC. This list may evolve based on comments received during the public comment period
- The current listing of sensitivity cases can be divided into three broad categories:

1. Testing the impact to the case results if a certain resource type not selected by the optimization model is forced into the portfolio, or a resource type previously selected is eliminated from consideration
   - *For example, forcing in a AP1000 nuclear unit or removing EE from the portfolio options*
2. Testing the impact to the case results if a specific combination of assumptions is imposed on the optimization model, rather than using the correlated scenario assumptions developed for the study
   - *An example would be forcing in a high gas price forecast*
3. Testing the impact to the case results if key characteristics of one or more resource types are altered or fixed prior to running the optimization model
   - *An example would be changing the ramp rate of the energy efficiency resource*

Sensitivity Analysis: From Draft to Final IRP (Cont'd)

Sensitivity	Scenario	Strategy	Comments
Nuclear			
Bellefonte	1	A	Force BLN into plan
AP 1000	1	A	Force AP 1000 into plan
SMRs	1	A	Force SMRs into plan
Nuclear Scenario	new	A	High loads, high gas price, high CO2, nuclear retirements
EEDR			
No EE Resources	1	A	Do not allow EE expansion in plan
No DR Resources	1	A	Do not allow DR expansion in plan
No EEDR Resources	1	A	Do not allow EE or DR expansion in plan
EE Planning Factor Adjustment	1	A, D	1) Remove planning factor adjustment for Scenario 1A 2) Remove cost impacts of planning factor adjustment in Case 1D
EE Ramp Rate Sensitivity	A	A, D	Increase initial and lower out year ramp rates

Continued on next slide

Sensitivity Analysis: From Draft to Final IRP (Cont'd)

Sensitivity	Scenario	Strategy	Comments
Renewables			
Extension of Solar Tax Credits	1	A	Extend tax credits for solar at existing levels; maintain current de-escalation rates
Extension of Wind Tax Credits	1	A	Extend tax credits for wind at existing levels; maintain current de-escalation rates
Slower Solar Cost De-escalation	1	A	Costs decline at slower rate than reference case
Slower Wind Cost De-escalation	1	A	Costs decline at slower rate than reference case
Higher HVDC Wind NDC & Capacity Factor	1	A	Increase the NDC, capacity factor, and cost for HVDC wind to proxy oversubscription model
Resource Sensitivities			
Pumped Storage	1	A	Force pumped storage into plan
Compressed Air Energy Storage	1	A	Force CAES into plan
IGCC	1	A	Force IGCC into plan
IGCC with CCS	1	A	Force IGCC with CCS into plan
PC with CCS	1	A	Force PC with CCS into plan
Biomass	1	A	Force Biomass option into plan

Continued on next slide

Sensitivity Analysis: From Draft to Final IRP (Cont'd)

Sensitivity	Scenario	Strategy	Comments
Other Sensitivities			
Higher load	1	A	Test a scenario with faster load growth than Growth Economy case
No CO2	1	A	Remove CO2 assumptions from base case
Low gas price	1	A	Run a case with lower gas and market electricity prices
High gas price	1	A	Use one of our gas scenarios to run a high gas price sensitivity
Strategy C Sensitivity	1	C	Change PPA terms to 20 years; fully recover asset costs over PPA term

Sensitivity Analysis: Alignment with RERC & IRPWG

Sensitivity Case Name	RERC/ EE Se.	IRPWG
Nuclear		
Bellefonte		
AP 1000		
SMRs		✓
Nuclear Scenario		✓
EEDR		
No EE Resources	✓	✓
No DR Resources	✓	✓
No EEDR Resources	✓	✓
EE Planning Factor Adjustment	✓	✓
EE Ramp Rate Sensitivity	✓	✓
Renewables		
Extension of Wind & Solar Tax Credits	✓	✓
Slower Solar Cost De-escalation	✓	✓
Slower Wind Cost De-escalation	✓	✓
Higher HVDC Wind NDC & Capacity Factor	✓	✓

Sensitivity Case Name	RERC/ EE Se.	IRPWG
Resource Sensitivities		
Pumped Storage		✓
Compressed Air Energy Storage		✓
IGCC without CCS		
IGCC with CCS		
Biomass		
Other Sensitivities		
Higher load		✓
No CO2		
Low gas price	✓	✓
High gas price	✓	✓
Strategy C Sensitivity		✓

Feedback from the Working Group

Questions/Comments from the group

- Any thoughts on these sensitivity cases?
- Any additional sensitivities not captured here?
- Any additional questions or comments?

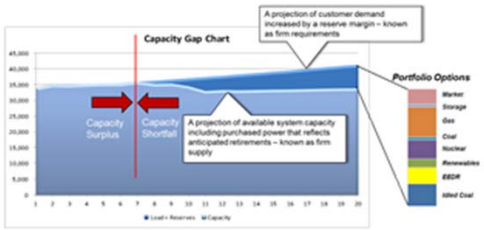
Public Sessions: Sample Format and Content

- There will be seven public comment sessions held throughout the valley beginning March 13th and ending April 27th
  - TVA will post the draft reports and promote stakeholder review the week of March 9th
- The sessions are designed to allow members of the public to enter comments into the record, provide input into the process, and ask questions about the Draft IRP. They also fulfill TVA's NEPA requirements.
- The format for the sessions will include the following elements
  - Formal presentation from TVA (45 min)
  - Q&A period (45 min)
- The formal presentation will generally follow the agenda below
  - Objectives of the IRP
  - Public Engagement Throughout the Process
  - Alignment with TVA's Mission
  - IRP Methodology
  - Draft IRP Results
  - Next Steps
- The following slides provide some examples of the type of content we intend to use in the public sessions

Public Sessions: Sample Format and Content (Cont'd)

What is An Integrated Resource Plan (IRP)

An Integrated Resource Plan is a common tool in the utility industry used to identify future capacity with the least implementation cost needed to meet customer demand over a long horizon (usually 20 years or longer).



- The IRP provides guidance for future capacity planning decisions
- The IRP is a compass, not a GPS
- It sets strategic direction, it does not define a specific path or make individual asset decisions
- Guideline ranges for components are described, but allow for flexibility in future decision making

Why This Is Important to Customers?

- The IRP defines a road map that will guide future production capacity decisions while, at the same time, supporting TVA's overall mission
  - Low cost reliable power
  - Environmental stewardship
  - Economic development
- This road map outlines changes that, if implemented, will impact the cost to produce the power and the net environmental effects of producing that power
- So it's important for customers to be aware of the direction we are headed and the current thinking about how we plan to get there

The IRP Results Must Be Consistent with TVA's Mission

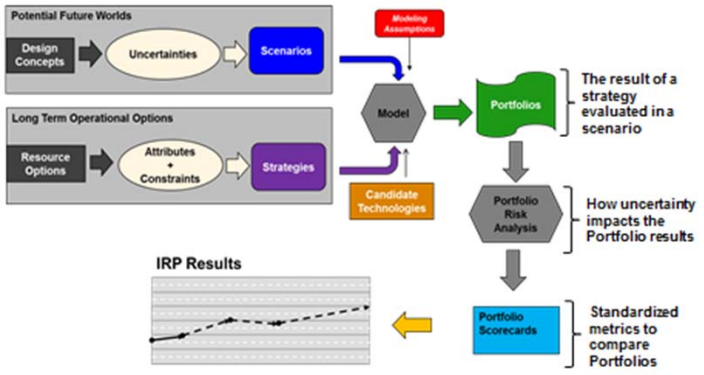
RATES: maintain low rates

ASSET PORTFOLIO: meet reliability expectations & provide a balanced portfolio

STEWARDSHIP: be responsible stewards

DEBT: live within our means

How the Resource Planning Process Works At TVA



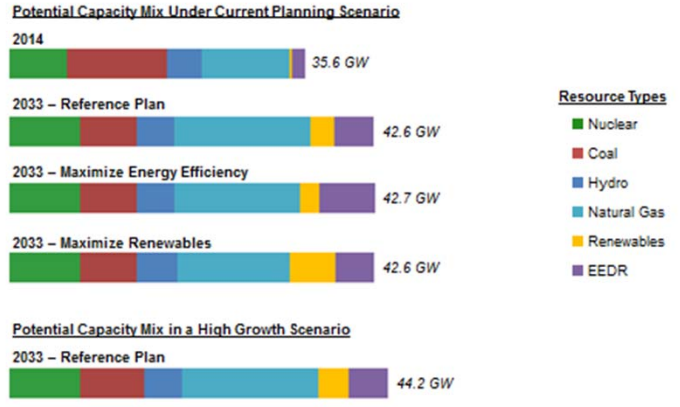
Public Sessions: Sample Format and Content (Cont'd)

Selected Scenarios and Strategies

Scenarios	Strategies
1 - Current Outlook	A - The Reference Plan
2 - Stagnant Economy	B - Meet an Emissions Target
3 - Growth Economy	C - Focus on Long-Term Market Supplied Resources
4 - De-Carbonized Future	D - Maximize Energy Efficiency
5 - Distributed Marketplace	E - Maximize Renewables

Each Scenario/Strategy combination produces a unique portfolio for evaluation

What might the TVA portfolio look like in 2033?



Initial Observations from the Analysis So Far

- There is a need for new capacity in every scenario being modelled
  - New CT capacity additions in virtually every case; first unit could be added as early as 2020; in the majority of cases first self-build CT addition in 2023
- No additional significant baseload expansion beyond Watts Bar Unit 2 and Browns Ferry extended power uprates
  - Most of the variation in expansion plans is around CTs and Renewables
- Higher EE and Renewable levels than current budget in all cases
  - Solar showing up in mid 2020s; HVDC wind not until early '30s (generally)
  - Seeing tradeoff between EEDR and gas resources
  - Generally selecting more CTs than CCs – EE is acting as an intermediate resource

In the next 5 years, the preliminary study results indicate that resource additions would include one CT site and Energy Efficiency

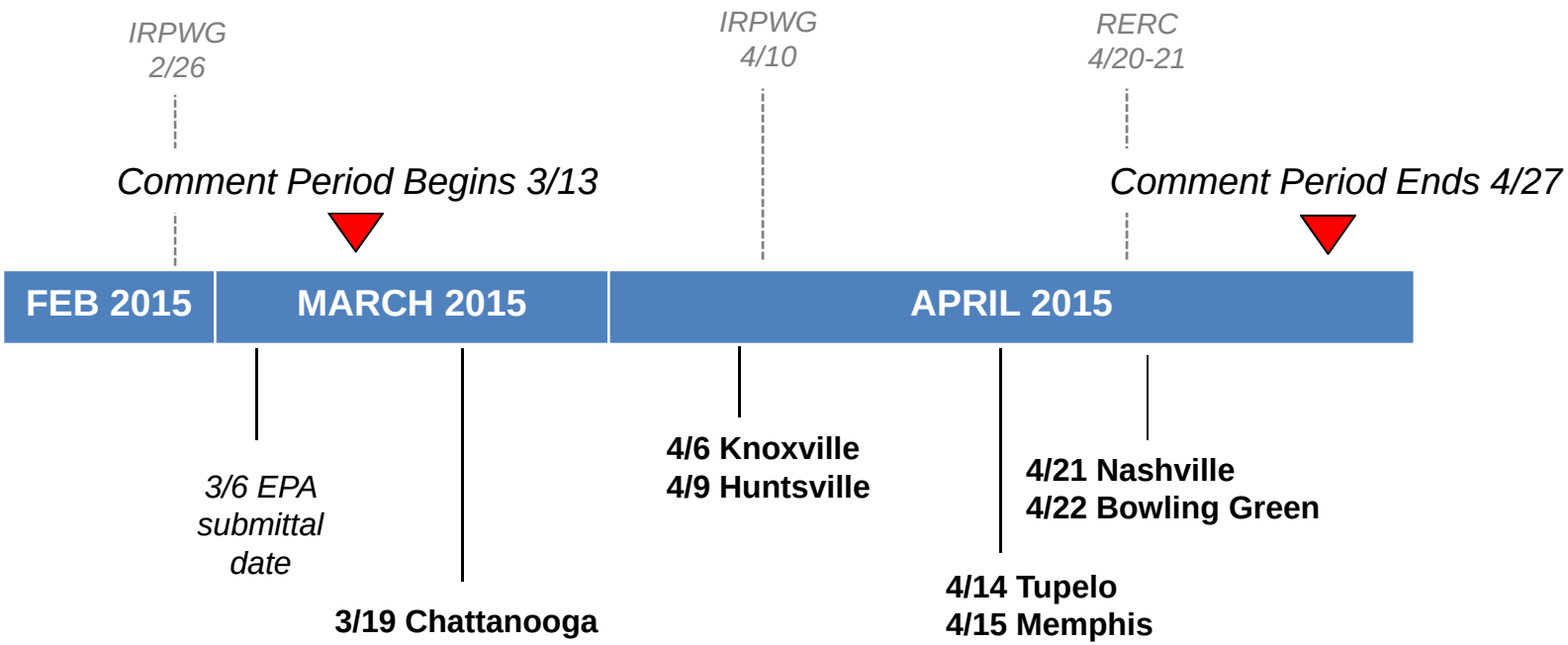
What Do The Metrics Tell Us?

- COST: the strategies have very similar total plan costs (20-year view), with the more extreme strategies (focusing on EE, renewables) slightly more expensive. On the basis of average system costs, all strategies are virtually identical over the first 10 years.
- FINANCIAL RISK: risk scores are higher for the strategies that emphasize either significant investment in EE or renewables.
- ENVIRONMENTAL STEWARDSHIP: strategy to maximize renewables shows the best performance in this metric. All strategies show improvement in air (CO_2), water and waste categories compared to the performance of the current resource portfolio.
- FLEXIBILITY: the ability of the system to respond to load uncertainty is most limited in the strategy that maximizes renewables. The strategy that maximizes EE investment appears to have a good flexibility score as a result of reduced loads.
- VALLEY ECONOMICS: the strategies seem to have essentially the same very low impact on macro-economics in the Valley as measured by per capita income. There is a somewhat higher impact for the strategy that seeks to maximize EE (higher % of investments remain in the Valley)

Feedback from the Working Group

Questions/comments from the group?

Public Sessions: Schedule & Locations

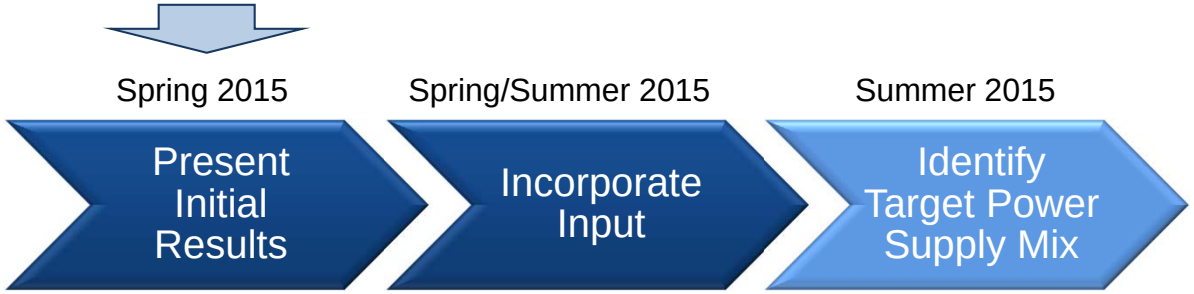


Locations and logistics are still being refined; actual dates and places may change prior to the start of the public comment period

2015 IRP/SEIS Schedule: Draft 2 Final

Public Comment Sessions

• 3/19 Chattanooga • 4/6 Knoxville • 4/9 Huntsville • 4/14 Tupelo	• 4/15 Memphis • 4/21 Nashville • 4/22 Bowling Green



- Draft report posted for comments
- Public Comment Sessions set to accept feedback

IRPWG

RERC

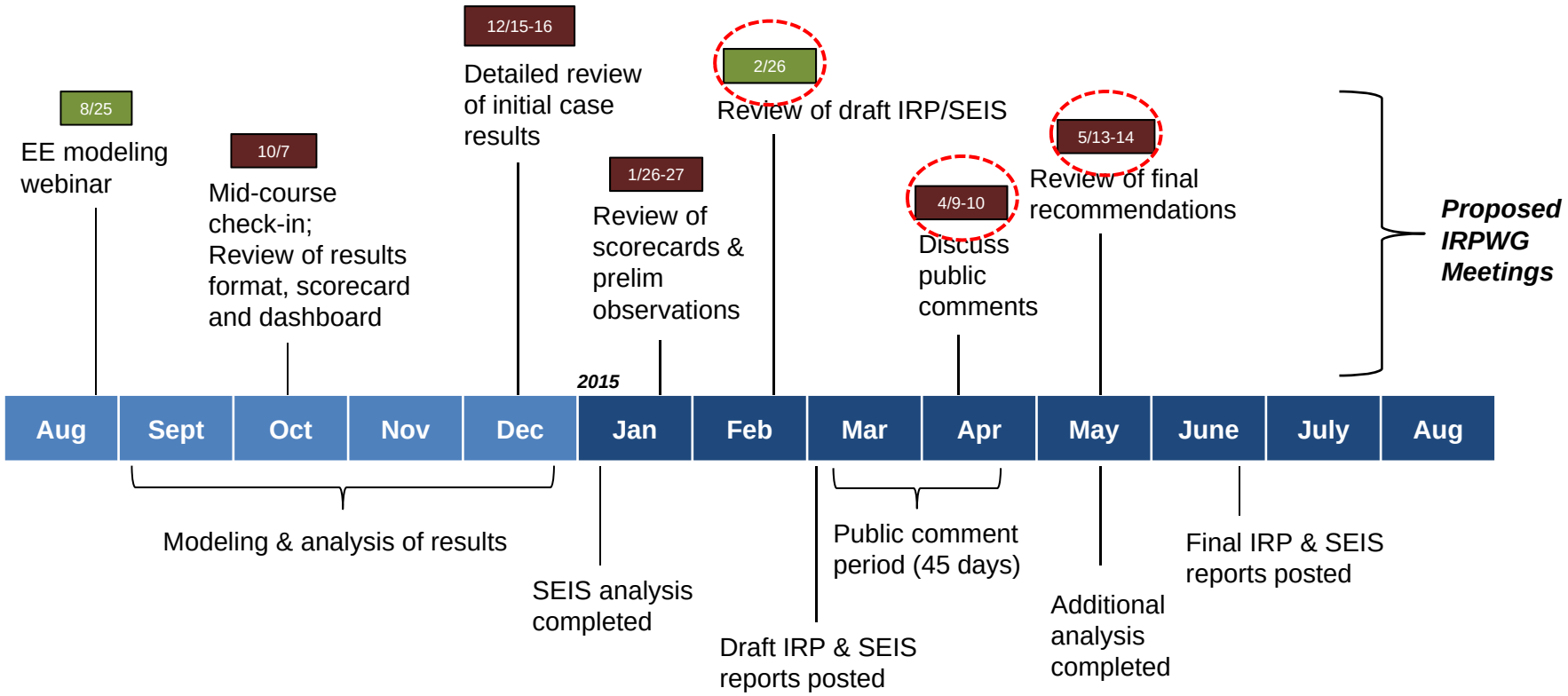
- Review public comments
- Complete additional analyses if needed
- Revise the study report

IRPWG

- Develop study recommendations
- Prepare final report & post
- Request TVA Board action

RERC

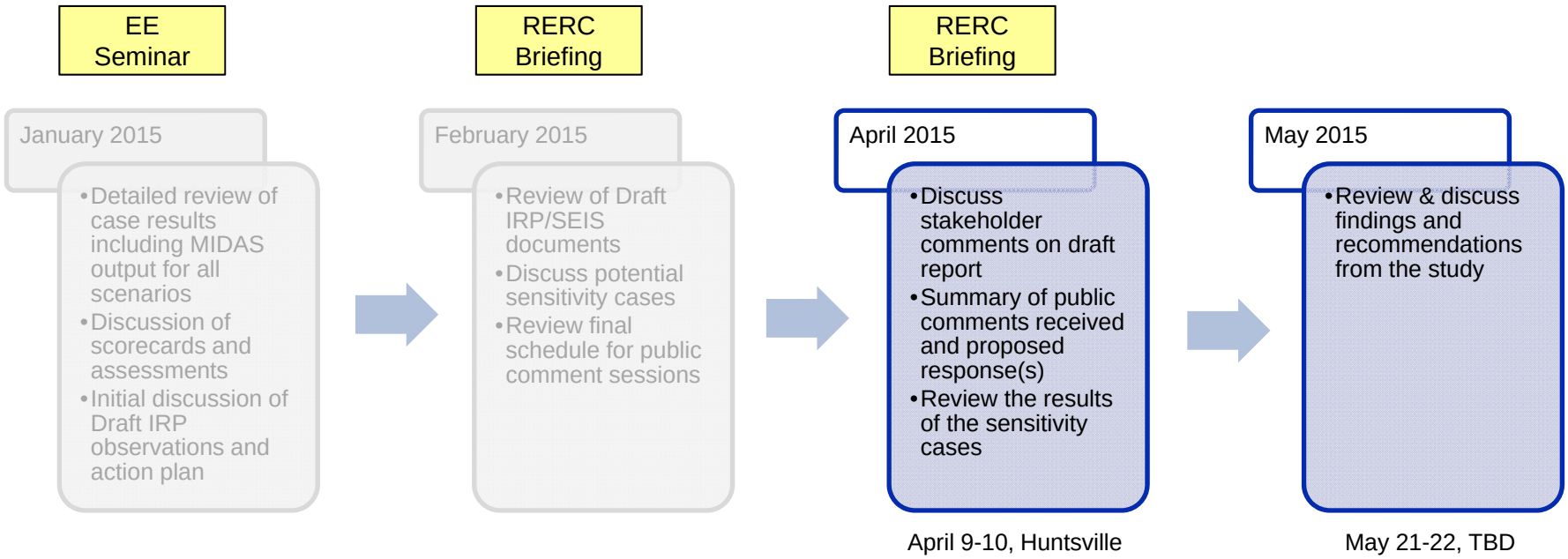
2015 IRP/SEIS Schedule: Major Milestones & Stakeholder Sessions



<u>Schedule changes since the January stakeholder meeting:</u>

- *February session became a webinar*
- *April 10th session will be converted to in-person, and likely we will add an additional half day*
- *May meeting date may be changing due to adjustments to the public comment period*

April IRPWG Meeting Objectives



During the April meeting, we aim to accomplish the following objectives:

- Provide feedback on comments from IRPWG members on the draft reports
- Present a summary of public comments received and proposed response(s)
- Review the results of the sensitivity cases

Adjourn