

cleanenergy.org

Southern Alliance for
Clean Energy



Gearing up for the 2015 TVA IRP

John D. Wilson & Colleagues
Southern Alliance for Clean Energy
November 2013

Presentation Overview

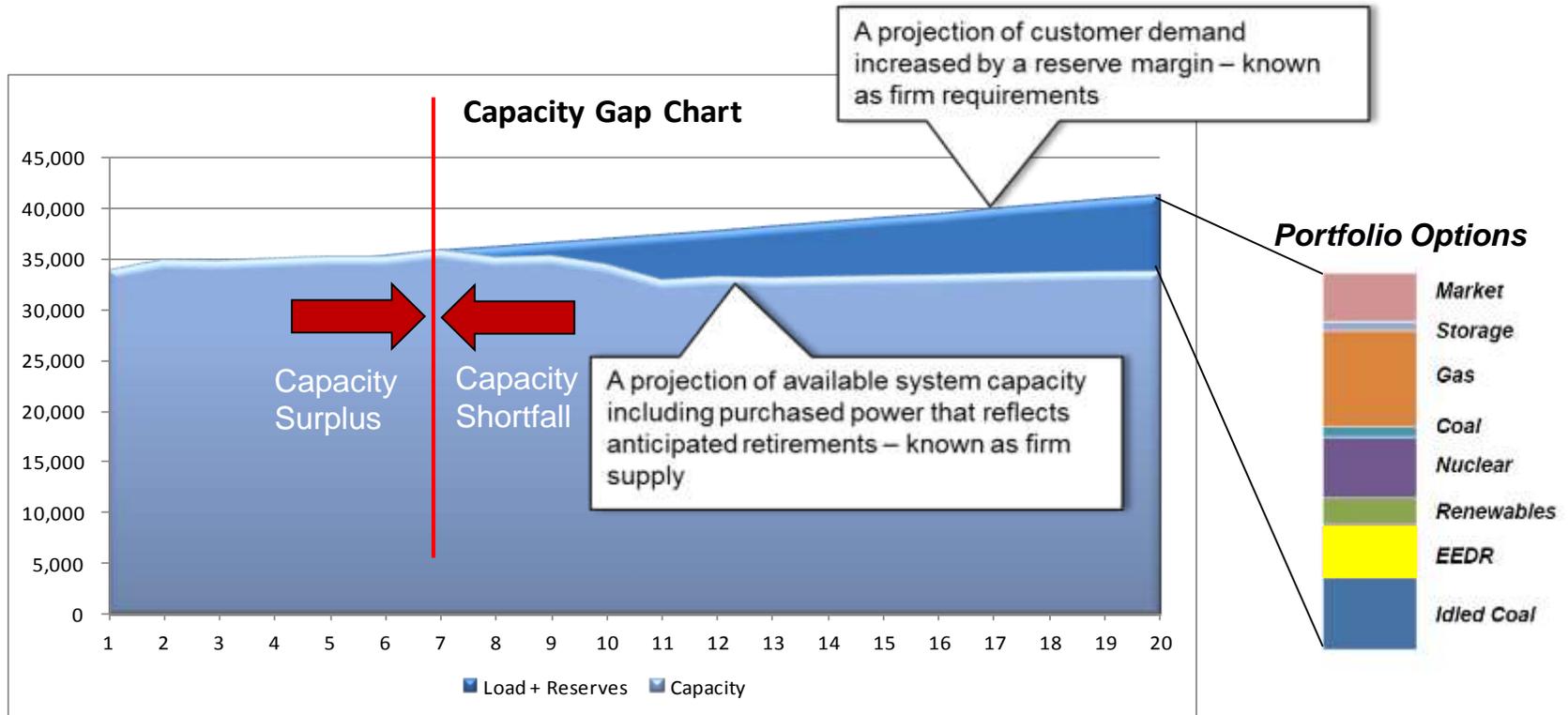
1. Brief intro to Integrated Resource Planning
 2. History of the 2011 IRP
 3. Timeline & process overview of 2015 IRP
 4. Key opportunities to get involved in the formal IRP process
 5. Collaboration to influence TVA outside the formal IRP process
- Questions: will ask for clarifying questions at the end of each section, will have significant discussion after sections 4 & 5

Brief Overview of Integrated Resource Planning

- **Generally: identify capacity needs and solutions**
- **More recently: optimize the mix by also considering:**
 - Retirements,
 - Demand-side resource investments, and
 - Energy (in addition to capacity) resource investments.
- **Note: TVA slides in this presentation are excerpted from IRP Working Group meeting slides (November 5, 2013). Many of these slides are available in TVA's scoping presentation available on [TVA's website](#).**
- **[TVA's 2011 IRP](#) should be carefully reviewed by anyone wishing to participate throughout the IRP process.**

Resource Planning Addresses Future Capacity Needs

Resource planning is about optimizing the capacity mix

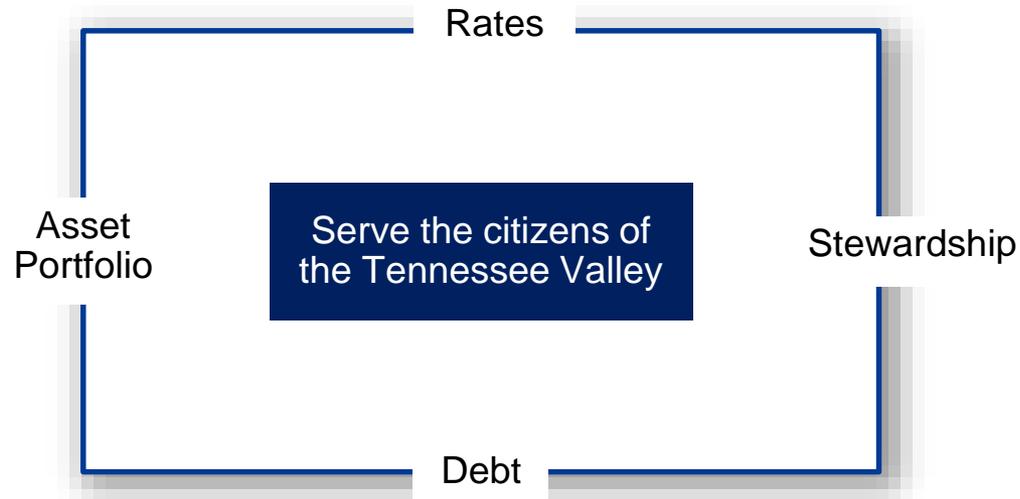


Projections of capacity needed are filled by the most cost-effective resource.

Recommended path provides low cost, diversity and flexibility



The 2015 IRP Must Be Consistent with TVA's Key Strategic Imperatives



Key Imperatives

- ◆ *Rates*: we must maintain low rates that encourage regional economic development, encourage energy efficiency and accommodate changing paradigms (e.g., distributed generation, etc.) in our region
- ◆ *Debt*: we must live within our means
- ◆ *Asset Portfolio*: we must optimize the value of the resource portfolio for the Valley
- ◆ *Stewardship*: we must be responsible stewards for the environment/economic resources entrusted to our care



A Brief History of the 2011 TVA IRP

- What TVA decided in the [2011 TVA IRP](#)
- Key “wins & losses” (SACE’s perspective)
- What has actually happened, and how connected has that been to the 2011 IRP
- What is driving the 2015 TVA IRP



2011 Recommended Planning Direction

Component	Guideline MW Range	Window of Time	Recommendations
Energy Efficiency/ Demand Response	3,600-5,100 (11,400-14,400 GWh)	By 2020	◆ Expand contribution of energy efficiency/demand response in the portfolio
Renewable additions	1,500-2,500	By 2020	◆ Pursue cost effective renewable energy
Coal capacity idled	2,400-4,700	By 2017	◆ Consider Increasing amount of coal capacity idled
Energy storage	850	2020-2024	◆ Add pumped storage hydro capacity
Nuclear additions	1,150-5,900	2013-2029	◆ Increase contribution of nuclear generation
Coal additions	0-900	2025-2029	◆ Preserve option of generation with carbon capture
Natural gas additions	900-9,300	2012-2029	◆ Utilize natural gas as an intermediate supply source
Market purchases	1,300-4,700	2013-2029	◆ Utilize cost effective market purchases to supplement TVA owned supply

**Additional details about Recommended Planning Direction components are included in the 2011 IRP*



What TVA Did with the 2011 IRP Recommendations

Component	Recommendations
Energy Efficiency/ Demand Response	◆ Expand contribution of energy efficiency/demand response in the portfolio
Renewable additions	◆ Pursue cost effective renewable energy
Coal capacity idled	◆ Consider Increasing amount of coal capacity idled
Energy storage	◆ Add pumped storage hydro capacity
Nuclear additions	◆ Increase contribution of nuclear generation
Natural gas additions	◆ Utilize natural gas as an intermediate supply source
Market purchases	◆ Utilize cost effective market purchases to supplement TVA owned supply



TVA's current resource mix and long-term resource plan reflect adoption of the recommendations outlined in the last IRP

Key “Wins & Losses” (SACE Perspective)

Component	Wins	Losses
Energy Efficiency/ Demand Response	Considered higher level of EE and looked long-term in response to comments	Did not truly consider all EE potential as a resource
Renewable additions	Renewables were evaluated, and IRP process validated concurrent decisions to invest in wind and solar	Initial RE evaluation framed as a response to federal legislation (RPS); as it withered, TVA had no alternative evaluation method
Coal capacity idled	TVA tested and validated a high level of coal retirements (even beyond the recommended levels)	The plan did not produce specific guidance for deciding which and how many units would be retired; such criteria remain confidential
Energy storage	Pumped storage was not a priority for SACE so not a “win”	Other technologies were not ready for serious evaluation
Nuclear additions	Able to highlight risks of Bellefonte and constrain its development path	Bellefonte remained in the plan with highly favorable planning assumptions
Coal additions	No significant plans for additions	None
Natural gas additions	Increased TVA awareness of how natural gas could help retire coal	An ideal balance between natural gas capacity and RE deployment was not studied

Plans vs Actions

Component	Plans	Actions
Energy Efficiency/ Demand Response	Substantial ramp-up of EE in terms of scale and breadth	Early ramp-up occurred, but then budget decisions constrained the scale and breadth of EE program growth
Renewable additions	Follow through on existing wind and solar programs	Wind investments have occurred and are viewed positively within TVA; Solar programs have not been implemented in a sustained fashion
Coal capacity idled	2400-4700 MW idled/retired	6,612 MW idled/retired, approximately 3,140 MW more potential retirement
Energy storage	Additional pumped storage unit	Deferred (indefinitely?)
Nuclear additions	Watts Bar 2, Bellefonte advanced	Watts Bar 2 behind schedule but still supported by TVA; Bellefonte development cancelled
Coal additions	Standing by on CCS	No indication of actual interest by TVA
Natural gas additions	Utilize NGCC for intermediate generation, adding 900-9300 MW	Appears to be acting as a baseload/intermediate resource towards the middle of TVA's planning range
Transmission (Tx)	Was not a primary focus of IRP	TVA has focused on Tx as part of enabling retirements, etc.

Driving the 2015 TVA IRP

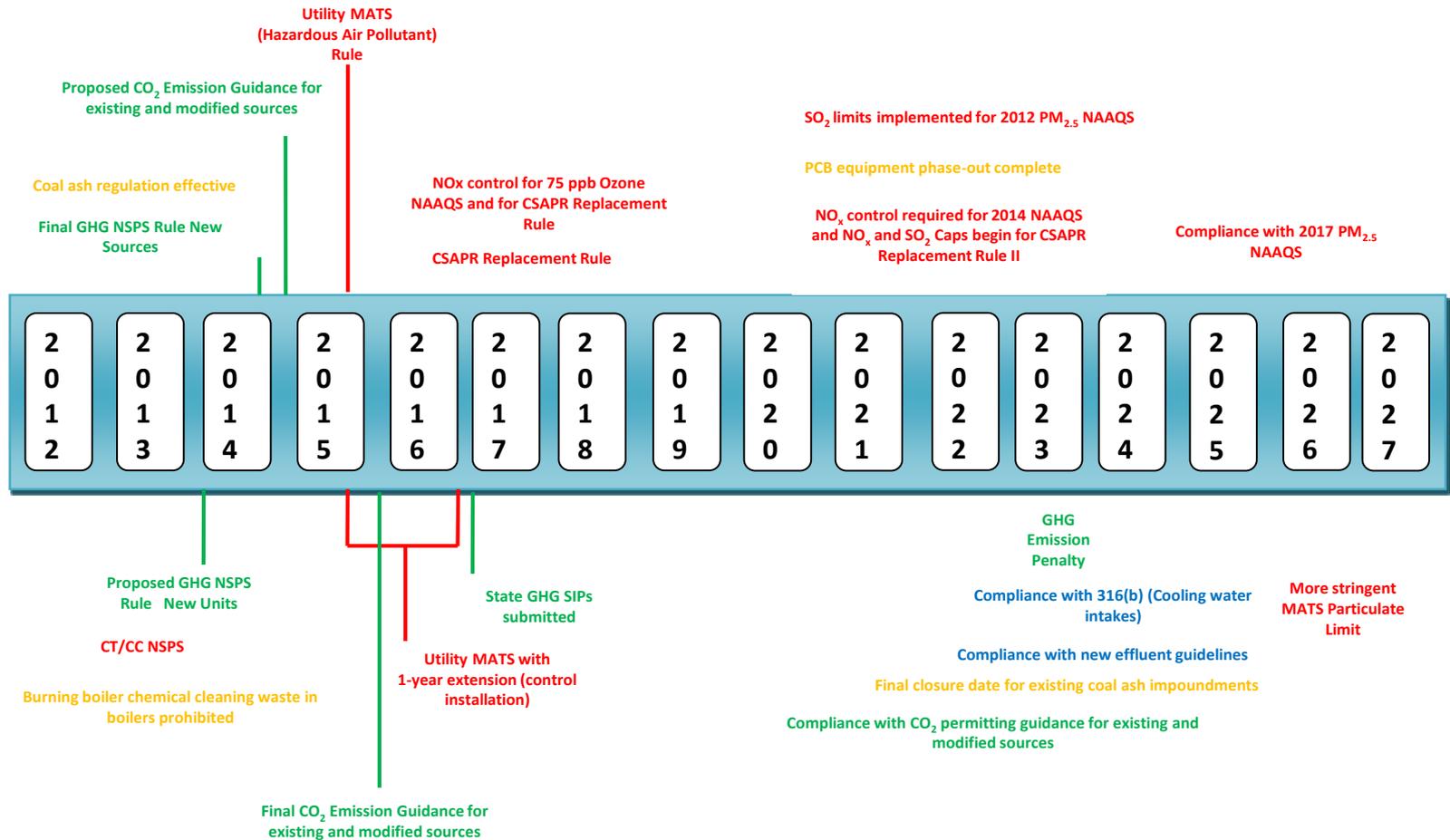
Issue	SACE View	TVA View
Watts Bar 2	Cost overruns and schedule changes	Cited as a motivation for IRP schedule
Bellefonte	(Was included in 2011 IRP) Project is less feasible than ever	Not cited as a motivation for IRP schedule and project has now been re-re-mothballed
Retail sales forecast	Technology (energy intensity of economy), closure of USEC, and recession impacts driving down sales and load forecast	Slow economic recovery will lead to little growth in sales over next decade
Energy Efficiency	TVA EE/DR Potential Study indicates greater opportunity than TVA has evaluated in planning studies	EE/DR mentioned as one of several trends reshaping the equation between supply and demand
Distributed Generation	TVA has not fully evaluated the value of solar, nor considered what customers will (and would like to) invest in solar	DG mentioned as one of several trends reshaping the equation between supply and demand
HVDC Transmission (Tx)	Two credible projects are on track for construction, and need to be a part of resource planning immediately	Has not been evaluated in resource planning, and is not currently identified as a motivation for the IRP schedule
Natural Gas	Near term gas prices should be leveraged to support a transition to clean energy resources	Will increase share of power generation over next two decades
Environmental Regulation	TVA should plan for environmental regulations, invest in resource alternatives and necessary transmission	TVA views environmental regulations as sources of uncertainty and risk, but is now looking as far out as 2027
Overall	TVA is off the “highway”	TVA is headed off the “highway”

IRP and Federal Environmental Impact Statement (FEIS)

- **As a federal agency, TVA has the distinction of being one of very few electric utilities that is required to prepare a FEIS alongside its IRP**
- **For 2015, TVA will produce a “Supplemental Environmental Impact Statement” (SEIS)**
 - NOT a separate document with distinct inputs
 - Do not send separate comments on IRP and SEIS
 - BUT it is a distinct “deliverable” with statutory requirements and legal implications
- **TVA planners describe the SEIS as justifying its overall system strategy, not as speaking to actions on specific resources (efficiency, power plants, transmission, etc.)**
- ***More on STRATEGY for the SEIS later ...***



The Plan Needs to Keep Addressing Emerging Environmental Regulations



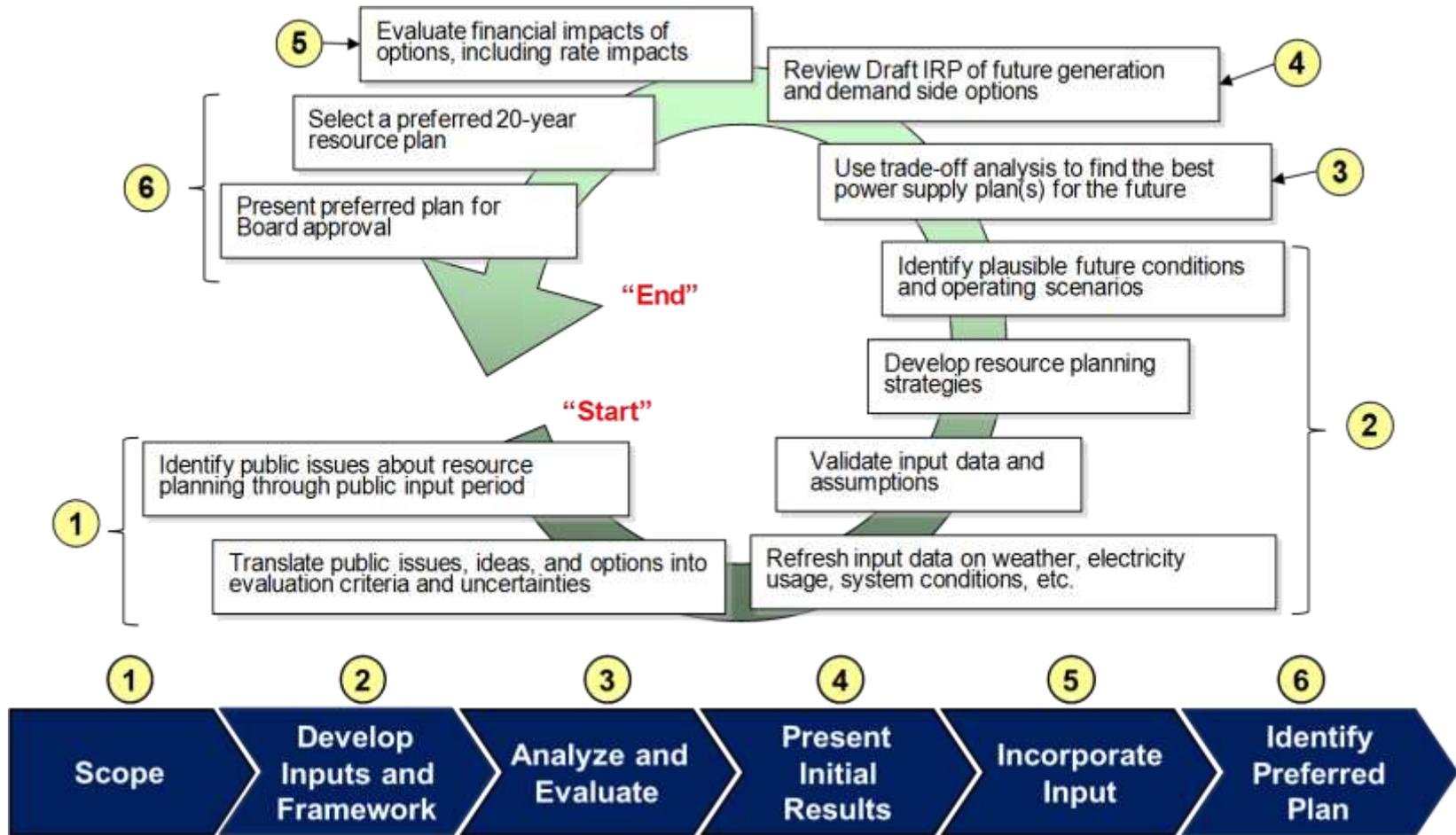
Legend	
	Air
	Water
	Waste
	Climate

- Future rules are hard to predict
- Costly and difficult to comply
- Introduce uncertainty and risk into planning and future operations

Timeline & Process Overview for 2015 TVA IRP

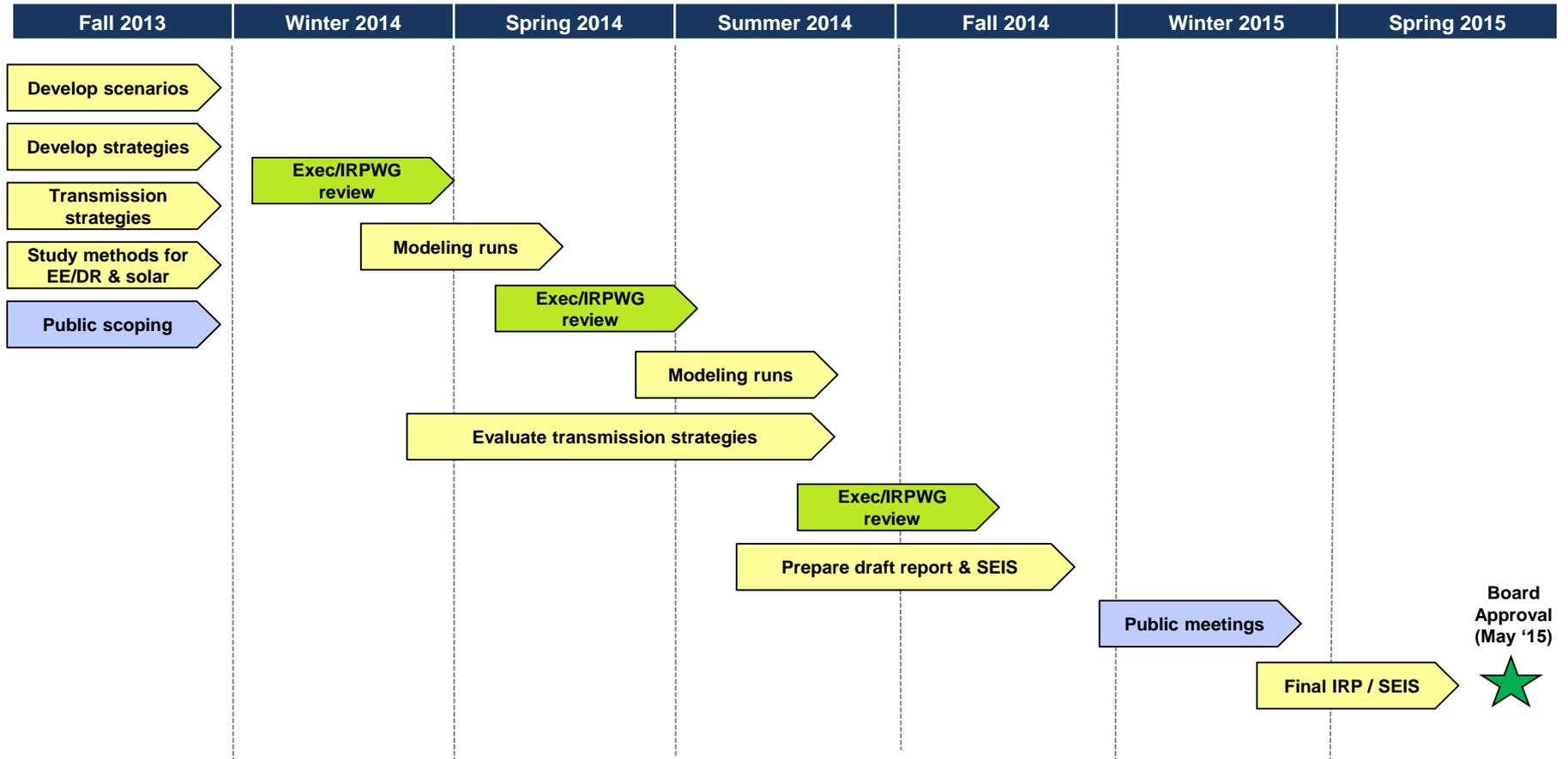
- **Timeline**
- **Stakeholder Input**
- **Key TVA terms: Scenarios vs Strategies**

2011 IRP Study Process





2015 IRP Schedule: Major Tasks



Stakeholder input will be instrumental throughout the process

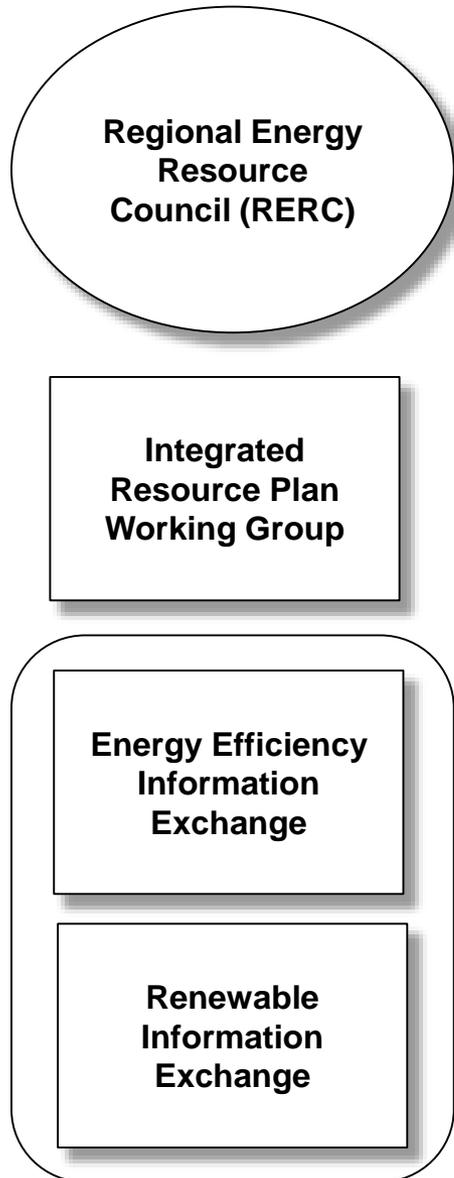


IRPWG Members

Name	Organization
Kate Shanks	Kentucky Energy and Environment Cabinet
Michelle Walker	TDEC Policy Advisor
Lance Brown	Partnership for Affordable Clean Energy
Louise Gorenflo	Sierra Club
John Wilson	Southern Alliance for Clean Energy
Nathan Moore	Southern Environmental Law Center
Janet Miller	Nashville Chamber of Commerce
Donald C. "Chip" Cherry, Jr.	Chamber of Commerce of Huntsville/Madison County
Jack Simmons	Tennessee Valley Public Power Association
Lloyd Webb	Tennessee Valley Industrial Committee
Dana Jeanes	Memphis Light Gas & Water
Jay Stowe	Huntsville Utilities
Keith Hayward	Northeast Mississippi
Jack Barkenbus	Vanderbilt Institute for Energy & Environment
Mary English	Baker Center, University of Tennessee
Tom King	Oak Ridge National Laboratory
Richard Holland	Tennessee Paper Council
Don Huffman	Associated Valley Industries



IRPWG Relationship to Other Stakeholder Groups



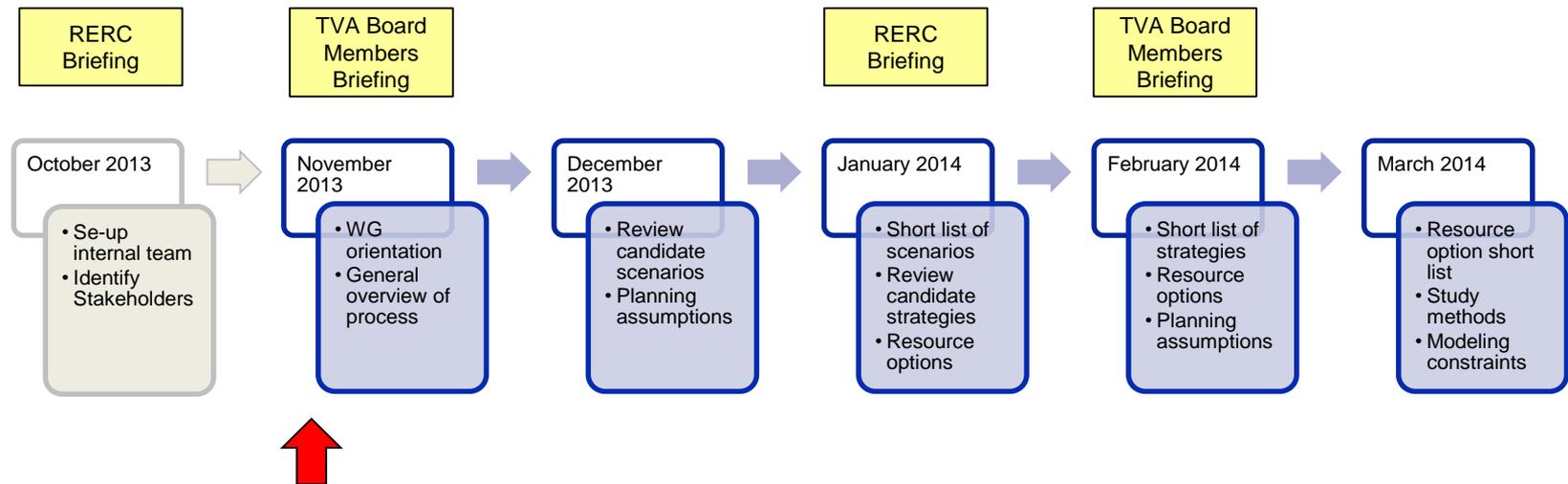
- ◆ *FACA Committee*
- ◆ *Provides Council’s advice to TVA Board External Relations Committee on energy policy matters*

- ◆ *Working stakeholder groups (not formal FACA committees)*
- ◆ *Provides input/counsel into various work efforts and initiatives within TVA*
- ◆ *Stakeholder group members speak in “many voices;” no consensus required*

SACE Staffing for TVA Stakeholder Groups

Stakeholder Group	Member	Alternate (additional support)
Regional Energy Resource Council (RERC)	Stephen A. Smith	James E. Green
IRP Working Group	John D. Wilson	Stephen A. Smith (James E. Green)
Tennessee Valley Renewable Information Exchange (TV-RIX)	Stephen A. Smith	John D. Wilson (Simon Mahan, Charlie Coggeshall)
Energy Efficiency Information Exchange (EE-IX)	James E. Green	Natalie Mims (John D. Wilson)

Meeting Objectives for IRPWG thru Spring 2014



- ◆ The IRPWG feedback over the next 5 months will provide valuable guidance to TVA during the Inputs & Framework phase of the IRP
- ◆ Examples of the questions this stakeholder group will be asked to provide input upon include:
 - Are the scenarios and strategies TVA has developed reasonable? Has a key plausible future or likely business approach/option been overlooked?
 - Have all reasonable resource options (supply-side and demand-side) been considered and included if applicable?
 - Has the modeling approach been selected to ensure that special types of resources (like intermittent wind or solar) are fairly and accurately considered?

TVA's IRP Framework

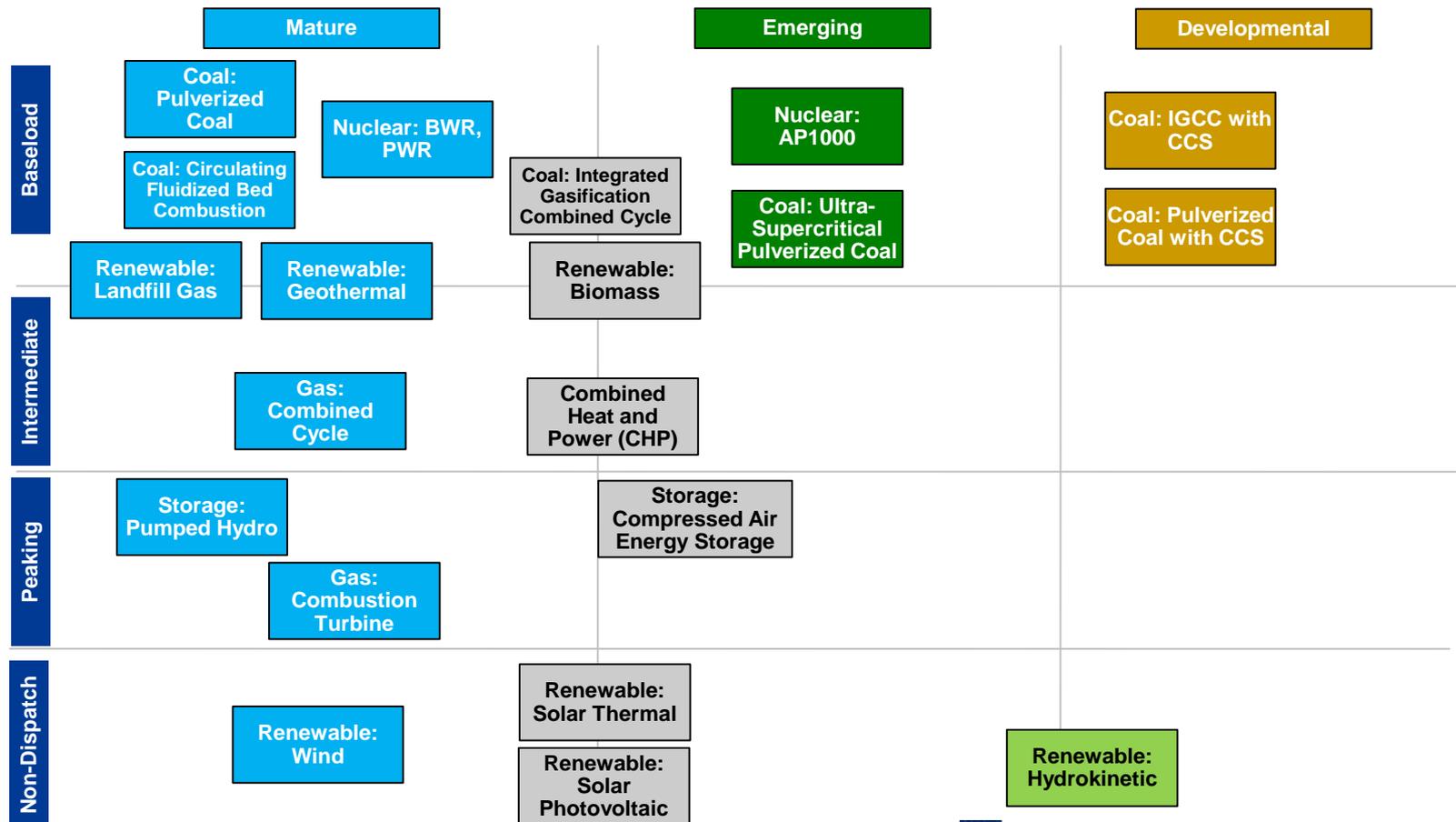
- **The following slides explain the terms TVA uses to describe the structure of its IRP analysis**
- **Resources – for example, coal and efficiency**
- **Scenarios – future conditions**
- **Strategies – TVA policy or investment decisions**



A Wide Variety of Resource Options Were Evaluated As Well

Capacity resources included traditional generation, renewables as well as demand-side options.

Example of Resources Options Used during the 2011 IRP



The Scenario Planning Approach



- ◆ Scenarios allow us to bound key uncertainties to create a wide range of possible future outcomes
- ◆ Scenario analysis looks at a set of “*plausible futures*”. They do not cover the universe of unpredictable possibilities and are not intended to predict the future
- ◆ Plans developed in these “*futures*” show how the value of near-term and future decisions could change under different conditions, giving an idea of robustness
- ◆ Basic assumption is that a “*good*” strategy is one that performs well in most possible futures
- ◆ Commonality across scenarios concerning near-term decisions give some comfort that decisions are less “*risky*” and less leveraged to specific futures

“Scenarios are stories. They are works of art, rather than scientific analyses. The reliability of (their content) is less important than the types of conversations and decisions they spark...”

- Arie de Geus, The Living Company

“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

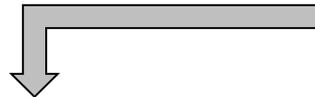
A well-designed strategy will perform well in many possible scenarios

Findings Presented Using Scorecard Metrics

- ◆ Modeling results facilitate a discussion/debate about trade-offs that lead to the selection of the preferred resource plan. Key metrics are used to enable this trade-off discussion
- ◆ At TVA, we use a scorecard approach to packaging the metrics, so that stakeholders and decision-makers can be fully engaged in the identification of what makes a resource plan “preferred”
- ◆ IRP scorecards are developed to reflect components of TVA’s mission and strategic principles

		Scenarios						
		#1	#2	#3	#4	#5	#6	#7
Strategies	A							
	B							
	C							
	D							
	E							

Scorecards evaluate the performance of a strategy across many different scenarios



Example Scenario Scorecard

Scenarios	Ranking Metrics					Strategic Metrics		
	Energy Supply					Environmental Stewardship		
	PVRR	Short-Term Rate Impact	PVRR Risk/Benefit	PVRR Risk	Total Plan Score	CO ₂ Footprint	Water	Waste
1	99.00	95.13	100.00	99.53	98.36	🌐	🌐	🌐
2	100.00	95.58	99.40	95.30	97.85	🌐	🌐	🌐
3	100.00	100.00	99.81	89.37	97.56	🌐	🌐	🌐
4	100.00	97.40	100.00	95.37	98.36	🌐	🌐	🌐
5	100.00	96.43	100.00	100.00	99.19	🌐	🌐	🌐
6	100.00	100.00	100.00	86.69	96.97	🌐	🌐	🌐
7	100.00	97.24	100.00	97.03	98.70	🌐	🌐	🌐
8	99.84	96.66	98.35	97.93	98.50	🌐	🌐	🌐
Total Ranking Metric Score					785.49			

How TVA Developed Strategies

- **Initially, TVA let the model select the capacity plans**
- **TVA then identified the “different” strategies suggested by those plans under different futures (scenarios)**
- **TVA then modified the model results to develop strategies**
 - A. Limited Change in Current Resource Portfolio**
 - B. Baseline Plan Resource Portfolio**
 - C. Diversity Focused Resource Portfolio**
 - D. Nuclear Focused Resource Portfolio**
 - E. EEDR and Renewables Focused Resource Portfolio**
 - F. Recommended Portfolio**
(developed after initial results shared publicly)

Key Opportunities to Get Involved in the FORMAL Planning Process

- **Scoping Comments**

- Primarily viewed by TVA as a NEPA compliance activity - published deadline is Nov. 22nd
- TVA has indicated in writing that it will continue to accept comments through Dec. 6th
- SACE advice (next slide)

- **Advice on Inputs & Framework**

- Collaborate through SACE & other working group members (no written comment process)
- Main activity in Spring 2014

- **Responses to Initial Results**

- Fall 2014
- This is the MOST IMPORTANT input opportunity for technical expertise, and also important for activating members, grassroots, and other allies on more value-driven messages.
- The exact process for input is not clear, but SACE will definitely be advising stakeholders who are putting significant technical resources

- **Final Draft IRP**

- Formal comment process – honestly, not many changes or any major changes in response
- These comments are important as leverage towards influencing the NEXT IRP and potentially creating leverage around specific resource asset decisions
- Spring 2015 timeframe

SACE Advice for Scoping Comments

- This is **NOT** the right time to deliver *complex* technical information or legal arguments to TVA
- Be positive, TVA is demonstrating that it will seriously consider “our” perspective
- **SACE Priorities:**
 - Linkage between strategic outcomes and specific resource decisions (FEIS/SEIS → project specific impact statements)
 - Water-energy nexus
 - Distributed vs utility-scale vs renewables-by-wire
 - Data availability
- **Suggestions on inputs & framework**
 - Generally, these will have little actual impact
 - Exceptions would be any suggestions that are novel, for example new data on energy storage that TVA hasn’t previously considered
 - Otherwise, a brief endorsement of a wide range of EE & RE evaluation and support for the TV-RIX and EE-IX processes will be sufficient

Collaboration on Inputs & Framework

- **Process:**

- Collaborate through SACE & other working group members (no written comment process)
- Main activity in Spring 2014

- **Key Issues:**

- Renewable energy work initiated through TV-RIX process
- Energy efficiency work is further along internally at TVA, EE-IX process is just getting started
- Economic impact indicator – SACE recommending that TVA revisit this indicator, invest in improvements
- Transmission options – SACE is partnering with SELC and others to look at transmission and reliability issues

- **Open Discussion: Scoping and other FORMAL input opportunities**

Collaboration to Influence TVA OUTSIDE the Formal Process

- **Key SACE staff contacts**
(at least as a starting point)
 - Generally – Jimmy Green
 - Technical studies / analysis – John D. Wilson
 - Coal & grassroots organizing – Angela Garrone
 - Wind allies – Simon Mahan
 - Solar allies – Charlie Coggeshall
 - EE allies – Jimmy Green
 - Nuclear activist allies – Sara Barczak
 - TVA Board / Federal Officials – Stephen A. Smith
- **Periodic IRP Working Group post-meeting debrief sessions**
 - Louise Gorenflo of TN Sierra Club will facilitate a conference call to debrief on each meeting (not open to the public)
- **Open discussion / brainstorming**