Consumer energy efficiency and conservation will play a vital part of TVA's overall strategy for a greener future.

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TVA's resource portfolio will continue to diversify in the future with the pursuit of new ways to harness renewable energy sources that are environmentally conscious and sustainable.

Scenarios and Strategies

Scenario

① Economy Recovers Dramatically

② Environmental Focus is a National Priority

③ Prolonged Economic Malaise

④ Game-Changing Technology

⑤ Energy Independence

⑥ Carbon Regulation Creates Economic Downturn

⑦ Reference Case: Spring 2010

⑧ Reference Case: Great Recession Impacts Recovery

Planning Strategy

Ⓐ Limited Change in Current Resource Portfolio

Ⓑ Baseline Plan Resource Portfolio

Ⓒ Diversity Focused Resource Portfolio

Ⓓ Nuclear Focused Resource Portfolio

Ⓔ EEDR and Renewables Focused Resource Portfolio

Ⓡ Recommended Planning Direction

8 Final Study Results and Recommended Planning Direction

TVA's IRP was developed in two major phases – the draft and final. The Draft IRP recommended retaining three of the five original planning strategies. This provided the starting point for the development of the final IRP in fall 2010. Considering updated forecast information and public comments, additional analyses were conducted with the goal of developing a "no-regrets" strategy. This was accomplished by fine-tuning and improving the strategies selected in the Draft IRP. The analyses included rescoring the ranking and strategic metrics in order to evaluate new component combinations identified in the analyses. This chapter describes the final analysis results and the Recommended Planning Direction that was produced by evaluating the analysis results, stakeholder input and other considerations.

8.1 Results Analysis

8.1.1 Firm Requirements and Capacity Gap

The final IRP used the same firm requirements and capacity gaps as discussed in Chapter 7 – Draft Study Results. In addition to the scenarios used in the Draft IRP, an additional reference case was created to reflect the lingering economic recession as shown in Figure 8-1.

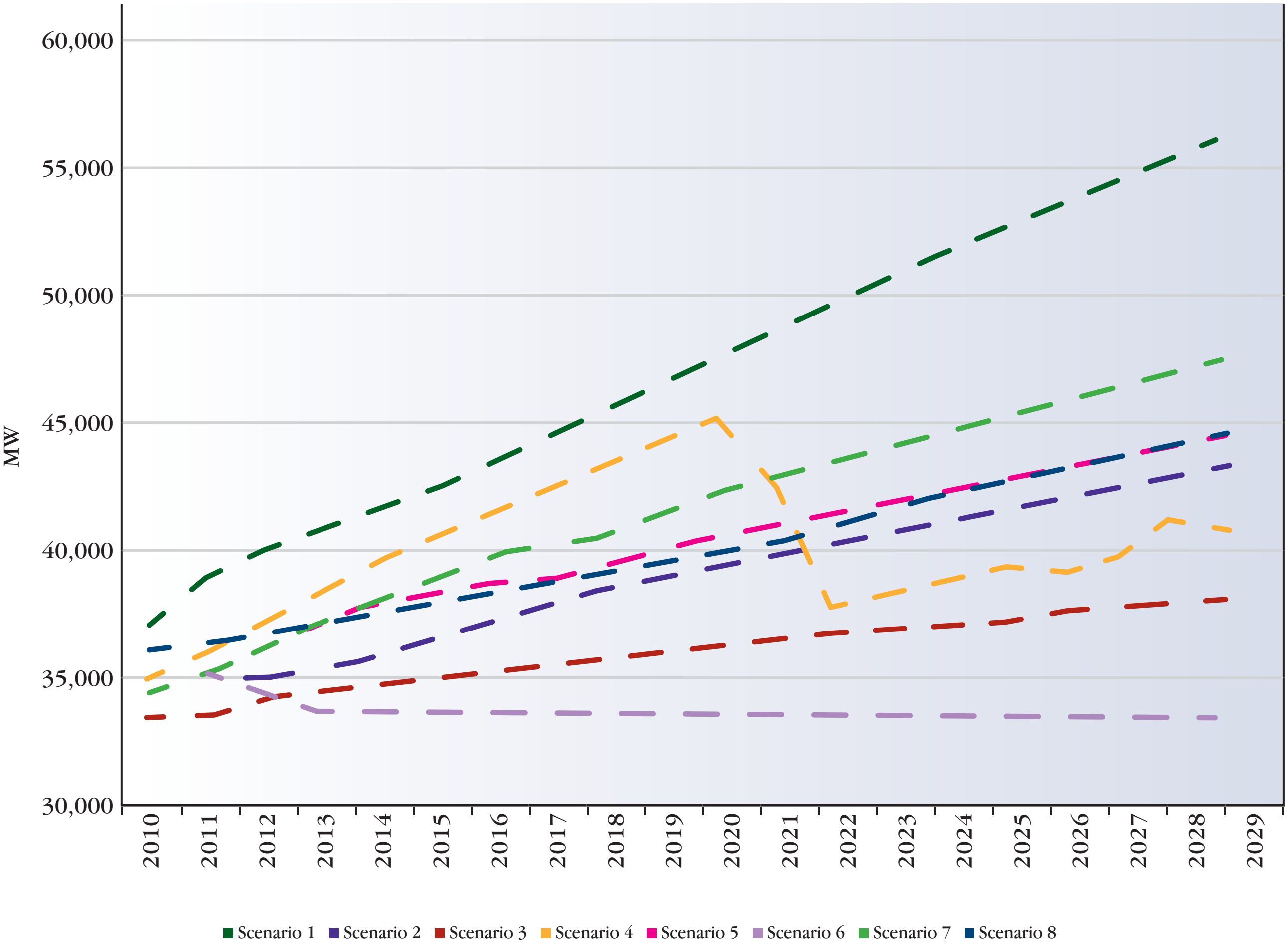


Figure 8-1 – Firm Requirements by Scenario

8.1.2 Previously Identified Sensitivities

Additional sensitivity cases were identified from work done for the Draft IRP and feedback received from stakeholders. The type of sensitivity, the purpose for analysis and the method that was incorporated into the final IRP analysis are listed in Figure 8-2.

Sensitivity Description	Basis for Selection	Method for Addressing
Evaluate increment/decrement of renewable additions for Strategy C	To identify the optimum level of renewable additions given the other assumptions already set in this strategy	• The range of renewable additions retained in the Draft IRP (along with additional increments) will be a selectable resource in the blended optimization
Evaluate alternate idled capacity values for Strategy C	To test the impact of varying idled capacity values	• The range of idled capacity retained in the Draft IRP will be evaluated with all other resources in the blended optimization
Evaluate increment/decrement of EEDR impacts for Strategy C	To identify the optimum level of EEDR given the other assumptions already set in this strategy	• The range of EEDR portfolios retained in the Draft IRP will be a selectable resource in the blended optimization
Test "gas-only" expansion in Strategy C	To evaluate the impact of gas capacity expansion on the short-term rate metric score	• "Gas-only" expansion will not allow nuclear additions • To be tested with 3,200 MW of idled capacity • All other factors will be optimized
Evaluate an aggressive EEDR portfolio that targets 50% of the capacity gap beginning in 2015	To evaluate the impact on plan cost and risk for a more aggressive portfolio of EEDR programs	• The 50% target will be based upon the capacity gap in the latest reference case (Scenario 8) with 3,200 MW of idled capacity • All other factors will be optimized
Test deferral of nuclear expansion in Strategy C until 2020	To identify the capacity additions that would be required if nuclear was not available	• Schedule of nuclear additions will be optimally selected based on the options and constraints described previously

Figure 8-2 – Sensitivity Runs Identified From Draft IRP

8.1.3 Final Study Results

The study approach in the final IRP produced 12 portfolios that resulted from a blended optimization. The boundaries (resource constraints) were defined by the planning strategies (Strategies B, C and E) retained in the Draft IRP. The 12 cases were produced by testing four possible levels of idled coal-fired capacity in each of the three representative scenarios (Scenarios 1, 3 and 8) which represent the high, medium and low load forecasts described in Section 6.1 – Development of Scenarios and Strategies. Multiple iterations were used to test all levels of idled coal-fired capacity. Optimum renewable and EEDR portfolios were selected for each assumed level of idled coal-fired capacity. Figure 8-3 summarizes the results of those cases.

	Scenario 1 Capacity Additions				Scenario 8 Capacity Additions				Scenario 3 Capacity Additions			
Idled Capacity[1]	2,400	3,200	4,000	4,700	2,400	3,200	4,000	4,700	2,400	3,200	4,000	4,700
Renewable Portfolio	2,500	2,500	2,500	2,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500
EEDR Portfolio	5,074	5,074	5,074	5,074	3,627	3,627	5,074	5,074	3,627	3,627	3,627	3,627
2010	PPAs	PPAs	PPAs	PPAs								
2011												
2012	JSF CC	JSF CC	JSF CC	JSF CC	JSF CC	JSF CC	JSF CC	JSF CC	JSF CC	JSF CC	JSF CC	JSF CC
2013	WBN 2	WBN 2	WBN 2	WBN 2	WBN 2	WBN 2	WBN 2	WBN 2	WBN 2	WBN 2	WBN 2	WBN 2
2014												
2015	CTb PPAs	CTb PPAs MKT	CC CTb PPAs	CC (2) CTb PPAs	CTb	CTb	CTb	CC CTb				CC
2016	MKT	CC	CTa	CTa								
2017	CC	CTa	CT	CTa								
2018	BLN 1	BLN 1	BLN 1	BLN 1								
2019						MKT						
2020	BLN 2 PSH	BLN 2 PSH	BLN 2 PSH	BLN 2 PSH	BLN 1 PSH	BLN 1 PSH	BLN 1 PSH	BLN 1 PSH	PSH	PSH	PSH	PSH
2021												
2022	CT CTa	CC CT	CC CT	CC CT	BLN 2	BLN 2	BLN 2	BLN 2				
2023	CT	CT	CTa	CT								
2024	NUC	NUC	NUC	NUC								
2025	IGCC	MKT	IGCC	IGCC								
2026	NUC	NUC	NUC	NUC		CTa						
2027	CT	CT	IGCC	IGCC		MKT						
2028	CT	CT	CT	CTa IGCC	CTa	CT	CTa	CTa				
2029	CC	CT IGCC	CT IGCC	CTa IGCC	CT	CT	CTa	CTa				

1 – MW values based on maximum net dependable capacity

Abbreviation	Name
BLN 1	Bellefonte Nuclear Unit
CC	Combined Cycle Combustion Turbine (Natural Gas)
CT	Combustion Turbine (Natural Gas) ~800 MW
CTa	Combustion Turbine (Natural Gas) ~600 MW
CTb	Combustion Turbine Refurbishment (Natural Gas)
IGCC	Integrated Gasification Combined Cycle (Coal)
JSF CC	John Sevier Combined Cycle (Natural Gas)
MKT	Annual market purchases greater than 400 MW
NUC	AP 1000 Nuclear Unit
PPAs	Purchased Power Agreements and Acquisitions
PSH	Pumped-storage Hydro
WBN 2	Watts Bar Nuclear Unit 2

Figure 8-3 – The 12 Portfolios

Referring to the blended optimization results, the following general observations were made:

- Nuclear expansion is present in the majority of portfolios with the first unit on line between 2018 and 2020
- Expanded energy efficiency and demand response (EEDR) portfolios performed well in the optimization cases. The mid level portfolio (3,600 MW and 11,400 annual GWh reductions by 2020) was chosen in half of the cases
- Renewable generation above existing wind contracts plays a key role in future resource portfolios
- Expansion of natural gas capacity is needed, but typically occurs after 2024. Gas may serve as the most advantageous way to address any emerging supply shortage
- Preliminary financial results show that component ranges considered produced relatively robust plans with little variation in total plan costs (PVRR) within scenarios

The cost and risk metrics for the portfolios produced in the blended optimization were relatively constant across the coal-fired capacity levels, especially in Scenarios 3 and 8. This is illustrated in Figure 8-4 which compares the short-term rates ranking metrics for the portfolios organized by idled coal-fired capacity level (2,400/3,200/4,000/4,700 MW).

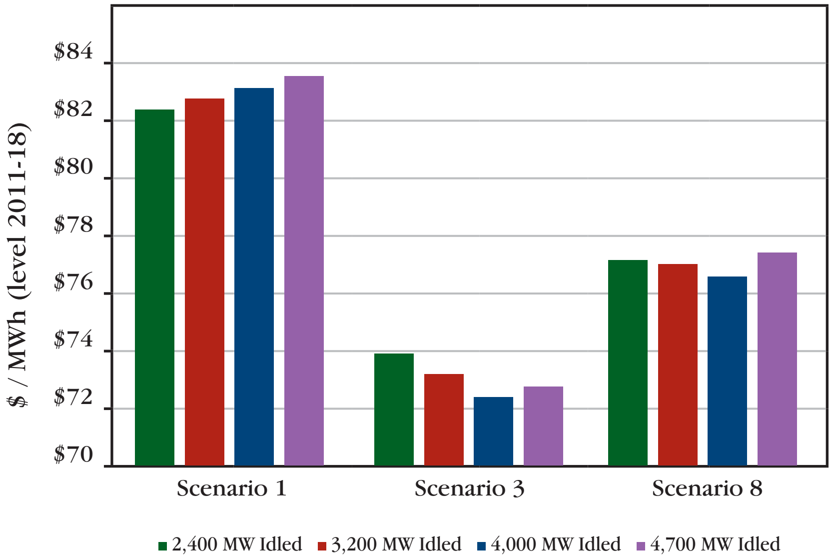


Figure 8-4 – Short-Term Rate Impacts by Scenario

This outcome was primarily driven by two characteristics. First, new unit additions are very similar in these two scenarios for all four coal-fired idling levels. Second, as the amount of idled coal-fired capacity increased from 3,200 to 4,700 MW, a larger EEDR portfolio was selected in Scenario 8. This larger portfolio had similar costs in comparison to the smaller EEDR portfolio chosen at the 2,400 MW and 3,200 MW levels. In addition, no expansion resources were selected in Scenario 3. As a result, overall PVRR for the plans was essentially unchanged.

The two metrics that measure financial risk for these resource plans were also essentially unchanged across the levels of idled coal-fired capacity except for Scenario 3. The variation seen in Scenario 3 was the result of increasing idling levels, which had an impact on the dispatch of resources in the existing system since there were no expansion resources added in that scenario.

In general, the ranking metrics show that the 12 cases produced in the blended optimization represented robust expansion solutions. The overall results were clustered closely together despite the changes in idled coal-fired capacity assumed and the variation of the key assumptions tested in the stochastic analysis. This set of portfolios represents a more focused set of possible expansion alternatives and was used to define the characteristics of the Recommended Planning Direction.

8.2 Component Identification

The Recommended Planning Direction was designed by utilizing the findings from the blended optimization to select the components that became part of the strategy. The strategy design considered the following major factors:

Stakeholder input	• Continuous dialogue with the Stakeholder Review Group • Input received from the fall 2010 Draft IRP public comment period • Quarterly public briefings conducted by TVA staff and responses to surveys
Analysis results	• Output from the resource optimization cases and associated financial modeling translated into ranking and strategic metrics
Recognition of non-quantified risks	• “No-regrets” approach • Broader considerations not fully captured in the quantitative analysis, but have some impact on the selection process

8.2.1 Idled Coal-Fired Capacity

Selection of the preferred level of idled coal-fired capacity was the next step in producing the case results in the final IRP. Cost and risk ranking metrics used in the Draft IRP were applied to select a level of idled coal-fired capacity from the options considered. Each idled capacity level was given an ordinal rank for each metric within a scenario.

The ordinal rankings for each scenario were weighted using the same formula as applied in the Draft IRP. Scores were summed for each idled coal-fired capacity level to create total ranking scores. Results are shown in Figure 8-5.

	Idled Capacity	Scenarios			Total
		Sc 1	Sc 3	Sc 8	
Weighted Ranking	2,400	1.7	3.0	2.4	7.1
	3,200	2.7	2.2	2.7	7.7
	4,000	2.5	1.7	1.7	5.9
	4,700	3.1	3.1	3.2	9.4

Figure 8-5 – Weighted Ranking Scores

Based on the ranking results, the 4,000 MW level performed the best across the three scenarios and was used as the scorecard value. This level of idled coal-fired capacity was used as a fixed assumption for further refinement of the remaining components of the Recommended Planning Direction. Model results were then reviewed to identify optimal values for the renewable resources portfolio and the level of EEDR.

8.2.2 Renewable Portfolio

In the least-cost optimized plans, results tended to favor the 1,500 MW portfolio, which represented the current wind contracts as the preferred level. However, based on stakeholder comments and feedback on the Draft IRP desiring an increased emphasis on renewable development, the Recommended Planning Direction was increased to incorporate the 2,500 MW portfolio which was used as the scorecard value. This reflects projected growth of 1,000 MW of additional renewables above existing and contracted amounts. Figure 8-6 shows a potential mix of components in this renewable portfolio.

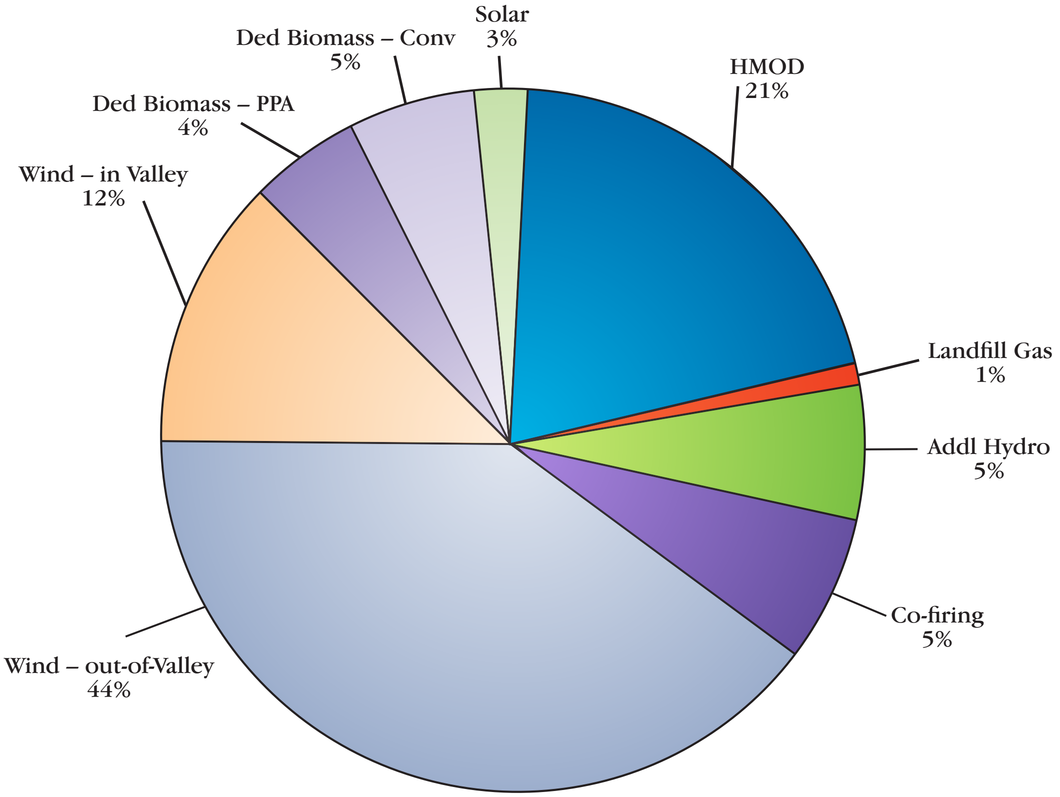


Figure 8-6 – Potential 2,500 MW Renewable Portfolio

Prior to making this decision, the cost premium to increase to the 2,500 MW portfolio was calculated. It was determined to be relatively small (typically less than 1 percent of total plan cost). Not all of this cost change was directly attributable to the renewable portfolio itself because of other changes in the resource plan. This premium was deemed acceptable given TVA's objectives to increase reliance on cleaner and more environmentally responsible energy sources.

8.2.3 EEDR Portfolio

The modeling results were evenly split in selecting either the mid level EEDR portfolio (3,600 MW by 2020) or the larger portfolio (5,100 MW by 2020). For reference, the mid level portfolio was part of Strategy C, and the larger portfolio was included in Strategy E in the Draft IRP.

Given the uncertainty about the pace of customer participation and the implementation challenge for TVA associated with the larger portfolio, the mid level EEDR portfolio was used as the scorecard value. This selection also recognized there are similar non-quantified risks associated with implementation of this mid level portfolio. Those risks were deemed to be sufficiently manageable to include the portfolio in the Recommended Planning Direction.

For a more complete discussion of the non-quantified risks that were part of TVA's assessment of the planning strategies, see Chapter 6 – Resource Plan Development and Analysis.

8.3 Recommended Planning Direction Development

8.3.1 Key Characteristics

After the key components of idled coal-fired capacity, EEDR and renewables were determined, the key characteristics of the strategies following the blended optimization were observed. These observations are shown in Figure 8-7.

Component	Observations
Nuclear additions	Nuclear expansion is present in the majority of portfolios. Up to three[1] units are added between 2013 and 2029
Coal additions	New coal capacity is only selected after 2025 in scenarios with dramatic load growth
Natural gas additions	Expansion of natural gas is needed, but typically occurs after 2024 with simple-cycle combustion turbines. The dramatic load growth scenario is an exception as combined cycles and combustion turbines are chosen as early as 2015. Additional units may be required for reliability and/or grid stability
Renewable additions	Model results tend to favor the current wind contracts (1,500 MW) as the least cost plan. The renewable portfolio that delivers 2,500 MW by 2029 is selected in the dramatic load growth scenario
EEDR	Results evenly split in selecting either the 3,600 MW by 2020 portfolio and the 5,000 MW by 2020 portfolio

1 – Included in number of nuclear units is TVA Board of Directors' approved project Watts Bar Unit 2

Figure 8-7 – Observations Developed from Preliminary Results

The remaining components of the Recommended Planning Direction were selected with consideration of these outcomes. Figure 8-8 is a tabular summary of the Recommended Planning Direction.

Component	Guideline MW Range	Window of Time	Recommendations
EEDR	3,600-5,100 (11,400-14,400 GWh)	By 2020[1]	Expand contribution of EEDR in the portfolio
Renewable additions	1,500-2,500[2]	By 2020[1]	Pursue cost-effective renewable energy
Coal-fired capacity idled	2,400-4,700[3]	By 2017	Consider increasing amount of coal capacity idled
Energy storage	850[4]	2020-2024	Add pumped-storage capacity
Nuclear additions	1,150-5,900[5]	2013-2029	Increase contribution of nuclear generation
Coal additions	0-900[6]	2025-2029	Preserve option of generation with carbon capture
Natural gas additions	900-9,300[7]	2012-2029	Utilize natural gas as an intermediate supply source

1 – This range includes EEDR savings achieved through 2010. The 2020 range for EEDR and renewable energy does not preclude further investment in these resources during the following decade

2 – TVA's existing wind contracts that total more than 1,600 MW are included in this range. Values are nameplate capacity. Net dependable capacity would be lower

3 – TVA has previously announced plans to idle 1,000 MW of coal-fired capacity, which is included in this range. MW values based on maximum net dependable capacity

4 – This is the expected size of a new pumped-storage hydro facility

5 – The completion of Watts Bar Unit 2 represents the lower end of this range

6 – Up to 900 MW of new coal-fired capacity is recommended between 2025 and 2029

7 – The completion of John Sevier combined cycle plant represents the lower end of this range

Figure 8-8 – Recommended Planning Direction

The above figure contains seven components that comprise the strategy and shows a range of the amount for each component as well as the timing of when these components would be added to the system.

8.3.2 Recommended Planning Direction Illustrative Portfolios

After the Recommended Planning Direction was defined, it was evaluated to determine if it represented an improvement over the strategies evaluated in the Draft IRP. A group of portfolios was developed and scored.

To produce the portfolios, the Recommended Planning Direction was tested in each of the eight scenarios. These portfolios were based on scorecard values for the key components of the Recommended Planning Direction (idled coal-fired capacity, EEDR and renewables) with optimized additions of the other resources that made up the capacity plans.

The resultant portfolios are illustrative in nature and based on the particular set of assumptions contained in each of the scenarios. Figure 8-9 is a tabular summary of the illustrative portfolios for the Recommended Planning Direction and shows the resource plans that result in each of the eight scenarios.

Year	Capacity Additions by Scenario									
	EEDR	Renewables	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5	Scenario 6	Scenario 7	Scenario 8
2010	300 MW	300 MW	PPAs							
2011										
2012			JSF CC	JSF CC	JSF CC	JSF CC	JSF CC	JSF CC	JSF CC	JSF CC
2013			WBN 2 PPAs	WBN 2	WBN 2	WBN 2	WBN 2	WBN 2	WBN 2	WBN 2
2014			CT			CTb PPAs				
2015			CC CTb CT PPAs			CC PPAs	CTb PPAs		CTb PPAs	CTb PPAs
2016			CT			CT	MKT		MKT	MKT
2017			MKT			MKT			MKT	
2018			BLN 1	BLN 1		BLN 1			BLN 1	
2019			MKT			MKT	MKT		MKT	MKT
2020	3,600 MW	2,500 MW	BLN 2 PSH	BLN 2 PSH	PSH	BLN 2 PSH	BLN 1 PSH	PSH	BLN 2 PSH	BLN 1 PSH
2021			CC							
2022			CC MKT				BLN 2			BLN 2
2023			CT MKT						CTa	
2024			NUC							
2025			IGCC MKT						CT	
2026			NUC						MKT	CT
2027			CT				MKT		CT	MKT
2028			CT				CT		MKT	CT
2029	4,600 MW	2,600 MW	CT IGCC	CT			CT		CT	CT

*Illustrative portfolios assume 4,000 MW of idled coal-fired capacity by 2015

Additions			
Natural Gas	🟪	Pumped Hydro	🟦
Coal	▨	Renewables	🟧
Nuclear	🟩	EEDR	🟥
Purchased Power	🟨		

Figure 8-9 – Illustrative Portfolios for the Recommended Planning Direction

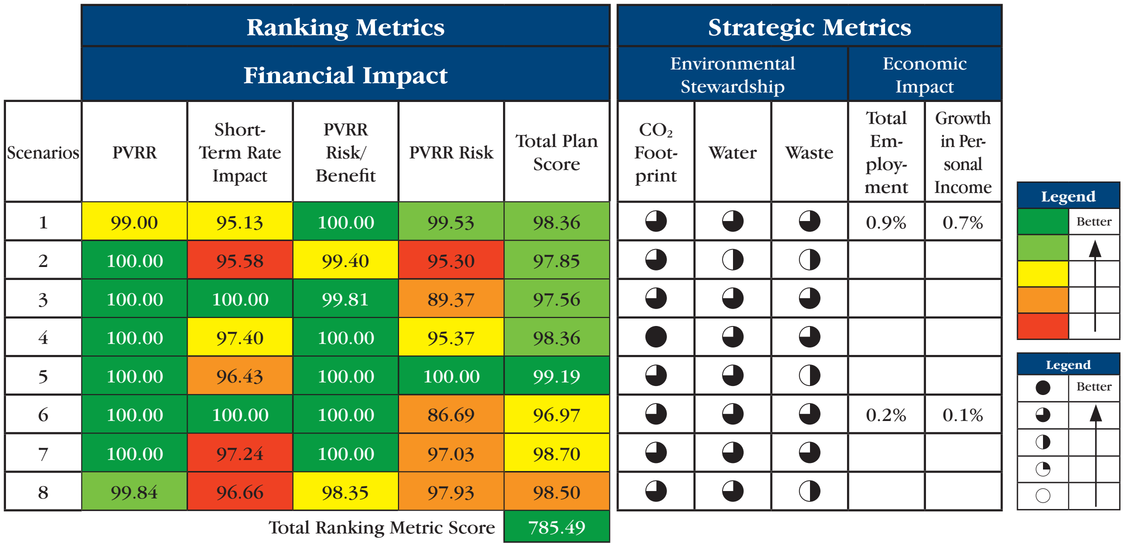
After reviewing the resource plans in Figure 8-9, the following observations can be made about near-term and long-term additions:

- Near-term additions (0-5 years) were generally consistent across the scenarios, reflecting the addition of approved projects by the TVA Board of Directors, which include additions at John Sevier and Watts Bar. Resource additions in this time frame also included new natural gas plants and purchased power arrangements, depending on load growth

- Long-term additions (5-20 years) were somewhat more flexible. Nuclear capacity was a major component of the capacity plans in this period, with the first nuclear unit typically added between 2018 and 2020. Expansion of natural gas capacity often occurred after 2024

8.3.3 Recommended Planning Direction Validation

The Recommended Planning Direction was scored using the same ranking and strategic metrics utilized in the Draft IRP. The scorecard results of the Recommended Planning Direction were compared to the scorecard results of the strategies retained from the Draft IRP. Figure 8-10 is a fully populated scorecard for the Recommended Planning Direction, and Figures 8-11 and 8-12, respectively, show scorecards from the Draft IRP for Strategy C and Strategy E.



	Ranking Metrics					Strategic Metrics				
	Financial Impact					Environmental Stewardship			Economic Impact	
Scenarios	PVRR	Short-Term Rate Impact	PVRR Risk/ Benefit	PVRR Risk	Total Plan Score	CO_2 Foot-print	Water	Waste	Total Em-ployment	Growth in Per-sonal Income
1	99.00	95.13	100.00	99.53	98.36	◕	◕	◕	0.9%	0.7%
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	◕	◕	◕	0.2%	0.1%
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					

Legend	
🟩	Better
🟩	↑
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Legend	
●	Better
◕	↑
◑	
◔	
○	

Figure 8-10 – Recommended Planning Direction

	Ranking Metrics					Strategic Metrics				
	Financial Impact					Environmental Stewardship			Economic Impact	
Scenarios	PVRR	Short-Term Rate Impact	PVRR Risk/ Benefit	PVRR Risk	Total Plan Score	CO_2 Footprint	Water	Waste	Total Employment	Growth in Personal Income
1	99.22	94.09	97.68	100.00	98.04	◐	◐	◐	0.9%	0.6%
2	96.35	100.00	96.46	95.85	97.08	◐	◕	◕		
3	95.56	94.68	100.00	100.00	96.91	◐	◐	◐		
4	97.39	98.37	98.19	100.00	98.30	◕	◐	◐		
5	98.90	100.00	97.49	99.17	99.04	◐	◐	◕		
6	95.08	94.41	97.83	93.22	94.82	◐	◐	◐	0.2%	0.1%
7	98.88	98.94	99.45	100.00	99.22	◐	◐	◐		
8	99.56	99.63	99.03	99.31	99.45	◐	◐	◕		
				Total Ranking Metric Score	782.86					

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Legend	
●	Better
◕	↑
◐	
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Figure 8-11 – Planning Strategy C – Updated Scorecard

	Ranking Metrics					Strategic Metrics				
	Financial Impact					Environmental Stewardship			Economic Impact	
Scenarios	PVRR	Short-Term Rate Impact	PVRR Risk/ Benefit	PVRR Risk	Total Plan Score	CO_2 Footprint	Water	Waste	Total Employment	Growth in Personal Income
1	100.00	100.00	96.78	95.46	98.57	●	●	●	0.8%	0.6%
2	97.74	98.20	99.96	98.54	98.30	●	●	●		
3	94.67	93.55	95.91	97.73	95.26	●	●	●		
4	96.83	100.00	93.42	89.57	95.48	◐	●	●		
5	98.72	99.50	96.33	98.64	98.59	●	●	●		
6	95.62	93.91	99.65	100.00	96.72	●	●	●	0.3%	0.2%
7	98.56	100.00	98.42	98.96	98.96	●	●	●		
8	100.00	100.00	100.00	100.00	100.00	●	●	●		
				Total Ranking Metric Score	781.88					

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Figure 8-12 – Planning Strategy E – Updated Scorecard

Comparing the Recommended Planning Direction to the top two strategies from the Draft IRP (Strategy C and Strategy E) shows that the Recommended Planning Direction represents the most favorable blending of portfolio components. The performance of the Recommended Planning Direction across all scenarios implies that it is a more robust approach with a lower likelihood of regret. The following are additional observations based on the scorecard results:

- The Recommended Planning Direction was the top performer on total plan cost (PVRR) in six of the eight scenarios tested
- The Recommended Planning Direction was the top performer on the risk/benefit ratio metric in five of the eight scenarios
- The strategic metrics for the Recommended Planning Direction were improved from metrics for Strategy C (the top-ranked strategy from the Draft IRP), but were not as good as the strategic metrics for Strategy E
- The economic impact metrics for the Recommended Planning Direction were similar to the metrics for the strategies retained from the Draft IRP, indicating there was no significant difference among the strategies in terms of macroeconomic impacts

The Recommended Planning Direction provided a more effective balance between plan cost and financial risk, as shown in Figure 8-13. The graph presents a cost versus risk curve, and the Recommended Planning Direction provided the lowest combination of plan cost (PVRR) and financial risk of any of the strategies that were considered in this IRP.

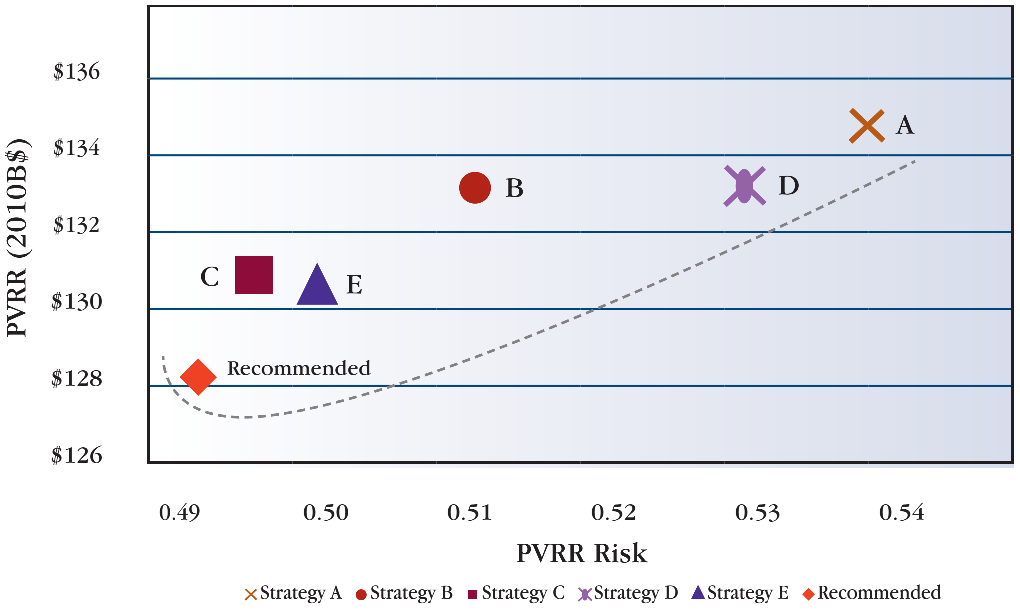

Figure 8-13 – Plan Costs vs. Financial Risk

Figure 8-14, a risk trade-off graph that compares financial risk versus the risk/benefit ratio, reinforces the conclusion drawn from Figure 8-13. This shows that improved risk performance comes at a higher overall plan cost.

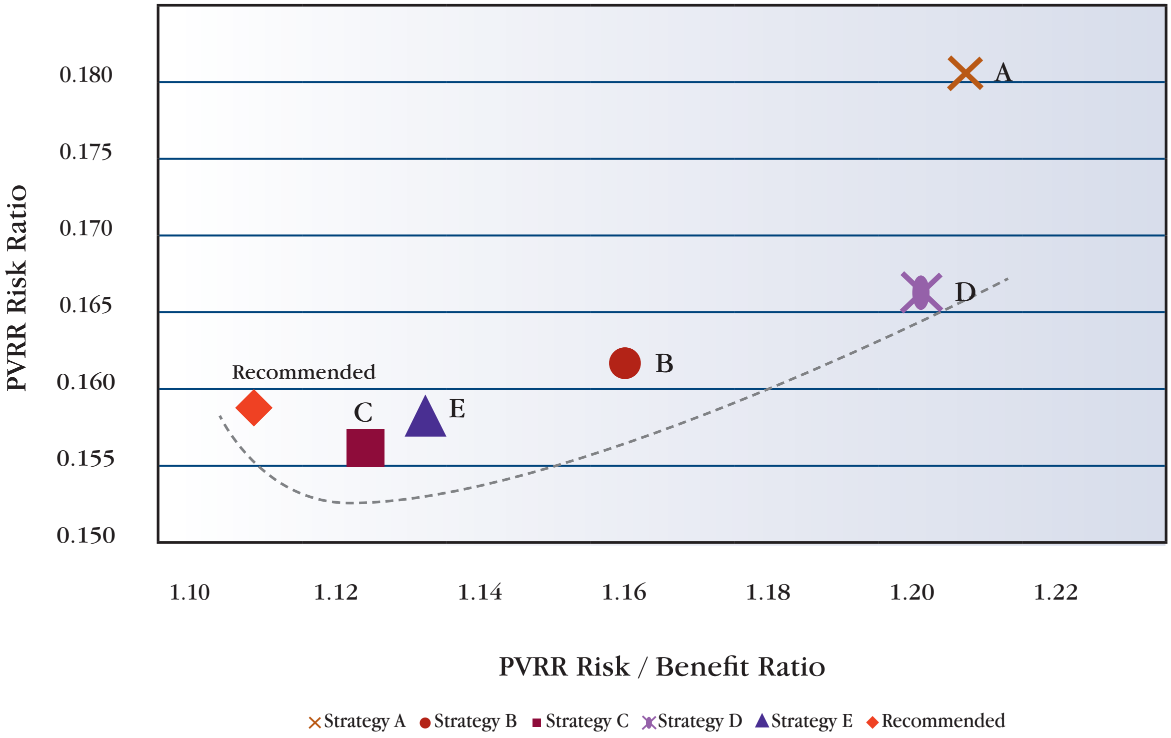

Figure 8-14 – Comparison of Financial Risks of Strategies

The uncertainty range in PVRR across the scenarios was another measure of performance used to assess the Recommended Planning Direction. Figure 8-15 is a tornado diagram of the variation in total plan cost (PVRR) from the stochastic analysis of the strategies in each of the eight scenarios. The width of the bars indicates the variation and uncertainty in plan cost. This figure shows that in most scenarios the Recommended Planning Direction (R) had the smallest range of cost uncertainty and that the expected value of the total plan cost was lower compared to the other strategies (C or E).

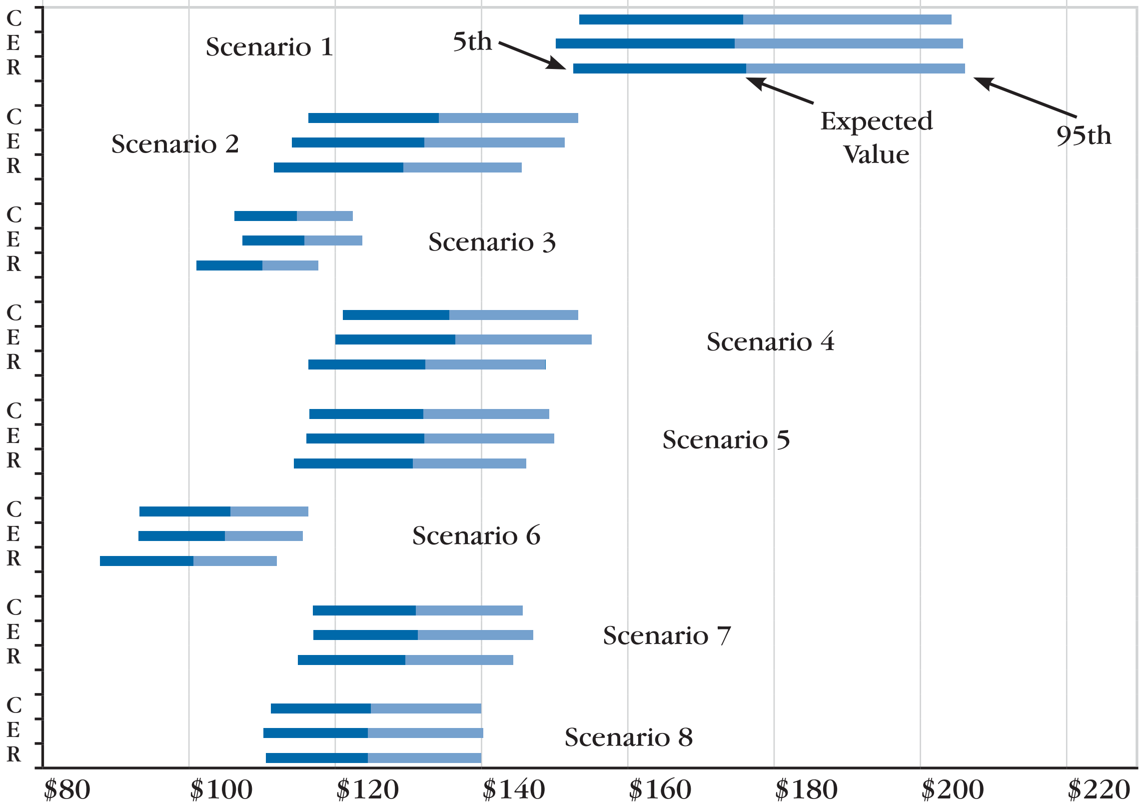

Figure 8-15 – PVRR (2010 $B)

In addition to financial trade-offs, the Recommended Planning Direction also provided the best balance of plan cost and environmental footprint, represented by the graph of plan cost versus CO_2 tons shown in Figure 8-16.

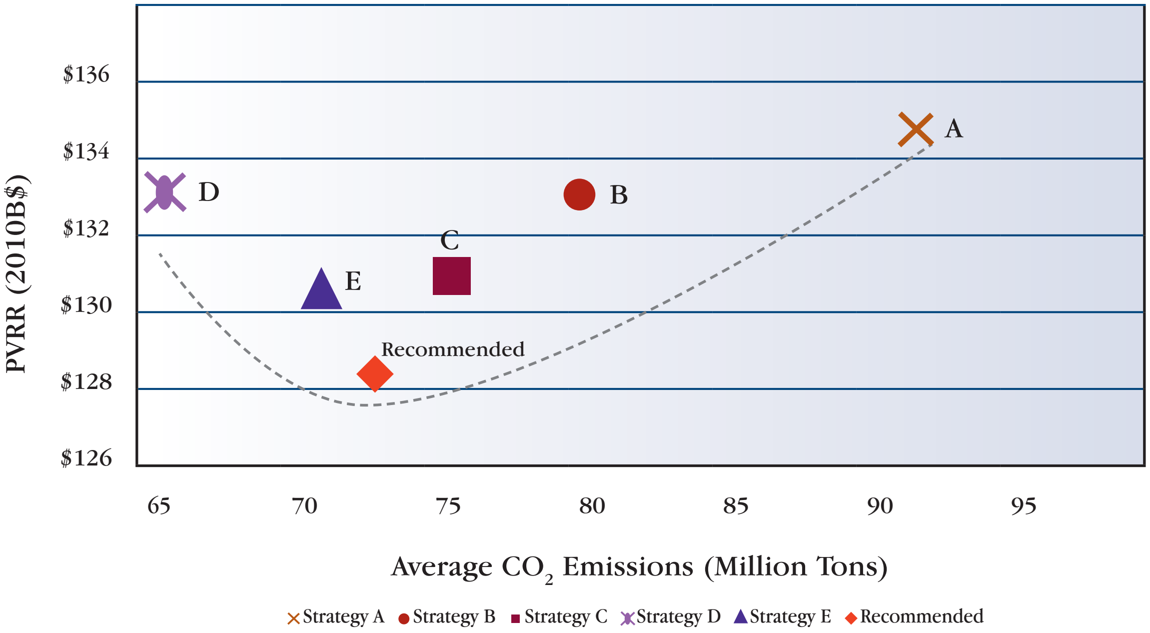

Figure 8-16 – Plan Costs vs. Annual CO_2 Emissions

8.3.4 Other Considerations

The modeling results represented by the ranking and strategic metrics, along with other financial and risk assessments discussed in the preceding section, provided strong support for the Recommended Planning Direction. However, as indicated in Section 7.2.4 – Other Strategic Considerations, the analytics are not the only considerations that were factored into the selection of TVA's Recommended Planning Direction. Certain non-quantified risk concerns, also known as "no-regrets considerations," were included, either directly or indirectly, when making the selection. Figure 8-17 shows the key items of the "no-regrets considerations."

Other Risk Considerations	Potential Implications	Potential Early Warning Signs
Establishing a successful partnership with distributor group to administer EEDR programs and deliver forecasted reductions	• Planning strategies with higher EEDR targets will have a greater exposure to this risk	• Delays in establishing formal agreement with distributors by end of FY 2012
The ability of EEDR programs to stimulate customer participation and deliver forecasted reductions	• Planning strategies with higher EEDR targets will have a greater exposure to this risk	• Measurement and verification data of actual reductions is significantly below forecast
The ability to achieve schedule targets for licensing/permitting, developing and constructing large baseload generation	• Risks of meeting schedule targets will likely increase as the number and complexity of construction projects increase • Projects with more extensive permitting requirements may have greater exposure to schedule risk	• Critical internal resources for permitting, design, and construction are not maintained for upcoming projects • Dramatic changes in licensing/permitting requirements
The timely build-out of transmission and distribution (smart grid) infrastructure to support future resources	• Risks will likely increase as the amount of construction required increases; particularly if that construction is undertaken by entities other than TVA	• Diminished availability of transmission design and construction resources • Limited smart grid capability added to distribution system by 2015
The ability to maintain appropriate operational flexibility after significant changes in resource mix	• Risks of limiting operational flexibility increase as the quantity of baseload, dispatchable, and non-dispatchable resources change	• Prolonged increases in system load factor • Emergence of barriers that delay addition of energy storage

Figure 8-17 – Other Risk Considerations

The Recommended Planning Direction provides the most balanced approach to mitigating the risk associated with these non-quantified factors while providing the best performance in key metrics.

8.4 Conclusion

Based on the results of the analysis conducted in the Draft and final IRP, as well as the consideration of non-quantified risk factors, the Recommended Planning Direction positions TVA with the best balance of flexibility and "no-regrets" risk mitigation. A discussion of next steps and recommendations for implementation of this strategy is discussed in Chapter 9 – Next Steps.