Integrated Resource Planning: A TVA Case Study

Webinar Presentation

October 26, 2010

About Us

- The Southern Alliance for Clean Energy (SACE) has been a leading voice for energy reform to protect the quality of life and treasured places in the Southeast for the past 25 years. Founded in 1985, SACE is the only regional organization primarily focused on developing clean energy solutions throughout the Southeast.

- Since its formal inception in 1985, SACE has grown from a small group of individuals into a dynamic organization, with five offices across the Southeast and initiatives at federal, state and local levels. SACE continues to expand organizationally, to address the needs of a rapidly changing planet.

- As we look towards the future, SACE's commitment to preserve, restore and protect our environment through the use of innovative technology, grassroots and grasstops education, and pioneer policy work remains steadfast.

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Outline of today's webinar:

1. What is Integrated Resource Planning (IRP)?
2. How is TVA evaluating the results of its IRP process?
3. What are the draft results of TVA's IRP process?
4. SACE's perspective on TVA's IRP draft results.
5. How you can make a difference in the Valley's energy future.

Why we're here: TVA's IRP process

- **In June 2009, TVA announced an IRP process to determine a preferred strategy for meeting electrical demand through 2029.**
- **Unlike the typical utility IRP process, TVA's IRP process includes a Stakeholder Review Group to provide input into the planning process.**
  - Dr. Stephen Smith, SACE's Executive Director, is a member of the Stakeholder Review Group.
- **On September 16th, TVA released a Draft IRP for public review and comment.**
  - Comment period runs through November 8, 2010
- **A final plan will be presented to TVA's Board of Directors in spring of 2011.**
  - The final plan will present a preferred strategy for meeting future energy demand over the next 20 years.

What is Integrated Resource Planning (IRP)?

- **The IRP process is a modeling process used by utilities to determine:**
  - The best possible mix of supply side (such as new power plants) and demand side (such as energy efficiency) resources to meet future energy demand, within the utility's operating constraints, at the least cost and risk.

The IRP process: predicting the future?

- **No. The IRP process seeks to choose a resource strategy that will perform best over a range of possible future scenarios. There are two overarching consideration to figuring this out:**
  - What might future energy demand look like?
  - What resource options does the utility have to meet future energy demand?

- **These considerations are impacted by an almost infinite number of uncertainties that will define the conditions under which TVA must operate.**
  - **Narrowing these uncertainties into a manageable number that reflects the most likely range of possible conditions is** a **key to successful planning.**

Future Energy Demand: TVA's Key Uncertainties

Initial List of Uncertainties
Total load
Change in load shape
Demand side management penetration
Energy efficiency penetration
Technology improvement (e.g., PHEV)
Greenhouse gas regulation
Cost of emissions allowances
Coal ash regulation
Hydrothermal effects (weather)
Judicial mandates
Environmental legislation
Public sentiment for "go green"
Renewable requirements
Cost of capital
Construction cost
Natural gas price
Coal price
Wholesale electricity price
Natural gas infrastructure (pipeline)
Oil price
Cost of purchased power
Availability of purchased power
Price hedging program
Nuclear build out viability
Nuclear legislation
Transmission capability / limitations
Cost/time of transmission expansion
Generating unit availability
Hydro unit availability
Catastrophic event
Retirement of existing assets

Key Uncertainty	Description
Greenhouse gas (GHG) requirements	• Reflects level of emission reductions (CO_2 and other GHG) mandated by federal legislation plus the cost of carbon allowances
Total load	• Reflects variance of actual load to what is forecast • Accounts for impacts of DSM/EE penetration
Change in load shape	Includes effects of factors such as: •Time-of-use rates •PHEV (transportation) •Distributed generation •Economics changing customer base • Energy storage • Energy efficiency • Smart grid / demand response
Commodity prices	Includes natural gas, coal, oil, uranium, and spot price of electricity
Renewable electricity standards (RES)	• Reflects mandates for minimum generation from renewables and the viability of renewable generation sources
Environmental outlook	Includes: •Air emissions (exclusive of GHG) •Water •Land •Waste
Capital expansion viability	For nuclear, fossil, other generation, and transmission, includes risks associated with: •Licensing •Permitting •Project schedule
Financing	Financial cost (interest rate) of securing capital
Construction cost escalation	Includes the following for nuclear, fossil, and other generation: •Commodity cost escalation •Labor and equipment cost escalation
Contract purchase power cost	• Reflects demand cost, availability of power and transmission constraints

A low and high value is given to each uncertainty to bound the model's analysis.

“Scenarios” are created to reflect the range of uncertainties:

Uncertainty	Scenario #1 Economy Recovers Dramatically	Scenario #2 Environmental Focus is a National Priority	Scenario #3 Prolonged Economic Malaise	Scenario #4 Game-Changing Technology	Scenario #5 Energy Independence	Scenario #6 Carbon Legislation Creates Economic Downturn	IRP Base Case[1]
Greenhouse gas requirements	CO_2 price \$30/ton in 2014, \$90/ton by 2030. 77% allowance allocation, 0% by 2040	CO_2 price \$19/ton in 2012, \$104/ton by 2030. 77% allowance allocation, 0% by 2040	No federal requirement	CO_2 price \$20/ton in 2012, \$50/ton by 2030. 77% allowance allocation, 0% by 2040	CO_2 price \$20/ton in 2012, \$50/ton by 2030. 77% allowance allocation, 0% by 2040	CO_2 price \$19/ton in 2012, \$104/ton by 2030. 77% allowance allocation, 0% by 2040	CO_2 price \$17/ton in 2013, \$62/ton by 2030 77% allowance allocation, 0% by 2040
Environmental outlook	Same as Base Case	SCR all units by 2016 FGD all units by 2017 HAPs MACT by 2015 Hg MACT by 2014	No additional requirements	Same as Base Case	Same as Base Case	Same as Base Case	SCR all units by 2020 FGD all units by 2018 HAPs MACT by 2015
Renewable Electricity and EE Standards	RES – 3% by 2012, 20% by 2021 (adjust. total retail sales) EE up to 25% of req't	RES – 6% by 2012, 30% by 2020 (adjust. total retail sales) EE up to 25% of req't	No federal RES	RES – 6% by 2012, 20% by 2020 (adjust. total retail sales) EE up to 40% of req't	RES – 5% by 2012, 20% by 2020 (adjust. total retail sales) EE up to 40% of req't	RES – 6% by 2012, 30% by 2020 (adjust. total retail sales) EE up to 25% of req't	RES – 3% by 2012, 15% by 2021 (adjust. total retail sales) EE – up to 25% of req't
Commodity prices	Same as Base Case	Gas higher than Base Case; coal same as Base Case	Gas and coal lower than Base Case	Gas, coal higher than Base Case; lower after load decrease	Gas and coal higher than Base Case	Gas, coal higher than Base Case; same after load decrease	Gas \$6-8 / MMBtu Coal \$40 / ton[2]
Total load	Highest growth (5-6%)	Moderate growth (1.1%)	Low or no growth (0%)	High growth (4%) and sudden decrease (-2%)	Moderate growth (1.1%)	Brief growth (1.1%) then decrease (-1.1%)	Moderate growth (1.1%)
Change in load shape	Current shape	Shift from peak (-5% MW during peak hrs)	Current shape	Shift from peak (-5% MW during peak hrs)	Shift from peak (-5% MW during peak hrs)	Current shape	Current shape
Capital expansion viability[3]	Moderate schedule risk (1-2 years – nuclear, 1 year non-nuclear)	High schedule risk (2+ years – nuclear, 1 year non-nuclear)	Low schedule risk (<1 year – nuclear, 0 year non-nuclear)	Moderate schedule risk (1-2 years – nuclear, <1 year non-nuclear)	Moderate schedule risk (1-2 years – nuclear, 0-1 year non-nuclear)	Low schedule risk (<1 year – nuclear, 0 year non-nuclear)	Moderate schedule risk (1-2 years – nuclear, <1 year non-nuclear)
Financing	Much higher than Base Case	Higher than Base Case	In line with Base Case	Much higher than Base Case	Higher than Base Case	In line with Base Case	Based on current borrowing rate
Construction cost escalation	Higher escalation (2% non-nuclear, 3.5% nuclear)	Much higher escalation (3% non-nuclear, 5% nuclear)	Lower escalation (0.5% non-nuclear, 1.5% nuclear)	Higher escalation (2% non-nuclear, 3.5% nuclear)	Higher escalation (2% non-nuclear, 3.5% nuclear)	Lower escalation (0.5% non-nuclear, 1.5% nuclear)	Moderate escalation (1% non-nuclear, 2.4% nuclear)
Contract Purchase Power Cost	Higher cost and lower availability	Much higher cost and lower availability	Lower cost and availability	Higher cost, lower avail then lower cost after load decrease	Much higher cost and lower availability	Moderate cost and availability	Moderate cost and availability

These scenarios represent the range of future conditions that are analyzed to determine the best resource mix for meeting future energy demand.

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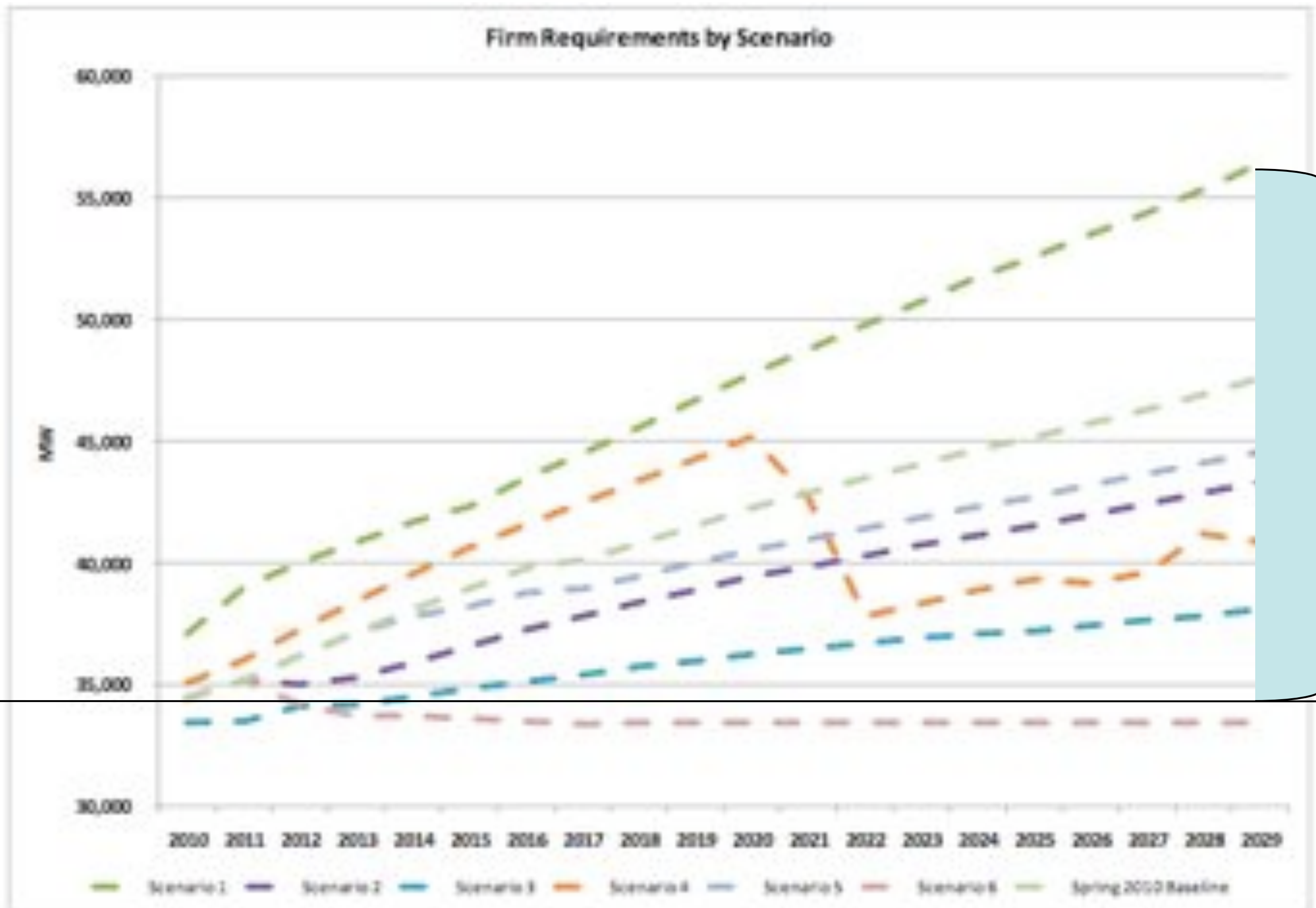
These Scenarios also represent different levels of possible load growth

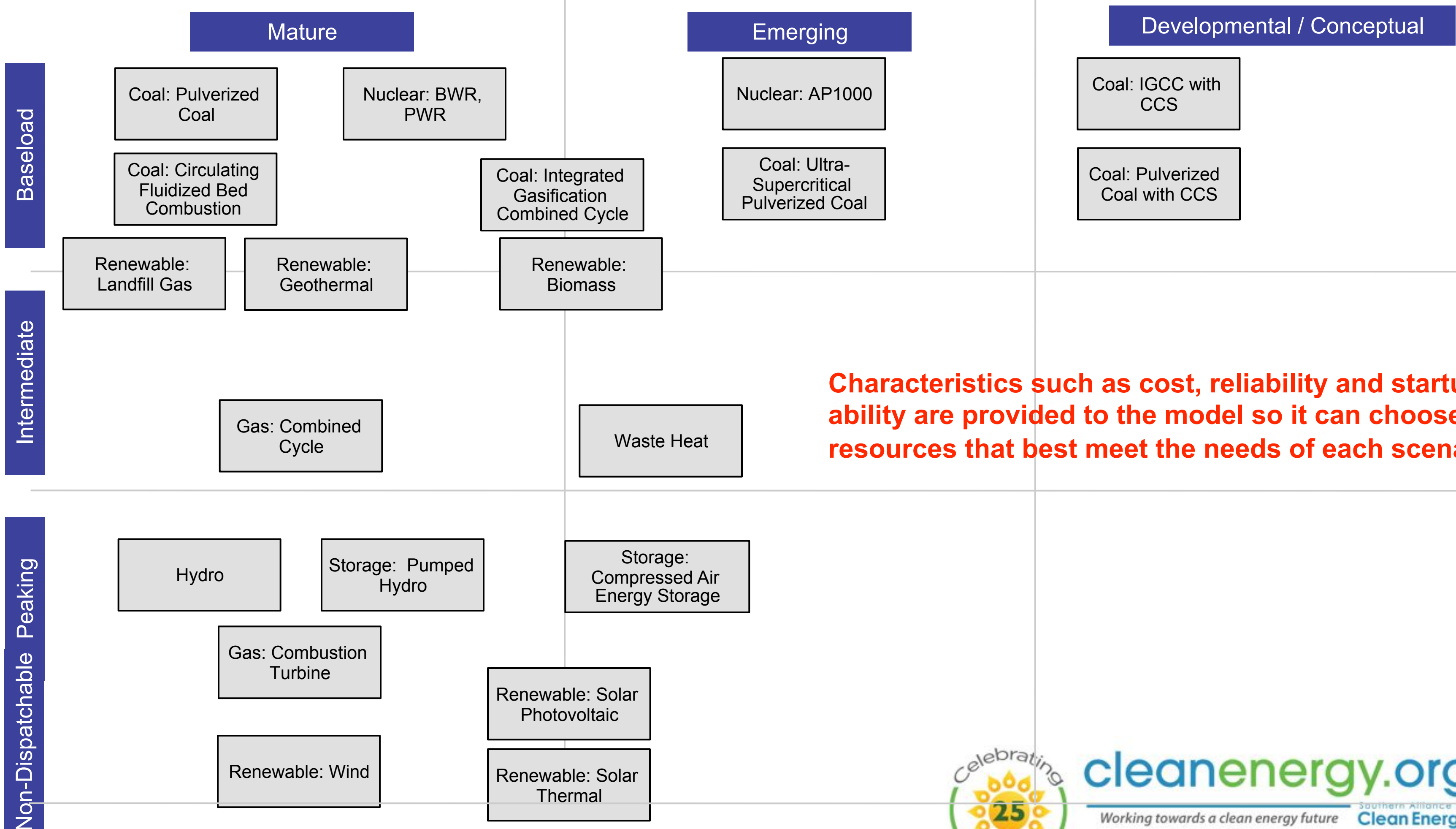


TVA's current generation resources.

Filling this gap with the best mix of resources is the goal of the IRP process.

The model also needs an understanding of the resources it can choose to fill future demand requirements.

There are many technologies to consider – cost, application, and maturity vary widely. Geography and proximity to supply source are also major factors.



Characteristics such as cost, reliability and startup ability are provided to the model so it can choose the resources that best meet the needs of each scenario.

“Inputs” and “constraints” are used to guide the model’s selection of future resource additions.

- **Inputs and constraints into the model’s resource selection process allows the utility to impose certain priorities or limitations on the model’s resource selection process.**
  - Inputs are akin to the utility making a decision for the model
  - Constraints are limits on the models ability to choose certain resources.

- **Different combinations of inputs and constraints are used to create “strategies” for meeting future energy demand.**

Summary of TVA's Strategies

Attributes	A – Limited Change in Current Resource Portfolio	B – Baseline Plan Resource Portfolio	C – Diversity Focused Resource Portfolio	D – Nuclear Focused Resource Portfolio	E – EE/DR and Renewables Focused Resource Portfolio
EE/DR	– 1,940 MW & 4,725 annual GWh reductions by 2020	– 2,100 MW & 5,900 annual GWh reductions by 2020	– 3,600 MW & 11,400 annual GWh reductions by 2020	– 4,000 MW & 8,900 annual GWh reductions by 2020	– 5,900 MW & 14,400 annual GWh reductions by 2020
Renewable Additions	– 1,300 MW & 4,600 GWh competitive renewable resources or PPAs by 2020	– Same as Planning Strategy A	– 2,500 MW & 8,600 GWh competitive renewable resources or PPAs by 2020	– Same as Planning Strategy C	– 3,500 MW & 12,000 GWh competitive renewable resources or PPAs by 2020
Fossil Asset Layup	– No fossil fleet reductions	– 2,000 MW total fleet reductions by 2017	– 3,000 MW total fleet reductions by 2017	– 7,000 MW total fleet reductions 2017	– 5,000 MW total fleet reductions by 2017
Energy Storage	– No new additions	– Same as Planning Strategy A	– Add one pumped storage unit	– Same as Planning Strategy C	– Same as Planning Strategy A
Nuclear	– No new additions after WBN2	– First unit online no earlier than 2018 – Units at least 2 years apart	– Same as Planning Strategy B	– Same as Planning Strategy B	– First unit online no earlier than 2022 – Units at least 2 years apart – Additions limited to 3 units
Coal	– No new additions	– New coal units are outfitted with CCS – First unit online no earlier than 2025	– Same as Planning Strategy B	– Same as Planning Strategy B	– No new additions
Gas-Fired Supply (Self-Build)	– No new additions	– Meet remaining supply needs with gas-fired units	– Same as Planning Strategy B	– Same as Planning Strategy B	– Same as Planning Strategy B
Market Purchases	– No limit on market purchases beyond current contracts and contract extensions	– Purchases beyond current contracts and contract extensions limited to 900 MW	– Same as Planning Strategy B	– Same as Planning Strategy B	– Same as Planning Strategy B
Transmission	– Potentially higher level of transmission investment to support market purchases – Transmission expansion (if needed) may have impact on resource timing and availability	– Complete upgrades to support new supply resources	– Increase transmission investment to support new supply resources and ensure system reliability – Pursue inter-regional projects to transmit renewable energy	– Same as Planning Strategy C	– Potentially higher level of transmission investment to support renewable purchases – Transmission expansion (if needed) may have impact on resource timing and availability

Defined model inputs (yellow)

Constraints in model optimization (white)

Producing resource portfolios: the model's best guess

- **After inputting all of this information, the model is run to develop a resource portfolio for each strategy under every scenario.**

Unit Addition Schedules – Planning Strategy C

Year	Defined Model Inputs			Capacity Additions by Scenario						
	EE/DR[1]	Renew-ables[2]	Fossil Layups[3]	SC1	SC2	SC3	SC4	SC5	SC6	SC7
2010	298	35	-	PPA's & Acq						
2011	389	48	(226)							
2012	770	145	(226)	CC	CC	CC	CC	CC	CC	CC
2013	1,334	286	(935)							
2014	1,596	442	(935)	CT			CT			
2015	2,069	515	(3,252)	CT (2) CC			CT (2) CC	CT		CT (2)
2016	2,537	528	(3,252)	CT			CT			
2017	2,828	715	(3,252)							
2018	3,116	768	(3,252)	BLN1			BLN1			BLN1
2019	3,396	822	(3,252)							
2020	3,627	883	(3,252)	BLN2 PSH	PSH	PSH	BLN2 PSH	PSH	PSH	BLN2 PSH
2021	3,817	896	(3,252)	CT						
2022	3,985	911	(3,252)	CC	BLN1			BLN1		
2023	4,143	922	(3,252)	CC						
2024	4,295	935	(3,252)	BLN3	BLN2			BLN2		
2025	4,412	942	(3,252)	IGCC						CT
2026	4,502	947	(3,252)	BLN4						
2027	4,561	948	(3,252)	CT						CC
2028	4,602	953	(3,252)	CT						
2029	4,638	954	(3,252)	IGCC CT	BLN3			CT		CT

Evaluating the resource portfolios

- **Utilities generally evaluate resource portfolio options based on cost and risk.**

- **However, due to TVA's statutory directives, TVA also evaluates its resource portfolio options based on environmental performance, economic development and technological innovation.**

TVA's IRP Scorecard

TVA's IRP scorecard gives representative scores for each model-produced resource portfolio to compare them to one another.

-- scores are then applied to a ratings system: color-coded for ranking metrics and the Harvey-Ball system for strategic metrics.

Planning Strategy C – Diversity Focused Resource Portfolio

	Ranking Metrics				
	Energy Supply				
Scenarios	PVRR	Short-Term Rate Impact	Risk/Benefit	Risk	Total Plan Score
1	100.00	97.48	100.00	100.00	99.43
2	99.58	100.00	96.20	96.17	98.40
3	100.00	97.13	100.00	100.00	99.35
4	100.00	97.94	100.00	100.00	99.53
5	100.00	100.00	100.00	100.00	100.00
6	98.59	96.09	98.19	99.22	98.35
Baseline	100.00	98.71	100.00	100.00	[illegible]
			Total Ranking Metric Sc		693.25

Strategic Metrics				
Environmental Stewardship			Economic Development	
CO_2 Footprint	Water	Waste	Total Employment	Growth in Personal Income

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Based on the total ranking metric score, TVA has narrowed down its options to three "preferred" strategies.

- **Planning Strategy C: Diversity Focused Strategy**
  - Ranking metric score: 693.25

- **Planning Strategy E: EE/DR and Renewables Focused Strategy**
  - Ranking metric score: 690.47

- **Planning Strategy B: Baseline Plan**
  - Ranking metric score: 675.78

➢ **Planning Strategy C and E score significantly higher than the other strategies, indicating these strategies perform better across a wide range of possible future conditions.**

➢ **Planning Strategy C and E scores are very similar, meaning other evaluation metrics may play an important in role in deciding between the two.**

*Two other planning strategies, Strategy A: Limited Change in Current Portfolio and Strategy D: Nuclear Focused Strategy (ranking metric scores of 657.15 and 668.26 respectively) have been removed by TVA from further consideration.

So how do Strategy C and E score in terms of TVA’s strategic metrics?

Strategy C:

Strategic Metrics				
Environmental Stewardship			Economic Development	
CO_2 Footprint	Water	Waste	Total Employment	Growth in Personal Income
◑	◔	◔	◕	◕
◑	◑	◑		
◑	◑	◑		
◕	◑	◔		
◑	◑	◑		
◑	◑	◑	●	●
◑	◑	◔		

Strategy E:

Strategic Metrics				
Environmental Stewardship			Economic Development	
CO_2 Footprint	Water	Waste	Total Employment	Growth in Personal Income
◕	●	◕	◑	◑
◕	●	◕		
◕	◕	◕		
◑	●	◕		
◕	◕	◕		
●	◕	◕	●	●
◕	◕	◕		

Next Steps: testing the "what if" with sensitivity runs.

- **Sensitivity runs will test the preferred strategies under additional conditions by tweaking the inputs and constraints for additional model runs.**

- **Planned sensitivity runs to date include:**
  - Higher levels of energy efficiency and renewable energy
  - Gas only expansion under Strategy C
  - Deferral of nuclear expansion from 2018 to 2020
  - Alternative levels of fossil layups

Shortcomings in TVA's IRP: Energy Efficiency

Attributes	A – Limited Change in Current Resource Portfolio	B – Baseline Plan Resource Portfolio	C – Diversity Focused Resource Portfolio	D – Nuclear Focused Resource Portfolio	E – EE/DR and Renewables Focused Resource Portfolio
EE/DR	– 1,940 MW & 4,725 annual GWh reductions by 2020	– 2,100 MW & 5,900 annual GWh reductions by 2020	– 3,600 MW & 11,400 annual GWh reductions by 2020	– 4,000 MW & 8,900 annual GWh reductions by 2020	– 5,900 MW & 14,400 annual GWh reductions by 2020

- **Issue: The range of energy efficiency represented by TVA's preferred strategies, 8,900 to 14,400 annual GWh of demand reductions by 2020, is an improvement over TVA's current efforts, but still represents significantly less than what is cost-effectively achievable in the Valley.**
  - TVA's proposed 14,400 GWh by 2020 represents about 8% of baseline projected demand in 2020, or about 0.8% annual reduction.
  - In comparison utilities across the nation are currently achieving 1% annual reductions in energy demand and maintain goals of achieving 15% or more of projected demand by 2020.

Shortcomings in TVA's IRP: Energy Efficiency (continued)

Attributes	A – Limited Change in Current Resource Portfolio	B – Baseline Plan Resource Portfolio	C – Diversity Focused Resource Portfolio	D – Nuclear Focused Resource Portfolio	E – EE/DR and Renewables Focused Resource Portfolio
EE/DR	– 1,940 MW & 4,725 annual GWh reductions by 2020	– 2,100 MW & 5,900 annual GWh reductions by 2020	– 3,600 MW & 11,400 annual GWh reductions by 2020	– 4,000 MW & 8,900 annual GWh reductions by 2020	– 5,900 MW & 14,400 annual GWh reductions by 2020

- **Why the Shortcoming?**
  - TVA has not conducted the research necessary to understand what could be accomplished with an aggressive approach to developing the energy efficiency resource.
  - TVA's treatment of energy efficiency as a model input artificially constrains the model from choosing the most cost-effective level of energy efficiency

Shortcoming in TVA's IRP: Renewables Additions

Attributes	A – Limited Change in Current Resource Portfolio	B – Baseline Plan Resource Portfolio	C – Diversity Focused Resource Portfolio	D – Nuclear Focused Resource Portfolio	E – EE/DR and Renewables Focused Resource Portfolio
EE/DR	– 1,940 MW & 4,725 annual GWh reductions by 2020	– 2,100 MW & 5,900 annual GWh reductions by 2020	– 3,600 MW & 11,400 annual GWh reductions by 2020	– 4,000 MW & 8,900 annual GWh reductions by 2020	– 5,900 MW & 14,400 annual GWh reductions by 2020
Renewable Additions	– 1,300 MW & 4,600 GWh competitive renewable resources or PPAs by 2020	– Same as Planning Strategy A	– 2,500 MW & 8,600 GWh competitive renewable resources or PPAs by 2020	– Same as Planning Strategy C	– 3,500 MW & 12,000 GWh competitive renewable resources or PPAs by 2020

- **Issue: TVA's proposed renewable additions, 8,600 to 12,000 annual GWh by 2020, does not represent a serious commitment to developing the Valley's renewable energy resources into a meaningful part of TVA's portfolio.**
  - Even TVA's largest proposed portfolio, 12,000 annual GWh, represents only 7.6% of baseline projected demand in 2020. This is far short of what TVA could accomplish.
  - The largest portions of TVA's proposed renewable portfolios consists of out-of-Valley wind resources. While TVA deserves credit for investing in this resource, these purchases should be accompanied by greater levels of in-Valley renewable resources.

Shortcomings in TVA's IRP: Renewables Additions (continued)

Attributes	A – Limited Change in Current Resource Portfolio	B – Baseline Plan Resource Portfolio	C – Diversity Focused Resource Portfolio	D – Nuclear Focused Resource Portfolio	E – EE/DR and Renewables Focused Resource Portfolio
EE/DR	– 1,940 MW & 4,725 annual GWh reductions by 2020	– 2,100 MW & 5,900 annual GWh reductions by 2020	– 3,600 MW & 11,400 annual GWh reductions by 2020	– 4,000 MW & 8,900 annual GWh reductions by 2020	– 5,900 MW & 14,400 annual GWh reductions by 2020
Renewable Additions	– 1,300 MW & 4,600 GWh competitive renewable resources or PPAs by 2020	– Same as Planning Strategy A	– 2,500 MW & 8,600 GWh competitive renewable resources or PPAs by 2020	– Same as Planning Strategy C	– 3,500 MW & 12,000 GWh competitive renewable resources or PPAs by 2020

- **Why the shortcoming?**
  - TVA cost estimates for in-Valley renewable energy are too high.
  - TVA's model does not take into account cost trends/technological advancement of renewable energy resources.
  - TVA does not fully value the host of benefits that accompany renewable energy, including:
    - Increased grid stability
    - Higher levels of job creation
    - Reduced greenhouse gas emissions
    - Reduced emissions of hazardous air pollutants
    - Greater levels of in-Valley investment

Shortcomings in TVA's IRP: Fossil Asset "Layups"

Attributes	A – Limited Change in Current Resource Portfolio	B – Baseline Plan Resource Portfolio	C – Diversity Focused Resource Portfolio	D – Nuclear Focused Resource Portfolio	E – EE/DR and Renewables Focused Resource Portfolio
EE/DR	– 1,940 MW & 4,725 annual GWh reductions by 2020	– 2,100 MW & 5,900 annual GWh reductions by 2020	– 3,600 MW & 11,400 annual GWh reductions by 2020	– 4,000 MW & 8,900 annual GWh reductions by 2020	– 5,900 MW & 14,400 annual GWh reductions by 2020
Renewable Additions	– 1,300 MW & 4,600 GWh competitive renewable resources or PPAs by 2020	– Same as Planning Strategy A	– 2,500 MW & 8,600 GWh competitive renewable resources or PPAs by 2020	– Same as Planning Strategy C	– 3,500 MW & 12,000 GWh competitive renewable resources or PPAs by 2020
Fossil Asset Layup	– No fossil fleet reductions	– 2,000 MW total fleet reductions by 2017	– 3,000 MW total fleet reductions by 2017	– 7,000 MW total fleet reductions 2017	– 5,000 MW total fleet reductions by 2017

- **Issue: While the proposed level of "layup," between 3,000 and 5,000 MW would put TVA among that national leaders, its of the term "layup" leaves open the option for re-instatement at a future date.**

  - TVA's draft IRP states: "The goal of a long-term layup is the preservation of the asset so that it could be re-integrated into TVA's generating portfolio in the future if power system conditions were to warrant it."

Shortcomings in TVA's IRP: Fossil Asset "Layups" (continued)

Attributes	A – Limited Change in Current Resource Portfolio	B – Baseline Plan Resource Portfolio	C – Diversity Focused Resource Portfolio	D – Nuclear Focused Resource Portfolio	E – EE/DR and Renewables Focused Resource Portfolio
EE/DR	– 1,940 MW & 4,725 annual GWh reductions by 2020	– 2,100 MW & 5,900 annual GWh reductions by 2020	– 3,600 MW & 11,400 annual GWh reductions by 2020	– 4,000 MW & 8,900 annual GWh reductions by 2020	– 5,900 MW & 14,400 annual GWh reductions by 2020
Renewable Additions	– 1,300 MW & 4,600 GWh competitive renewable resources or PPAs by 2020	– Same as Planning Strategy A	– 2,500 MW & 8,600 GWh competitive renewable resources or PPAs by 2020	– Same as Planning Strategy C	– 3,500 MW & 12,000 GWh competitive renewable resources or PPAs by 2020
Fossil Asset Layup	– No fossil fleet reductions	– 2,000 MW total fleet reductions by 2017	– 3,000 MW total fleet reductions by 2017	– 7,000 MW total fleet reductions 2017	– 5,000 MW total fleet reductions by 2017

- **Why the shortcoming?**
  - TVA's longstanding reliance on coal-fired generation has created institutional biases in favor of fossil-fueled fired generation.
  - As mentioned, TVA does not give full value to the benefits of alternative resources such as efficiency and renewables.
  - TVA must maintain some security against the risk of a failed nuclear renaissance.

Summary:

It’s not perfect. . .

- **While the overall process was a positive step forward, TVA’s treatment of efficiency, renewables and coal-plant retirement needs improvement.**

but it’s not over!

- **During the comment period, a strong public voice in favor of higher levels of efficiency and in-Valley renewables can make a difference.**

TVA needs to hear from you that efficiency and in-Valley renewables must play a larger role in meeting the Valley's future energy demand.

- The draft IRP and supplemental information can be accessed at: www.tva.gov/irp
- Comments can be submitted by mail or online through November 8th. Details on how are also available at: www.tva.gov/irp
- For more information or additional questions, visit our website or contact us at www.cleanenergy.org

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