MLGW RFP Evaluation & Savings Validation

MLGW BOARD OF COMMISSIONERS

& MEMPHIS CITY COUNCIL

JUNE 9, 2022

PRESENTATION AGENDA



- Where Have We Been?
- Updates Since IRP
- RFP Recap
- RFP Proposal Evaluation
- Validation of Savings (RFP vs IRP)
- Sensitivity Analysis
- Non-Financial Risks
- MLGW CEO's Comments
- Questions / Discussion

INDUSTRY TERMS AND ACRONYMS

- BESS Battery Energy Storage System
- Capacity generation necessary to meet peak demand
- CCGT Combined Cycle Gas Turbine
- CT Combustion Turbine (Gas)
- IRP Integrated Resource Plan
- LTPA TVA Long-Term Partnership Agreement (aka, LTP)
- MISO Midcontinent Independent System Operator
- RFP Request For Proposals



Where Have We Been?

WHERE HAVE WE BEEN?

2018-19

2019-20

2021

2022

Receive Unsolicited Proposal(s) Conduct IRP, Identify Alternatives

Issue RFP, Receive Bids Evaluate, Determine Feasibility

WHY ALL THE EFFORT?

- Concerns about MLGW's power cost under existing TVA agreement. Unlike other TVA wholesale customers, MLGW can interconnect to MISO and find new suppliers.
- Key decision is whether MLGW should stay with TVA or leave TVA and start anew.

EXISTING TVA AGREEMENT VS LTPA

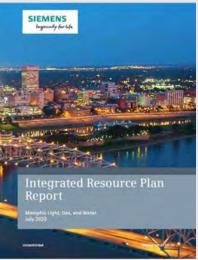
- Determining to leave TVA is not an easy decision. One alternative is to consider TVA's LTPA option which provides immediate cost reductions and benefits.
- However, the LTPA does have decreased flexibility and future obligations.

Key Contract Items	TVA	LTPA
1. Termination Notice	5 Years	20 Years
2. Base Rate Charge	-	3.1% Decrease
3. Base Rate Protection	n/a	10 years (2020-2029)
4. Acquire Renewables	n/a	Up to 5% of MLGW energy needs
5. Stranded Cost Obligation	n/a	May be responsible for % of TVA's future obligations*

^{*} Further analysis pending

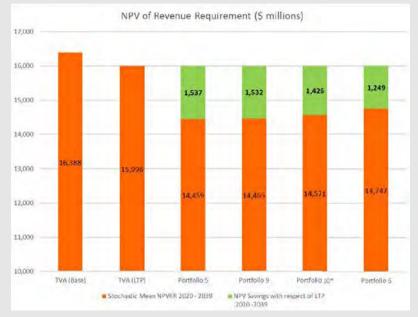
IRP CONCLUSIONS AND NEXT STEPS

- IRP evaluated eleven resource portfolios using multiple criteria, including cost, sustainability, and reliability, to identify the optimal resource portfolios as compared to TVA.
- IRP determined that three of them, 6, 9, and 10, were optimal; however, 10 included a 950MW CCGT that posed reliability and siting issues on MLGW's system.
- Next step was to issue RFPs to procure 'real-world' cost information for the resource portfolios and transmission facilities.

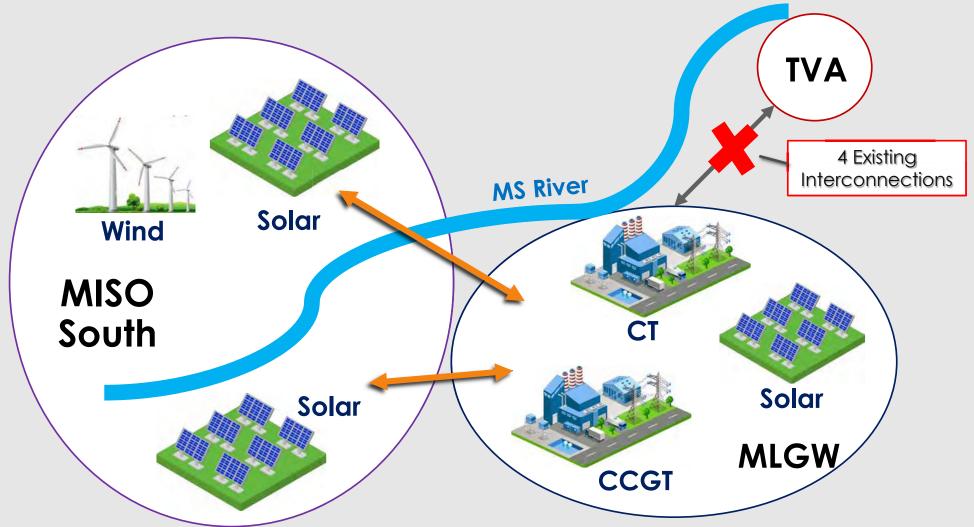


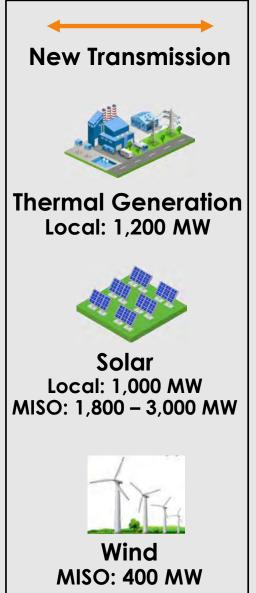
Portfolio ID	Final Portfolio	Total Thermal 2039	Local Renew 2039	Battery 2039	Total Local Nameplate 2039	MISO		950 MW CC	450 MW CC	237 MW CT
S3S1_P	Partfalio 1	1137	1000	0	2137	2200	1761	0	2	1
\$3\$1_F	Partfolio 2	1587	1000	0	2587	1550	1487	0	3	1
S3S2_BB	Portfolio 3	1824	1000	0	2824	1350	1308	0	3	2
\$3\$3_BB	Portfolio 4	1350	1000	0	2350	1550	1697	0	3	0
\$355	Portfolio 5	1398	1000	100	2498	3450	1183	0	1	4
S3S7_BB	Portfolio 6	1137	1000	0	2137	2200	1761	0	2	1
5351_2CT	Portfolio 7	1374	1000	0	2374	2200	1550	0	2	2
5357_2CT	Portfolio 8	1374	1000	0	2374	2200	1550	0	2	2
\$355_YD	Portfolio 9	1398	1000	100	2498	3450	1186	0	1	4
\$3510	Portfolio 10	950	1000	0	1950	2250	1901	1	0	0
5451	Portfolio All MISO	950	0	0	0	3200	1909	1	0	0





IRP RESOURCE PORTFOLIOS



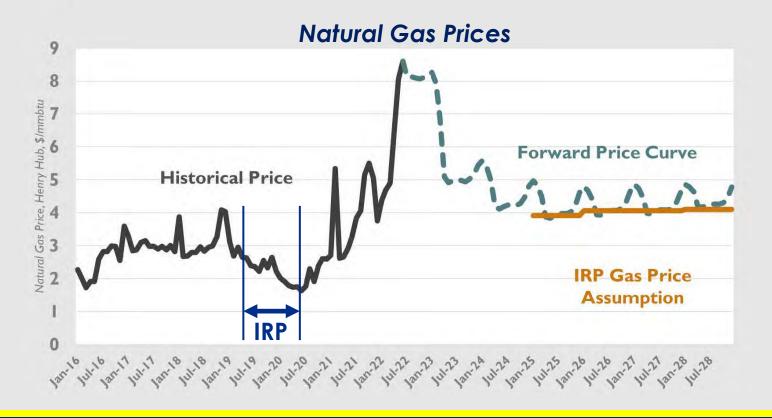


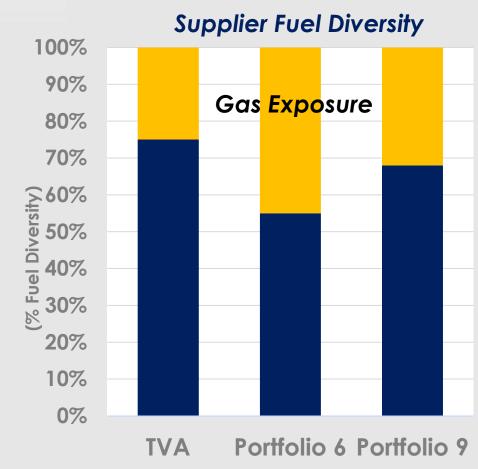


A lot has changed since the IRP ...

WHAT HAS CHANGED? PRICE OF NATURAL GAS

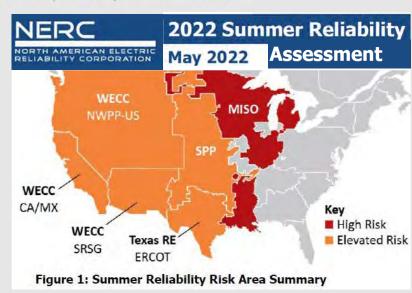
- Recently, extreme volatility in natural gas prices
- IRP assumptions based on low price environment
- Exposure to natural gas can increase cost





WHAT HAS CHANGED? MISO CAPACITY PRICES

- MISO Capacity Auction yielded highest price ever & NERC's 2022 Summer Assessment deemed MISO a high reliability risk
- What is driving this?
 - Thermal plant retirements replaced by renewables
 - Increasing load growth
- IRP assumptions based on surplus available capacity for purchase

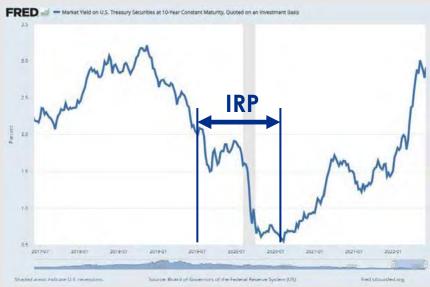




WHAT HAS CHANGED? INFLATION & INTEREST RATES

- Inflation and interest rates impact cost of everything
- Inflation is at highest levels since 1980's
 - Currently inflation is over 8%
 - IRP assumes inflation rate of 2.1%
- Although at historic lows, interest rates increasing since mid-2020
 - 10-Year US T-Note is around 3% (up 1.5% in 6 months). Likewise, credit grade corporate bond interest rate index is over 4%.
 - IRP assumes bond financing rate of 3.5%

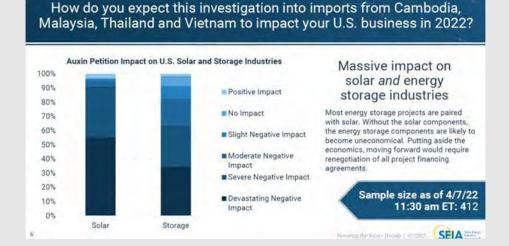


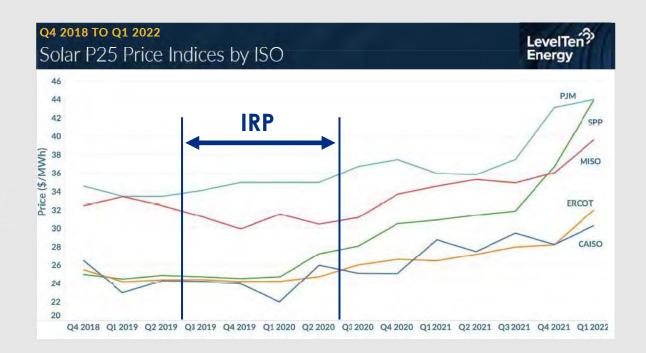


WHAT HAS CHANGED? DEVELOPMENT OF SOLAR POWER

March 2022

- Solar developers are facing more headwinds:
 - Supply chain issues
 - Increasing commodity, labor, and component prices
 - US Dept of Commerce investigation
 & President's Executive Order
- Solar prices up 15.8% (one year)





US Solar Market Insight

Despite the large project pipeline, volatile commodity prices and supply chain uncertainty continue to put projects at risk. About one-third of the capacity slated to come online during Q4 2021 was delayed by at least a quarter. For the 2022 pipeline, developers have postponed at least 8% of planned capacity to 2023 or later and canceled at least 5%. As supply chains continue to face backlogs and delays, Wood Mackenzie remains conservative about equipment supply availability, maintaining the 2022 buildout at about

WHY IS THIS IMPORTANT?

- IRP used assumptions that were relevant at the time AND the 'Validation of Savings' analysis uses several key IRP assumptions (will discuss later in the presentation)
- Since IRP was conducted in 2020, it's necessary to evaluate Portfolios 6 & 9 (and TVA) under updated assumptions
- Sensitivity analysis is used to evaluate outcomes using different assumptions (will discuss later in the presentation)





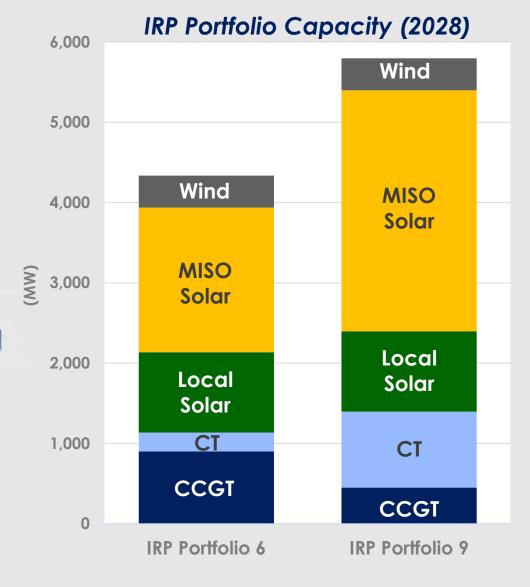
Recap of RFP Process

MLGW RFP RECAP

MLGW developed 3 separate RFPs

- Transmission Facilities: facilities necessary to interconnect to MISO per the IRP / MISO's reliability assessment*
- Thermal Generation: acquire approximately ~ 1,200 MW of gas-fired resources in Shelby County per IRP's Portfolios 6 and 9*
- 3. Renewable & Other Power Supply Alternatives: procure solar and wind per IRP's Portfolios 6 and 9*, as well as potential other alternative resources not identified in IRP

All three RFPs follow IRP 'road map' and adhere to the "4 Points" approved by MLGW Board in March 2021



MLGW RFP RECAP

RFPs Issued:

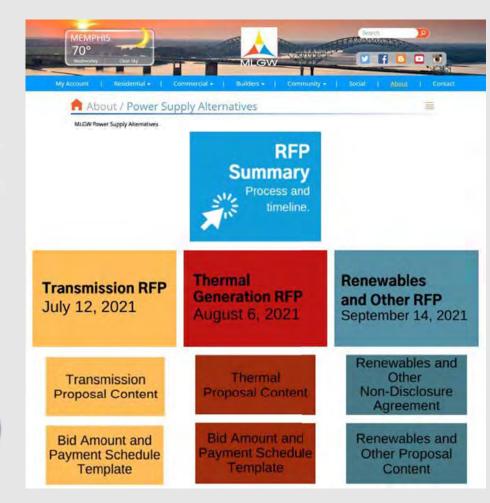
- 1. Transmission Interconnection: July 12, 2021
- 2. Thermal Generation: August 6, 2021
- 3. Renewable & Other Alternatives: September 14, 2021

Proposals Received:

- 1. Transmission Interconnection: February 4, 2022
- 2. Thermal Generation: December 9, 2021
- 3. Renewable & Other Alternatives: December 6, 2021

Number of RFP Generation Projects:

- 1. Thermal Generation: 5 CCGT / CT projects (5,500+MW)
- 2. Renewable Resources: 17 Local solar projects (2,150 MW) and 21 MISO solar projects (4,900 MW)
- 3. Other Alternatives: 3 partial / full-requirements





RFP Proposal Evaluation

RFP EVALUATION CRITERIA

- Each RFP had specific criteria and metrics for evaluating the qualitative and quantitative information from each supplier
- Proposals were evaluated and scored based on RFP criteria and metrics, and then ranked based on scoring
- MLGW determined appropriate "bonus points" for Supplier Diversity

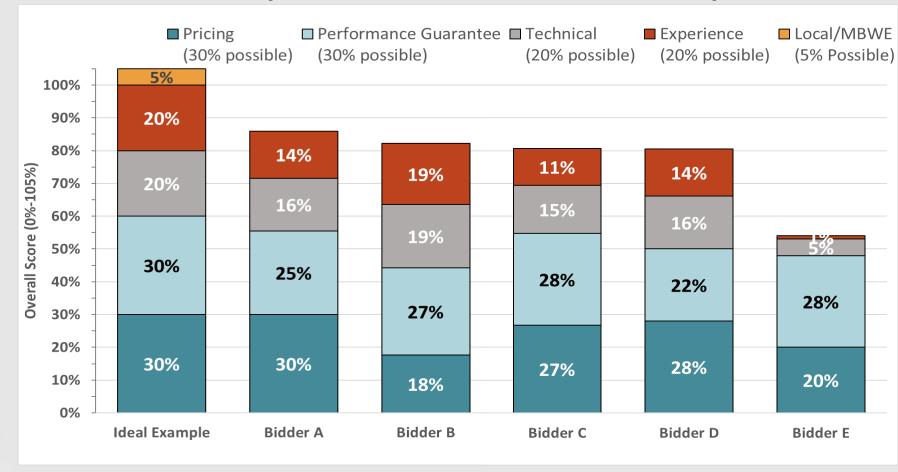
	Criteria		ieneration PPA Evaluation Metrics/Criter Sub-criteria	Example		Crite	ria	Sub-criteria	Example Score
				Score	-	, e		PPA Rate Cost / Charge (\$/MWh)	30
Specificity)	ing a		Fixed Cost / Charge (e.g. \$/kW-mo rate)	30		Pricing	30%	Land Lease Estimated Cost / Charge	
	Pric ft.	60	Non-Fuel Variable Cost / Charge (e.g. \$/MWh rate)		Evaluation Principles Applied (Certainty, Risk Mitigation, Cost & Specificity)	Pricing Structure	3(Pricing Structure	
	PPA Pricin	m	Start-Up Cost / Charge (e.g. \$/Start)					Payment Terms	
be	<u>a</u>		Payment Terms					Commercial Operating Date	30
8 5			Heat Rate	30		<u></u>		Environmental Attributes	
Cost	an see		Availability			Commercial	30%	Delay Damages ("if applicable")	
8	Performance Guarantees	1%	Emissions			umo	30	Availability & Guaranteed Energy Production	
gation,	for are	m	Ramp Rate / Start-Up Time			٥		MISO Queue Position ("if aplicable")	
i i	E G		Capacity / Capability					Financial / Creditworthiness	
i ii			Minimum Run-Time / Down-Time		tion K N			Technical Design	20
S			Technical	20	Evalua:	ity	\o	Modules and Racking System Quality	
*	£ .	18	Water & Wastewater Supply			Viability	20%	Inverter and Balance of Plant Quality	
Certainty, Risk Miti	dei	2	Environmental			5	1	Land Use and Footprint (Local Solar)	
\$	>	m	Financial / Creditworthiness		يّ			Operating Constraints (i.e. permits)	
ai			Design	20				Engineering and Construction	20
F	83		Construction Management			nce		Procurement	
2	i i	20%	O&M			Experience	20%	O&M	
	Expe		A 10 A 10			Exp	7	Safety Record	
	a		Safety					Asset Management	
	617		Asset Management		S	ub-Tota	Sco	ore Before Supplier Diversity Bonus Points	100
	Sub-I	otal	Score Before Supplier Diversity Bonus Points	100	S S				
Points	Supplier	Anie Canada	Local firm and MBWE participation*	5	Bonus Points	Supplier	Diversity	Local firm and MBWE participation*	5
To	otal Max	imur	n Score After Supplier Diversity Bonus Points	105		Tot	al S	core After Supplier Diversity Bonus Points	105

(as published in the Thermal and Renewable RFPs)

RFP EVALUATION - THERMAL GENERATION

- Thermal generation interconnects to MLGW system (developer responsible for interconnection cost)
- Non-pricing terms and conditions make-up 70% of total score
- RFP validation analysis utilizes proposal information from top 3 bidders.

(Thermal Generation Evaluation Score Card)

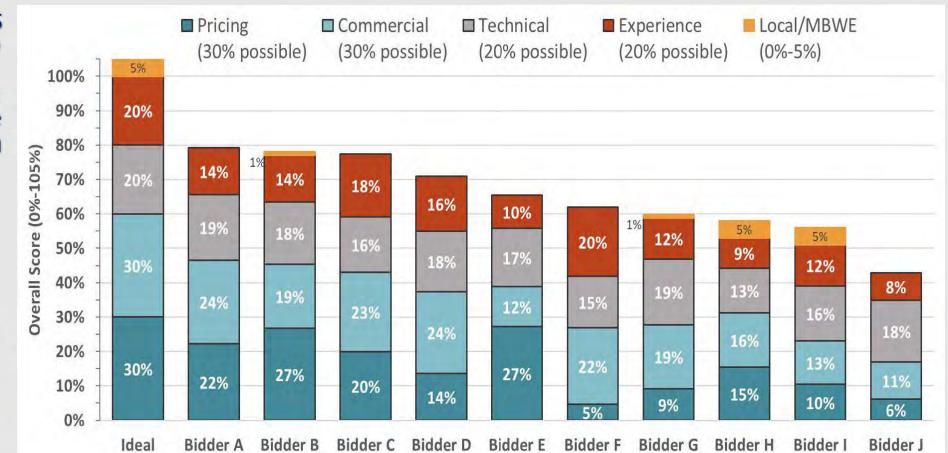


(RFP Bidders)

RFP EVALUATION - LOCAL SOLAR

Example

- Local solar projects will interconnect to MLGW's transmission system (bidder responsible for interconnection cost)
- Non-pricing terms and conditions make-up 70% of total score
- IRP Portfolios 6 and 9 require 1,000 MW of local solar. RFP validation analysis utilizes proposal information from top 5 bidders.



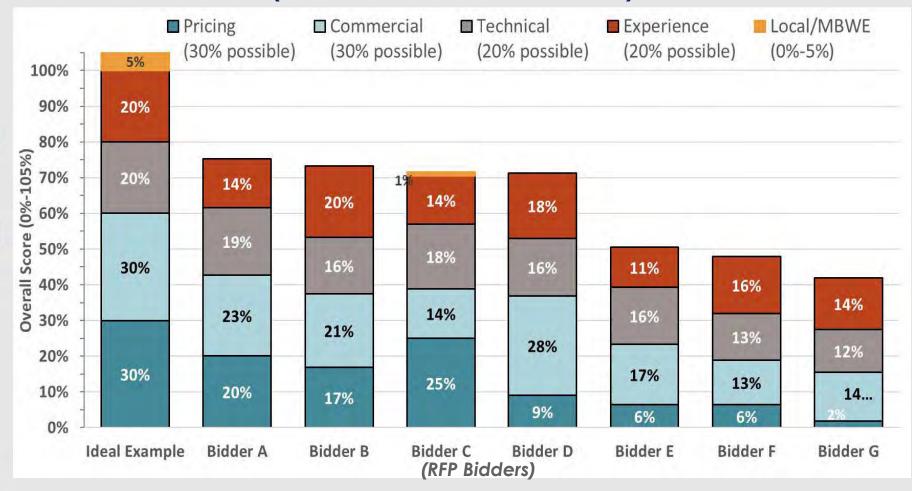
(RFP Bidders)

(Local Solar Evaluation Score Card)

RFP EVALUATION - MISO SOLAR

- MISO solar projects will interconnect to MISO's transmission system (bidder responsible for interconnection cost)
- Non-pricing terms and conditions make-up 70% of total score
- IRP Portfolios require 1,800 MW (#6) and 3,000 MW (#9) of MISO solar. RFP validation analysis utilizes proposal information from top 4 bidders.

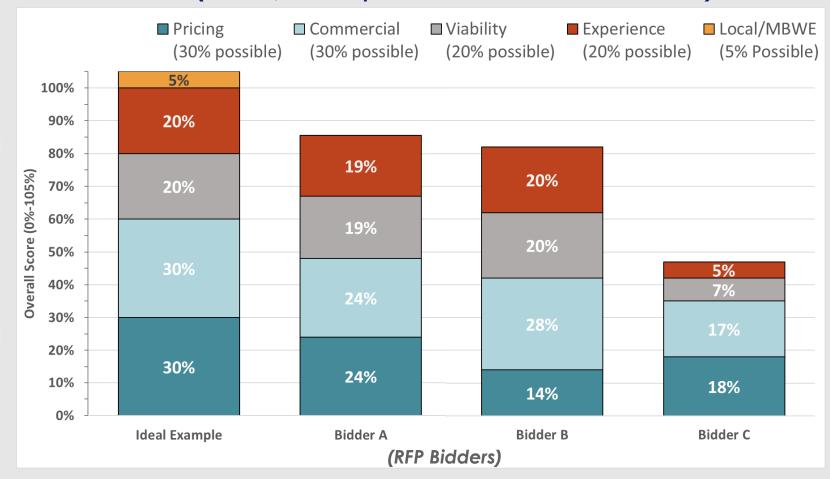
(MISO Solar Evaluation Score Card)



RFP EVALUATION - PARTIAL / FULL REQUIREMENTS

- MLGW received alternative proposals from three suppliers for partial / full-requirements service
- Non-pricing terms and conditions make-up 70% of total score
- For comparison purposes, RFP Portfolios 6 and 9 are evaluated against viable fullrequirements proposal (will discuss later in the presentation)

(Partial / Full Requirements Evaluation Score Card)

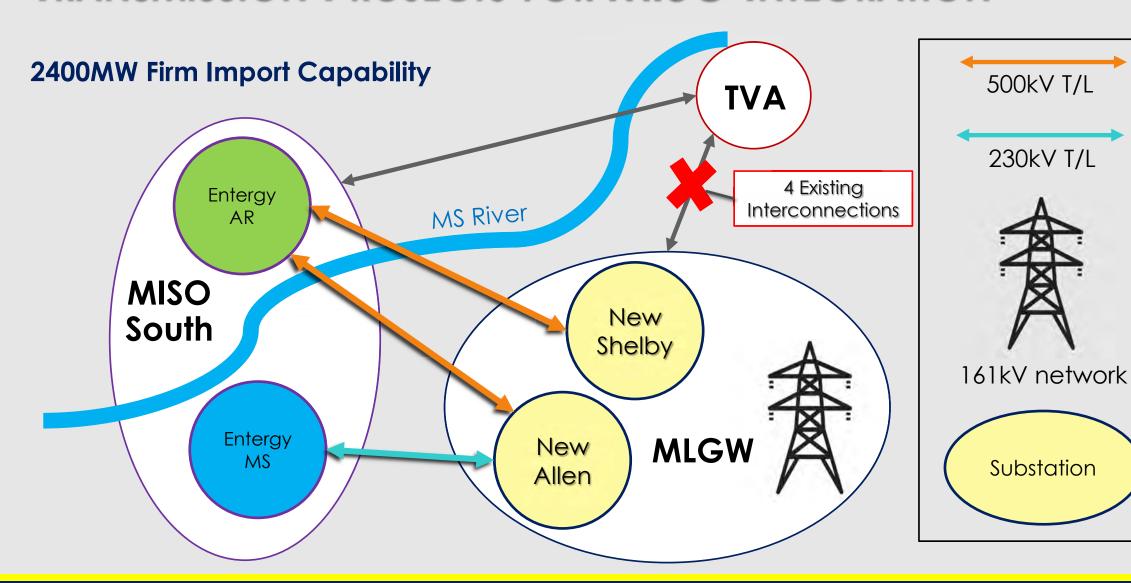




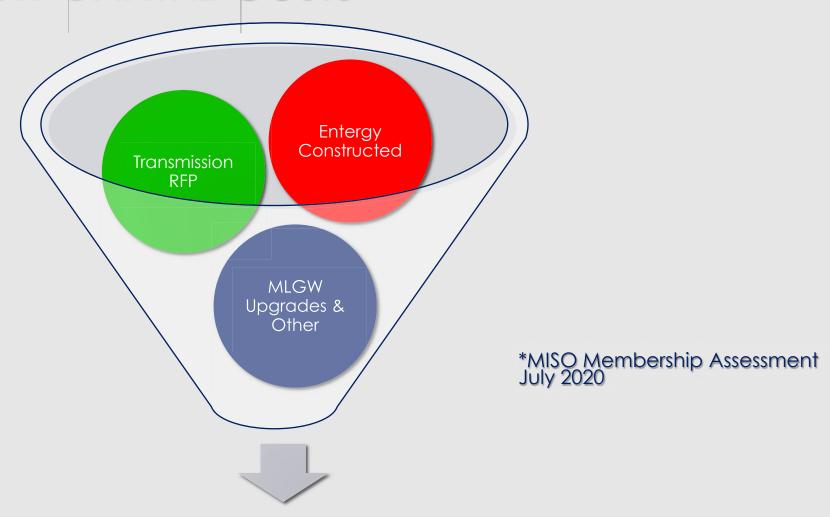
MLGW MISO Integration

Transmission Bid Review & Cost Summary

TRANSMISSION PROJECTS FOR MISO INTEGRATION



TRANSMISSION CAPITAL COSTS

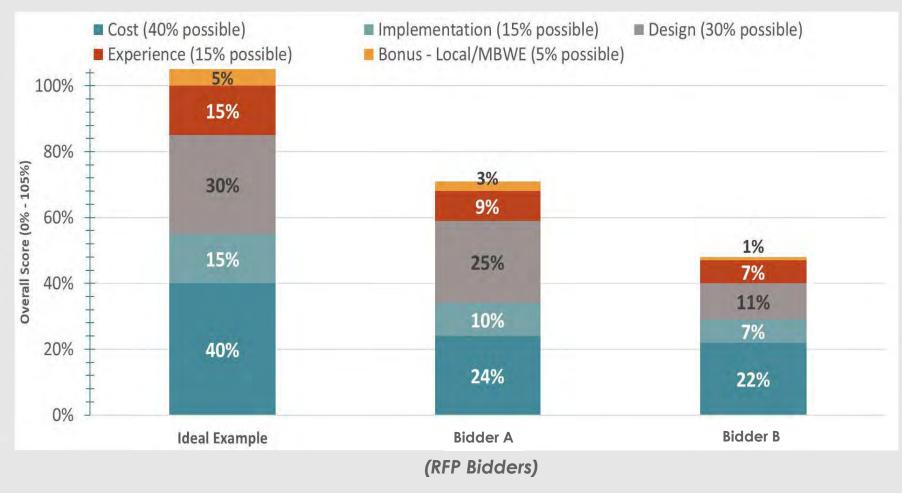


Total Transmission Integration Costs ~\$736M*

RFP EVALUATION - MISO TRANSMISSION FACILITIES

- MLGW received proposals to build transmission facilities to interconnect to MISO's transmission system
- Non-pricing terms and conditions make-up 60% of total evaluation score
- RFP validation analysis utilizes proposal information from one bidder

(Transmission Evaluation Score Card)



INITIAL COST AND COMPONENT SCORING BIDDER A

Initial Scoring: 24 out of possible 40 points

- Highest bid price
- "Firmest" of the 2 conforming bids but still escalatable
- Cost detail is not as granular as requested

INITIAL COST AND COMPONENT SCORING BIDDER B

Initial Scoring: 22 out of possible 40 points

- Lowest bid price
- Progressive design-build proposed (not fixed)
- Requires award for all 5 projects
- Bid was built using actual vendor pricing

ENTERGY CONSTRUCTED TRANSMISSION INTERTIES

Facility	Estimate 2021 \$
San Souci Substation	\$5,284,950
San Souci – New Shelby 500kV T/L	\$89,356,353
West Memphis Substation	\$5,378,320
West Memphis – New Allen 500kV T/L	\$10,520,159
Arkansas Tax Gross-Up	\$15,309,761
Twinkletown Substation	\$9,107,965
Twinkletown – New Allen 230kV T/L	\$35,773,448
Mississippi Tax Gross-Up	\$5,728,022
TOTAL*	\$176,458,976

^{*} Entergy agreed to allow MLGW to provide funding

MLGW UPGRADES & OTHER CAPITAL COSTS

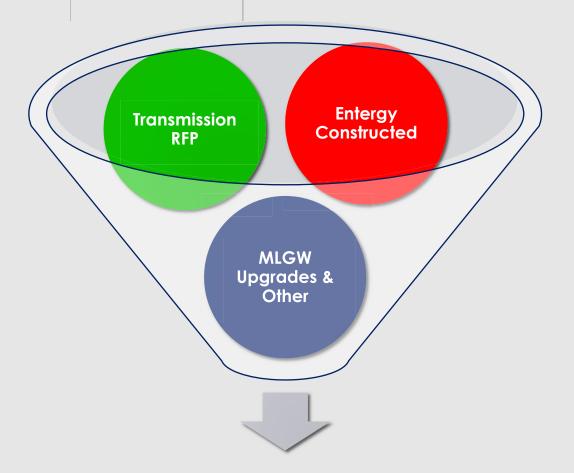
Facility	Estimate
Upgrades for New Generation Impacts & Reinforcements to Existing 161kV Network (2022 \$)	\$511,798,390
Reimbursement to TVA for Allen Switchyard Changes (2020 \$)	\$54,700,000
System Operations & Market Interface Costs*	\$4,600,000
TOTAL	\$571,098,390

^{*}NOTE: Costs (in 2018\$) are derived from Siemens Integrated Resource Plan Report dated July 2020

MLGW 161kV NETWORK UPGRADES

- Siemens IRP estimated \$184MM (Siemens states "...final determination on the list of facilities to be reinforced and associated cost estimates is subject to full detailed engineering review prior to implementation.")
- MLGW detailed engineering review yields \$511MM (\$327MM increase)
 - 40 miles new 161 kV transmission lines, 5 new161kV switching stations
 - The impact of major construction-related outages to the MLGW electric system and potential regulatory requirements were considered
 - The higher estimate reflects a detailed analysis that does not sacrifice system reliability and service to MLGW customers during the time of construction.

TRANSMISSION CAPITAL COSTS



Total Transmission Integration Costs ~ \$1,200MM (increase of ~ \$465MM)

WHAT HAPPENS NEXT?

 Take "best of the best" and use that to "validate savings" of the IRP process

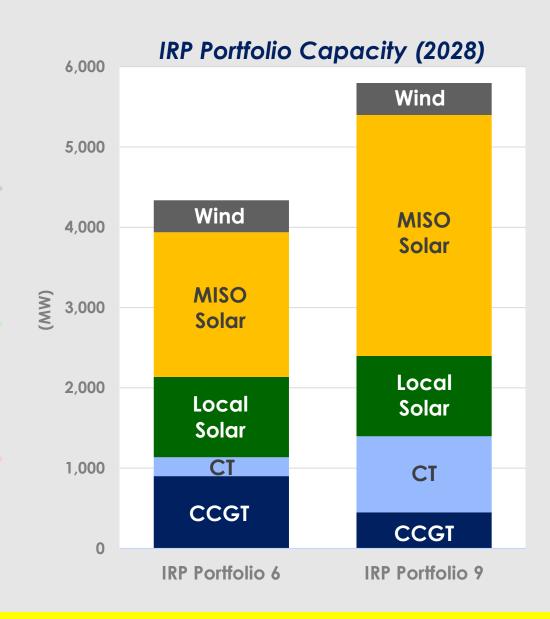
No Wind Proposals

 Replace with BESS / Solar

Renewable RFP Top 9 Solar Proposals

Thermal RFP

 Top 3 CCGT / CT Proposals





Validation of Savings (RFP versus IRP)

WHAT IS THE VALIDATION SAVINGS ANALYSIS?

- Purpose of RFP was to "validate" potential savings identified in IRP
- RFP acquired 'real-world' information for (1) new transmission facilities, (2) thermal generation, and (3) Local / MISO solar resources
- Validation analysis replaces IRP assumptions for those three items BUT, analysis does rely on several IRP assumptions (which represent 40% of MLGW's total power cost)
- Since the world has changed, one way to evaluate IRP assumptions is to conduct sensitivity analysis [will discuss later in the presentation]

Power Cost Items	IRP	RFP
1. Gas Price Forecast		
2. Capacity Price Forecast		
3. Interest & Inflation Rates		
4. PILOT / Other Cost		
5. New Transmission Facilities		
6. New Thermal Generation		
7. New Local & MISO Solar		

SETTING THE STAGE

 IRP savings based on projections of TVA's LTPA cost and estimated cost of Portfolios 6 & 9 from 2025 – 2039 (15 years)

- Validation of savings involves updating
 TVA cost and comparing to updated
 Portfolios 6 & 9 over 2028 2047 (20 years)
 - As well as comparing potential savings based on full-requirements from an alternative supplier (based on proposals received in the RFP)
- Finally, account for potential 2023-2027
 "benefits" of staying with TVA under the LTPA (and pursuing the 5% carve-out)

Update TVA LTPA



Update IRP / RFP Portfolios



Compare Full-Requirements



Compare TVA & RFP Results



Determine 2023 – 2027 Benefits



Conduct Sensitivity Analysis

COST ANALYSIS: REAL VS NOMINAL

- IRP used Real 2018\$ as basis for projecting future cost, meaning IRP <u>ignored</u> impacts of inflation
- RFP evaluation uses Nominal \$ as basis for projecting future cost, meaning it includes inflation
- Both approaches are correct and commonly used for determining future cost. More importantly, end results are the same using either method.

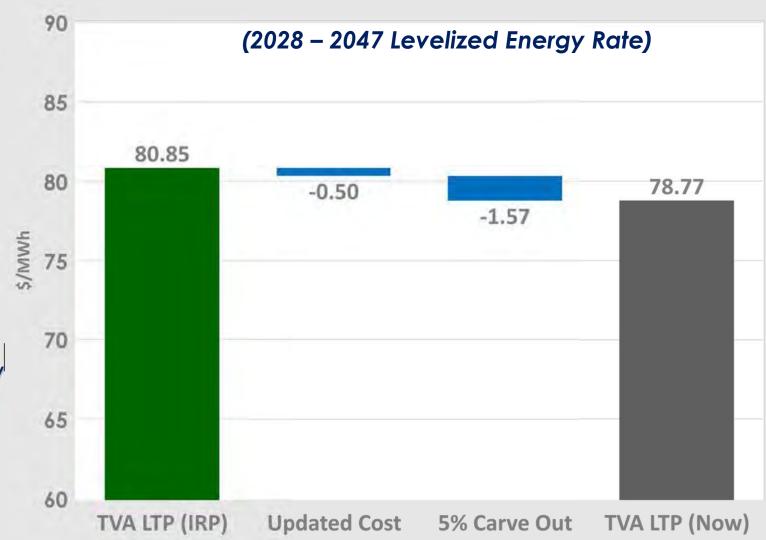
Why is this important?

 RFP rates are "higher" than IRP, but it does not change the results

Analyzing Cost	IRP Real\$	IRP Nominal\$
1. Includes Inflation	No	Yes
2. Discount Rate	1.37%	3.50%
3. Inflation Rate	n/a	2.10%
4. TVA Levelized Rate	\$69.05/ MWh	\$80.85/ MWh
5. Portfolio 6 Levelized Rate	\$59.90/ MWh	\$70.70/ MWh
6. Portfolio 9 Levelized Rate	\$58.96/ MWh	\$69.59/ MWh

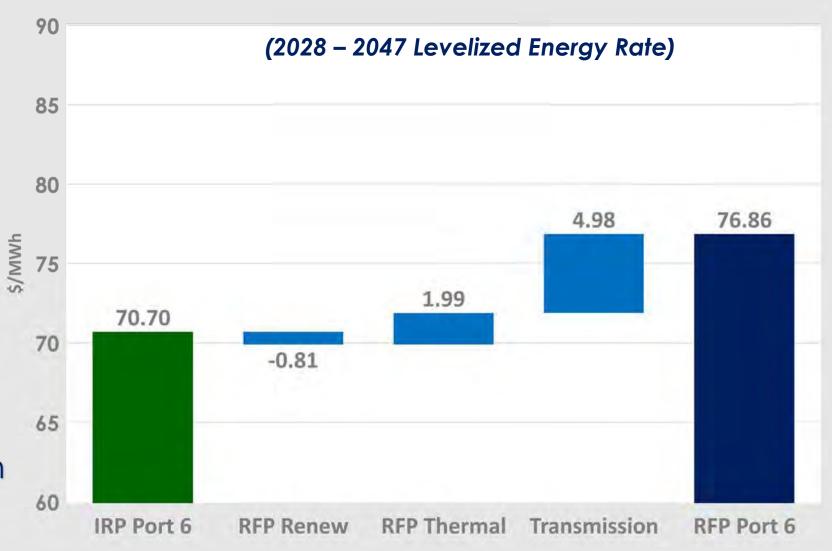
PROJECTED TVA POWER COST (IRP VS TODAY)

- During IRP, created projections of MLGW's power cost from TVA and expected cost under TVA's LTPA, based in part, on information provided by TVA
- TVA power cost projections updated based on latest available information (reduces cost \$0.50/MWh)
- Under LTPA, MLGW eligible to purchase up to 5% of its energy requirements from renewable resources (estimated benefits of \$1.57/MWh)



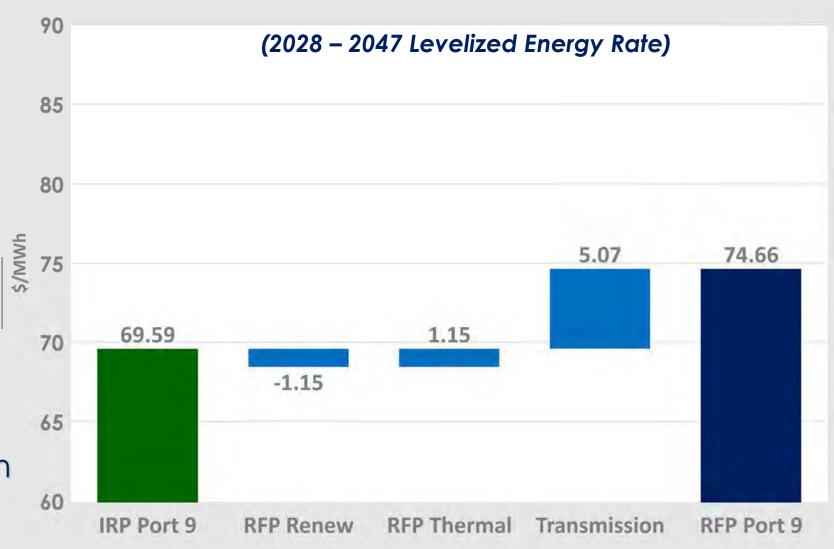
IRP PORTFOLIO 6 COMPARED TO RFP

- Updated IRP Portfolio 6 projected cost with RFP proposal cost and performance information
- RFP Renewable proposals results in slightly lower cost than IRP assumptions
- RFP Thermal proposals and updated Transmission assessment results in higher cost than IRP assumptions



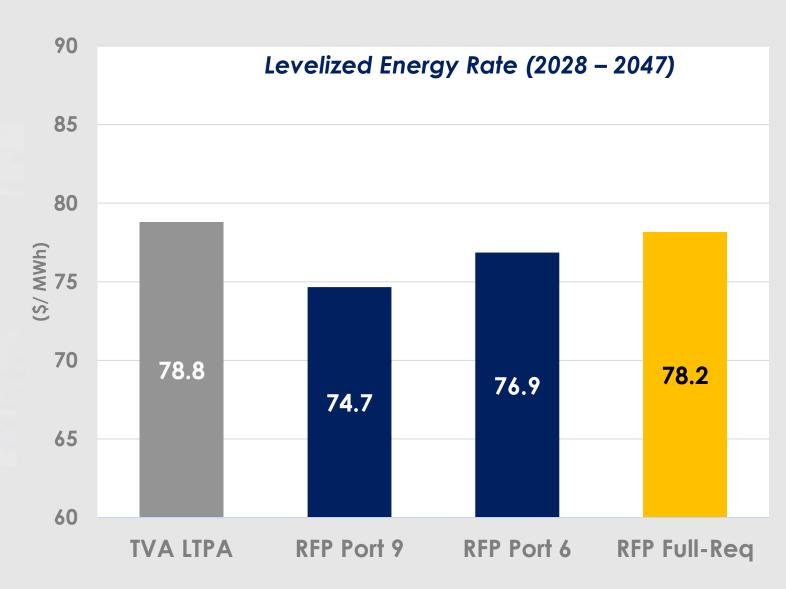
IRP PORTFOLIO 9 COMPARED TO RFP

- Updated IRP Portfolio 9 projected cost with RFP proposal cost and performance information
- RFP Renewable proposals results in slightly lower cost than IRP assumptions
- RFP Thermal proposals and updated Transmission assessment results in higher cost than IRP assumptions



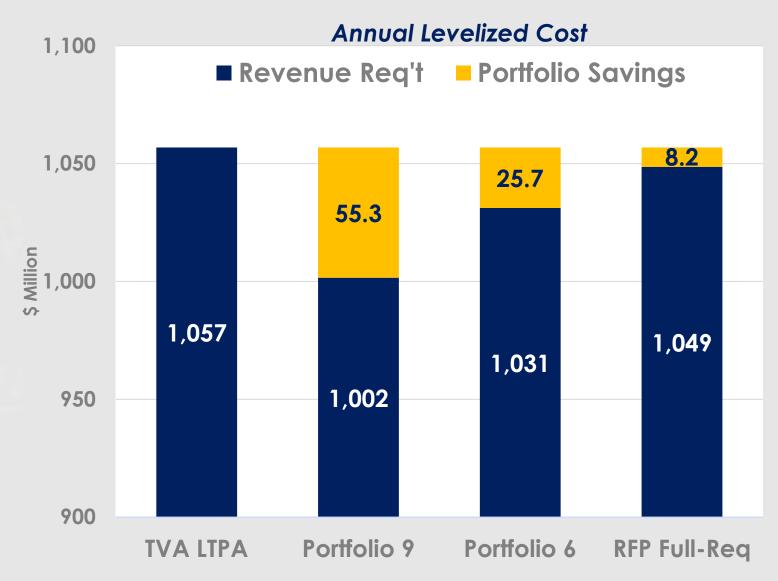
RFP FULL-REQUIREMENTS COMPARISON TO PORTFOLIOS

- TVA is MLGW's current fullrequirements provider
- MLGW received alternative partial / full-requirements proposals from other potential suppliers
- Comparing best fullrequirements proposal to RFP Portfolios 6 and 9 results in slightly higher cost
 - In addition, greater qualitative benefits come with RFP Portfolios 6 and 9



RFP POWER COST VS TVA (2028 – 2047)

- Utilizing RFP cost information and updated internal transmission cost results in updated RFP Portfolios 6 & 9 power cost
- Comparing updated TVA and updated RFP Portfolios 6 & 9 power cost results in \$25.7M and \$55.3M of annual savings, respectively
- These updated savings do not account for MLGW's cost under existing TVA arrangement from 2023 – 2027 (relative to LTPA)



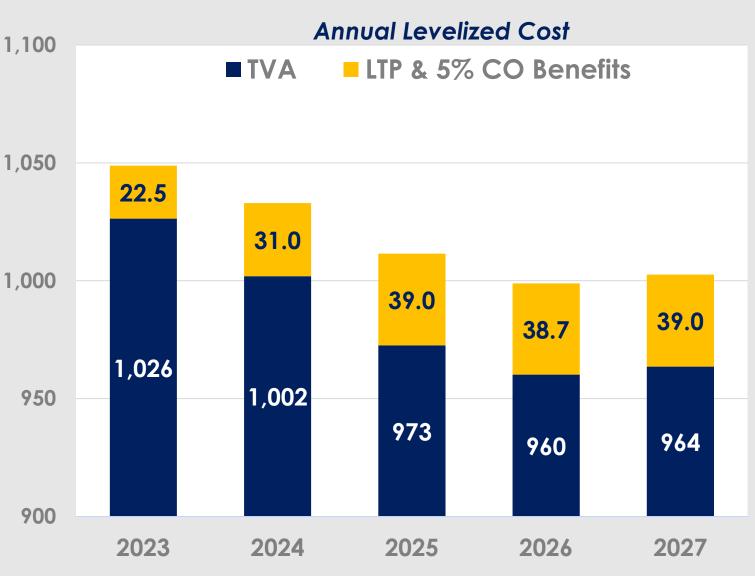
THREE ALTERNATIVES DURING 2023 - 2027

- IRP Savings
 Validation assumes
 MLGW provides 5year termination
 notice to TVA by Jan
 1, 2023
- From 2023 2027, MLGW would continue to pay TVA full revenue requirement
- What are benefits of the LTPA during 2023 – 2027?

	Present Arrangement (continue with TVA)	Terminate TVA Contract, Pursue New Power Supply	Remain with TVA, execute LTPA
Dec 31, 2022	Continue with TVA	Provide termination notice to TVA	Execute LTPA with TVA
2023 – 2027	Preserve Optionality	Continue under current agreement	Receive immediate benefits
Jan 1, 2028	Preserve Optionality	New power supply resources	Continue under LTPA

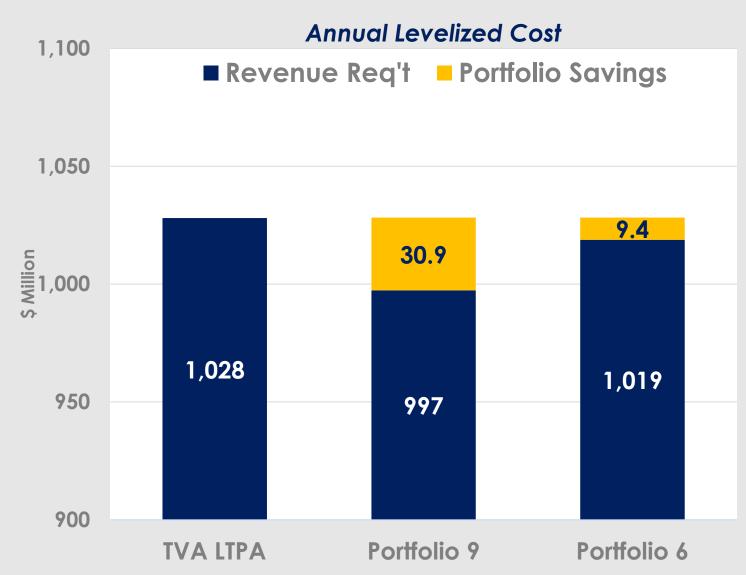
BENEFITS UNDER TVA LTPA (2023 – 2027)

- From 2023 2027, MLGW would continue to pay TVA full revenue requirement
- Alternatively, if MLGW executed TVA LTPA, it would receive immediate rate reduction and could also pursue 5% Carve Out
- The LTPA option provides approximately \$170M in benefits from 2023 – 2027



RFP POWER COST VS TVA (2023 - 2047)

- Termination with TVA means paying higher cost for 2023 – 2027 (relative to LTPA)
- Incorporating MLGW's power cost for the 2023 – 2027 period completes the savings validation analysis
- Comparing updated TVA and updated RFP Portfolios 6 & 9 power cost results in \$9.4M and \$30.9M of annual savings, respectively





Sensitivity Analysis

MANAGING CHANGE SINCE THE IRP

What Has Changed?

- Price of Natural Gas
- MISO Capacity Prices
- Inflation & Interest Rates
- Cost Of Renewables

Why Is This Important?

- IRP used assumptions relevant at the time
- Because the world is always changing, necessary to evaluate Portfolios 6 & 9 /
 TVA under different assumptions to determine impact

How Does MLGW Assess The Impact?

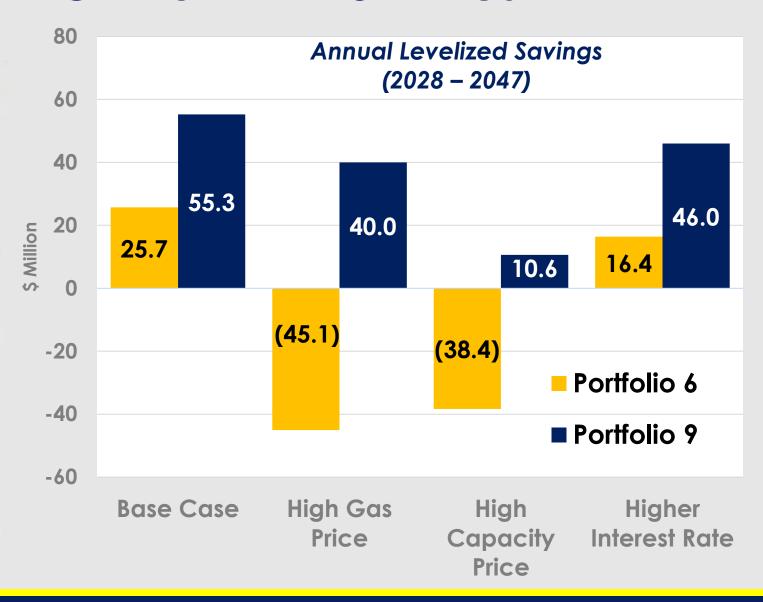
 Conduct a sensitivity analysis and evaluate impacts on estimated savings and determine if there are risks / benefits in different environments

SENSITIVITY ANALYSIS ASSUMPTIONS

- Higher Natural Gas Price
 - IRP used an average price of \$5.04/mmBtu
 - Sensitivity analysis assumes \$7.55/mmBtu
- Higher Capacity Price
 - IRP assumed an average price of \$4.77/kW-month
 - Sensitivity analysis assumes \$7.84/kW-month
- Higher Interest Rate (for Transmission Facilities)
 - IRP assumed 3.50% bond financing rate
 - Sensitivity analysis assumes 4.50% financing rate

IMPACT OF SENSITIVITY ON POTENTIAL SAVINGS

- Sensitivity analysis is conducted on both TVA and Portfolios 6 & 9 to determine new power cost
- Comparing cost of Portfolios to TVA demonstrates impact on potential savings from isolated events
- While each sensitivity is done in isolation, all of these sensitivities reduce MLGW's savings. Combinations of sensitivities would mean greater reductions in savings.





Non-Financial Risks

NON-FINANCIAL RISKS

- Sensitivity analysis attempts to quantify specific risks items
- However, many power supply risks cannot be quantified, nor easily mitigated
- Under non-TVA based arrangement, MLGW will assume new risks that it does not have today



Siting & Permitting Risk



Credit Rating Risk



Counterparty Performance Risk



Labor Market



Regulatory Risk

NON-FINANCIAL RISKS

- In addition to construction, permitting, and supply chain constraint related risk, MLGW could incur external credit rating risk by changing suppliers
- MLGW will need to develop internal systems and processes to manage these nonfinancial risks accordingly



Supply Chain Logistics & Constraints



Construction Risk (i.e. permitting, weather delays, environmental, supply & labor)



Counterparty
Credit Risk



Potential Load Loss Risk

MLGW POWER SUPPLY NEXT STEPS AND TENTATIVE PLAN

- Today's presentation will be posted to the MLGW website by the end of today.
- Questions and answers from MLGW's Board & City Council during today's meeting will be posted on MLGW website beginning June 17th and will be updated and finalized within the next 30-days.
- Comments from the public will be accepted via PowerSupply@MLGW.org at any time and during the MLGW Board of Commissioners' Meetings on June 15th, July 6th, and July 20th
- GDS will finalize their evaluation and conduct negotiations with the short-list of bidders.
- MLGW Executive Staff will present a power supply recommendation to MLGW Board of Commissioners at its August 17th meeting at which time all bids received will be available to the public.
- Following staff's recommendation to the MLGW's Board on August 17th, there will be an additional period of approximately 30 days for public comments prior to a request for a vote by the MLGW Board, anticipated to be at its Board Meeting not later than September 21st.
- Reminder: Under the current arrangement with GDS, finalization of any contract negotiations and subsequent approvals are anticipated to be completed sometime during the 4th quarter of 2022.



Questions / Discussion