

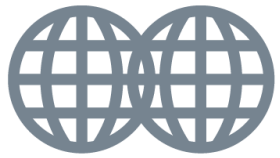
# Power Supply Cost Savings Opportunity:

Power Supply Advisory Team

November 7, 2018

# Introduction to ICF

# A Growing, Global Company **Since 1969**



Global advisory, digital and engagement services firm



More than

**5,000** People

Headquartered in Fairfax, Virginia with:



**67** Offices



**80** Nationalities

**\$1.2B** In annual revenue



Speaking more than

**70** Languages

# Our Expertise



Government



Transportation



Energy



Education  
+ Social Programs



Consumer



Retail



Environment



Hospitality



Health

# Our Clients

- Fortune 100 Companies
- Leading consumer brands
- 50+ top U.S. utility companies
- Most U.S. federal agencies
- International, state and local governments
- 9 of the top 10 U.S. hub airports

# ICF Energy Overview

- Recognized energy experts since 1969
- Support all major Federal Government agencies on energy issues
  - DOE, EPA, FERC, DOI, DHS, DOS, USAID, DOD, DOT
- Support all major energy NGOs
  - EEI, API, INGAA, AGA, NEI, NRDC, EDF
- Worked with almost every major energy company in North America, and many overseas
- Approximately 1,100 energy professionals across North America, U.K., India, China, and Ghana
- Strong base of proprietary and 3<sup>rd</sup> party IP supports our engagements

## Sectors



Power and Transmission



Oil and Gas



Renewables



Integrated DER



Energy Efficiency/DSM



Electrification



Climate Change

# Power Markets + Independent Engineering Advisory

## Offerings

- Technical and market asset valuation / due diligence
- Independent engineering / owner's engineering services
- Energy storage optimization and valuation
- Electric transmission studies
- Wholesale market analysis
- Natural gas infrastructure + market analysis
- Asset management
- Integrated resource planning

## Clients

**Blackstone**



CYPRESS CREEK  
RENEWABLES



EnergyCapital  
Partners

# ICF Study of Memphis Opportunity

## Key Questions to be answered regarding Memphis Opportunity:

What rate would MLGW likely pay for TVA power over the next 30 years?

What is the cost of procuring the power needed by MLGW ?

How can MLGW best go about procuring this power?

How can MLGW access backup generation reserves to ensure reliable service?

Overall, given the above, is it economically attractive for MLGW to purchase power from the commercial market, as compared to the normal TVA rate?

If so, how can MLGW go about implementing this change? What challenges might be faced in implementation and how can MLGW address them?

What are the risks of not going forward?

# ICF Study: Methodology

ICF Used publicly available information to inform the current state assumptions and projected future costs of power based on ICF modelling of future prices of electricity, fuel, debt and other commodities, as well as debt and future operating & maintenance (O&M) costs.

ICF analyzed a Business as Usual case, a case where Memphis moved to MISO, bought power from Bellefonte under the terms of the previous offer to Memphis plus supplemental power from other MISO providers and a case where Memphis moved to MISO and bought power from various power providers in MISO (No Bellefonte case).

ICF analyzed the MISO cases assuming that MISO provided all transmission balancing services (MISO as BA) and assuming that MLGW staffed up and developed the capability to perform these functions for themselves. (MLGW as BA)

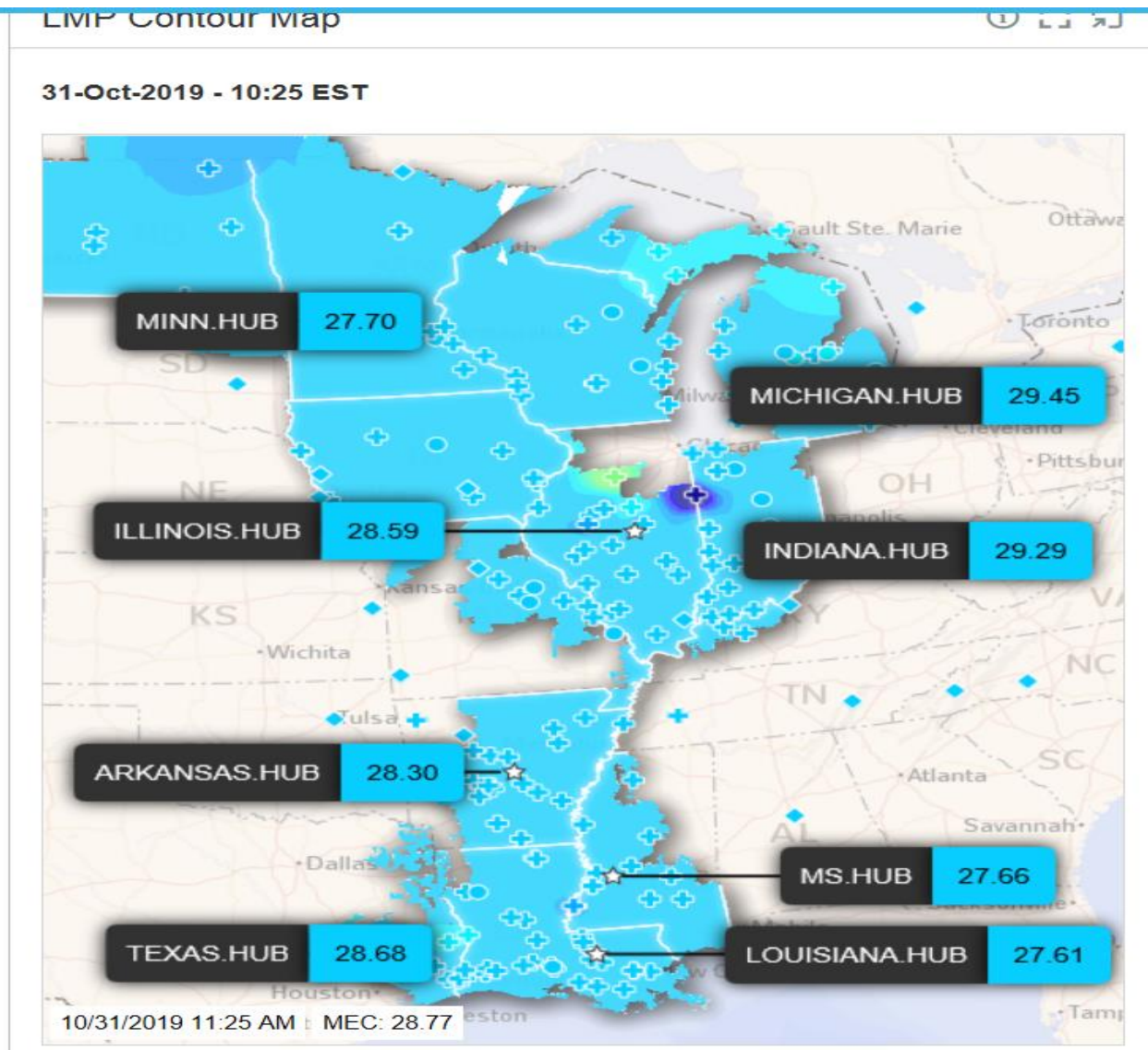
The scenarios with MLGW performing the transmission balancing function were not cost competitive with the MISO as BA cases, because you lose the economies of scale (MISO is five times bigger than TVA). Therefore today we will not discuss those cases.



# **ICF Results**

## **Cost Savings – MISO Only**

# Midcontinent Independent System Operator (MISO)



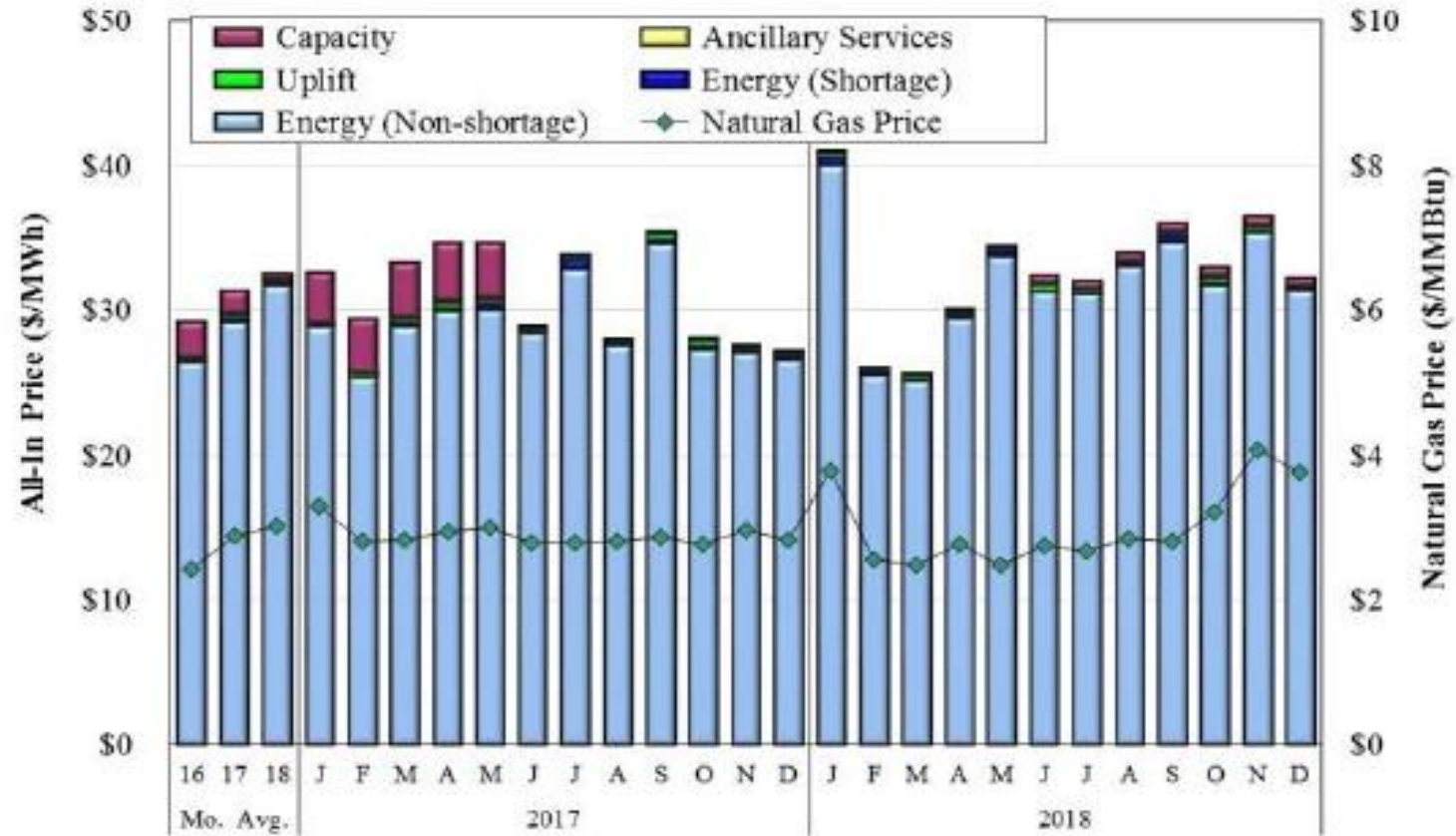
MISO is a not-for-profit organization that operates the transmission system across 15 US states and the Canadian province of Manitoba. MISO also manages a competitive market for power within its territory, with \$29B in gross market energy transactions. <https://www.misoenergy.org/markets-and-operations/real-time--market-data/real-time-displays/>

MISO is governed by an independent nine member Board of Directors, elected by the MISO membership. Members include utilities, transmission or generation owners and developers, as well as other stakeholders.

MISO is significantly larger than TVA in both the size of transmission system and amount of generation resources.

# MISO Independent Monitor Report, 2018, June 2019 - \$33/MWh

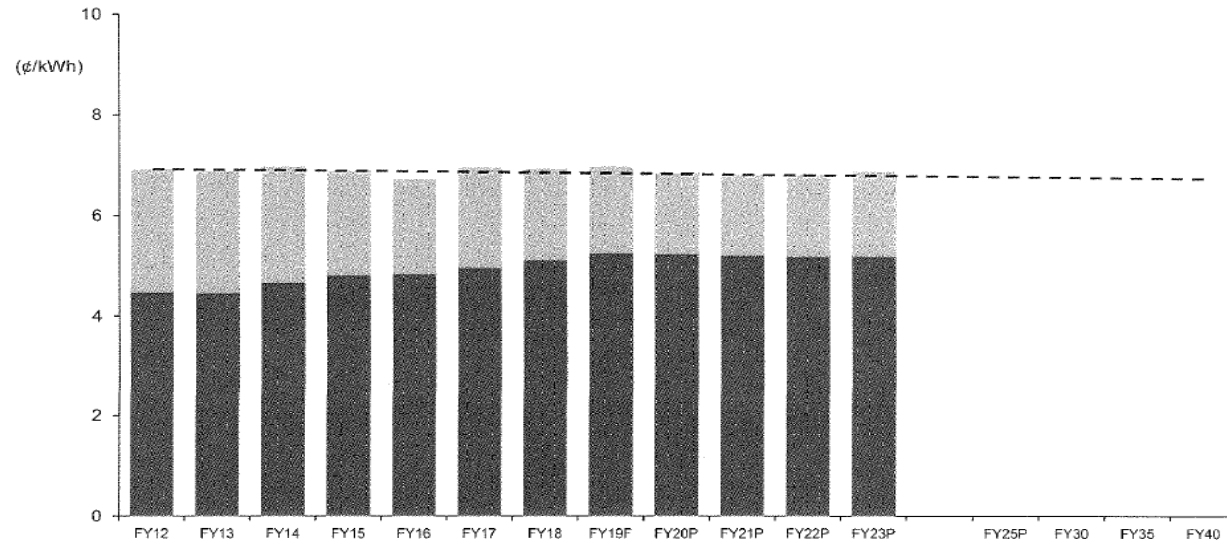
**Figure 1: All-In Price of Electricity  
2017–2018**



# TVA Cost Outlook

## TVA Rate Outlook

Flat and Stable Expected to Continue



- TVA reports FY 2019 to be 6.96 cents/kWh. For 2018, the estimated actual rate that MLGW pays is 7.4 cents/kWh (\$74/MWh).<sup>1</sup>
- TVA Not Undertaking to freeze fuel rate and other cost exceptions.
- TVA assumes currently low gas prices and environmental regulations continue through 2040 (see lightly shaded fuel component of rates). ICF study projections should be adjusted to have apples to apples assumptions and potentially even more cost savings in later years.

Source: “Memphis Matters to TVA”, MLGW Power Supply Advisory Team, May 16 2019, page 6. TVA reports FY2018 and FY2019 Flat Effective Wholesale Rates at 6.92 and 6.96 cents per kWh.

Notes: 1) Calculated as “purchased power” divided by “total sales” or (i.e., \$1.035 billion / 13,993 GWh). MLGW’s “2018 Annual Report”, pages M-3 and M-13.

# MLGW Savings with all power needs from MISO sources: (No Bellefonte Case)

## Business As Usual (\$MM)

Business As Usual	Levelized (2024-2053)	Cumulative Costs (2024-2053)	2024
TVA Rate Cost - Business As Usual Case	1,417	46,776	1,154

## Option #4A- MISO is Balancing Authority and All Power is Hedged and Sourced from MISO (\$MM)

Cost/Benefit Summary	Levelized (2024-2053)	Cumulative Savings (2024-2053)	2024
<b>Gross Savings (\$mm)</b>	<b>527</b>	<b>13,777</b>	<b>614</b>
Other Cost/Revenue (\$mm)	<b>257</b>	<b>8,704</b>	<b>198</b>
Capacity Cost	152	5,165	117
Transmission Upgrade Fee	58	1,927	47
Regulatory Cost	34	1,161	26
Ancillary Cost	12	450	8
Excess Energy Sold in Spot Market	0	0	0
<b>Net Savings (\$mm)</b>	<b>270</b>	<b>5,074</b>	<b>416</b>

ICF analysis includes all cost elements including transmission, shows huge first year savings relative to TVA and huge cumulative savings.

# **ICF Results**

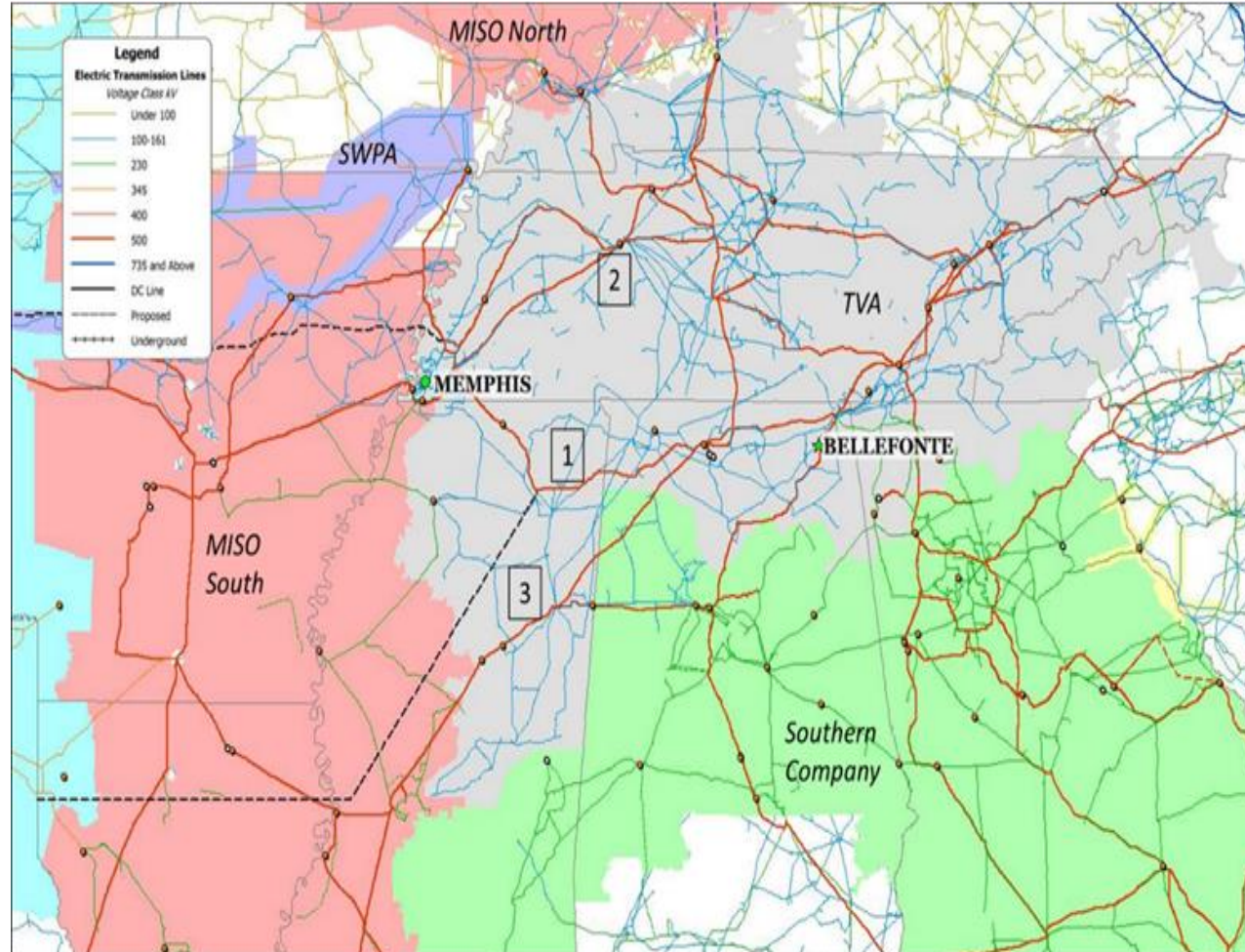
**Cost Savings – MISO With Bellefonte**

# MISO All Hours Firm Price Well Above Bellefonte Price





# ICF Transmission Assessment Confirms Delivery from Bellefonte to TVA on multiple Routes



ICF conducted detailed engineering power flow studies using Critical Energy Infrastructure Information and confirmed the deliverability of power from Bellefonte to MLGW via multiple routes including through TVA and through neighboring systems (Southern to MISO South to TVA to MLGW).



# MLGW – Net Savings From a Bellefonte PPA

## A Selected Case Review of Memphis Savings Relative a “Business as Usual” Case (\$MM)

### Business As Usual (\$MM)

Business As Usual	Levelized (2024-2053)	Cumulative Costs (2024-2053)	2024
TVA Rate Cost - Business As Usual Case	1,417	46,776	1,154

### Option#2A : MISO is Balancing Authority and Incremental Power is Hedged (\$MM)

Cost/Benefit Summary	Levelized (2024-2053)	Cumulative Savings (2024-2053)	2024
<b>Gross Savings (\$mm)</b>	<b>686</b>	<b>22,132</b>	<b>567</b>
Incremental Other Cost/Revenue (\$mm)	<b>199</b>	<b>6,785</b>	<b>152</b>
Capacity Cost	105	3,589	78
Transmission Upgrade Fee	58	1,927	47
Regulatory Cost	34	1,161	26
Ancillary Cost	10	333	8
Excess Energy Sold in Spot Market	-8	-226	-8
<b>Net Savings (\$mm)</b>	<b>487</b>	<b>15,347</b>	<b>416</b>

# Conclusions

# Changing power suppliers is clearly a winning strategy for Memphis

- Multiple independent studies have shown hundreds of millions of dollars per year savings for Memphis.
- Savings enable MLGW infrastructure improvement without rate increases. A UBS study shows bonds can be used based on future savings, providing money now for MLGW and City, as well as rate relief for MLGW customers.

## MLGW SAVINGS Switching to MISO VERSUS TVA

There have been 4 independent reports that have shown MLGW savings.

- The ACES Report (*Attachment 1*) shows in a 15-year period MLGW could save \$413 million in the first year to \$817 million in year 15 for a total savings of \$9.2 billion.
- The ICF Report (*Attachment 2*) shows in a 30-year period MLGW could save \$416 million in the first year to \$692 million in year 30 for a total savings of \$15.3 billion.
- The GDS Report (*Attachment 3*). The GDS Report shows MLGW could save \$417.8 million in the first year
- **Conclusion: All 3 Reports show approximately a \$400 million savings in year 1 by switching to MISO.**

**UBS performed a study and used the \$400 million in savings to fund:**

- **MLGW Infrastructure needs:** MLGW: Receives 73.2 million to fund its \$1 billion-dollar infrastructure needs.
- City of Memphis: Receives ½ of the Savings (\$208.9 million per year) based on authority to collect ½ of the total savings per line item 6 above.
- And Ratepayers: Receive \$135.7 million per year or a 14% rate reduction.

**Conclusion: Above is how UBS distributed the Savings, but the breakdown is clearly up to the City, the Council and/or MLGW and there is plenty of money to split.**

# How does Memphis make this change?

An Integrated Resource Plan (IRP) can provide information on scenarios and potential futures based on a variety of assumptions, but does not provide definitive market information, i.e. What power supplies are available to Memphis at what price

IRP's are normally required of vertically integrated utilities in regulated areas, such as Southern Co, Duke Energy, etc. and are used as a basis for obtaining regulatory approval of capital spending plans. Other large municipal utilities (Jacksonville Electric Authority, Austin Energy, etc) do not use an IRP process. They go directly to the market and get price and volume information through a Request For Proposal (RFP) or similar process.

Bottom line: Regardless of what the IRP and other studies say, you will still have to go to the market to find out where you can get electricity, how much and at what price. Only current market information can inform a decision as to what supply alternatives are the best.

Since the electric market is competitive in MISO, **obtaining market information is easy.**

# How does Memphis make this change?

Memphis should apply for membership in MISO and request they provide information on connecting to MISO for reliable electric supply. MISO engineers will then perform a detailed transmission interconnection study and provide Memphis a proposed solution and costs to provide transmission service (if any). Studies by others **cannot** provide the real answer to the transmission question. **Only a MISO transmission analysis can.** Applying and getting a transmission analysis **does not obligate Memphis to do anything** or make any change. Memphis controls the decision to proceed or not after you have the results from MISO.

At the same time, Memphis should engage with a company experienced in the MISO energy markets to send out a **Request for Proposals (RFP)** on Memphis' behalf. MISO recommended ACES Power, a service company owned by non-profit electric Cooperatives, to provide this service. The RFP would allow companies to propose a broad range of electric supply arrangements, with definitive costs and contract terms. There would be **NO RISK and no obligation for Memphis**, as the RFP would clearly state Memphis reserves the right to decline any and all offers for any reason or no reason. TVA can be given the opportunity to respond to the RFP if Memphis chooses.

Both the MISO study and RFP can be completed in weeks, not months or years.

## How does Memphis make this change?

- MISO transmission study results will answer all questions about how and at what cost power can be reliably supplied to Memphis from MISO. This is the **ONLY** way these questions can be answered. MISO will not make transmission system changes based on studies by others.
- The results of the RFP process will be multiple contract offers from electric power providers: **definitive offers** the suppliers are willing to stand behind. ACES will evaluate the contracts for price, credit risk, supply risk and any other factors Memphis chooses. From this will come a recommended portfolio of supply contracts that will provide Memphis a reliable low cost supply of power in the future.
- **Neither the MISO request or the RFP process obligates Memphis to anything.** These steps are the only way to get real cost numbers on power and transmission service.



## **How is Reliability Assured if Memphis Leaves TVA?**

- The simple answer: The same way large utilities like TVA, Southern Company, etc. do it.
- They use a portfolio of supply options that all back each other up to ensure reliability, and they use supply interchange arrangements with adjacent utilities to provide an ultimate backstop.
- Memphis would have a portfolio of supply contracts in which you only pay for the power if you need it. This overlapping contract portfolio provides assurance of supply. No one or two supplies being out compromises your ability to get enough power.
- MISO provides the ultimate backstop: In the extremely unlikely event that Memphis is short on contracted supply, MISO will provide power from their on-call resources at current market prices. The lights stay on regardless!

## A Time For Action

“We should be doing a [request for proposals] or whatever the necessary next steps are because it’s \$1 million a day. Every day we wait is a \$1 million that our citizens are paying.... That’s \$400 million you save in a year and each day you go on is a day you’re paying a higher rate and you don’t have to. You’ve got to give them five years notice, but the five years notice keeps running longer and longer.”

Memphis Commercial Appeal October 28, 2019

**QUESTIONS ?**

# Appendix

Additional Information

# **Attachment 1.**

## **ACES Report Executive Summary**

This report assesses potential power supply savings for the City of Memphis.

There is a potential opportunity for the City of Memphis to save an estimated \$9.2 billion between 2024 and 2038 if Memphis Light, Gas and Water (MLGW) chooses to self-supply its electricity needs beginning in 2024 rather than staying in the current all-requirements contract with the Tennessee Valley Authority (TVA). ACES has not reviewed and has no legal opinion on the ability of MLGW to exit its TVA contract, the implications of the TVA Act, or any other contracts governing the relationship between MLGW and TVA.

Assuming the opportunity exists to change power supply strategies beginning in 2024, the potential annual savings range from \$413 million in the first year to \$817 million by the end of the study (2038), totaling \$9.2 billion over the 15-year period. Figure 1 below compares the current TVA cost for wholesale electric supply (2018 rate for demand and energy), escalated at 2.1% (historical growth rate) annually with the expected power costs from self-supplying a power supply portfolio under current market conditions and capital costs.

Figure 2 below provides the range of total potential savings given the expected self-supply costs and a range of TVA rates.

# Attachment 2

## ICF Report Executive Summary

### 1. Results of Economic Analysis – Bellefonte PPA vs. BAU

*ICF PROJECTS LARGE SAVINGS – \$15.6 BILLION NET OVER 30 YEARS  
– PRIMARILY BECAUSE THE BELLEFONTE PPA COSTS ARE SIGNIFICANTLY LESS THAN PROJECTED TVA COSTS.*

TVA currently provides MLGW wholesale power supply at \$74/MWh, and hence an annual cost of approximately

\$1.0 billion per year. As show in Exhibit 2-1, ICF projects in 2024, the first year of our study, MLGW's cost under the TVA contract (referred to the Business as Usual case) to be approximately \$1.15 billion.

In contrast, switching MLGW to a combination of the Bellefonte 1 PPA and market-based incremental power results in a net savings of \$416 million: the total cost to MLGW decreases to approximately \$738 million.

This equals wholesale power cost savings of approximately 40%.

Over the 30-year period, there is aggregate net savings of approximately \$15.3 billion.



# Attachment 3

## UBS Analysis:

### Leveraging the Savings from Alternative Energy Options

Based on our understanding:

- MLGW's current cost for energy is approximately \$946.4 million
- Under certain options being considered for alternative providers, MLGW could receive similar services for as low as \$528.6 million (assumes Scenario D, referenced below).
- Assuming this alternative is pursued, MLGW could save approximately \$417.8 million annually
- Any savings from switching energy providers would not materialize until after the TVA cancellation, which we understand to be five years Assuming savings of \$417.8 million annually:
- MLGW would use such savings to make a payment to the City of Memphis of ~\$208.9 million annually for various city infrastructure projects, or 50% of savings
- \$73.2 million for debt service annually after the five-year initial period, or 18% of savings, to support a **\$1 billion construction fund** to improve MLGW's electric infrastructure, and various other uses
- \$135.7 million annually for a potential rate payer reduction

Although this is a viable solution for alternative power, UBS has not evaluated the risks associated with this scenario.

However, UBS would welcome the opportunity to further discuss and explore these and additional financing alternatives with the City of Memphis and MLGW

Graphic taken from MLGW's Evaluation of Long-Term Power Supply Alternatives. Prepared by GDS Associates, Inc. as of January 28, 2019

General Assumptions on Analysis:

1. Assuming that the total savings is shared equally by the City and MLGW
2. Assuming payment to the City does not exceed 50% of the net profit realized by the Light Division on any given year

