

MEMORANDUM

TO: Friends of the Earth

FROM: Jurgen Weiss/The Brattle Group

SUBJ: Comments on MLGW Draft IRP by Siemens

DATE: June 24, 2020

We were asked by Friends of the Earth (FOE) to review the recently presented MLGW draft IRP prepared by Siemens.¹ Beyond a general review, we were asked in particular to examine why cost savings estimates in the draft IRP from leaving the TVA differ from the differences between the estimated TVA resource cost and various alternative resource portfolios developed by The Brattle Group in our report prepared for FOE in 2019.²

This memo summarizes our review and comparison of Siemens' draft IRP with our previous reports and the assumptions contained therein. The comparison is intended to provide high level observations and focuses on both commonalities and differences that materially affect the potential savings to MLGW and the citizens of Memphis from seeking an alternative power supply arrangement to a continued relationship with the TVA.

The memo is structured in three parts. First, it provides a high level summary of our observations. Second, it describes overlaps and differences in assumptions and results in areas where both the draft IRP and The Brattle Group reports can be compared. Third, it describes our observations in areas where the draft IRP and the Brattle Group reports cannot easily be compared, due primarily to differences in scope and focus of analysis.

1. High-level Summary of Observations

At a high level, the Siemens and Brattle reports come to a similar conclusion. Alternative power supply options to the current (and future) TVA contract could significantly increase the share of renewable energy (and correspondingly lower the amount of greenhouse gas emissions) providing power to Memphis, at costs that could save Memphis ratepayers billions of dollars over the coming decades. Importantly, any differences between estimated potential cost savings are **not** primarily the result of different assumptions about the cost of power supply from alternative sources such as wind and solar facilities, complemented by MLGW owned gas-fired generation or market purchases. Rather, they result from different assumptions about the cost of a continued contract

¹ Siemens, DRAFT: Integrated Resource Plan Report, Memphis Light, Gas, and Water, May 2020

² The Brattle Group, Power to Memphis; Options for a Reliable, Affordable and Greener Future, January 2019 and Power to Memphis: Renewable and Storage Supplement, September 2019

with the TVA as well as by costs estimated by Siemens to be incurred by MLGW in case of a non-TVA option going forward, but outside the scope of the previous Brattle reports.

Specifically, the supply costs of Brattle's portfolios range from \$50/MWh to \$59/MWh, compared to supply costs of \$50/MWh for Siemens portfolios 5 and 9.³ However, while Brattle's analysis assumed no incremental transmission (intended to show the cost of an "island" system relying only on existing transmission capacity), Siemens' analysis explicitly allows for the construction of new transmission both to access more resources outside of Memphis and for reliability reasons. These transmission costs have a Net Present Value Revenue Requirement (NPVRR) of \$561 million for portfolio 5, or 6.2% of the portfolio's power supply NPVRR.⁴ For portfolio 9, the transmission cost NPVRR is \$469 million, or 5.2% of the portfolio 9 power supply NPVRR. Simply grossing up the power supply cost by the assumed transmission investments⁵ would result in approximate power supply costs (including transmission) of \$52-\$53/MWh for portfolios 5 and 9, well within the range of Brattle's portfolio and even about 10% lower than the \$59/MWh estimated cost for the "Higher RE" portfolio likely most comparable to portfolios 5 and 9 (based on a more comparable share of renewables). Hence, before taking into consideration costs that Brattle's work did not include in its scope of analysis, Siemens' draft IRP suggests power supply costs without a TVA contract may even be lower than those estimated by Brattle. Given that The Brattle Group conducted a much less detailed analysis, did not have access to MLGW transmission information and that assumptions about power generation technologies are derived mostly from the same sources (such as NREL), Siemens' generation cost estimates appear reliable.

It is also important to note some important methodological differences between the reports by Siemens and the Brattle Group that make a direct comparison of estimated potential savings more complicated. Chief among them is the fact that the draft IRP calculates levelized annual savings over a 15 year period from 2025 to 2039 whereas the Brattle Group reports estimated the cost of various "snapshot" portfolios in 2024 and in 2050. Also, the criteria of the portfolios constructed differed significantly, both with respect to the amount of renewables included in potential portfolios and the use of additional transmission to connect to MISO. Finally, the Siemens draft IRP includes significantly expanded reliability analyses not part of The Brattle Group's scope. Nonetheless, the estimated annual savings potential for the portfolio developed by The Brattle Group most closely matching the preferred portfolios by Siemens (Portfolios 5 and 9) – the 2024 "Higher RE" portfolio, are broadly consistent once some of the cost factors not in the scope of The Brattle Group's initial scope are taken into account. The Brattle Group estimated an annual cost difference between the higher RE portfolio and an estimated annual cost of a continued TVA

³ Siemens draft IRP, page 291 and 330.

⁴ Ibid, Exhibit 269, page 296

⁵ Using the transmission NPVRR as a percentage of the generation NPVRR to gross up the total rate is a simplification since the useful lives of the assets involved may differ, but should approximately capture the impact of including transmission in average generation costs including transmission.

contract at \$201.5 million.⁶ The Siemens draft IRP estimated potential levelized annual savings for Portfolios 5 and 9 of approximately \$153 million per year.⁷

As explained in the next sections, this difference can in part be explained by some additional costs MLGW would likely indeed incur, but which were not part of the Brattle Group's initial scope, and in part by a small number of questionable assumptions made by Siemens in areas, resulting in material cost estimates.

2. Comparison in areas of overlapping assumptions

As already highlighted, both Siemens and Brattle make assumptions about the cost of alternative power supply portfolios, based on more fundamental assumptions about the evolution of costs over time of various types of resources such as onshore wind, large scale and smaller scale solar PV, batteries, etc.

The major differences between Brattle's analyses and those presented in the Siemens draft IRP relate to the cost of transmission (also already discussed above) and the assumed cost to MLGW of a continued contract with the TVA beyond 2024.

Because both the assumptions about the cost of future supply portfolios not involving TVA and transmission assumptions were already discussed above, this section focuses on the differing assumptions about the cost of continued TVA membership. The Brattle Group, in its analyses, had been instructed by FOE to assume an average cost of a TVA contract to MLGW of 7.5 cents/kWh (in \$2017). By contrast, Siemens estimates future costs to MLGW under two separate cases: a continued contract with a five-year notice period, and a second option with a 20-year commitment resulting in an assumed discount. Since, at the time of preparing our reports, we did not have any knowledge of either the existence or the terms of an optional 20-year contract, the relevant comparison is between 7.5 cents/kWh assumed in Brattle's analyses and a continued contract with the TVA with a five year notice period.

While a direct comparison of the assumed costs by Brattle and Siemens is complicated by some of the same issues discussed above (annual versus net present value calculations, the use of different base years, method for allocating peak-related costs), we observe that, as Siemens acknowledges, Siemens' bottom-up calculation of an estimated TVA rate is not only below the 7.5 cents/kWh assumed by The Brattle Group, it is also materially below the **current** cost of power to MLGW.

Siemens uses a number of different approaches to estimate a future MLGW all-in rate (\$/MWh), depending on whether TVA or Siemens assumptions are used for some of the projected TVA costs and whether the historic relationship between TVA's overall average rate and the MLGW rate or

⁶ The Brattle Group, Power to Memphis; Options for a Reliable, Affordable and Greener Future, January 2019, page 16.

⁷ Siemens draft IRP, Exhibit 9, page 16.

an allocation of TVA fixed costs based on the 200 highest peak hours is used to derive a projected MLGW rate going forward. Since it expresses its rates in \$2018, to compare to the rate actually paid by MLGW, Siemens applies an inflation adjustment of approximately 2%⁸ and compares inflation adjusted rate estimates to the “current” (2019) MLGW rate, which it suggests was \$74.45/MWh. It appears that Siemens is assuming that the 2019 rate of \$74.45 MWh will remain unchanged in 2020 since it inflation adjusts its estimated \$2018 rates by two years and compares these to the actual 2019 rate without an inflation adjustment between 2019 and 2020. We are not convinced that this rationale is solid. Siemens argues it is consistent with the TVA’s commitment not to increase rates for 10 years under the LTP agreement.⁹ However, since no decision has been made on whether or not the LTP is the preferred option should MLGW decide to continue its contract with the TVA, it is also not clear that no inflation adjustment will occur.¹⁰ We have therefore calculated the effect of Siemens’ MLGW TVA rate projections on associated savings from leaving the TVA that would result from using MLGW’s actual 2019 TVA rate rather than the rates calculated by Siemens (and comparing the computed Siemens rate to the rate actually paid in 2019 adjusted by one year of inflation to create a comparison based on \$2020. The result of this comparison is shown below.

	Inflation	Rate 2018	Rate 2019	Rate 2020	Difference to MLGW Actual	Annual Memphis Demand	Implied Additional Cost Savings
	%	\$/MWh	\$/MWh	\$/MWh	\$/MWh	GWh	\$000 p.a.
Siemens Projection (allocated to 200 top)	2.02%	\$ 69.12	\$ 70.51	\$ 71.94	\$ 4.02	13,786	\$ 55,355
Siemens Projection (historic relationship)	2.02%	\$ 69.21	\$ 70.61	\$ 72.03	\$ 3.92	13,786	\$ 54,063
TVA Projection (allocated to 200 top)	2.02%	\$ 70.71	\$ 72.14	\$ 73.59	\$ 2.36	13,786	\$ 32,542
TVA Projection (historic relationship)	2.02%	\$ 70.93	\$ 72.36	\$ 73.82	\$ 2.13	13,786	\$ 29,385
MLGW 2019 Actual	2.02%		\$ 74.45	\$ 75.95	\$ -	13,786	

⁸ It is actually somewhat unclear what inflation rate is used. Siemens uses a 1.37% real discount rate assuming a 3.5% cost of capital and a 2.1% inflation rate (Draft IRP, page 190). Since the three numbers are not mutually compatible – for example, 3.5% minus 1.37% would imply an inflation rate of 2.13%, we assume some of this is due to rounding. However, the calculations in the draft IRP converting \$2018 to \$2020 imply the use of an inflation rate of 2.02% rather than either 2.1% or 2.13%. Based on the available information, we have not been able to reconcile, but instead use an inflation rate of 2.02% consistent with Siemens’ conversions of \$2018 to \$2020.

⁹ Siemens Draft IRP, page 194.

¹⁰ We do not have sufficient information about the LTP to evaluate whether a pledge not to increase rates implies no inflation related adjustment of rates.

As the table shows, adjusting the Siemens forecast for the TVA rate for the difference between the estimated 2020 rate and the actual 2019 rate paid, inflated to 2020, results in additional costs under a continued TVA contract of between roughly \$30 million and \$55 million per year. This represents a range of potential additional savings of a power supply alternative relative to continuing the current TVA contract. While these additional savings are not certain, a forecast of a future TVA rate that estimates a rate for 2019 or 2020 that is significantly below the actual rate paid likely underestimates the savings relative to staying with the current TVA contract since it is likely that at least in the next decade the actual costs of staying with the TVA would be higher than estimated in the Siemens draft IRP.

3. Comments on assumptions not analyzed by Brattle

Finally, we provide some comments about assumptions made in the Siemens IRP resulting in costs not previously analyzed by The Brattle Group. While we have no basis for analyzing Siemens' assumptions about the costs related to MLGW's organizational capacity should MLGW decide to seek an alternative power supply to the TVA,¹¹ it is indeed likely that some such additional costs would be incurred. However, these costs would be both likely modest and result in additional employment in Memphis and hence also provide some positive economic impacts on the city. Beyond these costs related to MLGW's organizational capacity, there are two costs Siemens includes in its analyses that are material enough to merit comment.

First, Siemens assumes that the \$37 million per year of bill credit associated with the TVA's use of MLGW-owned transmission would go away if the TVA were no longer the power supplier to MLGW. If it is indeed the case that the payment is uniquely for flowing power supply to MLGW over MLGW owned transmission, this assumption may well be correct. However, it is also possible that some of the use of MLGW infrastructure by the TVA might continue even if the TVA no longer supplied power to MLGW. This could be the case if TVA continues to own and operate the Allen plant and if transporting power from the Allen plant to remaining TVA customers would require continued use of MLGW transmission infrastructure. We therefore suggest that Siemens provide more information about the nature of the payments, at a minimum to create more transparency about the nature of this bill credit and its potential loss.

The future of the Allen plant is also relevant for the final material cost assumption in the Siemens draft IRP: payments in lieu of taxes (PILOT). Siemens assumes that the TVA's current PILOT would go away if MLGW canceled its current power supply agreement with the TVA. These PILOT represent approximately \$50 million per year.¹² While we have not conducted analyses

¹¹ Siemens identifies \$4.6 million in capital expenditures as well as operational expenses of between \$1.3 million and \$2.6 million per year required to upgrade MLGW's capabilities. This adds about \$0.5/MWh to the calculated procurement cost between 2025 and 2039.

¹² See for example Siemens Draft IRP, Exhibit 22, page 28, which shows \$53 million in levelized annual payments in lieu of taxes lost under Portfolio 9.

related to the current and future basis for PILOT, it is generally the case that PILOT is based on ownership of infrastructure assets (and very broadly speaking are substitutes for property taxes). Hence, whether or not the TVAs payments would disappear (or diminish) after the end of a power supply agreement depends on whether or not the level of infrastructure assets otherwise subject to local taxes would diminish or disappear. This likely largely depend on the future of the Allen plant, which is the TVA's major asset in Memphis. Should the TVA continue to own and operate the Allen plant, it would seem likely that some continued payment in lieu of taxes would be made, thus lowering the revenue loss estimated by Siemens accordingly. Also, if, as a result of a new power supply structure independent of the TVA, MLGW made investments in additional infrastructure in Memphis (such as building new plants), this would likely indeed result in additional payments in lieu of taxes. However, from the perspective of the city and its residents, such incremental payments would not represent costs, but rather transfers from ratepayers to residents – and given that ratepayers and residents in Memphis are identical (given that MLGW is a municipally owned utility), in total these payments should not be considered a net cost of canceling the current TVA power supply agreement. Hence, the magnitude of having to make up payments in lieu of taxes currently being made by the TVA in case of a separation from the TVA depend mostly on the future of the Allen plant and could be significantly lower than estimated by Siemens if the Allen plant continues to be operated.¹³

4. Conclusions

In summary, our review of the Siemens Draft IRP suggests that differences in calculated potential cost savings are NOT primarily driven by differences in assumptions about the costs of the alternative sources of power supply that MLGW could rely on in the absence of a TVA power supply contract.

Rather, the differences are driven by a) an assumed higher share of renewables than the portfolios Brattle had analyzed; b) a questionable projection of the future costs of staying with the TVA that is substantially below the current cost to MLGW under the existing TVA contract; c) the questionable assumption that payments in lieu of taxes currently being made by the TVA would entirely disappear without a TVA supply contract even though in all likelihood these payments are based on locally owned assets that would otherwise be subject to local property taxes and which would only disappear if the assessed value of those assets also disappear; and finally d) costs not analyzed by Brattle such as increasing organizational capacity at MLGW, incremental transmission investments needed to also meet reliability requirements (and not analyzed by Brattle).

¹³ We do not have information on the basis for assessing the PILOT. To the extent the TVA owns other assets than the Allen plant, future tax or PILOT revenues absent a TVA contract will depend on whether or those assets themselves would disappear. If they would not, then a future owner would have to pay either property taxes or PILOT. This is also true if MLGW acquired such assets, but presumably the purchase price for such assets would reflect such payments as a cost (lowering the value of such an asset).

In summary, improving some of the more questionable assumptions made by Siemens, in particular related to the future TVA costs under the current contract and more precisely estimating any impact on PILOT, would likely substantially narrow (and perhaps more than close) the gap in estimated potential annual cost savings between the approximately \$200 million per year under Brattle's more renewables focused 2024 portfolio most closely comparable to Siemens' Portfolios 5 and 9 and the potential annual cost savings estimated for those portfolios by Siemens, which, prior to adjusting for the factors just outlined, of about \$150 million per year.