Integrated Electric Resource and Master Plan Task Force Report to Columbia City Council

November 2021

Integrated Electric Resource & Master Plan Task Force Members:

Alexander Antal
Gregg Coffin
Kim Fallis
Philip Fracica
Jay Hasheider, Chair
Thomas Jensen
Detelina Marinova
Tom O'Connor, Vice Chair
Dick Parker
Robin Wenneker
David Switzer

Ad Hoc Members:

Tom Rose (Community Development Commission)
Leanne Tippett Mosby (Climate and Environment Commission)

November , 2021

To: Columbia City Council

With submission of this report, the Integrated Electric Resource and Master Plan Task Force is completing two of the three major tasks originally assigned to it by the Council in 2018. The two completed tasks are the creation of an Integrated Resource Plan (IRP) and Master Plan (MP). The third remaining task, the Cost of Service study, is currently underway but not completed.

The attached report covers highlights, observations and findings made by the Task Force that are derived from the Siemens Industry Inc. (consultant) IRP and MP reports that were completed earlier this fall. Our report is not intended to replace the consultant's report, but rather to provide a perspective on selected topics from that report which the Task Force has deemed worthy of special notice. We do not agree with all the findings presented by Siemens and have pointed out those disagreements. Nor do we have unanimous agreement within the Task Force on every observation and recommendation made, and have introduced minority opinions to help the Council understand those divides. Overall, this Task Force report is intended to inform the Council of our thinking regarding these critical issues.

This report represents only a portion of the work we've performed over the last three years. Several hundreds of hours of collective work is embedded in working with staff to develop a request for proposal, in conducting interviews for a consultant, in the selection process, and throughout the many meetings of presentations by the consultant and others as the report was developed. We provided much feedback and guidance over this time through our discourse with both consultant and staff.

Throughout this development many unanticipated events occurred, such as the COVID 19 pandemic, with numerous attendant logistical and communication changes; through changes to utility administration and staffing, and through several significant utility events, including the record cold weather of February/2021, and the near flooding of the Hinkson Substation in June, 2021, and more. All of them in some way affected, but did not deter, our mission. Most importantly, in the process, the Task Force work and consultant investigations have helped to unveil new information and discoveries that are pointed out in our report.

This has been a unique study to Columbia; unique in how the Integrated Resource Plan and Master Plan and Cost of Service studies have been conducted simultaneously instead of separately, and in the structural aspect of a citizen task force working in such close relationship with utility staff, covering complex subjects and over an extended length of time. In my view these submitted reports demonstrate that we have risen to that task.

After three years and many meetings we are pleased to be delivering both our report and the consultant's report to the Council for its review and use.

Sincerely,

Jay Hasheider, Chair

Integrated Electric Resource and Master Plan Task Force

Table of Contents

Priority Task Force Recommendations

Integrated Resource Plan

- **Existing Generation and Supply Contracts** (page 5 of Task Force Report): CWL should perform a legal review of all coal PPAs to understand the options available to the utility to meet renewable obligation while under life-of-plant contracts.

- **Resource Generation Plan** (page 7) **:** The Task Force recommends that the City Council pursue a revision or replacement of the Renewable Energy Ordinance, setting a date for the utility to achieve 100% Renewable Energy **by the earliest date practicable,** which should provide staff with needed direction for future programming and power supply acquisitions.

- **Value of Solar (VoS) Study** (page 10) :

  1) Task Force recommends Council not rely on this value of solar study to represent the total value of solar in Columbia

  2) Task Force recommends a follow-up (value of solar) study be conducted to include a wider set of input variables to reflect the interests of the community, primarily environmental and societal valuations.

- **AMI and Smart Grid Assessment** (page 12) **:** Task Force agrees with Siemens' recommendation that CWL issue a request for proposal for an AMI System Project as soon as reasonably possible. The Task Force acknowledges that the deployment of an AMI system will likely be a multi-year project.

Master Plan

- **Transmission System Assessment** (page 15) **:** Option W provides the flexibility to accommodate potential capacity requests from the University of Missouri in the future. It also incorporates a rebuild of the Hinkson substation which is highly recommended due to the flooding vulnerabilities that were demonstrated in the flash-flood event of June 2021. It could also likely prevent the need for potential load shed in an N-1-1 contingency.

- **Capital Projects** (page 17) : The Task Force recommends ongoing meeting with CWL staff to learn their impressions of the project prioritization list compiled by Siemens and determine whether projects with immediate needs exist so that we can begin to define commencement steps for putting CWL into the best position to begin those in need of immediate action.

- **Comment on Non-wire solutions (NWS)** (page 17) **:** The Task Force unanimously recommends an increase in the use of NWS, particularly with regard to building codes, distributed solar and storage, and a rate structure that incentivizes efficiency and conservation throughout all customer classes. NWS should be included in CWL standard engineering practices on a routine basis, at all scales

Volume 1: Integrated Resource Plan (IRP)

Chapter 1: Siemens Executive Summary

Chapter 2: Overview of IRP Methodology

Chapter 3: System Load and Energy Forecast

A. *Summary of report content and consultant recommendations*

Siemens created energy consumption and peak load forecasts for the years 2020 to 2040. Both system energy consumption and peak load are projected to grow over the next 20 years, by about 0.8 percent annually, with projected increases declining to 0.7 percent annually by the end of the forecast.

Siemens created forecasts for how energy efficiency (EE) and demand side management (DSM) programs would save energy usage over the same period. Siemens provided three potential scenarios, each of which assumed different levels of energy savings from DSM/EE programs over the next 20 years: 0.8% for the high case, 0.5% for the reference case, and 0.2% for the low case. The report does not currently contain specific information about new programming, basing all estimated reductions on current programs.

Siemens also created forecasts for the estimated adoption of electric vehicles (EV) and the impact of EV adoption on system energy consumption and peak load for the projected period. EV charging is projected to account for between 1.2% (low case) and 8% (high case) of gross load by 2040. The reference case estimate is 1.7% of gross load.

Siemens forecasts the impact that distributed solar (DS) adoption will have on the system, as well as projections for the price of installation and payback times. The projections are that customer owned solar will grow significantly over the next 20 years. In the reference case, it is expected to grow from 4,584 MWh in 2020 to 107,433 MWh in 2040 (reaching 296,958 MWh in the high adoption case).

Siemens combined the energy consumption and peak load forecasts (based on CWL's models) with their estimates of EE/DSM programs, EV adoption, and DS adoption, to come up with projections of net energy consumption and peak load over the next 20 years. Net energy consumption is projected to increase at an average annual rate of 0.3% over the next 20 years. It is expected to decrease slightly in the next ten years, before increasing due to projected EV adoption. Net peak demand is projected to increase at a higher rate over the next 20 years, since DS has a larger impact on total consumption than peak due to the peak occurring at around 5 pm in the summer.

B. *Task Force Majority Opinions and Recommendations*

- The task force notes that net energy consumption and peak load are projected to only modestly increase over the next twenty years. This is in stark contrast to previous IRPs, which projected significantly higher increases. This is in line with the recent history of CWL, where peak load and total consumption have remained relatively stable over the past 10-15 years.
- The Task Force has little disagreement with Siemens findings in this section. We do express disappointment, however, with the lack of proposed future DSM/EE programming in the report. This had been identified as a task in the original scope of work and at the last Task Force meeting with the consultant, they indicated an intention to complete this task, however, there was no date given and the Task Force is forced to assume that it is incomplete. We do not expect that the section will be forthcoming, especially in time for the Task Force to review any recommendations on future programs.

- Given that the report includes no review of current EE/DSM programming, nor any guidance for new EE/DSM programming, and with little expectation of a significant work if and when it is delivered, we recommend that Council increase funding for CWL efforts aimed at EE/DSM programs and provide guidance to the utility on new programming to meet or exceed the targets set forth in this report.

C. *Task Force Minority Opinions*

None

Chapter 4: Existing Generation and Supply Contracts

A. *Summary of report content and consultant recommendations*

In this chapter, Siemens provided an overview of current CWL generation assets. CWL's generation assets primarily operate during peaking or emergency times, as most of the electricity requirements for the city are met through Power Purchase Agreements (PPAs). Older assets may not be competitive as import capacity increases and may be targets for closures in the future.

Siemens investigated the possibility of converting Boiler #7 at the Municipal Power Plant to biomass combustion, something previously discussed by CWL. Siemens concluded that this conversion is likely not viable as the price of fuel would be excessive. The University's biomass plant already exhausts most of the regional supply of biomass fuel making it difficult to find sources at an economic price point.

Siemens investigated the possibility of upgrading the Columbia Energy Center to increase capacity. Siemens determined that the upgrades would cost more than the market price for capacity.

Siemens reviewed CWL's current and future PPAs. CWL receives 136 MW of capacity from three coal PPAs. These are life of plant contracts. CWL receives 86 MW of capacity from renewable PPAs. CWL has signed future renewable PPAs totaling 99 MW. The Boone Stephens 64 MW solar PPA is planned to start operation in December 2023. The Iron Star wind PPA (35 MW) is planned to start operation in November 2024 (depending on transmission becoming available). Siemens compared CWL's current PPAs with PPA options available on the market and found that the variable costs of CWL's coal contracts are competitive, though fixed capacity charges were a little bit higher than the current market. Siemens found that the renewable PPAs were in line with those currently available in MISO. Cheaper alternatives are available in SPP, but the point to point transmission charges erode this difference. There is an increasing number of solar projects in close proximity to the city of Columbia, with 2,414 MW of capacity under development.

B. *Task Force Majority Opinions and Recommendations*

- The report assumes that the Sikeston coal PPA is going to be retired in 2030 but this does not appear to be certain. CWL staff suggests that 2030 is the absolute earliest the Sikeston plant could be retired, but it is far from a guarantee. The PPA is a life-of-plant contract, and Siemens is not in a legal position to evaluate the contract.
- At this time, CWL should not convert boiler #7 at the Municipal Power Plant to Biomass.
- CWL should not pursue upgrades of the Columbia Energy Center at this time.
- CWL should perform a legal review of all coal PPAs to understand the options available to the utility to meet renewable obligations while under life-of-plant contracts.
- CWL and the city should continue discussions on the future of CWL owned fossil fuel based generation assets.

C. *Task Force Minority Opinions*

None

Chapter 5: Identification Screening of Future Supply Options

A. *Summary of report content and consultant recommendations*

This chapter covers future power options. Eight alternative sources for energy were identified and costs per unit of energy were determined. Table below lists the eight options identified by Siemens from most cost efficient to least.

Potential Future Power Options	Life Cycle Cost per Megawatt-Hour		
	Year 2021	Year 2030	Year 2040
Solar PV (tracking arrays)	$34	$30	$26
Wind PPA	$34	$30	$26
Landfill Gas (limited by fuel availability)	$53	$53	$53
Nat Gas (Reciprocating Internal Combustion Engine)	$76	$80	$84
Lithium Ion Batteries	$109	$80	$70
Biomass (limited by fuel availability)	$103	$100	$98
Natural Gas Aero Cycle LM 6000	$98	$104	$115
Natural Gas Aero Cycle LM 2500	$138	$143	$150

B. *Task Force Majority Opinions and Recommendations*

C. *Task Force Minority Opinions*

One member disagreed with the cost provided in the table above.

Chapter 6: Resource Generation Plan

A. *Summary of report content and consultant recommendations*

A unique feature of this report is the use of eight scenarios to forecast potential futures for Columbia's power projections. Each scenario incorporates a distinct mix of economic and demographic inputs to formulate a prediction of utility loads over the next 20 years that is matched with a portfolio of generation sources. In their analysis Siemens depicts the impacts to Columbia's energy environment within each scenario and concludes the chapter with estimates of total costs for all eight scenarios over their 20-year planning horizon. A table of the scenarios is below, listed by costs from least to highest. More detail of all scenarios can be found in the Siemens report.

Scenario	**Description of Energy / Capacity mix**	**Total Costs 20 years NPV ($Million)**	**Cost Compared to Reference (%)**
High Tech	New developments in nat gas extraction as well as in EVs, renewable energy, and in energy efficiency	$688	94.6 %

Recession Economy	Poor economic conditions, slow de-carbonization, low investment opportunities	$705	97.0 %
Reference Case	CWL achieves 100% Renewables by 2050, Columbia achieves 80% CO2 reduction by 2050 and 100% by 2060	$727	0.0 %
High Regulatory	High CO2 cost, natural gas fracking becomes regulated, high level of energy efficiency	$763	105.0 %
Early Renewable	CWL achieves 100% renewable energy by 2030. High EV penetration and high level of energy efficiency	$777	106.9 %
Mid Renewable (w/ high CO2 costs)	CWL achieves 100% renewable energy by 2040. High EV penetration and energy efficiency	$781	107.4 %
Early Renewable (w/ high CO2 costs)	Same goals as Early Renewable scenario but with high CO2 costs (with cost increases affecting fossil fuels)	$789	108.5 %
High Growth	Weather (especially warmer summers) drives loads and capacity needs. Regional electric use rises driving market prices high	$838	115.3 %

B. ***Task Force Majority Opinions and Recommendations***

- The scenarios provide eight different paths that could occur. The inherent difficulty is that selecting any one of them is a guess of our future as they are all complicated by real-world inputs that are beyond Council's control. For example, Council does not control federal mandates nor regional economic conditions which are two of the inputs into the scenario matrix. There are a total of seventeen inputs in all. Another option for council would be to provide directions on inputs in which it does have control over. These include when goals for 100% renewable energy and carbon reduction should be achieved, or which levels (high,medium,low) of energy efficiency programming and electric vehicle penetration should be targeted. Staff could then incorporate those directives into actions and portfolios by adopting future development that is best aligned with the scenarios incorporating council's decisions.
- The Task Force recommends that the City Council pursue a revision or replacement of the Renewable Energy Ordinance, setting a date for the utility to achieve 100% Renewable Energy by the earliest achievable date while considering affordability, which should provide staff with needed direction for future programming and power supply acquisitions.
- The Task Force also recommends that staff pursue programs and action to achieve the higher targets for Demand Side Management (DSM), Energy Efficiency (EE), and Distributed Energy (DE) that are identified in the report.

C. ***Task Force Minority Opinions***

- Task Force minority opinion is preference for the Early Renewable scenario. We recognize that this may be difficult to achieve and, if that proves to be the case, to strive for a 100% renewable energy portfolio by the earliest date possible. (2 members shared this view)

Chapter 7: MISO vs. SPP Membership Assessment

A. *Summary of report content and consultant recommendations*

Siemens was asked to evaluate the CWL association with Regional Transmission Organizations and whether CWL should consider joining the Southwest Power Pool (SPP) instead of continuing their association with the Midcontinent Independent System Operator (MISO). Analysis was performed utilizing the above referenced scenarios.

Based on the Reference Case, Siemens concluded that potential wheeling costs would far exceed the potential savings from lower PPA prices by joining SPP (page 136). Wheeling charges are the cost for importing energy from another RTO. SPP's charges are somewhat higher than MISO's. However, under the Early Renewable scenarios CWL has the most potential to benefit from joining SPP with 100% of the load being supplied by renewable generation in 2030 (page 136).

B. *Task Force Majority Opinions and Recommendations*

- Columbia joined MISO at its formation in early 2000s. Columbia's location is near the border between MISO and SPP, but with most of the existing power contracts residing within the MISO territory, it was logical to join the MISO operations.
- The option of moving Columbia to the Southwest Power Pool (SPP) should be revisited after Columbia makes a decision regarding renewable energy goals. This would influence the amount of coal based energy that would need to be imported and hence the amount of wheeling charges to be incurred.
- When the decision is made on CWL goals, the issue of joining SPP should be reviewed approximately 8 years in advance of reaching 100% renewable energy.

Chapter 8: Value of Solar (VoS) Study

A*. Summary of report content and consultant recommendations*

Utility Financial Solutions, LLC (UFS) was engaged by the Siemens team to provide guidance on the valuation of solar for the City of Columbia Water & Light (CWL). UFS used the avoided cost/utility savings methodology to calculate the values, considering short-run marginal costs. The savings were calculated by solar weighted market pricing, variable transmission costs, predicted capacity purchases savings plus distribution system loss savings.

The purpose of this report is to identify the average kWh value of electricity produced by customer installed fixed array rooftop solar. There are many factors and considerations for calculating the current and potential future value of solar. With the study based on current market pricing UFS recommends that the value be updated annually or updated as a part of the CWL rate making process or when significant assumptions change.

The study was carried out using the following assumptions:

Table 25: fixed array: Value Breakdown

Solar NREL Fixed Roof Mount 7.95 KW DC	
With Loss Savings (behind customer meter)	

Annual	per kWh	
$ 265.20	$ 0.02422	Energy Value (CLWD hrly price node for 2021)
$ 16.98	$ 0.00155	Capacity (1 CP X 6 Year av annual auction
$ 3.31	$ 0.00030	Transmission - Delivery
$ 19.43	$ 0.00178	Delivery
$ 304.92	$ 0.02785	Total Average KWh Value

For smaller customer installed rooftop fixed arrays the VoS was calculated to be 2.8 cents per kWh. The detailed calculations and assumptions used in the analysis are listed in subsequent sections of the report. Large solar installs (as defined by CWL policy) should be valued on a per case basis. Energy savings value portion is expected to be 2.4 cents per kWh.

UFS provides below general recommendations that CWL should consider when integrating distributed solar to its system:

i. Eventual move for all customers toward rate structures having a demand or Time of Use (TOU) component
ii. Right sizing - (within allowed sizing of CWL's interconnection policy), for example allow solar install up to lesser of 100% of a customer's peak demand "before solar" or 100% of a customer's average annual kWh usage "before solar" (net zero)
iii. Metering, billing and strategies: Final metering and billing options selected by CWL are ultimately based on their management and governing Body preferences. It is often based on a combination of philosophy preference as well as metering and billing capabilities of CWL. Many utilities are adopting multiple approaches depending on the size of solar install. The most common method for smaller, rooftop solar installations is net billing. The most common method for larger solar installations is buy-all-sell-all – (This is the closest to provide services at cost of service.) Many utilities, however, are moving toward a more robust rate structure. At a minimum, all rates (including residential rates) should evolve to include demand component(s). In general, the closer CWL can get their kWh retail rate (energy component) to match their marginal power supply costs, CWL should be more indifferent to customer-installed generation.
iv. It is critical to consider battery value based on utility demand management vs power quality in future studies.
v. CWL management should track and allocate future costs to be charged back in support of distributed solar for the basis of updating the future value of solar calculation.

UFS recommended the following for inclusion in a future study:

The State of Missouri currently does not have a formal Renewable Energy Credit (REC)/Solar REC program. **UFS recommends that CWL explore the REC/SREC value for solar to be studied**. If self-directed benefit by CWL, this may need to be paid by other CWL rate payers. Currently, RECs have a value to CWL and have spent money on RECs for RES compliance, which was not reflected here.
UFS recommends that CWL explore the value of solar with batteries. The maximum battery value is usually calculated by charging and discharging the battery around reducing the utility capacity and/or transmission peaks ("utility demand management or peak shaving") or achieving energy arbitrage. If this cannot be accomplished, it is actually possible for a battery to have lower and even a negative value. This is due to energy loss when a battery is charged and discharged. This is often referred to as battery "round trip efficiency". It is common to lose around 15% of the electricity when storing and discharging a battery.

Depending on a variety of factors, it may be useful to configure an appropriately sized battery to be integrated with the renewable generation and configured to operate as a “power quality” battery vs. a “utility demand management or peak shaving” battery to support power quality. This often depends on a variety of factors such as the size of distributed generation resource, percent of renewables penetration vs. non-renewable, minimum and maximum feeder loadings vs. total renewables. Batteries run in power quality or blended mode generally do not realize as high of value due to their reduced ability to maximize utility demand management savings.

Potential **environmental and social values** were not considered in this study. This is due to these values not currently being identified as an actual expense to the utility. It is possible that future requirements may be introduced to have an actual dollar value to the costs of the utility. It is recommended that CWL consider adding this potential, future value if it becomes a true cost. Some utilities are electing to add this value on their own. This would be at the discretion of CWL Management and Governing Body. **UFS recommends a study if this becomes the case.**

B. ***Task Force Majority Opinions and Recommendations***

- **Task Force recommends Council not rely on this value of solar study** to represent the total value of solar in Columbia
- Task Force recommends a follow-up study be conducted to include a wider set of input variables to reflect the interests of the community, primarily environmental and societal valuations.
- Task Force expectations were that the study would include environmental and societal values. These were not conveyed to the consultant’s sub-contractor. As a result, the value for solar in Columbia was ranked at the lowest end compared to 11 other Values of Solar, in a 2016 study (figures 1&2 in Appendix A). The consultant's report is not a comprehensive representation of values for solar in Columbia.
- In the current state, the VoS study cannot be used to advance any environmental or climate goals and could potentially be used to advocate against local photovoltaic investments in Columbia and other locales.
- Missing variables in this study include avoided base load plant, O&M, grid infrastructure savings, ITC federal tax credit consideration, job creation, grid reliability/resiliency, and societal & environmental benefits including consideration for the goals set forth under Columbia Climate Action Plan findings.

Chapter 9: AMI and Smart Grid Assessment

A. ***Summary of report content and consultant recommendations***

The U.S. Department of Energy (DOE) describes the Smart Grid as “an intelligent electricity grid—one that uses digital communications technology, information systems, and automation to detect and react to local changes in usage, improve system operating efficiency, and, in turn, reduce operating costs while maintaining high system reliability.”[1]

One foundational component of the smart grid is Advanced Metering Infrastructure (AMI). The U.S. Department of Energy calls AMI an “integrated system of smart meter, communications networks, and data management systems that enables two-way communication between utilities and customers”

1

which has “the ability to automatically and remotely measure electricity use, connect and disconnect service, detect tampering, identify and isolate outages, and monitor voltage…AMI also enables utilities to offer new time-based rate programs and incentives that encourage customers to reduce peak demand and manage energy consumption and costs.”

The Siemens’ AMI and Smart Grid Assessment provides an extensive list of benefits:

Benefits to Customers

- ☐ Quicker notification of service problems
- ☐ On-demand meter reading
- ☐ Customer usage portal with hourly usage data
- ☐ New rate structure enablement
- ☐ Prepaid metering options
- ☐ Home energy management solutions
- ☐ Modern demand response programs

Benefits to Electric Utility

- ☐ More efficient service restoration
- ☐ High & low voltage notifications
- ☐ Improved system monitoring
- ☐ Reduced utility revenue loss
- ☐ Reduced system demand & energy loss

Benefits to Water Utility

- ☐ Eliminates visual reading of meters
- ☐ Eliminates ad hoc replacement of failed batteries
- ☐ More efficient use of customer service reps time
- ☐ Improved system monitoring
- ☐ Reduced utility revenue loss
- ☐ Better matching of supply and demand to reduce energy usage/cost
- ☐ Better pressure management

Benefits to Other Areas

- ☐ Positive contribution to Columbia’s CAAP including less vehicle usage for meter reads

Siemens recommends that CWL should immediately stop installing the Itron Bridge Electric meters. This meter platform may be reliant on a communications technology in the process of being retired by the manufacturer.

Siemens also recommends that CWL issue a request for proposal for an AMI System project, the likely savings to CWL could approach $6-8 million through the competitive bid process.

Summary of capital investment using existing contracts and unit prices:

Electric Meter Infrastructure & Install Costs	$22,804,870
Water Meter Infrastructure & Install Costs	$7,711,635
Communication Infrastructure & Install Costs	$335,000
AMI Software	$1,261,000
Total Capital Investment	**$32,112,505**

B. ***Task Force Majority Opinions and Recommendations***

- The Task Force agrees with Siemens' recommendation to stop installing the Itron Bridge Electric meters as soon as reasonably possible. The Task Force recommends the City Council direct CWL to confirm Itron's technology roadmap for the Itron Bridge Electric meter compared to the vendor's current communication's system offerings. This meter platform may be reliant on a communications technology in the process of being retired by the manufacturer.
- The Task Force agrees with Siemens' recommendation that CWL issue a request for proposal for an AMI System Project as soon as reasonably possible. The Task Force acknowledges that the deployment of an AMI system will likely be a multi-year project.
- The Task Force recognizes that the capital investment associated with an AMI System Project must be weighed against other utility system needs and the city's financial constraints and therefore cannot be implemented immediately.

C. ***Task Force Minority Opinions***

None

Volume 2: Master Plan Transmission and Distribution

Chapter 3: Spatial Load Forecast:

Chapter 4: Substation Expansion and Coverage Areas; and

Chapter 5: Distribution Network System Assessment

A*. Summary of report content and consultant recommendations*

In these chapters, Siemens evaluated the CWL electric distribution system. This assessment included system load forecasts and evaluation of substation coverage areas with recommendations for needed updates to the distribution network-increased use of electric vehicles were also evaluated. Siemens provided a detailed distribution system network analysis with recommendations to address potential overloading conditions both in normal forecasted growth and emergency system conditions.

Siemens concluded that there are no significant distribution overload concerns in the short term of less than 5 years, however substation and feeder expansion projects will be needed by 2030 to avoid overload issues at the Perche, Blue Ridge, Grindstone, Hinkson, Rebel Hill, and Bolstad substations.

Up to 77.8 MW of additional distributed solar power is forecasted within the service territory by 2040 with most installed by commercial customers. This installed solar will help offset some load growth.

Siemens also determined that a new substation, including the previously proposed Millcreek substation, is no longer necessary if the distribution system is updated and re-balanced per Siemen's recommended capital projects and improvements to address anticipated growth and overload conditions.

A total of $51 million is estimated for projects over the 20-year study period, with most projects, approximately $41.5 Million recommended within the next three to five years. Projects include: additional and upsized circuits, added distribution and transmission level transformers, and more distribution capacitors for voltage and power factor management.

Siemens did explore a Non-Wired alternative as part of the distribution system evaluation for an area south of Perche Creek substation, however it was determined to be a much higher cost at this time compared to a standard wired solution.

B. *Task Force Majority Opinions and Recommendations*

- The Task Force agrees with the updated modeling, engineering design standards, spatial load forecast, and the level of detailed analysis of the distribution system completed by Siemens.
- The Task Force supports the recommended distribution upgrade projects to address load growth. The Task Force recognizes completing $41.5 million in distribution system projects with the next three to five years is not logistically or financially realistic. The CWL engineering staff shall continue to evaluate and prioritize each of the recommended projects to strategically include within the CWL's capital planning process.
- The Task Force agrees with Siemens that the proposed Mill Creek Substation is no longer needed if the recommended distribution projects are implemented. However, we recognize another distribution substation may be needed within the community during the next 20 years depending on growth.
- The Task Force recommends that CWL shall maintain its distribution planning and engineering effort to ensure the system continues to provide reliable, safe and cost effective service.
- The Task Force recommends that CWL consider Non-Wired alternatives for future distribution projects where applicable as the costs of these technologies are expected to be more competitive in the future.
- The Task Force does not recommend any specific Council actions at this time. Distribution projects will be brought to the Council per the capital project planning and approval process already in place.

Chapter 6: Transmission System Assessment

A. *Summary of report content and consultant recommendations*

The transmission study was carried out over a 10 year time horizon assuming summer peak loads listed below. Modeling was conducted without deployment of the Columbia Energy Center or Plant Generation).

Year	Predicted Peak Load for Transmission models	
Year 2020	273.1 MW	
Year 2025	274.7 MW	(would be 276 MW without distributed generation)
Year 2030	274.2 MW	(281 MW without distributed generation)
Year 2030 (high load)	296.0 MW	(300 MW without distributed generation)

Siemens studied the following transmission options in their modeling:

Option Z: Building a 161kV line connecting Perche Creek and Grindstone substations. This option is a revision of the original Option A, with the 161KV line between Perche and Grindstone kept to its originally proposed route, however the Mill Creek substation was removed as Siemens determined that a new substation was not needed at that location. Also removed was a second 161kV line that existed in the original Option A connecting the proposed Mill Creek substation to the McBaine substation.
Option B-2: Building a 161 kV line connecting Perche Creek substation to McBaine substation. Approximately 40% of this route is owned by the City which would reduce costs associated with property acquisition.
Option E-2: Building a 161 kV line connecting Perche Creek substation to Bolstad substation.
Option F: Creating a 345 kV interconnecting line between an existing Ameren substation west of town and the Perche Creek substation.
Option W: Rebuilding the existing 69kV line between Perche Creek and Hinkson Creek substations to carry both the existing 69kV line and a new 161kV line. Additionally, building a 161kV connector between Hinkson substation and Grindstone substation. This option keeps the existing 69kV line, and adds a new 161kV line on the existing route.
Option NWA: Building a 30 MW photovoltaic array (presumably located west of Columbia) and installing 27 MW of energy storage, with a Point of Interconnection (POI) at Perche Creek substation. This option is added as a reference as it was analyzed in the Master Plan B.

Siemens ranked the above options from a technical point of view with consideration for their ability to handle forecasted loads with N-1-1 vulnerabilities, and for other parameters. Option W ranked higher than Option F (see report for ranking details). Option F would require interfacing with Ameren.

Siemens also ranked the options by cost. Option Z was the least cost option, followed by F and then W (see report for details)

In their analysis of our transmission system Siemens determined it is currently in compliance with NERC (North American Electric Reliability Corporation) requirements and will continue to be in compliance for the foreseeable future, without any changes to the transmission system.

Siemens identified two scenarios which could create the need to shed load. Load Shedding is the controlled reduction of power to selected portions of the distribution system on a rotating basis. These scenarios involve failures at two points in the transmission system, an N-1-1 situation. The two scenarios identified would involve failures occurring simultaneously at critical points and during times of high load and would require the utility to shed load. Siemens estimated the likelihood of these events occurring is approximately every 100-200 years. This is equivalent to a 0.5% - 1% chance of occurrence in any year.

The City has an acceptable load shedding plan in place should we ever need to deploy it. Implementing the load shedding plan may become necessary should a “do nothing” option be chosen.

The previously proposed Mill Creek substation is no longer necessary. In the event we decide to add a substation on the south side of the CWL service territory, Siemens recommends identifying a location that is further to the south and west, closer to the water treatment plant.

In general, load growth over the planning horizon is expected to move towards the northeast of the transmission system.

The University of Missouri may request up to 40 MW of firm capacity in the future.

B. *Task Force Majority Opinions and Recommendations*

- The Task Force recognizes that since CWL is in compliance with all NERC requirements, the utility is not required to do anything to our system to remain in compliance for the foreseeable future.

- Option W (described above) provides the flexibility to accommodate potential capacity requests from the University of Missouri in the future. It also incorporates a rebuild of the Hinkson substation which is highly recommended due to the flooding vulnerabilities that were demonstrated in the flash-flood event of June 2021. It could also likely prevent the need for potential load shed in an N-1-1 contingency.
- If the CEC (Columbia Energy Center) dispatch is considered as part of the utility response in N-1-1 transmission contingencies, Option W should be capable of handling all modeled events throughout the planning horizon.
- Option F has best "ranking score" (lowest load value) according to Siemens analysis, indicating that it results in the lowest loading of the critical elements for the various contingencies and scenarios. However, the costs of interconnection with Ameren are unknown, and costs to own and maintain 345kV equipment and line could mean increased operations and maintenance costs.
- A majority of Task Force members supported putting Option W forward as our first recommendation to Council, with agreement for Option F and B2 being secondarily recommended, but in no particular order. The Task Force conducted a poll of its members to gain insight into opinions regarding covered options. The results of the poll are presented in a matrix in Appendix.

C. *Task Force Minority Opinions*

There was a minimal amount of support (2 votes) for the Non-Wires Alternative identified by Siemens.

Today, we have many non-wire solutions available, and we should thoughtfully consider and implement them before we spend tens of millions of dollars on transmission lines or other hallmarks of the centralized energy systems of the past. Instead, we should envision and build the decarbonized, decentralized energy system of the future, such as through local, renewable energy sources and similar smart grid functionalities.

Chapter 7: Standards Review

Chapter 8: Capital Projects

A. *Summary of report content and consultant recommendations*

The Siemens Master Plan's Capital Project summary appears in Chapter 8. It is divided into sections for Transmission investments, and Distribution investments. Each of the capital projects described in this section pertain to specific projects identified in Chapter 5 and are only referenced in this Chapter according to the number assigned in Chapter 5.

Transmission: The principal focus of transmission investments relates to Siemens's summary and recommendation for CWL's N-1-1 challenge defined earlier in the Master Plan and described in greater detail of the Task Force Report for Chapter 6. Though Siemens makes a series of recommendations in its earlier analysis, it addresses the Task Force's specific request for an analysis of costs for non-wire alternative solutions. Non-wire projected costs are set forth in 8.1 and are projected to be more than 100% higher than the core group of alternatives discussed in Chapter 6.

Distribution: With respect to the distribution investments, the reporting is far more detailed than for the transmission summary. The Master Plan's distribution subsection begins by expressing a series of assumptions made by Siemens which are defined with the benefit of Siemens's technical expertise and experience pertaining to the establishment of: project prioritization methodology, unit cost and capital expenditure methodology, and CWL's overall capital expenditure budget –

Following the presentation of the various methodologies and resulting budgets, Siemens offers its recommended order of priorities of twenty (20) separate capital projects it considers necessary to complete over the next eighteen (18) years. Total projected costs are $51 million with more than 80% of that figure recommended to be spent by 2025.

After offering its priorities for those capital projects, Siemens breaks down the elements of each project over a series of sections divided primarily between each project's anticipated principal components such as underground cable; feeders (new and existing); breakers and switches; distribution transformers; and capacitor banks.

B. ***Task Force Majority Opinions and Recommendations***

- The Task Force accepts the methodology provided for determining project prioritization and the various categories defining its composition.
- The Task Force accepts the methodology provided for determining unit costs in capital expenditures and defers to CWL staff for any divergence of opinions relating to costs.
- The CWL overall capital expenditure budget includes timing for expenditures that demonstrates that the Capital Projects analysis did not include a careful review or consideration of CWL's financial condition or borrowing capacity. Projecting $41.5 million in expenditures in the next 3.5 years is not realistic logistically or financially.
- In terms of the Siemens project prioritization methodology, the Task Force recommends deferring to CWL staff's existing process for determining capital improvement project priorities. While we agree with the Siemens methodology, some elements of that methodology may evolve or change when measured against the prospect of a modified timetable necessitated by CWL's logistical and financial realities/limitations. In such a case, the Task Force assumes that CWL staff will adjust and modify each consideration to assure that the influences of capital project decision making are up to date with the needs and challenges facing CWL at that time.
- Because the projected costs of the Capital Projects far exceed CWL's financial capacity to undertake and complete at this time, the Task Force recommends that City Council, Columbia Water & Light staff, and the Water & Light Advisory Board develop a capital plan and priority list for the Capital Projects to manage the financial divide between available resources and project needs.

<u>Comment on Non-Wire Solutions (NWS)</u>

During the spring of 2021 Siemens was asked to add to their scope of work a review of the possibility of a Non-Wires Solution approach to Transmission and Distribution issues. The results of that are included in several references in their report. The following are comments/observations and recommendations by the Task Force on the NWS portions of the report:

- The Task Force was disappointed that the Siemens report was limited in its coverage of non wired solutions. In one instance, Siemens considers one configuration of a NWS, which is a photovoltaic and battery system at Perche Creek. The Task Force agrees that this particular NWS at this specific instance would be technically feasible, though not necessarily optimal.

- The Task Force would have liked to see more non-wire solutions and demand side management programs considered. NWS are programs, policies, and technologies that complement and improve operation of existing transmission and distribution systems and defer or eliminate the need for upgrades to the transmission and distribution systems.*

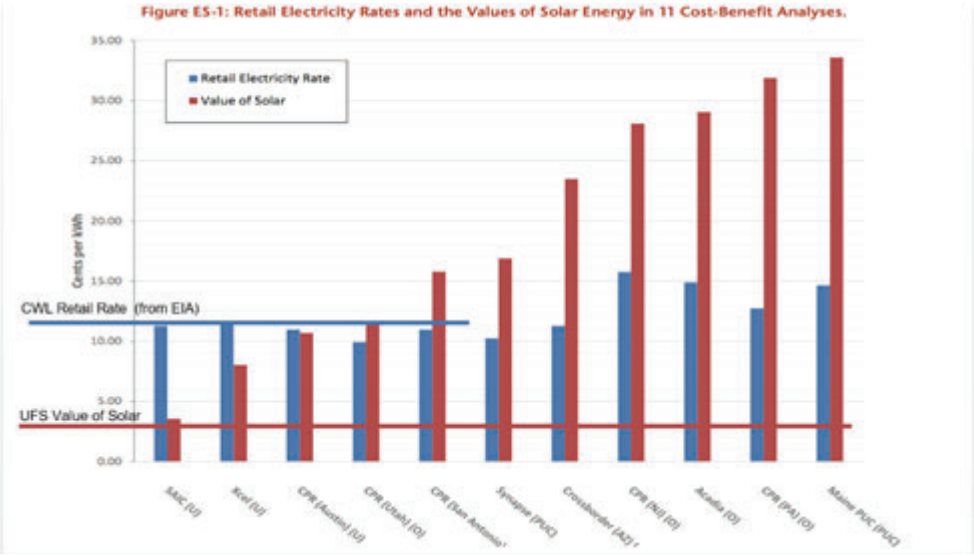
- The Task Force believes that the full spectrum of NWS should be considered and implemented based on cost effectiveness. CWL has been successfully using NWS for many years, in the forms

of efficiency programs, energy audits, solar rebates, etc. Our NWS have helped flatten our usage for 15 years, deferred or eliminated the need for more wires, and saved both the utility and the citizens money.

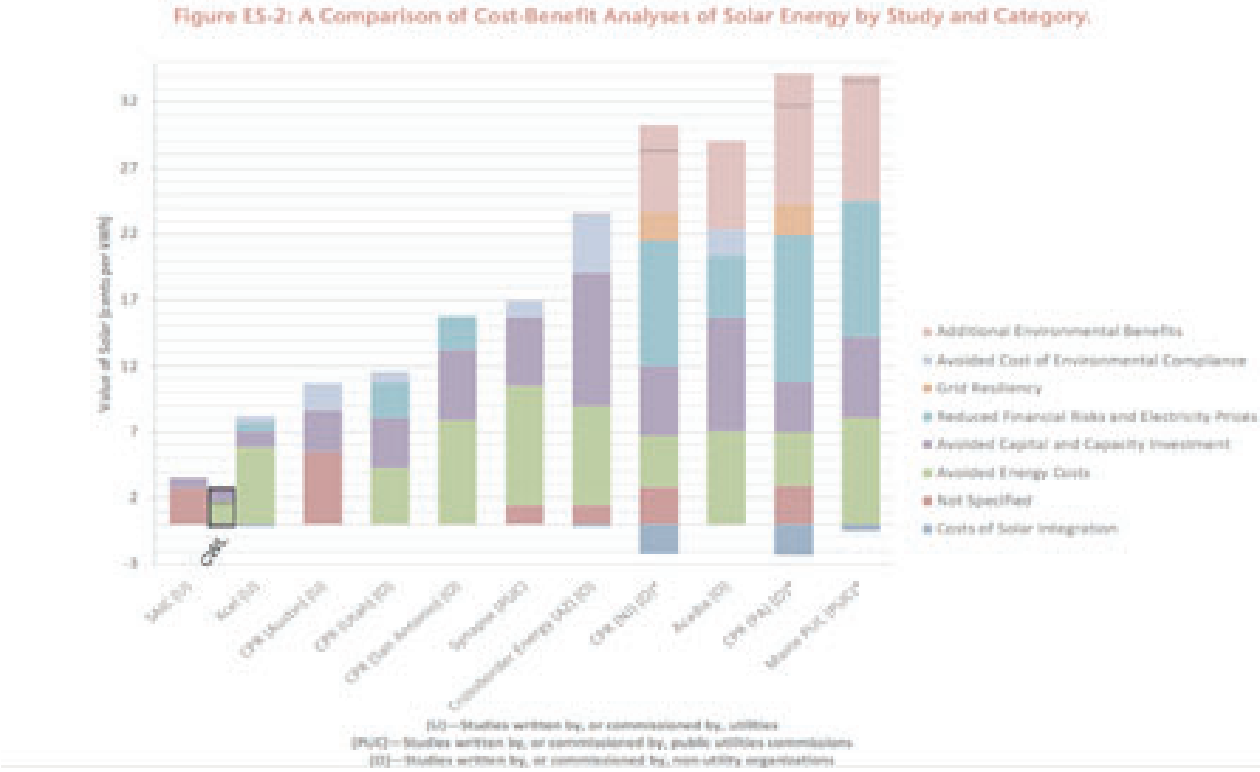
- The Task Force majority recommends an increase in the use of NWS, particularly with regard to building codes, distributed solar and storage, and a rate structure that incentivizes efficiency and conservation throughout all customer classes. NWS should be included in CWL standard engineering practices on a routine basis, at all scales.

* "*Updating the Electric Grid: An Introduction to Non-Transmission Alternatives for Policymakers*," USDOE, 2011

Appendix A (Value of Solar Study)



Adapted from: Shining Rewards: The Value of Rooftop Solar Power for Consumers and Society, by Gideon Weissman, of Frontier Group, and Bret Fanshaw, of Environment America Research & Policy Center, October 2016
Modified to depict the value of solar in Columbia as identified by UFS in IRP Report by Siemens 2021.
mahb.stanford.edu/wp-content/uploads/2016/12/77NYE-ShiningRewards-Rpt-Oct16-copy.pd



Adapted from: Shining Rewards: The Value of Rooftop Solar Power for Consumers and Society, by Gideon Weissman, of Frontier Group, and Bret Fanshaw, of Environment America Research & Policy Center, October 2016
Modified to depict the value of solar in Columbia as identified by UFS in IRP Report by Siemens 2021.

mahb.stanford.edu/wp-content/uploads/2016/12/77NYE-ShiningRewards-Rpt-Oct16-copy.pdf

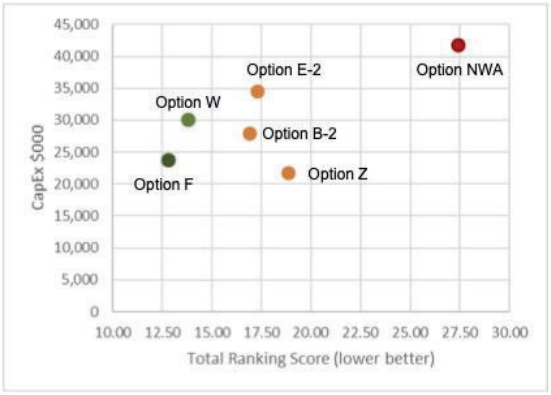
Appendix B Task Force Members Poll on Transmission Options and Graphs from Siemens Analysis

	Simens Option "W"	Siemens Option "F"	do nothing at this time	Siemens Option "B-2"	Siemens Option "NWA"	Siemens Option "E-2"	Siemens Revised "Option A" now called 'Z"
	rebuild exising 69kV Perche-Hinkson-Grindstone to include new 161kV line. Also updrade Hinkson substation or relocate outside of floodway	creating an interconnect with Ameren 345kV line northwest of Columbia, and adding 161kV from that interconnection to Perche Substation	do nothing w/ transmission expansion at this time, ensure appropriate load shedding plan in place now, and reevaluate needs during next planning process	161kV line from Perche to McBaine, approximatly 40% of this property is already owned by the City	30 MW of photovoltaic and 27 MW of energy storage at Perche Creek 69 kV. This option is added as a reference as it was analyzed in the Master Plan	Option E - north of town along existing Ameren route	161kV from Perche Creek to Grindtone, without a new substation
Task Force support for each option	10 out of 11	9 out of 11	9 out of 11	8 out of 11	2 out of 10	0 out of 10	0 out of 10
approximate distance of line	iles . (- 4 miles Perche to Hinkson and - 6 miles Hinkson to Grindstone)	15.4 miles. (~2 miles from interconnect to Perche and ~13.4 from interconnect to Bolstead)	N/A	~ 11 miles	N/A	~13.4 miles	~ 8 miles
meets NERC requirements	yes	yes	yes	yes	yes	yes	yes
meets potential n-2 contengincy (rare circumstance where utility might be required to shed load)	yes	yes	yes	yes	yes	yes	yes
does it meet potential University of Missouri request for firm capacity	potentially	potentially	not likely	potentially	not likely	potentially	potentially
adds renewable to utility protfolio	allows import	allows import	allows import	allows import	yes	allows import	allows import
estimated cost	$33,033,000	$23,683,000	N/A	$27,964,000	$41,730,000	$34,584,000	$21,735,000

Conclusions and Observations

SIEMENS

- Considering Cost and Ranking (see figure to the right) we observe that Option F seems to be the preferred with a capital level similar to Option Z but much better performance. It requires the CEC to address AECI overloads.
- Option Z is the least cost, but it requires the CEC, has high loadings and some overloads in AECI system under 2030 and High Load are not resolved and high
- Option W and Option B-2 have similar cost, but option W has much better performance and relies much less on the CEC to address AECI overloads.
- In summary and based on the above it is our opinion that CWL should pursue two parallel paths for the development of Option F and Option W.
- Option F has risk as it depends on agreements with Ameren and Option W requires expanding a transmission corridor in an urban setting, which has risks.



 Contains CEII Information do not release

Siemens Energy Business Advisory

Appendix C

Task Force Mission Statement

Link to Council Resolution: Adopted - R36-18A.pdf

Task Force Duties *extracted from Council Resolution* :

SECTION 1. There is hereby established an integrated Electric Resource and Master Plan Task Force. lts purposes include the following:

- Assist City staff and City Council in the planning and rate-setting process associated with the preparation of an updated Integrated Electric Resource and Master Plan in 2018.
- Ensure public participation throughout the planning process.
- Review the forecasted capital needs and rate structure based on:
    - Capacity requirements;
    - System reliability;
    - Economic viability
    - Customer satisfaction;
    - Stakeholder needs;
    - Cost of service recovery;
    - System equity charge; and
    - Renewable energy.
- Determine the costs of expanding the capacity of the Electric Utility's transmission and distribution system to accommodate a growing number of customers, which includes:
    - A review of the current mechanism for recovering those costs;
    - A review of other potential strategies for recovering those costs, including, but not limited to the "system equity connection fee" method and "line extension policy"; and
    - Recommendations to City Council on how to recover those costs.
- Review the plan for continued compliance with established electric system planning criteria.
- Assist staff in developing projects and capital programs which implement strategic goals and initiatives.
- Assist staff in identifying specific generation, transmission, substation, distribution system, and distributed generation improvement projects, budgets and schedules.
- Assist staff in identifying long-range property and right-of-way acquisition requirements. Any other matters referred to the Task Force by the City Council.

Appendix D

Siemens Scope of Services

Link to Siemens full contract: Contract with Siemens Sept 2019.pdf

Siemens Scope of Services *extracted from contract* :

PART I – INTEGRATED RESOURCE PLAN:

1. Conduct a load forecast of at least 5 years, but preferably 10 years or more to determine the electric energy and capacity requirements of the City of Columbia as a whole. Develop a model for which the City of Columbia may run scenarios based on values of different variables. Include the model as a deliverable. Disclose all assumptions utilized in the creation of the model.

2. Review all current generation and capacity import contracts. Indicate when those contracts that will need to be renewed and/or that may be approaching end of life. Evaluate the status of the contracts and address the options available to the City of Columbia regarding these contracts. Evaluate the marketability of the contracts.

3. Review local generation assets. Predict useful life remaining of current local assets using existing condition assessments or prudent industry standards. Examine the viability of maintaining ongoing operation of existing generation and compare to building new local generation or increasing portfolio of import contracts. Examine the costs and benefits of converting a retired local generation unit from coal fired boiler to biomass fired boiler. Examine the cost and benefits to convert gas turbine units to combined cycle units for improved efficiency and added capacity.

4. Develop a resource utilization plan. Identify the utilization of resources and types of units selected to meet future needs and other factors of interest to permit an understanding of the potential future resource needs. In the plan identify strategies that would meet or exceed the minimum renewable energy and greenhouse gas emission requirements established by the City of Columbia. Existing goal is for 15% renewables at present; 25% renewables by 2023; 30% by 2029; and potentially 100% renewables at some future date within the next 40 years. Take into account results of the City of Columbia's Climate Action and Adaptation Plan currently in progress. Currently adopted community wide greenhouse gas emission reductions levels are: 35% by 2035, 80% by 2050, & 100% by 2060. Currently electric use is credited with 45% of emissions. Request for Proposal 140/2018: Electric Integrated Resource and Master Plan Page 7 of 10

5. Conduct sensitivity studies. Recommend sensitivities, to be examined. Include load growth, cost, reliability and resiliency, renewable expectations, climate regulation, and adoption of new technologies such as electric vehicle charging, increased use of heat pumps, and increased customer solar utilization as mandatory sensitivities.

6. Review current demand side reduction programs with regard to participation, participation potential, costs and results of the programs. Determine the appropriateness of existing demand and energy

Appendix D Siemens Scope of Services (cont'd)

reduction programs and make recommendations regarding the continuation of these programs. Determine the impact to existing programs due to current and future state and federal efficiency standards, rebates, or tax credits. Recommend any new programs or technologies that would increase the effectiveness of demand side and energy reduction programs.

7. Evaluate the potential for expanded use of private and public distributed generation and storage to contribute to the energy and capacity requirements of the City of Columbia. Examine the effectiveness

and appropriateness of distributed energy resources such as, but not limited to, neighborhood and rooftop solar arrays, energy storage, and industrial customer generation as a means to curtail energy and capacity requirements.

8. Evaluate CWL's position as a MISO member vs. SPP. Evaluate and compare the availability of renewable energy in SPP and MISO.

9. Conduct a value of solar study. Evaluate how City of Columbia customers benefit from the proliferation of net metered solar including the solar incentive program costs and accounting for all costs, benefits, and opportunities involved.

PART II – MASTER PLAN

1. Determine the load serving ability of the CWL service territory. Conduct a spatial load forecast to determine the localized load serving ability for various locations within the City of Columbia distribution service area. Take into account potential growth, redevelopment, and energy efficiency improvements, private solar generation, other private distributed generation, and proliferation of new technologies such as energy storage and electric vehicle charging stations when conducting the load forecast.

2. Determine the appropriateness of using battery storage, utility provided solar, or other distributed generation as options for serving local load serving ability needs. Include how these options could be used to prolong investments in the distribution system.

3. Review existing CWL standards for system reliability. Make recommendations to modify the City of Columbia electric engineering standards by taking into account economic viability, customer satisfaction, and best practices of the electric utility industry. Determine the risks associated with the standards. Document the standards in such a manner that they can be implemented as an official City of Columbia policy. Recommend a process in which standards are reviewed and updated. Document the Request for Proposal 140/2018: Electric Integrated Resource and Master Plan Page 8 of 10 NERC function types for which the City of Columbia is registered. Evaluate the appropriateness of each of these registrations.

4. Make recommendations regarding the expansion of the City of Columbia transmission system. Recommendations must take into account established NERC and other regulatory standards, requirements of the MISO ISO and established or modified CWL standards for system reliability. Evaluate CWL's transmission system as a MISO member bordering SPP and AECI territories and determine how that affects regulatory requirements. Address the needs of the transmission level interconnections with the University of Missouri and City of Fulton when making the recommendations.

5. Make recommendations regarding the expansion of the City of Columbia distribution system. Recommendations must take into account existing or modified standards for system reliability. Take into account the localized growth of the system to determine recommendations regarding how to provide adequate capacity for that growth.

6. Review the capital projects currently forecasted by CWL and determine if they are in keeping with the recommendations established by the master plan. Identify projects that may be unnecessary. Identify projects that might be considered to meet established recommendations. Determine the prioritization of these projects.

7. Review the costs and benefits of adaptation of AMI metering or other "smart-grid" technologies.

Appendix E Chronology of IERMP Meeting Dates

2018	7/11/18	9/27/18	10/25/18	11/12/18	
2019	1/24/19	2/4/19	2/11/19	2/28/19	3/14/19
	3/19/19	4/9/19	4/16/19	5/23/19	6/5/19
	7/25/19	8/22/19	10/1/19	10/24/19	11/13/19
	11/21/19	12/9/19			
2020	1/14/20	1/23/20	2/27/20	7/8/20	7/30/20
	8/12/20	8/27/20	9/23/20	10/28/20	11/12/20
	11/17/20	12/15/20	12/23/20		
2021	1/6/21	1/28/21	2/16/21	2/25/21	3/16/21
	3/25/21	4/15/21	4/28/21	5/13/21	5/17/21
	5/27/21	6/24/21	7/22/21	8/26/21	9/1/21
	9/23/21	10/7/21	10/14/21	10/28/21	11/16/21

Appendix F

Task Force

Public Comments

Link to public input meeting video:

https://gocolumbiamo.granicus.com/player/clip/2531?view_id=13&redirect=true

city of Columbia

Christian Johanningmeier <christian.johanningmeier@como.gov>

Electric Service Planning

2 messages

Sarah Read <sjread@buildingdialogue.com> Thu, May 13, 2021 at 4:48 PM
To: Jay Hasheider <rabbitfields@gmail.com>, Christian Johanningmeier <christian.johanningmeier@como.gov>

Dear Sirs, I am writing as a citizen and W & L customer to share some concerns about the current electric service planning processes which I have been trying to follow through the meetings of the various boards, task forces, and Council.

First, it is not clear what baselines will be used for comparing different options, and a baseline is needed for both sound analysis and clear communication on the relative merits of different options.

The baseline for evaluating the various transmission/distribution options should be the plan previously known as Option A. We know what the route, cost, reliability benefits, and long term value were for that Option and we deserve to know how other options compare. On a related note, we also should have a full accounting of the costs we have incurred as a result of the Council's "pause" of that line, including both direct costs such as the bond interest payments (which represent one cost of delay) and increases in the cost of construction, as well as the indirect costs such as those incurred adding feeders to the Rebel Hill substation in order to free up capacity downtown after Option A (which would have met that need) was paused.

I note that in a recent Council meeting it was reported that the consultants had "indicated an additional substation was not necessary" (IERMP Minutes 3/16/21). I respectfully submit that whether a new substation is "necessary" is the wrong question. The right question is "How do we best engineer our system for safety, reliability, cost-effectiveness, and long term value?" Clearly new investment is needed and several new feeders and transformers are being recommended by the consultants, but the key design question of how to best engineer for safety, reliability, cost-effectiveness, and long term value appears to be being avoided. This sense that we are working around Option A rather than evaluating it as a known and appropriate baseline option was reinforced by the Mayor's asking at the January 19, 2021 Council meeting whether any scenarios would include "high voltage power lines down Nifong Boulevard," and Mr. Hashheider's response that he did "not believe it would include that scenario per se" (Council Minutes, p. 4).

The baseline for the generation part of the IRP should be the existing system resources and any additional purchased power as might be needed to meet projected loads, preserve system resiliency, and provide appropriate reserves during the planning period. Then, as appropriate, we can substitute in various combinations of renewable or DSM or other options and compare. Although PVRR and societal cost analyses both help inform planning, the two should not be mixed and matched as some appear to be suggesting (See IERMP Minutes, 3/16/21 p.2). Nor should climate change goals be driving purchasing decisions without regard for cost. Again the question, "What is the best way to provide safe, reliable, and cost-effective electric service?" should be the key focus.

Second, I am concerned that, contrary to the comment made by Mr. Hashheider at the January 19, 2021 Council Meeting (Minutes, p.3), the process to date has not been open, transparent, or effective at engaging the public. Even for someone informed on energy matters, it is hard to follow what is under consideration, and there has been little public outreach. Several of the representatives chosen by the Council were outspoken opponents of Option A, and others champions of specific kinds of resources. This does not give confidence that they are representing the general public. I saw one chart that listed public support of "Option A" as "low" (note, matrix entry was "accepted option by the community"). How can you conclude this without asking the public? I and many others in the public did, and may well continue to support, Option A if the facts were actually presented to us.

I contrast the approach currently being used with the extensive outreach W & L used when planning the proposed transmission line (surveys, public meetings, and a vote where over 60% of the public voting approved Option A), and also the public discussion and vote that occurred prior to the enactment of the current renewable ordinance. Suggestions made in various meetings that the existing renewable rate cap might be eliminated by the City Council based on a board or task force recommendation, and without a public discussion or vote, are disturbing. I also note that the City Charter gives the decisions on how best to engineer our electric system to W & L. (See Section 100 – "The director of the water and light department . . . shall have charge of: . . . (2) The designing, construction, reconstruction, addition, repair, replacement supervision and operation of the water and light plants, physical properties, buildings and distribution systems; . . .") This appears to have been ignored in the Council's unprecedented decision to stop a previously approved, on-time, on-budget and needed project, and disregarded in the current process. We need to return to a focus on the safe, reliable, efficient and cost-effective engineering and operation of our electric system, and listen well to those who are in charge of making sure it works to meet the needs of those who rely on it.

I would be happy to meet to discuss any of the above points with you, and you are welcome to share these thoughts with others on WLAB or the IERMP Task Force.

Sarah Read
The Communications Center, Inc.
303 N. Stadium Blvd #200
Columbia, MO 65205
https://buildingdialogue.com/
https://facilitationanalytics.com/

IERMPTF comments on survey

1 message

Sarah Read <sjread@buildingdialogue.com> Sat, Jun 12, 2021 at 9:39 PM
To: Jay Hasheider <rabbitfields@gmail.com>
Cc: Christian Johanningmeier <christian.johanningmeier@como.gov>

Jay - At the last meeting of the IREMP Task Force you invited me to send you written comments on the survey put together by Kim Fallis. As I indicated in our discussion, I think that survey ignored some key considerations.

+. The first question appears to be talking about FERC regulatory requirements that protect the interconnected grid from events on a local system. What the question ignores is that the existing electric infrastructure meets all regulatory requirements only with load shedding (rolling blackouts) and that this is a change from how we planned and engineered our system in the past. It might be more accurate to ask "Are you comfortable turning off electricity to customers in Columbia, rather than investing in additional infrastructure, as the contingency plan for meeting federal regulatory requirements that protect customers of other interconnected utilities from failures on the Columbia system?" I don't think customers of the Texas and California blackouts were comforted by the fact that their systems also met regulatory requirements, at least on paper.

+. The second question appears to go to the existing local transmission infrastructure. It does not reflect the existing concerns with overloading. Answers might vary if those concerns were understood. This might be rewritten as follows: "Although several transformers exceed their loading goals and we lack the desired redundancy for back-up on several feeders at times of system peak, and the line loadings are such that W & L is finding it increasingly difficult to schedule routine maintenance, I am comfortable with the existing infrastructure and willing to rely on load shedding to address the events that do occur for the next several years."

+ I have similar comments to those above on Question 5. One might ask instead, "How comfortable are you substituting statistical analyses of various contingencies for the informed engineering judgement of those who operate our electric system?" I note that we have a city conduit on our lot that was sized to handle "10 year floods." We had several such "10 year floods" in the first year alone. Would the IERMPTF be comfortable designating "load shed zones" (like flood plains) and representing to homeowners that there is "no need to worry, the statistical probabilities say an extended outage would be rare?" Or informing potential economic development projects that "unlike other utilities we have chosen to rely on load shedding as our go to contingency plan rather than invest in a resilient infrastructure, but don't worry, such events are likely to be statistically rare?" If not, then maybe load shedding isn't the right choice.

+ There are at least two problems that affect the remaining questions. First, there is no consideration of the costs of different options. All of these options need new study as changes such as the construction of Nifong have occurred. I continue to recommend a study of how any option compares to the original Option A so we can measure the costs and consequences of that decision and improve our approaches for the future. Second, several of the questions pose a false dichotomy between building adequate transmission infrastructure and diversifying our transmission resources to include solar, battery storage, etc. The answer may well be to do both. Building adequate transmission structure adds needed redundancy to the system, boosting its resiliency, and the other resources also can contribute to resiliency and we can study their effect and use that data for future planning.

Please share this with other members of the task force and as public comment. Thank you for the opportunity to comment.

Sarah Read
The Communications Center, Inc.
303 N. Stadium Blvd #200
Columbia, MO 65205
https://buildingdialogue.com/
https://facilitationanalytics.com/

city of Columbia

Christian Johanningmeier <christian.johanningmeier@como.gov>

Electric Resource and Master Plan

2 messages

Sarah Read <sjread@buildingdialogue.com> Fri, Oct 8, 2021 at 4:39 PM
To: WLmail@como.gov
Cc: Christian Johanningmeier <christian.johanningmeier@como.gov>, Jay Hasheider <rabbitfields@gmail.com>

Attached please find my comments on the Electric Resource and Master Plan Parts 1 and 2 prepared by Siemens. To view all of the comments one has to scroll down in one of the fields on the PDF. So for ease of reading I have also cut and pasted the text below. Please confirm receipt.

- Begin copied text -

Comments are provided below first on Part 1 and then on Part 2 of the Siemens Integrated Resource and Master Plan.

Part 1: The primary flaw of the Part 1 generation study is that it does not contain an adequate "business as usual" baseline that would reference existing assets and fill in remaining needs through market purchases (p. 59). A clear baseline is needed both for analysis of, and communication on, the available options. Instead the Siemens study uses a "reference case" that includes not only renewable goals adopted (and bounded by a price cap) in the Renewable Energy Ordinance, but also "societal goal targets" with regard to renewables and emission reductions (adopted without any electric service cost analysis in the City of Columbia Climate Action and Adaptation Plan). This obscures the costs to ratepayers involved in meeting those targets. Renewable goals and related costs were previously put before voters and boundaries were set. If we are now going to make changes, the costs of those changes should be clearly set out and citizens should again be afforded a right to vote on those new goals.

The study also makes clear that CWL is currently overbuying resources to meet renewable goals. This means it is buying resources that are not currently needed to ensure reliable electric service, and showing a "long position" through 2030. The study downplays the associated costs by offsetting the costs with assumed sales from the displaced resources (example, $898 million reduced to $726 million, p. 72; CWL might sell up to a third of its total generation, p. 69). This is gambling with the public's money and without its consent. It's also a "smoke and mirrors" approach to meeting the societal goals – the coal plants will still keep running, even though our portfolio may be "clean on paper."

Neither of the above approaches is consistent with past practice and good planning. Nor is it consistent with the City's stated mission of serving the public "equitably through democratic, transparent and efficient government." The IERMP Task Force was charged with engaging the public throughout the planning process, presumably to help build public understanding and acceptance of any plan that emerged. It has failed to do so. Allowing public observation of task force meetings, with brief public comment periods, is not public engagement. Posting a technical plan that exceeds 300 pages in total and inviting public comment is not a way to get substantial public input, or to clearly outline key choices being made that will affect the cost of service. Public engagement includes providing clear and easy to understand summaries of key issues, and inviting input on those.

I have reviewed and generally agree with the Siemens study's recommendations on value of solar (including the "generous assumption" on p. 131), change in rates, AMI, and staying in MISO. The forecast analysis is also reasonable.

I also agree with the recommendation in various portions for ongoing reports and updates to build public understanding and provide accountability for decisions made. That again depends on an adequate baseline. Providing a clear baseline, updates, and accountability would help prevent decisions that are more driven by politics than sound data.

Part 2: The Siemens study further confirms what CWL has been saying for several years: that the local transmission and distribution networks are in need of new investment. It also confirms, that as a result of Council's ill-considered decisions to "pause" that investment, the system has deteriorated. Many lines/substations are overloaded, and immediate changes are needed, particularly at the Perche Creek substation.

Unfortunately, the Siemens transmission study fails to provide the public the necessary information to evaluate what are the best choices at this time to ensure reliable and cost-effective electric service. This is because it fails to do any analysis of the "paused" option, known as "Option A" (Mill Creek station and transmission line) against the investments it does recommend. The key question the Siemens report appears to answer is "can we come up with some changes that will address immediate concerns while avoiding a new substation at Mill Creek?" It avoids a comparison with Option A largely by introducing a "spatial load forecast", which while well done as an academic exercise, is largely irrelevant. It is difficult under the best of circumstances to predict where new development will occur. And Siemens admits it did not have certain kinds of data and so substituted assumptions correlating likely growth to empty lots (p. 33). The Mill Creek substation option is then dismissed as not being ideally correlated with the model's predictions for growth (p. 18) (elsewhere the report acknowledges a need to upgrade infrastructure in the Southwest, limits its focus to a single area, proposes an alternative substation just to serve that area, dismisses Mill Creek as being further away from the limited

focus area, and then dismisses the alternate substation as likely to be underutilized – p. 55). What the report fails to do is look at how Option A would have solved the many issues identified in the report on a system-wide basis. And so there is no comparative benefit/cost analysis that would allow for an analysis of Option A as compared to the alternative investments outlined in the report. Another portion of the report that addresses a transmission event is heavily redacted and so can't be reviewed. I would like to know though whether Option A, had it been completed, may have alleviated the risks that materialized.

The best approach, both for reliable electric service and economic development, would seem to be to plan for a robust, resilient, system capable of supporting growth wherever it occurs. Option A was designed to strengthen the system at a cost far lower than the projected costs here. In particular, it was designed to meet the challenges posed by existing growth in the Southwest. Not only are the costs of the alternatives outlined in the Siemens study higher, the expensive 4 hour battery storage back-up option for the residential neighborhoods south of Perche Creek (58% higher – p. 215) does not provide the same standard of reliability that Option A would have or that other neighborhoods enjoy by having more than one interconnection into the system. Option A also was presented as having a 40 year period of benefits; this apparently more expensive plan seems to have a 20 year horizon.

The public is not well served by avoidance of questions of how much the delay has cost us, or whether changes in circumstances might support a different plan (and what those are). To the extent the Siemens analysis avoids these issues, it is deficient. I again refer to the Task Force's failure to adequately engage the public, addressed in the Part 1 comments above. Much more could have been done (and in fact was done in educating the public on Option A) to help the public understand and be engaged in the choices before us. Unfortunately, political decisions sidetracked progress several years ago. It is past time to take politics out of the process, to be open and honest with the public, and to return the planning focus to how to best engineer our system for safe, reliable, and cost-effective service. That requires a fair presentation and evaluation of all of the options, including the one that was "paused."

Sarah Read
The Communications Center, Inc.
303 N. Stadium Blvd #200
Columbia, MO 65205
https://buildingdialogue.com/
https://facilitationanalytics.com/

iermp_comment_form_sjr 100821.pdf
1113K

Christian Johanningmeier <christian.johanningmeier@como.gov>

Fwd: [WLmail]: Energy Task Force- comment submission

1 message

Chris Kisch <Chris.Kisch@como.gov> Wed, Oct 27, 2021 at 7:57 AM
To: Christian Johanningmeier <Christian.Johanningmeier@como.gov>

Good Morning Christian,
This was received just this morning.

Thanks,
Chris

---------- Forwarded message ---------
From: **Laura Froese** <lfdoll88@gmail.com>
Date: Wed, Oct 27, 2021 at 7:55 AM
Subject: [WLmail]: Energy Task Force- comment submission
To: <WLmail@como.gov>

Energy Task Force:

Please consider the review of micro-grids as a solution for communities to increase self-reliance. With the increased risks of cyber attacks on infrastructures, wildfires, flooding and natural disasters, this seems to be a method likely to reduce risks on a large scale and allows local energy sourcing to maintain some normalcy for communities.

In addition to considering micro-grids, alternative energy sources like wind, sun, water, wood (and pellets of various sorts) options should be reviewed.

Sincerely,
Laura

--
Chris Kisch
chris.kisch@como.gov
City Utilities-Water & Light
701 E. Broadway
P.O. Box 6015
Columbia, MO 65205
573-874-7323 phone
573-443-6875 fax

city of Columbia

Chris Kisch <chris.kisch@como.gov>

[WLmail]: Energy Task Force

1 message

Dan Goldstein <dan604@gmail.com> Thu, Oct 28, 2021 at 4:19 PM
To: WLmail@como.gov, Karl Skala <skalaforcouncil@yahoo.com>, mayor@como.gov, Pat Fowler <fowler.pat.j@gmail.com>
Cc: tom o'connor <tom@h2oc.com>

Dear Council members,
I am sending this note to ask that you please consider all alternatives to only adding power lines when reviewing the Energy Task Force report and assessing future power plans. I strongly agree with Tom O'Conner's Minority Report on Transmission Lines.
As much as possible we really do need to invest "in local renewable energy sources, forward-thinking policies, and smart grid functionalities."

Thank you,
Dan Goldstein, PhD ME, Former chair of the Environment and Energy Commission.

--
"There is nobody in this country who got rich on his own. Nobody. You built a factory out there - good for you.

But I want to be clear. You moved your goods to market on the roads the rest of us paid for. You hired workers the rest of us paid to educate. You were safe in your factory because of the police forces and the fire forces that the rest of us paid for. You didn't have to worry that marauding bands would come and seize everything at your factory...

Now look. You built a factory and it turned into something terrific or a great idea - God bless! Keep a big hunk of it. But part of the underlying social contract is you take a hunk of that and you pay forward for the next kid who comes along."
- Elizabeth Warren (Sept. 2011)

city of Columbia

Chris Kisch <chris.kisch@como.gov>

Thank you!

1 message

Melinda Jenne <melindahawks@gmail.com> Thu, Oct 28, 2021 at 3:30 PM
To: Christian.Johanningmeier@como.gov, chris.kisch@como.gov, rabbitfields@gmail.com

Hi all-
I was hoping this email could be added to the public comments for tonight's task force meeting. Unfortunately, I am unable to attend in person.
I want to thank the city and the members of the task force for doing so much work to find different ways to bring power to our city. I think the public voiced their opposition to Option A and the city listened. The city and the task force have worked to not only find other options, but they found better options that will benefit our community in the long run. The idea that we would have been the only municipality in the nation to put these size structures through existing neighborhoods is unbelievable.
I know our family is grateful to all of you and the hard work you have done for our community.
Sincerely-
Melinda Jenne

Sent from my iPhone

city of Columbia

Chris Kisch <chris.kisch@como.gov>

HVTL Task Force Meeting Tonight

1 message

Michael Sykuta <msykuta@gmail.com> Thu, Oct 28, 2021 at 3:48 PM
To: Christian.Johanningmeier@como.gov, chris.kisch@como.gov, rabbitfields@gmail.com

Greetings,

I recently learned that the Task Force considering the City's HVTL needs is presenting its preliminary findings tonight at a public meeting for input. Unfortunately, I cannot be present.

I appreciate that the City took pause when it last considered this project and the proposed "Option A" at the time. It was a poor option at the time, and I'm grateful that time was taken to reevaluate the City's needs and options available.

Because the Task Force has not made its information publicly available, I have no ability to comment on anything specific in the plan. I understand there was a consultant report made public earlier this year for comment, but I was completely unaware of that report until just now and I cannot find it on the City's website.

Based on what I have heard, I understand that the consultant and the Task Force have both identified other alternatives that better serve the City's needs, and may even be less expensive, than the old Option A. I hope that means Option A will be removed from further consideration as the process moves forward. I know there may be some individuals who continue to hold onto Option A for any number of reasons, but this should be the nail in the coffin of that argument. Especially now that the City has completed its renovation of the Nifing corridor between Providence and Forum, Option A as proposed is even less practical or desirable than it was when first proposed. The City lost its opportunity to be forward-thinking and incorporate a more reasonable installation jointly with the corridor improvements.

Thank you for your consideration. I look forward to being able to see what the Task Force's report says and hope you will make sure it is made more transparent and accessible than the consultant's report seems to have been. In addition to different route options, I hope to see that different technology solutions might be part of the plan as well.

Thank you for your service to the community on this matter.

Sincerely,
Michael Sykuta
4103 Watertown Place, 65203
Ward 5

Fwd: [WLmail]: Task Force Comment on Renewable Electricity

1 message

Chris Kisch <Chris.Kisch@como.gov> Tue, Nov 2, 2021 at 7:34 AM
To: IER&MP <IERMP@como.gov>
Bcc: Christian.Johanningmeier@como.gov

Good Morning,
Please see the comment for the IERMP Task Force that was just received last evening.

Thanks,
Chris

---------- Forwarded message ---------
From: **Mary Keiser** <dragongirl5146@gmail.com>
Date: Mon, Nov 1, 2021 at 7:11 PM
Subject: [WLmail]: Task Force Comment on Renewable Electricity
To: <WLmail@como.gov>

I am a 20 year old who has been living in Columbia for most of my life. All my life I've been told countless times about the destruction humans cause to the environment we live in, deforestation, pollution, climate change, they've been mentioned to us countless times in school and through the news. Until I was 18 my thoughts were "I hope someone will do something about this" and now it's "I hope our elected officials listen to the people who voted for them and will do something about this." We are used to seeing bad news regarding climate change and seeing the door for action closing slowly while the people around us act like nothing is wrong. I can't speak for all young people when I recount these experiences, but I'm sure that many have had the same experiences as I have. I want to have a livable future, I want to feel secure living in my community in this environment on this planet. As someone who's been volunteering to help petition for the 2030 plan I know that many people feel the same and share my concerns about climate change. For these reasons I urge the Integrated Electric Resource and Master Plan Task Force to consider a 100% renewable electricity by 2030 plan. I know that this plan would be difficult but I know that the positive effects it would have on our planet and community are more than worth it and its the only way for us to reach the goal of 50% reduced emissions by 2030 as said in the IPCC report. If Columbia were to adopt a plan that creates renewable energy within the city it would also help create a strong and self sufficient community and create good jobs. We don't know where the world will be in 10-20 years, but if we adopt a plan for renewable electricity and self reliance we can aim the city of Columbia towards a better future for all. Thank you.

Mary Keiser 1337 Valley Creek Ln Columbia MO, 65202

--
Chris Kisch
chris.kisch@como.gov
City Utilities-Water & Light
701 E. Broadway
P.O. Box 6015
Columbia, MO 65205
573-874-7323 phone
573-443-6875 fax

Fwd: [WLmail]: To Task Force, Integrated Electric Resource and Master Plan

1 message

Chris Kisch <Chris.Kisch@como.gov> Thu, Nov 4, 2021 at 8:13 AM
To: IER&MP <IERMP@como.gov>
Cc: Christian Johanningmeier <Christian.Johanningmeier@como.gov>

Good Morning,
Please see the comment received yesterday afternoon.

Thank you,
Chris

---------- Forwarded message ---------
From: **Linda green** <lindamgreen927@gmail.com>
Date: Wed, Nov 3, 2021 at 1:32 PM
Subject: [WLmail]: To Task Force, Integrated Electric Resource and Master Plan
To: <WLmail@como.gov>

I am entirely supportive of the city's goal to have 100% renewable energy by 2030. I do have concern about transmission lines, which, in addition to the expense involved, would indicate more vulnerability to blackouts due to storms, technology glitches and terrorism. I think the ideal system is off grid wherever possible, which is the safest and most reliable.

There is another crucial problem in regards to saving our climate. I don't expect an immediate public push on this, but I would ask you to give thoughtful consideration as to how the issue could be approached, publicly and privately. This is laid out in a book called "Food is Climate" by Glen Merzer. The public library has a paperback copy. Here's an interview with the author on You Tube: "Food is Climate/Chef AJ LIVE! With Glen Merzer & Dr. Sailesh Rao" https://youtu.be/KZiL-bofmz8

The book lays out the complete story of waste and depletion of resources and far-reaching domino effects, from deforestation to ocean, land and water destruction, to recent and current proliferation of diet-caused human diseases (heart disease, diabetes, cancer, etc.), to the eventual destruction of the very air we breathe—caused by eating animal products. Implausible? Read this book first. We have the solution in our grasp— see You Tube videos: "Plant Based Nutrition: What, Why, How?" https://youtu.be/BZtpz_6DB38 and "Lifestyle Medicine: What the World Needs Now!—Chef AJ LIVE! With Susan Benigas" https://youtu.be/ICgXoTnv73Q. There are many resources for a deeper dive at: Plantpoweredstl.com/resources.

Thanks for your consideration,

Linda Green

206 Anderson Ave.
Columba MO 65203

--
Chris Kisch
chris.kisch@como.gov
City Utilities-Water & Light
701 E. Broadway
P.O. Box 6015
Columbia, MO 65205
573-874-7323 phone
573-443-6875 fax

Christian Johanningmeier <christian.johanningmeier@como.gov>

Additional Comments For IRPMP Task Force

JR Windsor <jimwindsor520@gmail.com> Tue, Nov 16, 2021 at 9:28 AM
To: Carol Schafer <carol.schafer@como.gov>
Cc: Jay Hasheider <rabbitfields@gmail.com>, Christian Johanningmeier <christian.johanningmeier@como.gov>, Brian Treece <mayor@como.gov>, City Of Columbia Ward1 <ward1@como.gov>, City Of Columbia Ward2 <ward2@como.gov>, Karl Skala <ward3@como.gov>, Ian Thomas <ward4@como.gov>, Matt Pitzer <ward5@como.gov>, City Of Columbia Ward6 <ward6@como.gov>

Ms Schafer,

After reading the minutes of the task force public comment, I do not believe my comments were presented correctly. In fact, some of my key points were not included in the minutes. Those being:
1. That "competitive rates" as outlined in the City Charter was not considered as a critical aspect of the study.
2. That "resilience" as identified as one of two purposes in the Climate Action Plan was not considered as a critical aspect of the study.
3. That the potential fiscal impact of setting a goal of 100% renewable energy by 2030 could cause dramatic rate increases for customers.

I had requested time for a short presentation at tonight's meeting and was told there wouldn't be time for slides. I would ask two things.
1. That the key points I previously made be included in the minutes
2. That the four slides attached to this email be included as further comments and be forwarded to the full task force.

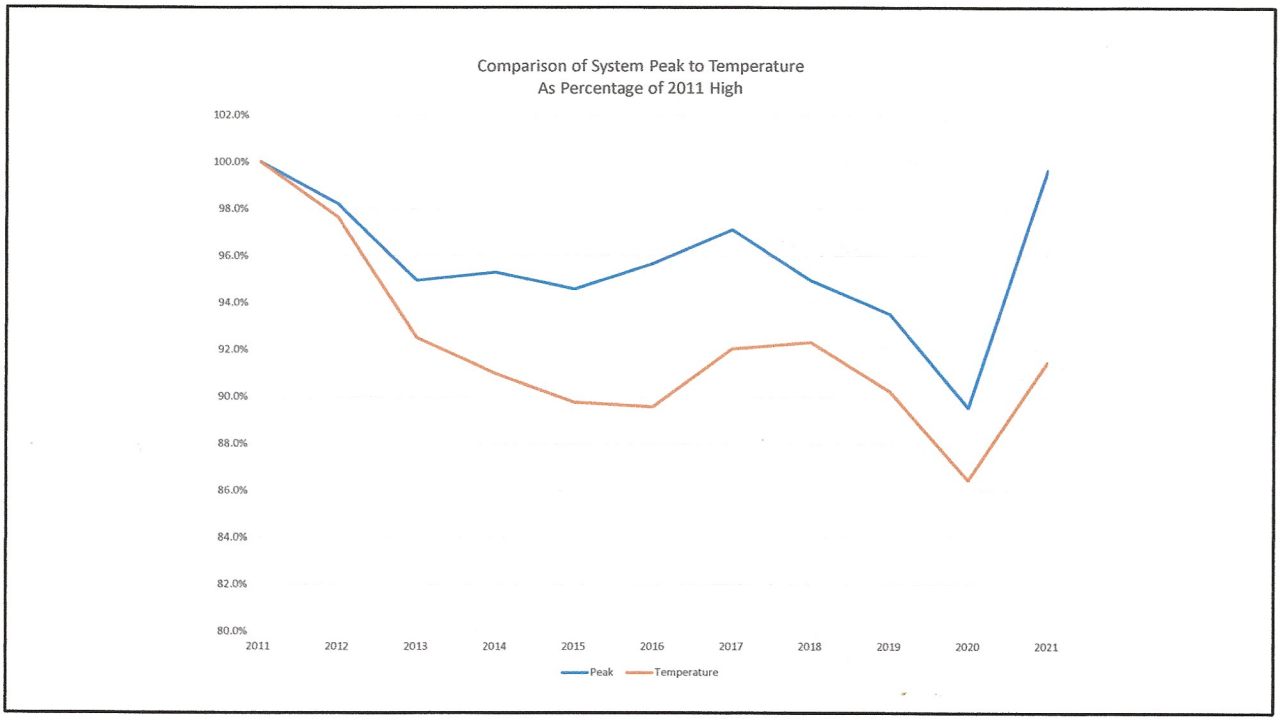
Thank you
Jim Windsor

4 attachments

- **Slide 3 - 11 16 21.pdf** 439K
- **Slide 1 - 11 16 21.pdf** 748K
- **Slide 2 - 11 16 21.pdf** 611K
- **Slide 4 - 11 16 21.pdf** 640K

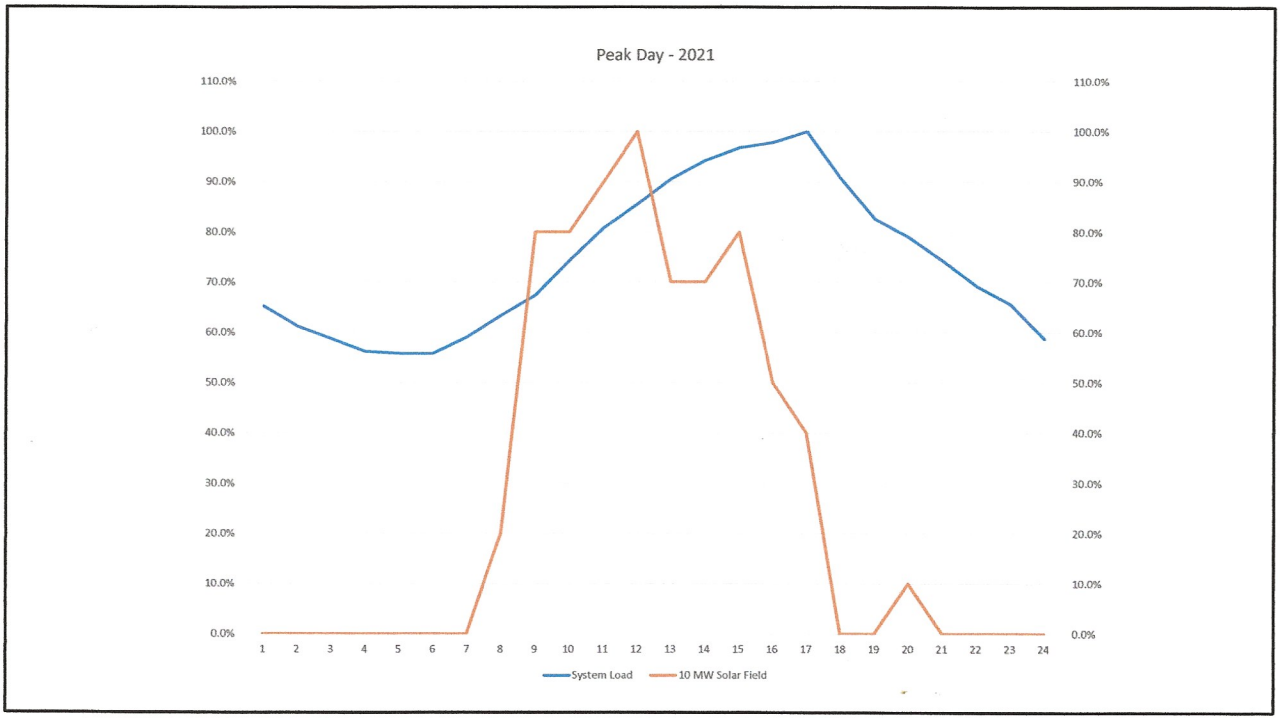
Year	Month	Day	Peak Hour	System Peak	High Temperature Peak Day	Lowest Temperature Prior Night	High Temperature Prior Day
2003	August	21	6 P.M.	253	104.1	75.8	101.8
2004	August	26	5 P.M.	238	92.9	73.3	87.3
2005	August	1	7 P.M	257	97.2	70.9	93
2006	July	20	3 P.M.	272	100.1	76.8	100.2
2007	August	15	4 P.M.	265	102.8	77.2	101.6
2008	August	4	4 P.M.	257	96.2	79.1	94.1
2009	June	23	3 P.M.	250	95.3	77.3	92.6
2010	August	10	4 P.M.	265	97.1	79.1	92.6
2011	August	2	4 P.M.	277	105.4	81.1	102.0
2012	July	23	5 P.M.	272	102.9	78.3	100.7
2013	August	30	5 P.M.	263	97.5	78.5	94.3
2014	August	25	5 P.M.	264	95.9	76.5	96.9
2015	July	13	5 P.M.	262	94.6	77.2	92.2
2016	June	15	3 P.M.	265	97.4	78.8	90.8
2016	July	21	5 P.M.	265	94.4	77.7	92.2
2017	July	20	5 P.M.	269	97.0	77.1	92.6
2018	August	28	5 P.M.	263	97.3	78.4	95.7
2019	July	19	5 P.M.	259	95.1	78.6	94.6
2020	July	8	4 P.M.	248	91.1	73.9	90.9
2021	August	26	5 P.M.	276	96.4	76.6	94

The consultant decided to focus on July which ignores the fact that in eleven of the last 19 years the annual system peak occurred in August and not in July. Even the historic highest system peak occurred in August 2011.



Looking only at July and at "normal" weather can lead some people to believe that Columbia's peak load has not grown. In 2011, the system peak was 277 MW's, and the highest hourly temperature was 105.4 degrees.

Over the last decade Columbia has enjoyed relatively normal weather with heat waves only reaching about 97 degrees which is the 92% line on the graph above. What wasn't normal was the 2021 system peak. The 2021 peak was 276 MW's which is only 1 MW below the historic high. The 2021 high temperature was only 96.4 degrees which is 9 degrees lower than the 2011 temperature of 105.4. *Note: the historic high temperature for Columbia is 113 degrees.*



The 2021 system peak was 276 MW's but two renewable resources were operating "behind-the-meter". The new 10 MW solar field was providing 4 MW's during the peak hour and 0 MW's the following hour. Above is a graph of the peak day and solar field using 100% of each to graph the comparison.

The 3 MW landfill gas facility was producing 2 MW's during the peak hour.

Stop Pretending We Use Renewable Energy

- 166,000 MWhs of 196,000 MWhs listed in 2019 Renewable Energy Report never came to Columbia
- 161,000 MWhs of 191,000 MWhs listed in 2020 Renewable Energy Report never came to Columbia
- Truman Solar Field is tied to Columbia system
- Boone Stephens Solar contract will be tied to Columbia system
- MPUA Wind contract will not be tied to Columbia system

84% of the renewable energy purchased to meet Columbia's renewable energy requirement is not delivered to Columbia and the generation facilities do not count toward Columbia's capacity requirement

Setting a goal of 100% renewable without educating the public and discussing what the citizens/ratepayers want does nothing to reduce the use of fossil fuels.

It does set Columbia up for potentially fiscally damaging cost increases that can seriously impact residential and commercial customers.

Good evening. My name is Esther Stroh, and I live at 807 Leawood Terrace

Next 20 years

1. I was asked to attend this meeting and support the alternative for 100% renewable energy by 2030. However, I am concerned that this seemingly forward-looking alternative is a red herring preventing us from making real progress toward truly long-term, climate-friendly solutions.

2. The citizens of Columbia own our power utility. This is important, because it means that we have a say in how it is designed and run. It is important for citizens to know what is at stake, and what ***all*** of our options are.

3. The report points out that social and environmental values and other important factors including grid infrastructure savings, federal tax credits, job creation, and grid reliability and resiliency were not included in the "Value of Solar Study." The Task Force warns that Council cannot rely on Siemen's report to represent the true value of solar in Columbia. [redacted] We need to know that. We paid nearly $1 million for the Siemens Report. We shouldn't have to pay for another study. They dropped the ball

4. [redacted], the Task Force glosses over the Non-wired Alternative in the Transmission System Assessment and throws support behind Option W, which is to add more transmission lines. This means spending $41.5 million, simply to avoid a potential load-shedding event ***every one hundred to two hundred years.*** This small, low-probability future benefit pales in comparison to the much larger economic, social, and environmental benefits that are immediately available. **The minority opinion that explains all this was not included in the Task Force report being discussed tonight.**

5. The city currently spends nearly $100 million per year on electricity produced outside of Columbia. Adding more transmission lines will lock us into a future of dependence on imported energy, ***regardless of what percentage of that imported energy is renewable.*** Instead, we should focus on ***what percent of Columbia's energy is locally-produced.***

6. We own our electric utility, and we can choose to invest these dollars in our own community, on energy self-reliance, the only climate-friendly, long term solution. ***But we can only do this if we have all of the information***, much of which is missing from this report.

7. We need to keep our eyes on ***the real solutions.*** We should not waste our time arguing about options that lock us into spending our hard-earned tax dollars on transmission lines and other centralized energy systems of the past.

Thank you for your work, and thank you for the opportunity to comment.

My name is Jim Windsor. I retired as assistant director of utilities after working for Columbia Water and Light for almost 36 years. Initially I had thought I would present examples of factual errors and misrepresentation in the report but decided there were too many to present in the time allowed. Instead, I have some questions and comments.

Why are representatives of the company that ratepayers have paid almost $900,000 not present to provide information and answer questions?

Why were competitive electrics rates not identified as a critical aspect of the study when competitive electric rates are written into Article XII – Section 102 of the Columbia City Charter?

Why was resilience not identified as a critical aspect of the study when it is identified as one of two stated purposes of the Climate Action & Adaptation Plan? That purpose being, "to prepare Columbia's natural and built environments and people to be more resilient to the impacts of climate change."

Why does the Climate Action & Adaptation Plan state that "Extreme heat, drought, higher incidence of severe storms and reduced air quality are growing threats in Columbia due to climate change", yet the company that ratepayers have paid almost $900,000 choose to use average temperature as the basis for all projections?

Why would the task force support a solution to get a second transmission path to Perche Creek Substation that is not resilient by putting both transmission lines on the same poles from the same substation.

While I understand that some of the members of the task force were vocal opponents of the Option A transmission path, why did none of the task force vote to support Option A (now call Option Z) when it was identified as the least cost solution to get a second transmission path to Perche Creek Substation and would increase system resilience by having a second path from a second substation?

For those of you that have come tonight to support the idea of 100% renewable energy. Do you know what that really means? It should mean that all the electricity we will use will come from renewable sources. It doesn't. Most of our energy would still come from fossil fuel. What it would mean is that we would buy an amount of renewable energy to equal the total amount of non-renewable energy used by Columbia. That would require buying about 1 million MWh's per year more of renewable energy. We would then play a dangerously risky financial game of buying and selling non-renewable energy that could greatly impact the local economy. All for the purpose of saying we are 100% renewable and pretending we were getting all of our energy from renewable sources even though we won't.

There are currently two renewable energy contracts in place that will more than double the current amount of renewable energy that Columbia counts toward its annual renewable ordinance requirement. One, the solar contract, will actually deliver renewable energy to a Columbia substation and be used by Columbia. The second one will deliver renewable energy to the MISO energy market at a location near Hannibal.

Columbia ratepayers have to decide how we want to move forward with our electric system. I, for one, want a resilient system that will quickly recover from any microburst, bomb cyclone, heat dome, polar vortex, or other atmospheric disturbance that will likely visit us in the future. I also want to increase efficiency, reduce capacity requirements, and move forward with a real transition to renewables resources. Despite the $900,000 ratepayers paid for this report I do not believe these issues have been adequately addressed.

Sierra Club Osage Group Statement on IERMP Integrated Electric Resource and Master Plan Public Meeting October 24, 2021

This statement is on behalf of the **Sierra Club Osage Group** and the over 4,000 members and supporters in the Columbia area.

The Sierra Club strongly supports setting a goal for Columbia Water and Light to produce 100% of electricity from clean, renewable sources such as wind and solar by 2030. **We are asking the taskforce to recommend the 2030 date to the City Council.**

In order for the Columbia Climate Action plan to succeed, the Council needs to update our utility's energy plan to set targets for reaching 100% renewable energy by 2030.

Cities nationwide are making commitments to transition to 100% renewable electricity to tackle the climate crisis while creating *good jobs and protecting our air quality*. Cities like Norman Oklahoma, Fayetteville Arkansas, Longmont Colorado and others are committing by either 2030 or 2035.

42 communities in the west, Midwest and south have achieved 100% electricity from clean renewable sources already. They have shown us it can be done.

Sierra Club has reviewed the Siemens **Integrated Electric Resource and Master Plan** report and believes the it provides sufficient evidence of an affordable path to 100% renewable electricity by 2030.

Sierra Club also supports the taskforce recommendation that "CWL should perform a legal review of all coal Power Purchase Agreements. It is important that Columbia do everything in our power to end coal-burning related to our contracts.

Sierra Club believes this energy transition must be just. **The Sierra Club calls on the taskforce to recommend more energy efficiency programs specifically designed for low-income households.**

Climate change is already having a negative impact on local households. After our summer heat waves, here are some of the comments from local citizens obtained from Facebook:

Sep 23 "Wow, $400 for my utility this month! That's absolutely absurd! I'm on disability and its literally half my income"

AND - 'I'm a single mom of 2 kids and I'm struggling to pay these $300+ utility bills.."

Columbia needs to contribute to stopping climate change by reducing our greenhouse gas emissions **dramatically** by 2030 and we need to help those among us who do not have the resources to handle extreme weather.

NOW WOULD EVERYONE IN THE ROOM WHO SUPPORTS A GOAL OF 100% CLEAN, RENEWABLE ENERGY FOR CWL ELECTRICITY BY 2030 - PLEASE STAND OR RAISE YOUR HAND HIGH TO SHOW YOUR SUPPORT

THANK YOU

Christine Doerr, Sierra Club

Public Comment on IERMP Task Force Report Oct 28, 2021
Submitted by Sarah Read, 3802 Bedford Dr. Columbia, MO 65203

Let me start with where I agree with the Task Force draft:

AMI
I do agree with the Task Force recommendations on Advanced Metering Infrastructure.

Transmission and Distribution
On transmission and distribution, I do agree that investment in new infrastructure is needed, in fact I believe it is long overdue. The Task Force summary, however, minimizes and thus misstates the findings in the Siemens report as to the need for that infrastructure. I also disagree with the Task Force's endorsement of the spatial load forecast. We should not be making decisions based on an academic, hypothetical, and unproven analysis. Nor do I agree with the Task Force's apparent conclusion that the current "load shedding" plan is an adequate and acceptable long term way of meeting NERC reliability criteria.

Renewables
Although I too am concerned about climate change, and support some use of renewables, I object to the incorporation by the Task Force of a 100% renewable standard in the baseline case. A true baseline would be based on current policy and purchased power, and not obscure the cost of change by embedding an aspirational standard. Overall, the Task Force failed to give adequate consideration to the affordability and reliability of electric service in making this recommendation. I have a number of questions as I consider the various scenarios and recommendations in the report:

With electric service costs high and budgets limited, why are we buying excess energy just to meet aspirational renewable targets?

And why have an early increase in renewable energy purchases when selling excess coal generation into the market does not result in an actual decrease in emissions? (See comments of Chair in IERMPTF minutes 10/28/21)

What happens if market rates for reselling the displaced purchased power that we have contracted for are less than projected? How will the higher costs be covered? How will rates be affected?

On average, renewable energy costs more than purchased power. How much more would this new energy standard cost us?

We know that the timing of mandated investments can have a big and adverse impact on the rates customers pay. We need to do more to study the timing of additional renewable investments and the impact on the rates customers will pay.

If all this is such a good idea, why not ask the public before increasing the renewable targets or taking off the existing cap on increased costs due to renewables? The public previously approved the existing targets and caps and should have the opportunity to weigh in before those are revised.

Value of Solar

I also object to the recommendation that taxpayers fund another value of solar study to look at environmental and societal costs. The Siemens report sets forth a comprehensive review of the value of solar that is appropriately focused on the costs/benefits incurred by CWL. Instead of funding another study, why not follow the suggestion in the Siemens report to pursue a state level REC program?

Energy efficiency

Finally I would object to the recommendation to fund yet another study on energy efficiency and demand-side management programs. The Task Force report itself (p. 16) recognizes that CWL has been successfully using efficiency programs, energy audits, and solar rebates and other such programs for many years. In fact this week, CWL was recognized by the American Public Power Association as a Smart Energy Provider for "demonstrating a commitment to and proficiency in energy efficiency, distributed generation, and environmental initiatives that support the goal of providing safe, reliable, low-cost, and sustainable electric service." So why pay for another consultant to study what our utility is already doing well?

Columbia Renewable Energy - Public Hearing 28 October 2021

- **Climate Change is advancing much faster than predicted!**
- CO2 levels in the atmosphere reached a 3 million-year high, (420 ppm) putting the world 'way off track' on climate goals, according to a UN report published on Monday, putting the planet on course for warming that far exceeds critical limits of 1.5 degrees Celsius to stave off catastrophic climate change.
- The UN Report said we're already at 1.1 degrees Celsius! Unless changed quickly, it may lead to a temperature rise of about 2.7°C by the end of the century."
- **The findings add to a sense of urgency ahead of the COP26 climate talks, which begin in Glasgow, Scotland on Sunday. Columbia needs to do our part to achieve the United States commitments.**

The United States Congress

- Any one of ten pending bills in the US Congress will add a carbon emissions fee to fossil fuels, (1 ton of coal releases 3 tons of CO2).
- **Any carbon fee could double the cost of a ton of coal, causing adverse economic impact to Columbia, that will become more severe each year.**

Coal-Fired Power Plants Are Going Away (From Show Me Solar)

- The May 2021 study, Coal Cost Crossover 2021 by Energy Innovations, reports that **due to rapid recent cost declines for wind and solar, the combined fuel, maintenance, and other costs of most existing coal-fired power plants are now higher than the all-in costs of new wind or solar projects.**
- Morgan Stanley predicts that U.S. coal will retire by 2033, largely replaced by least-cost wind, solar, and batteries.
- **Wyoming is closing its coal mines and developing wind energy to replace the revenue; most of the coal we burn in MO is WY coal!**

Kids' quality of life will depend on today's climate choices

- A new Science Study helps quantify climate regulation cost and benefit choices in real-world terms. Discounting the welfare of future generations and threats they will face from climate change impacts, **will result in children born today experiencing 5 to 10 times more extreme heatwaves, droughts, wildfires, floods, crop failures, and hurricanes during their lifetimes.**
- All of which may add ammunition to recent research suggesting that young people increasingly have a **"we don't trust you" attitude** toward tepid governmental climate actions they largely see as a betrayal and as a failure to protect their generation.

Columbia MO's Challenge

- Columbia voters have demonstrated their support for renewable energy by approving a renewable energy ordinance in 2004, that called on the city to steadily increase its renewable energy supply through 2030.

- **We need a bold new plan to identify what goals would be required reach 100% renewable energy by 2030:**
    1. All city vehicles are electric to minimize emissions & life cycle cost
    2. All city buildings are solar powered with battery backup
    3. All new city buildings will be constructed as net zero
    4. Significantly increase wind and solar purchased power agreements.
    5. Update building codes to require solar panels and increased energy efficiency for all new construction in Columbia.
    6. Expand tax credits and incentives for citizens and companies to increase energy efficiency and transition to renewable energy in existing buildings.

Today the White House Released a Framework Agreement on a $1.75 Trillion Budget Reconciliation Bill that Includes $555B Climate Change Items. This agreement can help Columbia achieve a 2030 goal.

- Deliver substantial consumer rebates and ensure middle class families save money as they shift to clean energy and electrification. These measures include enhancement and expansion of existing home energy and efficiency tax credits, as well as the creation of a new, electrification-focused rebate program.
- The framework will cut the cost of installing rooftop solar for a home by around 30 percent, shortening the payback period by around 5 years.
- The Build Back Better legislation will target incentives to grow domestic supply chains in solar, wind, and other critical industries in communities on the frontlines of the energy transition.

I ask you to please support a recommendation for Columbia to Achieve100% clean renewable energy by 2030.

Jack Marquenbach
573-289-7327

Statement from CEC for Public Hearing on IERMP on October 28, 2021

The Columbia Climate and Environment Commission (CEC) supports recommending to the City Council to formally adopt an electric resource plan and implement a goal via ordinance for Columbia Water and Light (CWL) that will achieve 100% clean, renewable energy for electricity by 2030, rather than by 2035 as recommended in the Climate Action and Adaptation Plan (CAAP). (CAAP Action E-1.3.2) This change is driven by new scientific information available from the IPCC on the urgent need to reduce greenhouse gas emissions and the analysis available in the 2021 Integrated Resource and Master Plan (IERMP), Volume 1. These are the reasons we support this recommendation:

1. UN Secretary-General António Guterres summarized the latest Intergovernmental Panel on Climate Change (IPCC) report as follows: "Today's IPCC Working Group 1 report is a code red for humanity. The alarm bells are deafening, and the evidence is irrefutable: greenhouse-gas emissions from fossil-fuel burning and deforestation are choking our planet and putting billions of people at immediate risk. Global heating is affecting every region on Earth, with many of the changes becoming irreversible.

The internationally agreed threshold of 1.5°C is perilously close. We are at imminent risk of hitting 1.5°C in the near term. The only way to prevent exceeding this threshold is by urgently stepping up our efforts and pursuing the most ambitious path.

We must act decisively now to keep 1.5°C alive. We are already at 1.2°C and rising. Warming has accelerated in recent decades. Every fraction of a degree counts. Greenhouse-gas concentrations are at record levels. Extreme weather and climate disasters are increasing in frequency and intensity."

2. The UN Emissions Gap Report 2019 says that the reduction in greenhouse gas (GHG) required by 2030 is 55% of the 2018 production to keep global warming below 1.5 degrees C (2.7F) required to prevent the most severe problems.

"There is no sign of GHG emissions peaking in the next few years; every year of postponed peaking means that deeper and faster cuts will be required. By 2030, emissions would need to be 25% and 55% lower than in 2018 to put the world on the least-cost pathway to limiting global warming to below 2˚C and 1.5°C respectively."

Inventory Year	2018 Actual*	2019 Actual*	Goal 2030
% Reduction over 2018 as baseline	0%	3%	55%
Total annual emissions Metric Tons CO2e	2,318,070	2,248,340	1,043,132
Reduction in Metric Tons CO2e over 2018		69,730	1,274,938

Note: Emissions data available at Climate Action and Adaptation - Web Page - City of Columbia Missouri (como.gov)

2019 emissions from CWL for electricity were 42% (947,198 MTCO2e) of 2019 community GHG emissions, providing the largest segment over which the city has control to meet our goals. It is impossible for Columbia to meet UN goals without aggressive conversion of CWL energy production to clean, renewable energy.

Other recommendations for the IERMP Taskforce and the City Council regarding the IERMP:

1. The CEC supports the future investment in Advanced Metering Infrastructure intelligent electric meters that would enable time of day pricing, drive conservation and unlock potential savings for both water and electricity for customers. The meter conversion should happen in a time frame to facilitate achieving the primary goal of 100% clean, renewable energy for electricity by 2030. (CAAP Action E-2.2.1)
2. The city needs to plan both for significant investments in improving energy efficiency in the community and for high seasonal temperatures. High seasonal temperatures are becoming increasingly likely for longer periods in the summer and possibly for short, very cold periods in the winter. According to the high seasonal load scenario the impact of these higher and lower temperatures on heating and cooling can be minimized or eliminated by doubling the energy efficiency improvements in the 2021-2030 period. The plan for the next 10 years must include assumptions for high seasonal loads based on current climate trends and projections.

Data for Missouri		
Time period	Historical Number of days > 95°F	Number of days > 95°F with median probability
1981-2010	9	
2020-2039		26
2040-2059		38
2080-2099		75

Notes:

Data from Climate Impact Lab at impactlab.org using High Emissions Scenarios (Representative Concentration Pathway 8.5)

Median Probability described by Wikipedia is as follows:
In statistics and probability theory, the median is the value separating the higher half from the lower half of a data sample, a population, or a probability distribution. For a data set, it may be thought of as "the middle" value. The basic feature of the median in describing data compared to the mean (often simply described as the "average") is that it is not skewed by a small proportion of extremely large or small values, and therefore provides a better representation of a "typical" value. Specifically for this data the 50% or median outcome can be interpreted as “more likely than not.”

Other recommendations for the City Council to consider to facilitate the achievement of 100% clean, renewable energy for electricity by 2030 and steps to bring the IERMP into closer alignment with the CAAP:

1. We recommend the Taskforce support more residential energy efficiency programs for low to moderate income households. Residential energy efficiency programs from CWL need to measure the participation of low income households and determine if the investment is equitable. If low income households are not participating at the same rates as other households, the energy efficiency programs need to be modified to enable greater participation by low to moderate income households. Programs that offer greater participation opportunities and energy efficiency benefits for low to moderate income households include programs to replace old refrigerators with newer more efficient models, old electric water heaters with heat pump water heaters and old electric heating such as baseboard heating systems, forced air furnaces, and electric wall heaters with

ductless heat pumps. More on this topic can be found in the report, "Building Better Energy Efficiency Programs for Low-Income Households," see https://www.aceee.org/sites/default/files/publications/researchreports/a1601.pdf. https://www.aceee.org

Increasing energy efficiency for low to moderate income households will facilitate achieving the CAAP goals and reduce the energy burden on these households, which can deliver a wide variety of benefits to the community and the household. The recommended data to be collected regarding energy efficiency programs includes income, education, home ownership, age, language spoken, and race/ethnicity. The report also recommends targeting outreach to low income high volume users and also users that are in arrears on their bills to determine the opportunity to help them with energy efficiency programs. This will aid both the customer and the utility in reduction of costs and potentially free up funds from bill assistance to fund more energy efficiency programs. (Lifting the High Energy Burden in America's Largest Cities: How Energy Efficiency Can Improve Income and Underserved Communities, see https://www.aceee.org/research-report/u1602). All programs should be reviewed to reflect current technology and building materials (CAAP Action H-1.1.2)

2. Commercial energy efficiency programs should be developed that provide incentives to reduce energy use in addition to peak demand reduction. All programs should be reviewed to reflect current technology and building materials (CAAP Action H-1.2.3).

Public Comment Form

Integrated Electric Resource and Master Plan Task Force

The Integrated Electric Resource and Master Plan Task Force, a citizen-led committee, is seeking public input on the finalized Integrated Electric Resource and Master Plan reports and Task Force draft recommendations to the City Council.

The Integrated Electric Resource and Master Plan Task Force was established in 2018 to assist in Water & Light's long-term utility planning process. Siemens, a consultant for the City, prepared the studies that the task force is using to inform its recommendations to the Council.

We would appreciate hearing your thoughts on this project. You may make comments directly on this fillable PDF and submit it via the Water & Light email, **WLmail@CoMo.gov**.

Thank you for your input.

Comments may be emailed to:

WLmail@CoMo.gov

(Include "Task Force" in the subject line)

Comments *(additional space for more comments on the following page)*

Like many Columbians I'm very concerned about climate change and painfully aware that Columbia has fallen behind many other enlightened university towns in addressing it. Like many Columbians, I don't have the technical knowledge to evaluate the proposed plan critically. I do want to say, however, that the recent MIssourian op-ed by Jay Hasheider accurately represents my priorities. We need to do more to reduce our energy use and carbon footprint, and it seems that incentivizing conservation measures like insulation and highly efficient appliances and a/c units is the high road to doing this. It's heartening to see that the task force is bringing something definite to the table. I hope the city will press hard to reduce our emissions, and that it will pay special attention to conservation measures.

The personal information request below is not required and could be made available to the public.

Name Douglas Hunt Email HuntD@missouri.edu

Mailing address 206 Westwood Ave.

City Columbia State MO Zip 65203

Signature Douglas Gene Hunt

Public Comment Form

Integrated Electric Resource and Master Plan Task Force

The Integrated Electric Resource and Master Plan Task Force, a citizen-led committee, is seeking public input on the finalized Integrated Electric Resource and Master Plan reports and Task Force draft recommendations to the City Council.

The Integrated Electric Resource and Master Plan Task Force was established in 2018 to assist in Water & Light's long-term utility planning process. Siemens, a consultant for the City, prepared the studies that the task force is using to inform its recommendations to the Council.

We would appreciate hearing your thoughts on this project. You may make comments directly on this fillable PDF and submit it via the Water & Light email, **WLmail@CoMo.gov**.

Thank you for your input.

Comments may be emailed to:
WLmail@CoMo.gov
(Include "Task Force" in the subject line)

Comments *(additional space for more comments on the following page)*

What Legecy will we Leave our Grand Children? We must meet the challenge of 100% ReNewable By 2030, IF we want to Leave them a Livable World.

The personal information request below is not required and could be made available to the public.

Name Lawrence Lile Email LawrenceLile@gmail.com

Mailing address 7425 E Route Y

City Ashland State Mo Zip 65010

Signature

Public Comment Form

Integrated Electric Resource and Master Plan Task Force

The Integrated Electric Resource and Master Plan Task Force, a citizen-led committee, is seeking public input on the finalized Integrated Electric Resource and Master Plan reports and Task Force draft recommendations to the City Council.

The Integrated Electric Resource and Master Plan Task Force was established in 2018 to assist in Water & Light's long-term utility planning process. Siemens, a consultant for the City, prepared the studies that the task force is using to inform its recommendations to the Council.

We would appreciate hearing your thoughts on this project. You may make comments directly on this fillable PDF and submit it via the Water & Light email, **WLmail@CoMo.gov**.

Thank you for your input.

Comments may be emailed to:
WLmail@CoMo.gov
(Include "Task Force" in the subject line)

Comments *(additional space for more comments on the following page)*

Columbia should set an ambitious goal for 100% renewable energy by 2030, and work hard to achieve it.

Including radical energy efficiency. Get out of long-term coal contracts, not just pass the dirty fuel on to other people.

The personal information request below is not required and could be made available to the public.

Name Dee Dokken Email deedokken@gmail.com

Mailing address 804 Again

City Columbia State MO Zip 65203

Signature Dee Dokken

Public Comment Form

Integrated Electric Resource and Master Plan Task Force

The Integrated Electric Resource and Master Plan Task Force, a citizen-led committee, is seeking public input on the finalized Integrated Electric Resource and Master Plan reports and Task Force draft recommendations to the City Council.

The Integrated Electric Resource and Master Plan Task Force was established in 2018 to assist in Water & Light's long-term utility planning process. Siemens, a consultant for the City, prepared the studies that the task force is using to inform its recommendations to the Council.

We would appreciate hearing your thoughts on this project. You may make comments directly on this fillable PDF and submit it via the Water & Light email, **WLmail@CoMo.gov**.

Thank you for your input.

Comments may be emailed to:
WLmail@CoMo.gov
(Include "Task Force" in the subject line)

Comments *(additional space for more comments on the following page)*
I think the City should have zero Carbone emitions by 2028.

The personal information request below is not required and could be made available to the public.

Name Frederick Park Email Khafre29@aol.com

Mailing address

City Columbia State Mo Zip 65203

Signature Frederick Park

Public Comment Form

Integrated Electric Resource and Master Plan Task Force

The Integrated Electric Resource and Master Plan Task Force, a citizen-led committee, is seeking public input on the finalized Integrated Electric Resource and Master Plan reports and Task Force draft recommendations to the City Council.

The Integrated Electric Resource and Master Plan Task Force was established in 2018 to assist in Water & Light's long-term utility planning process. Siemens, a consultant for the City, prepared the studies that the task force is using to inform its recommendations to the Council.

We would appreciate hearing your thoughts on this project. You may make comments directly on this fillable PDF and submit it via the Water & Light email, **WLmail@CoMo.gov**.

Thank you for your input.

Comments may be emailed to:
WLmail@CoMo.gov
(Include "Task Force" in the subject line)

Comments *(additional space for more comments on the following page)*

I think the city should have zero carbon emissions by 2028. It is a goal that will help us achieve a better quality of life for our citizens.

The personal information request below is not required and could be made available to the public.

Name May Parker Email meparker8@cougars.ccis.edu

Mailing address _____

City Columbia State Mo Zip 65202

Signature May Parker

Public Comment Form

Integrated Electric Resource and Master Plan Task Force

The Integrated Electric Resource and Master Plan Task Force, a citizen-led committee, is seeking public input on the finalized Integrated Electric Resource and Master Plan reports and Task Force draft recommendations to the City Council.

The Integrated Electric Resource and Master Plan Task Force was established in 2018 to assist in Water & Light's long-term utility planning process. Siemens, a consultant for the City, prepared the studies that the task force is using to inform its recommendations to the Council.

We would appreciate hearing your thoughts on this project. You may make comments directly on this fillable PDF and submit it via the Water & Light email, **WLmail@CoMo.gov**.

Thank you for your input.

Comments may be emailed to:
WLmail@CoMo.gov
(Include "Task Force" in the subject line)

Comments *(additional space for more comments on the following page)*

As the wife of a committee member I have seen the numbers, and I believe that if CWL staff can be positive and have bids ready for the city council meeting, instead of waiting until the city council tells them to, the fastest we can reach 100% renewable power is 2027. There will be glitches of course, but it looks like 2028 is an achievable goal.

The personal information request below is not required and could be made available to the public.

Name Maria Parker Email meparker222@gmail.com

Mailing address 215 W. Sexton Rd

City Columbia State MO Zip 65203

Signature Maria E Parker

Public Comment Form

Integrated Electric Resource and Master Plan Task Force

Additional Comments

Please set new renewable targets to reach 100% by 2030

Since demand has been steady & as projected to continue, I question the need to add transmission lines.

Expand energy efficiency programs.

Wm Edwards

city of Columbia Utilities

Public Comment Form

Integrated Electric Resource and Master Plan

We would appreciate hearing your thoughts on this project. You may make comments directly on this fillable PDF and submit it via the Water & Light email, **WLmail@como.gov** or mail it to the address indicated below. All comments must be submitted by Oct. 10, 2021. Thank you for your input.

Please send comments by Oct. 10, 2021. Thanks for your input.

Comment forms can be mailed to:
Attn: Chris Kisch
Columbia Water & Light
P.O. Box 6015
Columbia, MO 65205

Comments may also be emailed to: WLmail@CoMo.gov
(Include "Electric Resource and Master Plan" in the subject line)

Comments *(additional space for more comments on the following page)*

Comments are provided below first on Part 1 and then on Part 2 of the Siemens Integrated Resource and Master Plan.

Part 1: The primary flaw of the Part 1 generation study is that it does not contain an adequate "business as usual" baseline that would reference existing assets and fill in remaining needs through market purchases (p. 59). A clear baseline is needed both for analysis of, and communication on, the available options. Instead the Siemens study uses a "reference case" that includes not only renewable goals adopted (and bounded by a price cap) in the Renewable Energy Ordinance, but also "societal goal targets" with regard to renewables and emission reductions (adopted without any electric service cost analysis in the City of Columbia Climate Action and Adaptation Plan). This obscures the costs to ratepayers involved in meeting those targets. Renewable goals and related costs were previously put before voters and boundaries were set. If we are now going to make changes, the costs of those changes should be clearly set out and citizens should again be afforded a right to vote on those new goals.

The study also makes clear that CWL is currently overbuying resources to meet renewable goals. This means it is buying resources that are not currently needed to ensure reliable electric service, and showing a "long position" through 2030. The study downplays the associated costs by offsetting the costs with assumed sales from the

The personal information request below is not required and could be made available to the public.

Name Sarah Read Email sjread@buildingdialogue.com

Mailing address 3802 Bedford Drive

City Columbia State MO Zip 65203

Signature /s/Sarah J. Read

city of Columbia
Utilities

Public Comment Form

Integrated Electric Resource and Master Plan

Additional Comments

Part 2: The Siemens study further confirms what CWL has been saying for several years: that the local transmission and distribution networks are in need of new investment. It also confirms, that as a result of Council's ill-considered decisions to "pause" that investment, the system has deteriorated. Many lines/substations are overloaded, and immediate changes are needed, particularly at the Perche Creek substation.

Unfortunately, the Siemens transmission study fails to provide the public the necessary information to evaluate what are the best choices at this time to ensure reliable and cost-effective electric service. This is because it fails to do any analysis of the "paused" option, known as "Option A" (Mill Creek station and transmission line) against the investments it does recommend. The key question the Siemens report appears to answer is "can we come up with some changes that will address immediate concerns while avoiding a new substation at Mill Creek?" It avoids a comparison with Option A largely by introducing a "spatial load forecast", which while well done as an academic exercise, is largely irrelevant. It is difficult under the best of circumstances to predict where new development will occur. And Siemens admits it did not have certain kinds of data and so substituted assumptions correlating likely growth to empty lots (p. 33). The Mill Creek substation option is then dismissed as not being ideally correlated with the model's predictions for growth (p. 18) (elsewhere the report acknowledges a need to upgrade infrastructure in the Southwest, limits its focus to a single area, proposes an alternative substation just to serve that area, dismisses Mill Creek as being further away from the limited focus area, and then dismisses the alternate substation as likely to be underutilized – p. 55). What the report fails to do is look at how Option A would have solved the many issues identified in the report on a system-wide basis. And so there is no comparative benefit/cost analysis that would allow for an analysis of Option A as compared to the alternative investments outlined in the report. Another portion of the report that addresses a transmission event is heavily redacted and so can't be reviewed. I would like to know though whether Option A, had it been completed, may have alleviated the risks that materialized.

The best approach, both for reliable electric service and economic development, would seem to be to plan for a robust, resilient, system capable of supporting growth wherever it occurs. Option A was designed to strengthen the system at a cost far lower than the projected costs here. In particular, it was designed to meet the challenges posed by existing growth in the Southwest. Not only are the costs of the alternatives outlined in the Siemens study higher, the expensive 4 hour battery storage back-up option for the residential neighborhoods south of Perche Creek (58% higher – p. 215) does not provide the same standard of reliability that Option A would have or that other neighborhoods enjoy by having more than one interconnection into the system. Option A also was presented as having a 40 year period of benefits; this apparently more expensive plan seems to have a 20 year horizon.

The public is not well served by avoidance of questions of how much the delay has cost us, or whether changes in circumstances might support a different plan (and what those are). To the extent the Siemens analysis avoids these issues, it is deficient. I again refer to the Task Force's failure to adequately engage the public, addressed in the Part 1 comments above. Much more could have been done (and in fact was done in educating the public on Option A) to help the public understand and be engaged in the choices before us. Unfortunately, political decisions sidetracked progress several years ago. It is past time to take politics out of the process, to be open and honest with the public, and to return the planning focus to how to best engineer our system for safe, reliable, and cost-effective service. That requires a fair presentation and evaluation of all of the options, including the one that was "paused."

Public Comment Form

Integrated Electric Resource and Master Plan Task Force

The Integrated Electric Resource and Master Plan Task Force, a citizen-led committee, is seeking public input on the finalized Integrated Electric Resource and Master Plan reports and Task Force draft recommendations to the City Council.

The Integrated Electric Resource and Master Plan Task Force was established in 2018 to assist in Water & Light's long-term utility planning process. Siemens, a consultant for the City, prepared the studies that the task force is using to inform its recommendations to the Council.

We would appreciate hearing your thoughts on this project. You may make comments directly on this fillable PDF and submit it via the Water & Light email, **WLmail@CoMo.gov**.

Thank you for your input.

Comments may be emailed to:

WLmail@CoMo.gov

(Include "Task Force" in the subject line)

Comments *(additional space for more comments on the following page)*

Thank you for the opportunity to provide input. I support many of the task force recommendations and want others to go further than the task force has gone in the draft report.
1. Regarding DSM/EE programming - The task force should recommend a legal review and appropriate action with Siemens to either compel Siemens to produce the report specified in the statement of work or reduce Siemens payment appropriately. Taxpayers should not have to pay twice for this study.
The City should plan to expand DSM/EE programming in the coming decade and ensure programs address overall energy reduction in addition to peak demand reduction and also that there are appropriate programs designed for low and moderate income households and that participation is tracked for equity in program investments. The goals should be for the highest levels of improvement included in the scenario models.
2. The City of Columbia must do everything in it's power to hasten the closing of the coal-fired power plants with which the city has contracts. I strongly support a legal review of the coal contract PPAs.
The city should not convert boiler #7 to biomass. The City should not complete upgrades to the Columbia Energy Center.
3. The city should commit by ordinance to a goal of 100% renewable electricity for CWL by 2030. Additionally the city should plan for high seasonal loads as climate change accelerates. If by 2028 or later, the city realizes for some

The personal information request below is not required and could be made available to the public.

Name Carolyn Amparan Email carolyn.amparan@gmail.com

Mailing address 4804 Shale Oaks Avenue

City Columbia State MO Zip 65203

Signature _____

Public Comment Form

Integrated Electric Resource and Master Plan Task Force

Additional Comments

4. I agree the Value of Solar study should be re-done with a clear and detailed statement of work to obtain the desired work product including environmental and social values
5. All future CWL decisions should include environmental and social factors.
6. I support the investment in Advanced Metering infrastructure and the deployment of time of day pricing to promote conservation. AMI will also enable Columbia to reduce GHG emissions related to meter reading and other operational activities.
7. Regarding Transmission and Distribution, Increasing resilience needs to be a factor in future decisions. Particularly resilience with respect to floods, extreme temperatures and a future tornado or tornadoes. Additionally, I support the investment in non-wire solutions of distributed solar and batteries to improve the resilience of the grid, increase local generation and reduce the need for new transmission lines.
When considering investments to prevent possible low shedding, CWL should consider the impacts on customers who might be impacted. How long? Do they have critical needs such as for medical equipment? For some of us loosing electricity for 1 hour is not a big deal, for others it may be life or death. The negative consequences on the customer base need to be clear to understand the level of investment to prevent this possibility and weigh that investment versus the investments in other areas that will help address the climate crisis which has 100% certainty of getting worse.
8. I support the task force recommendation that building codes must continue to increase building energy efficiency, that distributed solar and storage should be pursued and a rate structure must be implemented that incentives efficiency and conservation throughout all customer cases. Additionally the rate structure should reduce dependence on the base rate and move it to the tier structure by reducing the base rate and increasing the tiers. This would be more equitable.

city of Columbia Utilities

Public Comment Form

Integrated Electric Resource and Master Plan

We would appreciate hearing your thoughts on this project. You may make comments directly on this fillable PDF and submit it via the Water & Light email, **WLmail@como.gov** or mail it to the address indicated below. All comments must be submitted by Oct. 10, 2021. Thank you for your input.

Please send comments by Oct. 10, 2021. Thanks for your input.

Comment forms can be mailed to:

Attn: Chris Kisch
Columbia Water & Light
P.O. Box 6015
Columbia, MO 65205

Comments may also be emailed to: WLmail@CoMo.gov

(Include "Electric Resource and Master Plan" in the subject line)

Comments *(additional space for more comments on the following page)*

The "public comment" process is lacking in involving the public. What was done other than a press release? I only became aware of the call for public comment on October 9 when public comment closes on October 10.

During the development of the transmission planning process, over a decade ago, a well publicized public meeting was held where the reason and project scope was explained. Following that public comment was taken.

This project is too important not to take the time to inform the public of the scope of this plan and then get public comment. A well advertised "televised" public meeting should be held that fully explains the scope, methodology and results of the existing plan. Questions should be taken and answered. Once that process is complete, then a public comment process hould be opened.

A fully transparent process is necessary for such an important plan for the future of the citizen owned electric utility. Public presentation at a Council session is not sufficient.

The personal information request below is not required and could be made available to the public.

Name Jim Windsor _____ Email jimwindsor520@gmail.com _____

Mailing address 200 Manor Drive _____

City Columbia _____ State MO _____ Zip 65203 _____

Signature _____