BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI

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| In the Matter of a Determination of Special Contemporary Resource Planning Issues to be Addressed by The Empire District Electric Company d/b/a Liberty in its Next Triennial Compliance Filing or Next Annual Update Report | ) ) ) ) ) | Case No. EO-2023-0102 |

**PUBLIC COUNSEL'S SUGGESTED SPECIAL CONTEMPORARY ISSUES**

**COMES NOW** the Office of the Public Counsel and, in response to the September 13, 2022, order in the above-captioned case opening it and ordering, "Any party wishing to suggest a special contemporary issue that The Empire District Electric Company d/b/a Liberty should consider in its next annual IRP update filing shall file its written suggestion no later than September 15, 2022," suggests in the attached verified memorandum certain special contemporary issues that Ameren Missouri should consider in its next annual update report.

Respectfully,

*/s/ Nathan Williams*

Nathan Williams
Chief Deputy Public Counsel
Missouri Bar No. 35512

Office of the Public Counsel
Post Office Box 2230
Jefferson City, MO 65102
(573) 526-4975 (Voice)
(573) 751-5562 (FAX)
Nathan.Williams@opc.mo.gov

**CERTIFICATE OF SERVICE**

I hereby certify that copies of the foregoing have been mailed, hand-delivered, transmitted by facsimile or electronically mailed to all counsel of record this 15th day of September 2022.

/s/ Nathan Williams

MEMORANDUM

To: Missouri Public Service Commission Official Case File,
Case No. EO-2023-0102

From: Geoff Marke, Chief Economist
Lena Mantle, Senior Analyst
John A. Robinett, Utility Engineering Specialist
Jordan Seaver, Policy Analyst
Missouri Office of the Public Counsel

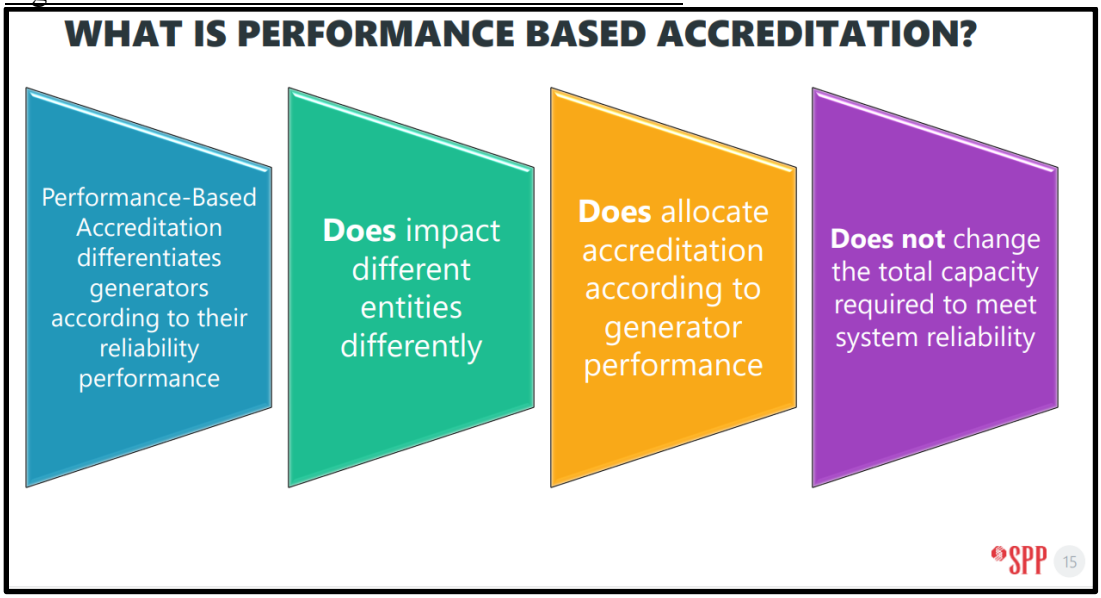
Re: Special Contemporary Issues for The Empire District Electric Company d/b/a Liberty in its Next Triennial Compliance Filing or Next Annual Update Report

Date: 9/15/2022

# Issue 1: Modeling for Low, Medium, High Performance Base Accreditation of Existing and Planned Units

Historically, the Southwest Power Pool ("SPP") generation accreditation process has not taken into consideration performance or contribution to reliability in assessing an appropriate accreditation capacity amount for specific generation. Moving forward the SPP plans to implement a phased-in approach for performance based accreditation that will quantify each resource's contribution to reliability by 2027 (or earlier). Figure 1 provides an excerpt from a recent SPP presentation at the PSC's agenda providing a general overview of Performance Based Accreditation.

Figure 1: What is Performance Based Accreditation?



The introduction of performance-based accreditation will have a serious impact on SPP participants' abilities to meet their planning reserve margins as this new framework "values conventional resources that are reliable and available to perform when needed most" and "incents underperforming resources to improve."[1]

Suggestion:

1.) Liberty should be required to update its annual and triennial IRP with what it (or SPP) believes is the likely (or the known) performance accreditation amount for each of its existing generating units and should include the rationale for calculating said amount for each of its new supply side resources it models in its IRP.

All performance-based accreditation analyses should include the interdependent nature of operating in a competitive market which includes (but is not limited to) the following variables:

- Current and expected load of the utility;
- Current SPP generation make-up;
- Expected retirement and location of expected lost generation;
- Generation type, and location of expected new generation within the SPP que in determining likely accreditation amount; and
- Any interplay between generation make-up/accreditation and expected build-out of new transmission investments.

# Issue 2: Modeling for Low, Medium, High Participation of Aggregator of Retail Customer ("ARCs")

Although the MO PSC currently has a temporary prohibition on ARC participation in Missouri such a prohibition is not guaranteed. The increased volatility surrounding market prices, concerns over reliability and the introduction of FERC Order 2222 create a scenario where RTO rules and assumptions are in-flux and likely to include an increased emphasis on demand response actions whether from incumbent utilities, third-party aggregators, or both.

Suggestion:

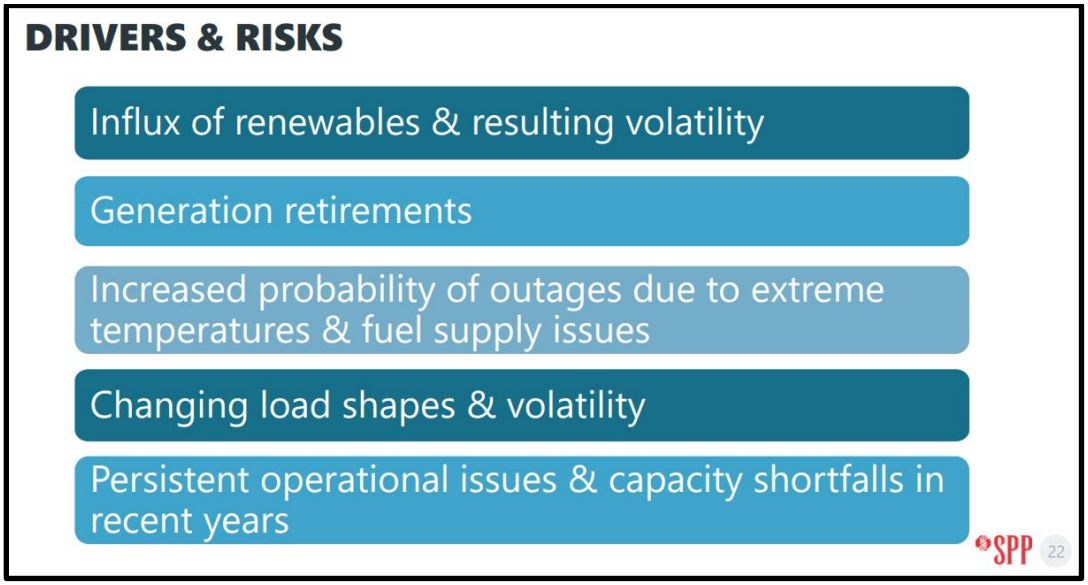
1.) Liberty should model for a low, medium, and high participation scenario of commercial and industrial customers electing to participate in demand response activities based on the introduction of a third-party(s) ARC within its footprint and provide an analysis on what the impact said ARC would have on Liberty's IRP.

[1] See p. 16 of SPP's PowerPoint to the Missouri Public Service Commission. https://psc.mo.gov/CMSInternetData/Agenda%20Presentations/2022%20Presentations/8-31-2022%20SPP%20Update.pdf

# Issue 3: Over-Reliance on SPP Market to Meet Energy Needs

OPC's warnings about resource adequacy and reliability were realized by customers in both 2021 and 2022 in the form of higher fuel costs. The SPP echoed these concerns at a recent PSC Agenda as seen in Figure 2 below.

Figure 2: SPP Update to the Missouri Public Service Commission: Planning Reserve Margin "Drivers and Risks" [2]




Suggestion:

1.) Liberty should run a scenario for each of its plans in which the SPP energy available to meet Liberty's energy requirements is limited to ten percent of Liberty's annual peak load. The number of hours and the amount of energy required, but not provided from Liberty's resources should be reported. Liberty's choice of preferred plan should be reviewed taking into account this additional information.

2.) Liberty should adjust its IRP modeling to account for the new 15% reserve planning margin recently set by SPP.

[2] Bright, B. & Elliott L. (2022) SPP Update. Southwest Power Pool Presentation to the Missouri Public Service Commission https://psc.mo.gov/CMSInternetData/Agenda%20Presentations/2022%20Presentations/8-31-2022%20SPP%20Update.pdf

# Issue 4: Inflation Reduction Act

The Inflation Reduction Act of 2022 sets aside nearly $370 billion in tax credits and federal funding for building certain qualified facilities or rebating certain measures over the next decade. Incentives for further renewable development, electric vehicle adoption, energy efficiency and target emission reductions from various sectors are all included as provisions within the bill.

Suggestion:

1.) In its future IRP updates and plans Liberty should account for and explicitly identify cost reductions from the Inflation Reduction Act for procuring new generation, transmission, and distribution. Analysis should also include updated assumptions around load growth and/or appliance saturation based on targeted rebates surrounding EV's and energy efficiency products.

# Issue 5: Additive Manufacturing ("AM" or "3D Printing")[3]

Background:

As it has for prior resource planning filings, OPC is requesting the Commission to include additive manufacturing technology as a cost-saving tool and supply chain risk mitigation measure for resource planning purposes as a special contemporary issue.

Additive manufacturing (AM) is the process of producing objects from computer-aided design (CAD) model data, usually adding layer upon layer, in contrast to conventional subtractive manufacturing methods that involve the removal of material from a starting work piece. AM is also called 3-D printing, additive fabrication, or free-form fabrication. Once employed purely for prototyping, AM is now increasingly used for spare parts, small series production, and tooling. The continued proliferation of AM can provide utilities (and other industries in general) new design flexibility, reduced energy use, and shorten time to market.

Among the many potential sustainability benefits of this technology, three stand out:

- Improved resource efficiency: improvements can be realized in both production and use phases as manufacturing processes and products can be redesigned for AM;
- Extended product life: achieved through technical approaches such as repair, remanufacture and refurbishment, and more sustainable socio-economic patterns such as stronger persona-product affinities and closer relationships between producers and consumers;
- Reconfigured value chains: shorter and simpler supply chains, more localized production, innovative distribution models, and new collaborations.[4]

The number of materials and complexity that AM can handle is constantly expanding and is already a reality in many industries through enhanced benefits listed in Figure 3 from a recent McKinsey Consulting white paper:

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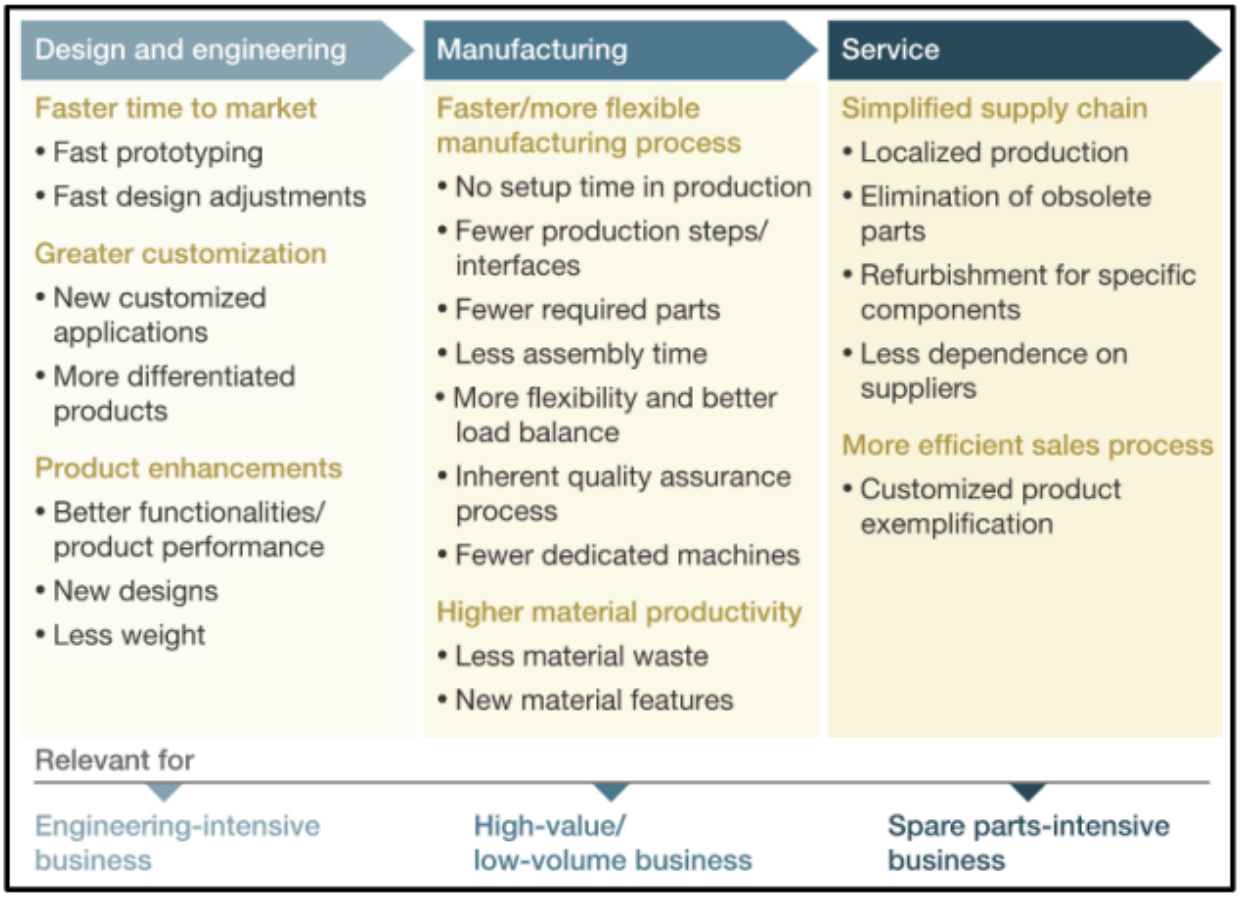
[3] Dowd, K. (2020) How 3D printing can help power the energy industry. BizTech Magazine. https://biztechnmagazine.com/article/2020/02/how-3d-printing-can-help-power-energy-industry

[4] Ford, S. & M. Despreisse (2016) Additive manufacturing and sustainability: an exploratory study of the advantages and challenges. Journal of Cleaner Production. 137, p. 1573-1587. https://www.sciencedirect.com/science/article/pii/S0959652616304395

Figure 3: Enhanced benefits of AM applications[5]




In principle, additive technologies are able to produce almost every part that can be produced by means of traditional procedures. The increase of AM will no doubt have cost and operational implications on an investor-owned utility's cost of service that should begin to be considered as a relevant input in future planning scenarios. Such examples include but are not limited to:

a) Generation construction of wind turbines (or other production plant parts):

The enormity of wind turbines (blades and tower segments) makes it both difficult and expensive to transport materials on the highway to project sites. 3D printing could enable construction at the project site which should result in financial savings. Most recently, a California startup (Reinforced Concrete Additive Manufacturing "RCAM" Technologies) was awarded a grant from the California Energy Commission ("CEC") to develop and test AM printing technology of concrete for turbine towers on-site in the hopes of boosting capacity factors and lowering overall costs.[6]

[5] Kelly, R. & J. Bromberger (2017) "Additive Manufacturing: A Long-Term Game Changer for Manufacturers." McKinsey Consulting. https://www.mckinsey.com/business-functions/operations/our-insights/additivemanufacturing-a-long-term-game-changer-for-manufacturers

[6] Gerdes, J. (2017) Is 3-D Printing the Solution for Ultra-Tall Wind Turbine Towers? GTM. https://www.greentechmedia.com/articles/read/is-3d-printing-the-solution-for-ultra-tall-wind-turbinetowers#gs.uTRMrnsU

b) Lower costs, quicker delivery of spare parts for grid reliability:

Simplification of the supply chain necessary to support grid reliability can be improved by eliminating the need to produce components at different sites or having to store excess distribution and transmission investments in warehouses. With AM, "on-demand" products/parts could be manufactured in proximity to the impacted area following both low- impact, high frequency events (e.g., a power outage from a blown transformer) and high-impact, low frequency events (e.g., severe weather events, earthquake, and electromagnetic pulses). In theory, AM could provide a cost-effective alternative to securing long-lead-time transmission and distribution equipment.

c) Load forecasting implications:

If AM technology were to be adopted and utilized on a macro-scale it could have profound implications on the entire economy. AM has already created homes,[7] cars, and homes[8] + cars.[9] Verhoef, et al. (2018) estimate that AM could lead to a 5-27% reduction in global energy use by 2050 primarily from "material savings, transportation savings, production savings, savings in use phase and in operation and maintenance." Table 1 provides a U.S. Department of Energy assessment of AM impact attributes on both product offerings and supply chain structures.

[7] Cowan, M. (2018) The World's First Family to Live in a 3D-Printed Home. BBC. https://www.bbc.com/news/technology-44709534

[8] Hanley, S. (2018) LSEV 3D-printed Electric Car Costs Just $7,500. How is that Possible? Clean Technica https://cleantechnica.com/2018/03/19/lsev-3d-printed-electric-car-costs-just-7500-possible/

[9] Oak Ridge National Laboratory (2018) ORNL integrated Energy Demo Connects 3D-Printed Building, Vehicle. https://www.ornl.gov/news/ornl-integrated-energy-demo-connects-3d-printed-building-vehicle see video at: https://www.youtube.com/watch?v=RCkQBlFJRN4&feature=youtu.be

Table 1: Impact of AM on product offerings and supply chain:

| AM Attributes compared to traditional manufacturing | Impact on product offerings | Impact on supply chains |
|---|---|---|
| Manufacturing of complex-design products | ● | ◉ |
| New products that break existing design and manufacturing limitations | ● | ◉ |
| Customization to customer requirements | ● | ◉ |
| Ease and flexibility of design iteration | ◉ | ○ |
| Part simplification/sub-parts reduction | ○ | ○ |
| Reduced time to market | ○ | ○ |
| Waste Minimization | ○ | ○ |
| Weight reduction | ○ | ◌ |
| Production near/at point of use | ○ | ● |
| On-demand manufacturing | ◌ | ● |

Key: Very High ● High ◉ Medium ○ Low ◌

OPC is not requesting any specific modeling; rather, we are looking for the utilities to examine the feasibility and potential cost savings implications (if any) of adopting AM technology to maintain present-day investments or for future investments at the generation, transmission, and distribution levels. Stated differently, we believe this technology should have cost saving and reliability implications that merit further research and consideration and would like the utilities to explore this technology within the Special Contemporary Topics sections of its IRP.

Suggestion:

1.) Liberty should explore applicability of this technology within its Distribution, Transmission and Supply Side Generation Chapters as an approved Special Contemporary Topic for its IRP modeling. Examples can include but are not limited to exploring this topic with non-profits (e.g, EEI, EPRI), federal agencies (e.g., The Department of Energy Oak Ridge National Laboratory), and private entities (e.g., General Electric).[10]

[10] Utilities and the Commission are encouraged to examine attachment OPC-1: GE Additive (2022) Building the Business Case: Identifying Criteria to Measure ROI for Additive Manufacturing. https://www.ge.com/additive/roi-playbook?_ga=2.254924040.1279298689.1622149638-799926883.1622149638 the link includes a webinar as well.

**BEFORE THE PUBLIC SERVICE COMMISSION**
**OF THE STATE OF MISSOURI**

**AFFIDAVIT OF LENA M. MANTLE**

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| STATE OF MISSOURI | ) | |
| | ) | SS. |
| COUNTY OF COLE | ) | |

**COMES NOW LENA M. MANTLE** and on her oath declares that she is of sound mind and lawful age; that she contributed to the foregoing *Special Contemporary Topics* and that the same is true and correct according to her best knowledge and belief.

Further the Affiant sayeth not.

Lena M. Mantle
Senior Analyst

**JURAT**

Subscribed and sworn before me, a duly constituted and authorized Notary Public, in and for the County of Cole, State of Missouri, at my office in Jefferson City, on this 15th day of September, 2022.

NOTARY PUBLIC NOTARY SEAL STATE OF MISSOURI

TIFFANY HILDEBRAND
My Commission Expires
August 8, 2023
Cole County
Commission #15637121

Tiffany Hildebrand
Notary Public

My Commission expires August 8, 2023.

**BEFORE THE PUBLIC SERVICE COMMISSION**
**OF THE STATE OF MISSOURI**

**AFFIDAVIT OF GEOFF MARKE**

| | | |
|---|---|---|
| STATE OF MISSOURI | ) | |
| | ) | SS. |
| COUNTY OF COLE | ) | |

**COMES NOW GEOFF MARKE** and on his oath declares that he is of sound mind and lawful age; that he contributed to the foregoing *Special Contemporary Topics* and that the same is true and correct according to his best knowledge and belief.

Further the Affiant sayeth not.

Geoff Marke
Chief Economist

**JURAT**

Subscribed and sworn before me, a duly constituted and authorized Notary Public, in and for the County of Cole, State of Missouri, at my office in Jefferson City, on this 15th day of September, 2022.

NOTARY PUBLIC NOTARY SEAL STATE OF MISSOURI

TIFFANY HILDEBRAND
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August 8, 2023
Cole County
Commission #15637121

Tiffany Hildebrand
Notary Public

My Commission expires August 8, 2023.

**BEFORE THE PUBLIC SERVICE COMMISSION**
**OF THE STATE OF MISSOURI**

**AFFIDAVIT OF JOHN A. ROBINETT**

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|---|---|---|
| STATE OF MISSOURI | ) | |
| | ) | SS. |
| COUNTY OF COLE | ) | |

**COMES NOW JOHN A. ROBINETT** and on his oath declares that he is of sound mind and lawful age; that he contributed to the foregoing *Special Contemporary Topics* and that the same is true and correct according to his best knowledge and belief.

Further the Affiant sayeth not.

John A. Robinett
Utility Engineering Specialist

**JURAT**

Subscribed and sworn before me, a duly constituted and authorized Notary Public, in and for the County of Cole, State of Missouri, at my office in Jefferson City, on this 15th day of September, 2022.

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**BEFORE THE PUBLIC SERVICE COMMISSION**
**OF THE STATE OF MISSOURI**

**AFFIDAVIT OF JORDAN SEAVER**

| | | |
|---|---|---|
| STATE OF MISSOURI | ) | |
| | ) | SS. |
| COUNTY OF COLE | ) | |

**COMES NOW JORDAN SEAVER** and on his oath declares that he is of sound mind and lawful age; that he contributed to the foregoing *Special Contemporary Topics* and that the same is true and correct according to his best knowledge and belief.

Further the Affiant sayeth not.

Jordan Seaver
Policy Analyst

**JURAT**

Subscribed and sworn before me, a duly constituted and authorized Notary Public, in and for the County of Cole, State of Missouri, at my office in Jefferson City, on this 15th day of September, 2022.

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Tiffany Hildebrand
Notary Public

My Commission expires August 8, 2023.