



## **Filing Receipt**

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BEFORE THE PUBLIC UTILITY COMMISSION OF TEXAS

)  
Project to Develop the Texas Backup Power ) Project No. 57236  
Package Program )

MAINSRING ENERGY, INC. COMMENTS IN RESPONSE TO COMMISSION STAFF'S  
QUESTIONS ON THE TEXAS BACKUP POWER PACKAGE PROGRAM RESEARCH ENTITY  
FINAL REPORT

**I. Introduction**

Mainspring Energy, Inc. ("Mainspring") appreciates the opportunity to submit comments to the Public Utility Commission ("Commission") in response to the questions posed in the Staff's Memo dated January 23, 2025.<sup>1</sup> Patrick Engineering, Inc.'s Final Report ("the Report")<sup>2</sup> on the Texas Backup Power Package Program ("TBPP") was statutorily mandated and provides information for the Commission to consider in finalizing the contours of the TBPP. One of the key findings from the Report is the potential for cost to exceed the level of incentives.

Regarding this key finding, Mainspring underscores the need to ensure open competition among manufacturers and vendors. Competition will benefit customers and reduce costs. In addition, Mainspring offers detailed input on approaches to lower the costs of microgrids in the TBPP. Lower costs mean more microgrids. More microgrids mean a more reliable grid, particularly for critical loads.

Mainspring respectfully implores the Commission to value stakeholder input, including from manufacturers and vendors, before finalizing the TBPP. Mainspring appreciates the significant research conducted by Patrick Engineering and inclusion of linear generator technology in the review of generator technology. Simultaneously, Mainspring identifies several errors and problems in the Report. Mainspring was not contacted to supply information which may explain some of the issues. In these comments, Mainspring offers corrections.

Mainspring offers these written comments as a manufacturer and vendor of local, flexible linear generators. Linear generation is distinct from internal combustion, as it does not rely on a

<sup>1</sup> Commission Memorandum. Available:  
[https://interchange.puc.texas.gov/Documents/57236\\_14\\_1462164.PDF](https://interchange.puc.texas.gov/Documents/57236_14_1462164.PDF)

<sup>2</sup> Patrick Engineering, Inc. Final Report. Available:  
<https://interchange.puc.texas.gov/search/documents/?controlNumber=57236&itemNumber=11>

spark or flame to produce electricity. Based on the statute, linear generators should be eligible TBPP technology. Mainspring has previously written to the Commission to request “urgent action to ensure open, and fair review of all capable technologies to participate in the Backup Power Package”.<sup>3</sup>

Mainspring appreciates that its technology was included in the Report list of manufacturers.<sup>4</sup> However, the technology was incorrectly listed as a “Genset”. One of Mainspring’s continuing concerns with the Report is the lack of consistent evaluation of Mainspring Linear Generator technology alongside traditional gensets.

Mainspring is also a member of Grid Resilience in Texas (“GRIT”) and strongly supports GRIT’s comments submitted today in this docket related to the need for flexibility in microgrid design. Further, Mainspring agrees with many of the comments submitted by Alison Silverstein, particularly related to the unnecessary island-only operation of microgrids and the oversizing of the battery energy storage system (BESS) proposed in the Report. Mainspring applauds the efforts of the Commission and staff in proactively addressing the challenges facing the state’s energy landscape.

### **III. About Mainspring**

Mainspring is a U.S.-headquartered manufacturer of dispatchable, fuel-flexible, and scalable linear generators. Mainspring was founded in 2010 and its first commercial units were deployed in 2020. The company has customers across the country that span numerous industries, including commercial and industrial facilities, data centers, utilities, and independent power producers.

Mainspring customers and potential customers include Critical Facilities described in SB2627<sup>5</sup>, the enabling legislation for the Texas Backup Power Package Program. One of our existing customers recently placed an order for more than 30 additional units to be sited at multiple locations throughout Texas to help provide resilience to their critical operations.

Mainspring is a leader in converting fuel to electricity through its linear generator technology that is highly efficient and low emissions. The linear generator delivers unmatched flexibility for the grid transition, including the ability to switch between various gaseous fuels, including natural gas, propane, biogas and hydrogen. The linear generator uses a low-temperature reaction without a spark or flame, which results in near-zero emissions of nitrogen oxides. This is vital for permitting generation near load where it is needed most. In addition, it is an alternative to longer-lived transmission and gigawatt-scale generation capacity build outs. The linear generator can also quickly track and firm renewables with its full

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<sup>3</sup> Mainspring Letter Dated September 13, 2024 regarding Project No. 55407 Backup Power Package & Contractor’s Report. Available: [https://interchange.puc.texas.gov/Documents/55407\\_16\\_1427676.PDF](https://interchange.puc.texas.gov/Documents/55407_16_1427676.PDF)

<sup>4</sup> TBPP Final Report Appendices. Appendix 5: Manufacturers, Suppliers, Vendors. Available: <https://interchange.puc.texas.gov/search/documents/?controlNumber=57236&itemNumber=11>

<sup>5</sup> Facilities that “support community health, safety and well-being”

dispatchability, and its modular design allows for scalability similar to battery energy storage, but does not face the same energy duration limitations.

Mainspring Linear Generators have been deployed on the distribution and sub-transmission systems across the country. Mainspring Linear Generators are fully dispatchable and scalable from 250 kW to 100+MW power blocks. Mainspring customers include Fortune 500 companies such as Lineage Logistics, Prologis, and Kroger, as well as utilities such as AEP, Florida Power and Light, and others. Mainspring Linear Generators, in configuration with 100% green fuels stored on-site, can provide cost-effective, long duration energy storage for seasonal reliability needs.

Finally, Mainspring is proud to announce a \$174 million investment to establish a manufacturing facility in the Pittsburgh, Pennsylvania area. This facility will produce approximately 1,000 linear generators annually. Mainspring aims to deploy this US- technology in Texas to enhance grid reliability and support economic development across various sectors, including those seeing growing load in data centers and manufacturing.

#### **IV. Responses to Commission Staff Questions**

1. The Final Report outlines specifications for TBPPs of various sizes to serve critical Facilities.

A. How, if at all, could these specifications affect the ability of critical facilities to apply for, install, or utilize TBPPs?

In the Executive Summary, the Report states “the program grant may only fund a small portion of the cost of the TBPP” since “the total cost of each backup power package is significantly greater than the TBPP program grant cap of \$500 per kW”. Given this concern, the Commission should look for ways to cut some of these costs out or make them optional and to create the potential additional value creation from these assets without compromising the primary mission of resiliency.

Mainspring agrees with GRIT that prescriptive TBPP sizing specifications are likely to limit the ability of customers to implement projects and raise costs. Mainspring has extensive experience with customers that also have on-site batteries and/or solar.<sup>6 7</sup> The Report’s evaluation to minimize capital costs while fulfilling the statutory requirements makes several problematic assumptions. The Report’s recommendation to size generation to meet package capacity, plus one hour of storage and a solar PV system sized at 16% of package capacity, should not be implemented as a requirement, but rather as an option among many that satisfy the statute and intent of the TBPP. Packages could reduce costs significantly by allowing customers the flexibility to adopt component sizing that suits their needs.

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<sup>6</sup> For example, see Prologis Mobility case study for linear generators coupled with BESS <https://cdn.sanity.io/files/m8z36hin/production/57fd50e31bd00b303f8b4dec5aeee97c7d996072.pdf>

<sup>7</sup> For example, see Lineage Logistics case study for linear generators coupled with solar <https://cdn.sanity.io/files/m8z36hin/production/999b4b50f1ef665396dc6494df6185a16c99e674.pdf>

In addition, Mainspring agrees with GRIT and Alison Silverstein that the Report inaccurately interprets the statute to require operation only in island-mode. Further, overly restrictive use of a microgrid to emergency-only situations would result in forcing customers to use grid power when it would instead be in the customer's best interest (and likely, even the wider load's best interest) for the customer to come offline and self-serve their load.

One can easily imagine a scenario in which the grid is dangerously reaching or exceeding historic peak demand, LMP is increasing, and microgrids could alleviate costs to themselves and other ratepayers by coming off the grid. However, if the Commission required that TBPP microgrids can only operate in emergency island mode, these customers would be forced to continue to purchase grid power.

B. How, if at all, should the outlined specifications for TBPP packages be modified to ensure that the packages can serve most critical facilities in Texas?

The Commission should modify many of the specifications. First, the Commission should ensure flexibility such that customers can choose the duration of on-site fuel storage and type of fuel that satisfies their objectives. The Report alludes to microgrid designs that in some cases leverage underground pipelines and in other cases, use propane utilizing skid mounted tankage. As we get to later, skid mounts are not necessary.

Focusing on the fuel side, the simple fact that not every customer in Texas will have access to pipeline natural gas should underscore that design flexibility is essential. Across the United States, Mainspring is developing projects with customers with multi-day fuel, primarily propane on-site. Many customers are actively pursuing biogas and hydrogen, as well. While the Report states that "Propane tank sizing for larger systems to accommodate 48 hours operation becomes unwieldy", our experience is that some customers desire such a duration of fuel on-site because of the incredible cost of potential outages and continued concerns over gas pipeline interruptions during emergencies.<sup>8</sup>

Further, Mainspring respectfully recommends that the Commission welcome alternative fuel types beyond propane and natural gas. While the statute states that TBPPs must be capable of operating on one of these fuels, some generation types such as the Mainspring Linear Generator can run on these required fuels, plus others. Mainspring has customers that prefer an alternative and anticipates increasing access to alternatives in the future, particularly in Texas. TBPP microgrids should be capable of evolving with changes in fuel preferences.

Finally, Mainspring agrees with Patrick Engineering finding that "The cost estimates determine that the total cost of each backup power package is significantly greater than the TBPP program grant cap of \$500 per kW". Greater design flexibility is needed to bring costs down. In addition, the Commission should consider recommending to the Legislature that future legislation increase the grant cap.

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<sup>8</sup> Micro grid design basis. "3. Design Assumptions.... Propane is expected to be used in general for small TBPPs only, except for CFs requiring large TBPPs and where Natural Gas (NG) is not available. Otherwise, NG for the remaining TBPPs... Propane tank sizing for larger systems to accommodate 48 hours operation becomes unwieldy." (p 16)

2. The Final Report provides a list of potential vendors for the TBPP program.

A. What factors, if any, could affect the ability of such vendors to assist with the sale, installation, operation, and ongoing maintenance of TBPPs?

The Commission should address the range of potential commercial arrangements in its final TBPP rules. The Commission should allow commercial structures such as leases, not only asset sales. At the same time, it will be important for the Commission to enact consumer protections.

B. How should the TBPP program be designed to maximize the ability of vendors to assist with the sale, installation, operation, and ongoing maintenance of TBPPs?

Mainspring has two specific constructive modifications in this area of “generator” definition and manufacturer, supplier, vendor lists:

First, Mainspring’s concern is that the technology was listed incorrectly as a “genset”. As a solution, Mainspring requests that the Commission correct this in future reports and TBPP activities. The column on Appendix page 54 is titled “Genset” whereas it should simply state “Generator”. This change should be adopted throughout the Report, also. This issue also continues to Appendix page 55 where Mainspring is listed as a Supplier of “Gensets”. This should say “generator” or “linear generator”.

Second, Mainspring is also a vendor of linear generator technology installing, operating and maintaining its technology at customer sites. It appears that the Report made a simple oversight in not listing Mainspring as a vendor on Appendix page 56. As a solution, Mainspring requests to also be named in the Vendor list

Finally, if a vendor can pre-certify its eligibility it would reduce uncertainty and support the sales process.

3. In Sections 2-4 and 2-5, the Final Report outlines design requirements and assumptions; technology specifications; operating sequences; and installation requirements.

A. How, if at all, could the specifications described in these sections affect implementation of the TBPP program?

The Report states the operating sequence: “Operate only islanded with grid failure. Grid connection is not permitted, with the possible exception of charging of the BESS from the grid.” As stated above and in the GRIT comments, this operating sequence is an overly conservative view of the TBPP. Consistent with statute, microgrids in this program should be able to operate grid parallel, as well.

To make microgrids economic, a customer should be eligible to develop a BPP and operate independently from the grid in other circumstances, for instance, when grid power is more expensive than self-supply in the energy market. Customers should also be able to mitigate demand charges such as the 4CP. Operating in this configuration could also help avoid a grid failure.

The Report also assumes for the solar that it can charge a BESS during daylight hours and it can potentially provide auxiliary power to the genset. In the event of a grid failure, the BESS immediately takes over the full load of the site and then the genset comes on within 10 seconds.

There are a few things that are potentially suboptimal about having several other hard design requirements:

- The site may not have sufficient space for enough solar to be able to charge a BESS that is equivalent size to the facility.
- Not every site requires bumpless transfer (i.e., no interruption to power in the event of grid failure) so having such a large sized BESS in place is not always necessary and drives up project costs.
- If the BESS stays and is sized as a one-hour BESS (as dictated in their requirements), there isn't a need for the generator to start after only a 10 second delay. If the generator took 30 seconds or even a minute to come online, that wouldn't be an issue. 10 seconds is presumably driven by NFPA 110 given the focus on "critical facilities" but the overall project would still meet NFPA 110 if the BESS kicks in immediately even if the generators took longer.
- If the generator were permitted to run grid-parallel, it could both charge the BESS (eliminating the need for requiring such large solar) and potentially generate cost savings to the facility (e.g, peak shaving).
- Most gensets wouldn't work well for prime power and other higher capacity factor applications - but that is not true for all generators. Linear generators can do this given low NOx and high efficiency.
- The Report suggests a requirement that all TBPP components be individually skid mounted. We could potentially do that for the linear generator but it's not our standard and would increase cost. Mainspring recommends to remove the requirement for skid mounting and instead be replaced with a need to "conform with existing codes and regulations". Installers of microgrids already are familiar with how to make on-site generation safe.

B. How, if at all, should the specifications be modified to ensure effective implementation of the TBPP program?

Mainspring recommends adopting the terminology of "generator" rather than "genset" in all future TBPP rules and materials. As described earlier, Mainspring agrees that the Report names Mainspring as a suitable manufacturer of generation technology. The Report states the research process under Section 2.4: "New technology in relation to the performance of IC engines was also reviewed and included for the genset component. The technology is related to the method of fuel use and power generation. As no special fueling requirements or space constraints beyond the normal IC engine installations are required, this technology was found to be suitable." This implies that linear generator technical capabilities were reviewed and confirms the suitability of linear generators as an alternative.

Mainspring recommends additional modifications:

- The BESS requirements should be reduced (for instance, to 50% peak load and to 10 minutes or less of runtime).
- To the extent the Commission is concerned about the emission impacts of reducing the solar/BESS content, the Commission should dictate a performance-based threshold
  - For instance, "BESS can be less than 100% if the generator emissions are below 3ppm NOx.
- Specific design requirements (e.g. skid mounting) should be replaced with a need to "conform with existing codes and regulations"). We already know how to make on-site power generation safe - so don't reinvent the wheel.

4. How should the TBPP be designed to mitigate or remedy any other factors that could negatively affect program implementation or participation, while ensuring compliance with statutory requirements? Please limit this response to factors not previously mentioned in responses to questions one through three above.

The Commission is responsible for finalizing the list of "Critical Facility" types. Patrick Engineering's Initial Report detailed six categories.<sup>9</sup> When it comes to grocery stores, the Commission should clarify in its final rulemakings that cold storage facilities that serve as a waypoint in the food supply chain for groceries are also considered "groceries". In other words, the list should be expanded to "grocery *and cold storage*".

Cold storage facilities preserve the quality and safety of perishable goods, which are a basic human need. For instance, the Texas Homeland Security Strategic Plan underscores the importance of the food system<sup>10</sup>. If the Commission were only to approve the only final destination of groceries as Critical Facilities, it would severely limit the ability of Texas residents to obtain sufficient food during an emergency, particularly emergencies that last 48 hours or more (to be consistent with the run-time duration requirements of TBPP).

## **VI. Conclusion: Mainspring's Linear Generator, A Key Reliability Solution**

Given the challenges the grid faces in Texas, Mainspring's Linear Generator provides unprecedented operational and fuel flexibility, making it an essential tool for microgrids and grid reliability:

- **Rapid scalability:** While many other technologies face multi-year procurement delays, Mainspring's technology is available now. In addition, given its modular nature, projects can be deployed to minimize risks of over-building and keep pace with load ramps.

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<sup>9</sup> Available at [https://interchange.puc.texas.gov/Documents/56176\\_7\\_1433872.PDF](https://interchange.puc.texas.gov/Documents/56176_7_1433872.PDF)

<sup>10</sup> Texas Homeland Security Strategic Plan. Available at [https://gov.texas.gov/uploads/files/press/HSSP\\_2021-2025.pdf](https://gov.texas.gov/uploads/files/press/HSSP_2021-2025.pdf)



- **Operational Flexibility:** Load following, unlimited starts and stops and unlimited runtimes enable the linear generator to deliver best-in-class, on-site power generation. The technology serves customers 24/7 or on a back-up basis.
- **Fuel Flexibility:** The ability to switch between natural gas, hydrogen, propane, biogas, and even ammonia ensures reliability during fuel supply interruptions and a pathway to clean fuels as they become available.
- **Environmental Benefits:** Compared to many traditional thermal units in operation today, Mainspring's technology cuts carbon dioxide and criteria pollutants by more than half.
- **Reliability During Extreme Events:** Modular redundancy and multi-fuel designs ensure 100% availability, with projects including five days of on-site fuel storage to manage through natural gas pipeline emergencies.

Looking ahead, Mainspring Energy urges the Commission to take proactive steps to enhance grid reliability in Texas by fully implementing the TBPP. The growth rate of electricity demand in the region creates short-term and long-term reliability challenges. By adopting forward-looking policies, Texas can maintain its position as a leader in energy innovation and economic growth. Mainspring stands ready to collaborate with the Commission and other stakeholders to achieve these goals.

For further information, please contact Brian Kauffman, Director of Wholesale Market Development, at [brian.kauffman@mainspringenergy.com](mailto:brian.kauffman@mainspringenergy.com).

Sincerely,

/s/Brian Kauffman

Brian Kauffman

Director, Wholesale Market Development

Mainspring Energy, Inc.

February 14, 2025

**Attachment: Executive Summary**

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Project to Develop the Texas Backup Power ) Project No. 57236  
Package Program )

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**Executive Summary**

As requested by Staff, Mainspring offers its insights as a technology provider and vendor for TBPP microgrid with the following summarized recommendations:

- Mainspring adds to the record by outlining concerns we have as a non-"genset" generator operating on natural gas, propane and other gaseous fuels. In particular, the current language of the Report at points could be interpreted that a generator must be a genset. The Commission should instead simply use the terminology of "generator" to be consistent with the statute and avoid unnecessarily picking winners and losers.
- Mainspring linear generators offer an attractive solution that is already listed in the Report's "manufacturer" list. In addition, Mainspring should be added to the "vendor" list as the company also installs and operates units at customer sites. As stated above, the terminology throughout the report should specify "generators" rather than "gensets".
- The Commission should ensure flexible designs are eligible when it comes to project sizing up to 2.5 MW.
- Eliminate the requirement for TBPP operation only in island-mode.
- The BESS requirements should be reduced (for instance, to 50% peak load and to 10 minutes or less of runtime).
- To the extent the Commission is concerned about the emission impacts of reducing the solar/BESS content, the Commission should dictate a performance-based threshold.
  - For instance, "BESS can be less than 100% if the generator emissions are below 3ppm NOx.
- Specific design requirements (e.g. skid mounting) should be replaced with a need to "conform with existing codes and regulations".
- Commercial arrangements such as leasing should be available.
- Critical Facility list should be expanded to "grocery *and cold storage*".