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PROJECT TO DEVELOP THE TEXAS BACKUP POWER PACKAGE PROGRAM	§ § §	PUBLIC UTILITY COMMISSION OF TEXAS

COMMENTS OF GENERAC POWER SYSTEMS, INC ON TEXAS BACKUP POWER PACKAGE PROGRAM VIRTUAL WORKSHOP AGENDA AND RESPONSES TO COMMISSION QUESTIONS

Generac Power Systems, Inc, (Generac) files these comments in response to Commission questions and invitation for public comment in the design and specifications for proposed backup power packages as part of the Texas Energy Fund. As a leading resiliency provider with over 65 years of experience manufacturing and deploying technology solutions for residential and commercial needs alike, Generac offers a comprehensive suite of product offerings providing homes, businesses, communities, and the grid with increased resiliency. Generac is a leader in the residential energy solutions industry with offerings including smart thermostats, EV charging, batteries, load management, and generators. In the commercial sector, Generac offers a complete portfolio of solutions including generators, battery energy storage systems, microgrid controllers, and more. This product suite works together to reinforce the electrical grid and provide backup power in case of outage, ensuring comfort and reliability at homes and businesses, and providing stability to critical facilities throughout the country.

Generac appreciates your consideration of the following comments and remains eager to participate in providing critical resilience to Texas facilities under the program. Generac refers to its past filing(s) throughout this document and considers this filing to be complementary to our last.

Executive Summary

The Patrick Engineering Report provides significant technical guidance for the implementation of the Backup Power Package program under SB2627. The proposed designs, however, result in packages that are unnecessarily expensive and too restrictive for most use cases. Generac Power Systems recommends modifications to their proposal that will dramatically reduce the cost of the systems for critical facilities across the State. As detailed in our prior filing, those changes, broadly, are the following:

1. Allow for an industry standard ten second startup time for on-site generation. This will allow for the rightsizing of all three assets, eliminate the need for some more expensive components, and provide a reliable and more affordable solution for critical facilities under the program.
2. Allow an additional package category for individually designed solutions that meet the program requirements but for either space, power, or other needs, do not fit easily into the predetermined package sizes.
3. Allow providers greater flexibility in providing technical components and specifications according to site requirements, manufacturer capabilities, and any utility interconnection agreements in line with the enabling legislation.
4. For smaller systems, where $/kW disparity becomes greater between the incentive and cost, consider grants plus low interest loans. Further support for this is provided in the appendix.

In response to Patrick Engineering's second report Generac filed comments expanding in detail on these points and provided recommendations along with technical documentation to support the modified system design we proposed. We have aimed with these comments to be additive and not repetitive.

Responses to PUC Workshop #2 Questions

1. Cost Offsets

A. How can the specifications be refined to 1) prioritize cost savings, effectiveness, and affordability for TBPPs without compromising backup power and resilience goals?

- In our experience designing and installing similar systems for this customer class, most customers do not value the premium associated with instantaneous transfer. Generac recommends the program provides customers with flexibility in sizing the required engine, BESS, and solar components to meet their technical and financial requirements. Generac's Option B and Option C illustrated this in the form of improved economics which makes the packages more affordable.
- Flexibility in asset sizing – If standard package sizes are required, we recommend the PUC allow for an additional package category for individually designed solutions that meet the program requirements but for either space, power, or other needs, do not fit easily into the predetermined package sizes. (Ex: 600kW customers should not be required to purchase a 500kW and 100kW package if a 600kW package can be provided.)

- Load control capability – if facility loads can be managed during an event, it is possible that a system may be sized more cost-effectively for the site (ex: 27kW peak facility can load control 2kW and be more suitable for a 25kW package versus a larger package)
- Technical flexibility – there are several technical specifications in PE's system specifications which we believe are overly prescriptive and may result in vendor lock. Examples include DC Bus Voltage Range, Overload Capability. We highlighted these in our prior filing and have included details in the appendix with recommendations.
- We also note that the original legislation contemplated cybersecure, open and interoperable communication and control systems; however, we noted PE's report did not go into detail on these items. Our recommendations to the PUC and PE related to cybersecure, open, and interoperable communication, control, and microgrid-controller systems and suggested specifications were provided in our 1st and 2nd public filing. Additional details are provided in the appendix below.
- Generac notes that we would be happy to support the PUC by submitting pricing for microgrid components or pricing for revised packages.
- Finally, Patrick Engineering exceeded legislative direction in limiting the systems only to islanded operation. Legislation is silent on this matter and only prohibits the use of systems for the sale of energy or ancillary services.

B. How can the features of a TBPP provide added value for a critical facility compared to purchasing and installing a generator set? How can this value be quantified relative to the cost of additional TBPP features?

- Many options exist for critical facilities looking to purchase and install a generator set, including different fuel types and designation for emergencies and/or non-emergency use. Common configurations include Tier 2 Diesel, Tier 4 Diesel, Propane, and Natural Gas.
- We understand the intent of including BESS and solar with a gas engine was to enable an additional layer of redundancy. Secondary and tertiary benefits can be derived from the BESS and solar reducing engine operating expenses and emissions. For example, if the engine has an unplanned outage due to a mechanical failure or fuel supply chain disruptions, the BESS and solar may be sized economically to allow the facility operator to power the critical loads of the facility. This may provide a crucial extension of time for response measures during an emergency at these critical facilities. Therefore, the incremental value of the BESS and solar can be quantified based on the customer's unique redundancy interests or requirements. This "flexible" approach may provide the customer with a greater understanding and acceptance of the incremental cost of the BESS and solar.

C. How can contracts for alternative ownership models and financing mechanisms be structured to comply with statutory requirements? If these models and mechanisms are considered, what metrics could effectively measure value, performance, and compliance for the TBPP program?

As an OEM, Generac takes no position on ownership models or financing mechanisms.

2. Flexibility and Applicability of Technical Specifications

A. How can specifications include performance-based factors for design, installation, or operation without overly burdening a critical facility in installing or maintaining a TBPP?

- We have provided comments on this previously and responses to question #1 above.
- Performance based factors for design may include 1) system ability to provide outage support for 48 hours 2) Performance-based factors could consider routine testing, maintenance, and training with documented logs.
- Legislation requires that these packages use, "interconnection and controls that enable immediate islanding from the power grid and stand-alone operation for the host facility." In our experience, customer needs may vary significantly and as a result, flexibility in utility connection is valuable. For example, one customer may be ok with an open transition islanded system which would create a 10 second facility outage anytime the system is operated while some customers may require a short-term parallel operation while moving to fully islanded operation. If a customer desires a grid-tied operation, additional coordination will need to be made with their respective utility. In all options systems are legislatively prohibited from the sale of energy or ancillary services. In summary our recommendation is for customers to have the option to pursue the connection strategy appropriate for their respective circumstances and pursuant to original legislation.

B. Should the specifications vary based on the size, type of critical facility, or other criteria? If so, how and for what reasons? How can the specifications be refined to encourage participation from or integration with existing backup facilities?

- Yes, the system specifications should vary based on these factors; however, our recommendation is to allow flexibility in sizing the 3 assets to accommodate the variety of facilities and their unique circumstances. Generac has provided recommendations on this in our last filing and within this filing.
- If a customer has an existing natural gas or propane engine capable of islanding, they may or may not pursue TBPP funds to incorporate BESS/solar.
- If a customer has an existing natural gas or propane engine which no longer meets their needs the customer may be motivated to utilize the TBPP program to increase backup capacity and redundancy by integrating additional gas or propane engines and solar/BESS to meet the TBPP requirements.
- We believe in most cases eligible facilities will have no existing backup or they will have limited tier 2 diesel backup for their code requirements. These backup systems may be sized to less than 30% of the facility peak and therefore are not capable of islanding. These systems could also be at the end of life and require replacement. Since diesel is not an eligible TBPP technology, these customers represent most of the customers who may pursue the program to replace or supplement their diesel system with a TBPP system to meet their reliability and resiliency requirements.

C. Considering that access to natural gas or propane may be limited in different geographic areas of the state, how, if at all, can specifications be expanded to include alternative technologies and fuels?

- We view co-located propane as the most suitable alternative to utility natural gas; however, customers will need to take into consideration the additional technical and financial requirements associated with collocated propane storage.

3. Supply Chain & Deployment

A. Considering vendors that may utilize alternative fuel sources or other components that can meet the performance criteria, how could the Commission consider adapting the specifications to increase the number of vendors eligible to participate in the program and support other business models?

Response to this question is provided throughout this document and in prior filings.

B. How might other business models enable TBPP deployment by reducing the potential limitations or constraints that a critical facility may face when installing or maintaining a TBPP? What would the implications be if a critical facility exists the program?

- Generac is an OEM and provides its solutions to end-use customers and a variety of parties including developers, 3rd party owners, and electrical contractors, and others. Where

customers have capital expense limitations or resource limitations to handle such systems, we find there are a variety of alternative solutions available in the market.

- If a critical facility exits the program, it may be due to a sale or closure of the facility. In this event, the TBPP system may have been included in the sale or transfer of the facility or the owner of the TBPP system will need to remove/repurpose the system.

C. How can vendors, including those with alternative business models, address supply chain disruptions to ensure timely deployment and adequate preparedness for emergencies?

- Generac, like other providers, works diligently to manage supply chain risks including potential disruptions, tariffs, and other constraints. Accordingly, we develop contracts and processes to manage and balance risks and costs between the parties involved.
- Where components have long lead times, the market may consider temporary solutions. For example, if a permanent generator has a 52-week lead time but much of the project can be completed in less time, the owner may consider using a mobile engine until the permanent engine arrives. While the PUC doesn't need to provide this clarity, we believe the theme of flexibility would allow the market to meet the customer's needs through commercial solutions.

Generac appreciates the opportunity to contribute to the development of the Backup Power Package program and looks forward to continuing our engagement. We are excited about the potential of this program to provide robust support to Texas' reliability landscape, and we are eager

to contribute our technologies and expertise towards realizing this potential. Please do not hesitate to contact me at Meredith.Roberts@generac.com with any questions about our recommendations.

Thank you for your consideration of our questions and comments.

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Appendix: Further information about Generac's flexible design recommendations

Generac provides the following additional information to the record in the hope that our expertise in providing similar systems over our 65-year history can be helpful. Traditionally, critical facilities that are interested in resiliency solutions would consider purchasing a backup generator (diesel, gas, propane) but may or may not have the necessary capital or operating budget. Furthermore, they are almost always inclined to only purchase sufficient backup power for their critical loads which may be a small percentage of their facility. The TBPP can broaden the accessibility of full-facility backup power options to a greater number of critical facilities, but only if it is designed as a *more cost-effective* alternative to existing solutions. If the TBPP remains the high-cost option, the majority of customers will opt for traditional solutions or continue to operate without any resiliency solution. Short of any mandates, the available TBPP market hinges on the relative cost of a TBPP package vs. a standalone generator (e.g. Tier 2 diesel or natural gas).

Relative Cost Scenarios	**Market Potential**
Net cost* of TBPP is higher than standalone natural gas or Tier 2 Diesel generator	Very Low - Low
Net cost of TBPP is competitive with standalone natural gas generator and/or Tier 2 Diesel generator	Medium
Net cost of TBPP is better than standalone natural gas generator and/or Tier 2 Diesel generator	High

* We are using the term "Net cost" to represent all project costs minus all project benefits over the lifetime of the system.

As introduced in our prior filing and further detailed below, Generac's proposed flexible design concept would achieve better economics and greater market adoption. Principal in this recommendation is allowing the customer to specify their desired sizing for the BESS as a redundancy asset. Benefits and considerations (i.e., flexibility, interconnection, single line diagram, sequence of operation, etc.) were detailed in our prior filing. Below are examples of alternative flexible 3-asset configurations by package size:

TBPP Size	*Incentive*	*Genset*	*BESS*	*Solar*
10 kW	$5,000	10 kW	5 kW (1hr)	1 kW
25 kW	$12,500	25 kW	12.5 kW (1hr)	2.5 kW
100 kW	$50,000	100 kW	50 kW (1hr)	10 kW
500 kW	$250,000	500 kW	250 kW (1hr)	50 kW
1000 kW	$500,000	1000 kW	500 kW (1hr)	100 kW

To demonstrate the relative project economics, we have created an indicative financial model and produced the following table to summarize the expected market potential of each design option:

Market Potential			
Design	**<500kW**	**500kW-1000kW**	**>1000kW**
Generac Flexible Design	Lower	Medium	Higher
Patrick Engineering Design	Very Low	Very Low	Very Low

- Standalone Tier 2 Diesel– In most cases, this option has the lowest capital cost for the larger systems. Annual operation and maintenance (O&M) costs occur over the lifetime of the asset.

- Standalone Natural Gas– In most cases, natural gas generators have a higher upfront cost versus tier 2 diesel, but incremental cost may be recovered over the lifetime of the asset by energy savings and lower O&M costs.

- PE Design– As Generac and other industry members have detailed in this and previous filings, **the high cost of Patrick's Engineering design specifications may lead to a program that is not cost-effective relative to traditional resiliency solutions and would likely result in very low market adoption.** Even after accounting for the TBPP incentive and applicable investment tax credits, this option is significantly higher cost than all other options.

- Generac "Flexible" Design– The flexible 3-asset design has significantly more marketable project economics (including both capital and operating costs) than the Patrick

Engineering Design. Depending on size, this design is much more economically competitive with standalone natural gas and diesel generators, net of TBPP and ITC incentives:

- Large (>1000kW): Flexible TBPP design is expected to have a net cost that is competitive or better than traditional generator options. Combined with the additional resiliency value from redundant backup power sources, this can lead to higher market adoption for this customer segment.
- Medium (500-1000kW): Flexible TBPP design is expected to have a similar net cost as traditional generator options. While the TBPP will offer additional resiliency value from redundant backup power sources, it will also be a more complex solution and is unlikely to lead to high market adoption for this customer segment.
- Small (<500): Flexible TBPP design is expected to have a higher net cost than traditional generator options, primarily due to the $/kW incentive being less impactful in smaller systems. For this reason, this will likely lead to lower market adoption for this customer segment.

As a result, we encourage the PUC to enable the combination of grants and loans for TBPP packages. This will increase program marketability to all target customer segments.

Technical Specifications – from prior filing, flexibility (ex: voltage)

In reviewing the report's detailed specification documents, the following technical requirements are overly prescriptive and may be favorable to only a few select vendors. Generac is available to provide further insight into our technical view of designing integrated and packaged systems to meet specified levels of AC power requirements.

1. DC Bus Voltage Range – specified at 600-900VDC. This is too prescriptive, requiring providers to provide expected AC power output at required voltage and kW power level. We recommend this range be removed and allow battery manufacturers to determine their best battery configuration. This recommendation will enable greater vendor participation and to accommodate future technology improvements or changes.
2. Overload Capability – This is overly prescriptive given the microgrid controller can instruct load management. If the generator and battery are in parallel operation, the generator can take the bulk of the load while the battery handles transient peaks. The providers need to have flexibility to work with the end user to meet their requirements. We recommend the PUC remove this specification to allow greater flexibility to meet customer requirements, enable grater vendor participation, and to accommodate future technology improvements or changes.
3. K. Power conversion system – Item 8.a. UL1741CRD is mainly CA specific. We believe this is not always necessary, particularly if the systems are not grid tied. We recommend the PUC remove this specification since vendor will need to conform with

UL and IEEE standards inherently and in coordination with the distribution utility requirements.

4. Prescribed Ambient Temperature range is overly prescriptive. Manufacturers will provide systems which can meet the tolerances of a given geography and warranty the system within the appropriate range. We recommend the PUC remove the explicit temperature range specification but maintain the requirement that systems must be designed to operate within the necessary Ambient temperature range of that geographic area and in conformance with Authorities Having Jurisdiction requirements.
5. Item L "Batteries" – Cell and Module Capacity, Nominal Energy, and Voltage Range are too prescriptive. Energy output (AC requirements) is the meaningful factor and manufacturers need to solve capacity, energy, and range in a manner which meets the energy requirement. We recommend the PUC remove this specification to allow greater flexibility to meet customer techno-financial requirements, enable grater vendor participation, and to accommodate future technology improvements or changes.
6. Item L "Batteries" – C-Rate listed here as 0.5C, but from the other documentation we believe C-Rate should be listed as 1C capable. We recommend the PUC remove this specification to allow greater flexibility to meet customer requirements, enable grater vendor participation, and to accommodate future technology improvements or changes.

Cybersecurity

Generac Industrial Energy provides customers with our Generac Link Manager, a world-class asset connectivity, monitoring, and control platform which is open and interoperable. This system is available to customers to use irrespective of their desired vendor for power generation solutions, so it may be deployed over existing or new assets irrespective of type, make, model, or vintage. Additional details on this product are provided in our initial filing and Generac offers the additional information below which may serve as guidance to the PUC and program design.

Cyber Security Architecture:

- OAUTH 2.0 for runtime connections; separate security communications pathway.
- Data services layer containerized to a single tenant environment for enterprise programs. Data is isolated to program/customer specific instances to isolate concerns of comingled data, system performance and system access.
- Transport security for all data transactions (TLS/SSL). All web application endpoints are hosted in MS Azure App Service containers and only accessible via HTTPS.
- Generac personnel access to cloud resources managed via Azure VPN Client, connected to user Active Directory.
- Authentication via Azure IoT Hub with key regeneration.
- Extendable end-point security
- No transfer or management of global credentials.
- IoT Edge Gateway acts as a Fieldbus boundary, securing data packets for traffic required outside of local networks

API Connection Security:

- Expirable/Renewable connection token

- Additional end-point security methods can layer on top of the token.

- Whitelisting the 3rd party IP address to limit traffic to explicit addresses/ranges.

Data Security:

Our solution is designed with robust security measures that align with industry best practices. It incorporates strong access controls, adheres to the principle of least privilege, and has dedicated resources and teams for vulnerability management and incident response. All data within our system is encrypted both at rest and in transit, ensuring the highest level of protection. Additionally, a dedicated team manages and maintains our InfoSec program, actively working to extend ISMS implementation across all business units, further strengthening our overall security posture.

We rely on two carefully selected third-party providers to ensure the secure and efficient operation of our solution. These providers play essential roles in hosting and securing customer data:

1. Azure is our cloud hosting provider, enabling us to securely host, process, and manage customer data. It provides a highly scalable and resilient infrastructure, ensuring that our solution meets performance, reliability, and security requirements. Azure's compliance with industry-leading security standards and certifications ensures the protection of customer data.

2. Auth0 is our authentication provider, responsible for managing secure user authentication and access control to the solution. Auth0's robust security framework helps safeguard user credentials and customer data from unauthorized access.

Interface Security:

-User Access: Administrators invite select users and assign site associations. Sites associated with other accounts are not visible.

-Environments: Dedicated cloud environments for each program/enterprise customer. Logins only perform on those instances.

-User Controls: Features to delete or temporarily disable users to eliminate inactive vulnerability.

Third-Party Risk Management (TPRM):

Every new vendor undergoes a thorough risk assessment process, which is tailored to the level of risk associated with the engagement. This assessment is initiated well before any contracts are signed, allowing our cybersecurity team to identify potential security risks and ensure compliance with our security requirements. By conducting these assessments early, we can proactively address any concerns and maintain the integrity of our systems and data.

Business Continuity and Disaster Recovery:

Generac has a documented Business Continuity and Disaster Recovery policy and procedure that outlines the process for conducting a Business Impact Analysis (BIA) and Continuity Requirements Assessment. The procedure defines the approach for identifying and prioritizing critical processes within each department, assessing the potential impact of disruptions, determining the minimum resource requirements to sustain essential operations, and establishing recovery objectives to guide continuity planning. While we have these foundational elements in place, we are currently in the process of developing and implementing a comprehensive Disaster Recovery Plan (DRP).

Generac has implemented a Geo-redundant implementation of the underlying data store that provides zone redundancy and real-time recovery/failover in the event of a regional outage at the data center level.

Physical Security:

Generac has implemented robust physical security controls across all our facility locations, aligning with the ISO 27001 physical security requirements. Additionally, our solution is hosted on Microsoft Azure, where state-of-the-art physical security measures are in place at their data centers. These include:

- 24/7 Monitoring and Surveillance: Data centers are secured with continuous video surveillance and on-site security personnel.
- Multi-Layered Access Controls: Physical access to data centers is restricted through multi-factor authentication, including biometric scans, keycards, and PINs.
- Perimeter Security: Facilities are equipped with perimeter fencing, security gates, and intrusion detection systems to prevent unauthorized access.
- Environmental Controls: Azure data centers are designed with robust fire suppression systems, redundant power supplies, and climate control to ensure optimal operating conditions and prevent disruptions.
- Auditing and Compliance: Azure data centers adhere to stringent compliance standards, undergoing regular audits to maintain certifications such as ISO 27001, SOC 1, SOC 2, and others.

These measures, combined with our own stringent physical security controls, ensure the safety and security of our systems and customer data.

Recommendations:

It's the recommendation of Generac Industrial Energy that any cloud-based platform to be used in the TXBPPP have the capability to create a single tenet environment for the program and meet similar interoperability and cybersecurity standards.