UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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GENERAC POWER SYSTEMS, INC.
Petitioner,

v.

PSLC LLC
Patent Owner.

_____

Case No. IPR2026-00022
U. S. Patent No. 11,967,857

PATENT OWNER'S PRELIMINARY RESPONSE

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LIST OF PATENT OWNER'S EXHIBITS

Exhibit No.	Description
2017	Patent Owner's Response to Restriction Requirement 11/18/2020

I. INTRODUCTION

Petitioner Generac Power Systems, Inc. ("Petitioner") files three serial petitions for *inter partes* review (the "Petition" or "Petitions")[1] together challenging the validity of all claims of U.S. Patent No. 11,967,857 (the "'857 Patent"), owned by PSLC LLC ("Patent Owner").

This first Petition challenges a subset of the claims of the '857 Patent under 35 U.S.C. § 103 and relies upon the base combination of U.S. Patent App. No. 2006/0208574 ("Ex. 1005" or "Lasseter") and J.A. Peças Lopes et al., *Defining Control Strategies for MicroGrids Islanded Operation*, 21 IEEE TRANSACTIONS POWER SYSTEMS 916 (May 2006) ("Ex. 1011" or "Lopes"). Petitioner relies upon Lasseter and Lopes as the base combination for all three of its serial Petitions and because Petitioner fails to show a reasonable likelihood of prevailing as to any of the claims challenged in its Petitions, Patent Owner respectfully requests that the Board decline institution as to all three Petitions.

Petitioner's serial challenge does no more than recast the prior art cited during examination as well as that described in the specification of the '857 Patent and in doing so leaves substantial holes in Petitioner's challenge which require institution be denied. As described in Patent Owner's Discretionary Denial Brief and herein, Petitioner's primary reference bears the same title and teachings as one of the

[1] IPR Nos. 2026-00022-24.

references cited during initial examination and is nearly identical to prior art systems described by the '857 Patent's specification. Petitioner's secondary reference's teachings are also nearly identical to the prior art disclosed by Patent Owner in the specification of the '857 Patent, particularly Figure 3 and its corresponding text. But try as Petitioner might, it cannot and did not find a reference that discloses, teaches, or suggests the "proactive overload-prevention" Petitioner acknowledged is disclosed by the '857 Patent's claims in its Notice Ranking document. *See* Paper 2 at P. 2.

Notably, when faced with the similar art of record, the examiner did not issue a single Section 102 or 103 rejection during examination of the '857 Patent. Unsurprisingly, Petitioner's cumulative challenge leaves the same holes identified by the examiner in his Notice of Allowance and more. Specifically, Petitioner's challenge fails to disclose, teach, or suggest the claimed (1) power source controlling its frequency to have a second frequency when the power source is overloaded or near to being overloaded; (2) power source controlling the frequency of the power source to indicate the loading of the power source, (3) processor circuit operating in response to the occurrence of the second frequency to prevent or alleviate an overload of the power source; or (4) power systems providing AC power with a controlled AC frequency to manage the loading thereof.

One or more of these requirements are present within the limitations of the challenged claims of the '857 Patent, including each of the challenged independent claims, 1, 39, and 61, at limitations [pre], [b], or [c], and thus, Petitioner has failed to meet its burden to establish a reasonable likelihood that it would prevail with respect to at least one of the claims challenged by the Petition. Institution must be denied.

II. BACKGROUND

A. The Inventions of the '857 Patent

The '857 Patent claims priority to provisional application No. 61/490,253 filed on May 26, 2011, and Petitioner has not contested the '857 Patent's claims entitlement to priority as of that date.

The '857 Patent is directed to "[a] method and apparatus for controlling the total load presented to an AC power source" wherein through the control of the frequency of AC power, "controllable loads and load control devices can determine the amount of remaining power available for the power source in order to determine if a given load can be connected without creating an overload." In certain embodiments, "[t]he frequency may also be controlled at the power source to indicate an overload, with the loads being responsive to that overload frequency to reduce the load and thereby alleviate the overload." Ex. 1001 at Abstract.

The ‘857 Patent sets forth a need “to determine and control which and how many loads are connected [to a power source] in order that the total of the loads does not create an overload” of the power source and a desire to “control the total load presented to a particular power source to keep that load at or somewhat below the maximum capability of the power source.” *Id.* at Col. 2, L. 15-17; Col. 7, L. 26-30. The ‘857 Patent explains that this need is driven by the fact that “[o]verloads are generally undesirable in that they may cause deviation from power output specifications, loss of power, damage or combinations thereof” and that operating below at or near the maximum capability of the power source results in “efficiency robbing factors” due to power sources being “design[ed] to handle maximum load.” *Id.* at Col. 4, L. 37-40. Thus, the inventions of the ‘857 Patent aim to balance efficiency considerations favoring operation of power sources near their maximum output capability while simultaneously preventing overloads.

Acting as his own lexicographer, Patentee explicitly defined the term “overload,” which is used repeatedly in the ‘857 Patent’s specification and claims and is essential to the understanding of the same:

> As used herein and in the claims, overload means ***a load that if not disconnected or otherwise prevented*** will either cause a departure from specifications for the power output from the power source, for example such as a deviation of AC power voltage or frequency for longer than a specified time period, a loss of power such as from a tripped circuit

breaker, or damage such as overheating or exceeding mechanical stress limits. *Id.* at Col. 7, L. 55-62.

Immediately preceding patentee's definition of overload, the '857 Patent notes that "[i]t will be understood by one of ordinary skill that short term large loads may be allowed in that many engine driven alternator systems are designed to permit short term increases in power output above the maximum power that can be continuously delivered." *Id.* at Col. 7, L. 51-55. The '857 Patent elaborates on the importance of this characteristic by explaining "[m]ost generators can handle significant excessive output currents for short periods of time and that [this] is useful in providing large starting currents for motors" which "normally go away after a few seconds" upon reaching operating speed. *Id.* at Col. 18 L. 18-23. In doing so, the '857 Patent draws an important distinction between what it defines as an overload and mere short-term increases in power above maximum output that power sources readily handle without deviation from power specifications or damage.

The '857 Patent explains that its inventions allow for "efficient matching of a total load made up of individual loads to one or more power sources without overloading the power sources" and "sizing of power sources to accommodate less than the maximum possible load" while also "prevent[ing] overloading of the power source by preventing a load which would otherwise immediately cause or which could lead to a future overload from being connected or alternatively by restricting

the power supplied to that load and/or others." *Id.* at Col. 8-9, L. 59-1. The '857 Patent thus allows power sources to "power the maximum number of loads and/or to operate nearer to or achieve optimum efficiency while at the same time monitoring the present and expected future load thus ensuring that the generator will not be overloaded instantly or during the duration of any particular connection. *Id.* at Col. 9, L. 21-25.

The '857 Patent provides multiple figures which help to explain the claimed inventions. For example, the '857 Patent's Figure 4 "shows a simplified diagram of the preferred embodiment of the invention in which the power grid 12 or a generator 13 may power a group of loads including [a] set of uncontrolled loads and a set of individually switched loads." *Id.* at Col. 20, L. 29-33. This preferred embodiment contains load monitor 23a to monitor the power output of the generator which is conveyed to load control 25a via generator monitor 24. *Id.* at Col 21, L. 28-32.

Figure 4 utilizes load switches 22a-c which are responsive to load control 25a via communications link 26a-c and operable to connect and disconnect power coming from the transfer switch to various loads. "[I]t is desirable that load control 25a be capable of sensing several parameters of the generator, and that it may be programmed or otherwise set to operate in response to those parameters and the particular generator and environment." *Id.* at Col. 25 at 37-41.

"After generator power is made available via the transfer switch, load control 25a operates to determine if the highest priority load 16-18 can be supported by the available power of generator 13 and if so load control 25a causes the load switch associated with that load to be closed via commands conveyed to the switch by its corresponding communications channel." *Id.* at Col. 26 at L. 26-32. "Load control 25a also monitors the generator 13 for overloads, and other parameters such as minor equipment failures such as slight overheating and chooses which loads to disconnect[.]" *Id.* at Col. 27 at L. 3-6. In this way, the '857 Patent's load control is able to use "intelligent timing for connecting and disconnecting loads to one or more power sources in order that the total load on any one power source is kept at or below the maximum output capability of that source[.]" *Id.* at Col. 61-62, L. 66-4.

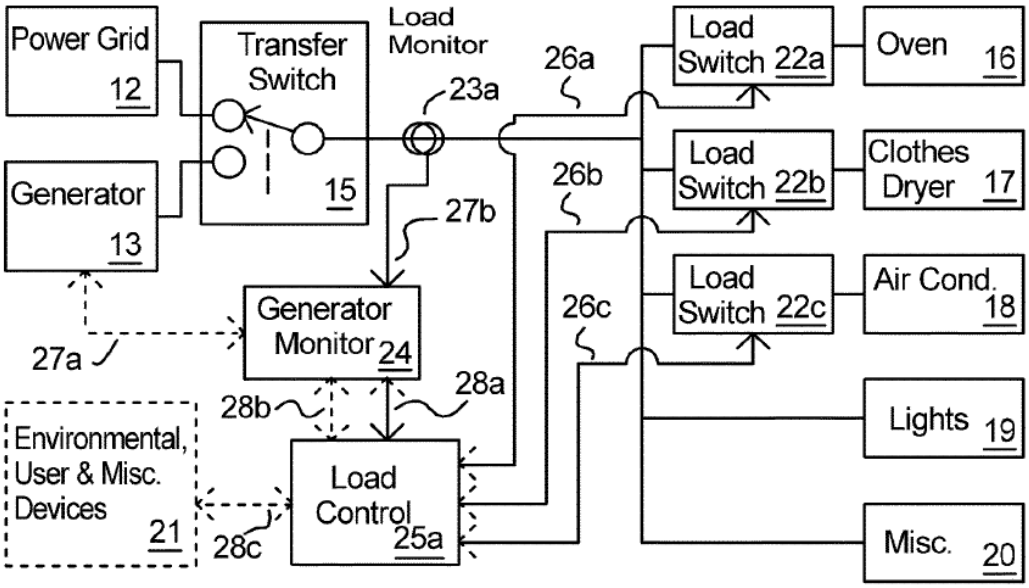


Figure 4

B. The ‘857 Patent’s Description of the Prior Art

The ’857 Patent provides a robust description of the prior art at the time which includes a description of highly similar pieces of art as to what is being cited by Petitioner in its challenge.

In doing so, the ‘857 Patent keys in on the reactive nature of the prior art which relies on frequency detection once a generator is in an overload condition that sheds low priority loads only “after the generator has been overloaded.” *Id.* at Col. 6, L. 43. The prior art load shedding occurs because the rotation of generator engines slow when the engine cannot produce enough torque to keep the alternator rotating at the correct speed and as a result, the frequency of the AC power decreases. *Id.* at Col. 6. L. 31-35. Thus, the load shedding prior art described by the ‘857 Patent responds to the departure from frequency specifications of the power source caused by the overload of the power source and subsequently sheds loads “after the overload happens.” *Id.* at Col. 6. 50-52.

The ‘857 Patent describes this method of load shedding as not only reactive, but unreliable because the prior art’s frequency detectors have issues with both speed and accuracy of AC frequency detection. *Id.* at Col. 6, L. 53-57. The ‘857 Patent notes that these inaccuracies in AC power frequency detection “can cause an actual overload to go undetected” and it is quite possible that “damage to the generator or its load, may have already happened by the time the overload is detected.” *Id.* at Col.

6 L. 59-64. In situations where "the frequency detection is too sensitive unneeded shedding may occur, or if it is not sensitive enough, slow or no load shedding may occur with the possible result of the generator's circuit breaker tripping thus removing all power." And "[a] one size fits all frequency threshold used to cause a complete disconnect of the load from the generator may allow overheating or other damage to the generator[.]" *Id.* at Col. 18, L. 48-55.

The '857 Patent also provides diagrams of example prior art systems upon which it has improved. Figure 2 of the '857 Patent, reproduced below, shows a simplified diagram of a prior art backup generator system wherein electrical power from the grid is supplied via the transfer switch 15*a* to a home consisting of a group of electrical loads consisting of an oven, clothes dryer, air conditioner, lights, and other miscellaneous loads. *Id.* at Col. 14, L. 30-37. The Generator & Transfer Switch Controller 14 is responsive to the grid power to control whether the transfer switch selects either grid or generator power to power the home. *Id.* at Col. 14, L. 43-47.

To prevent the generator from being overloaded, backup systems often include the pictured distribution sub panel 15*c* which is connected to high priority loads which are needed when power is lost and require power from the backup generator. *Id.* at Col. 15 L. 8-12. The rest of the loads which the generator is not capable of powering are connected to the main panel 15b and remain unpowered while the backup generator is running. *Id.* at Col. 15 L. 13-17. In this way, the prior

art was able to manage the load presented to the backup power source by preemptively disconnecting lower priority loads during power outages.

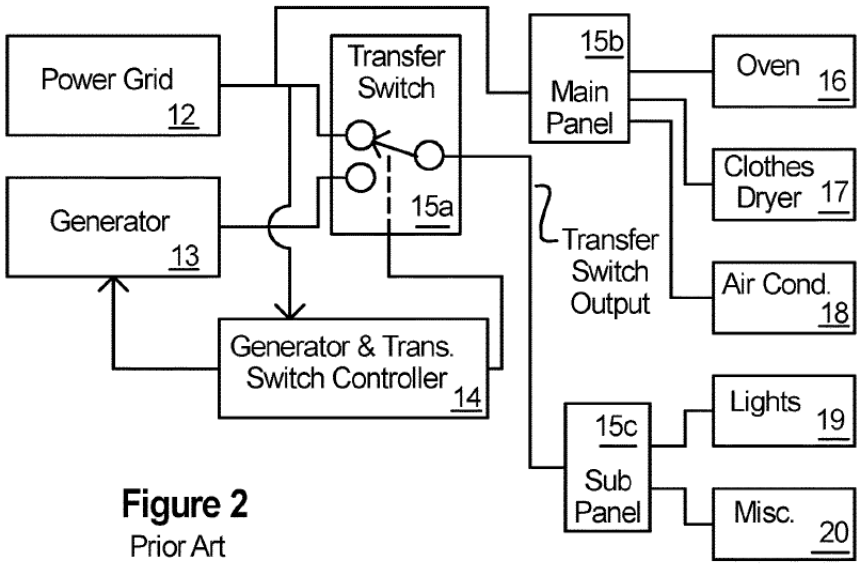


Figure 2
Prior Art

Figure 3 is a simplified example of an improved prior art version of the backup system in FIG. 2 which provides power to a group of loads, including a set of uncontrolled loads and a set of controlled loads which may be simultaneously switched off if the generator becomes overloaded. *Id.* at Col. 17, L. 45-49. After the controlled loads are simultaneously switched off they may then be automatically (and blindly) switched on in a sequential fashion according to priority, each additional load being switched a time period after the previous one. *Id.* at Col. 17, L. 50-54. "FIG. 3 additionally includes load managers 14a which are contactors to switch the high current load on and off in response to a control signal [such as a drop in frequency]. A contactor is essentially a high current relay which switches the load

completely on or off." *Id.* at Col. 17, L. 56-59. These prior art load shedding methods are an "inexpensive manner of detecting and removing overloads" but their reliance on the detection of the power frequency of the generator as a means of signaling a load shed requires that "the generator must already be overloaded to the point of not being able to supply enough rotating torque to the alternator to maintain the proper speed" or nominal frequency. *Id.* at Col. 7, L. 1-3; Col. 18, L. 12-15. Thus, the reactive methods set forth by Figure 3 still expose the generator and/or its loads to "deviation from power output specifications, loss of power, damage, or combinations thereof." *Id.* at Col. 2, L. 17-20.

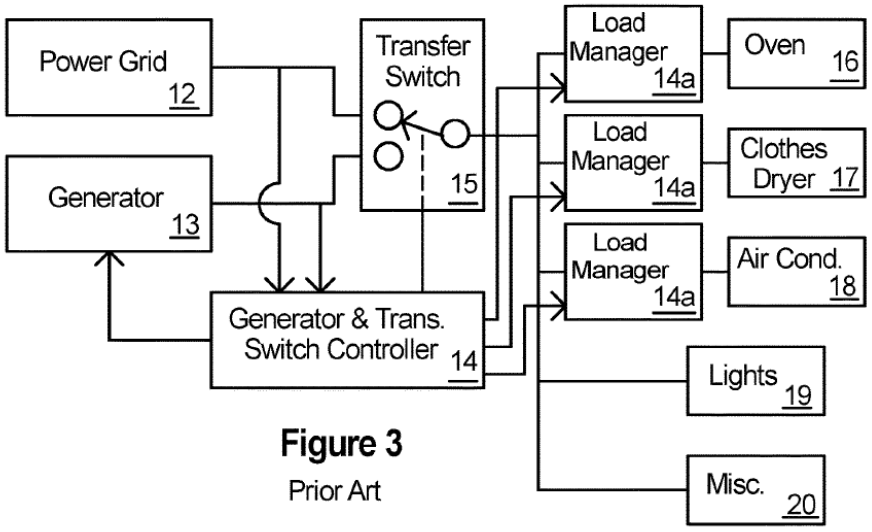


Figure 3
Prior Art

C. File History of the '857 Patent

The '857 Patent received no anticipation or obviousness rejections during prosecution but instead received a restriction requirement which the Patent Owner responded to with traverse. Ex. 2017. In responding to that restriction requirement,

patentee explained that "the frequency of the AC power is controlled in [the] claims such that it conveys information" that "may be used to prevent or relieve an overload." *See* Restriction Requirement at P. 2; 6. Patentee contrasts his inventions from the prior art AC power "which is maintained at a standard frequency" and conveys "no loading information[.]" *Id.* at P. 6.

Although the examiner issued no anticipation or obviousness rejections as to the '857 Patent, when explaining why the patentee was entitled to the '857 Patent, the examiner noted the following shortcomings of the prior art, specifically, U.S. Application 2004/0051387 by Lasseter:

> Lasseter fails to teach the power source operating in such a manner as to control the frequency of the output AC power to have a first frequency when the power source is not overloaded and a second frequency when the power source is overloaded or near to being overloaded in addition to a processor circuit operating in response to the occurrence of the second frequency to control the amount of AC output power consumed by at least one load. *See* Ex. 2010 (emphasis added).

Petitioner's expert explained in his declaration that the Lasseter reference put forward by the current challenge is "consistent with and reflects the same concepts and control strategies described across many of Lasseter's academic and industry publications[.]" *See* Ex. 1003 at P. 53 ¶ 51. Consistent with the foregoing, the Lasseter reference cited by the examiner as well as the Lasseter reference put forth

by Petitioner share the exact same title and discuss the same subject matter, including a relationship between output power and frequency wherein maximum power output is reached at the same time as minimum frequency which Petitioner cites to for evidence of the claimed second frequency. *Compare* e.g. Ex. 1005 at [0117-0119] to Ex. 2011 at [0111-0112]. As will be shown in greater detail herein, Petitioner's "new" Lasseter reference contains the same shortcomings noted by the examiner, some of which Petitioner's challenge does not so much as dispute.

D. Challenged Claims

Petitioner challenges the validity of all claims of the '857 Patent through their three Petitions filed against the '857 Patent,[2] but challenges only claims 1-16, 39-44, and 61-65 through this Petition. Independent claims 1, 39, and 61 are reproduced below.

1. A power system which provides A.C. power with a controlled A.C. frequency to assist in managing the loading thereof, the power system comprising:
   a) a non-utility type power source comprising an inverter which provides single or multiple phase output A.C. power to one or more of a plurality of loads, the power source having at least one maximum output power parameter which if exceeded causes an overload of the power source, the output A.C. power having an A.C.

[2] IPRs 2026-00022-24.

frequency, which frequency is controlled in response to the timely amount of the output A.C. power;

b) a power sensing circuit which may be part of the power source or otherwise and is responsive to the timely amount of the output A.C. power, the power source operating in response to the power sensing circuit to control the frequency of the output A.C. power to have a first frequency when the power source is not overloaded and a second frequency when the power source is overloaded or is near to being overloaded;

c) a processor circuit comprising one or more processors responsive to the output A.C. power, the processor circuit operating in response to the occurrence of the second frequency to control the output A.C. power consumed by at least one load of the one or more loads thereby helping to prevent or alleviate an overload of the power source.

39. A power system which provides AC power with a controlled AC frequency to assist in managing the loading thereof, the power system comprising:

a) a non-utility type power source having one or more inverter which provides single or multiple phase output AC power to one or more of a plurality of loads, the power source having at least one power system parameter which if exceeded indicates an actual or potential overload of the power source, the output AC power having an AC frequency, which frequency is controlled in response to a timely amount of a parameter of the power source;

b) a sensing circuit which may be part of the power source or otherwise and is responsive to the timely amount of at least one loading parameter

of the power source, the power source operating in response to the sensing circuit and the at least one power system parameter to control the frequency of the output AC power to have a first frequency when the power source is not over-loaded and a second frequency when the power source is overloaded or is near to being overloaded;

c) a processor circuit comprising one or more processors responsive to the output AC power, the processor circuit operating in response to the occurrence of the second frequency to control the output AC power consumed by at least one load of the one or more loads thereby helping to prevent or alleviate an overload of the power source.

61. A power system which provides AC power with one or more controlled power parameters to assist in managing the loading thereof, the power system comprising:

a) a non-utility type power source comprising an inverter which provides single or multiple phase output AC power to one or more of a plurality of loads, the power source having at least one maximum power source parameter which if exceeded for a specified period of time may cause a loss of output AC power or damage to the power source, the output AC power having one or more timely power parameter, including AC frequency, which may be changed;

b) a power sensing circuit which may be part of the power source or otherwise and is responsive to the timely power parameter, the power source operating in response to the power sensing circuit and the maximum output power parameter to control the frequency of the output AC power to indicate the loading of the power source;

c) a processor circuit comprising one or more processors responsive to the frequency of the output AC power to control the coupling of power

to at least one load of the one or more loads thereby helping to prevent or alleviate an overload of the power source.

E. Petitioner's Grounds of Challenge

Ground	Claims	Basis	References
1A	1-6, 8, 13-15, 39-43, 61-62, and 65	Obviousness	Lasseter-Lopes
1B	5-12, 16	Obviousness	Lasseter-Lopes-Miller
1C	13, 44, 63-64	Obviousness	Lasseter-Lopes-Baldassarre
1D	16	Obviousness	Lasseter-Lopes-Baldassarre-Miller

Patent Owner does not purport to present all of its rebuttal arguments herein and reserves its right to present further argument and evidence related to these prior art references, the combinations thereof, and the content of the Petitions later in this proceeding, consistent with the Board's Rules and practice. No waiver is intended by any argument withheld by Patent Owner at this stage of the proceeding.

III. CLAIM CONSTRUCTION

Consistent with Patent Owner's constructions in the district court proceeding, Patent Owner construes the following terms as defined by patentee acting as his own lexicographer in the '857 Patent:

Overload - a load that if not disconnected or otherwise prevented will either cause a departure from specifications for the power output from the power source, for example such as a deviation of AC power voltage or frequency for longer than a

specified time period, a loss of power such as from a tripped circuit breaker, or damage such as overheating or exceeding mechanical stress limits. *See* Ex. 1001 at Col. 7, L. 53-60.

Parameter - a quantity of one or more property or attribute (e.g. of a device, physical property, substance or environment) which is treated as a constant and which is expressed as numbers which are suitable for use by the device(s) using or responsive to such parameters. *See* Ex. 1001 at Col. 10, L. 9-12.

Power grid - any commonly known and used sources of electrical power to homes and businesses, e.g. public and private electric utility companies. *See* Ex. 1001 at Col. 15, L. 21-23.

Timely - instant, real time, close to real time or a suitable time. *See* Ex. 1001 at Col. 25, L. 60-62.

Know or **Known** - to have been previously stored in a memory and available e.g. having been previously manufactured with, programmed with or measured. *See* Ex. 1001 at Col. 26, L. 18-21.

Patent Owner further identifies the preambles of the challenged independent claims, claims 1, 39, and 61 as limiting because they breathe life, meaning and vitality into the claim.

"[A] claim preamble has the import that the claim as a whole suggests for it." *Pitney Bowes, Inc. v. Hewlett-Packard Co.*, 182 F.3d 1298, 1305 (Fed. Cir. 1999)

(quoting *Bell Communications Research, Inc. v. Vitalink Communications Corp.*, 55 F.3d 615, 620 (Fed. Cir. 1995)). "If the claim preamble, when read in the context of the entire claim, recites limitations of the claim, or, if the claim preamble is 'necessary to give life, meaning, and vitality' to the claim, then the claim preamble should be construed as if in the balance of the claim." *Pitney Bowes*, 182 F.3d at 1305. "The effect preamble language should be given can be resolved only on review of the entirety of the patent to gain an understanding of what the inventors actually invented and intended to encompass by the claim." *Corning Glass Works v. Sumitomo Elec. U.S.A., Inc.*, 868 F.2d 1251, 1257 (Fed. Cir. 1989).

Because the preambles of the claims speak to a core piece of the operation of the claimed inventions described both in the specification and the file history of the '857 Patent, they should be treated as limiting. As set forth above, in the file history of the '857 Patent, patentee emphasized that "the frequency of the AC power is controlled in [the] claims such that it conveys information" that "may be used to prevent or relieve an overload"[3] a concept that is directly manifest in the preambles of the challenged claims. The challenged claims describe power systems which provide AC power with a controlled AC frequency or other controlled power parameter to assist in managing the loading of the of the power systems by communicating information regarding the loading of a power source, namely

[3] *See* Ex. 2017 at P. 2; 6.

whether it is overloaded, near overloaded, or not overloaded, in order to connect, disconnect, or control the power provided to a given load. This is consistent with the specification of the '857 Patent which teaches that the frequency of the power system may be "controlled at the power source to indicate an overload, with the loads being responsive to that overload frequency to reduce the load and thereby alleviate the overload." *Id.* at Abstract. When viewed in light of the entire patent, the preambles provide important meaning to the claims and inform the purpose of the frequency control disclosed by the '857 Patent which is directly relied upon for proactive load management and essential to the meaning of the claims.

IV. DISCUSSION OF THE ALLEGED PRIOR ART

A. Lasseter

At a high level, Lasseter teaches frequency control methods for one or more microsources that allow for the efficient matching of power generation and load demand while simultaneously guaranteeing that the microsources will not exceed their maximum power output.

Lasseter discloses "[a] method of controlling the output inverter of a microsource in a distributed energy resource system" wherein unit or zone power controls are used to "reduce the operating frequency of the inverter to increase its unit output power." Ex. 1005 at Abstract. Lasseter discloses "methods wherein the inverter reaches maximum output power and minimum operating frequency at the

same time." *Id.* Lasseter's control methods teach a range of power output from minimum power (P_{min}) to maximum output power (P_{max}) wherein frequency inversely corresponds to output power. Lasseter teaches that using its control methods, minimum operating frequency (F_{min}) corresponds to P_{max} and maximum operating frequency (F_{max}) corresponds to P_{min}. *See* e.g. *id* at Abstract, [0116-0131].

Lasseter relates more particularly to "controlling the instantaneous frequency and power from one or more microsources in ways that tend to ensure the microsources stay within their normal operating ranges and otherwise operate efficiently" by focusing "on what needs to be done in response to events such as islanding or new loads to transition smoothly between stable steady state frequency and power operating points." *Id.* at [0058].

Lasseter teaches a variable slope method wherein "all units reach their maximum power output and their minimum frequency limit simultaneously. . . because the operating characteristics for all the units converge at the point of maximum power and minimum frequency." *Id.* at [0117]. "One of the advantages of [Lasseter's] variable slope method is that all sources reach their maximum output together and ***there are no problems with limits on minimum frequency and maximum power***." *Id.* at [0118] (emphasis added). This is because Lasseter's control method "correctly enforces the limits on the frequency and power" and ensures that the "[m]inimum frequency limit ***cannot*** be exceed[ed] as a consequence of the fact

that maximum power cannot be exceeded" *Id.* at [0130]; [0132]. Put another way, "[s]ince all units cannot exceed maximum power . . . then it follows that the units will not go beyond the lower limit for the frequency range." *Id.* at [0120]

Lasseter further teaches that the stability of power sources can be ensured through the assigning of a maximum slope value, a function of the power set point and frequency,[4] which "would effectively translate into a limit on the maximum power setpoint" which could solve "the problem of stability" while also allowing the unit to "end up operating at full maximum power." *Id.* at [0132]. In sum, Lasseter discloses methods wherein power sources are able to utilize the entirety of their power output range, from P_{min} to P_{max}, while simultaneously ensuring stability. *See id.* at [0137].

B. Lopes

Lopes "describes and evaluates the feasibility of control strategies to be adopted for the operation of a microgrid [(MG)] when it becomes isolated." Ex. 1011 at Abstract. Lopes explains that by using a Voltage Source Inverter (VSI) "to provide a reference for voltage and frequency, it is thus possible to operate the MG in islanded mode, and a smooth moving to islanded operation can be performed without changing the control mode of any inverter" because the VSI is able to "provide[] a primary voltage and frequency regulation in the islanded MG." *Id.* at P. 5.

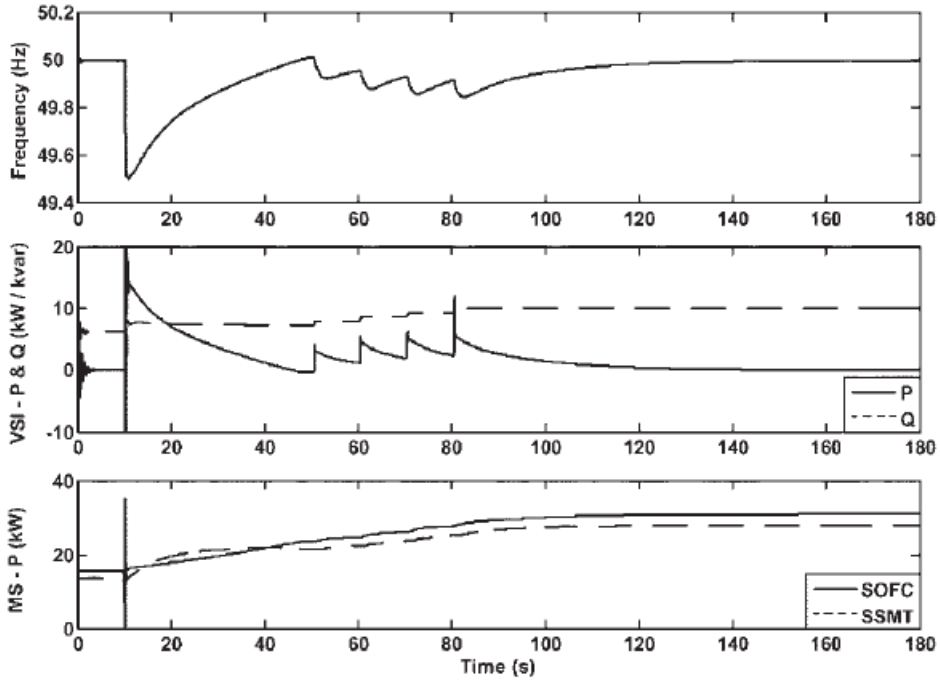
[4] *See* Ex. 1005 at P. 34, Equation 9.

Lopes explains that "[i]slanding of the MG can take place by unplanned events like faults in the MV network" but that in the presence of such events, "MG separation from the MV network must occur as fast as possible" because "the switching transient will have great impact on MG dynamics." *Id.* at P. 5. These impacts occur because "[w]hen moving to islanded operation or when a large load is connected during islanded operation, the initial high imbalance between local load and generation may lead to large frequency deviations and transient overload of the VSI [.]" *Id.* at P. 4. Lopes teaches a method of restoring frequency to a nominal value after such disturbances and explains that "correcting permanent frequency deviations during any islanded operating conditions should then be considered as one of the key objectives for any control strategy." *Id.* at P. 5.

Lopes teaches that "[t]wo kinds of control strategies may be used to operate an inverter" including "PQ *inverter control:* [wherein] the inverter is used to supply a given active and reactive power set-point" and "*Voltage source inverter (VSI) control:* [wherein] the inverter is controlled to "feed" the load with pre-defined values for voltage and frequency." *Id.* at P. 3. Lopes explains that its "[e]quation (4) shows that the VSI active power output is proportional to the MG frequency deviation" and that "[i]f the MG frequency stabilizes in a value different from the nominal one (due to the use of only proportional droop controls), storage devices would keep on injecting or absorbing active power whenever the frequency

deviation differs from zero" and that "[t]his should only be admissible during transient situations[.]" *Id.* at 5. "The results obtained suggest that the management of storage devices are absolutely essential to implement successful control strategies for MG operation in islanded mode with the load shedding procedure assuming also very high importance to avoid fast and long frequency deviations." *Id.* at 8.

Lopes demonstrates its reactive load shedding techniques through its Figure 11 shown below wherein "[a] fault in the MV side occurred at t = 10s" and islanding ensued[5]:



Lopes explains that "[d]ue to the large initial frequency deviation, a certain amount of load is automatically shed through the activation of under-frequency load

[5] *Id.* at P. 6-7.

shedding relays in order to aid frequency restoration. This load is later reconnected in small load steps, to avoid load disconnection by activating the under-frequency load shedding relays." *Id.* at 7. Notably, Lopes's load shedding occurs as a result of substantial frequency deviations caused by "the initial high imbalance between local load and generation" as well as "transient overload of the VSI" and is inherently reactive, acting in a similar manner to the prior art disclosed by the '857 Patent. *See id.* at P. 4; *see* also Ex. 1001 at Col. 18, L. 12-15.

C. Lopes and Lasseter are Cumulative of the Art Cited by Examiner and Discussed by Patent Owner in the Specification

As set forth in Patent Owner's Discretionary Denial Brief and above, Petitioner's challenge is cumulative of art previously evaluated by the examiner and described in the '857 Patent.

When presented with the '857 Patent claims, the examiner noted a prior Lasseter publication bearing the same title and disclosing same subject matter as the Lasseter reference put forth by Petitioner, including a relationship between output power and frequency wherein maximum power output is reached at the same time as minimum frequency, which Petitioner now relies on to teach the claimed second frequency. *Compare* e.g. Ex. 1005 at [0117-0119] to Ex. 2011 at [0111-0112]. Patentee's specification also described reactive load shedding modules and prior art systems at length in the specification of the '857 Patent. *See* e.g. Ex. 1001 at Col. 5-7, L. 64-4; Col 17-19, L. 45-19. Notably, in view of nearly identical art to the art

cited by Petitioner, the examiner did not issue a single rejection under either anticipation or obviousness grounds.

Not only is Petitioner's "new" Lasseter reference cumulative of the reference cited by the examiner, but it is also cumulative of the prior art described in the '857 Patent's specification. [0099] of the "new" Lasseter reference all but confirms the similarity of its disclosure to Figure 2 of the '857 Patent wherein it specifically accounts for a situation wherein during islanding of the power source, the combined power capacity of the power sources "is not adequate to supply the total load of from loads M5, M7, M8, and M9" but is "adequate to supply the combined load from loads M5, M8, and M9, which are assumed to be critical loads." Ex. 1005 at [0099].

Much like prior art Figure 2 of the '857 Patent, which uses a transfer switch as well as main and subpanels to prioritize high priority or critical loads which must be powered during islanding, Lasseter addresses such a situation by opening switch 732 to "disconnect feeder 745 and its associated load M7 from the main distribution bus 730." *Compare* Ex. 1001 Figure 2 to Ex. 1005 Fig. 7. Simply put, both Lasseter and the prior art Figure 2 in the '857 Patent ensure the stability of power sources through preemptive disconnection of non-critical loads in favor of guaranteeing steady state power to loads that are critical.

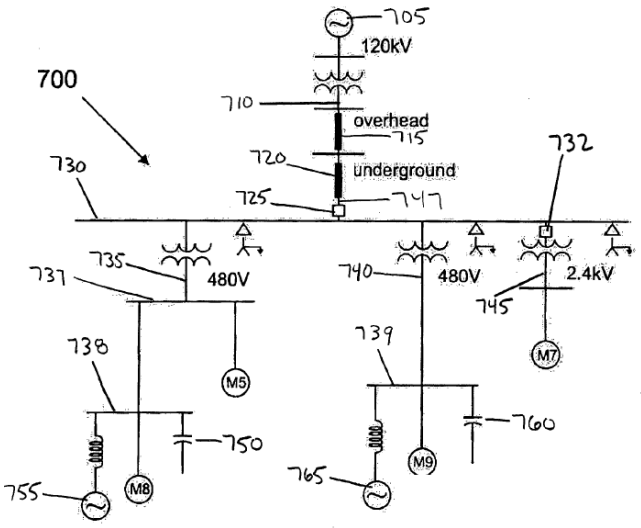


FIG. 7

Similarly, Lopes's Figure 11 and disclosure of reactive load shedding in response to large frequency deviations induced by the initial high imbalance between local load and generation and transient overload of the VSI, confirms its similarity to Figure 3 of the '857 Patent. Both Lopes and the prior art described by the '857 Patent use relays responsive to detection of the power frequency of a power source, caused by imbalance in generation capacity and load demand, as a means of reactively disconnecting loads after an overload has occurred. But neither of these methods constitute the proactive load management approach set forth by the '857 Patent because both methods are reacting to situations wherein there has been a departure from specifications of the power output of the power sources in the form of frequency deviation due to overload. Because the USPTO has already considered almost identical art as to what is set forth by Petitioner in this challenge, and readily

appreciated the novelty of the claimed inventions, Petitioner respectfully requests the Board deny institution.

V. THE PETITION FAILS TO DEMONSTRATE A REASONABLE LIKELIHOOD OF PREVAILING UNDER ANY ASSERTED GROUND

Institution is only permissible when the Petition establishes a "reasonable likelihood that the petitioner would prevail with respect to at least one of the claims challenged in the petition." 35 U.S.C. § 314(a). Because Petitioner fails to meet this threshold requirement because every prior art reference relied upon fails to disclose, teach, or suggest at least Limitations 1[pre], [b], [c]; 39[pre], [b], and [c]; and 61[pre], [b], and [c], the Board must deny institution. *Par Pharm., Inc. v. TWi Pharms., Inc.*, 773 F.3d 1186, 1194 (Fed. Cir. 2014) (petitioner bears burden of proving every claim limitation is disclosed in the prior art); *Medichem, S.A. v. Rolabo, S.L.*, 437 F.3d 1157, 1164 (Fed. Cir. 2006) (consideration of any motivation to combine and reasonable expectation of success is only reached "if all the elements of an invention are found in a combination of prior art references").

A. The Asserted Art of Grounds 1A Does not Disclose, Teach, or Suggest Limitation (b) of Claims 1, 39, or 61

1. Petitioner Fails to Show that Lasseter or Lopes Teach the Second Frequency Claimed by Claim 1 or 39

Petitioner's challenge must be denied because Petitioner has failed to show that either Lasseter or Lopes teach the second frequency in claims 1 and 39 of the '857 Patent.

> Limitation (b) of independent claim 1 of the '857 Patent states:
> (b) a power sensing circuit which may be part of the power source or otherwise and is responsive to the timely amount of the output A.C. power, the power source operating in response to the power sensing circuit to control the frequency of the output A.C. power to have a first frequency when the power source is not overloaded and ***a second frequency when the power source is overloaded or is near to being overloaded;***
> Limitation (b) of independent claim 39 of the '857 Patent states:
> b) a sensing circuit which may be part of the power source or otherwise and is responsive to the timely amount of at least one loading parameter of the power source, ***the power source operating in response to the sensing circuit and the at least one power system parameter to control the frequency of the output AC power to have a first frequency when the power source is not over-loaded and a second frequency when the power source is overloaded or is near to being overloaded***;

Both limitations are directed to the use of frequency control that results in the output AC power having a first frequency when the power source is not overloaded and a second frequency when the power source is overloaded or is near to being overloaded. Both limitations disclose the use of a sensing circuit that is responsive to either the output AC power of a power source or another loading parameter of the power source to communicate the loading condition of the power source. This loading information is then subsequently used in each claim's respective limitation [c] to prevent or alleviate overloads.

Petitioner's challenge does not cite to Lopes as evidence that limitation (b) was disclosed, taught, or suggested in the art and instead merely relies on Lasseter. But as the examiner stated in the '857 Patent's Notice of Allowance in view of a substantially similar Lasseter reference,[6] Lasseter "fails to teach the power source operating in such a manner as to control the frequency of the output AC power to have a first frequency when the power source is not overloaded and a second frequency when the power source is overloaded or near to being overloaded[.]"[7] Unsurprisingly, Petitioner's "new" Lasseter reference which their expert states is "consistent with and reflects the same concepts and control strategies described

[6] Ex. 2011.
[7] Ex. 2010.

across many of Lasseter's academic and industry publications" fails to do the same. *See* Ex. 1003 at P. 53 ¶ 51.

Petitioner spends but one paragraph of its seventy-nine-page Petition addressing a key aspect of the '857 Patent claims, and in doing so mischaracterizes the claim language and the teachings of Lasseter. Patent Owner reproduces Petitioner's ***entire argument*** regarding the claimed controlled second frequency below[8]:

> Where "load exceeds the aggregate power capacity of the units," and microsources exceed P_{max}, microsources drop below "minimum operating frequency." EX1005, ¶¶[0118]-[0119], ¶[0141], FIGS. 14-17; supra [1.a]. This constitutes overload, per the '857 patent, and frequency below the minimum frequency is a second frequency. Supra, §III.A.1-2 (beyond P_{max} is an overload); EX1011, 4, 5, 8 (overload); EX1003, ¶¶101-102. Lasseter similarly teaches when the microsource reaches P_{max}, i.e., near to being overloaded, frequency drops to "minimum operating frequency," i.e., a second frequency. *Id.*

Petitioner's argument regarding Lasseter's supposed teaching of the claimed second frequency has two fundamental and incurable flaws that require institution be denied. First, Petitioner does not so much as address Lasseter's repeated, express teachings that the exact condition Petitioner points to as evidence of Lasseter's

[8] *See* Paper 3 at P. 23-24.

teaching of the claimed controlled second frequency when the power source is overloaded ***cannot occur***. Second, Petitioner's characterization of the claimed second frequency is directly at odds with clear teachings in the specification which Petitioner selectively acknowledges in other portions of its Petition.

As set forth above, Lasseter teaches "methods wherein the inverter reaches maximum output power and minimum operating frequency at the same time" and expressly states that one of the advantages of its control methods is that all power sources reach their maximum output together and ***there are no problems with limits on minimum frequency and maximum power*** because "[s]ince all units cannot exceed maximum power . . . then it follows that the units will not go beyond the lower limit of the frequency range." *Id.* at [0118]; [0120] (emphasis added).

Petitioner's recasting of Lasseter to incorporate situations where "load exceeds the aggregate power capacity of the units" is an incomplete and misleading quote from Lasseter's [0119] which actually discusses the applicability of Lasseter's variable slope method which helps ensure the stability of power sources. Lasseter's [0119] simply discusses two situations: (1) one where the total load demanded by the loads could exceed the aggregate power capacity of the units and (2) one wherein the combined power capacity of the microsources naturally exceeds the total possible load of the system. *Id.* at [0119].

Lasseter explains two solutions to the first situation, where there is not sufficient capacity to power the total possible load in order to guarantee stability of the power sources and ensure that they never encounter an overloaded condition. As set forth above, Lasseter explains that the assigning of a maximum slope value to a given power source using its variable slope method "would effectively translate into a limit on the maximum power setpoint" which could solve "the problem of stability" while also allowing the unit to "end up operating at full maximum power." *Id.* at [0132]. In this way, Lasseter guarantees that its microsources can operate in their full range of power from P_{min} to P_{max} but that simultaneously "all units cannot exceed maximum power[.]" *Id.* at [0120]. Lasseter also explains that such situations can be cured through preemptively disconnecting non-critical loads during islanding where the power sources do not have sufficient capacity to power all the loads. *See* Ex. 1005 at [0099] and Figure 7. Lasseter's explicit and repeated teachings that its methods ensure the stability of power sources by guaranteeing that maximum power and minimum frequency cannot be exceeded are fatal to Petitioner's attempted contortion of Lasseter to incorporate situations Lasseter repeatedly states cannot occur.

Petitioner's attempt to characterize Lasseter as teaching the claimed second frequency wherein the power source is near to being overloaded is similarly doomed. As set forth above, the '857 Patent explains on numerous occasions the benefits of

operating power sources at or near their maximum power output and the "efficiency robbing factors" that occur when operating substantially below maximum power output. Ex. 1001 at Col. 4, L. 36-40. Thus, the '857 Patent's claimed inventions are designed to thread the needle of power source efficiency and reliability by simultaneously operating at or near maximum power output while also preventing overload conditions. Id. at Col. 9, L. 21-25.

Petitioner's challenge lackadaisically points to Lasseter's "minimum operating frequency" which corresponds to Lasseter's P_{max}, as being indicative of Lasseter's teaching of a second frequency when the power source is near overloaded. But Petitioner does not even attempt to grapple with the practical applications of its own challenge. Why would the claimed inventions want to proactively shed loads when operating at maximum output power, which the '857 Patent explicitly teaches is often the most efficient point of operation for a power source? Lasseter intentionally sets power output limits at P_{max} to ensure the stability of the power sources and contains no teachings that its microsources cannot continue to operate at P_{max} indefinitely. Here, Petitioner has done no more than reconstruct the teachings of Lasseter to fit its challenge without any regard to the integrity of the claimed inventions or their ability to allow for power sources' operation at maximum power output thereby optimizing their efficiency. Because Petitioner's attempt to characterize Lasseter's minimum operating frequency as a second frequency when

the power source is near overloaded is in direct conflict with '857 Patent's core teachings as well as Lasseter's teachings that its power sources can operate at P_{max} in a steady state, it must similarly fail.

2. Petitioner Fails to Show that Lasseter or Lopes Teach Frequency Control in Claim 61

Petitioner's challenge must be similarly denied as to claim 61 because Petitioner has failed to show that either Lasseter or Lopes teach the claimed power source operating in response to the power sensing circuit and the maximum output power parameter to control the frequency of the output AC power to indicate the loading of the power source.

> Limitation [b] of independent claim 61 of the '857 Patent states:
> b) a power sensing circuit which may be part of the power source or otherwise and is responsive to the timely power parameter, ***the power source operating in response to the power sensing circuit and the maximum output power parameter to control the frequency of the output AC power to indicate the loading of the power source***;

Claim 61's limitation [c] subsequently operates in response to the controlled frequency of limitation [b] to control the coupling of power to at least one load of the one or more loads thereby helping to prevent or alleviate an overload of the power source. Petitioner once again relies on Lasseter alone to teach limitation 61[b] and its claimed frequency control to indicate the loading of the power source. In doing so, Petitioner incorporates by reference its discussion of limitations 1[b] and

39[b] and adds a sole paragraph discussing Lasseter's supposed teaching of the claimed controlled frequency to indicate the loading of the power source reproduced below[9]:

> Changes in output frequency ω_i *indicate the loading of the power source*. Figures 14-15, and 17 depict loading (indicated by changing frequency). EX1005, ¶¶[0033]-[0036], ¶¶[0110]-[0115], ¶¶[0121]-[0140].

But Petitioner's barebones analysis is devoid of any attempt to capture the meaning of the limitation. Petitioner attempts to equate Lasseter's disclosure of simply altering frequency to modulate output power to the claimed frequency control that is indicative of the loading of the power source. But this simply cannot be the case. In order for the claimed controlled frequency to indicate the loading of the power source in a manner that provides meaningful information for independent claim 61's limitation [c], the frequency control must be able to signal an overloaded or near overloaded condition as described in the specification and the claims, not merely modulate output power. As explained above, Lasseter simply does not teach controlling frequency to correspond to an overloaded or near overloaded condition and instead provides methods of ensuring such situations never occur. Because Lasseter does not teach controlling the frequency to correspond to such a condition,

[9] Paper 3 at P. 42.

Lasseter similarly cannot teach the claimed frequency being controlled to indicate the loading of the power source because using Lasseter's method, the frequency from Lasseter will always indicate that the power source is operating in steady state and would never signal a need for subsequent load shedding. Because Petitioner adds little to its already flawed challenge and fails to even attempt to grapple with the meaning of the claims, institution should be denied.

B. The Asserted Art of Grounds 1A Does not Disclose, Teach, or Suggest the Processor Circuit Claimed in Claims 1, 39, or 61

Petitioner's challenge must be denied because Petitioner has failed to show that either Lasseter or Lopes teach the processor circuit in claims 1, 39, and 61 of the '857 Patent.

> Limitation [c] of independent claim 1 of the '857 Patent states:
> c) a processor circuit comprising one or more processors responsive to the output A.C. power, the processor circuit operating in response to the occurrence of the second frequency to control the output A.C. power consumed by at least one load of the one or more loads thereby helping to prevent or alleviate an overload of the power source.

> Limitation [c] of independent claim 39 of the '857 Patent states:
> c) a processor circuit comprising one or more processors responsive to the output AC power, the processor circuit operating in response to the occurrence of the second frequency to control the output AC power consumed by at least one load of the one or more loads thereby helping to prevent or alleviate an overload of the power source.

Limitation [c] of independent claim 61 of the '857 Patent states:

> c) a processor circuit comprising one or more processors responsive to the frequency of the output AC power to control the coupling of power to at least one load of the one or more loads thereby helping to prevent or alleviate an overload of the power source.

All the identified limitations disclose the concept of responding to the controlled frequency of their corresponding limitation [b] which conveyed loading information indicating whether the power source was overloaded, near to being overloaded, or not overloaded. In response, the claimed processor circuit operates to control the output AC power consumed by or control the coupling of power to at least one load to proactively prevent or alleviate an overload of the power source.

Not to be lost in the mix, patentee's definition of overload is particularly important to ensure full understanding of the claims. Here, the processor circuit is operating to prevent or alleviate "***a load that if not disconnected or otherwise prevented*** will either cause a departure from specifications for the power output from the power source, for example such as a deviation of AC power voltage or frequency for longer than a specified time period, a loss of power such as from a tripped circuit breaker, or damage such as overheating or exceeding mechanical stress limits." *Id.* at Col. 7, L. 55-62.

The claimed processor circuit in limitation [c] is responding to the claimed controlled frequency to ensure the claimed power source does not suffer a departure

from power specifications or damage through managing the connection and disconnection of loads to the power source, thereby proactively managing the loading of the power source. This is consistent with the '857 Patent's focus on its proactive approach to overload prevention and improvements over the prior art which sheds low priority loads only "after the generator has been overloaded." *Id.* at Col. 6, L. 38-41.

Petitioner's challenge does not cite to Lasseter as evidence that limitation [c] was disclosed, taught, or suggested in the prior art and thus, Petitioner's challenge relies solely on Lopes for this limitation. Once again, Petitioner gives surprisingly short shrift to one of the most important elements of the '857 Patent and relies upon but one sentence of a three-sentence paragraph to explain how Lopes teaches preventing or alleviating overloads[10]:

> Lopes supplies algorithms for "shedding" "controllable loads" "based on the amplitude of frequency deviation." EX1011, 4-5. Load shedding controls output A.C. power consumed by the load, because it "[a]llow[s] a temporary disconnection of less important loads." *Id.* Shedding loads can cure "high imbalance between local load and generation," preventing or alleviating "frequency deviations and transient overload[s]" including an overload of the power source, per the '857 patent, e.g., excursions beyond P_{max}. *Id.*; EX1003, ¶¶103-105.

[10] Paper 3 at P. 24.

In doing so, Petitioner attempts to render one of the most important limitations of the '857 Patent claims meaningless and equate any reference that teaches "[s]hedding loads" as sufficient to disclose, teach, or suggest the claimed operation. But a closer read of the '857 Patent, Lopes, as well as Petitioner's own challenge and notice ranking document confirms this is simply not the case. As set forth above, the '857 Patent provides an in-depth analysis of known reactive load shedding techniques used in the prior art and their drawbacks upon which the '857 Patent improved. As confirmed by the next paragraph of Petitioner's challenge, Lopes teaches these same reactive techniques[11]:

> "Lopes' load-shedding algorithm is responsive to "amplitude of the frequency deviation" (reflecting changes in output A.C. power), specifying "a certain amount of load" to be "automatically shed through the activation of under-frequency load shedding relays" based on "frequency deviation" (the second frequency). EX1011, 6; EX1003, ¶104.

But this is exactly what the '857 Patent teaches against and has improved upon. The '857 Patent explains that in prior art systems, for the frequency to have dropped in the first place, there must have already been "a departure from specifications for the power output from the power source, for example such as a deviation of AC power voltage or frequency for longer than a specified time

[11] Paper 3 at P. 24-25.

period[.]" *See* Ex. 1001 at Col. 7, L. 57-60. And Lopes explains that "[w]hen moving to islanded operation or when a large load is connected during islanded operation, the initial high imbalance between local load and generation may lead to large frequency deviations and transient overload of the VSI[.]" *See* Ex. 2011 at P. 4-5. In doing so, Lopes confirms that its load shedding solution is inherently reactive to frequency drop caused by imbalance between load and generation capacity and is incapable of proactively preventing or alleviating an overload as claimed by the '857 Patent. How could Lopes proactively prevent or alleviate "a load that if not disconnected or otherwise prevented will either cause a departure from specifications for the power output from the power source" if Lopes itself teaches that such departure from specifications due to an imbalance between generation and load is the condition that triggers its load shedding methods? Petitioner does not and cannot answer that question. In fact, their notice ranking document even states that the '857 Patent "[c]oncerns proactive approaches to prevent power source overload"[12] further confirming Lopes's inability to teach the claimed operation. Because the claimed processor circuit is not disclosed, taught, or suggested, institution must be denied.

[12] *See* Paper 2 at P. 2.

C. The Asserted Art of Grounds 1A Does not Disclose, Teach, or Suggest the Limiting Preamble of Claims 1, 39, or 61

1. The Asserted Art of Grounds 1A Does not Disclose, Teach, or Suggest the Power System Providing A.C. Power with a Controlled A.C. Frequency to Assist in Managing the Loading Claimed in Claims 1 or 39

Petitioner's challenge must be denied because Petitioner has failed to show that either Lasseter or Lopes disclose, teach, or suggest a power system providing AC power with a controlled AC frequency to assist in managing the loading of the power system.

> The limiting preamble of independent claim 1 of the '857 Patent states:
> 1[Pre] A power system which provides A.C. power with a controlled A.C. frequency to assist in managing the loading thereof, the power system comprising:
> The limiting preamble of independent claim 39 of the '857 Patent states:
> 39[Pre] A power system which provides AC power with a controlled AC frequency to assist in managing the loading thereof, the power system comprising:

As explained above, the file history of the '857 Patent makes clear that the frequency of the AC power in the claimed inventions is controlled "such that it conveys information" that "may be used to prevent or relieve an overload" and the preambles of both claims are limiting because they breathe life into the claims and provide the basis for core operations of the claimed power systems. *See* Ex. 2017.

Similarly to limitation [b], Petitioner's challenge does not cite to Lopes as evidence that the preambles were disclosed, taught, or suggested in the art and instead solely relies on Lasseter. Once again, Petitioner dedicates but a single paragraph of its seventy-nine-page Petition to discussing a key concept of the '857 Patent claims reproduced below:

> If limiting, Lasseter's "distributed energy resource system" (DER) the claimed power system. EX1005, Abstract, ¶¶[0063]-[0069], FIG. 1 (equating DERs and microgrids); EX1011, 1 (noting "MG" stands for microgrid); EX1003, ¶84. DERs comprise "microsource[(s)]" that output "AC voltage or current at the required frequency." EX1005, ¶[0010], ¶¶[0015]-[0018], ¶¶[0071]-[0088], FIG. 1. Frequency is controlled—Lasseter discloses "control schemes for controlling the instantaneous frequency…from one or more microsources." Id., ¶[0058], ¶¶[0014]-[0018], ¶[0142]. This control assists in managing the DER's loading—frequency is controlled "in response to events such as islanding or new loads." Id.; EX1003, ¶¶85-105.

Petitioner's analysis of Lasseter's supposed disclosure of the preamble is not only threadbare but also completely unsupported by Lasseter's disclosure and insufficient to support that the preamble was disclosed, taught, or suggested. As set forth above, Lasseter teaches "method[s] of controlling the output inverter of a microsource in a distributed energy resource system" wherein unit or zone power controls are used to "reduce the operating frequency of the inverter to increase its unit output power" in order to accomplish "what needs to be done in response to

events such as islanding or new loads to transition smoothly between stable steady state frequency and power operating points." Ex. 1005 at Abstract. Simply put, Lasseter tells the reader that it discloses methods of controlling the power output of power sources through increasing and decreasing frequency and does not use its frequency control to connect or disconnect loads.

Thus, Lasseter's disclosure is far from the concept disclosed by the preamble of the '857 Patent claims which control frequency for the purpose of ***managing the loading of the power system***. When read in light of the specification and file history, it is unmistakable that patentee did not simply claim the idea of controlling frequency with respect to output power, but he invented a method of managing the loading of the power system through the use of a controllable frequency which transmits loading information to a processor circuit that can subsequently prevent or alleviate an overload Patentee's disclosure of prior systems nearly identical to Lasseter confirms the same.

This is also consistent with the body of each of the challenged claims, wherein the claimed processor circuit acts to respond to the claimed controlled frequency to control the power demanded by or coupling of power to a given load, thereby managing the loading of the power system. Instead of merely using frequency to modulate the output of power sources, the '857 Patent uses frequency control to signal load disconnection or limiting to proactively alleviate overloads.

Petitioner's own challenge which does not cite to Lasseter as teaching any form of load disconnection or limiting taught by the '857 Patent and found directly in limitation [c] of the challenged claims further confirms Lasseter's failure to teach frequency control for the purpose of managing the loading of a power system. Petitioner's attempt to simplify and misread the claims of the inventions to make the prior art's unrelated disclosures fit for the purposes of its obviousness challenge is clear. The limiting preambles are not disclosed, taught, or suggested.

2. The Asserted Art of Grounds 1A Does not Disclose, Teach, or Suggest the Power System Providing AC Power with one or more Controlled Power Parameters to Assist in Managing the Loading Claimed in Claim 61

Petitioner's challenge must be denied because Petitioner has failed to show that either Lasseter or Lopes disclose, teach, or suggest a power system providing AC power with one or more controlled power parameters to assist in managing the loading of the power system.

> The limiting preamble of independent claim 61 of the '857 Patent states:
> 61[Pre] A power system which provides AC power with one or more controlled power parameters to assist in managing the loading thereof, the power system comprising:

Similarly to limitation [b] and the preambles discussed above, Petitioner's challenge does not cite to Lopes as evidence that the preambles were disclosed, taught, or suggested in the art and instead solely relies on Lasseter. Petitioner's

challenge as to this limitation does little more than cite to its threadbare analysis for the prior preambles and assert that frequency is a controlled power parameter, which for the purposes of this Preliminary Response, Patent Owner does not contest.

Thus, Patent Owner incorporates by reference its discussion regarding the limiting preambles of claims 1 and 39 herein. Patent Owner once again notes that the file history of the '857 Patent makes clear that a power parameter, the frequency of the AC power, is controlled in the claimed inventions "such that it conveys information" that "may be used to prevent or relieve an overload" and the preamble of claim 61 is limiting because it breathes life into the claims and provides the basis for a core operation of the claimed power system. *See* Ex. 2017 at P. 2; 6. Because the limiting preambles are not disclosed, taught, or suggested, institution should be denied.

D. A POSA Reading Lasseter Would have No Motivation to Find a Solution to Overloads because Lasseter had Already Done so

While Patent Owner contends that the Petition must be denied because it fails to show that either Lasseter and/or Lopes teach several key limitations of the '857 Patent claims, Patent owner also contends that a POSA would have no motivation to combine Lasseter and Lopes. In an attempt to cobble together a single motivation to combine rationale the Board would find persuasive, Petitioner goes with the classic kitchen sink approach and puts forward six alleged motivations a POSA would have

to combine Lasseter and Lopes that are riddled with hindsight bias and wholly unpersuasive.

Petitioner's first motivation to combine rationale which states "because Lasseter does not detail what to do when its microsources' generation capacity is inadequate to supply the total potential load, POSITA would have looked to Lopes and its responsive frequency-based load-shedding scheme for solutions" is factually inaccurate.[13]

Lasseter explicitly details how to deal with situations where its microsources' generation capacity is inadequate to supply the total potential load. As set forth above, Lasseter's [0099] and Figure 7 demonstrate that when the combined power of the microsources' during islanding "is not adequate to supply the total load of from loads M5, M7, M8, and M9" but is adequate to supply power to a subset of the loads, Lasseter simply utilizes a switch to disconnect non-critical loads that will not be connected for the duration of the power grid failure. *See* Ex. 1005 at [0999] and Fig. 7. Also described above is Lasseter's assigning of a maximum slope value which "effectively translate[s] into a limit on the maximum power setpoint" which solves "the problem of stability" while also allowing the unit to "end up operating at full maximum power." *Id.* at [0132]. In these ways, Lasseter directly addresses what to do when its microsources' generation capacity is inadequate to supply the

[13] Paper 3 at P. 13.

total potential load and guarantees the stability of its microsources in a manner that guarantees they will not be overloaded. Because Petitioner's first motivation to combine rationale is fundamentally untrue, it must fail.

Petitioner's second motivation to combine rationale which states that "employing responsive load-shedding activated at or below Lasseter's minimum frequency could avoid inefficiencies from excess generation capacities"[14] is wholly illogical. As set forth above, Lasseter teaches that its methods result in power sources which reach their maximum power output at a corresponding minimum frequency. *See* e.g. Ex. 1005 at [0117]. Thus, when Lasseter's power sources are operating at their minimum frequency, they are conversely outputting maximum power and have ***no excess generation capacity*** and would be suffering no inefficiencies due to excess generation capacity. Further, as explained above, Lasseter repeatedly teaches that its power sources' "[m]inimum frequency limit *cannot* be exceed[ed]" and thus teaches no frequency below its minimum. *See* Ex. 1005 at [0130]. But assuming that Lasseter provided such a teaching, that frequency would correspond to a situation wherein the limit on maximum power is exceeded. Thus, the power sources would once again have no excess generation capacity and instead, would be putting out more power than their rated specifications. Because Petitioner's second alleged

[14] *Id.* at P. 14.

motivation to combine is divorced from the reality of Lasseter's teachings, it also must fail.

Petitioner's third motivation to combine rationale which states that "Lasseter teaches that one could alternatively impose an express power output limit, but this could result in providing less power than the loads demanded" is simply a truism not fixed by Lopes. *Id.* at P. 15. In concocting its third motivation to combine argument, Petitioner points to Lasseter's [0137] wherein Lasseter explains that it is more advantageous to have situations where the combined power sources have "enough generation" to power the loads rather than for Lasseter to have to actively enforce limits on power output, a simple fact true of any power source or system no matter the size.

Petitioner then states that "shedding and reconnecting "less important" loads—only as needed—ensures critical loads can continue to receive power." Paper 3 at P. 15. But Petitioner fails to acknowledge that Lasseter's [0099] and Fig. 7 similarly address situations wherein the combined power of the microsources is insufficient to supply the total load presented to the power sources and that Lasseter simply uses a switch to preemptively and permanently disconnect non-critical loads in favor of higher priority loads to ensure the same. In this way, Lasseter similarly ensures critical loads continue to receive power. Because Lopes's load shedding

does not fix the inherent limitation of power sources having a maximum power output, Petitioner's third motivation to combine argument must also fail.

Petitioner's fourth motivation to combine argument states that a "POSITA would have been especially motivated to employ load shedding in systems where only some loads are truly critical" and that because "there may be periods when both critical and non-critical loads can be adequately powered" a POSA would have been motivated to delay Lasseter's shedding of non-critical loads until necessary to "preserve adequate power for critical applications[.]" *Id.* at P. 15. Petitioner further points to hospitals wherein interruption of power can have life threatening consequences to critical loads such as life support.

But in making its motivation to combine argument, Petitioner fails to meaningfully grapple with the fact that Lopes's reactive load shedding does not guarantee stability of the power sources throughout operation. Instead, Lopes's methods experience lengthy frequency deviations and transient overload of the power sources that have the capacity to damage the precious hospital equipment Petitioner seeks to protect. Ex. 1011 at P. 4.

As noted by the '857 Patent and above, there are substantial drawbacks associated with the reactive load shedding mechanisms set forth by Lopes including slow and inaccurate frequency detection which can cause actual overloads to go undetected and damage to either the generator or the load to have happened prior to

load shedding. Ex. 1001 at Col. 6, L. 59-64. Using Petitioner's example, implementing Lopes's reactive load shedding rather than Lasseter's preemptive methods may allow for a system to power non-critical loads in moments where both critical and non-critical loads can be adequately powered, but doing so comes at the risk of possible damage to machines such as life support or heart and oxygen monitoring equipment due to Lopes's inability to proactively prevent overloads. Interestingly, Petitioner's motivation to combine analysis is silent as to these potential consequences. Because a POSA would understand the risk posed to critical loads in important contexts noted by Petitioner using Lopes's reactive load shedding, a POSA would not be motivated to deviate from Lasseter's teachings which guarantee a steady state amount of power and the safety of the critical loads.

Petitioner's fifth motivation to combine argument states that a "POSITA would have been motivated to combine Lasseter and Lopes to avoid drawbacks associated with Lasseter's preemptive load disconnection" and is for all intents and purposes, a rehashing of its fourth argument.[15] It is true, due to variations in the loads presented to Lasseter's power sources, there may be situations wherein the power sources are able to power all loads, both critical and non-critical at times of low-power demand but not when faced with their maximum total load. But Petitioner once again fails to grapple with the potential consequences of the approach put forth

[15] *Id.* at P. 16.

by Lopes which risks damage to both the power sources and the loads via its reactive load shedding mechanisms. Sure, in certain niche circumstances, Lasseter could have excess generation capacity which results in some inefficiencies due to preemptive disconnection. But Lopes's alternative comes with even worse consequences, the guarantee of potential risk to the very power sources Lopes aims to protect as well as their critical loads. It is for this very reason that the '857 Patent's file history, specification, and claims, all consistently focus on the proactive nature of the claimed inventions which are able to circumvent the problems posed by both Lasseter and Lopes in isolation and combination. Because a POSA would understand the potential consequences of Lopes's reactive load shedding approach and the increased stability of Lasseter, Petitioner's fifth motivation to combine arguments must fail.

Petitioner's sixth motivation to combine argument states that "shedding loads only when necessary (as in Lopes) helps power sources operate near maximum-output (and most efficient), motivating POSITA"[16] and is not only highly similar to its fourth and fifth arguments but inconsistent with its own challenge.

Petitioner's challenge uses Lasseter's teaching of a minimum frequency which corresponds to its power sources' maximum power output to indicate a situation where Lopes's processor circuit would know to shed loads. Petitioner's

[16] *Id.* at P. 16.

sixth motivation to combine argument now explains that a POSA would be motivated to combine Lasseter with Lopes to operate more closely to its maximum power output. But Petitioner's own challenge applies Lopes in a way that guarantees Lasseter could never operate at its maximum power output because once it does, Lopes will shed loads based on the sensing of Lasseter's minimum frequency. In this way, Petitioner's application of Lopes actually guarantees that Lasseter is unable to utilize the entirety of its steady state operating range because Lopes's methods will not allow for such operation. Because Petitioner's sixth motivation to combine argument is in direct conflict with its challenge, it similarly must fail.

While Patent Owner believes that Petitioner has failed to put forth a single meaningful reason why a POSA would be motivated to combine Lasseter and Lopes, Patent Owner also notes that a POSA would have no reasonable expectation of success using Petitioner's own combination. As explained in detail above, Petitioner points to any frequency below the minimum frequency disclosed by Lasseter as satisfying the claimed second frequency. While Lasseter repeatedly states that no such frequency occurs using its methods, Petitioner's lackadaisical identification is nevertheless fraught with issues, many of which are detailed in the '857 Patent specification.

Taking Petitioner at its word, that any "frequency below the minimum frequency is a second frequency" guarantees that a host of the frequencies included

in this range will result in damage to the power source. As explained by the '857 Patent, the prior art's frequency detectors have issues with both speed and accuracy of AC frequency detection which can allow an actual overload to go undetected and thus, damage to the generator or its load may have already happened by the time the overload is detected. Ex. 1001 at Col. 6, L. 53-57. Frequencies just below Lasseter's minimum would be highly susceptible to such inaccuracies because of issues in calibrating sensitivity of the detectors. *Id.* at Col. 18, L. 48-55. Further, frequencies farther below Lasseter's minimum frequency run the risk of allowing overloads which occur that do not meet its frequency threshold but can still cause damaging effects to the generator and its loads. Because Petitioner's challenge does no more than point to any frequency below Lasseter's minimum or explain any teaching from Lasseter that clarifies where such a frequency threshold should be set, a POSA would have no expectation of success in the combination and a simultaneous awareness of all the drawbacks associated with under-frequency relay shedding set forth by the '857 Patent.

VI. CONCLUSION

Petitioner's challenge does no more than repackage art substantively the same as art previously considered by the USPTO during examination and in doing so leaves the same holes identified by the examiner and more. At bottom, Petitioner's entire challenge can be summed up as a combination of the '857 Patent's prior art

Figures 2 and 3 which simply fail to disclose the proactive approach to preventing and alleviating overloads claimed in the '857 Patent.

As detailed above, Petitioner's challenge fails to show that any of its references disclose, teach, or suggest critical elements of the challenged claims found in limitations [pre], [b], and [c], of challenged independent claims 1, 39, and 61.

Because Petitioner's challenge fails to establish a reasonable likelihood that the they would prevail with respect to at least one of the claims challenged in their Petition, Patent Owner respectfully requests that the Board deny institution of Generac's Petition with respect to all grounds asserted and all challenged claims.

Dated: January 16, 2026.

Respectfully submitted,

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CERTIFICATION UNDER 37 C.F.R. §42.24(d)

I hereby certify that the word count for the foregoing Patent Owner's Preliminary Response is 12,937 words, which is within the limit set in 37 C.F.R. §42.24(b)(1).

Dated: January 16, 2026

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CERTIFICATE OF SERVICE

I hereby certify that on this the 16th day of January, 2026, a true and correct copy of the foregoing PATENT OWNER'S PRELIMINARY RESPONSE and the associated exhibits were served via electronic mail upon counsel of record for Petitioner at the following address:

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