

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

CHOLLA ENERGY LLC and OBM, INC.,
Petitioners,

v.

LANCIUM LLC,
Patent Owner.

IPR2024-00914
Patent 11,016,456 B2

Before KEN B. BARRETT, AMBER L. HAGY, and
KARA L. SZPONDOWSKI, *Administrative Patent Judges*.

HAGY, *Administrative Patent Judge*.

DECISION
Granting Institution of *Inter Partes* Review
35 U.S.C. § 314

I. INTRODUCTION

A. *Background and Summary*

Cholla Energy LLC and OBM, Inc. (collectively, “Petitioner”) filed a petition requesting *inter partes* review (Paper 3, “Pet.”) of claims 1–10, 12, and 14–30 (“the challenged claims”) of U.S. Patent No. 11,016,456 B2 (Ex. 1001, the “’456 patent”). *See* 35 U.S.C. § 311. Lancium LLC (“Patent Owner”) did not file a Preliminary Response.

Under 37 C.F.R. § 42.4(a), we have authority to determine whether to institute review. The standard for instituting an *inter partes* review is set forth in 35 U.S.C. § 314(a), which provides that an *inter partes* review may not be instituted unless the information presented in the Petition shows “there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.”

Applying those standards, we determine that Petitioner has demonstrated a reasonable likelihood that it would prevail in showing unpatentability of at least one challenged claim of the ’456 patent. We institute review on all challenged claims and on all grounds raised in the Petition.

Our findings of fact and conclusions discussed below are based on the evidentiary record developed thus far. This Decision to institute trial is not a final decision as to the patentability of any challenged claim. Any final decision will be based on the full record developed during trial.

B. Real Parties in Interest

Petitioner identifies Cholla Energy LLC and OBM, Inc. as the real parties in interest. Pet. 97.

Patent Owner identifies itself the real party in interest. Paper 5, 1.

C. Related Matters

As required by 37 C.F.R. § 42.8(b)(2), the parties identify as a related matter a district court proceeding filed by Patent Owner involving the '456 patent: *Lancium LLC v. U.S. Data Mining Group, Inc. et al.*, No. 6:23-cv-00344 (W.D. Tex.). Pet. 97; Paper 5, 1.

D. The '456 patent (Ex. 1001)

The '456 patent, titled “Method and System for Dynamic Power Delivery to a Flexible Datacenter Using Unutilized Energy Sources,” issued on May 25, 2021. Ex. 1001, codes (45), (54). The '456 patent claims priority to provisional application No. 62/616,348, filed January 11, 2018. *Id.* at code (60). Petitioner does not dispute this priority claim for purposes of this proceeding. Pet. 13.

The '456 patent is directed to “a method and system for dynamic power delivery to a flexible datacenter [that] uses unutilized behind-the-meter power sources without transmission and distribution costs.” Ex. 1001, 4:18–20. The '456 patent allows the “flexible datacenter” to “be configured to modulate power delivery to one or more computing systems based on the availability of unutilized behind-the-meter power or an operational directive.” *Id.* at 4:21–24.

The '456 patent generally describes a flexible datacenter. *Id.* at 6:14–29. The flexible datacenter includes a mobile container, a behind-the-meter (“BTM”) power input system, a power distribution system, a climate control

system, a datacenter control system, and computing systems disposed in racks. *See id.* at 6:14–22. Figure 2, reproduced below, depicts a “flexible datacenter.” *Id.* at 6:14–67.

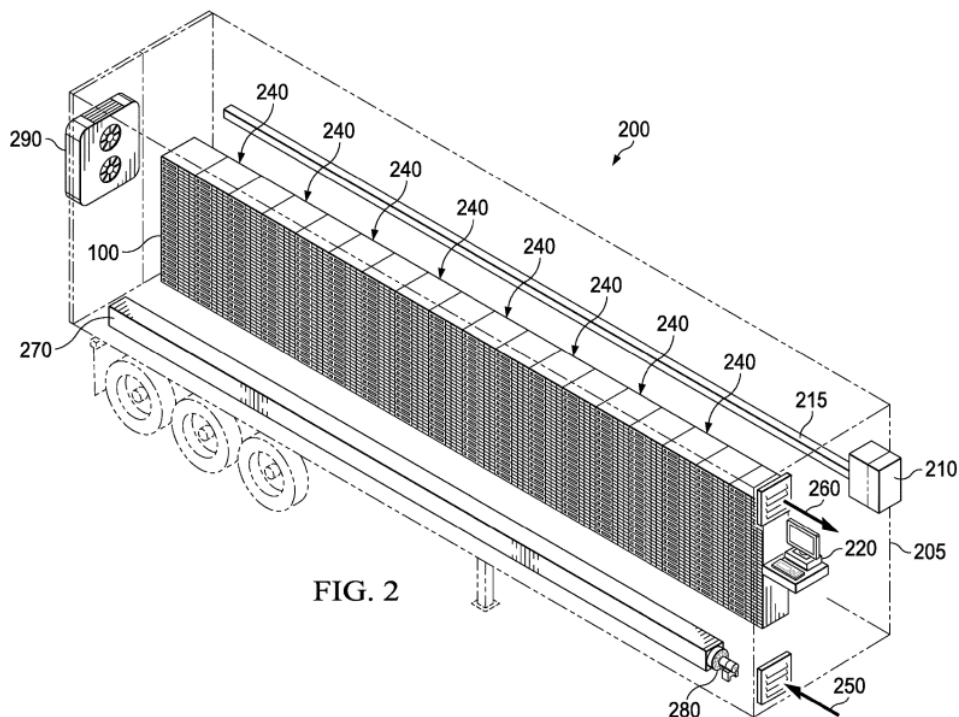


Figure 2 is a diagram depicting “a flexible datacenter” that “may be rapidly deployed on site near a source of unutilized behind-the-meter power generation.” Ex. 1001, 6:39–41.

As depicted in Figure 2, flexible data center 200 includes datacenter control system 220, which is “configured to dynamically modulate power delivery to one or more computing systems 100 disposed within flexible datacenter 200 based on unutilized behind-the-meter power availability or an operational directive from a local station control system” or “a remote

master control system” or “a grid operator.” Ex. 1001, 6:22–29.¹ Behind-the-meter power generation includes receiving three-phase behind-the-meter alternating current (“AC”) voltage, stepping down three-phase behind-the-meter AC voltage to three-phase nominal AC voltage, and providing three phases of three-phase nominal AC voltage to power distribution system 215. *Id.* at 6:41–7:3. Power distribution system 215 then “controllably provide[s] a single phase of three-phase nominal AC voltage to each computing system 100 or group 240” in flexible datacenter 200. *Id.* at 7:3–10. This allows datacenter control system 220 to “modulate power delivery by either ramping-up flexible datacenter 200 to fully operational status, ramping-down flexible datacenter 200 to fully offline status,” or “reducing power consumption by withdrawing power delivery from, or reducing power to, one or more computing systems 100 or groups 240.” *Id.* at 7:10–22.

E. Illustrative Claim

Of the challenged claims, claims 1, 25, and 28 are independent. Challenged claims 2–10, 12, and 14–24 depend, directly or indirectly, from claim 1, challenged claims 26 and 27 depend from claim 25, and challenged claims 29 and 30 depend from claim 28. Claims 1, 25, and 28, reproduced below (with bracketed numbering as added by Petitioner), illustrate the claimed subject matter:

1. [1.0] A flexible datacenter comprising:
 - [1.1] a behind-the-meter (BTM) power input system, wherein the BTM power input system is configured to receive power from a power generation station prior to the power

¹ All bolding of reference numbers has been omitted in material quoted herein from the ’456 patent and the prior art references.

undergoing step-up transformation for transmission to a power grid;

[1.2] a power distribution system;

[1.3] a plurality of computing systems; and

[1.4] a datacenter control system configured to modulate power delivery to the plurality of computing systems based on an operational directive.

Ex. 1001, 19:6–16.

25. [25.0] A system comprising:

[25.1] a first flexible datacenter that comprises:

[25.2] a behind-the-meter (BTM) power input system, wherein the BTM power input system is configured to receive power from a power generation station prior to the power undergoing step-up transformation for transmission to a power grid;

[25.3] a power distribution system; and

[25.4] a plurality of computing systems configured to receive power from the BTM power input system via the power distribution system;

[25.5] a second flexible datacenter; and

[25.6] a routing control system configured to modulate power delivery to the first flexible datacenter and the second flexible datacenter.

Id. at 20:47–61.

28. [28.1] A method of dynamic power delivery to a flexible datacenter using behind-the-meter (BTM) power comprising:

[28.1] monitoring, by a control system, BTM power availability at the flexible datacenter, [28.2] wherein the flexible datacenter includes a BTM power input system configured to receive power from a power generation station prior to the power undergoing a step-up transformation for transmission to a power grid;

[28.3] determining that a ramp-up condition is met, wherein the ramp-up condition depends on BTM power availability at the flexible datacenter; and

[28.4] based on determining that the ramp-up condition is met, providing an operational directive to a datacenter control system at the flexible datacenter, [28.5] wherein the operational directive instructs the datacenter control system to enable BTM power delivery to one or more computing systems at the flexible datacenter.

Id. at 21:8–22:6.

F. Prior Art and Asserted Grounds

Petitioner asserts that claims 1–10, 12, and 14–30 are unpatentable on the following grounds:

Claim(s) Challenged	35 U.S.C. §	References/Basis
1–4, 14, 17, 18, 20, 25, 27	103 ²	Pelio, ³ Chapel ⁴
5–8, 10, 12, 28–30	103	Pelio, Chapel, Yang ⁵

² The Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284 (2011) (“AIA”), amended several provisions of 35 U.S.C., including § 103. Because the ’456 patent has an effective filing date after the effective date of the applicable AIA amendments, we refer herein to the AIA version of § 103.

³ U.S. Patent Pub. No. 2011/0316337 A1, published December 29, 2011 (Ex. 1005, “Pelio”).

⁴ U.S. Patent Pub. No. 2010/0145542 A1, published June 10, 2010 (Ex. 1006, “Chapel”).

⁵ F. Yang and A. A. Chien, “ZCCloud: Exploring Wasted Green Power for High-Performance Computing,” in 2016 IEEE Int’l Parallel and Distr. Proc. Symposium (IPDPS), Chicago, IL, 2016, pp. 1051–1060 (Ex. 1007, “Yang”).

Claim(s) Challenged	35 U.S.C. §	References/Basis
19, 21–24, 26	103	Pelio, Chapel, Belady ⁶
9	103	Pelio, Chapel, Rasmussen ⁷
15, 16	103	Pelio, Chapel, Corhodzic ⁸

As further support, Petitioner offers the Declaration of Tajana S. Rosing, Ph.D. Ex. 1003.

II. ANALYSIS

A. *Principles of Law*

A patent claim is unpatentable under 35 U.S.C. § 103 “if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains.” 35 U.S.C. § 103; *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and

⁶ U.S. Patent No. 8,849,469, issued September 30, 2014 (Ex. 1008, “Belady”).

⁷ N. Rasmussen, “Impact of Leading Power Factor on Data Center Generator Systems,” Schneider Electric, White Paper 200, Rev. 0 (2014) (Ex. 1010, “Rasmussen”).

⁸ U.S. Patent No. 8,080,900, issued December 20, 2011 (Ex. 1011, “Corhodzic”).

(4) when in evidence, objective evidence of nonobviousness.⁹ *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

“In an [*inter partes* review], the petitioner has the burden from the onset to show with particularity why the patent it challenges is unpatentable.” *Harmonic, Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016) (citing 35 U.S.C. § 312(a)(3) (requiring *inter partes* review petitions to identify “with particularity . . . the evidence that supports the grounds for the challenge to each claim”)). This burden of persuasion never shifts to Patent Owner. See *Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015) (discussing the burden of proof in *inter partes* review).

B. Level of Ordinary Skill in the Art

The level of skill in the art is a factual determination that provides a primary guarantee of objectivity in an obviousness analysis. *Al-Site Corp. v. VSI Int’l Inc.*, 174 F.3d 1308, 1324 (Fed. Cir. 1999) (citing *Graham*, 383 U.S. at 17–18; *Ryko Mfg. Co. v. Nu-Star, Inc.*, 950 F.2d 714, 718 (Fed. Cir. 1991)).

Relying on the declaration testimony of Dr. Rosing, Petitioner asserts that a person of ordinary skill in the art “would have had a bachelor’s degree in computer science, computer engineering, electrical engineering, mechanical engineering, or an equivalent, and two years of professional experience relating to green datacenters, or more particularly, the use of renewable energy in powering datacenters and power management techniques for datacenters.” Pet. 14 (citing Ex. 1003 ¶¶ 20–22).

⁹ We have no evidence of secondary considerations before us at this stage.

Patent Owner has not filed a preliminary response, and therefore Petitioner's assessment is unchallenged at this stage.

For purposes of this institution decision, and based on the present record including the disclosure in the '456 patent, we apply Petitioner's definition of the level of ordinary skill in the art (*see* Pet. 14). We determine this level of skill comports with the qualifications a person would have needed to understand and implement the teachings of the '456 patent and the prior art of record. *Cf. Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001) (noting that the prior art itself may reflect an appropriate level of skill in the art).

C. Claim Construction

In interpreting the claims of the '456 patent, we “us[e] the same claim construction standard that would be used to construe the claim[s] in a civil action under 35 U.S.C. [§] 282(b).” *See* 37 C.F.R. § 42.100(b) (2024). The claim construction standard includes construing claims in accordance with the ordinary and customary meaning of such claims as would have been understood by one of ordinary skill in the art in light of the written description and the prosecution history pertaining to the patent. *See id.*; *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–14 (Fed. Cir. 2005) (en banc).

Petitioner asserts “for the purposes of this proceeding and the grounds presented herein, no claim term requires express construction.” Pet. 14.

For purposes of this Decision, we agree with Petitioner and determine that no claim term requires express interpretation at this time. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (per curiam) (claim terms need to be construed “only to the

extent necessary to resolve the controversy” (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999))).

D. Overview of Cited References

1. Pelio (Ex. 1005)

Pelio is a U.S. Patent Application entitled “Power Generation Data Center,” published on December 29, 2011. Ex. 1005, at codes (43), (54). Petitioner asserts that Pelio is prior art under 35 U.S.C. § 102(a)(1). Pet. 17.

Pelio discloses data centers located at a power generation source in a manner “such that the power does not have to be stepped-up to transmission level and then stepped-down to distribution and end-users.” Ex. 1005 ¶¶ 2, 19. Pelio avoids the use of step-up transformers and step-down transformers employed by typical electrical power producers because each stepping up and stepping down of voltages with transformers and transmitting electrical power long distances leads to power losses due to heating. *Id.* ¶¶ 38–39. Instead of the typical electrical power system, Pelio uses a flexible, just-in-time, modular data center 200, as shown in Figure 2 reproduced below. *Id.* ¶ 48.

Fig. 2

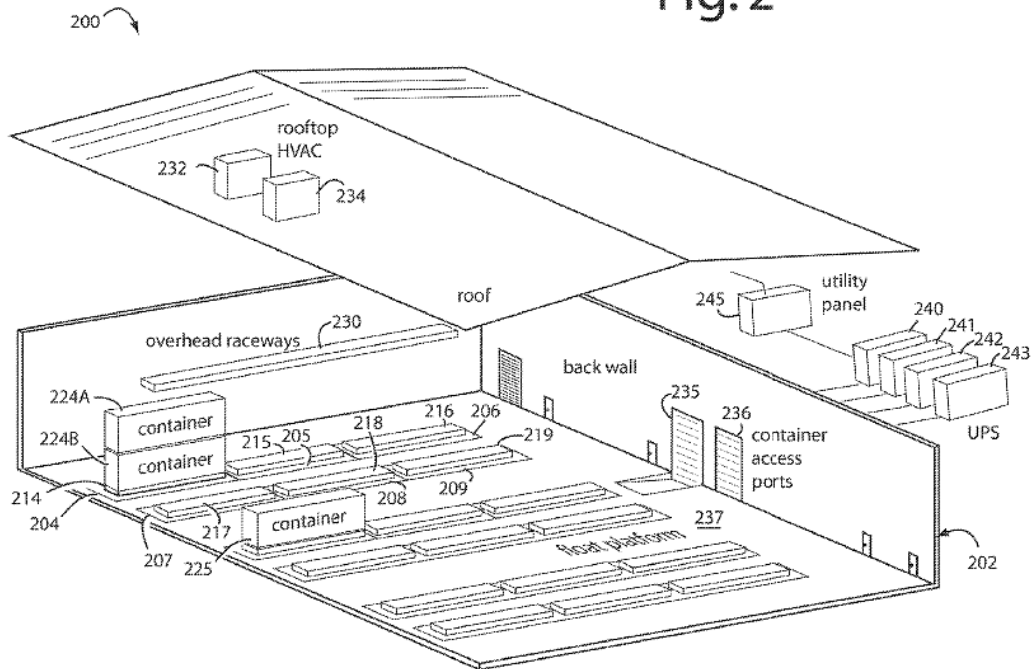


Figure 2 from Pelio depicts a flexible, just-in-time, modular data center showing containers placed on various designated floor spaces and supported by a modular infrastructure. Ex. 1005 ¶ 24.

Pelio's modular data center 200, as depicted in Figure 2 above, includes common building shell 202 that is partitioned into floor spaces 204–209 and supports critical loads, as well as electro-mechanical adapters 214–219 for the floor spaces to allow for modular containerized data centers 224A, 224B, and 225 as critical loads. Ex. 1005 ¶¶ 48–49. In Pelio's flexible modular data center, the containers are smaller than the typically large, open rooms of traditional data centers. *Id.* ¶¶ 55–56. This allows cooling to be localized, thus reducing the size of the cooling units needed as compared to the larger rooms of traditional data centers, which necessitated cooling air to flow relatively long distances to cool the servers and then be exhausted from the large rooms. *Id.*

2. Chapel (Ex. 1006)

Chapel is a U.S. Patent Application entitled “Smart Electrical Outlets and Associated Networks,” published on June 10, 2010, and claims priority to a provisional application filed on March 14, 2007. Ex. 1006, at codes (43), (54), (60). Petitioner contends that Chapel is prior art under 35 U.S.C. § 102(a)(1). Pet. 17.

Chapel discloses intelligent local circuit devices, or intelligent outlets, that control power delivered to an electrical device via a circuit. Ex. 1006 ¶¶ 47–48. An intelligent outlet includes standard receptacles, which receive standard electrical plugs and establish electrical connections between standard electrical plugs and wiring. *Id.* ¶ 48. Chapel discloses that these receptacles in the intelligent outlets also include a controller that monitors loading with respect to each receptacle, and controls delivery of power to the receptacles in order to alleviate safety concerns, enhance efficiency of power distribution, and address potential or actual over capacity conditions of a power grid. *Id.*

3. Yang (Ex. 1007)

Yang is an article entitled “ZCCloud: Exploring Wasted Green Power for High-Performance Computing,” which bears a legend of the “2016 IEEE International Parallel and Distributed Processing Symposium.” Ex. 1007. Petitioner contends that Yang was published in May 2016 and publicly accessible “well before the earliest priority date of the ’456 patent.” Pet. 15 (citing Exs. 1007, 1021; Ex. 1003 ¶¶ 194–195). Petitioner contends Yang is prior art under 35 U.S.C. § 102(a)(1). *Id.* at 17.

Yang discloses a Zero-carbon Cloud (ZCCloud) system to expand traditional supercomputers with volatile computing resources that are

powered exclusively by wasted power generated from intermittent renewable sources. Ex. 1007, 1. ZCCloud computing resources are co-located with renewable generators and deployed incrementally in units of containers, allowing for lower building costs, free-cooling to lower cooling costs, and easy scaling. *Id.* ZCCloud resources are activated only when “wasted” renewable power, stranded power, is available, and is shutdown whenever there is insufficient power, resulting in their power consumption not competing with normal grid loads. *Id.*

4. *Belady (Ex. 1008)*

Belady is a U.S. Patent entitled “Data Center System that Accommodates Episodic Computation,” and was issued on September 30, 2014. Ex. 1008, at codes (45), (54). Petitioner contends that Belady is prior art under 35 U.S.C. § 102(a)(2). Pet. 17.

Belady discloses a data center system that includes plural data centers powered by plural power sources. Ex. 1008, 2:6–7. Each data center includes computational resources, cooling equipment, and networking coupling equipment. *Id.* at 5:46–6:22. The data centers receive power from plural power sources, some of which correspond to renewable power sources, which can eliminate some of the infrastructure associated with conventional power distribution infrastructure. *Id.* at 6:43–7:4. For example, the use of power transformation equipment can be eliminated or reduced, which reduces associated power losses and transmission limits. *Id.* at 7:1–9.

5. *Rasmussen (Ex. 1010)*

Rasmussen is a Schneider Electric White Paper entitled “Impact of Leading Power Factor on Data Center Generator Systems.” Ex. 1010.

Petitioner contends that Rasmussen was published in 2014 and was publicly accessible on Schneider Electric’s support website “as of at least December 22, 2014.” Pet. 16 (citing Exs. 1010, 1022–1026; Ex. 1003 ¶¶ 371–372). Petitioner contends Rasmussen is prior art under 35 U.S.C. § 102(a)(2). *Id.* at 17.

Rasmussen discloses a solution for the impact on generators from out-of-phase reactive currents that are present in power factor corrected power supplies. Ex. 1010, 4. Rasmussen discloses actions to correct a currently unstable condition for a data center or to ensure that the data center does not enter a future unstable condition. *Id.* at 14–17. These mitigating and preventative actions include removing load from the generator, installing an inductive load bank, installing an electronic power factor correction system, identifying the worst offending IT devices and replacing them, selecting IT equipment vendors based on power supply capacitance, avoiding using very large quantities of small servers, designing for increased power supply utilization, and not allowing two power paths on one generator. *Id.*

6. *Corhodzic (Ex. 1011)*

Corhodzic is a U.S. Patent entitled “Direct-Coupled IT Load,” and was issued on December 20, 2011. Ex. 1011, at codes (45), (54). Petitioner contends that Corhodzic is prior art under 35 U.S.C. § 102(a)(2). Pet. 17.

Corhodzic discloses a technique to efficiently deliver uninterruptible power to scalable, modular data-processing equipment. Ex. 1011, 1:6–8. Corhodzic discloses a data center with various loads to which power proceeds without any substantial conditioning, unlike in general data center systems. *Id.* at 5:58, 6:1–5. Each load may include a small group of electronic equipment and be provided with a local uninterruptible power

supply (UPS) in order to provide distributed UPS functionality. *Id.* at 6:9–13.

E. Asserted Obviousness

1. Ground 1: Obviousness of Claims 1–4, 14, 17, 18, 20, 25, and 27 over the Combination of Pelio and Chapel

Petitioner contends that claims 1–4, 14, 17, 18, 20, 25, and 27 are unpatentable under 35 U.S.C. § 103 over the combined teachings of Pelio and Chapel. Pet. 17–54. Patent Owner has not submitted a preliminary response and, therefore, does not challenge Petitioner’s showing at this stage.

For the reasons explained herein, we are persuaded that Petitioner has established a reasonable likelihood of establishing unpatentability of at least one of these claims on this basis.

a. Motivation To Combine Pelio and Chapel

As a precursor to its obviousness analysis, Petitioner articulates reasons why the ordinarily skilled artisan would have combined the teachings of Pelio and Chapel in the manner proposed by Petitioner. Pet. 20–25. Petitioner contends: (1) Pelio and Chapel are both analogous art, “pertaining to the same field of endeavor as the ’456 patent, power delivery to computers in a datacenter” (*id.* at 20–22 (citing Ex. 1001, 19:5–20:46; Ex. 1005, Abs., ¶¶ 2, 37, 57, 106; Ex. 1006 ¶¶ 2, 19, 56, 79, 90; Ex. 1003 ¶¶ 55–56)); (2) Pelio teaches containers receiving BTM power, and distributing power to servers within a container via power feeds, but “leaves the power distribution details up to” the ordinarily skilled artisan, who would have been motivated to turn to Chapel, which describes a datacenter including a “power distribution unit” associated with one or more power

sources, wherein such power distribution units were “a well-known aspect of datacenter design” (*id.* at 22–23 (citing Ex. 1005 ¶¶ 2, 19, 51, 79, 99; Ex. 1006 ¶¶ 27, 82; Ex. 1007, 1, 4; Ex. 1013, 7; Ex. 1015, 3, 4; Ex. 1003 ¶¶ 61–62)); (4) “Pelio recognizes the variability of renewable sources resulting in times where there is insufficient power for computing operations,” and Chapel addresses that problem by teaching “monitoring and controlling power delivery to manage electrical power distribution within a datacenter based on the available power supply” (*id.* at 23 (citing Ex. 1005 ¶¶ 2, 37, 70, 106; Ex. 1006 ¶¶ 2, 47, 80–83, 90; Ex. 1003 ¶¶ 63–64)); (5) the ordinarily skilled artisan would have had a reasonable expectation of success in combining the teachings of Pelio and Chapel because their teachings are “compatible” and combining them “would have been predictable” and within the skillset of the ordinarily skilled artisan as it was “already known” in the art to collocate datacenters with “renewable generators” and to control a datacenter’s load “in response to a renewable source’s varying power supply” (*id.* at 24–25 (citing Ex. 1005, Abs., ¶¶ 2, 33, 37, 50, 106; Ex. 1006 ¶¶ 2, 47, 80–83; Ex. 1007, 1, 4; Ex. 1013, 7; Ex. 1014, 6; Ex. 1015, 3, 4; Ex. 1016, 2; Ex. 1003 ¶ 65)); and (6) the Pelio-Chapel combination “would predictably result in Pelio’s datacenter containers including Chapel’s teachings for controlling power delivered to servers,” which “would advantageously enable Pelio’s datacenters to better follow the power supply and avoid grid electricity costs when the renewable supply cyclically dwindles,” thus combining “known elements” according to “known methods” to achieve “predictable results” (*id.* at 25 (citing Ex. 1005, Abs., ¶¶ 2, 33, 37, 50, 106; Ex. 1006 ¶¶ 2, 47, 80–83; Ex. 1003 ¶¶ 68–69)).

b. Claim 1

(1) “[1.0] A flexible datacenter comprising”

Petitioner presents evidence that Pelio teaches a “flexible datacenter” by disclosing datacenter containers (e.g., containers 224A, 224B, and 225 in Fig. 2), as well as modular datacenters that each house one or more datacenter containers (e.g., datacenter 200 housing containers 224A, 224B, and 225 in Fig. 2). Pet. 26–28 (citing Ex. 1005, Fig. 2, ¶¶ 24, 48–50, 55, 66–68, 70, 71, 89, 95, 97). In particular, Petitioner cites disclosure in Pelio that the datacenter containers are mobile and home to thousands of servers each (*id.* at 26 (citing Ex. 1005 ¶¶ 50, 66, 70, 71)) and using such containers facilitates “flexible, just-in-time modular data centers” (*id.* (citing Ex. 1005 ¶¶ 95, 97, Fig. 4) (emphasis omitted)).

We have reviewed the arguments and evidence submitted by Petitioner. At this stage, and on this record, we determine that Petitioner has shown sufficiently for institution that the prior art teaches or suggests a flexible datacenter, as recited in claim 1.¹⁰

(2) “[1.1] a behind-the-meter (BTM) power input system, wherein the BTM power input system is configured to receive power from a power generation station prior to the power undergoing step-up transformation for transmission to a power grid”

Petitioner presents evidence that Pelio teaches “a behind-the-meter (BTM) power input system, wherein the BTM power input system is configured to receive power from a power generation station prior to the

¹⁰ Petitioner does not take a position on whether the preambles to the claims are limiting. At this stage, for purposes of this Decision, we accept Petitioner’s showing that the preambles are taught or suggested by the prior art, without deciding whether the preambles are limiting.

power undergoing step-up transformation for transmission to a power grid,” as recited in claim 1. Pet. 28–32. Petitioner relies on Pelio’s disclosure that the modular datacenters / containers “receive power ‘*behind-the-meter*’ with ‘data centers located at a power generation source and connected to be powered . . . at a point before the voltages are stepped up through transformers to the transmission and distribution utility grids.’” *Id.* at 28 (citing Ex. 1005 ¶ 2) (bold and underlined emphasis omitted). According to Petitioner, because power is provided directly to Pelio’s datacenter where it “does not have to be stepped-up to the transmission level,” this avoids power losses. *Id.* at 28–29 (citing Ex. 1005 ¶¶ 19, 39).

Petitioner also presents evidence of Pelio’s disclosure that “the power input to each datacenter container within the modular datacenter is also ‘*behind-the-meter*,’ since the containers receive power via ‘modular power supply systems 240-[2]43’ from the behind-the-meter power input to the modular datacenter.” *Id.* at 29 (citing Ex. 1005 ¶ 51).

Petitioner also presents evidence that Pelio’s “modular power supply systems” 240–243 are “examples of a ‘*power input system*,’ as is the utility sub-panel 245 as depicted in Figure 2 of Pelio.” Pet. 29. Petitioner discusses Pelio’s disclosure of examples of BTM power generation stations, including a wind farm and a hydro-electric generating station. *Id.* at 30–32 (citing Ex. 1005, Figs. 1A–1C, ¶¶ 5, 44–47). Petitioner submits that “[c]ommon to each example is the datacenter taking its ‘power directly from the electrical generating units before any corresponding step-up transformer.’” *Id.* at 32 (citing Ex. 1005 ¶ 47 (emphasis omitted)).

We have reviewed the arguments and evidence submitted by Petitioner. At this stage, and on this record, we determine that Petitioner has

shown sufficiently for institution that the prior art teaches or suggests the subject matter of this limitation as recited in claim 1.

(3) “[1.2] a power distribution system”

Petitioner presents evidence that Pelio alone, and also combined with Chapel, teaches “a power distribution system” as recited in claim 1. Pet. 32–35. Petitioner refers to Pelio’s disclosure that “‘electrical power [is] consumed by the servers and data storage units,’ with up to ‘1,000 or more servers each’ per container.” *Id.* at 32 (citing Ex. 1005 ¶¶ 71, 75). Petitioner notes that Pelio “teaches distributing the power to servers in a container via one or both of ‘the “A-side” and “B-side” power feeds.’” *Id.* at 33 (citing Ex. 1005 ¶ 79). Relying on expert testimony, Petitioner contends that “[p]ower feeds are well-known to be ‘independent electrical feeds coming into a data center from the utility company’ with corresponding power distribution units (PDUs) container-wide and rack-specific.” *Id.* (citing Ex. 1003 ¶ 95; *see also* Ex. 1019, 1). Petitioner also contends that Pelio’s “modular datacenter itself includes a ‘power distribution system’ with its ‘raceway 440’ teaching, which ‘provides . . . electrical power connections to uninterruptible power supply (UPS) unit 442 and utility power.’” *Id.* at 33–34 (citing Ex. 1005 ¶ 99, Figs. 2, 4).

Petitioner additionally cites to Chapel’s disclosure, contending that “[i]t would have been obvious that the electrical power, input via the ‘modular power supply systems’ and utility sub-panel” in a system such as Pelio’s “would be distributed to each server in a container via a ‘*power distribution system*.’” *Id.* (citing Ex. 1006 ¶¶ 27, 82). Petitioner additionally contends that “Chapel confirms that a datacenter, like in Pelio, has a ‘*power*

distribution system’ (PDU) to distribute ‘*behind-the-meter*’ power.” *Id.* at 34 (citing Ex. 1006 ¶¶ 27, 82, Fig. 6).

We have reviewed the arguments and evidence submitted by Petitioner. At this stage, and on this record, we determine that Petitioner has shown sufficiently for institution that the prior art teaches or suggests the subject matter of this limitation as recited in claim 1.

(4) “[1.3] a plurality of computing systems”

Petitioner presents evidence that Pelio discloses “a plurality of computing systems” as recited in claim 1 by disclosing “that each datacenter container includes ‘network servers’ mounted in racks and rows, such as ‘1,000 or more servers each.’” Pet. 35 (citing Ex. 1005 ¶¶ 48, 71). Petitioner contends “[t]hese servers, and generally the datacenters, are ‘computing systems.’” *Id.* (citing Ex. 1005 ¶ 8).

We have reviewed the arguments and evidence submitted by Petitioner. At this stage, and on this record, we determine that Petitioner has shown sufficiently for institution that the prior art teaches or suggests the subject matter of this limitation as recited in claim 1.

(5) “[1.4] a datacenter control system configured to modulate power delivery to the plurality of computing systems based on an operational directive”

Petitioner presents evidence that Pelio in combination with Chapel teaches “a datacenter control system configured to modulate power delivery to the plurality of computing systems based on an operational directive,” as recited in claim 1. Pet. 35–39. Petitioner contends “Pelio focuses on the design of a modular datacenter and collocation with a generating station . . . , leaving details of how power can be controlled within a datacenter” up to an ordinarily skilled artisan, who “would have been motivated to turn to

Chapel, which teaches ways to control power in a datacenter to address potential shortfalls, such as those arising from variable sources of power including e.g., solar, wind, etc. (as Pelio taught).” *Id.* at 36.

With regard to collocating datacenters with generating stations, Petitioner cites Pelio’s disclosure that such collocation allows “a higher percentage of power produced” to actually reach the datacenter loads (Pet. 35 (citing Ex. 1005 ¶ 19)), and also cites Pelio’s disclosure of different types of power-generating sources, including renewable energy (e.g., wind and solar), which “naturally cycle between full operation and zero.” *Id.* at 35–36 (citing Ex. 1005 ¶¶ 5, 37). Petitioner further characterizes Pelio as teaching that “there are times when power is less available from renewables (if at all) than other times, and requires some action to account for that shortfall. Pelio’s solutions include drawing ‘inexpensive power’ from a grid, or stopping servers from operating while power is not available.” *Id.* at 36 (citing Ex. 1005 ¶¶ 37, 45, 105–106).

As noted, Petitioner turns to Chapel for teaching details of how to control power within a datacenter where the “available power supply (e.g., from a renewable station) falls below the power demand of Pelio’s datacenter.” *Id.* (citing Ex. 1006 ¶ 48). Petitioner argues “Chapel teaches controlling power in a datacenter by modulating power delivery to one or more servers to address such over capacity conditions.” *Id.* (citing Ex. 1003 ¶ 107). In particular, Petitioner contends Chapel discloses “electrical power distribution and management,” including “intelligently monitor[ing] at least a portion of the circuit and control[ling] delivery . . . over the circuit.” *Id.* at 36–37 (citing Ex. 1006 ¶ 2) (alterations in original). Petitioner also contends “Chapel’s teachings apply to ‘a data center’ with ‘data center equipment

control and power distribution systems.” *Id.* at 37. As support, Petitioner refers to Chapel’s teachings of “enabl[ing] ‘remote monitoring and/or control of multiple receptacles’ providing power to servers,” in which “‘local controller 34’ at the ‘customer premises’ communicates with the receptacles, and also ‘with a remote controller 308’ operated by an owner of the customer premises, a controller of the power gride, etc.” *Id.* (citing Ex. 1006 ¶ 56). To illustrate, Petitioner provides an annotated version of Figure 3 of Chapel, which is reproduced below, in which Petitioner reads the claimed “datacenter control system” onto Chapel’s local controller 304, and the claimed “datacenter” onto Chapel’s smart receptacle 302.

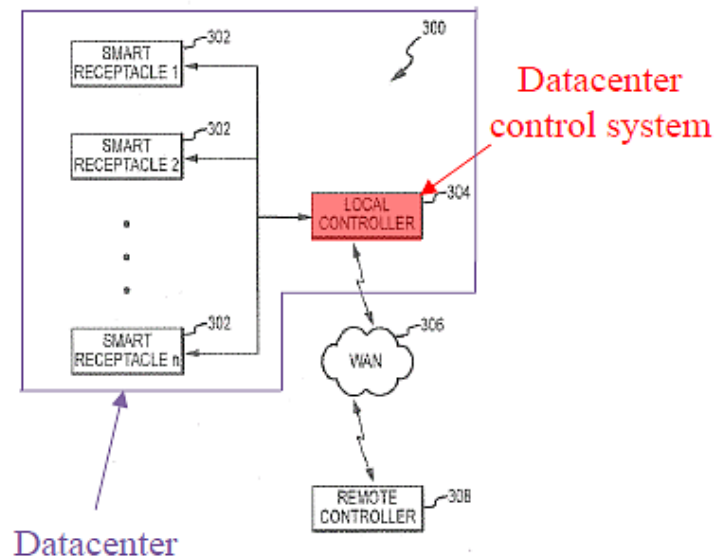


FIG.3

Figure 3 of Chapel, as annotated by Petitioner (Pet. 37), is a “schematic diagram of a smart outlet system implemented in a wide area network.” Ex. 1006 ¶ 39.

With reference to Figure 3, Petitioner contends Chapel’s “local controller” discloses a “datacenter control system” because “it is a control system at the datacenter.” Pet. 37 (citing Ex. 1006 ¶ 56). Petitioner reasons

that “the local controller ‘control[s] delivery of power to the electrical device,’ which includes turning off devices or operating the devices in reduced power mode – e.g., by interrupting power distribution.” *Id.* at 37–38 (citing Ex. 1006 ¶¶ 18, 25–26; Ex. 1003 ¶¶ 108–109) (alteration in original).

Petitioner also points to Figure 6 of Chapel, which Petitioner contends “illustrates ‘control in a data center environment,’ with servers plugged into controllable receptacles.” *Id.* at 38 (citing Ex. 1006 ¶ 90, Fig. 6). Figure 6 of Chapel, as annotated by Petitioner, is reproduced below.

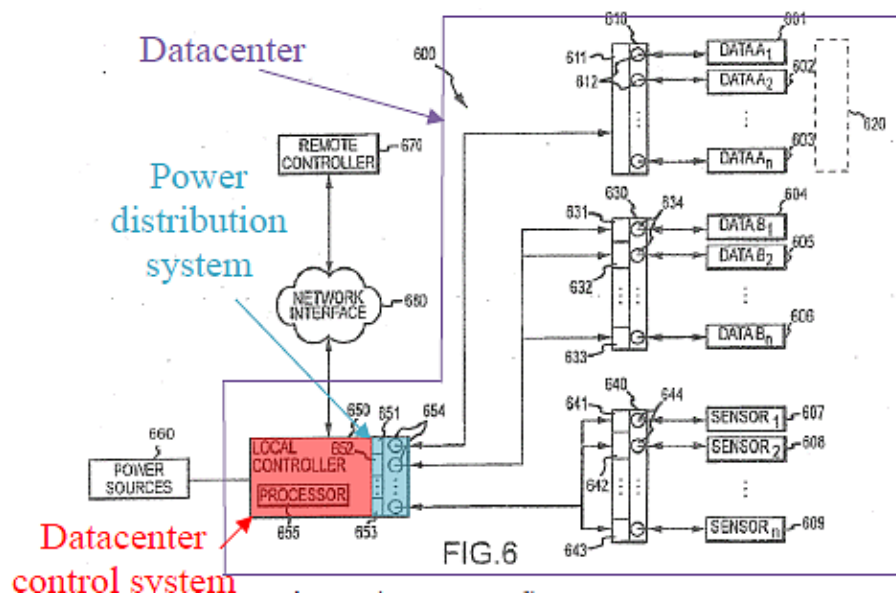


Figure 6 of Chapel, as annotated by Petitioner (Pet. 38), “illustrates a smart outlet system in accordance with the present invention implemented in a data center context.” Ex. 1006 ¶ 42.

Petitioner reads the claimed “datacenter control system” onto Chapel’s “local controller 650,” which communicates with the receptacles and with remote controller 670. Pet. 38 (citing Ex. 1006 ¶ 82). Petitioner contends Chapel’s “local and remote controllers collectively provide ‘remote and/or policy based operation’ of the servers.” *Id.* (citing Ex. 1006 ¶ 83).

By way of an example, Petitioner notes Chapel's disclosure that "'an operator of a remote controller unit may choose to power down or power up a set of devices,' so the remote controller transmits a message to the local controller to implement the requested action." *Id.* (citing Ex. 1006 ¶ 90, Fig. 6).

Petitioner also argues that Chapel teaches the local controller ("datacenter control system") "modulating power delivery via policies, including those from a remote controller, like 'a message from the electrical utility provider specifying transition to an efficiency mode or a brownout mode.'" *Id.* at 38–39 (citing Ex. 1006 ¶¶ 58, 66, 76, 90). According to Petitioner, with reference to expert testimony, "[s]uch 'messages' and policies communicated from remote controller(s) render obvious the claimed modulation of the power delivery 'based on an operational directive.'" *Id.* at 39 (citing Ex. 1003 ¶ 111).

Petitioner further contends, "[i]n combination, Pelio-Chapel teaches a 'local controller' (per Chapel) determining to control power delivery by interrupting power distribution from the power distribution system to one or more servers within Pelio's flexible datacenters, according to a message from a remote controller." *Id.* (citing Ex. 1006 ¶¶ 17, 25–26, 76). Relying in part on the testimony of Dr. Rosing, Petitioner reasons:

A POSITA would have understood that Pelio's flexible datacenters collocated with a generation station would have times when there would be a reduction in power output (e.g., solar or wind conditions changing), causing an overload condition unless power is received from the grid or load is reduced. A POSITA would have thus implemented Chapel's teachings for reducing delivery of power to one or more

datacenter servers to reduce load and avoid an overload condition.

Id. (citing Ex. 1003 ¶¶ 112–113).

We have reviewed the arguments and evidence submitted by Petitioner. At this stage, and on this record, we determine that Petitioner has shown sufficiently for institution that the prior art teaches or suggests the subject matter of this limitation as recited in claim 1.

(6) Claim 1: Conclusion

We find, on the present record, Petitioner has presented arguments and evidence sufficient for institution that the combination of Pelio and Chapel teaches or suggests all elements of claim 1. We also find Petitioner has shown sufficiently for institution that the ordinarily skilled artisan would have been motivated to combine the teachings of these references with a reasonable expectation of success.

For the foregoing reasons, based on the current record, we determine Petitioner has established a reasonable likelihood of prevailing in showing that claim 1 is unpatentable over the combination of Pelio and Chapel.

c. Claims 2–4, 14, 17, 18, 20, 25, and 27

Petitioner also presents evidence and argument supporting its contention that claims 2–4, 14, 17, 18, and 20, which depend directly or indirectly from claim 1, would have been obvious over the combined teachings of Pelio and Chapel. Pet. 39–48. Petitioner also presents evidence and argument that independent claim 25 and claim 27, which depends from claim 25, would have been obvious over the combined teachings of Pelio and Chapel. *Id.* at 48–55.

In particular, Petitioner presents evidence that the combination of Pelio and Chapel teaches the subject matter of (1) claim 2 (Pet. 39–41 (citing Ex. 1006 ¶¶ 27, 56, 8, 66, 76, 78–80, 82–83, Figs. 3, 6; Ex. 1003 ¶¶ 114–122)); (2) claim 3 (*id.* at 41–42 (citing Ex. 1006 ¶¶ 4, 26, 27, 28, 56, 79–83, 88, 90, Fig. 6; Ex. 1005 ¶¶ 5, 19, 33, 37; Ex. 1003 ¶¶ 123–129)); (3) claim 4 (*id.* at 42–44 (citing Ex. 1005, Abs., ¶¶ 24, 48, 49; Ex. 1006 ¶¶ 27, 56, 76, 83, Figs. 3, 6; Ex. 1003 ¶¶ 130–135)); (4) claim 14 (*id.* at 44–45 (citing Ex. 1005 ¶¶ 2, 19; Ex. 1006 ¶¶ 4, 25, 26, 47, 56, 68, 83; Ex. 1003 ¶¶ 139–141)); (5) claim 17 (*id.* at 45–46 (citing Ex. 1006 ¶¶ 18, 25, 26, 80–83, 90; Ex. 1003 ¶¶ 142–147)); (6) claim 18 (*id.* at 46–47 (citing Ex. 1006 ¶¶ 56, 80–82, 90; Ex. 1008, 8:15–20; Ex. 1003 ¶¶ 148–153)); (7) claim 20 (*id.* at 47–48 (citing Ex. 1006 ¶ 56, Figs. 3, 6; Ex. 1003 ¶¶ 154–157)); (8) claim 25 (*id.* at 48–54 (referring to showing for claim 1 and also citing Ex. 1005, Abs., Figs. 2, 4, ¶¶ 24, 48, 49, 79, 97, 99; Ex. 1006 ¶¶ 18, 25, 27, 56, 77, 79, 80, 82, 83; Ex. 1019, 1; Ex. 1003 ¶¶ 158–184)); and (9) claim 27 (*id.* at 54–55 (citing Ex. 1006 ¶¶ 4, 47, 56, 83, Fig. 6; Ex. 1003 ¶¶ 185–193)).

As this stage of the proceeding, Patent Owner has not submitted a preliminary response and, therefore, does not challenge Petitioner’s arguments or evidence as to these claims.

We have reviewed Petitioner’s evidence and arguments and we determine, at this stage and on this record, that they are sufficient to show a reasonable likelihood that claims 2–4, 14, 17, 18, 20, 25, and 27 would have been obvious over the combination of Pelio and Chapel.

2. Additional Grounds

Petitioner additionally challenges several claims as obvious over the same primary combination (Pelio and Chapel) in further combination with

one of Yang, Belady, Rasmussen, and Corhodzic. Pet. 55–95. In particular, Petitioner challenges claims 5–8, 10, 12, and 28–30 as obvious over the combination of Pelio, Chapel, and Yang (*id.* at 55–72); claims 19, 21–24, and 26 over the combination of Pelio, Chapel, and Belady (*id.* at 72–87); claim 9 over the combination of Pelio, Chapel, and Rasmussen (*id.* at 87–91); and claims 15 and 16 over the combination of Pelio, Chapel, and Corhodzic (*id.* at 91–95).

At this stage of the proceeding, it is not necessary for us to provide a detailed assessment of the additional grounds. A decision to institute under 35 U.S.C. § 314 may not institute review on fewer than all claims challenged in a petition. *SAS Inst., Inc. v. Iancu*, 584 U.S. 357, 364–65 (2018).

Moreover, when we institute a trial, we must institute on all challenges raised in the petition. *PGS Geophysical AS v. Iancu*, 891 F.3d 1354, 1360 (Fed. Cir. 2018) (noting that a decision to institute is “a simple yes-or-no institution choice respecting a petition, embracing all challenges included in the petition”). In light of our above-described determination that Petitioner has met its burden under 35 U.S.C. § 314(a) as to its challenge as to claims 1–4, 14, 17, 18, 20, 25, and 27 over the combination of Pelio and Chapel, we also determine that it is appropriate to institute *inter partes* review based on Petitioner’s other asserted grounds.

III. CONCLUSION

For the foregoing reasons, we determine Petitioner has established a reasonable likelihood of prevailing in showing that one or more claims are unpatentable over the cited prior art.

IV. ORDER

For the reasons given, it is:

ORDERED that, pursuant to 35 U.S.C. § 314(a), an *inter partes* review is *instituted* on all challenged claims with respect to all grounds set forth in the Petition; and

FURTHER ORDERED that, pursuant to 35 U.S.C. § 314(a), *inter partes* review of the '456 patent is instituted commencing on the entry date of this Order, and pursuant to 35 U.S.C. § 314(c) and 37 C.F.R. § 42.4, notice is given of the institution of a trial.

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