UNITED STATES INTERNATIONAL TRADE COMMISSION

Washington, D.C.

In the Matter of **CERTAIN SMART THERMOSTAT SYSTEMS, SMART HVAC SYSTEMS, SMART HVAC CONTROL SYSTEMS, AND COMPONENTS THEREOF**	**Inv. No. 337-TA-1258**

ORDER NO. 18: CONSTRUING THE TERMS OF THE ASSERTED CLAIMS OF THE PATENTS AT ISSUE

(September 1, 2021)

GOOGLE EXHIBIT 1034

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I. INTRODUCTION

This Investigation was instituted by the Commission on December 29, 2020 to determine whether there is a violation of subsection (a)(1)(B) of section 337 in the importation into the United States, the sale for importation, or the sale within the United States after importation of smart thermostat systems, smart HVAC systems, smart HVAC control systems, and components thereof by reason of infringement of one or more of: claims 1, 2, 5, and 7 of U.S. Patent No. 8,423,322 ("the 322 patent"); claims 1, 2, 5, 7, 15, 16, 19, and 20 of U.S. Patent No. 8,019,567 ("the 567 patent"); claims 1-3 and 16-18 of U.S. Patent No. 10,612,983 ("the 983 patent"); claims 1, 5-7, 9, 13-15, and 17 of U.S. Patent No. 8,596,550 ("the 550 patent"); and claims 1, 2, 5, 7-10, and 13-15 of U.S. Patent No. 8,886,488 ("the 488 patent"). *See* 86 Fed. Reg. 17403 (April 2, 2021). The Complainant is EcoFactor, Inc. ("EcoFactor"). The Respondents are Carrier Global Corporation ("Carrier"); ecobee Ltd. and ecobee Inc. (collectively, "ecobee"); and Google LLC ("Google") (collectively, "Respondents").

EcoFactor recently dismissed the 322 Patent. Order No. 16 (August 5, 2021). The Commission did not review the Initial Determination. EDIS Doc. No. 749920.

No *Markman* hearing was held; however, the parties filed joint proposed claim construction charts setting forth a limited set of terms to be construed, and also filed initial and reply claim construction briefs wherein each party offered its construction for the claim terms in dispute.[1]

[1] For convenience, the briefs and amended chart submitted by the parties are referred to as:

CIMB	Complainant's Initial *Markman* Brief
CRMB	Complainant's Reply *Markman* Brief
RIMB	Respondents' Initial *Markman* Brief
RRMB	Respondents' Reply *Markman* Brief
JC	Joint Claim Construction Chart

II. IN GENERAL

The claim terms addressed below are construed for the purposes of this Investigation, and those terms not in dispute need not be construed. *See Vanderlande Indus. Nederland BV v. Int'l Trade Comm'n*, 366 F.3d 1311, 1323 (Fed. Cir. 2004) (noting that the administrative law judge need only construe disputed claim terms). The meaning of claim terms not presently disputed will be addressed in connection with the evidentiary hearing.

III. RELEVANT LAW

"An infringement analysis entails two steps. The first step is determining the meaning and scope of the patent claims asserted to be infringed. The second step is comparing the properly construed claims to the device accused of infringing." *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 976 (Fed. Cir. 1995) (*en banc*) (internal citations omitted), *aff'd*, 517 U.S. 370 (1996). Claim construction is a "matter of law exclusively for the court." *Id.* at 970-71. "The construction of claims is simply a way of elaborating the normally terse claim language in order to understand and explain, but not to change, the scope of the claims." *Embrex, Inc. v. Serv. Eng'g Corp.*, 216 F.3d 1343, 1347 (Fed. Cir. 2000).

Claim construction focuses on the intrinsic evidence, which consists of the claims themselves, the specification, and the prosecution history. *See Phillips v. AWH Corp.*, 415 F.3d 1303, 1314 (Fed. Cir. 2005) (*en banc*); *see also Markman*, 52 F.3d at 979. As the Federal Circuit in *Phillips* explained, courts must analyze each of these components to determine the "ordinary and customary meaning of a claim term" as understood by a person of ordinary skill in art at the time of the invention. 415 F.3d at 1313. "Such intrinsic evidence is the most significant source of the legally operative meaning of disputed claim language." *Bell Atl. Network Servs., Inc. v. Covad Commc'ns Grp., Inc.*, 262 F.3d 1258, 1267 (Fed. Cir. 2001).

"It is a 'bedrock principle' of patent law that 'the claims of a patent define the invention to which the patentee is entitled the right to exclude.'" *Phillips*, 415 F.3d at 1312 (quoting *Innova/Pure Water, Inc. v. Safari Water Filtration Sys., Inc.*, 381 F.3d 1111, 1115 (Fed. Cir. 2004)). "Quite apart from the written description and the prosecution history, the claims themselves provide substantial guidance as to the meaning of particular claims terms." *Id.* at 1314; *see also Interactive Gift Express, Inc. v. Compuserve Inc.*, 256 F.3d 1323, 1331 (Fed. Cir. 2001) ("In construing claims, the analytical focus must begin and remain centered on the language of the claims themselves, for it is that language that the patentee chose to use to 'particularly point [ ] out and distinctly claim [ ] the subject matter which the patentee regards as his invention."). The context in which a term is used in an asserted claim can be "highly instructive." *Phillips*, 415 F.3d at 1314. Additionally, other claims in the same patent, asserted or unasserted, may also provide guidance as to the meaning of a claim term. *Id*. "Courts do not rewrite claims; instead, we give effect to the terms chosen by the patentee." *K-2 Corp. v. Salomon S.A.*, 191 F.3d 1356, 1364 (Fed. Cir. 1999).

The specification "is always highly relevant to the claim construction analysis. Usually it is dispositive; it is the single best guide to the meaning of a disputed term." *K-2 Corp.,* 191 F.3d at 1315 (quoting *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996)). "[T]he specification may reveal a special definition given to a claim term by the patentee that differs from the meaning it would otherwise possess. In such cases, the inventor's lexicography governs." 191 F.3d at 1316. "In other cases, the specification may reveal an intentional disclaimer, or disavowal, of claim scope by the inventor." *Id.* As a general rule, however, the particular examples or embodiments discussed in the specification are not to be read into the claims as limitations. *Id.* at 1323. In the end, "[t]he construction that stays true to the claim language and most naturally aligns

with the patent's description of the invention will be ... the correct construction." *Id.* at 1316 (quoting *Renishaw PLC v. Marposs Societa' per Azioni*, 158 F.3d 1243, 1250 (Fed. Cir. 1998)).

In addition to the claims and the specification, the prosecution history should be examined, if in evidence. *Id.* at 1317; *see Liebel-Flarsheim Co. v. Medrad, Inc.*, 358 F.3d 898, 913 (Fed. Cir. 2004). The prosecution history can "often inform the meaning of the claim language by demonstrating how the inventor understood the invention and whether the inventor limited the invention in the course of prosecution, making the claim scope narrower than it would otherwise be." *Phillips*, 415 F.3d at 1317; *see Chimie v. PPG Indus. Inc.*, 402 F.3d 1371, 1384 (Fed. Cir. 2005) ("The purpose of consulting the prosecution history in construing a claim is to exclude any interpretation that was disclaimed during prosecution.").

When the intrinsic evidence does not establish the meaning of a claim, then extrinsic evidence (*i.e.*, all evidence external to the patent and the prosecution history, including dictionaries, inventor testimony, expert testimony, and learned treatises) may be considered. *Phillips*, 415 F.3d at 1317. Extrinsic evidence is generally viewed as less reliable than the patent itself and its prosecution history in determining how to define claim terms. *Id*. "The court may receive extrinsic evidence to educate itself about the invention and the relevant technology, but the court may not use extrinsic evidence to arrive at a claim construction that is clearly at odds with the construction mandated by the intrinsic evidence." *Elkay Mfg. Co. v. Ebco Mfg. Co.*, 192 F.3d 973, 977 (Fed. Cir. 1999).

If, after a review of the intrinsic and extrinsic evidence, a claim term remains ambiguous, the claim should be construed so as to maintain its validity. *Phillips*, 415 F.3d at 1327. Claims, however, cannot be judicially rewritten in order to fulfill the axiom of preserving their validity. *See Rhine v. Casio, Inc.*, 183 F.3d 1342, 1345 (Fed. Cir. 1999). Thus, "if the only claim construction

that is consistent with the claim's language and the written description renders the claim invalid, then the axiom does not apply and the claim is simply invalid." *Id.*

The construction of a claim term is generally guided by its ordinary meaning. However, courts may deviate from the ordinary meaning when: (1) "the intrinsic evidence shows that the patentee distinguished that term from prior art on the basis of a particular embodiment, expressly disclaimed subject matter, or described a particular embodiment as important to the invention;" or (2) "the patentee acted as his own lexicographer and clearly set forth a definition of the disputed claim term in either the specification or prosecution history." *Edwards Lifesciences LLC v. Cook Inc.*, 582 F.3d 1322, 1329 (Fed. Cir. 2009); *see also GE Lighting Sols., LLC v. AgiLight, Inc.*, 750 F.3d 1304, 1309 (Fed. Cir. 2014) ("the specification and prosecution history only compel departure from the plain meaning in two instances: lexicography and disavowal."); *Omega Eng'g, Inc, v. Raytek Corp.*, 334 F.3d 1314, 1324 (Fed. Cir. 2003) ("[W]here the patentee has unequivocally disavowed a certain meaning to obtain his patent, the doctrine of prosecution disclaimer attaches and narrows the ordinary meaning of the claim congruent with the scope of the surrender."); *Rheox, Inc. v. Entact, Inc*., 276 F.3d 1319, 1325 (Fed. Cir. 2002) ("The prosecution history limits the interpretation of claim terms so as to exclude any interpretation that was disclaimed during prosecution."). Nevertheless, there is a "heavy presumption that a claim term carries its ordinary and customary meaning." *CCS Fitness, Inc. v. Brunswick Corp.*, 288 F.3d 1359, 1366 (Fed. Cir. 2002) (citations omitted). The standard for deviating from the plain and ordinary meaning is "exacting" and requires "a clear and unmistakable disclaimer." *Thorner v. Sony Computer Entm't Am. LLC*, 669 F.3d 1362, 1366-67 (Fed. Cir. 2012); *see Epistar Corp. v. Int'l Trade Comm'n*, 566 F.3d 1321, 1334 (Fed. Cir. 2009) (requiring "expressions of manifest exclusion or restriction, representing a clear disavowal of claim scope" to deviate from the ordinary meaning) (citation

omitted). As the Federal Circuit has explained, "[w]e do not read limitations from the specification into claims; we do not redefine words. Only the patentee can do that." *Thorner*, 669 F.3d at 1366.

A claim must also be definite. Pursuant to 35 U.S.C. § 112, second paragraph: "The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention." 35 U.S.C. § 112, ¶ 2. In *Nautilus, Inc. v. Biosig Instruments, Inc.*, 134 S. Ct. 2120 (2014), the Supreme Court held that § 112, ¶ 2 requires "that a patent's claims, viewed in light of the specification and prosecution history, inform those skilled in the art about the scope of the invention with reasonable certainty." *Id.* at 2129. A claim is required to "provide objective boundaries for those of skill in the art," and a claim term is indefinite if it "might mean several different things and no informed and confident choice is among the contending definitions." *Interval Licensing LLC v. AOL, Inc.*, 766 F.3d 1364, 1371 (Fed. Cir. 2014). A patent claim that is indefinite is invalid. 35 U.S.C. § 282(b)(3)(A).

Courts are not required to construe every claim limitation of an asserted patent. *See O2 Micro Intern. Ltd. v. Beyond Innovation Technology Co.*, 521 F.3d 1351, 1362 (Fed. Cir. 2008) (citations omitted). Rather, "claim construction is a matter of resolution of disputed meanings and technical scope, to clarify and when necessary to explain what the patentee covered by the claims, for use in the determination of infringement." *Id.* at 1362 (quoting *U.S. Surgical Corp. v. Ethicon, Inc.*, 103 F.3d 1554, 1568 (Fed. Cir. 1997)); *see also Embrex*, 216 F.3d at 1347 ("The construction of claims is simply a way of elaborating the normally terse claim language in order to understand and explain, but not to change, the scope of the claims.") (citation omitted). In addition, "[a] determination that a claim term 'needs no construction' or has the 'plain and ordinary meaning' may be inadequate when a term has more than one 'ordinary' meaning or when reliance on a term's 'ordinary' meaning does not resolve the parties' dispute." *O2 Micro*, 521 F.3d at 1361. Claim

construction, however, is not an "obligatory exercise in redundancy." *U.S. Surgical Corp.*, 103 F.3d at 1568. "[M]erely rephrasing or paraphrasing the plain language of a claim by substituting synonyms does not represent genuine claim construction." *C.R. Bard, Inc. v. U.S. Surgical Corp.*, 388 F.3d 858, 863 (Fed. Cir. 2004).

IV. LEVEL OF ORDINARY SKILL

EcoFactor asserts that a person of ordinary skill in the art at the time of the invention "would have had (a) a bachelor's degree in engineering, computer science, or a comparable field of study, and (b) at least 2 years of professional experience in temperature controls, embedded control systems, electronic thermostats, HVAC controls, building energy management and controls or other similarly relevant industry experience. Additional relevant industry experience may compensate for lack of formal education or vice versa." CIMB at 5. This assertion is supported by the opinion of one of Complainant's experts, Mr. Robert Zeidman. *See id.*, Zeidman Decl. ¶ 37.

Respondents assert that a person of ordinary skill in the art would have had "a (1) Bachelor's degree in engineering, computer science, or a comparable field of study, and (2) at least five years of (i) professional experience in building energy management and controls, or (ii) relevant industry experience. Additional relevant industry experience may compensate for lack of formal education or vice versa." RIMB at 8. This assertion is supported by the opinion of one of Respondents' experts, Dr. David M. Auslander. *See id.*, Ex. 6 ¶ 27.

The parties' experts' opinions regarding the educational background necessary for a skilled artisan are the same and are reasonable: a bachelor's degree in engineering, computer science or a comparable field of study. Their opinions regarding the professional experience vary slightly, with Mr. Zeidman requiring 2 years of in specific fields of experience, such as temperature controls, embedded control systems, electronic thermostats, or HVAC controls, or "building energy

management and controls," whereas Dr. Auslander requires 5 years of practical experience in the general area of "building energy management and controls."

Professional experience in a more specialized area, even if for a shorter time (as Complainant contends), seems more appropriate than a more general area of experience having no direct connection to the relevant technology, even if for a longer time (as Respondents contend). Therefore, a person of ordinary skill in the art at the time of the invention would have had a bachelor's degree in engineering, computer science, or a comparable field, with 2-3 years' experience in temperature controls, embedded control systems, electronic thermostats, or HVAC controls, or similarly relevant industry experience, with relevant experience substituting for education and vice versa.

V. THE ASSERTED PATENTS

The 567, 488, and 983 patents are in the same family and have substantially the same specification. The 983 patent ultimately is a continuation of the 567 patent, and all three of these patents claim priority to provisional application No. 60/994,011, which was filed on September 17, 2007.

The 567, 488, and 983 patents relate to the operation and operational efficiency of HVAC systems. The patents are directed to a system that evaluates the changes in the operational efficiency of existing HVAC technology using processor(s) that receives outside temperature measurements from a source other than the HVAC system, stores those measurements over time in a database, compares the inside temperature measurements and outside temperature measurements over time, and then compares an inside temperature of the structure with an inside temperature of that same structure recorded at a different time to "determine whether the operational efficiency of the HVAC system has decreased over time." 567 patent, cl. 1. The specifications teach an improvement to the

"standard programmable thermostat" that relies on "other sources of information that could be used to increase comfort, decrease energy use, or both." *Id.*, 1:66-67. Thus, a goal of these patents is to have "a thermostat system using only a single temperature sensor to take . . . suboptimal installations into account and to correct for the erroneous readings generated by such thermostats." *Id.* 2:41-44.

A. The 567 Patent

The 567 patent, entitled "System and Method For Evaluating Changes In The Efficiency Of An HVAC System," was filed on September 16, 2008 and issued on September 13, 2011. The 567 patent is assigned on its face to EcoFactor, Inc.

The 567 patent has 20 claims, of which claims 1, 2, 5, 7, 15, 16, 19, and 20 are asserted in various combinations against the various respondents. The asserted claims in which there are agreed upon and disputed terms read as follows, with the agreed terms in *italics* and the disputed terms highlighted in **bold.**

1. A system for evaluating changes in the **operational efficiency** of an **HVAC system** over time comprising:

at least one HVAC control system associated with a first structure that receives temperature measurements from at least a first structure conditioned by at least one **HVAC system**, and **receives status of said HVAC system**;

one or more processors that receive measurements of outside temperatures from at least one source other than said **HVAC system** and **compare said temperature measurements from said first structure**, wherein said one or more processors compares the inside temperature of said first structure and the outside temperature over time to derive an estimation for the *rate of change* in inside temperature of said first structure when said **HVAC system** is in a **first state of repair;** and

one or more databases that store at least said temperature measurements obtained from said first structure over time,

wherein said one or more processors *compares* an inside temperature recorded inside the first structure with said estimation for the *rate of change* in inside temperature of said first structure to determine whether the **operational efficiency** of the **HVAC system** has decreased over time; and

wherein if said **operational efficiency** has decreased, said one or more processors analyzes the changes in the **operational efficiency** over time to **suggest a cause of degradation**.

2. A system as in claim **1** in which said processors receive measurements of outside temperatures for geographic regions such as ZIP codes from sources other than said HVAC control systems.

5. A system as in claim **1** in which said **HVAC system** includes a programmable thermostat and said programmable thermostat is the sole source for current data regarding temperature inside said first structure conditioned by said **HVAC system**.

7. A system as in claim **1** in which the status of said **HVAC system** includes whether said system is "on" or "off'.

15. A method for evaluating changes in the **operational efficiency** of an **HVAC system** over time comprising:

storing temperature measurements from at least a first structure conditioned by an **HVAC system**; and

comparing with one or more processors said temperature measurements from said first structure with outside temperature measurements over time to derive **expected temperature measurements of a *rate of change* in inside temperature** of said first structure when the **HVAC system** is in a **first state of repair** wherein the expected temperature measurements are based at least in part upon past temperature measurements and based at least in part on outside temperature measurements,

wherein said one or more processors *compares* an inside temperature recorded inside the first structure with said expected temperature measurements to determine whether the **operational efficiency** of the **HVAC system** has decreased.

16. The method as in claim **15** wherein said outside temperature measurements are for geographic regions such as ZIP codes from sources other than said **HVAC system**.

19. The method as in claim **15** wherein a programmable thermostat associated with said **HVAC system** is the sole source for current data regarding temperature inside the first structure conditioned by said **HVAC system**.

20. The method as in claim **15** further comprising whether the status of said **HVAC system** is "on" or "off'.

B. The 983 Patent

The 983 patent was filed on April 3, 2019 and issued on April 7, 2020, and is entitled "System and Method For Evaluating Changes In The Efficiency Of An HVAC System." The 983 patent is assigned to EcoFactor, Inc.

The parties agree that the preamble of claim 1 is limiting. JC at 1. The 983 patent has 30 claims, of which claims 1-3 and 16-18 are asserted in various combinations against the various respondents. The asserted claims read as follows (with the agreed to terms in *italics* and disputed term highlighted in **bold**):

> **1.** A system for controlling an **HVAC system** at a user's building, the system comprising:
> a memory; and
> one or more processors; the one or more **processors configured to** receive a first data from at least one sensor, wherein the first data from the at least one sensor includes a measurement of at least one characteristic of the user's building;
> the one or more **processors further configured to** receive a second data from a network connection, wherein the second data from the network connection is collected from a source external to the building;
> the one or more **processors further configured to** receive a first temperature *setpoint* for the building, wherein the first *setpoint* includes a temperature value and a time value;
> the one or more **processors further configured to** predict, based at least on the first data from the sensor, the second data from the network connection, and the first temperature *setpoint*, the time necessary for the **HVAC system** to operate in order to reach the temperature value by the time value; and
> the one or more **processors further configured to** control the **HVAC system** to operate to cause the building to reach the temperature value by the time value.
>
> **2.** The system of claim **1,** wherein the first data from the at least one sensor comprises a measurement of the current temperature and humidity of the building by the sensor.
>
> **3.** The system of claim **2,** wherein the second data from the network connection comprises a measurement of the current outdoor temperature.
>
> **16.** The system of claim **1,** wherein the memory is further configured to store historical values of the first data and second data.

17. The system of claim **16,** wherein the one or more processors' prediction of the time necessary for the HVAC system at the user's building to operate in order to reach the temperature value by the time value is further based on analyzing the stored historical values of the first data and second data.

18. The system of claim **17,** wherein the one or more processors is further configured to calculate a **performance characteristic** of the HVAC system based at least on the historical values of the first data and second data.

C. The 488 Patent

The 488 patent, entitled "System and Method For Calculating The Thermal Mass of a Building," was filed on May 1, 2012 and issued on November 11, 2014. The 488 patent is assigned on its face to EcoFactor, Inc.

The 488 patent has 15 claims, of which claims 1, 2, 5, 7-10, and 13-15 are asserted in various combinations against the various respondents. The asserted claims in which there are agreed upon and disputed terms read as follows, with the agreed terms in *italics* and the disputed terms highlighted in **bold.**

1. A system for calculating a value for the **operational efficiency** of a **heating, ventilation and air conditioning (HVAC) system** comprising:

at least one HVAC control system that receives inside temperature measurements from at least a first location conditioned by at least one **HVAC system**;

one or more databases that store at least said temperatures measured at said first location over time;

one or more processors comprising computer hardware that is configured to receive outside temperature measurements from at least one source other than said **HVAC system**, wherein said one or more processors are configured to calculate one or more predicted *rates of change* in said inside temperature measurements at said first location **based on the status of the HVAC system** and *to relate said one or more predicted rates of change to said outside temperature measurements*; and

said one or more processors further configured to *compare* at least one predicted temperature based on the one or more predicted *rates of change*, with an actual inside temperature measurement.

2. The system as in claim **1** in which said processors receive outside temperatures for geographic regions based on ZIP codes from sources other than said **HVAC system**.

5. The system as in claim **1** further comprising a programmable thermostat and said programmable thermostat is a source for current data regarding temperature inside said location conditioned by said **HVAC system**.

7. The system as in claim **1** wherein said one or more predicted *rates of change* is the predicted speed with which the temperature inside a building will change in response to changes in outside temperatures.

8. The system as in claim **1** wherein said one or more processors calculate the one or more predicted *rates of change* for a given time on a given day.

9. A method for calculating a value for the **operational efficiency** of a **heating, ventilation and air conditioning (HVAC) system** that comprises:

receiving inside temperature measurements from at least a first location conditioned by at least one **HVAC system**;

storing in one or more databases at least said inside temperatures measured at said first location over time;

receiving outside temperature measurements from at least one source other than said **HVAC system**;

calculating with computer hardware comprising one or more computer processors one or more predicted *rates of change* in said inside temperatures at said first location **based on the status of the HVAC system**, where said predicted *rates of change* are related to said outside temperature measurements; and

comparing with the one or more processors, at least one predicted temperature based on the one or more predicted rates of change, with at least one actual inside temperature measurement.

10. The method as in claim **9** in which said outside temperatures are received for geographic regions based on ZIP codes from sources other than said **HVAC system**.

13. The method as in claim **9** in which said data regarding said inside temperatures at said location conditioned by said **HVAC system** is supplied by a programmable thermostat.

14. The method as in claim **9** wherein said one or more predicted *rates of change* is the predicted speed with which the temperature inside a building will change in response to changes in outside temperatures.

15. The method as in claim **9** wherein said one or more processors calculate the one or more predicted *rates of change* for a given time on a given day.

D. The 550 Patent

The 550 patent, entitled "System, Method, And Apparatus For Identifying Manual Inputs To And Adaptive Programming Of A Thermostat," was filed on May 11, 2010 and issued on December 3, 2013. The 550 patent is assigned to EcoFactor, Inc.

The 550 patent relates to systems and methods that incorporate "manual changes to the setpoint for a thermostatic controller into long-term programming of the thermostatic controller." 550 patent at Abstract. The Specification explains that when "temperatures programmed into a thermostat do not accurately reflect the preferences of the occupants, those occupants are likely to resort to manual overrides of the programmed settings." *Id.* 1:64–67. Thus, it would be "advantageous to . . . adapt[] to signaling from occupants in the form of manual temperature changes and incorporat[e] the information contained in such gestures into long-term programming." *Id.* at 2:9–12. Therefore, the 550 patent teaches a system that "compares the actual setpoint at a given time for the thermostatic controller to an expected setpoint for the thermostatic controller in light of the scheduled programming. A determination is then made as to whether the actual setpoint and the expected setpoint are the same or different. Furthermore, a manual change to the actual setpoint for the thermostatic controller is compared to previously recorded setpoint data for the thermostatic controller. At least one rule is then applied for the interpretation of the manual change in light of the previously recorded setpoint data." *Id.* at Abstract.

The 550 patent has 23 claims, of which claims 1, 5-7, 9, 13-15, and 17 are asserted in various combinations against the various respondents. The asserted claims in which there are agreed upon terms read as follows, with the agreed terms in *italics.* There are no disputed terms.

1. A method for detecting manual changes to the setpoint for a thermostatic controller comprising:

accessing stored data comprising a plurality of internal temperature measurements taken within a structure and a plurality of outside temperature measurements relating to temperatures outside the structure;

using the stored data to predict a *rate of change* of temperatures inside the structure in response to at least changes in outside temperatures;

calculating with one or more computer processors, scheduled programming of the thermostatic controller for one or more times based on the predicted *rate of change*, the scheduled programming comprising at least a first *automated setpoint* at a first time;

generating with one or more computer processors, a *difference value based on comparing an actual setpoint at the first time for said thermostatic controller* to the first *automated setpoint* for said thermostatic controller;

detecting a manual change to the first *automated setpoint* by determining whether said actual *setpoint* and said first *automated setpoint* are the same or different based on said difference value; and

logging said manual change to a database associated with the thermostatic controller.

5. A method as in claim **1** in which at least one remote processor is in communication with said thermostatic control device.

6. A method as in claim **5** in which said remote processor is not located in the same structure as said thermostatic controller.

7. A method as in claim **5** in which said remote processor sets programming for said thermostatic controller.

9. A method for incorporating manual changes to the *setpoint* for a thermostatic controller into long-term programming of said thermostatic controller comprising:

accessing stored data comprising a plurality of internal temperature measurements taken within a structure and a plurality of outside temperature measurements relating to temperatures outside the structure;

using the stored data to predict a *rate of change* of temperatures inside the structure in response to at least changes in outside temperatures;

calculating scheduled programming of *setpoints* in the thermostatic controller based on the predicted *rate of change*, the scheduled programming comprising at least a first *automated setpoint* at a first time and a second *automated setpoint* at a second time;

comparing the actual *setpoint* at the first time for said thermostatic controller to the first *automated setpoint* for said thermostatic controller;

detecting a manual change to the first *automated setpoint* by determining whether said actual *setpoint* and said first *automated setpoint* are the same or different;

changing the second *automated setpoint* at the second time based on at least one rule for the interpretation of said manual change.

13. A method as in claim **9** in which at least one remote processor is in communication with said thermostatic control device.

14. A method as in claim **13** in which said remote processor is not located in the same structure as said thermostatic controller.

15. A method as in claim **13** in which said remote processor sets programming for said thermostatic controller.

17. An apparatus for detecting manual changes to the set- point for a thermostatic controller comprising:

at least a programmable communicating thermostat;

at least a remote processor;

at least a network connecting said remote processor and said communicating;

at least a database comprising a plurality of internal temperature measurements taken within a structure and a plurality of outside temperature measurements relating to temperatures outside the structure;

computer hardware comprising one or more computer processors configured to use the stored data to predict a *rate of change* of temperatures inside the structure in response to changes in outside temperatures;

the one or more computer processors configured to calculate scheduled *setpoint* programming of the programmable communicating thermostat for one or more times based on the predicted *rate of change*, the scheduled programming comprising one or more *automated setpoints*;

at least a database that stores the one or more *automated setpoints* associated with the scheduled programming for said programmable communicating thermostat;

at least a database that stores actual *setpoint* programming of said programmable communicating thermostat; and

the one or more computer processors configured to *compare* the one or more *automated setpoints* associated with said scheduled *setpoint* programming with said actual *setpoint* programming.

VI. CLAIM CONSTRUCTION

A. Construction of the Agreed-Upon Claim Terms

The Parties reached agreement regarding the construction of certain terms in the patents. Because the patents are related, there is overlap of claim terms:

Claim Term	Presented in Asserted Claims	Agreed Construction
"compare" / "comparing"	567 Patent, claims 1, 15 488 Patent, claims 1, 9 550 Patent, claims 1, 9, 17	"analyze/analyzing to determine one or more similarities or differences between"
"rate of change in inside temperature" / "rate of change of temperatures inside the structure" / "rates of change in said inside temperature"	567 Patent, claims 1, 15 488 Patent, claims 1, 7, 8, 9, 14, 15 550 Patent, claims 1, 9, 17	"the difference between inside temperature measurements divided by the span of time between the measurements"
"to relate said one or more predicted rates of change to said outside temperature measurements"	488 Patent, claims 1, 10, 11, 12, 14	"to correlate said one or more predicted rates of change to said outside temperature measurements"
whether the preamble is limiting in claim 1 of the 983 patent	983 Patent, claim 1	Yes
"setpoint"	983 Patent, claim 1 550 Patent, claims 1, 9, 17	"a temperature setting for a thermostat to achieve or maintain"
"automated setpoint"	550 Patent, claims 1, 9, 17	"a computer-calculated temperature setting for a thermostat to achieve or maintain"
"difference value based on comparing actual setpoint at the first time for said thermostatic controller to the first automated setpoint for said thermostatic controller"	550 Patent, claim 1	"a value indicating the difference between at least one of the actual setpoints at the first time and the first automated setpoint for the thermostatic controller"

JC at 1.

These constructions are consistent with the plain and ordinary meaning of the terms. The preamble to claim 1 of the 983 patent provides antecedent basis for the term "HVAC system," so it is properly construed as limiting. Otherwise, the agreed-upon constructions are either synonymous with the claim language (as with "compare," "rate of change," "relate," and "difference value"), or are supported by the specification (as with "setpoint" and "automated setpoint"). *E.g.*, 983 patent

at 13:29-31 ("the server calculates the appropriate setpoint information to be used by the thermostat to maintain the desired temperature"). These agreed-upon constructions are therefore adopted.

B. Construction of the Disputed Claim Terms

As a preliminary matter, both parties cite to a previous investigation that involved related but different patents to the asserted patents here, and in which similar terms were construed: *In the Matter of Certain Smart Thermostats, Smart HVAC Systems, and Components Thereof*, Inv. No. 337-TA-1185, Final Initial Determination (April 20, 2021) ("*Smart Thermostats*"), *aff'd in pertinent part*, Comm'n Op., EDIS Doc. No. 747359 (July 20, 2021). While similar terms were construed in that investigation, they do not have preclusive effect because the patents and claims litigated in the prior action are not identical to those here. *Comair Rotron, Inc. v. Nippon Densan Corp.*, 49 F.3d 1535, 1539 (Fed. Cir. 1995) ("separate patents describe 'separate and distinct [inventions]' … and it cannot be presumed that related patents rise and fall together" for the purpose of collateral estoppel").

The disputed claim terms are summarized in the parties' Joint Claim Construction Chart. *See generally* JC. They are discussed individually below.

1. "operational efficiency of a heating, ventilation and air conditioning (HVAC) system" / "operational efficiency of an HVAC system"

Claims	EcoFactor's Proposed Construction	Respondents' Proposed Construction
567 patent [1, 15]; 488 patent [1,9]	"energy or time required by the HVAC system to change inside temperature by any given amount for a set of one or more indoor and outdoor conditions"	"energy required by the HVAC system to change inside temperature by a given amount over a given time for a set of indoor and outdoor conditions"

JC at 1.

EcoFactor states that there is only one point in dispute with respect to the first term – and that is "whether the scope of the claim term should be 'energy' alone or 'energy *or time.*'" CRMB

at 4 (emphasis in original). This has been the main issue regarding the term from the beginning, and the parties' positions remain mostly unchanged from initial to reply briefs. However, in its Reply Markman Brief, EcoFactor states that its revised proposed construction is not "broad enough to include 'time alone'" because it "limits operational efficiency to 'energy or time required by the HVAC system to change inside temperature by any given amount for a set of one or more indoor ***and*** outdoor conditions.'" CRMB at 3 (emphasis in original). EcoFactor's explanation makes little sense, however. The use of the term "or" in EcoFactor's proposal provides that either energy alone or time alone is measured, and the requirement that indoor and outdoor conditions are measured does not change the meaning of "or" in this term.

More to the point, the specification does not equate "time" by itself with efficiency. Instead, the specification defines the measure as a duration of time over which changes in efficiency are evaluated. 597 patent at 9:27-29 (". . . correlating the drop in efficiency and the time interval over which it has occurred."). In addition, the specification teaches that a longer cycle time might be indicative of lower operational efficiency due to clogged filter, refrigerant leak, etc., but this time lag, by itself, is not equated with a measure of efficiency. *Id.* at 3:33-35.

Of course, time is a factor in the term's construction, and under Respondents' proposed construction the energy of the HVAC system must be measured "over a given amount of time" in order to define the operational efficiency. RRMB at 9. This is exactly what the patents teach. For example, the 567 patent teaches that in diagnosing an HVAC's operational efficiency, the system records "the response of each house to changes in outside conditions and cycling behavior over time." 567 patent, 9:1-2. Thus, evaluation over time must be assessed or the energy required to change the inside temperature will not actually measure energy efficiency, but simply energy.

Therefore, the correct construction is "energy required by the HVAC system to change inside temperature by a given amount over a given time for a set of indoor and outdoor conditions."

2. "receives status of said HVAC system" / "based on the status of the HVAC system"

Claims	EcoFactor's Proposed Construction	Respondents' Proposed Construction
567 patent [1]; 488 patent [1, 9]	Plain and ordinary meaning; no construction necessary	to obtain a signal generated by the HVAC unit that contains its status

JC at 2.

Respondents submit that the claims at issue in the asserted patents recite using the status of the HVAC for a number of different calculations and evaluations of the system, and that the status must be "informed by the HVAC unit itself when it operates to heat or cool the structures . . [and any] 'status' not informed by the HVAC unit itself would only be an estimation of the status of the HVAC system." RIMB at 20-21. Respondents argue that performing "the recited operations using an estimated status, rather than the true status, would not result in a value of the operational efficiency of the HVAC system, as required by the claims." *Id.* at 21. Respondents further reason that if another unit, such as a thermostat, were to provide the status, the information received would not be the actual status, but merely an "expected status of the HVAC." *Id.* Respondents explain that, for example, should the link between the thermostat and the HVAC unit break, the thermostat would not provide the actual "status" of the HVAC system; or if the HVAC unit cannot turn on despite being instructed to do so by the thermostat, the thermostat again would not provide the actual status of the HVAC system without receiving the actual status from the HVAC system. *Id.*

In the 567 patent, the HVAC system status is "receive[d]" by the "at least one HVAC control system," and in the 488 patent, the HVAC system status is an input to "one or more processors."

567 patent, cl. 1; 488 patent, cls. 1, 9. But Respondents point to no disclosure that the HVAC unit transmits its own system status, either directly or indirectly. Respondents argue that Fig. 2, which is "a high-level illustration of the architecture of a network showing the relationship between the major elements of one embodiment of the subject invention" (567 patent, 5:31-33), illustrates that the "only source from which EcoFactor's designated 'HVAC control system' can receive the 'status' of the HVAC system is the HVAC unit 110 itself." RRMB at 13. As shown below, Respondents annotated Fig. 2 with the components in red being "the components EcoFactor contends are the 'HVAC control system' that receives the 'status of the HVAC system.'" *Id.*

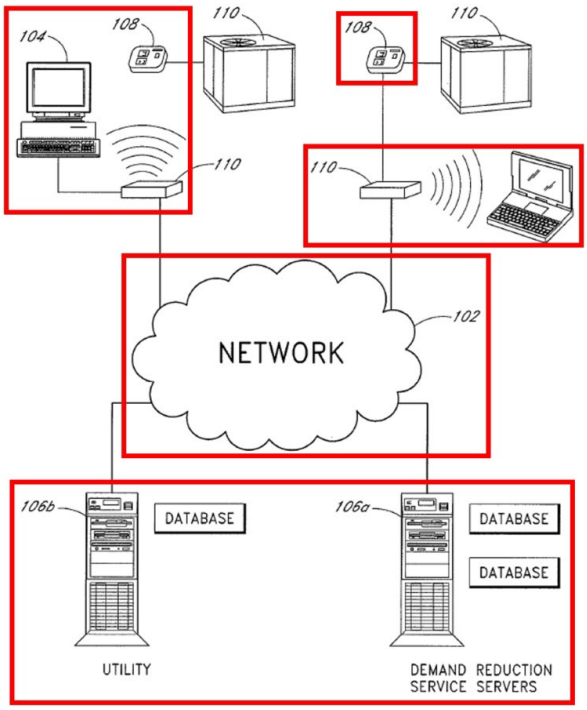


FIG. 2

As shown, the HVAC unit 110 is connected to thermostat 108, and the thermostat 108 is connected to the computers 104 or servers 106 via a gateway (also labeled 110). *See* 567 patent, 7:5-20. Respondents argue that this figure shows that the only source from which the HVAC control system can receive the status is the HVAC unit 110, stating that the HVAC unit "may transmit a

signal to the thermostat 108." RRMB at 13. However, the specification does not teach or ever state that the HVAC unit transmits a signal. Instead, the specification teaches that "control of the HVAC system, which relies primarily on communication running from the server to the thermostat, [includes] bi-directional communication [that] will also allow the thermostat 108 to regularly measure and send to the server information about the temperature in the building." 567 patent, 8:13-17. Thus, EcoFactor is correct in asserting that the specification does not describe signals "'generated by' the HVAC system." CRMB at 7. And Fig. 2 of the 567 patent shows this as well. The control system, which Respondents annotated in red, includes the thermostat 108 and not the HVAC unit, and shows the thermostat is in communication with the computers and network; and the specification further teaches that the thermostat "communicate[s] bi-directionally with the computer network." 567 patent, 7:40-41.

Thus, the term "receives status of said HVAC system" is accorded its plain and ordinary meaning, with no requirement that the HVAC unit generate a signal.

3. "compare said temperature measurements from said first structure"

Claims	EcoFactor's Proposed Construction	Respondents' Proposed Construction
567 patent [1]	Plain and ordinary meaning; no construction necessary	Indefinite

JC at 2.

Respondents argue that this term is indefinite because the claim does not make clear which of the "said temperature measurements" are to be compared. "Is it a comparison of inside temperature measurements, outside temperature measurements, or inside to outside temperature measurements? The claims do not specify." RIMB at 22. Respondents further state that the specification discusses a variety of temperature comparisons, but one of ordinary skill in the art

would not know with reasonable certainty which temperature measurements should be compared." *Id.* at 23.

EcoFactor points out that the first part of this term, i.e., "compare," has an agreed construction of "analyze to determine one or more similarities or differences between." CIMB at 22. Thus, the term to be construed actually is "analyze to determine one or more similarities or differences between said temperature measurements from said first structure." This clarifies which measurements are to be compared. Further, claim 1 of the 567 patent recites "receives temperature measurements from at least a first structure." 567 Patent, cl. 1. And this recitation is the antecedent basis for the disputed term "said temperature measurements from said first structure." Thus, a fair reading of the claim language is that the recited comparison is of inside temperature measurements of the first structure. One skilled in the art would surely understand this language. As EcoFactor points out, "the claim's later recitation of 'receive measurements of outside temperatures from at least one source other than said HVAC system' indicates that the disputed comparison is not a comparison of outside temperature measurements because such measurements are not from the [first] structure but are instead from a source other than the HVAC system." CRMB at 9.

Therefore, the term "compare said temperature measurements from said first structure" is construed to be "analyze to determine one or more similarities or differences between said temperature measurements inside said first structure."

4. "first state of repair"

Claims	EcoFactor's Proposed Construction	Respondents' Proposed Construction
567 patent [1, 15]	Plain and ordinary meaning; no construction necessary	Indefinite

JC at 2.

The term "first state of repair" does not appear in the specification of the asserted patents. In fact, neither of the terms "state of repair" or "repair" appear in the specification. The claims recite no "second" state of repair, as might be expected from the use of the term "first." Although the term "state of repair" could refer to other claim elements, particularly "status of said HVAC system" or "cause of degradation," it is not clear from the intrinsic evidence that that is the proper construction. Moreover, no evidence has been presented to show that "state of repair" or "first state of repair" are terms of art familiar to one skilled in the art but not to a lay person.

Nonetheless, EcoFactor argues that a POSITA would readily understand the scope of the term given its use within the claims. CIMB at 24. For example, EcoFactor argues that "claims 1 and 15 [of the 567 patent] indicate that the derived 'estimation for the rate of change' and derived 'expected temperature measurements of a rate of change' are based on information associated with a first state of repair for the HVAC system." *Id.* at 25. This explanation simply reiterates the term and does not define what the "first state of repair" is. Without guidance as to what a state of repair is, a POSITA does not know whether or when an HVAC system achieves the required "first state of repair" and thus, cannot "derive an estimation for the rate of change in inside temperature of said first structure when said HVAC system is in a first state of repair" as claimed.

In an attempt to define what this term means, EcoFactor offers extrinsic evidence provided by EcoFactor's expert, Mr. Zeidman, who opined that:

> For example, on date X, the HVAC system may have no refrigerant leak, resulting in certain derived estimations and measurements. But on date X+1 (one day after date X), the HVAC system may suddenly have a refrigerant leak, which could significantly alter the derived estimations and measurements recited in claims 1 and 15. The claims merely specify that the HVAC system is in a first state of repair (e.g., no refrigerant leak) to make clear what the baseline is for deriving the claimed estimations and measurements.

CIMB, Zeidman Decl. ¶ 82.

This explanation is not based on teachings within the specification, does not explain how "state of repair" differs from "cause of degradation," and appears to be speculation rather than an understanding gleaned from the teachings in the specification or prosecution history. As stated previously, Section 112, ¶ 2 requires "that a patent's claims, viewed in light of the specification and prosecution history, inform those skilled in the art about the scope of the invention with reasonable certainty." *Nautilus, Inc. v. Biosig Instruments, Inc.*, 134 S. Ct. 2120, 2129 (2014). The term "first state of repair" simply does not meet this requirement as it fails to "provide objective boundaries for those of skill in the art." *Interval Licensing LLC v. AOL, Inc.*, 766 F.3d 1364, 1371 (Fed. Cir. 2014).

Therefore, the term "first state of repair" is indefinite.

5. "suggest a cause of degradation"

Claims	EcoFactor's Proposed Construction	Respondents' Proposed Construction
567 patent [1]	Plain and ordinary meaning; no construction necessary	"identify a basis for a degraded state of the HVAC unit, such as clogged filters, refrigerant leaks, or duct leakage"

JC at 2.

Respondents argue that their construction of this term is needed because "the '567 patent's claims require that suggesting a cause of degradation be more than simply detecting degradation." RIMB at 19. Respondents state that the "claimed system first 'determine[s] whether the operational efficiency of the HVAC system has decreased over time,' and, if it has, 'analyzes the changes in the operational efficiency over time to suggest a cause of degradation. ('567 Pat. at cl. 1.) Suggesting a cause of degradation follows, and is independent from, detecting the degradation." *Id.* Thus, Respondents submit that the term should be construed to mean "identify a basis for a degraded state of the HVAC unit." *Id.* at 20.

Respondents' suggested construction does not add further clarification to the existing term of "suggest a cause of degradation." In fact, Respondents' citation to the claim language makes clear that the system first determines if the operational efficiency of the HVAC system has decreased over time, and if so, analyzes the changes in order to "suggest a cause of degradation." Moreover, Respondents do not point to anything in the specification or prosecution history of the patents to modify the plain and ordinary meaning of the claim language. Indeed, Respondents even point to the 567 patent, 9:33-35, where the specification uses the present claim language to teach that, after determining that the operational efficiency has decreased, the system will "suggest a possible cause," as opposed to "identify a basis." RIMB at 20.

Respondents also seek to add examples of the types of degradations that might be suggested, "such as clogged filters, refrigerant leaks, or duct leakage." JC at 2. EcoFactor states that this addition is acceptable but unnecessary, and asserts that the examples should be non-limiting. CRMB at 12-13. The examples are not necessary because the specification clearly teaches types of degradations, and one skilled in the art would understand that other types might also be suggested. *See* 567 patent, 3:33-35 (listing possible degradation causes).

Thus, the term "suggest a cause of degradation" is accorded its plain and ordinary meaning, and no further construction is necessary.

6. "expected temperature measurements of a rate of change in inside temperature"

Claims	EcoFactor's Proposed Construction	Respondents' Proposed Construction
567 patent [15]	Plain and ordinary meaning; no construction necessary	Indefinite.

JC at 2.

Respondents argue that this term is indefinite because neither the specification nor the claim explains what "expected temperature measurements of a rate of change" could be. RRMB at 19. Respondents submit that claim 15 of the 567 patent requires (1) storing temperature measurements from an HVAC system; (2) performing a comparison using those measurements; and (3) from those comparisons, determining if the operational efficiency of an HVAC system has decreased. This term describes specifics of the second, comparison step – namely, that the claimed comparison must result in "expected temperature measurements of a rate of change in inside temperature." However, according to Respondents, the comparison of temperatures results in "a delta in those two temperature measurements – not 'expected temperature measurements of a rate of change.'" RIMB at 29, *citing* Ex. 6 (Auslander Decl.) ¶ 68.

But the whole point of the invention is to monitor an HVAC system's operation over time to determine its operational efficiency. 567 patent, Abstract. The patent teaches that temperatures inside a house and outside a house are measured, and these measurements are used to predict what the house temperature should be at similar times of day, seasons, etc. *See, e.g.,* 567 patent, 9:1-35; 11:11-56. Moreover, claim 15 recites how the expected temperature measurements are derived, which are "based at least in part upon past temperature measurements and based at least in part on

outside temperature measurements." 567 patent, cl. 15. And the parties already agree that the meaning of "rate of change" is "the difference between inside temperature measurements divided by the span of time between the measurements." JC at 1. Thus, a POSITA would understand, reading claim 15 and the specification, that "expected temperature measurements of a rate of change in inside temperature" means exactly that – the inside temperature that would be expected based on historic measured rates of change in inside temperatures. *See* CIMB, Zeidman Decl. ¶¶ 91-93.

Thus, the term "expected temperature measurements of a rate of change in inside temperature" is accorded its plain and ordinary meaning, is not indefinite, and no further construction is necessary.

7. "performance characteristic"

Claims	**EcoFactor's ProposedConstruction**	**Respondents' Proposed Construction**
983 patent [18]	"characteristic indicative of a capability to change inside temperature"	Indefinite

JC at 2.

The term "performance characteristic" is not defined in the specification. However, EcoFactor argues that this term is a straightforward one that a lay person and a POSITA would understand because both the term "performance" and the term "characteristic" have well-known meanings, and "performance characteristic" is not a coined term. CIMB at 30. EcoFactor argues that, based on the teaching of the specification, its use in the claims, and "the context of HVAC systems," a POSITA would understand the phrase "performance characteristic" to mean a "characteristic indicative of a capability to change inside temperature." *Id.* at 31. EcoFactor presents the following reasoning:

> The phrase "performance characteristic" is readily understandable to a POSITA, particularly in the context of HVAC systems and in view of the specification.

> Zeidman Decl. ¶¶ 94-99. Indeed, the phrase uses plain and ordinary words. The claims themselves provide ample context regarding "performance characteristic." Claim 18 of the '983 Patent recites "calculate a performance characteristic of the HVAC system based at least on the historical values of the first data and second data." Claim 18 ultimately depends from claim 1, which recites that "first data …includes a measurement of at least one characteristic of the user's building" and that "second data … is collected from a source external to the building." Zeidman Decl. ¶¶ 95-98. Claim 1 further recites that the "first data," "second data," and "temperature setpoint" are used to predict the "time necessary for the HVAC system … to reach the temperature value." '983 Patent at cl. 1. In other words, the claims themselves explain that a "performance characteristic" is a "characteristic indicative of a capability to change inside temperature," just as EcoFactor proposes.

Id.

This reasoning does not comport with the teaching in the specification or the claims' recitations. The specification teaches that a building's "characteristics" include "size, level of insulation, method of construction, etc." 983 patent, 11:40-41. Claim 1 recites that first data "includes a measurement of at least one characteristic of the user's building," and second data is "collected from a source external to the building." 983 patent, cl. 1. Claim 1 further recites that the first and second data, along with a "first temperature setpoint . . . includ[ing] a temperature value and a time value" are used by the processor to "predict . . . the time necessary for the HVAC system to operate in order to reach the temperature value by the time value." *Id.* So in the context of claim 1, "characteristic" refers to a trait of the building, rather than to the claimed invention's ability to change temperature.

Claim 18, however, does not use the term "characteristic" in the same way. Instead, claim 18 relates to using historic values of the first data (building characteristics) and second data (unspecified data received from an outside source) "to calculate a performance characteristic of the HVAC system." 983 patent, cl. 18. Nor does it clearly relate to temperature changes of the building. The claim does not expressly address the building's temperature, so that the claimed "performance

characteristic" could refer to some trait completely unrelated to temperature control, such as noise level, frequency of required maintenance, or air flow rate.

EcoFactor further argues that the specification teaches that "performance" of an HVAC system relates to "the speed with [which] the temperature inside a given building will change." CIMB at 32, *quoting* 983 patent, 9:13-22. Specifically, EcoFactor relies on the specification's teaching that:

> Because server 106 logs the temperature readings from inside each house (whether once per minute or over some other interval), as well as the timing and duration of air conditioning cycles, database 300 will contain a history of the thermal performance of each house. That performance data will allow the server [] to calculate an effective thermal mass for each such structure—that is, the speed [at which] the temperature inside a given building will change in response to changes in outside temperature and differences between inside and outside temperatures.

983 patent, 9:13-22. But this discussion is not related to a performance characteristic of the HVAC system; it instead relates to the thermal performance of a house, and how to calculate the thermal mass of a house. It specifically relates to the system's ability to "predict at any given time on any given day, the rate at which inside temperature should change for given inside and outside temperatures," as opposed to the HVAC system's actual ability to achieve a change in temperature. 983 patent, 9:24-27.

Moreover, EcoFactor's proposed construction may present a claim differentiation issue. Claim 1 requires a "predict[ion]" of the "time necessary for the HVAC system to operate in order to reach the temperature value by the time value." 983 patent, cl. 1. Claim 17 depends indirectly from claim 1 and further requires the prediction to be "based on analyzing the stored historical values of the first data and second data." *Id.*, cl. 17. Claim 18 depends directly from claim 17 and requires the "performance characteristic" to be "calculate[d] . . . based at least on the historical values of the first data and second data." *Id.*, cl. 18. That is, claim 17 covers the use of historical

data to predict the "time necessary . . . to reach the temperature value by the time value." But claim 18, according to EcoFactor's proposed construction, covers the use of historical data to calculate a characteristic "indicative of a capability to change inside temperature," which claim 17 seemingly already covers, although possibly more narrowly.

So there is considerable uncertainty over whether claim 18 is indefinite, and if not, whether it means what EcoFactor urges. Nonetheless, there is some extrinsic evidence supporting EcoFactor's position. *See* CIMB, Zeidman Decl. ¶ 95 ("A POSITA would readily understand that an HVAC system's function is to change inside temperature, and therefore that a 'performance characteristic' of an HVAC system is a characteristic indicative of the HVAC system's capability to change inside temperature."). This is sufficient to require further evidentiary development regarding how a skilled artisan would understand the term.

Therefore, it is not possible to resolve this without further evidence and information. Accordingly, whether the term is indefinite will be resolved after the evidentiary hearing.

8. Whether the preambles of the 567 patent are limiting

Claims	EcoFactor's Proposed Construction	Respondents' Proposed Construction
567 patent [1, 15]	Preambles are not limiting	Preambles are limiting

JC at 2.

"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, Inc. v. Hewlett-Packard Co.*, 182 F.3d 1298, 1305 (Fed. Cir. 1999) (quoting *Kropa v. Robie*, 187 F.2d 150, 152 (CCPA 1951)). However, "a preamble is not limiting 'where a patentee defines a structurally complete invention in the claim body and uses the preamble only to state a purpose or intended use

for the invention.'" *Acceleration Bay, LLC v. Activision Blizzard Inc.*, 908 F.3d 765, 770 (Fed. Cir. 2018); *Arctic Cat Inc. v. GEP Power Prod., Inc.*, 919 F.3d 1320, 1327 (Fed. Cir. 2019).

Respondents argue that the preambles are limiting because they define "that the subject matter of the claims is the evaluation of operational efficiency." RRMB at 10. Thus, the preambles are "necessary to give life, meaning, and vitality" to the claim. *Id., citing Kropa v. Robie*, 187 R.2d 150, 152 (CCPA 1951). Respondents further submit that "calculating and comparing values for operational efficiency over time are 'fundamental characteristic[s]' of the claimed systems. . . . Indeed, the language of the preambles is mirrored in the first sentence of the '567, '322, and '488 patent specifications: 'The invention comprises systems and methods for evaluating changes in the operational efficiency of an HVAC system over time.' ('567 Pat. at Abstract; '322 Pat. at Abstract; '488 Pat. at Abstract.)." RIMB at 15-16.

In claim 1, the preamble recites: "A system for evaluating changes in the operational efficiency of an HVAC system." 567 patent, cl. 1. The body of the claim then recites various structures performing various functions, culminating in processors "determin[ing] whether the operational efficiency of the HVAC system has decreased over time," and, if so, suggesting a cause of the decrease. *Id.* Without the preamble reciting the term "operational efficiency," one skilled in the art still would understand that the ultimate purpose for the system provided in the body of the claim is the evaluation of operational efficiency and the cause of its degradation. Claim 15 is to similar effect, although reciting a method rather than a system. 567 patent, cl. 15. Both claims therefore recite structurally complete inventions, and the preambles merely state their purpose or intended use. *Arctic Cat Inc. V. GEP Power Prod., Inc.,* 919 F.3d 1320, 1327 (Fed. Cir. 2019).

Respondents also argue that the claims "rely on the preamble for antecedent basis of claim elements requiring a determination of 'whether the operational efficiency has decreased,' which

further indicates that the preamble is intended to define the claimed invention." RRMB at 10. But Respondents fail to identify any element needing an antecedent basis that lacks one recited in the body of its respective claim. Thus, for example, "said operational efficiency" (567 patent, 13:46) has an antecedent basis of "the operational efficiency" (*id*., 13:43-44), and "said HVAC system" (*id*., 13:27) has an antecedent basis of "at least one HVAC system" (*id*., 13:26-27). Changing the preambles to omit all reference to any system elements, such that they read simply "a system, comprising," and "a method, comprising," would not alter the meaning of either independent claim, or undermine their definiteness.

Respondents further argue that "a POSITA would look to the preamble to understand the import of the calculations provided in the body of the claims." RRMB at 9-10. But as relevant here, the scope of a claim need only be reasonably ascertainable by those skilled in the art. *Energizer Holdings Inc. v. Int'l Trade Comm'n,* 435 F.3d 1366, 77 USPQ2d 1625 (Fed. Cir. 2006) (holding that "anode gel" provided by implication the antecedent basis for "zinc anode")*; Ex parte Porter*, 25 USPQ2d 1144, 1145 (Bd. Pat. App. & Inter. 1992) ("controlled stream of fluid" provided reasonable antecedent basis for "the controlled fluid"). As shown above, a POSITA can reasonably ascertain the meaning of "operational efficiency," and what structure, as claimed, is capable of determining it. Reciting "operational efficiency" in the preamble contributes nothing to a POSITA's understanding beyond what is established by that term's recitation in the body of the claim.

Respondents lastly argue that similar claims in *Smart Thermostats* were construed to have limiting preambles. *See* RRMB at 15. *Smart Thermostats* involved different claim language, of course, and even if it did not its reasoning would not be binding here. *See Smart Thermostats* at 34-36.

Accordingly, the preambles of claims 1 and 15 of the 567 patent are not limiting.

9. Whether the preambles of the 488 patent are limiting

Claims	EcoFactor's Proposed Construction	Respondents' Proposed Construction
488 patent [1, 9]	Preambles are not limiting	Preambles are limiting

JC at 2.

The parties' preamble-related arguments regarding the 488 patent are similar as those presented for the 567 patent. However, the preambles of the 488 patent present a different scenario. In the 488 patent, the preamble of claim 1 recites, "[a] system for calculating a value for the operational efficiency of a heating, ventilation and air conditioning (HVAC) system." 488 patent, cl. 1. The body of the claim then recites "at least one HVAC control system that receives temperature measurements"; "one or more databases that store at least said temperatures"; "one or more processors . . . to receive outside temperature measurements from at least one source other than said HVAC system"; and "said one or more processors further configured to compare at least one predicted temperature based on the one or more predicted rates of change with an actual inside temperature measurement." *Id*. Claim 9's preamble recites "[a] method for calculating a value for the operational efficiency of a heating, ventilation and air conditioning (HVAC) system." 488 patent, cl. 9. The body of this claim is the method counterpart of claim 1's structural recitation

In neither claim is the term "operational efficiency" recited, except in the preamble. Without the preamble term "operational efficiency" one of ordinary skill in the art simply would not understand the point of the system of claim 1 or the calculations provided in claim 9. In contrast to the 567 patent, substituting "a system, comprising" or "a method, comprising" for the actual preambles would leave a skilled artisan at a loss as to the utility of the claimed inventions. Thus, in this case, the preambles provide "life, meaning, and vitality to the claim[s]." *Pitney Bowes,* 182 F.3d at 1305.

Therefore, the preambles of claims 1 and 9 of the 488 patent are claim limitations.

10. "HVAC system" / "heating, ventilation, and air conditioning (HVAC) system" / "heating ventilation and air conditioning system"

Claims	EcoFactor's Proposed Construction	Respondents' Proposed Construction
567 patent [1, 5, 15, 16, 19, 20] 488 patent [1, 2, 5, 9, 13]; 983 patent [1]	Plain and ordinary meaning; no construction necessary	Plain and ordinary meaning, an example of which is: heating, ventilation, and/or cooling devices that transfer heat into or out of a structure/location

JC at 3.

Respondents argue that their construction is correct as it is identical to the construction adopted in *Smart Thermostats*. *See* RIMB at 17. As explained previously, that investigation has no binding effect.

Respondents further argue that their construction applies because it "is consistent with technical documentation from at or around the time of Complainant's patents." RIMB at 17. Even to a lay person, though, "HVAC system" has a plain and ordinary meaning: "heating, ventilating, and air conditioning" system, or as the 983 specification characterizes it, "heating, ventilation and cooling" system. 983 patent, 1:26. There is no basis to introduce extrinsic evidence and there is no evidence that the inventors acted as their own lexicographers or disavowed the full scope of the term HVAC system. Moreover, Respondents' construction is too narrow; an HVAC system need not operate in heating or cooling mode, that is, "transfer[ring] heat into or out of a structure/location," and may simply provide ventilation. So the examples provided in the 322 patent – air conditioners and heat pumps – are plainly not meant to be exclusive. *See* RIMB at 18, citing 322 patent, 7:19-21; *Thorner v. Sony Comp. Ent. Am. LLC,* 669 F.3d 1362, 364 (Fed. Cir. 2012) ("We do not read limitations from the specification into the claims; we do not redefine words. Only the patentee can do that").

Thus, the term "HVAC system" / "heating, ventilation, and air conditioning (HVAC) system" / "heating ventilation and air conditioning system"" is accorded its plain and ordinary meaning, and no further construction is necessary.

11. "processors . . . configured to"

Claims	EcoFactor's Proposed Construction	Respondents' ProposedConstruction
983 patent [1, 3]	Plain and ordinary meaning; no construction necessary	Subject to paragraph 6 of Section 112; indefinite for lack of structure

JC at 3.

Respondents contend "processors . . . configured to" invokes means-plus-function claiming because the limitations "recite only a generic 'processor' despite setting forth specialized functions requiring specific programming in order to accomplish them." RIMB at 35. Respondents submit that while the claims do not recite "means," the term is still within the scope of § 112 ¶ 6 because "processor" is a generic structural "nonce" word like mechanism, element, or device, "that reflect[s] nothing more than verbal constructs . . . in a manner that is tantamount to using the word 'means' because [it] typically [does] not connote sufficiently definite structure." *Id.* (*quoting Williamson v. Citrix Online, LLC*, 792 F.3d 1339. 1350 (Fed. Cir. 2015)). Respondents submit this is the case here as the processor is defined only by the specialized functions it performs, and thus, a generic "off-the-shelf" processor does not provide "adequate structure for the associated functions to individuals with ordinary skill in the art." *Id.* at 37.

When a claim term lacks the word "means," there is a rebuttable presumption that § 112 ¶ 6 does not apply. *See Williamson*, 792 F.3d at 1348. This presumption can be overcome if the proponent demonstrates that the claim term fails to recite sufficiently definite structure or recites a function without reciting sufficient structure for performing that function. *Id.* at 1349 (citations omitted). Respondents have marshaled several District Court cases where "analogous terms to those

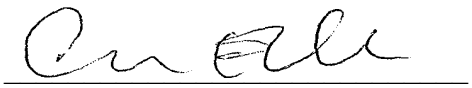
recited here [were found] subject to § 112 ¶ 6," even though, as here, the term "means" was not used. RIMB at 35; *see id*. at 35-38 (collecting cases).

The most authoritative case, however, is from the Federal Circuit, and is closely analogous. *See Zeroclick, LLC v. Apple Inc.*, 891 F.3d 1003 (Fed. Cir. 2018). In *Zeroclick* one of the disputed claims recited a "processor . . . configured to receive" certain information from a touch-sensitive screen, as well as "user interface code stored in a memory" and "executable by the processor," where the user interface code was "configured" to perform certain functions. *Id*. at 1006. The Federal Circuit held that § 112 ¶ 6 did not apply, both because the "context . . . strongly suggests the plain and ordinary meaning" of "user interface code," and because there was no finding by the District Court that that term "is used in common parlance as substitute for 'means.'" *Id*. at 1008-09.

Here, too, the context strongly suggests that "processor" carries its plain and ordinary meaning. The specification clearly says so: "conventional computers that are equipped with communications hardware . . . include processors." 983 patent, 6:61-64. Nor is there any evidence that the term "processor" is commonly used as a substitute for "means." Even Dr. Auslander, who opines that "one of ordinary skill in the art would understand that there are a number of different ways that a 'processor' can be programmed to perform the claimed function," provides no evidence supporting the interchangeable use of "processor" and "means." RIMB, Ex. 6 (Auslander Decl.) ¶ 81. Therefore, the term "processor" is not properly construed as a "nonce" term, and Respondents have not rebutted the presumption that § 112 ¶ 6 does not apply. *See* 891 F.3d at 1008 ("the district court effectively treated 'program' and 'user interface code' as nonce words, which can operate as substitutes for 'means'").

Accordingly, the claim term "one or more processors" is construed as not subject to 35 U.S.C. § 112(6), and is otherwise accorded its plain and ordinary meaning.

SO ORDERED.



Cameron Elliot
Administrative Law Judge