

UNITED STATES DISTRICT COURT
NORTHERN DISTRICT OF TEXAS
DALLAS DIVISION

GENERAL ELECTRIC COMPANY,
Plaintiff,

v.

MITSUBISHI HEAVY INDUSTRIES,
LTD. ET AL.,
Defendants.

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CIV. ACTION NO. 3:10-CV-276-F

**ORDER CONDITIONALLY
GRANTING PLAINTIFF'S MOTION FOR
JUDGMENT; GRANTING IN PART PLAINTIFF'S
MOTION FOR ENTRY OF PERMANENT INJUNCTION;
DENYING DEFENDANTS' MOTION FOR JUDGMENT AS A MATTER
OF LAW; AND DENYING DEFENDANTS' MOTION FOR A NEW TRIAL**

BEFORE THE COURT are Plaintiff General Electric Company's ("GE") Motion for Judgment and Permanent Injunction (Doc. No. 561); Defendants Mitsubishi Heavy Industries, Ltd.'s and Mitsubishi Power Systems Americas, Inc.'s (collectively "Mitsubishi") Renewed Motion for Judgment as a Matter of Law (Doc. No. 588) and Motion for a New Trial (Doc. No. 591); and the parties' various Responses and Replies thereto. After considering the parties' briefs and the applicable law, the Court is of the opinion that should the Court find the '705 patent is enforceable at the conclusion of the inequitable conduct proceedings, GE's Motion for Judgment should be GRANTED; GE's Motion for Permanent Injunction should be GRANTED IN PART; Mitsubishi's Renewed

Motion for Judgment as a Matter of Law should be DENIED; and Mitsubishi's Motion for a New Trial should be DENIED.¹

I. Factual and Procedural Background

GE and Mitsubishi are competitors in the global market for wind energy. The United States Patent and Trademark Office ("PTO") issued U.S. Patent No. 7,629,705 ("the '705 patent"), entitled "METHOD AND APPARATUS FOR OPERATING ELECTRICAL MACHINES," to GE on December 8, 2009. The '705 patent describes a method of allowing a wind turbine to remain connected to the utility grid during voltage disturbances, including fluctuations down to zero volts.

GE brought suit against Mitsubishi for infringement of claims 1, 9, and 13 of the '705 patent in February of 2010. GE later dropped claims 9 and 13, leaving only the method described in claim 1 of the '705 patent at issue for trial. Claim 1 provides as follows:

1. A method for operating an electrical machine, said method comprising:
 - coupling the electrical machine to an electric power system such that the electric power system is configured to transmit at least one phase of electric power to the electrical machine; and
 - configuring the electrical machine such that the electrical machine remains electrically connected to the electric power system during and subsequent to a voltage amplitude of the electric power system operating outside of a predetermined range for an undetermined period of time, said configuring the electrical machine comprising:

¹ This resolves Doc. Nos. 561, 588, 591, 628, 633.

electrically coupling at least a portion of a control system to at least a portion of the electric power system;
coupling the control system in electronic data communication with at least a portion of the electrical machine; and
configuring the electrical machine and the control system such that the electrical machine remains electrically connected to the electric power system during and subsequent to the voltage amplitude of the electric power system decreasing below the predetermined range including approximately zero volts for the undetermined period of time, thereby facilitating zero voltage ride through (ZVRT).

Mitsubishi raised defenses of non-infringement; invalidity based on anticipation, the on-sale bar, and failure to comply with the written description and enablement requirements; and inequitable conduct. On October 19, 2011, the Court bifurcated the litigation such that infringement and invalidity issues would be tried to a jury, with inequitable conduct to be tried to the bench in a separate, subsequent proceeding. The Court granted partial summary judgment in favor of Mitsubishi's on-sale bar defense on February 8, 2012, finding as a matter of law that the claimed invention was the subject of a commercial offer for sale before October 20, 2005, the critical date.

The first stage of the trial on the remaining infringement and invalidity issues began on February 28, 2012. The jury returned its verdict nine days later, finding as follows:

- 1) GE proved that Mitsubishi directly infringed claim 1 of the '705 patent;
- 2) Mitsubishi did not prove that it is highly probable that claim 1 was ready for patenting before October 20, 2005.

- 3) Mitsubishi did not prove that it is highly probable that claim 1 was anticipated by the Nielsen reference;
- 4) Mitsubishi did not prove that it is highly probable that claim 1 is invalid for failure to comply with the enablement requirement;
- 5) Mitsubishi did not prove that it is highly probable that claim 1 is invalid for failure to comply with the written description requirement;
- 6) GE proved that it is more likely than not entitled to lost profits for Mitsubishi's infringement;
- 7) GE is entitled to \$166,750,000 in lost profits; and
- 8) GE is entitled to \$3,445,000 in royalties.

After the jury rendered its verdict, the Court ordered the parties to file all post-trial motions pending the outcome of the inequitable conduct proceedings.

GE now moves the Court to enter judgment on the verdict and to enter an order permanently enjoining Mitsubishi from commissioning wind turbines that employ the method described at claim 1 of the '705 patent in the United States. Mitsubishi renews its motion for judgment as a matter of law and moves, in the alternative, for a new trial. In the interest of judicial efficiency, the Court issues this Order on the parties' post-judgment motions conditionally, pending the outcome of the inequitable conduct proceedings. This Order will take effect only upon completion of the bench trial on inequitable conduct, and only if the Court finds that the '705 patent is enforceable.

II. Discussion

Mitsubishi's motions challenge the sufficiency of the evidence and a number of the Court's rulings during trial. The Court's analysis proceeds as follows: First, the

Court reviews the broad legal standards governing the parties' motions. The Court then considers all the parties' arguments in each of the three challenged categories: invalidity, infringement, and damages. At the end of this discussion, the Court turns to GE's request for injunctive relief.

A. Applicable Legal Standards

1. Motion for Judgment on the Verdict

GE petitions the Court to enter final judgment of the following, pending the outcome of the inequitable conduct proceedings: (1) Mitsubishi infringes claim 1 by making, using, offering for sale, and/or selling its 2.4 MW wind turbines in the U.S.; (2) claim 1 of the '705 patent is not invalid; and (3) GE is entitled to \$166,750,000 in lost profits and \$3,445,000 in reasonable royalty damages, plus post-judgment interest. The court must approve the form of the judgment when "the jury returns a special verdict or a general verdict with answers to written questions." Fed. R. Civ. P. 58(b)(2). Judgment on the verdict should be entered if the jury's findings are supported by substantial evidence. *See Insurance Co. of N. America v. Aberden Ins. Serv., Inc.*, 253 F.3d 878 (5th Cir. 2001) (directing entry of judgment where substantial evidence supported the jury's verdict).

2. Motion for Judgment as a Matter of Law

Mitsubishi argues that it is entitled to judgment as a matter of law that 1) claim 1 of the '705 patent is invalid; 2) Mitsubishi's turbines do not infringe claim 1; and 3) GE is not entitled to lost profit damages. The Federal Circuit reviews the denial of a motion

for judgment as a matter of law under the law of the regional circuit. *Verizon Serv. Corp. v. Cox Fibernet Virginia, Inc.*, 602 F.3d 1325, 1331 (Fed. Cir. 2010). In ruling on a renewed motion for judgment as a matter of law in the Fifth Circuit, a court may: “(1) allow judgment on the verdict, if the jury returned a verdict; (2) order a new trial; or (3) direct the entry of judgment as a matter of law.” Fed. R. Civ. P. 50 (b)(1)–(3). Judgment as a matter of law is appropriate “when a party has been fully heard on an issue and there is no legally sufficient evidentiary basis for a reasonable jury to find for that party on that issue.” *Wallace v. Methodist Hosp. Sys.*, 271 F.3d 212, 218–19 (5th Cir. 2001) (quoting Fed. R. Civ. P. 50(a)). There is no legally sufficient evidentiary basis when “the facts and inferences point so strongly and overwhelmingly in favor of one party that the Court believes that reasonable men could not arrive at a contrary verdict.” *Rubinstein v. Adm’rs of the Tulane Educ. Fund*, 218 F.3d 392, 401 (5th Cir. 2000). Thus, a trial court may decide the case as a matter of law, notwithstanding the jury’s verdict “when the facts are sufficiently clear that the law requires a particular result.” *Weisgram v. Marley Co.*, 528 U.S. 440, 448 (2000) (quoting 9A CHARLES ALAN WRIGHT & ARTHUR R. MILLER, FEDERAL PRACTICE AND PROCEDURE § 2521, at 240 (2d ed. 1995)). In considering the sufficiency of the evidence, the Court must “give credence to the evidence favoring the nonmovant as well as that “evidence supporting the moving party that is uncontradicted and unimpeached, at least to the extent that that evidence comes from disinterested witnesses,” and “must draw all reasonable inferences in favor of the

nonmoving party.” *Reeves v. Sanderson Plumbing Prods., Inc.*, 530 U.S. 133, 150, 151 (2000) (internal quotation marks omitted).

3. Motion for a New Trial

Mitsubishi asks the Court to declare a new trial on validity, infringement, and damages based on “legal errors in claim construction, exclusion of evidence and argument, and jury instructions that prejudiced Mitsubishi’s ability to present its case and defend against GE’s allegations.” Defs.’ Mot. for a New Trial 1. The Federal Circuit applies regional circuit case law to review district court decisions on motions for new trial in patent infringement actions. *Verizon Serv. Corp.*, 602 F.3d at 1331. In the Fifth Circuit, a motion for a new trial is reviewed for abuse of discretion and will be affirmed unless the movant demonstrates that the jury’s verdict is against the clear weight of the evidence. *Sam’s Style Shop v. Cosmos Broad. Corp.*, 694 F.2d 998, 1006 (5th Cir. 1982). A court can also grant a motion for a new trial when procedural errors, such as erroneous evidentiary rulings, improper claim construction, or defective jury instructions, have prejudiced the verdict. *See Eastman Kodak Co. v. Martin*, 362 F.2d 684, 687 (5th Cir. 1966) (explaining “[t]he procedural errors thus committed by the district court can be remedied only upon a new trial”).

B. Invalidity

Mitsubishi contends that it is entitled to judgment of invalidity as a matter of law for the following reasons: 1) claim 1 of the ‘705 patent is anticipated by Nielsen; 2) the invention that is the subject of claim 1 was ready for patenting when GE offered it for

sale more than a year before filing its patent application; and 3) claim 1 fails to meet the enablement and written description requirements of the Patent Act. As the party challenging the validity of the patent, Mitsubishi bore the burden of proving invalidity by clear and convincing evidence at trial.

1. Anticipation

To show that a patent claim is invalid as anticipated, the party challenging the patent must show that a single prior art reference expressly or inherently discloses each and every element of a claimed invention. *Finisar Corp. v. DirecTV Grp. Inc.*, 523 F.3d 1323, 1334–35 (Fed. Cir. 2008). Anticipation further requires that the prior art disclose all elements of the claimed invention arranged as in the claim. *Id.* As with all claims that a patent is invalid, the party challenging the patent must come forward with clear and convincing evidence of invalidity by anticipation. *Cordance Corp. v. Amazon.com, Inc.*, 658 F.3d 1330, 1337 (Fed. Cir. 2011). This burden is made heavier still where the claim of invalidity is based on prior art that was before the patent examiner charged with reviewing the patent at issue. *Am. Hoist & Derrick Co. v. Sowa & Sons, Inc.*, 725 F.2d 1350, 1359 (Fed. Cir. 1984).

Mitsubishi argues that no legally substantial evidence supports the jury's verdict of no invalidity because claim 1 of the '705 patent is anticipated by the Nielsen reference. At trial, Mitsubishi introduced evidence that Nielsen discloses a wind turbine that includes a doubly-fed induction generator. Nielsen's generator has two connections that exchange electrical power with the utility grid: (1) a connection between the generator's

stator and the grid and (2) a connection from the generator's rotor to the grid through a back-to-back power converter. The generator disclosed in Nielsen maintains its rotor-side connection with the grid during and after fault conditions, including those down to zero volts. The rotor is part of the electrical machine recited in claim 1.

GE counters that the evidence indicating that the Nielsen reference does not anticipate claim 1 of the '705 patent presented at trial easily sustains the jury's verdict. GE's expert, Dr. Mack Grady and Einar Larson, one of the inventors of the '705 patent, testified that the system disclosed in the Nielsen reference does not anticipate claim 1 of the '705 patent because it cannot synchronize with the grid during zero voltage events at which time the stator is disconnected, and cannot, therefore, deliver power to the grid. This evidence tends to show that Nielsen does not anticipate each element of claim 1 of the '705 patent because claim 1 requires that the electrical machine be coupled to an electric power system such that the machine delivers power to the grid during zero voltage events. Grady further testified that Nielsen's method required three seconds to reconnect the stator after the zero voltage event cleared, and that Vestas was never able to achieve ZVRT, which, GE argues, bolsters the conclusion that the Nielsen reference does not anticipate the method of achieving the zero-voltage ride through the claimed method.

Having reviewed the evidence presented at trial, the Court is of the opinion that the facts and inferences do not point so strongly and overwhelmingly in favor of Mitsubishi that no reasonable jury could have found against it on the anticipation issue. Therefore, the Court finds that the evidence regarding anticipation by the Nielsen

reference provides a legally sufficient evidentiary basis for a reasonable jury to find as it did.

Both parties spend a great deal of time in their briefs regarding Mitsubishi's motion for judgment of invalidity as a matter of law disputing issues ancillary to the weight of the evidence presented at trial. Mitsubishi contends that by distinguishing Nielsen on the ground that the stator side disconnects from the grid during zero-voltage events, GE is attempting to improperly add a limitation to claim 1; namely, that "electrical machine" refers to both the stator and the rotor. GE counters that by characterizing GE's arguments with respect to Nielsen as claim-interpretation, Mitsubishi is attempting to shift its burden to prove by clear and convincing evidence that Nielsen invalidates the patent. GE further argues that should the Court consider GE's arguments directed to claim interpretation rather than the weight of the evidence, GE is correct in asserting that the electrical machine refers to both rotor and stator. Because the Court finds that the above-described evidence presented at trial gave the jury a legally sufficient evidentiary basis to find that the Nielsen reference does not meet every limitation of claim 1, the Court declines to entertain the parties' ancillary arguments regarding claim construction. Accordingly, Mitsubishi's motion for judgment of invalidity by anticipation as a matter of law is DENIED.

In the alternative, Mitsubishi moves the Court to grant a new trial because the jury's finding that the '705 patent is against the great weight of the evidence that Nielsen anticipates claim 1, because GE improperly argued that the patent examiner knew about

the Nielsen reference because it was pending before the same examiner, and because the Court erred by excluding evidence relating to the PTO's reexamination of the '705 patent. For the same reasons that the Court declines to grant Mitsubishi's motion for judgment of invalidity as a matter of law based on Nielsen, the Court declines to grant Mitsubishi's motion for a new trial on the ground that the jury's verdict is against the great weight of the evidence. The Court now turns to Mitsubishi's assertion that GE's arguments regarding the patent examiner were improper.

In the Fifth Circuit, "when based on improper argument by counsel, a new trial should be granted only when 'improper closing argument irreparably prejudices a jury verdict or if a jury fails to follow instructions.'" *Nissho-Iwai Co., Ltd. v. Occidental Crude Sales, Inc.*, 848 F.2d 613, 619 (5th Cir. 1988). Mitsubishi contends GE improperly argued to the jury that Nielsen does not anticipate claim 1 because it was pending before the same patent examiner that issued the '705 patent. GE asserts that Mitsubishi's objection to this argument is not supported by any case. As noted above, the fact that a reference was before the patent examiner during the application process and not found to anticipate the patent has the effect of heightening the challenger's burden of showing invalidity by anticipation. *Am. Hoist & Derrick Co.*, 725 F.2d at 1359. The Court has already found that the jury had a legally sufficient evidentiary basis to find as it did notwithstanding the patent examiner's knowledge of Nielsen or lack thereof. As such, there is no way that GE's argument, proper or not, irreparably prejudiced the jury's verdict.

The Court now considers its exclusion of evidence regarding the PTO's reexamination of the '705 patent. In the Fifth Circuit, a verdict can be set aside based on a Court's erroneous evidentiary ruling only if the error adversely affected the substantial rights of the complaining party. *Stover v. Hattiesburg Pub. Sch. Dist.*, 549 F.3d 985, 992 (5th Cir. 2008). On May 24, 2011, the PTO granted Mitsubishi's request to reexamine the '705 patent. Before trial, GE moved to preclude Mitsubishi from offering evidence or argument relating to the Patent Office's reexamination of the '705 patent. The Court granted GE's Motion in part, explaining:

The Court is of the opinion that evidence or argument concerning the Patent Office's reexamination of the '705 patent is probative of validity; however, in most instances, its probative value is substantially outweighed by its prejudicial effect, as any lay jury would be automatically inclined to defer to the findings of the government agency that issued the patent in the first instance, notwithstanding the fact that the review process is still pending or that different legal standards that apply.

Ct.'s Order on Pl.'s Mots. in Limine 2 (Doc. No. 483). Mitsubishi contends that it was entitled to tell the jury that the Patent Office is reconsidering its decision to issue the '705 patent and that the '705 patent "is not a pioneering invention because the claims stand rejected over multiple items of prior art that described methods for achieving ZVRT long before GE." Br. Supporting Mitsubishi's Mot. for a New Trial 9. Mitsubishi further argues that the Court should have let it explain to the jury that the PTO is reexamining its issuance of the '705 patent because the Supreme Court has held that a challenger's burden may be mitigated when the relevant art was not before the Patent Office during the original prosecution. GE counters that the Court's decision was not in error and that

Mitsubishi's argument with respect to excluded evidence of prior art is waived because it did not make an offer of proof of the "relevant art" that Mitsubishi would have admitted had it been permitted to do so.

The Court finds that its decision to exclude such evidence was not in error. The probative value of the fact that a reexamination is occurring or any of the determinations the PTO makes therein is far outweighed by their prejudicial effect because the PTO applies a different—and far lower—standard of proof regarding invalidity during a reexamination proceeding than that which the jury must apply to evaluate invalidity in a civil case. *In re Baxter Intern., Inc.*, --- F.3d ---, No. 2011-1073, 2012 WL 1758093, *6 (Fed. Cir. 2012). The Federal Circuit has affirmed district court decisions excluding such evidence for precisely this reason: "The district court did not abuse its discretion in concluding that the prejudicial nature of evidence concerning the ongoing parallel re-examination proceeding outweighed whatever marginal probative or corrective value it might have had in this case." *Callaway Golf Co. v. Acushnet Co.*, 576 F.3d 1331, 1343 (Fed. Cir. 2009).

Mitsubishi also claims it should have been permitted to explain to the jury that certain prior art was not before the Patent Office during the original prosecution of the '705 patent. However, the Court expressly gave Mitsubishi the opportunity to do exactly that. The Court's Order granting GE's Motion in Limine explicitly states,

This decision shall in no way prevent Mitsubishi from presenting evidence and argument relating to prior art that is properly in evidence, or explaining to the jury that certain prior art references were not before the Patent Office

when it issued the '705 patent to help meet its burden of proving invalidity by clear and convincing evidence. *See Microsoft Corp. v. i4i Ltd. P'ship*, 131 S. Ct. 2238, 2242 (2011) (explaining evidence that certain prior art was not considered by the PTO may make it easier for accused infringers to meet their burden of proving invalidity by clear and convincing evidence).

Ct.'s Order on Pl.'s Mots. in Limine 3 (Doc. No. 483). At no point during trial did the Court exclude prior art that was not before the Patent Office when it issued the '705 patent because Mitsubishi never attempted to introduce it. Therefore, the Court finds that its ruling precluding Mitsubishi from discussing the reexamination was not in error, and its ruling with respect to other prior art not before the Patent Office has no impact whatsoever on Mitsubishi's substantial rights. Accordingly, Mitsubishi's Motion for a New Trial on these grounds is DENIED.

2. Ready for Patenting

35 U.S.C. § 102(b) provides: "A person shall be entitled to a patent unless . . . (b) the invention was . . . on sale in this country, more than one year prior to the date of the application for patent in the United States." 35 U.S.C. § 102(b) (2006). In *Pfaff v. Wells Electronics, Inc.*, the Supreme Court explained, "the on-sale bar applies when two conditions are satisfied before the critical date. First, the product must be the subject of a commercial offer for sale . . . Second, the invention must be ready for patenting." *Pfaff v. Wells Elecs., Inc.*, 525 U.S. 55, 67 (1998). The party asserting the on-sale bar as a defense to infringement bears the burden of showing invalidity by clear and convincing

evidence. *Atlantic Thermoplastics Co., Inv. v. Faytex Corp.*, 970 F.2d 834, 836 (Fed. Cir. 1992).

Before trial, the Court found as a matter of law that GE offered the technology described in claim 1 of the '705 patent was the subject of a commercial offer sale before the critical date. The only question presented to the jury was whether the technology was ready for patenting before the critical date. The "ready for patenting" prong can be satisfied in two ways: "by proof of reduction to practice before the critical date; or by proof that prior to the critical date the inventor had prepared drawings or other descriptions of the invention that were sufficiently specific to enable a person skilled in the art to practice the invention." *Pfaff*, 525 U.S. at 67. Mitsubishi contends that the facts and inferences point so strongly and overwhelmingly in favor of a finding that GE had reduced the technology described in claim 1 of the '705 patent to practice or at least had an enabling disclosure by October 20, 2005, that no reasonable jury could have found that the technology was not ready for patenting by the critical date. GE counters that the evidence presented at trial easily creates a legally sufficient evidentiary basis for the jury to find that the invention was not ready for patenting. Sidney Barker, one of the inventors behind the '705 patent, kept a journal that detailed the GE inventors' daily progress as they worked to build and test a control system that would enable GE's 2.X wind turbine to achieve zero-voltage ride through. At trial, both sides relied heavily on entries from Barker's journal to advance their respective positions on both the reduction to practice and enabling disclosure prongs of the "ready for patenting" issue.

a) Reduction to Practice

“To demonstrate reduction to practice, a party must prove that the inventor (1) constructed an embodiment or performed a process that met all the limitations and (2) determined that the invention would work for its intended purpose.” *In re Omeprazole Patent Litig.*, 536 F.3d 1361, 1373 (Fed. Cir. 2008) (quoting *Z4 Techs., Inc. v. Microsoft Corp.*, 507 F.3d 1340, 1352 (Fed. Cir. 2007) (internal quotation marks omitted). An invention works for its intended purpose when there is a demonstration of “practical utility.” *Fujikawa v. Wattanasin*, 93 F.3d 1559, 1563 (Fed. Cir. 1996). Testing as part of an effort to reduce an invention to practice does not render an invention ready for patenting where the tests show the patentee still had work to do to ascertain the success of the operation. *Honeywell Intern., Inc. v. Universal Avionics Sys. Corp.*, 343 F. Supp. 2d 272, 298 (D. Del. 2004).

Barker’s journal describes his efforts to begin developing the PLL state machine for the 2.X system in March of 2005. The journal describes successful ZVRT tests on October 14, 2005, and more successful tests on October 19, 2005. These tests were run on the generator, power converter, and cabling used in GE’s 2.X wind turbine to confirm that GE’s ZVRT solution would work in an electrical machine connected to the utility grid.

Mitsubishi contends that the successful tests during the week before October 20, 2005 are clear and convincing evidence that GE performed each element of the method described in claim 1 of the ‘705 patent and had determined that the invention would work

for its intended purpose before the critical date, thereby meeting every element of the “reduction to practice” test. GE highlights entries from the journal explaining that the converter was failing more than it was passing, and that additional testing went on after the critical date to verify and develop the system to ensure that it would work to achieve ZVRT. GE pointed to Barker’s testimony explaining that after the first successful test on October 14, 2005, he did not think he was done working to achieve ZVRT because a series of testing was required to have a successful product; and Dr. Grady’s testimony that while the product had “passed a test or two[,] . . . there were many, many failures, and sometimes explosive failures” in the months that followed. Trial Tr. vol. 6, 180 March 6, 2012 (Doc. No. 543). GE also points to evidence that while Barker began creating the source code for suspending the 2.X converter during ZVRT, the code could not have been deciphered by a person of ordinary skill in the art before the critical date. GE argues that this evidence indicates that the pre-critical date testing did not demonstrate that the technology could be used for its intended purpose, and that further testing after the critical date was necessary for the inventors to determine whether the invention could be used for its intended purpose.

Mitsubishi retorts that GE performed the patented method before the critical date. The post-critical date testing was conducted for the limited purpose of fine tuning different embodiments of the claimed method and evaluating the invention’s performance in different environments, none of which preclude application of the on-sale bar. However, Mitsubishi’s argument undervalues the second prong of the test for reduction

to practice, that is, that the patentee had determined the invention would work for its intended purpose, and cases demonstrating that testing is a critical part of that determination. See *In re Omeprazole Patent Litig.*, 536 F.3d at 1373 (affirming that certain claims were not invalid based on the district court's factual determination that the claimed formulation was not ready for patenting until after clinical studies were completed); *Honeywell Intern., Inc.*, 343 F. Supp. 2d at 298 (affirming the trial court's finding that the claims had not been reduced to practice where "[t]he testimony at trial show[ed] that continued experimentation was necessary to test certain algorithms of the alerting elements and to collect and analyze the resulting data"). The jury heard testimony from the inventors themselves and Dr. Grady explaining that they had not determined that the 2.X wind turbine would achieve ZVRT as intended before October 20, 2012, and continued to run tests to verify its viability after the critical date. This evidence indicates that while GE had performed the patented process before the critical date, it had not determined that the method would achieve its intended purpose. Mitsubishi did not present clear and convincing evidence to the contrary. Accordingly, the Court is of the opinion that the facts and inferences do not point so strongly and overwhelmingly in favor of Mitsubishi that no reasonable jury could have found that the technology described in claim 1 of the '705 patent was reduced to practice before the critical date.

Mitsubishi further argues that the verdict cannot be upheld because counsel for GE improperly "suggested that development work performed in January 2006—on GE's

DFIG embodiment—was necessary to reduce claim 1 to practice.” Br. in Support of Mitsubishi’s Mot. for Judgment as a Matter of Law 14. Mitsubishi contends this argument misled the jury for the following reasons: 1) claim 1 is not limited to a DFIG embodiment; 2) the on-sale bar only requires that a single embodiment be ready for patenting; and 3) the invention can be reduced to practice without being tested to the point of being in a commercially satisfactory stage of development. As noted above, a new trial should only be granted for improper argument when counsel’s argument “irreparably prejudices a jury verdict.” *Nissho-Iwai Co., Ltd.*, 848 F.2d at 619. The Court finds Mitsubishi’s statements of law to be accurate. However, as just explained, the jury had a legally sufficient evidentiary basis to find that Mitsubishi did not prove by clear and convincing evidence that the invention had been reduced to practice prior to the critical date in the embodiment GE was working with at the time. In light of this evidence, the Court is of the opinion that GE’s “suggestion” during closing argument that the tests on the DFIG embodiment were necessary to reduce claim 1 to practice did not irreparably prejudice the jury’s verdict. Accordingly Mitsubishi’s motions for judgment of invalidity as a matter of law and for a new trial on these grounds is DENIED.

b) Enabling Disclosure

The “ready for patenting” prong can also be satisfied “by proof that prior to the critical date the inventor had prepared drawings or other descriptions of the invention that were sufficiently specific to enable a person skilled in the art to practice the invention.” *Pfaff*, 525 U.S. at 67. Evidence introduced at trial showed that Einar Larsen prepared an

initial concept document for GE's 1.5 MW DFIG system on January 14, 2005, which discloses changing PLL modes to facilitate ZVRT technology, but does not disclose using a fixed-frequency operating mode during ZVRT or suspending the firing of the grid-side converter during some voltage drops. GE's inventors also developed drawings of a PLL state machine that included the same states and performed the same functions as the state machine later illustrated in the '705 patent, though it lacks the gain values listed therein, and started developing the source code for implementing the PLL state machine in GE's 2.X system all before the critical date.

Mitsubishi alleges that these three documents (the initial concept document, the PLL state machine drawings, and the source code for the 2.X system) combined were specific enough to enable a person of ordinary skill in the art to practice the method described at claim 1 of the '705 patent without undue experimentation more than one year before it filed its application for the '705 patent. GE counters that the on-sale bar is not triggered based on an enabling disclosure because the documents reveal that further verification and testing was required in order for the inventors to reduce the invention to practice. GE further argues that these documents would not have enabled a person of ordinary skill in the art to practice the invention before the critical date because they pertain to different embodiments of the invention, such that in order to practice the claimed method based on these documents, a person of skill in the art would have to piece together three different elements of three separate and independently incomplete inventions.

Citing all the same evidence discussed at length under the “reduction to practice” prong of the ready for patenting test, GE contends that the pre-critical date documents would not enable a person of ordinary skill in the art to practice claim 1 because additional testing and verification were required. Mitsubishi counters that the enabling disclosure test does not require verification testing. Mitsubishi Reply Supporting Their Renewed Motion for Judgment as a Matter of Law 15 (Doc. No. 613) (quoting the following language from *Robotic Vision*, 249 F.3d at 1312: “Notably absent from [the enabling disclosure test] is a requirement that an inventor have complete confidence that his invention will work for its intended purpose”). Notably, in *Robotic Vision*, the court’s focus was clarifying the *Pfaff* decision’s requirement that the *concept*, and not the invention itself, need be fully disclosed and substantially complete before the critical date in order to trigger the on-sale bar, hence the court’s emphasis that the inventor need not be totally confident that the invention will work based on the pre-critical date disclosures. *Robotic Vision*, 249 F.3d at 1312. Therefore, the Court agrees with Mitsubishi that evidence of testing and verification is less compelling evidence of the “enabling disclosure” prong of the *Pfaff* test than the “reduction to practice” prong. *See id.* (“Such confidence often must await a reduction to practice, which is a separate basis on which an invention may be shown to be ready for patenting.”). The Court then turns to that evidence which bears on the state of the concept’s development before the critical date.

GE presented the following evidence that the concept behind the claimed patent was not fully disclosed and substantially complete before the critical date: Barker

testified that the initial concept document did not disclose two details necessary to practice ZVRT: 1) using a fixed-frequency operating mode during ZVRT and 2) suspending the firing of the grid-side converter during some voltage drops. While Mitsubishi contends that these concepts were adequately described in other pre-critical date documents, GE presented evidence that these other documents were written in support of different embodiments of the claimed method. The initial concept document pertains to GE's 1.5 MW DFIG system, and the source code described in the pre-critical date documents pertains to the 2.X system. Mitsubishi's expert Dr. Ehsani testified that one cannot use the gain values from one machine and use the same ones in another. Even if these elements could be applied across separate embodiments, GE presented evidence that they are independently incomplete: The PLL state machine drawings are missing gain values for the PLL state machine that is illustrated in the patent, and Dr. Grady testified that the source code for the 2.X system as described in the pre-critical date documents could not be deciphered by a person of ordinary skill in the art.

Mitsubishi argues that GE cannot assert that a PLL state machine or its accompanying gain values had to be fully disclosed in order to trigger the on-sale bar because GE took the position at trial that a PLL state machine is not required to practice claim 1. However, a PLL state machine *was* necessary to practice claim 1 through the embodiment that Mitsubishi alleges was disclosed before the critical date. Therefore, Mitsubishi cannot be heard to argue that GE's contentions regarding the PLL state machine under the enablement prong of the "ready for patenting" test are superfluous.

As GE points out, Mitsubishi's enablement argument assumes that a person of ordinary skill in the art "would be able to review the concept document, drawings, and source code; throw them by the wayside; and then assemble an entirely different system that achieves zero voltage ride through as claimed without the use of a PLL state machine, suspension of the converter, or a DFIG system." GE's Opposition to Mitsubishi's Renewed Motions for Judgment as a Matter of Law 24.

Having reviewed the evidence presented at trial, the Court is of the opinion that the facts and inferences do not point so strongly and overwhelmingly in favor of Mitsubishi that no reasonable jury could have found against it on the enabling disclosure prong of the "ready for patenting" analysis. Accordingly, Mitsubishi's motion for judgment of invalidity as a matter of law is DENIED on this ground. For the same reasons, the Court rejects Mitsubishi's argument that the jury's verdict on ready for patenting is against the great weight of the evidence and DENIES Mitsubishi's motion for a new trial on this ground.

3. Written Description and Enablement Requirements

35 U.S.C. § 112 provides:

The specification shall contain a written description of the invention and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor of carrying out his invention.

35 U.S.C. § 112 (2006). As with all challenges to a patent's validity, the party asserting that a claim does not meet these requirements bears the burden of proving that invalidity by clear and convincing evidence. *Boston Scientific Corp. v. Johnson & Johnson*, 647 F.3d 1353, 1361 (Fed. Cir. 2011).

Mitsubishi contends that the facts and inferences point so strongly and overwhelmingly in favor of a finding that claim 1 fails to meet the written description and enablement requirements of the Patent Act that no reasonable jury could have found that the patent is not invalid. Mitsubishi further argues that it is entitled to a new trial because the Court's instructions to the jury on these requirements were incomplete. GE counters that the Court properly instructed the jury, that Mitsubishi failed to meet its burden of presenting clear and convincing evidence of invalidity based on the written description and enablement requirements, and that what evidence was presented easily creates a legally sufficient evidentiary basis for the jury to find that claim 1 meets both statutory requirements.

The Court turns first to Mitsubishi's arguments with respect to the jury instructions. In the Fifth Circuit, a party moving for a new trial based on improper jury instructions must "demonstrate that the charge creates substantial doubt as to whether the jury was properly guided in its deliberations." *Green v. Admin. of Tulane Ed. Fund*, 284 F.3d 642, 659 (5th Cir. 2002) (internal citations omitted) (overruled on other grounds). Even if the instructions were erroneous, a new trial will not be granted if the court

determines “based on the entire record, that the challenged instruction could not have affected the outcome of the case.” *Id.*

Mitsubishi contends that the Court’s instructions on written description and enablement were incomplete and, as a result, the jury could not have known that the evidence established that claim 1 failed to meet these requirements. Specifically, Mitsubishi argues that the Court should have included the language “a patent specification must ‘enable a person of skill in the art to make and use the *full scope* of the invention without undue experimentation.’ ” Mitsubishi’s Mot. for a New Trial 10 (quoting *LizardTech, Inc. v. Earth Res. Mapping, Inc.*, 424 F.3d 1336,1344–45 (Fed. Cir. 2005)).

The jury was instructed as follows:

3.2 Written Description

Mitsubishi contends that claim 1 of the ‘705 patent is invalid for failure of the patent to provide an adequate written description of the claimed invention. Mitsubishi must prove that it is highly probable these claims lacked an adequate written description.

The written description requirement is satisfied if a person of ordinary skill in the field, reading the patent application as originally filed, would recognize that the patent application described the invention of these claims, even though the description might not use the exact words found in the claim. The written description is adequate if it shows that the inventor was in possession of the invention at the time the application for the patent was filed, even though the claim may have been changed or new claims added during the prosecution of the application.

It is not necessary that each and every aspect of the claim be explicitly discussed, as long as a person of ordinary skill would understand that any aspect not expressly discussed is implicit in the patent application as originally filed. If you find that the claim challenged by Mitsubishi lacked an adequate written description, you must find that claim invalid.

3.3 Enablement

Mitsubishi contends that claim 1 of the '705 patent is invalid because the patent does not disclose sufficient information to enable one skilled in the field of the invention, at the time the application was filed (or its effective filing date), to make and use the claimed invention. This requirement is known as the enablement requirement. If a patent claim is not enabled, it is invalid. Each claim must be analyzed for compliance with the enablement requirement. Mitsubishi must prove that it is highly probable that the claim was not enabled.

In considering whether a patent claim satisfies the enablement requirement, you must keep in mind that patents are written for persons of skill in the field of the invention. Thus, a patent need not expressly state information that skilled persons would be likely to know or could obtain.

Mitsubishi bears the burden of establishing lack of enablement by showing that it is highly probable that a person skilled in the art, upon reading the patent document, would not be able to make the invention work without undue experimentation. The fact that some experimentation may be required for a skilled person to make or use the claimed invention does not mean that a patent's written description fails to meet the enablement requirement. Factors you may consider in determining whether making the invention would require undue experimentation include:

1. the quantity of experimentation necessary;
2. the amount of direction or guidance disclosed in the patent;
3. the presence or absence of working examples in the patent;
4. the nature of the invention;
5. the state of the prior art;
6. the relative skill of those in the art;
7. the predictability of the art; and
8. the breadth of the claims.

If you find that one or more of these claims did not comply with the enablement requirement, you must find each such claim invalid.

Ct.'s Charge to the Jury 9–11. These instructions were pulled directly from the Model Patent Jury Instructions prepared by the National Jury Instruction Project, which both parties agreed to use in this case. Mitsubishi's proposed "full-scope" instruction varies

from the model instructions, which, notably, were issued four years after the *LizardTech* decision that Mitsubishi cites in support of its contention that an explanation of the “full scope” of the claim must be included. The Court is of the opinion that the instructions as a whole do not create substantial doubt as to whether the jury was properly guided in its deliberations. Further, the Court concludes that even if the instructions were erroneous, no new trial is warranted because the same outcome would have obtained had Mitsubishi’s proposed language been included. As discussed at length in the next sections of this Order, Mitsubishi did not carry its burden of introducing clear and convincing evidence that claim 1 of the ‘705 patent did not meet the written description and enablement requirements. Accordingly, the Court finds that Mitsubishi’s motion for a new trial on the ground that the jury was not properly instructed on the written description and enablement requirements is DENIED.

The Court now considers whether the jury had a legally sufficient evidentiary basis to find that claim 1 is not invalid based on the written description and enablement requirements.

a. Written Description

The written description requirement is intended to “prevent an applicant from later asserting that he invented that which he did not.” *Amgen Inc. v. Hoechst Marion Roussel, Inc.*, 314 F.3d 1313, 1330 (Fed. Cir. 2003). In order to comply with the written description requirement, the patentee must “convey with reasonable clarity to those skilled in the art that, as of the filing date sought, he or she was in possession of the

invention.” *Vas-Cath Inc. v. Mahurkar*, 935 F.2d 1555, 1563–64 (Fed. Cir. 1991). The patentee has possession of the invention if she has invented what is claimed. *LizardTech, Inc. v. Earth Res. Mapping, Inc.*, 424 F.3d 1336, 1345 (Fed. Cir. 2005).

Mitsubishi contends that the jury lacked a sufficient evidentiary basis to find that claim 1 was not invalid based on the written description requirement because the claim is written more broadly than what GE was in possession of at the filing date. In the exemplary embodiment of the ‘705 patent, ZVRT is achieved through the use of a fixed-frequency operation mode; that is, a method of adjusting the gains and clamps of the PLL to fix the output of the PLL to a predetermined frequency. However, claim 1 does not require the use of a fixed-frequency operation mode. Mitsubishi argues that claim 1 fails the written description requirement because the inventors were not in possession of any method of performing ZVRT without the use of a fixed frequency operating mode by the filing date. Mitsubishi bore the burden of proving failure to meet the written description requirement by clear and convincing evidence at trial. The Court is of the opinion that Mitsubishi did not meet its burden.

Mitsubishi points to testimony from the inventors of the ‘705 patent that they did not know how to perform ZVRT without using a fixed-frequency operating mode, however this is far from clear and convincing evidence that they were did not invent what was claimed. This testimony merely shows that once they achieved a method of facilitating ZVRT with the use of a fixed frequency operating mode, GE’s inventors stopped looking for other methods. Mitsubishi did not introduce any other evidence that

would tend to establish that claim 1 is limited to a fixed frequency mode of operation. Further, GE's expert, Dr. Grady, and Einar Larson presented testimony that while the PLL state machine is the exemplary embodiment of claim 1, a person of ordinary skill in the art who had read the specification would believe GE to be in possession of methods that do not require a fixed frequency operating mode because such a person would understand that alternative control actions could be substituted for the state-machine component. Accordingly, the Court finds that Mitsubishi did not meet its burden of proving failure to comply with the written description requirement by clear and convincing evidence and that there is a legally sufficient evidentiary basis to support the jury's finding of no invalidity.

b. Enablement

35 U.S.C. § 112 provides that a patent specification must "enable a person of ordinary skill in the art to make and use the full scope of the invention without undue experimentation." 35 U.S.C. § 112. "The scope of the claims must be less than or equal to the scope of the enablement." *Nat'l Recovery Techs., Inc. v. Magnetic Separation Sys., Inc.*, 166 F.3d 1190, 1195–96 (Fed. Cir. 1999). Whether undue experimentation is required is not a "single, simple factual determination, but rather is a conclusion reached by weighing many factual considerations," including:

- (1) the quantity of experimentation necessary,
- (2) the amount of direction or guidance presented,
- (3) the presence or absence of working examples,
- (4) the nature of the invention,
- (5) the state of the prior art,
- (6) the relative skill of those in the art,
- (7) the predictability or unpredictability of the art,
- and (8) the breadth of the claims.

In re Wands, 858 F.2d 731, 737 (Fed. Cir. 1988).

Mitsubishi argues that the scope of claim 1 is broader than the scope of what it enables because it does not describe how to perform ZVRT without use of a fixed frequency operating mode. However, here too, Mitsubishi relies exclusively on the testimony of GE's inventors indicating that they do not know how to perform ZVRT without using a fixed-frequency operating mode. As noted above, once GE's experts found a working solution in the exemplary embodiment they did not need to continue exploring alternative options. Mitsubishi failed to introduce any other evidence that would tend to establish the level of difficulty a person of ordinary skill would face if they set out to practice claim 1 without employing a fixed frequency mode of operation. Further, GE's expert, Dr. Grady, presented testimony that while the PLL state machine is the exemplary embodiment of claim 1, a person of ordinary skill would be able to practice claim 1 without a PLL state machine because she would have knowledge of alternative control actions that could be substituted for the state-machine component. The Court finds that Mitsubishi has failed to meet its burden of proving invalidity based on the enablement requirement by clear and convincing evidence, and that there is a legally sufficient evidentiary basis to support the jury's finding of no invalidity.

For the above-stated reasons, Mitsubishi's motion for judgment of invalidity as a matter of law for failure to meet the written description and enablement requirements is DENIED. For the same reasons, the Court rejects Mitsubishi's argument that the jury's

verdict on invalidity is against the great weight of the evidence and DENIES Mitsubishi's motion for a new trial on this ground.

B. Infringement

Mitsubishi contends that it is entitled to judgment as a matter of law of non-infringement because GE did not introduce enough evidence to give the jury a legally sufficient evidentiary basis to prove that Mitsubishi performed each step of claim 1 in the U.S. during the term of the '705 patent. In the alternative, Mitsubishi argues it should be afforded a new trial because of the Court's errors in construing the claim terms "remains electrically connected . . . for [an] undetermined period of time" and "configuring," and corresponding decisions to exclude evidence tending to show that Mitsubishi's turbines do not infringe because they disconnect after a pre-determined period of time and that Mitsubishi's commissioning of the wind turbines in the United States does not constitute infringement because the control system and electrical machine were not configured in the United States within the term of the patent.

The Court turns first to Mitsubishi's arguments challenging the Court's claim construction and corresponding exclusion of evidence inconsistent therewith. Claim 1 requires that the wind turbine be configured to remain electrically connected to the power grid during and after grid-voltage fluctuations for "an undetermined period of time." '705 patent, cl. 1. The Court's *Markman* Order construes "an undetermined period of time" as "an indeterminable or unknowable period of time." Claim Construction Order 15, May 9, 2011 (Doc. No. 155). Mitsubishi argued at the *Markman* hearing that the

phrase “undetermined period of time” refers to the period of time when the machine remains connected to the electric power system when the voltage is outside the range. *Id.* at 10. The Court’s Claim Construction Order expressly rejects this construction, stating that the “undetermined period of time” refers “to the voltage fluctuation taking place on the grid itself,” and not the connection between the grid and the wind turbine. *Id.* at 14. The Court’s construction is supported by the purpose of the invention as described in the specification. The specification makes clear that the ‘705 patent is intended and designed to allow the machine to stay connected to the power grid during voltage fluctuations, including those down to zero volts. It explains that the duration of the zero voltage events through which the ‘705 patent facilitates ride-through necessarily varies with the nature of the external events that cause voltage levels to fluctuate, such as lightning strikes or downed trees. *See, e.g.,* ‘705 patent, co. 6:30–37 (“[A] length of time of the zero voltage condition and the characteristics of a grid voltage recovery depend upon a variety of factors known in the art”). The Court properly determined that “undetermined period of time” refers to the length of the zero-voltage events to which the ‘705 patent refers, and not the period of time the machine remains connected to the grid. For these reasons, the Court finds no error in its construction and declines to grant a new trial on the ground that it erroneously construed the claim phrase “an undetermined period of time” to provide ZVRT for any time period.

Mitsubishi further argues that even if there is no error in the Court’s construction of the phrase “an undetermined period of time,” the Court’s decision to exclude evidence

tending to show that Mitsubishi's turbines do not infringe because they disconnect from the grid after a predetermined period of time was erroneous. Mitsubishi asserted that its turbines do not infringe because they disconnect from the grid after a predetermined period at the summary judgment stage and the pre-trial hearing. At each one of these phases of the litigation, the Court rejected this argument as inconsistent with the Court's claim construction because it assumes that the undetermined period of time refers not to the zero-voltage event, but to the duration of the connection between the electrical machine and the grid. The latest iteration of Mitsubishi's argument focuses on the Court's evidentiary ruling prohibiting it from introducing evidence that its wind turbines disconnect from the grid after a predetermined period of time for the purpose of advancing its non-infringement position. Had the Court permitted Mitsubishi to introduce this evidence, the jury would have been forced to decide an issue of claim construction, that is, does the claim term "undetermined period of time" foreclose wind turbines that impose a limit on the period of time the machine remains connected while the voltage is outside of the predefined range? This is a question of claim interpretation, not of fact, and it is one that the Court squarely answered in the negative in its *Markman* Order. The evidence Mitsubishi wanted to introduce expressly contradicted the Court's claim construction and was properly excluded. Accordingly, the Court declines to order a new trial on the ground that the Court's decision to exclude evidence tending to establish the length of time Mitsubishi's turbines remain connected to the grid was erroneous.

Next, Mitsubishi contends that the Court erred by clarifying the construction of the claim term “configuring” *sua sponte* during trial and incorporating this clarification into the jury instructions. The Court’s ongoing analysis requires a bit of history. GE filed suit against Mitsubishi in February of 2010, alleging that Mitsubishi infringes the ‘705 patent by commissioning its turbines in the United States. The parties do not dispute that the act of commissioning refers to setting up the turbines to operate with respect to the power grid. Before the *Markman* hearing, the parties agreed that configuring means “setting up.” The Court adopted this agreed proposal in its *Markman* Order. Ct.’s Order at 21–22. After GE rested its case in chief, Mitsubishi moved for judgment of non-infringement as a matter of law, contending that GE failed to present evidence that Mitsubishi performed each step of claim 1 in the United States within the term of the patent. Specifically, Mitsubishi argued that GE presented no evidence that it performed the step of “configuring” the electrical machine and the control system in the United States within the term of the patent, and argued for the first time that there is no way Mitsubishi in fact performed the “configuring” step because its supplier, Ingeteam, designed and manufactured the software necessary to facilitate ZVRT in Spain before the patent issued. This non-infringement position is premised on a construction of “configuring” that refers to the design and manufacture of software components of the machine and control panel to facilitate ZVRT as opposed to setting them up to operate in relation to the power grid. The Court denied Mitsubishi’s Motion, stating, “[a]s explained in the Court’s Claim Construction Order, the ‘configuring’ language of the ‘705 patent refers to setting up the

electrical machine and control system in relation to the power grid.” Ct.’s Order Denying Defs.’ Mot. for Judgment as a Matter of Law of Non-Infringement 2 (Doc. No. 529). The jury was instructed that “[f]or purposes of your infringement analysis, the question before you is whether GE has proven that the act of commissioning infringes.” Ct.’s Charge to the Jury 8 (Doc. No. 538).

The Court finds that its clarification of the meaning of “configuring” during trial and the corresponding jury instruction do not amount to error and do not entitle Mitsubishi to a new trial. Mitsubishi argues that the Court’s decision to clarify a claim term *sua sponte* during the trial without the benefit of briefing was itself error. However, it was Mitsubishi’s last-minute non-infringement position that required the Court to act on its own to clarify the meaning of a previously agreed-upon claim term. The Court’s quick decision merely reflects the realities of trial. Even if the Court should have interrupted and delayed the trial indefinitely to afford the parties an opportunity to brief the issue, the Court finds that its failure to do so does not entitle Mitsubishi to a new trial because its clarification of the term is technically correct.

That “configuring” refers to setting up the electrical machine and control panel relative to the power grid is supported by the best evidence available—the language of the claim. What is claimed is “[a] method for *operating* an electrical machine . . . said method comprising: . . . configuring the electrical machine such that the electrical machine remains electrically connected to the electric power system.” ‘705 patent, cl. 1 (emphasis added). The claim also requires “coupling the electrical machine to an electric

power system.” *Id.* The language of the claim makes clear that the patent is not directed to the design or manufacture of the software components of the electrical machine and control system as Mitsubishi contends, but to their operation on site with respect to the grid. The present tense of the term “configuring” indicates that this step is performed during the operation of the electrical machine and not during its manufacture. This clear evidence from the language of the claim satisfies the Court that its interpretation of the claim term “configuring” is correct.

Next the Court turns to the jury instructions. As noted, when moving for a new trial based on an improper jury instruction, the Fifth Circuit advises:

First, the challenger must demonstrate that the charge creates substantial doubt as to whether the jury was properly guided in its deliberations. Second, even if the jury instructions were erroneous, we will not reverse if we determine based on the entire record, that the challenged instruction could not have affected the outcome of the case.

Green v. Admin. of Tulane Ed. Fund, 284 F.3d 642, 659 (5th Cir. 2002) (internal citations omitted) (overruled on other grounds).

The jury was instructed as follows:

GE alleges that Mitsubishi literally infringes claim 1 of the ‘705 patent. You must decide whether Mitsubishi has made, used, sold, or offered for sale within the United States, a method covered by claim 1 of the ‘705 patent. For purposes of your infringement analysis, the question before you is whether GE has proven that the act of commissioning infringes. You must compare each claim to Mitsubishi’s method to determine whether every requirement of that claim is included in the accused method. A “PLL State Machine” is not required to infringe claim 1.

To prove literal infringement of claim 1 of the ‘705 patent, GE must prove that it is more probable than not that Mitsubishi’s method includes

every step in GE's patent claim, and every step was performed in the United States after the '705 patent issued. If Mitsubishi's method omits any step recited in GE's patent claim, Mitsubishi does not infringe that claim.

Ct.'s Charge to the Jury 8. The jury was also given the Court's original claim constructions. Accordingly, the Court is of the opinion that the charge as a whole properly guided the jury in its deliberations.

For the same reasons that it rejects Mitsubishi's claim construction argument, the Court declines to grant Mitsubishi a new trial on the ground that it improperly excluded evidence and argument tending to show that Ingeteam "configured" the electrical machine and control system outside the United States and outside the term of the patent. It is well-established that claim construction is for the Court. *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 977-79 (Fed. Cir. 1995) (en banc), *aff'd*, 517 U.S. 370 (1996). As noted, Mitsubishi advanced a non-infringement position at the eleventh hour that turned entirely on claim interpretation. Had the Court permitted Mitsubishi to present evidence and argument in support of this position, the jury would have been forced to decide a question not of fact, but of claim construction; that is, whether "configuring" means manufacturing the component software and hardware parts of the electrical machine and control panel or setting up them up to operate with respect to the power grid. By clarifying the meaning of "configuring," the Court prevented the jury from deciding the proper construction of the claim term. Mitsubishi points out that GE's expert was permitted to testify as to the meaning of configuring and its expert, Dr.

Ehsani, was not. However, as explained at length, this is because Dr. Ehsani's testimony tending to show that the electrical machine and control system were configured during the design or manufacturing process would have been inconsistent with the Court's claim construction.

Finally, the Court considers whether GE introduced enough evidence at trial to give the jury a legally sufficient evidentiary basis to find that Mitsubishi performed each step of claim 1 in the United States within the term of the patent. The Court concludes that it has. "To establish infringement of a patent, every limitation set forth in a claim must be found in an accused product or process exactly or by a substantial equivalent." *Becton Dickinson and Co. v. C.R. Bard, Inc.*, 922 F.2d 792, 797 (Fed. Cir. 1990). Mitsubishi does not dispute that it commissioned its 2.4 MW wind turbines in the United States during the term of the patent. During his testimony, Dr. Grady relied on Mitsubishi's Commissioning and Converter Control Unit (CCU) Firmware Manuals to demonstrate how Mitsubishi practices each of the five steps of the claimed method during commissioning. The claimed method requires that both the control panel and the electrical machine be "configured" to facilitate ZVRT. Relying on their claim construction position that the "configuring" step is performed before operation begins, Mitsubishi contends that Dr. Grady did not explain how the control panel and the electrical machine are "configured" to facilitate ZVRT during commissioning. However, Dr. Grady testified that Mitsubishi configures the control system and the electrical machine to facilitate ZVRT during commissioning, because during commissioning, the

system is energized such that it becomes electrically connected to the power grid. Trial Tr. vol. 6, 85, March 1, 2012 (Doc. No. 540). Once the control panel and the electrical machine are electrically connected to the grid, the control panel uses data exchanged with the grid through the electrical connection to instruct the electrical machine as to when to stay connected to the grid and when to disconnect, thereby setting up the electrical machine to facilitate ZVRT. *Id.* at 88. While the software that runs the control panel is put in place before commissioning, it is not until the system is electrically connected to the grid during commissioning that the variables present in the software take on specific values that facilitate ZVRT. *Id.* at 78–79.

Having reviewed the evidence presented at trial, the Court is of the opinion that the facts and inferences do not point so strongly and overwhelmingly in favor of Mitsubishi that no reasonable jury could have found that its turbines practice each step of claim 1 in the United States within the term of the patent. Therefore, the Court finds that the evidence regarding infringement provides a legally sufficient evidentiary basis for a reasonable jury to find as it did. Mitsubishi's Motions for judgment of non-infringement as a matter of law is DENIED.

D. Damages

The jury awarded GE lost profit damages in the amount of \$166,750,000 for the Elm Creek II, Juniper Canyon, and Taloga projects and a reasonable royalty of \$3,445,000 for the Penascal II and Pinnacle projects. Mitsubishi contends that it is entitled to judgment as a matter of law on damages because the jury lacked a legally

sufficient evidentiary basis to award GE lost profits at all or at least lacked a sufficient evidentiary basis to award GE the amount of lost profits that it did. Mitsubishi moves the Court to reduce GE's lost profits award to \$19,000,000 for Mitsubishi's sales to EME for the Taloga project and award \$9,786,900 based on a reasonable royalty for Mitsubishi's sales to Elm Creek II and Juniper Canyon. In the alternative, Mitsubishi moves the Court to order a new trial on damages.

In order to recover lost profits, a patentee must present evidence tending to demonstrate a reasonable probability that "but for" the infringement he would have made the sales that the infringer made. *Rite-Hite Corp. v. Kelley Co., Inc.*, 56 F.3d 1358, 1545 (Fed. Cir. 1995). One non-exclusive method for establishing "but for" causation is the four-factor test adopted by the Sixth Circuit in *Panduit Corp v. Stahlin Bros. Fibre Works, Inc.* According to the test, in order to show that the patentee is entitled to lost profits, the patentee must prove "(1) demand for the patented product; (2) absence of acceptable non-infringing substitutes; (3) manufacturing and marketing capability to exploit the demand; and (4) the amount of profit it would have made." *Panduit Corp. v. Stahlin Bros. Fibre Works, Inc.*, 575 F.2d 1152, 1156 (6th Cir. 1978). "The 'but for' inquiry therefore requires a reconstruction of the market, as it would have developed absent the infringing product, to determine what the patentee would have made." *Grain Processing Corp. v. Am. Maize-Prod. Co.*, 185 F.3d 1341 (Fed. Cir. 1999) (internal quotation marks omitted). "Although the amount of lost profits need not be proven with unerring precision, lost profits cannot be awarded based on speculation." *Bio-Rad Labs.*

v. Nicolet Instrument Corp., 739 F.2d 604, 616 (Fed. Cir. 1984). Where lost profits cannot be proved with reasonable certainty, a royalty measure of damages is appropriate. *Hanson v. Alpine Valley Ski Area, Inc.*, 718 F.2d 1075, 1078 (Fed. Cir. 1983).

Mitsubishi claims that the jury had no legally sufficient evidentiary basis to find that “but for” Mitsubishi’s infringement GE would have made the sales for the above-mentioned projects for four reasons: 1) Mitsubishi had a contractual right to cure infringement; 2) GE’s damages expert admitted that other wind-turbine suppliers sold non-infringing alternatives; 3) GE failed to present sound economic proof that Mitsubishi’s Customers would have purchased additional turbines from GE but for Mitsubishi’s use of the accused ZVRT system; and 4) the *Panduit* analysis by GE’s damages expert did not provide a legally sufficient basis for the jury to award lost profits. The Court considers these challenges to the sufficiency evidence first with regard to those turbines that Edison Mission Energy (“EME”) purchased from Mitsubishi for the Taloga project, and then turns to those turbines Iberdrola purchased from Mitsubishi for the Juniper Canyon and Elm Creek II projects.

1. Taloga

The Court first considers whether GE introduced enough evidence to establish a legally sufficient evidentiary basis in support of the jury’s finding that “but for” Mitsubishi’s infringement, GE would have sold its turbines to EME for the Taloga project. Mitsubishi’s contract with EME for the Taloga project contained a provision granting Mitsubishi the right to cure in the event that “an order by any court of competent

jurisdiction shall be obtained against the sale or delivery to Owner, or Owner's use or operation of, the Wind Turbines . . . by reason of any alleged infringement of any intellectual property right of any party." GE introduced evidence that in 2010, EME contacted GE to request a bid for turbines to fulfill its Taloga project. GE provided EME with a bid that priced each of its 1.5 MW turbines at \$1.77 million. EME did not accept GE's bid and Mitsubishi commissioned its turbines at the Taloga site in 2010. Using the offer GE extended to EME in 2010, GE's expert, Ms. Julie Davis testified that GE's total profit on the Taloga project would have been \$19,000,000.

Mitsubishi argues that because its contract with EME provided it the right to cure in the event of infringement, Mitsubishi would not have released EME from its contract and would instead have offered EME a non-infringing hardware alternative. Mitsubishi further argues that GE failed to prove that GE and not one of its competitors in the market that had non-infringing alternatives would have made the sale in the event that EME had indeed broken its contract with Mitsubishi. Finally, Mitsubishi argues that GE failed to establish factors 1 and 2 of the Panduit analysis, that is, demand for the patented product and absence of acceptable non-infringing substitutes.

With respect to Mitsubishi's contractual right to cure, GE counters that Mitsubishi's right had not yet been triggered because no court order had yet been issued and that even if it had, evidence of EME's actual purchasing behavior tends to indicate EME would have purchased the turbines from GE notwithstanding this contract provision. GE points to the fact that the contract provision describing what happens in

the event of infringement makes clear that a court order declaring the sale, installation, or operation of Mitsubishi's products infringing is a condition precedent to Mitsubishi's right to cure. GE contends that because by the time Mitsubishi commissioned the turbines in the United States no such order has been issued, Mitsubishi's right to cure had not yet ripened, and its customers were free to purchase turbines from another supplier.

The Court agrees with Mitsubishi that the fact that the infringement in this case is the commissioning and not the sale of the turbines such that Mitsubishi's customers were already under contract adds a level of complexity to the lost profits analysis and increases GE's burden of establishing that they would have broken their contracts and purchased from GE instead of continuing with Mitsubishi. Nevertheless, the Court is of the opinion that this element of uncertainty is outweighed by the evidence tending to prove a reasonable probability that EME would in fact have purchased from GE but for Mitsubishi's infringement.

GE's sales agent Liping Guthrie's testified that EME contacted GE in August of 2010 to solicit a bid on the Taloga project on an emergency basis after EME and Mitsubishi had a dispute over an unrelated contract provision. Guthrie explained that she was not aware of any other company that was similarly asked to bid on the project at that time, and had there been, it would have made sense for EME to communicate that to her in order to exert downward pressure on GE's bid. This evidence strongly suggests that EME was likely to break its contract with Mitsubishi and purchase turbines from GE in the event of a conflict. Mitsubishi points to evidence indicating that at the time of its

dispute with EME, EME represented that using turbines other than the Mitsubishi model for which it had already contracted would place the entire project at risk. However, in spite of this perceived risk, EME pursued a quote from GE one month later. Mitsubishi further argues that EME's ultimate rejection of GE's bid after its emergency request tends to establish a lack of demand for its products. However, as GE points out, the opposite is true. EME's request for a bid establishes that GE's products were in demand by EME, and that GE would have fulfilled that demand but for Mitsubishi's infringement. The Court finds that this evidence soundly answers Mitsubishi's challenges to the sufficiency of the evidence with respect to the Taloga project and establishes a reasonable probability that EME would have purchased GE turbines but for Mitsubishi's infringement.

Further, the Court finds that because Ms. Davis's estimation of the appropriate amount of lost profits was based on GE's 2010 bid for the Taloga project in response to EME's emergency request, GE established with reasonable certainty that the appropriate amount of lost profits was \$19,000,000. Accordingly, the Court finds that GE introduced enough evidence to establish a legally sufficient evidentiary basis in support of the jury's finding that GE is entitled to lost profits from Mitsubishi's sale to EME for the Taloga project in the amount of \$19,000,000.

2. Juniper Canyon and Elm Creek II

With respect to those turbines that Iberdrola purchased from Mitsubishi for the Juniper Canyon and Elm Creek II projects, Mitsubishi's raises the following challenges

to the evidence: GE failed to prove a reasonable probability 1) that there was a demand for the patented product; 2) that there were no acceptable non-infringing substitutes and 3) that it was entitled to the amount of lost profits it was awarded. The Court rejects Mitsubishi's contention that GE failed to prove a reasonable probability that the patented technology was in demand. Mitsubishi contends that the fact that Iberdrola ultimately substituted Mitsubishi's turbines for GE's on its interconnection request for the Juniper Canyon and Elm Creek II wind farms show a lack of demand for GE's turbines. GE counters that this is not the case because the lost profit analysis assumes that the infringer got the bid. The Court agrees. Further, as discussed in greater detail below, the very fact that GE was the company whose turbines were originally listed on Iberdrola's interconnection bid, thus prompting the substitution, is evidence that its turbines were in demand.

Next the Court considers Mitsubishi's argument that GE failed to present sufficient evidence to satisfy its burden of showing that there was no acceptable substitute available to Iberdrola. Like Mitsubishi's contract with EME, its contract with Iberdrola had a "right-to-cure" provision, and Mitsubishi was in possession of a non-infringing hardware method of achieving ZVRT. Mitsubishi argues that this tends to show that GE would not have sold the turbines but for Mitsubishi's infringement because Mitsubishi could have replaced the infringing technology with the hardware substitute. Once again, GE asserts that Mitsubishi's right to cure had not yet been triggered and, even if it had, evidence of Iberdrola's actual purchasing behavior proves to a reasonable

certainty that Iberdrola would have purchased GE's turbines instead. Once again, the Court finds that this evidence slightly increases GE's burden to show that Mitsubishi's customers would have abandoned the contract and purchased from GE. And once again, the Court is of the opinion that GE presented enough evidence to create a legally sufficient evidentiary basis in support of the jury's award of lost profits notwithstanding this added level of complexity. GE did so, however, by a narrower margin for Iberdrola than EME, which acted affirmatively to acquire GE turbines when a contract dispute with Mitsubishi arose. Less direct evidence of Iberdrola's actions in a hypothetical market requires a more detailed analysis of the "but for" world.

GE does not dispute that Mitsubishi and Gamesa were in possession of non-infringing hardware methods of achieving ZVRT which were available to Iberdrola. The question for the Court then becomes: was the non-infringing hardware substitute acceptable to Iberdrola? To establish that an available substitute is not acceptable within the legal meaning of that term, the patentee must show that the purported substitute lacks the advantages of the patented technology. *See Fonar Corp v. General Elec. Co.*, 107 F.3d 1543, 1533 (1997) (finding that the jury's award of lost profits was supported by substantial evidence based on the patentee's expert's testimony that "the available alternatives would have led to a significant compromise in speed and quality in comparison to using [the patented technology]"); *TWM Manufacturing Co. v. Dura Corp.*, 789 F.2d 895, 901-02 (Fed. Cir. 1986) ("Mere existence of a *competing* device does not make that device an *acceptable* substitute. The special master committed no

error in noting that none of the alleged substitutes had all benefits of the patented device.”). Consumer demand defines the substitutability among products in the relevant market. *Grain Processing Corp.*, 185 F.3d at 1355. “Important factors shaping demand may include consumers’ intended use for the patentee’s product, similarity of physical and functional attributes of the patentee’s product to alleged competing products, and price.” *Id.*

Through its damages expert, GE presented the testimony of Harm Toren, the Iberdrola employee responsible for purchasing wind turbines, explaining that Salvador Fernandez, one of Iberdrola’s engineers “preferred that the reactive power support and specifically the low voltage ride through capabilities existed in the turbine.” Trial Tr. vol. 4B, 20 March 2, 2012 (Doc. No. 541). GE also cites the testimony of Mitsubishi’s damages expert, Todd Schoettelkotte, indicating that installation of the external hardware solution would require the involvement of as many as five different companies and new equipment to ensure that the project would conform with the interconnection requirements, all of which would not be necessary if the turbines used the patented technology. Trial Tr. vol. 4B, 132–34, March 2, 2012 (Doc. No. 543).

Only Mitsubishi’s infringing turbines and GE’s turbines containing the patented technology provide the zero and low voltage ride through capabilities in the turbine. While the hardware substitute is capable of achieving ZVRT, this capability does not exist in the turbine. Further, installation of the hardware substitute would have required Mitsubishi’s customers to engage a number of parties, equipment, and tasks that the

patented technology did not require. The substitute, therefore, did not possess all the advantages of the patented technology and, accordingly, was not “acceptable” to Iberdrola. The Court is of the opinion that this creates a legally sufficient evidentiary basis for the jury to find that GE met its burden of proving a lack of acceptable substitutes and is entitled to recover lost profits associated with Mitsubishi’s infringement at Iberdrola’s project sites. Nevertheless, the Court considers the parties’ other arguments with respect to GE’s entitlement to lost profits.

GE also presented testimony from Ms. Davis and GE’s employee Liping Guthrie that switching to the hardware substitutes would have impacted Iberdrola’s place in the interconnection queue and delayed the projects indefinitely, rendering the substitute unacceptable to Iberdrola. Mitsubishi contends that Iberdrola was not concerned about delay because it actually requested that Mitsubishi delay delivery of the turbines to the project sites for a year and a half because of the economic collapse of 2008. The Court is satisfied that sufficient evidence has been presented to establish that the hardware solution was not an acceptable substitute without reaching the issue of whether Iberdrola the possibility of delay rendered the hardware solution unacceptable to Iberdrola.

Mitsubishi also contends that the fact that Iberdrola signed a contract in which Mitsubishi preserved a right to cure infringement by providing the hardware solution evidences that the substitute was, in fact, acceptable to Iberdrola. However, the fact that Mitsubishi offered turbines with the patented technology and the external hardware solution and Iberdrola chose the infringing turbines over the hardware merely buttresses

GE's position that the patented technology offered some advantage that the substitute did not.

Finally, Mitsubishi emphasizes the evidence that Iberdrola holds an ownership interest in Gamesa, one of Mitsubishi and GE's competitors in the wind-energy market, in support of its argument that GE failed to establish a reasonable probability that Iberdrola would have purchased from GE but for Mitsubishi's infringement. However, Gamesa offered only the hardware solution to ZVRT, not the non-hardware in-turbine solution that the patented technology provides. The Court has already found that the hardware solution was not an acceptable substitute. Therefore, Mitsubishi and GE were the only competitors with respect to the method of achieving ZVRT that was acceptable to Iberdrola.

In further support of its burden to establish a reasonable probability that but for Mitsubishi's infringement GE would have sold its turbines to Iberdrola, GE introduced evidence that GE and Iberdrola had a long-standing relationship with Iberdrola; that Iberdrola already used GE's turbines at many of its project sites; and that Iberdrola submitted its interconnection request for the queue based upon GE turbines, only later changing them to reflect its contract with Mitsubishi. For the aforementioned reasons, the Court finds that GE carried its burden of presenting enough evidence to create a legally sufficient evidentiary basis in support of the jury's finding that GE established a reasonable probability that but for Mitsubishi's infringement GE would have sold turbines to Iberdrola for the Juniper Canyon and Elm Creek II projects.

Having established that GE created a legally sufficient evidentiary basis to support the jury's finding that it was entitled to recover lost profits associated with Iberdrola's projects at Juniper Canyon and Elm Creek II, the Court turns now to Mitsubishi's challenge to the amount of lost profits the jury awarded. Because Mitsubishi challenges the lost profits calculation that Ms. Davis performed for the Juniper Canyon and Elm Creek II projects, but not for the Taloga project, the Court subtracts the \$19,000,000 associated with the Taloga project for a total remaining award of \$147,750,000 for the Juniper Canyon and Elm Creek II projects. Mitsubishi contends that GE did not present a legally sufficient evidentiary basis to support the jury's award of this amount.

Mitsubishi challenges Ms. Davis's lost profits figure because the GE turbines on which Ms. Davis based her calculation: 1) were negotiated in 2008 when the market was constrained and prices were at their peak; and 2) were 1.6 MW turbines instead of 1.5 MW turbines. GE argues that it produced a legally sufficient evidentiary basis to support the amount of lost profits requested because Ms. Davis used a price per turbine that is \$250,000 less than what Iberdrola actually paid for the infringing turbines installed at the project sites. Therefore, GE contends, it is reasonable to assume that Iberdrola would have paid less for GE's turbines than what it actually did pay for Mitsubishi's. Further, the jury's award was over \$70,000,000 less than the lost profits figure Ms. Davis calculated, an amount far closer to Mitsubishi's expert's lost profits figure than GE's. Accordingly, the Court is of the opinion that GE presented enough evidence to support the jury's finding that GE proved by a reasonable probability that it would have earned

\$147,750,000 in profits for the Juniper Canyon and Elm Creek II projects but for Mitsubishi's infringement. Mitsubishi's Motions for Judgment as a matter of law and for a new trial on damages are therefore DENIED.

For the aforementioned reasons, the Court DENIES Mitsubishi's Motion for Judgment as a Matter of Law, DENIES Mitsubishi's Motion for a New Trial, and GRANTS GE's Motion for Judgment on the Verdict. The Court now considers whether a permanent injunction should issue, pending the outcome of the inequitable conduct phase of the trial.

E. GE's Motion for Permanent Injunction

GE moves the Court to enter a permanent injunction against Mitsubishi's continued infringement. Mitsubishi objects on a number of grounds, including the scope of the proposed injunction, the timing of GE's motion, and its merits. The Court addresses scope and timing before turning to the merits.

In its principal motion, GE petitioned the Court to permanently enjoin Mitsubishi from making, using, importing, offering to sell, or selling in the U.S. the 2.4 MW wind turbines that the jury found to infringe claim 1 of GE's '705 patent. Mitsubishi argued that GE's requested injunction was overbroad and should not bar sales of Mitsubishi's Wind Turbines. In response, GE modified the proposed scope of its requested injunction such that it would permanently enjoin only "commissioning" or "causing or allowing to be commissioned in the United States any 2.4 MW wind turbine having the ZVRT capability that the jury found to infringe claim 1 of GE's '705 patent." The parties also

submitted a Joint Stipulation stating the GE does not seek to enjoin installation, commissioning, or operation of the wind farms currently under contract between Mitsubishi and Apex Wind Energy Holdings, LLC, . . . and between Mitsubishi and Duke Energy for the sale of 84 2.4 MW wind turbines.” Joint Stipulation Regarding GE’s Motion for Permanent Injunction 1 (Doc. No. 594). In the event that the patent is found to be enforceable and the jury verdict upheld on appeal, the parties have agreed that the appropriate measure of damages for the Apex and Duke Energy contracts “shall be the total MW of commissioned turbines multiplied by the reasonable royalty rate (calculated on a per MW basis) finally awarded to GE in this case.” *Id.*

The Court agrees with Mitsubishi that as initially proposed, the permanent injunction GE requested was overly broad. *See International Rectifier Corp. v. IXYS Corp.*, 383 F.3d 1312, 1316 (Fed. Cir. 2004) ([T]he only acts the injunction may prohibit are infringement of the patent by the adjudicated devices and infringement by devices not more than colorably different from the adjudicated devices.”). However, as amended, the Court finds that the scope of the injunction that GE proposes is as narrow as possible to prevent the infringing activity without foreclosing non-infringing activity. Accordingly, the Court’s ongoing analysis concerns only those pre-existing projects not addressed in the Joint Stipulation and future projects in which Mitsubishi would commission or cause or allow to be commissioned in the United States any 2.4 MW wind turbine having the ZVRT capability that the jury found to infringe claim 1 of GE’s ‘705 patent.

Mitsubishi also raises concerns about the timing of GE's motion and entry of the injunction itself. Mitsubishi contends that GE's Motion is premature given the pending resolution of its Rule 50 and Rule 59 Motions, and the inequitable conduct phase of the trial. The Court notes that this entire Order will take effect only after the inequitable conduct proceedings have been completed and only if the Court finds that the '705 patent is not unenforceable. The Court considers the merits of GE's Motion as if judgment of infringement, no invalidity, and no unenforceability had been finally entered. The Court now turns to the merits of the motion with these conditions of scope and timing in mind.

The grant of a patent gives the owner the right to exclude competitors from infringing the patent. 35 U.S.C. § 154(a)(1); *Apple, Inc. v. Samsung Elec. Co.*, 678 F.3d 1314, 1334 (Fed. Cir. 2012) (“[I]njunctive relief is particularly important in the patent context, where patent holders undoubtedly have the right to exclude others from using their intellectual property without permission.”). Permanent injunctive relief is an appropriate remedy for infringement only when the patent holder demonstrates the following:

- (1) that it has suffered an irreparable injury; (2) that remedies available at law, such as monetary damages, are inadequate to compensate for that injury; (3) that, considering the balance of hardships between the plaintiff and defendant, a remedy in equity is warranted; and (4) that the public interest would not be disserved by a permanent injunction.

eBay Inc. v. MercExchange, L.L.C., 547 U.S. 388, 391 (2006). The Court now considers the parties' arguments with respect to each of the four factors from *eBay*.

1. Irreparable Harm

A permanent injunction is designed to prevent future infringement rather than compensate for past infringement. *O2 Micro Intern. Ltd. v. Beyond Innovation Tech. Co.*, 449 Fed. Appx. 923, 932 (Fed. Cir. 2011). However, “past harm to a patentee’s market share, revenues, and brand recognition is relevant to determining whether the patentee has suffered an irreparable injury.” *Id.* (quoting *i4i Ltd. v. Microsoft Corp.*, 598 F.3d 831, 861-62 (Fed. Cir. 2010)) (internal quotation marks omitted). The principal measure of irreparable harm is direct competition in the marketplace that leads to price erosion and loss of market share. *Robert Bosch, L.L.C. v. Pylon Mfg. Corp.*, 659 F.3d 1142, 1152 (Fed. Cir. 2011). The patentee’s decision not to license or attempt to license the patent to the infringer also weighs in favor of finding irreparable harm, though past willingness to license is not sufficient to establish lack of irreparable harm. *eBay*, 547 U.S. at 393.

As discussed at length in the section of this Order concerning lost profits, while they are not the only competitors in the market for wind turbines, GE and Mitsubishi are the only companies that offer customers in-turbine ZVRT capability. They are, therefore, direct competitors in the wind-energy market with respect to this technology. Also as previously discussed, GE has lost customers as a result of Mitsubishi’s infringement.

Mitsubishi contends that the two companies are not direct competitors because customer decisions regarding what turbines to use cannot always be attributed to the availability of in-turbine ZVRT technology. Such decisions can turn instead on the specific nature of the project site and features of the turbines that are unrelated to ZVRT. However, to the extent the customers’ decisions do turn on the availability of the patented

technology, GE can expect to continue to suffer lost market share and price erosion if Mitsubishi is not enjoined from using it. By merely replacing the infringing technology with a hardware substitute, which is all GE's proposed injunction would require, Mitsubishi would eliminate any unfair competition with respect to GE's patent while preserving all other competitive features of its turbines.

Mitsubishi further argues that the fact that GE offered it a licensing opportunity that included the '705 patent weighs in favor of finding no irreparable harm. GE counters that while it did offer Mitsubishi a broad license to its wind energy portfolio, its broad price of \$500 million and the fact that it never offered the '705 patent for individual licensing evidences the high value it places on its right to exclude others from practicing its patent. The Court is of the opinion that these facts tend to establish that GE would suffer irreparable harm if Mitsubishi was not permanently enjoined from commissioning its 2.4 MW wind turbines with the infringing ZVRT capability in the United States.

2. Inadequacy of Monetary Damages:

In determining whether monetary damages are an adequate remedy for infringement, district courts consider largely the same factors that they do for purposes of the "irreparable harm analysis." *See i4i Ltd. v. Microsoft Corp.*, 598 F.3d at 862 (finding no abuse of discretion where district court concluded that monetary damages were inadequate based on the facts that the patentee was practicing its patent, did not pursue licensing efforts, and suffered a loss of market share, brand recognition and goodwill as a result of the defendant's infringement). The Court finds that the same facts that

established irreparable harm in this case also establish inadequacy of monetary damages. It is undisputed that GE practices its patent. While GE did offer Mitsubishi a license to GE's ZVRT technology as part of a \$500 million offer for a global license to GE's wind-energy portfolio before filing this lawsuit, it never offered a license for the '705 patent specifically. This, combined with the fact that GE has engaged in this protracted litigation for the purpose of enforcing its patent, is strong evidence that GE places an extremely high value on its right to exclude competitors from use of its invention such that a royalty will not adequately compensate it for the loss of market share and price reduction that can be attributed to Mitsubishi's ongoing infringement. Further, as discussed at length in the damages section of this Order, the evidence indicates that GE has lost and will continue to lose customers as a result of Mitsubishi's infringement.

Mitsubishi contends that a reasonable royalty would adequately compensate GE for any harm from continued infringement and would have the added benefit of giving Mitsubishi the flexibility to make future sales for projects that GE could not supply because of site constraints. However, as discussed earlier, the proposed injunction is limited to the specific turbines that infringe, and Mitsubishi has expressed that it has an adequate, hardware substitute that can be installed in those turbines. Therefore, even if enjoined from commissioning turbines that employ the infringing technology, Mitsubishi could easily design, market, and commission turbines that are specifically suited to certain project sites and that use the hardware substitute instead of the patented method. Accordingly, the Court finds that GE has shown that monetary damages are inadequate.

3. Balance of Hardships

The “balance of hardships” analysis requires assessment of the relative effect of granting or denying an injunction on the parties. *eBay*, 547 U.S. at 391. Factors bearing on the court’s analysis include the parties’ respective market shares, revenues, and business strategies. *i4i Ltd. v. Microsoft Corp.*, 598 F.3d at 862.

Both GE and Mitsubishi are large, global companies with proportionate wind power businesses. Therefore, the Court’s analysis is narrowed to the hardship each would suffer if a permanent injunction was granted or denied. GE contends that Mitsubishi will not suffer from an injunction because it can simply replace the patented technology with the hardware method of achieving ZVRT. However, if an injunction does not issue, GE will lose the value of its invention, will continue to lose customers, and will suffer price erosion. Mitsubishi counters that while the external ZVRT solution provides an acceptable noninfringing alternative, implementing such a solution creates additional costs for Mitsubishi and its customers.

The Court is of the opinion that Mitsubishi’s cost in implementing the hardware substitutes must be weighed less than GE’s interest in protecting the value of its invention and its right to exclude competitors’ use. *See i4i Ltd.*, 598 F.3d at 863 (explaining that “the consequences to Microsoft of its infringement, such as the cost of redesigning the infringing products” are irrelevant in the “balance of hardships” analysis). The Court is, however, concerned about the hardship that would be imposed on those of Mitsubishi’s customers that are now operating wind farms with Mitsubishi’s infringing turbines.

Because the definition of “commissioning” assumes that the same wind turbines can be commissioned more than once at a project site, the Court is concerned that in order to comply with the injunction, Mitsubishi would have to replace the infringing technology with the hardware substitute in every one of its turbines now operating at project sites. As explained in the damages section of this Order, the expense and delay brought about by such an installation could have a significant impact on these companies. Any hardship GE would face if commissioning was allowed at these three project sites is minimal because it has already been awarded lost profits and a reasonable royalty in association with Mitsubishi’s infringement at these locations. Further, GE’s willingness to accommodate potential hardship to Mitsubishi’s customers is evidenced by its agreement to accept a reasonable royalty for those projects that Mitsubishi will commission for Apex Wind Energy Holdings, L.L.C. and Duke Energy, L.L.C. See Joint Stipulation Regarding GE’s Motion for Permanent Injunction (Doc. No. 594). Accordingly, the Court finds that GE has established that the balance of hardships favors entry of a permanent injunction, provided that any future commissioning of the turbines is permitted at existing project sites.

4. Public Interest

With the public interest analysis, the Court seeks to determine “whether an injunction both in scope and effect, strikes a workable balance between protecting the patentee’s rights and protecting the public from the injunction’s adverse effects.” *i4i Ltd.*, 598 F.3d at 863 (citing *Broadcom, Corp. v. Qualcomm, Inc.*, 543 F.3d 683, 704

(Fed. Cir. 2008)). Mitsubishi argues that permanently enjoining its use of wind turbines featuring the technology would foreclose the availability of green energy where only Mitsubishi's turbines are suitable for the selected site. Mitsubishi also argues that the public interest demands that no permanent injunction issue while the '705 patent is being reexamined, so that competition is not "repressed by worthless patents." Mitsubishi's Response at 12 (quoting *Pope Mfg. Co. v. Gormully*, 144 U.S. 224, 234 (1892)).

With respect to Mitsubishi's concerns regarding public access to green energy, as explained above, an injunction would not foreclose the availability of wind turbines to Mitsubishi's customers or to the public at large because Mitsubishi can substitute the infringing technology with the non-infringing hardware solution. Further, the public has a competing interest in protecting the integrity of the patent system. While reexaminations by the PTO are certainly an important part of that system, the Court is of the opinion that the public's interest will be adequately protected if the patent is ultimately invalidated because the injunction can be lifted at that time. The re-examination proceedings are more fully discussed in the next section of this Order. For the aforementioned reasons, the Court finds that GE has established that a permanent injunction is an appropriate remedy in this case as long as any future commissioning of the infringing turbines at the Penascal II, Pinnacle, Taloga, Juniper Canyon, and Elm Creek II project sites is not enjoined.

5. Stay Pending Outcome of the PTO's Re-examination/Appeal

Finally, Mitsubishi petitions the Court to stay any permanent injunction it should find merited pending the outcome of the reexamination proceedings in the PTO and/or appeal. The Court appreciates that the PTO has issued an initial rejection of the patent, and may decide to invalidate it altogether. However, the proceedings in the PTO are ongoing. Granting Mitsubishi's request has the potential to deprive GE of the benefit of exclusive use of its invention for years as the administrative proceedings run their course. As GE points out, if the PTO ultimately declares the '705 patent invalid, any injunction then in place can be lifted. The Court is of the opinion that after trial and the exhaustive post-trial review of the litigation and the evidence set forth above, the jury's verdict and its equitable consequences should be given the force of law notwithstanding the ongoing reexamination. *See MercExchange, L.L.C. v. eBay, Inc.*, 500 F. Supp. 2d 556, 563 (E.D. Va. 2007) (rejecting defendant's request to stay post-trial proceedings "pending a potentially lengthy *administrative* process of which the initial phase has not yet been finalized"). Accordingly, the Court concludes that the injunction should not be stayed until the re-examination in the PTO is complete.

The Court now turns to Mitsubishi's request for a stay pending appeal. The Federal Circuit applies a four factor test in evaluating whether a stay is warranted: (1) whether the stay applicant has made a strong showing that he is likely to succeed on the merits (2) whether the applicant will be irreparably injured absent a stay; (3) whether issuance of the stay will substantially injure the other parties interested in the proceeding; and (4) where the public interest lies. *Syngor, Inc. v. Artesyn Tech.*, 417 Fed. Appx. 976,

977 (Fed. Cir. 2011). Mitsubishi contends that its post-trial motions demonstrate a likelihood of success on the merits, and that the immediate imposition of a permanent injunction will work a hardship on Mitsubishi and its customers because they will have to spend a great deal of money redesigning their turbines before the matter has been resolved on appeal. As discussed at length above, the Court finds Mitsubishi has little chance of success on the merits and that the balance of hardships weighs in favor of enjoining Mitsubishi's infringement to protect the value of GE's patent, even if the patent should be invalidated by the PTO or on appeal. Accordingly, the Court is of the opinion that no stay pending appeal should issue. In the event that the Court finds the patent is not unenforceable, this Order permanently enjoining Mitsubishi from commissioning or causing or allowing to be commissioned in the United States any 2.4 MW wind turbine having the ZVRT capability that the jury found to infringe claim 1 of GE's '705 patent with the exception of those infringing turbines at existing project sites will take effect notwithstanding an appeal.

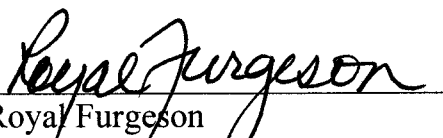
III. Conclusion

For the aforementioned reasons, the Court DENIES Mitsubishi's Motion for Judgment as a Matter of Law, DENIES Mitsubishi's Motion for a New Trial, and GRANTS GE's Motion for Judgment on the Verdict and PERMANENTLY ENJOINS Mitsubishi from commissioning or causing or allowing to be commissioned in the United States any 2.4 MW wind turbine having the ZVRT capability that the jury found to infringe claim 1 of GE's '705 patent, with the exception of those infringing turbines

installed at existing project sites and the Duke and Apex projects as to which the parties have agreed. This Order is stayed pending the outcome of the inequitable conduct proceedings and will take effect in its entirety if and only if the Court finds that the '705 patent is not unenforceable.

IT IS SO ORDERED.

Signed this 9th day of July, 2012.



Royal Furgeson
United States Senior District Judge