UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SOLAREDGE TECHNOLOGIES LTD.,
Petitioner,

v.

KOOLBRIDGE SOLAR, INC.,
Patent Owner.

Patent No. 8,937,822
Filing Date: May 8, 2011
Issue Date: January 20, 2015
Title: SOLAR ENERGY CONVERSION AND UTILIZATION SYSTEM

Inter Partes Review No.: IPR2022-00010

PETITIONER'S PETITION RANKING AND EXPLANATION OF MATERIAL DIFFERENCES BETWEEN PETITIONS

Petitioner submits this notice of its ranking of its petitions for *inter partes* review of U.S. Patent No. 8,937,822 ("the '822 patent"). *See* "CONSOLIDATED TRIAL PRACTICE GUIDE UPDATE (November 2019)" at 59-60.

The '822 patent includes 20 claims covering two distinct alleged inventions—a "method of detecting a ground leak" in claims 14-19 and a DC-to-AC power conversion apparatus/method in claims 1-13 and 20. It is not practical or efficient to address these distinct inventions in the same proceeding. Accordingly, Petitioner filed 3 petitions for each claim group. In Group 1, Petition 1 relies on Tracy, Petition 2 relies on Mori, and Petition 3 relies on Schmidt. In Group 2, Petition 4 relies on Suzui, Petition 5 relies on Fujimoto, and Petition 6 primarily relies on Mirafzal.

Ordering of Petitions. Although all petitions are meritorious and justified in light of the positions PO may take at this stage, their consideration is requested in the following order, which ranks the petitions for each of the two distinct groups:

Rank	Petition	Primary Reference(s)	Claims
A-1	IPR2022-00007 (Petition 1)	Tracy	1-13, 20
A-2	IPR2022-00010 (Petition 4)	Suzui	14-19
B-1	IPR2022-00008 (Petition 2)	Mori	1-13, 20
B-2	IPR2022-00011 (Petition 5)	Fujimoto	14-19
C-1	IPR2022-00009 (Petition 3)	Schmidt	1-13, 20
C-2	IPR2022-00012 (Petition 6)	Mirafzal	14-19

Below are some of the material differences between the petitions in each group:

Group 1 – Claims 1-13 and 20

(1) ***Varying Disclosures of Primary References to Show Convoluted Claims*****:**

Claims 1-13 and 20 seek to capture several disparate "implementations" of the '822 patent, leading to a convoluted mix of features recited in the claims. *See, e.g.*, Ex. 1001, 3:14-4:45. Claim 1 broadly covers the single-phase, cascaded H-bridge inverter in Fig. 1; the single-phase, H-bridge inverter in Fig. 15; and the three-phase, half-bridge inverter in Fig. 16. Petitioner would be prejudiced if not permitted to challenge claims 1-13 and 20 with a primary reference directed to each implementation. Accordingly, Petitioner presents Mori (Petition 2) for teaching the Fig. 1 inverter; Schmidt (Petition 3) for teaching the Fig. 15 inverter; and Tracy (Petition 1) for teaching the Fig. 16 inverter.

Petitions 1-3 are each strong as to independent claim 1, which does little more than recite the common-mode waveform that is intrinsic to any transformerless inverter. But, these petitions vary in their treatment of the diverging dependent claims. For example, claims 5, 12, and 13 are directed to the single-phase, cascaded H-bridge inverter and ternary control in Fig. 1, while dependent claim 7 requires a "three-phase grid-interactive inverter" as in Fig. 16. Mori (Petition 2) teaches a cascaded H-bridge inverter similar to Fig. 1, and thus is strongest on claims 5, 12, and 13, but requires structural changes to meet claim 7. Tracy (Petition 1) teaches a three-phase inverter similar to Fig. 16, and thus is strongest on claim 7, but requires structural changes to meet claims 5, 12, and 13. Schmidt (Petition 3) provides the simplest explanation of "common mode" in all of the claims, but requires more

structural changes than Tracy and Mori to meet many of the dependent claims.

(2) *Claim Interpretations*: The claims are also open to different constructions (particularly potential means-plus-function terms) making different references important. For example, depending on the corresponding structure identified for the "DC to AC converter" in claim 1, any one of Petitions 1-3 could become paramount because each relies on a different converter structure. The same applies for potential means-plus-function terms in the dependent claims as well. Constructions of other terms could also have significant impact. For example, independent claim 8 is directed to a method "to provide AC output power…to a number of output terminals corresponding to the number of phases required," including a "first output terminal" and a "next-in-sequence output terminal." If this language is construed to allow for the single-phase output and control scheme of the Fig. 15 inverter, Schmidt (Petition 3) provides the most straightforward teaching of the claim 8 "sequence," but if claim 8 requires multiple phases as in Fig. 16, Tracy (Petition 1) would be the only reference to address this construction. Claims 12 and 13 provide additional complication in that they combine features only disclosed in the Fig. 1 inverter with the control scheme of the Fig. 15 or Fig. 16 inverters. Either Mori (Petition 2) or Tracy (Petition 1) provides the strongest starting point for these claims depending upon claim 8's construction. As such, Petitioner is in the position of having to rank the Schmidt petition third despite its clear anticipation of claim 1. The following

table summarizes some of the relative strengths of Petitions 1-3:

Pet.	Ref.	Claim 1	Claims 5, 12-13	Claim 8
1	Tracy	✓	Uses two secondary refs	✓
2	Mori	No explicit common mode waveform	✓	No explicit common mode waveform
3	Schmidt	✓	Uses two secondary refs	Requires single-phase interpretation

(3) ***Different Resulting Combinations*****:** Petitions 1-3 also present non-cumulative combinations providing different results. For example, with respect to the "AC ground leak detector" in claim 4, Petition 1 modifies Tracy to incorporate Fujimoto's detector utilizing a band pass filter and comparator for detecting an unwanted leakage impedance, while Petition 3 modifies Schmidt to incorporate Suzui's detector which relies on a controller 11. *Compare* Ex. 1034, Fig. 1 *with* Ex. 1106, Fig. 2. As another example, Petitions 1 and 2 combine their primary references with De to show the common-mode filter of claims 6 and 20, while Petition 3 uses Koyama and Ahmed for the same claims, which includes an additional damping circuit in case Patent Owner argues one is required by these claims.

(4) ***Varying Disclosures for Supporting Obviousness Rationales*****:** Some references provide additional support for obviousness. For example, Petitions 1 and 2 rely on Bond to show the claim 7 "metering device," but Bond does not expressly describe its meter with an inverter as proposed. In contrast, Petition 3 relies on Becker and Russell for this claim, which expressly discloses a meter with an inverter.

Group 2 – Claims 14-19

(5) ***Varying Structures of Primary References*****:** As mentioned above in (3), Suzui and Fujimoto (primary refs. for Petitions 4-5) teach different structures for detecting ground leakage. While Suzui more clearly illustrates the claimed "common mode waveform," it requires an additional reference for claim 19. Mirafzal and Ivan (primary refs. for Petition 6) teach yet another structure that distinguishes sources of ground leaks based on the frequency of the common mode leakage. Ex. 1528, Fig. 1. The precise structure may become important depending on how the "detector" (which may be a means-plus-function term) of claim 14 is interpreted. Mirafzal also provides additional description regarding the windings used to capture the "unusual current" on the DC conductors. Ex. 1528, Fig. 2. In this respect Mirafzal may be strongest, but Mirafzal is not specific to a solar energy installation, as claimed.

(6) ***Authentication/Public Accessibility Issues*****:** The NEC Handbook (used in Petitions 5-6) is a strong secondary reference, but requires authentication and proof of accessibility. If not for these additional requirements, it would have been included in Petition 4. Thus, Petitions 5-6 are needed for this reference to be considered.

In view of the material differences above, the Board should consider all six petitions and not exercise its discretion to deny institution of any of the IPRs.

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CERTIFICATE OF SERVICE

Pursuant to 37 C.F.R. § 42.105, I hereby certify that I caused a true and correct copy of the PETITIONER'S PETITION RANKING AND EXPLANATION OF MATERIAL DIFFERENCES BETWEEN PETITIONS to be served via FedEx Priority Overnight on October 11, 2021, on the following:

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