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CIGS and CPV Are Winning the Patent Competition among the Alternative Solar Technologies

SHANGHAI, CHINA – July 22, 2015 – Alternative solar technologies have been evolving rapidly in a fierce competition to lead in taking over the solar market from the conventional crystalline silicon (x-Si). After analyzing over 10,000 patents filed by global alternative solar PV technology developers in the past five years (2010 – 2014), Innova Research concluded in the new report, "Chasing the Sun: Searching for Game Changers in Disruptive Photovoltaic Technologies", that CIGS and CPV are the winners of the patent competition so far. The patent analysis covered all major alternative solar technologies including Copper indium gallium (di)selenide (CIGS), Cadmium Telluride (CdTe), thin-film silicon (TF-Si), concentrated PV (CPV), organic PV (OPV), dye-sensitized solar cell (DSSC), copper zinc tin sulfide (CZTS), quantum dot (QD), and perovskite solar cells.

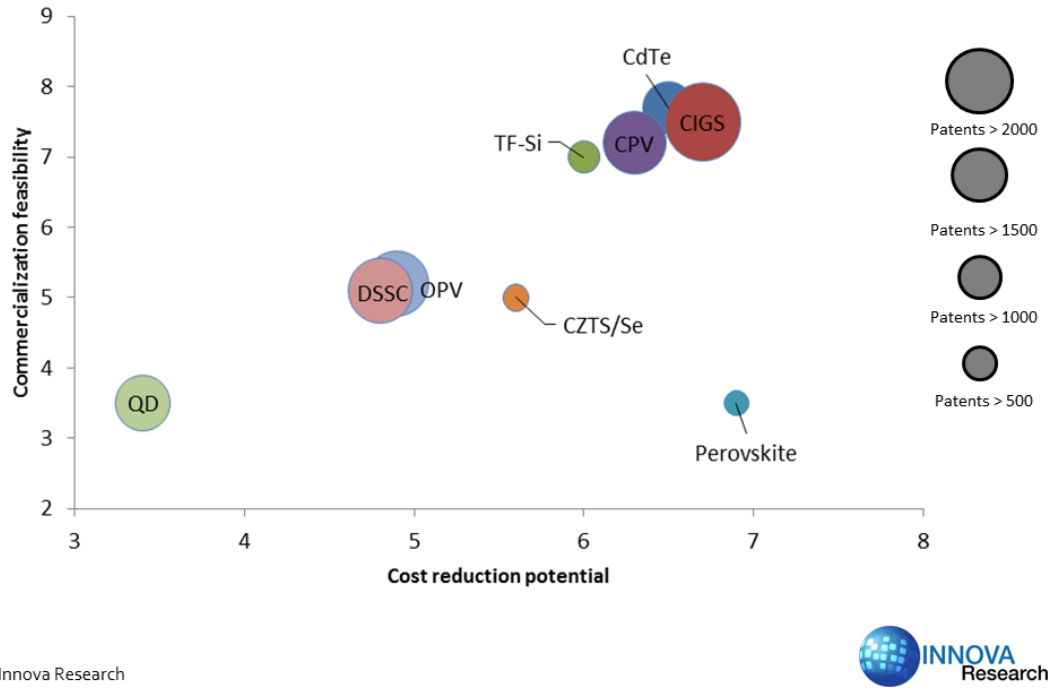
Here summarizes the key findings and trends:

- **CIGS and CPV technologies gained the highest growth rates in terms of the numbers of patents filed from 2010 to 2014**, with compounded annual growth rates (CAGRs) close to 30%, respectively, while the aggregate patent numbers for the *aforementioned* PV technologies grew at a CAGR 24% in the same period.
- **TF-Si was losing in the competition for technology developers' attention with a negative growth on patent publications since 2011;** this is mainly due to the difficulty to go beyond 10% efficiency limit on large-area TF-Si module.
- **The 3rd generation PV technologies, namely, OPV, DSSC, and QD patents are also blooming** with the numbers of annual patent publications grew to over 300 in 2012.
- **U.S. China, Japan, and South Korea are leading the world's patent filing on alternative solar technologies, while the leading countries showed different technology focuses.** U.S. companies filed more patents in alternative solar technologies with higher commercialization feasibilities, such as CdTe, CIGS, and CZTS. Chinese universities and Korean research institutes were catching up fast, with particular interests in emerging solar technologies, such as DSSC, QD, and perovskite. Meanwhile, Japanese patents in alternative solar technologies were mostly held by industry heavyweights, such as Sharp, Toyota, Kyocera, and Fujifilm, among others.
- **Patents addressed problems for different alternative solar technologies are very uneven in development stages.** Thin-film and CPV are ready or on the verge of large-scale applications and therefore drew more attentions from industry players, and patents in these technology fields were mainly calling for cheaper alternates of expensive materials and equipment for the cost reduction purpose. While the relevant studies in the 3rd generation solar technologies were mainly focusing on the efficiency enhancement and stabilization of the systems, which were essential for realizing massive commercialization.

Furthermore, Innova Research also ranked these alternative solar technologies based on key technology indices and M&A activities. Nancy Wu, Research Director of Innova Research and the lead author of the report commented, “Thin-film and CPV technologies are poised for large commercialization in the near future while the 3rd generation PV technologies still have a long way to go towards that goal. We believe that the winners among the emerging PV technologies will be copper indium gallium (di)selenide (CIGS) and high-concentrating PV (HCPV), both are benefiting from their outstanding cost reduction potentials and the feasibility for massive adoptions.”

This report, “Chasing the Sun: Searching for Game Changers in Disruptive Photovoltaic Technologies,” is part of the Innova Research Renewable Energy and Environmental Technologies service.

CIGS and CPV Are Likely Winners in Alternative Solar Technologies



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