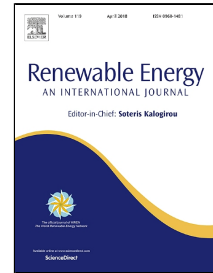


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A novel bibliometric-based technique to identify emerging photovoltaic technologies in a comparative assessment with expert review.

Alberto Moro, Elisa Boelman, Geraldine Joanny, Juan Lopez Garcia



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1 **A novel bibliometric-based technique to identify emerging**
2 **photovoltaic technologies in a comparative assessment**
3 **with expert review.**

4 *Alberto Moro^a, Elisa Boelman^a, Geraldine Joanny^a, Juan Lopez Garcia^a*

5 ^a European Commission, Joint Research Centre, via Enrico Fermi 2749, Ispra, Italy

6 E-mail addresses: alberto.moro@ec.europa.eu; elisa.boelman@ec.europa.eu;
7 geraldine.joanny@ec.europa.eu; juan.lopez-garcia@ec.europa.eu

8 Corresponding author: Alberto Moro, E-mail: alberto.moro@ec.europa.eu

9

10 **Abstract**

11 This paper compares the results of technology mapping from bibliometric analysis and results from
12 expert review to identify emerging solar photovoltaic (PV) technologies. The bibliometric analysis is
13 based on “Tools for Innovation Monitoring” (TIM), a new software code developed by the Joint
14 Research Centre. With this text-mining software a set of relevant keywords is extracted through
15 frequency analysis from a corpus of pertinent scientific publications. Keywords obtained by
16 quantitative analysis by TIM are tested against results from qualitative cognitive analysis by an
17 international panel of PV technology experts by means of a set of proposed indicators. The
18 technologies identified by the PV experts are well represented amongst the most frequently occurring
19 (highest ranked) keywords retrieved by TIM. The more salient keywords tend to correspond to the
20 relatively more established technologies such as dye sensitised solar cells, organic PV and more
21 recently-developed technologies such as perovskites. These high rated/developed
22 keywords/technologies can be relatively straightforwardly detected through bibliometric analysis.
23 Contrary to that, keywords designating the most emerging technologies like ferroelectric PV, hot
24 carriers and multiple exciton generation solar cells tend to occur much less frequently and therefore
25 provide weaker signals. These weak signals can be important in foresight.

26

27 **Keywords:** Bibliometrics; Technology mining; Emerging technologies; Photovoltaics; Horizon
28 scanning; Policy support.

29 **Highlights:**

30 Emerging PV technologies are identified by keyword analysis using TIM software

31 A parallel expert review exercise was conducted as a reference

32 Simple indicators to compare bibliometrics with expert review results are introduced

33 Most (63%) technologies identified by experts are in the best 300 ranked by TIM

34 This software requires 10% of the time and costs necessary to run the expert review

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