Request for Information: Technology and Market Potential of Photovoltaic-Thermal (PVT) Systems in the United States

DE-FOA-0003465

DATE: September 17, 2024
SUBJECT: Request for Information (RFI)

Description

Through this RFI, the U.S. Department of Energy (DOE) Solar Energy Technologies Office (SETO) seeks to gain a better understanding of photovoltaic-thermal (PVT) technologies. SETO is looking to solicit information on PVT technology, including but not limited to business, state-of-the-art, regulatory statutes, and consumer opinion. SETO aims to summarize the information gathered from this RFI and will use the stakeholder feedback obtained to inform future program development.

Background

Photovoltaic-thermal (PVT) systems combine standard photovoltaic (PV) panels with waste heat recovery systems. Heat from PV panels that is normally lost to the environment can be transferred to a thermal collector at the back of a PV panel to produce domestic hot water. The heat can also be coupled to heat pumps for space conditioning or coupled to other usable thermal energy systems for future application. Some benefits of PVT systems include higher electrical and system efficiencies, smaller footprint when compared to stand-alone conventional PV and solar hot water systems, and the potential for coupling PVT with thermal energy storage.[1]

To date, PVT systems have seen greater deployment internationally than domestically.[2] According to 2018 statistics by the International Energy Agency Solar Heating and Cooling Program, the U.S. has installed 2 megawatts thermal (MW_{th})of PVT systems while Korea, China, Germany, and Israel have installed 138 MW_{th}, 66 MW_{th}, 54 MW_{th}, 26 MW_{th}, respectively.[2] One goal of this RFI is to understand the challenges and barriers to PVT technology.

Domestically, PVT systems have maintained a low percentage of adoption when compared to conventional stand-alone PV systems, PV+ battery energy storage systems, and concentrating solar-thermal power. SETO is interested in gaining more information from current and potential PVT stakeholders.

Purpose

1-Photvoltaic-Thermal New Technology Demonstration: https://www.nrel.gov/docs/fy15osti/63474.pdf
2-Existing PVT Systems and Solutions: IEA-SHC-Task60-A1-Existing-PVT-Systems-and-Solutions.pdf

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The purpose of this RFI is to solicit feedback from industry, academia, research laboratories, state and local government agencies, and other stakeholders on issues related to PVT technologies and market. This is solely a request for information and not an announcement of funding. SETO is not accepting applications.

Disclaimer and Important Notes

This RFI is not a funding opportunity; therefore, SETO is not accepting applications at this time. SETO may issue funding in the future based on or related to the content and responses to this RFI; however, SETO may also elect not to issue funding. There is no guarantee that funding will be issued as a result of this RFI. Responding to this RFI does not provide any advantage or disadvantage to potential applicants if SETO chooses to issue funding regarding the subject matter. Final details, including the anticipated award size, quantity, and timing of SETO funded awards, will be subject to Congressional appropriations and direction.

Any information obtained as a result of this RFI is intended to be used by the Government on a non-attribution basis for planning and strategy development; this RFI does not constitute a formal solicitation for proposals or abstracts. Your response to this notice will be treated as information only. SETO will review and consider all responses in its formulation of program strategies for the identified materials of interest that are the subject of this request. SETO will not provide reimbursement for costs incurred in responding to this RFI. Respondents are advised that SETO is under no obligation to acknowledge receipt of the information received or provide feedback to respondents with respect to any information submitted under this RFI. Responses to this RFI do not bind SETO to any further actions related to this topic.

Confidential Business Information

Pursuant to 10 CFR 1004.11, any person submitting information that they believe to be confidential and exempt by law from public disclosure should submit via email, postal mail, or hand delivery two well-marked copies: one copy of the document marked “confidential” including all the information believed to be confidential, and one copy of the document marked “non-confidential” with the information believed to be confidential deleted. Submit these documents via email or on a CD, if feasible. DOE will make its own determination about the confidential status of the information and treat it according to its determination.

Evaluation and Administration by Federal and Non-Federal Personnel

3- FACT SHEET: How the Inflation Reduction Act’s Tax Incentives Are Ensuring All Americans Benefit from the Growth of the Clean Energy Economy | U.S. Department of the Treasury: https://home.treasury.gov/news/press-releases/jy1830

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Federal employees are subject to the non-disclosure requirements of a criminal statute, the Trade Secrets Act, 18 USC 1905. The Government may seek the advice of qualified non-Federal personnel. The Government may also use non-Federal personnel to conduct routine, nondiscretionary administrative activities. The respondents, by submitting their response, consent to EERE providing their response to non-Federal parties. Non-Federal parties given access to responses must be subject to an appropriate obligation of confidentiality prior to being given the access. Submissions may be reviewed by support contractors and private consultants.

Request for Information Categories and Questions

Questions have been divided into categories: business, technology, regulatory, and consumer. Please respond to the questions which best fit your experience and expertise. These sets of questions are of key interest to SETO but do not require responses for each. Responses can be in bullet format or as a text narrative. Please be factual in responses and use citations for source data when possible.

Category 1: **Business**

1. What are current limitations and head winds facing PVT adoption by domestic markets?
2. In which domestic markets (by region and/or segment) has PVT made the most penetration and why?
3. What untapped market opportunities exist for PVT?
4. Who are the key PVT manufacturers in the United States/serving the U.S. market and where are their manufacturing operations located?
5. How do the financial and energy costs to the consumer of a PVT module compare to separate PV + solar collector systems (i.e. concentrating solar collectors, non-concentrating solar collectors) of equal electrical and thermal capacity?
6. What is the consumer interest in purchasing and installing a PVT system?
7. Costs and specifications of PVT products:
    a. What PVT products do you offer and what are their PV and thermal performance metrics and associated pricing?
    b. What are the total and separate thermal and electrical efficiencies of your PVT product, and how are those efficiencies measured and calculated?
    c. What are the warrantied lifetimes of the PVT modules offered for sale by your business? What testing was done to determine these lifetimes?

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d. What is the operating temperature of the thermal fluid and/or thermal energy storage system of your PVT products? How do these operating temperatures vary daily and seasonally? And what is the thermal energy used for?

Category 2: **Technology**

1. What are the key research, development, or demonstration activities that could improve PVT system performance or reduce costs?
2. How can the next generation of PVT systems reduce system complexity without compromising efficiency and durability?

Category 3: **Regulatory**

1. What siting and permitting requirements are required in your jurisdiction for PVT installation? Are these requirements different from those of separate PV and solar thermal systems? What costs are associated with these permits?

Category 4: **Consumer**

1. Do you have any interest in purchasing and installing a PVT system? Why or why not?
2. What price would you purchase a PVT system and how did you arrive at that price?
3. What features are most important to you in PVT systems?

Request for Information Response Guidelines

Responses to this RFI must be submitted electronically to PVT-RFI@ee.doe.gov no later than 5:00pm (ET) on December 31, 2024. Responses must be provided as attachments to an email. It is recommended that attachments with file sizes exceeding 25MB be compressed (i.e., zipped) to ensure message delivery. Responses must be provided as a Microsoft Word (.docx) attachment to the email, and no more than 5 pages in length, 12-point font, 1-inch margins. Only electronic responses will be accepted.

Please identify your answers by responding to a specific question or topic if applicable. Respondents may answer as many or as few questions as they wish.

EERE will not respond to individual submissions or publish publicly a compendium of responses. A response to this RFI will not be viewed as a binding commitment to develop or pursue the project or ideas discussed.

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Respondents are requested to provide the following information at the start of their response to this RFI:

- Company / institution name;
- Company / institution contact;
- Contact's address, phone number, and e-mail address.
- How did you hear about the RFI?

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