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**Solar Energy Technologies Program**

# SAI PV Pre-INCUBATOR

Net Conference  
February 10, 2009

We will begin at 9:40 MT to allow additional time for login

Audio: 1-800-988-9638

Conference #: PW7672999

Participant Pass code: 3585966



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## Basic Information

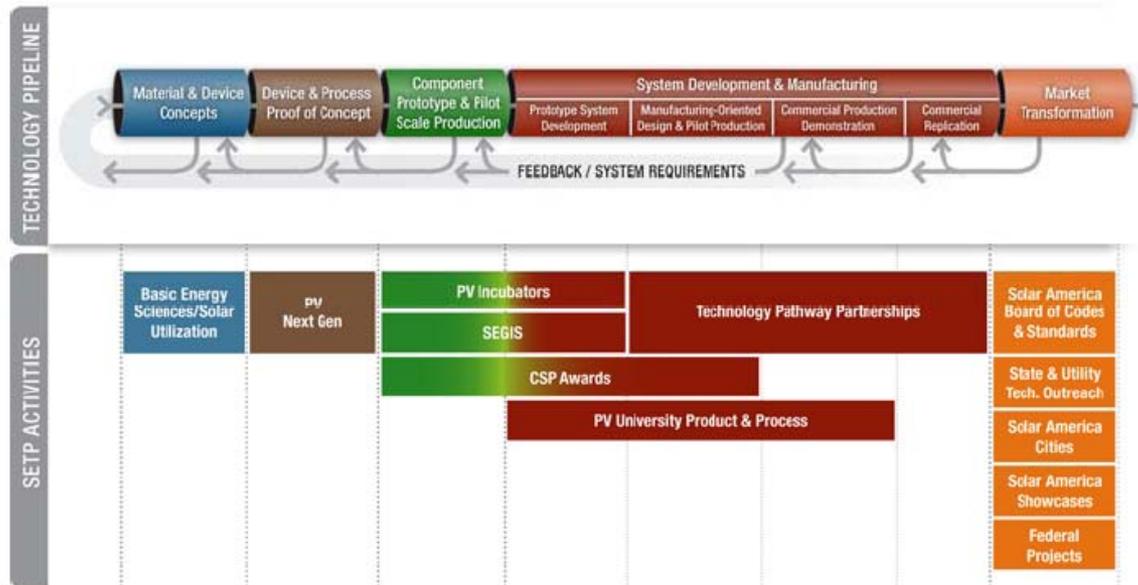
- ✓  $\approx$  15 minutes on overview of the Pre-Incubator Solicitation for LOI
- ✓ Participants are in a “listen-only” mode
- ✓ Participant’s questions must be typed and sent via the Net Conference Interface
- ✓ Please do not include personal/company identification in your question
- ✓ Please do not include proprietary data or business sensitive information in your question
- ✓ In order to provide the most accurate information possible, NREL may elect not to provide a response to a question during the net conference, but will respond to the question as part of an LOI amendment. All amendments will be posted at the following website: [www.nrel.gov/business\\_opportunities/solicitations\\_rfps.html](http://www.nrel.gov/business_opportunities/solicitations_rfps.html)



# U.S. Department of Energy Energy Efficiency and Renewable Energy

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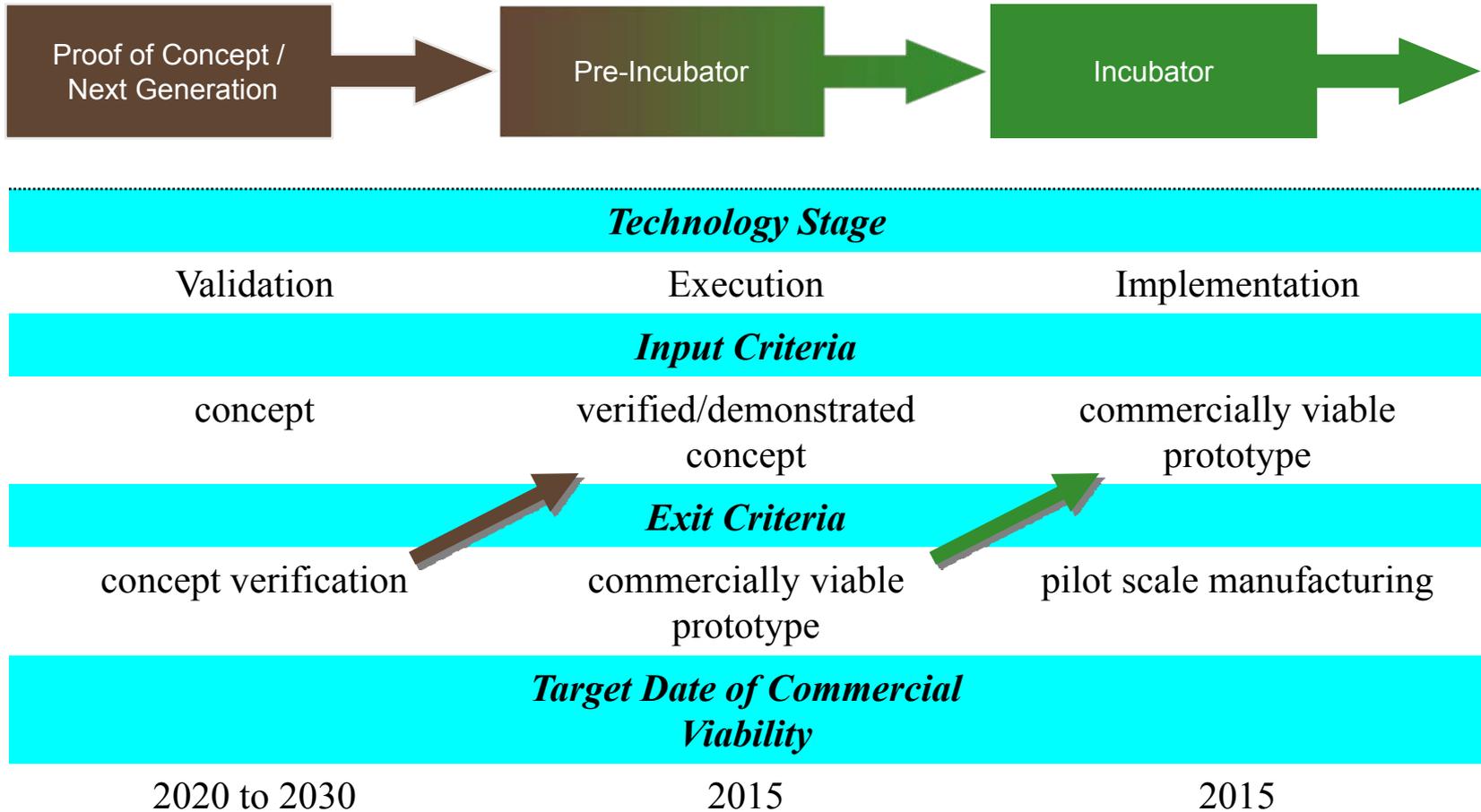
## Photovoltaics R&D: DOE Funding Opportunities





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***Bridging the gap between “concept verification” and “commercially viable prototype”***



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***Contract Duration (years)***

3

1

1.5

***Max Contract Award (\$)***

900K

500K

3M

***Approx. Yearly Cost to DOE (\$)***

≈7M

≈2-3M

≈18M

(25 Awards)

(4-6 Awards)

(10-13 Awards)

***Additional Info***

Funding Agreement

firm fixed price

firm fixed price

hardware deliverables

hardware deliverables

Active NREL participation

Active NREL participation

Responses Due: 3/10/09

Next Release: Late February



## SAI PV Technology Pre-Incubator Objective:

“...to accelerate the development of  
*innovative PV module related concepts*  
to the *prototype* stage of technology development.”



# SAI PV Technology Pre-Incubator Technologies:

“...demonstrated innovative technologies, with the potential for a disruptive improvement in solar energy conversion...”

Example technology topic areas include, but are not limited to:

- High efficiency concepts (e.g. multijunctions, multiple exciton generation, intermediate band designs, and hot carrier solar cells)
- Polymer and molecule based organics
- Organic/inorganic hybrids
- Nanostructure-based concepts
- Dye-sensitized solar cells
- Light management concepts (e.g. texturing, morphology, light-trapping)
- Rectenna-based designs
- Thermoelectric solar energy conversion
- Innovative wafer-based silicon concepts
- Film silicon on a foreign substrate
- Thin films (e.g. CdTe, CdSe, CuInGaSe<sub>2</sub>, a-Si,  $\mu$ c-Si, etc.)
- Concentrating PV module concepts (low-X and high-X)
- Innovative manufacturing processes



## SAI PV Technology Pre-Incubator Entrance Criteria:

“The minimum requirement for a successful LOI is an *innovative and demonstrated* PV module related concept capable of meeting the LCOE goals of the SAI.”

This demonstrated baseline level of technology development *does not* need to be a cell or module.



## SAI PV Technology Pre-Incubator Exit Goal:

The expected 12 month objective and deliverable is a demonstrated innovative PV cell/module prototype that

- ✓ incorporates the core innovations,
- ✓ meets the proposed level of performance (e.g. efficiency, reliability, cost)



# SAI PV Technology Pre-Incubator Metrics:

## Key Performance Parameters (KPP)

Metric	Units	Comments
Levelized Cost of Energy (LCOE)	\$/kWh	Principle metric that measures degree of competitiveness with conventionally produced electricity
Annual manufacturing capacity	MW/yr	MW of annual subsystem and/or component manufacturing capacity in a given year at the target LCOE cost level. Like LCOE, this is a driving metric for SAI.
Direct manufacturing cost	\$/Wp	This is the direct manufacturing cost of a subsystem and/or component that includes materials, labor, equipment depreciation, facilities costs, etc.
PVcomponent performance factor(s)	Unit To Be Determined by Responder	This performance factor(s) should be selected by the TPP to represent the driving contribution to system-level performance that will be provided by the subsystem and/or component they are improving. For example, a module development project might select the “nameplate” rated power output for the module ( $W_{p_{dc}}$ ). This factor can be calculated on a daily or annual basis, but daily calculations must be averaged over an operating year. This metric is based on performance only, and does not take into account cost or lifetime issues.
Mean Time Between Failure (MTBF)	Time (hrs)	Expressed as the "average" time between failures for a subsystem and/or component – i.e. the reciprocal of the failure rate in the special case when failure rate is constant.



# SAI PV Technology Pre-Incubator Responders:

- All efforts funded under this project shall be performed ... *in the United States or its territories.*
- This Solicitation will accept *Responses from U.S. small businesses only*
- The Response must contain *at least 20% price participation on behalf of the Responder/Team*, relative to the entire project price. This requirement is applied to the entire project price, not each team member's price independently.



## SAI PV Technology Pre-Incubator & NREL:

“NREL ... cannot be a lower-tier subcontractor ...

however, *NREL resources area available* to assist”

- Equipment
- Personnel
- Limited to  $\approx 5\%$  of awarded amount
- Awards do not preclude funded collaboration with NREL (e.g. CRADA)



# SAI PV Technology Pre-Incubator Merit Criteria:

## **Quality and Relevance of the Proposed Technical Plan (60%)**

- Extent of technical innovation and viability with regard to price and/or performance.
- Clarity with which TIO(s) to be addressed are articulated.
- Degree to which improvements to that TIO are linked to impacts on relevant KPPs.
- Degree to which details of the R&D paths for the proposed TIO(s) are articulated and technically feasible.
- Degree to which risks and barriers are identified and addressed. Failure to identify specific risks and barriers is considered a greater deficit than an uncertain plan for overcoming them.
- Degree to which key milestones and deliverables are specific, measurable, achievable, relevant and timely.
- Suitability of the Responder's proposed and subsequently developed prototype for contributing to the SAI goals.



# SAI PV Technology Pre-Incubator Merit Criteria:

## **Technical Capability of the Responder/Team (30%)**

- Adequacy of the proposed Responder (as defined in Section 6).
- Experience and record of success of the Responder – both generally and on previous DOE/NREL subcontracts.
- Adequacy of existing infrastructure and resources to achieve the project objectives (including proposed lower-tiers).

## **Quality and Relevance of the Proposed Business Strategy (10%)**

- Degree to which the commercialization advantage that results from successful development of the proposed technology is explained and utilized.
- Degree to which the target markets are described.
- Degree to which supply chain related issues are addressed.
- Degree to which business risks and assumptions are identified and assessed.



# SAI PV Technology Pre-Incubator Proposed SOW:

## I. Background

“... clearly defining the proposed technology/concept, the current state of that technology/concept, the target markets for the technology being developed, and how the proposed technology relates to existing or competing technologies. Responders should include data or references to support cost and performance claims.”

## II. Objectives

“... R&D objectives that will be pursued under this effort within the TIO and KPP framework.”

## III. Scope of Work – Task Descriptions

“... a task-by-task description of the work to be conducted ...”



# SAI PV Technology Pre-Incubator Proposed SOW:

## IV. Deliverables and Project Plan (cont.)

In addition to these task-specific entries as stated in Table 13-1, an additional table should be included for the Deliverables (see Table 13-2 below). The table should include due dates and the proposed price associated with each deliverable.

- ***A hardware deliverable that represents the current performance baseline of the proposed technology due within the first month. The payment for this deliverable is limited to a maximum of 20% of the total subcontract price.***
- Quarterly Technical Progress Reports at month 3, 6 and 9 written in a short letter format, not to exceed six (6) pages in length, with emphasis placed on the status rather than a description of the progress.
- A Final Report detailing the accomplishments of the project and the status of the developed prototype.
- ***A final hardware deliverable of the prototype due at month 12. This deliverable must be a finished cell or module capable of undergoing efficiency tests and satisfactorily meeting the conversion efficiency defined within the proposal. The payment for this deliverable must be a minimum of 30% of the total subcontract price.***

**Table 13-2. Deliverable Schedule Example**

<u>Deliverable</u>	<u>Due Date</u>	<u>% of Subcontract Price</u>
* Hardware Baseline	1 <sup>st</sup> Month	20% of subcontract
* Task 1, D-1	6 <sup>th</sup> Month	15% of subcontract
* Task 2, D-2	9 <sup>th</sup> Month	15% of subcontract
* Prototype	12 <sup>th</sup> Month	30% of subcontract
** Quarterly Report	3 <sup>rd</sup> Month	5% of subcontract
** Quarterly Report	6 <sup>th</sup> Month	5% of subcontract
** Quarterly Report	9 <sup>th</sup> Month	5% of subcontract
** Final Report	12 <sup>th</sup> Month	5% of subcontract

\* Price allocated to % of work effort associated with this deliverable.

\*\* Total of these deliverables must not exceed 20% of the total subcontract price.



## SAI PV Technology Pre-Incubator Schedule:

Solicitation Released:	January 27, 2009
Net Conference:	February 10, 2009
Technical Questions Due :	February 17, 2009
LOI/Responses Due:	March 10, 2009
LOI/Responses Reviewed:	March 17 - April 22, 2009
Selections Announced:	Early May

Note: Next Incubator Solicitation expected in Late Feb 09