SERIIUS

Solar Energy Research Institute for India and the United States

SERIIUS is facilitating joint R&D and related activities on clean energy—by teams of scientists, technologists, and engineers from India and the United States—needed to deploy clean energy technologies rapidly with the greatest impact. The Indo-US Joint Clean Energy R&D Center (JCERDC) will support SERIIUS' multi-institutional network project costs using a public/private partnership funding model.

Vision: To create an environment for cooperation and innovation "without borders" to develop and ready emerging revolutionary solar electricity technologies toward the long-term success of India's Jawaharlal Nehru Solar National Solar Energy Mission and the U.S. Department of Energy SunShot Initiative.

Objectives:

- High-impact R&D, analysis, and assessment (Photovoltaics, Concentrating Solar Power, Solar Energy Integration)
- Identify and quantify critical technical, economic, and policy issues for solar energy development / deployment in India
- Collaborative project structure and joint intellectual property management (teaming)
- Effective bi-national collaboration
- Collaborative culture and outreach
- Workforce development

Budget:

$25 million for 5 years (50% Indian side, 50% US side)

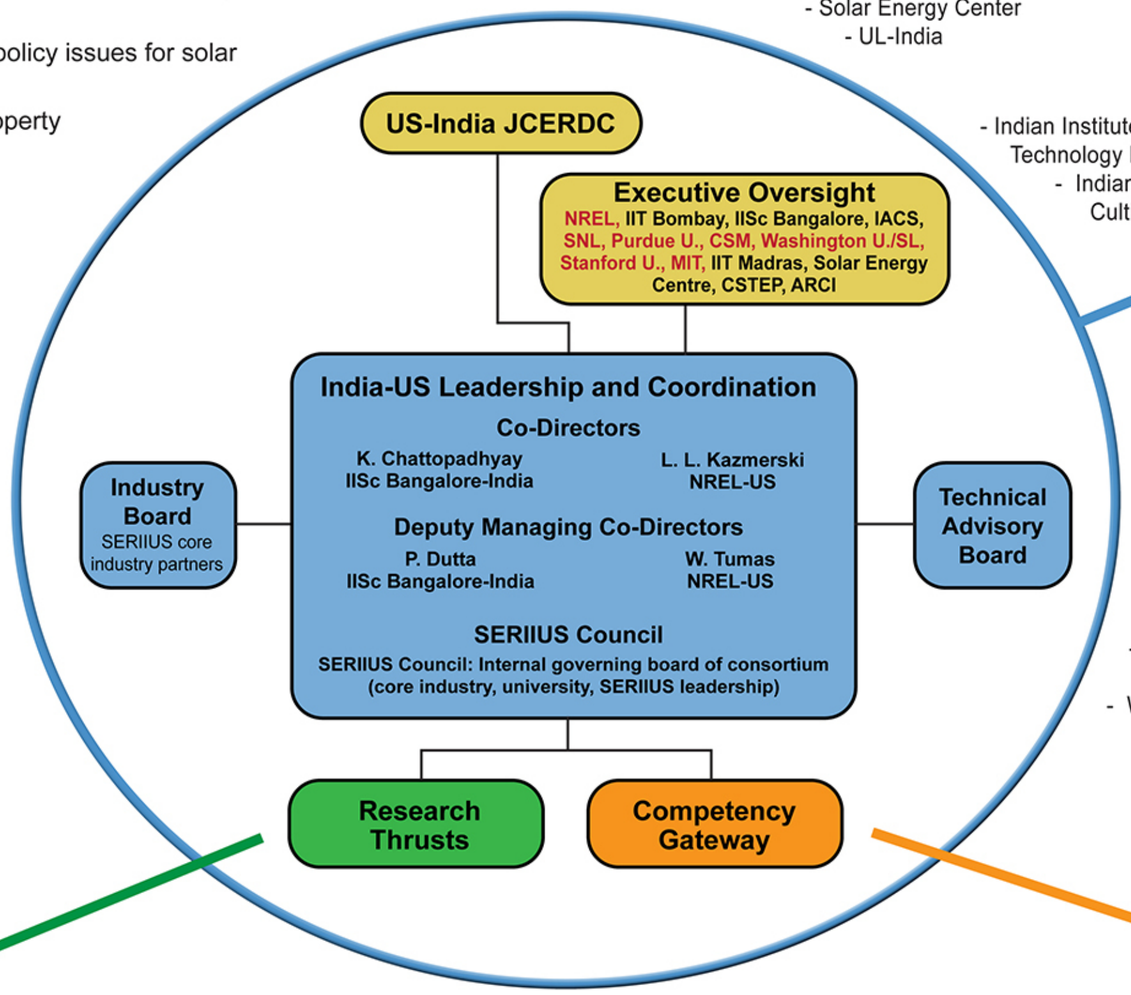
$25 million (minimum) matching funds

SERIIUS Research Strategy

Each **Activity** in a **Thrust** comprises:

- **Consortium Projects** that are higher risk, pre-competitive disruptive or transformative R&D, and
- **Core Projects** that are led by core industrial partners and focus on specific technical issues identified by industry. Core industry partners provide $300K in-kind or $100K cash matching funds.

The Organization



The Leadership Team and Partners

India	United States
Consortium Leaders	
- Indian Institute of Science—Bangalore Dr. Kamanio Chattopadhyay	- National Renewable Energy Laboratory Dr. Lawrence Kazmerski
Research Thrust Leadership	
- Indian Institute of Technology Bombay - Center for the Study of Science, Technology and Policy (CSTEP)	- Sandia National Laboratories - RAND Corporation

Consortium Partners

Institutes and National Laboratories

- International Advanced Research Centre for Powder Metallurgy and New Materials
- Solar Energy Center
- UL-India
- Lawrence Berkeley National Laboratory

University Partners

- Indian Institute of Technology Madras
- Indian Association for the Cultivation of Science
- Arizona State University
- Carnegie Mellon University
- Colorado School of Mines
- Massachusetts Institute of Technology
- Purdue University
- Stanford University
- University of Central Florida
- University of South Florida
- Washington University in St. Louis

Industry Partners

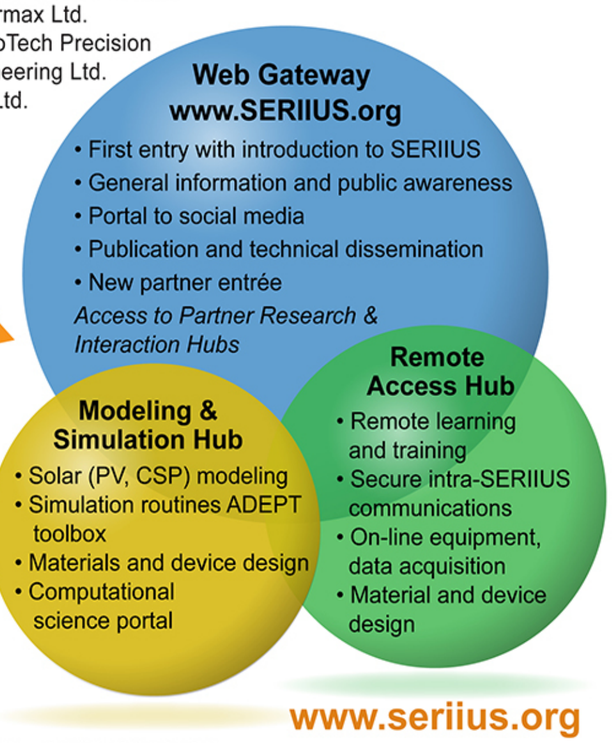
- BHEL
- Clique Developments Ltd.
- Hindustan Petroleum Corp.
- Moser Baer India Ltd.
- Thermax Ltd.
- TurboTech Precision Engineering Ltd.
- Wipro Ltd.
- Alpha/Cookson Electronics
- Corning Incorporated
- General Electric Company
- MEMC Corporation
- Solarmer Energy, Inc.

Research Thrusts

Thrusts	Sustainable Photovoltaics (PV)			Multiscale Concentrated Solar Power (CSP)		Solar Energy Integration (SEI)	
Activities	Earth-Abundant PV and Advanced Processing	Advanced Process/ Manufacturing Technology	Multiscale Modeling and Reliability	High-T, High-P, Closed-Cycle CO_2 Brayton Cycle	Low-T Organic Rankine Cycle	Thermal Storage & Hybridization	Roadmapping & Assessment	Solar Energy Integration and Storage Analysis
Projects	Consortium Projects			Consortium Projects		Consortium Projects	
	Core Projects			Core Projects		Core Projects	

Objectives of the Research Thrust Activities

Sustainable Photovoltaics		
Earth-Abundant PV & Advanced Processing	**Advanced Process/ Manufacturing Technology**	**Multiscale Modeling & Reliabilty**
Develop new scalable absorbers based on Earth-abundant materials and processes.	*Develop ink-based processes for PV elements based on new flexible substrates and printing techniques.*	*Couple materials to module modeling with real-world reliability testing to provide direct feedback to the materials and process development tasks.*
Multiscale Concentrated Solar Power		
High-T, High-P, Closed-Cycle CO_2 Brayton Cycle	**Low-T, Organic Rankine Cycle**	**Thermal Storage & Hybridization**
Develop supercritical 20-80 bar 600-800°C Brayton cycle with >50% efficiency (100 kW to 1 MW)	*Develop organic Rankine cycle with operating at <330°C and with efficiency >20% (25 kW to 1 MW)*	*Develop hybridized storage systems for the diverse temperature ranges of the Brayton and Rankine converters in the first two tasks.*
Solar Energy Integration		
Roadmapping and Assessment	**Solar Energy Integration & Storage Analysis**	
Analyze the necessary market, policy, and technology data to develop roadmaps for the bankable deployment options for solar electric conversion.	*Quantify the interactions of a diverse set of solar electric generators on the grid in India and predict optimum deployment interconnection, validate the modeling. Look at the impact of localized storage and validate with test systems.*	



www.seriius.org

The SERIIUS Web Gateway —

- The point of connection and communication for internal and external exchanges
- The entrée for new partners
- Will be our innovative cyber infrastructure for transformative scientific discovery and interaction.

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U.S. DEPARTMENT OF ENERGY

NREL NATIONAL RENEWABLE ENERGY LABORATORY

CSTEP

Sandia National Laboratories

RAND CORPORATION