

# CREATING LEADERS FOR A SUSTAINABLE TOMORROW

Certificate Programme on

## Grid-connected Solar Rooftop PV System: Design, Development and Simulation



9-10 February 2017  
NIRD, Rajendranagar,  
Hyderabad, Telangana

## ■ Background

The National Solar Mission is a major initiative taken by the Ministry of New and Renewable Energy (MNRE), Government of India in co-ordination with all the State Nodal Agencies (SNAs) to promote ecologically sustainable growth while addressing India's energy security challenge. The Mission had an original target of 20,000 MW which was revised to 100 GW in June 2014, and stipulates implementation and achievement of the target in three phases (first phase up to 2012-13, second phase from 2013 to 2017 and the third phase from 2017 to 2022). The 100 GW target comprises a huge target of 40 GW for grid-connected roof-top solar power by 2022. The successful penetration of roof-top solar power requires substantial support from important stakeholder groups such as Channel Partners/New Entrepreneurs, distribution utilities, regulatory commissions and financial institutions. One important area for sustaining rapid market-growth for the Grid Connected Solar Roof-top Programme is skills and capacity-building. The availability of skilled personnel to design, install and maintain roof-top solar systems will be a bigger challenge than for other renewable technologies because with small system sizes, roof-top solar is more labour-intensive than ground-mount solar. However, the upside of this is that the roof-top solar industry will generate more employment than the other technologies. Against this backdrop, TERI proposes to organize a comprehensive training programme on roof-top PV system design best practices for new entrepreneurs, channel partners and engineers. The training is designed with a goal to enable the target groups to develop specific understanding on basic concepts of solar PV potential assessment and PV system design. Apart from the technical component, regulatory directives and financial aspects of roof-top solar PV would be covered in the training program.

## ■ Objectives

The overall objective of the proposed training programme is to provide training, subject specific knowledge addition to new entrepreneurs, channel partners and renewable energy engineers to take up assessment, yield estimation and system design for grid connected solar rooftop plants and also perform basic financial calculations for determining cost of energy from them.

## ■ Key Takeaways

- Understand grid-connected rooftop (GCRT) solar PV plants (1 – 500 kWp), their features and functionalities
- Software based designing of GCRT and estimation of yield through simulations
- Understand the preparation of site assessment report

## ■ Outcomes

- The programme will enable the participants to undertake system designing for the government and private buildings as required in the SECI programme implementation
- The pool of trained participants will be able to design grid connected solar rooftop systems for project developers selected under the Solar Energy Corporation of India (SECI) Limited and State Nodal Agencies of MNRE.

## ■ Potential Participants

- Graduate Engineers/New Entrepreneurs
- Channel Partners/ Project Developers and System Integrators



## ■ Curriculum

### Introduction and Fundamentals

- Basic understanding of Solar PV technology grid-connected rooftop (GCRT) solar PV plants (1 – 500 kWp), their features and functionality
- Central and State government Solar roof-top policy and regulatory framework

### PV System Estimation and Design

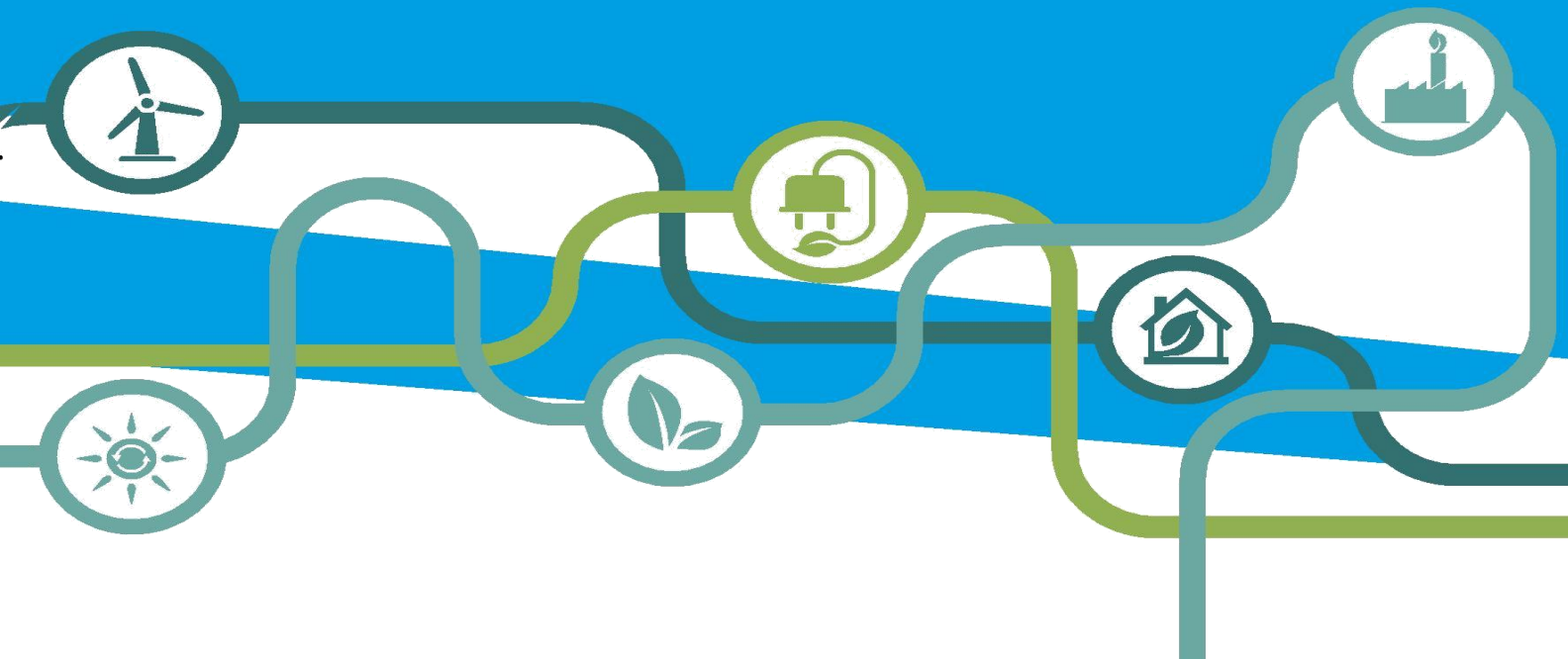
- Understanding the requirements of site assessment report as per SECI format
- Assessment of solar PV potential and shadow analysis at site using on-site measurements, software tools and meteorological data
- Understanding customer requirements and PV system sizing
- Design of photovoltaic (PV) systems, including selection of system components & their sizing using software tools (PVSyst)
- Power evacuation from PV plant into grid
- Estimation of energy yield considering system losses and comparison with actual system
- Remote monitoring of power plants and preventive maintenance

### Financial Evaluation

- Determining levelized cost of energy from solar PV plants
- Determining payback period and Net Present Values
- Difference between CAPEX and RESCO business models

### Practical Sessions

- Exercise on PV System Design
- Site-visit



## ■ Pedagogy

The above set of modules will be covered during the two-day programme. Through lecture sessions, case studies, practical exercises and site visits, this programme aims to equip the participants to take up and handle Solar Roof-top PV Projects in the market.

## ■ Programme Faculty

Mr. Alekhya Datta, Associate Fellow, Electricity & Fuels Division, TERI

Mr. Arun Joshy, Research Associate, Electricity & Fuels Division, TERI

Mr. Abhinav Jain, Research Associate, Electricity & Fuels Division, TERI

## ■ Certificate of Participation

A certificate of participation shall be given by TERI to the participants on successful completion of the programme.

## ■ Venue

National Institute of Rural Development and Panchayati Raj (NIRD)

Rajendranagar, Hyderabad - 500030, T.S, INDIA | Phone: 91-40-24008526

## ■ Programme Fee

Non-Residential: INR 12,500 + Service tax @15% per participant

The fee includes programme fee, course material, course kit, and arrangements for lunch along with tea/snacks during the programme. Reaching the programme venue would be the responsibility of the concerned participant.



#### Note

- Nominations should reach TERI Management Development Programme Division latest by February 2, 2017.
- The number of participants is restricted to 30 in order to maintain an interactive batch and the registration will be on first-come, first-served basis.
- Organizational sponsorship is generally required but can be waived off in case the participant is likely to gain significantly from the programme for personal improvement or greater job effectiveness.
- Please confirm your nomination/participation by returning the enclosed registration form duly filled along with the registration fee at least 7 days in advance prior to the commencement of the programme.
- Pre-registration and pre-payment is a must.
- Programme fee is neither non-refundable nor adjustable against any other event of TERI.
- All nominations are subject to review and approval by the programme faculty (usually after the due date for receiving nominations). A formal acceptance letter will be sent to the selected nominees accordingly. Nominees are requested to make their travel plan only after receiving the acceptance letter.

## ■ Payment Options

- (a) The payment needs to be made in favour of 'The Energy and Resources Institute' in the form of Demand Draft payable at New Delhi. Kindly dispatch the duly filled registration form with the demand draft at the address mentioned in the registration form.
- (b) The payment against the programme fee can also be made through the online mode (NEFT/ RTGS transfer); the bank details are mentioned below:  
Name of the A/c Holder: The Energy and Resources Institute  
Savings Account Number: 52142907894  
Name of the Bank: State Bank of Hyderabad  
Branch: SCOPE Complex, New Delhi – 3  
NEFT IFSC Code: SBHY0020511  
RTGS IFSC Code: SBHY0020511  
9 Digit MICR Code: 110004005  
Please ensure that the code 'MDPGCRT' is mentioned as reference to the payment made through online mode
- (c) Payment Gateway:  
Please visit MDP website (<http://www.teriin.org/management-development-programme>) and pay through the individual programme online payment option.

*If you pay online, please e-mail us the complete transaction details immediately so that we can connect your remittance to your nomination.*



## ■ About TERI

TERI (The Energy and Resources Institute) established in 1974, is led by its vision of 'Creating Innovative Solutions for a Sustainable Future' developing in-depth expertise and a sound knowledge base through research, documentation, policy formulation, innovation, and capacity building in key focus areas related to the environment and energy, including climate change, energy efficiency, renewable energy, biotechnology, social transformation, sustainable habitat, and knowledge management.

TERI is the largest developing country institution of its kind working towards sustainability and is deeply involved in formulating local and national level strategies to shape global solutions to critical environmental issues. TERI has been ranked as a top global Climate Think Tank under the category 'Absolute Ranking' in 2015 by the International Centre for Climate Governance (ICCG).

## ■ About TERI University

TERI University was conceived in 1998 to cater to the need of disseminating the vast reservoir of knowledge created by TERI, a not for profit, independent research institute recognized globally for its contribution to scientific and policy research in the realms of energy, environment, and sustainable development.

The genesis of TERI University is rooted in the comprehensive research, consultancy and outreach activities of TERI. The relationship with TERI has propelled and influenced the evolution of the University's academic units. This relationship is enshrined in a memorandum of understanding between the University and TERI, wherein the two have agreed on collaborative research and programmes, joint studies and mutual support for seminars, symposia and conferences.

Since its inception, the University offers not just world-class education, but also an environment that enables its students to develop fresh perspectives on their subjects of study. Giving an importance to international perspectives in its programmes, TERI University has entered into memorandums of understanding with several international universities aimed at facilitating mutually beneficial exchange of students, faculty, knowledge, resources and ideas.

The Institute conducts the following major programmes:

- Ph.D. in Energy and Environment
- M.Tech in Renewable Energy Engineering and Management
- MBA in Business Sustainability
- Advanced PG Diploma in Renewable Energy
- M.Tech in Urban Development & Management
- M.Sc in Environmental Studies and Resource Management
- Certificate Courses and Management Development Programmes for working professionals

Centres and Departments: Department of Natural Resources, Centre for Bioresource and Biotechnology, Department of Energy and Environment, Department of Regional Water Studies, Department of Policy Studies, Department of Business Sustainability

## CONTACT

For further details, please contact, TERI Management Development Programme Division:

Mr Gagan Suneja, Dy. Manager, TERI MDPs | gagan.suneja@teri.res.in | 011-24682100 (Ext: 2043)

Ms Sakshi Gaur, Programme Officer, TERI MDPs | sakshi.gaur@teri.res.in | 011-24682100 (Ext: 2017)

# REGISTRATION FORM

## MANAGEMENT DEVELOPMENT PROGRAMME

We are nominating the following personnel from our company to attend the Programme:

<p>Participant Information</p> <p>Prof./Dr/Mr/Ms.....</p> <p>Position:.....</p> <p>Email:.....</p> <p>Mobile:.....</p>	<p>Programme Code :.....</p> <p>Programme Date :.....</p> <p>Fee :.....</p> <p>Non Residential :.....</p> <p>Residential :.....</p> <p>Payment Details:</p>
<p>Participant Information</p> <p>Prof./Dr/Mr/Ms.....</p> <p>Position:.....</p> <p>Email:.....</p> <p>Mobile:.....</p>	<p>• Online Mode (NEFT/RTGS):</p> <p>Name of the A/c Holder: The Energy and Resources Institute</p> <p>Savings Account Number: 52142907894</p> <p>Name of the Bank: State Bank of Hyderabad</p> <p>Branch: SCOPE Complex, New Delhi – 3</p> <p>NEFT IFSC Code: SBHY0020511</p> <p>RTGS IFSC Code: SBHY0020511</p> <p>9 Digit MICR Code: 110004005</p>
<p>Participant Information</p> <p>Prof./Dr/Mr/Ms.....</p> <p>Position:.....</p> <p>Email:.....</p> <p>Mobile:.....</p>	<p>• Offline Mode:</p> <p>Demand Draft in favour of 'The Energy and Resources Institute' payable at New Delhi.</p> <p>Enclosed Cheque/Demand Draft no.....</p> <p>dated.....for `.....</p> <p>in favour of 'The Energy and Resources Institute' towards Programme fee. Please mention 'MDPGCRT' while making online or offline transaction.</p>
<p>Participant Information</p> <p>Prof./Dr/Mr/Ms.....</p> <p>Position:.....</p> <p>Email:.....</p> <p>Mobile:.....</p> <p>Organization:.....</p> <p>Address:.....</p> <p>Town/State: ..... Pin Code: .....</p>	<p>The completed Registration Form with Account Payee Draft or with the details of the online payment should reach the following address 10 days in advance, prior to the commencement of the programme.</p>
<p>Authorization: (Signatory must be authorized to sign on behalf of the organization)</p> <p>Name:.....</p> <p>Position:.....</p> <p>Signature:.....</p>	<p>Ms Sakshi Gaur   The Energy and Resources Institute (TERI)   Darbari Seth Block, IHC Complex, Lodhi Road   New Delhi 110 003, INDIA</p> <p>  Tel. (+91 11) 2468 2100 &amp; 4150 4900</p> <p>  Fax: (+91 11) 2468 2144 and 2468 2145</p> <p>  E-mail:sakshi.gaur@teri.res.in</p>

