SOLAR ANALYTICS

2nd Program on SOLAR ANALYTICS

(5 DAYS WORKSHOP ON BIG DATA ANALYTICS AND DATA SCIENCE (ML/AI) IN CREATING PLANT EFFECIENCES FOR SOLAR SYSTEM)

PROGRAM DATE: 4th NOV- 08th NOV ,2019
VENUE: NISE CAMPUS, GURUGRAM
Last Date to Submit Form: - 31st October 2019 (Thursday)

Program Brief

SOLAR PLANT DATA ANALYSIS APPLYING DESCRIPTIVE ANALYTICS, DIAGNOSTIC ANALYTICS & PREDICITVE ANALYTICS IN ASSESSING PLANT CONDITION AND FUTURE OUPUT WITH REAL TIME ANALYTICS OF BIG DATA (PLANT PARAMTERS, RADIATION, SENSORS, SCADA ETC) APPLYING MACHINE LEARNING PRINCIPLES

About NISE

National Institute of Solar Energy (NISE), an autonomous center of excellence of Ministry of New and Renewable Energy, Government of India, is conducting national skill development programs to meet the needs and upgrade the technical expertise of solar professionals.

About PRAGYA SOLAR

Pragya Solar, is a social startup in solar with the vision to bring solar adoption awareness in India aligned with National Solar Mission principles. Pragya Solar has conducted Entrepreneurial development workshop for 250 individuals and 1500 students across the nation of which 25 individuals are standing on their own feet. Pragya Solar is represented by profession from IIT/NIT & Harvard University Alumni. Pragya is a step towards innovation & transformation with niche offering aimed at nation development thru skill enhancement and opportunity creation.

Learning Objectives

- How to Gain intelligence on plant data and analyze the output with descriptive modelling to understand the current operation
- Understand the parameters which contribute to the variable generation and diagnostics analytics on assessing their impacts
- Explore the methods of Statistical analysis to analyze the data quality from different sources and making it ready for exploratory and inferential analysis
- Understand the basics of plant sustainability with predictive modelling to assess solar plant output, solar cell efficiencies and degradation, inverter outputs and cables /joints impacts
- How to achieve the optimization at the plant level and parameters contributing to same

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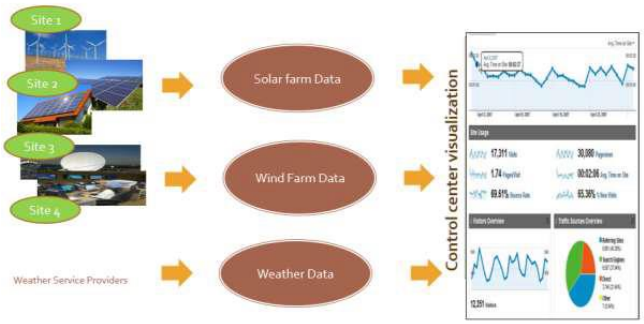
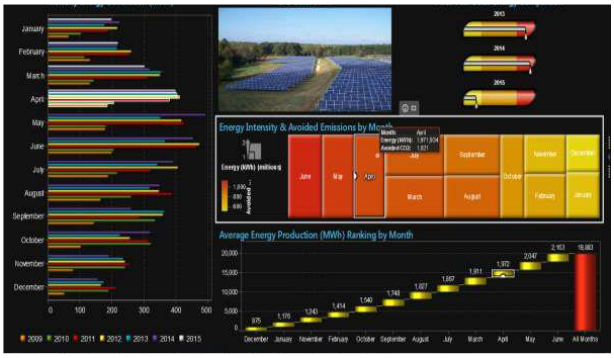
About the Program

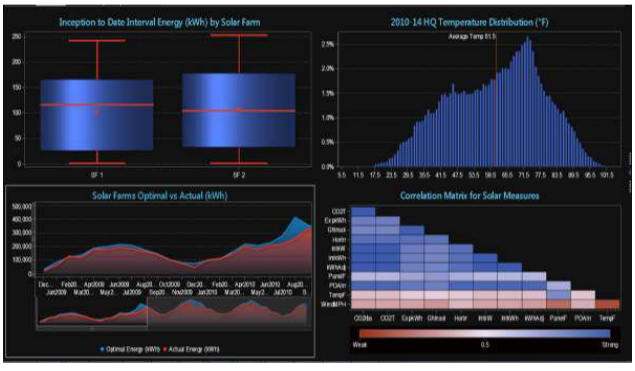
Solar Sector is growing at a tremendous pace with government aiming to achieve 100GW target till 2022. This initiative has seen government directive on solar adoption as grounds up, roof top system across longitude and latitude of India. Solar system works with solar radiation, which create impact on the output energy depending on the quality radiation, cloud cover, ambient temperature, and module technology. Today there is need of knowledge of weather forecasting / solar generation forecasting as it helps the utility professionals with long terms analysis on solar energy generation, O&M, with its relevance and impact on the grid stability, load balancing, addressing peak power demands, creation of power portfolio within utility power purchase basket on renewable energy. Energy Audit of Solar plant is the key objective looked upon for already installed facilities when they are looked upon their quality generation

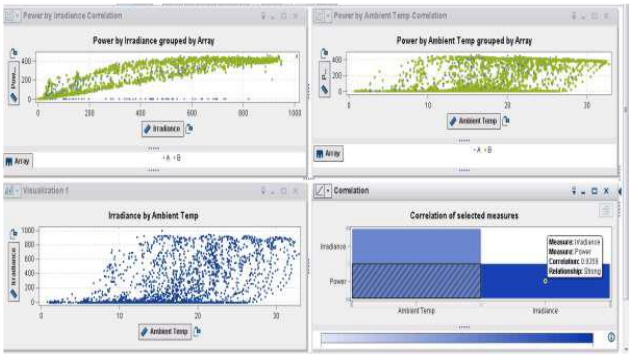
Like other energy operations SOLAR too generate BIGDATA (radiations, plant parameters etc.) which need to be studied for effective operation as large utility power output impacts power evacuation and grid balancing perspective for state as well as central utility.

SOLAR ANALYTICS is aimed at Developing **CoE (Centre of Excellence) on analytics** for organization as well as developing skills for managing the same. The program encompasses the combination of solar domain with the technology like Internet of things (IOT), Machine Learning, predictive modelling, forecasting, optimization which has to be understood by utility/solar plant engineers and decision makers to carve differentiator for their utility operations in resolving day to day problems. For private sector solar generators Analytics in today's scenario is used by organization in creating a competitive edge, wherein market share is getting limited and margins are shrinking with each passing day as well as address long term perspective of operational efficiency, Energy Audit, Financial return on investment. In today's scenario organizations are preferring to onboard professional who are prepared in taking responsibility at business with less project deployment expenses/learning. This program would help professional/organization carve a difference for themselves at workplace and help establish a foundation of deep analytics for organization they are part of.

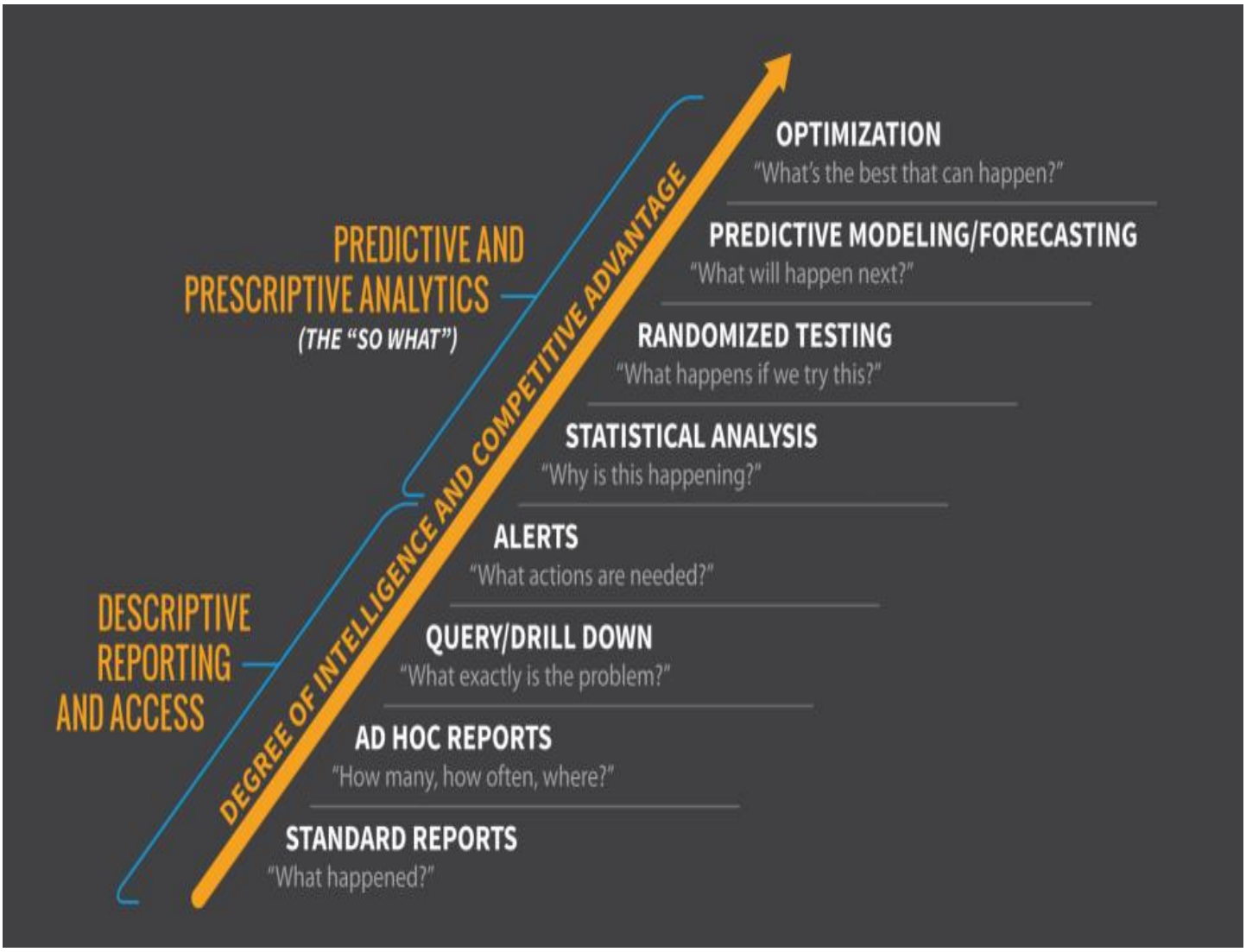








SOLAR ANALYTICS



Target Audience :

Graduates, Engineers, Management consultants, Consulting firms, Solar Entrepreneurs; Public Sector Undertaking Officials; solar Developers & EPC contractors; Senior Energy Department Officials of Govt. of India, Engineers from Power DISCOMS

Program Fees :

Training Fee per participant Rs. 25,000 + GST of 18%

Batch Strength will be limited to 25. Lunch, Tea will be provided during all five days. However no TA/DA will be provided. Accommodation at NISE Guest house is available on payment basis (600/- per day), depending on the availability of the rooms.

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Participants Profile- 1st Program on

Solar Analytics, 17st-21st December@ NISE Campus

Name-> **Neeraj Srivastava**

Current Organization-> **Tata Power Trading Company**
Location-> **Delhi**
Role/Designation-> Head -Renewable Trading
Work Description-> Power Trading Forecasting, DSM strategy

Program Feedback -
www.youtube.com/watch?v=y3Z8ZnItjok

Name-> **Sama Hari Kumar**

Current Org-> **China Lighting Power company**
Location-> **Hyderabad (Telangana)**
Role/Designation-> Solar Plant –Operation /Planning
Work Description ->. Have been working on excel to Evaluate Solar plant Condition

Program Feedback-
www.youtube.com/watch?v=GdlONIPrnug

Name-> **Venkata Murali Ravi Sankar Mallampalli**

Current Organization-> **MSL Electricals And Electronics PVT LTD**
Location-> **Qatar**
Role/Designation-> Managing Director
Work Description-> Entrepreneur In Solar Sector and working in diversifying portfolio in global market on newer solar trends

Program Feedback –
www.youtube.com/watch?v=UuvHrGxlx0A

Name->**Lakshmi Nambiar**

Current Organization-> **Amrita School Of Engineering**
Location-> **Kerala**
Role/Designation-> **Research Scholar**
Work Description-> Have a start up working on Load forecasting & management and moderating wit with off grid solar power supply

Program Feedback -
www.youtube.com/watch?v=n1o2QA3SImI

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Name-> **Gaurav Saini**

Current Organization-> **Saini Power Transactor Company**
Location-> **Chandigarh**
Role/Designation-> Director
Work Description-> Power Trading , Solar Energy Trading, guide customer on solar energy dynamics and analytics

Program Feedback -
www.youtube.com/watch?v=jSQgTyvNY9g

Name->**Naveen Kumar**

Current Organization-> **National Institute Of Wind Energy**
Location-> **Chennai, Tamil Nadu**
Role/Designation-> Project Engineer
Work Description-> The Action plan which can be taken with the help of Solar Analytics and forecasting and help states like Tamil Nadu and Karnataka on renewable energy balancing

Program Feedback -
www.youtube.com/watch?v=eaaA9dW9DPA

Name-> **Biswajit Dutta**

Current Organization->**Ex Trina Solar**
Location-> **Gurugram, Harayana**
Role/Designation-> Management Consultant
Work Description-> Helping Clients in making decision on M&A, Investment , Expansion /Diversification of portfolio in Solar Sector,

Program Feedback -
www.youtube.com/watch?v=vYrEY3h-zso

Name-> **Subrata Bhattacharya**

Current Organization-> **Entrepreneur**
Location-> **West Bengal**
Role/Designation-> Director
Work Description-> Start Up working in direction of creating new applications to help consumer get benefited by solar data analytics. Getting the Solar data right way and how it can be transformed using Solar Analytics.

Program Feedback -
www.youtube.com/watch?v=_8xQscgGjxI

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Name-> **Parth Tyagi**

Current Organization-> **Ex Infosys**
Location-> **Noida,Uttar Pradesh**
Role/Designation-> Developer
Work Decription-> computer science graduate with interest to grow in area of Solar worked for 2 years in programming.

Program Feedback -
www.youtube.com/watch?v=V2DjhgzxM1I

Name->**Puspal Manna**

Current Organization->**State Engineering College Arunachal Pradesh**
Location-> **Arunachal Pradesh**
Role/Designation-> Electrical Engg Student
Exposure to Analytics-> understand the dynamics of Solar to start up new venture

Program Feedback -
www.youtube.com/watch?v=8rM7VUT81KM&t=19s

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Feed Back and Interaction with Dr A. K Tripathi (Director General , NISE)

1 www.youtube.com/watch?v=oogw2sbVrq4
2 www.youtube.com/watch?v=9ZeBoeF8pXI
3 www.youtube.com/watch?v=JBorwPMHICs

Program Certificate for Participants

NISE

PRAGYA SOLAR

NISE/SA/2018-19/10

Award of

Certificate

to

Biswajit Dutta

(Gurugram)

for successfully completing the

5 days Skill Development Program on Solar Analytics

Organized By

National Institute of Solar Energy

(An Autonomous Institute of Ministry of New and Renewable Energy, Govt. of India)

Gurugram, Haryana-122003, India

(17th December - 21st December, 2018)

Dr. Chandan Banerjee
Dy. Director General, NISE

Dr. Arun K. Tripathi
Director General, NISE

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TENTATIVE PROGRAM DETAILS

PROGRAM DATE: 4th NOV to 8th NOV, 2019 VENUE: NISE CAMPUS, GURUGRAM

DAY	DURATION	Topic	Activity & Learning
1	10:00 am - 11:30 am with Tea Break	**Introduction to analytics**	What is Data Analytics and its life cycle for industry (Descriptive Analytics, Diagnostics Analytics, Predictive Analysis, Prescriptive Analytics) with reference to SOLAR DOMAIN
			What are the components of data Analytics (Data integration, Data preparation, Data processing/modelling, Data visualization)
			what is BIG Data in Solar
			What is IOT
	11:45 am - 1:00 pm	**Introduction / components of solar analytics/ usefulness of solar data/ solar system pre-requisites**	Solar Radiation data and SRRA
			solar industry preview and integrated role of solar analytics- from business stand point
			solar data sources/parameters/variables - solar irradiance (direct, diffused, reflected, refracted), impact of weather parameters (wind, humidity, precipitation, cloud etc.)
			Impact of solar components on power output or generated energy - panels, cables, inverter
	1:00 pm - 2:00 pm	**BREAK**	LUNCH
	2:00 pm - 3:00 pm	**SITE VISIT**	**VISIT TO SOLAR INSTALLATION IN THE NISE PREMISES**
	3:00 pm - 4:00 pm (with tea break	**Solar Data Management**	Know your data - What kind of data is important for Analysis (ground mounted/ roof top). Data types (structured, unstructured, real time, discrete etc.)
	4:15- 5:00 pm	**How do we get the data**	Solar Radiation data- HOW to get the data - data sources/databases, FIELD sensors/instruments/SRRA/data logger
			Weather data - How to get the data - public domain/weathering agency
			Energy efficiency data - Solar Energy generation data PR & CUF data analysis for the solar plant

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DAY	DURATION	Topic	Activity & Learning
2	10:00 am - 11:30 am with Tea Break	**Solar Analytics**	Introduction to Analytics, key components of analytic-data management, business intelligence and correlation/regression
			Analysis of different solar parameters for data driven approach
			Understanding impact of variables like GHI, DNI, Cell data, temperature, weather data influence on the outcome
	11:45 am - 1:00 pm	**Business Solar Analysis**	Building relation and their impact on Generation, Financial impact, Operation impact Analysis using Descriptive analysis
	1:00 pm - 2:00 pm	**BREAK**	LUNCH
	2:00 pm - 3:00 pm	**CASE ANALYSIS**	**SOLAR PLANTS DATA ANALYSIS**
	3:00 pm - 5:00 pm with tea break	**Solar descriptive analytics**	Introduction to Business Intelligence (BI) tool
			Hands on exercise on the Solar Descriptive Analytics- Show casing how to work on this rule using the tool, by simple bar graph, comparative charts, how to Build up KPIs, KRA in solar space
DAY	**DURATION**	**topic**	**Activity & Learning**
3	10:00 am - 11:30 am with Tea Break	**Solar Data Management principles - Statistical modelling of solar data**	Moving tor predictive analysis with Data aggregation techniques, Data cleaning techniques, Data Quality
			Role of Statistic in Solar data Analysis
	11:45 am - 1:00 pm		Introduction to data Management/aggregation tool thru platform like “Aaas” Analytics as a Service
	1:00 pm - 2:00 pm	**BREAK**	LUNCH
	2:00 pm - 3:00 pm	**CASE ANALYSIS**	**ROLE OF INTEGRATED VIEWING OF RENEWABLE PLANTS**
	3:00 pm - 5:00 pm with tea break	**Solar Data Management Practical**	working on data from the large grounds up MW level plant on solar data analysis thru platform like “Aaas” Analytics as a Service
			practically understand how to work on solar plant data analysis thru platform like “Aaas” Analytics as a Service

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DAY	DURATION	Topic	Activity & Learning
4	10:00 am - 1:00 pm with Tea Break	**Solar Advanced Analytics- Regression modelling**	• Drive Plant Energy Audit • Plant operational Efficiency • Plant Generation and ROI analysis • Net return on Investment Establish relationship between impact of solar radiation data , temperature, weather thru regression analysis using R
	1:00 pm - 2:00 pm	**BREAK**	LUNCH
	2:00 pm - 3:00 pm	**CASE ANALYSIS**	**LARGE MW LEVEL PLANT CASE ANALYSIS**
	2 pm -5:00 pm with tea break	**Solar Advanced Analytics- Regression modelling -Practical**	Understand how to evaluate plant operating variables relations (univariate, bi variate, multi variate , collinearity) in solar , derive meaning full output from the plant data relations. Solar cell degradation analytics Solar Plant Audit
DAY	**DURATION**	**Topic**	**Activity & Learning**
5	10:00 am - 1:00 pm with Tea Break	**Solar Advanced Analytics - Time series predictive modelling-Practice**	Role of Renewable Energy Monitoring Centre. Working on Solar Data towards - forecasting & predictive analysis. Understand the Industrial usage of the same in Solar arena - yearly, monthly, weekly, day ahead, intraday forecast. Impact of solar forecasting for developer, EPC player, Financial organization, Investor, Consultant, Power utilities. Exposure to approach and methodology for solar forecasting forecasting variables and data for a solar plant, working on a business case with modelling and forecasting platform as R. The short-term forecasting can help grid balancing for Load dispatch center
	1:00 pm - 2:00 pm	**BREAK**	LUNCH
	2 pm -4:00 pm tea break	**Solar Advanced Analytics – Artificial Intelligence on SOLAR CELL**	Usage of Artificial Intelligence in analyzing the SOLAR CELL DEGRDATION
	4:00 pm - 4:30 pm		PROGRAM FEEDBACK
	4:30 - 5:00 pm	**PROGRAM CLOSURE**	**DISTRIBUTION OF CERTIFICATE**

SOLAR ANALYTICS

Registration:

Training Program on SOLAR ANALYTICS

Date: 04th November to 08th November 2019

Registration Form

Name of Delegate/Participant:

Name of the Organization:

Designation:

Contact Number:

Email Id:

NEFT / RTGS Number:

Amount/Date of payment:

Bank Details of NISE:

Account Holder Name:	National Institute of Solar Energy-Capacity Building
Bank Name:	State Bank of India
Branch:	State Bank of India – DLF Qutab Enclave, Shop No:109-110, Qutab Plaza Shopping C, Gurugram
SB Account No.	37266665652
IFSC Code:	SBIN0006604
Branch Code:	6604

The participants must clearly indicate send their bank transfer details (by e-mail) in advance to the Course Coordinator, then only, the participants could be allowed to attend the training programs.

Contact Information: Administrative

Information Submission forms can be sent through email only (startups.nise@gmail.com). The last date to submit the form is **31st OCTOBER 2019 (Thursday).** For any queries please write an e-mail to **Dushyant@nise.res.in** or call to **Mr. Dushyant, Head, Technology (9560329740/)** NISE shall respond to your queries on immediate basis. Upon receipt of application and proof of deposit of payment (such as screen shot or electronic receipt of scanned copy of IMPS/NEFT/On-line transfer receipt, etc.) by e-mail, NISE shall confirm the seat to individual candidate by return e-mail. The consolidated list of all participants shall be sent to all confirmed candidates one or two days in advance by email.

Contact Information: Technical

Mr Sumit Gupta (**9560329740),** sumit.gupta@pragyasolar.in

For **Accommodation (on payment basis)** please contact -Mr. Deepak Mathur (Deepak.mathur@nise.res.in)

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Program Frequently Asked Question

1) What are the eligibility criteria for its enrolment (like Qualification, Work experience etc.)?

Work Experience:
This program is ideal for people who have been working in Solar industry and have exposure to data and have had challenges in managing the same to give a meaningful insight to the business they are part of, for themselves as well as for their clients.
An excellent opportunity to practically understand how your business data can help in your growth by working beyond the spread sheets with application of decision science in your business environment
Eligibility:
Background in any would be useful Engineering/ Science/ Economics/ Statistics/ Finance/ Management/ Information Technology

2) I am a profession with good number of years of Industry Experience. How will this workshop benefit me in running my business or managing my client?

Benefit:
The program is designed in a manner wherein concepts are explained through practical sessions on tools. You are encouraged to being your data and work around the tool and take some meaningful insight back to your workplace in form of your learning and understanding the way the learning can be applied in your business environment

.4) Do I need to carry my personal laptop for doing the practical sessions?

Kindly bring in your laptop as you would need to install the software on which you would be working.
Alternatively, once you confirm your program participation, we may also send you the link from where you can download the software in advance which would save time to do more of practical session in the class.
The laptop configuration, can be minimum 2 GB RAM, 1.5 GHz speed, with i3 or above and any OS

5) Whom to contact for more information regarding technical session plan?

You can write an e-mail to **Mr Sumit Gupta (9560329740)** between 10 am -6 pm (all days) on , **sumit.gupta@pragyasolar.in**

6) What tool(s) would be used for the workshop and how to get the same?

The tools that would be used shall be given to participation on registration.

7) What certificate is given at the end of the program.

The program certificate is towards participation and learning on the REAL time project which will have unique identifier.