

# PRACTICAL TRAINING & HOST COMPANY

After the completion of Expert Training Course 1, participants are required to complete the on the job training within a durations of 6 months.



## PROJECT PROFILE

### STRUCTURE OF ON THE JOB TRAINING

<b>Required Personnel</b>	A company representative	OR 1-2 local consultants (energy manager, researcher & academician) will be matched to the participating company
<b>Tasks for OJT Personnel</b>	Energy efficiency audit, task to be completed within a duration of 6 months	

# MALAYSIA ENERGY EFFICIENCY AND SOLAR THERMAL APPLICATION PROJECT

The company is required to register as a Host Company for the OJT and will benefit from:

- Free energy audit report on the thermal energy efficiency findings and solar thermal integration at the completion of the training course.
- Free technical support and consultancy from national and international experts.
- Free use of equipment provided by MAEESTA during the audit assessment.
- The opportunity to join the demonstration project where MAEESTA will cover 20% of the equipment cost for the solar thermal system implementation.

As a condition to become a Host Company, the company must use heat in their processes and commit to provide support during the training course.



#### Office & Mailing Address

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# THE MAEESTA BACKGROUND

MALAYSIA  
ENERGY EFFICIENCY  
AND SOLAR THERMAL  
APPLICATION  
PROJECT

# PROJECT OBJECTIVE

Project Start - July 2014

## Benefits of the MAEESTA Project & Solar Thermal Technology

The Malaysia Energy Efficiency and Solar Thermal Application Project (MAEESTA) is a national initiative supported by the Government of Malaysia, funded by the Global Environment Facility (GEF) and implemented by the United Nations Industrial Development Organization (UNIDO).

This 5-year project was developed based on Malaysia's vast potential for thermal energy savings and solar thermal energy utilization and is linked with Malaysia's commitment to reduce greenhouse gas (GHG) emissions through its Intended Nationally Determined Contribution (INDC).

The MAEESTA project aims to reduce fossil CO<sub>2</sub> emissions by promoting and demonstrating sector-specific energy efficiency (EE) improvements and solar thermal technology

utilization in industry. The project focuses on improving thermal EE at manufacturing and processing plants with possible integration of solar thermal systems in targeted industrial sub-sectors.

Based on their potential for energy savings, the industry with feasible processes in low and mid temperature range such as Plastic, Rubber, Textile, Food & Beverage, Chemicals and Pharmaceutical, Agribusiness, Pulp & Paper, Metal Surface Treatment as well as Hospitality.

The daily management of the project is led by a Project Management Unit (PMU) established within SIRIM Bhd, the national executing agency. The National Project Steering Committee (NPSC) is chaired by MOSTI. Other stakeholders of the project include KeTTHA, MITI, MNRE, ST, SEDA, MIDA, EPU, SME Corp, MGTC, SERI and FMM.

The project title is "GHG Emissions Reductions in Targeted Industrial Sub-Sectors through Energy Efficiency and Application of Solar Thermal Systems in Malaysia".

To reduce GHG emissions by promoting and demonstrating sector-specific EE improvements and solar thermal technology utilization in industry.

## Core Project Components

### Component 1

Development of **regulatory framework, support programme** and **financial incentives** scheme to facilitate solar thermal energy utilization.

### Component 2

**Awareness raising** and capacity building programme relating to process heating and cooling optimization and solar thermal energy utilization.

### Component 3

**Demonstration** and **scaling up** of sector-specific EE and solar thermal energy utilization in targeted industrial sub-sectors.

### Bright Prospects For Solar Thermal

Malaysia's geographical vicinity to the equator is an advantage. The country has constant solar radiation which has high potential for the constant supply to the thermal process.

Fossil fuel used for industrial thermal applications accounts for 67% from the total Energy Demand.

Extensive use of steam in industrial applications indicates high potential for solar heat application.

Solar heat can be used as supplementary heat with heat recovery systems for feed.

### Expected Outcome 1

Policy paper and financial incentive scheme established and endorsed by stakeholders

### Expected Outcome 2

Awareness and capacity of equipment vendors, service provider, industry management, plant engineers, and financial institutions in targeted industrial sub-sectors strengthened and utilized.

### Expected Outcome 3

Thermal energy efficiency (EE) and solar thermal technology demonstrated and deployed in targeted industrial sub-sectors

# DEMONSTRATION PROJECT, CRITERIA & ASSISTANCE

# TYPES OF TRAINING, TIMELINE & OBJECTIVES

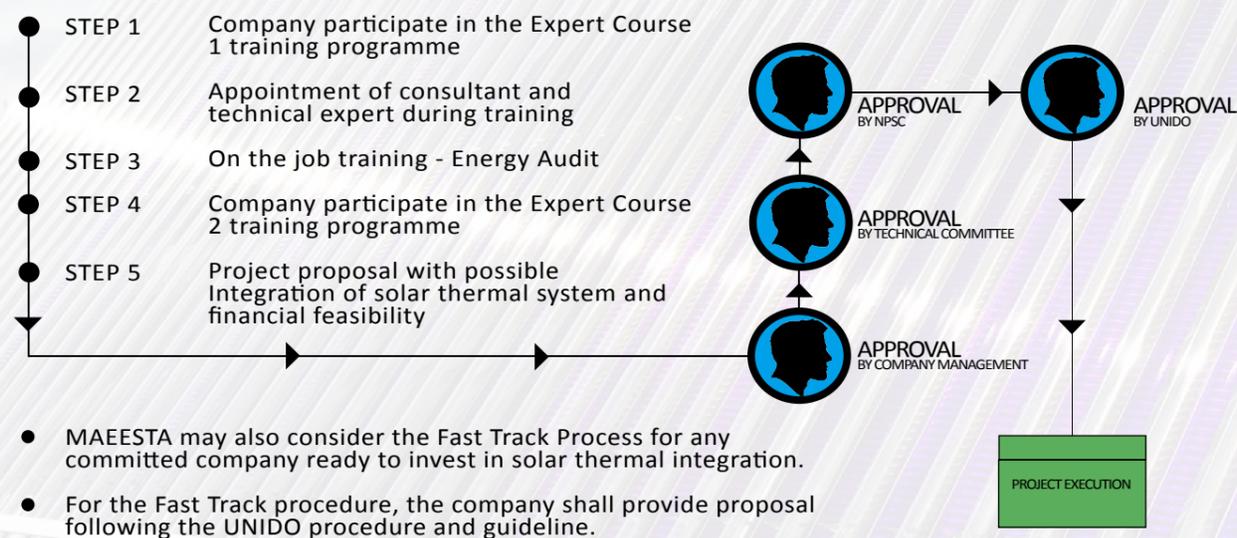
Training programme on energy efficiency based on process heating and cooling and on solar thermal technology for energy managers, engineering and consultants companies, equipment manufacturers, suppliers or vendors, universities and other research institutes, and interested audience from selected sub-sectors.

## CRITERIA FOR THE SELECTION

- Registered entity under Company Act, 1965 or government entity
- Fall under targeted sub-sectors
- Conducted complete feasibility study by UNIDO consultant
- Commitment from the company to implement and finance the project
- Willingness to share experience from the project with other stakeholders

Grant disbursement is upon project completion and verification by UNIDO. UNIDO will cover 20% (with maximum RM400,000) of the solar thermal system cost excluding civil and structural works.

## PROCESS FLOW FOR DEMONSTRATION PROJECT APPLICATION



## TRAINING TIMELINE

User Training	Expert Training programme		
Basic Training 2 Days	Course 1 4 Days	On the Job Training 6 months	Course 2 4 Days

## AWARENESS SEMINARS

The awareness seminar aims to promote and create awareness for industry, stakeholder, academia and public on EE and solar thermal technology application. The seminar content covers the introduction on the MAEESTA project, energy efficiency measures, solar thermal process heat and cooling application and integration as well as best practice examples (national and international project). Awareness seminars are organized in every region of Malaysia jointly with associations and organizations such as FMM and MAESCO.

We welcome other associations and organizations that wish to organize awareness.

## USER TRAINING GETTING TO KNOW SOLAR THERMAL

On-site improvements in energy efficiency is often the best way to optimise costs and operations. This training which falls under capacity building is conducted by leading international process heating and solar thermal experts - participants will be engaged in an active discussion throughout the course.

# 2 DAYS USER TRAINING COURSE CONTENTS

Basics of Solar Thermal	Solar resources	Solar thermal system designs	Equipments & components
Industrial Processes	Specifications	Advanced & emerging process technologies	Benchmarks
Heat Integration	Energy balance	Design & type of heat exchanger networks	Heat recovery
Standardised Procedures	Solar thermal integration & energy efficiency	Energy audits	Software tools & Internet platforms
Economics & Subsidies	Basic economics calculations with consideration of GHG savings & other environmental impacts.		Incentives & financing
Case Studies	Overview of practices from different industrial sectors in different climates and contexts around the world		

## COURSE 1 ENGAGEMENT TOPICS

### ENERGY ASSESSMENT

- Basics on thermodynamics & energy balance:
  - Energy and mass balance
  - Flow sheets
  - Sankey diagram
  - Measurement procedures
- Steps of an energy audit assessment
- Evaluation of energy supply & demand, including possible optimizations

### ENERGY MANAGEMENT

- Heat Integration:
  - Training on fast assessment tools
  - Pinch analysis
  - Design of heat exchanger network & detailed calculation of heat exchanger
  - Thermal storage management
  - Training on heat integration software (Pinch)
- Exposure to state of the art technologies
- Identification of energy efficiency measures on process & system level including evaluations

### PRACTICAL WORK



Participants will be expected to carry out energy audits and propose suitable energy saving measures for the Host Companies.

Presentation of case studies from targeted industries

## EXPERT TRAINING PROGRAMME

Participants who attended the User Training are encouraged to attend the Expert Training Programme. The aim of this course is to certify Energy Experts and Trainers in thermal energy efficiency and solar thermal technology as well as sharing best practice of the local and international examples.

### Stages of the Expert Training Programme

#### Expert Course 1

Energy Efficiency and invitation of companies to become a Host Company

#### On the Job Training

Conduct energy audit at the Host Company

#### Expert Course 2

Solar Thermal System Design

#### Final energy audit report

Participants must be able to attend all THREE courses to be successfully accepted for the programme. Please refer to the terms and requirements contained in the Expert Training Course Form

## COURSE 2 ENGAGEMENT TOPICS

### SOLAR THERMAL THEORY

#### Participants will explore:

- Solar resources (solar radiation)
- Solar thermal system designs (pumped & thermo-syphon systems)
- Types of collectors (materials & performance criteria)

Components of solar thermal systems

Static considerations of roof structures, manufacturing & assembly

Installation & maintainance

Solar air-conditioning & cooling

Test procedures, standards & quality requirements

### SOLAR THERMAL THEORY

#### Solar Integration Points:

- How to identify, system concepts & collector hydraulics
- Stagnation behaviour of large solar thermal systems
- Potential applications & system integration of solar process heat

System designs of small & large-scale solar thermal systems for residential applications

System designs based on computer simulation (T-Sol)

### CASE STUDIES

Identification of solar thermal integrations

### FUNDING & FINANCING

Basic economic calculations with consideration of GHG savings & other environmental impacts

Possibilities for subsidies, incentives & financing

### PRACTICAL WORK

Presentation & discussion of energy balances of case studies

Discussion of solar thermal systems integration