# SOLAR PAYBACK - TRAIN-THE-TRAINER
# SOLAR HEAT FOR INDUSTRIAL PROCESSES

Tendering and Commissioning of SHIP


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Solar Payback

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# Tendering and Commissioning – Technical Focus

- Tendering
  - Objectives
  - Content
- Commissioning
  - Objectives
  - Procedures

# Content

- Tendering
  - Objectives
  - Content
- Commissioning
  - Objectives
  - Procedure

# Tendering
## Objectives

- Clear definition of service/product requirements
- Establishment of a clear framework for offer assessment and comparison
- Requirements:
  - Be objective and define clearly the scope of services to be offered
  - Clarify the questions/doubts suppliers might have
  - Leave no space for misunderstandings
  - Establish clearly the format and contents of the offers
  - Establish a clear framework for offer assessment and ranking
  - Assure reliability / quality of suppliers

# Tendering
## Content

- The contents of a Call for Tenders depend on the scope of services procured
- General structure :
  - Introduction: Identification of the customer and general objectives and framework of the Call
  - Technical Description: objectives, identification of the interface, identification of the scope of supply, identification of all relevant technical constraints and requirements
  - Description of items: technical description of all the items to be include in the proposal (component and/or service related technical characteristics, conformity/standardization criteria, dimensioning, material properties/specification, reference component / service – when allowed)
  - Testing procedure during commissioning
  - List of items and map of quantities
  - Supplier access conditions
  - List of documentation/information to be included in the offer

# Tendering
## Content

- Based on internal / external engineering
  - **Internal engineering**: the customer already has an engineered solution, described in the tender / the supplier only has to offer specific components / services (E.g.: purchase of a 100 m2 solar field )
  - **External engineering**: the customer only has a definition of the requirements / the supplier has to provide a technical solution (including engineering) as well the components / services enabling its implementation (E.g.: purchase of a solar system suitable for water pre-heating for a 5 ton/h boiler)

# Tendering
## Content - Interface

- The definition of the interface for the scope of supply is paramount for a due definition of customer / supplier responsibilities
- To be defined:
  - Technology (e.g. connection of components),
  - Concept (on a design layout)
  - Material (connection and/or interface accessories)
  - Responsibilities of suppliers and 3rd persons
  - Precise description of existing facilities / equipment
  - Environmental conditions (e.g. corrosivity)
  - Objectives to be achieved with purchase of services, and expected impacts

# Tendering
## Content - Ranking / Selection

- Ranking criteria:
  - Transparency of the assessment process and guides suppliers in the proposal preparation
  - Clears assessment procedures and avoids post-ranking/supplier selection conflicts
  - Might be constrained by regulations (e.g. public procurement)
- Possible criteria
  - Price, warranty, supplier track record, quality of the proposed technical solution
  - Criteria shall be weighted according to the customer preferences / priorities

# Content

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# Commissioning
## Objectives

- The commissioning procedures aims at ensuring the quality and conformity of the delivered goods and services :
  - Test of performance of critical components (e.g. control of solar field performance, heat exchangers, storage heat losses)
  - Test of correct operation of the equipment and/or system (different operation modes: normal / safety / maintenance, etc)
  - Confirmation of the supplied services / goods compliance with the planned layout and with all the applicable regulations / standards (quantities, design, component location)

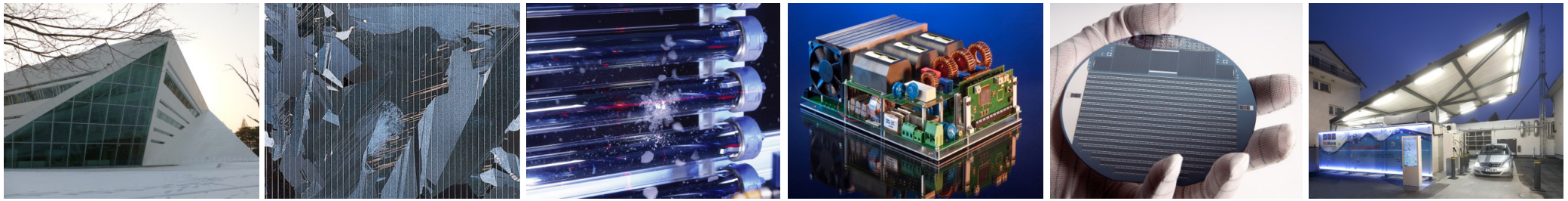
# Commissioning
## Procedure

- Besides documentation related checks, the procedure might include:
  - Test-Lab measurement of collector
  - Solar field performance (in-situ) :
    - measurement of HTF flow
    - inlet and outlet temperatures and available solar radiation
    - ➔ Calculating the solar field performance and
    - ➔ Comparing with solar collector  efficiency curve
  - HX performance:
    - measurement of hot and cold stream massflow and
    - inlet / outlet temperatures
    - ➔ enabling the calculation of HX effectivity and comparison with equipment specifications

# Commissioning
## Procedure

- Heat store
  - Quality of insulation by measurement of heat drop during some hours (e.g. over night)
- Control system:
  - test of relevant operation conditions including solar field stagnation,
  - 3-way valve operation,
  - Mass flow control after controlled variation of control variables (temperatures, pressures, etc)
  - Tracking system (including collector geometry)
- Safety:
  - control of safety valves
  - Max pressure test
  - Max temperature test

# Thank you for your Attention!



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