SHIP2FAIR

TVP SOLAR
Thermal Vacuum Power

Innovative Solar Thermal Technology for Low-to-Medium Heat Generation - Demonstration under SHIP2FAIR

SHIP2FAIR project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 792276.

The World Best Solar Thermal Collector

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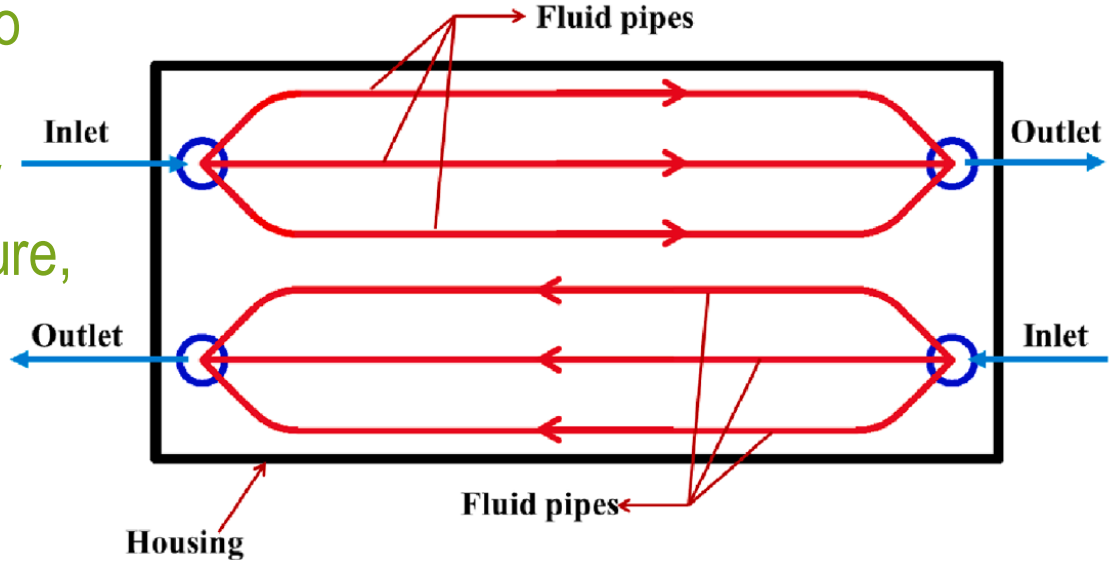
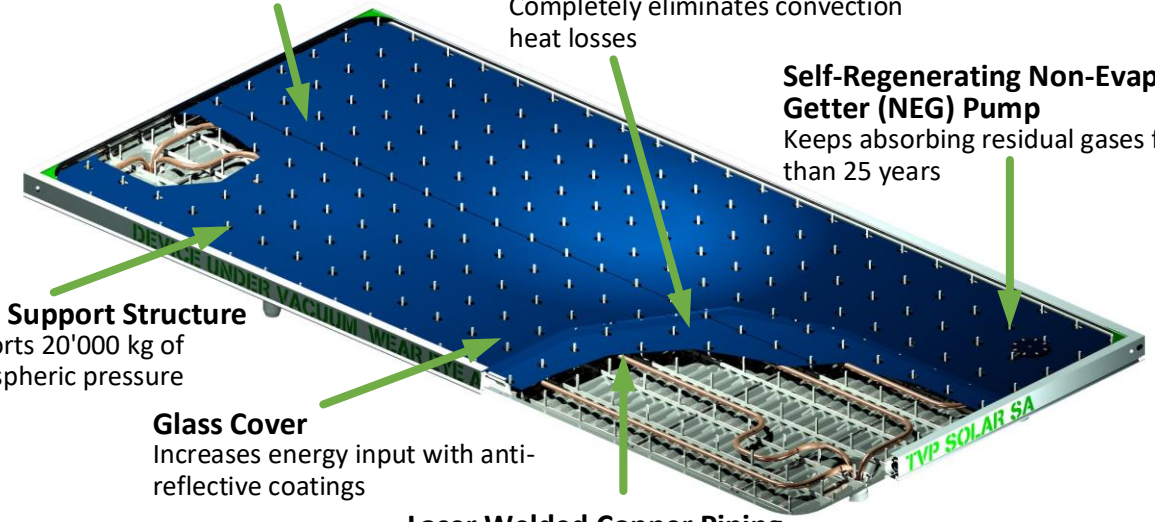
- SolarKeyMark certified best performance 65˚C to 200˚C
- Best efficiency and highest energy production at any operating temperature, with any ambient temperature, in any climate condition



Aluminium Absorber Plate with Advanced Selective Coating Technology
Converts sunlight to usable heat

High Vacuum Insulation <0.1Pa
Completely eliminates convection heat losses

Self-Regenerating Non-Evaporable Getter (NEG) Pump
Keeps absorbing residual gases for more than 25 years



Glass Support Structure
Supports 20'000 kg of atmospheric pressure

Glass Cover
Increases energy input with anti-reflective coatings

Laser Welded Copper Piping
Circulates fluid to extract heat (2 inlets and 2 outlets to maximize panel string efficiency)

- High-vacuum insulation suppresses thermal losses
- 20 years consistent & predictable performance without any degradation
- Designed for industrial-scale applications

TVP Value Proposition

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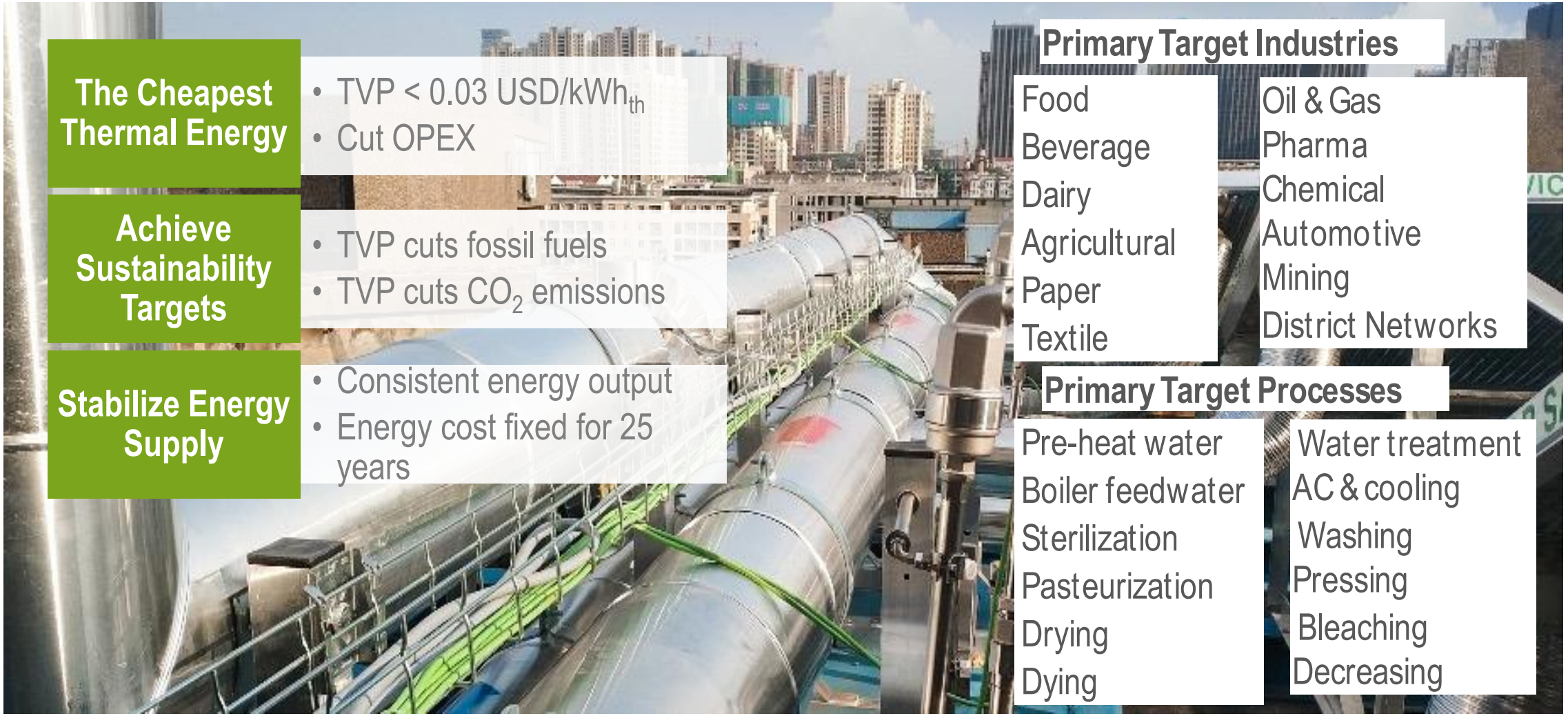

The Cheapest Thermal Energy

- TVP < 0.03 USD/kWh$_{th}$
- Cut OPEX

Achieve Sustainability Targets

- TVP cuts fossil fuels
- TVP cuts CO_2 emissions

Stabilize Energy Supply

- Consistent energy output
- Energy cost fixed for 25 years

Primary Target Industries

Food
Beverage
Dairy
Agricultural
Paper
Textile

Oil & Gas
Pharma
Chemical
Automotive
Mining
District Networks

Primary Target Processes

Pre-heat water
Boiler feedwater
Sterilization
Pasteurization
Drying
Dying

Water treatment
AC & cooling
Washing
Pressing
Bleaching
Decreasing

Seamless Integration to Industrial Processes

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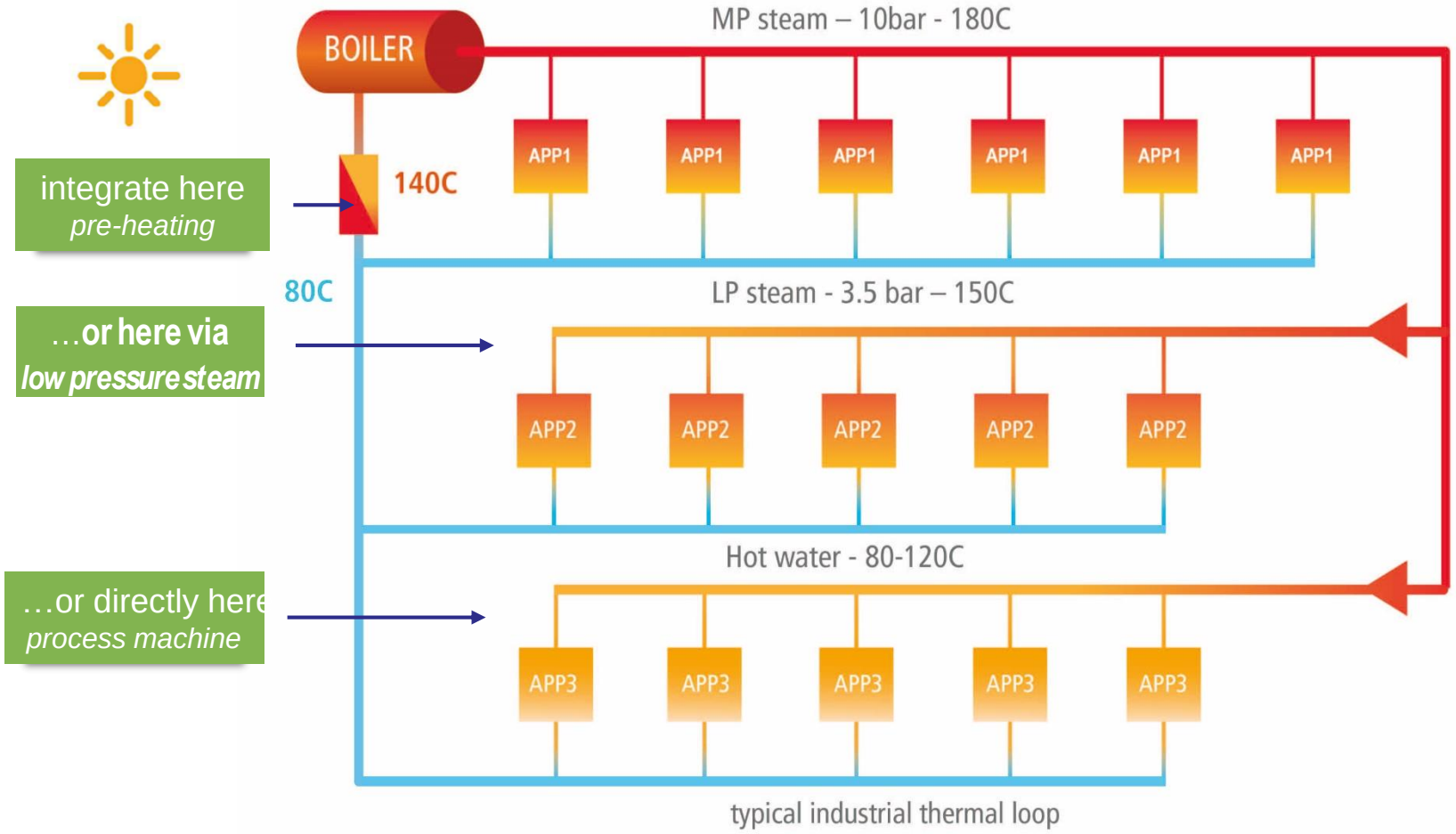
TVP's solar thermal system can be seamlessly integrated with existing thermal systems at different levels



Standardized and Modular Solar System

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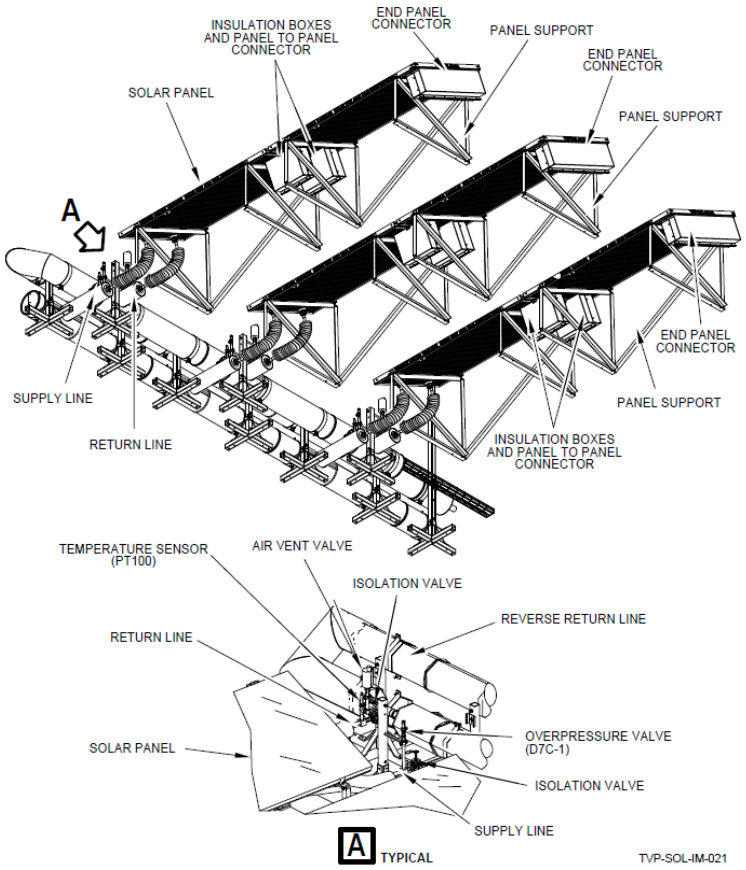
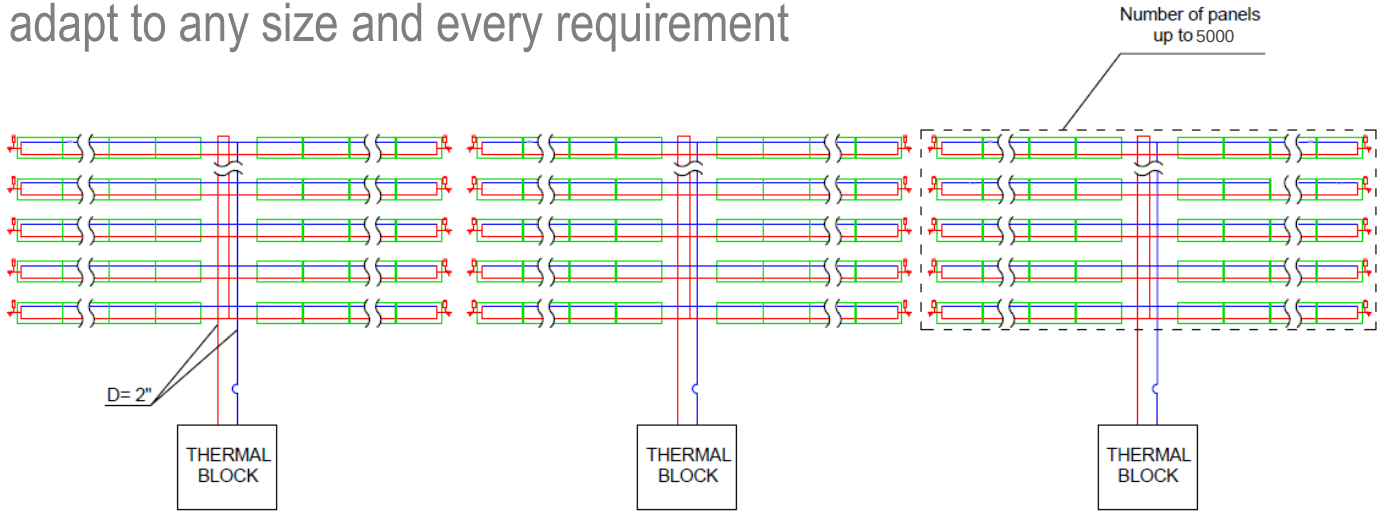
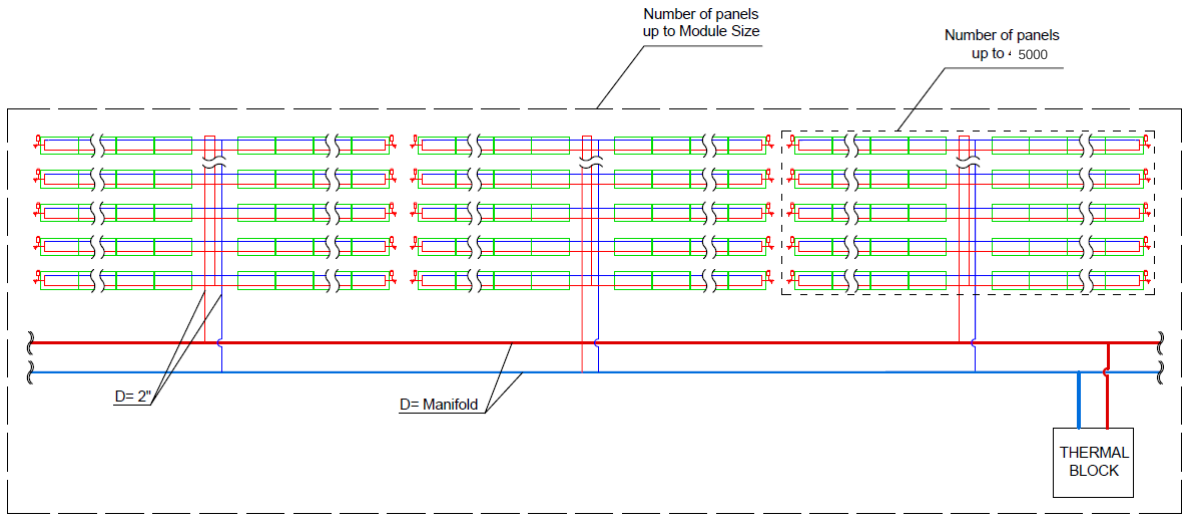
Standardized solar system components ease installation and maintenance

Modularity to adapt to any size and every requirement



TVP Solar Field – Assembly





Steam Generation – Summer
Space Heating – Winter

‘Martini & Rossi SpA’ Case Study - Italy

Solar Process Heat at M&R: Overview

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- **Context:** Demonstration site under the H2020 **SHIP2FAIR** project
- **Solar thermal technology:** High Vacuum Flat Panels (HVFPs)
- **Site & Location:** Alcoholic beverage plant – Pessione, Turin, Italy
- **Global Horizontal Irradiance**: 1332 kWh/m²
- **Installation**: Rooftop
- **Collector surface**: 596 m2
- **Installed Power:** 327 kWp
- **Energy production**: 349,403 kWh/y (586 kWh/m2/y)
- **Configuration:** Oct-Mar: Hot water. Operating T: 90ºC (outlet)
  Apr-Sep: Steam. Operating T: 170ºC (outlet)
- **Installation completed:** Dec 2020; **Commissioning**: Feb 2021

Upcoming Demo

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Jean LARNAUDIE DEPUIS 1951

Foie-gras production
Castelnaudary, France

LARNAUDIE

Technology: HVFP
Solar Field size: 1600 m² – 1MW$_{th}$
Cascade application:

- Boiler feed water pre-heating @140C
- Water tank heating @65C

Larnaudie solar system: engineering

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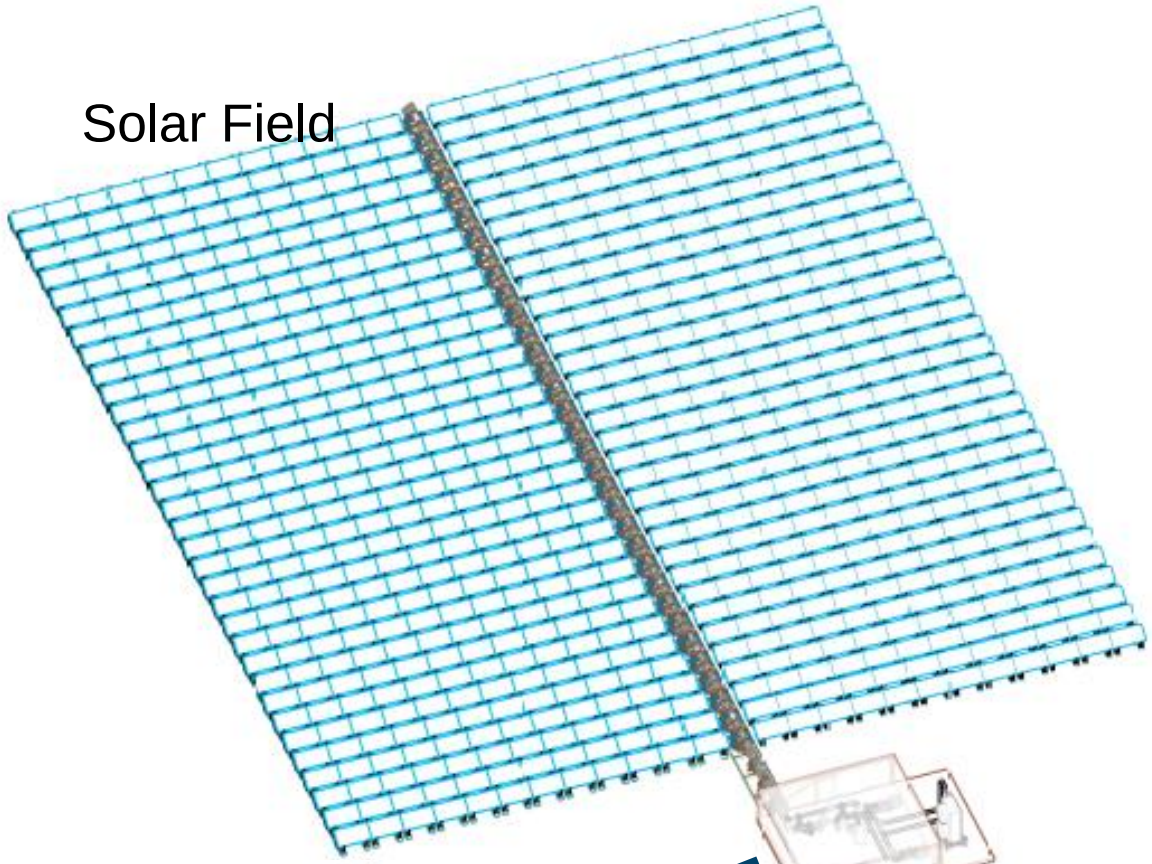
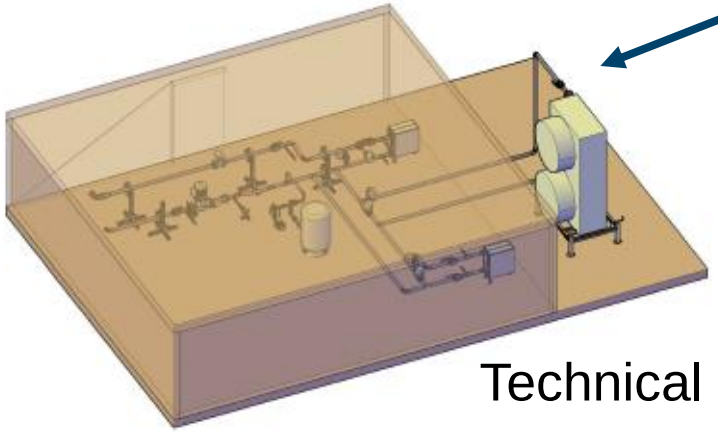
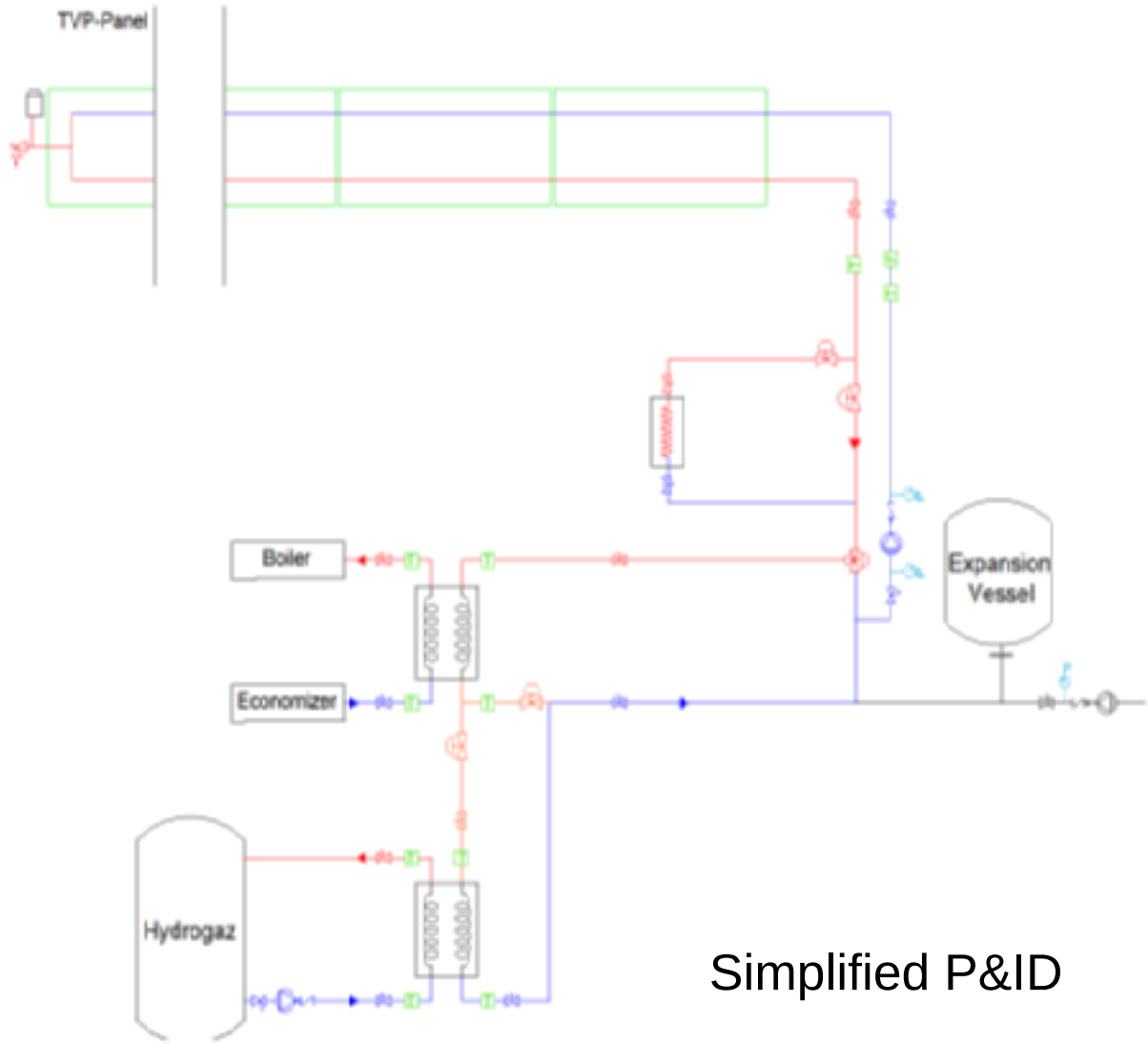
Solar Field





Technical room



Simplified P&ID

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Questions?