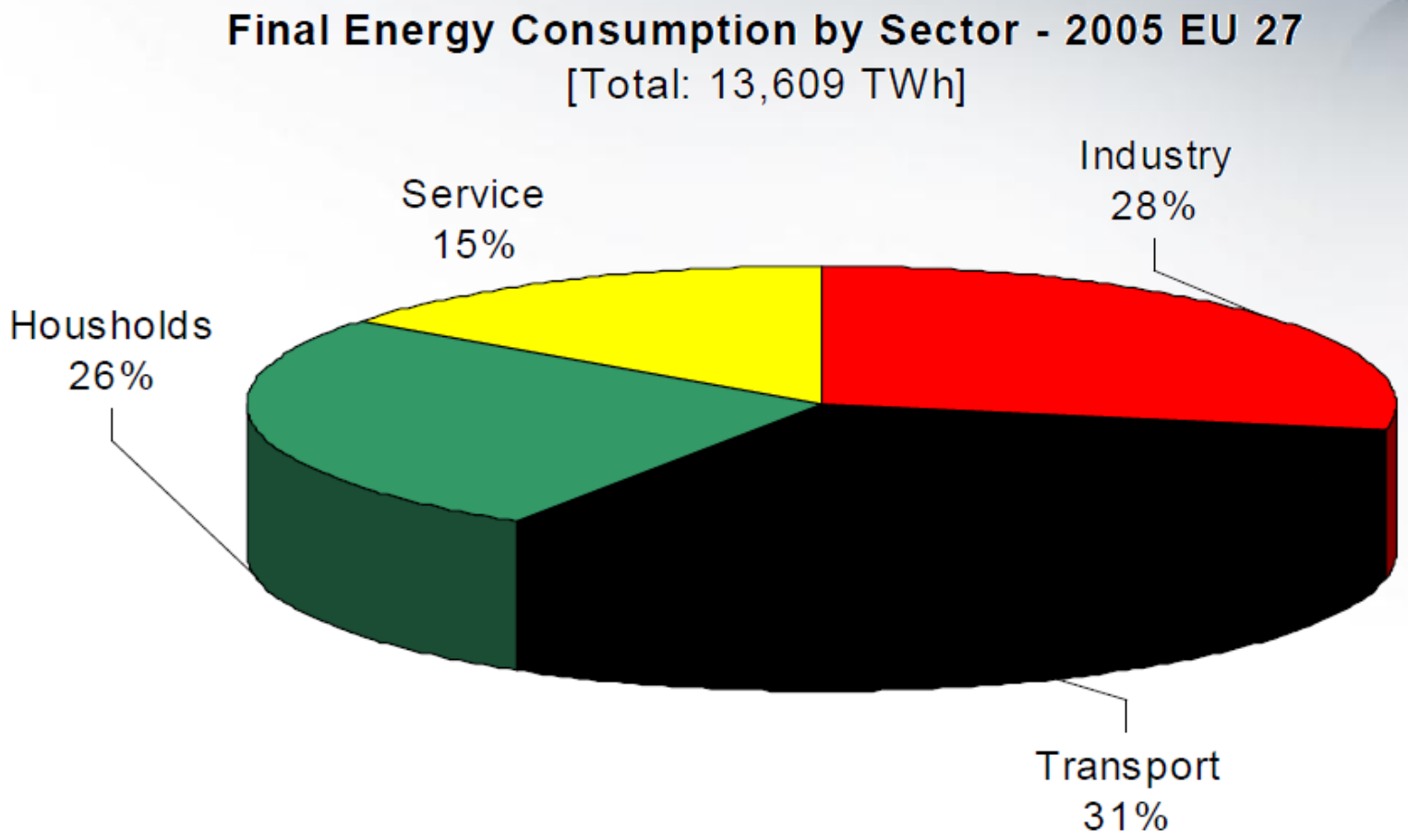
Solarni termo sistemi - STS d.d.
Solar Thermo Systems – STS Inc.
Obrtniška cesta
3220 Štore
www.sts-inc.eu
info@sts-inc.eu

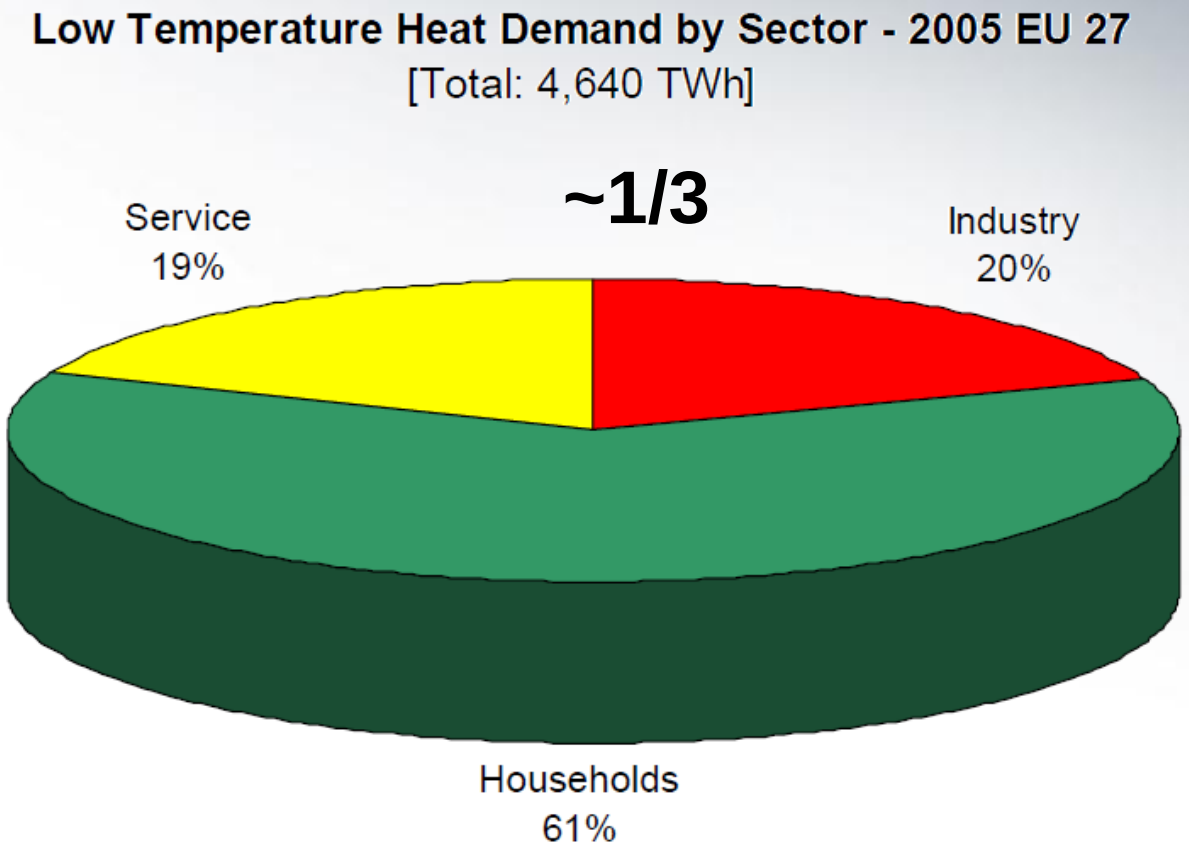
september 2010

# Final Energy Consumption EU-27 by Sector in 2005




Source of data:European Communities 2008, EU energy and transport in figures, Statistical Pocket book 2007/2008

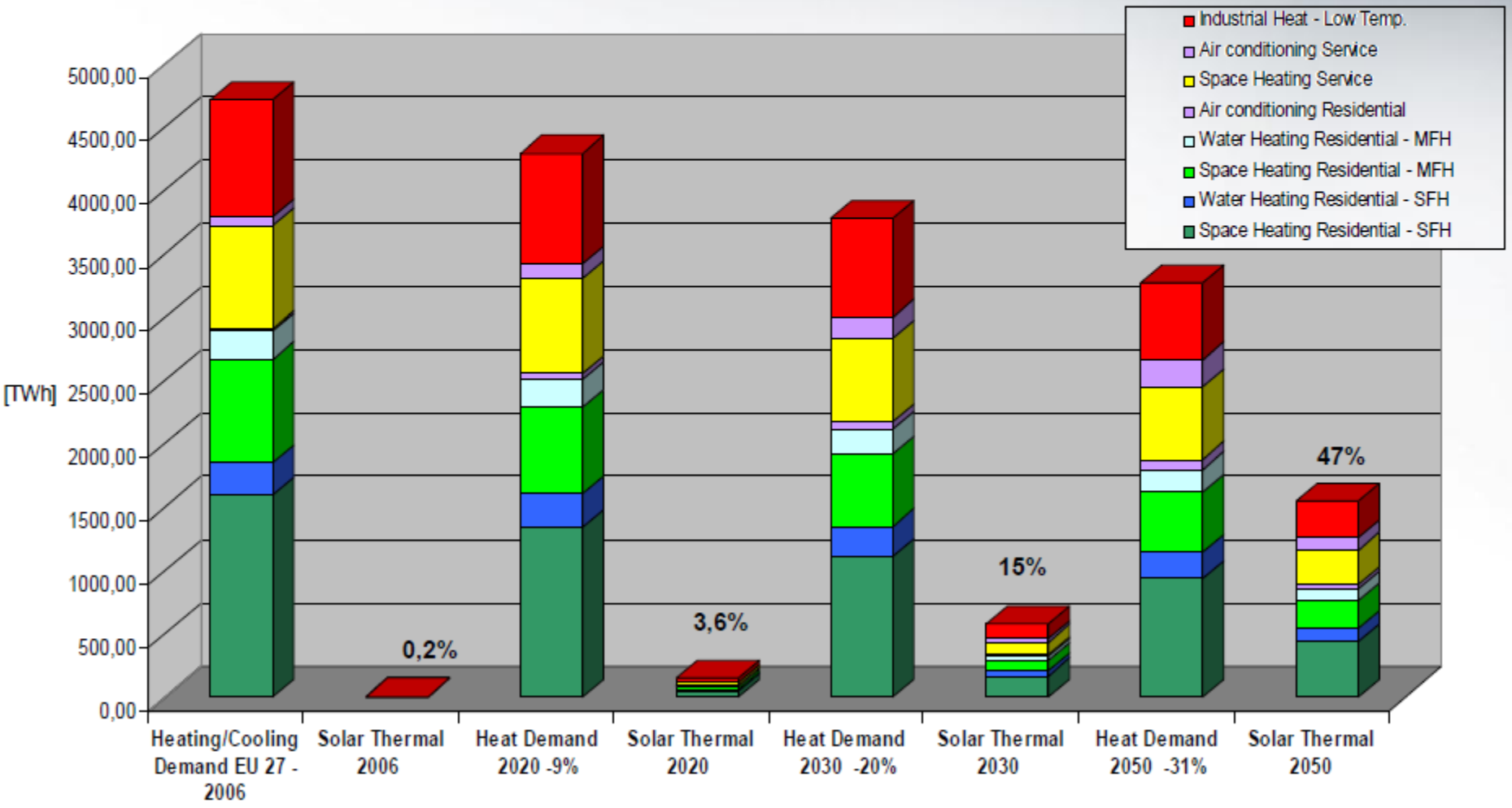
# Low Temperature Heat Demand EU-27 by Sector in 2005




Source of data:European Communities 2008, EU energy and transport in figures, Statistical Pocket book 2007/2008

# Solar Thermal Potential EU27

## Contribution of Solar Thermal to the EU 27 Heating and Cooling Demand by Sector

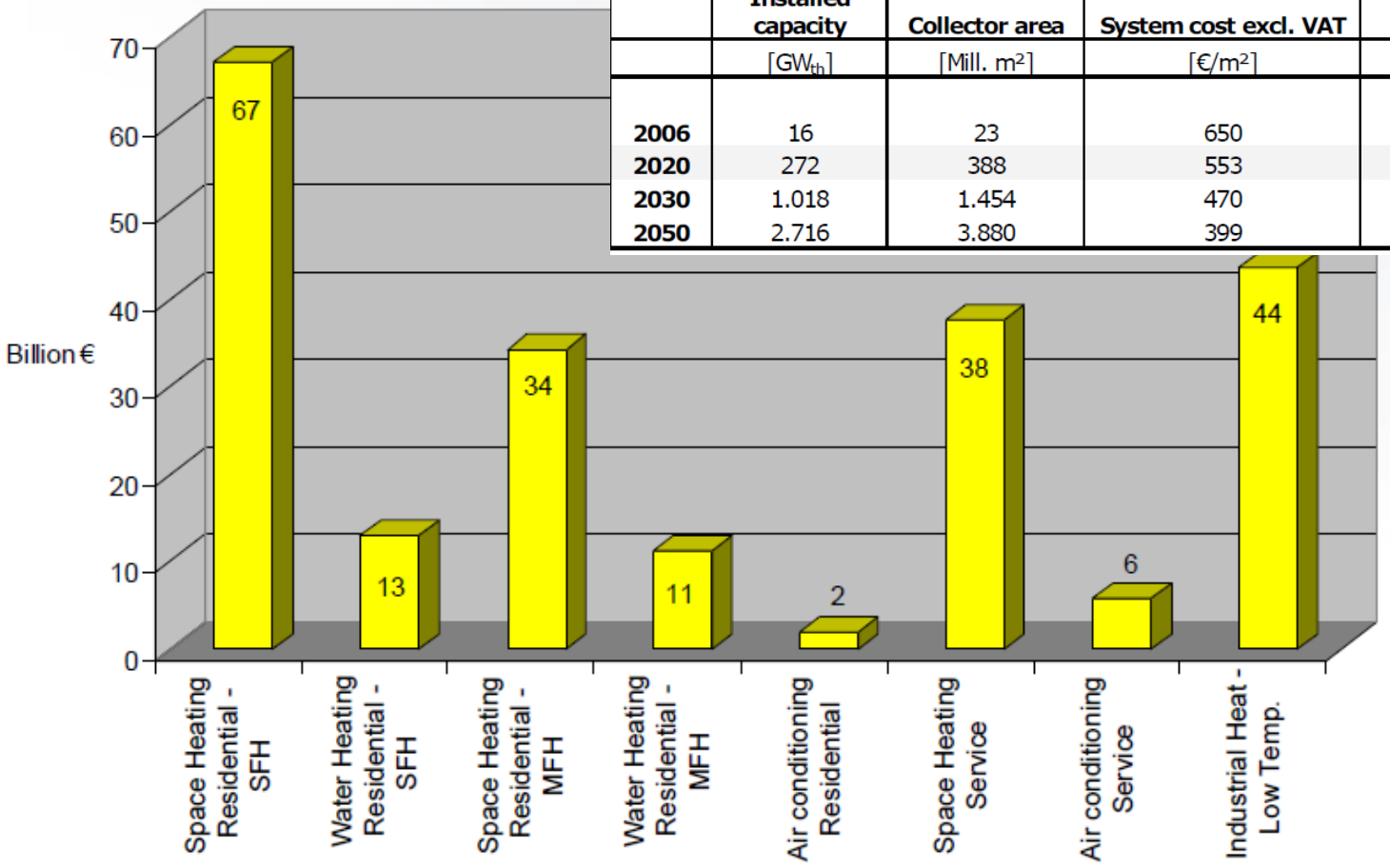


# Economical Impact

## Total Investment 2006 - 2020

[Total 214 Billion €]

| | Installed capacity | Collector area | System cost excl. VAT | Total Investment until… |
|---|---|---|---|---|
| | [$GW_{th}$] | [Mill. m²] | [€/m²] | [Bilion €] |
| **2006** | 16 | 23 | 650 | 15 |
| **2020** | 272 | 388 | 553 | **214** |
| **2030** | 1.018 | 1.454 | 470 | 683 |
| **2050** | 2.716 | 3.880 | 399 | 1.549 |

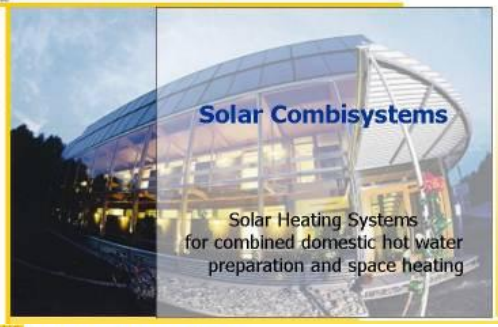


# Development

**SOLAR HEATING SYSTEMS**
Status and Recent Developments

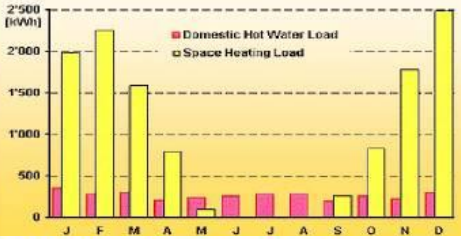
Werner Weiss
AEE INTEC
A-8200 Gleisdorf, Austria

## Solar Combisystems




## Solar Combisystems

Seasonal variations of the heat demand for space heating and DHW




## Solar Combisystems

### System Concepts

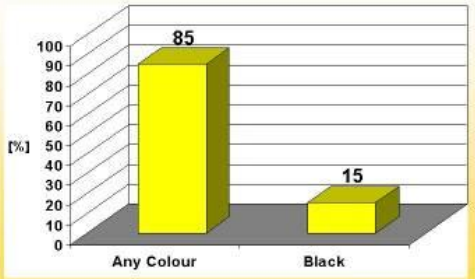
- Using the thermal mass of the building as heat store
- Using Domestic Hot Water to store the heat
- Using the space heating store to store the heat

## Architectural Aspects

## Façade Integrated Solar Collectors

## Large-Scale Prefabricated Solar Renovation

## Survey amongst Architects




## Coloured Absorbers

## Coloured Absorbers

# SOLAR HEATING SYSTEMS

Status and Recent Developments

Werner Weiss
AEE INTEC
A-8200 Gleisdorf, Austria

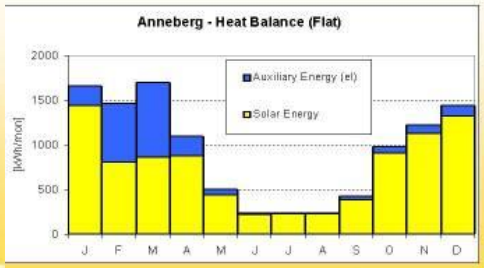
## System with seasonal storage – Anneberg, S

| Project | Heat Storage | Project -Size: Collector area (m²) | Storage Volume (m³) | fsol (%) | Nb. of Flats |
|---|---|---|---|---|---|
| Anneberg-Danderyd | seasonal | 2.400 m² | 60.000 m³ | 70% | 50 |

## System with medium-term storage – Gneis-Moos, A

| Project | Heat Storage | Project -Size: Collector area (m²) | Storage Volume (m³) | fsol (%) | Nb. of Flats |
|---|---|---|---|---|---|
| Gneis Moos | weekly | 410 m² | 100 m³ | 34% | 61 |

## System with seasonal storage – Anneberg, S




## LARGE-SCALE INDUSTRIAL APPLICATIONS

## Most promising applications and processes

**Applications**
- Food industry
- Beverage industry
- Textile industry
- Chemical industry

**Processes**
- Drying processes
- Evaporation
- Pasteurising
- Sterilising
- Cleaning and washing
- General heating of processes

## *Tannery, Athens , Greece*

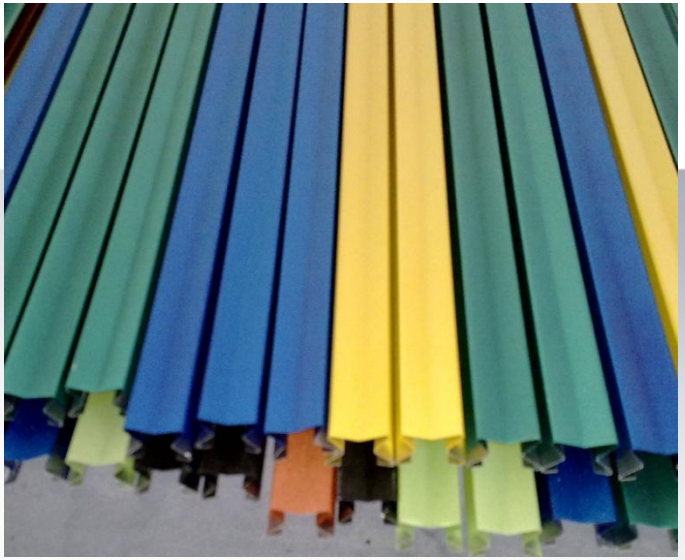
Use: Hot water for industrial processes (40 – 90 °C).

- Collector area: 308 m² (flat plate) , closed loop water circuit
- Fuel replaced: Natural gas

Solar Thermo Systems – STS Inc. is a modern undertaking, oriented to the client and bases on the newest technology and materials available on the market. The main aims of the STS are development and production of solar air and water heating collectors.

During the development, we took in consideration the following guidelines:
- Collectors should replace conventional façade or roof cladding;
- Collectors must satisfy customer's and architect's aesthetics;
- Collectors must be designed to integrate in existing structural façades or roof systems;
- Collectors must be designed to retain optimal performances in all climate conditions.

The results of this development are technically modern and adapted solar collectors, which are designed for the most practical, affordable and easy usage of solar energy as possible. Design of the collectors allows us to produce dimensional and colour adapted collectors to customer specification. Collectors also serve as a building element - façade or roof cladding. They are easy to install and combine with existing building's heating and air-conditioning system.

Black
$e_T$: 0,34; $a_S$: 0,91

Brick red
$e_T$: 0,30; $a_S$: 0,75

Mahogany
$e_T$: 0,35; $a_S$: 0,84

Brown
$e_T$: 0,35; $a_S$: 0,86

Olive green
$e_T$: 0,31; $a_S$: 0,61

Dark green
$e_T$: 0,35; $a_S$: 0,85

Ocher
$e_T$: 0,33; $a_S$: 0,61

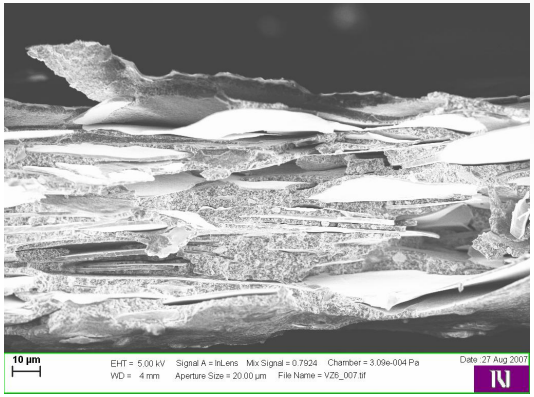
Bronze
$e_T$: 0,27; $a_S$: 0,60

Turquoise
$e_T$: 0,36; $a_S$: 0,77

Blue
$e_T$: 0,31; $a_S$: 0,72

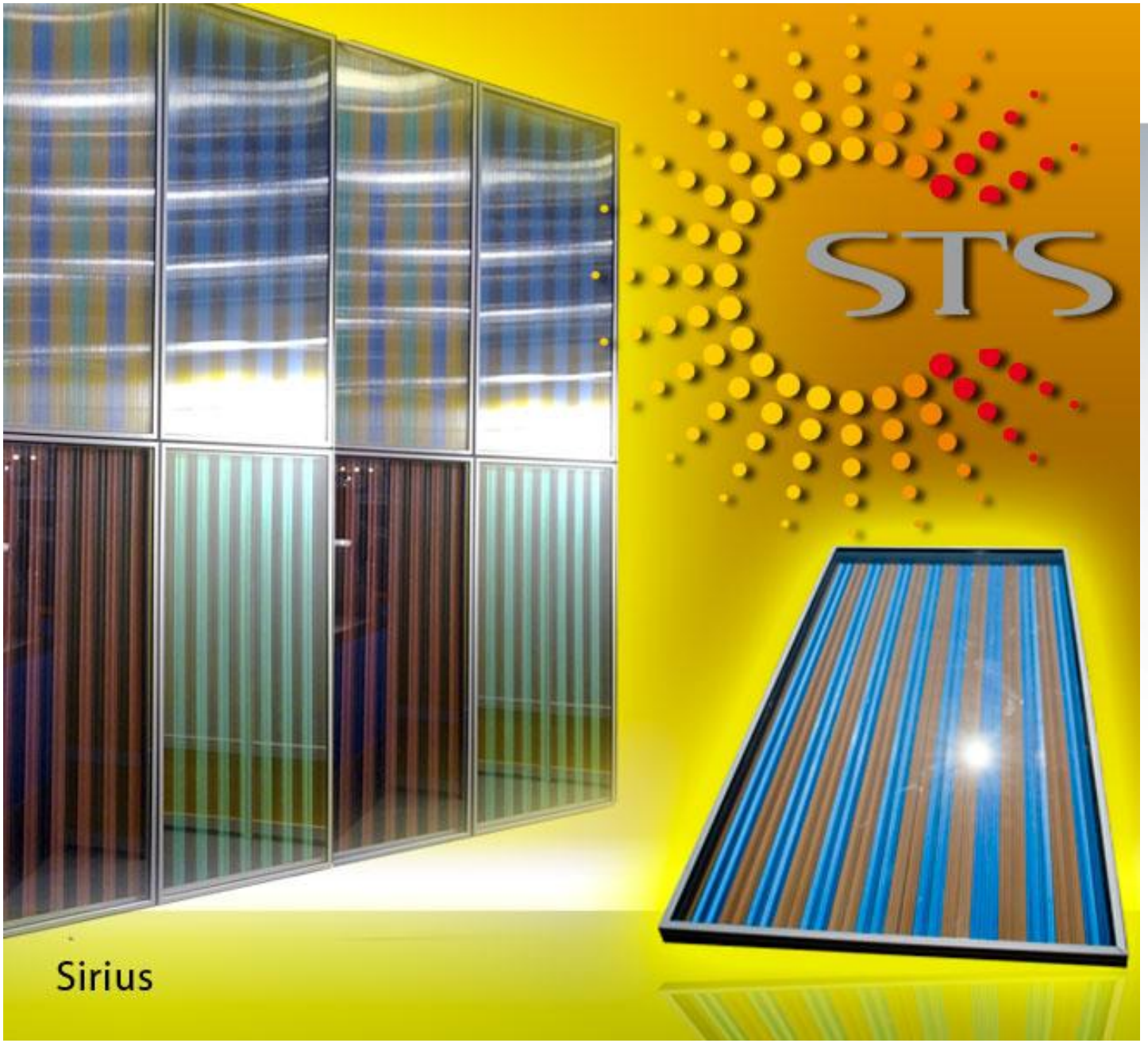
OTHER COLORS CAN BE ARRANGED !!!

Legend:
$e_T$ - emission;
$a_S$ - absorption

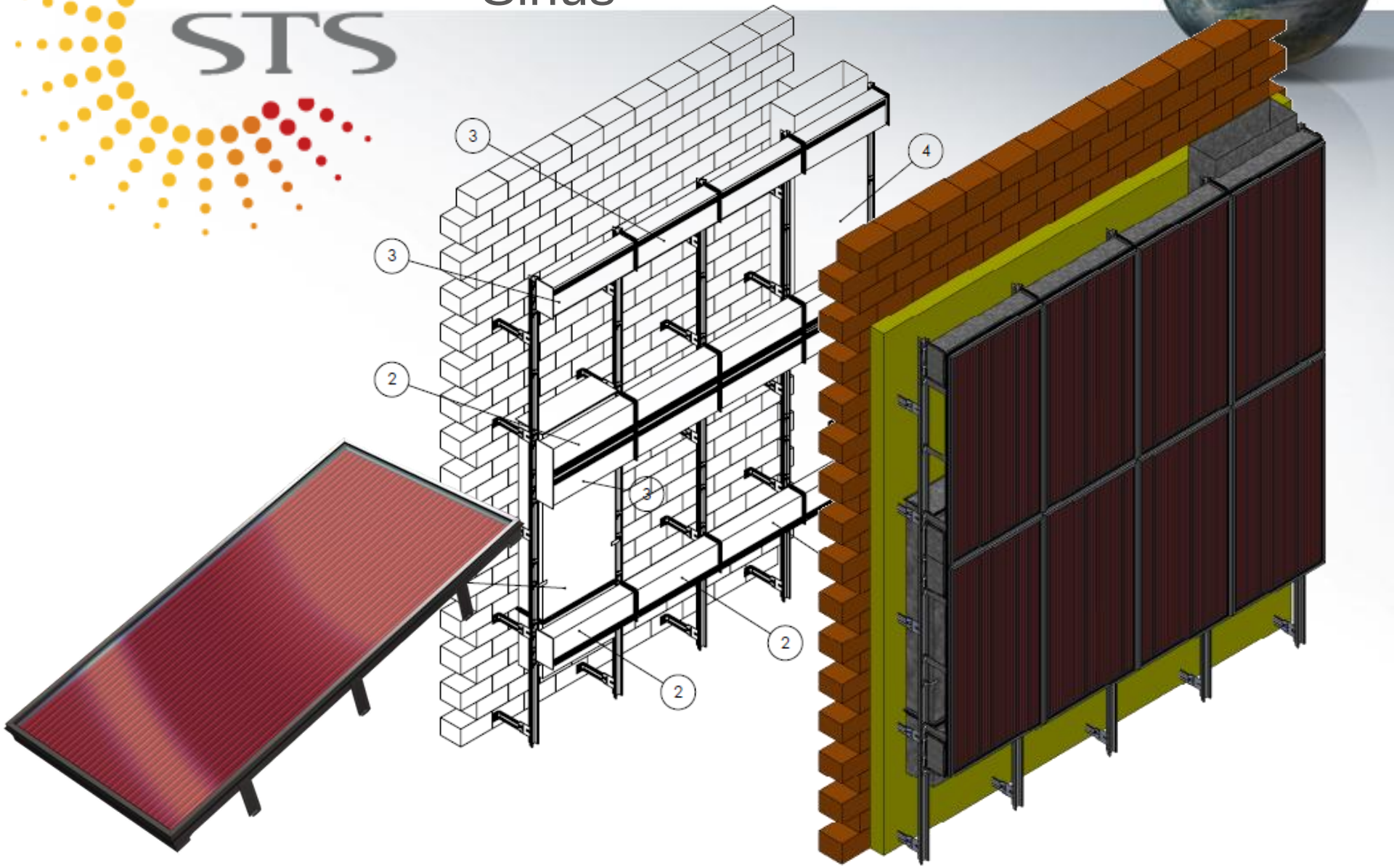



STS
Pegasus

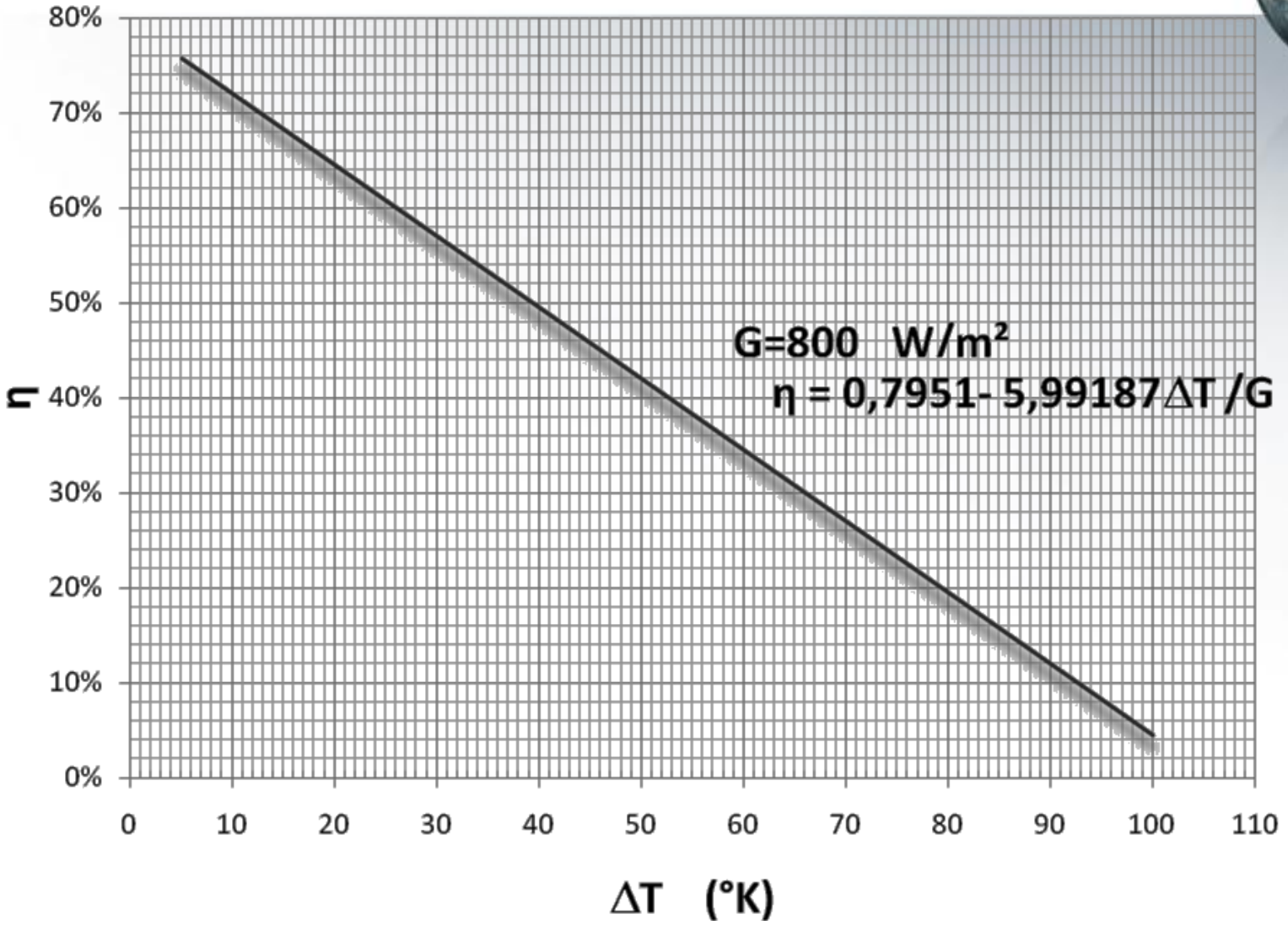
# BOSIO ŠTORE Pegasus



STS
Sirius

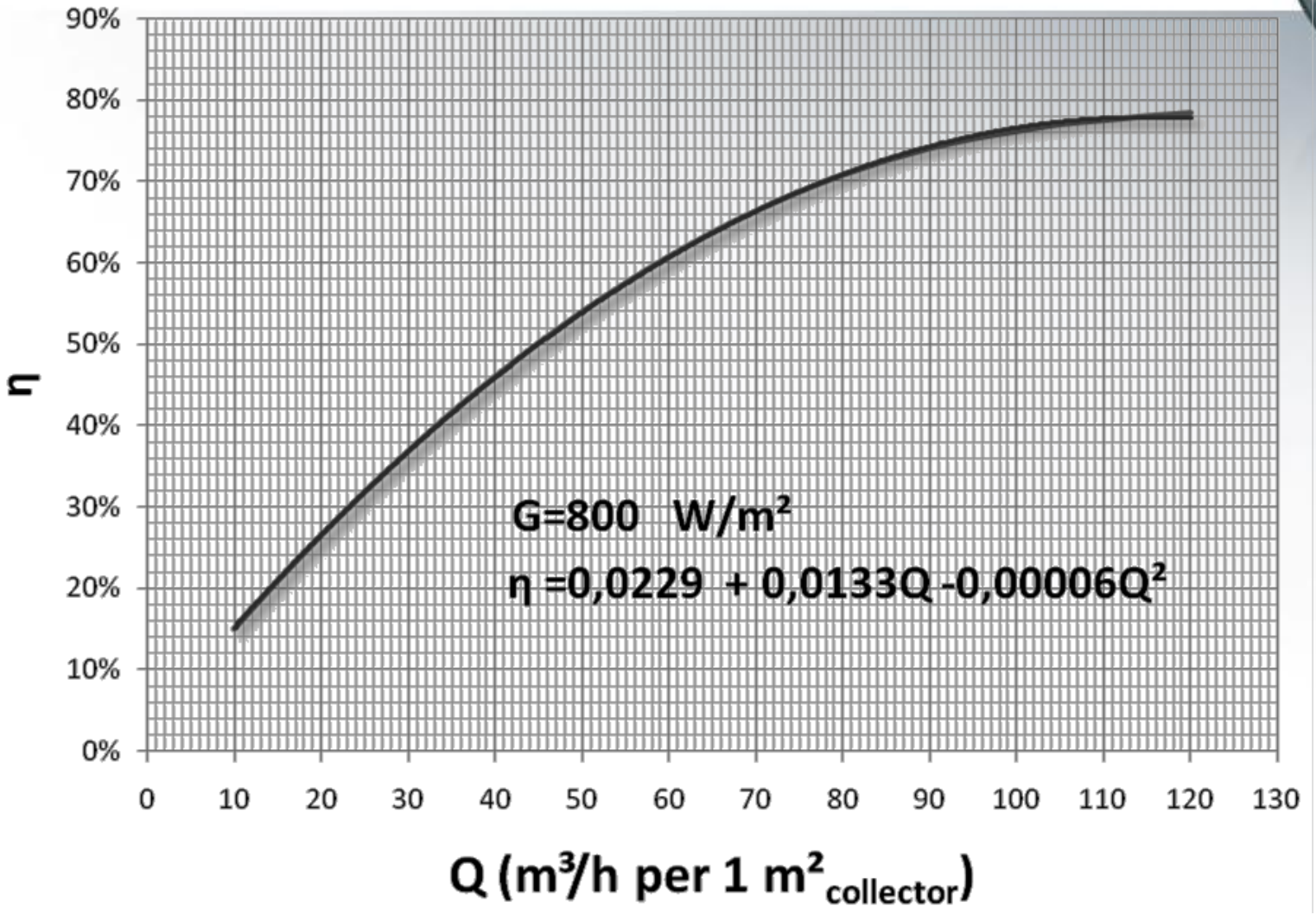
# Sirius



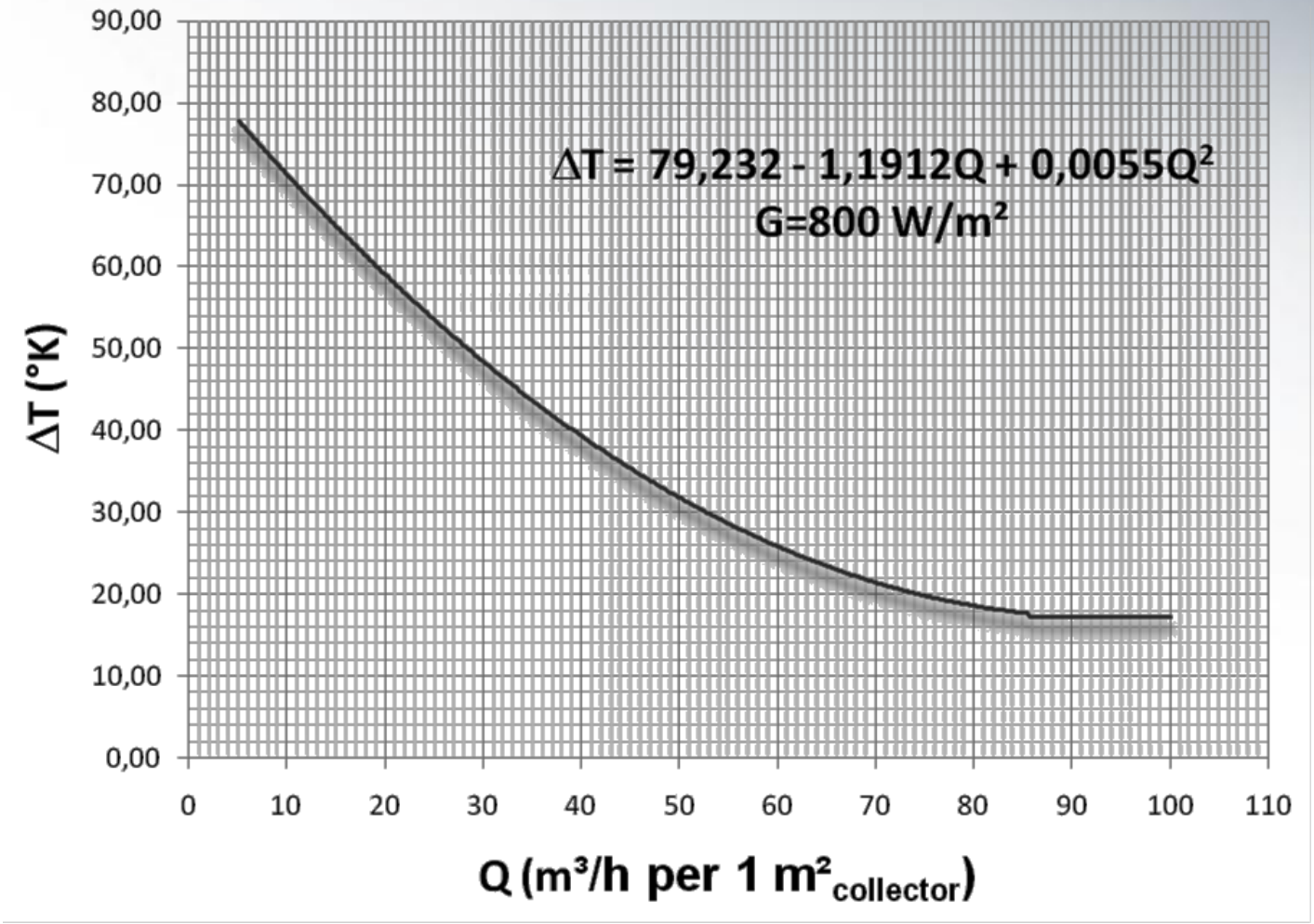
# Pegasus Sirius



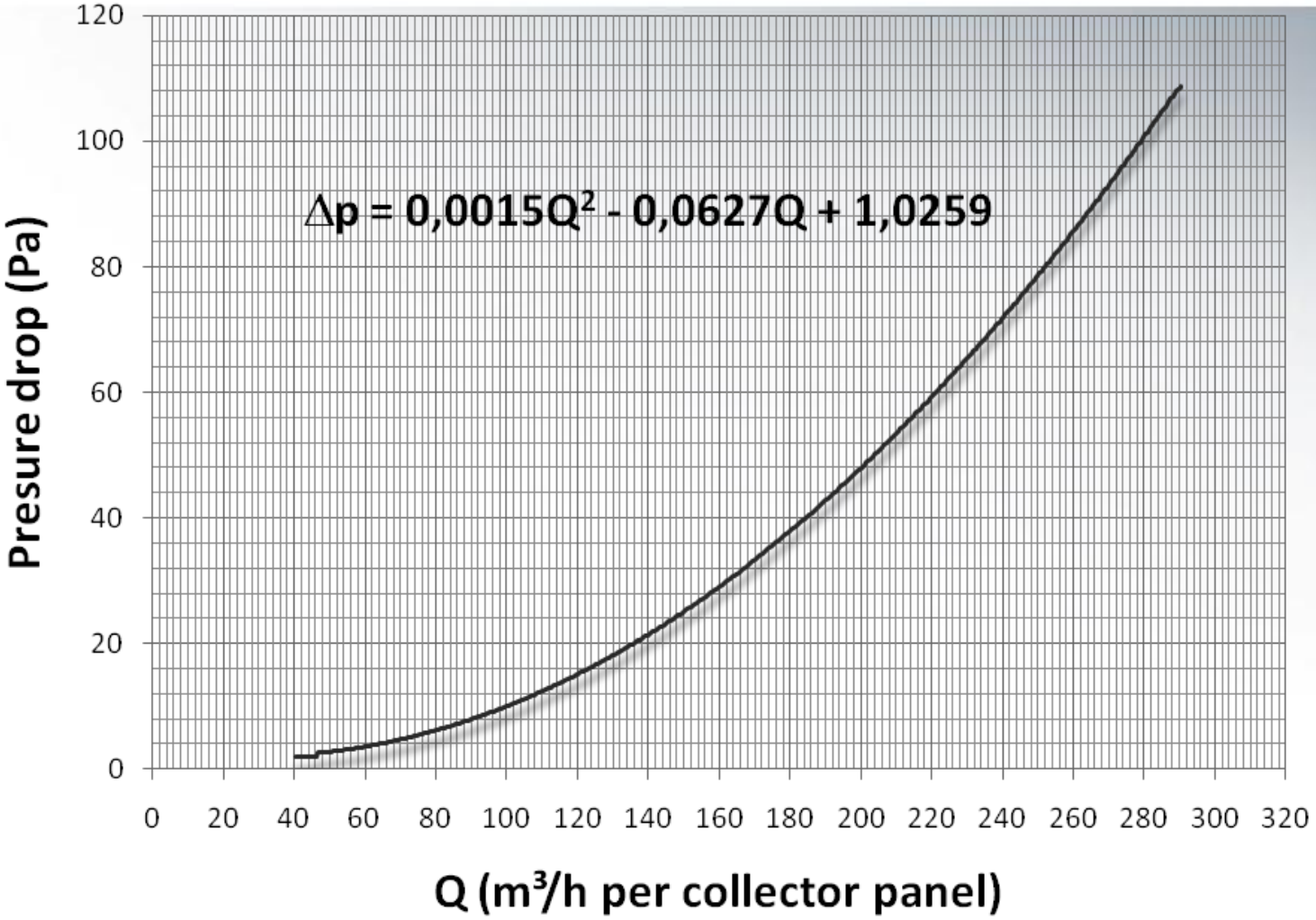
# Pegasus Sirius



# Pegasus Sirius



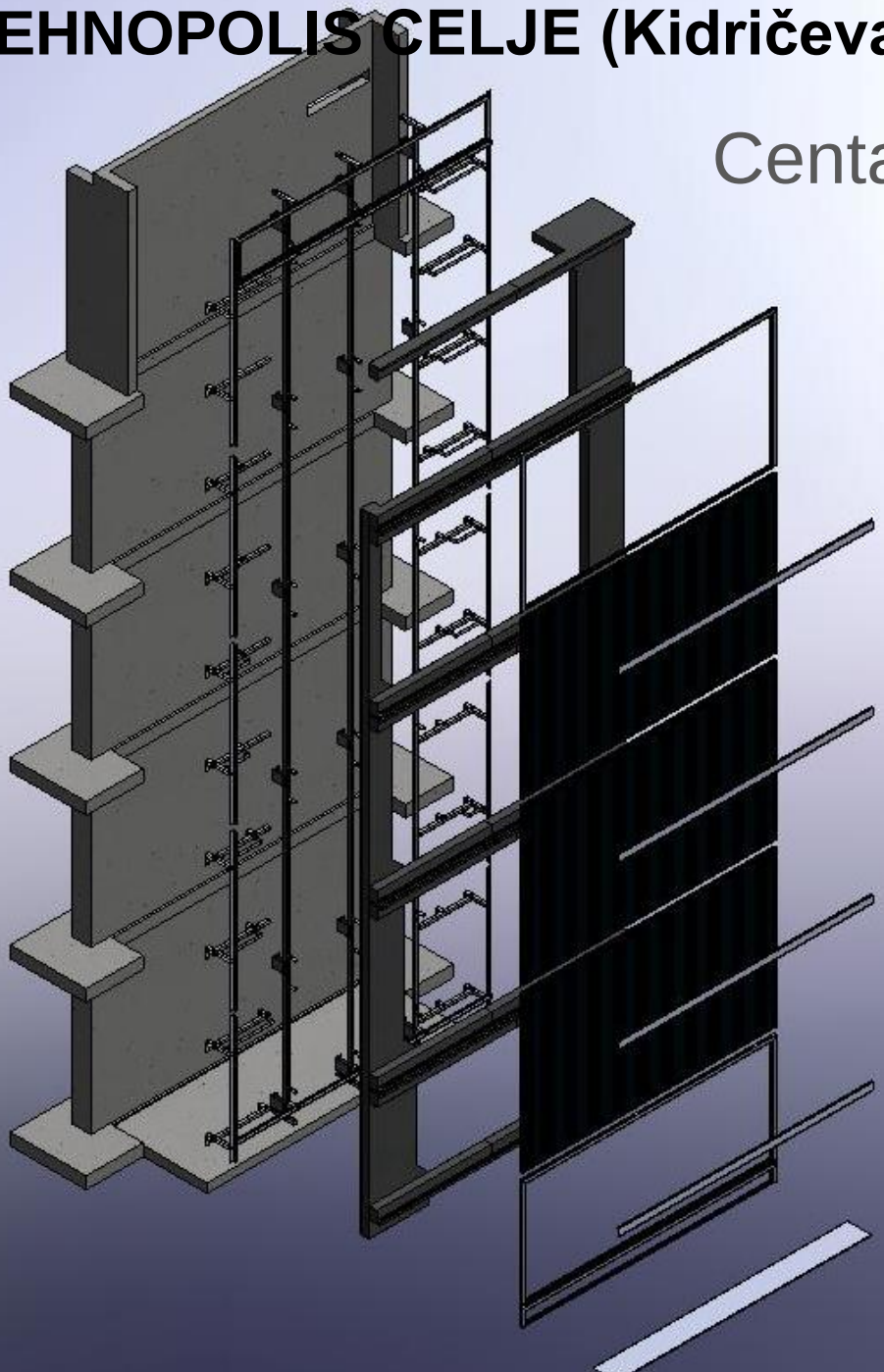
# Pegasus Sirius



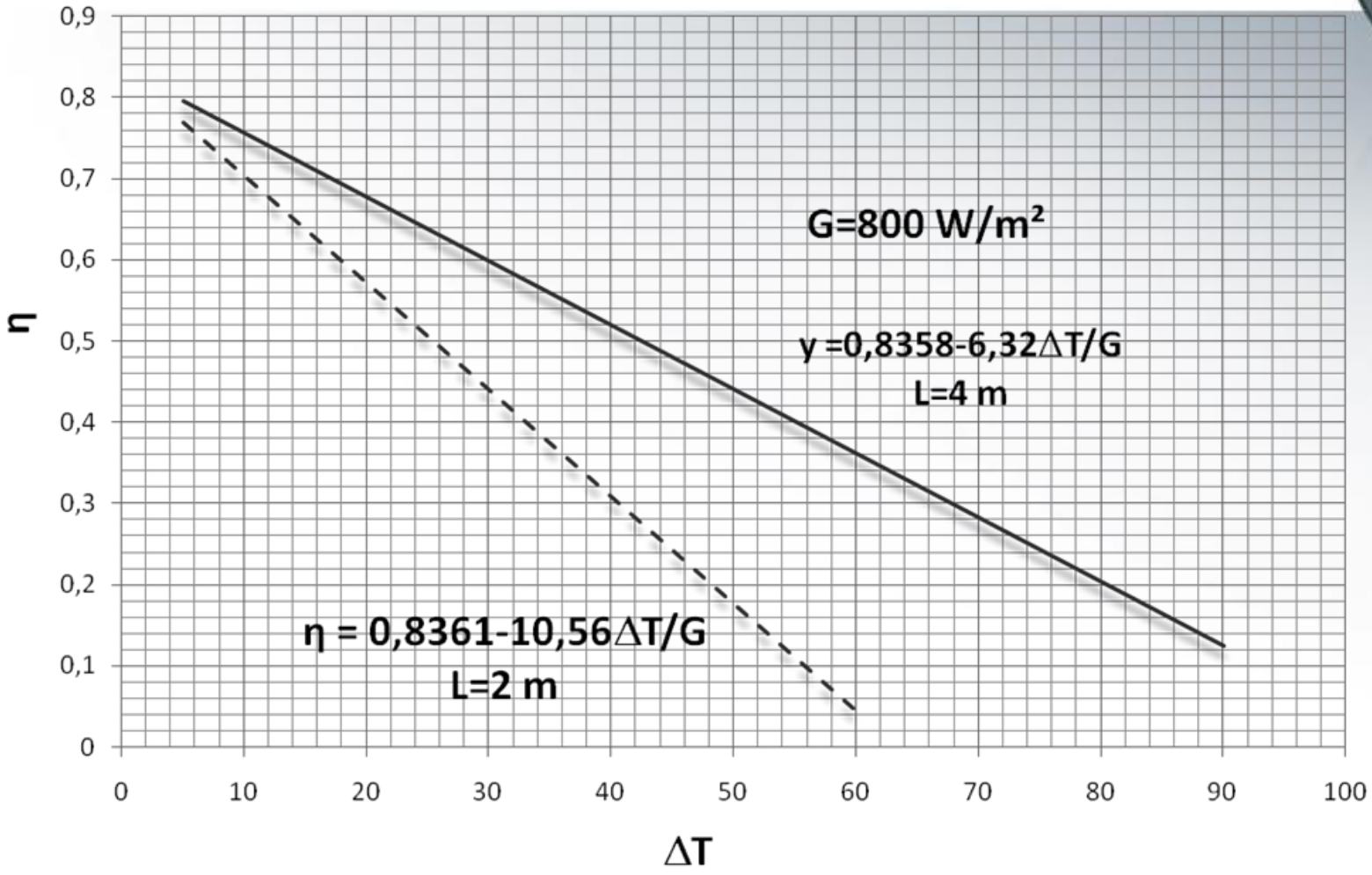

Centaurus

# TEHNOPOLIS CELJE (Kidričeva 24b)

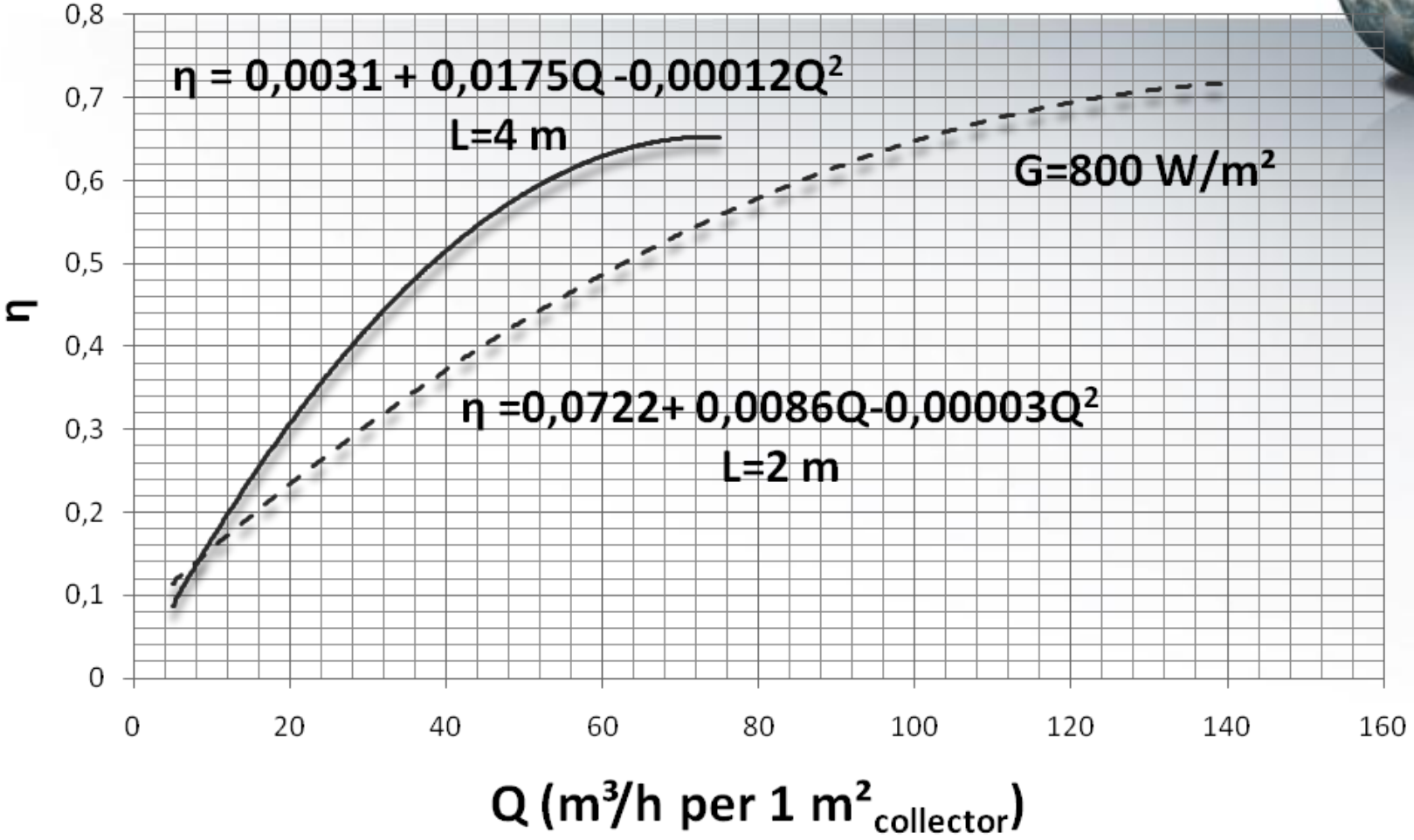
Centaurus



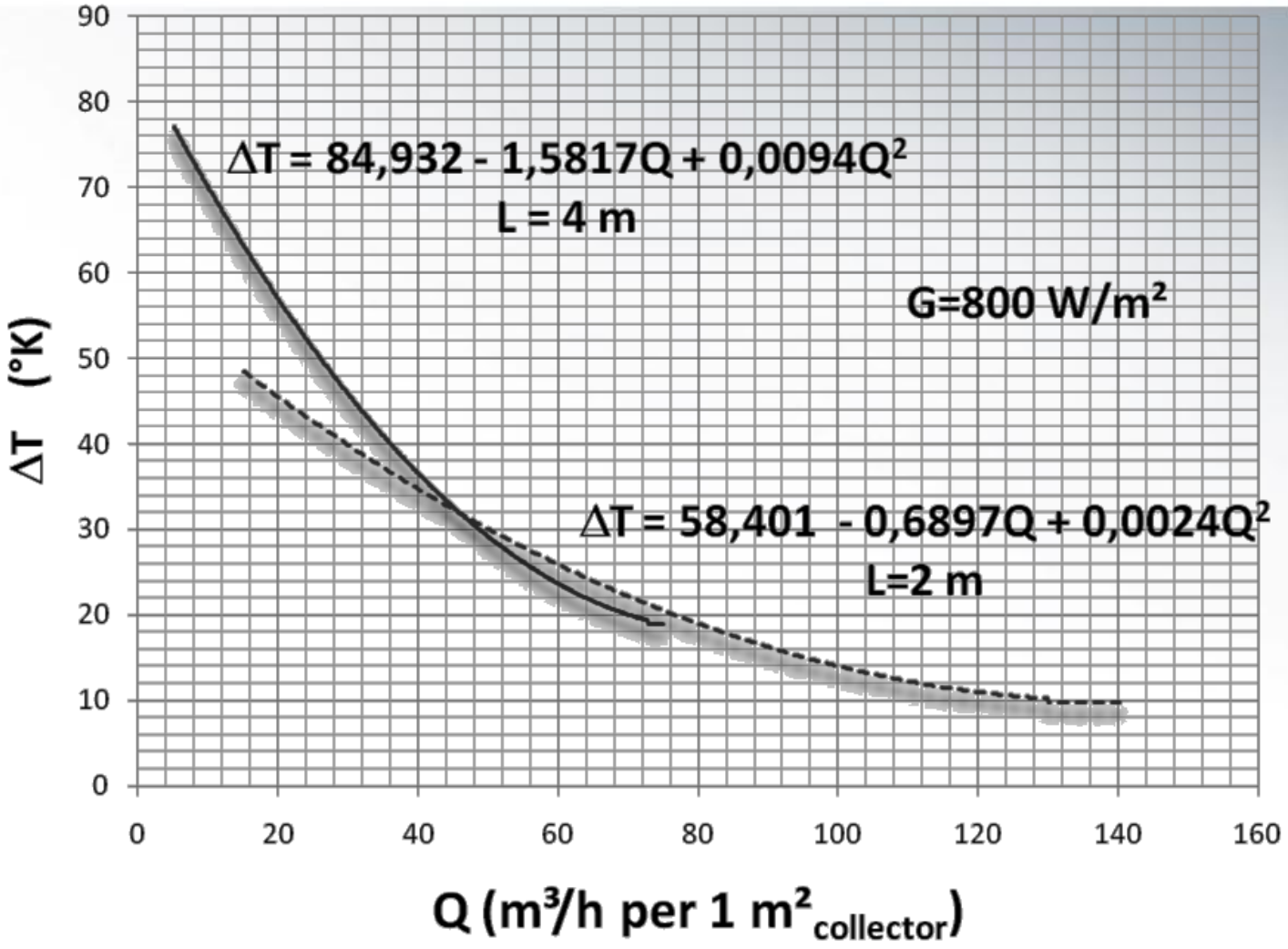
# Centaurus


η
0,9
0,8
0,7
0,6
0,5
0,4
0,3
0,2
0,1
0
0
10
20
30
40
50
60
70
80
90
100
ΔT
G=800 W/m²
y =0,8358-6,32ΔT/G
L=4 m
η = 0,8361-10,56ΔT/G
L=2 m

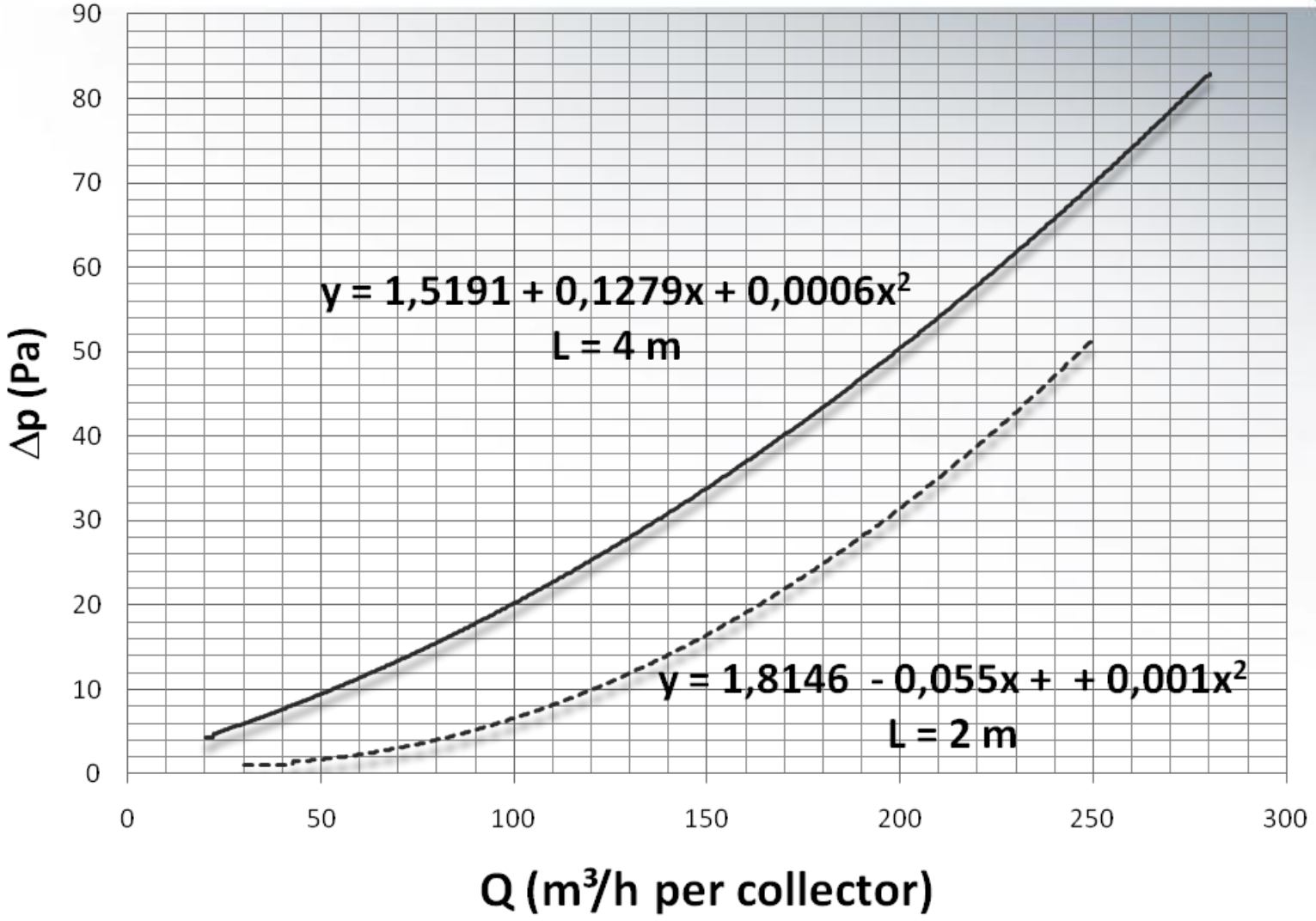
# Centaurus


η = 0,0031 + 0,0175Q -0,00012Q²
L=4 m
G=800 W/m²
η =0,0722+ 0,0086Q-0,00003Q²
L=2 m
η
0,8
0,7
0,6
0,5
0,4
0,3
0,2
0,1
0
0
20
40
60
80
100
120
140
160
Q (m³/h per 1 m²collector)

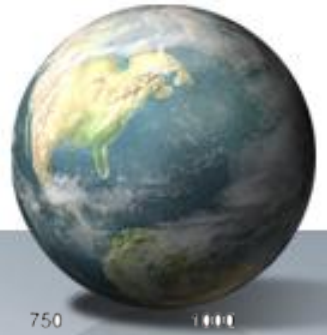
# Centaurus

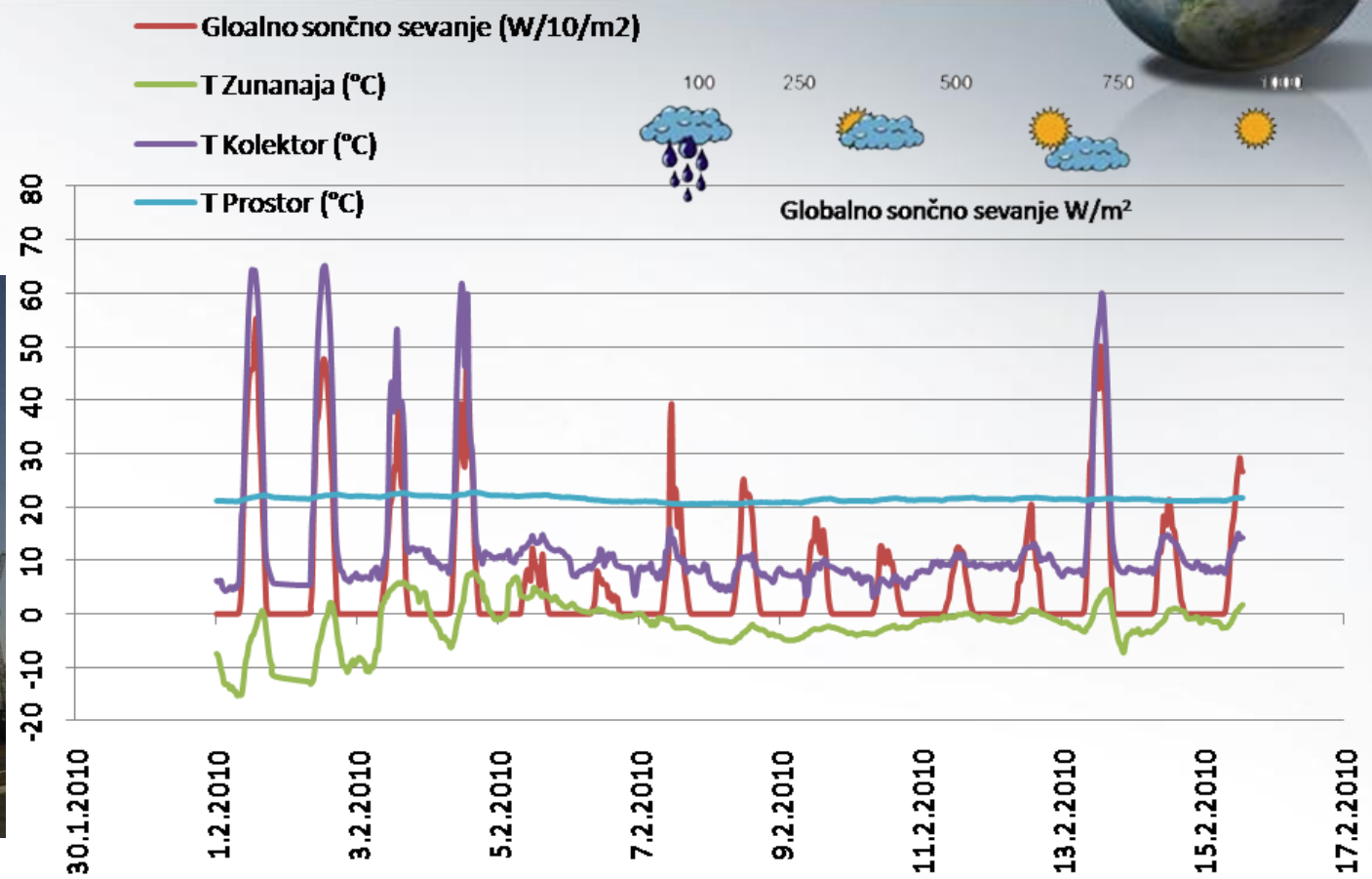

ΔT = 84,932 - 1,5817Q + 0,0094Q²
L = 4 m
G=800 W/m²
ΔT = 58,401 - 0,6897Q + 0,0024Q²
L=2 m
ΔT (°K)
Q (m³/h per 1 m² collector)
0
10
20
30
40
50
60
70
80
90
0
20
40
60
80
100
120
140
160

# Centaurus


90
80
70
60
50
40
30
20
10
0
Δp (Pa)
y = 1,5191 + 0,1279x + 0,0006x²
L = 4 m
y = 1,8146 - 0,055x + + 0,001x²
L = 2 m
0
50
100
150
200
250
300
Q (m³/h per collector)

# Centaurus




# DELOVANJE SISTEMA

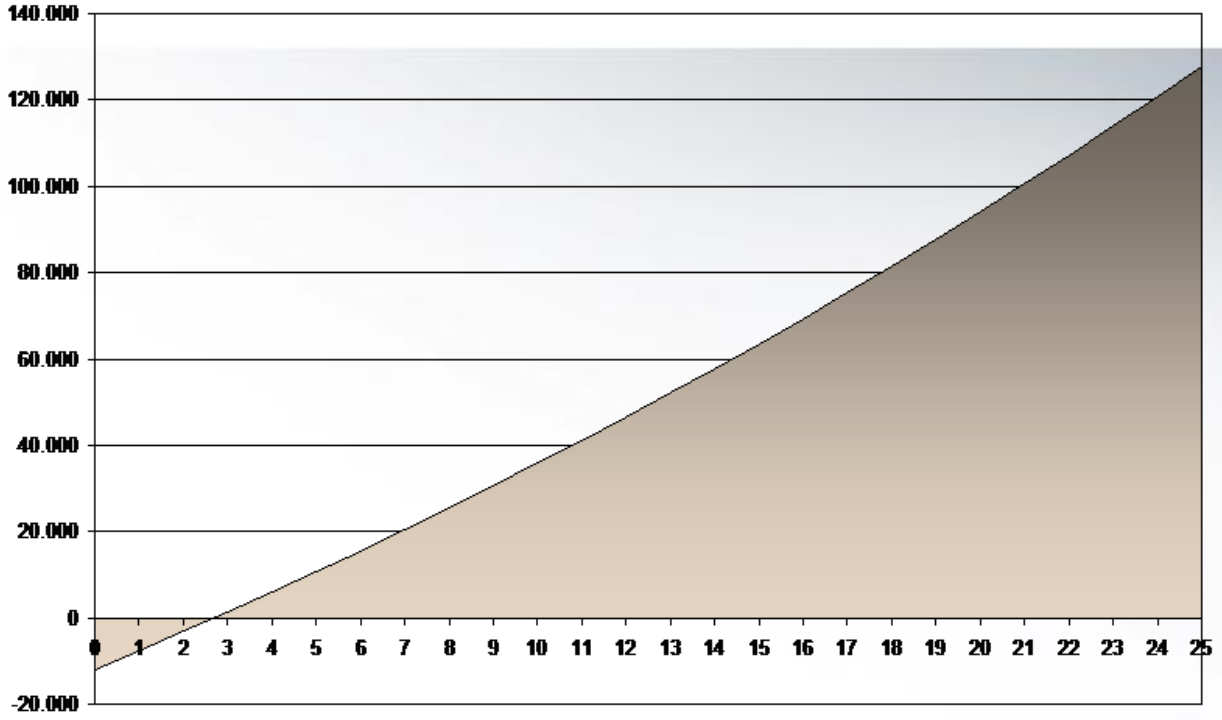
## Project information


| | |
|---|---|
| Project name | Tehnološki park II |
| Project location | Celje tehnopolis |
| Prepared by | STS |
| Project type | Heating |
| Technology | Solar air heater |
| Analysis type | Method 2 |
| Heating value reference | Lower heating value (LHV) |

**Project location**

| | | Climate data location | Project location |
|---|---|---|---|
| Latitude | ˚N | 46,1 | 46,1 |
| Longitude | ˚E | 15,3 | 15,3 |
| Cooling design temperature | C | 23,7 | |
| Earth temperature amplitude | C | 20,1 | |

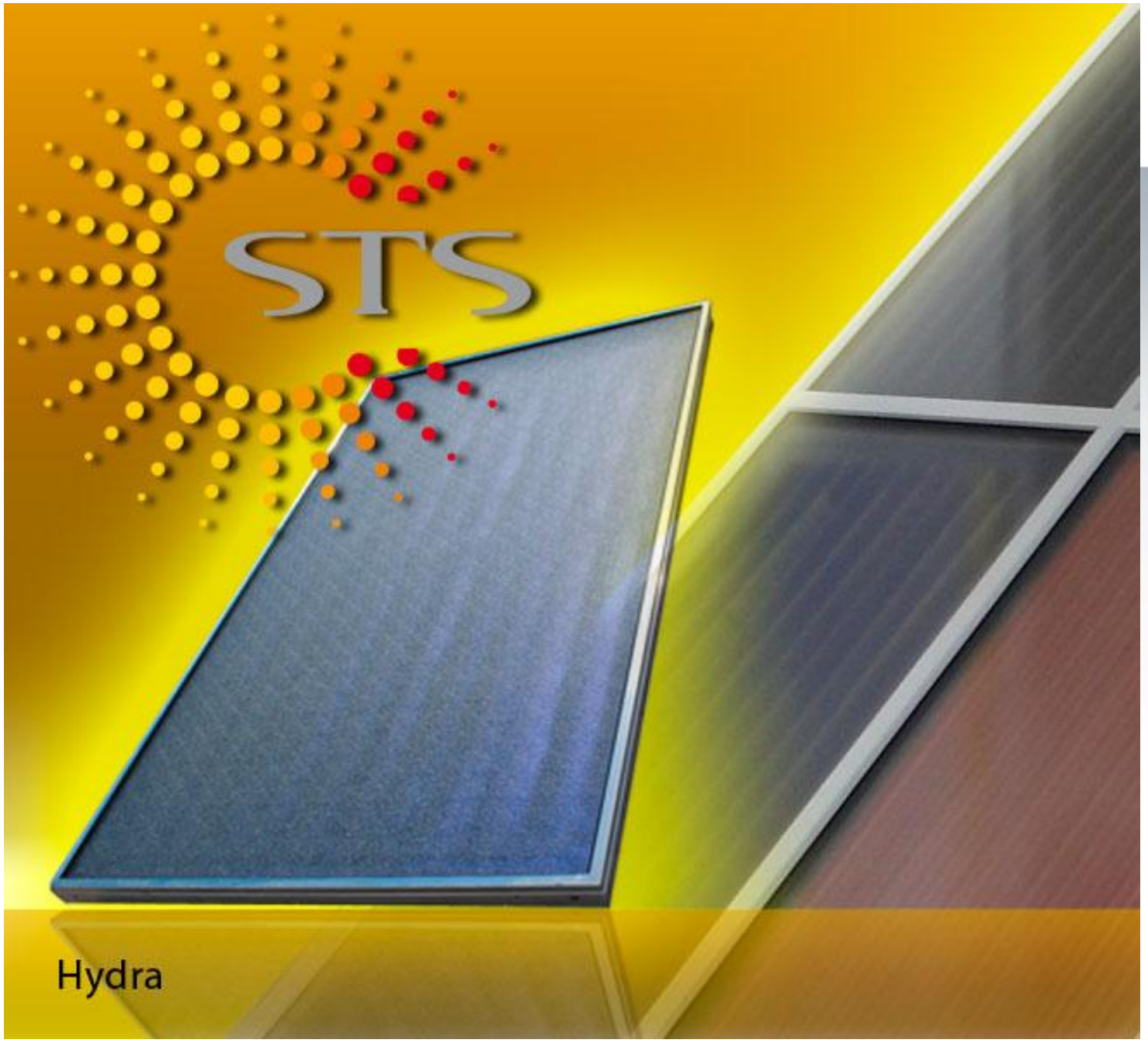
# EKONOMSKA UPRAVIČENOST

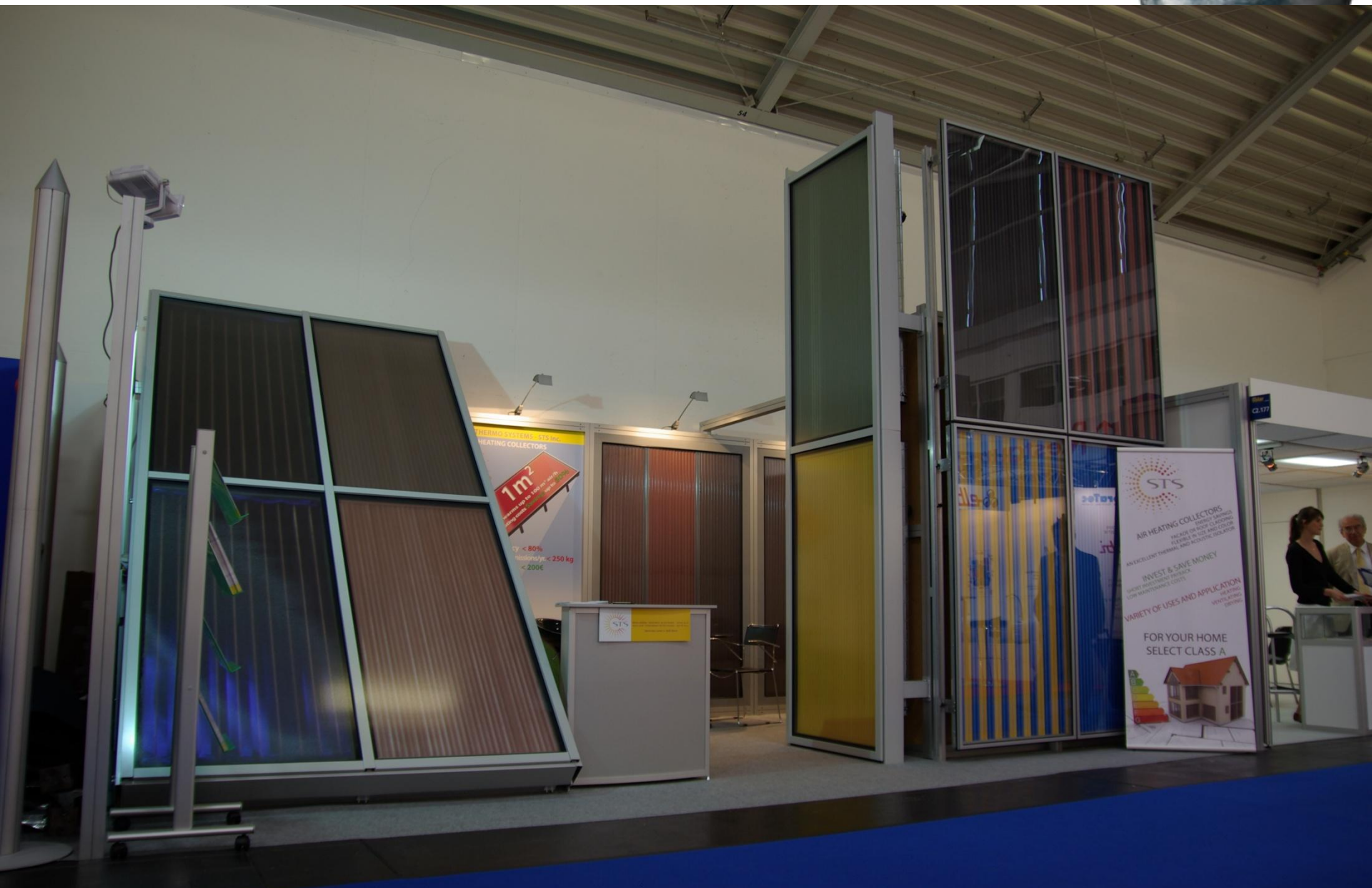


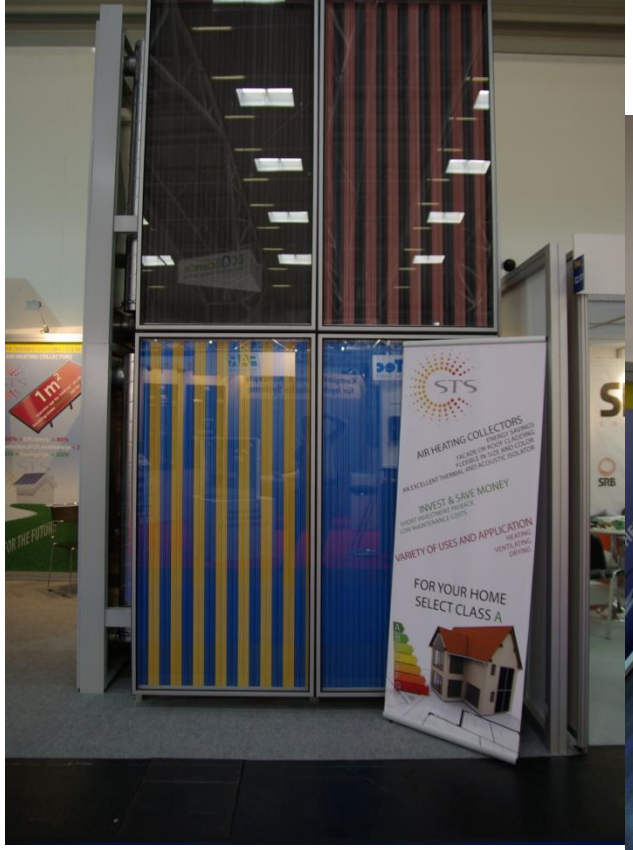


**GHG emission reduction summary**

| | Base case GHG emission t CO2 | Proposed case GHG emission t CO2 | | | Gross annual GHG emission reduction t CO2 | Net annual GHG emission reduction t CO2 |
|---|---|---|---|---|---|---|
| **Heating project** | 21 | 0 | | | 21 | 21 |
| Net annual GHG emission reduction | 20,5 | t CO2 | is equivalent to | 8.335 | Litres of gasoline not consumed | |


STS
Hydra

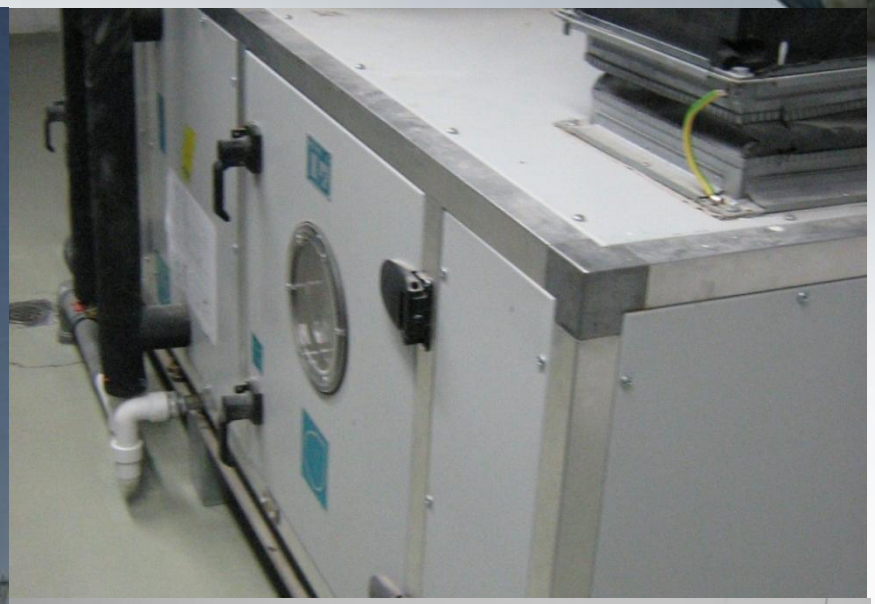

STS
AIR HEATING COLLECTORS
INVEST & SAVE MONEY
VARIETY OF USES AND APPLICATION
FOR YOUR HOME
SELECT CLASS A

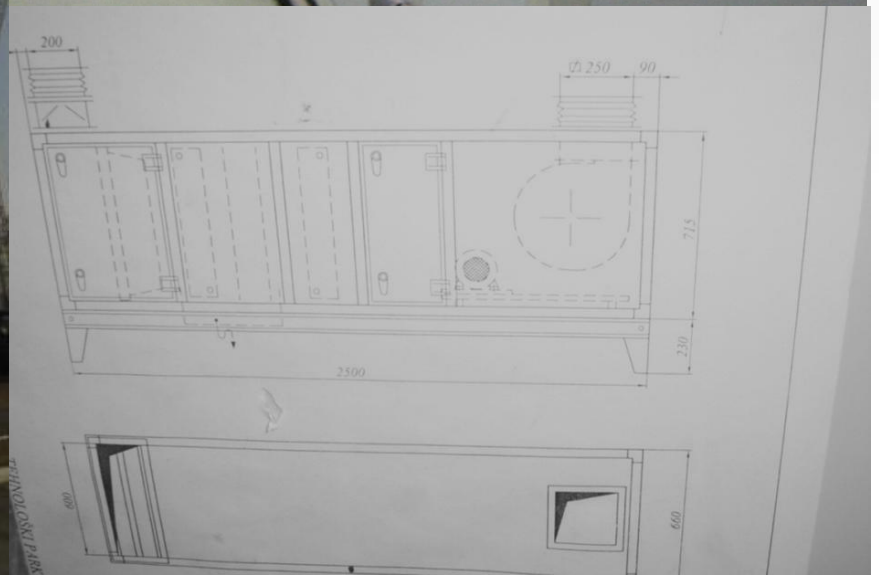

STS
AIR HEATING COLLECTORS
INVEST & SAVE MONEY
VARIETY OF USES AND APPLICATION
FOR YOUR HOME
SELECT CLASS A

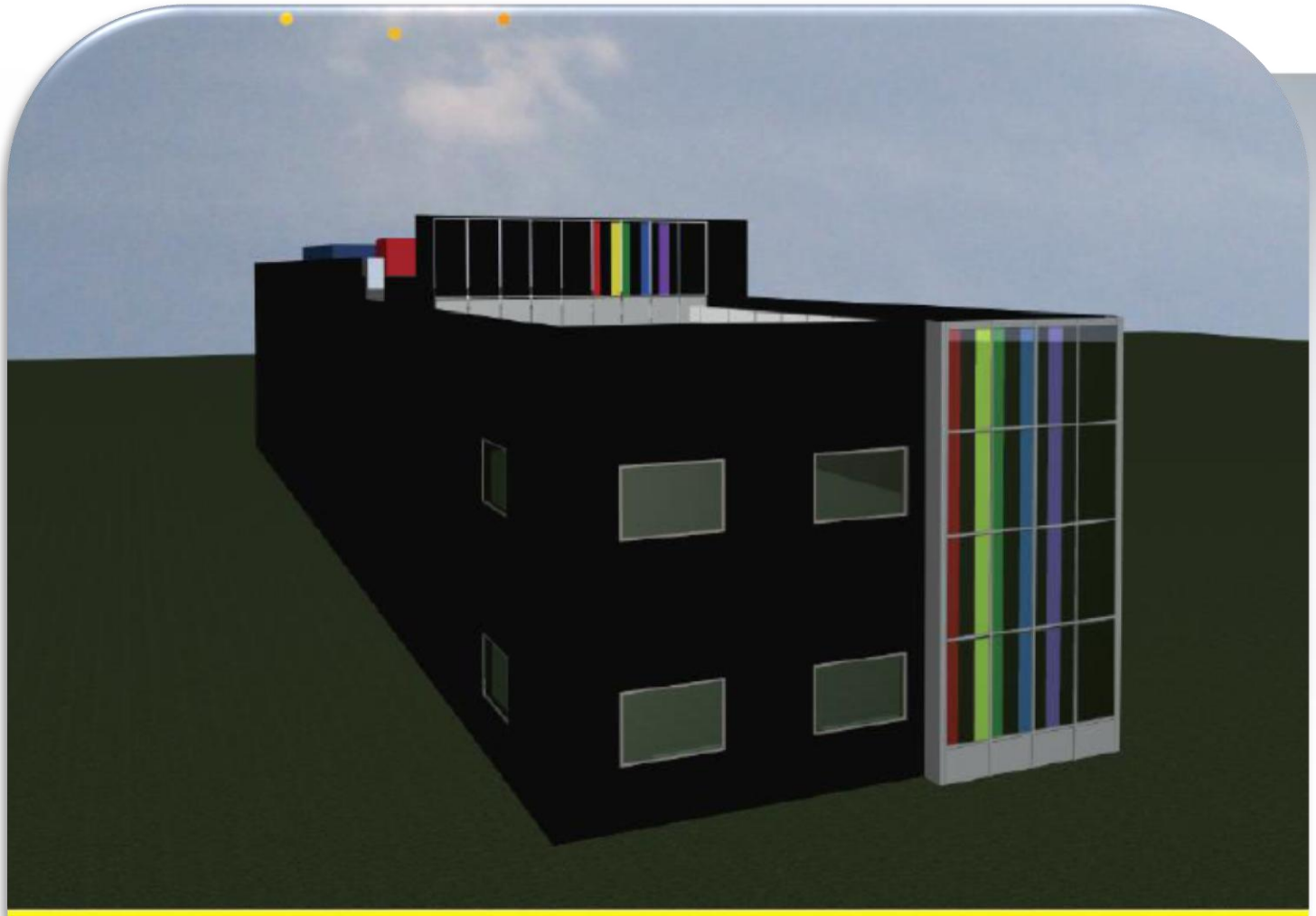

STS

STS

# TP3 CELJE





SOLARNA FASADA
Objekt: Color Medvode Tehnična stavba 28

STS

SOLARNI TERMO SISTEMI
SOLAR THERMO SYSTEMS

# SOLARNI TERMO SISTEMI - STS d.d.


**Obrtniška cesta 3, 3220 Štore, Slovenija**

**Telefon:** + 386 (0)59 083 800

**Telefax:** + 386 (0)59 083 805

**Mobilni:** + 386 (0)31 376 363

**E-pošta1:** info@sts-inc.eu

**WWW:** http://www.sts-inc.eu