Solar Process Heat in Spain
Best practices

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International Training Seminar Solar Process Heat

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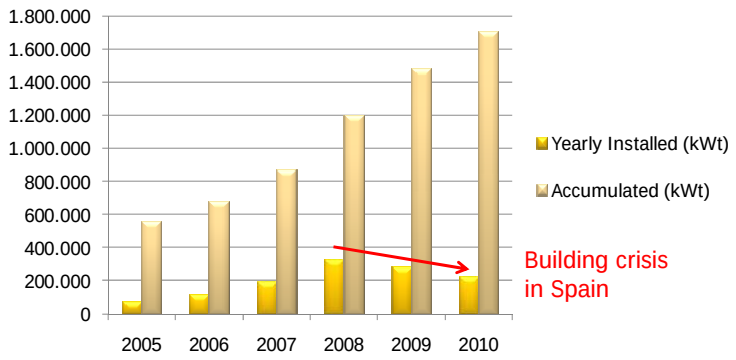
Situation

Solar Thermal Development during last 6 years, in kWt



Situation

National Action Plan for RES 2011-2020

Main pillars for the development of solar energy in Spain in the next ten years:

- solar thermal energy for building sector, following the current regulation:
  - obligation of solar thermal for hot sanitary water in new buildings and solar PV in some circumstances
  - solar heating and cooling
- **solar thermal energy for industries**
- solar thermoelectric energy

Situation

Potential of solar process heat in Spain

Study developed in 2010

Technical potential (without economic considerations)
59,9 TWh heat
97,4 million m2

→

Economic potential (with support)
8,9 TWh heat
14,4 million m2

Projects

Project 1

- Name: Solar thermal installation for Truck cistern vessels washing
- Place: Villamuriel de Cerrato (Palencia)
- System: 72 solar collectors of 1,94 m^2 (140 m^2) and two 5.000 l accumulators (10.000 l).
- Brief description: the system is part of a new washing system, constituted by a 2 ways truck vessels washing.

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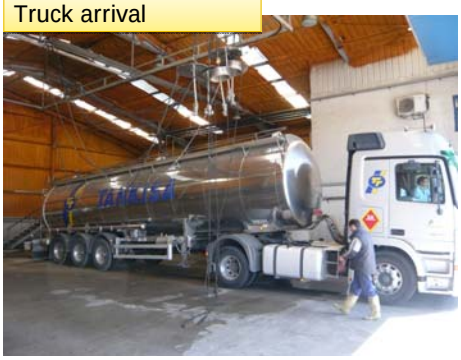
Projects

Project 1

Truck arrival



The cleaning system

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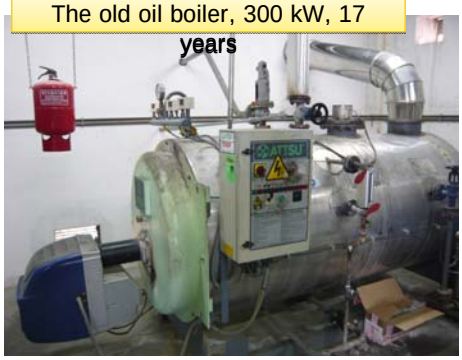
Projects

Project 1

The old oil boiler, 300 kW, 17 years



Conventional accumulation

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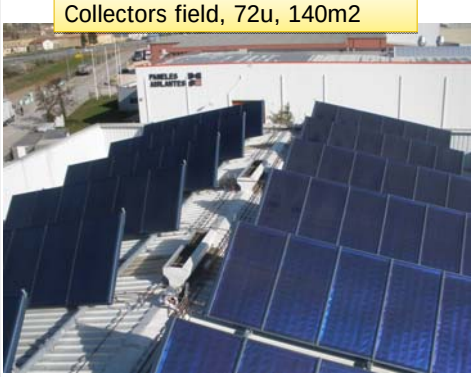
Projects

Project 1

Collectors field, 72u, 140m2



Accumulation 2 x 5.000 l

Projects

Project 1

Circulation pumps and exchanger

Primary circuit:
Flow: 4.190 l/h
Load looses: 9,05 m.w.c.
Pump: GRUNDFOS UPS 40-180 F

Secondary circuit:
Flow: 4.190 l/h
Load looses: 4,0 m.c.a.
Pump: GRUNDFOS UPS 32-60F

Heat exchanger:
83,8 kW (600 W/m2)

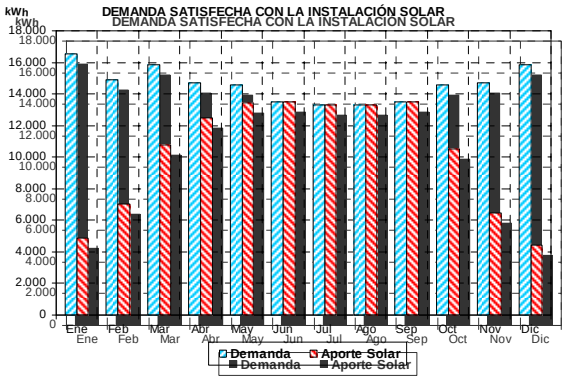
Projects

Project 1

Steam comes out after cleaning

Projects

Project 1



Projects

Project 1

Investment	Subsidy	Final Cost
85.374 €	34.150 €	51.224 €

Savings	Pay-back
7.161 €/year	7 years

Projects

Project 2

- Name: Solar thermal installation for iberic products (ham and pig products)
- Place: Jerez de los Caballeros
- System: 120 solar collectors of 2,03 m^2 (252 m^2) and two 15.000 l accumulators (total 30.000 l).
- Brief description: the system provides heat to hot water for cleaning and washing: floors, plastic trays, food.

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Projects

Project 2

The old oil boiler, 1080 kW, 14 years

Burner detail

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Projects

Project 2

Collectors field, 72u, 140m2

Accumulation 2 x 15.000 l

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Projects

Project 2

Collectors field details

Projects

Project 2

Collectors field details

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Projects

Project 2

Collectors field details

Projects

Project 2

Collectors field details

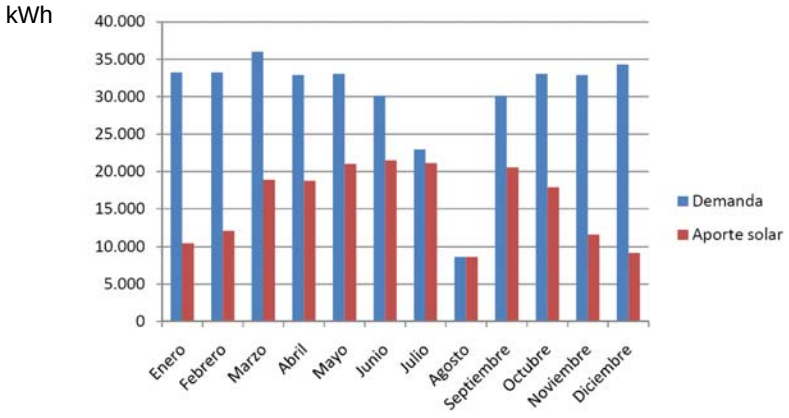
Projects

Project 2

3 ways-valve and exchanger

Projects

Project 2



Projects

Project 2

Investment	Subsidy	Final Cost
175.000 €	61.250 €	113.750 €

Savings	Pay-back
13.760 €/year	8,3 years

Projects

Project 3

- Name: Solar thermal installation for car industry
- Place: Valladolid
- System: 120 solar collectors of 2,03 m^2 (244 m^2) and three 5.000 l accumulators (total 15.000 l).
- Brief description: the system provides heat to the painting process

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Projects

Project 3

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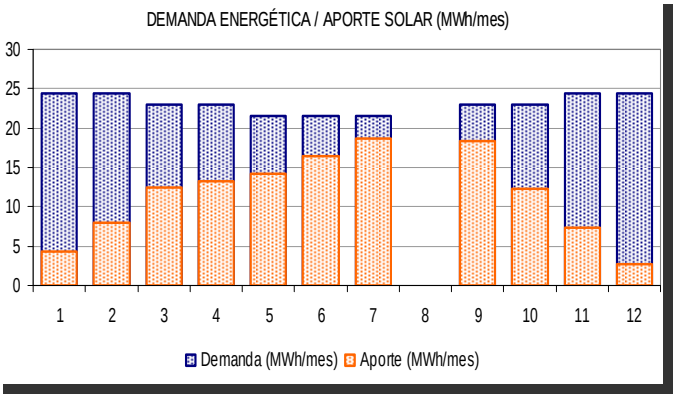
Projects

Project 3



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Projects

Project 3

Investment	Subsidy	Final Cost
147.577 €	45.076 €	102.501 €

Savings	Pay-back
9.200 €/year	11 years

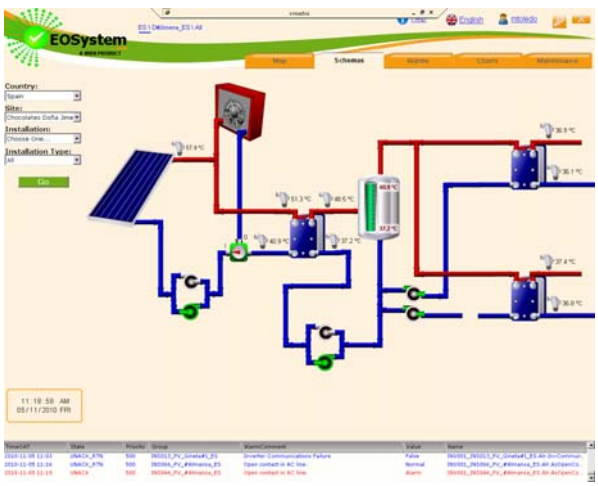
Projects

Project 4

- Name: Solar thermal installation for food industry (chocolate)
- Place: Alcaudete (Jaén)
- System: 132 solar collectors of 2,01 m^2 (265 m^2) and one 15.000 l accumulator.
- Brief description: the system provides heat to the raw material preparation and for the cleaning process

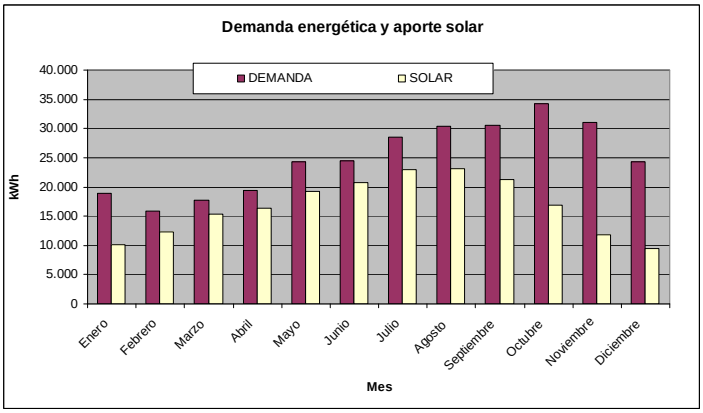
Projects

Project 4



Projects

Project 4



Projects

Project 4

Investment	Subsidy	Final Cost
180.000 €	70.000 €	110.000 €

Savings	Pay-back
14.000 €/year	8 years

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THANK YOU !

You are welcomed to ask any question on Spanish situation:

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