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Financial Formulas for the Take-off of Renewable Energy Sources in Spain

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FINANCIAL FORMULAS FOR THE TAKE-OFF OF RENEWABLE ENERGY SOURCES IN SPAIN

IDAE
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Operations Director

CONTENTS

1. Introduction

What is IDAE?

- A Public Business Entity

- Reporting to the Ministry of Industry, Tourism and trade, through the General Secretariat for Energy.

Mission:

- To promote energy efficiency and the rational use of energy in Spain

- To promote the diversification of energy sources and the increasing use of renewable energies

INTRODUCTION

IDAE'S ACTIVITY INCLUDES:

- **MONITORING AND ANALYSIS OF THE SECTOR**
- **PROMOTION AND DIFFUSION ACTIVITIES**
- **COLLABORATION WITH PUBLIC BODIES**
- **IMPLEMENTING DEMONSTRATION PROJECTS**
- **LINES OF FINANCIAL SUPPORT**

2. Third party financing

2. Third party financing

2.a- General remarks

Problems faced by potential investors in RES:

- High initial capital outlay difficult to be met by promoters
- Difficulty to obtain external finance – reluctance of banks –
- Lack of familiarity with energy technologies – difficulty to evaluate the technical feasibility of the projects

Third party financing as a solution:

- Suitable formula to overcome these handicaps
- First applied in the US (1980's) was rapidly adapted by IDAE to the special circumstances of the Spanish market
- IDAE, being the Spanish energy agency, has strongly contributed towards the take-off of RES and RUE technologies thanks to this formula

Nature of the TPF formula:

IDAE finances to the industrialist all or part of the investment.

IDAE participates in the definition of the project and afterwards, purchases, supplies and installs the proper equipment as agreed with the final user.

The involvement of IDAE lasts until it recovers the investment through its profit. Then, IDEA retrieves, leaving the installations as property of the industrialist.

TPF project phases:

Project Identification

⇩

Definition of the project: technical, financial and economic study

⇩

Financing Contract: preparation of legal documents and signing of contract

⇩

Construction stage (under IDAE management control)

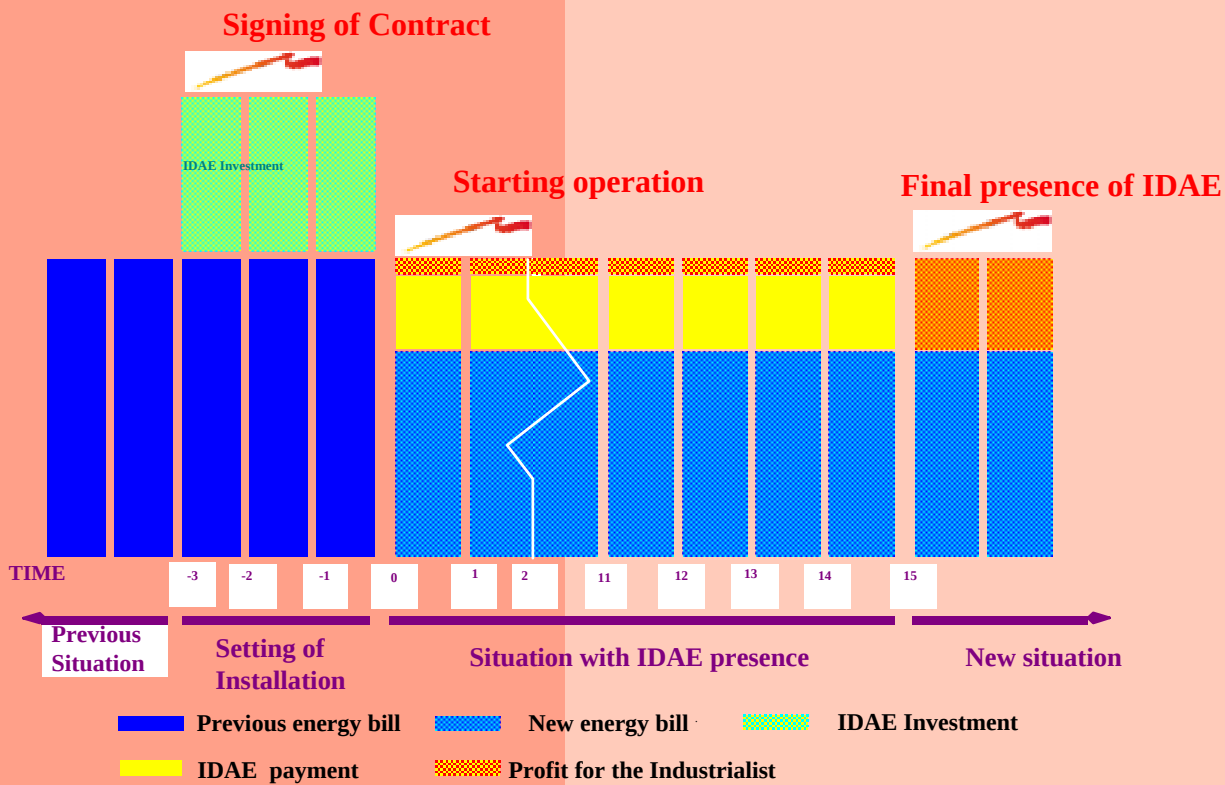
⇩

Operation Stage

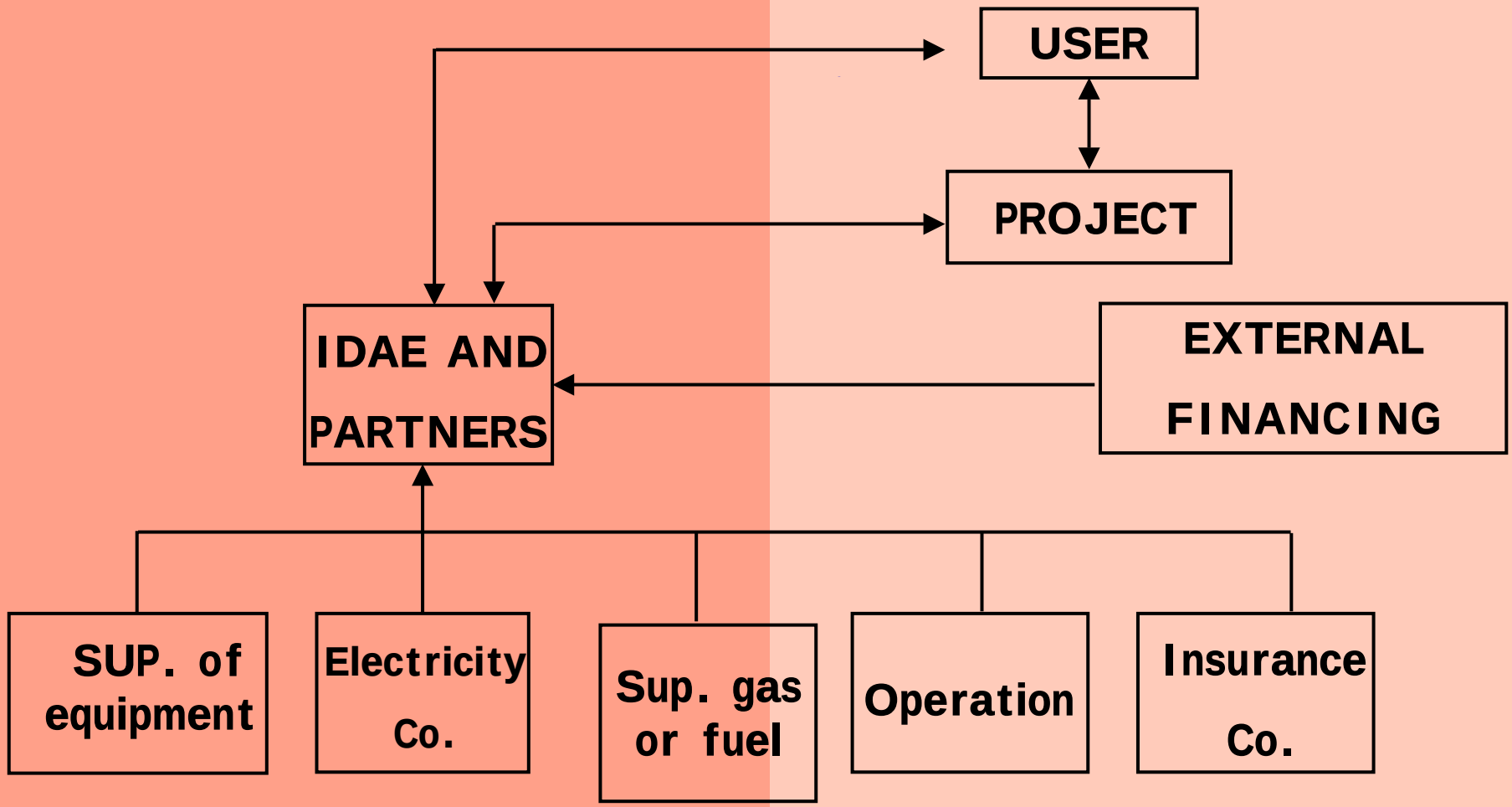
⇩

End of IDAE involvement

Recovery of the investment:



Complex scheme:



Role of IDAE in TPF:

- Participates in the definition of the project - provides the best technical solution -
- Elaborates the financial part of the project
- Advises about additional support mechanisms and aids Prepares the contractual documentation.
- Takes charge of the technical direction, purchases the equipment
- Shares the risk generated by the project.
- Contributes with its supervision during the exploitation phase.

Advantages of TPF for the industrialist:

Best technical-economic solution by an expert in the energy field

The risks are borne by the ESCO and follow up is ensured

Renovation of equipment at low cost and with no initial investment

Costs are paid with savings and thus does not increase the indebtedness of the industrialist

Ownership of equipment at end of operation

Key figures of TPF investment:

Many projects in all energy areas (RES and RUE) have been implemented by IDAE since the mid 1980's.

The Institute has also contributed to the spread of this formula in other countries.

Only in RES, IDAE has devoted 94 million euros to projects using TPF, mobilising a total investment of around 103 million euros.

They have led to a reduction of 406 thousand tonnes of CO2.

2. Third party financing

2.b- Case studies

BIOMASS ENERGY

Biomass district heating in Cuéllar

DEMONSTRATION PROJECTS

- Location: Cuéllar (Castilla & León)
- Biomass: timber industry wastes
- 789 toe/year of primary energy
- One 4,500,000 kcal/h boiler, other one with a capacity of 600,000 kcal/h and distribution grid with preinsulated piping
- It provides heat to 3 municipal buildings, 3 housing cooperatives and 13 detached houses
- It supplies heat and hot water
- First Spanish facility of this kind (without CHP)
- It substitutes old diesel boilers
- Running since April 1999

BIOMASS ENERGY

DEMONSTRATION PROJECTS

Biomass district heating in Cuéllar

- Owners: IDAE & EREN
- User: Council of Cuéllar
- Investment: 1.17 million euro
- IDAE: Third Party Financing (20 years). Quota are linked to the price of diesel for heating
- Low profitability
- Final users pay for the energy to the Council, with 10% discount with regard to diesel
- Two kinds of payment: individual users (linked to their consumption) and blocks of apartments (quota)

SOLAR THERMAL ENERGY

DEMONSTRATION PROJECTS

SHW *production in hotel installation*

Gran Tinerfe Hotel

Third Party Financing.
IDAE market share 40%

Location:
Adeje (Tenerife)

- 300 ESE TF-7911 (510 m^2) captors
- South world orientation and lean 40 º.
- Location: Cover of one of the buildings of the hotel in battery of 5 units connected in reverse return
- 8 storage heater tanks of 5.000 l and 6.000 l and an interchange of solar planes in the engine room.
- Monitoring system through the Viterra Sensonic.
- Auxiliary installation with diesel oil boiler.
- Predicted saving: 304.271 toe/year.
- Running since 1998
- Supplier company: PROCALOR, S.L..

SOLAR THERMAL ENERGY

DEMONSTRATION PROJECTS

SHW *production in hotel installation*

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SMALL HYDRO ENERGY

DEMONSTRATION PROJECTS (I)

Dam bottom

C.H. Porma and Ferreras

- 4.532 toe/year primary energy
- Flow: Porma 30 m3/s y Ferreras 4 m3/s.
- Head: Porma 87 m and Ferreras 62 m.
- In Porma:Turbina Francis vertical axis, 2 groups of 7.583 kW and one of horizontal axis of 2.308 kW, in Ferreras Francis horizontal axis 2.434 kW.
- In Porma: synchronous turbine, 2 groups of 8.004 kVA and 1 group of 2.436 kVA and in Ferreras, 1 group of 2.595 kVA.
- 52.700 (45.700+7.000) MWh of production in a representative year.
- Electry grid: Porma subestation Garrafe L= 34 Km, 45 kV, in Ferreras till support nº 7 Porma-Garrafe, L=4,3 km to 45 kV.
- Start up in March 2004

Third Party Financing.
IDAE market share 100%

Location:
Boñar (León)

SMALL HYDRO ENERGY

DEMONSTRATION PROJECTS (I)

C.H. Porma and Ferreras

Third Party Financing.
IDAE market share 100%

Location:
Boñar (León)

Dam bottom

WIND ENERGY

DEMONSTRATION PROJECTS

Third Party Financing

P.E. Tarazona Sur

Investment:

8,18 M. Euros

Start-up:

July 2002

Location:

Tarazona (Zaragoza)

- Total installed power 9,6 MW in two phases::
  - Phase I: 5,6 MW (7 x 800 kW)
  - Phase II: 4 MW (5 x 800 kW)
- Limited power waste to 5,4 MW
- Technology: 12 wind turbines MADE AE-52/800
  - Unit nominal power 800 kW, Ø 52m
  - Tubular tower, high of axle box 60m
  - Variable speed
  - Type I (according to IEC), location strong winds
- 23.520 MWh (2.450 h. equivalent) of production annual media
- 2.023 toe/year in primary power terms
- 22.085 tCO_2 /year avoided
- Creation of employment:
  - *125 man-year* (Diseño&Construcción&Montaje)
  - *2 employments* (O&M)

WIND ENERGY

DEMONSTRATION PROJECTS

Third Party Financing

P.E. Tarazona Sur

Promoter:

ELECDEY Tarazona S.A.

IDAE third party financing: 95,5%

Location:

Tarazona (Zaragoza)

SOLAR PHOTOVOLTAIC ENERGY

DEMONSTRATION PROJECTS (I)

Palacio de la Moncloa
Pergola

Third Party Financing.
IDAE market share 100%

Location:
Madrid

- Total power: 41 kWp.
- Foreseen production: 45.002 kWh
- Real production: 2001: 29.333 kWh
  2002: 34.420 kWh
  2003: 31.900 kWh
- Contract of sale with IBERDROLA
- Start up in 2000
- Main equipment supply companies:

Inversores Enertron S.A., paneles UTE (Atersa S.A., BP Solarex S.A., Isofoton S.A.)

SOLAR PHOTOVOLTAIC ENERGY

DEMONSTRATION PROJECTS (I)

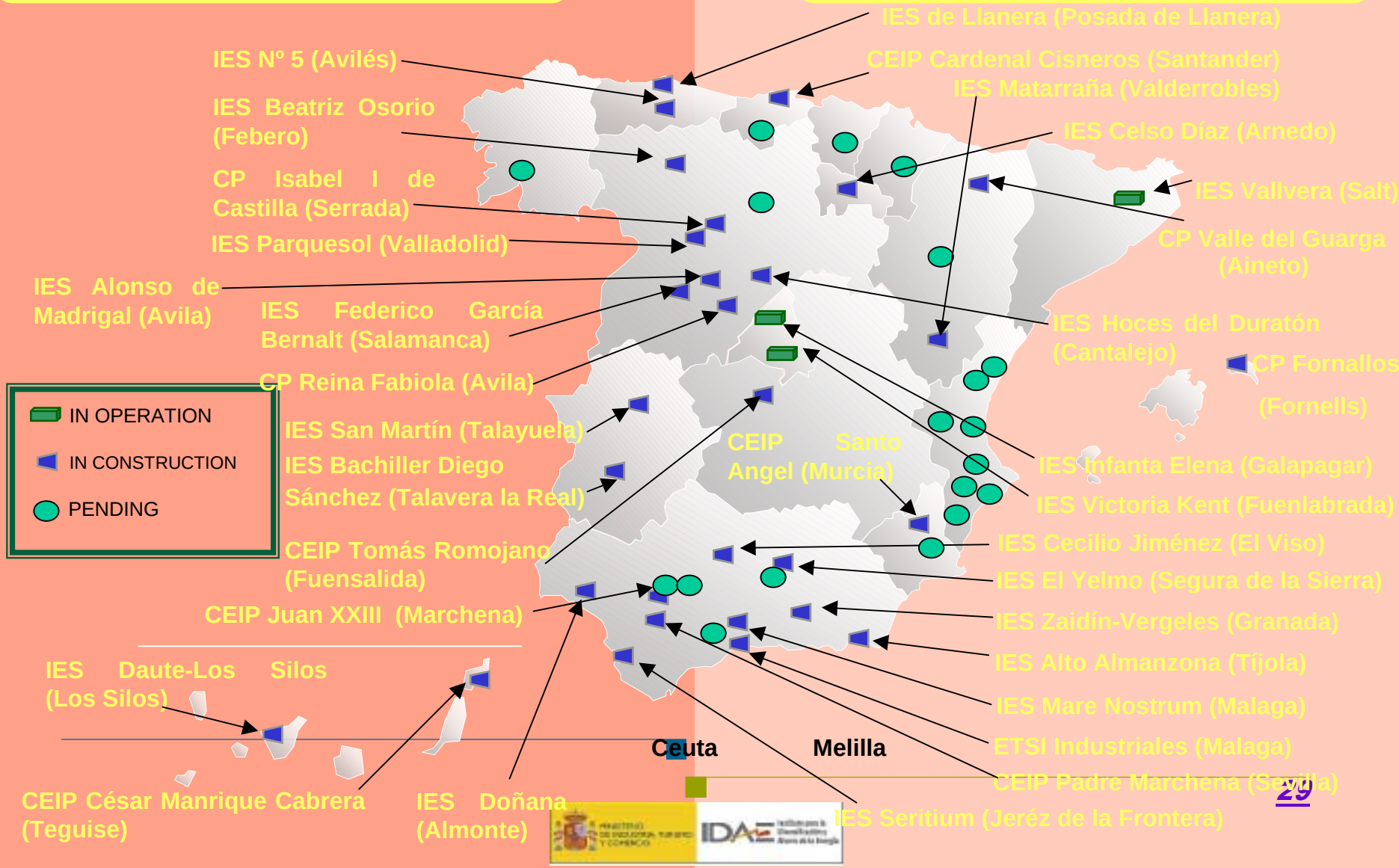
Palacio de la Moncloa
Pergola

Third Party Financing.
IDAE market share 100%

Location:
Madrid

PHOTOLVOLTAICS

GREENPEACE PROJECTS



PHOTOVOLTAICS

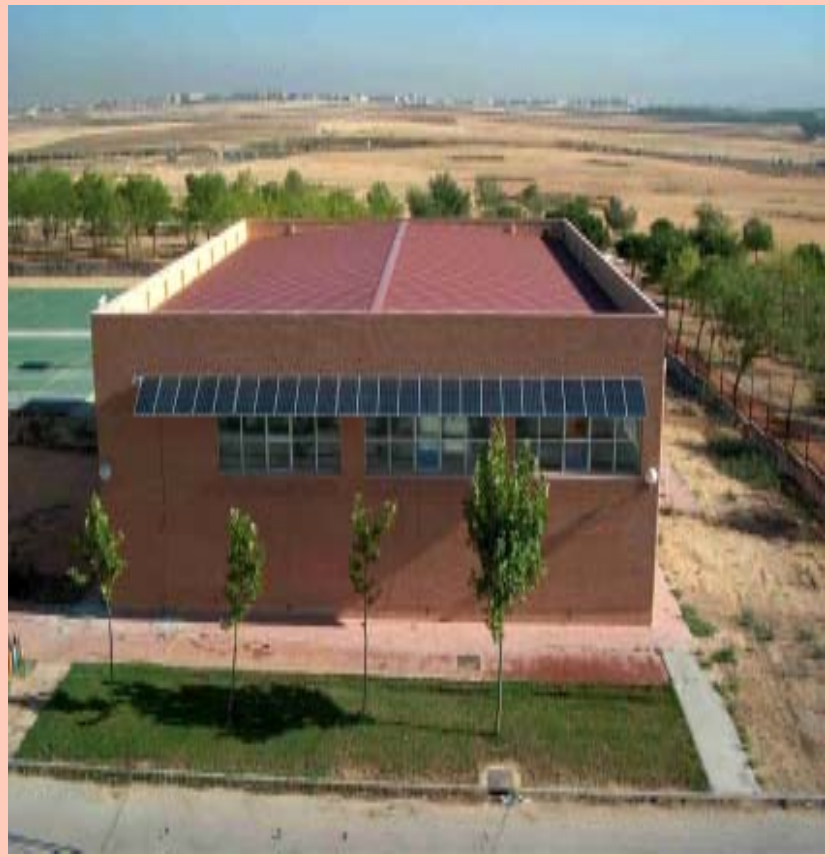
GREENPEACE PROJECTS

I.E.S. Victoria Kent

IDAE is the owner of this installation

Location:
Fuenlabrada (Madrid)

- 2,65 kWp with 2,5 kW of power investment.
- Final inscription in REPE ongoing.
- Contract of sale with IBERDROLA
- Start up in January 2004



3. Conclusions

Key conclusions:

- Very appropriate technical and financial solution for the industrialist
- Does not increase the indebtedness of the user and is repaid with gains or savings of the installation
- At the end of the operation the industrialist owns the installation
- But is not a panacea for all situations. Some aspects have to be carefully analysed.

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