HYBRID SOLAR GAS PROJECT

Project definition

The project is analysed with the following options:

- Size 150 MW

Combine cycle 107,1 MW net.

Solar Field 43,56 MW net.

- Size 306 MW

Combine Cycle 258,8 MW net.

Solar Field 54,1 MW net.

-**Size 400MW**

Combine Cycle 363,4 MW net.

Solar Field 71 MW net.

In both choices we will add a desalting plant with a volume that will be determined by the thermic flux available at the steam turbine extraction.

This possibility has been added when GEF declared to us that in case of an asset's lack within the solar thermic programm, he will be able to give assistance to cover the incremental cost of the investment with the help of another water programm.

- **I) The Site Localisation**
- The Start Mission of Solar Paces has resulted in the discovery of several potential sites offering advantages such as :
- The access to the natural gas
- The recovery of salted water presently rejected
- An easy access to the electrical transport grid
- The disposal of transport infrastructures
- (Road, Railway – Airport)
- **Environment facilitating the project**
- All the factors for the project success are gathered.
- **Political will**
- It has been recorded by the president himself, being an ardent adherent of the sustainable development.
- It represents the basis of a support schedule to the renewable energies development plan in Algeria.
- It came to reality by the electricity law on account of the energy Ministery efforts. The application text project for renewable energies is under examination . It forecasts incentives with a sufficient out put to make possible the economical viability of the project .
- It was also demonstrated by the Governor of the state where will be located the plant who took all the local assistance measures to the project : land, gas feeding etc……

- **Investment Sight**
- The investment code otherwise very attractive forecasts more important incentive measures to renewable energies.
- **The Potential of Development**
- We think that the Start Mission conclusions underlying the relevant potentialities that exist in Algeria compared to other countries should encourage many electricity producers to invest in this particular field in Algeria.
- However, a number of difficulties regarding the access to the energy European market have to be overcome, but this does not concern our first project addressed to the Algerian market.

- **II) Structure of the project taking up**
- The project will be an IPP type, where the financial taking up will be a project finance one
- the existing securities are :
- a gas sale contract
- a purchase electricity contract
- a water purchase contract

From the first step up to the start up :

- NEAL will hold : 20 to 30% of the equity
- EPC constructor : 10 to 20%
- SONATRACH : 20 to 30%
- SONELGAZ : 30 to 40%

As to the second step :

- NEAL : 20 to 30% of the equity
- EPC constructor : 10 to 20 %
- Foreign Developer 10 to 20%
- Funds + BANKS 20 to 30%
- SONATRACH : 7%
- SONELGAZ : 10 to 33%;
- The equity will represent nearly 25% of the global investment

- **III) <u>The financing</u>**
- Apart from the expected help from GEF or GMI :
- the project can be financed locally utterly as far as the law on electricity allows the payment of the overcost and that it reaches an IRR of 15% on the basis of granted bonus.
- The local banks have enough provisions to totally support on project. Whithout having the GEF help, the project can be financed thorougly or partly by BEI with a concessional credit type + Shareholding credit + Commercial credit.
- The Project can be financed upon the GMI initiative with the German Government help and if needed the rest can be provided by the other already cited means.

- **Draft Feasability Results**
- **Project : 150 MW**
- 107 MW net Combined cycle
- 43,56 MW net Solar field
- Ratio : Solar out put (kwh) / Total out put (Kwh) = 11%
- **Agregate investment**
- - EPC 143 866 000 $
- - Intercalary interests 12 064 500 $
- - Preliminary costs 500 000 $
- - Contingency 4 315 980 $
- - Customs taxes 5 296 111 $
- **TOTAL 176 833 290 $**
- - IRR : 15%
- Production's premium (by law) : 140% onthe conventional price
- Estimated power conventional price : 2,2 cts $/kw/h
- Pay-back / 7 years

- **Draft Feasability Results**
- **Project : 300 MW**
- 251,8 MW net Combined cycle
- 54,1 MW net Solar field
- Ratio : Solar out put (kwh) = 6%
- Total out put (Kwh)
- **Agregate investment**
- - EPC 190 983 000 $
- - Intercalary interests 16 378 000 $
- - Preliminary costs 500 000 $
- - Contingency 5 729 490 $
- - Customs taxes 7 015 880 $
- **TOTAL 263 397 070 $**
- - IRR : 15%
- Production's premium (by law) : 50% onthe conventional price
- Estimated power conventional price : 2,2 cts $/kw/h
- Pay-back / 7 years

- **Draft Feasability Results**
- **Project : 400 MW**
- 363,4 MW net Combined cycle
- 71 MW net Solar field
- Ratio : Solar out put (kwh) = 5,4%
- Total out put (Kwh)
- **Agregate investment**
- - EPC 235 044 640 $
- - Intercalary interests 19 911 000 $
- - Preliminary costs 500 000 $
- - Contingency 7 051 340 $
- - Customs taxes 8 008 920 $
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- **TOTAL 286 015 900 $**
- - IRR : 15%
- Production's premium (by law) : 30% onthe conventional price
- Estimated power conventional price : 2,2 cts $/kw/h
- Pay-back / 7 years

TOTAL INVESTMENT COST

PROJECT SIZE	INVESTMENT COST
150 MW	176 833 000 $
300 MW	236 397 000 $
400 MW	286 015 900 $

SOLAR ANNUAL OVERCOST

PROJECT SIZE	OVER COST USD	% ON TOTAL SALE
150 MW	28 815 690	58%
300 MW	22 733 170	33%
400 MW	19 785 610	23%

- Conclusion
- The 400 MW project appears to have the best irnternal return than the other options.
- The feasibility study should allow us to confirm this.
- The adding of a desalting plant will not only make the water resources available to the plant and the whole area but also it allows the access to a relatively important local and international financing.
- It is true that pollution by salted water and lack of water generally speaking in this zone are major preoccupations that can be solved by our project.
- The economical development resulting from this project will be reflected either directly by job creations or by the agricultural development in a zone pedicted to be the equivalent of California state if the water problem was solved.
- One should not forget the health problem of "population consuming a hard, hot water (60°).
- Our project would contribute to this.
- The existing Algerian thermic solar potential has raised a remark from the experts of solar paces who declared that 1/10 of sahara will be suffiscient to provide the electrical needs of the whole Europe.
- Therefore, the volumes of gas which could be saved would be available for other markets.
- All the evaluation is based on US equipments