Network of 1,5 Mega Watts wind deflectors over a gas tanker.

Case study.

A company already involved in the sector of energy have decided to install a network of wind deflectors above one of its reservoirs. The tank being 155 meters in diameter, a carrousel of 150 m. was installed; this one supports and point true wind 20 sets of 5 deflectors. The surface of harnessed wind is 150 X 20 = 3,000 square meters. This network of wind turbines thus has a nominal output of 1,5 MW, as the conditions of the site are favourable, the hoped of annual power production is between 3.5 and 5 million kWh. For end of cost-benefit analysis, a value of 4.25 million kWh was retained.

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The structure of the tank had to be reinforced to receive the system of wind turbines. The modifications especially aimed at reinforcing the structure against shearing, the weight of the wind turbines being rather negligible. The cost of this work was 400,000$. Construction and installation of the carrousel and its positioning mechanisms cost 850,000$. Each module of 5 deflectors cost a little less than 100,000$ for a total of 1,850,000$. Miscellaneous make expenses, including engineering advises and conception, was separated on several sites; the charged fee are of 75,000$. The baseline cost of the project was thus of 3,175,000$.

As the company in located in a zone where the electricity is produced up to 80% from coal, an annual allowance of 3,400 tons of saving in carbon gas was allocated for this project of clean energy conversion. The company will directly apply this economy to its charge for gas emission and will save 1,530,000$ over the 30 years of damping of the system. The final cost of the project is thus of:

Baseline cost	3,175,000$
Credit of taxes	1,530,000
Net cost	1,645,000$

The company having a rather low capital cost of 4%, the financing expenses of the project will thus be considered at 94,000$ annually, damping over 30 years included. With maintenances expenses estimated at 75,000$, the annual cost of the electricity production is of 166,000$, for a cost price of 3.90 cents per kWh. In others words, if the corporation can sell these power at 11 cents per KWh, they can expect a net benefit of 300,000$ per years, for a 5 1/2 years payback.

A digital simulation allowed estimating at 5% the average loss of power output if wind turbines have to be installed on 30 of the 38 tanks of their exploitation site.

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