

Mediteranean Clean Propre Limpio



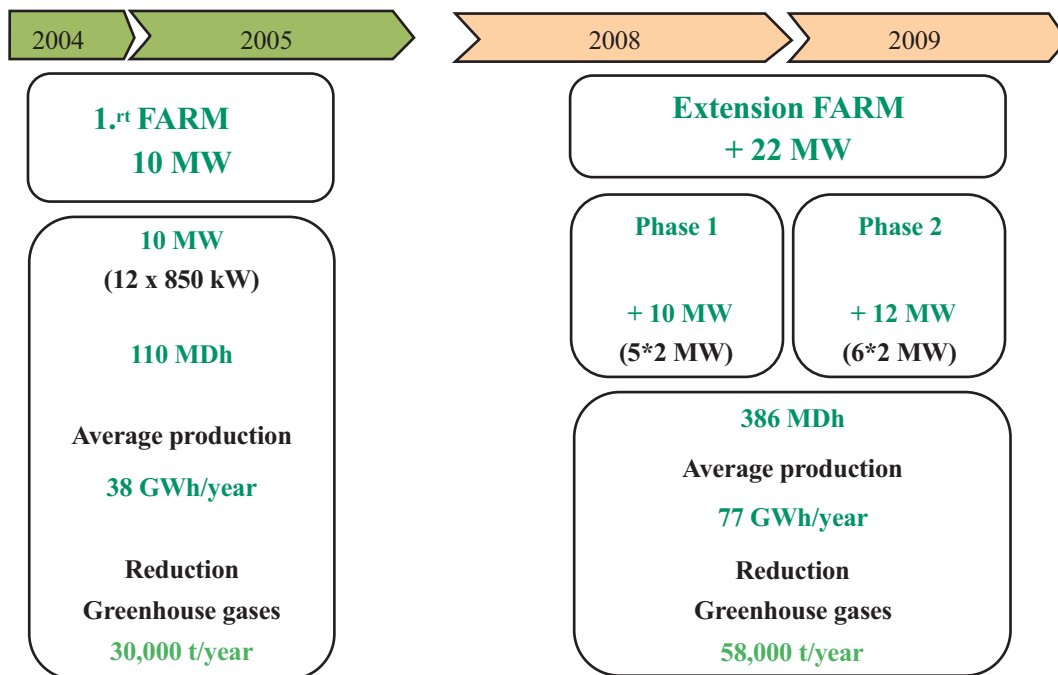
No. 123

Renewable energy

Utilization of wind energy instead of electrical energy. Installation of a wind farm

Company	Lafarge (Morocco)
Industrial sector	Manufacture of cement, lime and plaster ISIC Rev 4 n. 2394 (<i>International Standard Industrial Classification of All Economic Activities</i>)
Environmental considerations	<p>A series of environmental factors were considered when the project was initially analyzed:</p> <ul style="list-style-type: none"> • Interest for the diversification of the national energy supply. • Cost of energy in Morocco is high. • Significant cost saving by using of wind energy instead of electrical energy. • Reduction of CO₂ emissions, which becomes an important issue in the context of the Kyoto agreements on climate change (greenhouse gases). • Contribution to the development of investment (domestic and foreign) in the energy sector. • Clean technology transfer and capacity building.
Background	<p>As part of its sustainable development policy, Lafarge Morocco has decided in 2001 to build a wind farm with a capacity of 10 MW, to supply the new cement plant in Tétouan with a significant portion of its electricity consumption from renewable energy. In 2008-2009 they expanded the wind farm. The capacity is now 10 MW + 22 MW.</p> <p>Moreover, to improve the profitability of this investment, it was also decided to conduct the procedures for registering as a CDM (Clean Development Mechanism) project to benefit from carbon credits.</p> <p>This project, in line with Lafarge's commitment in reducing CO₂ emissions by 20% per ton of cement in the 1990-2010 period, is contributing to sustainable development in Morocco.</p>
Summary of actions	<p>The different phases carried out to develop the project were as follows:</p> <ul style="list-style-type: none"> • 1995-2001: Initial feasibility studies and start of proceedings for the CDM project. • 2002-2003: Budgeting and characterization of potential wind. • 2003-2004: Environmental studies and ornithological survey. • 2004: Contract signed Lafarge / CTA for the first farm with an option for extension. • 2004: Starting of construction of first wind farm. • 2005: First wind farm put into operation and registration of CDM project. • 2008: Permitting of wind farm expansion and starting of construction. • 2008: Commissioning of phase 1 expansion (+ 10 MW). • 2009: Commissioning of phase 2 expansion (+ 12 MW). • 2009: Registration of CDM expansion project.

Diagrams



Balances

	2005 (from June)	2006	2007	2008	2009
Energy from Office National d'électricité kWh consumption* kWh	25,147,009	48,260,863	50,784,116	54,542,976	49,223,522
Energy produced by farm 1 kWh	20,852,753	35,239,731	33,244,979	28,236,597	30,687,435
Energy produced by farm 2 kWh					42,012,555
Energy supplied to the network from F1 kWh	1,210,192	2,623,858	1,058,191	1,057,606	6,526,185
Energy supplied to the network from F2 kWh					13,167,523
Wind energy consumed by the factory kWh	19,642,561	32,615,873	32,186,788	27,178,991	53,006,282
Total energy consumed by the factory kWh	44,789,570	80,876,736	82,970,904	80,721,967	102,229,804
CO ₂ emissions reduction (t)	15,681	26,500	25,000	21,234	54,348
Investment	€44.39 M				

Conclusions

Lafarge has installed the first private wind farm in Morocco. The plant located in Morocco has become the first cement plant in the world powered directly by wind energy.

This project has represented a very significant reduction in CO₂ emissions, which can be estimated at more than 142,000 tons in the period from 2005 to 2009. This reduction is even more considerable following the wind farm expansion, achieving an annual CO₂ emissions reduction of 54,000 tons in 2009.

NOTE: This case study seeks only to illustrate a pollution prevention example and should not be taken as a general recommendation.



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