Novo Nordisk’s search for cost-effective solutions to reduce CO2 emissions had driven the development of a new business model which expanded the commercial basis of renewable energy in Denmark.
Developing an innovative business model: Novo Nordisk and Dong Energy driving the market for renewable energy in Denmark.

ESBJERG, DENMARK. SEPTEMBER 17, 2009. Jan Hoff, Corporate Vice President of Global Support in Product Supply at Novo Nordisk, felt honored and proud as Crown Prince Frederik of Denmark was inaugurating Horns Rev II. Located in the North Sea and owned by Dong Energy, Horns Rev II is the world’s largest offshore wind farm.

Novo Nordisk had played a crucial role in developing the business model innovation that allowed Dong Energy to form the commercial base that contributed to finance the construction and operation of Horns Rev II. Hoff had championed the Novo Nordisk team that had worked alongside Dong Energy executives on the design of the innovative climate partnership.

**Background**

Novo Nordisk is a focused healthcare company headquartered in Denmark. A world leader in diabetes care, the company was created in 1989 through a merger between two Danish companies – Novo Industri A/S and Nordisk Gentofte A/S. As of December 2008, Novo Nordisk had over 27,000 employees in 81 countries and production facilities in six countries.

The company’s response to climate change was kicked off in 2003 as a result of internal discussions and a dialogue with WWF. It is based on reducing dependence on carbon-based fuel and showing leadership in this respect.

In January 2006 Novo Nordisk became the tenth company to join the WWF Climate Savers initiative. Climate Savers was founded in 1998 by WWF as a platform to enable companies to join forces in committing to more ambitious reductions in their greenhouse gas emissions. At that time Climate Savers was the first partnership of its kind. The main objective of the initiative was to transform the industry’s more customary incremental and/or passive approach toward climate change action.

By the end of 2008, Novo Nordisk had begun to reap rewards from its Climate Savers efforts, as energy-related emissions went from 236,000 tons of CO2-equivalent in 2007 to 215,000 tons in 2008 (refer to Exhibit 1 for data on energy use and CO2 emissions from 2004 to 2008).

**Being pushed towards innovation**

In its Climate Savers agreement with WWF, Novo Nordisk committed to reduce emissions from global production sites by 10% by 2014 (in absolute terms compared with 2004 emissions). Hoff qualified the target as bold. It meant that production and business growth would have to be decoupled from growth in energy consumption and would represent a reduction of 65% when taking projected production capacity growth into consideration (refer to Exhibit 2 for data on projected reduction of emissions). Moreover, the...
company’s approach to setting the target was fundamentally different from that of most other industry players. He explained:

Companies usually set emission reductions targets based on the following process. They first calculate their current emissions and evaluate how many tons of CO2-equivalent they would be able to cut through well-known measures, mostly incremental improvements. Then, in light of the business growth targets, they calculate a feasible and reasonable emission reduction target. Our process was exactly the opposite and turned out to be very ambitious. We started by agreeing with WWF on a meaningful target based on its potential to impact the concentration of greenhouse gases in the atmosphere. Then, we decided to make it happen; even if, at the time, we were unsure of how to achieve this ambitious goal. We then sought incremental improvements against the target and radical innovative solutions to achieve the target. By being daring, we forced ourselves to innovate!

After setting the target, Novo Nordisk began to seek opportunities to improve productivity in its industrial facilities, reduce energy consumption and increase renewable energy use.

Focusing on the Danish production sites made a lot of sense since 85% of the company’s CO2 direct emissions comes from the production of insulin – a highly energy-intensive process - which takes place only in Denmark.

The incremental path to reduce emissions was delegated to a global project manager and a network of thirty energy stewards placed throughout the company’s production sites. While the company had been working with energy management prior to the Climate Savers agreement, this new set-up was a significant strengthening of energy management in the company, including training of the energy stewards and the inclusion of CO2 reduction targets in the company’s Balanced Scorecard. The energy saving team was responsible for identifying opportunities in production sites – mainly in ventilation and cooling systems – and, through relatively simple facility management optimization, ensuring their successful exploitation. However, although results from incremental advances were substantial, achieving ambitious targets would call for more radical innovation.

In its quest to fully power Danish production sites with renewable electricity by 2014, Novo Nordisk first investigated the opportunity of building their own wind farm, which turned out not to be financially feasible. It was Novo Nordisk’s company motto “our focus is our strength” that showed the way forward. Hoff explained:

Our expertise is on diabetes care and biopharmaceuticals. To create real change in the energy area, we had to team up with someone with the right expertise. We needed to bring new brain power to the table.

Novo Nordisk sought a partnership with an energy company which would ensure the provision of certified additional renewable energy to the grid and fit in with the company’s ambition to help driving the market for renewable energy in Denmark.

An Innovative Business Model

A world leader in the construction and operation of offshore wind turbines, Dong Energy was one of the leading energy groups in Northern Europe. With its cutting-edge technological expertise on wind power generation, the company’s ambition was to triple its renewable energy capacity by 2020. However, to ensure financial leverage for long-term investments

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1 Novo Nordisk Annual Report 2008, reports that nearly a quarter of the energy-savings achieved in 2008 came from projects which required no upfront investment. It also reports that half of the completed projects were expected to have a pay-back time of one year, while two thirds of the remaining projects were expected to have a pay-back time of three years.
in renewable energy, Dong Energy needed a sustained commercial base (refer to Exhibit 3 for further information on Dong Energy’s efforts on renewable energy).

Furthermore, in early 2006, Dong Energy had set itself the objective to put its expertise on energy efficiency to the service of its residential and industrial customers in order to save 144 million kWh a year in the following two years. This was part of an agreement between the Danish Parliament and power and gas companies aiming at reducing Danish energy consumption outside the transport sector.

Novo Nordisk executives saw a perfect opportunity to collaborate with Dong Energy to establish a partnership responding to the challenges of both companies. Together they sought for an innovative business model to boost the identification of energy savings in Novo Nordisk industrial plants and use the resultant financial benefits to buy renewable energy from Dong Energy that was additional to the grid.

Even though the two companies had a strong business case for action and a fertile ground for understanding, structuring a business model that would back up Dong Energy’s heavy capital investments on renewables would prove challenging. Hoff commented:

We had a common view on what we wanted to achieve, but we had to spend a lot of energy and creative power to find out exactly how to do it. The strong shared vision was what kept us together when negotiations became challenging. Partnerships always involve complex negotiations on how to reasonably split costs and benefits. Our partnership was no exception. Moreover, it was a long-lasting partnership, as we were committing to each other all the way to 2020. It took a while before everyone was comfortable with the terms of our collaboration.

The partnership agreement between Novo Nordisk and Dong Energy was signed in May 2007 (refer to Exhibit 4 for a graphic representation of the partnership mechanism).

So how did the process work? First, Dong Energy lent its expertise in energy efficiency to Novo Nordisk, by offering technical advice and consulting services. Dong came up with customized solutions which integrated energy consumption audit, efficiency improvements and servicing, and maintenance of energy installations. Once the solutions had been implemented, Novo Nordisk earmarked all financial savings for purchasing renewable energy from the new wind farm Horns Rev II.

In this way, Novo Nordisk devised a cost-neutral way of achieving significant reductions in CO2 emissions, since the premium price of green electricity would be financed through energy savings. At the same time, Dong Energy devised a long-term mechanism that would contribute to financing the capital requirements of bringing additional renewable energy to the grid and expanding the commercial basis of renewable energy in Denmark.

Hoff explained that Novo Nordisk would very likely purchase about a third of the total energy produced by the Horns Rev II offshore wind farm (refer to Exhibit 5 for information on Horns Rev II). He added that the significant reductions achieved in energy consumption through the implementation of Dong Energy solutions in the first two years of the partnership should enable Novo Nordisk to attain its goal of fully powering Danish facilities with green energy a few years ahead of schedule.

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1 Dong energy was directly responsible for 27% of the overall reduction target agreed between the Parliament and energy companies.
Leadership Demonstration

A year and a half after entering the partnership with Novo Nordisk, Dong Energy had entered into 13 similar partnerships with other companies following the same business model. The company worked with each company in a customized way, assisting them in realizing energy savings of up to 10% on an average basis. All the partners earmarked these energy savings to purchasing renewable energy from Horns Rev II (refer to Exhibit 6 for a description of the partnerships from Dong Energy’s point of view).

In May 2009, Allan Schefte, vice president of Business to Business activities at Dong Energy, announced to the Danish newspaper “Berlingske Tidende” that he was expecting up to 100 new partnerships in Northern Europe within the next five years.

Dong Energy’s success in replicating the partnership model with other companies endorsed the leadership dimension of Novo Nordisk’s climate strategy. Hoff commented:

We found a cost-effective way of reducing our emissions. But we are aware that it is not enough, as our own emissions are just a drop in the ocean. We want to be a leader in the transition to a low carbon economy. However, being a leader is only possible if others follow. Our partnership with Dong Energy has had a snowball effect. With other companies joining DONG Energy in similar partnerships, we are achieving scale.
Exhibit 1

Novo Nordisk’s CO₂ Emissions (2004 to 2008)


Exhibit 2

Novo Nordisk’s Projected CO₂ Emissions (2004 to 2014)

Note: cLEAN is Novo Nordisk’s program aimed at optimising production. The program has a positive impact on energy efficiency by decreasing energy consumption per unit produced. The cLEAN program was launched prior to the Climate Savers agreement. Thus, the business as usual curve in Novo Nordisk’s Climate Savers agreement is the middle curve - "with cLEAN® - without climate strategy".

Source: Novo Nordisk. cLEAN® - Novo Nordisk’s LEAN program.
Exhibit 3
Dong Energy’s Efforts on Renewable Energy Generation

Dong Energy is headquartered in Denmark. It is one of the leading energy groups in Northern Europe, procuring, producing, distributing and trading energy and related products. In December 2008, the company had approximately 5,500 employees and revenues of €8 billion.

In 2008, renewable energy sources accounted for 14% of the company’s power generation and for 61% of the company investments. Dong Energy had set the long-term objective for energy production to be carried out with zero CO2 emissions while maintaining high levels of supply security.

According to company sources, as of December 2008, half of the world’s existing offshore wind turbine capacity had been built by Dong. The company inaugurated the largest wind farm in the world in September 2009. When fully operational it will have a capacity of 209 MW, which is equivalent to the power consumption of 200,000 households.

Source: Dong Energy A/S. Annual Report 2008
Exhibit 4
Novo Nordisk and Dong Energy Partnership Mechanism

- Novo Nordisk saves energy at Danish production facilities.
- The financial savings are earmarked to purchase green electricity.
- The energy will be supplied from a new wind farm in the North Sea.
- Danish production sites are powered by green electricity.

Source: Novo Nordisk, 2009

Exhibit 5
Horns Rev II Wind Farm

About the Project

Horns Rev 2 is a grand construction masterpiece where many sub-elements have to form a synthesis. Horns Rev 2 is somewhat of a challenge because this wind farm is built furthest offshore compared to any other wind farm in the world, and on top of that it is located in the North Sea – waters which earlier in the Danish history have been known to swallow up many good men. That is why safety is such an important part of the project. The construction period goes from May 2008 to November 2009.

More than 600 people are involved in the project in Esbjerg, and more than 25 different vessels have been hired for the construction period. DONG Energy is the owner and coordinates the complete construction process with seven different sub-suppliers.

Source: http://www.dongenergy.com/Hornesrev2/EN/Pages/index.aspx
Exhibit 6
Description of the Partnerships from Dong Energy’s Point of View

PARTNERSHIPS
– because the climate is the greatest challenge of our time

The climate challenge is on the agenda everywhere – at the UN, in the EU, in the Danish Parliament, in the business community and in private homes. The climate debate and the need for action here and now create an ideal platform for growth and innovation.

DONG Energy has successfully entered into climate partnerships with businesses, housing associations and local authorities that see potential in the new challenges. Such partnerships are individual and tailored to each customer’s needs. The recurring theme is that financial savings achieved by means of specific energy reduction measures finance a climate strategy based on renewable energy. Partnerships enable our customers to react proactively to the business-critical climate challenges facing them while at the same time establishing a responsible climate profile benefitting the company’s reputation and surroundings.

We entered into our first climate partnership in 2007, with Novo Nordisk, and by the end of 2008 we had entered into a total of 13 partnerships. In June 2008, we entered into our largest partnership to date, with Novazymes. The aim is to make Novazymes in Denmark CO2 neutral in terms of power as early as 2012. As an element of the partnership, Novazymes will significantly reduce its energy consumption and continuously convert the savings into power purchases from the coming new offshore wind farm Horns Rev 2.

In August, DONG Energy entered into a partnership with the Municipality of Fredericia. As one of the exciting elements of the partnership, the possibilities of introducing natural and biogas as fuel in, for example, city buses are being explored. The aim is to reduce emissions of environmentally harmful particles and nitrogen.

In December, we entered into a climate partnership with the Tivoli Gardens in Copenhagen under which all energy must emanate from wind power from as early as 2010. The partnership acts as a stimulus to an increased supply of wind power to the market, as Tivoli will have its own turbine at Avedøre Power Station.

A partnership was also entered into with KMD in 2008. The aim of this partnership is to reduce direct energy consumption by at least 10% by the end of 2010. The municipalities of Albertslund, Ballerup and Kalundborg and the housing association DAB also entered into climate partnerships with us in 2008.