



## Norway

### Renewable energy

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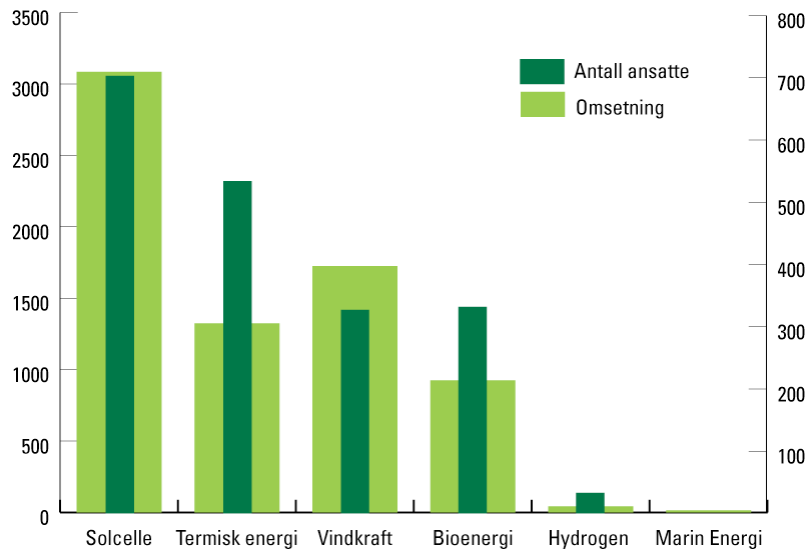
## Overview

- The Norwegian Government has over the past years increased substantially its efforts to develop new renewable energy sources.
- Norway has a renewable energy share at about 56 percent
- In 2006, the Norwegian Government established a national combined target of 30 Terra Watt hours of increased annual production of renewable energy and energy efficiency (from 2001 to) by the year 2016.
- The Norwegian power system is dominated by hydropower, which is a practically 100 percent clean and renewable energy form. It is also highly flexible and the production can be quickly regulated to fulfill the need of the power systems in other countries.
- It is a priority to be part of constructing the bridge from the fossil fuel society to the renewable society. Over the past decade or two, the Norwegian Government has increased substantially its efforts to develop new renewable energy sources, and in greater energy efficiency.
- In 2001 the public agency Enova was established under the Ministry of Petroleum and Energy. Enova promotes more efficient energy use and production of new renewable sources of energy.
- The Norwegian Water Resources and Energy Directorate (NVE) is also subordinated to the Ministry of Petroleum and Energy, and is responsible for the administration of Norway's water and energy resources. Enova's activities are financed partly by a levy on the electricity distribution tariffs, partly by the yield from a newly established Fund for Renewable Energy and Energy Efficiency, and partly from direct allocations over the State Budget.
- The goals of NVE are to ensure consistent and environmentally sound management of water resources, promote an efficient energy market and cost-effective energy systems, and contribute to the economic utilization of energy. NVE is also responsible for all new renewable energy and has the legislative power to issue regulations and to make individual decisions and perform preparatory procedures of cases to be resolved by the Ministry of Petroleum and Energy.

## Analysis

The chart below shows how the number of employees and revenues are distributed among various new forms of energy. Solar cell production is the largest with about 3 billion in revenues and approximately 700 employees. Wind Power Producers have high turnover, 1.7 billion, but fewer employees than the other groups. This is because the major players, such as Ruukki Profiler, provide capital-intensive equipment. Manufacturers of thermal energy is far more labour intensive.

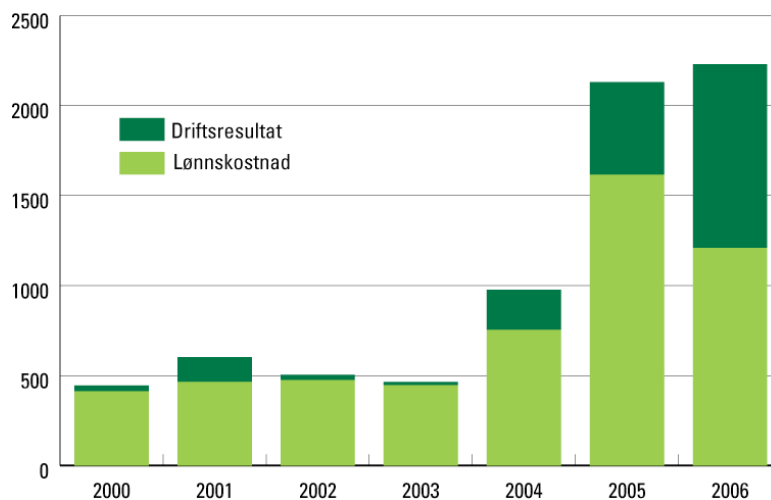
Figure 18: Turnover and number of employees in new renewable energy in Norway 2006 Number of employees on the right axis, turnover on the left axis (MNOK)



Source: Menon Business Economics (Key: No. of Employees / Turnover)

The first four years after the turn of the century there was only a few producers of new energy, indicated in the figure below. The total labour costs were stable at just under NOK 500 million. From 2004, however, growth has been very high. In 2005, labour costs more than tripled, and operating results shot up, primarily driven by REC. The total value added is still small compared with the two major energy forms in Norway, petroleum and hydropower.

Figure 19: Trends in wealth creation within the renewable energy (current million) Number of employees on the right axis, turnover on the left axis (MNOK) (current million)

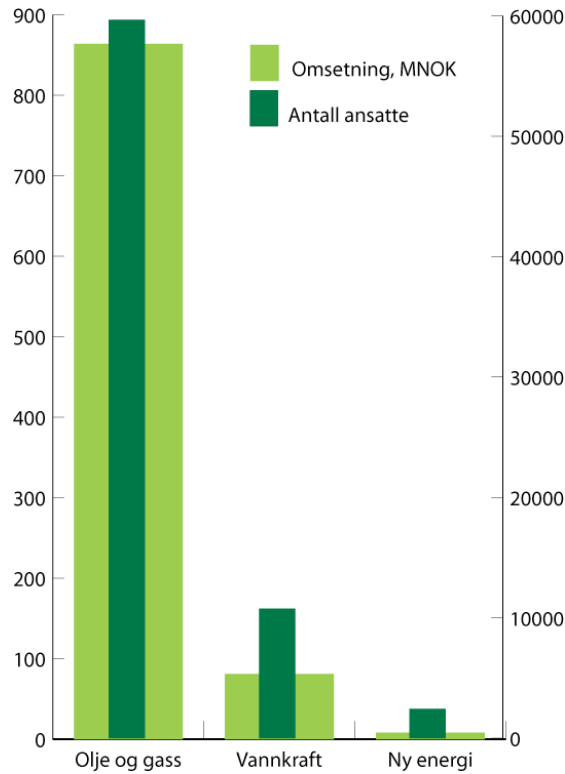


Kilde: Menon Business Economics

Source: Menon Business Economics (Key: Operating Profit / Salaries)

1.1.1 New energy is a small industry, but is growing fastest Compared with petroleum, and hydropower. Only 3.5 per cent of those employed in energy production in Norway are working with new energy. The proportion was however, even less in 2003, only 1.5 percent. This is because employment growth is strong among producers of new energy, while it is stable within the petroleum. Number of employees actually fell by 25 percent from water power producers since 2000, while it has remained stable in petroleum.

Figure 20: Turnover and number of employees in energy companies in Norway 2006



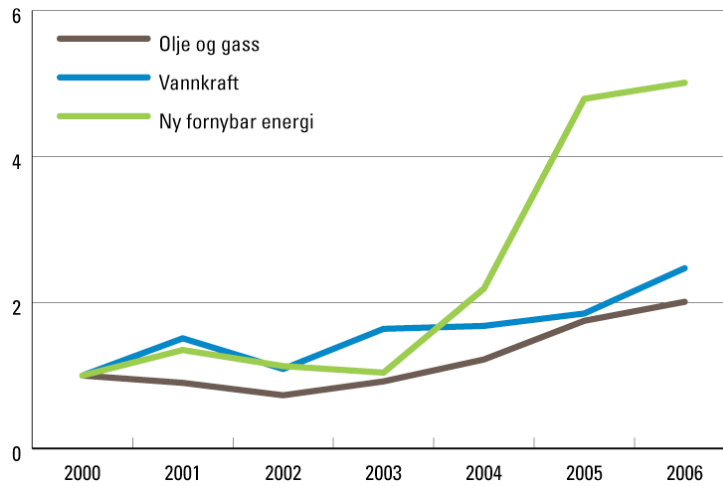
Kilde: Menon Business Economics

Source: Menon Business Economics (Key: Turnover / Number of Employees)

In terms of revenue and value creation are the differences even greater. Water power producers have 10 times more revenue than the producers of new energy, and oil companies have left 10 times higher turnover than water power producers.

If we look at the growth in the same key figures, the picture changes completely. From 2004, value added growth in new energy has been formidable, with a quadrupling in three years. It is however interesting to note that value added growth was in line with oil and gas and water power until 2004.

Figure 21: Value added development in energy companies in Norway



Kilde: Menon Business Economics

Source: Menon Business Economics (Key: Oil and Gas / Hydropower / New Renewables)

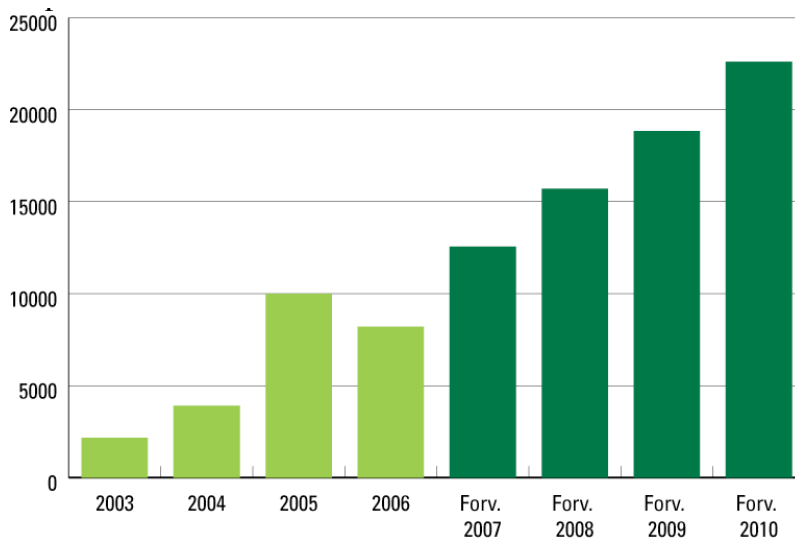
### 1.1.2. Continued high growth going forward?

If we look at REC, which is the largest company within renewable energy in Norway, seems future prospects good. Of course, the growth rate slowed somewhat, but even in 2007 increased turnover by 53 percent from the year before. The company's own forecasts indicate that the turnover will increase by another 25 percent in 2008

Another indication of growth in production of new energy in Norway can be obtained by looking at the global investment figures for renewable energy. According to New Energy Finance has global investments in clean energy (that is, including hydroelectric power) increased dramatically in recent years.

In 2007, investment, according to preliminary figures of 117 billion dollars. The growth rate has flattened out somewhat, but was still more than 40 percent from 2006 to 2007. The growth rate among the Norwegian producers have been relatively uneven, with a flat development in value added, number of employees and turnover of the first three years after the turn of the millennium, and powerful growth in the two subsequent years. If we look at the period 2003-2006 in context, it has average annual growth was respectively 44 per cent in the number of employees, 93 percent in revenue and 127 percent in value creation. It is hardly realistic to expect as strong growth in the years ahead, but if we consider the REC's revenue growth from 2003 to 2008 as representative, we will have a development path in sales to manufacturers of new energy in Norway as in the figure below.

Figure 22: Actual and expected sales growth for renewable energy in Norway



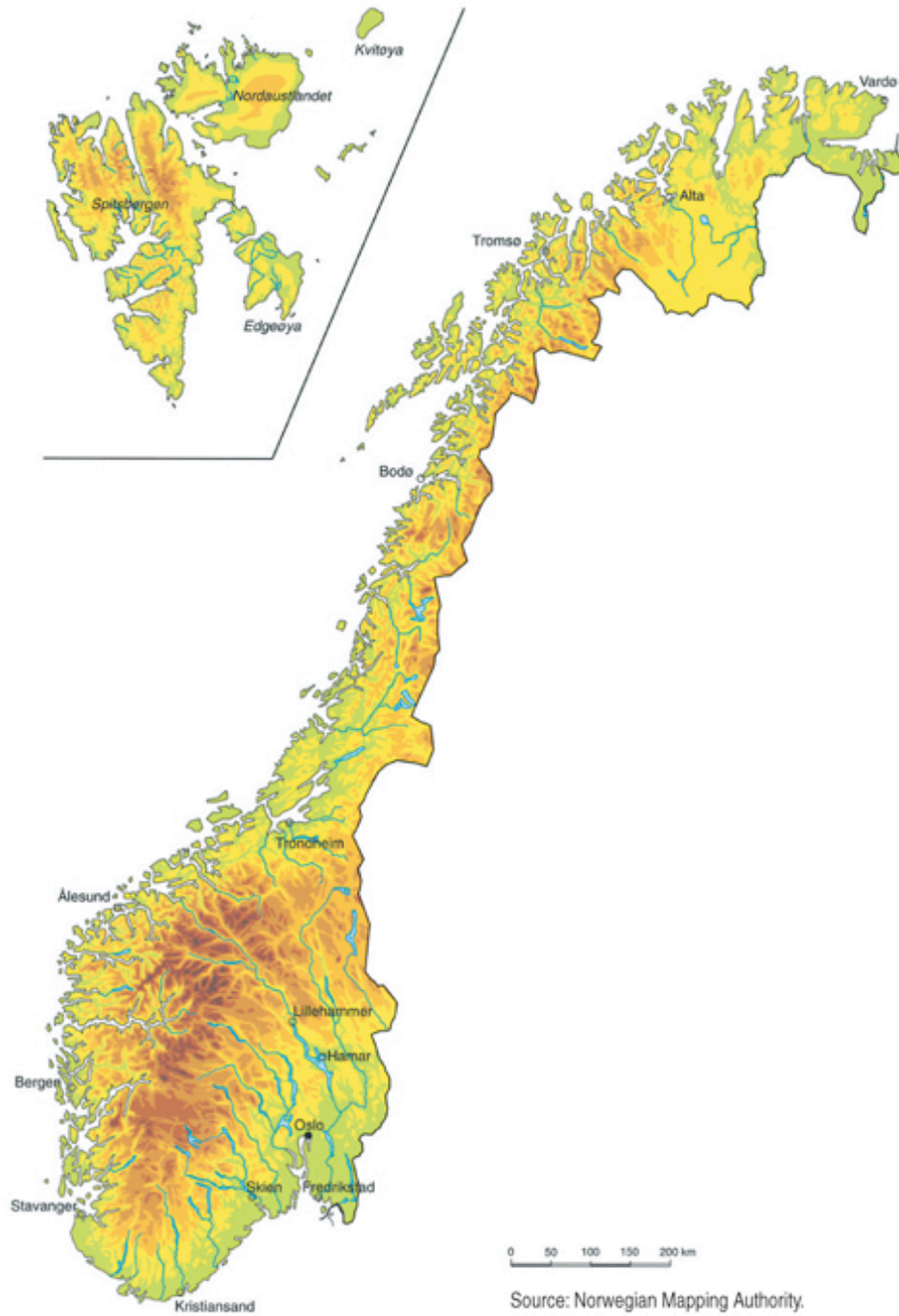
Kilde: Menon Business Economics

Source: Menon Business Economics

In the figure, we have an expectation of 53 percent growth from 2006 to 2007, 25 per cent growth in 2008 and then 20 percent growth over the next two years. This is probably quite cautious forecasts.

## Map

### Norway, with Svalbard



## Sources

MENON Business Economics  
Statistics Norway  
Innovation Norway  
Nordic Energy Solutions