

THE NETHERLANDS



Population: 16,446,000 (2008)

Source: Demographic Yearbook 2008,
Table 5 Estimates of mid-year population: 1999-2008
<http://unstats.un.org/unsd/demographic/products/dyb/dyb2008.htm>

Carbon emissions per country: 2007: 173 244

Source: (CDIAC) Carbon dioxide emissions (CO₂),
thousand metric tons of CO₂ <http://unstats.un.org/unsd/mdg/SeriesDetail.aspx?srid=749&crid=>

Carbon emissions per capita: 2007, The Netherlands: 10,5253

Source: (CDIAC) Carbon dioxide emissions (CO₂), metric tons of CO₂ per capita
<http://unstats.un.org/unsd/mdg/SeriesDetail.aspx?srid=751&crid=>

Population below \$1 (PPP) per day, percentage: No country level data
are available.

Source: <http://unstats.un.org/unsd/mdg/Data.aspx>

GDP per capita: Netherlands \$ 40,500 (2010 est.)

Source: <https://www.cia.gov/library/publications/the-world-factbook/rankorder/2004rank.html>





NETHERLANDS

This section on the Netherlands constitutes to a large extent an extract and analysis of the WWF-commissioned national review titled “Clean Economy, Living Planet - Building the Dutch clean energy technology industry”, produced by Roland Berger Strategy Consultants, November 2009. More elaborate description and analysis of the Netherlands’ national climate innovation system can be found in the original report at www.climatesolver.org.

The Netherlands is very vulnerable to increasing climate change.

With many low-lying coastal and river areas at risk of sea level rise and severe flooding, it is critical that the country generates high levels of knowledge and takes

active measures towards mitigating and adapting to climate change. A lot of activities have been initiated to protect people at risk from the effects of climate change and the Netherlands is generally perceived as one of the European countries most active in promoting domestic climate adaptation measures. In spite of this positive trend, the Netherlands does not seem to approach the climate change challenge in a holistic and comprehensive way. Dutch CO₂ emissions per capita are among the highest in the world (seventh place). The Netherlands emits three times the global average. Furthermore, when WWF-NL in 2009 presented the first ranking ever of countries’ total annual sales of clean energy technology, the Netherlands seriously lagged behind the most proactive countries, coming out in an unflattering 17th place.

Clean energy technologies are urgently needed in the Netherlands in order to genuinely cut CO₂ emissions, limit global warming, and protect crucial ecosystems. Although the Netherlands does promote clean energy solutions, there is a long way to go to strengthen this industry and make it as strong as those in Denmark, Brazil and Germany, which hold the top rankings in clean energy technology sales globally. It might take many years until the Netherlands has reached such an ambitious target, but it is important to note that the country has the knowledge (third place in basic science), wealth (sixth economy in GDP per capita) and capacity (more than 260 companies active in clean energy technology) to take a leading role in the world market for clean energy technology. The following sections will summarize the current status of this industry in the Netherlands and analyze the strengths and weaknesses of the country’s climate innovation system.

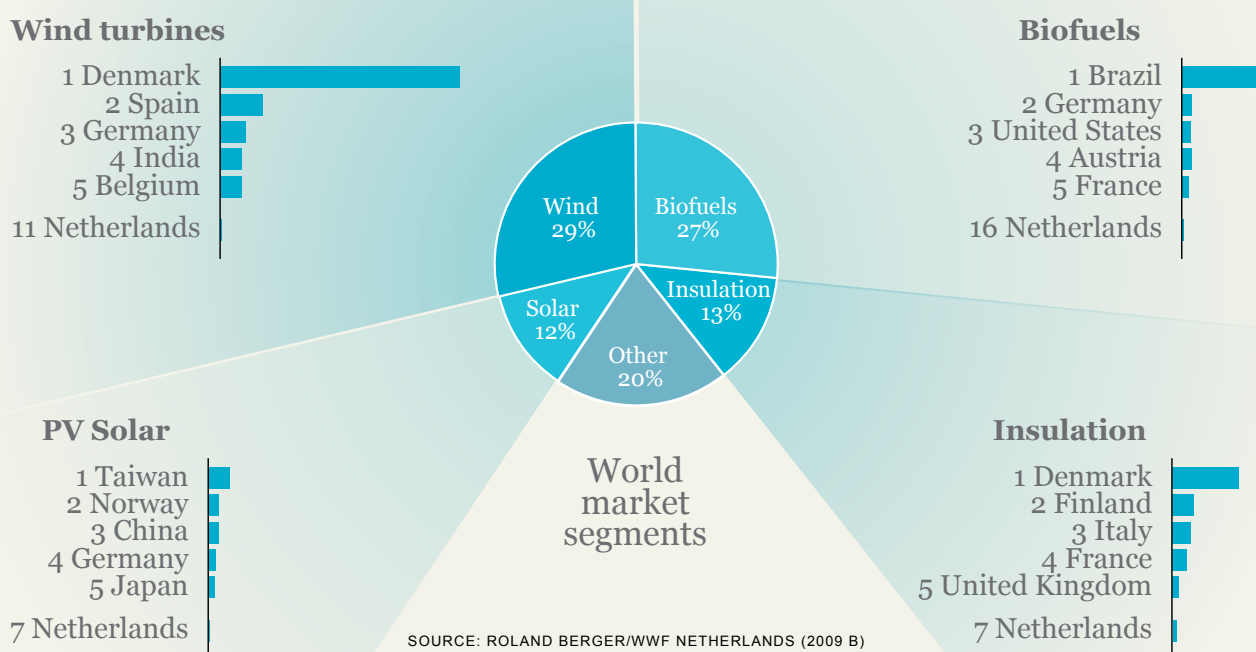
Climate Innovations in the Netherlands

Wind energy and biofuels are the most important markets in clean energy technology worldwide (with 29% and 27% of total sales respectively). The rapid expansion of wind power capacity in Europe, the US, and in recent years, China, has created a 27 GW (capacity) market in 2008. The relatively low cost of wind and biomass favors their use over solar, which holds 12% of the overall low-carbon energy market. The largest market segment for energy efficiency is insulation, with 13% of total clean

energy technology sales in 2008. Figure 22 shows the position of the Netherlands in each of the four largest clean energy technology segments.

As the chart reveals, the Netherlands has no leading position in any of the major segments. The national clean technology market consists of a few start-up companies in wind energy which are mainly focusing on developing prototypes for offshore wind turbines. The few suppliers to this industry are smaller still. A new initiative (FLOW, Far and Large Offshore Wind) may give these existing companies, like Darwind and 2-B Energy, a much-needed boost. Offshore wind has the potential to grow into a substantial industry in coming years, and the Netherlands could still emerge as a major player in the future.

Figure 22: Dutch market position in major clean energy technology segments 2008 – weighted by GDP [%]



In biomass, the Netherlands still plays a modest role – despite the Port of Rotterdam, a major point of entry for biomass into Europe, and a strong petrochemical cluster that could pioneer biobased chemicals and materials. Although biomass co-firing in power plants is relatively common, the equipment can also be used to burn coal and is mostly supplied by foreign manufacturers. In comparison with the extensive national capacity for fossil fuel refineries, in-country biodiesel production is quite limited. Plans to increase capacity fivefold are yet to be realized. Although the biobased economy is now becoming a policy priority, (first generation) biofuels have not found favor with government and considering that the Netherlands is a gas country, biogas installations are few. Although it is an open, trading nation with a long tradition of science, (civil) engineering, and wind mills, it seems that the Netherlands neither profits from nor contributes to global emission reduction efforts as much as it should.

The Netherlands is home to more than 260 companies active in a broad range of clean energy technology. However it is rather difficult to collect valuable information about these firms since clean energy technology is not recognized as a category in public statistics, and there is no public register for clean energy technology companies.

Through a quick analysis of the 266 identified companies in this arena, it becomes clear that they are active in a broad range of technologies. The largest focus is energy efficiency, mainly through heating, cooling and ventilation (19%), insulation (6%), and lighting (3%). About a quarter are biobased (biomass, biofuels, biogas, algae, biorefinery) and 20% target technologies in the renewable sector of wind and solar.

The knowledge and the seeds for a Dutch clean energy technology industry are clearly there. Many excellent and promising companies could form the basis for a strong domestic industry. However, compared to international competitors, Dutch companies are still small. The small size and embryonic nature of most Dutch companies is a significant reason for the relatively weak sales position of the Netherlands. Building a strong Dutch clean energy technology industry will need increased government and private sector support towards development, demonstration, and scale-up of clean energy innovations and companies.

In contrast to the relatively weak commercial status of renewables in the Netherlands, analysis shows that the nation has an excellent knowledge base. Historically, the Netherlands has a strong tradition of R&D in areas related to clean energy technology, and only five countries in the WWF-NL ranking spent more on renewable energy R&D in 2006 (latest available figures). Statistics show that Dutch R&D expenditures unfortunately saw a steady decline during the last decade, while Denmark, situated in first place, raised its R&D investments almost six fold since 2002. Until the early 2000s, however, the Netherlands was the second or third largest spender on clean energy technology related R&D. It has consistently managed to turn these investments into world-class academic knowledge. Citation scores for scientific disciplines related to clean energy technology place the Netherlands squarely in the global top three.

Unfortunately what has not happened during the same time period is transforming this excellent knowledge base into true innovations delivered on a commercial scale. Yet the Netherlands ranks only 17th in overall GDP weighted clean energy technology sales. Another example is the relatively modest number of 2.7 patents per million

The Netherlands is not able to harvest as much as it should from its knowledge base in cleantech.



PHOTO: © WWF / ROB WEBSTER

inhabitants, especially when compared with Denmark's whopping 20.3. The high-quality knowledge base constitutes a critical building block for supporting a national shift towards accelerated domestic policy and practice for clean energy solutions.

Challenges and Recommended strategies

When comparing the status of the Dutch national climate innovation system with four of the most successful countries in clean energy technology – Denmark, Brazil, Germany, and Spain – WWF-NL identified three distinct areas for success that need to be addressed:

1. Subsidies do not contribute sufficiently to a stronger economic position

The Dutch government invests relatively high amounts in research and development, but this does not result in higher international sales. The most important reason for this is that individual technologies are not supported consistently over the product life cycle. For example: solar energy receives a considerable amount of R&D support, but a lot less support in the demonstration and market development phase.

Many clean energy technology innovations struggle to progress from one stage to the next in the innovation chain, especially where this involves the transfer of knowledge from one actor to the other – typically from academia to industry. Technologies proven in the lab must be made to work under real-life conditions, though testing in demonstration projects is too expensive for research groups or start-ups and too risky for industry: what works in the lab often will not work on a demonstration scale without extensive (and costly) rework and engineering, if at all. The amount as well as the consistency of current government funding is insufficient to encourage either party to collaborate in demonstration projects. Consequently, the difficulties encountered by entrepreneurs in the Valley of Death constitute a prominent obstacle for furthering the national climate innovation system in the Netherlands.

Another reason is that innovation in knowledge centers is not well connected to commercial companies. Furthermore, clean energy technology hardly play a role in public private partnerships (PPPs). Today, there are more than 60 public-private partnerships in the Netherlands that are specifically designed to bridge the gap between academia and industry R&D on themes that include: high-tech systems and materials, chemicals and energy, health and water, climate and the environment. Yet of the total EUR 2.3 billion invested, the combined budget of the five public private partnerships related to renewable energy amounts to less than EUR 100 million, or less than 5% of the total. Energy efficiency only plays a role in one roadmap (process intensification) in one PPP. No PPPs focus on large-scale demonstration or implementation projects in either renewable energy or energy efficiency.

The Netherlands risks falling even further behind as other countries are implementing economic stimulus packages that include significant “green funds.” Only EUR 2 billion of the Dutch stimulus package has been earmarked for sustainability, and that includes earlier subsidies already in the works. Other governments, investing a hundred billion US\$ or even more in green solutions as part of the stimulus packages, seem to have better understood that they should not “let a good crisis go to waste.”

2. There is not enough capital, especially in the seed phase

In the Netherlands there is a shortage of capital for clean energy technology. In 2008, in-country investments in clean technology decreased substantially by 34%. Meanwhile, in the rest of Europe they increased by 55%. In the seed phase especially,

the Netherlands is far below the European average. Furthermore, Dutch banks invest much more in fossil energy than in clean energy (<6%).

Only 1.6% of European PE investments in clean energy technology are in the seed stage, against a 4.4% average for all sectors. In the Netherlands, however, these seed-stage investments are almost nonexistent (0.3% of the total, less than EUR 1 million) and flat. By comparison, start-up and later-stage venture funds grew by more than 1400% each (to EUR 47 and 92 million, respectively) and expansion funding fell by 87% to EUR 34 million. According to venture capitalists in the Benelux, there is insufficient private equity in the Netherlands to finance both smaller and high risk start-up companies and to fund the expansion phase of larger clean energy technology firms.

The government is also pulling back. Public investments fell from EUR 21 million in 2007 to EUR 12 million in 2008, and the budget for the seed stage has decreased by an average 19% each year from 2004.

3. The Dutch home market for clean energy technology is underdeveloped

A strong home market is indispensable. It allows companies to experiment, gain experience and quickly traverse the learning curve – both giving them a competitive lead and providing them with reference and showcase projects. For smaller countries, this means benefitting from a first mover advantage. A well-developed home market is a precondition for the development of clean energy technology companies. It enables the experience and reference projects that businesses need to compete internationally. There is a clear correlation between a high share of wind energy in total electricity demand and international sales from wind energy products.

The Netherlands is lagging behind in developing a home market for clean energy technology applications. Where in Denmark renewable energy sources account for more than 17% of primary energy supply, in the Netherlands renewable energy supplies less than 4% of primary energy. That supply has grown by 10% annually since 2005, but from a very small base. In energy efficiency, too, other countries have far more developed home markets. The Netherlands improved its energy efficiency by only 0.6 % per year between 1990-1996.

There is not much support for a home market. A country like Germany employs a wide range of renewable energy policy instruments: quota obligations, feed-in tariffs, tax exemptions, direct taxation, direct subsidies, R&D subsidies (e.g. for PPPs), thermal regulations, dispatch priority and subsidized loans. The Netherlands only uses feed-in tariffs, tax exemptions, and direct and PPP subsidies – and on a smaller scale.

Thus the Netherlands falls short on all three key success factors (public funding, private investments, and home market maturity). However, the relatively young age of the clean energy technology industry means that it is by no means too late to improve Dutch performance.

Conclusions

The Netherlands has the potential and the ingredients for a strong domestic clean energy technology industry. The companies are present, the technology base is strong, and as one of the richest countries, the financial resources are available. Clean energy technology is needed to limit climate change and save crucial ecosystems. It is also a growing industry with attractive business opportunities, and



Private investments need to increase to make Dutch cleantech grow internationally.

the Netherlands has the potential to play a larger role. This analysis indicates what can be done to emulate the example of leading countries and to build a strong Dutch clean energy technology industry.

As a national target, the Netherlands should aspire to a global top-10 position in 2015 and pursue the 15% annual growth needed to achieve it.

The Netherlands should not be content either with its mediocre ranking, or with total sales figures in comparison to other countries' GDP-weighted CET industry size. Given its potential, in both knowledge and companies, and its long tradition of responsibility and environmental engagement, the Netherlands should be more ambitious. In a business-as-usual scenario, sales growth for Dutch clean energy technology will be limited to the average annual growth of 7.5% that is forecast for the global market as a whole. Dutch industry would add EUR 600 million to its sales between now and 2015, to reach a total of EUR 1.5 billion. In this scenario, the Netherlands would retain its 17th place – at best.

For a global top-10 position, sales must increase by almost threefold. To pass Israel and claim tenth place in the (GDP-weighted) country rankings, the Dutch clean energy technology industry must exceed EUR 2.5 billion by 2015. A global top-10 position in turn will reduce global/Dutch? CO₂ emissions by 130 Mton in 2015 and add 8,000 jobs and EUR 1.6 billion in sales to the Dutch economy.

The Netherlands is not starting from scratch. There are many promising companies in the Netherlands today that could help realize the 15% per annum additional growth needed for a top-10 position. To enable these companies and the Dutch clean energy industry to grow, the Netherlands needs to secure sufficient and consistent government support over the innovation cycle, stimulate high investment in sectors with a strong domestic fit, and facilitate strong home markets for Clean Energy Technology applications.