

Renewable Energy Policy Review

The Netherlands

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1. General information

Population and geography

The Netherlands is one of the world's smaller countries, with 15.8 million inhabitants and an area of 41,864 square kilometres. The major cities are all relatively close together. And none has a population of more than one million. Amsterdam with its historic city centre and museums, its unique ring of canals and impressive buildings, attracts the most tourists. The fact that the Netherlands lies on the coast and is situated on the estuaries of three major Western European rivers - the Rhine, the Maas and the Scheldt - has always been a major factor in the development of the economy. As Rotterdam is the largest port in the world, it is truly the gateway to Europe. Netherlands is a constitutional monarchy, member of the European Union since 1957.

Netherlands has a dual chamber system: the First Chamber and Second Chamber form the Parliament. The Queen, the Prime Minister and the Ministers form the Government. The Queen only has a ceremonial function nowadays. The Dutch legislation can be divided into two main categories. The first category includes *Acts of Parliament*. The Dutch written constitution prescribes that an Act of Parliament should be established with the co-operation of both the First and Second Chamber (House of Parliament) and the Crown (King and ministers). In the second category are Statutory Regulations other than Acts of Parliament. This category of legislation (*Royal Decree, Order in Council and ministerial regulation*) is established without the First and Second Chambers. Advantages are the easier and faster realisation of this legislation.

Lower authorities than the state (Provinces, Municipalities, Water Boards) also have legislative powers. Ordinances, for example Provincial and Municipal Ordinances are legally based upon competencies given to lower authorities in Acts of Parliament, and are legally binding for anyone concerned. In environmental policy, provincial authorities have major legislative powers, whereas municipalities have important competencies as regards spatial planning.

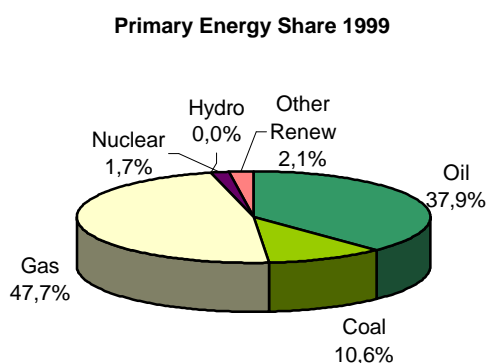
For a small country with a small population, the Netherlands has a large and powerful economy. It is the world's sixth-largest exporting country (third-largest in the export of food), the sixth-largest source of investment, and its gross domestic product (GDP) is the 14th-highest in the world. The workforce numbers 6.8 million, 64% of whom work in the service sector, with a relatively low 36% in manufacturing, agriculture, and government. The per-capita GDP was 22,570 euro in 1998, and unemployment stood at around 5%.

2. Renewable energy policy

Energy and renewable energy country profile

Country Profile

Population	15.98	Millions
Area	41,526	km ²
Total Primary Energy Supply	77.22	Mtoe
Electricity Production	93.747	TWh
Electricity Prod. by source		
Fossil Fuel	91.07	%
Hydro	0.12	%
Nuclear	4.24	%
Other	4.57	%



Source: EUROSTAT 2003

There are huge natural gas reserves in the north of the Netherlands, making it Western Europe's largest producer. Drilling companies operate in gas and oil fields both on land and in the Dutch part of the continental shelf. In Netherlands gas proved reserves, as reported by the Netherlands WEC (World Energy Council) Member Committee, have been gradually declining during the last ten years, but still represent one of the largest gas resources in Western Europe.

Nuclear energy is not significant; in fact the last reactor will be shut down by the end of 2003. Oil has been produced for well over 50 years, but there is estimated to be about 128 million tones still in place¹.

The Dutch target for 2020 is 10% renewable energy relating to primary energy sources. In the context of the EU's burden sharing arrangements, the Netherlands has committed itself to reducing its average emissions of greenhouse gases by 6 per cent between 2008 and 2012 compared with their 1990 levels. This also includes an intermediate objective of 5% renewable energy in 2010 relating to primary energy.

Renewable Energy Sources

Renewable energy country profile

	The Netherlands
Population	15.8 m
SPV (MWc)	
Grid connected	43.69
Off grid	4.93
Total	48.63
STH (square meter installed)	269112 m ²
Average surface for 1000 (2001 figure)	16.8 m ²
SHP (2001 figure)	2 MW
Biogaz (Mtep)(2002 figure)	134
Wood (Mtep) (2002 figure)	0.40
Wind (MW)	912

Source Eurobserv'ER 2003/Sun in Action 2/ EWEA

In 2002, production of electricity from renewable energy sources in the Netherlands amounted to 3 644 GWh and total electricity consumption was 108 355 GWh. The share of national renewable energy production in national consumption was therefore 3.4%. The development of Renewable energy sources in the Netherlands is still very limited, RES accounting for just 2% of gross inland energy consumption and 4.1% of electricity production. The main renewable source utilised is biomass, which accounts for nearly the whole of RES production (3.3% of electricity production). Wind and hydropower (0.7% and 0.1% of electricity production) complete the picture. The country also utilises landfill gas and digestion of biodegradable wastes, which produce of 6% and 13% respectively of total biomass-energy production. The importance of non-hydro renewable energy has increased slowly since 1990 to reach 1% of of TPES in 1996. The majority of this comes from the utilisation of municipal waste and landfill gas to generate heat and electricity, although the contribution by wind power is increasing.

Hydro

Small hydro power in The Netherlands followed a stable trend between 1990 and 2001 with installed capacity remaining at 2MW. SHP contributes to 0.01% of the total electrical installed capacity of the country and electricity generation has remain constant at 1 GWh. Statistics reflect that all production of electricity came from plants larger than 1 MW. SHP contributed to 0.85% of the Hydro generation in 2001. Hydropower represented 0.12% of the total electricity of the country in 2001

Biomass

Under the **Biomass Action Plan**, stock has been taken of problems in achieving *bioenergy projects*, in consultation with market participants. One part of the Action Plan focuses on sticking points in licensing procedures and administrative action. The main cause of complexity in this field is the fact that bioenergy projects have to comply with legislation on emission, waste and fertilisers..(source Report pursuant to the Directive on renewable electricity Attainment of National Indicative Targets, Status on Measures Taken 2003)

Waste

Municipal waste is the most important renewable energy source for the Netherlands. Production of electricity from these sources was 1.8 TWh (2.1% of total electricity generation) in 1996, a significant jump from its value in previous years. Waste is a significant source of Dutch renewable energy. Dutch policy aims at significantly increasing the use of waste for energy purposes to 1075 ktoe by 2020.

¹ WORLD ENERGY COUNCIL: *Netherlands Energy Data*, (s.l.e), 2000. p, 5.

Wind

The ambitious 750 MW windpower target for 2000 looked unlikely to be met on time as : installed capacity was only 333 MW in mid-1998. The installed capacity for the end of 2001 was 912 MW. This is also below the level of the target for 1995 (400 MW of wind capacity). The 1997 *Renewable Energy Action Programme* indicates expected wind capacity to be 750 MW in 2000 and 2000 MW by 2007. Although the cost of wind power has fallen from NLG 0.7/kWh in 1980 to 0.25/kWh in 1990 and 0.18/kWh in 1995, the market for wind turbines needs to increase before economies of scale drive costs down further. In addition, finding suitable sites for wind turbines has been a problem.

Solar

In 2002 a total of 8.500 systems were installed, bringing the total amount of installed systems in the Netherlands to approximately 70.000. The market is currently served by approximately 10 suppliers. The traditional heating-equipment suppliers play a dominant role. Most producers have been acquired by heating industries and suppliers in the course of the last 10 years. Over 300 installation companies have been trained in the installers training centre Intechnum or at the manufacturers training centres. However, only one-third of these (trained) installers are active in solar thermal. Although no specific statistic exists concerning the division between the individual house owners market and the project market (new-build projects and retro .t projects in the rental sector), it is generally believed that the project markets made up more than 75% of the total market in 2002. New initiatives are expected to stimulate the existing (individual) housing market beginning in 2003. The new-build sector is expected to maintain its present volume for the next few years. Further tightening of the energy performance standard is expected in coming years, although this requires further political decision making.

In 1996, the Dutch government presented its plans for the introduction of renewable energy. For solar thermal, the target was set at 400.000 solar systems in 2010 and 1 million systems in 2020. The present speed of development is too slow to reach these goals. However, as the pressure from environmental commitments (i.e. Kyoto-commitments) will increase and energy prices will increase (also due to environmental taxation on fossil fuels), a further increase of the market can be expected. The question appears to be rather when this will happen and not if it will happen. (European Solar Thermal Industry Federation, Sun in Action II – A Solar Thermal Strategy for Europe, Volume 2, The Solar Thermal Sector Country by Country, 21 National Reports, April 2003)

Solar PV

the total growth of installed power of on-grid PV-applications has increased from an estimated 5 817 kWp in 2002. In 2002 a total of 5 515 kWp on-grid PV-applications were installed. (source IEA Photovoltaic Power Systems Programme, National Status Report 2002, The Netherlands) In 2003, the investments in solar PV in the Netherlands were exceptionally high, especially by private house owners. This was due to several reasons. Starting January, no construction permits were needed for installing PV systems. Also, the dawn of the liberalized energy market and the green image of solar panels stimulated utilities to increase their subsidies for PV. Together with the Energy Premium Regulation (EPR) of 3,50 EUR/ Wp - 3,85 EUR/ WP, the total subsidy given could, in some cases, amount to 5,35 EUR per Wp. At the same time, a drop of about 10 % in module prices and a strong competitive market caused the prices of small systems to drop below 6,00 EUR per Wp and even further in large projects. Although the EPR subsidy did not apply for most of the larger, professional projects, these subsidy schemes were so successful that, already in September, it became clear that the budgets of the EPR would be insufficient. The government subsequently announced that the scheme would be closed by mid October. For PV however, the result was a snowball effect: shortly after the government's announcement, the support budgets of the utilities were in danger of running out as well, causing the demand to rise even more. First estimates of Holland Solar from December 2003, based on PV panel import data from members, show that the annual volume turn out to be as high as 20-25 MWp (3 - 4 times the volume of 2002).

The reduction of the EPC (Energy Performance Co-efficient) threshold value by 20 %, which was projected for 2004, and which would have been favourable for BIRES (Building Integrated Renewable Energy Sources), and PV and solar heat in particular, was postponed towards 2006. This was done to allow the building industry, which is under pressure due to the economic set-back, to prepare for the extra efforts needed for this extra requirement.

For highly innovative PV research projects, the New Energy Research (NEO) subsidy scheme was reopened in April 2003. However, since this subsidy scheme has a relatively small budget for a wide range of energy research subjects, this will be a small inducement for PV research. (source Netherlands Photovoltaic technology status and prospects Job Swens, Novem, and Willem van der Heul, Ministry of Economic Affairs, on IEA Photovoltaic Power Systems website, Annual Report, 2003)

Geothermal

The Netherlands possesses economically-viable potential for electricity generation from geothermal energy, but this has not been developed at present. A demonstration geothermal project that will produce hot water for heating greenhouses has been proposed by energy distribution companies.

RE Policy Outlook

Dutch energy policy aims to provide reliable, affordable, and clean energy. Almost half Dutch energy is supplied by indigenous natural gas. The densely-populated Netherlands has a shortage of space to exploit diffuse renewable energy sources such as biomass, and a lack of suitable sites for large-scale hydropower developments, which means that the potential for renewable energy development is limited. Renewable energy policy has evolved rapidly in the Netherlands over the 1990s. The current policy framework to encourage renewable energy is laid out in the 1997 White Paper *Renewable Energy - Advancing Power* written by the Dutch Ministry of Economic Affairs in. This White Paper sets a target of meeting 10% of its primary energy demand from renewable energy sources in the year 2020. With respect to the electricity share, this figure will even be higher: up to 17% of renewable in electricity production. The white paper proposes various reforms in the energy sector. It aims to establish a more sustainable energy infrastructure by improving energy efficiency by one third between 1990 and 2020 and to increase the share of renewables in total energy supply to 10% in 2020. The share of RES in electricity production is targeted at 17% in 2020 (9% intermediate objective for 2010). In a recent policy document on national policies for Climate Change ('Uitvoeringsnota Klimaatbeleid', 1999) a national target for renewable energy has been set in addition to the 2020 target of 10% of total energy supply. The mid-term target is to reach 5% in 2010.

The steps for reaching the targets are proposed in the "Action Program 1998-2000 Renewable Energy - Advancing Power".

These steps are classified as follows:

- Improving the price performance ratio;
- Promoting market penetration;
- Addressing administrative bottlenecks;
- Long-term research programs in the field of wind-energy, solar energy and energy from biomass and heat pumps;
- Agreements with the energy sector and manufacturing industry to co-ordinate and direct research programs;
- Agreements with organizations concerned in order to promote renewable energy options, for example through research, development and demonstration;
- Broadening the range of fiscal instruments;
- Improving the export instruments for renewable energy products;

Renewable Energy - Advancing Power outlines the measures needed to increase renewable energy supply in the Netherlands, and reiterates the expected supply of each renewable energy source until 2020 (although interim targets are often lower). This White Paper is predominantly a "technology push" programme that aims to improve the price-performance ratio, to promote market penetration of renewables, and to reduce administrative bottlenecks. While the programme includes voluntary actions, such as agreements between government and utilities, it also sets out a number of different economic and fiscal incentives used in the promotion of renewable energy. For example, there are many types of tax exemptions including corporation tax exoneration for investments in renewable energy technology and income tax exoneration for investments in "green" investment funds. The programme also doubled renewable R&D funding. The manner in which renewable energy is promoted is therefore changing from a system emphasising voluntary agreements and capital subsidies, to one that is more market-based and that gives a more prominent role to fiscal incentives. The Ministry of Economic Affairs, EZ, is responsible for promoting renewable sources of energy. Voluntary agreements with utilities are an important component, but may become less so with the introduction of "green certificates". The Ministry of Housing, Physical Planning and Environmental Management, VROM, is also involved in some renewable energy policy issues, and works with EZ on planning and siting problems for wind turbines and the joint energy-from-biomass programme. In general the provincial, municipal and water authorities do not have the competence to draw bills on renewable energy issues or targets.

Electricity

Before the start of the liberalisation of the electricity market between 1998 and 2000 renewable energy support came from a mix of instruments ranging from feed-in tariffs based on avoided cost, direct subsidies, fiscal investment incentives, and a system benefits charge. In July 2001, the Dutch renewable electricity market was opened up to competition, and at the same time a new system started. On the production side the scheme is based on a TGC system, but demand is created by a fiscal incentive instead of an obligation. A tradable green certificate system was set up for the verification, registration and tracking of renewable electricity and to facilitate the trade and retail supply of renewable electricity. Green certificates are awarded to renewable electricity generators. This creates a market for these certificates, and enables renewable electricity producers to sell to consumers in any part of the country, or to exchange them. In 2001, consumers were required to purchase "green certificates" confirming that a certain percentage of electricity consumed is from renewable sources. The Foreign producers are also allowed to apply for green certificates, although, as for Dutch producers, they have to contract with suppliers or consumers within the Netherlands.

The Regulatory Energy Tax was introduced in 1996 for households and medium-small enterprises to encourage energy conservation and renewable energy use by making fossil energy more expensive. Green energy has been exempted from tax since 1999. In 2003 the energy tax (REB) on fossil electricity for small consumers (<10.000 kWh) was further raised to 6,39 EUROcts/kWh, with a partial exemption of 2,9 €cts/kWh for RES. With this tax level, green electricity is on average as expensive as regular electricity. The energy tax exemption applies only to renewable electricity possessing a green certificate. The Dutch government decided to apply an annual indexing (to inflation) to all energy taxes and excise duties from 1 January 1999.

The MEP is a kWh subsidy which will be paid to producers in the Netherlands of electricity from renewable sources and CHP who feed in on the national grid, and is guaranteed for a maximum of 10 years (not for CHP). The level of producer support is differentiated for technologies. The highest support level (6.8 €ct/kWh) will be granted for offshore wind, PV, small (<50 MW) stand-alone biomass installations, hydro, wave and tide energy. For wind on shore the production support is 4.9 €ct/kWh for a maximum of 18000 full load hours in 10 years. The subsidy is financed by a levy of 34 € (2003) on all connections to the electricity grid in the Netherlands. This levy is for 100% compensated by means of a reduction of the REB on fossil energy consumption. The MEP producer support will exist next to partial REB exemption for renewable electricity consumption.

Energy Investment Reduction Scheme (EIA) is a tax credit. Companies can deduct from the taxable profit 55% of investments in equipment related to energy conservation and renewable energy. The eligible equipment is stated on the list "Energelijst" of the Energy investment deduction scheme (EIA)

EPR is a subsidy scheme for households and social housing corporations investing in energy efficiency and renewable energy. The subsidy averages between 25% (energy efficiency) and 50% (RES). EPA is a consultation which can be requested by (an association of) owners, landlords and tenants, to improve the energy performance of their dwellings or offices. The consult is performed by a certified company, and lists the possible measures to be taken. If the advice is neglected, a bill is presented. In case one or more of the measures is carried out, EPA pays the bill, and EPR will subsidise part of the cost. In addition, EPA adds a bonus of 10% (for private persons) to 25% (for housing co-operatives and landlords) to the EPR premium. Both measures are financed by means that become available from the energy tax REB. The mechanism thus encourages energy-efficiency. Thus, one of the requirements for using EPA and EPR is that the consumer pays REB.
(source for all above paragraphs in red is IEA Renewable Energy Policies and measures The Netherlands)

Since the opening of the Dutch retail market for renewable electricity in July 2001 the number of renewable electricity customers has increased from about 250,000 to approximately 1.4 million in January 2003. This surge in renewable electricity demand was mainly due to the ecotax² exemption and production incentive. Encouraged by the success of the renewable electricity market the Dutch government decided that it would seek to achieve its renewable electricity targets on the basis of a voluntary market for renewable electricity (Ministry of Economic Affairs, 2002).

Concerning other financial incentives, investments in a recognized "Green Project" can be financed with cheap loans from the so called "Green Funds". The interest rate is on average 1% lower than the market rates.

² As a consequence of the greening of the tax system in the mid-nineties the ecotax or regulatory energy tax (REB) on final energy consumption was introduced in 1996. Renewable electricity consumption was exempt from the ecotax. Moreover, producers of renewable electricity receive a production incentive from the ecotax funds collected from non-renewable electricity consumers.

Heating and Cooling

At present, the requirements of the *Energy Performance Standard (EPN)* for new residential properties is 1.2 which means that buildings must be designed in such a way that no more than 1 200 m³ of natural gas will be required each year for heating, hot water and cooking in a standard-size dwelling. The EPN requirement was tightened to 1.0 as of 1 January 2000.

The *Third White Paper on Energy Policy* of 1995/1996 set out an extremely ambitious objective for CHP: by 2010, 15 000 MW of CHP capacity were to be installed. This objective was repeated in the 1998 Energy Conservation White Paper (EBN) and forms part of the global competition scenario and thus the Dutch basket of measures for reaching the Kyoto target. This capacity increase, which represents more than four times the installed CHP capacity in 1990, was to be stimulated through a multitude of incentives and support measures. These support measures caused vigorous investment in decentralised CHP facilities throughout the 1990s, often by energy distributors entering into joint ventures with private companies. The number of new CHP plants was such that Sep (Samenwerkende Elektriciteits-Productiebedrijven, co-operating electricity production companies, the former Dutch electricity generating board) had to limit output from existing, economic base-load plants to accommodate over-capacity from the expensive new CHP plants. This led to under-utilised capacity and higher unit cost. Prices, which would normally fall in a market with over-capacity, instead rose to recover Sep's higher unit costs. Higher Sep prices in turn encouraged decentralised suppliers to develop more CHP. The Second Memorandum on Energy Conservation (SMEC) adopted in 1993 set the target for CHP at 8 000 MW and 30% of generation by 2000. This objective has been reached as the present capacity of CHP is 8 000 MW. However, severe competition with relatively low electricity prices, combined with high gas prices caused a slow-down in the development of CHP. The Minister of Economic Affairs announced measures to support CHP. A temporary tax refund for co-generation power was introduced in the Regulatory Energy Tax. For the years 2001 and 2002, the refund was 0.57 Eurocent for each kWh supplied to the grid. To be entitled to the refund, the plant must have a minimum efficiency of 60%. A maximum of € 5.7 Million_refunded per installation. This has resulted in an almost unchanged operation of the co-generation plants. (source IEA Energy Efficiency Update 2003 The Netherlands <http://www.iea.org/dbtw-wpd/textbase/newsletters/eneff/NL.PDF>)

Transport

In 1996 three transportation policy documents *Freight Transport in Balance*, *Working Together on Accessibility*, and *Memorandum on Vehicle Technology and Fuels* were produced. Various measures and programmes are carried out with the aim of reducing the number of vehicle-km travelled with special attention being paid to the improvement of public transport. A legislative measure was implemented in 1991 incorporating a mandatory check of engine adjustment as part of the annual vehicle inspections.

The government intends to influence driving behaviour through more stringent enforcement of speed limits, increased tyre pressure, and in-car instruments such as cruise control and econo-meters. Increased tyre pressure reduces fuel consumption by reducing friction between the car and the road surface and is expected to contribute 0.3 million tonnes of CO₂ savings. At present, tyre pressure is too low in about half of all cars.

Measures are being taken to improve the cost of public transport to make it more attractive than private passenger transport. A comprehensive investment programme to improve railroad connections is currently being implemented (*Rail 21*). The introduction of connections between the major cities in the Netherlands and the European high-speed train system is under consideration. (source IEA Energy Efficiency Update 2003 The Netherlands <http://www.iea.org/dbtw-wpd/textbase/newsletters/eneff/NL.PDF>)

Research and Development

Last year, the long-range Renewable Energy Programme (BSE-DEN), carried out by Novem, consisted of two calls, one in August and one in December. This programme supports R&D, demonstration, feasibility and knowledge transfer projects for all forms of renewable energy. The main evaluation criteria for this programme are innovation and overcoming thresholds; expressed in the contribution of anticipated spin-off projects to the Dutch energy production in 2020. The first tender in 2003 showed an emphasis on biomass and wind (resp. 17 and 7 projects awarded), comparable attention for thermal solar energy, PV and heat pumps (average of 3 projects) and no support for geothermal and ambient temperature applications. Tender 6 (end 2003) is still under evaluation, but a similar distribution of support is expected.

During 2003, the national priorities for government financed Energy R&D programme (EOS) were determined. This was done during a wide consultation amongst energy research and policy professionals. The main criteria in this evaluation were the contribution to the Dutch energy production in 2010, 2030 and 2050 and the level of expertise in the Netherlands. PV came forward as one of the main areas of interest,

with specific strong positions for polycrystalline silicon and inorganic thin film technologies. The actual EOS programme will be formulated and implemented in 2004.

(source Netherlands Photovoltaic technology status and prospects Job Swens, Novem, and Willem van der Heul, Ministry of Economic Affairs, on IEA Photovoltaic Power Systems website, Annual Report, 2003)

			TIME	1990	1995	1999	2000	2001
COUNTRY	PRODUCT	FLOW						
Netherlands	Million US\$ (2002 prices and exchange rates)	Solar Heating & Cooling	0.869	1,090	2,142	0.000	0.196	
		Solar Photo-Electric	7,817	10,947	16,498	12,257	16,919	
		Solar Thermal-Electric	4,111					
		Total Solar	12,797	12,036	18,640	12,257	17,115	
		Wind	9,496	6,797	9,052	8,034	13,398	
		Ocean	1,159	0.000	0.048	0.206	0.293	
		Biomass	7,759	3,995	12,994	10,918	13,398	
		Geothermal	4,342	0.051	1,120	0.000		
		Large Hydro (>10 MW)			
		Total Hydro		0.051	0.098	0.000		
		TOTAL RENEWABLE ENERGY	35,551	22,930	41,951	31,414	44,205	
		TOTAL OTHER TECH./RESEARCH	32,540	17,898	12,507	17,303	25,428	
		TOTAL ENERGY R&D	176,076	138,516	149,894	130,085	168,506	

(Source IEA 2003: National Budget RD&D in OECD Countries – The Netherlands 1980-2002, OECD, IEA)

3. RE Highlights

National Success Story

Netherlands — Photovoltaics

Dutch businesses have been market leaders in the photovoltaics (PV) industry since the late 1980s and in particular have developed a thriving export industry. A small number of PV installations were developed in the Netherlands during the early 1990s. The Barendrecht project is an early example of a grid-connected PV installation. It was conceived in 1993 and became operational in 1996. It consists of 12 grid-connected, roof-integrated PV systems in newly built houses, with a project life in excess of 20 years. Both stand-alone and grid-connected systems have since been developed: by the end of 1998 there was an installed capacity of 5 MW of PV installations and manufacturing production of 100 000 m² of PV panels.

Success factors:

- **Political: More ambitious national targets have recently been established for renewable energy use**

The main driving force for encouraging renewable energy uptake in the Netherlands has been the 1997 White Paper on renewable energy. These targets and associated initiatives were not available at the time the Barendrecht project was initiated, and represent an ambitious increase compared with the levels of use of renewable energy at the time (only about 1 % in the early 1990s). Nevertheless, the Barendrecht and other earlier PV installations benefited from a range of measures that benefited renewable energy developments.

- **Legislative: Electricity supply companies are obliged to purchase power from independent power producers**

Energy policy in the Netherlands during the 1990s has built on the foundations laid by the 1989 Electricity Act, which obliged electricity supply companies to purchase and distribute electricity produced by independent power producers, such as renewable power producers. Individual householders at Barendrecht can therefore sell power surplus to their domestic requirements to the utility. The utility buys at around NLG 0.23/kWh (EUR 0.13/kWh), which is equivalent to the price the owner would pay for conventional electricity provided from the utility. Prices are negotiated per project, however, and recent developments have now led to an average price of NLG 0.16/kWh (EUR 0.07/kWh) across the country. Some distribution companies also accept net metering: a household's meter is allowed to run backwards as compensation for feeding the surplus electricity into the grid.

- **Fiscal: Tax structure is favourable towards renewable energy**

Fiscal advantages under the REB regulatory energy tax. The use of photovoltaics in the Netherlands has expanded steadily since 1993, mainly in small-scale and off-grid applications. A large number of grid-connected projects have also been established, and more are being developed to meet new and more ambitious national targets for PV use.

Companies and firms which invest in energy-saving projects (including renewable energy) can be exempted from taxation, and can benefit from claiming accelerated depreciation of investment in energy conservation equipment including PV systems. Individuals benefit from income tax exemption for investments in 'green' funds.

- **Financial: Subsidies are available for renewable energy schemes, both from public and private sources (including utilities)**

Subsidies are available both from NOVEM (the Netherlands' energy and environment agency) and from local authorities to support energy-efficient technologies, including renewable energies. In addition, utilities are obliged to invest in energy conservation or renewable energy schemes, with the result that many utilities own and operate renewable energy projects such as PV installations. At Barendrecht, the local municipality and a private property developer initiated the project. The owners of the scheme are the homeowners themselves, although financing was provided in partnership with other local and national players, and from the utility. The owner of the house is obliged to keep the PV system for 10 years, and a contract is signed between the owner, the municipality and the utility. The system is guaranteed for 10 years after the completion date. The Netherlands also has a number of domestic banks (e.g. Triodos) which are supportive of environmental and community initiatives, including renewable energy schemes, and are willing to invest small amounts of finance towards these kinds of projects at favourable rates.

- **Administration: Municipal authorities are responsible for implementing spatial planning, including location of renewable energy systems**

The planning process addresses the removal of any barriers to maximising solar energy production in residential buildings.

- **Technological development: Strong market development programme under way**

During the 1990s NOVEM had a strong research and demonstration support programme, assisting government research organisations and industry to develop an indigenous PV industry. Fundamental and applied research is carried out by universities and research centres, to improve cell efficiency, to investigate new market applications (both on- and off grid), and to develop guarantees ensuring that Dutch PV products are high quality and operate to a good performance level. There is also an indigenous PV cell manufacturing capability, which by the end of 1998 was producing more than 100 000 m² of PV panels.

Regional or Local Best Practice

100 Blue Roofs Project – Delft

The desire of Delft to become a leading "Knowledge City" is centred in the fields of environment and energy, soil and water, communication technology and architecture and design. Delft aims to demonstrate and promote best practise in the above fields. The most famous and successful of the Delft Energy Agency's projects is the 100 Blue Roofs project. The two projects within this that have the highest level of European replication potential are the PV for homeowners (2001) and the PV for tenants (2003). The aim was to install PV systems in, initially as many private homes as possible, and then the project expanded to promote PV to tenants in one particular area of Delft.

Project details:

The city of Delft sent a letter to 14,500 house owners with a view to providing them with detailed information on the installation of PV and explanations of the subsidies. At the exhibition stand two weeks later, there was so much interest that Eneco and City of Delft decided to subsidize 400 instead of 100 houses. Following the success of this project, the energy agency put forward an extension of this project to include PV panels installed in rented housing and partially paid for by the tenants and partially by the housing associations Delftwonon, Vestia and Vidomes. The City of Delft and Eneco agreed to help with funding. The planning of the project followed these stages: a mailing and information evening for the tenants, energy scans for interested tenants, contracts supplied by the housing association, the ordering of PV systems, installation and a subsidy call. A PV offer was made by three housing associations to tenants in a particular area of Delft.

Success Factors:

Financial: The City of Delft and Eneco financed both parts of the project. The option offered to the tenants to make an immediate yield of 6,73 euros of sustainable energy (40 kWh) for a rent increase of 3 euros per month.

Challenges:

Financial: The design and finance of the tenants project was ready by mid-2002 but did not start before May 2003 due to fear that the national government subsidies would be withdrawn before the end of the project, thus leaving the housing associations with overwhelming costs. This was overcome by the government promising not to end the programme without a two month "ending period", which would have been enough time to finish the project anyway.

Public Awareness: The tenants who neglected to respond to one of the housing associations were contacted and 50% of them expressed the opinion that they thought green electricity was none of their concern.

Evaluation:

The PV for households has already been replicated a number of times the first of which occurring in 2001. Rotterdam and The Hague are prominent areas where PV for households has been implemented. PV for tenants has not yet been established in any other municipality. The PV for homeowners action led to 400 households ordering a self install PV system which equates to an installation of 160 kWp 2,2% of all the individually owned houses in Delft now have a PV system. Over 249 people signed up to the tenants' scheme, which amounts to a 144 kWp installed.

4. Websites

Name	Description	Website
Ministry of Economic Affairs	is responsible for promoting renewable sources of energy	http://www.ez.nl
Ministry of Housing, Physical Planning and Environmental Management	also involved in some renewable energy policy issues	http://www.vrom.nl
NOVEM National Agency for Energy and the Environment	The Netherlands national energy agency	www.novem.org
Europa website	EU Commission website	http://europa.eu.int
European Commission –		http://europa.eu.int/comm/energy/index_en.html

Directorate General for Transport and Energy		
Managenergy	Information services for local and regional energy actors	www.managenergy.net