Stichting Onderzoek Multinationale Ondernemingen
Centre for Research on Multinational Corporations

Sustainability in the Dutch Power Sector

Fact Sheet Series

Joseph Wilde-Ramsing, Tim Steinweg, Maaike Kokke

September 2008

Colophon

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Contents

1 Introduction

This series of fact sheets is designed to investigate the Dutch power sector and raise public awareness about the sustainability of power companies operating in the Netherlands. The series consists of ten company fact sheets and four thematic fact sheets, for a total of 14. The ten company fact sheets focus on ten of the Netherlands' leading power companies: DELTA, Electrabel, Eneco, E.ON, Essent, Greenchoice, Nuon, Oxxio, RWE, and Windunie. For each company, the fact sheet will contain information on four measures of sustainability: the company's current fuel mix for installed electricity generation capacity in Europe, current fuel mix of electricity supplied in the Netherlands, investments in new generating capacity in Europe, and initiatives to encourage consumers to become more sustainable in their energy use by conserving energy and reducing overall use (demand-side initiatives) in the Netherlands. The thematic fact sheets focus on these same four areas and compare the ten companies' performance in each area. Information for the fact sheets has been gathered from news articles and databases; company sources such as websites, annual reports and CSR reports; and personal interviews with the companies. All of the companies were given and used the opportunity to review a draft of their fact sheet, provide comments, and correct any factual errors. Funding for the fact sheets was provided by Greenpeace. All fact sheets in this series are available on the SOMO website at www.somo.nl.

2 DELTA

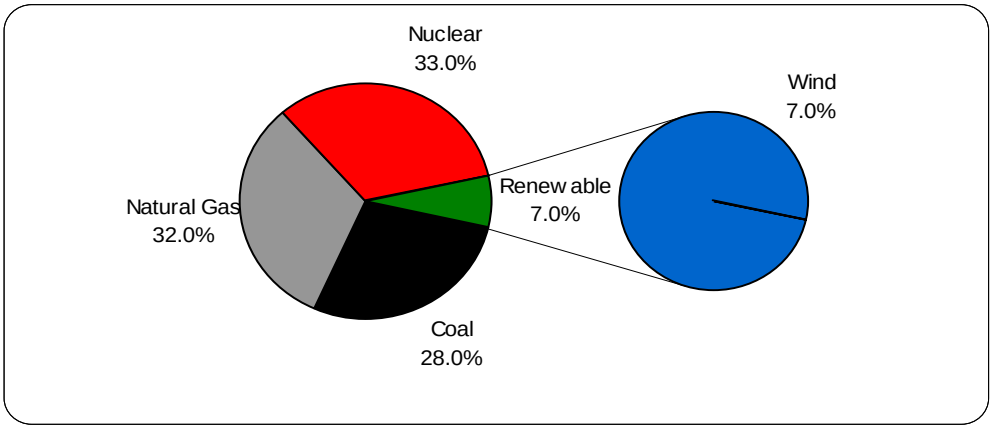
2.1 Basic company information

DELTA NV is a multi-utility company that supplies a wide range of products and services: electricity, gas and water, water treatment, solar cells, waste management, radio and television signals, internet and digital telephony over cable. It is a major electricity producer and manages and maintains the networks for electricity, gas, water and cable. The company operates across the entire electricity supply chain, from generation and fuel purchasing to industrial end-user sales. DELTA's core activity is providing electricity, gas, water, cable and internet services to domestic customers. Another key area of activity is the corporate market, where the emphasis lies on energy, water (including industrial water) and waste management. There is a strong interrelationship between these activities. DELTA has its roots in the province of Zeeland. From its base in this province its activities extend to the markets across the Netherlands and other parts of the Benelux region.

2.2 Installed capacity for electricity generation in Europe

Figure 1 reveals the fuel mix of DELTA's electricity generation capacity in 2007. DELTA's total generating capacity in the Netherlands is 750 MW.[1]

Figure 1: Fuel mix of DELTA's installed electricity generation capacity, 2007



Based on: DELTA[2]

2.3 Electricity supplied in the Netherlands

Figure 2 shows the fuel mix of energy supplied by DELTA in the Netherlands, and Table 1 presents the CO_2 emissions and radioactive waste production resulting from the generation of the electricity that RWE supplies in the Netherlands.

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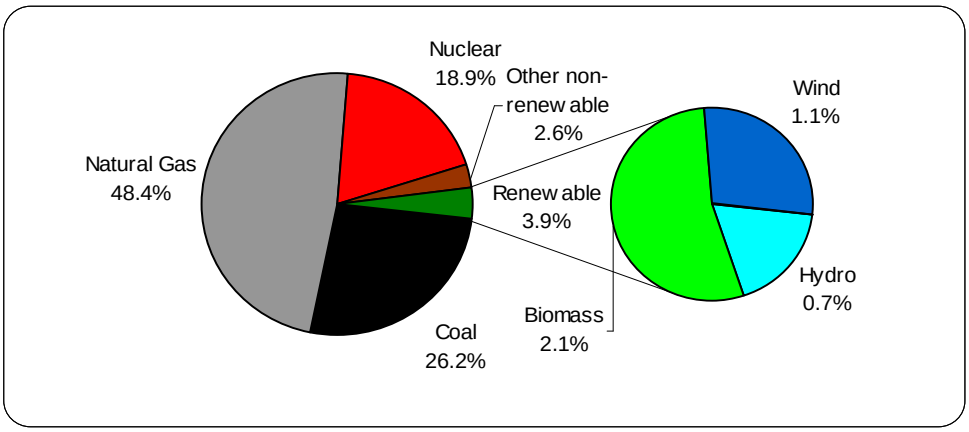
[1] Delta Annual Report 2007, p. 43.
[2] E-mail communication with Mr. Peter Couwenberg (02-09-08).

Figure 2: Fuel mix of electricity supplied by DELTA, 2007



Based on: DELTA stroometiket 2007

Table 1: Emissions and waste resulting from DELTA's electricity supply, 2007

Indicator	Amount
CO_2 (g/kWh)	427.6
Radioactive waste (µg/kWh)	570

Based on: DELTA stroometiket 2007

2.4 Announced investments in new generation capacity in Europe

DELTA's aim is to increase its generating capacity to 2,000 MW by 2015. The company is strongly in favour of bolstering Dutch nuclear generating capacity. In addition, DELTA is pushing the development of sustainable generating capacity in the form of biomass, wind and solar power. The Sloe Centrale is a combined heat and power (CHP) project, while the project in Moerdijk is a stand-alone biomass plant. Table 2 indicates the specifics of these investments.

Table 2: DELTA's announced investments in new production capacity

Project name	Location	Fuel Type	Date in operation	Amount (€)	Output Capacity (MW)	Project Status
Sloe Centrale	Vlissingen (NL)	Natural gas (CHP)	2009	550 million[3]	870[4]	Under construction
BMC Moerdijk	Moerdijk (NL)	Biomass[5]	September 2008	120 million[6]	36.5[7]	Under construction

Based on: DELTA[8]

[3] EDF, "EDF and Dutch energy company Delta announce the joint building and operation of a gas-fired combined-cycle power plant in the Netherlands", 19 March 2007, http://www.edf.fr/the-edf-group/press/press-releases/noeud-communiques-et-dossier-de-presse/communiques-2007-en/edf-and-dutch-energy-company-delta-announce-the-joint-building-and-operation-of-a-gas-fired-combined-cycle-power-plant-in-the-netherlands-94895.html (24-07-08)

[4] The Sloe Power Station is a 50-50 joint project by DELTA and the French company Electricité de France. The companies will jointly invest EUR 550 million.

[5] The plant is designed to turn more than 400,000 tonnes of poultry litter into electricity.

[6] Utilities, "Moerdijk krijgt kippenmest centrale", no date, http://www.utilities.nl/nieuws/index.php?option=com_content&task=view&id=174&Itemid=39 (24-07-09)

[7] BMC Moerdijk is a joint venture of DELTA, Coöperatie DEP, ZLTO and Austrian Energy & Environment.

Table 3 shows investment plans that Delta has announced or that have appeared in newspaper reports, but for which construction has not yet been initiated.

Table 3: DELTA's announced plans for investment in new capacity

Project name	Location	Fuel Type	Date in operation	Amount (€)	Output Capacity (MW)	Status
Indaver Gas-fired Power Station	Beveren (BE)	Natural gas	Unknown	Unknown	400	Feasibility study
Intended modernisation of the coal-fired power station	Borssele (NL)	Coal	Unknown	Unknown	Unknown	Planning phase
Intended modernisation of the nuclear power plant	Borssele (NL)	Nuclear	Unknown	Unknown	Unknown	Planning phase
Set of wind turbines	Unknown (NL)	Wind	Unknown	Unknown	Unknown	Planning phase
Building a second nuclear power plant	Unknown (NL)	Nuclear	Unknown	Unknown	Unknown	Planning phase
Oosterscheldekering project	Oosterscheldekering (NL)	Wind	Unknown	Unknown	Unknown	Planning phase

Based on: DELTA[9]

2.5 Demand-side initiatives

DELTA's demand-side initiatives include:

- In cooperation with certified advisors, DELTA takes care of requests for energy labels. In addition, DELTA offers its clients an energy test that shows them how much energy they consume in comparison with the national average. DELTA offers the test in a brief and an extensive version. DELTA also offers its clients a test that shows them how green/energy conserving they act in their daily life.
- On its website, DELTA gives its clients information about the power consumption of home appliances. DELTA publishes a number of energy use reduction tips and climate tips. It also brings out a free newsletter with information about sustainability and energy saving.
- On its website, DELTA offers its clients free information on solar panels, solar boilers and relevant subsidies, amongst other by means of a step-by-step plan. DELTA sells solar panels and gives its clients the possibility to choose for a free personal advice visit at home and on payment, the installation of the panels. DELTA also sells solar boilers.
- By means of the free initiative 'DELTA bespaar direct', clients can keep an eye on their energy consumption by filling in their meter reading regularly. After filling in their meter reading, they can see if their consumption decreased over time and they can compare their consumption with the national average.

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[8] DELTA Annual Report 2007
[9] Idem, p. 33 & 43.

3 Electrabel

3.1 Basic company information

Electrabel is a leading European energy company and number one on the Benelux market. It is part of GDF SUEZ, an international industrial and services group, which designs sustainable and innovative solutions in the management of public utilities as a partner of public authorities, businesses and individuals. GDF Suez was created in the merger between Suez and Gaz de France that took place on 22 July 2008.[10]

Electrabel has four core activities:

- Sales of electricity, natural gas and energy products and services
- Electricity generation
- Electricity and natural gas trading
- Management of electricity and natural gas networks, on behalf of distribution system operators (in Wallonia).[11]

Since its primary markets are Belgium, the Netherlands and France, and it also operates power plants in Luxembourg, Spain, Portugal, Germany, Poland, Hungary and Italy, it is also one of the few companies trading on all of Europe's energy markets.[12]

3.2 Installed capacity for electricity generation in Europe

Figure 3 reveals the fuel mix of Electrabel's electricity generation capacity in 2007. The total generation capacity of its European facilities is 31,187 MW. 5,200 MW, or 16.7%, of this generation capacity exists of renewable sources of energy for electricity generation. In 2007, these installations produced as much energy as the yearly electricity consumption of over 5.5 million households.[13] The 1.6% biomass is all co-fired in coal-fired power stations rather than in stand alone biomass installations.

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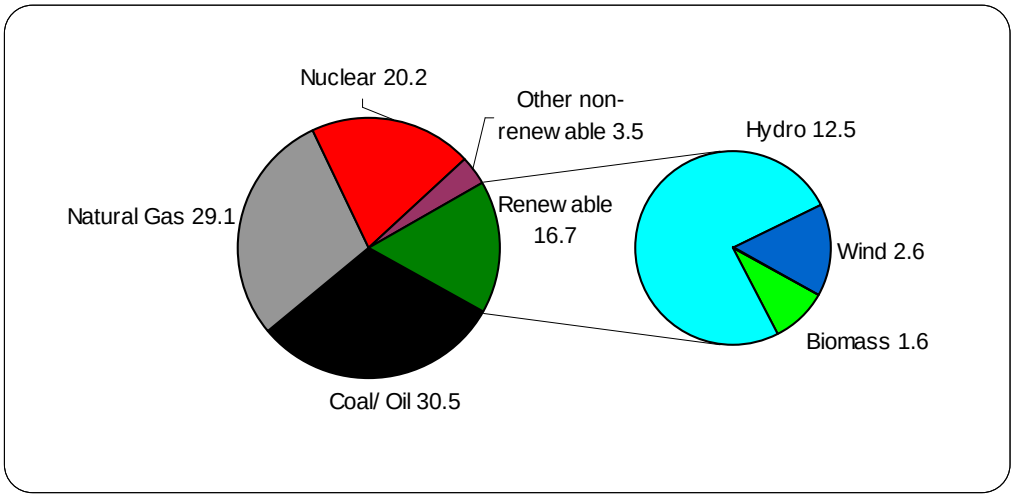
[10] Please note that as a result of the merger between Gaz de France and SUEZ, the energy activities in Europe have been restructured. The company now has a Branch GDF SUEZ Energy France (containing all former Electrabel SUEZ and GDF activities in France), and a branch GDF SUEZ Energy Europe and International. Within the latter branch there are 2 divisions (division Benelux and division Europe) in which the former electricity generation activities of Electrabel and GDF have been combined. This will have consequences for the installed generation capacity for the year 2008. W. Wolters, Directeur Strategie & Regulatory Affairs, Electrabel, email 11 August 2008.

[11] Folder Electrabel 2007, p.2.

[12] Electrabel website, Company profile, "Key figures", no date, http://www.electrabel.com/whoarewe/companyprofile/keyfigures.aspx (22-07-08).

[13] Electrabel website, Activities, Generation, "Generation figures", no date, http://www.electrabel.com/whoarewe/activities/keyfiguresgene.aspx (22-07-08).

Figure 3: Fuel mix of Electrabel's installed electricity generation capacity, 2007

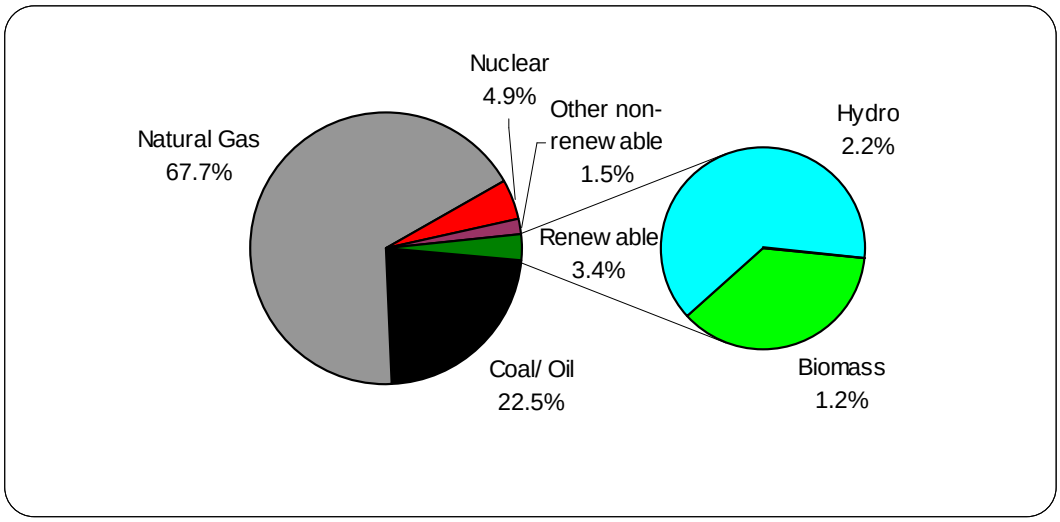


Based on: Electrabel[14]

3.3 Electricity supplied in the Netherlands

Figure 4 shows the fuel mix of energy supplied by Electrabel in the Netherlands.

Figure 4: Fuel mix of electricity supplied by Electrabel Nederland, 2007



Based on: Electrabel[15]

Table 4 presents the CO_2 emissions and radioactive waste production resulting from the generation of the electricity that Electrabel supplies in the Netherlands.

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[14] Non-renewable energy: Electrabel website, About us, Activities, Generation, "Generation figures", no date, http://www.electrabel.com/whoarewe/activities/keyfiguresgene.aspx (28-08-08).
Renewable energy: Electrabel website, About us, Activities, Generation, "Renewable energies", no date, http://www.electrabel.com/whoarewe/activities/renewableenergy.aspx (02-09-08).

[15] Electrabel stroometiket 2007

Table 4: Emissions and waste resulting from Electrabel Nederland's electricity supply, 2007

Indicator	Amount
CO_2 (g/kWh)	485.8
Radioactive waste (µg/kWh)	148

Based on: Electrabel[16]

3.4 Announced investments in new generation capacity in Europe

Table 5 indicates the projects Electrabel is currently developing in Europe. Electrabel is expanding its generating facilities to have a local presence in various European regions. Its target is to reach a generating capacity of 35,000 MW in Europe by 2009, and to increase the generating capacity based upon renewable energy sources to 6,300 MW or 18% of its total capacity.[17] This strategy is reflected in the large number of announced investment plans in new generation projects, with the use of various technologies and different fuels. In addition to investments in new to-be-built capacity, Electrabel has also been active in various acquisitions and joint ventures.

Table 5: Electrabel's announced investments in new production capacity

Project name	Location	Fuel Type	Date in operation	Amount (€)	Output Capacity (MW)	Project Status
Power Plant Wilhelmshaven	Wilhelmshaven (DE)	Coal	2012	1 billion	800[18]	Pre construction phase[19]
Flevo	Lelystad (NL)	Natural gas (CCGT)	End of 2009	Unknown	864	Under construction
Amercoeur	Charleroi (BE)	Natural gas (CCGT)	2009	150 million	420	Under construction[20]
Fos-sur-Mer	Fos-sur-Mer (FR)	Natural gas (CCGT)	Unknown	270 million	425	Under construction[21]
Degussa	Antwerp (BE)	Natural gas (CHP)	Mid 2010	45 million[22]	42	Under construction[23]
Lanxess	Zwijndrecht (BE)	Natural gas (CHP)	Autumn 2008	60 million[24]	56	Under construction[25]

[16] Idem.
[17] Electrabel website, Activities, Generation, "Generation figures", no date, http://www.electrabel.com/whoarewe/activities/keyfiguresgene.aspx (22-07-08).
[18] M. Gommeren, "Electrabel bouwt steenkoolcentrale in Wilhelmshaven", De Tijd, 14 November 2007, http://www.tijd.be/nieuws/ondernemingen_energie/Electrabel_bouwt_steenkoolcentrale_in_Wilhelmshaven.3378165-432.art (21-07-08).
[19] W. Wolters, Directeur Strategie & Regulatory Affairs, Electrabel, email 11 August 2008.
[20] Electrabel, "Electrabel invests €150 million in the Amercoeur (Belgium) power station", 14 November 2005, http://www.suezenergyna.com/press/documents/ElectrabelAmercoeur20051114.pdf (21-07-08).
[21] Energie Business Review Online, "Alstom to contruct combined cycle plant for Electrabel France", 20 March 2008, http://www.energy-business-review.com/article_news_print.asp?guid=AE8607B4-B818-411E-8F8B-A2312247917F (21-07-08).
[22] The power plant will be build in cooperation with E.ON. The two companies will jointly invest € 45 million.
[23] Thomson Reuters, "Suez, E.ON to build Belgian power plant for Degussa", 11 September 2007, http://uk.reuters.com/article/oilRpt/idUKL1184194320070911 (21-07-08).
[24] The power plant will be build in cooperation with Lanxess Rubber. The two companies will jointly invest € 60 million.

Teesside	Teesside, North East England (UK)	Natural gas (CCGT)	Unknown	Unknown	938	Acquisition (completed)
Napoli Levante	Unknown (IT)	Natural gas (CCGT)	Unknown	Unknown	185	Acquisition (completed)
Sidmar	Gent (BE)	Gas (furnace and convection gas)	2010	Unknown	305	Pre construction phase [26]
Doel 4	Doel (BE)	Nuclear	Unknown	Unknown	30	Unknown
Doel 1	Doel (BE)	Nuclear	Unknown	Unknown	40	Unknown
Tihange 3	Tihange (BE)	Nuclear	Unknown	Unknown	30	Unknown
Wind Farm Eemshaven	Groningen (NL)	Wind	End of 2008	Unknown	27	Under construction[27]
BASF	Unknown (BE)	Wind	Unknown	Unknown	12	Unknown
Büllingen	Büllingen (BE)	Wind	Unknown	14 million	12[28]	Under construction
Dour-Quiévrain	Dour-Quiévrain (BE)	Wind	Unknown	Unknown	6	Under construction
Izegem	Izegem (BE)	Wind	Unknown	Unknown	4	Under construction
Compagnie du Vent	Unknown (FR)	Wind	Unknown	375 million	64[29]	Acquisition (completed)
Trapani Salemi	Sicily (IT)	Wind	October 2009	Unknown[30]	66[31]	Pre construction phase[32]
Fafe extension	Fafe (PT)	Wind	Summer 2008	93.5 million[33]	26[34]	Under construction
Gardunha (Generg)	Gardunha (PT)	Wind	Unknown	Unknown	36	Unknown
Monte della Difesa	Salerno (IT)	Wind	Unknown	Unknown	29	Joint Venture (completed)
SHEM	La Verna (FR)	Hydro	Unknown	Unknown	4[35]	Acquisition

[25] Electrabel, "Lanxess Rubber en Electrabel bouwen samen een nieuwe warmtekrachtkoppelingscentrale", 15 february 2007, http://hugin.info/133965/R/1105632/198944.pdf (21-07-08).

[26] De Standaard, "Electrabel bouwt centrale Sidmar", no date, http://www.utilities.nl/index.php?option=com_content&task=view&id=675&Itemid=75 (21-07-08)

[27] Electrabel "Electrabel investeert in de toekomst!", no date, http://www.electrabel.nl/Over-Electrabel/Nieuws-en-Pers/~/media/Files/Over%20Electrabel/Electrabel%20investeert%20in%20de%20toekomst.ashx (21-07-08)

[28] Envirodesk, "Electrabel investeert in windturbines te Büllingen", no date, http://www.laatjebouwen.com/nieuws/bed-prod/bed-prod-item.asp?nieuws_id=29 (21-07-08).

[29] Electrabel, "Suez trekt de buidel voor uitbreidingen in de Zuid-Europese windenergiesector", 14 November 2007, http://mm.mailing-electrabel.nl/35/pages/website/archief.asp?type=ms&weeknummer=47&jaar=2007 (21-07-08).

[30] Electrabel took a 90 % shareholding in the company WindCo which is developing a 66 MW wind farm in Sicily.

[31] Energy Business Review, "vestas receives 66 MW wind turbine order for Windco's Sicily project", 20 June 2008, http://www.energy-business-review.com/article_news.asp?guid=0893CF54-6EFB-40CF-B7FC-252CB0EEFBBA (21-07-08).

[32] Vestas, Vestas receives order for 66 MW in Italy, 18 June 2008, http://www.vestas.com/files//Filer/EN/Investor/Company_announcements/2008/080618-MFKUK-31.pdf (13-08-08)

[33] This money is invested in the Fafe Extension, and in a wind farm in Mourisca that has already brought into use.

[34] Electrabel, "Electrabel, Suez Group, buys two new wind farms in Portugal", 14 November 2007, http://hugin.info/133965/R/1168329/229544.pdf (21-07-08).

						(completed)

Based on: Electrabel[36]

Table 6 lists Electrabel's investments that are either still awaiting permission or have merely been announced as plans.

Table 6: Electrabel's announced plans for investment in new capacity

Project name	Location	Fuel Type	Date in operation	Amount (€)	Output Capacity (MW)	Project Status
Power Plant Rotterdam	Rotterdam (NL)	Coal (and Biomass)	Mid 2012	Unknown	800	Awaiting permission
Power Plant Romania	Constanta (RO)	Coal (and Biomass)	Unknown	2.4 billion	1,600	Planning phase[37]
Power Plant Poland	Gdansk (PO)	Coal (and Biomass)	End 2012	2 billion	1,600[38]	Planning phase
Power Plant Gelderland	Nijmegen (NL)	Coal and biomass	2010	Unknown	150[39]	Planning phase
Power Plant Brunsbüttel or Stade	Brunsbüttel (DE) / Stade (DE)[40]	Coal	2012	Unknown	800	Planning phase
Vado Ligure	Vado Ligure (IT)	Coal	Unknown	Unknown	230	Unknown
Dunamenti	Szazhalombatta (HU)	Natural gas (CCGT)	Unknown	170 million	400	Unknown
Power Plant Germany	Site to decide (DE)	Natural gas (CCGT)	Unknown	Unknown	850	Unknown
Morata de Tajuña	Morata de Tajuña (ES)	Natural gas (CCGT)	Unknown	500 million[41]	1343	Planning phase, permissions granted[42]
Gas and Steam Turbine Power Plant	Schwandorf/ Calbe/ Stassfurt (DE)	Natural gas (CHP)	Unknown	500 million	800[43]	Planning phase
Comined heat and power plant in Belgium	Site to decide (BE)	Natural gas (CHP)	Unknown	Unknown	100	Unknown
Belene	Belene (BG)	Nuclear	Unknown	Unknown	2,000	Awaiting

[35] Already in operation since the first half of 2008.
[36] Electrabel Activities Report 2007, p. 68.
[37] In cooperation with the Romanian company Comvex.
[38] Central Europe Energy Weekly, "Belgian energy company Electrabel plans to invest EUR 2.5 bln in Poland", 29 September 2007.
[39] This investment will increase the total capacity of the primarily coal-based power plant to 600MW, of which 150MW (25%) is planned to be biomass co-fired.
[40] Electrabel will choose one of these locations for the construction of the power plant.
[41] Electrabel Spain website, Our offer, Generation, "Morata", no date, http://www.electrabel.es/content/corporate/aboutelectrabel/morata_en.asp (21-07-08).
[42] Electrabel Spain Website, Our offer, Generation, Morata, http://www.electrabel.es/content/corporate/aboutelectrabel/morata_en.asp (13-08-08).
[43] Electrabel, "Electrabel prüft bau von gaskraftwerken in Deutschland", 23 January 2008, http://hugin.info/133965/R/1184911/237016.pdf (21-07-08).

						allocation[44]
Cernavoda-3 and -4 Candu	Cernavoda (RO)	Nuclear	2014-2015	2.3 billion	1,460	Awaiting allocation[45]
Wind Farm Poland	North of Poland (PO)	Wind	2012	0.5 billion	100	Unknown
Dour-Quiévrain	Dour-Quiévrain (BE)	Wind	Unknown	Unknown	4	Planning phase
E-40	Landen (BE)	Wind	Unknown	Unknown	50	Planning [46]
La Roche	La Roche (BE)	Wind	Unknown	Unknown	12	Unknown
Wind Farm Belgium	Site to decide (BE)	Wind	Unknown	Unknown	100	Unknown
Bollène	Bollène (FR)	Wind	Unknown	Unknown	9	Unknown
Wind Farm France	Site to decide (FR)	Wind	Unknown	Unknown	300	Unknown
Wind Farm Italy	Site to decide (IT)	Wind	Unknown	Unknown	50	Unknown
Compagnie du Vent	Unknown (FR)	Wind	Unknown	375 million[47]	2000	Planning phase
Wind Farm Generg	Portugal (PT)	Wind	Unknown	Unknown	240	Unknown
Industrial partners Flanders	Belgium (BE)	Solar	Unknown	Unknown	11	Unknown
Photovoltaic France	Site to decide (FR)	Solar	Unknown	Unknown	220	Unknown
Photovoltaic Portugal	Site to decide (PT)	Solar	Unknown	Unknown	26	Unknown
Hydroelectric power station France	Site to decide (FR)	Hydro	Unknown	Unknown	50	Unknown
Hydroelectric power station IT	Unknown (IT)	Hydro	Unknown	Unknown	10[48]	Unknown

Based on: Electrabel[49]

3.5 Demand-side initiatives

Demand-side initiatives undertaken by Electrabel Nederland include:

- Electrabel Nederland publishes energy use reduction tips on its website[50]

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[44] Electrabel is in competition with RWE for a 49% stake in the enterprise.
[45] http://www.roconsulboston.com/Pages/InfoPages/Businesspages/NuclearCrnvd3and4.html (13-08-08)
[46] Website Propere Stroom Werkt, http://www.properestroomwerkt.be/doel2.html (13-08-08)
[47] Electrabel, "Suez trekt de buidel voor uitbreidingen in de Zuid-Europese windenergiesector", 14 November 2007, http://mm.mailing-electrabel.nl/35/pages/website/archief.asp?type=ms&weeknummer=47&jaar=2007 (21-07-08).
[48] Ownership Tirreno Power (50% ElectrabelAcea).
[49] Electrabel Activities Report 2007, p. 68.
[50] Electrabel website, Zakelijk, Midzakelijk, Advies, "Bespaartips", no date, http://www.electrabel.nl/Zakelijk/Midzakelijk/Advies/Bespaartips.aspx (21-07-08).

- Electrabel Nederland advises its clients on energy saving possibilities. Electrabel Nederland charges costumers for this service.[51]
- Electrabel Nederland advices its clients on possibilities to lower the energy costs, amongst others by way of Energy Kronos. Electrabel Nederland charges costumers for this service.[52]
- Electrabel Nederland advices its clients on environmental permits and subsidies concerning energy. Electrabel Nederland charges costumers for this service.[53]

[51] Electrabel website, Zakelijk, Midzakelijk, Advies,"Energie- en kostenbesparing", no date, http://www.electrabel.nl/Zakelijk/Midzakelijk/Advies/Energie-en-kostenbesparing.aspx (22-07-08).
[52] Electrabel website, Zakelijk, Midzakelijk, Advies,"Verbruiksmonitor", no date, http://www.electrabel.nl/Zakelijk/Midzakelijk/Advies/Verbruiksmonitoring.aspx (22-07-08).
[53] Electrabel website, Zakelijk, Midzakelijk, Advies,"Milieuvergunningen en subsidies", no date, http://www.electrabel.nl/Zakelijk/Midzakelijk/Advies/Milieuvergunningen-en-subsidies.aspx (22-07-08).

4 Eneco

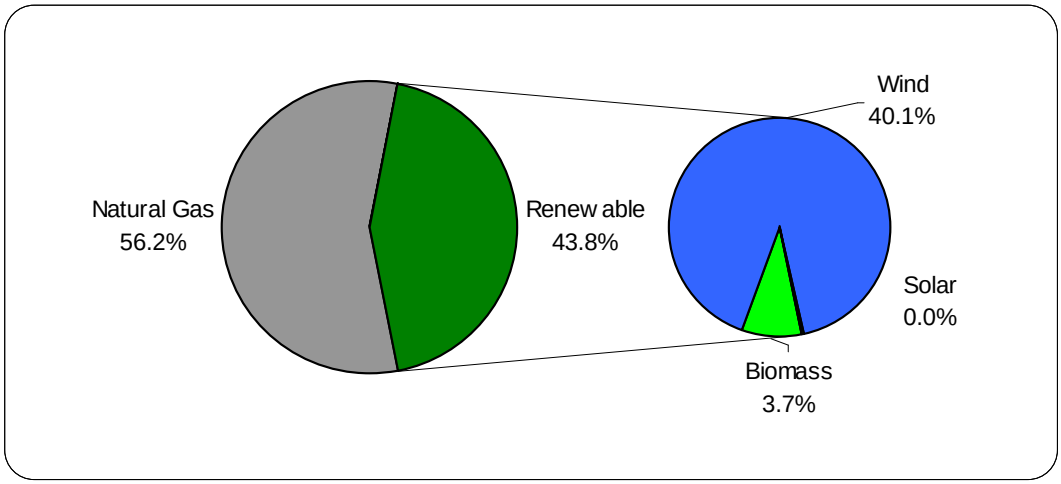
4.1 Basic company information

Eneco Holding N.V. is a non-listed public limited liability company with its official seat in Rotterdam. Through its wholly-owned subsidiary Eneco Nederland, the company supplies gas, electricity, and heat to retail and business customers throughout the Netherlands. Other activities revolve around the leasing of hot water and central heating and cooling systems, sustainable energy, public lighting, and traffic control systems. Along with Essent and Nuon, Eneco is one of the top three network operators in the Netherlands. Eneco's network operator Stedin serves approximately two million customers; Eneco also owns the electricity supplier Echte Energie and has a 30% stake in supplier Greenchoice.

4.2 Installed capacity for electricity generation in Europe

Eneco's two main sources of generation capacity are wind parks and natural gas plants. Eneco's total generation capacity cuurently amounts to 1,514MW. As shown in Figure 5, 43.8% of this capacity comes from renewable sources, mostly windparks.

Figure 5: Relative fuel mix of Eneco's generation capacity, 2007[54]



Based on: Eneco[55]

[54] It should be noted that these figures are partially based on exclusive contracts Eneco has, and partially on generation capacity actually owned by the company.

[55] Eneco Annual Report 2007

Table 7: Absolute fuel mix of Eneco's generation capacity

Fuel type	Capacity (MW)
Wind	607
Biomass	55.30
Solar	1.3
Natural gas (CHP)	850
Total	1,513.6

According to Eneco's annual report, in the future the company will source parts of its biomass supply from outside of Europe. Here, the company applies the so-called Cramer-criteria, which sets several requirements for sustainable biomass.[56] Its wind capacity is generated both from large off-shore wind parks, such as the Q7 park, and several smaller on-shore parks. The natural gas capacity comes from its exclusive contract with the Rijnmond Energie Centrale.

4.3 Electricity supplied in the Netherlands

As shown in Figure 6, the fuel mix of electricity supplied by Eneco is clearly less sustainable than that of its generation capacity. This is due to the fact that Eneco supplies much more electricity than it generates. The electricity that that is not generated by the company itself is bought through its Trading business unit.

Figure 6: Fuel mix of electricity supplied by Eneco, 2007

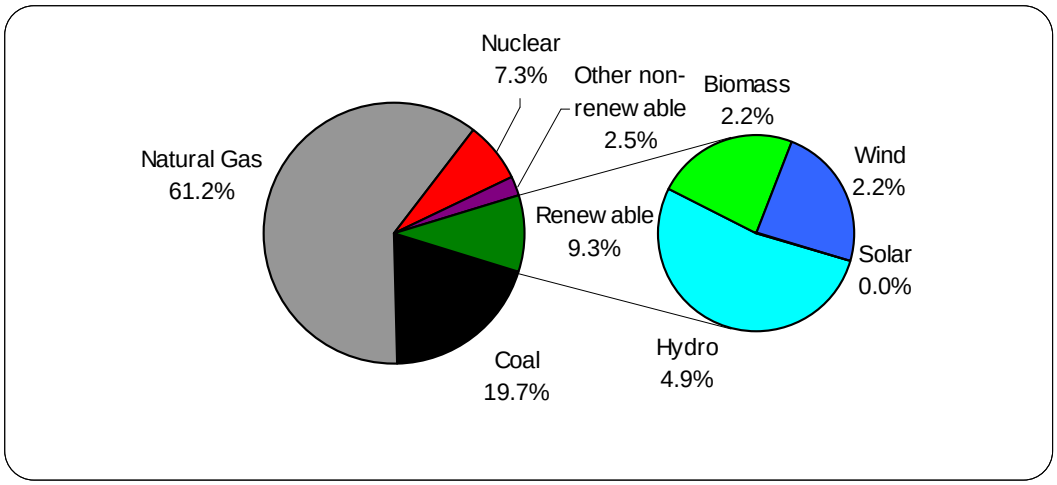


Table 8 presents the CO_2 emissions and radioactive waste production resulting from the generation of the electricity that Eneco supplies in the Netherlands.

[56] Idem, p.18. For more information on the Cramer criteria, see http://www.senternovem.nl/mmfiles/412293MEZ%20biomassa%20EN_tcm24-198026.pdf (02-09-08).

Table 8: Emissions and waste resulting from Eneco's electricity supply, 2007

Indicator	Amount
CO_2 (g/kWh)	419
Radioactive waste (µg/kWh)	200

Based on: Eneco Annual Report 2007

4.4 Announced investments in new generation capacity in Europe

Table 9 indicates all projects that are currently under construction. Eneco has announced that it is planning to invest a total of €5 billion in new gas and renewable capacity in the coming five years.[57] The Q7 wind park and the wind park in the municipality of Tholen are also featured in this section, although they are already in operation. This is because they were still under construction when Eneco's annual report was released. Both the EnecoGEN and the PerGEN plants will have combined heat and power (CHP) facilities.

Table 9: Eneco's announced investments in new production capacity

Project name	Location	Fuel Type	Date in operation	Amount (€)	Output Capacity (MW)	Project status
Q7 Offshore park	IJmuiden (NL)	Wind	2008	383 million (jointly)	120	In operation
Wind turbines Tholen	Tholen (NL)	Wind	2008	12.5 million[58]	15	In operation
EnecoGEN	Rotterdam Rijnmondgebied (NL)	Natural gas (CHP)	2008/2009	750 million[59]	840	Under construction
PerGEN (exclusive contract)	Rotterdam (NL)	Natural gas (CHP)	2010	200 million (jointly)[60]	250 (pro-rata)	Under construction

Eneco has expressed its intent to increase the share of renewable energy it supplies by investing in new renewable capacity. The company aims to supply 20% renewable energy by 2012, and 70% by 2020.[61]

[57] "Ruim baan voor groene stroom", Het Financieele Dagblad, 11 juli 2008.
[58] 5 windmills costing 2.5 million each. "Provincie zet sein op groen ", BN/DeStem, April 12, 2005.
[59] "Ruim baan voor groene stroom", Het Financieele Dagblad, 11 juli 2008.
[60] The investment itself is made by Air Liquide and Shell. Eneco will be allotted with 250 MW. It is unclear what investment Eneco has made. Mourik Magazine, 37, no date, http://www.mourik.com/pdf/brochure/nl/Magazine_37_Ned.pdf (24-07-08) p.5.
[61] "Eneco: Groene ambities zwarte cijfers", FEM Business, 10 mei 2008.

Table 10: Eneco's announced plans for investment in new capacity

Project name	Location	Fuel Type	Date in operation	Amount (€)	Output Capacity (MW)	Project status
Blue Energy	Afsluitdijk (NL)	Osmosis	After 2010	N/A	200	Planning phase
Various plant in The Netherlands and Belgium	Netherlands (NL) and Belgium (BE)	Biogas	N/A	N/A	3-6	Planning phase
Tidal wave turbine	Borssele (NL)[62]	Hydro	2008	1 million (jointly)	N/A	Planning phase
Tweede Maasvlakte (NL)[63]	Maasvlakte (NL)	Wind	>2013	>100 million	N/A	Planning phase
Offshore windpark	Undisclosed location Belgium (BE)	Wind	N/A	1.5 billion	420-630	Awaiting permission

Based on: Eneco Annual Report 2007

4.5 Demand-side initiatives

Eneco's demand-side initiatives include:

- Eneco has developed a technology for micro combined heat and power (CHP) plants to be used by individual consumers to generate and use their own electricity.[64]
- Eneco provides various services to stimulate consumption reduction by consumers. These include pre-paid meters, advice services, corporate CO_2 analyses, public awareness campaigns and various other schemes.[65]

[62] "Getijdenturbine aan Total-steiger ", Provinciale Zeeuwse Courant, July 14, 2008.
[63] "Groot windpark op nieuwe Maasvlakte", FEM Business, 10 mei 2008.
[64] Eneco Annual Report 2007, p.21.
[65] Idem. p.21-24

5 E.ON

5.1 Basic company information

E.ON is one of the two largest power companies in Germany. It is active throughout Europe, in Russia and the United States. Through E.ON Benelux, the company is active in the generation and supply markets of the Netherlands. The focus of this profile is on E.ON's activities in mainland Europe, the UK and Scandinavia.

E.ON has six business units active in Europe. E.ON Energie, of which E.ON Benelux is a subsidiary, is active in generation and supply in the Central European market. E.ON UK and E.ON Nordic have similar activities in their respective regions. E.ON Spain has recently been established, after the takeover of Viesgo and other Spanish power companies from Endesa in June 2008. Until recently, E.ON Italy was only active in electricity supply, but the deal with Endesa gave the company control over a large generation portfolio in Italy. E.ON Climate and Renewables, established in May 2007, is the business unit dealing with the company's activities in renewable energy sources.

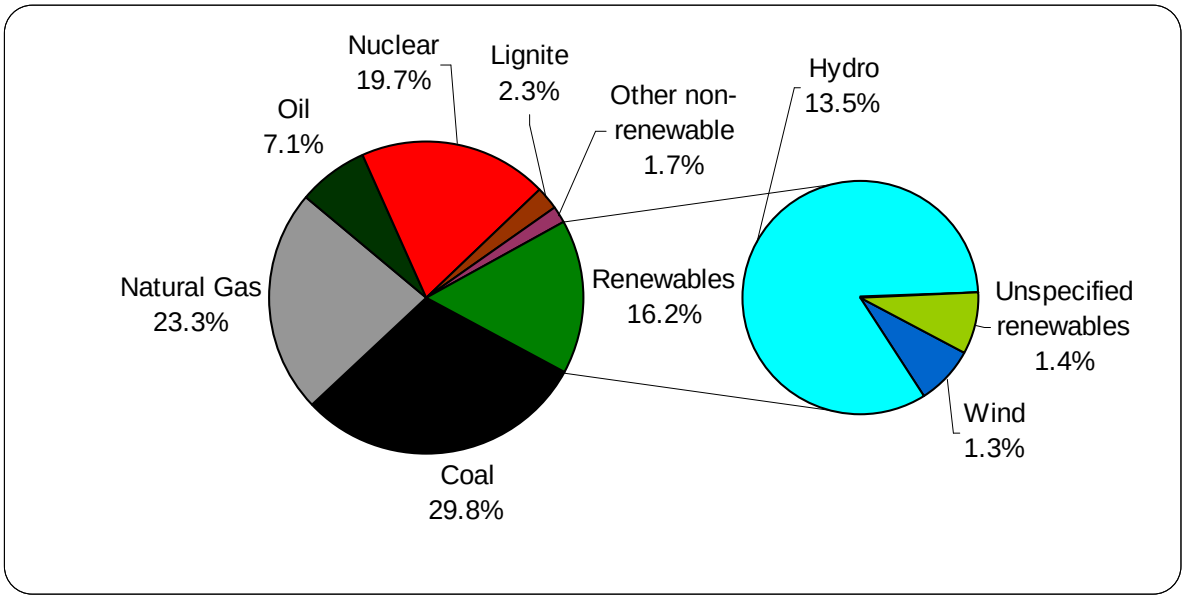
Other business units of E.ON include E.ON Russia, E.ON U.S., E.ON Energy Trading and E.ON Ruhrgas.

5.2 Installed capacity for electricity generation in Europe

Figure 7 reveals the fuel mix of E.ON electricity generation capacity in Europe in 2008. E.ON has generation capacity in Germany, the Netherlands, Belgium, Hungary, Slovakia, UK, Italy, Spain and Sweden. E.ON's total generation capacity in Europe is approximately 56,000 MW.[66] 16% of its generation capacity comes from renewable sources, primarily from large hydro-plants in Germany, Scandinavia and Italy.

[66] This figure is calculated by adding up the available figures for E.ON Energie, E.ON UK, E.ON Nordic, E.ON Italy, E.ON Spain and E.ON Climate and Renewables. No consolidated figures for all of the company's European activities were available. The figures include the generation capacity acquired by E.ON during the recent (June 2008) takeover deal with Endesa.

Figure 7: Fuel mix of E.ON's installed electricity generation capacity, 2008



Based on: E.ON[67]

Table 11 shows the absolute generation figures per fuel type for each of the business units active in Europe.

Table 11: E.ON's generation capacity (MW) in Europe per business unit and fuel type, 2008[68]

	Central Europe	UK	Nordic	Spain	Climate and renewables[69]	Italy[70]	Total
Nuclear	8,548	-	2,600	-	-	-	11,148
Coal	8,532	4,910	-	1,432	-	2,016	16,890
Lignite	1,315	-	-	-	-	-	1,315
Natural gas	5,258	3,865	130	410	-	3,540	13,203
Oil	1,145	1,300	1,551	-	-	-	3,996
Other	412	255	299	-	-	-	966
Wind	-	201	51	-	-	484	736
Hydro	3,153	50	2,754	668	-	1,014	7,639
Unspecified renewables	-	-	-	-	767	-	767
Total	28,363	10,581	7,385	2,510	767	7,054	56,660

[67] E.ON Strategy & Key Figures 2008, http://www.eon.com/en/downloads/EON_Strategy_Key_Figures_2008.pdf (03-09-08).

[68] Idem. It should be noted that the figures used here are based on calculations from the generation assets as listed in E.ON's Strategy & Key Figures document. Total might not correspond to overall figures given by E.ON elsewhere.

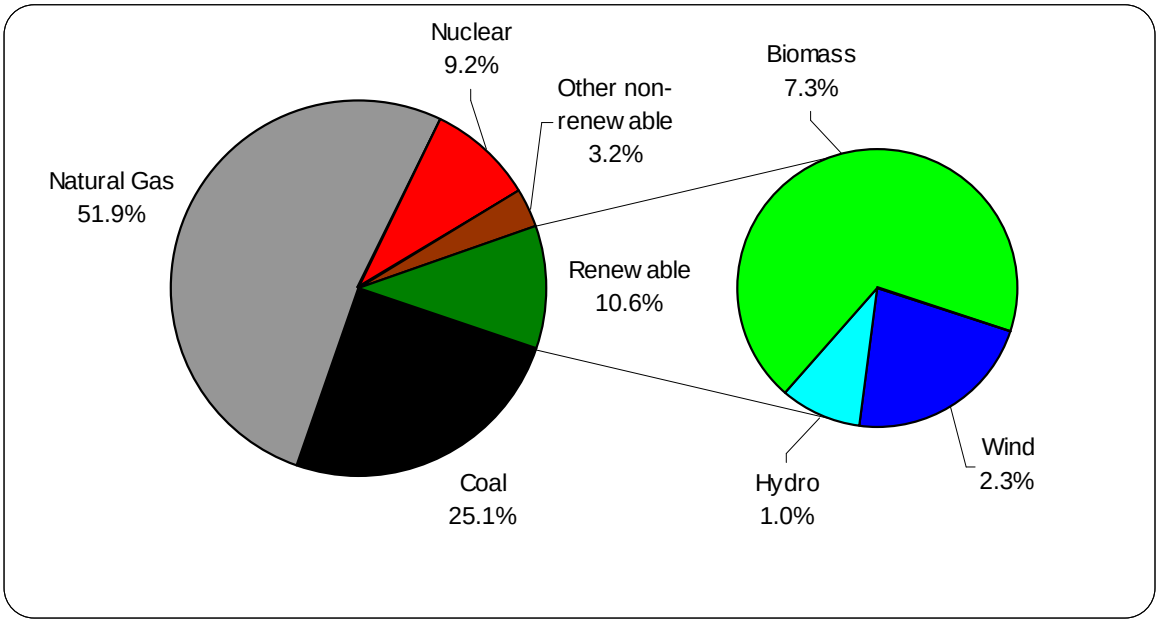
[69] These figures only include the capacity in Europe; US capacity from this business unit is excluded.

[70] These figures consist of the total capacity of the plants taken over by E.ON from Endesa. No information was found on the pro-rata capacity for E.ON, but such figures are likely to be lower than the ones given here.

5.3 Electricity supplied in the Benelux region

Figure 8 shows the fuel mix of energy supplied by E.ON Benelux in the Netherlands, Belgium and Luxemburg.[71] Table 12 presents the CO_2 emissions and radioactive waste production resulting from the generation of the electricity that E.ON supplies in the Benelux region.

Figure 8: Fuel mix of electricity supplied by E.ON Benelux, 2007



Based on: E.ON Benelux stroometiket

Table 12: Emissions and waste resulting from E.ON Benelux's electricity supply, 2007

Indicator	Amount
CO_2 (g/kWh)	438.1
Radioactive waste (µg/kWh)	277

Based on: E.ON Benelux stroometiket

5.4 Announced investments in new generation capacity in Europe

E.ON is expanding its generation capacity throughout Europe, mostly through the construction of new coal and natural gas plants and the updating of existing facilities. Four coal plants of similar size, and with a similar investment from E.ON, are currently under construction in Germany, Belgium and The Netherlands. E.ON Energie is also investing in several natural gas plants in Germany, Hungary, Slovakia and Italy. Investments by other E.ON business units in Europe include two more natural gas plants in the UK and Sweden, and a large off-shore wind park in the UK.

[71] It should be noted that the figures for electricity supplied are for E.ON Benelux, as E.ON does not release any figures on supply only in the Netherlands. This means that these figures are the consolidated figures of supply throughout the Benelux countries, not just the Netherlands as is the case with the other companies in this fact sheet series. It is likely, however, that the company's supply in the Netherlands is similar in fuel mix to its consolidated Benelux supply.

Table 13: E.ON's current investments in new production capacity

Business unit	Location	Fuel Type	Date in operation	Amount (€)	Output Capacity (MW)	Project status
E.ON Energie	Datteln (DE)	Coal	2011	1.2 billion	1,100	Under construction
E.ON Energie	Rotterdam (NL)	Coal	2012	1.2 billion	1,100	Under construction
E.ON Energie	Großkrotzenburg (DE)	Coal	2013	1.2 billion[72]	1,100	Under construction
E.ON Energie	Antwerp (BE)	Coal	2014	1.2 billion	1,100	Under construction
E.ON Energie	Irsching (DE)	Natural gas (CCGT)	2011	N/A	530	Under construction
E.ON Energie	Irsching (DE)	Natural gas (CCGT)	2009	450 million[73]	845	Under construction
E.ON Energie	Gönyü (HU)	Natural gas (CCGT)	2010	400 million	430	Under construction
E.ON Energie	Malzenice (SK)	Natural gas (CCGT)	2010	400 million	420	Under construction
E.ON Italy	Livorno Ferraris (IT)	Natural gas (CCGT)	2008	400 million	800	Under construction
E.ON UK	Isle of Grain (UK)	Natural gas (CCGT)	2010	615 million (app.)	1,275	Under construction
E.ON Nordic	Malmö (SE)	Natural gas (CCGT)	2008/2009	326 million	440	Under Construction
E.ON Spain	Bahia de Algeciras (ES)	Natural gas (CCGT)	2010	N/A	819	Under construction
E.ON Climate & Renewables	Robin Rigg (UK)	Wind	2009	400 million (app.)	180	Under Construction
E.ON Climate & Renewables	Alpha Ventus (DE)	Wind	Summer 2009	N/A	60	Under construction
E.ON Climate & Renewables	Various locations (ES and PT)	Wind	N/A	N/A	135	Under construction

Based on: Annual reports, E.ON websites[74], news reports

Table 13 shows all announced investments not yet underway. These include more coal and natural gas plants, as well as E.ON's minority stake in Fennovoima, a company that is developing nuclear capacity in Finland. In addition, E.ON has announced that it will invest a total of €6 billion in renewable

[72] In joint venture with the municipality of Hannover

[73] Power-technology website, Projects, "Irsching Siemens Gas Turbine, Germany", no date, http://www.power-technology.com/projects/irsching/ (02-09-08).

[74] E.ON websites, <www.eon-kraftwerke.com> (18-07-2008); www.eon-eromuvek.com (01-09-08), www.eon-elektrarne.com (01-09-08), http://www.eon-uk.com/generation/grainCHP.aspx (01-09-08), http://pressreleases.eon-uk.com/blogs/eonukpressreleases/archive/2007/12/18/1159.aspx (01-09-08), http://www.eon.se/templates/PressPage.aspx?id=73882 (01-09-08).

capacity by 2010.[75] However, no further details on projects or investments are given and therefore these plans are not included in Table 13 or the calculations in the thematic fact sheets.[76]

Table 14: E.ON's announced plans for investment in new capacity

Business unit	Location	Fuel Type	Date in operation	Amount (€)	Output Capacity (MW)	Project status
E.ON Energie	Stade (DE)	Coal	N/A	N/A	1,000	Planning phase
E.ON Energie	Willemshaven (DE)	Coal	N/A	1 billion	550	Planning phase
(various unknown projects)	Throughout the EU	Coal	After 2014	N/A	2,000	Planning phase
E.ON UK[77]	Kingsnorth (UK)	Coal	N/A	1 billion	1,600	Awaiting permission
E.ON Energie[78]	Kiel (Ostufer)	Coal	2015	N/A	800	Planning phase (unconfirmed)
(various unknown projects)	Throughout the EU	Natural gas (CCGT)	After 2011	N/A	3,200	Planning phase
E.ON UK	Drakelow, Derbyshire (UK)	Natural gas (CCGT)	2011	N/A	1,200	Permission given
E.ON Spain	Solvay (ES)	Natural gas (CCGT)	2011	N/A	400	Planning phase
E.ON Nordic	Fennovoima (FI)	Nuclear	2018-2020	N/A	1,500-2,500	Planning phase
E.ON UK	Blackburn Meadows (UK)	Biomass	2011	N/A	25	Awaiting permission
E.ON UK	Portbury Dock, Bristol (UK)	Biomass	2014	300 million	150	Planning phase
E.ON UK[79]	Humber Gateway (UK)	Wind	N/A	700 million	300	Planning phase
E.ON UK	Thames	Wind	N/A	N/A	1,000	Announced

[75] E.ON Sustainability Report 2007, p.24.

[76] On 9 September 2008, E.ON announced a framework agreement with Siemens in which E.ON's new Climate and Renewables Business Unit agreed to purchase 500 Siemens wind turbines with a total capacity of 1,150 MW for approximately €1.4 billion. E.ON claims that 550 MW of this new wind power will be installed in Europe, but the Siemens deal is only a framework agreement and E.ON has not yet announced any concrete plans or actually purchased any turbines, as specific orders will be placed later. Since no specific plans have been announced or specific monetary amounts spent, this potential investment is not taken up the fact sheets. For more details on the deal, see: http://www.eon.com/en/presse/news-show.do;jsessionid=D754ABC6493000296EA19DAC572BC516.2?id=8782&back=%2fen%2findex.jsp.

[77] This investment will replace existing facilities at Kingsnorth. For more information, see http://www.eon-uk.com/generation/supercritical.aspx (03-09-08).

[78] Planten website, "Positionspapier gegen das geplante Kohle-Großkraftwerk am Kieler Ostufer", 15-10-07, http://www.planten.de/2007/10/15/positionspapier-gegen-das-geplante-kohle-grosskraftwerk-am-kieler-ostufer/ (08-09-08). No information about these plans was found in any E.ON websites or documents.

[79] All information for the on-shore wind parks comes from the E.ON UK website, but it is possible that these projects fall under the E.ON Climate & Renewables business unit.

	estuary: London Array, (UK)					
E.ON UK	Scarweather Sands (UK)	Wind	N/A	N/A	100	Announced
E.ON UK	Aire and Calder (UK)	Wind	N/A	N/A	45	Planning phase
E.ON UK	Afton (UK)	Wind	N/A	N/A	74	Planning phase
E.ON UK	Auchencorth (UK)	Wind	N/A	N/A	45	Planning phase
E.ON UK	Blackstone edge (UK)	Wind	N/A	N/A	6.9	Awaiting permission
E.ON UK	Butterwick Moor (UK)	Wind	N/A	N/A	30	Planning phase
E.ON UK	Camster (UK)	Wind	N/A	N/A	50	Awaiting permission
E.ON UK	Chiplow (UK)	Wind	N/A	N/A	10	Planning phase
E.ON UK	Corriemoillie (UK)	Wind	N/A	N/A	45	Planning phase
E.ON UK	Denshaw Moor (UK)	Wind	N/A	N/A	17.5	Awaiting permission
E.ON UK	Dungavel (UK)	Wind	N/A	N/A	32.2	Planning phase
E.ON UK	Ferndale (UK)	Wind	N/A	N/A	10.4	Planning phase
E.ON UK	Haswell Moor (UK)	Wind	N/A	N/A	12.5	Planning phase
E.ON UK	Kelmarsh (UK)	Wind	N/A	N/A	17.5	Planning phase
E.ON UK	Lamonby (UK)	Wind	N/A	N/A	12.5	Planning phase
E.ON UK	Rosehall (UK)	Wind	N/A	N/A	22	Planning phase
E.ON UK	Tedder Hill (UK)	Wind	N/A	N/A	6.9	Planning phase
E.ON UK	Tweenbridge (UK)	Wind	N/A	N/A	66	Awaiting permission
E.ON Spain	Various locations (ES and PT)	Wind	N/A	N/A	439	Planning phase
E.ON Climate & Renewables	Rödsand (DK)	Wind	2011	400 million	207	Planning phase

Based on: E.ON[80]

[80] E.ON Annual Report 2007, E.ON Kraftwerke website (www.eon-kraftwerke.com), Fennovoima website (www.fennovoima.fi/en), E.ON UK website, http://www.eon-uk.com/generation/planning.aspx (03-09-08).

5.5 Demand-side initiatives

E.ON Benelux's demand-side initiatives include:

- E.ON Benelux owns Q-ENERGY, an energy advisory company that develops energy labels for homes. Costumers can request a calculation of the energy efficiency of their homes, including the quality of their roofs, floors, windows, etc.[81] Q-ENERGY also provides "energy performance advice", giving advice on investments for energy reductions.
- E.ON Benelux publishes a number of energy use reduction tips on its website.[82]

[81] E.On Benelux website, Over energie, "Energielabel", no date, <http://www.eon-benelux.com/eonwww/publishing.nsf/Content/Energielabel> (18-07-08).

[82] E.On Benelux website, Over energie, "Handige besparingstips", no date, <http://www.eon-benelux.com/eonwww/publishing.nsf/Content/Handige_besparingstips> (18-07-08).

6 Essent

6.1 Basic company information

Essent is a Dutch energy company that supplies electricity, gas and heat to households and business clients. Essent arose from a merger between PNEM/Mega Groep and the Edon Groep in 1999. The company considers the Netherlands as its home market, but has also built up a considerable market position in Germany, and is increasingly active in Belgium. Essent supplies energy to some 2.6 million clients and gas to around two million clients in the Netherlands. In terms of turnover, Essent is market leader in the Dutch energy market. In addition, Essent is the biggest producer of green power and has the most green power clients in the Netherlands.

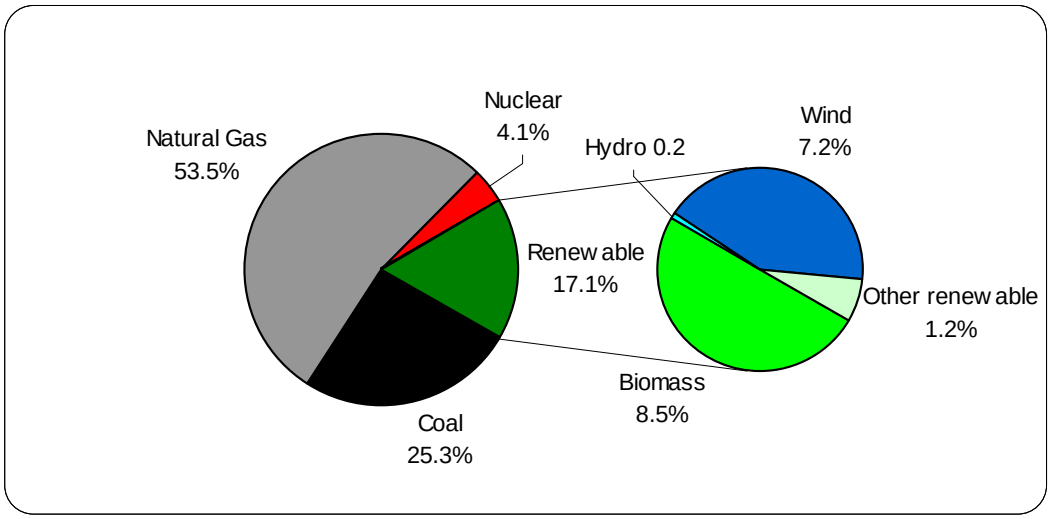
6.2 Installed capacity for electricity generation in Europe

Figure 9 reveals the fuel mix of Essent's electricity generation capacity in 2007. Essent's European generating capacity totalled approximately 6,000 MW in 2007.[83]

The majority of the biomass used by Essent is co-generated in the two big power stations for coal and natural gas, the Amercentrale, which has the capacity to produce 295 MW of electricity from biomass, and the Clauscentrale, which has a biomass capacity of 184 MW. The biomass-only plant in Cuijk has a generating capacity of 25 MW. The biomass combusted in these plants is primarily produced from wood pellets and other types of wood (Amercentrale), with a smaller amount from bio-oil (Clauscentrale) and from agricultural residues such as cacao bean pods (Amercentrale).
Essent has a natural gas capacity of 1,280 MW at the Clauscentrale, 184 MW of this 1280 MW can be used for biomass co-firing subject to the availability of 100% sustainable certified liquid bio fuels (f.e. palm oil residues). The majority of the remaining gas capacity is installed in several large and small-scale combined heat and power plants. With a capacity of high efficient combined heat and power of 1600 MW Essent is one of the biggest users of this technique in the Netherlands.
Essent generates wind energy with turbines in the Netherlands and Germany, and its hydroelectricity is produced at two small-scale hydroelectric power stations located in the Maas (11.5 MW) and in the Vecht (0.1 MW).

[83] Essent Annual Report 2007, p. 53.

Figure 9: Fuel mix of Essent's installed electricity generation capacity, 2007

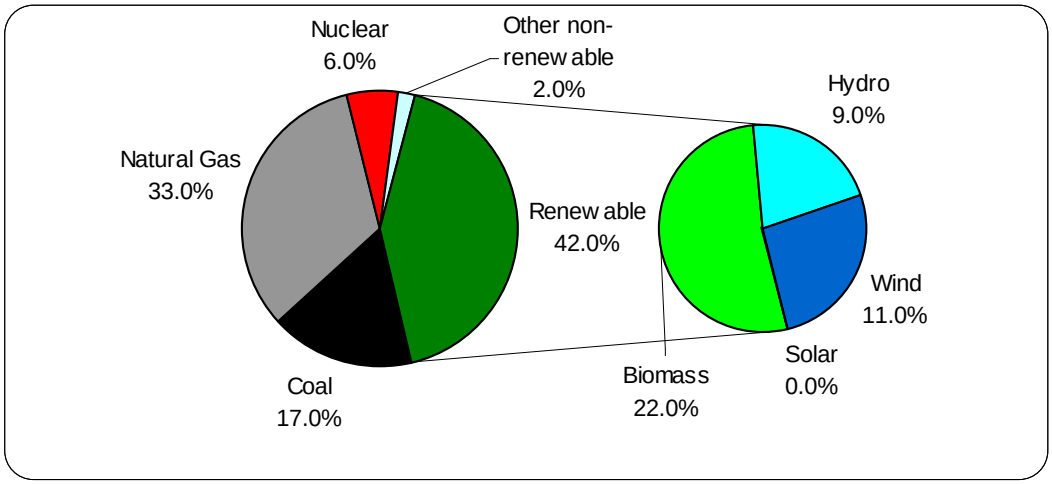


Based on: Essent[84]

6.3 Electricity supplied in the Netherlands

Figure 10 reveals the fuel mix of energy supplied by Essent in the Netherlands, and Table 15 presents the CO_2 emissions and radioactive waste production resulting from the generation of the electricity that Essent supplies in the Netherlands. Essent guarantees that the 'Groene Stroom' it supplies is solely generated from the sustainable energy sources wind, small scale hydro power, landfill gas and clean biomass, which is defined by Essent as biomass produced out of prunings from forests and public gardens, untreated rest wood from the wood processing industry, and 100% sustainable bio-oil (palm oil residues).

Figure 10: Fuel mix of electricity supplied by Essent, 2007



Based on: Essent stroometiket Retail 2007

[84] CSR Report Essent 2006, p. 50 & CSR report Essent 2007, p. 26 t/m 29 & Annual Report Essent 2007, p. 55.

Table 15: Emissions and waste resulting from Essent's electricity supply, 2007

Indicator	Amount
CO_2 (g/kWh)	284
Radioactive waste (µg/kWh)	180

Based on: Essent stroometiket 2007

6.4 Announced investments in new generation capacity in Europe

Essent's aim is to become one of the top five energy companies in Northwest Europe in terms of customer satisfaction and financial performance. Essent wants to reach this aim by growing its electricity generation capacity in the Netherlands, Belgium and Germany.
Table 16 reveals Essent's investments currently under construction. The Westereems wind project, to date the largest onshore wind project in operation in the Netherlands, has just been completed and the first wind turbines have begun to produce electricity.[85]

Table 16: Essent's announced investments in new production capacity

Project name	Location	Fuel Type	Date in operation	Amount (€)	Output Capacity (MW)	Project Status
Wind Turbines Westereems	Groningen (NL)	Wind	Early 2009	Unknown	156	Under construction[86]
Waste-to-energy plant	Bremen (DE)	Biomass	2009	112 million	27.5	Under construction[87]

Based on: Essent Annual Report 2007

Table 17 shows all the investment plans that Essent has announced or that have appeared in newspaper reports, but for which construction has not been initiated yet.

As is revealed in Tables 2 and 3, the investments of Essent are mainly focused on the expansion of gas and wind energy. Essent had also planned to construct a coal-fired power plant in Geertruidenberg, to be named Amer 10. However, the company decided to put the development of this unit on hold for the moment because of bad prospects concerning the assignment of CO_2 emissions rights and the uncertainty around subsidies for biomass.[88]

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[85] Essent, Eerste windturbines westereems leveren stroom, 24 July 2008, http://www.essent.nl/content/overessent/actueel/nieuwsberichten/eerste_windturbines_westereems_leveren_stroom.jsp (19-08-08).

[86] Essent website, Contact, Bouwprojecten, "Windpark Westereems", no date, http://www.essent.nl/content/overessent/contactmetessent/bouwprojecten/windpark_westereems/index.jsp (25-07-08).

[87] Investering door swb AG, Essent has a 51% share in this company.

[88] Hoog en laag, "Essent stopt met bouw kolencentrale", 29 May 2008, http://www.hoogenlaag.nl/page/Quick-menu/Plaatsnamen/Arnhem/Essent-stopt-met-bouw-kolencentrale.220266.news (28-07-08).

Table 17: Essent's announced plans for investment in new capacity

Project name	Location	Fuel Type	Date in operation	Amount (€)	Output Capacity (MW)	Status
Feasibility study IGCC & CCS[89]	Unknown	Coal	Unknown	Unknown	Unknown	Feasibility study
Amer 8	Geertruidenberg (NL)	Coal/ Biomass	Unknown	Unknown	Unknown	Life Extension Research
Moerdijk station	Moerdijk (NL)	Natural Gas (CCGT)	End-2011	0.5 billion[90]	400	Planning phase[91]
Claus station	Maasbracht (NL)	Natural Gas	Mid-2012	1 billion[92]	640	Planning phase[93]
Amer 9	Geertuidenberg (NL)	Natural Gas[94]	Unknown	Unknown	Unknown	Planning phase[95]
Wind expansion Europe	Europe	Wind	Unknown	Unknown	Unknown	Planning phase[96]

Based on: Essent Annual Report 2007

6.5 Demand-side initiatives

Essent's demand-side initiatives include:

- Essent offers its clients prepaid energy. Clients buy energy credit and can upload this credit by phone or text message. This gives clients the possibility to become more aware of their energy consumption.
- Essent compensates clients for energy that they produce themselves. Clients that have solar panels or a wind turbine and produce more energy than they consume receive compensation for the energy that flows back into the electricity grid.
- Essent offers 'Groen voor Gas', which means that for two cents extra per cubic meter of gas, Essent compensates the CO_2 emissions of clients' gas consumption by investing in two types of projects; projects that compensate CO2 that has already been emitted (f.e. planting trees), and projects that reduce CO2 emissions and meet the criteria of the Gold Standard Voluntary Emission Rights, an initiative of the WWF. At present, 80% of the compensation is done by Gold Standard projects. Essent aims to increase this percentage to 100%.[97]

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89 Coal gasification installation with an IGCC in combination with a CCS to capture and store carbon dioxide.
90 ANP, "Essent investeert 1.5 miljard euro in gas", 28 May2008.
91 Essent, "Essent investeert in gas en wind", 28 May 2008, http://www.essent.nl/content/overessent/actueel/persberichten/essent_investeert_in_gas_en_wind.jsp (28-07-08).
92 ANP, "Essent investeert 1.5 miljard euro in gas", 28 May 2008.
93 Essent, "Essent sluit contract met Alstom", 13 June 2008, http://www.essent.nl/content/overessent/actueel/persberichten/essent_sluit_contract_met_alstom.jsp (28-07-08).
94 The installation of a gas turbine.
95 Essent Annual Report 2007, p. 55.
96 ANP, "Essent investeert 1.5 miljard euro in gas", 28 May2008.
97 Essent Website, Thuis, Producten, Gas, Groen voor gas, "Wat is groen voor gas?", no date, http://www.essent.nl/content/thuis/producten/overzicht_gas/groen_gas/hoewerkthet.jsp (02-09-08).

- Essent offers high efficiency boilers. Clients can rent, lease or buy them. At this moment clients can receive €125 trade-in discount when they replace their boiler for a high efficiency boiler. In addition, Essent offers its clients this summer a ‘saving package’ when they choose a boiler maintenance contract. The saving package contains products that help clients to lower their energy consumption, like a low-energy light bulb, a weather strip, etc.
- Essent advises its clients about energy labels and provides official labels.
- Essent offers solar panels and boilers to its clients including advice and installation.

7 Greenchoice

7.1 Basic company information

Greenchoice is a Dutch supplier of renewable energy and gas and is a non-listed private company, based in Rotterdam.[98] The company was established in 2001 when the Dutch energy market was liberalised. Greenchoice supplies renewable energy and gas to household consumers and small businesses and currently services approximately 200,000 customers. In 2006, Greenchoice and Eneco initiated a joint venture called Greenlab. As part of this joint venture, Eneco took a strategic 30% stake in Greenchoice in early 2007.[99]

7.2 Installed capacity for electricity generation in Europe

Greenchoice is primarily a supplier of electricity, and its long-term strategy is to continue purchasing enough electricity generated at small-scale renewable units to supply its customers. The company has not traditionally generated any electricity itself. However, Greenchoice has recently purchased a 20% stake in a small-scale hydro plant in Germany.[100] In addition, the company has formed Greenlab, a joint venture with Eneco. Greenlab's purpose is to stimulate innovations for, and focus on the market of "*small scale and decentralized renewable energy solutions"*.[101]

7.3 Electricity supplied in the Netherlands

Greenchoice is the only supply company in the Netherlands that supplies electricity generated solely from renewable sources. Figure 11 shows the fuel mix of the energy supplied by Greenchoice. The biomass used in the supply is generated from starch and wood products, as well as natural fertilizers, corn and grass.[102] Most of this bio energy is sourced from farms and cooperatives, as well as university institutions.[103]

The hydroelectricity supplied by Greenchoice is generated both in run-of-the-river turbines and hydroelectric dams, but the company does not give any details on what percentage of its hydroelectricity comes from each generation method. Greenchoice has started a cooperation with the Hooydonkse Watermolen in a small-scale hydroelectric facility that Greenchoice claims is both environmentally and animal friendly.[104]

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[98] Greenchoice website, www.greenchoice.nl (21-08-08).

[99] "ENECO Energie en Greenchoice gaan samenwerken om meer groene energie te realiseren", Gezamenlijk persbericht ENECO Energie en Greenchoice, 06-1106, http://www.greenchoice.nl/Documents/Pers/20061106_Greenlab.pdf (25-07-08).

[100] M. Rexwinkel, Financial Director, Greenchoice, email to J. Wilde-Ramsing, 20-08-08.

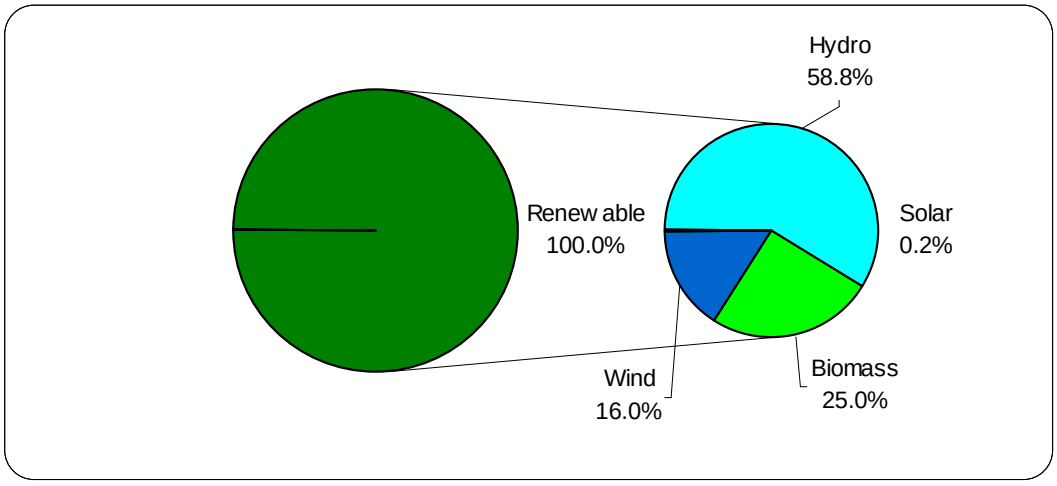
[101] "ENECO Energie en Greenchoice gaan samenwerken om meer groene energie te realiseren", Gezamenlijk persbericht ENECO Energie en Greenchoice, 06-11-06, http://www.greenchoice.nl/Documents/Pers/20061106_Greenlab.pdf (25-07-08).

[102] Greenchoice website, "Biomassa", no date, http://www.greenchoice.nl/Energiebronnen/Biomassa.aspx (25-07-08).

[103] "Biogasinstallatie Sterksel draait goed", Agrarisch Dagblad, 07 May 2008; "De Windvogel levert stroom aan Greenchoice", AD/Groene Hart, 20 September 2007 & "Bijna verdrievoudiging van energieproductie", Boerderij, October 16, 2007.

[104] "Nieuwe waterkrachtcentrale in de Dommel", Greenchoice press release, 02-10-06, http://www.greenchoice.nl/Documents/Pers/20061002_waterkrachtcentrale.pdf (26-07-08).

Figure 11: Fuel mix of electricity supplied by Greenchoice, 2007



Based on: Greenchoice

Table 18 shows the CO_2 emissions and radioactive waste production Greenchoice is accountable for based on the electricity it supplies. As the company only provides renewable electricity, it does not emit any CO_2, nor does it produce any radioactive waste.

Table 18: Emissions and waste resulting from Greenchoice's electricity supply, 2007

Indicator	Amount
CO_2 (g/kWh)	0
Radioactive waste (µg/kWh)	0

Based on: Greenchoice Annual Report 2007

7.4 Announced investments in new generation capacity in Europe

Following its investment in a 20% stake in a small-scale hydroelectric facility in Germany, Greenchoice expects to further invest in similar electricity generation projects, but no details are available.[105]

7.5 Demand-side initiatives

Greenchoice offers a number of demand-side initiatives, including:

- Greenchoice offers the 'Bosspaarplan', through which customers can acquire pieces of the Amazon rainforest in Brazil in order to protect it from possible harm.[106]
- Greenchoice offers energy reduction tips through animations on its website.
- It has set up the website www.energielabelvergelijken.nl, where consumers can compare the costs of different certified energy label advisors.

[105] M. Rexwinkel, Financial Director, Greenchoice, email to J. Wilde-Ramsing, 20-08-08.
[106] Greenchoice website, "Bosspaarplan", no date , http://www.greenchoice.nl/Groene-Energie/BosSpaarplan.aspx, (25-07-08).

- Greenchoice offers Wonen++, a program to assist customers in reducing their energy use through advise and financial incentives to install energy reduction tools, such as solar boilers and floor insolation.
- Greenchoice assists customers who want to install solar panels in their homes and offers financial incentives to those customers by providing discounts on additional solar energy used. It also offers costumers the opportunity to resell any additional electricity they generate.
- Greenchoice offers its customers the possibility to generate their own energy by putting a wind turbine on their own property.

8 Nuon

8.1 Basic company information

Nuon is a non-listed public limited liability company incorporated in 1998 with its registered office in Amsterdam. The company is active throughout the electricity chain, with operations in the field of generation, trade, distribution and supply. In addition to being one of the largest energy distributors in the Netherlands, the company has interests in energy generation and supply projects in Germany and Belgium, and has trading activities with, among others, the UK and Scandinavia. Nuon provides electricity, natural gas, cooling and heat to over three million customers in the Netherlands, Belgium and Germany. The company also markets and trades wholesale energy, and it offers energy-related services, such as equipment installation. Nuon's major shareholders include the municipality of Amsterdam, and the provinces Gelderland, Noord-Holland and Friesland.

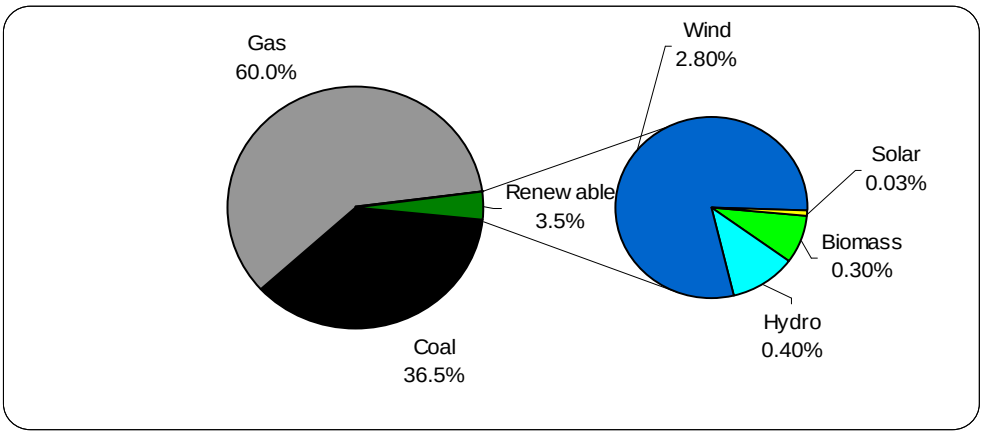
8.2 Installed capacity for electricity generation in Europe

While Nuon has several international operations, all its generation capacity is located in the Netherlands. Figure 12 shows the fuel mix of Nuon's generation capacity. Nuon makes the distinction between three different types of gaseous sources from which it produces electricity: 19.2% comes from blast furnace gases, generated at the Corus steel factory site, 25.1% from natural gas fired in combined heat and power plants, and the remaining 15.7% comes from natural gas fired in regular natural gas plants.[107]

In total, Nuon has a generation capacity of 4,108 MW. One-third of the wind capacity comes from the large offshore wind farm near Egmond aan Zee. The company also owns four small-scale hydroelectric plants, one in Maurik and one in Alphen with a capacity of 10 MW and 14 MW, respectively, and two smaller plants at Hagestein and Roermond.[108] The biomass capacity is accounted for by the biomass plant Lelystad and the co-generation of biomass and coal in the Willem-Alexander plant in Buggenum.[109]

[107] Nuon Annual Report 2007, p.35.
[108] Idem., p.47.
[109] Nuon website, Centrales "Willem-Alexander centrale te Buggenum, no date, http://www.nuon.com/nl/over-nuon/kernactiviteiten/opwekken-energie/centrales/buggenum.jsp (25-07-08).

Figure 12: Fuel mix of Nuon's generation capacity, 2007

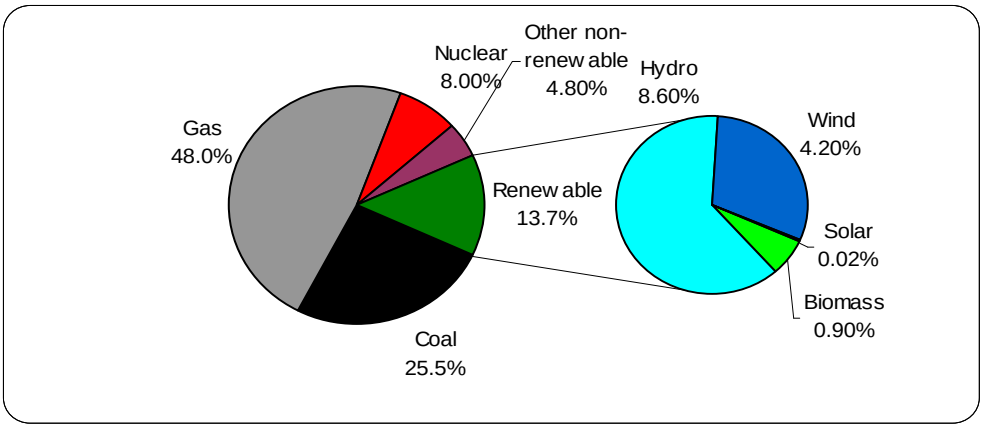


Based on: Nuon Annual Report 2007

8.3 Electricity supplied in the Netherlands

Figure 13 shows the fuel mix of electricity supplied by Nuon in the Netherlands. As the figure reveals, Nuon's supply mix is more sustainable than the mix for the electricity it generates itself. No information was found regarding the type of hydro power (large scale or small scale) that is supplied. Only for one renewable product the electricity is guaranteed from small-scale hydro, in addition to wind and solar energy.[110]

Figure 13: Fuel mix of supplied energy by Nuon Retail and Business, 2007



Based on: Nuon Stroometiket 2007

Table 19 presents the CO_2 emissions and radioactive waste production resulting from the generation of the electricity that Nuon supplies in the Netherlands.

[110] Nuon website, Maatschappellijk ondernemen, klanten, "Groene producten voor klanten", no date, http://www.nuon.com/nl/verslaggeving2007/maatschappelijk-ondernemen/klanten/groene-producten-voor-klanten.jsp (25-07-08).

Table 19: Emissions and waste resulting from Nuon's electricity supply, 2007

Indicator	Amount
CO_2 (g/kWh)	431.8[111]
Radioactive waste (µg/kWh)	240

Based on: Nuon Stroometiket 2007

8.4 Announced investments in new generation capacity in Europe

In July 2006, the construction plans for Nuon Magnum were announced. In September 2007, Nuon decided to invest in Nuon Magnum in two streams, starting with the natural gas stream and postponing the decision on the coal/gas/CCS stream with two years. Within the next two years, Nuon will decide whether it will continue with the coal gasification and biomass turbines, possibly with CO_2 capture facilities.

The company is also in the process of developing a wind farm near Antwerp, Belgium. Two wind turbines are already in operation, while an additional 38 are planned (total capacity of 90 MW).[112] Additionally, Nuon is entering a joint-venture with Electrawinds and C-Power Holdco to develop the biggest wind farm off the Belgian coast.[113]

Table 20: Nuon's announced investments in new production capacity

Project name	Location	Fuel Type	Date in operation	Amount (€)	Output Capacity (MW)	Project status
Nuon Magnum[114]	Eemshaven (NL)	Natural gas	2011	1.5 billion	1,300	Under construction
Wind farm Antwerpen	Antwerpen (BE)	Wind	2007 - unknown	100 million	78[115]	Various stages

Based on: Nuon Annual Report 2007

Table 21 shows all announced investments that are not yet underway. The construction of the CCGT in Frankfurt am Main is expected to start in 2008[116], while permission has just been granted for the construction of the CCGT plant near Charleroi, Belgium.[117]

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[111] The CO2 emissions have decreased by 12% in comparison with 2006. 6% of this decrease can be ascribed to a more renewable fuel mix. The other 6% is accounted by the different method of calculating the co2 emissions of Nuon's blast furnace gas plant. For more info see, http://www.nuon.com/nl/verslaggeving2007/maatschappelijk-ondernemen/klanten/groene-producten-voor-klanten.jsp.

[112] Nuon Belgium website, Duurzame Projecten, "De Antwerpse Haven", no date, http://www.nuon.be/nl/nuon/duurz_haven.html (28-07-08).

[113] "Joint Venture for largest offshore wind farm in Belgium", Nuon, 31 July 2008, http://www.nuon.com/press/press-releases/20080731/index.jsp (19-08-08).

[114] In July 2007, Nuon announced the suspension of the planned coal and biomass turbines at the Magnum plant. Nuon's plans currently are that the Magnum plant will consist of 3 gas turbines with a total generation capacity of 1,300 MW. After the first building phase, these gas turbines will be fuelled with natural gas. In the second phase an additional gasification plant will be built, in which coal and biomass can be gasified to form a so-called syn-gas. This syn-gas can be co-fired on the gas turbines (together with natural gas). Thus, when Magnum actually becomes multi-fuel (after phase 2), the existing gas turbines will not change and the total capacity will remain 1,300 MW; Nuon says that it is not possible to say which part of the capacity is used for which fuel (G. Beijen, Nuon, e-mail 03-09-2008). Thus, since the construction of the natural gas turbines is proceeding and the plans for coal and biomass are so vague, for the calculations in these fact sheets the entire 1,300 MW is considered to be natural gas.

[115] Expansion from 12MW existing capacity to 90MW after construction has finished.

Table 21: Nuon's announced plans for investment in new capacity

Project name	Location	Fuel Type	Date in operation	Amount (€)	Output Capacity (MW)	Project status
Gas plant Frankfurt	Frankfurt am Main (DE)	Natural gas (CCGT)	2010	N/A	450	Planning phase
Gas plant Charleroi	Charleroi (BE)	Natural gas (CCGT)	N/A	N/A	450	Permission granted
Hemweg[118]	Amsterdam (NL)	Natural gas	N/A	N/A	500	Planning phase
Gas plant Diemen[119]	Diemen (NL)	Natural gas	N/A	N/A	500	Planning phase
Nuon Magnum	Eemshaven (NL)	Coal and biomass	N/A	N/A	N/A	Planning phase

Based on: Nuon Annual Report 2007

Nuon is also investing in expanding existing gas storage in Epe and Zuidwending, and in a carbon capture and storage (CCS) demo project in Buggenum, all in the Netherlands. Additionally, Nuon purchased all shares of Burlington Resources Nederland Petroleum. Through this new subsidiary, Nuon acquired a stake in 35 gas fields in the Dutch North Sea.[120]

8.5 Demand-side initiatives

Nuon offers the following demand-side products and services:

- Development of innovative solar foil, Helianthos.
- Insulation products and advice to improve the energy efficiency of households.
- Customers can purchase high efficiency boilers, which require less energy to heat water.
- Boiler service contracts, to ensure proper maintenance and repair of boilers.
- Energy shops, offering products such as low energy light bulbs and water saving shower heads, which can be financed through the consumer's energy bill. Nuon also offers an online shop with the same products.
- Energy reduction advice services.
- Energy label development.

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[116] „Erweiterung der Produktionskapazität verstärkt Position auf deutschem Markt - Nuon schreibt Bau des Gaskraftwerks in", Nuon press release, 28 January 2008, http://nuon.de/publish/frameset.php?seite=%2E%2E%2Fpublish%2Fgeschaeftsbereiche%2F%5Fbersicht%5Fgeschaeftsbereiche%2Ehtml (25-07-08).

[117] "Nuon plant stroomcentrale in Seneffe", De Tijd, 11 July 2008, http://www.tijd.be/nieuws/ondernemingen_energie/Nuon_plant_stroomcentrale_in_Seneffe.7863844-432.art (25-07-08).

[118] "Nuon wil twee gascentrales bouwen", De Volkskrant, 19 April 2008; "Opeens regent het nieuwe energiecentrales", Nederlands Dagblad, 17 April 2008.

[119] Idem.

[120] "Nuon stapt groot in gasvelden", Dagblad de Pers, 12 Juni 2008.

9 Oxxio

9.1 Basic company information

Oxxio is a relatively young energy company that was incorporated in 2000. With over 800,000 private and business clients and a Dutch market share of more than 7%, it is the fourth largest energy supplier of the Netherlands in terms of clientele. In 2005, all shares in Oxxio were taken over by the energy company Centrica, the parent company of British Gas.
Oxxio has thus far only been a supplier of electricity, but it is now evolving into an energy production company as well. The company recently began construction of a new gas-fired power plant that is expected to be commercially operational in the summer of 2010.[121] With this new generating capacity, Oxxio expects to be able to serve 60% of its clients with its own electricity production.

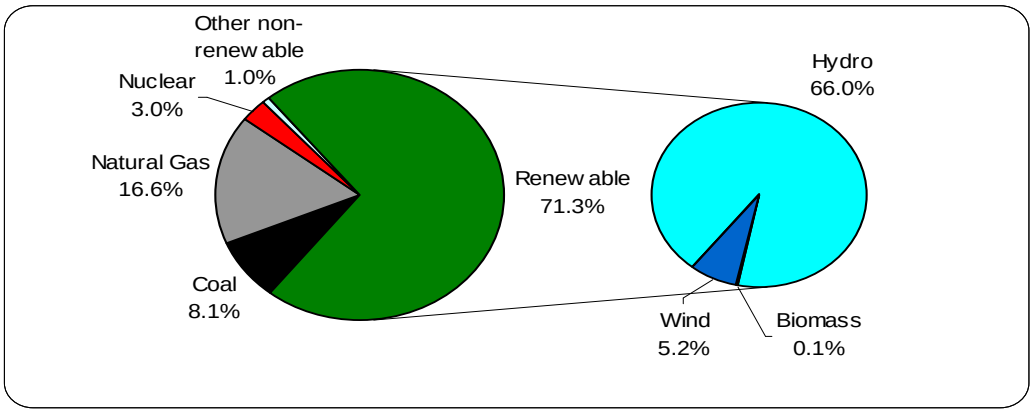
9.2 Installed capacity for electricity generation in Europe

Oxxio does not currently own any generation capacity. As explained above and below, the company has announced an investment in a natural gas power plant.

9.3 Electricity supplied in the Netherlands

Figure 14 shows the fuel mix of energy supplied by Oxxio, and Table 22 presents the CO_2 emissions and radioactive waste production resulting from the generation of the electricity that Oxxio supplies in the Netherlands.

Figure 14: Fuel mix of electricity supplied by Oxxio, 2007



Based on: Oxxio[122]

[121] Centrica Annual Report 2007, p. 22.
[122] Oxxio stroometiket 2007

Table 22: Emissions and waste resulting from Oxxio's electricity supply, 2007

Indicator	Amount
CO2 (g/kWh)	140.4
Radioactive waste (µg/kWh)	89

Based on: Oxxio[123]

Oxxio supplies electricity to private consumers and business clients. The fuel mix supplied to private households is fully renewable, consisting of 92.6% hydropower, 7.3% wind power and 0.1% biomass. Small business clients receive 100% renewable electricity. Large scale business clients are offered non-renewable and renewable energy. 66% of all electricity supplied by Oxxio is generated by hydropower. No information was available on whether the hydro power originates from large-scale hydropower stations or small-scale hydropower stations.[124]

9.4 Announced investments in new generation capacity in Europe

Table 23: Oxxio's announced investments in new production capacity

Project name	Location	Fuel Type	Date in operation	Amount (€)	Output Capacity (MW)	Project Status
Maasstroom power plant	Rijnmondgebied (NL)	Natural gas (CCGT)125	Summer 2010	480 million126	428	Under construction

Based on: Oxxio[127]

Oxxio's announced investment in a natural gas plant will be its first investment in production capacity.[128]

9.5 Demand-side initiatives

Oxxio's demand-site initiatives include:

- Oxxio informs its clients about sustainable products (e.g. Visa Green Card, an electric scooter, and the Pharox LED Lamp) and offers them a discount on these products.
- Oxxio helps its clients consume 10% less energy in three years by means of concrete online advice and the smart meter. The smart meter helps clients lower their energy consumption by

[123] Idem

[124] Small hydro is often developed using existing dams or through the development of new dams whose primary purpose is river and lake water-level control. Since small hydropower projects usually have minimal reservoirs and construction work, they are seen as having a relatively low environmental impact compared to large hydropower.

[125] The power plant disposes of an environmental technology that makes it the most economical and efficient gas-fired power plant in Europe at this moment. In order to take into account the air quality problem in the Rijnmond area, the SCR (Selective Catalytic Reduction)-technology is used voluntarily. This is the most advanced technology for minimising nitrogen emission.

[126] InterGen, "InterGen completes financing 428 Megawatt Rijnmond II project in the Netherlands", 12 December 2007, http://www.intergen.com/news/releases.php?shownews=true&id=116 (24-07-08)

[127] Oxxio, "Bouw energiecentrale Oxxio van start", 3 April 2008, http://www.oxxio.nl/Over-Oxxio/Nieuws-Pers/Archief/Nieuwsbericht?id=38 (24-07-08)

[128] The station is owned by InterGen. Oxxio has tolling contract with InterGen that has a validity of 20 years.

giving them more insight into their energy use, and is a substitution for the old electricity and gas meter. Rental costs for the smart meter are the same as, or lower than, a normal meter.

- Oxxio rewards the clients that are able to save 10% less in three years with a cash payment of EUR 300.

10 RWE

10.1 Basic company information

RWE currently has no generation operations in the Netherlands, but it is examined here because it is likely to become a major player in the Dutch power sector in the near future due to planned investment in large electricity plants in the country. Furthermore RWE Energy, RWE's electricity supplier, is active in the Dutch supply market.

RWE generates power through three business units. RWE Power controls the generation operations in mainland Europe, RWE Innogy is in control of the company's renewable energy activities; and RWE npower is responsible for RWE's UK energy businesses. RWE Power is based in Essen, Germany, and with 32,604 MW of installed capacity at its disposal in Germany, it is the country's largest power producer.[129] RWE Power produces lignite and generates electricity from coal, lignite, nuclear fuel, gas and renewables in Germany, Hungary and Luxembourg. RWE npower has a total capacity of 10,207 MW in the UK, while RWE Innogy controls a capacity of 1,230 MW.[130]

In addition to its RWE Power, RWE npower and RWE Innogy subsidiaries, the RWE Group's other market units include RWE Dea (oil and gas production), RWE Energy (sales and grid) and RWE Supply & Trading (energy trading).[131]

10.2 Installed capacity for electricity generation in Europe

Figure 15 reveals the fuel mix of RWE's electricity generation capacity in 2007. RWE owns generation capacity sites in Germany, the UK, Hungary, Portugal, France, Spain, the Czech Republic and Luxembourg. RWE's total power plant capacity amounted to 44,533 MW in 2007.[132]

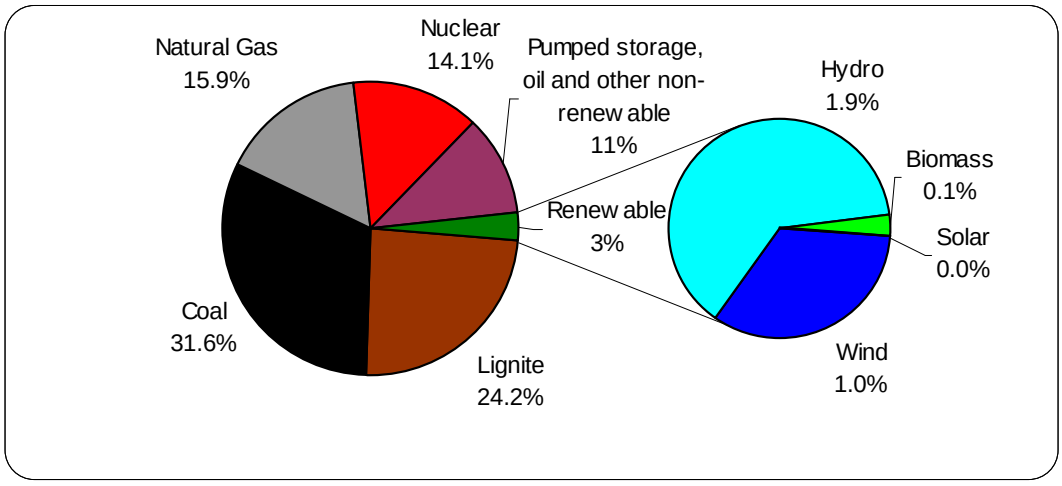
[129] RWE Annual Report 2007, p.62.

[130] It should be noted that there is a difference in calculating capacity between RWE Innogy and the other units. RWE Innogy is the only business unit that calculates its capacity on a pro-rata basis. This means that only the capacity of a plant that is attributable to RWE Innogy is calculated. For RWE Power, RWE npower and the consolidated figures of RWE Group, calculations are based on majority ownership. For all plants that RWE has a stake greater than 50%, the entire capacity of the plants is included. For all minority stakes, the capacity is not calculated at all.

[131] Ibid. p.4.

[132] RWE website, "Facts and Figures", 2007, http://www.rwe.com/generator.aspx/investor-relations/inhalte-de/language=en/id=227214/factbook-extlink.html (22-07-08).

Figure 15: Fuel mix of RWE's installed electricity generation capacity, 2007[133]



Based on: RWE[134]

The 3% renewable capacity amounts to 1,348 MW. Almost all this capacity is operated through its business unit RWE Innogy. This unit operates a total of 496 MW hydro power, 620 MW wind power, 113 MW biomass, and 2 MW solar power.[135] Please note that these figures do not correspond to the total renewable capacity due to the differences in accounting as explained in Footnote 129.

10.3 Electricity supplied in the Netherlands

Figure 16 shows the fuel mix of energy supplied by RWE in the Netherlands. The 16.3% renewable energy is all derived from wind parks.[136] RWE purchases this wind power on the spot market.

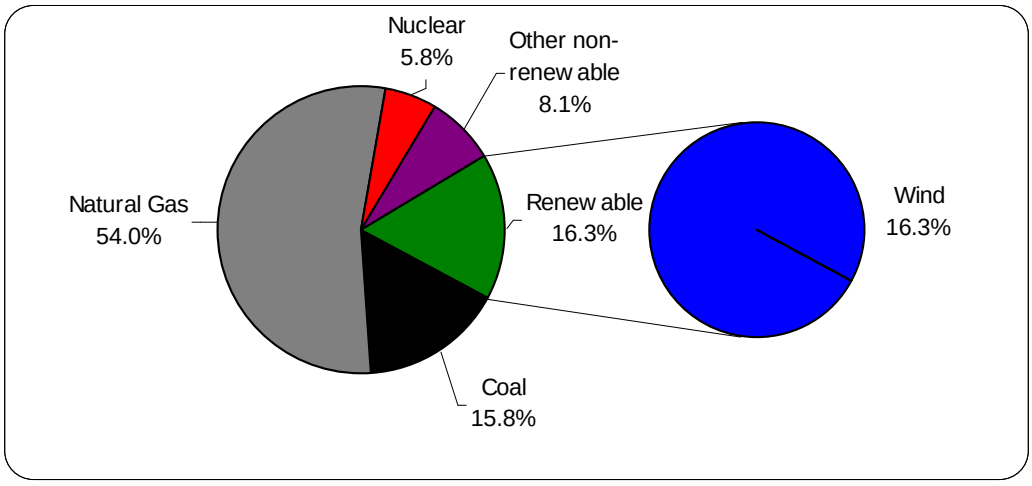
[133] Due to incongruence in the data provided on RWE's website, it is not possible to determine the exact mix of renewable sources within the production capacity of RWE. The total renewable capacity is 1,348 MW. However, when calculating from the data provided in RWE's Power Plant Portfolio, the combined capacity of all sites using renewable energy does not match up. Looking at the RWE Innogy capacity, there are also differences. Therefore, it is unclear what data was used to come to the total renewable capacity.

[134] RWE website "Fact and Figures"

[135] RWE Factbook Renewable Energy, June 2008, http://www.rwe.com/generator.aspx/rwe-innogy/property=Data/id=612806/dl-factbook-1.pdf (22-07-08).

[136] RWE Nederland website "Stroometiket", April 2008, http://www.rwe.nl/documents/RWE_Stroometiket_042008.pdf (22-07-08).

Figure 16: Fuel mix of electricity supplied by RWE Nederland, 2007



Based on: RWE[137]

Table 24 presents the CO_2 emissions and radioactive waste production resulting from the generation of the electricity that RWE supplies in the Netherlands.

Table 24: Emissions and waste resulting from RWE Nederland's electricity supply, 2007

Indicator	Amount
CO_2 (g/kWh)	339.7
Radioactive waste (µg/kWh)	174

Based on: RWE[138]

10.4 Announced investments in new generation capacity in Europe

Table 25 shows RWE's new projects that have already started construction. It should be noted that the three projects in Germany are replacing older plants and are not adding any additional capacity to RWE.[139] In addition to investments in new to-be-built capacity, RWE has also been active in acquisitions of existing capacity.

Table 25: RWE's announced investments in new production capacity

Business unit	Location	Fuel Type	Date in operation	Amount (€)	Output Capacity (MW)	Project status
RWE Power	Neurath (DE)	Lignite	2011	2.2 billion	2,100	Under construction
RWE Power	Hamm (DE)	Coal	2011	2 billion	1,530	Under construction
RWE Power	Lingen (DE)	Gas (CCGT)	2009	500 million	876	Under construction

[137] RWE Nederland stroometiket 2007
[138] Idem.
[139] Telephone conversation with Burkhard Pahnke, Investor Relations, RWE AG, 23-07-08.

RWE npower	Staythorpe (UK)	Gas (CCGT)	2010	900 million	1,650	Under construction
RWE Innogy	Rhyl Flats (UK)	Wind	2009	280 million	90	Under construction
RWE Innogy	Various sites (UK)	Wind	N/A	N/A	82	Under construction
RWE Innogy	Masuria (PL)	Wind	2009	50 million[140]	41	Under construction
RWE Innogy	Western Pomerania (PL)	Wind	2009	50 million[141]	35	Under construction
RWE Innogy[142]	Urvasco Energia (ES)	Wind	2008	N/A	150	Completed acquisition

Based on: RWE CSR Report 2007 and additional sources provided by RWE

Table 26 presents RWE's investment plans that have not been initiated yet. RWE Innogy, the company's new renewables unit, announced that it will invest € 1 billion annually in new renewable sources.[143] This reflects in a large number of announced investments plans in new wind projects. However, RWE also has a number of large investments in coal plants planned. In addition, several news reports make mention of possible future acquisitions.

Table 26: RWE's announced plans for investment in new capacity

Business unit	Location/Project name	Fuel Type	Date in operation	Amount (€)	Output Capacity (MW)	Project status
RWE Power	Unknown (DE)	Coal or lignite	2014	>1 billion	360	Planning phase
RWE npower	Blyth (UK)	Coal	2014	>2 billion	1,600 - 2,400	Site option
RWE npower	Tilbury (UK)	Coal	2013	> 1.4 billion	1,600	Site option
RWE Power	Eemshaven (NL)	Coal	2012	2.2 billion	1,560	Awaiting permission
	Maritsa Iztok (BG)[144]	Coal	unclear	700 – 800 million	600	Unconfirmed
RWE Power	Wola (PL)[145]	Coal	2015	1.5 billion (jointly)	800	Planning phase
RWER npower	Pembroke (UK)	Gas (CCGT)	2011	1.1 billion	2,000	Awaiting permission
RWE Power[146]	Belene (BG)	Nuclear	N/A	7 billion (jointly)	2,000	Acquisition of a 49% participation in two new

[140] The Masuria and Western Pomerania projects have a combined investment of € 100 million
[141] Idem.
[142] "RWE Setzt auf windkraft in Spanien" Borsen-Zeitung, 10-06-08. This takeover was completed in June 2008, and was not taken up in the Annual Report, on which the current generation capacity figures are based.
[143] RWE Annual Report 2007, p.25.
[144] "Bulgaria: RWE ready to invest in power station", Dnevnik, 09-05-08.
[145] "RWE, Polish company plan 800-MW project with carbon capture potential in Poland", Global Power Report 19-06-08.

						plants.
RWE Innogy	Gwynt y Môr (UK)	Wind	2012	2 billion	750	Awaiting permission
RWE Innogy	Triton Knoll (UK)	Wind	N/A	N/A	1,200	Planning phase
RWE Innogy	Tromp (NL)	Wind	N/A	N/A	1,150	Awaiting permission
RWE Innogy	Unknown (NL)	Wind	N/A	N/A	850	Awaiting permission
RWE Innogy	South Italy	Wind	2009-2013	N/A	969	Planning phase
RWE Innogy	Various sites (PL)	Wind	2010	N/A	200	Planning phase
RWE Innogy	Western Hungary	Wind	N/A	N/A	300	Planning phase
RWE Innogy	Various sites (CZ)	Wind	N/A	N/A	100	Planning phase
RWE Innogy	Various sites (FR)	Wind	N/A	N/A	163	Planning phase
RWE Innogy	Various sites (ES)	Wind	N/A	N/A	77	Planning phase
RWE Innogy	Various sites (UK)	Wind	N/A	N/A	2,170	Planning phase
-	Tychow (PL)[147]	Wind	2009/2010	100 million	70	Unconfirmed
RWE Innogy[148]	Aufwind Schmack (HU)	Wind	N/A	N/A	300	Acquisition (still awaiting permission)
-	Babcock and Brown (throughout Europe) [149]	Wind	N/A	3.5 – 4 billion	N/A	Acquisitions (Unconfirmed)
-	Slovakia[150]	Renewable and gas projects	N/A	N/A	unclear	Unconfirmed

Based on: RWE CSR Report 2007; news reports.

10.5 Demand-side initiatives

RWE's demand-side initiatives include:

- RWE Nederland offers a number of energy saving tips on its website
- The company offers assessments of homes for energy labels, as well as personal energy savings advise. RWE charges costumers for both these services.

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[146] "Bulgaria: RWE in leading position for Belene stake", Dnevnik, 20-06-08.
[147] "Poland: RWE, PEP to build wind farms for EUR 100mn ", Gazeta Wyborcza, 10-06-08.
[148] "Hungary industry: RWE Innogy acquires series of planned wind farms", EIU ViewsWire Select, 20-03-08.
[149] "RWE interested in acquiring parts of Babcock & Brown windparks ", Thomson Financial News Super Focus, 20-05-08.
[150] "Slovakia: E.ON and RWE present their plans ", SME, 09-06-08.

11 Windunie

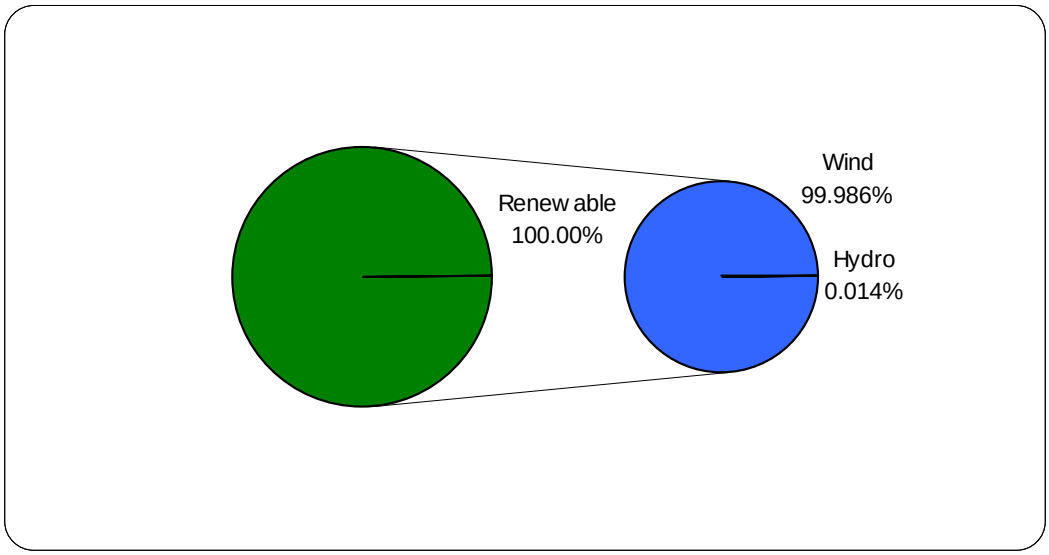
11.1 Basic company information

Windunie, founded in 2001, is a cooperative of wind turbine owners throughout the Netherlands. It is a cooperative under leadership of a management with complete entitlement to rights. By means of this collaboration, individual owners of wind turbines have the possibility to enter the energy market. Windunie supplies wind energy generated in the Netherlands to households and business clients. Windunie started in 2001 with 50 members, but that number increased to 231 members in mid-2008 and continues to rise.

11.2 Installed capacity for electricity generation in Europe

Figure 17 reveals the fuel mix of Windunie's electricity generation capacity in 2007. Windunie's installed capacity increased from 4 MW in 2001 to 396.325 MW in 2007, which is comprised wind power from the 380 wind turbines operated by its 231 members, as well as 0.055 MW from a small-scale hydro plant in the province of Limburg.

Figure 17: Fuel mix of Windunie's installed electricity generation capacity, 2007

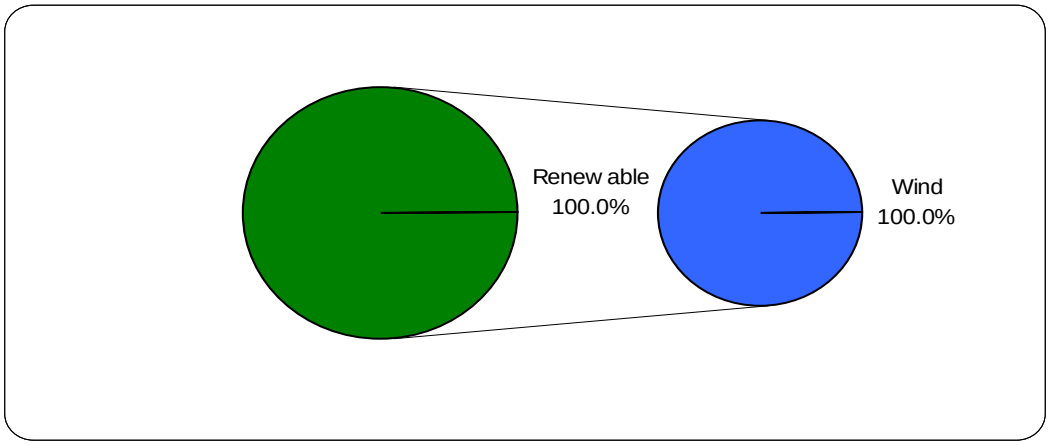


Based on: Windunie[151]

11.3 Electricity supplied in the Netherlands

Figure 18 shows the fuel mix of energy supplied by Windunie in the Netherlands. Of the energy generated by Windunie members, 80% is sold by contract to Essent and lesser amounts to other electricity supply companies, including Greenchoice. Windunie is able to repurchase this electricity for the sale to Windunie clients, through the direct supplier Greenchoice. In 2006, Windunie started its own energy trading company (Windunie Trading). Windunie serves 60,000 households itself, but produces enough electricity for 235,000 households.[152]

Figure 18: Fuel mix of electricity supplied by Windunie, 2007



Based on: Windunie[153]

[151] Windunie website, Klant worden, "Groene energie", no date, http://www.windunie.nl/groen-energie.aspx (28/07/08)
[152] S. Houppermans, Windunie, email to J. Wilde-Ramsing, 20-08-2008.
[153] Windunie website, Klant worden, "Groene energie", no date, http://www.windunie.nl/groen-energie.aspx (28/07/08)

Table 27 presents the CO_2 emissions and radioactive waste production resulting from the generation of the electricity that Windunie supplies in the Netherlands. Because the electricity supplied by Windunie comes from its own carbon- and nuclear-free generation, the company's electricity supply does not account for any radioactive waste or CO_2 emissions.

Table 27: Emissions and waste resulting from Windunie's electricity supply, 2007

Indicator	Amount
CO_2 (g/kWh)	0
Radioactive waste (µg/kWh)	0

11.4 Announced investments in new generation capacity in Europe

In the case of Windunie, the individual members are the ones that invest in new generating capacity by the purchase of wind turbines. As indicated above, Windunie currently has 231 members with a total of 380 wind turbines, but the capacity is growing as new members join Windunie and existing members invest in new capacity. Windunie has indicated that a number of its members wish to invest in new production capacity but are waiting for permits to build.[154]

11.5 Demand-side initiatives

Windunie's demand-side initiatives include:

- Windunie offers its clients a guarantee of origin. This means that clients of Windunie can choose which turbine they want to purchase electricity from. About 5% of the Windunie clients take advantage of this opportunity.

[154] S. Houppermans, Windunie, email to J. Wilde-Ramsing, 20-08-2008.

12 Demand-side initiatives

This thematic fact sheet provides an overview of the ten companies' performance on demand-side initiatives.

12.1 Demand-side initiatives in the Netherlands

Demand-side initiatives are efforts made by the energy companies to help consumers become more sustainable in their energy consumption, primarily by reducing their overall energy use. Demand-side initiatives undertaken by power companies active in the Dutch market include:

- Energy Label advice: Personal advice about Energy Labels, principally Energy Performance Advice (EPA).
- Energy Label assignment: Granting of Energy Labels by officially acknowledged advisors.
- Energy reduction tips on website: General energy reduction tips shown on the website of the energy company.
- Personal energy advice: Energy advice that applies to the specific situation of the individual client, such as energy tests, personal assistance, etc.
- Offering energy efficient products: The sale of energy efficient products like low-energy light bulbs or high efficiency boilers.
- Financial incentives for energy efficiency: Favourable conditions that take effect when clients buy energy efficient products, or when they cut back on power consumption.
- Awareness raising: Methods that help clients become more aware of their power consumption.
- Stimulating individual renewable energy production: Support and financial benefits for clients that produce their own energy by means of, for example, solar panels, solar boilers or wind turbines.
- Offering individual renewable energy products: The sale of products with which clients can generate their own energy, such as solar panels, solar boilers or wind turbines.
- Environmental subsidy advice: Providing advice to clients on available environmental subsidies related to energy.

Table 28 provides an overview of which power companies offer which demand-side initiatives in the Netherlands. Please note that it is possible that several demand-side initiatives of a company fall into a single category.

Table 28: Demand-side initiatives of the various power companies in the Netherlands, 2007

Demand-side initiative	DEL-TA	Electrabel	Eneco	E.ON	Ess-ent	Green choice	Nuon	Oxx-io	RWE	Windunie
Energy Label advice			X	X	X	X	X[155]		X	
Energy Label assignment	X		X	X	X		X		X	
Energy reduction tips on website	X	X	X	X		X	X		X	
Personal energy advice	X[156]		X[157]			X[158]	X[159]	X[160]		X[161]
Offering energy efficient products			X[162]		X[163]		X[164]	X[165]		
Financial incentives for energy efficiency					X[166]		X[167]	X[168]		
Awareness raising	X[169]	X[170]	X[171]		X[172]		X[173]	X[174]		

[155] Nuon EnergieAdvies. Nuon website, Producten en diensten, Bespaarproducten, Advies bij besparen, “EnergieAdvies aan huis”, no date, http://www.nuon.nl/producten-en-diensten/bespaarproducten/advies-bij-besparen/energieadvies/index.jsp (29-07-08).

[156] Delta website, Thuis, Energiebesparing, “Doe de energietest!”, no date, http://www.delta.nl/web/show/id=46378 (29-07-08) & Delta website, Thuis, Energiebesparing, “Doe de energietest uitgebreid”, no date, http://www.delta.nl/web/show/id=46434 (29-07-08).

[157] Eneco Besparingsrapport, Eneco Besparingsconsult, Eneco WKK-Exploitatieadvies, Energiewijzer, CO2 doorlichting bedrijf

[158] Wonen ++ Greenchoice website, Energie besparen, “Wonen ++”, no date, http://www.greenchoice.nl/EnergieBesparen/Wonen++.aspx (29-07-08).

[159] Nuon Isolatie, Nuon Verbruikstest, Nuon Verspillingstest, Nuon BespaarDirect.

[160] Oxxio BespaarAssistent.

[161] Guarantee of origin Windunie website, Klant worden, “Oorsprong”, no date, http://www.windunie.nl/oorsprong.aspx (29-7-08).

[162] Telmi EnergieTegoed. Eneco website, Producten en tarieven, “Slimme energiemeter”, no date, http://prive.eneco.nl/producten_en_tarieven/producten/telmi_nieuwsbrief.asp (29-07-08).

[163] High efficiency boiler. Essent website, Thuis, Producten, CV en warm water, CV ketels, “Essent keurselectie”, no date, http://www.essent.nl/content/thuis/producten/CV_en_warm_water/cv_ketel_kopen_huren_leasen/keurselectie.jsp (29-07-08).

[164] Isolation, high efficiency boilers, products from the Energy shops and the online shop.

[165] Smart meter and saving products Oxxio website, Producten en tarieven, “Slimme meter/ bespaarproducten”, no date, http://www.oxxio.nl/Oxxio-Thuis/Producten-Tarieven (29-07-08).

[166] CV Zomer Actie At this moment clients can receive EUR 125 trade-in discount when they replace their boiler for a high efficiency boiler. In addition, Essent offers its clients this summer a ‘saving package’ when they choose a boiler maintenance contract. The saving package contains products that help clients to lower their energy consumption, like a low-energy light bulb, a weather strip, etc.

[167] Nuon BespaarDirect: Energy efficient product that have no purchase price, but will be deducted in the energy bill.

[168] Oxxio BespaarBonus. The ‘BespaarBonus’ stimulates clients to consume energy in a responsible and sustainable way. Clients that use 10% less energy in three years (with the help of a Smart meter) receive EUR 300.

[169] Delta Bespaar Direct. Delta website, Thuis, Energiebesparing, “Delta Bespaar Direct”, no date, http://www.delta.nl/web/show/id=76978 (29-07-08).

[170] Energy Kronos, FactuurScan. Electrabel website, Zakelijk, Midzakelijk/Multisides/Grootzakelijk, Advies, “Verbruiksmonitoring”, no date, http://www.electrabel.nl/Zakelijk/Midzakelijk/Advies/Verbruiksmonitoring.aspx (29-07-08).

[171] Eneco Energiemananger, Telmi EnergieBalans.

[172] Prepaid energie via EnergieBewust. Essent website, Thuis, Producten, Elektriciteit, “Energiebewust”, no date, http://www.essent.nl/content/thuis/producten/elektriciteit/energiebewust/index.jsp (29-07-08).

[173] Nuon EnergieBesparen. Nuon website, Thuis, Producten en diensten, bespaarproducten, Wat kunt u doen?, “Inzicht in uw verbuik”, no date, http://www.nuon.nl/producten-en-diensten/bespaarproducten/watkuntudoen/inzicht-in-uw-verbruik.jsp.

Stimulating individual renewable energy production	X[175]		X[176]		X[177]	X[178]	X[179]			
Offering individual renewable energy products	X[180]		X[181]		X[182]	X[183]	X[184]			
Environmental subsidy advice	X[185]	X[186]								
Compensation measures					X[187]	X[188]				

Based on: company sources, news reports

The table indicates that Nuon offers the most diverse demand-side initiatives in the Netherlands. Eneco, Essent and Delta also have a varied range of demand side initiatives, of which Eneco clearly offers the most possibilities to clients (see endnotes).

Greenchoice, which supplies 100% renewable energy to its clients, also undertakes a wide range of demand-side initiatives to help clients become even more sustainable when it comes to energy use. Oxxio focuses primarily on advising and stimulating its clients to consume less energy, while Electrabel offers advice, tips and measures to monitor energy consumption.

E.ON and RWE undertake relatively few demand-side initiatives in the Netherlands, but do offer Energy Label advice and assignment, and some energy reduction tips on their websites. Windunie offers the least demand-side initiatives, but since this company supplies 100% renewable energy, its clients do not need much help to become more sustainable in their energy consumption.

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[174] Oxxio BespaarBonus.
[175] Support for clients that want to buy solar panels or boilers, by means of advice, installation etc. Delta website, Thuis, Producten, “Zonnepanelen/ zonneboilers”, no date, http://www.delta.nl/web/show/id=109558 (29-07-08).
[176] Terugleververgoeding. Eneco website, Producten en tarieven, Producten, Zonnepanelen, “Terugleververgoeding”, no date, http://prive.eneco.nl/producten_en_tarieven/producten/zonnepanelen_terugleververgoeding.asp (29-07-08).
[177] Terugleververgoeding. Essent website, Thuis, Producten, “Teruglevering”, no date, http://www.essent.nl/content/thuis/producten/elektriciteit/teruglevering/index.jsp (29-07-08).
[178] Greenchoice website, “Energie opwekken”, no date, www.greenchoice.nl (29-07-08).
[179] Terugleververgoeding. Nuon website, Thuis, Producten en diensten, bespaarproducten, Wat kunt u doen?, Zonnepanelen, “Prijs, betaling en besparing”, no date, http://www.nuon.nl/producten-en-diensten/bespaarproducten/watkuntudoen/zonnepanelen/prijs-subsidie-en-besparing.jsp (29-07-08).
[180] Solar panels and solar boilers.
[181] Solar power, HRe Ketel.
[182] Solar panels and boilers.
[183] Solar panels, solar boilers and wind turbines.
[184] Solar panels.
[185] Delta website, Thuis, Producten, Zonnepanelen, “Subsidieregeling zonnepanelen”’, http://www.delta.nl/web/show/id=107247.
[186] Electrabel website, Zakelijk, Midzakelijk/Multisides/Grootzakelijk, Advies, “Milieuvergunningen en subsidies”, no date, http://www.electrabel.nl/Zakelijk/Midzakelijk/Advies/Milieuvergunningen-en-subsidies.aspx (29-07-08).
[187] Groen voor gas. Essent website, Thuis, Producten, Gas, “Groen voor gas”, no date, http://www.essent.nl/content/thuis/producten/overzicht_gas/groen_gas/index.jsp, (29-07-08).
[188] ‘Bosspaarplan’ forest compensation and compensation by means of investments in sustainable energy supply in developing countries. Greenchoice website, Energibronnen, “CO2 compensatie”, no date, http://www.greenchoice.nl/Energiebronnen/CO2-Compensatie.aspx (29-07-08).

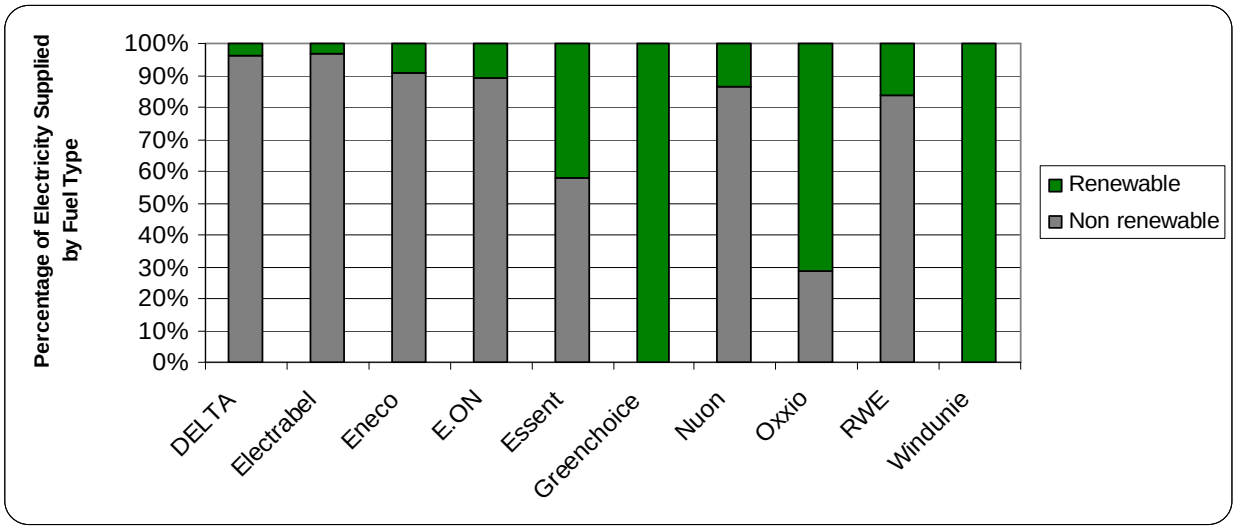
13 Fuel mix of electricity supply in the Netherlands

This fact sheet compares the ten companies regarding the renewable energy they supply to consumers in the Netherlands.[189] Contrary to the factsheets on current generation capacity and planned investments, this factsheet does not look at the situation in other European countries.[190]

13.1 Renewables vs non-renewables in electricity supply

Figure 19 illustrates the fuel mix of electricity supplied by the various companies in the Netherlands, and makes it clear that the smaller 'green' companies, such as Greenchoice and Windunie, are in fact the most renewable. For both companies 100% of their supplied electricity is renewable. Oxxio, the other company with only supply activities, also supplies more renewable than non-renewable energy. Of the seven companies with their own generation capacity, Essent supplies the most renewable energy. Electrabel, which owns the most renewable capacity (see Generation Factsheet) in Europe, actually supplies the least renewable energy to its Dutch customers.

Figure 19: Percentage of renewable and non-renewables in electricity supplied in NL, 2007



[189] With the exception of E.ON, for which figures given represent E.ON's electricity supply in the Benelux region since E.ON does not release any figures on supply only in the Netherlands. This means that these figures are the consolidated figures of E.ON's supply throughout the Benelux countries, not just the Netherlands as is the case with the other companies in this fact sheet series. It is likely, however, that E.ON's supply in the Netherlands is similar in fuel mix to its consolidated Benelux supply.

[190] The data and figures found in this fact sheet are based on information in the individual company fact sheets, a draft of which was reviewed and commented on by each company. Visit www.somo.nl for all fact sheets.

Table 29: Fuel mix of supplied electricity supplied in the Netherlands, 2007

Fuel type (%)	DEL-TA	Electra bel	Eneco	E.ON	Essent	Green choice	Nuon	Oxxio	RWE	Wind unie
Renewable	3.9	3.4	9.3	10.6	42.0	100.0	13.7	71.3	16.3	100.0
Gas	48.4	67.7	61.2	51.9	33.0	0	48.0	16.6	54.0	0
Coal	26.2	22.5	19.7	25.1	17.0	0	25.5	8.1	15.8	0
Nuclear	18.9	4.9	7.3	9.2	6.0	0	8.0	3.0	5.8	0
Other	2.6	1.5	2.5	3.2	2.0	0	4.8	1.0	8.1	0

13.2 CO_2 emissions and radioactive waste from electricity supplied

The figures for the CO_2 emissions and radioactive waste resulting from the electricity supplied by the companies in the Netherlands reflect the fuel mix of their supply. The energy supplied by Greenchoice and Windunie does not cause any CO_2 emissions. Oxxio's large share of renewables in its supply mix also results in low CO_2 emission figures. The supplier with the least sustainable supply mix, Electrabel, is also the largest emitter of this greenhouse gas.

Radioactive waste produced as a result of electricity supplied by the companies correlates to the presence of nuclear energy in each company's fuel mix for supply. DELTA, a company with a large share of nuclear energy in both its generation and supply mix, generates the most radioactive waste. E.ON and Nuon are the second and third largest producers of radioactive waste. Again, the suppliers of green energy, Greenchoice and Windunie, do not generate any.

Figure 20: CO_2 emissions and radioactive waste resulting from companies' power supply, 2007

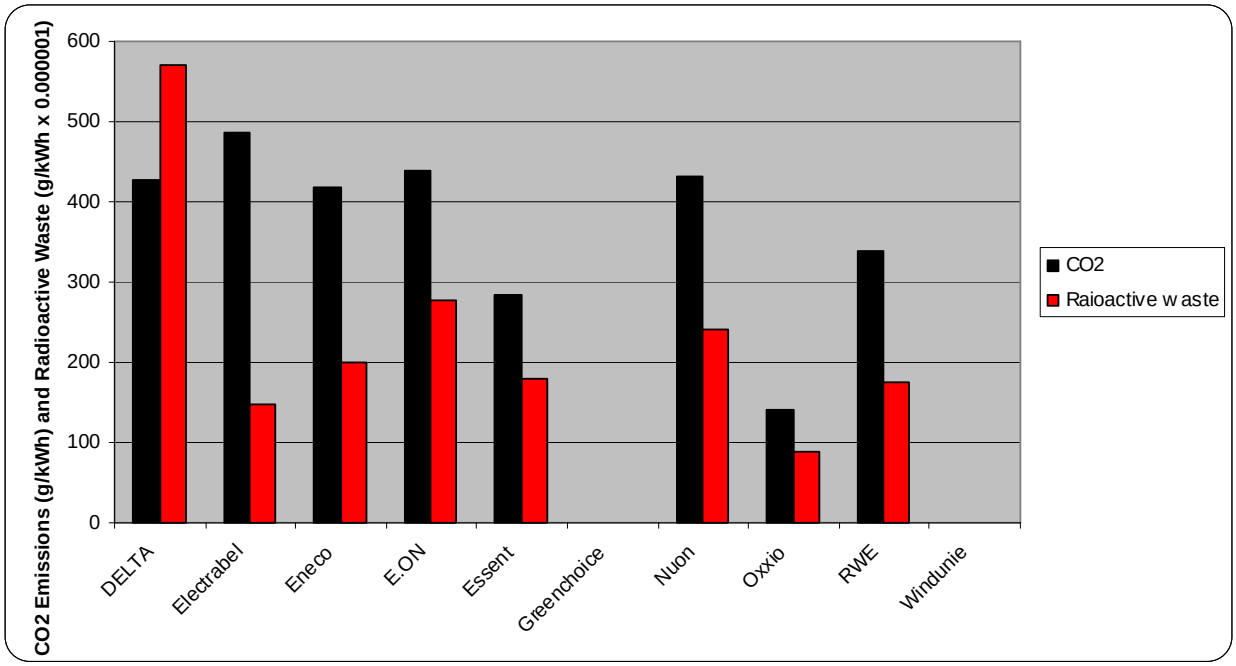


Table 30: CO_2 emissions and radioactive waste resulting from companies' power supply, 2007

	DEL-TA	Electra bel	Eneco	E.ON	Essent	Green choice	Nuon	Oxxio	RWE	Wind unie
CO_2 emissions g/kWh	427.6	485.8	419	438.1	284	0	431.8	140.4	339.7	0
Nuclear waste g/kWh (x0.000001)	570	148	200	277	180	0	240	89	174	0

14 Fuel mix of electricity generation capacity in Europe

This fact sheet provides a comparison of the current installed electricity generation capacity fuel mixes of the ten power companies.[191]

14.1 Overall electricity generation capacity in Europe

In terms of overall generation capacity, a clear distinction can be made between the large multinational companies, which have a very large generation portfolio, and the smaller Dutch companies, which operate on a more limited scale. A number of companies taken up in the research own no or very limited generation capacity. These figures include all the European generation capacity of each company.

Table 31: Overall generation capacity (MW)

Fuel type	DEL-TA	Electra-bel	Eneco	E.ON	Essent	Green-choice	Nuon	Oxxio	RWE	Wind unie
Renewable	52.5	5,208	663.6	9,142	1,009.6	0.0045	144	0	1,348	396
Gas	240	9,075	850	13,203	3,176.3	0	2,465	0	7,098	0
Coal	210	9,512	0	18,205 [192]	1,503.4	0	1,499	0	24,819	0
Nuclear	247.5	6,300	0	11,148	242.5	0	0	0	6,295	0
Other	0	1,092	0	4,962	0	0	0	0	4,973	0
Total	750	31,187	1,513.6	56,660	5,931.8	0.0045	4,108	0	44,533	396

14.2 Percentage of European generation capacity dedicated to renewables

While the scale of operations does affect the relative share of renewable capacity, several differences between companies can still be identified. Of the three large international firms, Electrabel and E.ON have a clear lead over its multinational counterpart RWE. RWE has a mere 3% renewable capacity. Of the larger Dutch companies, Eneco is more sustainable than Essent, Nuon or Delta when it comes to renewables in the generation fuel mix. With 100% wind capacity, Windunie is clearly the most renewable electricity generator active on the Dutch market. Greenchoice also has 100% sustainable generation capacity, but this is such a small amount (45 kW) that it makes it difficult to compare to the others.

[191] The data and figures found in this fact sheet are based on information in the individual company fact sheets, a draft of which was reviewed and commented on by each company. Visit www.somo.nl for all fact sheets.

[192] Including lignite.

Figure 21: Electricity generation capacity in Europe dedicated to renewables, 2007

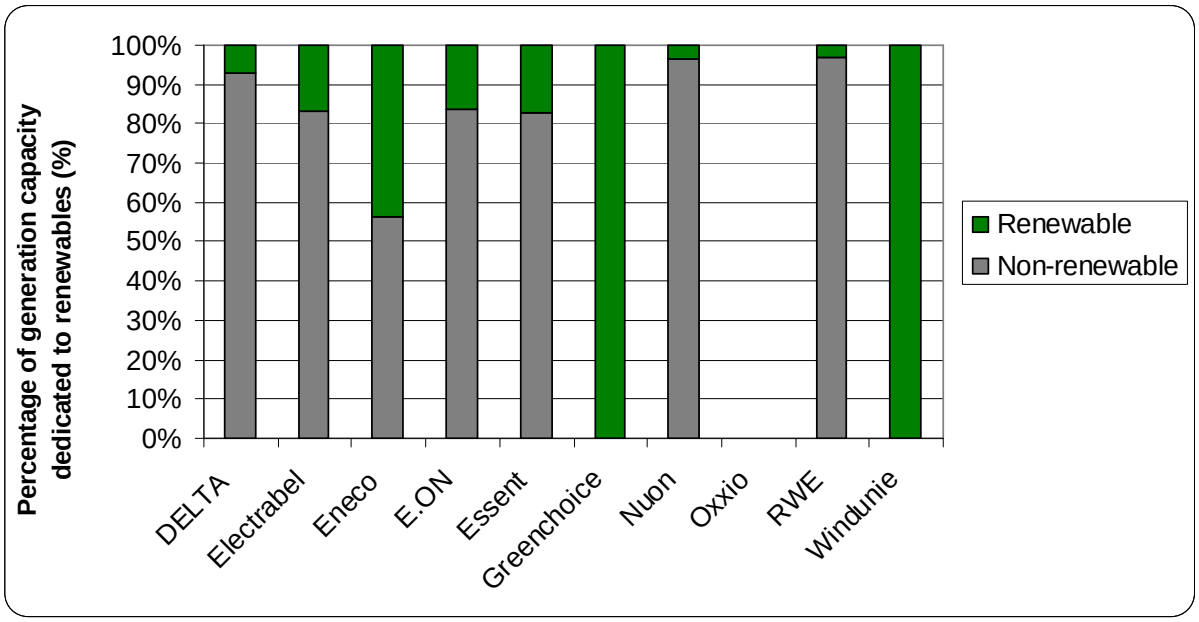


Table 32: Percentage fuel type of installed generation capacity in Europe, by company, 2007

Fuel type (%)	DEL-TA	Electra bel	Eneco	E.ON	Essent	Green choice	Nuon	Oxxio	RWE	Wind unie
Renewable	7.0	16.7	43.8	16.2	17.1	100	3.5	-	3.0	100
Gas	32.0	29.1	56.2	23.3	53.5	0	60.0	-	15.9	0
Coal	28.0	30.5	0	32.1 193	25.3	0	36.5	-	55.8	0
Nuclear	33.0	20.2	0	19.7	4.1	0	0	-	14.1	0
Other	0	3.5	0	8.7	0	0	0	-	11.2	0

[193] Including lignite.

15 Investments in new power generation capacity in Europe

This thematic fact sheet provides a forecast of the future fuel mixes of the generation capacity of the ten companies by examining these companies' current and announced investments in new electricity generation capacity in Europe.[194] A distinction is made between current investments, projects that are already under construction (and for which the investments are definite), and announced investment plans, those projects that are in various stages of planning (and which could still be cancelled or modified by the company).

15.1 Current investments in new generation capacity in Europe

This section analyses investment in electricity generation plants that are currently under construction in Europe. It does not include the announced investment plans. Table 33 presents the financial amount (in millions of €) of the investments, broken down into capacity for renewable, gas, coal and nuclear generation. Table 34 lists the investment according to the maximum amount output planned (in MW) for the investments, broken down in the same fashion.[195]

Table 33: Investments in new generation capacity in Europe, per fuel source (million €)[196]

Fuel type	DEL-TA	Electrabel	Eneco	E.ON [197]	Essent	Green choice	Nuon	Oxxio	RWE	Wind unie
Renewable	120	482.5	395.5	400	112	N/A	100	0	380	0
Gas	550	525	950	2,591	0	0	1,500	480	1,400	0
Coal	0	1,000	0	4,800	0	0	0	0	4,200	0
Nuclear	0	N/A	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0
Total	670	2,007.5	1345.5	7,791	112	N/A	1,600	480	5,980	0

[194] The data and figures found in this fact sheet are based on information in the individual company fact sheets, a draft of which was reviewed and commented on by each company. Visit www.somo.nl for all fact sheets.

[195] Note that these tables include only investments for which information with regard to monetary amounts and MW is available. it is therefore possible that more investments are currently under construction than those that are given in Tables 1 and 2.

[196] This Table only examines investments in new electricity generation capacity. This means that investments in new technologies or efficiency measures in existing plants are not taken up. For calculating these figures, the full amount of the investment is taken up, including when these projects are in collaboration with other companies/parties. If companies have specified their share, only their own investment is used. In the case of E.ON, the investments by E.ON UK and E.ON Nordic are also included.

[197] No financial information was found for several of the projects, including Irsching 4, Bahia de Algeciras, Alpha Ventus and various wind parks in Spain and Portugal. Therefore, these are not included in the calculations. This means that the actual investment in natural gas and wind capacity, as well as the total investment, could be higher than given in this table.

Table 34: Investments in new generation capacity in Europe, per fuel source (MW)[198]

Fuel type	DEL-TA	Electra bel	Eneco	E.ON	Essent	Green choice	Nuon	Oxxio	RWE	Wind unie
Renewable	36.5	286	135	375	183.5	N/A	78	0	398	0
Gas	870	3,235	1,090	5,559	0	0	1,300	428	2,526	0
Coal	0	800	0	4,400	0	0	0	0	3,630	0
Nuclear	0	100	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0
Total	906.5	4,421	1,225	10,334	183.5	N/A	1,378	428	6,554	0

15.2 Announced investment plans for new generation capacity in Europe

In addition to the plants that are currently being developed, companies have also announced various investments to be made in the future. These plans have a varying level of concreteness; some plans have been developed in detail and are only awaiting permits, while others are vague plans of possible future investment strategies. Due to this and other factors, not all financial details of these plans are known. This results in incomplete information that should be interpreted with caution.

Table 35 and Table 36 present the companies' additional investment plans. Table 3 provides the information in monetary terms (million €), while Table 4 presents the figures in terms of maximum output capacity (MW).

[198] When the capacity of a project is given as a range rather than as a single figure, the average of the range is used in the calculation.

Table 35: Additional investment plans for new generation capacity in Europe, by company and fuel source (million €)[199]

Fuel type	DEL-TA	Electra-bel	Eneco	E.ON	Essent	Green choice	Nuon	Oxxio	RWE	Wind unie
Renewable	0	875	2,600	1,400[200]	0	0	N/A[201]	0	5,850	0
Gas	N/A	1,170	0	N/A	1,500	0	N/A	0	1,100	0
Coal	0	4,400[202]	0	2,000	N/A	0	N/A[203]	0	8,850 *	0
Nuclear	0	2,300	0	N/A	0	0	0	0	7,000 *	0
Other	0	0	0	0	0	0	0	0	0	0
Total	0	8,745	2,600	3,400	1,500	0	0	0	22,800	0

* including joint investments

Table 36: Additional investment plans for new generation capacity in Europe, by company and fuel source (MW)

Fuel type	DEL-TA	Electra-bel	Eneco	E.ON	Essent	Green choice	Nuon	Oxxio	RWE	Wind unie
Renewable	0	3,332	729.5	2,724.4[204]	0	0	N/A[205]	0	8,299	0
Gas	400	3,493	0	4,800	1,040	0	1,900	0	2,000	0
Coal	0	5,030[206]	0	5,950	N/A	0	N/A[207]	0	6,920	0
Nuclear	0	3,460	0	2,000	0	0	0	0	2,000	0
Other	0	0	0	0	0	0	0	0	0	0
Total	400	15,315	729.5	15,474.4	1,040	0	1,900	0	19,219	0

On the basis of the data on the plants that are currently being constructed (Tables 1 and 2), an estimation can be made for each company about the fuel mixes for electricity generation once the

[199] Only the known investment figures are taken up. This means that a number of projects that are in advanced stages of planning, but for which no financial details have been disclosed, are not taken up in this table.

[200] This figure does not include the €6 billion of investments in renewable capacity announced by E.ON, as no information was found on actual projects or investments. On 9 September 2008, E.ON announced a framework agreement with Siemens in which E.ON's new Climate and Renewables Business Unit agreed to purchase 500 Siemens wind turbines with a total capacity of 1,150 MW for approximately €1.4 billion. E.ON claims that 550 MW of this new wind power will be installed in Europe, but the Siemens deal is only a framework agreement and E.ON has not yet announced any concrete plans or actually purchased any turbines, as specific orders will take place later. Since no specific plans have been announced or specific monetary amounts spent, this potential investment is not taken up the fact sheets. For more details on the deal, see: http://www.eon.com/en/presse/news-show.do;jsessionid=D754ABC6493000296EA19DAC572BC516.2?id=8782&back=%2fen%2findex.jsp.

[201] It should be noted that Nuon has plans to develop coal and biomass co-generation facilities at the Magnum plant. However, as no information is yet available about the amount of electricity that can be generated from these two sources, these were left out of the calculations in the two tables. See the Nuon fact sheet for more information.

[202] These investments in coal concern power plants in which co-firing of biomass is possible.

[203] See footnote 201.

[204] See footnote 200.

[205] See footnote 201.

[206] These investments in coal concern power plants in which co-firing of biomass is possible.

[207] See footnote 201.

investments have been completed. When all the additional capacity is added up, DELTA, Electrabel, Eneco, and E.ON will all have less sustainable fuel mixes in the near future than they currently have. Oxxio, a company that currently does not own any generation capacity, will only have non-renewable capacity once its investments have been completed.

When calculating the estimated fuel mix if all investments *and* investment plans were completed according to current projection, quite a different picture emerges. Two of the least renewable companies today, RWE and Nuon, would greatly increase the renewable share of their generation capacity. Others, such as DELTA, would actually decrease their relative share of renewables. However, these announced investments are unlikely to all be realized in the same form as they have been announced. Therefore, only limited weight should be given to these projections. Table 37 summarises these projections.

Table 37: Percentages of investments in sustainable electricity generation

Percentage	DEL-TA	Electra bel	Eneco	E.ON [208]	Essent	Green choice	Nuon	Oxxio	RWE	Wind unie
Current (2007) % renewable	7.0	16.7	43.8	16.2	17.1	100	3.5	N/A	3.0	100
% renewable after current investments are finished	5.4	14.6	29.2	14.2	19.5	100	4.0	0	3.1	100
% renewable after planned investments are finished	4.3	17.3	44.1	14.8	16.7	100	3.0	0	14.3	100

15.3 Investments per fuel type

This section presents the combined current and planned investments per fuel type in order to give an indication of the current trends regarding fuel type, as well as serving as further specification of the information provided above.[209] Table 38 reveals that most of the companies are building or are planning to build new capacity for power generation from renewable sources of some sort. Similarly, Table 39 indicates that most companies have plans for new natural gas capacity. Table 40 shows that E.ON and RWE are the most active in developing new coal plants, and that Electrabel and Nuon have announced plans as well. Finally Table 41 illustrates that E.ON and Electrabel are the companies interested in increasing power generation capacity from nuclear fuel.

[208] Due to organizational restructuring, all investments in renewable capacity has shifted to the E.ON Climate and Renewables business unit. Only the E.ON Energie business unit was looked at for the projections of future fuel mixes, as no concrete investment plans of the E.ON Climate and Renewables business unit was found. Investments in the UK and the Nordic countries were excluded in this calculation, as the data for the current generation mix is based on the E.ON Energie business unit only. See the E.ON company factsheet for further information.

[209] For the tables in this section, info on the monetary amounts (€) of investments planned are often not available, so these results should be interpreted with caution.

Table 38: Investment in sustainable generation capacity, by company

Investment	Company	Value (€ million)	Capacity (MW)
Current			
Biomass	DELTA	120	36.5
	Essent	112	27.5
Wind	Electrabel	482.5*	282
	Eneco	395.5	135
	Essent	N/A	156
	Nuon	100	78
	RWE	380*	398
	E.ON	400*	375
Hydro	Greenchoice	N/A	N/A
	Electrabel	N/A	4
Planned			
Biomass/coal	Electrabel	N/A	150
Biomass	E.ON	300	175
	Eneco	N/A	4.5
Wind	Electrabel	875*	2,865
	Eneco	1,600	525*
	RWE	5,580*	8,299*
	E.ON	1,100	2,549.4
Hydro	Electrabel	N/A	60
Solar	Electrabel	N/A	257
Osmosis	Eneco	N/A	200

*incomplete information

Table 39: Investment in natural gas generation capacity, by company

Investment	Company	Value (€ million)	Capacity (MW)
Current			
	DELTA	550	870
	Electrabel	525*	3,235
	Eneco	950	1,090
	E.ON	2,591*	5,559
	Nuon	1,500	1,300
	Oxxio	480	428
	RWE	1,400	2,526
Planned			
	DELTA	N/A	400
	Electrabel	1,170*	3,493
	E.ON	N/A	4,800
	Essent	N/A	1,040
	Nuon	N/A	1,900
	RWE	1,100	2,000

* incomplete information

Table 40: Investment in coal generation capacity, by company

Investment	Company	Value (€ million)	Capacity (MW)
Current			
	Electrabel	1,000	800
	E.ON	4,800	4,400
	RWE	4,200	3,630
Planned			
	Electrabel	4,400	5,030**
	E.ON	2,000	5,150
	Nuon	N/A	N/A
	RWE	8,850***	6,920

* incomplete information

** including biomass co-generation

*** including joint investments

Table 41: Investment in nuclear generation capacity, by company

Investment	Company	Value (€ million)	Capacity (MW)
Current			
	Electrabel	N/A	100
Planned			
	Electrabel	2,300*	3,460
	E.ON	N/A	2,000

incomplete information