Netherlands Enterprise Agency

Renewable energy report

Part 1 *Implementation 2003-2013*

+ SDE+, SDE, OV-MEP & MEP Annual report 2013

>> Sustainable. Agricultural. Innovative. International.

Introduction

Competition between green and fossil energy

It is the Dutch government's ambition to have 16 percent renewable energy by 2023. The SDE+ budget has increased substantially over recent years to realise this ambitious goal. The budget has grown from 1.7 billion euros in 2012 to 3.5 billion euros in 2014. This helps us to ensure that renewable energy has the ability to effectively compete with fossil energy.

In 2013, 871 projects were allocated in the SDE+. Collectively they generate a total of 19 petajoule of energy per year, in other words, the annual energy requirement of more than 300,000 households. Entrepreneurs are now able to start building their renewable energy production installations. This not only results in additional renewable energy, but also generates a serious boost to economic activity!

Competition between sustainable entrepreneurs

Entrepreneurs that are looking for SDE+ support will have to compete with one another, as the cheapest solutions are considered first in order to stimulate efficiency. This competition worked well in 2013: a great number of entrepreneurs demonstrated that they have the ability to produce more efficiently and applied for relatively low sums of subsidy in the free category. This means the realisation of more renewable energy production installations for the same amount of money. A substantial SDE+ budget is once again available for 2014. We look forward to more new initiatives, which will result in even more renewable energy.

Global market competition

Production subsidies alone are not enough. We should not only generate more renewable energy, it is also imperative that we do so more intelligently. It is therefore important that we combine the financial support for the rollout of new technologies with a solid innovation policy. The government stimulates innovation through the Top Sectors program in which the industry, research institutes and the government operate in close harmony. It is here that renewable energy plays a crucial role.

Innovation reduces the cost of generating renewable energy and allows us to strengthen our position in the global market. These innovative technologies for generating renewable energy can also be exported. For example think of increasingly intelligent solar panels, or drilling techniques to reach greater depths for geothermal energy. Rolling out renewable energy in The Netherlands means being less dependent on other countries, and becoming less susceptible to price variations in fossil fuels. The generation of more renewable energy, in combination with innovation, ensures a new energy landscape in ten years time.

Bert de Vries
Deputy Director-General Energy, Telecom and Competition, Ministry of Economic Affairs

> Explanation *of this report*

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The Dutch government supports the rollout and innovation of renewable energy by using a number of different instruments. In this report you will read about the status of the implementation of renewable energy in The Netherlands and the way in which these instruments contribute to it. An important aspect is the annual overview of the funds spent and the results of the SDE+, SDE, OV-MEP and MEP. These data, with reference date 1 March 2014, is based on RVO.nl's Subsidy-Administration system. These data may deviate from other publications that (also) make use of alternative sources.

The second part of the Renewable Energy Report comes out this fall. This part will deal more specifically with innovations and market developments regarding renewable energy.

This report begins with an overview: how much renewable energy has been generated in The Netherlands over the last 10 years? Which provinces show the fastest growth of the number of projects? How many of these were granted SDE+, SDE or (OV) MEP subsidies? What was the cash expenditure? What other governmental instruments contributed to the growth?

Chapters 2 to 6 offer a detailed analysis of each energy technology. For purposes of recognition, the same order of technologies is used as in the annual CBS report on renewable energy. A number of publications from the past years have been incorporated into this publication, including: SDE+, SDE and MEP annual report and the State document Bioenergy.

The CBS makes an inventory of all renewable energy per year. Not all renewable energy is subsidised by MEP or SDE(+) subsidies. Production of renewable energy that uses heat pumps, for example, is not MEP-SDE subsidised. Wind turbines may produce more than their subsidised capacity and usually continue to produce energy after the subsidy period has ended.

Interpretation of the figures

The historic data has been supplied by the CBS and the calculation is based on the gross final consumption method of the Protocol 'monitoring renewable energy' that assumes a contribution towards end use. The energy production is converted to the 'human scale': renewable electricity production is compared to the number of households that can be supplied with electricity for a year (use of 3,300 kWh); renewable heat and green gas production are converted to the equivalent in natural

gas use of an average Dutch household (1,600 m^3 per year). Savings in CO_2 emissions are compared to the annual emission produced by the equivalent number of petrol cars (3,300 kg CO_2 at an annual of 20,000 km). (Source: *Milieucentraal*)

Energy Agreement

The *Energy Agreement for Sustainable Growth* was finalised on 6 September 2013. This agreement details the arrangements made between cabinet, employers, employees, nature- and environmental organisations, energy corporations, decentralised governments and a substantial number of other organisations, to realise more sustainable energy and energy reductions in The Netherlands. The Energy Agreement has already set a great number of things in motion, the results however, are not represented in the production figures in this report yet.

Interpretation of the terminology

Further explanations regarding terminology and abbreviations can be found at the end of this document. From there you can click through to the relevant websites.
Go to the glossary.

Renewable energy report

Part 1: Implementation 2003-2013

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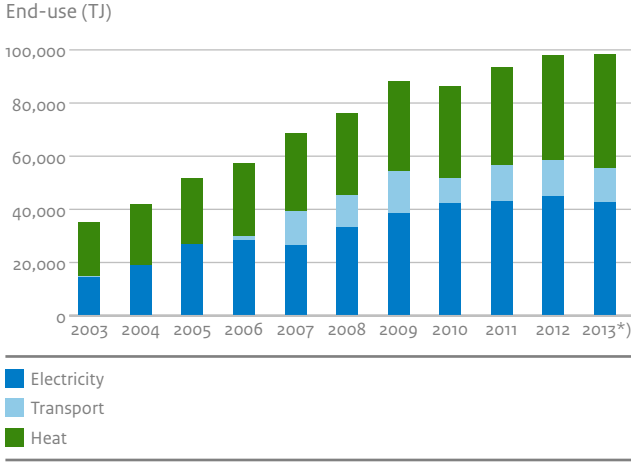
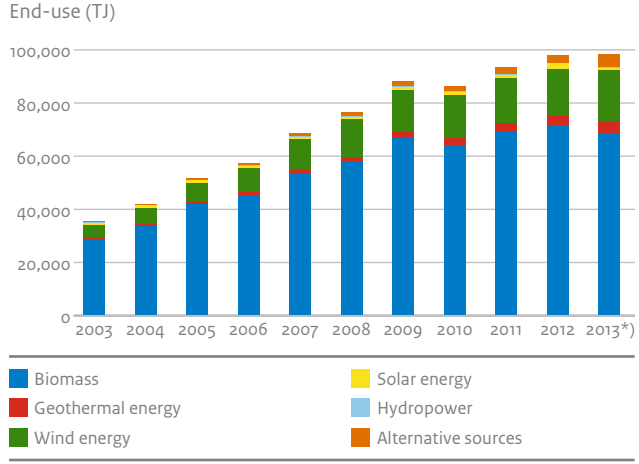
> Overview 2003-2013

Figure 1: Gross renewable energy use per energy carrier – CBS Statline



*) Data for 2013 is provisional.

Figure 2: Gross renewable energy use per energy source – CBS Statline



*) Data for 2013 is provisional.

Growth of renewable energy in The Netherlands

The production of sustainable energy has experienced a sharp increase over the past decade: the energy production has tripled and the heat production has doubled. In 2013, biomass accounted for 70 percent of the renewable energy production, followed by wind energy with a 19 percent share. The total gross end-use amounted to 98,300 TJ in 2013, which resulted in a renewable energy share of gross energetic end-use of 4.5 percent.

Electricity production equal to:
Consumption of 3.4 million households

Heat and green gas production equal to:
Consumption of 647,000 households

Avoided CO_2 emission:
Emission of 2.6 million petrol cars

Production figures and avoided CO_2 emission

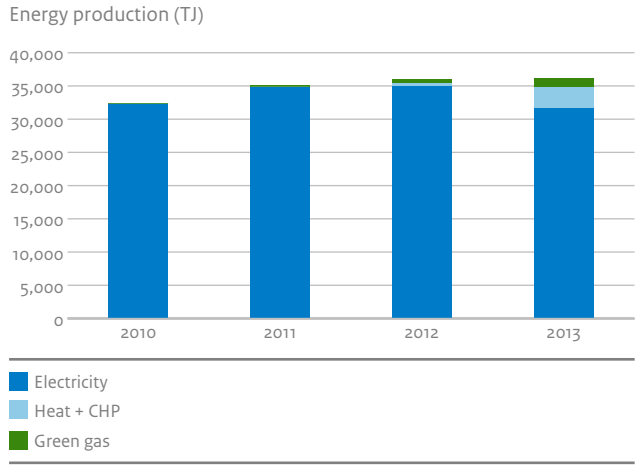
The total renewable net electricity production from renewable energy sources in 2013 was equal to 11,849 million kWh. When converted, this figure represents the annual electricity consumption of 3.4 million households. The total production of renewable heat and green gas in 2013 is equal to the natural gas use of 647,000 households. The avoided annual amount of CO_2 emissions is equivalent to the emission of 2.6 million petrol cars.

SDE+, SDE and (OV)MEP-projects: 2010-2013

Energy production

In 2013, all subsidised (OV)MEP, SDE or SDE+ projects collectively produced 36,000 TJ. Nearly 90 percent of the production can be attributed to the production of electricity, whilst the remainder is the production of heat, CHP and green gas. Today, the largest contribution is still made by biomass and wind projects that received MEP subsidies.

Figure 3: **Total renewable energy production per energy carrier – SDE+, SDE and (OV)MEP**



The total electricity production from renewable energy sources in MEP and SDE supported projects equalled 8,820 million kWh. This is roughly 75 percent of The Netherlands' total renewable electricity production. When converted, this figure is equal to the annual electricity consumption of 2.7 million households. The total production of renewable heat and green gas in 2013 is equal to the natural gas use of 86,000 households. The total renewable energy production by SDE/MEP subsidised projects avoids annual CO_2 emissions equivalent to the emission of 1.7 million petrol cars.

Figure 4: **Total renewable energy production per technology – SDE+, SDE and (OV)MEP**

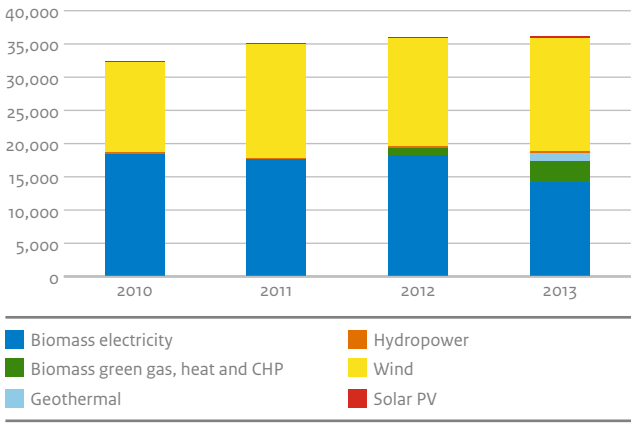
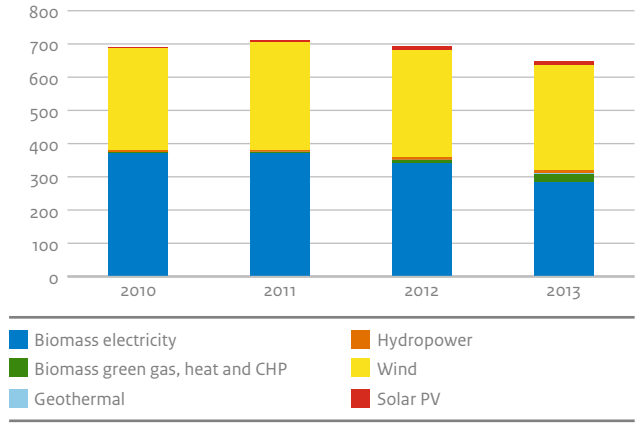


Figure 5: **Total cash expenditure per technology – SDE+, SDE and (OV)MEP**



Cash expenditure SDE+, SDE, OV-MEP and MEP: 2010-2013

Nearly half of the cash expenditure for renewable energy was spent on wind projects in 2013. The (OV)MEP, SDE and SDE+ expenditure totalled over 648 million euros that year. Almost 80 percent of this expenditure went to OV(MEP) subsidised projects. Over the last two years, the production of renewable energy has increased whilst the cash expenditure has gone down. This is a result of subsidies for biomass co-firing and wind projects drawing to a close over the last few years. By the end of 2013 almost none of these projects received MEP subsidies.

2013 SDE+ results

In 2013, SDE+ had an available budget of 3 billion euros. The received applications exceeded the available budget. A total of 1,067 applications with a gross maximum budget of over 5.8 billion euros were received. The total available budget of 3 billion euros was allocated to 871 projects; 62 percent of the available budget is allocated to heat, 26 percent to electricity and 11 percent to green gas.

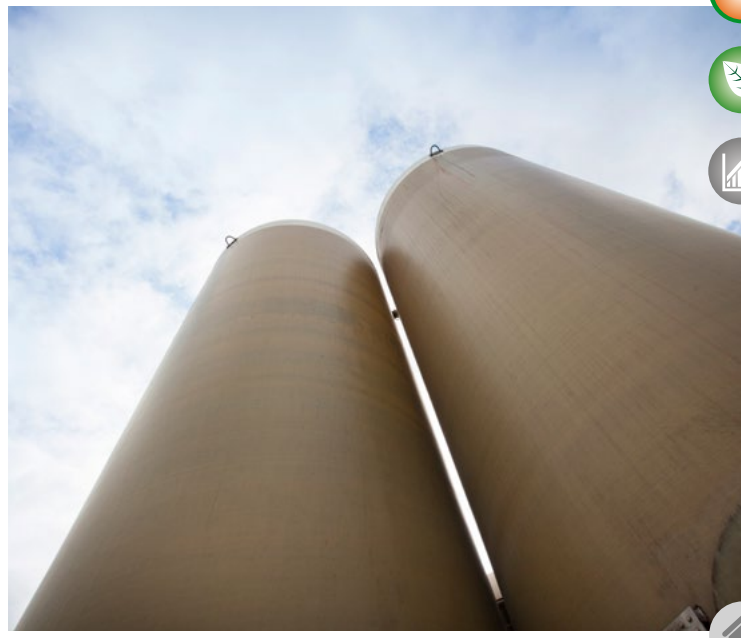
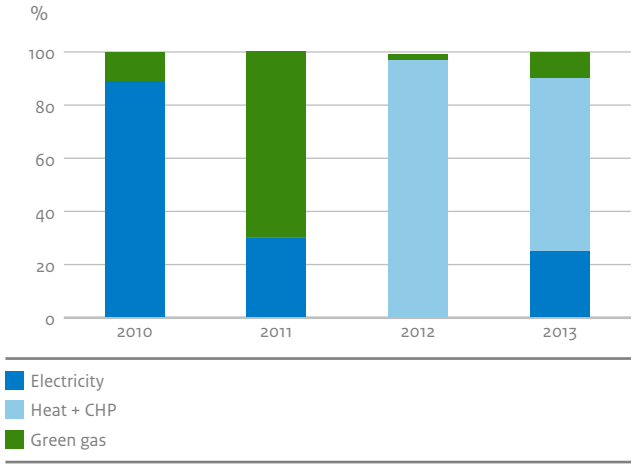


Figure 6: **Allocation of the available budget per energy carrier – SDE 2010 and SDE+ 2011, 2012 and 2013**



The allocation of the available budgets shows a strong variation over the different sources in the past few years. 70 percent of the available budget was allocated to green gas projects in 2011, whilst in 2012, a large portion of the budget was spent on heat projects. This is a result of the SDE+ working with a single budget for all categories, which is drafted in a phased structure from 2011 onwards.

Renewable heat projects could apply for subsidies for the first time in 2012 (possibly without the generation of electricity). Renewable heat projects are mainly eligible in the 1st or the 2nd phase. The quantity of renewable heat applications that were received in 2012 nearly immediately depleted the entire budget.

Table 1: SDE+ subsidy allocations 2013

Category	*No. of positively approved subsidy applications*	*Allocated capacity*	*Allocated budget*
		MWe	(million €)
Wind energy	66	404	642
Solar-PV	661	133	121
Biomass (water treatment installations)	2	5	13
Hydropower	4	11	13
Total renewable electricity	**733**	**553**	**790**
		MWth and MWe	
Waste combustion	1	155	23
Biomass	93	762	1,423
Geothermal energy	16	204	424
Solar thermal	5	2	1
Total renewable heat and CHP	**115**	**1,123**	**1,872**
		Nm^3/h	
Total renewable gas	**23**	**7,461**	**339**
Total SDE+ 2013	**871**		**3,000**

NB: The values in the table have been rounded off. The sum of the individual values may therefore differ slightly from the total.

Alternative government incentives for renewable energy

The government makes use of a great number of other instruments, apart from the (OV)MEP, SDE and SDE+, to stimulate the use of renewable energy sources. A number of these are highlighted in this report. In the second volume of the Renewable Energy report you can read more about the instruments that are used to promote innovation.

Energy investment allowance (EIA)

Nearly half of the EIA reported investments related to wind projects between 2009-2012. In 2012, investments worth 263 million euros in renewable energy techniques were registered for the EIA scheme. The largest amount that year was spent on solar energy systems. The registered investments more than tripled in 2011. In that year a number of large-scale wind projects were registered. A budget of 151 million euros was available in 2013. The applied for amount in 2013 is not yet known. Since the start of the SDE+ 2014, it is no longer possible for renewable energy projects to apply for the EIA in combination with SDE+ support; this will however remain possible for SDE decisions from previous years.

Table 2: **Energy investment allowance for renewable energy projects**

	2009	*2010*	*2011*	*2012*
Number of applications				
Total	**878**	**1,535**	**2,728**	**4,797**
Wind turbines	81	147	245	53
Photovoltaic solar energy system	292	760	1,737	3,538
Solar collection system	129	210	309	720
Geothermal collection systems	46	77	87	137
Biomass (heat and electricity)	241	223	222	222
Other	89	118	128	127
Reported investments (million euros)				
Total	**€ 140.1**	**€ 201.6**	**€ 638.0**	**€ 262.8**
Wind turbines	€ 54.6	€ 78.0	€ 417.8	€ 48.8
Photovoltaic solar energy system	€ 14.2	€ 32.1	€ 64.0	€ 89.4
Solar collection system	€ 6.3	€ 8.3	€ 5.1	€ 11.1
Geothermal collection systems	€ 10.3	€ 27.1	€ 29.7	€ 37.3
Biomass (heat and electricity)	€ 24.4	€ 14.5	€ 50.1	€ 40.2
Other	€ 30.3	€ 41.6	€ 71.3	€ 36.0

The Green Funds scheme

The number of 'green certificates' issued has significantly increased from 80 in 2012, to 339 in 2013. A large proportion of these fall into the project category sustainable energy. This number of green certificates rose from 49 in 2012, to 228 in 2013. Most of the green certificates were issued for solar power projects. In 2013, the allocated project capital for sustainable energy projects was almost 365 million euros.

Green funds

Banks obtain a share of their capital for the Green Funds scheme from what are called green funds. Participants in green funds are given tax advantages over the saved amount or the money invested. Up to the end of 2013 the advantages were twofold: an exemption up to a set maximum of 1.2 percent on the capital gains tax and a 0.7 percent credit for the value of the green invested funds. Therefore, the total advantage, compared to regular savings, was 1.9 percent. The tax reduction scheme has come to an end in 2014 so now an advantage of 1.2 percent remains. A green fund has to have at least 70 percent of its capital invested in projects with a green certificate.

Intervention programme integrated stimulation of renewable energy

There are other thresholds apart from financing that limit the increase in renewable energy. The national government actively contributes to removing these obstacles by specifically addressing hindering laws and regulations. This creates support for: renewable energy, spatial development, integrating central energy generation in the gas and electricity infrastructure and sustainability aspects. The national government has intervention programmes for all of the energy sources mentioned in this report, each with a variety of activities that contribute to the realisation of renewable energy initiatives.

Table 3: **Number of Green certificates and allocated project capital for renewable energy projects**

	2009	*2010*	*2011*	*2012*	*2013*
Number of certificates issued					
Total green certificates 'sustainable'	**77**	**65**	**44**	**49**	**228**
Biogas upgrading installation	-	-	1	0	2
Wind energy	12	10	12	12	21
Solar cells	31	30	14	23	182
Solar collectors	7	8	6	1	6
Geothermal energy	0	1	0	0	5
Heat pumps	27	16	11	13	12
Reported project capital (million euros)					
Total sustainable	**€ 61.9**	**€ 74.3**	**€ 112.6**	**€ 119.8**	**€ 364.8**
Biogas upgrading installation	€ 0.0	€ 0.0	€ 2.5	€ 0.0	€ 2.0
Wind energy	€ 52.4	€ 43.4	€ 83.7	€ 105.1	€ 312.4
Solar cells	€ 3.1	€ 2.4	€ 20.0	€ 7.4	€ 14.2
Solar collectors	€ 1.4	€ 1.7	€ 1.2	€ 0.2	€ 0.7
Geothermal energy	€ 0.0	€ 4.8	€ 0.0	€ 0.0	€ 29.7
Heat pumps	€ 17.0	€ 17.0	€ 5.3	€ 7.2	€ 5.8

State coordination scheme

Wind parks with a capacity over 100 MW automatically fall under the State coordination scheme. Up until now, 4 licensing procedures for wind projects that are part of the State coordination scheme have been completed: 2 offshore wind parks and 2 onshore wind parks. 5 wind park application procedures are still in progress at this point.

The State coordination scheme allows for a variety of decisions (licenses and exemptions) required for a project to be taken simultaneously in joint consultation. Aside from licences and exemptions, these projects often additionally require a State land-use plan. These are spatial decisions made by the State comparable to a zoning plan.

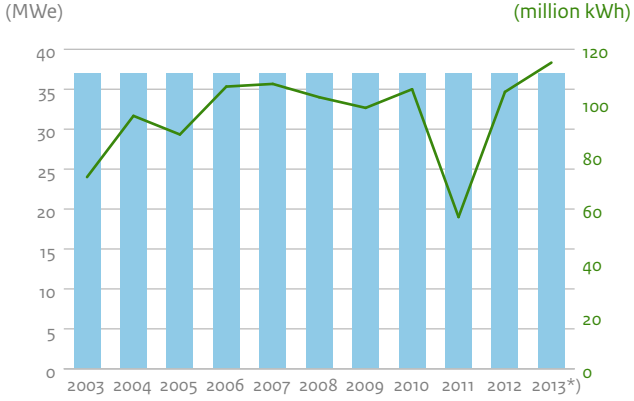
The coordinating minister, in consultation with the governmental bodies involved, determines when all the draft decisions and final decisions are taken. The coordinating minister has the power to independently make the decision, in consultation with the minister whose field it concerns, when an implementation order faces difficulties. In these cases restraint will be exercised.

In principle all decisions relating to a project are made available for inspection simultaneously. At this point it is possible for everyone concerned to voice his or her considerations. Afterwards, the governmental bodies will make their final decision at once, having first explored both the advice and the considerations. When a stakeholder, private citizens or organisations, do not agree with one or more of the decisions taken, then they have the right to lodge an appeal directly to the Administrative law division of the Council of State (no longer with the court). A single ruling takes place within 6 months after the period for appeal in the case of State coordination including a State land-use plan. This process substantially shortens the overall procedure.

> Hydropower

> Hydropower

Figure 7: Installed capacity and net production using hydropower – CBS Statline



*) Data for 2013 is provisional.

Electricity production equal to:
Consumption of 35,000 households

Avoided CO_2 emission:
Emission of 21,000 petrol cars

Hydropower energy growth in The Netherlands

Hydropower is the most important source of renewable energy from an international perspective. Despite being a nation of water, the options available to generate energy from water are more limited in The Netherlands than compared to other countries as the country lacks mountains. The capacity in place has remained constant over the last 10 years at 37 MWe.
The production is dependent on the annual water supply from the rivers. 2013 was a relatively good year with a production of 115 million kWh. When the production figures are adjusted, taking into account the variation in water supply, then the normalised electricity production has also remained relatively constant at approximately 100 million kWh.

Production figures and avoided CO_2 emissions

The total hydropower electricity production in 2013 was sufficient to provide 35,000 households with electricity for a year. This avoids an annual amount of CO_2 emissions equivalent to the emission of 21,000 petrol cars.

Hydropower market developments

Most hydropower projects in The Netherlands generate electricity from water flows near dams located on the larger rivers. Most of the installations were constructed some time ago. 23 MWe in new capacity has been allocated in the SDE+ from 2010 onwards, however these projects have not yet been realised.

A number of local initiatives for renovating old turbines or new installations also exist. However, there are a great number of obstacles, like licensing and regulations, which hinder the growth of the realised capacity.

Apart from subsidies for new installations, subsidies for the renovation of existing installations have been included in the SDE+ from 2013 onwards. A condition however is that it is mandatory for all turbines to be newly installed. 4 SDE+ subsidy applications were approved in 2013, of which 1 fell into the renovation category.

Water turbines that utilise wave and tidal forces may also be used to generate energy, however, at this point no projects of this type are operational in The Netherlands. Two applications were allocated in 2013. A third category is the generation of renewable energy that makes use of the difference in salt concentration between two bodies of water (blue energy). No such applications were received in 2013.

Energy production in SDE+, SDE and MEP projects: 2010-2013

Subsidies have been allocated for nearly 48 MWe in hydropower capacity since 2003. 24 MWe (54 percent of the total) has been taken into production. Out of the 8 allocated SDE/SDE+ projects, 2 were realised, 1 was withdrawn and 5 projects are currently still in the pipeline. The 2, relatively small, realised projects are situated in the provinces North Brabant and Limburg. These 2 projects were allocated in the SDE 2009 round. The withdrawn project, a hydro-electric power station on the Apeldoorn Canal in Hattem, has however been realised. This project was realised with the financial support from the province Gelderland. 4 out of 5 projects that are currently in the pipeline were allocated in the SDE+ 2013. The 5th project was already allocated in the SDE 2010. This is a 12 MWe project that is planned for construction on the Maas in the province of Limburg.

Production figures and cash expenditure

Figure 8: Hydropower – electricity production SDE+, SDE and MEP

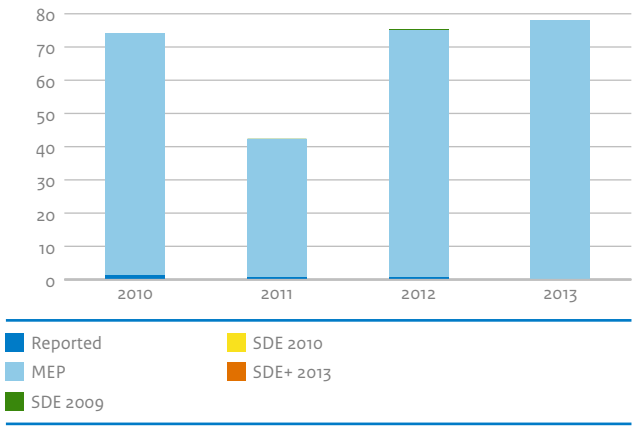
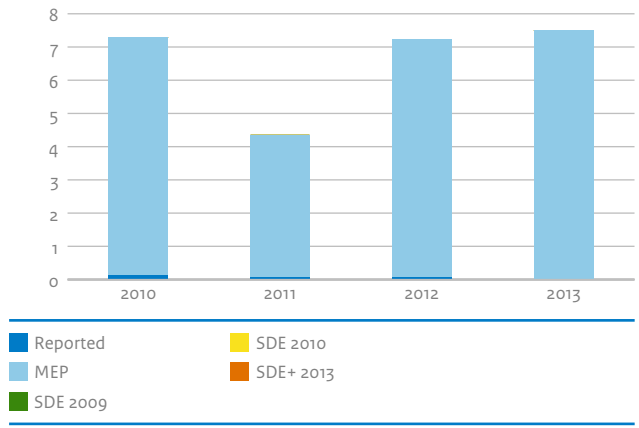


Figure 9: Hydropower – cash expenditure SDE+, SDE and MEP



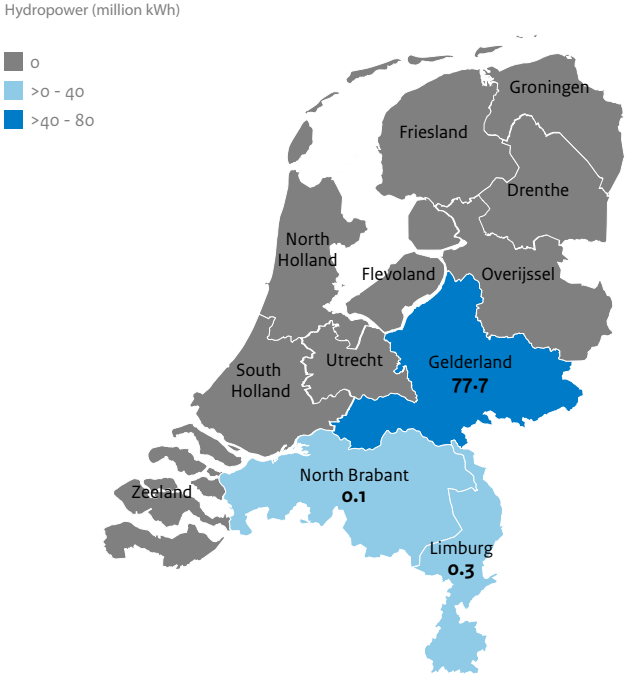
The combined subsidised projects produced 78 million kWh in 2013. This is equivalent to the annual electricity requirements of 24,000 households. The avoided CO_2 emissions are equivalent to the emission produced by circa 14,000 petrol cars.

A total of 7.5 million euros was paid in MEP subsidies for hydropower projects. There was no expenditure for hydropower projects in the SDE/SDE+.

Electricity production equal to: Consumption of 24,000 households

Avoided CO_2 emission: Emission of 14,000 petrol cars

Hydropower production SDE+, SDE and MEP 2013



Geographical spread

Dutch hydropower projects can be found in the provinces Gelderland, Limburg and North Brabant. Most of the subsidised projects are situated in Gelderland; over 99 percent of the total subsidised hydropower production was realised in Gelderland in 2013.

> Wind energy

Residents, government and energy company with the wind in their sails

The Dutch goal is to have 6,000 megawatts of onshore wind energy by 2020. However, the development of large-scale wind parks is far from easy and sometimes meets resistance from the local population. The 122-megawatt Prinses Alexia Windpark followed a remarkable path; a joining of forces ensured a swift and successful realisation.

A farmer's idea

In 1998, 63 agricultural families came up with the idea for a wind park in the Flevopolder. As a result of their intensive collaboration with governments and the energy company Nuon, the wind park opened in 2013. Site manager Ruben Lindenberg outlines the advantages of this collaboration: "In 2008, the farmers called in Nuon for the development. We were able to share our technical know-how with them. At first we concentrated on the engineering side of the project but later we also assisted with the financing and realisation. The farmers sold us their shares. This financial injection was a welcome one for the area at a time of economic crisis."

Swift decision-making process

"It was a great advantage to us that all families were united in a single board", Lindenberg continues. "That led to a swift decision making process. Also the municipality Zeewolde – voted the most sustainable municipality in The Netherlands in 2014 – offered us their full support." The Prinses Alexia Windpark was the first wind park in The Netherlands that completed all the stages of the State coordination scheme. Under this scheme all decisions, like those for licenses and exemptions, are made simultaneously. The licensing procedure only took two years: substantially faster when compared to other wind parks. The construction was equally successful: All 63 windmills were completed 17 months after construction began.

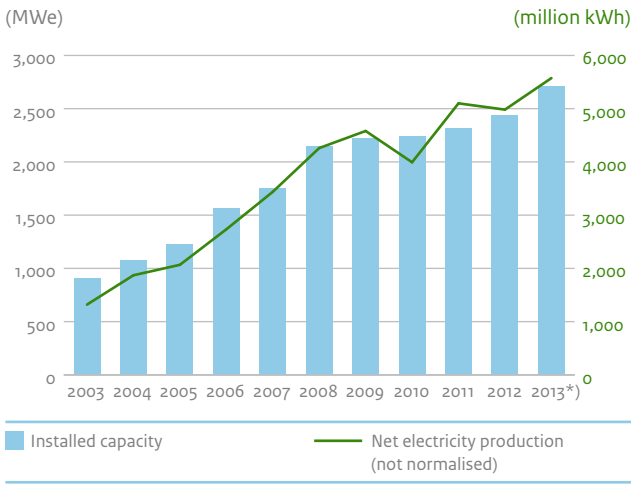
> *The future model for wind parks is active collaboration with governments and local population<*

Participation and support base

Many new wind parks are required to meet the 6,000 megawatt objective. "It won't be easy", says Lindenburg. "There are both financial and operational challenges. SDE support is often still required for ensuring the financial feasibility. Active collaboration for us is key in all of the projects. This is, for example, also the way we work in the development of Windpark Wieringermeer. We install an independent local board, which facilitates participation and creates a basis for support. This is the future model for the development of wind parks in a densely populated country like The Netherlands."

> Wind energy

Figure 10: Installed capacity and wind energy electricity production (not normalised) – CBS Statline



*Note: 2010, was an extremely bad year for wind with a 23 percent lower yield than what would be considered normal for that year (CBS, 2013). *) Data for 2013 is provisional.*

The growth of energy from wind in The Netherlands

Wind capacity has nearly tripled in the period between 2003 and 2013. The capacity of the production installations was 2,700 MWe by the end of 2013, of which onshore wind energy accounts for 90 percent. The electricity production has quadrupled over the same period to 5,574 million kWh. This is mainly because new locations have a higher wind yield on average, the placement of higher mills with a larger rotor diameter and the replacing of poorly performing mills (CBS, 2013).

Production figures and avoided CO_2 emissions

In 2013, the total electricity production from wind energy was sufficient to provide 1.7 million households with a year's supply of electricity. This avoids an annual amount of CO_2 emissions equivalent to the emission of 1 million petrol cars.

Electricity production equal to: Consumption of 1.7 million households

Avoided CO_2 emission: Emission of 1 million petrol cars

Wind energy market developments

Local (wind) energy initiatives have been steadily increasing over the past few years. '*HIER opgewekt*' (Generated localy) recently made an inventory of over 300 local initiatives of which some 20 percent are concerned with generating (amongst others) wind energy. Organisational structures are varied, ranging from a group of companies that locally join forces to generate their own energy, to crowd funding initiatives in which both individuals and companies participate in projects in which they generate their own energy.

Support for wind energy

NWEA works with the code of conduct 'support and participation', as announced in the Energy Agreement for Sustainable Growth by the SER, to enhance the support base for wind energy on a local level. The NWEA drafts this code in close cooperation with, amongst others, environmental federations and provinces. Other existing participation methods are closely analysed to determine what knowledge can be gained from them.

Replacing windmills at existing locations

Over the last few years there has only been a minimal rise in the number of windmills, the capacity however has changed considerably (CBS, 2013). Existing mills with a relatively small capacity are being taken out of service and are replaced by windmills with an increased capacity. Over 90 percent of the mills installed replaced existing mills in the 2010-2012 period. The connection between the replacing of stand-alone (solitary) mills with new better spatially installed linear mill installations with increased capacity (remediation and up-scaling) is emphasised in the policy of a number of provinces. These are often complex projects from a spatial and financial perspective.

Energy production in SDE+, SDE and MEP projects: 2010-2013

MEP, SDE and SDE+ subsidies were allocated for a combined total of 3,563 MWe in wind capacity late 2013. Onshore wind accounts for 75 percent of the capacity, whilst offshore wind parks generate 25 percent. Over half of this capacity was taken into production towards the end of 2013, including 2 offshore wind parks (228 MWe).

High realisation levels for wind projects

A great deal of the subsidised capacity will actually be realised. 228 MWe was awarded under the MEP scheme for offshore wind, and was realised. 3 offshore wind parks have been allocated in the SDE tender of 2009. 2 Gemini-wind parks are planned north of Schiermonnikoog with a total capacity of 600 MW. Wind park Luchterduinen, with a total capacity of 129 MW, is in the planning stages and will be constructed on the North Sea. The full capacity from the 2009 SDE tender for offshore wind will be realised upon completion of the three parks.

The forecasted realisation of onshore wind is also expected to be high. In excess of 430 MWe of the total 466 MWe allocated subsidies from the SDE 2009 budget has not yet been realised. The vast majority of the allocated capacity relates to a cluster of 5 wind parks situated in the Noordoostpolder, with a combined capacity of 429 MWe. The construction of these parks is making real progress. 3 projects from the 2011 SDE budget are currently still in the pipeline.

Table 4: Realised allocated onshore wind projects - SDE+, SDE and MEP

Onshore wind capacity	*MEP*	*SDE 2008*	*SDE 2009*	*SDE 2010*	*SDE+ 2011*	*SDE+ 2012*	*SDE+ 2013*
Allocated capacity (MWe)	1,131	46	466	459	109	2	402
Realised capacity (MWe)	1,131	46	36	431	83	2	5

Production figures and cash expenditure

Figure 11: **Wind energy – electricity production SDE+, SDE and MEP**

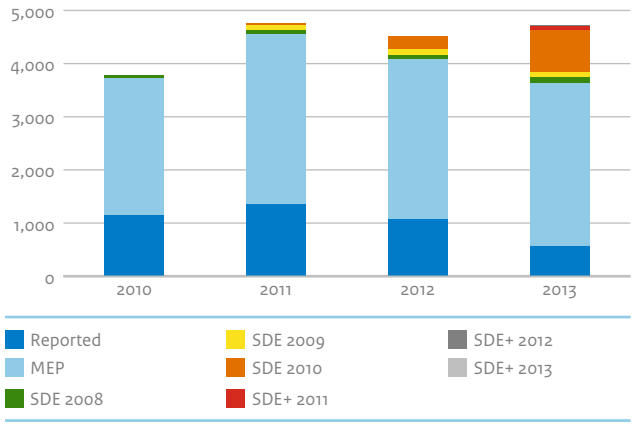
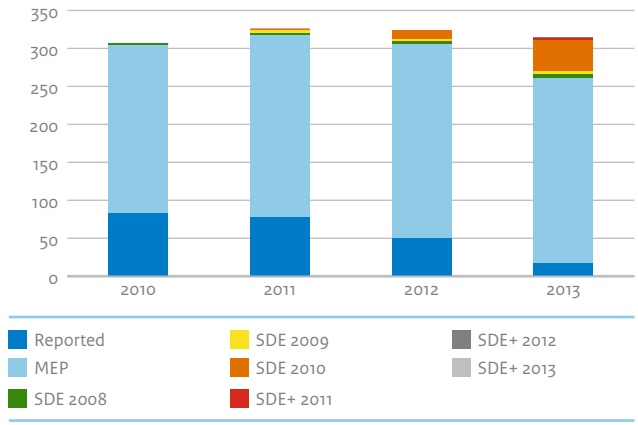


Figure 12: **Wind energy – cash expenditure SDE+, SDE and MEP**



The subsidised projects together produced 4,710 million kWh in 2013. This is equivalent to the annual electricity requirements of 1.4 million households. The avoided CO_2 emissions are equivalent to the emission produced by circa 870,000 petrol cars.

In 2013, nearly half of the cash expenditure for renewable energy was spent on wind projects. The overall expenditure for wind projects under the MEP, SDE and SDE+ schemes amounted to 314 million euros in 2013. 83 percent of this expenditure concerns projects that were subsidised in the MEP scheme.

Electricity production equal to: Consumption of 1.4 million households

Avoided CO_2 emission: Emission of 870,000 petrol cars

Geographical spread

Out of all the SDE+, SDE and MEP subsidised projects generating electricity from wind in 2013, almost 30 percent was realised in North Holland, followed by the provinces Flevoland with a 19 percent share and Groningen with an 18 percent share. In 2013, State and provincial departments have made agreements regarding the allocation of sufficient locations to facilitate the generation of 6,000 MWe in onshore wind energy.

Wind energy production SDE+, SDE and MEP 2013

Table 5: **Geographical spread of onshore wind energy (MW)**

Province	*Installed capacity end 2012*[1)]	*State agreements - IPO agreement pre 2020*[2)]
Flevoland	646	1,390.5
Groningen	377	855.5
South Holland	250	735.5
North Holland	347	685.5
Zeeland	241	570.5
Friesland	164	530.5
North Brabant	82	470.5
Other provinces	100	762.5[3)]
Total	**2,206**	**6,001**

1) *Source: CBS*

2) *Source: IPO*

3) *Gelderland (230.5 MW), Drenthe (285.5 MW), Utrecht (65.5 MW), Overijssel (85.5 MW), Limburg (95.5 MW)*

Alternative government support for wind energy

Alternative governmental instruments are also used to support wind energy projects. The EIA and the Green Funds scheme are the two most important additional financial instruments. Applying the State coordination scheme may substantially reduce the lead-time of the wind energy projects (for detailed information on these schemes please consult *the Glossary*).

Energy Investment Allowance and the Green Funds scheme

Over the past few years, the EIA has been used extensively in wind energy projects. The total reported capital investment was 49 million euros in 2012 and 418 million euros in 2011.

The average project capital for wind projects per green certificate has increased from 4 to 5 million euros in 2009-2010, to 9 to 15 million euros in 2012-2013. This is a clear indication that the wind projects are becoming increasingly bigger in scope.

Table 6: **Reported EIA investments and the Green Funds scheme for wind energy**

	2009	2010	2011	2012	2013
EIA					
Reported investments (million euros)	54.6	78.0	417.8	48.8	*)
Number of reported investments	81	147	245	53	*)
Green Funds scheme					
Allocated project capital (million euros)	52.4	43.4	83.7	105.1	312.4
Number of awarded certificates	12	10	12	12	21

*Source: EIA and Green Funds scheme Annual reports. *) EIA data for 2013 is not yet available*

State co-ordination scheme

Wind parks with a capacity over 100 MW automatically fall under the State co-ordination scheme. The scheme resulted in 4 completed licensing procedures – two offshore wind parks (Gemini and Luchterduinen) and two onshore wind parks (Prinses Alexia Windpark and Windpark Noordoostpolder) – 5 projects are still in progress. Applying for the State coordination scheme may substantially reduce the licensing procedure. This is also substantiated in the before mentioned interview on the Prinses Alexia Windpark.

> Solar energy

Crowd funding for solar panels on a football stadium

Banks and other major investors are bound by strict rules. This can make it more difficult for these parties to finance sustainable energy projects, like solar power projects. Therefore, project developers are looking for alternative sources of financing; a large solar power project in Groningen exists because of crowd funding.

Solar bonds

The roof of Groningen's football stadium Euroborg is, in stages, being fitted with a solar power capacity of 400 kilowatt peak. A large group of citizens and businesses put together the required capital. "In the first phase a group of 200 participants invested in 531 solar panels by purchasing special solar bonds, so called ZoNbligations (a contraction of the Dutch word for sun and bond)", explains Sven Pluut of the crowd funding platform Zonnepanelendelen (solar panel sharing). The call for the second round of applications is currently underway. This allows households and businesses that don't have a suitable roof to still generate their own solar power."

> *Households without their own roof are still able to generate solar power this way<*

Solar interest

"Good partners are an essential ingredient for success", Pluut continues. FC Groningen has committed itself to procuring the green energy produced till 2037. Stadium owner Euroborg granted permission for the installation of the panels. Essent used its client base to attract crowd funders to whom they offer an attractive return on investment. Investors, with financial support of the SDE and the Energy Investment Allowance (EIA), make an expected return on investment between 2.4 and 4 percent depending on the development of electricity prices. Essent then offsets the so-called solar interest against the client's energy bill.

Production and Savings

The participants have the ability to monitor the energy production of 'their' solar panels online and compare these figures with their own usage, as well as that of participants with a similar profile. "In the future we also want to provide targeted energy saving advice" says Pluut. "Apart from generating sustainable energy, we would also like to realise savings for the participants. This way the crowd funding scheme does not only contribute to a growth in sustainable energy production, but also stimulates energy saving.

> Solar energy

1. Solar power

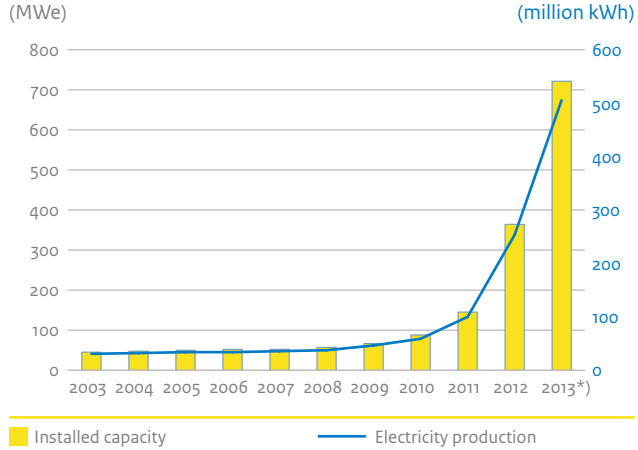
The growth of solar power in The Netherlands

Solar power has seen significant acceleration over the last few years. In 2011, growth in production measured 68 percent, in 2012 this figure increased to 150 percent and in 2013 the installed capacity has almost doubled. This growth can be mainly attributed to local, grid-connected projects. Towards the end of 2013, the estimated total installed capacity was 722 MWe.

Production figures and avoided CO_2-emissions

The total solar power electricity production was estimated to be 505 million kWh in 2013. This is equivalent to the annual electricity requirements of 153,000 households. The avoided CO_2 emissions are equivalent to the emission produced by 93,000 petrol cars.

Figure 13: **Installed capacity and electricity production using solar power – CBS Statline**



**) Data for 2013 is provisional.*

Electricity production equal to: Consumption of 153,000 households

X 10,000

Avoided CO_2 emission: Emission of 93,000 petrol cars

X 10,000

Solar power market developments

An increasing number of new players have entered the market for solar power over the last few years. Entrepreneurs, private citizens, energy corporations and housing associations each invest in solar power projects for their own reasons, for example, to accelerate the local energy supply, to be less dependent on the central electricity supply, or alternatively to be part of an attractive local initiative. The government supports this last group by making participation in collective projects easier and more attractive through the provision of netting schemes and subsidy programmes (also see Realisation and decline in costs and subsidies).

Decrease in price levels and market anxieties

The decline in prices for solar panels has contributed to growth of solar energy production. Prices dropped substantially in 2011 and 2012 and were highly volatile in 2013. This volatility was largely due to a dispute between the European Union and Chinese manufacturers of solar panels. At the end of 2013, a trade agreement was reached that brought stability to the prices. The cost price of a kWh of solar power currently stands at roughly 15 euro cent. An investment, at an average electricity price of 21 euro cent for households, is recuperated well within the natural life span of the solar panels.

Energy production in SDE+, SDE and MEP projects: 2010-2013

The SDE+, SDE and MEP schemes have allocated subsidies for 221 MWe in solar power projects. Over half of this was allocated in 2013. The low number of solar power projects in 2012 can be explained by the large number of applications for renewable heat and biomass combined heat and power installations. These types of projects could apply for SDE+ subsidy for the first time in 2012, which subsequently happened en masse. 97 percent of the total budget was allocated to projects in these categories. This resulted in the subsidy budget being already depleted in phase 1. The 2013 budget was only depleted by phase 6, which resulted in 661 positively approved solar power projects.

Decrease in solar panel cost

Stichting Monitoring Zonnestroom (Foundation for the Monitoring of Solar power) researched the cost price of solar panels between October 2011 and October 2013. Conclusion: the price of panels per Watt peak declined from 2,29 euro in October 2011 to 1,07 euro in October 2013 – a decline of 53 percent.

Such a number of renewable energy projects were allocated in phase 1 of the SDE+ in 2011, that projects for solar power were only allocated in phase 1 and 2, for base amounts of 9 and 11 euro cent per kWh respectively.

(Source: Stichting Monitoring Zonnestroom)

Realisation and decline in costs and subsidies

Many of the *allocated solar power projects* from the previous years (pre 2011) have been realised. 70 percent of the 2011 SDE+ projects have been realised up to now.

Many of the 2013 solar power projects were allocated in phase 5 and 6 for base amounts of 13 and 14,8 euro cents per kWh respectively. The expected realisation levels are high for this year (2013).

Production figures and cash expenditure

Figure 14: **Solar power (solar-PV) – electricity production SDE+, SDE and MEP**

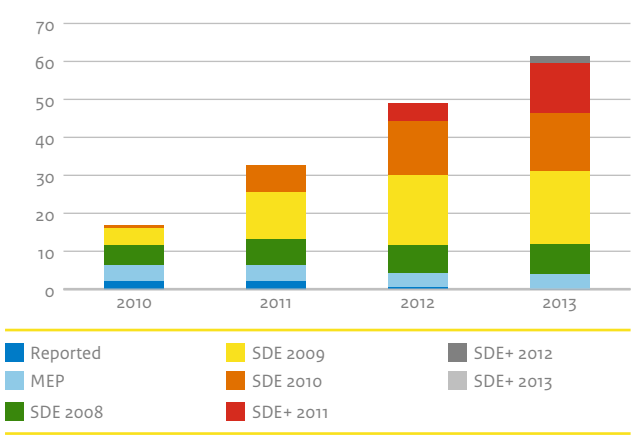
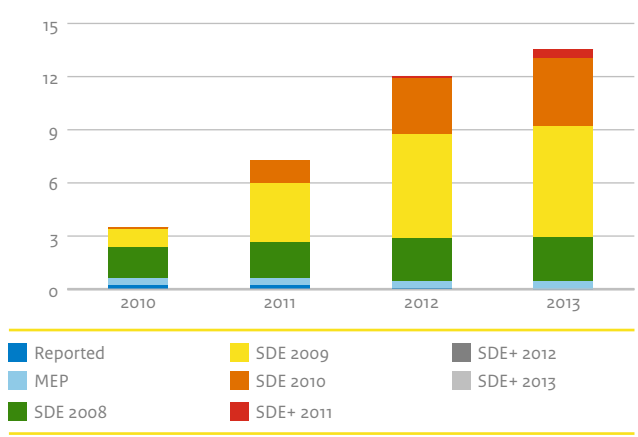


Figure 15: **Solar power (solar-PV) – cash expenditure SDE+, SDE and MEP**



The total production from SDE+, SDE and MEP subsidised solar power projects was well over 61 million kWh in 2013. This accounts for some 10 percent of the total solar power production in 2013. This is equivalent to the annual electricity requirements of almost 19,000 households. The annually avoided CO_2 emissions are equivalent to the emission produced by circa 11,000 petrol cars. Nearly 80 percent of the solar power production in 2013 is generated from projects that have received a positive SDE decision in the period between 2009-2011. A total amount of 13.6 million euros in subsidies for solar power was allocated in 2013.

Electricity production equal to: Consumption of 19,000 households

Avoided CO_2 emission: Emission of 11,000 petrol cars

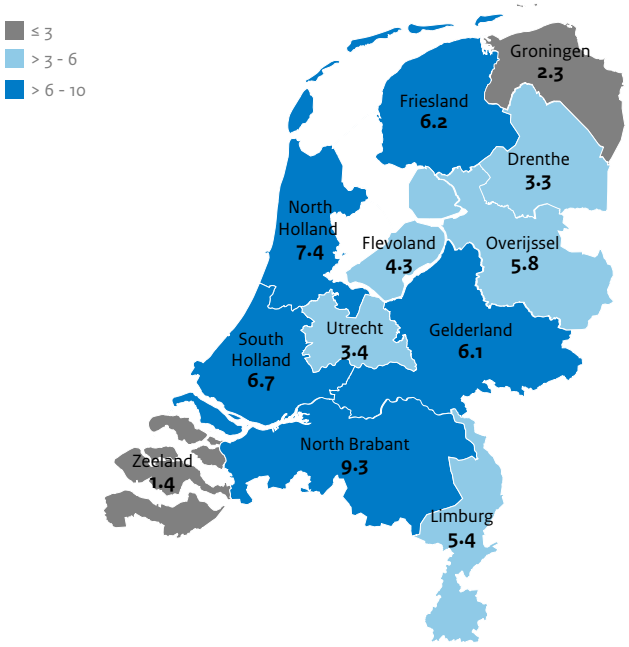
Table 7: Realised projects allocated solar-PV - SDE+, SDE and MEP							
Solar power capacity	*MEP*	*SDE 2008*	*SDE 2009*	*SDE 2010*	*SDE+ 2011*	*SDE+ 2012*	*SDE+ 2013*
Allocated capacity (MWe)	9	10	22	18	23	8	132
Realised capacity (MWe)	9	10	22	17	16	2	3

Geographical spread

The geographic spread of the solar power projects is smaller than that in other renewable energy categories. The provincial contribution to the total Dutch production varies from 2 percent in Zeeland to 15 percent in North Brabant.

Production solar-PV SDE+, SDE and MEP 2013

Solar energy (million kWh)



Alternative government incentives for solar power

The government supports solar power in a number of ways on top of the MEP, SDE and SDE+. The government also supports solar power through: the Energy Investment Allowance (EIA), the Green Funds scheme, exemptions on energy tax and the Solar panel subsidy scheme which ran until the 8th of August 2013. In addition there are a large number of provincial and municipal subsidy schemes available (see pages 9-10 for further details).

Energy Investment Allowance & the Green Funds scheme

The number of applications for solar power projects has risen sharply for both the EIA as well as the Green Funds scheme over the past few years. The reported average investment amount for the projects applying for EIA shows a downward trend due to a declining cost price.

Netting and energy tax exemptions

Homeowners and tenants with their own solar panels are exempt from energy taxation for the electricity they have generated. They are allowed to deduct their private use from the generated electricity. This process is commonly known as netting or offset. An advantage of this process is that the value of the electricity that is fed back to the grid is determined by the price of electricity including tax and transport costs. For households this is about 23 euro cent per kWh, including a 11.65 euro cent per kWh energy tax component. Netting was limited to 5,000 kWh until the end of 2013. The over production was calculated at a lower price. The electricity generated may be unlimitedly netted with the personal use from 1 January 2014 onwards.

Subsidieregeling Zonnepanelen

In 2012 and 2013, private individuals had the opportunity to reclaim up to 15 percent of the purchase price of solar panels as part of the *Solar panel subsidy scheme*. The State made over 50 million euros available in support. The subsidy scheme came to an end in August 2013 as the available budget had depleted.

***Table 8:* Number of applications and reported investments for solar power in the EIA and the Green Funds scheme**

	2009	*2010*	*2011*	*2012*	*2013*
EIA					
Reported investments (million euros)	€ 14.2	€ 32.1	€ 64.0	€ 89.4	*)
Number of applications	292	760	1,737	3,538	
Green Funds scheme					
Allocated project capital (million euros)	€ 3.1	€ 2.4	€ 20.0	€ 7.4	€ 14.2
Number of certificates issued	31	30	14	23	182

*Source: EIA and Green Funds scheme Annual reports. *) EIA data for 2013 is not yet available*

VAT & tax exemption and the postcode cluster

The developments:

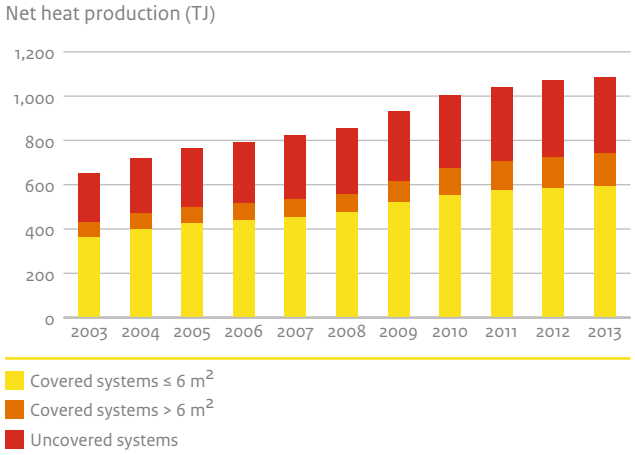
VAT exemption: *In June 2013, the European court has decided that VAT may be reclaimed over the purchase and installation of solar panels. This is possible from the perspective that everyone who supplies electricity is seen as a VAT-entrepreneur. Private individuals are required to ask for an exemption under the Small-entrepreneurs scheme (Kleine-ondernemersregeling) for the re-supplied energy. This exemption has a maximum of 1.345 euros.*

Changes in the tax exemption decision: *The tax exemption decision currently only applies to homeowners and tenants who have their own solar panels. The cabinet is planning to make the decision available for tenants whose landlord has installed solar panels from 2015 onwards. The possibility for 'netting' is ensured by the minister till 2017. In June 2013, the minister announced that he will review the scheme in 2017.*

The postcode cluster: *A tax discount of 7.5 euro cent per kWh was agreed in the SER Energy Agreement for re-supplying renewable energy by a cooperation or owners association (VvE). This agreement came into force 1 January 2014. The discount applies only when the energy is used by small users whose Owner Association members are situated within the so-called postcode cluster (4 digit postcode and the adjacent postcodes) and only for the electricity that is supplied back to the grid. Financing this scheme means that the energy taxation increases. Those opposing the scheme believe that the discount should also apply for entrepreneurs or find the scheme too complex. It is decided in the Energy Agreement that research into the possibility of allowing the discount to apply for corporate small users and the rental sector must be explored.*

2. Solar thermal energy

Figure 16: **Heat production that makes use of solar systems – CBS Statline**



Solar thermal energy growth in The Netherlands

Solar thermal energy accounts for 1 percent of The Netherlands' total renewable energy production. The market is growing steadily: over the previous 10 years, annual recorded growth is between 3 and 10 percent.

Heat production equal to:
Natural gas use of 21,000 households


X 10,000

Avoided CO_2 emission:
Emission of 18.000 petrol cars


X 10,000

Production figures and avoided CO_2-emissions

The total solar thermal energy production was 1,087 terajoule in 2013. This equals the annual natural gas use of 21,000 households. The annually avoided CO_2 emissions are equivalent to the emission produced by nearly 18,000 petrol cars.

Solar thermal energy market developments

35 percent of the solar thermal systems use uncovered collectors. These are primarily used for the heating of pools. Uncovered collectors have also started to be used for solar thermal roofs over the last few years. Solar thermal roofs are achieved by integrating the collector in the roofing material. Smaller closed off systems (solar boilers) are primarily used in homes for the supply of warm water for showering or space heating. These systems account for a constant 55 percent of the total solar thermal energy production which make use of solar collectors. The remaining 10 percent is generated by larger closed off systems. These systems are predominantly used in non-residential construction and industry for warm water, cooling and drying purposes.

Lower solar thermal energy growth than expected

Experts had expected an increase in solar thermal energy growth during the last few years, especially in relation to its utilisation in the construction of new buildings. Economic recession and the resulting stagnation within the building sector cancelled out the expected growth.

Energy production from SDE+, SDE and MEP projects: 2010-2013

Since 2012, solar thermal energy projects with an aperture surface of 100 m² or over are eligible for SDE+ subsidy. 2 applications were received in 2012 which both have been positively approved. Together they have a total production capacity of 11 terajoule. 5 projects were allocated for a maximum eligible production of 66 terajoule in 2013. A total budget of 1 million euros has been made available for these projects. There was no cash expenditure in 2013 as none of these projects had been realised at the time.

Large solar thermal energy projects in The Netherlands

Solar thermal energy is regularly utilised in solar boiler applications on the roofs of houses. The number of larger scale projects is however growing. Some examples:

- *Since 1997, the Perfetti van Mella confectionery factory in Breda has a solar boiler system in use with a 2,400 square meter collector surface. This warms 125 thousand litres of water and saves circa 170,000 cubic meters in natural gas per year.*
- *Zoneiland Almere (Solar Island Almere) was opened in 2010. 10 percent of the water requirements of 2,700 households in the adjacent residential area is supplied by 520 solar collectors. The collector surface is 7,000 square metres and produces 9,750 gigajoule annually.*
- *The energy system of residential complex Het Breed in Amsterdam-North has been made more sustainable in 2013. The total 1,200 square meters in solar collectors now supplies the tap water for 1,176 homes.*
- *The roof of public pool Zwembad Overbosch in The Hague contains 720 square meters of solar collectors. This saves roughly 100,000 cubic metres in natural gas per year.*

Alternative government incentives for solar energy

The government actively stimulates solar thermal energy both through subsidies and by guarding the quality.

Energy Investment Allowance and the Green Funds scheme

31 million euros in investments were reported in the EIA in the 2009-2012 period. The number of reports and investments has doubled between 2011 and 2012. 28 certificates were awarded under the Green Funds scheme for projects that use solar collectors, with a combined project capital of 8.3 million euros in the period 2009-2013. (Also see the explanation on page 9-10).

Quality register installation engineers

There is a training and qualification structure for installation engineers since 2013. Installation engineers that fulfil the quality requirements may register as a 'qualified installation engineer for photovoltaic and thermal solar energy power systems'. Other techniques are also included in the qualification such as the installation of small-scale warm water and heating boilers that run on biomass, soil energy and heat pumps. The *quality register* publishes a list with acknowledged courses, examining bodies and certified installation engineers. This eases finding competent installation engineers. The register also provides an overview of the various quality labels like *Zonnekeur*. This tool actively assists the solar sector in improving its quality.

Table 9: **Number of applications and reported investments for solar thermal projects in the EIA and the Green Funds scheme**

	2009	2010	2011	2012	2013
EIA					
Reported investments (million euros)	€ 6.3	€ 8.3	€ 5.1	€ 11.1	*)
Number of applications	129	210	309	720	
Green Funds scheme					
Allocated project capital (million euros)	€ 1.4	€ 1.7	€ 1.2	€ 0.2	€ 0.7
Number of certificates issued	7	8	6	1	6

*Source: EIA and Green Funds scheme Annual reports. *) EIA data for 2013 is not yet available*

> Geothermal energy

Cost savings by local sustainable energy management

Agriport A7 is situated alongside the A7 motorway in North Holland. This business park and green house horticulture area is renowned for being the most modern in the world. All the energy is locally generated and supplied through its own grid. ECW, the local power company, allows for this to be done in the most efficient and sustainable way.

Local grid management

Electricity and gas have been independently generated since Agriport A7's opening in 2006 and geothermal heat has recently been added. "We do what is right for the area and do what individual companies perhaps are unable to do themselves, or what we can do more efficiently" according to Robert Kielstra, director of Energy Combination Wieringermeer (ECW). "We are able to generate energy as efficiently as possible by matching supply and demand. We save on both production and grid costs and make active use of the waste flows for heat, process water and CO2. Cost savings and sustainability join forces here. This benefits all of the customers."

Geothermal heat is relatively complex

ECW was allocated in the SDE 2012 and 2013 for four geothermal heat projects. "The first two boreholes (doublets) have been drilled and we recently began producing geothermal heat", Kielstra explains. "As soon as we have acquired enough experience we will commence with the other two. This educational process is important, as geothermal energy is technically much more complex than wind energy for example. The risks, like that of unsuccessful drilling, are higher and results are less predictable. Subsidies are therefore crucial: without the SDE and the Energy Investment Allowance these projects would not have been feasible. The MEI, an innovation subsidy for the green house horticulture sector, was a deciding factor in the pre-financing of these projects."

Locational advantages

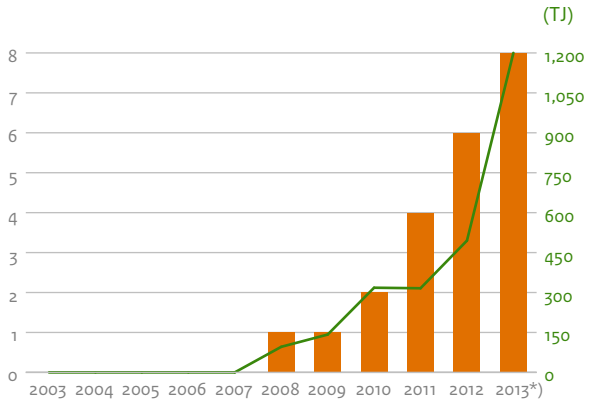
Further efficiency will be achieved by ECW as the central trade system is optimised for the trade in heat by the end of 2014. The organisation also looks to increase its geothermal energy production in the future. "The technical foundations have been laid, the challenge is financing" says Kielstra. Microsoft meanwhile is building one of Europe's largest datacenters at Agriport A7. The efficient supply of energy was an important factor in the decision to build here. "Our challenge is to make the operation even more sustainable, efficient and cost effective. New clients and suppliers for energy and water, but also, producers of CO2 are of course more than welcome."

> *Cost savings and sustainability join forces here* <

> Geothermal energy

1. Deep geothermal energy: geothermal power

Figure 17: **Number of geothermal installations and heat production – CBS Statline/RVO.nl**



**) Data for 2013 is provisional.*

Heat production equal to: Natural gas use of 23,000 households

X 10,000

Avoided CO_2 emission: Emission of 20,000 petrol cars

X 10,000

Geothermal energy growth in The Netherlands

Geothermal energy projects make use of energy that is stored in the soil. In these projects warm water is pumped from the earth, made valuable use of before pumping the cooled-off water back into the soil. The generated heat can be directly used for heating or cooling purposes. The heat may also be used for generating electricity. For geothermal energy one must drill two wells through natural aquifers. One well is designed for pumping the warm water up, whilst the other is used for pumping the cooled-off water back.

Production figures and avoided CO_2 emissions

Geothermal energy production is relatively new to The Netherlands. The first project was realised in 2008. There were 6 projects with a combined production of 485 terajoule in 2012. The production rose to 1,200 terajoule in 2013 and 8 projects were realised: 5 of these projects are situated in South Holland, 1 project was realised in the horticultural industry in Overijssel and 1 project makes use of mine water from submerged mines in Heerlen, Limburg. In 2014, the production will increase in number, with some projects set to be completed. Amongst which new projects situated in North Holland. The total production of 1,200 terajoule equals the annual natural gas requirements of 23,000 households. The avoided CO_2 emissions are equivalent to the emission produced by circa 20,000 petrol cars.

Geothermal energy market developments

An important application of geothermal energy in The Netherlands is found in the greenhouse horticulture industry. This relatively energy intensive sector has a constant and concentrated demand for low-temperature heat. Most of the new projects are also found in the greenhouse horticulture industry. Over 90 percent of the applications for the support of geothermal energy projects in the SDE+ derives from this sector.

Unsuccessful drilling risk

Geothermal energy projects are believed to have a higher risk profile than many other renewable energy projects. This can partly be explained by the fact that there is relatively little experience with geothermal energy in The Netherlands. The biggest risk factor is the cost associated with the drilling of the wells. Drilling accounts for a large proportion of the development cost. And whilst the chances of unsuccessful drilling might be limited, the effects of this happening would have major financial implications. In the case of unsuccessful drilling, the quantities of warm water found would be insufficient to make the project economically viable. Extensive geological research limits the chances of this happening. However, the risk involved is often too steep for many parties in the market, especially with deep strata geothermal energy. Therefore, the national government and several provinces have schemes in place that partly mitigate the risks of unsuccessful drilling.

Energy production in SDE+, SDE and MEP projects: 2010-2013

Geothermal energy has been included in the SDE+ since 2012, therefore, only a small number of projects have been realised. 44 projects have been allocated so far with a total committed capacity of 521 MW. 93 MW has been realised so far and a number of projects are currently still being developed. The relatively limited experience in The Netherlands sometimes causes delays. Important factors of these delays were the scarce drilling capacity available and insecurities regarding the capacity calculations of the found sources. 2 projects with a combined capacity of 28 MW have been withdrawn.

Geothermal energy in the SDE+ 2013

3 Geothermal energy categories are listed in the SDE+ 2013:

- *Geothermal heat with a minimum depth of 500 meters*
- *Geothermal heat with a minimum depth of 2,700 meters (deeper geothermal energy)*
- *Geothermal combined heat and power installation*

Deeper geothermal heat is a new category in the SDE+ of 2013. In 2014, the minimal depth has been increased to 3,300 metres. The SDE+ 2013 capped the eligible production. This means that there is no subsidy for production over this maximum quota.

Production figures and cash expenditure

Figure 18: **Geothermal – heat production SDE+**

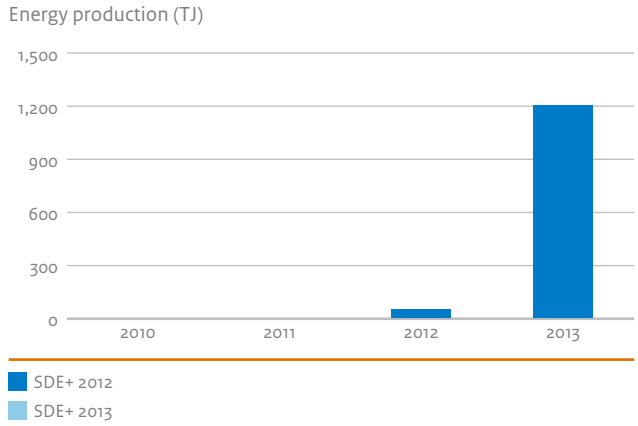
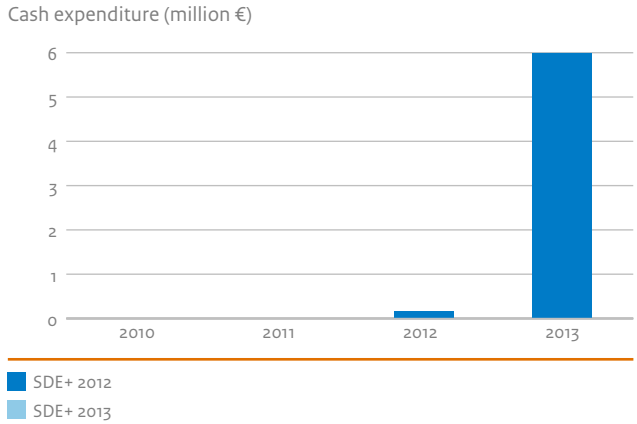


Figure 19: **Geothermal – cash expenditure SDE+**



Half of the SDE+ budget was allocated to geothermal projects in 2012. All of these projects were allocated in the first phase. In 2013, 14 percent of the available budget was allocated to geothermal projects. The projects that have been awarded SDE+ subsidies produced a total of 1,200 terajoule in renewable heat. The paid out subsidies in 2013 was more than 5.8 million euros.

Geographic spread

The Netherlands has a relatively high potential for the development of geothermal energy. Geothermal projects are a comparatively affordable way of generating renewable energy, especially when there is a constant and concentrated demand for low temperature heat. The largest share of this potential is being developed in South Holland, because of its concentrated green house horticulture sector. 23 out of the 44 allocated applications came from South Holland. This is reflected on the next page.

Geothermal production SDE+ 2013

Subsidised projects that have been realised and generated heat in 2013 are situated in Limburg, Overijssel and South Holland. These projects account for 4, 10 and 86 percent of the total energy production respectively.

Alternative government incentives for geothermal projects

In addition to the SDE+ subsidies, the government supports geothermal projects in a number of ways. Good examples of this support are: the Green Funds scheme, Geothermal Action plan, making data available regarding the location of geothermal potential, agreeing Green Deals and information programmes like 'The greenhouse as a source of energy'.

SEI Geothermal heat

The *SEI regulation*. (mitigating geothermal heat risks) started in 2009. This guarantee scheme insures the risk of unsuccessful drilling. The project developer pays a premium, but is compensated when the drilling result is not as expected. The compensation is dependent on the results of the drilling and the costs incurred. When it is possible to use the wells for an alternative application – for example for heat and cold storage - then the compensation will be adjusted on the basis of the residual value of the alternative application.

2013 was the third year the SEI regulation has been opened. A tender procedure allowed project developers to register for a single doublet or a half doublet. The maximum compensation in the case of miss drilling is dependent on the depth of the borehole: 7.25 million euros for depths up to 3,500 meters and 12.75 million euros in cases with a depth larger than 3,500 meters. The total available budget was 43.75 million euros, of which 12.75 million was reserved for deep drilling projects.

Greenhouse as a source of energy

The Greenhouse as a source of energy (Kas als Energiebron) is an innovation and action programme designed for the greenhouse horticulture sector. It supports the sector in realising objectives relating to energy savings and reductions in CO_2 emission. The programme also contributes towards the development of expertise, the sharing of knowledge and innovation and realisation. Marktintroductie Energie Innovaties (MEI – Market Introduction Energy Innovations scheme) under the scheme made subsidies available for investments in innovative energy systems for the greenhouse horticulture sector in 2013. The main advantage for project developers was that this subsidy was already given in the development phase and thereby lowers the investment costs and associated risks.

Energy Investment Allowance and the Green Funds scheme

The Green Funds scheme has issued 6 certificates for geothermal projects. 1 project with a (project) capital of 4.8 million euros in 2010. 5 green certificates were issued in 2013

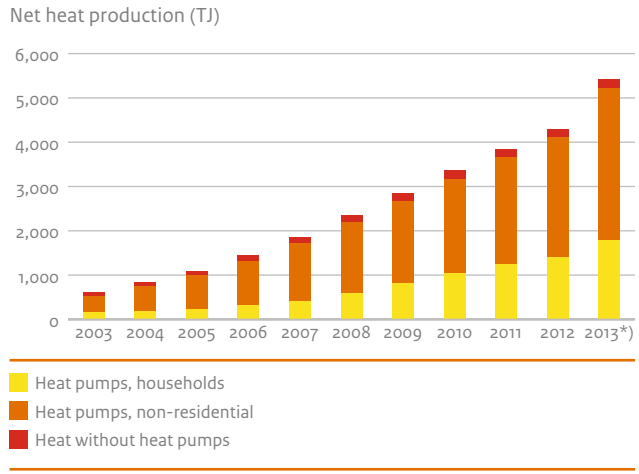
for projects with a combined total project capital of over 29.5 million euros. Geothermal projects are also reported for the EIA. Distinguishing between deep and shallow strata geothermal energy is however not possible for this scheme (see explanation page 9-10).

2. Shallow geothermal energy

Shallow geothermal energy growth in The Netherlands

Geothermal energy generates heat or cold from the shallow soil. This heat or cold is then cooled or heated using a water pump and is subsequently used for the heating or cooling of homes or other buildings. A third smaller category is geothermal energy that is used without the need for a water pump. This is the case with the pre-heating of ventilation air. The contribution of shallow geothermal energy to the overall renewable energy production in The Netherlands is still relatively low with a share of around 3 percent in 2012. The growth is strong however: the production has grown nine-fold in the last 10 years.

Figure 20: **Shallow geothermal heat production – CBS Statline**



**) Schatting van productie in 2013 op basis van opgesteld vermogen.*

Production figures and avoided CO_2 emission

The total production of shallow geothermal energy was 5,436 terajoule in 2013. A third is used for the building of homes; two-thirds is used for non-residential construction. The share of geothermal energy not using water pumps is circa 4 percent. The number of these types of systems has not grown over the last few years. The total production was sufficient to supply 107,000 households with a year's supply of natural gas. This avoids an annual amount of CO_2 emissions equivalent to the emission of almost 92,000 petrol cars.

Heat production equal to: Natural gas use of 107,000 households

Avoided CO_2 emission: Emission of 92,000 petrol cars

Shallow geothermal energy market developments

Shallow geothermal energy is most profitable when the demand for cold and heat is relatively constant and when the building is suitable to low temperature heating. Only 3 percent of the Dutch buildings make use of shallow geothermal energy, despite a much larger potential.

Open and closed geothermal systems

The market distinguishes between open and closed systems. Open systems extract groundwater which is subsequently pumped back. Closed systems do not extract groundwater but run fluids through pipes that run through the soil. In the period 2009-2013, between 1,500 and 3,000 open systems have been taken into use annually. These systems are particularly used in commercial and industrial buildings as well as in the green house horticultural industry. In the same period, the number of closed and open systems grew with 5,500 to 6,000 per year. These systems are used predominantly in the construction of homes.

Alternative government incentives for geothermal energy

Shallow geothermal energy is not supported in the SDE+ but is supported in other ways like in the EIA and the Green Funds scheme (also see page 9-10).

Over 200 million euros in investments, for a variety of geothermal techniques, were reported for the EIA in the period 2009-2012.

The Green Funds scheme over the years has financed between 5 and 7 million euros annually for projects that use heat pumps. In 2013, there were 12 projects with a combined total budget of 5.8 million euros.

Table 10: **Number of applications and reported investments for shallow geothermal energy techniques in the EIA and the Green Funds scheme**

	2009	2010	2011	2012	2013
EIA applications					
Geothermal heat generation systems	46	77	87	137	
Heat or cold storage in the soil (aquifer)	64	68	52	66	
Ground heat exchangers	11	23	11	10	
Reported Investment amount (million euros)					
Geothermal heat generation systems	€ 10.3	€ 27.1	€ 29.7	€ 37.3	
Heat or cold storage in the soil (aquifer)	€ 20.7	€ 24.2	€ 20.5	€ 27.0	
Ground heat exchangers	€ 0.9	€ 1.7	€ 1.6	€ 0.6	
Number of applications under The Green projects scheme					
Geothermal	0	1	0	0	5
Heat pumps	27	16	11	13	12
Reported investment amount The Green projects scheme					
Geothermal	€ 0.0	€ 4.8	€ 0.0	€ 0.0	€ 29.7
Heat pumps	€ 17.7	€ 17.0	€ 5.3	€ 7.2	€ 5.8

Energy presentation of geothermal energy systems

In 2011, a practical study by RVO.nl demonstrated that 70 percent of the systems offered lower returns than what was expected. The quality of the management and maintenance of the systems being below par was a major cause. Open systems displayed an additional cause namely interference with neighbouring systems. Water from a warm well mixes with water from a cold well which limits the performance of these systems. In 2013, new legislation was passed by the government for these reasons.

Source: RVO.nl

Quality requirements and mandatory licences

New rules apply from July 2013 onwards to safeguard the quality of shallow geothermal energy. Smaller closed sources up to 70 kW now require notification whilst larger closed sources must apply for a license. Open systems were required to have licenses already from 2009 onwards. Companies that work on geothermal energy systems must be certified since 1 July 2013. After 1 July 2014, companies that are not certified will no longer be allowed to operate in the sector. Since 2011, certification was already mandatory for companies that performed drilling operations. Provinces and municipalities were given the power, through zoning plans, to guide or prohibit the location of new sources.

Geographical spread

The Dutch soil is highly appropriate for shallow geothermal energy. Aquifers are too shallow or unavailable in only 5 percent of the country. This is the case in, for example, the eastern part of Gelderland, Overijssel and Drenthe, de Peelhorst in North Brabant and parts of Limburg (source: KWR, 2010). The majority of the larger systems are located in South Holland, North Holland and North Brabant.

> Biomass

Combined green activities bigger than the sum of their parts

Smits Group, a multi-faceted family owned business, is situated on the historic estate Princepeel, in the town of Wilbertoord in North Brabant. The business grows, amongst others, potatoes and sugar beets, keeps pigs, recycles foodstuffs and produces biogas. The synergy between these activities allows for a sustainable business operation.

Optimum use of resources

"The Smits family has been running an arable farm and keeping pigs here since the 80's" explains the manager. "Foodstuffs recycling, biomass fermenter and combined heat and power system installations were added over the years. This combination allows us to make optimum use of the flow of resources." The biomass fermenters run on a mixture of pig manure, arable produce and organic residual produce from the foodstuffs recycling. Smits Group is supported through the MEP and SDE, which made it financially possible to invest in biomass fermenters and CHP-installations.

For private use and the national grid

Five gas-fuelled engines converte the produced biogas into electricity and heat. The green electricity is predominantly fed back to the national electricity grid, whilst the produced heat is for private use. "The heat is used for heating the biomass fermenters, pasteurising and drying of the digestate – a residual product that remains after the fermentation process – and for the nitrogen processing of the thin fraction of manure. The dry digestate is mainly exported as fertiliser to France. The thin fraction goes to arable farms just across the border in Germany.

> *This combination allows us to make optimum use of the flow of resources<*

Transport costs cut in half

Since 2012, the farm receives SDE support for the extension of the heat utilisation. "This enables us to reduce the moisture content value of the digestate from 70 to 30 percent", according to the manager. "This allows us to half the number of transports and the cost for the phosphor and potassium rich digestate that is exported to France as fertiliser. This results in substantial environmental benefits."

> Biomass

Nearly three quarters of our renewable energy supply is generated using biomass. Biomass is used for generating electricity and heat as well as for the production of biomass fuels for the transport sector. Biogas is also used for the production of both electricity and heat; therefore it is included in both the overviews below.

1. Biomass electricity

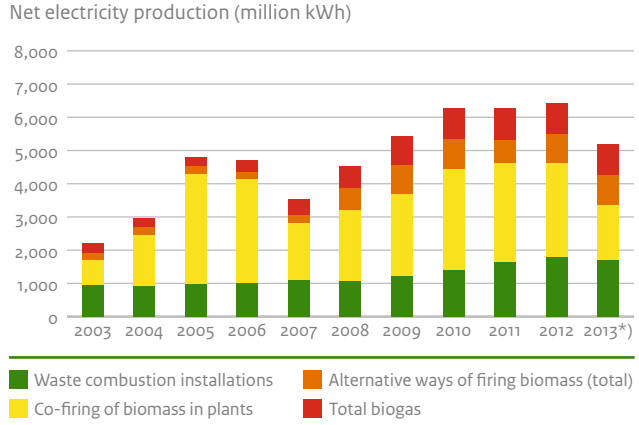
Biomass electricity growth in The Netherlands

For the period 2003-2005, the generation of electricity from biomass has more than doubled. A steep decline in 2007 was followed by a period of steady growth in production between 2007 and 2010. Production has remained relatively constant over the last few years, but has declined some 20 percent in 2013. This is due to a decline in the energy production by co-firing biomass of almost 40 percent compared to the prior year. This can be explained by changes in the stimulation programmes for the co-firing of biomass in coal-fired power stations.

The total production (heat and electricity) of waste combustion installations is classed as sustainable heat and energy for the biogenic component of the waste used. The generation of electricity using waste combustion represents an important share of the total electricity production and continues to grow steadily: the production has almost doubled over the past 10 years. This growth is realised by improved efficiency levels, an increase in the proportion of biogenic waste, and through the expansion of the combustion capacity.

Generating electricity from biogas and other biomass combustion processes contributed only minimally to the total renewable energy generated in 2003, but has seen a steady increase over the past 10 years.

***Figure 21:* Electricity production using biomass – CBS Statline**



**) Data for 2013 is provisional.*

Electricity production equal to: Consumption of 1.6 million households

x 100,000

Avoided CO_2 emission: Emission of 0.9 million petrol cars

x 100,000

Generating electricity from biogas has tripled as the production of biogas has constantly grown over the past decade. The growth in co-fermentation of manure and fermentation of residual flows has contributed to this growth. Production appears to be levelling out at the moment. Electricity generated by alternative biomass combustion processes has quadrupled.

Substantial increases were realised by wood combustion installations adjacent to the waste combustion installations in Alkmaar and Rozenburg, the biomass plant near Twence in Hengelo and the biomass plant Golden Raand in Delfzijl.

Production figures and avoided CO_2 emission

The total production of bioelectricity was over 6,400 million kWh. This amount is equivalent to the annual electricity requirements of 1.6 million households. This avoids an annual amount of CO_2 emissions equivalent to the emission of circa 900,000 petrol cars.

Electricity from biomass market developments

Apart from the availability of subsidies, price levels for biomass heavily influence the production of electricity from biomass. MEP subsidies have helped to increase the number of applications, especially for the co-firing of biomass in electricity plants. A combination of increased costs and a reduction in revenues, as a result of declining electricity market prices, have influenced the use of biomass in electricity plants. Various projects for bioelectricity plants have been postponed or cancelled as a result.

Energy production in SDE+, SDE and MEP projects: 2010-2013

Figure 22: **Biomass – electricity production SDE+, SDE and (OV)MEP**

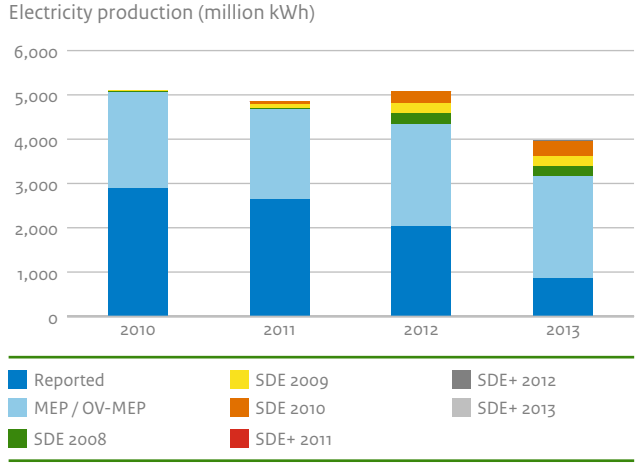
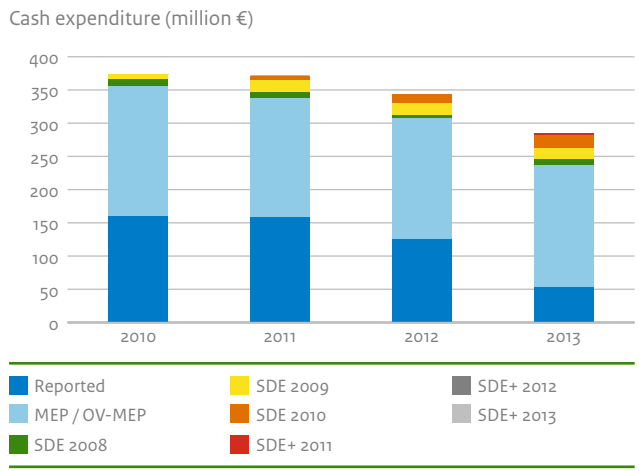


Figure 23: **Biomass electricity – cash expenditure SDE+, SDE and (OV)MEP**



Subsidising the co-firing of biomass

The co-firing of biomass in coal-fired power stations makes a substantial contribution to the total sustainable energy generation in The Netherlands. This was actively stimulated in the MEP, however, in the SDE and SDE+ no subsidies are available for co-firing. The Energy Agreement states that biomass in coal-fired power stations is stimulated up to a maximum of 25 PJ for new stations and those from the '90's. Stimulation regulations are being worked out at the moment where special emphasis is placed on how this support can be included in the SDE+ 2015.

Co-firing of biomass coming to an end in the MEP

Projects that were allocated in the MEP were granted 10-year subsidies, starting from the commissioning date. After the expiration date these projects are no longer awarded subsidies. A total of 24 projects for co-firing of biomass were allocated in the MEP, nearly all expired in 2012 and 2013. 22 out of the 24 projects were no longer eligible for MEP support towards the end of 2013. The period for the 2 remaining projects expired some months after.

Electricity production equal to: Consumption of 1.2 million households

X 100,000

Avoided CO_2 emission: Emission of 0.7 million petrol cars

X 100,000

Major fermentation changes

248 MW in allocated capacity for the generation of electricity on the basis of biomass has been realised. The projects that have not been realised so far are mostly co-fermentation projects from the period 2010-2011, that make use of arable produce and food industry residual waste streams. The total demand for these products increased substantially, resulting in higher prices. In addition, the banks, due to the economic crisis, have become more cautious in financing projects.

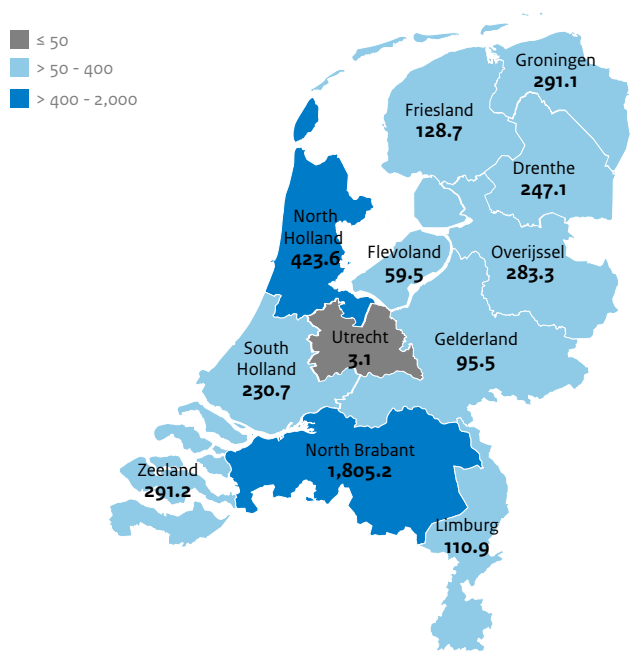
Production figures and cash expenditure

The total production of subsidised electricity generated from biomass was circa 4,000 million kWh in 2013. This amount is equivalent to the annual electricity requirements of 1.2 million households. This avoids an annual amount of CO_2 emissions equivalent the emission of circa 733,000 petrol cars.

44 percent of cash expenditure was allocated towards the generation of biomass-based electricity in 2013. This is lower than in the preceding years: this percentage was almost 54 percent in 2010. The total cash expenditure for these bioelectrical projects was nearly 284 million euros in 2013. 83 percent of the projects were (OV)MEP subsidised whilst 17 percent of the projects were financed through the SDE/SDE+.

Geographical spread

Biomass electricity production in SDE+, SDE and MEP projects 2013



A total of 45 percent of the production of electricity from biomass is realised in North Brabant. These are large-scale projects like the co-firing of biomass in the Amercentrale in Geertruidenberg. However, there are also a large number of smaller projects like the fermentation of agricultural produce in the farming sector. The SDE+ positively approved 3 applications for the production of biomass based electricity in 2012 and 2013, all three were waste water treatment installations. The applications were received from Limburg (2012), Overijssel and North Brabant. The electricity production from biomass based CHP projects fall into the category heat + CHP and green gas.

Alternative governmental incentives for electricity from biomass

The EIA stimulates a variety of biomass techniques. The number of reported projects was between 250 and 280 in the period 2009-2012. The majority of these concerned biomass fired boilers.

Only biogas upgrading installations were reported for the Green Funds scheme. Two of these projects were reported for a combined total capital investment of 2 million euros in 2013. (also see pages 9-10).

Table 11: **Number of EIA applications and reported investments for solid biomass**

	2009	*2010*	*2011*	*2012*
Number of EIA applications				
Total biomass techniques	**251**	**249**	**282**	**246**
Aerobe biomass reactor	0	0	0	1
Biofuel production installation	5	7	27	1
Biogas upgrading installation	5	19	33	22
Biomass fired boiler	218	201	176	198
Fermentation installation for dry biomass	0	0	0	5
Biomass fired cogeneration plant that uses a piston engine	0	0	41	19
Biomass cogeneration plant	23	22	5	0
Reported investment amount EIA (million euros)				
Total biomass techniques	**€ 28.6**	**€ 30.2**	**€ 99.2**	**€ 47.8**
Aerobe biomassreactor	€ 0.0	€ 0.0	€ 0.0	€ 0.0
Biofuel production installation	€ 0.2	€ 9.1	€ 24.3	€ 0.0
Biogas upgrading installation	€ 4.0	€ 6.6	€ 24.8	€ 7.6
Biomass fired boiler	€ 10.2	€ 9.1	€ 15.1	€ 34.5
Fermentation installation for dry biomass	€ 0.0	€ 0.0	€ 0.0	€ 2.4
Biomass fired cogeneration plant that uses a piston engine	€ 0.0	€ 0.0	€ 14.0	€ 3.3
Biomass co generation plant	€ 14.2	€ 5.4	€ 21.0	€ 0.0

Biomass sustainability, legal requirements and the Green Deal

Generating energy from biomass instead of fossil energy sources helps to reduce the green house gas emissions considerably. When labelling bioenergy as being sustainable, other aspects like the impact on the biodiversity, water use, soil quality and the quality of forestry have to be taken into consideration. The production may also have negative social and economic effects, like the competition for land that could otherwise be used for the production of food. Sustainability criteria were therefore developed to ensure the sustainability of biomass.

Sustainability criteria have been agreed in Europe for the use of biofuels for transport and for the use of liquid biomass for the generation of electricity and the production of heat. In The Netherlands, these criteria are set out in the Decision and the Regulation 'renewable energy transport'. Only biofuels that meet the sustainability criteria are allowed to count towards the renewable energy in transport objectives. SDE+ subsidy applicants that use liquid biomass are only awarded support when they use certified liquid biomass. Both parties can achieve this by making use of a recognised European sustainability system.

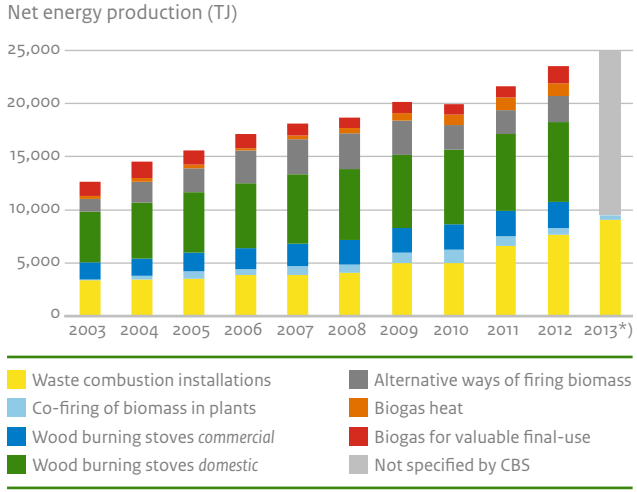
So far, no legal European sustainability criteria have been agreed for the use of biomass that are either solid or gas in nature. The Energy Agreement states that sustainability criteria must be formulated for the co-firing of biomass. These criteria must be determined before 31 December 2014 and will be used for the development of criteria in a European context.

In anticipation of such European agreements, the Green Deal Report Sustainability of Solid Biomass (Green Deal Rapportage Duurzaamheid Vaste Biomassa) has been agreed between the government and parties from the energy and biomass sector in 2012. In this agreement market parties commit themselves to report the characteristics of the solid biomass they use for the generation of energy. A 60 percent target was also decided upon for the reduction of green house gas emissions by using solid biomass as an alternative to fossil fuels.

The first report of 2012 reported about some 2,000 kilo tonnes in solid biomass. 36 percent of this makes use of reclaimed wood and 64 percent uses fresh wood. The reclaimed wood has no sustainability certification as they only pose limited sustainability risks. 71 percent of the 64 percent fresh wood is certified whilst 15 percent is a residual stream. The other 14 percent fresh wood, or 9 percent of the total reported solid biomass, is not certified. The reported reductions in green house gas emissions, for all participating organisations, were between 80 and 100 percent. (RVO, 2013).

2. Heat + CHP and green gas

Figure 24: Heat and green gas production from biomass – CBS Statline



*) Data for 2013 is provisional.

Growth of biomass based renewable heat and green gas

The heat production from biomass has doubled over the last 10 years. The residual heat from waste combustion installations contributes substantially. The co-firing of biomass in electrical plants also supplies a modest amount of residual heat. Another important contribution is made by wood burning stoves in households and companies. Finally, heat can also be obtained from biogas. The gas is generated with sewer or waste water treatment installations at landfills, by fermenting organic residual produce, or by the gasification of biomass. Biomass can be upgraded to the quality of natural gas before feeding it into the natural gas grid. This is represented in the statistics, as biogas for beneficial final use. For the sustainable energy objective, the gas fed into the grid is calculated at a percentage of 78.5.

Production figures and avoided CO_2-emission

The total heat production from biogas was equal to almost 22,000 terajoule in 2012. The biogas production for direct end-use was equal to 1,549 terajoule. These production figures combined are equivalent to the annual natural gas requirements of 494,000 households. This avoids an annual amount of CO_2 emissions equal to the emission of circa 425,000 petrol cars.

Energy production equal to:
Consumption of 494,000 households

Avoided CO_2 emission:
Emission of 425,000 petrol cars

Renewable heat and green gas market developments

The market for renewable heat is traditionally made up by a large variety of players. In the first category there are a small number of key players: waste combustion installations and coal-fired power plants that co-fire biomass. In the second category there are a large number of households and businesses that have small wood burning stoves for the private generation of heat. Whilst the third category is made up of the owners of fermentation installations, commonly found in the agricultural sector and the water treatment sector. Over the last few years many new players have entered the market, like local energy

companies whereby municipalities collaborate with local entrepreneurs to invest together in a bio combined heat and power system. The wider use of green gas also attracts many industrial parties into this market.

Energy production in SDE+, SDE and MEP projects: 2010-2013

Low realisation levels of green gas projects

Since 2008, green gas production has been stimulated in the SDE and SDE+. The number of applications and the allocated production was high in the first few years. 70 percent of the total SDE+ budget in 2011 was allocated for green gas projects . Over 13 percent of that has since been realised. 23 applications were positively approved for green gas projects in 2013.

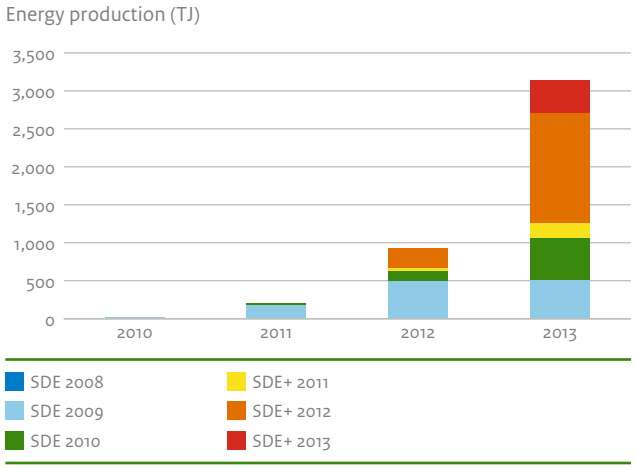
The potential for renewable heat from 2012 onwards

Renewable heat has been subsidised in the SDE+ since 2012. 171 projects were allocated in the category 'renewable heat + CHP in 2012 and 2013. They have a combined total allocated capacity of 1,627 MWth and MWe. 556 MW has been realised up to this point. A large number of these applications were for extended lifespan of installations for MEP projects after the MEP subsidy was suspended as well as for heat extension of MEP projects. In the latter category, the generation of electricity is financed through the MEP and allowed projects that fell under the SDE+ to apply for additional subsidies for the generation of heat from the same installation. Out of the total allocated eligible production of 246,800 terajoule in 2012, 74,000 terajoule was allocated to a heat extension of an existing project, whilst over 20,000 terajoule went to extended lifespan of an existing installation. This was respectively 10,000 terajoule and nearly 13,000 terajoule in 2013.

Decline in application for co-fermentation

In the last two years, there have been substantially fewer applications for co-fermentation than in previous years. The root cause for this is the rise in the cost of co-fermentation products. Another explanation for this decline lies in the systematics of the SDE+, in which co-fermentation projects have to compete with other, cheaper, techniques during the first stages. Finally, projects are required to apply for licenses prior to their application for SDE+ support, the cost of which are substantial. The number of new applications for co-fermentation projects has therefore remained limited. A part of this decline has been balanced out by a modest rise in mono- fermenters of manure. These fermenters are unhindered by price increases in co-fermentation products, reducing exploitation costs and associated risks. These projects are however only modest in scale. Mono- fermenters of manure, as opposed to co-fermentation installations, are built to ferment the manure from the farm together with a maximum of 5% of the residual flows of the farm itself.

Figure 25: **Biomass heat + CHP and green gas – energy production SDE+ and SDE**



The effect of the change in applications was particularly noticeable in 2012, with the SDE+ budget already depleted early on in phase 2. The total allocated eligible production was nearly 5,000 terajoule in that year. In 2013, projects were allocated up to phase 6, which led to a total allocated eligible production in excess of 8,000 terajoule.

Production figures and cash expenditure

The total production of the subsidised green gas projects was roughly 40 million Nm^3 in 2013. This amount is equivalent to the annual natural gas requirements of 25,000 households. This avoids an annual amount of CO_2 emissions equivalent to the emission of more than 21,000 petrol cars.

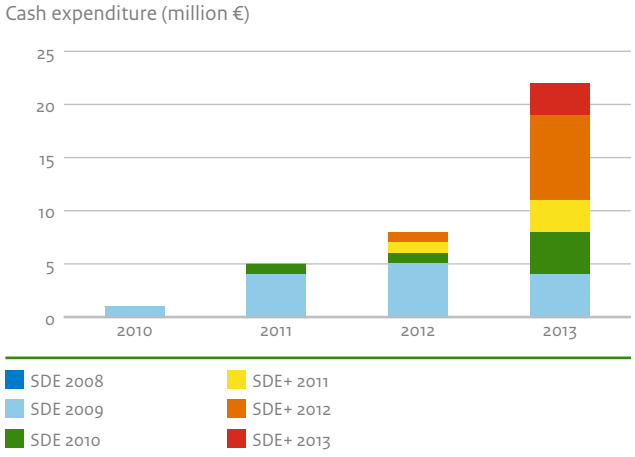
In 2013, the subsidised projects for the generation of biomass based renewable heat produced nearly 1,900 terajoule in renewable heat. This amount is equivalent to the annual natural gas requirements of 37,000 households. This avoids an annual amount of CO_2 emissions equivalent to the emission of more than 32,000 petrol cars.

Aardgasverbruik gelijk aan:
Consumption of 62,000 households

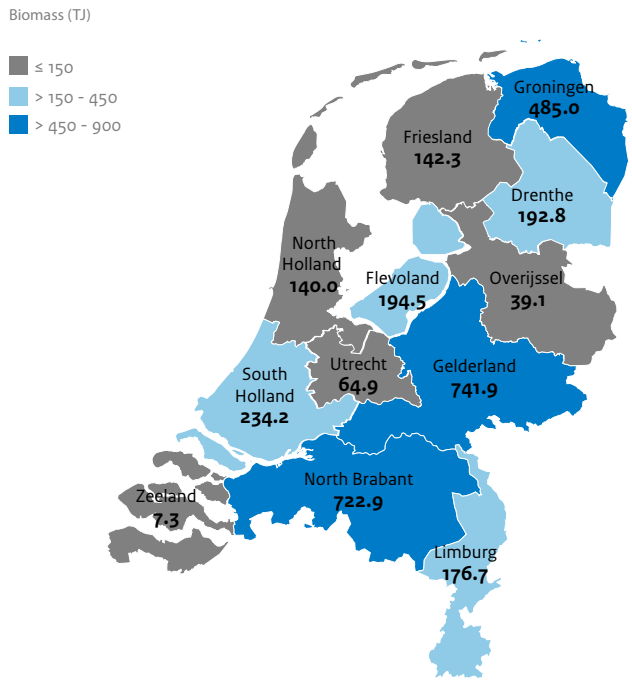
Avoided CO_2 emission:
Emission of 53,000 petrol cars

The cash expenditure for renewable heat + CHP and biomass based green gasses make up 3.6 percent of the cash budget. Green gas projects on average received 29 euro cent per Nm^3.

Figure 26: Biomass heat + CHP and green gas – cash expenditure SDE+ and SDE



Biomass heat + CHP and green gas production SDE+, SDE and MEP in 2013



Geographical spread

Two provinces together produced over half of 2013's green gas: Groningen (33 percent of the total Dutch production) and North Brabant (24 percent). The same goes for the production of renewable heat + CHP: Gelderland (37 percent) and North Brabant (22 percent).

The number of applications and decisions for green gas projects has again increased over the previous year. Only four green gas projects, from Friesland and Utrecht, were allocated in 2012. In 2013, this number rose to a total of 23 projects, over three quarters of these projects came from Overijssel, Gelderland, North Holland and Friesland. Over half of the allocated budget for sustainable heat was applied for from the provinces North Brabant and Gelderland in 2013.

Alternative government incentives for heat and green gas

The number of heat projects that make use of biomass and apply for the EIA is relatively modest compared to other applications, like those for bioelectricity, biofuels and biogas. Most applications of heat projects concern CHP-installations. For biogas 79 applications were received for upgrading installations in the period 2009-2013. No applications were received under the Green Funds scheme for biomass based heat projects, 3 applications were received for biogas upgrading installations (*see table 11*).

3. Biofuels

The growth of biofuels in The Netherlands

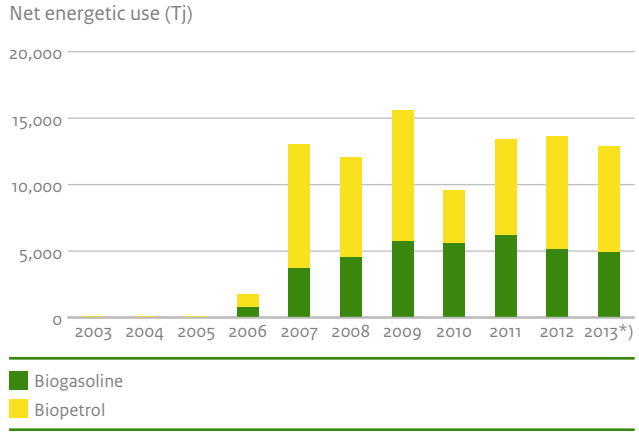
In 2003, all European nations made arrangements regarding the use of biofuels for transport. The objective was to have a 5.75 percent biofuel share in 2010. This was replaced in 2009 for a new target of 10 percent by the year 2020. These European aims have led to an increased use of biofuels from 2007 onwards. The Netherlands has implemented these ambitions in the decision 'Renewable Energy for Transport' which states that companies that supply the Dutch market with fuels have an obligation to blend their fuels. An example of this blending is the adding of biodiesel to regular diesel, or ethanol to petrol. Parties that blend more than their mandatory share or bring extra biofuels onto the market may administratively trade this surplus in the form of *biotickets* with other parties that do not, or insufficiently, sell biofuel.

The Netherlands has managed to realise her ambitions every year in the period 2010-2012. Over the last two years, the share of renewable energy in diesel use grew more than that in petrol. The share of renewable energy in petrol actually fell slightly in the period 2010-2012. The ambitions increase every year: 5 percent in 2013 and 5.5 percent in 2014.

Table 12: Annual quota and realisation of the share of biofuels in transport fuels

	2010	2011	2012
Annual quota (%)	4.00	4.25	4.50
Average realisation (%)	4.01	4.31	4.54
Realisation for petrol (%)	4.02	3.78	3.99
Realisation for diesel (%)	4.01	4.62	4.86

Figure 27: Energetic use biofuel production – CBS Statline

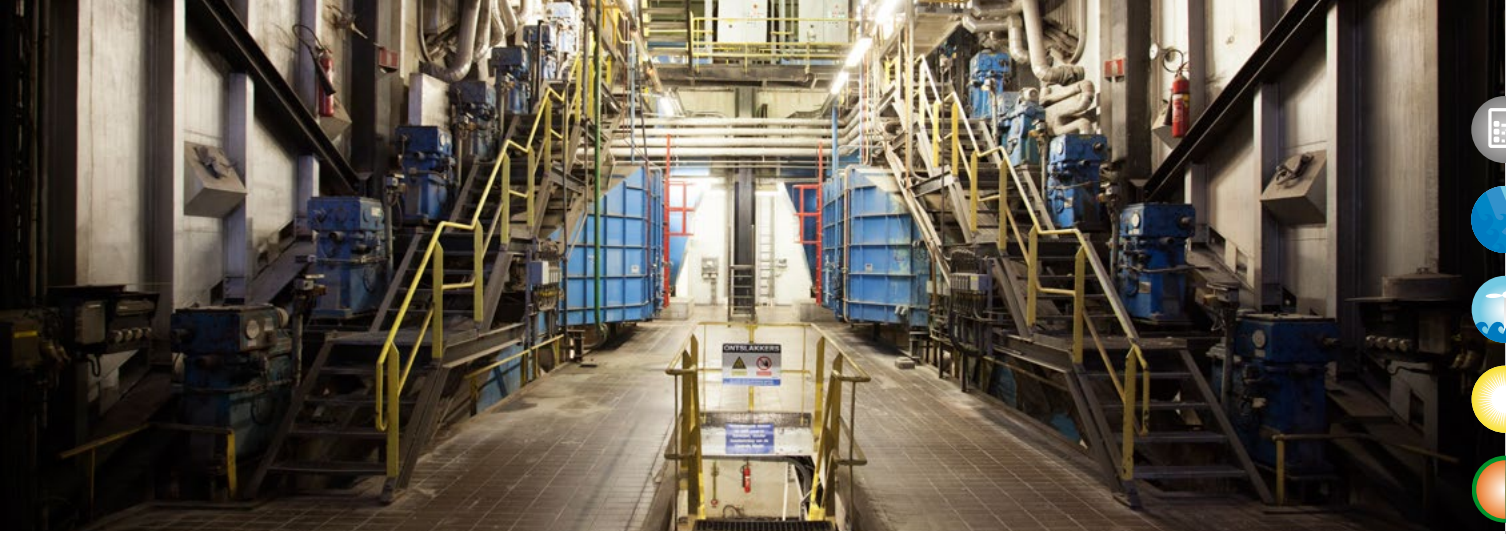


*) Data for 2013 is provisional. Bron: CBS Statline.

Biofuel certification and market developments

Biofuels are generated from a wide number of resources. For example, from cereals like corn, oilseeds like rapeseed, animal fats and talc, but also used deep-frying oil. A proportion of the biofuels that are produced on the basis of residual waste and residues are recognised as double rated biofuels under the decision 'Renewable Energy for Transport'. Suppliers may count the supply of these types of fuels double towards their annual quota (see box page 57). The share of these double rated biofuels is growing rapidly on the Dutch market: with a 40 percent share in 2011 and 51 percent share in 2012 (sources: *Emissieautoriteit* and *progress report*).

The sustainability of biofuels has to be demonstrated in The Netherlands by providing a certificate from a recognised European Union sustainability system. The official annual report of the Dutch Emission Authority (NEa) distinguished 10 different systems used in The Netherlands in 2011, and 11 in 2012.



Some systems are valid for all resources, whilst others just focus on a single resource like soy, wheat or palm oil. The ISCC, valid for all types of resources, is the system most frequently used. The ISCC was applied in 60 percent of the reported biofuels in 2011, and has risen to over three quarters in 2012.

Alternative government incentives for biofuel

The EIA received 40 applications for biofuel production installations in the period 2009-2013. (*see table 11*).

Biofuel certification

Only those biofuels that meet the European sustainability criteria are allowed to count towards the objective. One of these sustainability criteria is the reduction of greenhouse gas emissions through biofuels, as opposed to fossil fuels. The reduction should at least be 35 percent, from resource to end-use, measured throughout the chain of production. This percentage will be increased to 50 percent in 2017, whilst for new installations a percentage of 60 percent will be enforced from 2018 onwards.

Another important criterium is that the production of biofuel may not have a negative effect on biodiversity and land use. Some types of biofuels outweigh others for the realisation of the objectives. Biofuels based on waste, residual flows, non-food cellulose materials and ligno cellulose materials are classified as double rated biofuels. Renewable energy that is used by electrical vehicles is rated at a factor of 2.5. The contribution of this latter category is currently still relatively low.

Producers of biofuels can demonstrate that they fulfil the sustainability criteria by certifying their product. A variety of certification systems are in place in Europe, each differing in the reach by which they cover the sustainability criteria, but also varying in the quality of the audit process in place. The most commonly used system in Europe is the International Sustainability and Carbon Certification system (ISCC). All organisations in The Netherlands in possession of a recognised certificate are officially registered so that the sustainability of their activities and products can be monitored.

From waste bag to warm shower

One of Europe's largest waste power plants is located in the vicinity of the port of Rotterdam: AVR Rozenburg. The plant was established in 1973 to tackle the waste problem. Today Michael Timmerije, director of Energy and Residues, talks passionately about energy yields, warm showers and valuable resources.

Doubled energy yields

AVR generates energy from both domestic and foreign waste. The plant supplies electricity to the grid since the 70's and since last summer began supplying steam to the port's industry sector. AVR is also realising two connections to the urban heating grid. 50 thousand home equivalents in Rotterdam-South are supplied with heat since 1 October 2013, another 95 thousand home equivalents in Rotterdam-North will receive heat from 1 October 2014. The energy yield will be at least double due to this expansion in the delivery of heat and steam. The yield currently stands at 25 to 30 percent where it will be 55 to 60 percent in the near future.

> *It is our ambition to be one large energy and raw produce supplier<*

Heat Hub

"Our ambition: deploying all the energy from waste in the most effective way", says Timmerije. "Every installation that supplies heat on our premises is connected to the pipes, which are connected to the urban heating grid. These are deliberately over dimensioned: they posses extra capacity so that the surrounding companies can also tap in. This allows us to create a heat hub and a solution for smaller projects that would otherwise be too expensive on their own. "AVR receives SDE+ subsidy for the generation of heat. The plant also makes use of the decisions WBSO and EOS-IWB (see the glossary) for industrial heat utilisation and has applied for the EIA. "The subsidies speeded up the project substantially and more importantly, have also created the basis for future connections"

A cleaner Rotterdam

AVR's total combined heat and steam supply will save 225 kiloton in CO_2 per annum, compared to the current fossil energy generation. In the Climate Initiative Rotterdam, AVR is the largest project to reduce CO_2 emissions in the region. "But we are not done yet", says Timmerije. "AVR will become the largest heat supplier of Rotterdam, but it is our ambition to be one large energy and raw produce supplier. Every bag of waste is sufficient for seven hot showers and also contains valuable resources that we would like to utilise optimally. This way we fully re-extract valuable metals and work hard towards further recycling."

> Detailed figures

Changes in the SDE+ 2013

- Extra phase of € 0.08 per kWh.
- Differentiation in full load hours per year for onshore wind in a variety of free categories.
- No differentiation in the fermentation category between solo-installations and installations that are part of a hub.
- Maximum eligible geothermal production per installation per annum.
- The geothermal heat category is split into a category with a minimum depth of 500 metres and a category for depths of 2,700 metres and over.
- Category renovation of existing hydro-electric power stations.
- Green gas production at waste and sewer water treatment installations (AWZI and RWZI).
- Mono-fermentation of manure.

Explanation of the total overviews

- Tables provide an overview of the applications in the SDE rounds 2008, 2009 and 2010, the SDE+ 2011, 2012 and 2013 as well as the OV-MEP (transitional subsidy arrangement between MEP and the SDE) and the not yet determined producing MEP projects.
- The reference date for this report is 1 March 2014. The data is summarised in the overviews.
- The reference date for the SDE+ 2013 is 1 May 2014 with the exemption of the table 'allocated applications SDE+ 2013'
- The productions for calendar year 2013 reference the eligible productions that have been reported to RVO.nl prior to 1 March 2014. The production forecast used for funding purposes for 2013 was used for installations that had not yet communicated the production figures before that date.
- The data in this annual report is based on RVO.nl's Subsidy-Administration system. This data may deviate from other publications that (also) make use of alternative sources.

Overview SDE+, SDE, OV-MEP & MEP

Reference date 1-3-2014 (please note for the SDE+ 2013 the used reference date is 1-5-2014 as the handling was concluded on that date)

Table D1. Allocated production capacity and realised capacity for renewable electricity of the SDE+, SDE and MEP (MW)

	Allocated capacity (MW) reference date 01-03-2013	Allocated capacity (MW) reference date 01-03-2014	Realised capacity (MW) reference date 01-03-2014
SDE electricity	2,256	2,741	923
MEP	2,026	1,775	1,775
Total electricity	**4,282**	**4,516**	**2,698**

Table D2. Allocated production capacity and realised capacity for renewable heat and CHP of the SDE+ (MWth and MWe)

	Allocated capacity (MWth and MWe) reference date 01-03-2013	Allocated capacity (MWth and MWe) reference date 01-03-2014	Realised capacity (MWth and MWe) reference date 01-03-2014
SDE+ renewable heat + CHP	1,110	2,150	649

Table D3. Allocated production capacity and realised capacity renewable gas of the SDE+ and SDE (Nm^3/h)

	Allocated capacity (Nm^3/h) reference date 01-03-2013	Allocated capacity (Nm^3/h) reference date 01-03-2014	Realised capacity (Nm^3/h) reference date 01-03-2014
SDE(+) gas	35,652	40,753	10,381

Table D4. Biomass state of affairs

	No. of positively approved subsidy applications	Allocated budget	Allocated subsidisable production	Allocated capacity	Realised capacity
Renewable electricity		**(million €)**	**(GWh)**	**(MW)**	**(MW)**
SDE(+)	82	1,472.0	19,617	301	248
(OV)MEP	147	2,575.8		383	383
Total renewable electricity	**229**	**4,047.7**		**684**	**630**
Renewable heat + CHP			**(TJ)**	**(MWth and MWe)**	**(MWth and MWe)**
SDE+	171	2,229.5	232,580	1,627	556
Total renewable heat + CHP	**171**	**2,229.5**	**232,580**	**1,627**	**556**
Renewable gas			**(million Nm^3)**	**(Nm^3/h)**	**(Nm^3/h)**
SDE(+)	72	1,699.7	3,737	40,753	10,381
Total renewable gas	**72**	**1,699.7**	**3,737**	**40,753**	**10,381**
Total biomass	**472**	**7,977.0**			

***** The capacity for large scale biomass installations from the MEP (installation > 50 MW) have not been included*

Table D5. Renewable production and cash expenditure Biomass 2013

	Production 2013	*Cash expenditure 2013*
Renewable electricity	**(MWh)**	**(million €)**
SDE(+)	809,666	47.3
(OV)MEP	3,160,190	236.6
Total renewable electricity	**3,969,855**	**283.9**
Renewable heat + CHP	**(GJ)**	**(million €)**
SDE+	1,882,582	11.7
Total renewable heat + CHP	**1,882,582**	**11.7**
Renewable gas	**(million Nm^3)**	**(million €)**
SDE(+)	40	11.5
Total renewable gas	**40**	**11.5**
Total Biomass		**307.1**

Table D6. Geothermal energy state of affairs

	No. of positively approved subsidy applications	*Allocated budget (million €)*	*Allocated subsidisable production (TJ)*	*Allocated capacity (MW)*	*Realised capacity (MW)*
SDE+	44	1,192.1	164,876	521	93
Total Geothermal energy	**44**	**1,192.1**	**164,876**	**521**	**93**

Table D7. Renewable production and cash expenditure Geothermal energy 2013

	Production 2013 (GJ)	*Cash expenditure 2013 (million €)*
SDE	1,202,317	5.9
Total Geothermal energy	**1,202,317**	**5.9**

Table D8. Hydropower state of affaire

	No. of positively approved subsidy applications	*Allocated budget (million €)*	*Allocated subsidisable production (GWh)*	*Allocated capacity (MW)*	*Realised capacity (MW)*
SDE	7	67.5	1,227	23	< 1
MEP	6	85.7		24	24
Total hydropower	**13**	**153.2**		**48**	**24**

Table D9. Renewable production and cash expenditure Hydropower 2013

	Production 2013 (MWh)	*Cash expenditure 2013 (million €)*
SDE	14	0.0
MEP	78,059	7.5
Total hydropower	**78,073**	**7.5**

Table D10. Wind energy state of affairs

	No. of positively approved subsidy applications	*Allocated budget (million €)*	*Allocated subsidisable production (GWh)*	*Allocated capacity (MW)*	*Realised capacity (MW)*
SDE – Onshore wind	224	3,135.9	46,476	1,485	604
SDE – Offshore wind	3	5,384.8	33,166	719	-
MEP – Onshore wind	495	1,544.7		1,131	1,131
MEP – Offshore wind	2	778.6		228	228
Total wind energy	**724**	**10,843.9**		**3,563**	**1,964**

Table D11. Renewable production and cash expenditure Wind energy 2013

	Production 2013 (MWh)	*Cash expenditure 2013 (million €)*
SDE – Onshore wind	1,072,587	53.5
SDE – Offshore wind	-	-
MEP – Onshore wind	2,867,131	184.2
MEP – Offshore wind	771,086	76.6
Total wind energy	**4,710,804**	**314.3**

Table D12. Solar energy state of affairs

	No. of positively approved subsidy applications	*Allocated budget*	*Allocated subsidisable production*	*Allocated capacity*	*Realised capacity*
Renewable electricity		**(million €)**	**(GWh)**	**(MW)**	**(MW)**
SDE(+)	11,205	347.8	3,079	213	71
MEP	490	5.1		9	9
Total renewable electricity	**11,695**	**353.0**		**221**	**80**
Renewable heat			**(TJ)**	**(MWth)**	**(MWth)**
SDE+	7	0.9	77	2	-
Total renewable heat	**7**	**0.9**	**77**	**2**	**-**
Total solar energy	**11,702**	**353.9**			**80**

Table D13. Renewable production and cash expenditure Solar energy 2013

	Production 2013	*Cash expenditure 2013*
Renewable electricity	**(MWh)**	**(million €)**
SDE(+)	57,727	13.1
MEP	3,774	0.4
Total renewable electricity	**61,501**	**13.6**
Renewable heat	**(GJ)**	**(million €)**
SDE+	-	-
Total renewable heat	**-**	**-**
Total solar energy		**13.6**

Table D14. Total overview of subsidy allocations and realisation of renewable electricity

Incentive scheme and category	*Sub-category*	*No. of positively approved subsidy applications*	*Allocated budget (million €)*	*Allocated subsidisable production (GWh)*	*Allocated capacity (MW)*	*Realised capacity (MW)*
Wind energy						
SDE 2008	Onshore wind	20	72.0	1,223	46	46
SDE 2009	Onshore wind	58	1,351.6	16,952	466	36
	Offshore wind	3	5,384.8	33,166	719	-
SDE 2010	Onshore wind	68	875.2	12,389	459	431
SDE+ 2011	Onshore wind	11	197.8	2,932	109	83
SDE+ 2012	Onshore wind	1	2.3	61	2	2
SDE+ 2013	Onshore wind	66	637.0	12,920	402	5
SDE total		**227**	**8,520.7**	**79,642**	**2,204**	**604**
MEP	Onshore wind	495	1,544.7		1,131	1,131
	Offshore wind	2	778.6		228	228
MEP total		**497**	**2,323.2**		**1,359**	**1,359**
Total Wind energy		**724**	**10,843.9**		**3,563**	**1,964**
Solar power						
SDE 2008		4,700	43.8	126	10	10
SDE 2009		2,455	99.8	285	22	22
SDE 2010		2,932	65.9	224	18	17
SDE+ 2011		421	16.4	348	23	16
SDE+ 2012		53	1.5	115	8	2
SDE+ 2013		644	120.5	1,981	132	3
SDE total		**11,205**	**347.8**	**3,079**	**213**	**71**
MEP		490	5.1		9	9
Total Solar power		**11,695**	**353.0**		**221**	**80**

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> *Part 2 of table D14.*

Incentive scheme and category	*Sub-category*	*No. of positively approved subsidy applications*	*Allocated budget (million €)*	*Allocated subsidisable production (GWh)*	*Allocated capacity (MW)*	*Realised capacity (MW)*
Hydropower						
SDE 2009		2	0.1	1	0	0
SDE 2010		1	54.3	687	12	-
SDE+ 2013		4	13.2	539	11	-
SDE total		**7**	**67.5**	**1,227**	**23**	**0**
MEP		6	85.7		24	24
Total hydropower		**13**	**153.2**		**48**	**24**
Biomass - electricity						
SDE 2008	Waste combustion	2	169.3	4,250	78	78
	Biomass	3	22.5	354	4	4
SDE 2009	Waste combustion	2	123.8	2,805	49	49
	Biomass	22	341.5	2,747	31	19
SDE 2010	Waste combustion	5	172.2	3,736	79	74
	Landfill gas/biogas from water treatment installations	1	0.5	40	1	1
	Biomass	29	427.4	3,127	33	18
SDE+ 2011	Landfill gas/biogas from water treatment installations	1	0.2	12	0	0
	Biomass	14	199.5	1,986	21	4
SDE+ 2012	Landfill gas/biogas from water treatment installations	1	2.0	81	1	1
SDE+ 2013	Landfill gas/biogas from water treatment installations	2	13.0	480	5	-
SDE total		**82**	**1,472.0**	**19,617**	**301**	**248**
(OV)MEP	Waste combustion	1	59.7		74	74
	Landfill gas	19	9.6		11	11
	Biomass < 10 MW	120	867.9		137	137
	Biomass 10 - 50 MW	5	1,217.9		160	160
	Biomass > 50 MW	2	420.6		-	-
(OV)MEP total		**147**	**2,575.8**		**383**	**383**
Total Biomass electricity		**229**	**4,047.7**		**684**	**630**
Total SDE and MEP electricity		**12,661**	**15,397.8**		**4,516**	**2,698**

Please note the reference date for the SDE+ 2013 is 1 May 2014.

Table D15. Total overview of subsidy allocations and realisation of renewable heat and CHP

Incentive scheme and category	*Sub-category*	*No. of positively approved subsidy applications*	*Allocated budget (million €)*	*Allocated subsidisable production (TJ)*	*Allocated capacity (MWth and MWe)*	*Realised capacity (MWth and MWe)*
SDE+ 2012	Heat extension from waste combustion	3	265.6	64,788	413	271
	Biomass	74	517.2	49,372	297	116
	Geothermal energy	28	767.9	112,956	317	93
	Solar thermal	2	0.1	11	< 1	-
SDE+ 2013	Heat extension from waste combustion	1	23.3	4,863	155	-
	Biomass	93	1,423.3	113,557	762	169
	Geothermal energy	16	424.2	51,920	204	-
	Solar thermal	5	0.8	66	2	-
Total renewable heat and CHP		**222**	**3,422.5**	**397,533**	**2,150**	**649**

Please note the reference date for the SDE 2013 is 1 May 2014.

Table D16. Total overview of subsidy allocations and realisation of renewable gas

Incentive scheme and category	*Sub-category*	*No. of positively approved subsidy applications*	*Allocated budget (million €)*	*Allocated subsidisable production (million Nm^3/h)*	*Allocated capacity (Nm^3/h)*	*Realised capacity (Nm^3/h)*
Biomass - gas						
SDE 2008	Green gas	1	0.3	3	40	40
SDE 2009	Green gas	9	186.1	483	5,808	5,128
SDE 2010	Green gas	9	189.2	446	4,778	2,543
SDE+ 2011	Green gas	23	879.7	1,833	19,605	2,670
	Green gas hub	3	67.1	153	1,591	-
SDE+ 2012	Green gas	4	38.5	130	1,470	-
SDE+ 2013	Green gas	23	338.9	689	7,461	-
Total Biomass gas		**72**	**1,699.7**	**3,737**	**40,753**	**10,381**

Please note the reference date for the SDE 2013 is 1 May 2014.

Table D17. Total overview of renewable production and cash expenditure for renewable electricity in 2013			
Incentive scheme and category	*Sub-category*	*Production 2013 (MWh)*	*Cash expenditure 2013 (million €)*
Wind energy			
SDE 2008	Onshore wind	100,499	4.8
SDE 2009	Onshore wind	100,893	4.4
	Offshore wind	-	-
SDE 2010	Onshore wind	782,946	40.5
SDE+ 2011	Onshore wind	85,768	3.8
SDE+ 2012	Onshore wind	2,026	0.1
SDE+ 2013	Onshore wind	454	< 0.1
SDE total		**1,072,587**	**53.5**
MEP	Onshore wind	2,867,131	184.2
	Offshore wind	771,086	76.6
MEP total		**3,638,217**	**260.8**
Total Wind energy		**4,710,804**	**314.3**
Solar-PV			
SDE 2008		8,001	2.5
SDE 2009		19,362	6.2
SDE 2010		15,232	3.8
SDE+ 2011		13,186	0.5
SDE+ 2012		1,687	< 0.1
SDE+ 2013		261	< 0.1
SDE total		**57,727**	**13.1**
MEP		3,774	0.4
Total Solar-PV		**61,501**	**13.6**
Hydropower			
SDE 2009		14	-
SDE 2010		-	-
SDE+ 2013		-	-
SDE total		**14**	**-**
MEP		78,059	7.5
Total hydropower		**78,073**	**7.5**

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> Part 2 of table D17.

Incentive scheme and category	Sub-category	Production 2013 (MWh)	Cash expenditure 2013 (million €)
Biomass - electricity			
SDE 2008	Waste combustion	206,150	6.6
	Biomass	16,010	1.2
SDE 2009	Waste combustion	118,336	4.9
	Biomass	128,485	12.5
SDE 2010	Waste combustion	217,026	7.7
	Landfill gas/biogas from water treatment installations	3,113	< 0.1
	Biomass	97,018	12.4
SDE+ 2011	Landfill gas/biogas from water treatment installations	595	< 0.1
	Biomass	20,901	1.9
SDE+ 2012	Landfill gas/biogas from water treatment installations	2,032	0.1
SDE+ 2013	Landfill gas/biogas from water treatment installations	-	-
SDE total		**809,666**	**47.3**
(OV-)MEP	Waste combustion	256,138	9.5
	Landfill gas	28,871	0.5
	Biomass < 10 MW	562,372	51.3
	Biomass 10 - 50 MW	929,862	89.8
	Biomass > 50 MW	1,382,947	85.5
(OV-)MEP total		**3,160,190**	**236.6**
Total Biomass electricity		**3,969,855**	**283.9**
Total SDE and MEP electricity		**8,820,234**	**619.3**

Table D18. Total overview of renewable production and cash expenditure for renewable gas in 2013

Incentive scheme and category	Sub-category	Production 2013 (million Nm^3)	Cash expenditure 2013 (million €)
Biomass - gas			
SDE 2008	Green gas	-	-
SDE 2009	Green gas	16	3.8
SDE 2010	Green gas	17	4.3
SDE+ 2011	Green gas	6	3.3
	Green gas hub	-	-
SDE+ 2012	Green gas	-	-
SDE+ 2013	Green gas	-	-
Total Biomass gas		**40**	**11.5**

Table D19. Total overview of renewable production and cash expenditure for renewable heat and CHP in 2013			
Incentive scheme and category	*Sub-category*	*Production 2013 (GJ)*	*Cash expenditure 2013 (million €)*
SDE+ 2012	Heat extension from waste combustion	225,679	0.2
	Biomass	1,218,684	8.0
	Geothermal energy	1,202,317	5.9
	Solar thermal	-	-
SDE+ 2013	Heat extension from waste combustion	-	-
	Biomass	438,218	3.4
	Geothermal energy	-	-
	Solar thermal	-	-
Total renewable heat + CHP		**3,084,898**	**17.5**

Table D20. SDE budget ceiling per subsidy year		
Year	*Sub-category*	*Published budget (million €)*
2008	**Renewable electricity**	
	Onshore wind energy	796.0
	Solar PV	83.0
	Waste combustion	187.0
	Landfill gas or biogas from water treatment installations	10.0
	Biomass	325.0
	Renewable gas	
	Landfill gas or biogas from water treatment installations	16.0
	Biomass	42.0
	Total SDE 2008	**1,459.0**
2009	**Renewable electricity**	
	Onshore wind energy ≥ 6 MW	741.0
	Wind energy ≥ 3 MW on water	546.0
	Offshore wind energy	5,384.8
	Onshore wind energy	1,258.1
	Solar PV small (1,0 - 15 kWp)	86.5
	Solar PV large (15 - 100 kWp)	56.5
	Waste combustion	158.0
	Landfill gas or biogas from water treatment installations	7.0
	Biomass	625.0
	Hydropower < 5 m	60.0
	Hydropower ≥ 5 m	15.0

> Part 2 of this table on the next page.

> *Part 2 of table D17.*

Year	*Sub-category*	*Published budget (million €)*
	Renewable gas	
	Landfill gas or biogas from water treatment installations	15.0
	Biomass	243.0
	Total SDE 2009	**9,195.9**
2010	**Renewable electricity**	
	Onshore wind energy	937.0
	Solar PV small (1,0 - 15 kWp)	69.0
	Solar PV large (15 - 100 kWp)	24.0
	Waste combustion	238.0
	Landfill gas or biogas from water treatment installations	13.0
	Biomass	400.0
	Hydropower	63.0
	CHP	168.0
	Renewable gas	
	Landfill gas or biogas from water treatment installations	24.0
	Biomass	190.0
	Total SDE 2010	**2,126.0**
2011	Renewable electricity	500.0
	Renewable gas	1,000.0
	Total SDE+ 2011	**1,500.0**
2012	**Total SDE+ 2012**	**1,700.0**
2013	**Total SDE+ 2013**	**3,000.0**

Units and conversion factors

CO_2 units used		
Factor	*Name*	*Symbol*
10^0	ton	ton
10^3	kiloton	kton
10^6	megaton	Mton
10^9	gigaton	Gton

Energy units (kilowatt hour)		
Factor	*Name*	*Symbol*
10^3	kilowatt hour	kWh
10^6	megawatt hour	MWh
10^9	gigawatt hour	GWh
10^{12}	terawatt hour	TWh

Energy units (Joule)		
Factor	*Name*	*Symbol*
10^9	gigajoule	GJ
10^{12}	terajoule	TJ
10^{15}	petajoule	PJ

Conversion factors
1 kWh = 3.6 MJ
1 Nm^3 green gas = 31.65 MJ

> Glossary

Base amount
The sum of investment and exploitation expenses, plus a reasonable profit margin, divided by the expected production capacity, per energy technology.

Allocation and realisation of the SDE+, SDE and MEP projects
The allocated subsidy is a maximum amount. The eventual amount is calculated per year based on the subsidisable quantity of renewable energy produced and the determined correction amount. The subsidy applies to a maximum full load hours and has a maximum duration, depending of the category, of 10 years for MEP projects or 5,12 or 15 years for the SDE/SDE+ projects. Projects must be realised, depending on the category, between 18 months and 5 years from the moment a positive subsidy allocation has been received.

Gross end-use - CBS Statline
Renewable energies' gross end-use follows the definition that can be found in the EU Richtlijn Hernieuwbare Energie (EU decision Renewable Energy) of 2009. And is calculated as the sum of 3 components:
1. Gross electricity production from renewable sources
2. Gross production of sold heat from renewable sources
3. End-use of geothermal, air, solar and biomass energy

Unsold heat from renewable sources (for example, wood burning stoves in households) is seen as consumption of renewable energy. The import and export of green electricity is not included.

Energetic end-use - CBS Statline
The energetic end-use is the use of energy for heating and lighting purposes or as an energy source for the powering of cars, machines and other appliances. This excludes energy conversion. Energetic end-use examples include, the firing of natural gas in a boiler, the use of electricity by households and the use of engine fuels for transport purposes.

Energy Investment Allowance (EIA)
The Energy Investment Allowance (EIA) is a tax scheme. This scheme offers entrepreneurs a direct financial advantage, because they can deduct a part of the investment costs for energy saving and renewable technologies from their profits. This allows them to pay less income or corporate taxes. The average tax benefit of the EIA is 10 percent of the investment costs.

Energy production MEP, OV-MEP, SDE and SDE+
The energy production for the fiscal year 2013 relates to the eligible productions that were reported to RVO.nl before 1 March 2014. Please note: not all productions were reported prior to 1 March 2014. Forecasts based on the advances for 2013 are used for the overviews for these installations.

EOS
Energie Onderzoek Subsidie / Energy research subsidy (subsidy scheme has come to an end.)

IWB
Subsidieregeling Industriële Warmtebenutting / Industrial heat utilisation subsidy scheme (subsidy scheme has come to an end.)

Cash expenditure: MEP, OV-MEP, SDE and SDE+

Cash expenditure for the calendar year 2013 includes: advances, annual adjustments and the final payments after the subsidy period has come to an end. The latter only applies for the MEP.

MEI

Subsidieregeling Marktintroductie Energie-Innovaties / Market introduction Energy Innovation Subsidy Scheme
(subsidy scheme has come to an end.)

MEP

The decision Milieukwaliteit van de Elektriciteitsproductie / Environmental Quality of Electricity Production subsidy (*MEP*) is the predecessor to the SDE and was open for applications between July 2003 and August 2006. The subsidy was awarded for a maximum of 10 years. This is why there are still projects receiving MEP subsidies.

OV-MEP

Subsidy scheme for generating renewable energy in fermentation installations (*OV-MEP*)

RDA

Research en Development Aftrek / Research and Development Allowance scheme for alternative costs and expenditure relating to the project.

The Green Funds scheme

In the *Regeling Groenprojecten / Green Funds scheme* investors with a green certificate can qualify for green financing. Green financing allows them to borrow money at a lower interest rate, thereby lowering the financing charges of a project. The decision is available for a number of project categories including sustainable energy.

State coordination scheme

The *Rijkscoördinatieregeling / State coordination scheme* gives the national government the possibility to control the decision-making process where projects of national importance are concerned. This relates predominantly to the required licenses and exemptions to realise a project and in many cases it relates to the State land-use plan. The coordination may substantially reduce the decision-making process for a project.

SDE / Stimulating renewable energy production in The Netherlands

The decision Stimulering Duurzame Energieproductie / (*SDE*) subsidy scheme exists since 2008. This subsidy scheme is a exploitation subsidy in which the difference between the cost price of grey (fossil) energy and renewable energy is reimbursed for a period up to 15 years. The height of the subsidy amount is dependent on the quantity of the renewable energy produced.

SDE+

At the start of 2011, the SDE has been followed up by the *SDE+*. This subsidy scheme contributes to developing an investment climate in which sustainable energy is profitable and whereby entrepreneurship is encouraged. The decision aims for a cost-effective attainment of the aim for sustainable energy. Allowing various techniques for sustainability to compete within an integral budget ceiling and a phased opening structure, enables projects with a low base amount to register first. This allows for higher realisation rate of sustainable energy per euro.

The production of renewable heat has been included in the SDE+ from the start of 2012. Biomass, geothermal and solar thermal installations that only produce heat have since become eligible for subsidies. There are also subsidies for extended lifespan for biomass installations and the useful use of heat in existing installations. A premium on the energy bill finances the SDE+ from 2013 onwards.

SDE-contribution
The SDE-contribution is equal to the base amount minus the correction amount (average grey energy price per category).

SEI
Subsidieregeling Energie en Innovatie / Subsidy scheme Energy and Innovation, guarantee scheme for drilling for geothermal heat.

Subsidy SDE+
The amount of the subsidy is calculated per annum based on the quantity of the produced eligible renewable energy and the set correction amount. The subsidy applies up to a maximum of full load hours and has a maximum duration dependent on the category.

Settled projects
A separate category 'identified projects' is included in total overviews of the energy production and cash expenditure. These are MEP projects for which the subsidy amount has been definitively established on the reference date 1 March 2014.

WBSO
Wet Bevordering Speur- en Ontwikkelingswerk / Research and Development Promotion Act, lowers the wage costs.

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