WALLOON COMMISSION FOR ENERGY

SPECIFIC ANNUAL REPORT FOR 2005

CD-6e16-CWaPE

on

The Evolution of the Green Certificate Market

Issued in accordance with Article 22 of the Arrêté of 4 July 2002 concerning the promotion of green power

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Avenue Gouverneur Bovesse 103 -106 -- B 5100 JAMBES
☏ 081/33.08.10 - 🖷 081/33.08.11 - E-Mail : cwape@cwape.be

Specific annual report for 2005 by CWaPE on the evolution of the green certificate market (GCs)

1 Purpose

The Arrêté of 4 July 2002 concerning the promotion of green power specifies in its Article 22 that:

> *« Art. 22. By 31 March, CWaPE shall issue a specific report concerning the evolution of the green certificate market. This report shall in particular mention the number of green certificates issued for each technology and source during the year in question, the green certificates supplied to CWaPE as per Article 21, the average price of a green certificate and the fines imposed on system operators and suppliers for non-compliance with quotas. This report shall be supplied to the Walloon Government".*

Article 21 of the same Arrêté specifies that:

> *« Art.21 paragraph 1. At the end of the second month following the end of a quarter, system suppliers and operators shall supply CWaPE with a number of green certificates consistent with the quota imposed on them by this Article. For this purpose, they shall notify CWaPE of the number and characteristics of the green certificates they intend to include in their quota, as well as the total power supplied in the Walloon Region during the quarter under consideration.*
>
> *….*
> *paragraph 3. The quota shall be:*
> *3% between 1 January 2003 and 31 December 2003;*
> *4% between 1 January 2004 and 31 December 2004;*
> *5% between 1 January 2005 and 31 December 2005;*
> *….*

2 The green certificate system

2.1 Legal framework and goals

Within the scope of European directive 96/92/EC[1] concerning common rules for the internal market in electricity, the Walloon Region, within its area of competence relating to power distribution (grids with a voltage under 70 kV), adopted a décret on 12 April 2001 concerning the organization of the electricity market, hereafter referred to as the Décret.

This Décret covers the following concerns in particular:

- the gradual opening-up of the market for consumers and the introduction of a principle of competition between producers/suppliers
- the determination of the rules by which the market operates under the control of a public body: the Walloon Energy Commission (CWaPE)
- the determination of public-service obligations binding the market operators, including a green-certificate system to encourage all effective technologies for the generation of power from renewable energy and cogeneration.

On 4 July 2002, the Walloon Government adopted the Arrêté concerning the promotion of green power. This Arrêté, hereafter referred to as AGW-PEV, supplies a detailed description of the green certificate system applicable in Wallonia.

The supporting mechanism for the generation of green power set up in the Walloon Region is also based on the following European directives:

- Directive 2001/77/EC of 27 September 2001 on the promotion of electricity produced from renewable energy sources in the internal electricity market
- Directive 2004/8/EC of 11 February 2004 on the promotion of cogeneration based on a useful heat demand in the internal energy market

These directives make the promotion of green power a European priority due to its contribution to:

- the security and diversification of the energy supply
- environmental protection (and in particular the reduction of greenhouse gas emissions) and sustainable development
- the reinforcement of competition on the internal power market
- economic (regional and local development) and social (job creation on a local scale) cohesion.

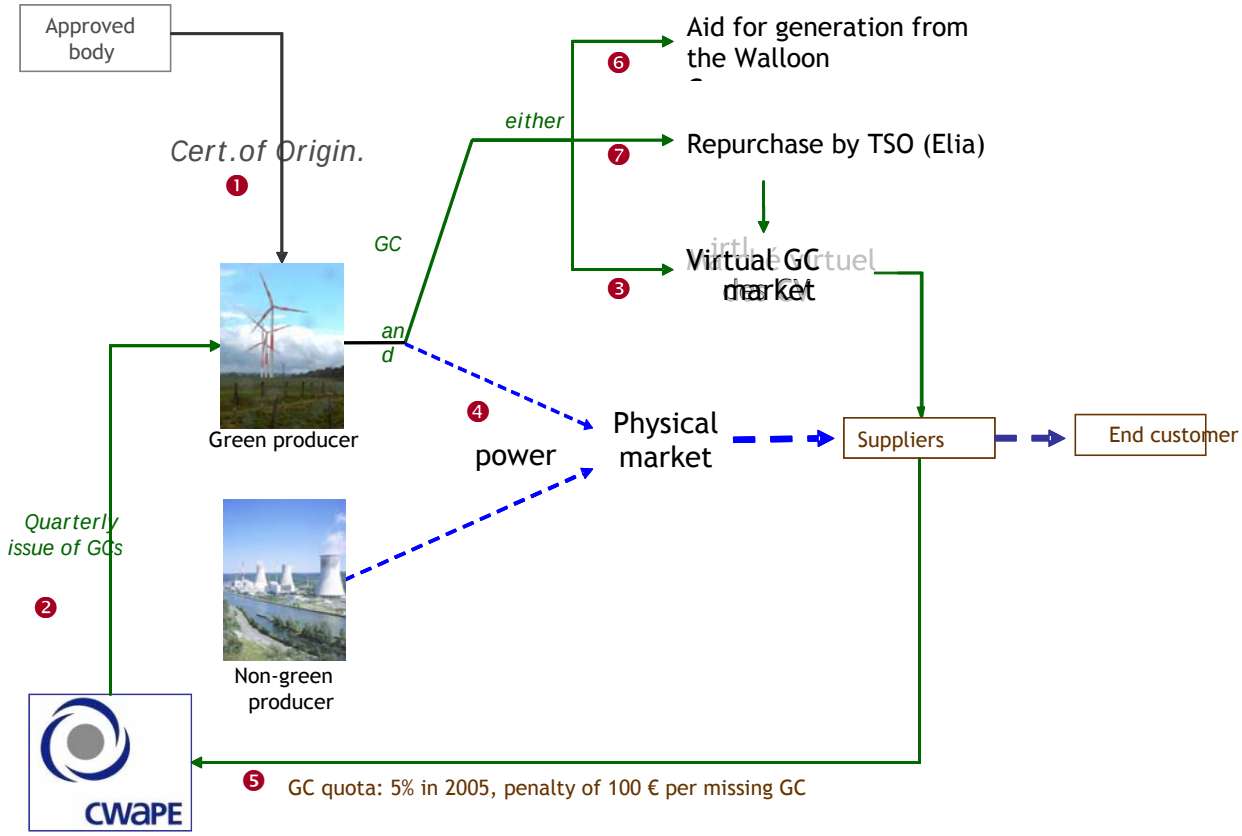
For these reasons, and in order to achieve national targets, these directives explicitly specify that the Member States shall set up supporting mechanisms for green certificate systems.

Moreover, on 6 November 2003, the Walloon Government adopted an Arrêté on aid for the generation of green power. On 16 July 2002, the Belgian federal government also adopted the Royal Decree on the setting-up of mechanisms for the purpose of promoting power generated from renewable energy sources and creating a minimum-price system for the purchase of green certificates by transmission system operators (TSOs).

On 16 March 2006, the Walloon Government adopted a series of measures intended to guarantee the equilibrium of the Walloon market for green certificates and which will require amendment of the prevailing legislation.

[1] This has since been repealed by Directive 2003/54/EC concerning common rules for the internal market in electricity.

2.2 The principle of the green certificate system



All green power generation units must submit a prior application to CWaPE for the issuance of green certificates. A certificate of origin (❶) issued by an approved inspection body must be attached to this application.

Once this preliminary application for certification has been accepted by CWaPE, the producer supplies its quarterly energy metering statements to CWaPE. On the basis of these statements, CWaPE issues (❷) a given number of green certificates.

Once in possession of the green certificates, producers may sell them to any purchaser (❸), regardless of physical power sales (❹).

Each quarter, power suppliers must return to CWaPE a quota of green certificates[2] proportional to the quantity of power supplied[3]. A fine of 100 euros per missing certificate is levied (❺).

As an alternative solution to the disposal of green certificates issued to facilities generating power from renewable energies, an aid system has been set up by the Walloon Government[2] (❻).

[2] Further to this operation, the green certificates are deleted from the database.

[3] However, a quota reduction is applied for the benefit of consumers consuming over 5 GWh per quarter and operations centre.(AGW-PEV, art. 21, §4)

A system imposing the repurchase of green certificates by the transmission system operator (Elia) at a minimum price is also imposed by the Federal Government. Green certificates purchased by the transmission system operator are then resold on the green certificate market (❼).

2.3 The main concepts relating to the issuance of green certificates

2.3.1 Definition of green power generation (Décret, Art. 2) -

Renewable energy sources: any energy source other than fossil fuels and nuclear fission, the consumption of which does not limit its future use, in particular hydraulic energy, wind energy, solar energy, geothermal energy, biogas, organic products and waste from agriculture and forestry, and the biodegradable organic portion of waste (Décret, art. 2, 4°).

High-quality cogeneration and trigeneration: combined generation of heat and power, designed according to the customer's heat or cold requirements, which saves energy compared with the separate generation of the same quantities of heat and power (and if applicable of cold) in modern reference facilities, the annual operating yield of which is defined and published annually by CWaPE (Décret, art.2, 3°).

Green power: power generated from renewable or high-quality cogeneration sources, the generation system for which generates a minimum saving of 10% on carbon dioxide emissions compared with the emissions defined and published annually by CWaPE for traditional generation in modern reference facilities. Power generated using hydroelectric or high-quality cogeneration facilities is limited to a capacity of less than 20 MWe (Décret, art. 2, 5°).

2.3.2 Principles of issuance of green certificates (Décret, art. 38) -

A green certificate is a transferable certificate issued by CWaPE to producers of green power for a number of kWh generated which is equal to MWhe divided by the carbon dioxide saving rate (Décret, art. 38, paragraph 2, line 1 and paragraph 3). Entitlement to green certification is limited to ten years for each generation site (AGW-PEV, art. 10).

The carbon dioxide saving rate is calculated by dividing the carbon dioxide gain achieved by the system under consideration by the carbon dioxide emissions of the traditional reference electric system (steam and gas turbine – STAG – AGW-PEV, art.11), the emissions of which are defined and published annually by CWaPE. This carbon dioxide saving rate is limited to 1 for generation units producing over 5 MW, and 2 below that limit. (Décret, art. 38, paragraph 2, line 2).

The carbon dioxide emissions are those generated by the green power generation as a whole and include fuel production, emissions during combustion if applicable, and waste processing if applicable. The facility emissions are taken into account in the case of hybrid facilities (Décret, art. 38, paragraph 2, line 3).

The carbon dioxide emission coefficients for each green power generation system under consideration are approved by CWaPE (Décret, art. 38, paragraph 23, line 4).

2.4 Conditions and procedure for the issuance of green certificates

2.4.1 Green power metering procedures and code -

Green certificates are issued both for green power consumed by the producer and green power dispatched to the grid or transmitted via direct lines, with the exception of green power exported outside Belgium (AGW-PEV, art. 10, line 3).

Green certificates are calculated on the basis of the net power generated (Eenp) measured prior to transformation and dispatch to the grid (if applicable). The net power generated is the power generated minus the power required by the generation unit's operating equipment or used for the preparation of the renewable energy sources required for power generation (AGW-PEV, art. 10, line 4).

A metering code[4] drawn up by the Minister as per Article 6 of AGW-PEV of 4 July 2002 describes the principles and methods applicable to the metering of the quantities of energy taken into account for the calculation of the number of green certificates to be issued to green power generation facilities.

2.4.2 Certification of a green power generation facility -

Green certificates are issued for the generation of green power only if a certificate of origin has been issued to the green power generation facility by an inspection body approved[5] by the Minister in charge of energy (AGW-PEV, art. 6 and 9).

This certificate of origin must, in particular, mention the energy sources used, the generation technology, the net developable capacity of the facility, and certify that the energy metering used for the calculation of the number of green certificates complies with the Metering Code.
The certificate of origin supplies the metering algorithms, i.e. the mathematical operations which enable the various quantities of energy to be calculated. The main algorithms are:

- the metering algorithm for the net power generated (Eenp)
- the metering algorithm for the net heat recovered (Eqnv)
- the metering algorithm for the net cooling energy recovered (Efnv)
- the metering algorithm for entering energies (Ee).

2.4.3 Prior application for the issuance of green certificates -

To achieve green certification, the producer must first apply to CWaPE for the issuance of green certificates. A copy of the certificate of origin shall be attached to this application.
CWaPE checks that the prior application for the issuance of green certificates includes all the information required and complies with the legislation, and makes its decision known. Entitlement to the issuance of green certificates is guaranteed for ten years as of the date of notification of acceptance by CWaPE.

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[4] See the Ministerial Arrêté of 1 June 2004 describing the metering procedures and code applicable to the metering of quantities of energy, published in the Moniteur belge of 17/09/2004 – Annex "Green power metering and code for the Walloon Region".

[5] The list of approved inspection bodies is available on the CWaPE website: www.cwape.be. The list of bodies approved as of 31 December 2005 is shown on page 15.

2.4.4 Method for the calculation of green certificates -

The number of green certificates (GCs) issued is equal to the CO2 saving rate (τ) multiplied by the net power generated by the facility (Eenp, expressed in MWhe):

Number of GCs = τ x Eenp (1)

The number of green certificates issued is proportional to the net power generated. It also depends on the overall performance of the facility in terms of CO2 saving.

To determine the CO2 saving rate (τ), CWaPE annually defines and publishes[6] (see table below) the annual operating efficiency[7] and CO2 emissions of modern reference facilities for the separate production of electricity (E_{ref}), heat (Q_{ref}) and cold ($Q_{f,ref}$), with which the green power generation facilities will be compared.

Reference of traditional electrical system:			**REFERENCE**
Nat. gas-fired STAG power station.	efficiency emission coefficient	η_e = 55% 251 kgCO $_2$/MWh $_p$	**E $_{ref}$ = 251/0,55 = 456 kgCO $_2$/MWh $_é$**
Thermal reference **Natural gas boiler**	**natural gas distribution area** efficiency emission coefficient	 η_q = 90% 251 kgCO $_2$/MWh $_p$	**Q $_{ref\ GN}$ = 251/0,90 = 279 kgCO $_2$/MWh $_q$**
Thermal reference **Fuel oil boiler**	**outside natural gas distribution area** efficiency emission coefficient	 η_q = 90% 306 kgCO $_2$/MWh $_p$	**Q $_{ref\ HGN}$ = 306/0,90 = 340 kgCO $_2$/MWh $_q$**
Cooling reference **Compression group**	**Cooling set point < 0°C** performance coefficient emission coefficient	 COP $_{ref}$ = 2 456 kgCO $_2$/MWh $_e$	**$Q_{f,\ ref} = E_{ref} / COP_{ref}$ = 228 kgCO2/MWh $_f$**
Cooling reference **Compression group**	**Cooling set point** performance coefficient emission coefficient	**? 0°C** COP $_{ref}$ = 4 456 kgCO $_2$/MWh $_e$	**$Q_{f,\ ref} = E_{ref} / COP_{ref}$ = 114 kgCO2/MWh $_f$**

Table 2.1: Annual operating capacity and emissions of carbon dioxide of reference facilities

The CO_2 emissions of reference modern facilities for the generation of cold are calculated on the assumption that the compression unit is powered via the traditional power system.

In which:	
MWh_p :	Megawatt-hour of primary energy
MWh_e :	Megawatt-hour of net power generated
MWh_q :	Megawatt-hour net thermal recovered
MWh_f :	Megawatt-hour net cooling recovered

6 Annual operating efficiency and carbon dioxide emissions of the traditional power generation system as well as of reference modern heat and cold generation facilities (CWaPE Management Committee of 18 October 2005 – Published in Moniteur belge of 22/11/2005)

7 For a given green power generation site, the efficiency of the reference modern facilities remains the value current at the time of the issuance of the first green certificates for the site concerned.

In the absence of a green power generation facility, the net electrical energy generated (Eenp) would have been generated by the reference system. The green power generation system therefore prevents the emission of a quantity of CO_2 equal to Eenp x Eref.

In the absence of a green power generation facility, the net heat recovered (Eqnv) would have been generated by the reference heat generation system. The green power generation system therefore prevents the emission of a quantity of CO_2 equal to Eqnv x Qref.

In the absence of a green power generation facility, the net cold recovered (Efnv) would have been generated by the reference cold generation system. The green power generation system therefore prevents the emission of a quantity of CO_2 equal to Efnv x Qf,ref.

However, in a number of cases, a green power generation facility releases a quantity of CO_2, depending on the fossil and renewable fuels used (C_{system})[8] proportional to the entering energies (Ee). In such cases, the green power generation facility releases a quantity of CO_2 equal to Ee x C_{system}.

The CO_2 gain G made by the green power generation facility is therefore equal to the difference between the sum of the total CO_2 emissions prevented minus the quantity of CO_2 released, i.e.:

CO_2 gain = CO_2 prevented – CO_2 released (2)

In which:

CO_2 prevented = Eenp x Eref + Eqnv x Qref + Efnv x Qf,ref

CO_2 released = Ee x C_{system}

The CO_2 saving rate (τ) has been set by convention at the ratio of the carbon dioxide gain achieved by the green power generation facility to the carbon dioxide emissions of the traditional generation system generating the same quantity of electricity (Eenp), and therefore:

[9]

τ = CO_2 gain / (Eenp x E_{ref}) (3)

In other words, green certificates are issued to a green power generation facility each time the latter has prevented the emission of the quantity of CO_2 released by the reference traditional generation system for the generation of 1 MWhe (Eref). This Eref value is 456 kg CO_2/MWhe.

The following paragraph presents a number of typical cases involving the issuance of green certificates. The calculations are valid provided the CO_2 saving rate exceeds 10% and the facility capacity is less than 5 MW. For further information, a brochure and software are available on the CWaPE website, which supply a more detailed description of the calculation methods to be applied to most green power generation systems.

[8] The methods and the list of conventional CO2 emission coefficients already approved by CWaPE are included in a statement by CWaPE dated 1 June 2004 (CD-4f01-CWaPE).

[9] Moniteur Belge of 22 November 2005

2.4.5 Several case studies

Case 1: Wind turbine, hydroelectric or photovoltaic plant

As the facility does not release any CO_2, the production of 1 MWhe by such a facility saves the CO_2 which would have been released by the reference power generation facility. This is known as the CO_2 gain and is 456 kg of CO_2.

Moreover, the saving rate of CO_2 (τ) is calculated as the quotient of the CO_2 gain and the quantity of CO_2 released by the reference power generation facility, i.e. 456 kg of CO_2.

The CO_2 saving rate (τ) is therefore 1, meaning that the producer receives 1 GC for each net MWhe generated.

Case 2: Biomass burning power station

Biomass continuously recycles in the atmosphere the carbon dioxide absorbed at a previous stage in its life. The CO_2 released today by combustion is that trapped in the past and which will be in the future. Therefore, the balance is zero. A biomass burning power station therefore releases some CO_2 when fossil energy has been used for the preparation and transport of the fuel. In this example, an arbitrary value of 50 kg CO_2/net MWhe generated is used.

However, this facility does ensure that less CO_2 is released than by the reference generation facility for the generation of the same quantity of electricity. This is known as the CO_2 gain and is 406 (=456-50) kg CO_2/net MWhe generated.

Moreover, the saving rate is calculated as the quotient of the CO_2 gain and the quantity of CO_2 released by the reference power generation facility, i.e. 456 kg of CO_2.

The CO_2 saving rate (τ) is therefore 0.89 (= 406/456), which means that the green producer is issued 0.89 GC for each net MWhe generated.

Case 3: Natural gas cogeneration unit

Cogeneration, in particular when fossil energy is used, generates CO_2. However, it saves the CO_2 which would have been released by a reference power station and reference boiler to generate an equivalent quantity of power and heat. By combining both types of generation (power and heat), green-quality cogeneration enables less CO_2 to be released than by the separate reference facilities.

This example involves natural gas cogeneration, which, to generate 1 MWh of power, consumes 3 MWh of natural gas (α_e = 33.33%) but recovers 1.5 MWh of heat (α_q = 50%).

The generation of 1 MWH of power by cogeneration prevents the emission of the 456 kg of CO_2 by the reference power station.

It also prevents the emission of 418.5 kg of CO_2 (= 1.5 MWh of heat x 279 kg of CO_2/MWh of heat by reference facility) by the reference natural gas boiler.

However, the cogeneration facility has consumed 3 MWh of natural gas and has therefore released 753 kg of CO_2 (= 3 MWh of natural gas x 251 kg CO_2/MWh for the gas).

The CO_2 gain is calculated by subtracting the quantity of CO_2 released by the green power generation facility from the quantities of CO_2 prevented at the reference facilities. In this example, this is (456 kg CO_2 + 418.5 kg CO_2 – 753 kg CO_2)/MWh = 121.5 kg CO_2.

The CO_2 saving rate (τ) is calculated by dividing the CO2 gain by the CO_2 emission of the reference power station, i.e.: 121.5 kg CO_2 / 456 kg CO_2 = 0.266.

The green producer receives 0.266 green certificate per net MWhe generated.

2.5 Impact of the green certificate system for green producers

The maximum income a green producer may expect from a green certificate system is directly linked to the amount of the fine:

Max. income = τ x fine (€/MWh)

The following table supplies (for information purposes) the maximum theoretical income (not including taxes) a green producer may expect according to the generation system used.

System	CO_2 saving rate (for information purposes)	Maximum theoretical income (not including taxes) (€/MWh)
Photovoltaic	1	100 € (150 € with Elia)
Hydraulic	1	100 €
Wind power	1	100 €
Biomass	0.7 to 1	70 to 100 €
Biomass cogeneration	1 to 2	100 to 200 €
Fossil fuel cogeneration	0.1 to 0.4	10 to 40 €

Table 2.2: Theoretical maximum income for a green producer

This income could even be higher when tax-related aspects are taken into consideration, as the purchase of green certificates, unlike fines, is tax deductible in the case of suppliers subject to corporate tax.

2.6 The green certificate market

2.6.1 The supply: green certificates issued to green producers - (AGW-PEV, art. 10/11)

Each green producer supplies its metering statements to CWaPE on a quarterly basis. On the basis of these statements and of the metering algorithms supplied in the certificate of origin, certified green power generation facilities are issued a number of green certificates proportionate to the number of MWh generated during the past quarter and to the CO2 saving rate calculated by CWaPE for the quarter. Green certificates issued by CWaPE are valid for 5 years. CWaPE issues green certificates on a quarterly basis and in an intangible form. This issuance is free of charge. Further to each issuance, CWaPE sends green producers an account statement specifying the details of the issuance and the status of the account.

2.6.2 Organization

The database (AGW-PEV, art. 15 and 17):

The authenticity of green certificates is guaranteed by their registration in a centralised database managed by CWaPE. This contains an inventory of green certificates issued, their certificate of origin, their date of issuance, their holder and the operations recorded (issuance, transactions, restitution for quota, expiry of validity).

Transactions:

CWaPE must be notified of all transactions involving green certificates so that they can be authenticated and recorded in the green certificate register.
The market actors negotiate the transfer of green certificates independently of CWaPE. Once the transaction is completed, the seller notifies CWaPE of the transfer of the green certificates by filling in the appropriate form and complying with the procedure set up by CWaPE[10].
Further to each transaction, CWaPE sends the parties an account statement with the details of the transactions performed and the status of their account.

Intermediaries:

Any individual or body which registers with the CWaPE database may perform green certificate transactions. It is therefore likely that ultimately some end customers will decide to purchase the green certificates relating to their consumption on the market and sell them to their electricity providers in return for special electricity prices (outside the factors linked to the green certificates).

Moreover, EDORA, the federation of generators of electricity from renewable energy sources, is planning to organize a green certificate exchange. The advantage of this system will be that it will guarantee the confidentiality of transactions with respect to buyers and sellers at the time of the transaction and provide a real-time indication of the price of green certificates.

[10] See "Certificats verts: modalités pratiques" brochure.

2.6.3 The demand: the quota return for suppliers

Obligations:

Each supplier must supply CWaPE on a quarterly basis[11] with a number of green certificates consistent with the number of MWh supplied to its end customers located in the Walloon Region multiplied by the current quota. In the case of system operators, the quota is applicable to the power supplied by them to end customers and to their own power consumption (AGW-PEV, art. 21, paragraphs 1 and 2).

The quota return procedure for suppliers includes four stages:

1. quarterly supply statements supplied to CWaPE
2. number of green certificates to be supplied calculated by CWaPE on the basis of the quota, with reductions if applicable
3. "quota return" green certificates supplied to CWaPE. Green certificates thus supplied are deleted from the database
4. calculation by CWaPE of the fines to be levied if the number of green certificates supplied is inadequate.

The quota to be achieved by suppliers and system operators is as follows (AGW-PEV, art. 21, paragraph 3):

- 3% from 01/01/2003 to 31/12/2003
- 4% from 01/01/2004 to 31/12/2004
- 5% from 01/01/2005 to 31/12/2005
- 6% from 01/01/2006 to 31/12/2006
- 7% from 01/01/2007 to 31/12/2007

These rates have been calculated on the basis of the potential evolution of green power generation. Depending on the evolution of the green power market, the Walloon Government may revise these quotas (AGW-PEV, art. 22).

An increase in quotas by 1% per year for the period from 2008 to 2012 was proposed to the Walloon Government by CWaPE in 2005[12]. In its decision of 16 March 2006, the Walloon Government set quotas of green certificates at 8% in 2008 …. 12% in 2012, while reserving the option of reviewing the situation in 2009, and increasing quotas if necessary. This decision was accompanied by a series of complementary measures which will require amendment of the legislation on green certificates.

Green certificates included in the quotas must have been issued on Belgian territory.[13]. However, green certificates issued by the other Belgian regions or by the federal authorities (North Sea licences) may only be included if Walloon green certificates can be included in the quotas of these other regions or in the federal quota (AGW-PEV, art. 23). Only the Brussels-Capital Region has applied this provision and recognises green certificates issued to a certified plant in Wallonia within 10 years of that plant being commissioned for industrial-scale generation.[14]

Sanctions (AGW-PEV, art. 24):

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[11] Before the end of the second month after the end of the quarter under consideration (i.e. by 30 April, 31 July, 31 October and 28/29 February)

[12] Proposal CD-5f28-CWaPE-101 of 11 July 2005

[13] Green certificates issued for power generated outside Belgium may be included in the quota subject to a bilateral agreement and mutual recognition by the parties.

[14] Ministerial Decree of 3 May 2005 on recognition of Walloon green certificates to allow them to count towards compliance with the obligation imposed on suppliers in the Brussels-Capital Region by Article 28, §2 of the electricity order.

In case of failure to comply with the required quotas, the supplier or system operator shall pay an administrative fine for the quarter concerned. The current amount of the fine is 100 euros per missing certificate. The Décret specifies that the Walloon Government may set the amount of this fine at 75 to 125 euros per missing certificate[15].

Reductions (AGW-PEV, art. 21, paragraph 4):

In 2004, the quota initially imposed by the legislation was amended. The Government decided to limit the impact of the cost of green certification on industrial heavy-use end customers to respond to the economic difficulties encountered by the latter within the context of intense international competition. Since 1 January 2004, the number of green certificates required of suppliers supplying an end customer consuming over 5 GWh at one operations centre during the quarter under consideration and which has signed an agreement with the Walloon Region to improve its short-, medium- and long-term energy efficiency (e.g. sectoral agreements, etc.) may be reduced.

The reduction granted for each operations centre is:

- 1/4 of the quota for the portion of the quarterly power consumption from 5 to and including 25 GWh

- Z, for the portion of the quarterly power consumption over 25 GWh, Z = quota – 2. This ultimately means a fixed quota of 2% for this portion, whatever the quota required of the suppliers.

When the end customer is supplied by several suppliers at the same operations centre, the reduction in the number of green certificates is distributed pro rata between the suppliers according to the volumes supplied by each.

Cost reductions subsequent to the provisions of this paragraph are passed on directly to each of the end customers by which they have been generated.

Example concerning the 2005 quotas:

Take an end customer which meets the requirements for the quota reduction and consumes 35 GWh during one quarter. Without any reduction, this customer's supplier would have had to present 1 750 GCs.

For the portion between 0 and 5 GWh, this customer's supplier will need to meet the full quota requirements, i.e., in 2005, 5% of 5 000 MWh, i.e. 250 GCs. For the second portion, between 5 GWh and 25,000 MWh, the supplier must fulfil a quota reduced by 25%, i.e. (5% x ¾) x (25 000-5 000) MWh = 750 GCs. For the third portion, over 25 GWh, the supplier's quota is cut to 2%, i.e. 2% x (35 000-25 000) MWh = 200 GCs. In all, the supplier must supply 1 200 GCs.

The reduction granted in this way to the supplier on behalf of its customer will therefore be 550 GCs.

[15] Decree, Art. 53, paragraph 2

2.6.4 Aid to generation by the Walloon Government -

On 6 November 2003, the Walloon Government adopted an Arrêté on aid to the generation of green power. The Ministerial Arrêté of 24 May 2004 specifies the procedures and conditions for application for and granting of aid to generation. Producers of green power generated from renewable energy sources, the facilities of which were commissioned after 30 June 2003 and which have signed an agreement with the Minister may turn over all or part of the green certificates they have been issued to the Minister. This agreement shall mention the period for which aid to generation is guaranteed. This period may not exceed 120 months as of the month following which the facility is commissioned.

The aid to generation accumulated during the period under consideration offsets the extra cost of generation with respect to the market price[16] during the write-down period for the facility concerned, including the return on the capital invested. The aid to generation granted by the Minister in exchange for the green certificates shall be 65 €/GC[17].

The decision whether to apply for aid to generation or sell the green certificates on the green certificate market is made by the producer which has signed an agreement each time the latter sends its quarterly metering statements. The Walloon Region sends a request for the cancellation of the green certificates it holds to CWaPE so that they are deleted from the database. Through this system, excess supply is reduced, which stabilises prices.

2.6.5 The minimum repurchase price federal system -

Within the scope of its public-service mission, and in application of *the Royal Decree of 16 July 2002 on the setting-up of mechanisms to promote electricity generated from renewable energy sources,* the transmission system operator (Elia) is obliged to purchase green certificates granted to a green power producer from the latter at a minimum set price which depends on the generation technology:

Generation technology	**Price per green certificate**
Offshore wind energy	107 / 90 €[18]
Onshore wind energy	50 €
Hydraulic energy	50 €
Solar energy	150 €
Other renewable energy sources (including biomass)	20 €

This obligation takes effect when the generation facility is commissioned, for a period of ten years. In practice, only photovoltaic facilities are concerned in the Walloon Region, as only in that case is the repurchase price by the system operator (150 €/GC) higher than the 100 € fine per missing certificate.

The system operator (Elia) must offer these certificates on the market in order to recoup the cost of this obligation. The net difference between the purchase price of the green certificates by the system operator and the selling price on the market is financed by a surcharge on the tariffs for connection to and use of the grid.

[16] This market price is set by CWaPE. The method used by CWaPE is described in detail in its statement CD-5d05-CWaPE of 7 April 2005.

[17] Depending on the technology, the agreement may stipulate a higher amount, which may not, however, exceed the amount of the fine.

[18] Per licence, 107 €/GC for the first 216 MW and 90 €/GC for the balance.

3 Results for 2005

3.1 Generation facilities

3.1.1 Generation facility certification

Three inspection bodies accredited by Belac as per the NBN 45004 standard and approved by the Minister of Energy issue certificates of origin to green power generation facilities. These bodies are: AIB Vinçotte, Bureau Technique Verbrugghe, SGS Bureau Nivelles.

Facilities certified in 2005 include:

- two photovoltaic facilities (Greindl and Hecq-Hannecart) with a total nominal capacity of 4 kW;
- five wind turbine sites (Villers-le-Bouillet, Perwez, Bronromme, Saint-Vith (Emmelsberg and Walcourt) with a total capacity of almost 27 MW;
- three hydroelectric plants (Bardonwez, Moulin de Jauche, Moulin de Berchiwé) with a total capacity of 60 kW;
- two biomass generation facilities (conversion of unit 4 of the Awirs station to wood pellets with capacity of 80 MW, and SEVA animal fat recovery centre, with a capacity of 885 kWe);
- five biomass cogeneration units (Thermal power stations at Isnes, Happes, Chapois, the Aigrement margarine plant, Secobois wood platform, Recybois wood platform), with a total capacity of 4 270 kW;
- eight cogeneration units running on natural gas (Frères Alexiens psychiatric hospital, three plants at the Warcoing sugar refinery, Provital, IPALLE sewage plant, Orafti's Notre-Dame refinery, and the Longchamps grinding mill) with a capacity of just over 26 MW.

Besides issuing the initial certificates, the three approved bodies perform annual inspections of all certified sites to ensure compliance with the data on the certificate of origin. Amendments to the certificate of origin are also issued if the measuring equipment or any other information specified on the certificate of origin is changed. Where biomass inputs are used (local or imported), the certification also covers the traceability and demonstration of the renewable character of these inputs.

3.1.2 Green power generation sites:

At the end of 2005, 105 green power generation sites met the requirements for the issuance of green certificates. Their total capacity was approximately 447 MW (see Annex 1). The number of green producers corresponding to the 105 sites was 64.

Situation at the end of 2005	Number of sites	Capacity (kW)
Photovoltaic	4	6
Hydro	46	103 791
Wind	11	49 018
Biomass	9	96 223
Biomass cogeneration	14	46 507
Fossil cogeneration	21	151 382
Total	105	446 927

Table 3.1: Green power generation sites in 2005

Moreover, two biomass generation sites and one natural gas cogeneration site were shut down.

3.1.3 Generation of green power and green certificates issued:

The number of green certificates issued for green power generated in 2005 was 823 000 compared with 715 000 in 2004, i.e. an increase of 15%.

During the year, there is a time-lag between the generation of green power and the issuance of the relevant green certificates. Green certificates are not issued continuously during the year, but on the basis of quarterly statements supplied by the producer. This means that the generation periods covered by these statements do not necessarily coincide with the calendar quarters. Moreover, in the case of new sites, certificates may be issued for different periods due to the certification procedure.

The breakdown of certificate issuance by generation method and by quarter is supplied in Annex 2. The following graph supplies an idea of the cumulative production of green power by smoothing green certificate issuances over the entire generation period.

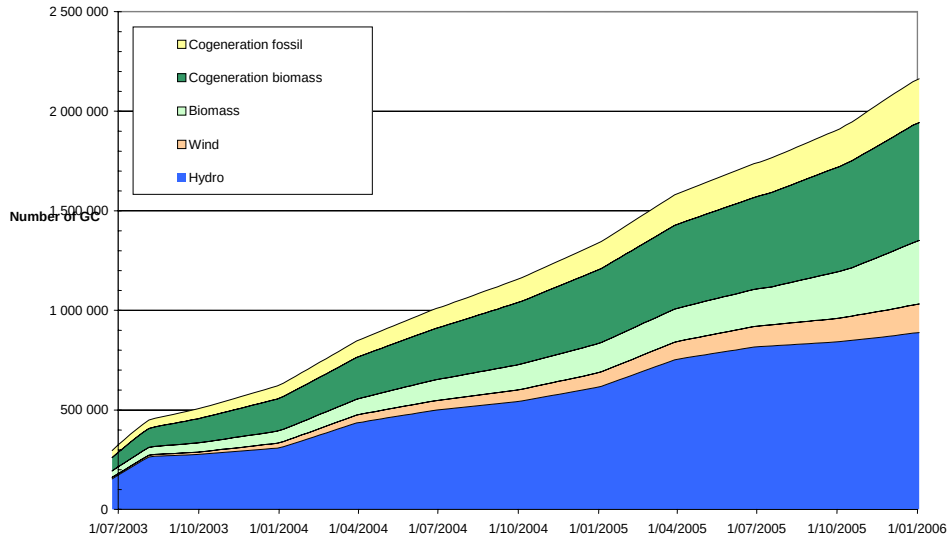


Figure 3.1: Cumulative production of green certificates

Changes in the breakdown of the certified power smoothed by splitting pro rata by number of days where a statement covers two years, and the relevant green certificates issued are described in the following table and illustrations.

Year	2004				2005				
	Capacity (MW)	Production (MWh)	(green MWh)	Number of GCs issued	Capacity (MW)	Production (MWh)	(green MWh)	Number of GCs issued	Increase in Gcs issued
Photovoltaic	0	0	0	0	0	1	1	1	-
Hydro	104	305 746	305 746	305 746	104	274 191	274 191	274 191	- 10%
Wind	23	46 178	46 178	46 178	49	70 858	70 858	70 858	+ 53%
Biomass	16	86 553	86 553	86 109	96	262 276	262 276	171 041	+ 99%
Cogeneration biomass	41	233 792	186 842	207 773	47	243 469	198 023	222 201	+ 7%
Cogeneration fossil	123	824 760	246 756	69 357	151	857 525	287 569	85 120	+ 23%
Total	**306**	**1 497 030**	**872 075**	**715 163**	**447**	**1 708 320**	**1 092 918**	**823 412**	+ 15%

Table 3.2: Generation of green power in 2004 and 2005

Given the definition of green power in the decree, for the cogeneration units (fossil and biomass) as well as the hydroelectric plants with a net developable capacity during the

period (Pendp) of over 20 MWe, "green MWh" correspond to the net electricity generated multiplied by the ratio (20 / Pendp).

The average CO2 saving rate (τ) of the green power generation facilities in 2005 was 0.75 CV/MWh (i.e. 0.48 GC per MWh of electricity generated), which was down on the rate of 0.82 (0.48 GC/MWh) observed in 2004.

The sites in existence at the time when the green certificate system came into effect, i.e. 1 October 2002, accounted for 77% in 2005 compared with 92% in 2004[19]

3.1.4 Results in 2005 compared with the forecasts made in 2004

In 2004, the forecasts were for issuance of nearly 975 000 green certificates, compared with approximately 823 400 actually issued. The difference is mainly explained by delays in the development of biomass and wind power facilities, as well as production at hydroelectric plants, which has been falling continuously since 2002.

As far as the hydroelectric plants are concerned, the downward trend is mainly explained by the sensitivity of this type of generation to weather conditions. So, compared with 2003, almost 34 000 fewer GCs were issued in 2005.

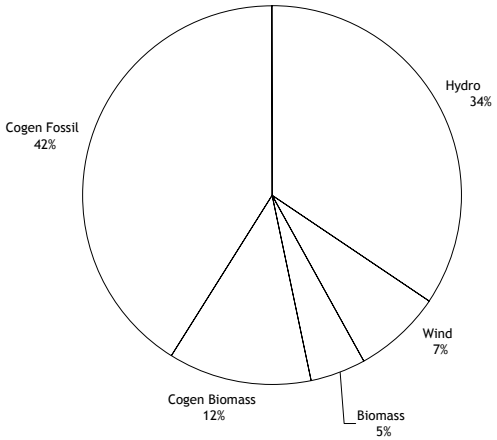
As for the delay in the building of certain biomass plants, we observe mainly lower green electricity generation in 2005 than forecast at the Awirs station.

With regard to the delays in the building of certain wind power units, we observe that two wind power sites (7.5 MW) which were due to be commissioned in the second half of 2005 will only start generation in 2006. We also observe that a wind power project to generate 18 MW that was expected to be commissioned in 2005 was abandoned, due to the refusal of a licence. It is important to bear in mind that five projects authorised in 2003 and 2004 (licences granted) with a total capacity of approximately 50 MW have still not been built.

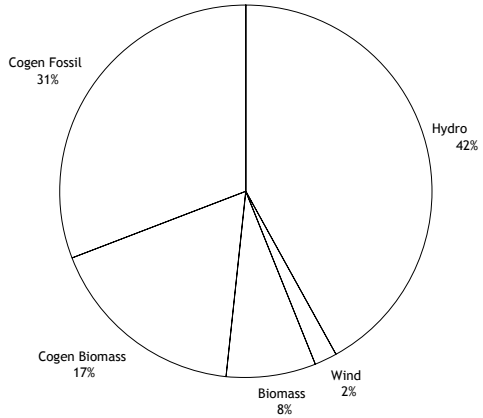
[19] Cf. CD-6c07-CWaPE-112

Figure 3.2: Green power generation facilities - 2004

Installed capacity: 306 MW



872 green GWh generated



Number of GCs issued: 715 163

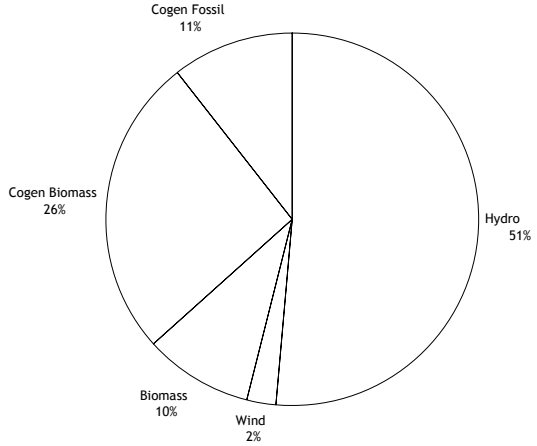
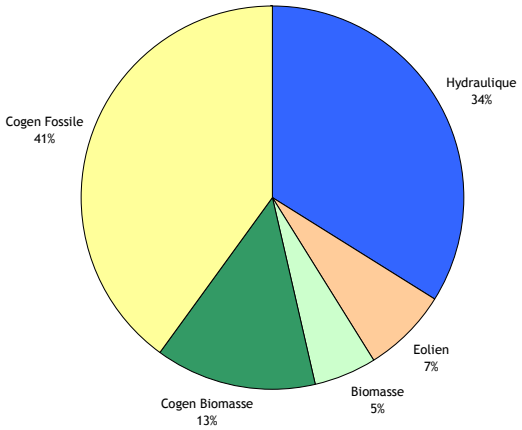
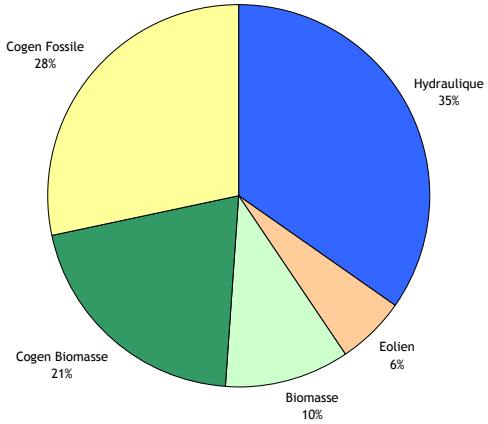


Figure 3.3: Green power generation facilities – 2005

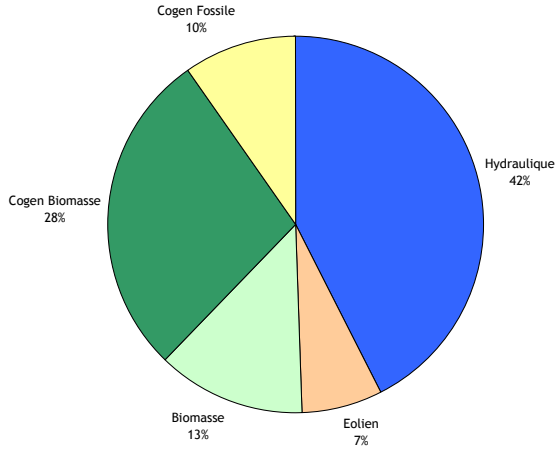
Installed capacity: 447 MW



1 093 green GWh generated



Number of GCs issued: 823,412



3.1.5 Share of green power in electricity supply in the Walloon region.

In 2005, the production of green electricity represented approximately 4.7% of electricity supplies in the Walloon region (approx. 23 341 000 MWh) compared with 3.7% in 2004.

Year	2004		2005	
Supplies WR	**23 628 470 MWh**		**23 341 061 MWh**	
	(MWh green)	**%**	**(MWh green)**	**%**
Photovoltaic	0	0,0	1	0,0
Hydro	305 746	1,3	274 191	1,2
Wind	46 178	0,2	70 858	0,3
Biomass	86 553	0,4	262 276	1,1
Cogeneration biomass	186 842	0,8	198 023	0,8
Cogeneration fossil	246 756	1,0	287 569	1,2
Total	**872 075**	**3,7**	**1 092 918**	**4,7**

Table 3.3: Share of green power generation in electricity supplies in Walloon Region

If we do not take account of the limit of 20 MW for cogeneration plants (fossil and biomass) and hydraulic stations, the share of electricity generated in certified units from renewable energy sources and high-quality cogeneration in the Walloon Region was 7.3% of electricity supplies in 2005 compared with 6.3% in 2004, which corresponds to generation of renewable energy (RES) as defined by Directive 2001/77/EC amounting to 3.4%.

Year	2004		2005	
Supplies in WR	**23 628 470 MWh**		**23 341 061 MWh**	
	(MWh)	**%**	**(MWh)**	**%**
Photovoltaic	0	0,0	1	0,0
Hydro	305 746	1,3	274 191	1,2
Wind	46 178	0,2	70 858	0,3
Biomass	86 553	0,4	262 276	1,1
Cogeneration biomass	233 792	1,0	243 469	1,0
Cogeneration fossil	824 760	3,5	857 525	3,7
Total	**1 497 030**	**6,3**	**1 708 320**	**7,3**
Total RES	**634 831**	**2,7**	**801 057**	**3,4**

Table 3.4: Share of energy generated in certified plants in electricity supplies in the Walloon Region

3.2 The green certificate market

3.2.1 Green certificate transactions:

During 2005, 413 720 GCs were traded[20]. The average unit price remained around 92 € during the year.

	Number of GCs	Average unit price
2003: 1st half	7 669	87.63
2003: 3rd quarter	94 575	79.29
2003: 4th quarter	62 700	91.65
2004: 1st quarter	81 757	91.57
2004: 2nd quarter	71 380	91.68
2004: 3rd quarter	89 318	91.95
2004: 4th quarter	84 279	91.74
2005: 1st quarter	81 830	91.81
2005: 2nd quarter	120 608	92.00
2005: 3rd quarter	91 942	92.29
2005: 4th quarter	119 340	92.26
2006: 1st quarter	132 064	92.08
Total	1 007 836	90.92

	Number of GCs	Average unit price
2003	164 943	84.38
2004	326 733	91.74
2005	413 720	92.10

Table 3.5: Average price of green certificates traded

These market prices, which have been published on the CWaPE website, apply to approximately 55% of the green certificates issued since the coming into force of the system. The remaining green certificates (45%) are chiefly those issued to generation sites belonging to suppliers, which were used for their respective quotas or kept for use at a later date.

3.2.2 Green certificate quotas (nominal and actual):

The number of green certificates to be supplied to CWaPE as per the obligation imposed on suppliers and system operators by Article 21 of the Arrêté of 4 July 2002 on the promotion of green power was calculated on the basis of a "nominal" quota of 5%, and on the other hand on the basis of the quota reductions for supplies to heavy-use end customers.

Electricity supplies declared and taken into account for 2005 were 23 341 061 MWh[21]. The minimum quota of 5% therefore corresponds to 1 167 053 green certificates.

In 2005, 78 sites operated by heavy-used end customers were granted a quota reduction. The total consumption of these sites represents about 37% of electricity supplies in the Walloon Region.

[20] Quota returns are not considered to be transactions.

[21] This is the value declared by the suppliers on 28/02/2006. Rectifications after that date are not taken into account in the calculation of 2005 quotas, but are carried forward to the calculation of 2006 quotas.

The quota reductions granted to suppliers of the operations centres of heavy-use end consumers amounted to 161,419 green certificates, or 13.8% of the nominal quota of green certificates. The average actual quota in 2005 for the 78 sites benefiting from quota reductions was 3.15%.

The saving made by the suppliers (to be passed on to the end customers) can be estimated as follows:

	Saving made in 2004: (in euros)	Saving made in 2005: (in euros)
Based on the amount of the fine (100 € / GC)	11 754 769	16 141 900
Based on the average price of a GC on the green certificate market (91.74 € in 2004, 92.10 € in 2005)	**10 783 825**	**14 866 690**

The nominal quota of 5% for the year 2005 was thus reduced to an actual quota (ratio between the number of green certificates to be submitted and the number of MWh supplied) of 4.3%, taking account of the reductions allowed, which corresponds to a number of 1 005 634 GCs actually to be submitted by suppliers and grid operators.

The figure below shows the change in quotas since the green certificate system came into effect.

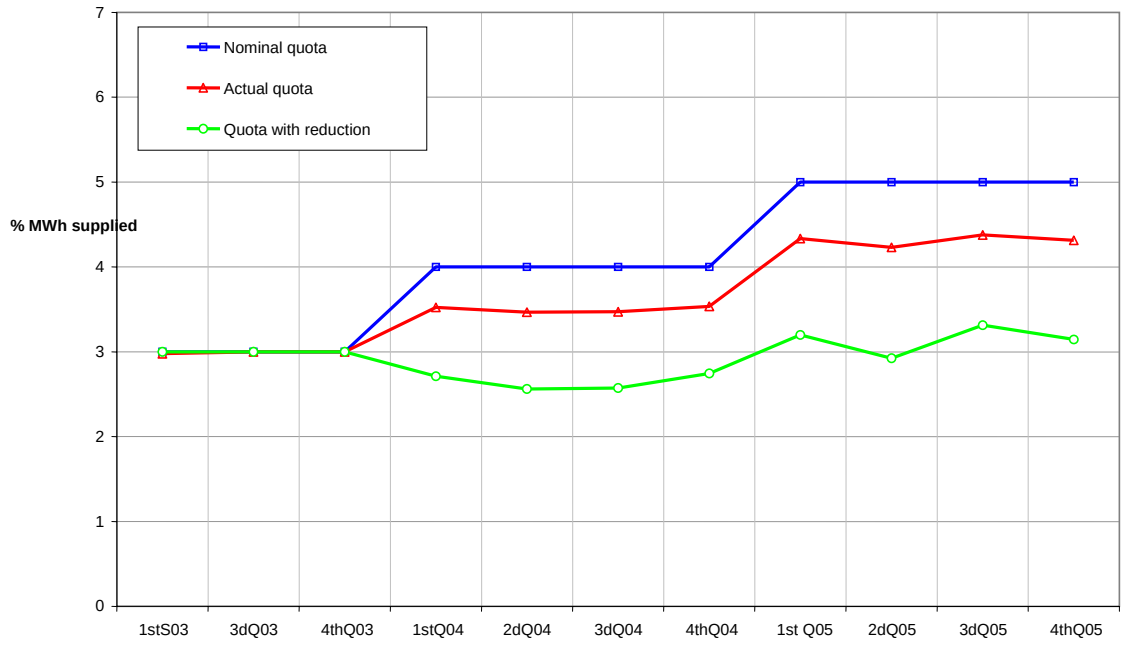


Figure 3.4 Change in the quotas over the period 2003-2005

The nominal quota corresponds to the quota that suppliers of customers who do not benefit from reductions in their green certificates are required to submit.

The quota with reduction corresponds to the average quota to which suppliers of heavy-used end users of electricity who benefit from reductions are subject. This reduction can

be seen to have maintained a relatively stable quota of green certificates for these customers.

The actual quota corresponds to the actual demand on the green certificate market.

3.2.3 Supply and demand on the green certificate market

The following graph shows the GC market at the time of the quota returns. The first column shows the number of green certificates issued between two quota return dates.

The "GCs available" are the GCs available on the market at the time of the quota return, the sum of the green certificates issued during the period and the stocks of unused green certificates from the previous period.

"GCs to be supplied" is the number of GCs to be supplied by the suppliers and system operators. This equals 5% of the total power supplied (4% in 2004), minus the reductions granted for heavy-use end customers.

Finally, "GCs supplied" is the actual number of certificates supplied for the quota. The difference between the GCs available and the GCs supplied is the stock of green certificates available at the quota return date. The difference between the "GCs to be supplied" and the "GCs supplied" corresponds to the fines.

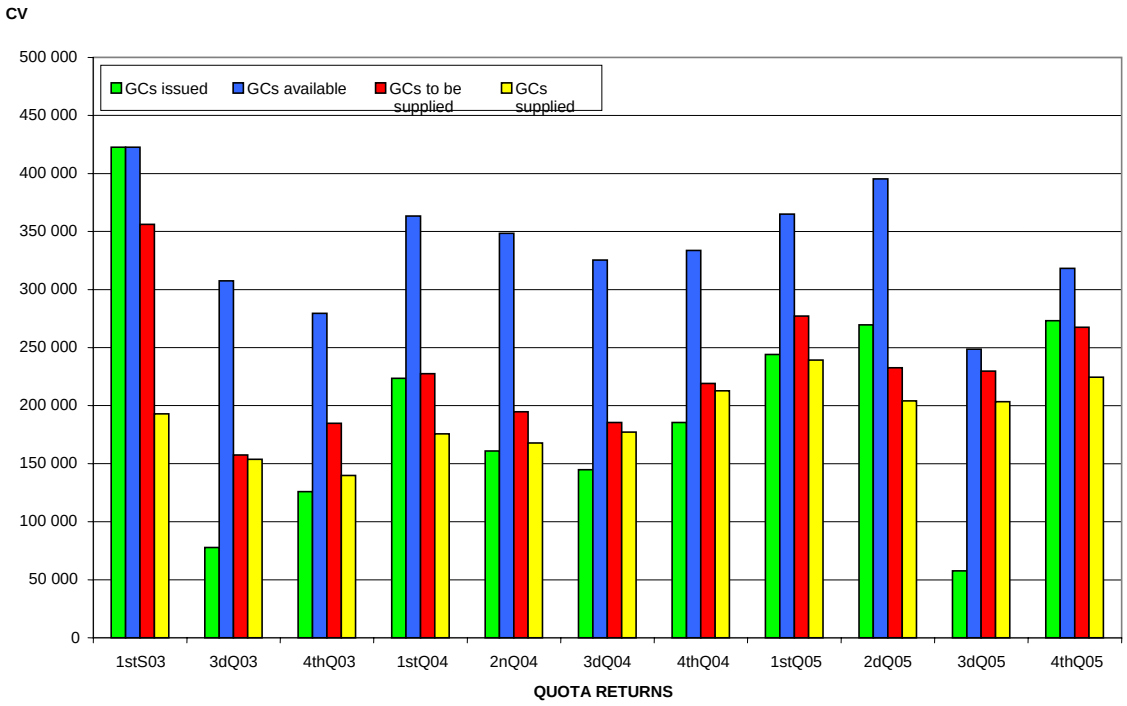


Figure 3.5: Change in supply and demand on the green certificate market

At the time of each quota return, the number of green certificates available was enough to cover the requirements. However, we observe a significant reduction in liquidity on the quota returns relating to the third quarter of 2005 (Q3 05).

Quarter concerned	Date of quota return	Stock of green certificates available on the market
1st quarter 2005	31 May 2005	125 769
2nd quarter 2005	31 August 2005	191 098
3rd quarter 2005	30 November 2005	45 158
4th quarter 2005	28 February 2006	93 758

The following graph supplies information concerning the green certificate market in 2003, 2004 and 2005.

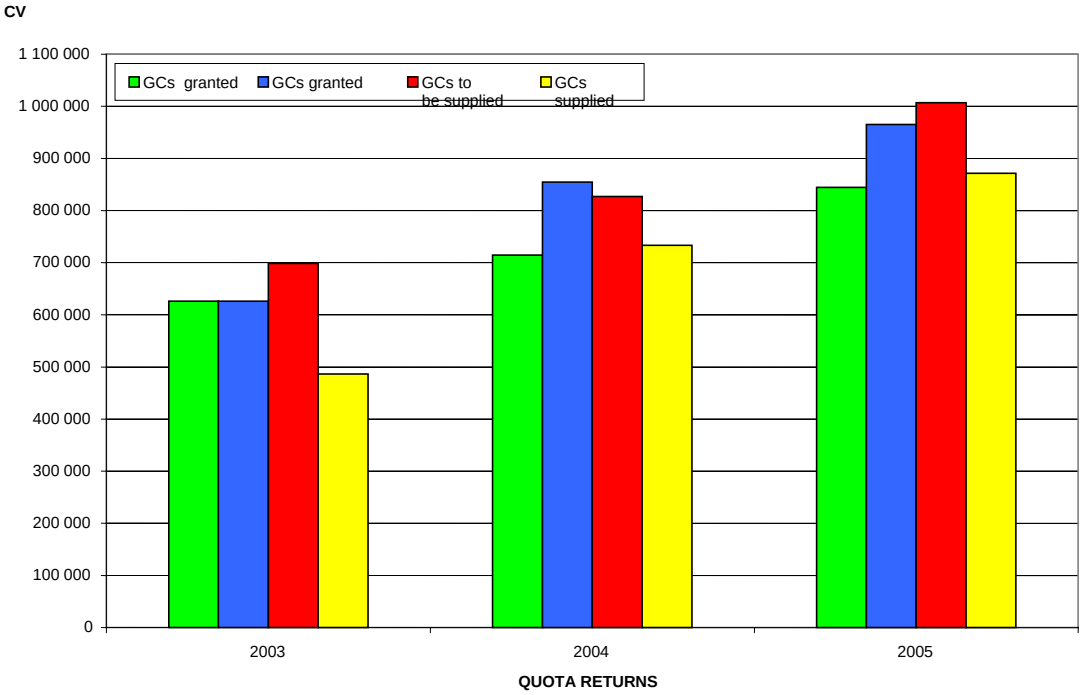


Figure 3.6: Annual results of the green certificate market

In this graph, "GCs available" is the sum of the green certificates issued during the year and of the stock of unused green certificates from the previous year.

We observe that the number of green certificates issued in 2005 remains lower than the number of green certificates to be supplied for the quotas (approximately 83.8%). The number of green certificates available on the market in 2005 taking account of the stock created in 2004 was slightly below the number of certificates to be supplied for the quotas (approx. 95.8%).

As explained earlier, this slight shortage of green certificates for the year 2005 is largely due to the fall in production by hydroelectric plants, and the delays in commissioning certain biomass stations and new wind generation facilities.

3.2.4 Quota returns and green certificates

The number of green certificates supplied to CWaPE pursuant to the obligation imposed on suppliers and grid operators was 871 447 GCs for the whole of 2005, compared with 733 370 for 2004. The 871 447 GCs supplied to the CWaPE represent 86.65% of the number of CVs that should have been supplied.

The number of suppliers and grid operators which were bound to submit quarterly returns of supplies in 2005 and a number of green certificates corresponding to the minimum quota of 5% to the CWaPE is as follows:

- 12 suppliers with a general supply licence;

- 5 suppliers with a green supply licence[22];
- 13 grid operators.

[22] A green supply licence is granted to suppliers who derive at least 50% of their supplies from renewable energy sources.

Table 3.6: Quarterly green certificate quota returns

	Total sales over year (MWh)	Quota of GCs excl. reduction	GC reduction	GCs to be supplied	GCs supplied	Missing GCs	A
1st quarter 2005							
Suppliers	3 808 895	190 445	42 126	148 319	148 274	45	
Grid operators	2 575 698	128 785	0	128 785	90 895	37 890	
TOTAL	6 384 593	319 230	42 126	277 104	239 168	37 935	
2nd quarter 2005							
Suppliers	3 735 271	186 764	41 521	145 242	145 242	0	
Grid operators	1 749 469	87 473	0	87 473	58 990	28 483	
TOTAL	5 484 741	274 237	41 521	232 716	204 233	28 483	
3rd quarter 2005							
Suppliers	3 481 857	174 093	35 891	138 202	138 026	176	
Grid operators	1 802 080	90 104	0	90 104	65 529	24 575	
TOTAL	5 283 937	264 197	35 891	228 306	203 555	24 751	
4th quarter 2005							
Suppliers	3 851 106	192 555	41 880	150 675	150 660	15	
Grid operators	2 336 684	116 834	0	116 834	73 831	43 003	
TOTAL	6 187 790	309 390	41 880	267 509	224 491	43 018	
TOTAL 2005							
	Total sales over the year (MWh)	Quota of GCs excl. reduction after corrections	GC reduction	GCs to be supplied	GCs supplied	Missing GCs	A
Suppliers	14 877 129	743 856	161 419	582 438	582 202	236	
Grid operators	8 463 931	423 197	0	423 197	289 245	133 951	
TOTAL	23 341 061	1 167 053	161 419	1 005 634	871 447	134 187	

The total sales shown in this table correspond to the amounts declared on 28/02/2006. Corrections submitted after this date are not taken into account in the calculation of 2005 quotas but are carried forward to the calculation of 2006 quotas.

3.2.5 Evolution of the amount of the fines:

The quarterly pattern of the amount of fines applied in 2005 is shown in the figure below.

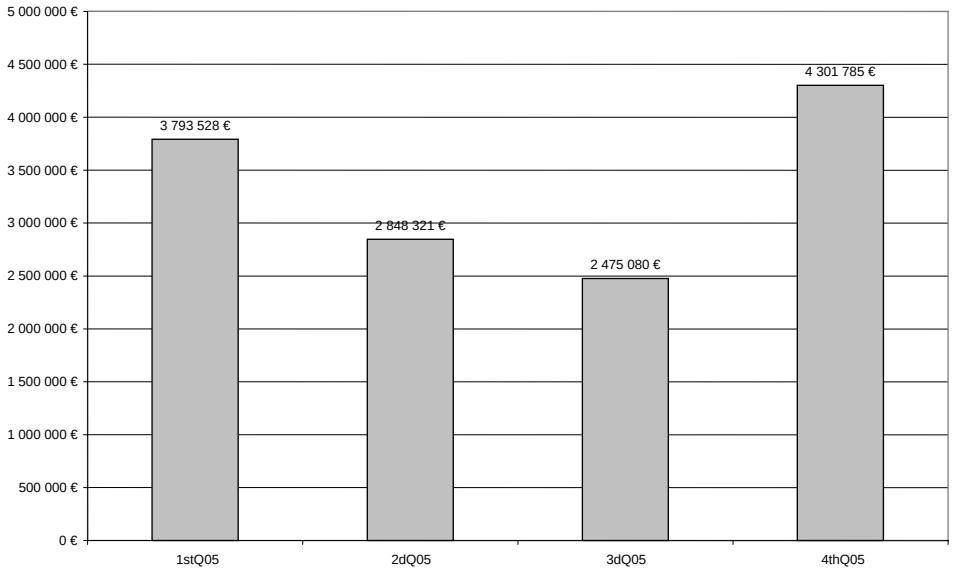


Figure 3.7: quarterly evolution of the amount of fines applied in 2005

The total number of green certificates missing in 2005 which led to the imposition of fines represents about 13.35% of the actual quota, compared with 11.4% in 2004. This amount is higher than the overall green certificate deficit for the year 2005 (4.2%).

Since the number of green certificates that should have been supplied for the year 2005 was 1 005 634, the difference, i.e. 134 187 certificates, gave rise to the imposition of administrative fines amounting to a total of 13 418 714 euro (compared with almost 9.5 million in 2004).

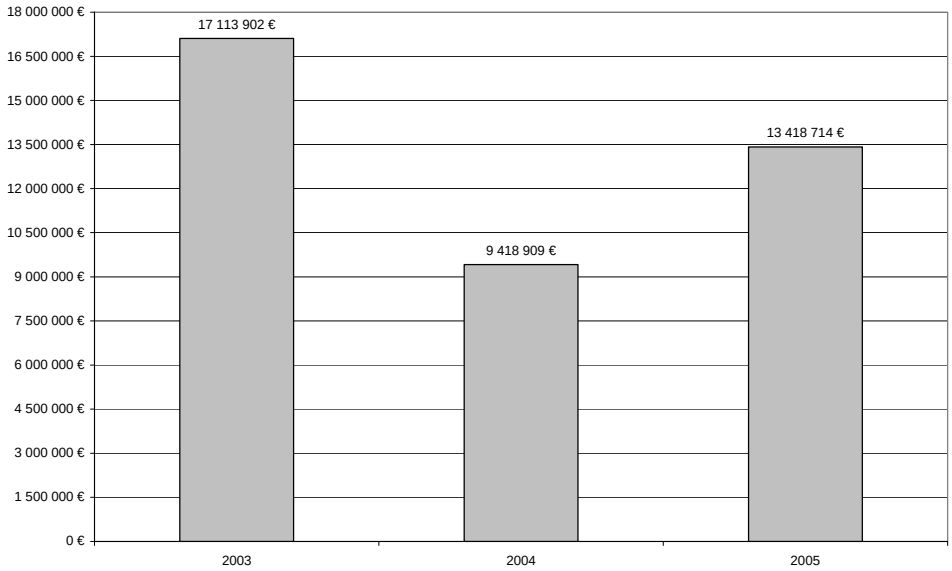


Figure 3.8: Fines applied over the period 2003-2005

It is important to bear in mind that these are almost exclusively fines for grid operators. The fines paid by suppliers to eligible customers represent only 0.2% of the total fines for the year 2005.

4 Prospects

4.1 Evolution of the green power generation facilities in 2006

On the basis of the projects currently under way and the evolution of the existing facilities at the end of 2005, the evolution of green power facilities in 2006 can be forecast as follows:

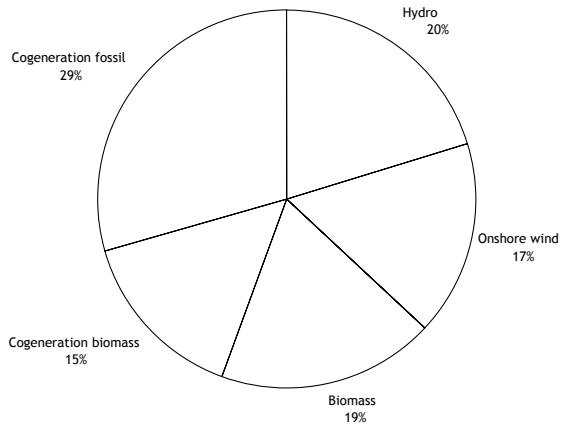
2006 projects	Capacity (kWe)	GCs expected in 2006	Increase in No. of GCs compared with 2005
Hydraulic	400	1 500	0,5 %
Wind	37 100	35 500	50 %
Biomass	0	210 000	123 %
Biomass cogeneration	30 825	108 000	49 %
Fossil cogeneration	0	15 500	18 %
TOTAL	68 325	370 500	45 %

Table 4.1: Projects planned for 2006

Among the major changes planned for 2006, we point to the increase in production at the Awirs station, and biomass cogeneration stations commissioned in 2005 (Aigremont, Recybois, etc.). We also need to mention the commissioning of biomass cogeneration stations with a capacity of slightly over 30 MW (Renogen, ERDA, Electrawinds, etc.) and the commissioning of new wind farms (extension of Gembloux-Sombreffe, extension of Perwez, Marbais, etc.) for a capacity of 37 MW.

Based on these forecasts, the structure of the green electricity generation capacity at the end of 2006 is given in the following figures:

Installed capacity: 515 MWe



Number of GCs issued: 1 194 000

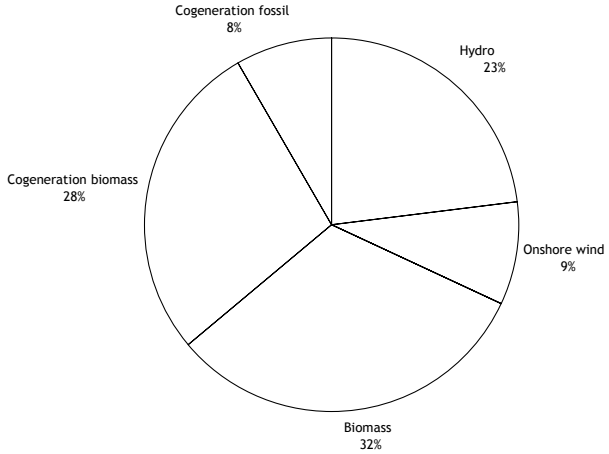


Figure 4.1: Forecasts for 2006

We observe that the share of hydroelectric will only account for about a quarter of the issuance of green certificates, and that over half of green certificates will be issued to plants recovering energy from biomass.

Plants commissioned before 1 October 2002 will only represent 52% of the total issued in 2006, compared with 77% in 2005.

4.2 Evolution of the green certificate market in 2006

Based on the evolution of the existing electricity generation plant, taking account of the 6% quota imposed in 2006 and quota reductions that can be requested, taking account of a hypothesis of a 1% increase in electricity supplies in 2006 (growth that was not observed in 2005), one can simulate the evolution of supply and demand for green certificates for 2006.

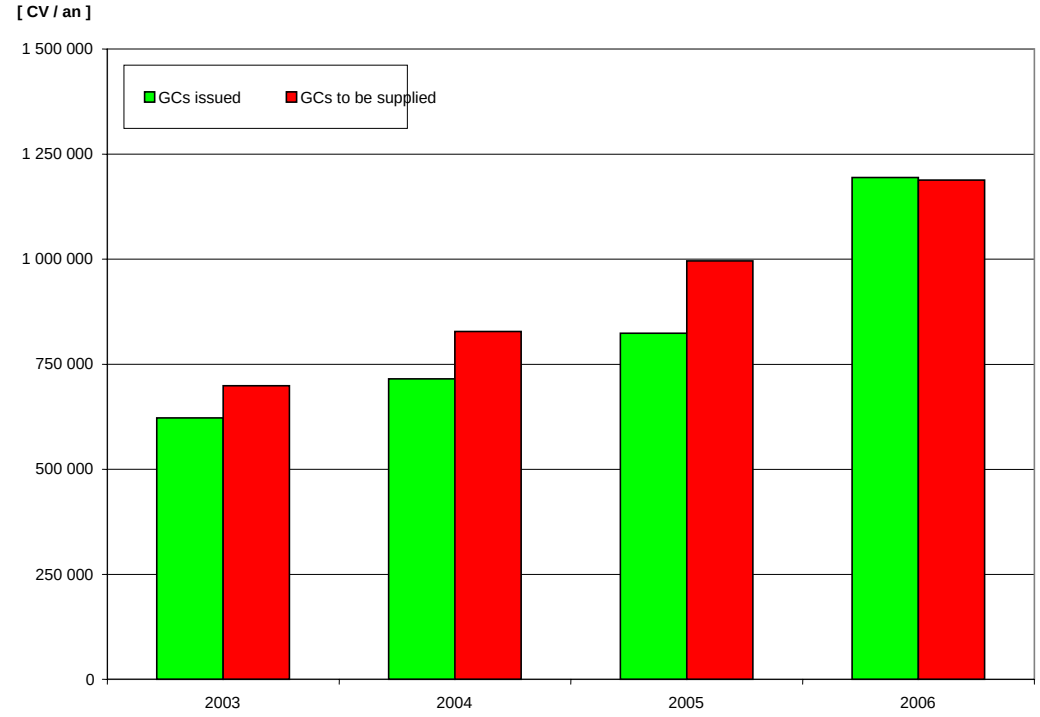


Figure 4.2: Evolution of supply and demand on the GC market

We observe that based on these forecasts, for the first year, we should reach for the first time a level of green certificate issuance that is slightly higher than the actual quota.

It should be borne in mind, however, that these results are extremely sensitive to the Awirs station working properly, which will account for about a quarter of the certificates due to be issued in 2006.

4.3 Evolution of green generation facilities over the period 2007-2012

Since the publication of the scenario for the development of the green certificate market (proposal 5f28-CWaPE-101 of 11 July 2005), many green generation projects have become clearer. Regardless of any legislative changes, these developments could already justify a revision of these scenarios.

Moreover, on the basis of the decision by the Walloon Government on 16 March 2006, the following hypotheses have been taken into account for the simulation of the development of the green electricity generation facilities:

1) due to the setting of quotas at 8% in 2008 rising to 12% in 2012, only the corresponding scenario will be revised;

2) elimination of the limitation of the CO2 saving rate to 1 for capacities greater than 5 MW for a number of biomass cogeneration sites;
3) introduction of the limitation of the concept of green electricity to 20 MW for biomass plants;
4) application of a reduction coefficient from 2008 onward for generation plants commissioned over 10 years ago.

The main modifications compared with the projects identified on 30/06/2005 in this context are as follows:

1) as a result of various initiatives taken in the Walloon Region over the second half of 2005, the probabilities of building biomass cogeneration plants in the sector of primary conversion of wood and in the vegetable/animal oils and fats sector have had to be revised upward;
2) as far as the offshore wind power sector is concerned, since there is currently no agreement concerning the rules for recognition / split between the regions of green certificates issued by CREG to offshore wind farms, it was deemed more appropriate not to include these facilities, in order to limit the analysis to studying types of generation that come within the responsibilities of the region. Likewise, the possibilities of mutual recognition between regions were not taken into account.

The results presented below were drawn up based on the update as of 31/03/2006 of the projects identified by CWaPE following the same methodology as presented in proposal CD-5f28-CWaPE-101.

The first scenario S1 below corresponds to an update of the previous scenario based on projects under way or authorised as of 31 March 2006. The second scenario S2 is based on the same elements, taking account of a reduction coefficient for units commissioned before the start of the green certificate system.

4.3.1 Scenario 1 – development of projects identified on 31/03/2006

Compared with the scenario drawn up in June 2005, we observe overall an increase in installed capacity of about 50 MW and an increase of about 380 000 in the number of green certificates. This is mainly due to taking account of large biomass cogeneration projects.

Projects 2007-2012	Number of sites	Pend (kW)	GC/year	MWh/year	average GC/MWh
Hydroelectric	12	2 580	13 540	13 540	1,000
Onshore wind	22	296 100	702 200	702 200	1,000
Biomass	1	350	42 100	61 801	0,681
Cogeneration biomass	11	35 688	821 160	486 260	1,689
Cogeneration fossil	2	9 100	6 531	24 100	0,271
Total	48	343 818	1 585 531	1 287 901	1,231

Table 4.2: Projects considered over the period 2007-2012

The structure of the green power generation capacity up to 2012 (excluding application of the reduction factor) is shown in the figures below:

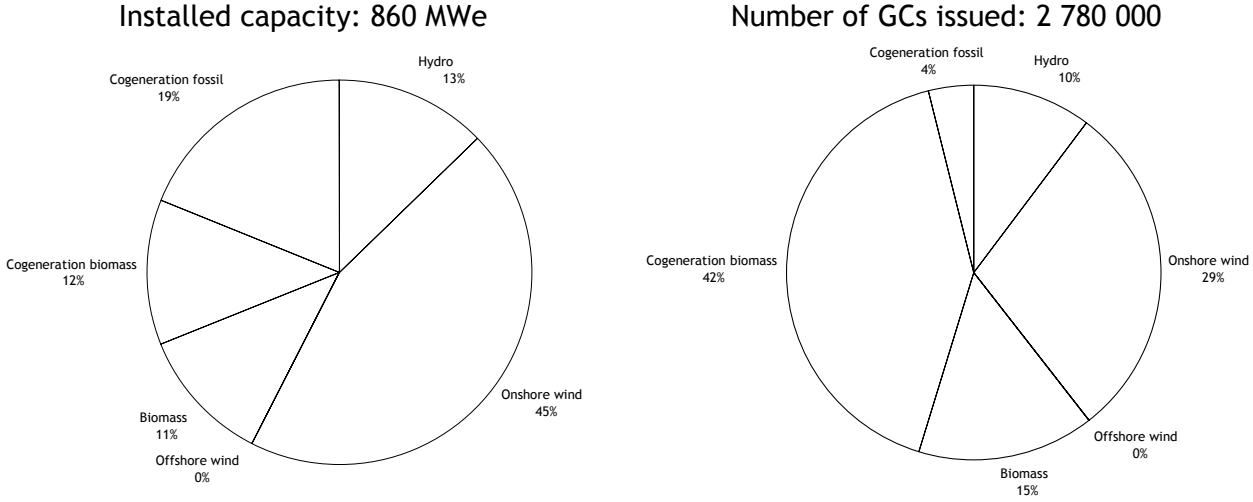


Figure 4.3: scenario 1 – forecasts for 2012

(excluding application of a reduction coefficient for generating capacity commissioned more than 10 years ago)

4.3.2 Scenario 2 – reduction factor for generating capacity commissioned more than 10 years ago

As the implementing arrangements for the decision by the Walloon Government of 16 March 2006 have not yet been defined, the hypothesis of a reduction factor of 50% has been applied from 2008 onward for green power generating capacity commissioned over ten years ago. However, no reduction factor has been applied to sites, which according to CWaPE, can justify that they have excess generating costs that require the current level of support to continue.

This hypothesis does not pre-judge the Government's decision on this point. It is only intended to help quantify the impact of the measure decided by the government using this hypothesis.
Additional hypotheses have also been incorporated, concerning the definition of the date when a plant is commissioned.

The CWaPE assumes that the date of commissioning of a green power generating plant which is taken into account may be different from the date when it first enters service, provided that there has been a substantial modification of the generating plant to enable it to meet one of the following conditions:

- significant improvement in the rate of CO2 saving (change of fuel, switch to cogeneration, etc.);
- significant increase in green power generation (increase in installed capacity, etc.).

The following table gives the cumulative reduction in the number of certificates issued for sites concerned over the period 2008-2012:

Year	Number of sites concerned	Cumulative reduction in green certificates
2008	46	- 185 000
2009	51	- 190 000
2010	55	- 215 000
2011	62	- 220 000
2012	69	- 310 000

Table 4.3: Cumulative reduction of green certificates with a reduction coefficient of 50%.

The structure of the green power generating capacity up to 2012 with application of the reduction coefficient is shown in the figures below:

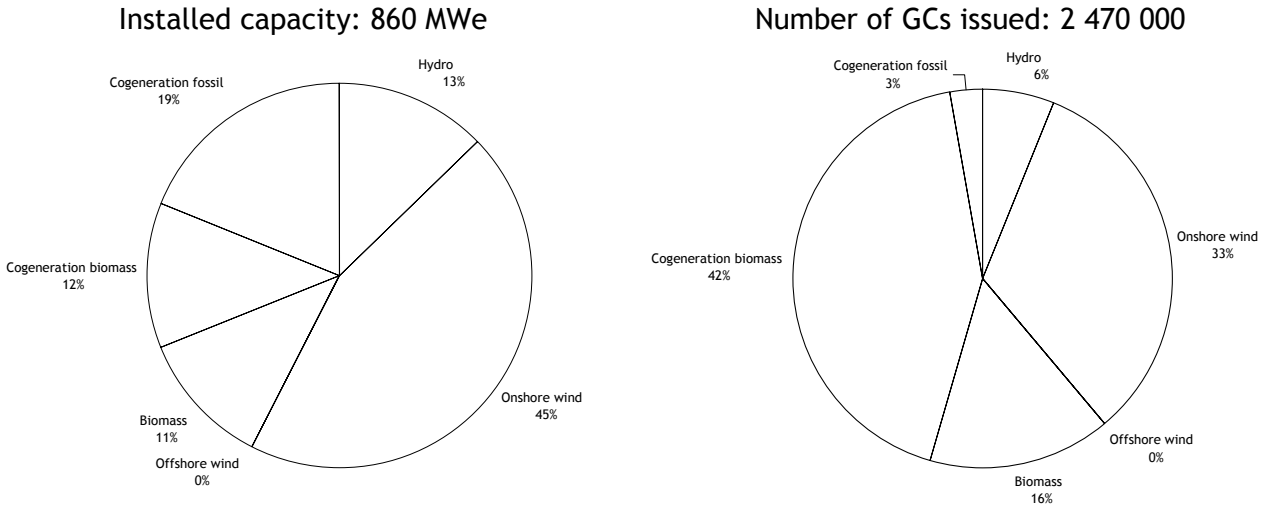
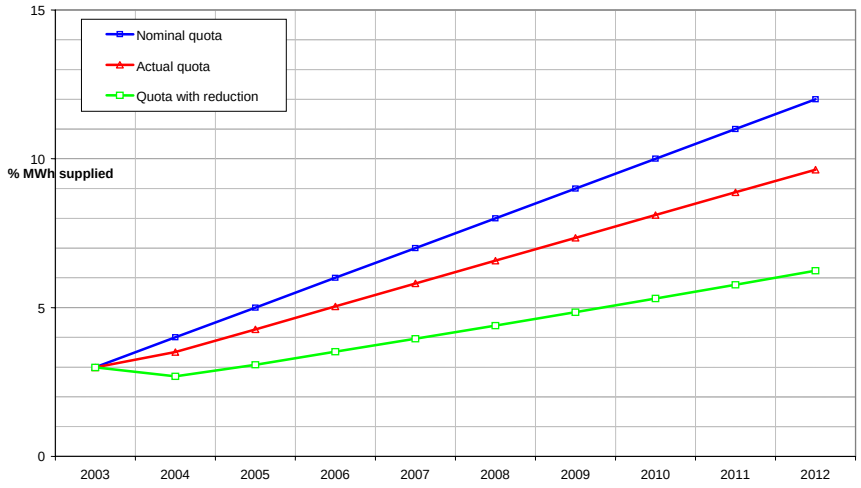


Figure 4.4: scenario 2 - forecasts for 2012

(with application of a reduction coefficient for generating capacity commissioned over 10 years ago)

4.3.3 Equilibrium conditions on the green certificate market

By adopting the same methodology presented in proposal CD-5f28-CWaPE-101 concerning taking account of quota reductions and a 1% growth in electricity supplies in the Walloon Region over the period 2006-2012, one can deduce the change in the actual quota (and that imposed on suppliers of sites of heavy-use end customers for electricity who are allowed a reduction) in relation to the nominal quota (see figure 4.5).



Actual quotas

2006	5.04 %
2007	5.81 %
2008	6.58 %
2009	7.35 %
2010	8.11 %
2011	8.88 %
2012	9.64 %

Figure 4.5: Nominal and actual quota

The graph below shows the change in equilibrium conditions between supply and demand in the case of scenario 1, where no reduction coefficient is applied for generating capacity commissioned more than 10 years ago. We observe excess supply of green certificates from 2008 onward, leading by the end of 2012 to a stock of green certificates representing nearly 75% of the actual quota for that year.

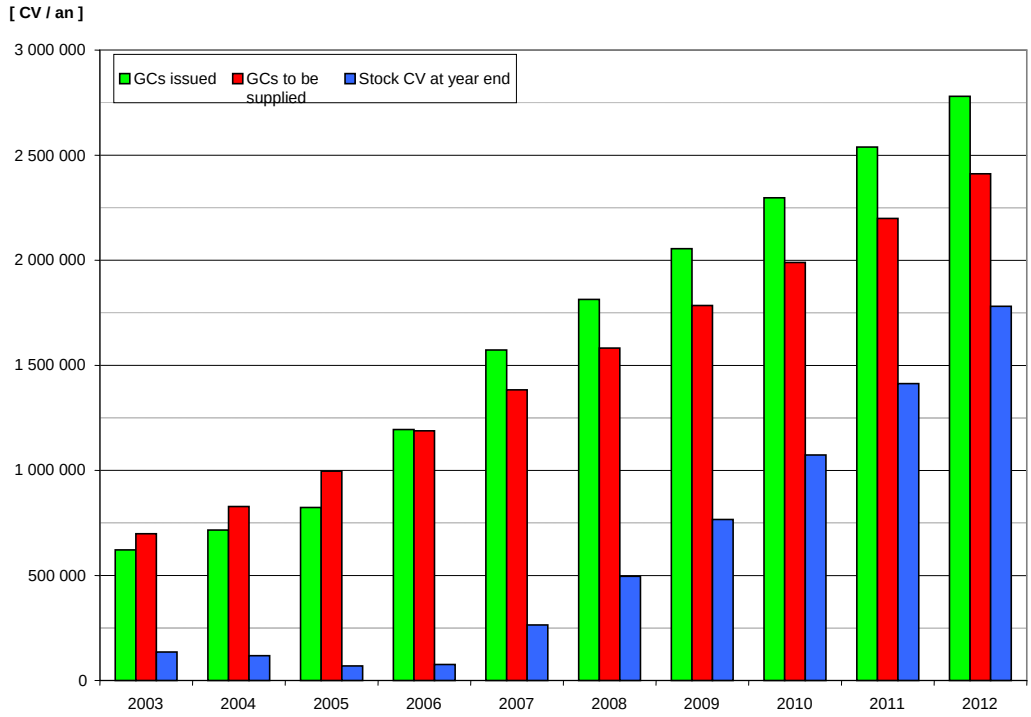


Figure 4.6: Equilibrium between supply and demand without a reduction coefficient

In the case of scenario 2, the equilibrium conditions may be met with a 1% annual increase in the nominal quota over the period 2008-2012 for the minimal development scenarion and based on the application of a reduction coefficient of 50% starting in 2008 for generating capacity commissioned over 10 years ago. In this scenario, the stock of green certificates by the end of 2012 represents about 28% of the actual quota of that year (see figure 4.7).

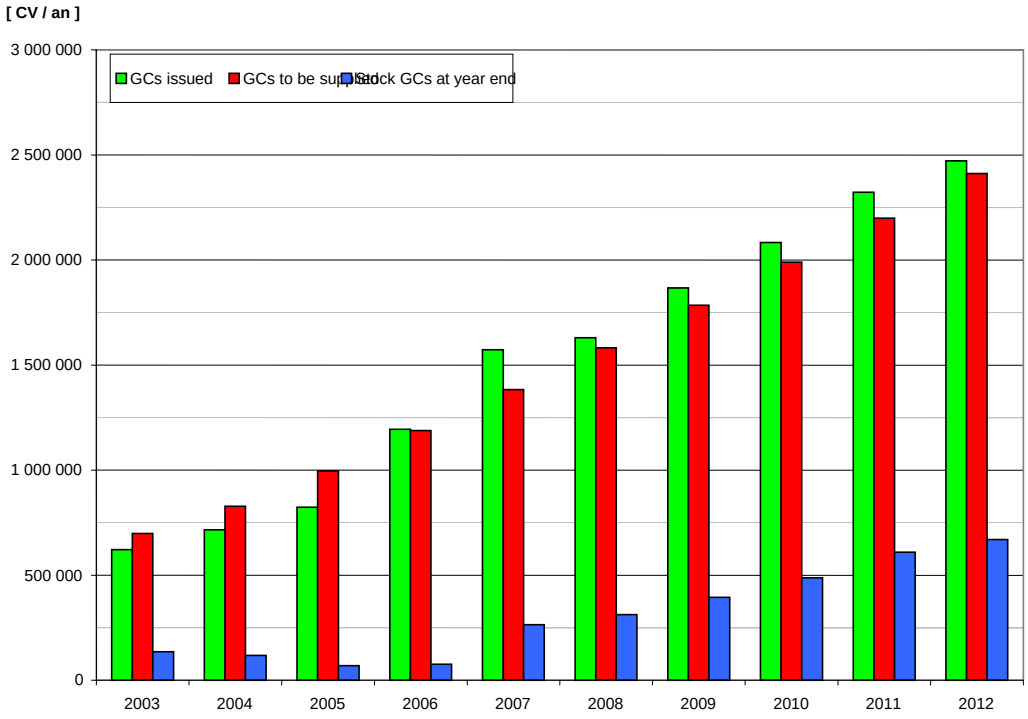


Figure 4.7: Equilibrium between supply and demand with reduction coefficient

Contents

ANNEX 1: List of green power production sites at the end of 2005

Type of generation	Generated by	Production site	Pend (kW)
Photovoltaïque	DAVENNE J-P. (private individual)	088_PHOTOVOLTAIQUE SOLWASTER	1
	GREINDL Bruno (private individual)	114_PHOTOVOLTAIQUE GREINDL	1
	HECQ-HANNECART (private individual)	125_PHOTOVOLTAIQUE HECK-HANNECART	3
	QUITTRE Laurent (private individual)	095_PHOTOVOLTAIQUE ISSOL	1
	Net developable electric power (Pend) (kW) - Photovoltaic		6
	Number of sites		4
Hydro	CENTRALE ELECTRIQUE LA FENDERIE	071_CENTRALE HE LA FENDERIE	276
	CENTRALES GAMBY	059_CENTRALE HE CHAPUIS	100
		060_CENTRALE HE D'OLNE	256
	DONY	048_MICRO CENTRALE HE DU VAL DE POIX	94
	ELECTRABEL	028_CENTRALE HE DE LORCE	51
		029_CENTRALE HE HEID DE GOREUX	7 344
		030_CENTRALE HE DE ORVAL	47
		031_CENTRALE HE DE COO DERIVATION	385
		032_CENTRALE HE DE STAVELOT	106
		033_CENTRALE HE DE CIERREUX	100
		034_CENTRALE HE DE LA VIERRE	1 976
		035_CENTRALE HE DE BUTGENBACH	2 106
		036_CENTRALE HE DE BEVERCE	9 902
		077_CENTRALE HE DE BARDONWEZ	32
	ÉNERGIE BERCHIWÉ	122_CENTRALE HE MOULIN DE BERCHIWE	22
	ENHYDRO	065_CENTRALE HE DE PONT-A-SMUID	174
		066_CENTRALE HE DE SAINTE-ADELINE	116
	HOTTOIS David (private individual)	120_CENTRALE HE MOULIN DE JAUCHE	7
	HYDROLEC DENIS	051_CENTRALE HE DE DOLHAIN	80
		052_CENTRALE HE DES FORGES	66
		053_CENTRALE HE DU MOULIN PIRARD	49
	HYDROVAL	047_CENTRALE HE ZOUDE	178
	JEANTY Nadine (private individual)	076_CENTRALE HE MOULIN DE VILLERS-LA-LOUE	15
	MARAITE Bruno (particulier)	061_CENTRALE HE MARAITE (LIGNEUVILLE)	217
	MERYTHERM	057_CENTRALE HE DE MERY	205
		058_CENTRALE HE DE RABORIVE	60
	MET - I.G. 45	078_CENTRALE HE DE L'EAU D'HEURE	951
	MOULIN FISENNE	073_CENTRALE HE MOULIN FISENNE	95
	MUYLE HYDROELECTRICITE	087_CENTRALE HE DE MORNIMONT	659
	PIRONT Alphonse	074_CENTRALE HE PIRONT (LIGNEUVILLE)	62
		075_CENTRALE HE MOULIN MAYERES	119
	PROTIN Josette (private individual)	056_CENTRALE HE MOULIN D'EN BAS	15
	REFAT ELECTRIC	067_CENTRALE HE DE STAVELOT	245
	S.P.E.	012_CENTRALE HE DE FLORIFFOUX	843
		013_CENTRALE HE DES GRANDS MALADES	4 887
		014_CENTRALE HE D'ANDENNE	8 986
		015_CENTRALE HE D'AMPSIN NEUVILLE	9 910
		016_CENTRALE HE D'IVOZ RAMET	9 742
		017_CENTRALE HE DE MONSIN	17 765
		018_CENTRALE HE DE LIXHE	22 979
	SAPIEF	072_CENTRALE HE DE FRAIPONT	75
	SCIERIE MAHY	083_ CENTRALE HE MAHY	25
	SOCIETE WALLONNE DES EAUX	054_COMPLEXE DE L'OURTHE	758
		055_COMPLEXE DE LA VESDRE	1 519
	WILLOT Jean-Luc (private individual)	099_CENTRALE HE MOULIN DE JEHOULET	22
	ZEYEN (particulier)	062_CENTRALE HE MOULIN DE WEWELER	169
	Net developable electric power (Pend) (kW) - - Hydro		103 791
	Number of sites		46
Wind	ELECTRABEL	070_PARC ÉOLIEN DE BÜTGENBACH	7 993
	ÉNERGIE 2030	104_ÉOLIENNE D'EMMELSBERG	593
	LES VENTS DE L'ORNOI	086_ÉOLIENNES DE GEMBLOUX SOMBREFFE	5 995
	LES VENTS DE PERWEZ	107_ÉOLIENNES DE PERWEZ	7 396
	LES VENTS D'HOUYET	094_ÉOLIENNE AUX TCHERETTES	607
	MICHAUX Jean-Pierre (particulier)	091_ÉOLIENNE DU CHAMP DE RANCE	25
	P.B.E.	069_ÉOLIENNE DE PERWEZ	597
	RENEWABLE POWER COMPANY	050_ÉOLIENNES DE SAINTE ODE	7 484
	SPE POWER COMPANY	100_ÉOLIENNES DE VILLERS-LE-BOUILLET	9 000
		121_ÉOLIENNES DE WALCOURT	9 000
	VERLAC	117_ÉOLIENNE DE BRONROMME	328
	Net developable electric power (Pend) (kW) - Wind		49 018
	Number of sites		11

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ANNEX 1: List of green power production sites at the end of 2005 (page 2 of 2)

Type of generation	Generated by	Production site	Pend (kW)
Biomass	ELECTRABEL	084_C.E.T. DE MONTZEN	409
		097_AWIRS 4	80 000
	IDEA HENNUYERE	068_STATION D'EPURATION DE WASMUEL	429
	INTRADEL	082_C.E.T. D'HALLEMBAYE	2 048
	ITRADEC	027_SITE DE HAVRE	1 623
	PAGE	002_CETEM	9 023
	SEVA	111_SEVA MOUSCRON	885
	SITA WALLONIE	001_CET D'ENGIS PAVIOMONT	1 780
	VERDESIS	090_ASSOCIATION INTERCOMMUNALE DE VALORISATION DE L'EAU	26
	Net developable electric power (Pend) (kW) - Biomass		96 223
	Number of sites		9
Cogeneration biomass	AIGREMONT	109_AIGREMONT	755
	BEP ENVIRONNEMENT	115_CET DE HAPPE-CHAPOIS	260
	BIFFA TREATMENT	020_COUR-AU-BOIS	3 041
	BURGO ARDENNES	043_BURGO ARDENNE (VIRTON)	29 801
	ELECTRABEL	010_LUTOSA	2 190
		102_SECOBOIS	608
	HECK	023_HOF HECK	41
	I.D.E.Lux	063_DECHARGE DE TENNEVILLE	693
	ISERA & SCALDIS SUGAR	098_SUCRERIE DE FONTENOY	5 580
	KESSLER FRERES	038_FERME DE FAASCHT	441
	LENGES	024_LENGES	155
	RECYBOIS	112_RECYBIOS LATOUR	2 600
	SPAQUE	064_DECHARGE D'ANTON	293
		105_CET DES ISNES	49
	Net developable electric power (Pend) (kW) - - Cogeneration biomass		46 507
	Number of sites		14
Cogeneration fossil	CLINIQUE PSYCHIATRIQUE DES FRERES ALEXIENS	103_CLINIQUE DES FRERES ALEXIENS	251
	DETRY FRERES	042_AUBEL	798
	GREEN ENERGY DIRECT	045_MOTEL DE NIVELLES	65
	ELECTRABEL	004_CHR DE NAMUR	813
		005_IRE (Institut national des elmts radioactifs)	1 024
		006_LABO THISSEN	338
		007_MINERVE	765
		008_SWEDEPONIC WALLONIE	341
		009_VESALE	1 331
		025_CENTRALE DE BRESSOUX	2 734
		039_SOLVAY	94 556
	IPALLE	089_STATION D'EPURATION DE MOUSCRON	403
	PROVITAL INDUSTRIE	096_PROVITAL INDUSTRIE	984
	RAFFINERIE NOTRE DAME ORAFTI	113_RAFFINERIE NOTRE DAME ORAFTI	9 500
	RAFFINERIE TIRLEMONTOISE	037_RAFFINERIE TIRLEMONTOISE WANZE	12 475
		108_RAPERIE DE LONGCHAMP	6 888
	S.P.E.	011_SUCRERIE DE WANZE	529
	SEDILEC	003_UCL	9 255
	WARCOING INDUSTRIE	041_SUCRERIE DE WARCOING (Site1)	981
		118_SUCRERIE DE WARCOING (Site2-NIRO)	803
		119_SUCRERIE DE WARCOING (Site3-TURBO)	6 547
	Net developable electric power (Pend) (kW) - Cogeneration fossil		151 382
	Number of sites		21
TOTAL Net developable electric power (Pend) (kW)			446 927
TOTAL Number of sites			105

ANNEX 2: Issue of green certificates 2005 – Breakdown by type of generation and by quarter

		2003**	2004	2005	2005 – Q1	2005 – Q2	2005 – Q3	2005 – Q4
Overall	GCs issued	**621 842**	**715 163**	**823 412**	249 080	154 033	164 485	255 814
	Tons of CO2 prevented	**283 560**	**326 114**	**375 476**	113 580	70 239	75 005	116 651
	Green power generated (MWh)	**775 807**	**872 075**	**1 092 918**	291 309	188 290	244 640	368 680
	RES electricity generated (MWh)	**559 359**	**634 831**	**801 057**	229 688	136 519	170 392	264 457
	Net electricity generated (MWh)	**1 422 503**	**1 497 030**	**1 708 320**	467 799	330 000	369 195	541 326
	Electricity supplies in WR	**23 368 935**	**23 628 470**	**23 341 061**	6 384 593	5 484 741	5 283 937	6 187 790
	% green electricity	**3.32%**	**3.69%**	**4.68%**	4.56%	3.43%	4.63%	5.96%
	% RES electricity	**2.39%**	**2.69%**	**3.43%**	3.60%	2.49%	3.22%	4.27%
Photovoltaic*	GCs issued	**0**	**0**	**1**	0	0	0	0
	Green power generated (MWh)	**0**	**0**	**1**	0	0	0	0
	RES electricity generated (MWh)	**0**	**0**	**1**	0	0	0	0
	Net electricity generated (MWh)	**0**	**0**	**1**	0	0	0	0
Hydro	GCs issued	**308 075**	**305 746**	**274 191**	140 763	62 154	24 507	46 768
	Green power generated (MWh)	**308 075**	**305 746**	**274 191**	140 763	62 154	24 507	46 768
	RES electricity generated (MWh)	**308 075**	**305 746**	**274 191**	140 763	62 154	24 507	46 768
	Net electricity generated (MWh)	**308 075**	**305 746**	**274 191**	140 763	62 154	24 507	46 768
Wind	GCs issued	**25 244**	**46 178**	**70 858**	17 809	14 496	13 507	25 045
	Green power generated (MWh)	**25 244**	**46 178**	**70 858**	17 809	14 496	13 507	25 045
	RES electricity generated (MWh)	**25 244**	**46 178**	**70 858**	17 809	14 496	13 507	25 045
	Net electricity generated (MWh)	**25 244**	**46 178**	**70 858**	17 809	14 496	13 507	25 045
Biomass	GCs issued	**60 560**	**86 109**	**171 041**	20 141	20 139	46 839	83 922
	Green power generated (MWh)	**60 713**	**86 553**	**262 276**	20 224	20 223	82 527	139 302
	RES electricity generated (MWh)	**60 591**	**86 366**	**242 025**	20 184	20 182	72 528	129 130
	Net electricity generated (MWh)	**60 713**	**86 553**	**262 276**	20 224	20 223	82 527	139 302
Cogeneration biomass	GCs issued	**162 295**	**207 773**	**222 201**	51 440	41 138	61 748	67 875
	Green power generated (MWh)	**133 549**	**186 842**	**198 023**	42 384	34 714	66 786	54 138
	RES electricity generated (MWh)	**165 449**	**196 540**	**213 983**	50 932	39 687	59 850	63 514
	Net electricity generated (MWh)	**183 061**	**233 792**	**243 469**	58 172	46 624	66 786	71 886
Cogeneration fossil	GCs issued	**65 668**	**69 357**	**85 120**	18 927	16 105	17 885	32 204
	Green power generated (MWh)	**248 226**	**246 756**	**287 569**	70 128	56 702	57 312	103 426
	RES electricity generated (MWh)	**0**	**0**	**0**	0	0	0	0
	Net electricity generated (MWh)	**845 410**	**824 760**	**857 525**	230 830	186 503	181 868	258 325

*** in view of the low number of certified plants and very low quarterly output, the rounding rules round the figures downward.**

**** the 2003 statistics include some certified production from 2002.**