

REQUIREMENTS OF ARTICLE 14, PARAGRAPHS 1, 3, 4 AND 11 OF CHAPTER III, ENERGY SUPPLY EFFICIENCY, OF DIRECTIVE 2012/27/EU OF THE EUROPEAN PARLIAMENT AND COUNCIL OF 25 OCTOBER 2012 ON ENERGY EFFICIENCY

INTRODUCTION

In order to satisfy the requirements of paragraphs 1 and 3 concerning the current situation in Wallonia, its potential for change and the prospects for cogeneration, waste heat and heating and cooling networks, Wallonia has awarded a public contract to PwC Enterprise Advisory with the Institute for Consultancy and Studies in Sustainable Development (ICEDD), EED Consulting and the company Bureau d'experts Ph. Deplasse et associés (SPRL) as designated subcontractors. The full results of this study are included in the annex and have been brought into line with the explicit requirements of the Directive.

The historical data has been compiled from information extracted from Wallonia's annual energy reports and strategic plans: the Marshall Plan 4.0. (<http://www.wallonie.be/fr/plan-marshall>) and the Air-Climate Plan (<http://www.awac.be/index.php/thematiques/changement-climatique/les-actions-chgmt-clim/plan-pace>)

**Paragraph 1 – A full assessment of the prospect of implementing high-efficiency cogeneration and efficient heating and cooling networks containing the information outlined in Annex VIII.**

*a) a description of the heating and cooling requirement;*

*b) a 10-year development forecast, focusing primarily on the requirement for buildings and various industrial sectors.*

Heating requirements

Heat requirements are identified by sector (residential, tertiary and industrial) based on the 2012 Energy Report and the changes in these requirements have been forecast until 2030. For the residential sector, these requirements will be affected by the changes in degree days, the energy performance of buildings, the changes in the average surface area of dwellings and the changes in the number of dwellings. For the tertiary and industrial sectors, the changes in these requirements will be affected by the changes in heating requirements per unit of value added (energy efficiency) as well as changes in the value added.

The result is illustrated by the following graph, which represents the heating requirement projections for individual sectors, expressed in GWh.

The projected changes in the industry for each individual sector are outlined below:

Cooling requirements

The cooling requirements are 20.8 GWh for the residential sector, 935 GWh for the tertiary sector and 830 GWh for the industrial sector.

Given the lack of information available for the cooling requirements in Wallonia for the residential sector, the development of cooling requirements up to 2030 have not been forecast. However, thanks to the study conducted by the FPS Environment ("Scenarios for a low carbon transition"), it has been anticipated that the number of households with air conditioning systems will remain similar to that of 2014, i.e. 1%.

For the tertiary sector, this change is largely due to the fall in cooling requirements recorded in the sector in which cooling requirements were the highest in 2012, namely business. Between 2012 and 2030, the total cooling requirements for the business sector are forecast to fall on average by 0.50%, largely due to an improvement in energy efficiency.

For the industrial sector, this change is largely due to the industrial sector in which the total cooling requirements were highest in 2012, namely chemicals. Between 2012 and 2030, the total cooling requirements in the chemicals industry will fall on average by 0.93% every year, largely due to an improvement in energy efficiency.

In conclusion, the forecasts demonstrate a slow and steady fall in the requirements between 2012 and 2030.

***c) a map of the national territory highlighting:***

***i) the heating and cooling requirement points;***

***ii) current and prospective heating and cooling network infrastructure;***

***iii) possible heating and cooling supply points,***

***while protecting commercially sensitive information.***

There are 11 heat maps in total:

- Map 1: Heating requirements in the housing sector by municipality (GWh, 2012)
- Map 2: Heating maps in the tertiary sector per establishment by municipality (GWh, 2012)
- Map 3: Heating requirements in the industrial sector per establishment by municipality (GWh, 2012)
- Map 4: Distribution of heating requirements in Wallonia per sector by municipality (GWh, 2012)
- Map 5: Heating requirement per dwelling by municipality (MWh/log, 2012)
- Map 6: Heating requirement per job in the tertiary sector by municipality (MWh/job, 2012)
- Map 7: Heating requirement per job in the industrial sector by municipality (MWh/job, 2012)
- Map 8: Waste heat supply by industry (kWh/m<sup>2</sup>)
- Map 9: Domestic heating requirements by surface area of municipality (kWh/m<sup>2</sup>)
- Map 10: Heating requirement of the tertiary sector by surface area of municipality (kWh/m<sup>2</sup>)
- Map 11: Heating requirement of the industrial sector by surface area of municipality (kWh/m<sup>2</sup>)

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Given the lack of information on the distribution of cooling requirements and the relatively low level of substitutable cooling requirements in Wallonia, there is no map available on this subject.

***d) determining the heating and cooling requirement that could be met through high-efficiency cogeneration, including domestic micro-cogeneration, and through heating and cooling networks;***

The heating requirement that could be met through high-efficiency cogeneration, including domestic micro-cogeneration and through heating networks is included under the term substitutable heat in annex 1 of the study. These practices require temperatures of between 50 °C and 250 °C.

The substitutable heating requirements are identified by sector (residential, tertiary and industrial) and by practice in the following table (ECS = domestic hot water).

The overall heating requirements (65.5 TWh) represent 76% of total energy consumption in three sectors, which demonstrates the importance of these requirements in the energy report. More than half (52.2%) of the final energy consumption of the three sectors are substitutable heating requirements, i.e. a total of 45 TWh. The largest contributor in this case is the residential sector (26.0 TWh, 58%) followed by the industrial sector (11.3 TWh, 25%) and finally by the tertiary sector (7.7 TWh 17%).

In short, in relation to point a) above, the results for the cooling requirements are 20.8 GWh for the residential sector, 935 GWh (of which 540 are substitutable, that is to say practices that may depend on cooling networks) for the tertiary sector and 830 GWh (of which 128 are substitutable) for the industrial sector.

According to the information available at the time of the study, there is no facility in Wallonia capable of producing cold air that can be recycled in a distribution network or for on-site consumption. The only sectors with the potential to do so are the chemical and food sectors.

Contact has been made with the relevant industrial federations (Essenscia for the chemical industry and Fevia for the food industry), which confirms that there is currently no facility in place capable of producing recyclable cold air.

***e) determining the prospects of additional high-efficiency cogeneration that could be achieved in particular as a result of the renovation of production plants, industrial plants or other existing plants producing waste heat or the construction of such new plants;***

Technical potential of cogeneration

To assess the technical potential of cogeneration, the methodology of reporting in accordance with the requirements of Directive 2004/8 on the promotion of cogeneration has been implemented based on the most recent data available. It shows that the thermal capacity is 529 MWth, of which the industrial sector is responsible for 76%, and the corresponding thermal output is estimated at 3 172 GWh. The electrical power capacity is 428 MWe, of which the industrial sector is responsible for 81%, and the corresponding electrical output is 2 621 GWh.

Economic potential of cogeneration

The following graph perfectly illustrates that the economic potential, with payback periods of two years for the industrial sector and five years for the tertiary sector, without taking account

of green certificates, is very low compared to the technical potential which is in effect around 15%.

The price per tonne of CO<sub>2</sub> restricts the potential for cogeneration, as there are additional installation costs in connection with the situation above despite a decrease in the amount of CO<sub>2</sub> in connection with separate heat and power production systems on a global scale. The expenditure related to the price of EUR 10 per tonne of CO<sub>2</sub> reduces the economic potential of the installed electrical power by half.

The lack of consideration for the support of green certificates (CV) also strongly limits the economic potential of cogeneration.

A green certificate, which can be purchased at the guaranteed price of EUR 65, increases the economic potential from 16% to 48% of the technical potential, which is a threefold increase.

The Simple Payback Period (SPP) also influences the outcome of economic potential. Two simulations were carried out on the payback period in the industrial sector and the tertiary sector (without the inclusion of financial support or green certificates), which revealed their susceptibility to financial assumptions.

#### Technical potential of industrial waste heat

The technical potential of waste energy recovery was assessed on the basis of information contained in Walloon Energy Reports and a study on the potential of waste heat recovery in Walloon industry (t° of heat > 100 °C) carried out in 2013; the results of this have been included in a published technical report available on the energy portal of the Walloon region (<http://energie.wallonie.be/fr/cahier-technique-recuperation-de-chaleur-fatale-pour-la-production-d-electricite-dans-l-industrie-et-applications-ene.html?IDC=8049&IDD=101504>).

In order to estimate the amount of waste heat produced by heating temperatures below 100 °C, the technical potential of Wallonia was primarily based on the results of French studies, the references for which can be found in Appendix 1, page 134.

The variations in these heating temperatures are shown in the table below. Together, they amount to a total of 2 627.6 GWh.

#### Economic potential of industrial waste heat

##### High temperature

Based on the methodology and detailed assumptions described in the study's report (cf. §Fout! Verwijzingsbron niet gevonden.), the graph below shows the SPP based on the cumulative high temperature heat potential and the total high temperature technical potential.

With an SPP constraint less than or equal to two years, the economic potential is zero. Currently, payback periods are too long to increase the value of waste heat. Based on current energy prices, the Organic Rankine Cycle (ORC) would not be profitable without the provision of financial aid.

##### Low temperature

The total economic potential amounts to 93.12 GWh/year and accounts for 31% of the total technical potential of the sectors in the study.

The graph below shows the results for each sector and shows which part of the technical potential would be economically viable.

***f) determining the energy efficiency potential of heating and cooling network infrastructures;***

Wallonia has 46 heating networks, but no cooling network. Sixty-seven per cent of these networks are publically owned rural networks as most of them were introduced under the wood-energy and rural development plan aimed at supporting the development of rural communities. Of these networks, 42 are supplied by biomass, two by natural gas, one by deep geothermal energy and one by waste heat. A non-exhaustive list is provided on page 77 of Annex I.

These 46 networks produce 402 GWh every year and 190 GWh of energy is distributed. These networks are 69.55 km long with more than 90% of the networks less than 500 m in length.

Technical potential

The estimated technical potential of heating networks is based on a bottom-up approach, starting with situations favourable to the development of a heating network in order to estimate qualitative potential. Indeed, information is available at the time of the study on municipalities and does not provide for extrapolation in relation to such situations in a neighbourhood or a street, for example.

This detailed information on heating requirements is collected progressively through BEP legislation for new housing or for undergoing a renovation with planning permission, and through home energy certificates. Similarly, it will be possible to collect detailed information on the heating and cooling requirements of the tertiary sector with the next certification scheme for the energy performance of non-residential buildings.

Economic potential

Heating networks show potential for development for increasing the value of heat waste and renewable energy. The new heating networks must, however, be able to adapt to a change in environment (disappearance of the source of waste heat, extension, densification) by means of a star operation with a variable flow rate, with the option of adding more power on the network, etc.

It is necessary to have a minimum heating requirement in order to consider a heating network. Given the energy performance of new housing units, it is necessary to provide for joint allocation projects (residential+offices/crèches/homes/hospitals, etc.)

Heating networks can have long-term economic interests but the decision to invest must be considered case by case, depending on the results of a feasibility study.

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***g) strategies, policies and measures that can be adopted until 2020 and 2030 for reaching the potential set out in e) to meet the requirement of point d), including in particular, where appropriate, the following proposals:***

In Wallonia, the available accruable financial support for cogeneration is:

- investment aid;

- production assistance in the form of green certificates for quality cogeneration, i.e. which reduce CO<sub>2</sub> by at least 10% in relation to the reference sectors;
- a federal tax deduction.

For promoting waste heat and heating and cooling networks, the following accruable support is available in Wallonia:

- investment aid
- a federal tax deduction.

This financial support will be provided for as long as possible, depending on the Walloon budget priorities and respect for EU rules on state aid, to guarantee project sponsors a long-term vision and help them with their profitability calculations. In order to facilitate the development of cogeneration, heating and cooling networks as well as the promotion of waste heat, Wallonia has proposed the following actions:

- Sectoral agreements for the most energy-intensive firms. These agreements, based on a commitment to energy efficiency and reducing CO<sub>2</sub> emissions between 2005 and 2020, prompt companies to carry out a comprehensive audit of their facilities through which the in situ recovery of waste heat and waste cold is always sought. The feasibility of fossil cogeneration and biomass is considered if appropriate.

- A facilitators service in renewables and energy efficiency whose mission is:

- to advise the target audience on cogeneration, waste energy recovery and the establishment of networks;
- to provide personalised advice to any project promoter;
- to facilitate the exchange of ideas on best practice in waste energy recovery among managers working in the same industry;
- to provide informative tools and calculation tools for ensuring project success;
- to train people to teach these techniques both at a basic level and a more advanced level.

- A requirement to assess new installations or installations due to be upgraded with a capacity greater than 20 MWth in implementation of the requirement of paragraph 5 of Article 14 of Directive 2012/27.

- Through the Marshall Plan 4.0, Wallonia will develop a mechanism for raising awareness of support for investment specifically for SMEs. The latter, based on an audit and financial incentives, shall provide the opportunity for SMEs to achieve cogeneration, waste energy recovery and network implementation.

- Based on the results of a prospective study to be carried out in 2016, Wallonia will develop and oversee a third-party investment mechanism and energy performance contracts.

- Wallonia organises the review of its systems for approving auditors with a view to improving their quality and further reinforcing audit methodologies.

- Wallonia will consider, after close analysis, lifting some of the barriers preventing low voltage cogeneration producers gaining access to the energy market for the resale of unconsumed surpluses.

**h) the share of high-efficiency cogeneration, the potential established and the progress achieved under Directive 2004/8/EC;**

Based on the 2012 Energy Report, it appears that, according to the rules of calculation and the values, laid down in Directive 2012/27, the percentage of primary energy savings (PES) achieved through cogeneration in Wallonia was up 18.6% in 2012, which corresponds to an absolute primary energy saving equal to 2 345 GWh.

The total amount of gross electricity generated via cogeneration in Wallonia in 2012, the total amount of electricity actually produced under the Directive and the production of high-efficiency cogeneration under the Directive are shown in the diagram below. As previously mentioned, a cogeneration unit is certified under the Walloon Commission for Energy (CwaPE) if a primary energy saving (>0%) can be achieved compared to reference values for separate production and it qualifies for a green certificate for its sustainable electricity production, i.e. reduced CO<sub>2</sub> emissions of over 10% compared to the reference sectors.

***i) An estimate of primary energy savings to be made;***

Based on the economic potentials outlined above (points e and f), the primary energy is calculated using a conversion factor of 2.5 for electricity and 1 for the other energy sources.

Cogeneration offers a primary energy saving of around 15% of the technical potential, i.e. 4 155 GWh.

Waste energy offers a primary energy saving of 93.12 GWh.

In total, the primary energy saving estimate is around 4 288 GWh.

This figure could be increased if more favourable economic parameters for an environment conducive to investment in cogeneration and high temperature waste heat recovery in the field of electricity production were taken into account.

***j) considering public support measures for heating and cooling, if any, with the annual budget and calculating the potential aid factor.***

Point g on strategy and policy highlights the ongoing actions to be extended until 2020 or even 2030.

Despite budgetary imperatives and constraints, Wallonia allocates the budgets required to implement cogeneration projects, waste heat recovery projects and heating and cooling network projects in market conditions favourable and conducive to the reproduction of successful industrial and service hold-over models.

**Paragraph 3 – A cost-benefit analysis covering their entire territory, taking into account climatic conditions, economic feasibility and technical suitability, in accordance with Annex IX, Part 1**

***a) Definition of system boundaries and geographical boundaries***

The boundaries of Wallonia are the boundaries of the system.

***b) Integrated approach for supply and demand options***

The cost-benefit analysis takes into account all relevant supply resources available within the system and geographical boundaries, based on the data available, including waste heat from electricity production installations and industrial installations and renewable energy sources, and the characteristics and changes as regards heating and cooling requirements.

***c) Establishing a baseline scenario***

In the context of both heating and cooling requirements, baseline scenarios have been established where applicable in the residential, tertiary and industrial sectors in Wallonia. A total of seven baseline scenarios were identified.

**Heating baseline scenarios**

In the residential sector, the baseline scenarios have been considered for a new district (group of 20 terraced houses or the equivalent) and a representative group of new apartment buildings. Indeed, the heating requirements are primarily from single-family homes (17 960 GWh) and the requirements from apartments are much lower (2 221 GWh).

**Baseline scenario 1** (district): decentralised condensing boilers per building

**Baseline scenario 2** (apartments): decentralised condensing boilers per building

In the service sector, the scenarios have been developed for a homogeneous group of six new office buildings. In this regard, it should be noted that the heating and cooling requirements of shops were similar to those of offices (hours of operation, typology, etc.).

**Baseline scenario 3**: decentralised condensing gas boilers

In the industrial sector, the scenarios were considered separately for the three sectors in which the ‘substitutable’ heating requirements are the most important, namely chemicals, paper and food.

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**Baseline scenarios 4.1, 4.2, 4.3** (one per sector): traditional decentralised gas boilers

**Baseline scenario 4.4**: centralised gas cogeneration with a network connecting three industrial sites (+ stand-alone gas heaters)



### Cooling baseline scenarios

No scenario has been considered for cooling requirements in the residential sector because they are negligible in Wallonia.

No scenario has been considered for cooling requirements in the industrial sector because these requirements are specific to each production process and are not easily substitutable.

For cooling requirements in offices and shops (tertiary):

Baseline scenario 5: traditional cooler

### ***d) Identifying alternative scenarios***

In total, there are 14 alternative scenarios that were chosen based on cogeneration, waste heat and/or a network depending on the highest success level.

### Definition of scenarios for heating requirements

#### Residential sector (district)

Alternative scenario 1.1: centralised gas cogen + heating network + stand-alone gas heater

Alternative scenario 1.2: centralised solid biomass boiler + heating network

Alternative scenario 1.3: heating network with waste heat injection

#### Residential sector (apartments)

Alternative scenario 2.1: centralised gas cogen + heating network + stand-alone gas heater

Alternative scenario 2.2: centralised solid biomass boiler + network

#### Tertiary sector

Alternative scenario 3.1: centralised gas cogen + heating network (+ stand-alone gas heater)

~~Alternative scenario 3.2: centralised solid biomass boiler + heating network~~

Alternative scenario 3.3: heating network with waste heat injection

#### Industrial sector

Alternative scenarios 4.1, 4.2, 4.3: centralised gas cogen (+ stand-alone gas heater)

Alternative scenario 4.4: centralised gas cogen with a network connecting three industrial sites (+ stand-alone gas heaters)

### Remarks

#### Scenarios 1.3 and 2.3 – Waste heat

In the scenarios related to waste heat, it is considered that this heat is priced at 90% of the baseline scenario price by the suppliers of waste heat, via the intermediary of an operator. This assumption is justified by the need to offer users a financially attractive alternative compared to the current one so that the project is feasible.

Therefore, the calculation of profitability to be analysed is that of the distributor who, on the one hand, promotes waste heat that was lost and, on the other, must bear the costs of investment to promote this heat.

Consideration is also given to (i) network-related costs necessary for transporting the heat to buildings, and (ii) the network charges for connecting buildings to the industrial site.

#### Scenarios 1.2 and 2.2 – Solid biomass

In the interest of reproducibility, only solid biomass was considered because it does not require the presence of specific equipment such as a digester (biogas). This technology does not require a backup, from a technical perspective.

#### Scenarios 1.1, 2.1 and 3.2 – Backup

In the scenarios using cogeneration, technical backup is essential given that cogeneration is not designed to meet 100% of the requirements.

#### Defining scenarios for cooling requirements

No scenario has been considered for cooling requirements in the residential sector because they are negligible in Wallonia.

No scenario has been considered for cooling requirements in the industrial sector as these needs are specific to each production process and are not easily substitutable.

For cooling requirements in offices and shops:

Alternative scenario 5.1 = gas cogen supplying an absorption cycle

Alternative scenario 5.2 = small cooling network supplied by a cooler

*e) Method for calculating of cost-benefit surplus*

*f) Calculating and forecasting prices and other assumptions for the economic analysis*

*g) Economic analysis: inventory of effects*

For these points, please refer to the study report attached and more specifically to task 4.

The main results are as follows.

#### Residential district (heating)

The comparison between the baseline scenario and the alternative options shows the high cost of using the latter except in the case of waste heat for new buildings (S.A.1.3).

The difference is negative for the heating networks supplied by cogeneration (SA 1.1) and particularly by biomass (SA 1.2). The situation is, however, clearly positive for waste heat, all other things being equal. The latter case shows that CAPEX relating to the single heating network are the responsibility of the energy supplier. It affects the corresponding charges in its selling price. The graph shows that this waste heat distributor charges up to 90% of the price of 'standard' technology.

As seen in the graph above illustrating value chains, the cogeneration network (SA 1.1) is hindered by CAPEX and OPEX (excluding fuel). The biomass solution is particularly hindered by the high cost of the OPEX (excluding fuels) and to a lesser extent CAPEX (SA 1.2). The reduced cost of waste heat stems from the savings on fuel costs, despite the relatively high sale price applied to it (SA 1.3).

#### Group of apartment buildings (heating)

As indicated in the graph on new buildings above, the option of cogeneration is barely less competitive than the baseline scenario (SA 2.1). The second option (biomass boilers; SA 2.2) is much more expensive than the baseline scenario (SB2).

The figure above shows that the main area responsible for the high cost of the latter option (individual boilers; SA 2.2) is 'other net costs' such as CAPEX, OPEX, financial expenses, etc. It mainly covers financial expenses and operating costs.

Purchases of electricity are lower in the case of cogeneration (SA 2.1a) but CAPEX and OPEX, including fuel, are much higher and cannot be wholly compensated by savings on electricity.

#### A group of shops and offices in the tertiary sector (heating)

In the case of new buildings as shown in the previous graph, the baseline scenario is less competitive than the network supplied by waste heat (SA 3.3). Cogeneration with supplementary boiler and network (SA 3.1) and in particular the solid biomass boiler (SA 3.2), however, are more expensive than domestic boilers (SB 3).

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As regards new constructions, the three scenarios are characterised by a strong focus on the electricity bill, which is the first component in the cost chain (see graph below). Other cost factors are fuel in every case and OPEX and CAPEX in the case of cogeneration (SA 3.1 and SA 3.2).

#### A group of offices and shops (cooling)

The baseline scenario is the most competitive (SB 5). The option of cogeneration with an absorption cycle is much more expensive than the cooling network combined with heat pumps, the latter being only slightly less competitive than the baseline scenario. The main area responsible for the high cost is 'other net costs', such as CAPEX, OPEX, finance charges, etc. As in previous scenarios, it mainly covers investments. Cogeneration with an absorption cycle (SA 5.1) results in savings on electricity purchases but the latter cannot compensate for 'other net costs' which comprises the other components mentioned above.

#### Industrial sector, chemical industry (heating)

The cogeneration option (SA 4.1) is slightly more competitive than the baseline version (SB 4.1). This finding can be explained as shown in the figure above by the positive impact of electricity production on the cost chain (SA 4.1).

#### Industrial sector, paper industry (heating)

The cogeneration option has a competitive advantage as shown in the graph above. It is revealed the cost of electricity is the highest in the value chain. The latter is significantly reduced by cogeneration and offsets the additional costs of CAPEX and OPEX.

#### Industrial sector, food industry (heating)

Cogeneration does not offer a competitive advantage. The difference in cost is low compared to the advantage of the traditional solution (SB4.3). The main factor is the cost of electricity both in terms of the baseline scenario and the alternative. The positive variance in electricity purchases does not offset the additional costs of CAPEX and OPEX resulting from cogeneration.

#### Industrial sector, combined industries (heating)

The combined scenario uses the cogeneration alternatives above (SB 4.4). As is the case with other industrial scenarios, it is still undergoing a process of change.

A summary of the results is provided for information purposes in the two graphs below where the combined scenario is compared to similar scenarios using cogeneration in the industrial sectors discussed above. They confirm the importance of the "electricity" component.

The graph is expressed in absolute terms in order to show the relative importance of each sector in the combined scenario.

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#### ***h) Sensitivity study:***

A sensitivity study of the main variables for which there is a source of uncertainty for the longer-term trend has been carried out (see below). The results for all the scenarios concerned appear in the following graphs.

This study is carried out respectively for:

- 1) fuel inflation rate: natural gas, biomass and/or waste heat;
- 2) electricity inflation rate;

In general, the sensitivity of the results is lower than the range of variation demanded of the baselines. Indeed, the results are generally around the 50% mark except in the case of (SA 2.1). They are often even significantly lower as is the case in scenarios 3, 4 and 5 for gas and scenarios 1 and 2 for electricity.

- 3) the rate of increase of operational expenses (excluding fuels) – OPEX;
- 4) cost of capital or discount rate.

The increase in the price of OPEX and the cost of capital<sup>1</sup> leads to broader ranges and reverse trends (see graphs above). Overall, the increase in the cost of capital tends to reduce future expenditure through the actuarial method, and therefore in the cost; the opposite is the case for OPEX. In both cases, the impact is much less significant in relative terms than the changes imposed on the variables tested (+ 50%; see above).

The OPEX results vary widely depending on the scenario. They also fluctuate within a small range (0% to 3%).

**Paragraph 4 – Suitable measures for developing efficient heating and cooling infrastructures and/or high-efficiency cogeneration and the use of waste heat and renewable energy sources in the heating and cooling processes, in accordance with paragraphs 1, 5, and 7.**

The results for paragraph 1 (prospective study and strategy) are presented at the beginning of this document and in the study report included herewith.

The measure in paragraph 5 (duty of studies, installation >20 MWth) has now been included in Walloon legislation. On 19 June 2014, the Government adopted a decree amending the decree of 4 July 2002 on the procedure and various methods of implementing the decree of 11 March 1999 on environmental consent, and attached Annex XXXII thereto.

The measure in paragraph 7 (adaptation of licences on the basis of paragraph 1, of respect for paragraph 5 and of the results of the cost-benefit analysis by territory) must be analysed in terms of impact and the need to adapt current texts.

**Paragraph 11 – all available support for cogeneration is subject to the condition that the electricity produced comes from high-efficiency cogeneration and that the use of waste heat actually leads to primary energy savings.**

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In Wallonia, the cumulative support available for cogeneration is:

- investment support covered by the General Block Exemption Regulation (GBER) which requires that high-efficiency cogeneration be used;

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<sup>1</sup> Discount rate

- production aid in the form of green certificates for quality cogeneration, i.e. reducing CO<sub>2</sub> by at least 10% with respect to the reference sectors;
- a federal tax deduction based on quality or high-efficiency cogeneration.

In Wallonia, the cumulative support available for waste heat is:

- investment support covered by the General Block Exemption Regulation (GBER) which requires that use of waste heat actually leads to primary energy savings;
  - a federal tax deduction based on primary energy savings.
-