

gent: klimaatstad

Ghent climate city working overtime



Ghent climate plan 2014-2019



FOREWORD



Cities are responsible for 80 percent of energy use and CO₂ emissions. City initiative is therefore of crucial importance, because not only is this where we find the causes, but also many solutions. Moreover, city administrations are very much in touch with what goes on within the local community. This allows cities to join forces and stimulate solutions.

Ghent wishes to continue to play a pioneering role on environmental issues, and aspires to become a climate neutral city by 2050. This means that by then, the city will no longer have a negative impact on climate. In addition, a full commitment to climate neutrality contributes to a liveable city. Ghent solidified its commitment to climate by being the first city in Flanders to sign the Covenant of Mayors in 2009, an initiative to mobilize local authorities against climate change. With it, Ghent made a commitment to reduce our local CO₂ emissions by at least 20 percent by 2020 compared to 2007. Roughly half of this reduction has already been accomplished. In the climate plan now before us, we propose actions intended to help achieve the remaining 10% of CO₂ reduction by 2019. This puts us on schedule towards climate neutrality in 2050.

The Ghent climate plan now before us, is a plan from the entire city administration. In it, a number of clear choices have been made. We do not always choose the path of least resistance towards reducing our CO₂ emissions. In this manner, we are not only striving towards structural solutions with a long-term impact, but also making a very conscious choice for a social climate policy. Within our policy of empowering families, organizations, institutions, and companies against rising energy prices by supporting structural energy-saving measures, we have earmarked additional resources for vulnerable families. In recent years, the city has created a lot of space for initiatives coming from citizens, organizations, and companies for the reduction of our energy consumption and further rendering our energy production more sustainable. We wish to carry this momentum into the coming years, as we are convinced that a climate neutral Ghent can only be achieved through cooperation. Lastly, we wish to emphasize that the city will not limit itself to the scope of the Covenant of Mayors. Among others by taking action regarding a sustainable food strategy, the city also seeks to reduce its CO₂ footprint in this area.

With this new climate plan, the city administration wishes to demonstrate our resolve. Climate is a priority, and along with all of the citizens and companies of Ghent we will leave no stone unturned.

On behalf of the entire city council

Tine Heyse

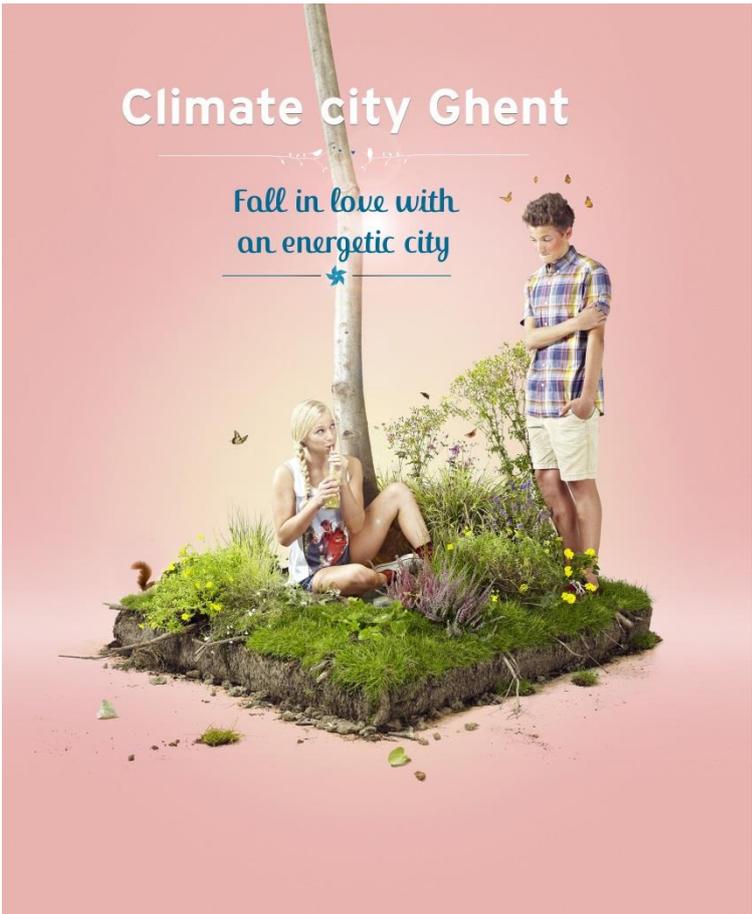
Deputy mayor for the Environment, Climate, Energy and North-South

Daniël Termont

Mayor

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cover of the Climate Booklet.

Twelve traceable copies are circulating among the residents of Ghent at the moment

1.1. International and Flemish contexts

INTERNATIONAL CONTEXT

There is a broad scientific consensus on the fact that global average warming cannot exceed 2°C if one wishes to contain the effects of climate change. In order to meet this general objective, industrialized countries must reduce their greenhouse gas emissions by at least 80% by 2050 compared to the level of the base year of 1990.

Following the ratification of the Kyoto protocol by the European member states, the EU approved its Climate and Energy Package in 2007. This strategy, also known as the 20-20-20 strategy, proposes 3 objectives by 2020:

- 20% reduction in greenhouse gas emissions
- A rise in the share of renewable energy to 20%
- An improvement of energy efficiency by 20%

The EU expects Belgium to reduce greenhouse gas emissions by 15% by 2020 (compared to 2005)¹ and a share of energy from renewable sources of 13%.

Following the approval of the Climate and Energy Package, the European Commission also launched the Covenant of Mayors, to recognize and support the efforts made by local authorities for the implementation of a sustainable energy policy.

After all, cities have a crucial role to play in slowing down climate change, as they consume three quarters of the energy produced in the European Union and are responsible for a comparable share of CO₂ emissions. Local authorities are also ideally placed to address the behaviours of citizens and other city users.

In January 2009 the city of Ghent was the first Flemish city to sign this Covenant of Mayors. With it, Ghent committed to a reduction of our local CO₂ emissions by over 20 percent by 2020 compared to 2007. The Covenant of Mayors is not an informal charter. In 2009, Ghent submitted a greenhouse gas emission inventory (CO₂ monitoring) and a climate plan, and now confirms this commitment with this new climate plan and an update of the CO₂ monitor.

¹ This reduction must be achieved within the sectors not covered by emission trading, such as transport, non-ETS industry, housing (heating, air conditioning), agriculture, and waste management.

In order to make good on its pioneering role, Ghent also participates in the European networks Eurocities² and Climate Alliance³, and we try to realize a number of policy objectives through European projects with other cities.

FLEMISH CONTEXT

Flemish policy has a strong impact on just about all climate themes. The Flemish authorities are not only in control when it comes to legislation (e.g. energy performance regulations for residences), but a multitude of areas directly impacting CO₂ emissions in Ghent are also part of Flemish competences. Investments in social housing construction, regional roads and highways, public transport, green energy certificates, school buildings, refurbishment premiums, energy policy agreements with companies, etc. ensure that the Flemish authorities will have a big hand in whether or not Ghent will achieve the objective of the Covenant of Mayors. Throughout the climate plan it becomes obvious in what themes the city of Ghent can provide an added value CO₂ reduction, alongside Flemish policy.

The Flemish authorities provide support for the cities that signed the covenant of mayors: VITO (Flemish Institute for Technological Research) standardized the method for the drafting of a CO₂ monitor and as of 2014 (figures from 2011) ensures the annual supply of data available at the Flemish level. The Ghent CO₂ monitor for the years 2007 and 2009 was recalculated according to this VITO method.

1.2. The Ghent climate challenge in numbers

2

CO₂ MONITORING

Our climate mitigation policy⁴ is based on readings supplied by means of CO₂ monitoring. This monitoring provides an overview of CO₂ emissions from the various sectors.

² Eurocities is a network of large European cities, founded in 1986. It was created from the premise that these cities may gain advantages from cooperation. These advantages are manifested politically – among others lobbying the European institutions concerning common standpoints – and in the fields of knowledge sharing, the exchange of ideas, etc. At the moment Eurocities represents over 130 large European cities. Every year Eurocities combines a *general meeting* with a conference on the themes of Eurocities. Ghent hosted these events in late 2013. Mayor Daniël Termont has a seat on the *executive committee*. More information on www.eurocities.eu

³ Climate Alliance is a European network of local governments making a voluntary commitment to take on greenhouse gases at the source – i.e. locally. Among others by focusing efforts on energy efficiency, environmentally friendly mobility, renewable energy. The alliance comprises over 1,600 cities, municipalities, provinces, and NGOs. More information on www.climatealliance.org

⁴ Climate policy comprises mitigation measures focused on avoiding CO₂ emissions, as well as adaptive measures focused on adapting to a changing climate.

Table 1. Biannual CO₂ monitoring Ghent

	2007		2009		2011	
	ktonne CO ₂	%	ktonne CO ₂	%	ktonne CO ₂	%
Industry excl. ETS	204	12.8%	157	10.4%	185	12.8%
Tertiary sector, of which	445	27.9%	461	30.6%	418	29.0%
city buildings	24		26		25	
Households	403	25.3%	395	26.2%	347	24.0%
Agriculture	25	1.6%	21	1.4%	20	1.4%
Transport, of which	510	32.0%	467	31.0%	468	32.4%
local road traffic	Not available		Not available		217	
highway traffic	Not available		Not available		244	
bus and tram	7		6		5	
city fleet	2		2		2	
Public lighting	5	0.3%	5	0.4%	5	0.3%
Total	1,592	100.0%	1,507	100.0%	1,443	100.0%
<i>evolution compared to reference year 2007</i>	<i>100.0%</i>		<i>94.7%</i>		<i>90.6%</i>	

This monitor does not include all CO₂ emissions on Ghent territory:

- Companies covered by the European Emission Trading System (ETS), are not included as they exceed the local policy level⁵.
- Likewise, emissions from shipping and train traffic are not included in the calculations for this reason.
- The figures also do not include CO₂ emissions related to the use of consumer goods. Many consumer goods are not produced on our territory. Ghent does opt in favour of developing a local food strategy, considering the substantial impact of food production and consumption on the emission of greenhouse gases (see also section 'food').

The afore-mentioned monitor pertains to the commitments by Ghent in the Covenant of Mayors, which is aimed at those sectors on which local authorities *can* have an impact.

The trend in Ghent CO₂ emissions is dropping, which is good news. Compared to 2007, CO₂ emissions on Ghent territory have dropped by 9.4%. Nevertheless, the figures are to be handled with some care. The emissions from the industry and transport (highway traffic) sectors are highly sensitive to the economic climate. Certainly 2009 and to a lesser extent 2011 were tougher years economically. Heating requirements play an important role in the figures for households and the tertiary sector. The mild winter of 2011 yields limited CO₂ emissions.

In other words, on the basis of 3 monitors, it is still too early to speak of a structural reduction.

⁵ The ETS is the European system for tradable emission rights in which the most energy intensive companies are obligated to participate. 22 ETS companies are active in Ghent, with a combined emission of 8722 ktonnes (2011). Over 90% of this is generated by iron and steel production.

PRODUCTION OF RENEWABLE ENERGY AND RESIDUAL HEAT

In addition to the focus on energy reduction, sustainable energy production is a crucial pillar in the climate mitigation policy. Ghent has the ambition to focus on renewable local energy production. This means production generated from the sun, wind, soil, sustainable biomass of local/regional origins, and residual heat. The majority of this energy is currently produced by wind turbines, energy from solar panels saw a tremendous rise in the period 2007-2011. This makes Ghent the municipality with the largest number of solar panels in Flanders, a feat rewarded by the VREG with the title 'sunniest municipality' in 2013⁶.

Table 2. The production of green energy and energy demand in Ghent			
	2007	2009	2011
	MWh	MWh	MWh
Wind energy on land	60,901	62,507	78,509
PV <10kW (for private persons)	101	1,767	8,746
PV >10kW (large installations)	0	1,251	20,701
energy from waste incineration (IVAGO)	10,018	10,471	10,490
energy from waste water (Aquafin Drogenen)	523	755	445
Total renewable energy	71,543	76,751	118,891
Total energy demand from households	1,844,569	1,806,860	1,611,945
<i>Degree of self-sufficiency compared to households</i>	<i>3.88%</i>	<i>4.25%</i>	<i>7.38%</i>

Despite the reduction in and eventual cancellation of green energy certificates for solar panels up to 10 kW⁷ and a recent reduction in realized wind turbine projects⁸, the city of Ghent is keen to continue the trend from the period 2007-2011.

ON THE RIGHT PATH?

CO₂ emissions in Ghent are declining owing to the efforts made by the residents of Ghent, Ghent companies, and authorities over the past years. However, these efforts need to be maintained and even ramped up. After all, Europe is seeking to propose a more thorough reduction objective for 2030.

⁶ http://www.vreg.be/sites/default/files/persmededelingen/pers-2013-11_0.pdf

⁷ www.vreg.be

⁸ Wind energy generated in Ghent rose from 30,000 kW to 42,150 kW between 2007 and 2011. In the period 2011-2014 this power rose to 45,150 kW. Source: www.vreg.be

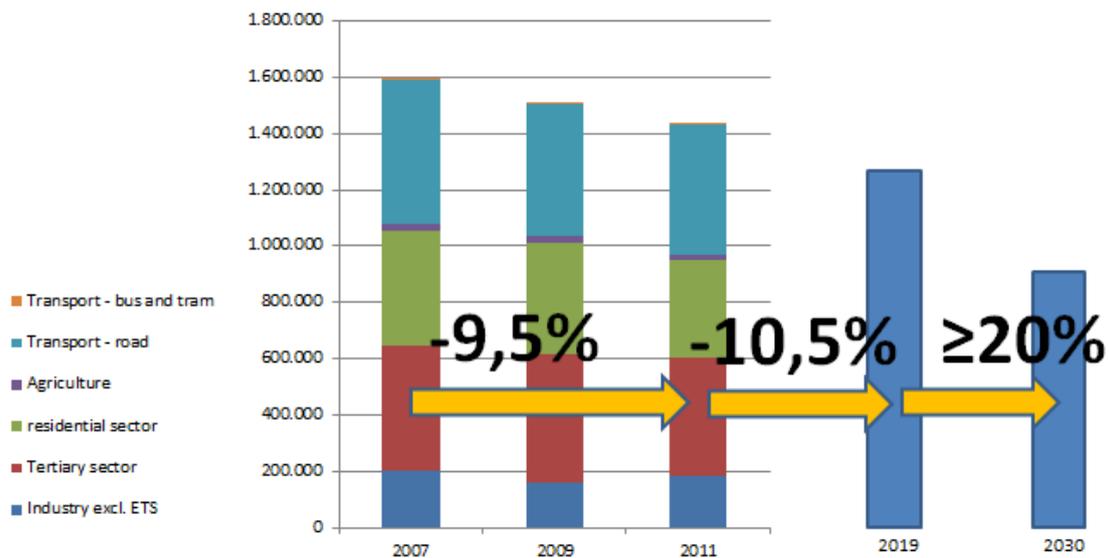


Figure 1. Evolution and perspective CO₂ emissions from the city of Ghent

The new climate plan 2014-2019 ensures that the City of Ghent does its utmost as a local authority and within its competences and financial framework to achieve the European objectives, paving the way towards climate neutrality in the long term.

1.3. Ghent's ambition

The Ghent Multi-Annual plan 2014-2019 states: *"Ghent is a city of openness, solidarity, wisdom, and child-friendliness. It pools all its powers to develop the city into a continuously liveable whole, further shaping the future. Ghent wishes to be a creative forerunner in the transition towards a climate neutral city. We continue to build an environmentally friendly and diversified economy to bring prosperity to all. This is how we develop into a society of responsible citizens who can thrive freely and count on the necessary support."*

The strategic objectives specify in greater detail the goals of the afore-mentioned mission:

In the long term, Ghent is climate neutral and energy independent through a maximum commitment to energy reduction and sustainable, renewable local energy production:

- Together with all of the stakeholders, we aspire to a climate neutral city through the stimulation of energy efficiency and low-energy housing for everyone and the use and production of renewable energy.
- We lead by example by being self-sufficient when it comes to electricity (100% green energy) and by reducing the energy consumption of our municipal services by 3% every year.

In the short term we wish to achieve the following objectives:

- CO₂ emissions in 2019 are lowered by 20% compared to reference year 2007. In numbers: emissions amounting to 1,274 ktonnes CO₂ in 2019;
- energy consumption in 2019 is lowered by 20% compared to reference year 2007. In numbers: energy consumption of 5,409 GWh in 2019
- local renewable energy production in 2019 covers 15% of domestic energy demand;
- energy consumption in city buildings and public lighting is reduced by 3% every year, (or 15% over the entire legislature) compared to consumption in 2012.

In the long term (2050) we wish to evolve into a climate neutral city.

To achieve this, Ghent focuses on six high-priority activities out of the 'climate' competence, described in sections 3.1. to 3.6.:

- housing (with emphasis on refurbishment);
- our own exemplary role
- enterprise (aimed at non-ETS companies and the service sector)
- renewable energy;
- transport;
- food.

1.4. Opting for a social climate policy benefits the residents and companies of Ghent

The Ghent climate policy and climate plan implies a number of clear choices:

- We are not necessarily taking the path of least resistance in reducing our CO₂ emissions. Indeed, we are making an explicit choice in favour of a social climate policy. We are implementing additional resources (be it with regard to premiums, loans, ... or with regard to support/unburdening) to also help vulnerable families make energy-saving investments.
- In general we seek to empower both families and companies against rising energy prices by supporting structural energy-saving measures. This not only benefits the climate, but also our wallets, as well as the local economy (local jobs due to refurbishments,...).
- Likewise, our approach regarding our own city buildings makes sense not only in light of our exemplary role, but also – certainly in the long term – for budgetary reasons.
- A great deal of measures leading to reduced CO₂ emissions also enhance the quality of living in Ghent: low-traffic city, modal shift towards more bicycles/public transport,...
- Despite the fact that CO₂ emissions from food consumption are not included in our CO₂ monitor, we opt to develop a local food strategy. We want to assume our responsibility not only when it comes to the greenhouse gases generated by the food chain (from production, processing, consumption, waste); this is another area where we can create social and economic win-win situations.

2

BUILDING UPON THE EFFORTS OF THE PREVIOUS LEGISLATURE

The current climate plan builds upon the first climate plan 2008-2013. Even though the administration at the time was aware that we still had too little data for specific actions and CO₂ monitoring, Ghent was the first Flemish city to draw up a climate plan that included 105 no-regret actions. The current administration emphasizes and enhances this approach.

Cooperations with stakeholders were initiated and knowledge was developed during the previous legislature. Both approaches formed the basis for improved climate scenarios.

COOPERATION WITH STAKEHOLDERS

Climate arena

Within the framework of EU project MUSIC⁹, Ghent experimented with new ways of governance. Through an arena setting, Ghent forerunners were asked to contribute ideas on what it implies to have the ambition to be climate neutral in 2050, and to cause a transition in the Ghent of today based on this long-term perspective. These forerunners were then given the space to start up experiments within the framework they developed. The figure below shows a number of examples of the experiments and actions resulting from this climate arena.

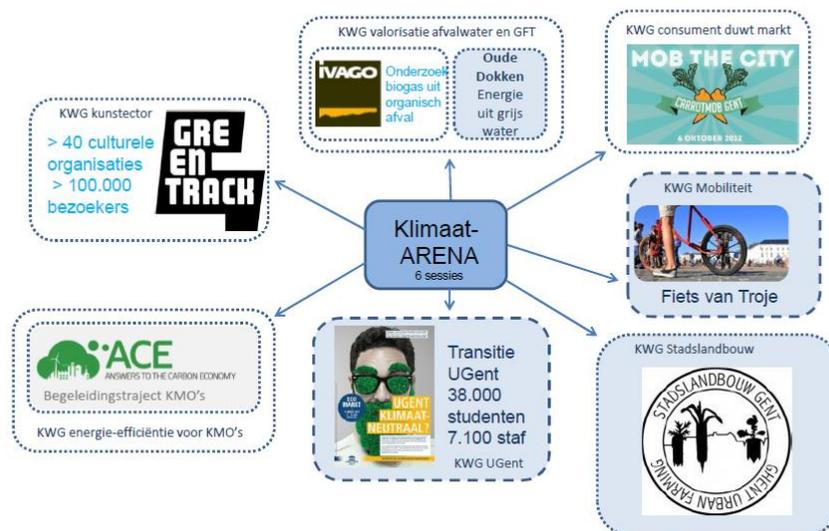


Figure 2. experiments and actions resulting from the climate arena

⁹ Mitigation in urban areas: solutions for innovative cities. See also <http://www.themusicproject.eu/>

For example, one development was the Trojan Bike¹⁰, a network of cooperating citizens, companies, authorities, and organizations who among others introduced the ‘liveable street’ in Ghent, and by 2017 wishes to demonstrate through strategically selected mobility experiments that structural changes are possible. The University of Ghent also transitioned, and refined the manner in which climate was included in its approach towards its own operation, student life, educational objectives, and research themes.¹¹ Energy coaching tailored to SMEs was tested in a pilot project and approved. Countless lines of reasoning and research into the production of energy from waste water came about and inspired the developer of the Oude Dokken (Old Docks) to move in that sense. Green Track¹², a project within the Ghent cultural sector to reduce their energy consumption and impact on the climate, was pushed to grow and has since gained traction in Antwerp and Leuven. And so on. It goes to show how much a small group of forerunners can activate and help advance.

The climate arena approach was a first tryout. The methodology indicated that stakeholders like taking matters into their own hands, and provide highly creative ideas. The groundwork has been laid for a different form of participation, one that gives more responsibility to the stakeholder and greater weight to the cooperation.

The members of the climate arena also shared their stories and experiences with the city administration. Many of their visions and actions to generate a transition for Ghent were integrated into party programmes, and lastly also into the new administrative agreement.

Consultation with Ghent stakeholders

The administration further strengthened the link between stakeholders and policy-making by entering into EU project STEP-UP (Strategic Energie Performance in Urban Planning, 2012-2015)¹³. STEP-UP strives for an improved Climate Plan with a more bottom-up approach. Consequently the contacts with the stakeholders were continued and intensified at the start of this legislature.

KNOWLEDGE BUILDING

Before 2008 the City had no insight into the impact it had on the climate. As a first step in its climate policy, Ghent developed a CO₂ monitor which charted CO₂ emissions from the entire territory of Ghent, as well as the proportion from various sectors (e.g. residences, companies, traffic, city organization, ...). From then onwards, a CO₂ monitoring took place every two years to survey the evolution in CO₂ emissions and the impact of the policy.

A second major question was: “what range of measures is possible to drastically reduce CO₂ emissions in Ghent?”. Our CO₂ emissions can be lowered by measures acting upon energy demand and by measures relating to the replacement of the energy source (from traditional fuels to renewable energy). A number of studies helped provide a better image of this range of possible measures, and to establish the link to the guiding principles of the stakeholders.

¹⁰ <https://www.facebook.com/pages/De-fiets-van-Troje/426374380771244#!/pages/De-fiets-van-Troje/426374380771244?sk=info>

¹¹ <http://www.ugent.be/nl/univgent/waarvoor-staat-ugent/verklaringen/duurzaamheidsvisie/transitie>

¹² <http://gent.greentrack.be/>

¹³ <http://stepupsmartcities.eu/>

A brief list of these studies and their conclusions:

- The potential for renewable energy production in Ghent was mapped out in the **Renewable Energy Scan** (Arcadis, 2011)¹⁴. Available renewable energy from wind, sun, water, soil, and biomass was calculated without taking into account possible obstacles to the production of this form of energy. In theory, Ghent has access within its own municipality to sufficient renewable energy to supply an additional 52% of its households with green energy or green heat. Along with the already existing renewable energy installations, this means that 71% of Ghent families can be supplied with renewable energy.
- Because some of the results from the afore-mentioned study are heavily influenced by the availability of the renewable energy source, the **soil energy potential** was further refined (GIM and IFtech, 2013). Via GIS, the areas and gardens that are accessible to heavy drilling machinery for shallow geothermal energy (borehole energy storage or BES) were charted. One third of Ghent residences proved to have sufficient space for this technique. The switch from a traditional heating system to a soil heat pump is one option that is open to these families. This technique is still innovative, and is mainly used for new buildings. This study indicated that there is a potential market for existing buildings.
- The Renewable Energy Scan was also supplemented with data on **sewage water heat potential** (Tauw, 2013). This technique is not easily applied collectively. Immediate recuperation of heat from shower water by means of a modified shower stall proved the most advisable, and is highly effective for families.
- Lastly, VITO and Arcadis performed the study '**Roadmap to a CO₂ neutral city in 2050**' (2013)¹⁵ to examine whether the long-term objective of climate neutrality in 2050 is achievable. VITO used an economic assessment framework to determine on the basis of the technologies known today how close Ghent can get to reaching the desired CO₂ neutrality by 2030. Additionally VITO developed a visionary scenario up to 2050 in which radical innovations and technical breakthroughs are considered. Such a cost curve is not an investment analysis. It merely considers the costs and effects of a measure with regard to a single objective (CO₂ reduction). This is why the measures were evaluated in a second step by means of an assessment framework based on the 4 Ps (people, planet, prosperity, and policy). The study concluded that a CO₂ reduction of 85% by 2030 is technically feasible (not including the steel sector, including electricity production). This corresponds with the European objectives for 2050 (-80 to -95% CO₂). Therefore, CO₂ neutrality proves to be no pipe dream either. The private and public investments required to achieve this through purely technical solutions are considerable, amounting to over 330 million Euros per year. One of the important measures from this study towards achieving this 85% CO₂ reduction, is doubling the refurbishment rate from 1,500 to over 3,000 refurbishments per year, allowing homes to be left with an actual energy consumption of 70 kWh/m² (and eventually 30 kWh/m²). Other important measures are energy efficiency in companies and the tertiary sector, where

¹⁴ <http://www.gentsklimaatverbond.be/study/hernieuwbare-energiescan>

¹⁵ <http://www.gentsklimaatverbond.be/study/energiestudie-0>

major profits can be generated with the application of the best techniques available. Lastly, with regard to mobility, the modal shift and more sustainable vehicles are the principal measures. With regard to energy production, the standouts are wind power and biomass. Biomass can make a considerable difference, but local availability is highly limited and the related carbon debt may amount to decades. District heating will play a larger role in the future, especially if waste heat can be valorised.

- It is not only important to gain a picture of the potential package of measures. It is also important to know where to best apply what measures, what areas are best regarded as intervention priorities. In addition to the creation of a transition network (see above), the MUSIC project also saw the development of the first **energy maps in GIS**. Maps showing the average consumption data for Ghent residences, the solar energy potential of roofs, soil energy storage (BES) and wind energy potential, energy poverty, ... were drawn up.

CLIMATE SCENARIOS

All contributions and knowledge stated above were 'funneled' and various climate mitigation scenarios were developed. They were analyzed against the city's financial scope as well as against the commitments within the framework of the covenant of mayors in order to come to a realistic and acceptable climate measure package for this legislature.

The Ghent Climate Plan has proven to be a well-balanced plan, with consideration for social, economic, ecologic, and participatory aspects. The details of the selected scenario have been developed per sector in section 3 of this plan. The CO₂ impact of these measures has been calculated in section 5.

ACTIONS PER THEME



Campaign picture sustainable refurbishment and roof insulation

Competent deputy mayors:

<i>Tine Heyse</i>	<i>deputy mayor for the Environment, Climate, Energy and North-South</i>
<i>Tom Balthazar</i>	<i>deputy mayor for Urban Development, Housing, and Public Green Spaces</i>
<i>Rudy Coddens</i>	<i>chairman of Belgian public social welfare centre OCMW and deputy mayor for Senior Citizen Policy, Work, and Poverty Reduction</i>

THE CLIMATE CHALLENGE

Every residence needs energy for heating, warm water, and lighting. Energy consumption in Ghent households accounts for about 25 percent of CO₂ emissions in our city. Not only CO₂, but also other polluting substances generated by the burning of fossil fuels are discharged into the air, with an impact on our health.

Therefore, the re-evaluation of the residential energy demand is one of the most significant challenges in realizing a liveable and climate neutral city. Not only to counter climate change, but also out of concern for our health, comfort of living, and the affordability of our energy.

Existing residences

Ghent is a vibrant city, and home to about 115,000 households¹⁶. Virtually half—or 53 percent—of the residents of Ghent is a home owner. Of the 47 percent non-owners, 34 percent live in private rented housing, while 13 percent rent from a social housing company or Belgian public social welfare centre OCMW. Ghent residents mainly live in single-family homes (64 percent). The remaining 36 percent live in an apartment, of which a minority in a studio, in student housing, or in another type of residence.

Each year, Belgian homes on average burn through nearly 350 kWh/m²¹⁷. This is an awful lot compared to neighbouring countries, and no less than 72% more than the European average. To illustrate: an economical newly built residence consumes an average of 50 to 60 kWh/m², and a passive building a mere 15 kWh/m². Therefore, it is important that the rate of refurbishment towards more energy-efficient residences be stimulated and increased.

¹⁶ [Gent in cijfers 2013: omgevingsanalyse](#)

¹⁷ http://www.mckinsey.com/App_Media/Reports/Belux/Energy_efficiency_in_Belgium_summary_NL.pdf

Newly built residences

Buildings being designed and built today, are meant to last dozens of years. This means that these buildings should already make an optimal contribution to the long-term objective of a climate neutral Ghent in 2050.

Hence, now is the time to exploit the opportunity afforded by new construction to make ambitious and future-oriented choices regarding energy.

THE AMBITION AND STRATEGY

Existing residences

In order to fulfil our climate ambitions, we must focus on two aspects: on the one hand to reduce residential energy demand, and on the other hand make the switch to renewable energy. In this context, special care should be given to energy poverty. After all, Ghent wishes to be a pleasant and affordable residential city for all residents of Ghent.

If we wish to achieve the goals related to a climate neutral Ghent in 2050, then the refurbishment rate in Ghent should at least double from 1,500 refurbishments to 3,500 refurbishments per year. In addition, the energy result for each refurbishment must be enhanced. To this end, we put forth the following objectives:

- 70 kWh/m² to become the 'new norm'

The installation of sufficient roof insulation, façade and floor insulation where possible, the placement of low-emission glass and an energy-efficient heating system are vital steps to be implemented during each residential refurbishment. At least 80% of refurbishments should achieve this actual energy consumption level. The remaining 20% of refurbishments is already held to greater energy ambitions.

- 30 kWh/m² to become the 'new future norm'

Many residences have room for profound measures, as well as thicker insulation, or the use of renewable energy. We want 20% of refurbishments to achieve this actual energy consumption level already.

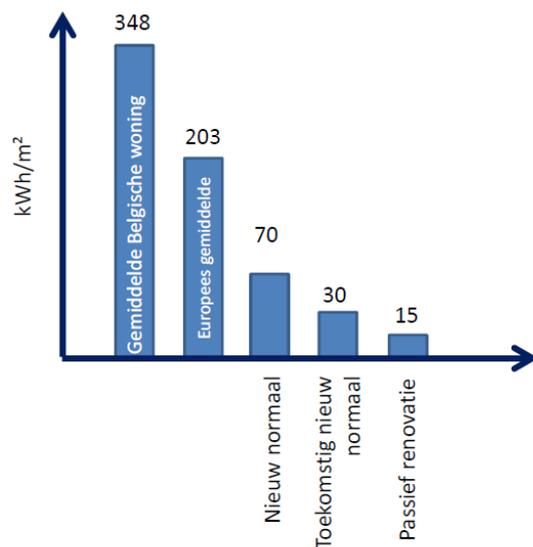


Figure 3. Phased plan for a low-energy residence

Not every residence or everyone's budget allow for all of these steps to be performed in one go. However, we ensure that for every refurbishment of existing residences, the higher levels of insulation and renewable energy application are implemented.

A great number of thresholds need to be overcome for these standards to be implemented. The common thread throughout the climate strategy is addressing what motivates Ghent families to invest in energy savings and independence from fossil energy in their refurbishment project. 3 major pillars are distinguished in this activation:

1. Inspiring Ghent families to implement a phased refurbishment of their residence to 70 kWh/m² or even 30 kWh/m²
2. Making it easy for Ghent families to implement these refurbishment phases
3. Also making the refurbishments affordable to Ghent families.

Always proportionate to the living conditions of a family.

We wish to instil the **passion** for energy-saving refurbishment through awareness raising, knowledge building, and setting good examples.

The first question a passionate citizen will then ask is: 'what am I supposed to do to my house?'. That is why we wish to **make it easy** for any refurbisher to find the right (technical) advice.

Tailored advice stimulates refurbishers to include the procedures in their plans at the right time and in the right manner. We also wish to offer additional support during the execution of the works.

Upon request, the Ghent resident may obtain advice and guidance for drawing up specifications, finding and contacting contractors, comparing quotations, and inspecting the works. The practical concerns related to the execution of a number of works such as installing roof insulation, can be handled for the Ghent resident. In this respect, the City will provide assistance in finding a contractor and organizing the works. This way, energy-efficient refurbishments are brought within the grasp of a great many people. After all, research has shown that financial incentives alone are not sufficient to activate people. This causes many to hesitate in the face of the fuss associated with refurbishment, due to a lack of knowledge or advanced age.

Finally, premiums and cheap loans are to ensure that these procedures become **affordable** for any Ghent resident.

Non-profit association REGent, the Ghent energy company, continues to guarantee intensive and high-quality support for the vulnerable families of Ghent, in collaboration with the OCMW. Their efforts are essential in the struggle against energy poverty. This service provision ranges from an energy scan of a residence, providing construction advice, and help looking for financial leverage and cheap loans, to the practical organization and guidance of energy-efficient refurbishment measures.

Newly built residences

Future-oriented construction for the purpose of achieving climate neutrality for the building (now or in the future) becomes the norm. First and foremost, this implies a high-performance building envelope at a very low-energy or passive level. Renewable energy must be relied on for the remainder of energy consumption. If a new building cannot be climate neutral immediately, it is important that it can become so in the future. This can be achieved for instance by providing a low-temperature system which can in the longer term be supplied by renewable energy or by providing reservation strips in projects where district heating can be installed later on.

The Flemish government has set forth ever-increasing demands leading up to Nearly Zero-Energy Buildings (NZEB) by 2021.

As a local authority we can mainly influence projects in which we are also involved, and subsequently we can aspire to greater ambitions ourselves. Indeed, the City of Ghent, the OCMW, and urban development company sogent own a number of terrains being developed into major residential projects ranging from dozens to hundreds of residences. As the owner of these terrains, the City, OCMW and sogent can impose loftier ambitions relating to energy performance and renewable energy. Therefore, in these urban development projects land position is a lever for loftier ambitions relating to sustainability. Larger projects are often developed via a public-private partnership or PPP¹⁸. The Sustainability Meter remains the guide for these projects as well. This instrument ensures that our sustainability ambitions (including climate neutrality) are achieved at that level as well. Specifically, conditions and ambitions regarding the energy and rain water concept etc. are set forth in selection and allocation dossiers for such PPP projects on the basis of this Sustainability Meter, in addition to the criteria regarding architecture, urban development, project approach, and financial bid. Therefore, developers working on an ambitious energy concept stand a better chance at being able to realize their project. Once a private partner has been selected, the commitments are embedded in the PPP agreement, so that follow-up remains possible.

Land position leverage is not there in case of private developments. Still, the approach to projects on terrains owned by the City and sogent may act as a source of inspiration for private developments. They are partly realized by the same project developers, architects, and engineering offices. Therefore, consultations within the framework of permit applications are seized to stimulate them to make more sustainable choices regarding energy.

¹⁸ http://www2.vlaanderen.be/pps/PPS/pps_definitie.html: A PPP is a collaboration in which the public and private sectors, while retaining their own identity and responsibility, jointly realize a project in order to realize added value, on the basis of a clear division of duties and risk. The added value can be financial, social, or operational.

ACTIONS

Existing residences

1. An energy-efficient residence for all

Inspiring people to refurbish the residence energy-efficiently

We wish to instil the **passion** for energy-saving refurbishment through awareness raising, knowledge building, and setting good examples. This is done by:

- Distributing general information on energy-efficient refurbishment and housing through digital and print media and via all involved intermediaries in the field, to all residents of Ghent in general and specific target groups (construction professionals, senior citizens, social target groups, within certain neighbourhoods within the framework of urban renewal projects, ...) in particular.

Action: Developing and providing online information on energy-efficient refurbishment and housing via websites

- Energy-efficient refurbishment on gent.be: energy-efficient refurbishment is clearly put in the picture on the new website of the City of Ghent. Visitors can find up-to-date information both under section 'building and refurbishing' and under section 'nature and the environment'.
- Housing is an important aspect of Ghent climate city. The portal www.gentklimaatstad.be/wonen is where Ghent residents always find an up-to-date overview not only of the City of Ghent, but also of other stakeholders whose actions for energy-efficient refurbishment contribute to Ghent Climate City.

- The development of an online decision tree to give Ghent residents a better view of exactly what it entails to refurbish one's residence energy-efficiently.

Action: Developing an online decision tree

Using this tool one can - after filling out a number of parameters on the residence and the plans - obtain a tailored to-do list for the residence. What procedures can still be implemented? How much will this roughly cost? How much savings will this roughly generate on my energy bill? What is my residence's renewable energy potential? To what premiums am I entitled? The answers to all these questions are then combined into a handy personalized overview.

- An annual awareness campaign focusing on one or more aspects of energy-efficient refurbishment to an actual consumption level of 70 kWh/m² (roof insulation, façade insulation, low-emission glass, heating systems), and so help create a support base for behavioural change regarding sustainable housing/construction.

Action: Awareness campaign ‘New norm’

Campaign 2014-2015: ‘Save for Life, Energy-efficient refurbishment is saving for life’.

Save for Life is an awareness campaign intended to motivate citizens with no sustainability motives to refurbish energy-efficiently. The campaign is to raise awareness of the offering of supporting measures, and help create a support base for behavioural change regarding housing and energy. In order to motivate citizens with no sustainability motives, this campaign focuses on the financial argument: If you refurbish energy-efficiently, you will save every month on your energy bill. The phrase ‘for Life’ emphasizes the sustainability of the investment.

The global campaign is city-wide, and aimed at every Ghent resident. Within the campaign, products and actions are developed aimed at specific target groups such as owner/landlords and senior citizens.

- Guidance for vulnerable target groups by REGent.
Families experiencing difficulties within our society have a greater need for guidance instead of awareness campaigns. This target group must also be actively approached via intermediaries.

Action: Guidance for vulnerable target groups by REGent

In order for vulnerable families to invest, a complete package is offered via non-profit organization REGent attuned to the needs of the most vulnerable in our society. Ranging from scans, premiums, and cheap loans to the practical organization and implementation of energy-efficient measures in the residence. Tailored communication materials are created based on this complete package.

- The development of an interactive digital platform on energy-efficient construction and housing in Ghent.

Action: Interactive digital platform on energy-efficient construction and housing in Ghent.

Such a platform is meant to connect potential refurbishers in Ghent for possible group purchases, peer-to-peer advice, references to other partners, and so forth. Other tools such as thermal imaging, decision tree, ... can also be integrated in an accessible manner into this platform.

Making it easier to implement energy-saving refurbishment phases

In the coming legislature, the City of Ghent wishes to do its utmost to offer guidance to Ghent families during their energy-efficient construction and refurbishment project through 1) tailored advice and 2) support during the implementation of the refurbishment.

REGent has been putting this second step into action for vulnerable families for a number of years now. This service provision will be expanded to include all Ghent families.

Action: Guiding Ghent families during their energy-efficient construction and refurbishment project

Energy-efficient refurbishment guidance consists of various complementary forms of tailored guidance:

- Construction advice: this service provision has existed since 2003, and is a good place to start for any construction and refurbishment plan. This is why the City of Ghent continues to offer this free planning advice to builders and refurbishers, be they families, associations, or schools, in order to render their building/refurbishment project more energy efficient. This takes place in the Woonwinkel (housing centre), at non-profit organization REGent, or at the MilieuAdviesWinkel (environmental advice centre).
- Refurbishment advice delivered to your door. Sometimes refurbishment issues can be difficult to explain on paper, or questions/issues/doubts suddenly arise in the midst of refurbishment. Such cases require a house call. This new service provision is being developed for families, associations, and schools.
- Unburdening during the execution of the energy refurbishment: during this legislature the City of Ghent wishes to go the extra mile and also offer support to all Ghent families during the execution of the refurbishment. This new service provision intends to address the obstacles keeping many Ghent residents from getting involved in energy-saving refurbishments (too much fuss, insufficient technical background, too old). Anyone who so desires can therefore obtain free additional support for the practical execution of the works (drawing up specifications, finding sustainable professionals, comparing quotations, and site inspection). This guidance will commence for procedures such as roof insulation, façade insulation, replacing joinery or heating unit.

Because sufficient high-quality rented housing is important for the social functioning of the city and because 70% of Ghent private rented housing is owned by senior citizens, additional efforts will be made to reach senior citizens. To refurbish their own homes energy-efficiently, to safeguard them from rising energy costs, and to refurbish the residences they rent out, so that they continue to have a high-quality property on their hands in the face of increasingly strict energy performance demands.

This service provision is developed starting in 2015 and will be operational in the second half of 2015, after the testing phase.

- Inform about financial leverage: It is by no means an easy thing to find one's way around the potential premiums and fiscal benefits a refurbisher may call upon. This new service provision informs Ghent families about the premiums they may request, allows for a simulation based on their situation, and if need be can provide assistance in filling out premium applications.
- Construction advice and tailored guidance for vulnerable families by non-profit organization REGent, the Ghent energy company: construction advice, refurbishment advice delivered to the place of address, support during the execution of the refurbishment, and assistance regarding financial leverage have been available to vulnerable families for a while now. Non-profit association REGent continues to guarantee intensive and high-quality support for the vulnerable families of Ghent, in collaboration with the OCMW. Their efforts are essential in the struggle against energy poverty.
To start, non-profit association REGent offers an energy and water scan, whereby advice and specific tips are given regarding immediate energy and water economy. At the same time they install a number of energy-saving measures such as compact fluorescent lamps, radiator foil, draught strip, water-saving shower head, etc. After the scan, the dossiers are further followed up so that anyone wishing to get to work in his residence may be unburdened and receive guidance to execute the energy-efficient refurbishment.

The offer must actually lead to more energy and water-saving measures being taken in the residences in question. The role of apprenticeships - more strongly professionalized - is enhanced.

The current framework of arrangements regarding façade insulation of the City of Ghent (October 2010) must also be re-evaluated in order to lower the threshold to energy-efficient refurbishment and insulation, so that façade insulation is made simpler and better applicable.

Making energy refurbishments more affordable

The City of Ghent focuses its efforts on affordable, high-quality, and energy-efficient housing, and does everything in its power to support the residents of Ghent. Premiums and cheap loans are to ensure that these procedures remain affordable for any Ghent resident:

- Providing energy premiums: in addition to the existing Flemish energy premiums, the Ghent resident may, depending on income, be eligible for additional energy premiums of the City of Ghent. The option of combining various premium is intended to make energy-efficient measures so attractive that families sufficiently prioritize energy-efficient measures in their refurbishment project. In addition, the City of Ghent motivates families to aspire to even greater energy savings via its own premiums.

In response to the rising energy poverty, the greatest care is given to those who need it most. Indeed, financial support is an essential condition to the realization of energy-efficient refurbishment for vulnerable families.

Many Ghent families can support a limited additional investment, but also have other investment needs beside energy savings. For them too, additional financial support is often needed to realize the energy ambitions of the City of Ghent. Depending on income, they have access to a range of premiums up to 1,500 or 2,500 Euros for energy-efficient refurbishments. With this, we wish to encourage them to consider energy efficiency at every stage of the refurbishment project. Because roof insulation remains a top priority for the City of Ghent, any resident of Ghent - regardless of income - may continue to rely on a financial incentive if they wish to sufficiently insulate their roofs. Social housing companies, co-ownership associations, and certified local associations may also be eligible for this premium.

Those owning multiple houses can only count on support for roof insulation, unless they rent out their residence via a social rental housing agency. Then they may rely on multiple premiums from the premium range.

Action: Providing energy premiums¹⁹

The premium range²⁰ comprises premiums for under roof/roof insulation, roof refurbishment, insulating glazing, façade insulation, floor insulation, wall and floor heating linked to a low-temperature system²¹ and heat pump²².

Within the framework of urban renewal projects, additional communication on housing and energy premiums will be provided.

A schematic overview of the energy premiums:

Joint net taxable income of the applicant (and possible partner) lower than or equal to		Maximum total premium sum	Type of works
Singles (without dependant)	Single with dependant/cohabitants/ married couples		
€28,941.88 + 1,504 per dependant + index Or an owner renting out his property to a Social Rental Housing Agency (SRHA)		€4600	Under roof/roof insulation Roof refurbishment Façade insulation Floor insulation Low-emission glass Heat pump Floor heating Apprenticeships OCMW ²³
€34,338 + index	€45,128 + 3,241.49 per dependant (as of 2nd dependant for singles) + index	€2500	Under roof/roof insulation Façade insulation Floor insulation Low-emission glass Heat pump
€40,518.64 +index	€57,883.77 + 3,241.49 per dependant (as of 2nd dependant for singles) + index	€1500	Heat pump Floor heating
Higher taxable income or multiple properties		€1000	Under roof/roof insulation
social housing companies, co-ownership associations and certified local associations		€1000	Under roof/roof insulation

- Providing housing premiums: the focus of the new housing premium is firstly to enhance the housing quality in Ghent, but contributions are also made to the climate objectives of the City of Ghent by supporting certain procedures.

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¹⁹ The full regulations can be found here: <http://bit.ly/ZOsFMo>

²⁰ The City of Ghent chose not to additionally support PV installations. After the cancellation of green energy certificates for PV installations up to 10 kW this will remain a profitable investment not requiring extra support. Likewise, solar boilers do not require additional incentives on top of the Eandis premium.

²¹ By supporting low-temperature systems, the City wishes to facilitate the requisite infrastructure for heating with renewable energy. In an initial refurbishment phase, not every family will immediately install a heat pump or a solar boiler. However, when the requisite infrastructure for these renewable energy systems is already present, the costs of conversion are less steep, and the conversion is more readily made.

²² To stimulate renewable energy, the City of Ghent provides support for heat pumps, in addition to the Eandis premiums. After all, this technology will continue to grow more profitable in the future.

²³ Exception: owners renting out via a SRHA cannot make use of the premium for OCMW apprenticeships.

Action: Providing a Housing Quality premium²⁴

With this premium the City offers financial support for the following works: moisture control, improving or renovating plumbing, electrical installation, heating installation and/or installation for domestic hot water. The premiums for moisture control (heating a damp residence requires more energy) and heating installations also contribute to a more energy-efficient residence²⁵. More support is provided to vulnerable families in the case of this premium as well. In this way the City compensates 50% of the price with a maximum of € 1,500 for vulnerable families. For other families the compensation is 30% of the price with a maximum of € 1,000. This premium can also be used for a combination of different works.

- Providing cheap loans via non-profit association REGent:

An affordable energy bill for families can be achieved by focusing on energy-saving measures. However, for the most vulnerable families (but also for others²⁶) it is not so simple to execute and finance energy-efficient refurbishments. Because even though these measures can be quickly earned back through various premiums and obtained energy savings, the sum for the refurbishments must be paid in advance.

Cheap loans provided by the FROCE (Fund to Reduce the Overall Cost of Energy) ensure that major investments people would not make for financial reasons, are made after all. The current FROCE fund is a rolling fund. Because this is a (pre-)financing of the investment, this capital always returns, generating highly cost-effective leverage to stimulate energy refurbishments. So credit provision works very smoothly, partly owing to the sound assessment of the credit risk, the close cooperation with the OCMW and the personal guidance from REGent. Because FROCE loans²⁷ in their current form are an important instrument for the financing of energy-efficient refurbishments, the City of Ghent will review with various institutions how current FROCE operation can be continued.

Action: Providing cheap energy loans

Providing cheap energy loans to Ghent families for energy-efficient investments. Vulnerable families can borrow at 0%.

The Energy Centre as a central point of contact

In order to ensure smooth service provision to the citizen, a clear and visible central point of contact will be provided for Ghent residents: the Energy Centre.

Action: The Energy Centre

The Energy Centre is to become the first point of contact for Ghent families, and ensures the coordination of all service provision regarding energy-efficient refurbishments.

²⁴ The full regulations can be found here: <http://bit.ly/1sbeh7d>

²⁵ The evaluation of the Urban Improvement Premium for owner-residents from 2009-2012 shows that 53% of premiums for heating were requested and 10% for moisture control. 63% of the budget at the time went to energy-related measures.

²⁶ But even outside of this target group of the most needy, there is tremendous need for (pre-)financing and guidance, for instance for senior citizens, single-parent families, singles, etc. Many private persons not part of the target group of the most needy, can sometimes not turn to a commercial bank for a loan either.

²⁷ <http://www.frge.be/>

2. Enable bottom-up and collective approach to housing refurbishments

The people of Ghent inspire the people of Ghent. In addition to an individual approach (inform - unburden – premiums) we also wish to stimulate initiatives whereby Ghent residents can inspire and strengthen one another. This is possible via:

- Sustainable Neighbourhoods: The City of Ghent actively seeks out forerunners in those neighbourhoods willing to prop up bottom-up projects leading to more energy efficiency, renewable energy, and CO₂ reduction. To give an idea of possible projects:
 - o Developing an information pathway for residents with associated group purchases for insulation, solar panels, heat pumps, ...
 - o Building a support base and realizing collective renewable energy supply
 - o Creating a network for the purpose of informing and helping each other regarding specific energy-efficient refurbishments
 - o Stimulating people and companies living and working in a specific neighbourhood to make better use of each other's knowledge, expertise, products, and services
 - o Developing and setting up an equipment sharing system (car, gardening tools, bike trailer, ...).

If a resident group requires process guidance, advice, expertise, ... financial support is provided. This way, ideas and initiatives that fail to get off the ground today (due to lack of knowledge, business plan, ...) can rely on a type of start-up fee, allowing them to continue operating autonomously after the subsidy ends.

Action: Sustainable Neighbourhoods

Stimulating collective energy projects and supporting process guidance, expertise, advice, ... for resident group initiatives regarding collective energy and CO₂ reduction. At the heart of the matter is the collaboration between the city of Ghent and the initiators of the project. Also of crucial importance is connecting (potential) initiators and having them exchange expertise and methodologies. The accumulated expertise will also be distributed to other neighbourhoods for inspiration. Through Sustainable Neighbourhoods we invite citizen, student, association, ... collectives to join the city of Ghent on the road to becoming a CO₂ neutral city.

- Ghent crowdfunding and participation platform: the objective of the crowdfunding platform is to facilitate crowdfunding of Ghent (non-)profit projects, a platform that can also be used to finance climate-related projects. The participation platform is conceived as a kind of 'box of building blocks' which the various services can use for their participatory initiatives. A 'market place'-functionality will be online continuously, where Ghent residents with ideas can meet and realize and enhance each other's ideas. Both instruments are operational in early 2015.
- Open data and climate: The City of Ghent is a partner to European project 'Citadel on the Move'. This project wants to make it easier to use open data for the creation of innovative mobile applications. At the moment the (often still scarce) open data is difficult to access and use for ICT

developers, let alone for citizens to readily work with. 'Citadel on the Move' seeks to remedy this situation in two ways: by agreeing on standards enabling municipalities to readily provide their data in usable, exchangeable formats and by developing user-friendly templates allowing citizens to build mobile applications themselves which can be used and shared throughout Europe. As more climate-related data is opened up, this project can prove to be highly relevant to the low-threshold development of climate applications.

- Ghent Living Lab: We purposely seek to make Ghent attractive as a living lab for knowledge institutions and innovative green companies willing to join the thought process and work on the societal challenges brought up by climate change. This allows innovative elements to be tested in an urban setting. This target-oriented stimulation of innovation will take place in collaboration with the Department of Strategy and Coordination and the Department of Economy in accordance with their future spearhead policy.

3. Social residences

The rental market is also home to a particular target group: social housing. At the moment 12.9 percent²⁸ of Ghent residences is a social residence.

A sizeable energy bill has a major impact on social tenants with a lower average income. It is important that social residences are also refurbished as more energy-efficient residences, and as such contribute to the reduction of CO₂ emissions and the struggle against energy poverty.

The policy and financing of social residences is a Flemish competence. The Flemish government aims to have all social residences fit within the Energy Renovation programme²⁹, which seeks to have all roofs insulated by 2020, have all single glazing replaced by double glazing, and wishes to ban obsolete heating units from Flemish residences.

In addition to the efforts by the Flemish government, the City of Ghent focuses on energy-efficient refurbishment of social residences via:

- Additional financing for energy-efficient refurbishment of social residences in Ghent:

Action: Ramping up energy refurbishments in social residences

In this legislature, Ghent focuses on additional energy-saving investments in the refurbishment of social housing.

The eligibility of refurbishment projects is assessed in conjunction with the various Ghent social housing companies³⁰. The idea is to create leverage through additional financing, allowing more social residences to be renovated by 2019 than originally planned, or allowing for the level of ambition regarding energy performance to be elevated.

- Refurbishment plan Woningent:
Woningent possesses 63% of social rented housing in Ghent. The City of Ghent is a majority shareholder of this social housing company. As fellow director, the city also indirectly ensures the realization of more energy-efficient social housing.
WoninGent created an inventory of its assets showing that a third of it required thorough refurbishment and that another third required thorough partial refurbishment within the next 10 years to further guarantee living quality (see policy plan WoninGent 2014-2019). For financing, WoninGent makes use of no-interest loans granted to social housing companies via the Flemish Agency for Social Housing (Vlaamse Maatschappij voor Sociaal Wonen or VMSW).
In addition, the agency sets out in search of additional financing to cooperate in innovative projects, reaching beyond the legal standards in the field of sustainability.
- A collaboration with external parties to empower its social tenants and raise awareness on sustainable housing, is being investigated
- Collaboration between social housing companies and non-profit association REGent:
REGent has already performed a large number of energy scans with social housing tenants. In

²⁸ <http://www.gent.be/eCache/THE/40/050.cmVjPTE4MjAzMg.html>

²⁹ <http://www.energiesparen.be/2020>

³⁰ The following social housing companies own residences in Ghent territory: Woningent, De Volkshaard, De Gentse Haard, ABC and Merelbeekse Sociale Woningen

collaboration with social housing company Gentse Haard, energy scans will be systematically executed with all residents of the same block.

Collaboration with other social housing companies will also be reviewed.

4. Urban renewal projects to leverage energetic residential refurbishments

The actions intended to encourage Ghent families to refurbish their residence energy-efficiently can in a number of neighbourhoods be embedded within the ongoing dynamic of an urban renewal project, and in turn reinforce it. Urban renewal also often generates new collaborations.

Urban renewal project Dampoort – Sint-Amandsberg:

- In the Dampoort – Sint-Amandsberg area we will go to work in 2014, within the framework of the urban renewal project and the European STEP-UP project, to establish a network of residents, companies, and institutions willing to set up collective projects themselves. The resulting projects can then be further supported via the sustainable neighbourhood subsidy. The methodology of getting people to work on collective projects can then be applied in other Ghent neighbourhoods.
- Odisee (KULeuven) is pushing the **Renoseec** project within the framework of a request from IWT. This is a collaboration between a knowledge institution and companies to develop new forms of accelerated refurbishment packages. A project to which the City of Ghent lends its assistance. Renoseec seeks to implement its pilot project in the Dampoort – Sint-Amandsberg neighbourhood.
- Another pilot project is taking place with the Flemish government within the framework of Flemish urban policy, seeking closer collaboration and coordination regarding major social challenges between Flanders and the cities via the concept of ‘city programme’. Ghent addresses the theme of climate neutrality, with focus on the Dampoort – Sint-Amandsberg neighbourhood.
- Pilot project "*Dampoort knapT OP!*": this is pilot project by OCMW Ghent in collaboration with non-profit association CLTGent (community land trust³¹). The project provides a refurbishment budget which the owner/residents only need to repay when the residence is sold or when the property is transferred for any other reason. The CLTGent provides guidance and advice with the refurbishment plans.

More urban renewal projects will be involved when they are developed.

³¹ Community Land Trusts are organizations that realize **affordable residences for people with low incomes**. Ownership of the land is separated from ownership of the residence. The resident merely buys the residence, but the land remains property of the trust/organization. (http://www.samenlevingsopbouwgent.be/themas/wonen_Private_market/CLT.htm)

Newly-built residences

1. Urban development projects

The City of Ghent and urban development company sogent are focusing heavily on sustainable new construction projects on their lands. Many of these projects also comprise social housing construction.

Action: Sustainable urban development

Some examples of ongoing projects with lofty ambitions regarding energy:

- The Tondelierproject at the former gasmeter site: this urban development project provides some 550 new residences, including 20% social and 20% modest residences. All residences are constructed according to the passive construction principles. The PPP agreement was signed in 2012. The City of Ghent finances the added cost for the passive construction of social housing. As for energy supply, this project ties in with nearby urban district heating by EDF-Luminus, and photovoltaic panels will be installed on a number of roofs for the production of green energy. Tondelier will also become a car-free neighbourhood with a green inner area accessible only to cyclists and pedestrians, will see a blend of housing and neighbourhood amenities, will receive partly visible development of rain water management, ...
- The Oude Dokken project will see about 1200 new residences. The PPP agreement for the first phase, Schipperskaai, was signed in 2014. This phase comprises 350 very low-energy residences, including 20% social and 20% modest housing. As for energy supply, the private partner commits to an innovative system that recuperates energy from separately collected grey waste water from baths and showers, supplemented with the production of biogas from the fermentation of black waste water from (vacuum) toilets supplemented with ground vegetable and fruit waste. This energy concept has never before been implemented in Flanders. In order to obtain full energy neutrality in the user phase, additional external purchases of heat and electricity from renewable sources will be made. In addition, this will also become a car-free neighbourhood where cars will be banned from the inner area almost completely.

The planned projects also aspire to sustainable energy consumption:

- The grounds of the former Otten stadium will see the construction of about 80 to 120 residences in an initial phase, and again as many have been slated for a later phase. This project is to become a model neighbourhood regarding mobility, residential typology, and energy. This project receives additional funding to realize collective renewable energy production (see renewable energy theme).
- The Bijgaarde park is a construction project of about 55 to 75 residences with cohousing. The ambitions are still being worked out, but this project also receives additional funding to realize collective renewable energy production (see renewable energy theme).
- The Fabiolalaan (area C) and The Loop veld 3 projects are in the competition phase and comprise about 300 and 150 residences respectively. Ambitions pertaining to energy are prioritized in the selection and allocation dossier: (very) low energy construction (a net energy requirement for heating and cooling of 30 kWh/m²), usage of renewable heat, considering collective energy supply.

- Woningent replaces the old residential towers at Rabot with a contemporary residential complex of about 350 residences in 8 rows. This project will be developed in phases. Low-energy construction tied in with the nearby urban district heating by EDF-Luminus has been planned in the concept for the first 3 rows. Solar boilers are also provided.

2. Various smaller new construction projects:

In addition to the afore-mentioned major urban development projects, a sustainable energy concept is also key in various smaller projects. A few examples:

- sogent sells a number of empty corner buildings in the Rooigemlaan near Leiegoed. The residences are demolished, and 14 new assisted living residences for people with autism are constructed. sogent required that the residences meet a low-energy level.
- The OCMW is also building various assisted living residences and group residences for senior citizens, imposing stricter energy performance requirements (see role model theme).
- Within the framework of urban renewal project “Ledeberg Leeft”, sogent demolished a number of dilapidated corner residences. They are now being replaced by new high-quality constructions. After all, the corners often determine the outlook of the entire neighbourhood. The new residences are compact low-energy residences. Some have been combined with a small public green area in the corner, or with green façades.
- With the financial support of the City of Ghent, sogent has been buying dilapidated residences and unused terrains across the city since 2007. sogent parcels out these lands and every year sells around a dozen parcels of construction land for terraced housing to young families with an average income. Anyone wishing to buy one of these construction lands from the so-called parcel project, works with one of the architects selected by a jury. These new residences must meet the EPIC requirements³² regarding energy as they prevail at the time of the building application. This allows unused terrains and dilapidated residences to be upgraded.

³² Whoever renovates or refurbishes must meet the energy performance regulations of the Flemish Government. They are described in the EPIC requirements, which stands for “Energy Performance and Indoor Climate”.
<http://www.energiesparen.be/bouwen-en-verbouwen/epb-energieprestatieregelgeving>



The Light Plan saves energy on public lighting

3.2

ROLE MODEL

Competent deputy mayors:

<i>Martine De Regge</i>	<i>deputy mayor for Staff Policy, Facility Management, and Administrative Simplification</i>
<i>Rudy Coddens</i>	<i>chairman of Belgian public social welfare centre OCMW and deputy mayor for Senior Citizen Policy, Work, and Poverty Reduction</i>
<i>Resul Tapmaz</i>	<i>deputy mayor for Well-Being, Equal Opportunities, Health, and Sports</i>
<i>Filip Watteeuw</i>	<i>deputy mayor for Mobility and Public Works</i>

THE CLIMATE CHALLENGE

The inner workings of city organization, i.e. the energy consumption of city buildings, public lighting, purchases by the City, the city fleet, and all manner of events, contribute to the CO₂ emissions within the city (contained in the tertiary sector and the transport sector).

City buildings and public lighting

The City of Ghent has been conducting a RUE (Rational Use of Energy) policy for its own buildings and public lighting since 1998. The consumption levels and realizations of this RUE policy have been reported annually in the Energy and Water note since 2000.

The table below shows gas and electricity consumption levels of city buildings and public lighting, their CO₂ emissions, and the share of renewable energy during the past 6 years as well as reference year 2003.

Table 3. Energy consumption, share of renewable energy, and CO₂ emissions of city buildings and public lighting

		2003 (ref.)	2008	2009	2010	2011	2012	2013
Energy consumption (million kWh)	total	143.69	139.20	138.00	131.15	139.01	135.84	133.47
	electricity buildings	21.55	22.67	23.18	23.43	22.40	22.73	22.20
	gas (corrected for degree days)	103.76	98.10	96.20	89.43	99.54	97.67	96.85
	electricity public lighting	18.37	18.43	18.61	18.29	17.07	15.44	14.42
CO ₂ emissions (tonnes, based on corrected gas consumption)		29,778	24,541	17,393	16,168	17,996	17,658	17,510
Share of renewable energy % ³³		0	11.8%	30.3%	31.8%	28.4%	28.1%	27.4%

³³ The share of renewable energy corresponds with the share of electricity consumption in total consumption. After all, the City has been buying completely green energy since September 2008 via a group purchase organized by Eandis.

The table shows that the objectives from the Energy Policy Plan for 2013, i.e. reduction of energy consumption and CO₂ emissions by 10% and 50% respectively compared to 2003 and a share of renewable energy of 40%, were not achieved. Energy consumption was reduced by 7.1%, CO₂ emissions by 41.2%, and the share of renewable energy is 27.4%.

Gas consumption in city buildings is lower than 10 years ago, although no clear downward trend can be discerned. Naturally, the weather will result in fluctuations in annual consumption, but this is converted to a consumption level at temperatures as in the reference year³⁴ using the degree day method.

Electricity consumption in city buildings proves more difficult to control. This is somewhat higher than 10 years ago. Lighting is a significant component here. However, electricity consumption is also determined by a variety of devices: ICT, refrigerators, and a variety of kitchen appliances, ... For years the specifications for the purchase of such devices call for energy-efficient models, but the increasing use of ICT for instance partly defeats these efforts.

The framework for public lighting (functional, mood lighting, monument lighting) is the Light Plan, which proposes certain types of lighting depending on location and intensity of use. Following a stagnation in the 2001-2009 period, electricity consumption for public lighting shows a significant drop since 2010 owing to an accelerated investment programme whereby the oldest, most power-hungry lighting units were replaced. This netted a reduction by 21.2% in the 2010-2013 period. More replacements have been planned, but will undoubtedly entail higher costs per saved kWh.

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Events can also result in high energy consumption levels. By installing meter boxes to be used for instance for markets, fairs, and information booths, the city has reduced the use of polluting and noisy generators, but this of course yields a certain level of energy consumption (about 2% of total energy consumption in city buildings).

Sport infrastructure

The sports halls and swimming pools of Ghent have been managed by Farys (new name for TMVW, an intercommunal multi-service company, primarily for water supply) since 2008. Consumption levels are also reported in the annual Energy and Water note. Consumption levels have remained somewhat constant compared to 2003.

The table below shows gas and electricity consumption for sports halls and swimming pools for the last 5 years and for reference year 2003.

³⁴ The degree day method allows for the influence of the weather to be neutralized, allowing for energy consumption for heating across various years to be compared after all. The degree day method uses a correction factor in its calculations which is proportional to the number of days below a certain temperature. A year with many degree days is a cold year, a year with few degree days is a warm year. By applying the system of correction with degree days, one regards consumption as though all winters being reviewed were as mild or severe as the reference year. This highlights the effect of energy efficiency measures more clearly.

Table 4. Energy consumption of sports halls and swimming pools

	2003 (ref.)	2008	2009	2010	2011	2012
Electricity (MWh)	3.370	3.699	3.825	3.657	3.686	3.609
Gas (MWh)	11.118	9.068	9.506	9.815	9.893	11.024

City fleet

At the moment (mid-2014), the city fleet consists of 578 cars, 434 of which run on diesel, 101 on gasoline, 27 on electricity, and 9 on CNG. There are also 7 hybrid cars. In 2003 the city fleet consisted of 566 vehicles. The expansion of the city organization, new service provision, and the deployment of smaller teams have led to a slight enlargement of the city fleet in 10 years.

Between 2013 and 2014, 19 vehicles were replaced by a new model with better emission standards. For instance, this year alone 2 electrical vehicles were added, and by late 2014 the City will operate 36 electrical cars.

Commuting

Before 2003, 60% of city personnel arrived at work in a sustainable manner (i.e. on foot, by bicycle, using public transport, or using the commuter bicycle). In 10 years the share of sustainable commuters has risen to 70% of commutes (staff members commuting by bicycle half the year and by car half the year not counted).

84.52% of OCMW staff members use sustainable transportation.

THE AMBITION AND STRATEGY

As a role model, the City of Ghent wishes to take measures to substantially reduce its own CO₂ emissions.

In general, the City wishes to reduce the energy consumption of city buildings by 3% per year during the legislature 2013-2018, or by 15% in the entire legislature compared to consumption levels in 2012. This compensates for the failure to meet the goals for 2013 from the previous Energy Policy Plan, allowing the city to catch up.

The experiences with the Energy Policy Plan 2008-2013 have shown that the measures included therein are not sufficient, and that additional and/or more focused efforts are needed. The strategy for achieving the projected goals, rests on the following pillars:

- Concluding energy performance contracts (EPC) with an Energy Saving Company (ESCO) for a number of city buildings;
- Implementing structural interventions in city buildings ourselves;
- Performing technical interventions, maintenance, and awareness raising;
- Purchasing 100% green energy. A number of buildings produce and use their own renewable energy;
- Ambitious energy goals are set forth for new buildings and thorough refurbishments;

- Continue to render public lighting more sustainable;
- Sustainable procurement (e.g. energy-efficient devices).

A goal of 15% energy savings is set forth regarding the City's own vehicular fleet as well.

The city administration and the OCMW will draw up a sustainable company transportation plan. This company transportation plan entails the study, execution, and follow-up of a series of measures aimed at the sustainable management of staff commutes.

ACTIONS

City buildings

An energy performance contract (EPC) will be concluded with an Energy Saving Company (ESCO) for a number of city buildings. The contract is to be drawn up by the City itself for an initial group of 12 buildings, with guidance from EU project Transparens. This will be effectuated via distribution system operator Eandis for a second group of 14 buildings. The advantages to this approach are that a certain level of energy savings is guaranteed and that the investments are made by a third party. The realization of the required procedures for the buildings therefore depends less on the City's budget restraints. A group of buildings has been selected in this context, together representing a little under 30% of energy consumption in city buildings. Energy savings of about 15% (typical for similar EPC) within these buildings will therefore yield global energy savings of 4%.

ESCOS typically focus on the technical installations and regulation, but the City pushes them to combine this with measures regarding the building envelope whenever this is appropriate. The EPCs are slated to start in April 2015, and have a duration of 10 to 12 years (with a maximum of 18 years). It is expected that the interventions for these buildings will be executed by the ESCO at an early stage of the duration, and the accompanying energy savings will therefore be realized within the current legislature.

ACTION: Energy performance contract (EPC) with an Energy Saving Company (ESCO).

- Through a procurement procedure, the City will initially propose 12 buildings for inclusion into an EPC during this legislature: fire station Roggestraat, Blaarmeersen central service, Zwarte Doos/City Archive in the Dulle Grietlaan, STIBO+KS Bollekens/Crèche in the Jubileumlaan, Departement FM/Sisal in the Sint-Salvatorstraat, Service Centre/Commissariaat Gentbrugge in the Braemkasteelstraat, STIBO+Pt 'Klimopje/BS De Sportschool in the Jules de Saint Genoisstraat, Catering College Gent/Academy for the Performing Arts in the Tweebruggenstraat, CLW in the Wittemolenstraat, CVO De Bargie in the Abeelstraat, Art Campus in the Ottogracht, and Atheneum Wispelberg in the Wispelbergstraat.
The procurement procedure was started in mid-2014; and the ESCO is expected to start in 2015.
- Through a framework agreement "Energy Services Local Authorities", Eandis will initially propose 14 buildings for inclusion into an EPC during this legislature: City Hall, Museum of Fine Arts, Primary School Bevelandstraat, STIBO Francisco Ferrerlaan, STIBO Coupure Rechts, STIBO Begijnhofdries, STIBO Frans Van Ryhovelaan, STIBO Schoolstraat, De Tuin van Kina (Berouw), STIBO Trekweg, Bollekensschool Neermeerskaai, STIBO Lucas Munichstraat, Inst. Bert Carlier

(Oudenaardsesteenweg) and Catering College Lange Violettestraat.
The contract with Eandis was being drawn up in 2014.

A second package of measures comprises the execution of a series of traditional structural procedures, the energy savings of which can be accurately calculated in advance: initially the replacement of the oldest heating installations combined with the optimization of management and heating output. A number of city buildings are still equipped with non-condensing gas boilers from the 1970s, by now very much obsolete. The systematic replacement of the oldest installations is less complex than the more global approach of the ESCOs, and is therefore easier to apply to a larger number of buildings. This is done specifically through a procurement procedure. The number of buildings to be modified depends on the needs and relative scale of each building. Realization began in late 2014. Lastly, the structural procedures also include a number of measures with a longer payback period, such as the installation of insulation and low-emission glass. In general, these procedures are intended to yield a reduction of 8% on total energy consumption for city buildings.

ACTION: Executing a series of traditional structural procedures

The following buildings are included in an initial series of procurement procedures:

- Boiler renovation: school Acaciastraat, school Aloïs Joosstraat, school Heldenplein, school Jozef II-straat, school Martelaarslaan
- Insulation of flat roof: school Aloïs Joosstraat, school Bargiekaai, school Dendermondsesteenweg, school Gordunakaai, school Meulesteedsesteenweg, school Neermeerskaai, school Nieuwland, school Offerlaan, school Pollepelstraat, school Steenakker, school Wispelbergstraat
- Roof refurbishment MIAT
- The lighting in exhibition rooms of the museums and historical houses is switched to LED or other energy-efficient light sources by 2018.

A third package of measures comprises more modest technical procedures, maintenance, and awareness raising. This is a combination of screening and execution of simple procedures by the City's own Building Maintenance Department on the one hand, and raising awareness among building users on the other hand. It concerns measures with a limited structural impact, but with direct potential savings such as the installation of piping insulation and radiator foil, modifying thermostat regulation, ... To increase user comfort is key here. Awareness raising takes the shape of a building manual: how can I use the installations in the building where I work correctly to ensure comfort and economical consumption? The link between the procedures and awareness raising is of the essence. The goal is a reduction of 3% on total energy consumption for city buildings.

The Environmental Department will also continue to raise awareness among city staff on energy and climate.

ACTION: Technical interventions, maintenance, and awareness raising

- Modest measures and maintenance combined with awareness raising by means of a building manual by the Building Maintenance Department are initially started up in a number of city buildings used by the FM department itself: in the Sint-Salvatorstraat, the Onderstraat, the Farmanstraat and the Maaltebruggestraat.
- Through orientation, the Environmental Department continues to raise awareness on RUE (Rational Use of Energy) and internal environmental care among new employees. In addition, initiatives and campaigns are set up for city staff around RUE (Rational Use of Energy) and sustainable food.
- With the support of the City of Ghent, the Ghent cultural sector started up Green Track in 2012, an initiative for more sustainability and particularly energy savings during cultural activities. The cultural associations tied to the City (among others Museum of Fine Arts, Historical Houses Ghent, ...) take part.

Just like new buildings in general, city buildings must be built in a futureproof manner. As early as 2007, the council decided that new city buildings had to comply with the low-energy level. However, due to the strengthening of Flemish EPIC regulations this was no longer ambitious enough. Hence it was decided in 2011 to stay one step ahead of regulations, and use passive construction for new city buildings, unless the building's function rendered such impossible or undesirable (e.g. warehouse). In this manner, the city departments (both those directly involved in construction and management and the users) can already gain experience with the building method, which is expected to become increasingly commonplace during the next 5 years due to the obligation of Nearly Zero-Energy Building (NZEB) in 2019. For refurbishments, the goal is to investigate by means of a technical and financial feasibility study how far one can make it regarding energy performance and the use of renewable energy.

ACTION: Futureproof new construction projects and refurbishments

The decision in favour of passive construction for new city buildings is now fully manifesting itself in the plans and realizations. Sound energy performance levels are often being set forth in refurbishment projects as well. A few examples of projects during this legislature:

- Passive new construction: part of school Sint-Bernadettestraat, primary school Moutstraat, primary school De Zonnepoort, youth centre De Bonte Was, youth centre El Paso, city building Oude Dokken (school, childcare centre and sports hall), kindergarten De Klavertjes, Fabiolalaan (primary school, STIBO, association hall and crèche)
- Low-energy new construction: extension primary school De Regenboog, primary school De Piramide, part of childcare centre De Bron, meeting centre Melac Zwijnaarde, multipurpose room and youth centre Neptunussite, new library Waalse Krook
- Low-energy refurbishment: part of school Sint-Bernadettestraat, part of childcare centre De Bron, kindergarten De Tovertuin, primary school De Letterdoos

In the past, the City of Ghent has also realized a number of projects using solar collectors for hot water and PV cells for electricity. About 50 kW_{peak} PV panels were installed on the city's buildings. A number of locations where PV cells were recently installed are Le Beach House in the Blaarmeersen,

childcare centres De Bevertjes (Sneppebrugstraat) and Het Perenboompje (Peerstraat), the police building at the Houtdoklaan and a building in the Heiveldstraat. Each year, these PV installations generate about 40,000 to 42,500 kWh of electricity, and provide about 0.1% of electricity consumption in city buildings and public lighting. The remaining electricity requirement is purchased, and is 100% renewable.

Useful locations for PV are reviewed within the framework of the esco projects and the execution of traditional construction.

Furthermore, the City also focuses on solar boilers (childcare centres De Bijendans and Het Nachtegaaltje) and on innovative technologies such as borehole energy storage field (BES) (the STAM and the future library at the Waalse Krook) and heat pumps (Pakhuis Clemmen). When useful and possible, multiple technologies are combined like in the CO₂ neutral Buurthuis Rooigem, where both a geothermal heat pump and PV cells were installed. The warehouse in the Proeftuinstraat, where a solar boiler is already operational, is set up so the roof structure will accommodate PV cells in a later phase.

Sport infrastructure

The sports halls and swimming pools are managed by Farys. For these buildings, Farys was asked to focus on the objective of 3% energy savings per year, which also applies to the remaining city buildings.

Based on the condition of the building envelope and the techniques and energy consumption, Farys has made the buildings they manage into a priority (= 15 buildings). Energy-saving procedures are first implemented in buildings with sound building envelopes and techniques, but with high consumption levels. Farys is committed to performing a feasibility study every year for 3 buildings (taking into account the prioritization) and to executing an action plan if favourable.

ACTION: Energy optimization of technical installations at Strop swimming pool

A number of possible procedures for Strop swimming pool have been reviewed in a preliminary feasibility study as to their energy-saving potential and costs. A combination of the following measures seems appropriate:

- Replacement of the air handling unit for space heating
- Installation of frequency controller with high-efficiency pump
- Extension of data capturing and reporting

This should reduce electricity consumption by 23%, gas consumption by 10%, and water consumption by 5%. The savings due to lower consumption amount to about 26,000 € every year.

OCMW buildings

The OCMW also leads by example by imposing loftier ambitions regarding energy performance and renewable energy for their infrastructure.

The OCMW is investigating the possibilities of an energy performance contract for HVAC³⁵ installations in OCMW-buildings. This is intended to reduce energy consumption for heating by 10%. A sound energy performance level is pursued for new construction projects.

³⁵ HVAC stands for heating, ventilation, and air conditioning

Action: Futureproof new construction projects by OCMW

A number of projects with low-energy or passive construction have been or are being started up for new buildings. Some examples are: De Baai (passive construction), WZC Mariakerke, 27 assisted living residences Zwijnaarde, 30 assisted living residences Sint-Amandsberg, senior citizen group housing, local service centre Zwijnaarde.

The OCMW is also launching a pilot project for installing PV cells on WZC Liberteyt (about 500 MWh/year). The possibility for third parties to participate (e.g. via crowdfunding or through cooperatives) is being investigated.

Public lighting

The Light Plan remains the framework for public lighting. After a sizeable reduction in consumption in 2010-2013, a second remediation phase for public lighting was slated for the period 2014-2019. The savings to be achieved are expected to amount to 3% per year for the period 2015-2019.

Action: Public lighting remediation - phase 2

The most power-hungry lighting fixtures under 30 years old are replaced with fixtures with a lower capacity, and therefore lower energy consumption levels. Unnecessary lighting units are also removed, and public lighting dimming is being prepared, so the City is ready to implement this when European standards are converted to a Belgian standard, making this implementation possible from a legal and insurance point of view as well.

Sustainable purchases

With the strategic and sustainable purchases project, the City of Ghent wishes to use its purchasing power to develop a strategic (= must contribute to the goals of the City of Ghent) and efficient purchasing system. Rational energy use and independence of non-renewable energy sources as well as rendering food more sustainable; these are the goals for this project.

The OCMW is also pursuing a policy for sustainable purchases, and participates in the workgroup sustainable purchases, in which the city departments in question are represented.

The ICT needs of the City of Ghent are procured by Digipolis. This is in adherence with the strategic choices of the City, including a focus on energy consumption. There is also a commitment to purchasing innovative ICT solutions, and innovative procurement.

ACTION: Realizing climate-related actions via a strategic and sustainable purchasing policy

- Ever since 2008, 100% green energy is purchased. This is continued in the current legislature.
- Inclusion of conditions regarding energy consumption (among others EU energy label) in relevant specifications, e.g. for ICT, household appliances, mass catering equipment, audio-visual devices, ...
- Rendering specifications concerning food more sustainable (e.g. school meals, purchasing vegetables/fruit/meat) according to the principles of the Ghent food strategy (see also chapter 'food')

Fleet

In the City of Ghent, vehicles are no longer systematically replaced: the transportation need is reviewed in conjunction with the relevant services. The type of usage (number of persons/freight volume to be transported), the number of kilometres per year and other potential requirements such as trailer, autonomy, ... are all charted, and then a proposal is made to the department to optimally address this need. Sustainable alternatives such as department bicycles, electric (freight) bicycles, electric cars, ... are being pushed where possible.

The further development of reporting systems is also part of the development of a more pro-active approach: insight is gained into the number of kilometres covered with a vehicle on the basis of tank data. When a vehicle is used too little, it is put to work elsewhere or sold.

Additional focus is given to cross-departmental vehicle pools. The new reservation tool which is being tested within the Service and Logistics department, will see a city-wide roll-out. This will allow us to combine the vehicle pools from various departments so that vehicles can be optimally put to work. This will also render a number of vehicles redundant, which will then be put to work elsewhere or sold.

ACTION: Greening the city fleet

The focus on green vehicles, sustainable transportation solutions, and awareness raising should reduce the environmental impact of the city fleet. Focus can also be given to cross-departmental vehicle pools through sound reporting. Optimization possibilities will become visible through the implementation of IT systems as well.

ACTION: Sharing city vehicles

The autumn of 2014 will see the start-up of a pilot project whereby 2 electric vehicles owned by the City of Ghent will be shared within the car sharing system Cambio. This will allow these vehicles to be used by cambio users in the evenings and during the weekends as well. This brings electric driving to the citizen.

If this pilot project receives a positive evaluation, the possibility of such a sharing system with more city cars will be assessed.

ACTION: Transportation of goods destined for the City of Ghent

Goods destined for the City of Ghent are transported by both external and internal people.

- As for transportation by external people, a new logistical concept is being developed for transportation up to the city gates (see also section mobility: city distribution centre). For this, it is necessary to attune the purchasing organization to the new logistical organization.
- As for the transportation of goods by our own people, a number of logistical vehicles owned by the City of Ghent are to be equipped with an ITS system. This allows for complete monitoring and management of routes. This data will be used for the optimization of the routes.

Both projects are in an initial phase, and are being further developed over the coming years.

Within the OCMW, focus is also given to rendering transportation more sustainable.

ACTION: Greening the OCMW fleet

The OCMW will lend its personnel commuter bicycles for commuting between home and work and within the department (incl. maintenance and repair of the bicycles).

Four vehicles are being replaced by electric vans in 2014. Minor solar panel installations will be installed on the Onderbergen and FM buildings, allowing the electricity needed to operate these cars to be produced. Two of those four vehicles are used as pool vehicles.

Future vehicles will preferably be hybrid or electric.

Intermunicipal waste company Ivago will also systematically review transitioning to CNG and e-transportation. During the coming years, funds are to be earmarked for the purchase of road sweepers and lorries running on CNG (natural gas). In addition, the purchase of the first electric lorry is being investigated. Meanwhile, a pilot project involving the purchase of two CNG vans has started.

Commuting

As the City of Ghent and OCMW Ghent have multiple locations, it is advisable to review the mobility and accessibility of the largest sites separately. In an initial phase, focus will be given to the Zuid site (AC Zuid, Library Building, Electrabel Building de Krook).

ACTION: Company transportation plan City of Ghent - OCMW - Zuid Site

Considering the dense concentration of staff members housed at this site (in the long term about 2000 employees will be housed at this site), measures must be taken aimed at a more sustainable management of these employees' commutes.

Events

The Ghent Light Festival had its third edition in 2015. During the previous editions (2011 and 2012), a number of installations were dedicated to sustainable energy consumption. The following editions will promote the use of economical lighting and installations.



new business areas and coaching on energy management
for small and medium-sized businesses offer climate opportunities
photograph: development of business area Wiedauwkaai

3.3

BUSINESS AND SERVICES SECTOR

Competent deputy mayors:

<i>Mathias De Clercq</i>	<i>deputy mayor for Port, Economy, and Enterprise</i>
<i>Tine Heyse</i>	<i>deputy mayor for Climate, Energy, and North-South</i>
<i>Christophe Peeters</i>	<i>deputy mayor for Finances, Festivities, Retailers, and Innovation</i>

THE CLIMATE CHALLENGE

Ghent is home to about 17,500 companies liable to pay VAT out of 19,000 organizations employing staff. The economic structure of Ghent is highly dictated by the industrial activity in the port and other regional and local business areas, by the close-knit local commercial system at the heart of the liveability of residential areas, and by a large number of major employers operating in the non-commercial services sector within the city, such as knowledge and care institutions. Our port and our regional position as a central city give Ghent its tremendous variety of businesses. This is apparent in a wide variety of areas: the range of economic activities, establishment locations, typology of company buildings, energy consumption, employment numbers, etc.

When it comes to energy, Ghent is a rather atypical city: there is a fair amount of companies in Ghent with a thermal capacity exceeding 20MW; mainly energy producers and production companies for steel, paper, and cement. This type of companies are covered by the mandatory EU Emissions Trading System³⁶. The ETS system is a cornerstone of European policy in tackling climate change, and focuses on the reduction of industrial greenhouse gases. A local authority has little to add to this when it comes to regulations and policy.

CO₂ emissions from the remaining Ghent companies - industrial and non-ETS companies from the secondary sector and companies in the tertiary and quaternary sectors - amount to about 40 percent of total CO₂ emissions from the sectors defined in the Covenant of Mayors³⁷.

The large presence of the business and services sector in our urban CO₂ footprint requires a coherent and efficient climate policy from the City and other players (such as the Ghent Port Company) aimed at the Ghent businesses and business areas, and the Ghent services sector. Indeed, companies with a commitment to energy efficiency and sustainable energy supply are more resilient to rising energy costs and energy crises. In addition to a clear positive effect on their competitive position, it also enhances their marketing value, customer loyalty, and employer brand and local connections, and frees up funding for innovation and growth.

³⁶ Tradable emission rights give companies the right to emit certain greenhouse gases or other harmful gases. As the number of rights is limited, emissions are becoming expensive for companies. At least in theory. The economic crisis in the period 2008-2011 lowered the production of many companies, leaving them with a great deal of emission rights. This has prevented a successful market from being created. The surplus of emission rights has caused a price drop, so the emission rights system to date leaves little incentive for companies to limit emissions.

³⁷ All sectors exclusive of ETS and shipping

This is why the city administration allocated a budget specifically for developing a climate policy geared towards the Ghent business and services sector.

The Ghent Port Company has likewise developed multiple initiatives and plans in the framework of their strategic plan 2010-2020. Our own company management is covered in the section ‘role model’. Other major ‘service institutions’ such as knowledge institutions, the art sector, hospitals, other authorities, ... also embed climate ambitions in their management. Together we will make Ghent a climate city (see section 5).

The focus of our policy for the business and services sector will be on SMEs, companies and services not covered by an agreement with a higher policy level (the European ETS system, but also the Energy Policy Agreement (EPA)³⁸ with the Flemish government). These companies (business and services sector) can be divided into 3 subgroups based on their energy consumption:

	<i>low</i>	<i>medium</i>	<i>high</i>
annual energy consumption	< 250,000 kWh	< 2.5 million kWh	< 27.7 million kWh (=0.1 PJ)
total energy consumption	33%	33%	33%
number of companies	95%	4.5%	0.5%

Figure 4. Division of companies based on their energy consumption

THE AMBITION AND STRATEGY

The City of Ghent wishes to accelerate green economic growth in the city by increasing the share of sustainable Ghent entrepreneurs who handle energy efficiently. In this context, the City of Ghent wishes to create a local framework to structurally anchor sustainability in the companies’ operation. It is important to harmonize the range of initiatives and incentives among the various government levels, and for the range to remain stable over extended periods of time. This gives entrepreneurs the necessary legal security and incentives to handle energy rationally. Strategic partners also need to continue to reinforce one another. In this context, the climate workgroup “Energy efficiency in industry”³⁹ is the ideal soundboard for evaluating and refining the approach, and for attuning it to the instruments of other partners.

³⁸ The energy policy agreement (EPA) seeks to push energy-intensive companies to become and remain leaders in the field of energy efficiency, without undermining their competitiveness. Energy policy agreements are agreements between company sectors and the Flemish government which individual companies with an energy consumption level greater than 1 PJ can join.

³⁹ The climate workgroup was founded in 2009 within the Ghent Climate Alliance. The members represent various regional economic players: among others Department of Economy of the City of Ghent, the Ghent Port Company, Enterprise Agency, VOKA, Unizo, the consultation platform for energy experts OVED, IVAGO, POM East Flanders, VITO, Eandis, worker associations, and individual companies.

The Ghent approach is based on an integrated package of harmonized instruments:

- coaching regarding energy management for individual (existing) companies through tailored guidance in the execution of energy efficiency measures and renewable energy investments, the so-called unburdening of companies;
- rendering new business areas more sustainable via the issuance policy;
- rendering existing business areas more sustainable, in conjunction with the business area associations;
- stimulating the ESCO market;
- stimulating sustainable refurbishments of commercial buildings;
- stimulating heat exchange among companies and/or residential areas (see section 'Renewable energy');
- setting up test beds, such as living lab experiments (see section 'residential sector');
- Networks, communication, and awareness raising via 'Ghent Climate City' (see also section 'Ghent Climate City')

ACTIONS

The plans and specific actions are presented below, divided according to 3 areas: individual companies, business areas, and the port area.

INDIVIDUAL COMPANIES

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Companies are often not structurally occupied with energy, leading them to be unaware of the many opportunities. This is also apparent from the evaluation of a Ghent pilot project⁴⁰ 'Energy Management Guidance' (2012-2014) which helped 15 companies from the business and services sector to implement energy-saving measures. Together they yielded a reduction of 1,820 tonnes of CO₂, saving a whopping 360,000 Euros per year in energy. The results of this pilot project demonstrate that a CO₂ reduction of 10% (sometimes even as high as 20%) is attainable for companies and that the willingness to invest in energy savings is real. It mainly demonstrates that companies have a greater need for unburdening when it comes to energy management than for an isolated energy audit and/or energy premiums. After all, many companies indicate having barely any time to invest in their energy policy. Their attention is mainly on the core activities. Typically they also lack the technical knowledge to implement energy-saving measures and are insufficiently aware of the cost-saving potential.

The wide variety of companies requires a diversified approach, and therefore customized efforts. We wish to accomplish this by offering coaching to companies, allowing them to make the right investments regarding energy efficiency and renewable energy production and also supporting them during the implementation thereof.

⁴⁰ in the framework of European project ACE (www.ace-low-carbon-economy.eu/)

ACTION: Coaching on energy management for individual companies

The secondary sector in Ghent has a great deal of energy-saving potential, among others the producers of food (bread and meat), the graphics industry, the chemical sector (mainly in the port area), the construction sector, and the producers of means of transport (mainly in the port area). In the tertiary sector in Ghent we mainly see potential in the catering industry (hotels and larger restaurants), wholesale, retail, storage (port area), self-service laundry, and office-like premises. A focus on energy-efficiency and sustainable energy supply is important for organizations from the quaternary sector as well (among others care organizations and educational institutions).

2 types of coaching are offered based on the company's energy consumption:

- 'MAXI' coaching (at a value of about 7,000 Euros) for companies and organizations with high energy consumption having complex production processes (= non-EPA companies with an annual energy consumption greater than 500,000 kWh of electricity or 1,725,000 kWh of natural gas⁴¹). The goal is to offer guidance to at least 30 such companies in the coming 5 years, which could then reduce CO₂ emissions by 10% to 20% through the implementation of energy-efficient measures. In case of the cautious estimate of 10% savings potential, this measure could lead to an annual emissions reduction of at least 7,380 tonnes of CO₂, equivalent to the emissions of about 1,500 families;
- 'MEDIUM' coaching (at a value of maximum 4,000 Euros) for companies and organizations with a lower energy consumption (= annual energy consumption between 100,000 and 500,000 kWh of electricity or between 345,000 and 1,725,000 kWh of natural gas). The goal is to offer guidance to at least 80 such companies in the coming 5 years. In the case of 10% energy savings, this could lead to an annual emissions reduction of at least 1,970 tonnes of CO₂, equivalent to the emissions of nearly 400 families;

An energy coaching range is being developed for **small companies** as well (= annual energy consumption lower than 100,000 kWh of electricity or 345,000 kWh of natural gas) during this legislature. The goal is to offer guidance to at least 400 companies during this legislature. This could yield an annual reduction of at least 2,300 tonnes of CO₂, equivalent to the emissions of nearly 500 families. A supplementary, more generic themed approach can also be set up, to deal with issues of energy efficiency (e.g. open doors, open refrigerators) in a focused manner.

In addition to individual coaching, the **ESCO market (energy service companies)** can form part of the solution regarding the climate transition for SME's. An ESCO is a specialized company offering full service provision including study, investment, and maintenance for energy-saving measures and renewable energy production. Sometimes the ESCO even guarantees the energy savings to be generated after making the recommended investments, as recorded in an Energy Performance Contract between the ESCO and the customer. ESCO companies also often offer third-party financing. Of particular interest to an ESCO are those sectors whose energy consumption is mainly linked to the building, such as offices (tenant-landlord issues), buildings from the care and education sectors, and particular SMEs, where group initiatives can be beneficial.

⁴¹ Heating/production with fuel oil, purchased heat and the like are converted to natural gas consumption

The Enterprise Agency launched the call for projects “ESKIMO” (ESCOs for SMEs) in early 2014. Consortia could put forward their candidacy for setting up pilot projects in the coming 2 years for the purpose of stimulating ESCOs with SMEs in order to achieve the objectives regarding energy efficiency and chart the reduction of CO₂ emissions.

ACTION: Stimulating the ESCO market with SMEs

The City of Ghent will assume a supporting role in the 2 approved ESCO pilot projects in Ghent (ESCO4Gent and ESKORT!). They verify whether a synergy is possible between these projects and the companies within a coaching context. By supporting such pilot projects, the City of Ghent hopes that the ESCO service provision will gain more traction among companies.

The City of Ghent (Department of Construction Projects) will also start up ESCO pilot projects itself for a number of its city buildings (see section ‘role model’).

In addition to the guidance of individual companies regarding their energy management, the city of Ghent will also stimulate sustainable refurbishment of commercial buildings and also specifically sustainable refurbishment of creative economy working areas in the Rabot neighbourhood. Investing in the quality of economic real estate in this way enhances the economic fabric, and gives impetus to the sustainable refurbishment of aged buildings. This has a positive impact on the appeal, image, and attractiveness of shopping streets and commercial buildings themselves.

ACTION: Subsidy regulations for the refurbishment and embellishment of commercial buildings

The City of Ghent seeks to increase urban appeal and enhance the image and quality of commercial buildings by granting a subsidy for the embellishment/refurbishment of the façade and/or structural works within the commercial area of the building. Certain sustainability measures, including on energy efficiency and renewable energy, are eligible for 10% additional subsidy. These include measures pertaining to the application of façade insulation, filling up cavity walls with ecologically sound materials, installing insulating windows, sustainable ventilation systems, heating and cooling installations, floor insulation, and roof insulation.

ACTION: Creative neighbourhood Rabot

Ghent offers a fertile ground for creative entrepreneurs. They are often innovative players in the world of design, fashion, audio-visual arts, new media, and culturally-specific services. The City of Ghent is setting up a pilot project in the Rabot neighbourhood to stimulate the creative economy of the area. Initially, attention is given to investments in appropriate spaces, and improving networking in the area.

In the framework of this pilot project, the City of Ghent also approved a subsidy programme whereby structural works to working spaces for creative economic activities can be subsidized. The support amounts to a maximum of 50% of proven costs, with a maximum of 12,500 Euros. Extra efforts on sustainability and energy-efficient procedures receive additional support, analogous with the subsidy programme for the refurbishment and embellishment of commercial buildings, with a maximum of 3,000 Euros.

Action: The refurbished Winter Circus as an innovation hub for digital media

Between 1894 and 1939, the building was a circus with a covered inner ring, and will be transformed into a leading contemporary hotspot for digital media, while respecting its rich heritage. The new city functions taking place in the building will combine creativity, knowledge, and economy. The location close to a public transportation hub opens up perspectives regarding sustainable transportation towards this new digital centre. From 2015 onwards, the refurbished Winter Circus will offer office spaces around a central covered inner yard to organizations and companies involved in digital innovation in media. A concert hall has been planned under the inner ring for about 500 people. Events, a café, restaurant, and foyer have also been planned. The entire refurbishment is ambitious when it comes to sustainability. sogent aspires to a CO₂-neutral development.

A higher rate has been included in the tax regulations on private use of the public road for terraces with terrace heater (approved by the city council of 18 December 2013).

BUSINESS AREAS**New business areas**

The issuance of new business areas (partly owned by the City of Ghent) offers a unique chance to be ambitious. Indeed, the development of new business areas is an ideal opportunity to make good on the above-mentioned ambitions regarding CO₂ neutrality. A new building is a chance for an optimal, sustainable, and sensible design, regarding both construction and processes.

With the development of new business areas where we the City hold the leverage to impose conditions, a sustainable approach is developed for the planning and issuance of these areas. The goal is to stimulate energy reduction and the production of renewable energy. This can be done, for instance, by using part of the proceeds from the sale of parcels to provide support for companies and reward rational energy measures. The City of Ghent also assumes the role of facilitator regarding collective energy and harmonizing a possible match between the heat supply and heat demand of companies.

ACTION: Development of business area Wiedauwkaai

Such an innovative approach will be tested in the new business area Wiedauwkaai during the first phase of the issuance (5 ha for 10 to 50 companies). The price of the parcels to be sold includes guidance for the company by an energy expert. This expert will assist the company in the design and construction. The feasibility of collective energy projects and cooperation between companies is also reviewed. A final inspection is made at the end of this evolution, when the building is first used, to verify whether everything is set up energy-efficiently and is being operated correctly by staff. In addition, the companies are given back a (bank) guarantee - as a reward - if they meet four general conditions which should be feasible for any company. This includes goals pertaining to 'Energy Performance and Indoor Climate' (EPIC) which go beyond the minimal legal requirements (such as the extension of the energy level for small offices and the prevention of thermal bridges), but also the application of low-temperature heating (e.g. linked to heat pumps) and an air tightness test.

Business area Eiland Zwijnaarde holds lofty ambitions regarding sustainability. The goal is CO₂ neutrality by fully concentrating on energy efficiency and renewable energy. Using an energy strategy, one of the aims is to review how to implement this in practice. The business area lies within the Zwijnaarde cluster, one of the locations for wind turbines as designated by the province of East Flanders. The southern part of the Zwijnaarde island, where the City is one of the partners via sogent, also shows a willingness to provide 1 wind turbine in this framework.

Sustainability meter for economic sites

The Sustainability Meter for economic sites is the foremost guiding principle for developers, designers, and authorities in the development or refurbishment of economic sites, not as a list of obligations imposed upon public or private developers or upon individual companies. Sustainability is given a broad interpretation: in addition to the usual focus on energy, other aspects such as liveability and process aspects are also put forth.

Sustainable choices are stimulated using objective criteria regarding ten sustainability themes, without unnecessarily hindering design freedom. The criteria always go one step beyond the prevailing regulations. The consideration of the themes and criteria reflects Ghent policy, which envisages among other things climate neutrality in 2050. The application of the Sustainability Meter results in a total score in %. The instrument was inspired by BREEAM⁴², LEED⁴³, and HQE⁴⁴, but without the attachment of a certificate.

The Sustainability Meter allows for the follow-up of the implementation of sustainability throughout the entire development process from site selection to realization, and for the accomplishment of the initial ambitions to be monitored.

Existing business areas

Making Existing business areas more sustainable (energetically) also merits our attention. This can be done via individual coaching, for instance. Business area associations also constitute a platform for discussing matters. This may stimulate B2B (business to business) measures (at the initiative of the companies themselves) - such as a harmonization of heat supply and heat demand - which could be facilitated by the city. In order to strike a balance between an autonomous non-profit business

⁴² BREEAM stands for Building Research Establishment Environmental Assessment Method and was developed in the United Kingdom. It is the most widely used system in Europe for measuring and assessing the sustainability of buildings. BREEAM communities also constitute an instrument that evaluates sustainability at the area level

⁴³ LEED stands for Leadership in Energy and Environmental Design and was developed in the United States. The LEED certification system is one of the world's most widely used standards in sustainable construction.

⁴⁴ HQE stands for Haute Qualité Environnementale. This too is an instrument for the integration of sustainability in buildings and areas.

association and the realization of the sustainable measures in a business area, a methodology will be developed to support business associations focusing on sustainable initiatives.

In addition, focus can be given to the development of the concept 'Business area of the Future'. This concept is to dictate how existing business areas can continue to be transformed into sustainable business areas. A great deal of efforts regarding the sustainability of business areas are made in the public domain. This concept intends to go one step beyond and look at how such a transition can be reinforced through cooperation and interaction between companies. The development of this concept is slated to begin in 2016.

In late 2014 - early 2015 the City of Ghent is cooperating with various (foreign) partners in the framework of the Interreg Cluster SAFE ICE on a sustainability approach for existing business areas.

THE PORT AREA

The Ghent Port Company accelerates its transition to a sustainable port, on the one hand by leading by example in its own operation, on the other hand by maximizing the stimulation and support of sustainable projects within the port area. Among others, the efforts are part of a strategic objective, an aspiration, to improve the energy efficiency of economic activity within the port area by 20% by 2020. Below is a non-exhaustive overview of the manner in which the Ghent Port Company accomplishes this. Multiple actions aim to create a dynamic to motivate companies to invest. Systematic follow-up of initiatives is guaranteed through the PERS⁴⁵ methodology which was developed in 2013.

ACTION: Energy efficiency within the Ghent Port Company's own operation

The Ghent Port Company will implement the following actions to render its own operation more energy efficient:

- The existing diesel and gasoline-powered fleet is converted to hybrid vehicles or vehicles running on alternative fuels. At the moment, 7% of the fleet has been converted; by 2020 all company cars will be evaluated to find the ideal conversion.
- The efficiency of the shipping fleet (7 vessels) is enhanced by means of a rejuvenation.
- Public lighting is rendered more sustainable by choosing LED whenever possible for new installations, taking into account luminous efficiency, colour accuracy, and TCO.
- Shipping assistance by fireboat Roeland is replaced by radar and AIS assistance on the canal.
- The Ghent Port Company buildings are rendered more sustainable: both the offices and the visitor centre have been designed to be as energy efficient as possible.
- All (grey) electricity contracts of the Ghent Port Company across the various sites are bundled into a single 100% 'green' contract.

With the implementation of these actions in 2017, annual CO₂ emissions of the transport facilities of the Ghent Port Company are reduced by **51%** compared to reference year 2011.

⁴⁵ Port Environmental Review System: a methodology of ESPO (European Sea Ports Organisation). This is a set of directives designed for ports, by ports, for the implementation of an environmental management system.

ACTION: To stimulate and support sustainable projects within the port area as area director

- Residual current exchange: The Ghent Port Company maximizes support for the projects 'district heating Stora Enso/Volvo Cars' and 'creation of biomass centre BEE and possible exchange of residual heat'. The district heating between Stora Enso and Volvo Cars is slated to be operational in late 2016 and will net savings of 15,000 tonnes of CO₂ per year (or a reduction of 40% of total CO₂ emissions by Volvo Cars Ghent).
In addition, the Ghent Port Company has conducted a study regarding the mapping of residual currents in the port area, investigating a number of specific business cases regarding heat exchange. The Ghent Port Company is now investigating the follow-up based on the results and recommendations of this study.
- Development of renewable energy production: In the framework of the wind energy plan, the Ghent Port Company assumes the role of coordinator on the one hand to obtain optimal spatial planning for wind turbines, and on the other hand to allow the permit procedure to run as smoothly as possible. Concession lands: as the manager of the terrain, the Ghent Port Company only imposes land-bound conditions: Should additional conditions be imposed, the Ghent Port Company will adhere to the principle of equality and all existing concession contracts will need to be renegotiated. For new contracts, the Ghent Port Company is currently investigating the possibility of including additional measures.
- Sustainable spatial design planning is being developed both for new and existing industrial areas: as little space and energy is used (focus on heat and CO₂), and compatible activities are to be placed in proximity of each other. This is how the Ghent Port Company is fully dedicated to the creation of a master plan for the further development of the Kluzendok, business area Rieme-Noord which is currently being constructed, and a refurbishment of the 'Darsen' (the oldest part of the current port between the Grootdok and the Sifferdok).
- It was decided to install shorepower facilities (3 shorepower cabinets)⁴⁶ for river cruises along the Rigakaai, and to conduct further investigation into the possibility of providing shorepower facilities for barges as well at the Sifferdok inlet.
- The Ghent Port Company takes part in the Flemish LNG project workgroup⁴⁷ which - due to stricter limits imposed by the International Maritime Organisation from 2015 onwards regarding sulphur emissions of ships - investigates how LNG usage can be optimized as a fuel alternative (among others by bunkering LNG in Flemish ports).
- The rate regulations provide for a discount for environmentally friendly ships, in order to stimulate the greening of shipping.
- The Ghent Port Company facilitates the installation of electric charging posts and conducts investigations into CNG/LNG filling stations. At the moment there is 1 electric charging post, and a CNG filling station is being constructed in the port area, namely in the Skaldenpark.

Moreover, the Ghent Port Company is taking various actions **to stimulate** the transfer from a fossil-based economy to a **bio-economy**, as this provides promising perspectives regarding employment and added value. These developments go hand in hand with the policy objectives of the City of Ghent

⁴⁶ Shorepower is a term indicating that a ship is connected to the power grid on land. While sailing, ships use their own generators to produce electricity, but at port running diesel engines is unnecessarily harmful to the environment (emissions of CO₂, NOx and PM10 particulates).

⁴⁷ <http://www.flanderslogistics.be/fpa/lng.php>

- Economy Department - where a great deal of focus is given to attracting investments in biotechnology.

The Ghent Port Company stimulates the bio-economy by:

- Continuing to develop the biofuel cluster: 51% of the allocated Belgian quota is produced in Ghent. The Ghent Port Company wishes to maintain and further develop this position.
- Facilitating the construction of a new biomass power plant by Belgian Eco Energy (BEE) which will produce power for 450,000 families starting in 2017, and will create 120 jobs. This keeps CO₂ emissions as low as possible by bringing the raw materials (1 million tonnes per year) to the power plant by water. The possibilities for residual heat exchange are also being investigated.
- Intense cooperation between the port, the City of Ghent (Economy Department), knowledge centres and businesses regarding commercial realizations in the bio-based chemistry sector. Making room in Ghent for spin-offs of knowledge centres, including in the port, allowing them to have a catalysing effect.
- 80 hectares of the Kluizendok complex are reserved for the further development of a new biocluster. The goal is to obtain a cluster of companies, rendering transportation from one company to the next unnecessary. Supply of raw materials by sea, processing, storage, and distribution: all of it can be done in the same zone.
- Continuing to work on a broad support base for the development of the bio-economy in the entire Canal area from Ghent to Terneuzen via Ghent Bio-Economy Valley (GBEV) and Bio Base Europe (BBE) - in close collaboration with the City of Ghent (Economy Department). BBE seeks to make the canal area into the chief anchorage for bio-economy in Europe, and enable the transition from bioproducts of the first generation to the second and third generations. The two levers available to BBE are the Pilot Plant along the Moervaart, and the Training Centre in Terneuzen where specialized process operators receive training or retraining.



investments in renewable energy in the port

3.4

RENEWABLE ENERGY AND RESIDUAL HEAT

Competent deputy mayors:

Tine Heyse

Mathias De Clercq

Tom Balthazar

Rudy Coddens

deputy mayor for Climate, Energy, and North-South

deputy mayor for Port, Economy, and Enterprise

deputy mayor for Urban Development, Housing, and Public Green

chairman of Belgian public social welfare centre OCMW and deputy mayor for Senior Citizen Policy, Work, and Poverty Reduction

THE CLIMATE CHALLENGE

In addition to a dramatic reduction in the demand for energy, achieving climate objectives also requires measures to allow for the required energy to be generated as sustainably as possible.

As is apparent from table 2 (section 'Ghent climate vision and objectives') which gives an overview of green electricity generation in Ghent, we can see that wind energy is the chief green source of power. Today Ghent is home to 22 wind turbines, the majority of which are located in the Ghent port area. Ghent also made substantial investments in solar power. In 2013, Ghent was nominated the sunniest municipality by the VREG, as no other municipality granted more green energy certificates for the production of solar power⁴⁸.

Figures are more difficult to come by regarding green and residual heat. Even if this is more limited than green energy production, efforts have been made in Ghent regarding this aspect over the past couple of years. There is tremendous potential for the useful implementation of residual heat from companies. A number of studies have been conducted in this framework. Some have led to specific projects. For instance, Ivago has been supplying the University Hospital with steam via an underground pipe since 2007.

Still the challenge is formidable. For instance, investing in solar panels remains profitable, but over the past months we have noticed a decline in Flanders after the removal of green energy certificates for solar panels. The past years we have also seen a reduction in realized wind turbine projects in Ghent. And even though there is tremendous potential for the useful application of residual heat, the development of district heating is proving difficult due to a number of bottlenecks.

⁴⁸ http://www.vreg.be/sites/default/files/persmededelingen/pers-2013-11_0.pdf

THE AMBITION AND STRATEGY

The administrative agreement gives a clear direction: “In the long term, Ghent wishes to be energy independent by fully concentrating on energy reduction, and sustainable and renewable local energy production.” In this way, the City wishes to assume its responsibility in order to allow for the transition to renewable energy.

In this framework, the City of Ghent has set forth a clear objective: for locally produced renewable energy (green energy), we are aiming at a production of 15% of domestic energy demand in 2019. In 2011 this degree of self-sufficiency was 7.38% (see section 1 of this plan).

A study conducted in 2011 regarding the potential for renewable energy production shows that there are many opportunities yet for the development of renewable energy. The possible renewable energy sources are limited to solar, wind, soil, sustainable biomass from local/regional sources, and residual heat.

Therefore, in order to achieve the objective of 15% renewable energy (green energy) by 2019, full focus must be given to the various renewable energy sources available to us in Ghent. Considering the renewable energy objective linked to the domestic energy demand, it is also clear that if this demand is not reduced by 2019, more renewable energy projects must be realized in order to achieve the 15% objective.

In addition to our ambition regarding green energy, a number of actions will also be undertaken to launch more projects regarding residual heat.

As the City of Ghent, we see a clear role in the facilitation of local renewable energy production and residual heat. This is why we wish to focus on the following matters:

- There is still great potential for wind production in Ghent. For the coming wind projects, we wish to remove a number of barriers and create a broader support base.
- In order to further utilize the potential of residual heat and encourage the production of green heat, the City of Ghent wishes to further facilitate the development of district heating and bring together the right partners.
- In addition to the financial support of renewable energy for residents (see section ‘residential sector’) the City also wishes to utilize other tools to assist citizens and companies in generating their own renewable energy.

ACTIONS

WIND

A lot of wind turbines have been planned for the coming years in the Ghent port area. A number of wind turbines have been planned for the Zwijnaarde⁴⁹ cluster as well, one of the locations for wind turbines as designated by the province of East Flanders. The City also undertakes to contribute to the development of the wind cluster in Zwijnaarde.

Wind projects are usually a cause for concern with local residents regarding the impact of such projects on their housing quality. The City of Ghent wishes to focus on the creation of a broader support base for wind. In Ghent we are noticing a growing group of citizens willing to commit to the realization of renewable energy projects. This is why the City has a very positive outlook on the creation of citizen cooperatives wishing to participate in renewable energy.

The Zwijnaarde cluster, one of the clusters designated by the province of East Flanders, is at least one area where the participation of citizens and local authorities will be possible.

ACTION: Investing in wind energy

A local authority can also invest in renewable energy production. With its Energielandschap, the province of East Flanders aspires to a participation of 20% (10% local authorities, 10% citizens) in the 6 selected wind turbine clusters along the E40 highway. The City Administration therefore wishes to earmark funding for investments in wind energy on Ghent soil.

The OCMW also stimulates wind energy. For lands on its territory, the OCMW concluded 6 contracts with 4 different wind farm developers. This has paved the way for 9 wind turbines on East and West-Flemish soil, of which 1 wind turbine (in Wachtebeke) is already in use. The OCMW has the ambition of also including citizen participation in the superficies agreements during negotiations.

For the port area, the Ghent Port Company assumes the role of coordinator on the one hand to obtain optimal spatial planning for wind turbines, and on the other hand to allow the permit procedure to run as smoothly as possible.

DISTRICT HEATING

District heating is already present in Ghent in various places. For instance, the EDF-Luminus plant on the Ham site supplies heat to a large number of institutions and residences. In order to consolidate operation of the existing system, the company will carry out additional investments for the site. For this project, the City of Ghent wishes to act as a facilitator, so that the district heating can be further optimized.

⁴⁹ The Zwijnaarde Cluster comprises various business areas and a zone for community functions north of the Ringvaart, existing business areas south of the Ringvaart, and the new business area Eilandje Zwijnaarde south of the Ringvaart.

It is very likely that more district heating systems will become part of the future energy supply of Ghent. Construction and refurbishment projects may therefore become dependent on a collective district heating system in order to become climate neutral. An overall strategy for district heating will be developed in the period 2014-2016.

ACTION: Developing a district heating strategy for Ghent

Eandis is helping the City of Ghent develop a strategy for district heating, and is carrying out an initial screening of potential areas for district heating. This is done based on the relationship between the energy consumption of an area and the investment costs of district heating. This potential is then further refined by the City, in collaboration with Eandis, by adding more criteria taking into account more than purely economic criteria (such as energy independence, spatial planning of the soil, timing of road works, ...). In addition, potential projects are made more concrete. The strategy can then be embedded into various spatial tools (e.g. spatial planning processes, Sustainability Meter, construction regulations).

In addition to strategy development, the City of Ghent also wishes to stimulate district heating among companies, and if possible also among companies and residential areas. The role assumed by the City of Ghent in these potential district heating systems, is determined for each case based on need. This is often done in conjunction with other stakeholders. For instance, the City can act as a *matchmaker* for larger companies whose residual heat may offer a solution to the heat demand of other companies and/or residential areas.

Two examples of projects:

- Ivago: Over the past years, a number of studies were commissioned by the City of Ghent regarding business area Gent Zuid I, whereby focus was given to cooperation between companies regarding energy. The chief opportunity proved to be Ivago's available steam capacity. Not only could more steam be delivered to the hospital, neighbouring companies also showed an interest in making use of IVAGO's supply. These cases have been studied. A letter of intent was signed with one company: Eastman, and the project is being further materialized.
- BEE: In case of the new BEE biomass plant to be built, we will act as a *matchmaker* along with the developer and the Ghent Port Company. We conducted initial feasibility analyses for the creation of district heating, continue to build on this, and verify potential moves for the future.

The Ghent Port Company also facilitates such projects:

- support for the projects 'district heating Stora Enso/Volvo Cars' and 'creation of biomass centre BEE and possible exchange of residual heat'.
- Mapping residual currents in the port area, whereby a number of specific business cases regarding heat exchange were investigated

PUSHING URBAN DEVELOPMENT PROJECTS TOWARDS CLIMATE NEUTRALITY

sogent reviewed its own upcoming urban development projects to see which among them could stand to see their ambition levels raised, so that they may become model projects regarding collective renewable energy systems and CO₂ neutrality.

ACTION: Collective renewable energy provisions for urban development projects

Funds from the Environmental Department's climate budget are being earmarked for the development of a collective energy system in the projects Otten stadium and Bijgaarde park. The grounds of the former Otten stadium will see the construction of about 80-120 residences in an initial phase, and a similar number has been slated for a later phase. This project is to become a model neighbourhood regarding mobility, residential typology, and energy. The Bijgaarde park is a construction project of about 55-75 residences with cohousing.

In the urban development project Oude Dokken, 350 residences are being developed in the first phase, as well as a primary school, crèche, and sports hall (see also section 'residential sector'). As for energy provision, the private partner commits to an innovative system which recuperates energy from the heat of separately collected grey waste water from baths and showers, supplemented with the production of biogas from the fermentation of black waste water from (vacuum) toilets supplemented with ground vegetable and fruit waste.

RAISE AWARENESS AMONG CITIZENS AND COMPANIES AND SUPPORT THEM IN THEIR INVESTMENTS IN RENEWABLE ENERGY

The City of Ghent is developing energy maps. These maps visualize things like energy demand, the reduction potential of buildings, and possibilities for the application of renewable energy (solar, wind, and soil energy).

We are researching the best way in which to render certain maps available. Today it is possible for citizens or companies to gain insight into the insulation level of the roof through thermal imaging. The goal is also to provide information on the solar potential of the roof, or where soil energy could be a potential solution. Combining maps and service provision such as construction advice can also help make a choice between various measures.

55

ACTION: Development and availability of energy maps

2 energy maps are being developed for renewable energy at an individual level:

- A solar potential map in 3D (or solar 3D): via the 3D web portal, any Ghent resident can see whether his or her roof is suitable for PV panels. This map is to be rendered available in 2015.
- We are assessing how the energy map representing soil potential for geothermal energy at the parcel level can be rendered available.

A number of initiatives have been included in the 'residential' sector theme, and also seek to increase the share of renewable energy. To stimulate renewable energy supply to private residences, support is provided for heat pump (boiler) and low-temperature systems. The project and the 'Sustainable Neighbourhoods' subsidy aims to ramp up both energy efficiency and renewable energy. The Ghent crowdfunding and participation platform can also address this.

Attention is given to renewable energy in company-oriented initiatives as well (coaching development of business areas).

In addition, we also focus on renewable energy within our own operations (see section 'role model').

ACTION: Tax on heat pumps in the framework of environmental permit applications

The City of Ghent is levying a tax on applications for opening facilities requiring notification or permits (this tax ranges from 180 € to 3000 €). Operators applying only for an environmental permit for installing a heat pump are exempted from the tax as of 1 January 2014.

Buurzame Stoorm

The “Buurzame stroom” experiment investigates how solar power can be generated at the neighbourhood level (for instance on large roof surfaces such as schools, garage boxes, and apartment buildings) and how the power can be shared with multiple local residents.

This is a way of making solar power more affordable for a larger group of people, generating more solar power, and setting up more efficient systems. Additional focus will be given to people who do not have the financial means to install PV panels on their own roof, but who will be able to enjoy cheap green energy thanks to the experiment.

At the moment, solar power at the neighbourhood level is either not legally feasible or not profitable.

The experiment first and foremost aims to create a dialogue with all partners involved in giving shape to the framework and the regulations on the generation and distribution of (green) energy across the grid. Together with them, the search is on for a new (experimental) framework with which to make local green energy production and supply profitable.



mobility will preferably follow the *modal split* principle

Competent deputy mayors:

Filip Watteeuw
Tine Heyse

deputy mayor for Mobility and Public Works
deputy mayor for Climate, Energy, and North-South

THE CLIMATE CHALLENGE

Different from households, for instance, transportation emissions are not based on actual consumption data. On the basis of model data (in this case traffic model Flanders), an estimate is made of the total number of vehicular kilometres covered on Ghent territory. Fuel consumption and the associated CO₂ emissions are estimated on this basis. Only from 2011 onward can a distinction be made between highway traffic and local traffic, on which the city administration has a bigger impact of course.

Table 5: Biannual CO₂ monitoring Ghent, transport section

	2007		2009		2011	
	ktonne CO ₂	%	ktonne CO ₂	%	ktonne CO ₂	%
Transport, of which	510	32.0%	467	31.0%	468	32.4%
local road traffic	not available		not available		217	
highway traffic	not available		not available		244	
bus and tram	7		6		5	
City fleet	2		2		2	

Mobility is responsible for the lion’s share of CO₂ emissions. For 2011, emissions are estimated at 468 ktonnes, equivalent to a share of 32% of total CO₂ emissions in Ghent. About half of these emissions are due to local road traffic, the other half to highway traffic.

The mobility share of CO₂ emissions will have a tendency to increase over the coming years⁵⁰ and the figures from other sectors more or less show a structural decline. Not only is there an increase in the population of Ghent and the number of vehicles registered on Ghent territory, but there is also an increase in city users (students, employees, tourists, ...). Lastly, the distance we cover each day is still

⁵⁰ VMM report-emissions-into-the-air-2000-2012: Part I — Emissions per sector — 3. Emissions from traffic p59

increasing⁵¹. Although the share of newly purchased vehicles with low CO₂ emissions continues to rise, this is nowhere near enough to net a structural decline.

The challenges regarding transportation are considerable at the moment, and will only grow worse over the coming years.

THE AMBITION AND STRATEGY

A study by researchers at the Institute for Transportation and Development Policy (University of California) shows that one of the most effective ways of countering climate change is to design cities in such a way that they offer more people more options for clean modes of transportation, such as public transportation, bicycles, and travelling on foot.⁵²

If we as a city wish to stay the course towards climate neutrality, then clear commitments must be made to limit the share of motorized traffic compared to more environmentally friendly modes of transportation.

For the City of Ghent, this means that, in addition to the supralocal efforts (Europe), at least the following efforts must be made:

- by 2030: a reduction of vehicular kilometres by 9.5% for passenger transportation and 5.35% for heavy goods transport;
- by 2050 (additionally compared to 2030): a reduction of vehicular kilometres by 3.7% for passenger transportation and 2.14% for heavy goods transport.

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In order to achieve the afore-mentioned objectives, the City of Ghent and its (mobility) policy focus on the following: ensuring proximity, lowering the number of required kilometres, enhancing steps, stairs, and public transportation, and greening modes of transportation. The majority of measures involved also clearly contribute to the reduction of CO₂ emissions from transportation.

- **Ensuring proximity:** we want a sophisticated location policy for new spatial developments and a diversified implementation thereof. By bringing functions together and interconnecting them, they can be combined in a single trip. This can actually prevent trips, without sacrificing a high-quality activity pattern.
- **Lowering the number of required kilometres:** this can be done for instance by stimulating economy of proximity, by focusing on functional interconnectivity, ... These are also matters to be included in the 'Structuurvisie 2030' trajectory. In addition there are other policies which focus on limiting trips, such as decisions on the extension and allocation of enrolments in childcare centres and schools whereby distance to the residence is taken into account.

⁵¹ Between 2001 and 2011, the average distance covered per day by a Fleming rose from 32.7 km to 42.1 km. Source: Mobiel Vlaanderen, Study on travel behaviour Flanders 2001 and 2011

⁵² Replogle M.A. & Fulton L.M., A Global High Shift Scenario: Impacts And Potential For More Public Transport, Walking, And Cycling With Lower Car Use, 2014, https://www.itdp.org/wp-content/uploads/2014/09/A-Global-High-Shift-Scenario_WEB.pdf

- **Enhancing steps, stairs, and public transportation:** ‘Modal split’ is the choice of mode of transportation for a trip. The goal is to shift car trips towards more sustainable modes of transportation, such as walking, cycling, or public transportation. This can be done among others with the introduction of a sustainable parking policy, clever densification, stimulating P&Rs, introducing a regional public transportation network with full focus on tramification, with an integral bicycle policy, and setting up a sustainable distribution centre.
- **Greening modes of transportation:** in the first three steps we focus on shrinking and reducing the mobility system and rendering it more sustainable (demand side). Lastly, the fourth step is aimed at the supply side, whereby the various mobility networks are organized as safely and efficiently as possible. And also as environmentally friendly as possible based on the climate and liveability objective. A growing need for a drastic reduction of our CO₂ emissions in the coming years forces us to think about the further development of clean passenger and goods traffic in our city. A comparison of various technologies by the Free University of Brussels VUB shows that today plug-in electric passenger cars score the highest when it comes to CO₂ emissions across the entire lifecycle. A major focal point is that an optimal result can only be achieved if the electric car is powered by green energy⁵³.

ACTIONS

Shrinking and reducing the mobility system and rendering it more sustainable

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Despite the relatively high number of cyclists in Ghent, there is still tremendous margin for growth in the modal shift from car to bicycle. Still too many Ghent residents use their cars for short trips as well. Significant investments in high-quality public transportation and improved infrastructure for bicycles and pedestrians will guarantee optimal mobility for the majority of trips.

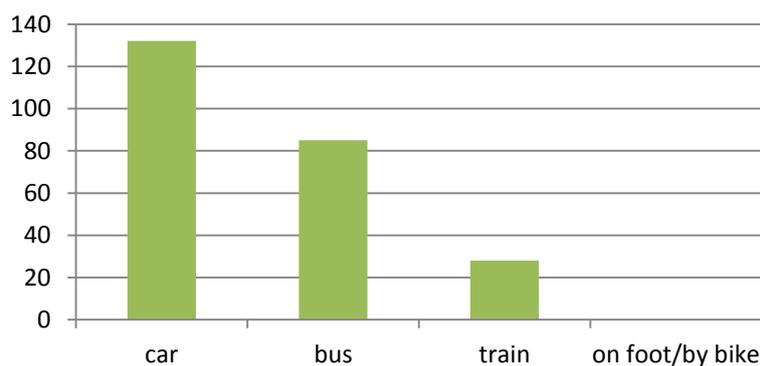


Figure 5. CO₂ emissions from traffic
(expressed in grammes per km and per person)
source: www.delijn.be/over/milieu/co2_uitstoot_verkeer

⁵³ Jan Turf (red.), Energie voor morgen, krijtlijnen van een duurzaam energiesysteem. Argus vzw & Uitgeverij Lannoo, Tielt, 2004

ACTION: Pushing the modal shift towards sustainable modes of transportation

The following sub-actions fit in this strategy:

- **Management and expansion of pedestrian areas**
Investments in cameras and retractable posts turn the expanded pedestrian areas into true car-free zones once again, benefiting pedestrians and cyclists alike.
- **Stimulating the shift towards sustainable modes of transportation.**
Supporting schools, companies, and events in setting up and initiating mobility and transportation plans. Developing and realizing campaigns on sustainable mobility (e.g. bicycle campaigns, car sharing, ...) and subsidy regulations regarding sustainable mobility.
- **Reconstruction of school environments to benefit sustainable mobility**
The reconstruction of at least 10 school environments to create a car-free and safe environment for the purpose of a modal shift towards walking and cycling.
- **Investing in bicycle infrastructure**
Continued but intensified development of the bicycle route network in Ghent for the purpose of a modal shift towards cycling. Among others the layout of cycling infrastructure and a bicycle underpass at the Gasmeterlaan/Nieuwevaart, a bicycle tunnel under the railroad at Dampoort station, bicycle connections at the Franse vaart, Parkbos bridges and an underpass at the Rozemarijn bridge have been defined already. In addition, there is a large and quickly growing demand for bicycle parking facilities in the city. For instance, the need for parking space near Gent-Sint-Pieters station.
- **Huis van de Fiets**
Investing in the reorganization and housing of various bicycle service providers for the purpose of optimal service provision for cyclists.
- **Investing in bicycle parking facilities**
Significant investments in all manner of bicycle parking facilities, including the expansion of the underground bicycle parking facility at Gent-Sint-Pieters station from 6,800 to 10,000 spaces, a new bicycle parking facility at the Waalse Krook, and bicycle parking spaces in the street.
- **Tramification**
Tram projects intended to significantly increase the scope, quality, reliability, capacity, and comfort of public transportation for the purpose of a modal shift towards public transportation. This includes the following projects: tram extension Zwijnaarde, tram 4 in the direction of the University Hospital, the tramification of line 7, and the first steps for tram line 3 and the extension of tram 4 to the Dampoort.
- **Financing public transportation**
Contribution to the late and nighttime network of Flemish public transportation company De Lijn and contribution to De Lijn passes for youths for the purpose of a modal shift towards public transportation.
- **Premium for the repayment of registration fees for car and freight bike sharing**
This premium stimulates the use of car and freight bike sharing by citizens. A private person getting rid of his own car in favour of a shared car will on average drive 9,000 fewer car kilometres. Therefore, car sharing leads to a reduction in the use of fossil fuels and less pollution (be it noise, particulates, or CO₂). Freight bike sharing is in many cases also an alternative to the use of a car.

- **Distance parking**

With its Mobility Plan the City of Ghent wishes to focus on proximity, on reducing the number of unnecessary kilometres, and on stimulating people to make more use of other modes of transportation such as bicycles and public transportation. Motivational parking policy and pricing fit within this strategy. With distance parking, the City of Ghent discourages the use of cars in favour of bicycles and public transportation. The realization of a P+R at the Speurder in Ledeborg is one of the elements to fit within this strategy.

- **Development of city distribution centre**

Study regarding the possibilities regarding the bundling of flows of goods bound for the inner city at the edge of the city and transporting them to the city centre in a sustainable manner. This could involve stricter permit conditions for the pedestrian area so that only heavy goods vehicles with low emission levels enter the city centre.

- **Students and mobility**

Students and employees of the university of Ghent and university colleges can rent a high-quality bicycle from StudentENmobiliteit vzw. Non-profit association StudentENmobiliteit is an initiative of the city of Ghent, UGent, and the University Colleges of Ghent.

- **Tourism**

We promote sustainable transportation as part of the tourist experience (water shuttle, bicycle, boats, public transport, ...). Specifically for waterborne transportation, we stimulate the shift from diesel engines to electric and alternative power sources.

Perhaps the biggest gain regarding modal shift can be obtained through the development of a sophisticated Mobility and Parking Plan. By intervening in the city's traffic circulation, passing car traffic is discouraged while simultaneously rendering the cycling and public transportation alternatives considerably more attractive. Bicycles become even safer, and public transportation is not caught up in traffic jams. Well-selected parking measures are effective among others in removing cars from the city centre, and pushing less passing traffic through residential streets. Without these accompanying measures, the stimulating measures (such as new bike paths, new tram lines, and nighttime transportation) will not generate a big enough effect.

Greening modes of transportation

The City of Ghent wishes to incentivize the switch to alternative vehicles among its residents and companies. In addition, the City of Ghent also wishes to stimulate car and freight bike sharing. The incentives are fleshed out as follows:

ACTION: Stimulating electric and CNG mobility

- **Premium for electric (freight) bike in connection with the relinquishment of a licence plate**

With this premium we are encouraging citizens to get rid of their cars and switch to more environmentally-friendly transportation.

- **Premium for electric and CNG-powered shared car**

With this premium we encourage those seeking to buy a shared car to choose an electric or CNG variant. By choosing an electric shared car, one chooses to remove local emissions of particulates and CO₂, to greatly reduce noise, and clear up space in the city.

A comparative VUB study shows that electric passenger cars score the highest when it comes to CO₂ emissions across the entire lifecycle. However, one major condition is that the electricity is generated using green energy. A CNG car also limits the emission of particulates, CO₂, and noise. CNG can be regarded as a transitional fuel, as CNG vehicles can switch to biogas or synthetic gas produced using green hydrogen gas without any trouble. This is why the City of Ghent stands behind a stronger focus on CNG vehicles in Ghent.⁵⁴

In addition to premiums, the City also wishes to provide additional stimulation for the development of charging and filling infrastructure for electric and CNG transportation, and lead by example with its own fleet. This means that the City of Ghent will take into account the latest European standards for the purchase of new vehicles, and will also focus more on electric and CNG cars (see section 'role model').

ACTION: Stimulating charging infrastructure for electric and CNG transportation

- **Tax reduction CNG pumps**

The City levies a tax on filling stations. The tax on CNG pumps is 20 percent lower than the tax on diesel pumps. With this tax reduction we want to stimulate filling station operators to invest in CNG filling options.

- **Developing CNG filling options**

At the moment, public filling options for CNG are fairly limited in the Ghent region. Through collaboration with Eandis we wish to facilitate the implementation of public CNG filling stations. We advocate opening at least 1 additional CNG filling option to the public to supply city fleet and IVAGO vehicles.

- **Providing charging infrastructure for electric cars in strategic locations**

The City is reviewing how it can provide charging posts in its underground car parks and other strategic locations (e.g. neighbourhood car parks, park and rides, ...) within this legislature.

- **Premium for rendering charging infrastructure (semi) public**

According to the European strategy on cleaner fuels, by 2020 some 21,000 charging points must be provided in the public domain, and 207,000 in the private domain. Reality teaches us that the number of electric vehicles is growing at a slower rate than projected, but the market and technology are evolving quickly. Reports indicate that 2.5 charging points are required per electric car. It is also apparent that at the moment the preferred scenario is a charging point at the home of the EV user and one at work. With this premium we wish to stimulate companies to render their charging infrastructure (semi) public.

⁵⁴ Argusrapport (2014). Energie voor morgen. Krijtlijnen voor een duurzaam energiesysteem.
<http://www.lannoocampus.be/sites/default/files/books/issuu/9789401417129.pdf>



campaign picture Ghent en garde

Competent deputy mayors:

<i>Tine Heyse</i>	<i>deputy mayor for Climate, Energy, and North-South</i>
<i>Tom Balthazar</i>	<i>deputy mayor for Urban Development, Housing, and Public Green</i>
<i>Mathias De Clercq</i>	<i>deputy mayor for Port, Economy, and Enterprise</i>
<i>Christophe Peeters</i>	<i>deputy mayor for Finances, Festivities, Retailers, and Innovation</i>
<i>Rudy Coddens</i>	<i>chairman of Belgian public social welfare centre OCMW and deputy mayor for Senior Citizen Policy, Work, and Poverty Reduction</i>

THE CLIMATE CHALLENGE

CO₂ emissions associated with food production and consumption are not included in the Ghent CO₂ monitoring. The majority of these CO₂ emissions occur outside of the territory of Ghent. However, food contributes to the environmental impact of a city in many ways. The production of meat has a significant impact on the emission of greenhouse gases. Halving meat and dairy consumption would reduce greenhouse gas emissions in the EU by 42%⁵⁵. Transportation, storage, preparation, and waste production also make their mark on the environment. The Food and Agriculture Organization (FAO) of the United Nations stated in a recent study⁵⁶ that food waste alone is the single greatest emitter of greenhouse gases after the U.S. and China.

With about 25 percent of the total area in Ghent, agriculture is an important element of the spatial structure. Our territory mainly sees a mixture of cattle breeding, arable farming, and intensive (greenhouse) horticulture. The number of agricultural businesses is slowly declining, but Ghent is also seeing a rising trend in agricultural land area per company. Within our urban evolution with a demand for housing, space for enterprise, recreation, and mobility, pressure regarding the conservation of agricultural space is mounting.

Many consumers feel disconnected from the source of their food. This sentiment is enhanced by global markets with production in faraway countries and complex distribution. Food prices are increasingly determined by these global markets, and are subject to speculation and increasing purchasing power in BRIC⁵⁷ countries. In Ghent as well for instance, this leads to limited local autonomy regarding food.

⁵⁵ Westhoek et al, Food choices, health and environment: Effects of cutting Europe's meat and dairy intake, 2014, <http://www.sciencedirect.com/science/article/pii/S0959378014000338>

⁵⁶ FAO, Food Wastage Footprint : Impacts on Natural Resources, 2013.

⁵⁷ The acronym *BRIC* refers to Brazil, Russia, India, and China. These four countries are in a comparable state of economic development. The acronym became a symbol for the development of new economic super powers outside of the developed G7 economies.

SOCIETAL OPPORTUNITIES

The need for a more sustainable food system is growing. Consumers are searching for products they can trust, the City sees a major opportunity in a sustainable local food system. Local and sustainable food production can provide an attractive alternative to farmers whose income is under pressure from international food prices. Focusing on short-chain initiatives whereby producers from the region create strong ties with local consumers can also help keep food affordable for the local population.

The strength of local products is that they are widely perceived to be healthier and more sustainable quality products. Local products inspire confidence. Local producers are visible, and obtain a clearer identity. New business models and innovative systems focus on a more sustainable food system: CSA⁵⁸ farms and cooperative structures are also gaining a foothold in Ghent and the region around the city.

Many initiatives have a clear social perspective. A major attribute of food is that food connects people. It offers opportunities for additional social employment, such as the 'Le petit botanique' initiative or the Site, and can be used to create stronger social cohesion. For many small-scale Ghent initiatives, there is a growing demand for support to help broaden their scope, scale up, and better harmonize demand and supply in the local food system.

Focusing on organic production, seasonal products, lowered meat consumption, shortened chain, reduced food wastage, and less and more environmentally friendly packaging all reduce the ecological footprint of food and contribute to our climate objectives.

STRIVING FOR A SUSTAINABLE FOOD SYSTEM

Ghent is hailed as the veggie capital of Europa. Mainly due to the impulse from the City Administration to encourage residents and staff to keep fish and meat off their plates for at least one day every week under the label *Thursday Veggie Day*. In a broader context, Ghent is now also advocating local, sustainable, and tasty food with *Ghent en Garde*. The goal is to gain ecologic victories throughout the entire local food chain: from production, processing, and distribution to consumption and waste management. The ultimate goal being to dramatically reduce the environmental impact of our food system.

For this purpose, the City of Ghent seeks to strike alliances among others with local producers and consumers, assume a coordinating role based on networks, stimulate sustainable cooperation, and harmonize the many players in the field.

Ghent en garde proposes five objectives:

Objective 1: push for a shorter and more visible food chain

Consumers and local producers alike must re-establish their alliances as much as possible. This requires robust contacts and the elimination of as much intermediate chain links as possible. City-

⁵⁸ CSA stands for Community Supported Agriculture, a kind of farming company where citizens pay a contribution in advance, and in return receive part of the proceeds.

oriented agriculture means that farmers should gain easier access to the local market; on the consumer side we wish to place agriculture in the limelight. This way, consumers learn a great deal about the source of their food as well.

Current or planned actions:

- **Short chain competition**
A competition is organized to support new initiatives focusing on shortening the chain.
- **Study area for (urban) agriculture**
This study aims to develop a vision of agriculture and give it a spatial expression, with 2030 as the time horizon. The study will include policy recommendations in order to realize this vision.

Objective 2: stimulate sustainable food production and consumption

The City of Ghent wishes to get farmers, residents, and users to participate in sustainable urban farming, and have users consume in a more sustainable manner; think local, seasonal, organic, vegetarian, or fair trade products. We the City support the growth of CSA initiatives, organic farming, and sustainable agriculture in and around the city. Because the scope for new urban farming projects in the city is limited, the available space must be utilized cleverly. That is why urban farming on roofs, terraces, in streets, and temporary public spaces are among the possibilities.

Actions already planned:

- **Thursday veggie day**
Along with non-profit organization EVA vzw, the City of Ghent continues to focus on broadening veggie in Ghent. Think veggie meals in schools, awareness-raising and educational workshops on veggie cuisine, veggie leftover banquets, promoting vegetarian and alternative foods among tourists, etc.
- **Space for (urban) farming**
A workgroup addresses supply and demand of space in the city for (urban) farming: what is (not) possible, where can we find more opportunities, etc. For instance: small urban farming projects at the city's cultural sites such as Veldstraat 82.
- **Guidance for school kitchen gardens**
Guidance for schools wishing to start a kitchen garden at school, or seeking support in this context.
- **Moestdazo? First aid for Ghent cultivation**
A place for citizens and organizations from Ghent to turn to (by phone and by e-mail) with all their questions regarding kitchen gardens, fruit trees, and fruit bushes.
- **Temporary usage**
Initiatives for the temporary use of fallow lands or empty buildings are eligible for support or guidance from the City of Ghent. Urban farming can be a form of temporary usage, such as Dampoort City Garden.

- **Rendering our purchase policy more sustainable:**
Rendering the specifications regarding food (e.g. school meals, purchases of vegetables/fruit/meat) more sustainable.

Objective 3: creating added social value regarding food initiatives

Sustainable food connects young and old, man and woman, poor and rich. Based on this social potential, the City of Ghent is pioneering a food system to create added social value. New food initiatives are to bring people together in communal gardens, enhance local employment regarding food, etc.

Actions already planned:

- **Veggie cooking workshops for small budgets**
Organizing workshops together with the OCMW, aimed at underprivileged target groups.
- **Urban farming project WZC Heiveld**
The OCMW collaborated with Compaan and Labeur to realize an urban farming project with social employment in WZC Heiveld. The goal is to offer healthy and affordable food. Thanks to the shortened chain, citizens can gain access to cheaper seasonal vegetables.
- **Focusing on the recuperation of food leftovers and redistributing them socially.**
The OCMW is looking to bring together partners both on the supply side (supermarkets) and on the demand side to see if progress can be made.

Objective 4: reducing food waste

Today one third of produced food goes to waste. Losses are tremendous, especially at the beginning and end of the food chain. Delicious vegetables that do not meet our aesthetic expectations never make it to the shelves. A more efficient food system merits our attention; one where food leftovers find new markets or better processing. Lastly, we wish to encourage Ghent residents to buy in a conscious manner, store food in an optimal manner, and process it better.

Actions already planned:

- **Leftover box**
By launching the leftover box, the City of Ghent wishes to achieve a behavioural change whereby leftovers from restaurant visits are readily taken home to be consumed later on. In addition, the City of Ghent focuses on raising awareness on this theme and distributing practical tips to help citizens store and process food better.
- **Nothing goes to waste festival**
Leftover banquet for 5000 people in collaboration with Ghent chefs and some 40 partner organizations.

Objective 5: food waste becomes raw material

Some food will inevitably go to waste. The City of Ghent wishes to go one step further to optimize the collection and processing of waste. Because waste can also generate ecological added value. Our rubbish bags or containers hold a great deal of biodegradable waste.

Action already planned:

- **Ivago is continuing work on the optimization of biodegradable waste collection and processing**
We want to keep more biodegradable waste from our household waste by creating a greater price difference with household waste, by expanding the area where wheeled containers are used and where biodegradable waste is not allowed in household waste, through intensive awareness-raising and information campaigns, and continuing to promote neighbourhood composting. Specifically, we want to double the number of families making active use of biodegradable waste collection in the urbanized area. Ivago also wishes to realize new options for processing in the framework of the cooperation between the City of Ghent and OVAM (Public Waste Agency of Flanders). This will entail among others a technical and financial feasibility study on fermentation.



With a subsidy for the organization of a climate project the project *The Travelling Pineapple* demonstrated the CO₂ impact of food kilometres

Since time immemorial, Ghent has been a city where new trends are created. Their stubbornness, moxie, and keen interest in new and other things and cultures allow Ghent locals to cope with change. Even in the 21st century, this makes Ghent a trendsetter in picking up developments that make Ghent a city where life will still be good 50 years from now.

As early as 2009, enthusiasts united in the Ghent Climate Alliance to search for ways to reduce our impact on the climate. This group of forerunners has since set up a tremendous amount of actions to make Ghent a climate-friendly city. Over the past years, 1274 Ghent residents, companies, schools, and associations have rallied under the banner of the Ghent Climate Alliance.

Many of the actions generated within this Climate Alliance have since grown and gained renown among a wider audience. Think of the Leefstraten, Transitie UGent, or Green Track within the cultural sector. Initiatives to enhance the liveability of the city are sprouting up everywhere in Ghent. Repair cafés, sharing initiatives, group purchases, and urban farming are no longer confined to the margins, but are found in the heart of Ghent.

So by now there are a lot of us trying to make our city into a place with a good climate in which to reside, do business, work, and live. Initiatives such as group purchases of solar panels or citizen initiatives regarding wind turbines ensure that we do not further burden our climate for our energy supply. People sharing cars or - even better - using bicycles provide our city with better air quality. People growing their own vegetables avoid undue transportation kilometres. All of the Ghent residents insulating their homes make sure that less energy is wasted, and thus less CO₂ is emitted. Traders and companies installing bicycle parking infrastructure or reducing their energy consumption with minor or major procedures, all make their own contributions. Too many to list, too many to bundle into a single alliance. We are slowly changing our city into a city which has a good climate, and is good to the climate.

In short, we are on the road to Ghent climate city. A city where you breathe healthy air, where there are sufficient green spaces to relax or cool off in the summer, a city with space to play and meet, a city with well-insulated, warm, and comfortable homes, a city where not the people but the wind turbines and solar panels are putting in overtime, a city that is energy-independent. Ghent wishes to be that city in 2050, without a negative impact on climate.

This climate plan has covered a number of forms of support for Ghent residents in the realization of their climate plan. For instance, with the project 'Sustainable Neighbourhoods' the City wishes to support frontrunners in those areas willing to shoulder bottom-up projects leading to greater energy efficiency, renewable energy, and CO₂ reduction (see section 'Residential sector'). As for shortening the chain (see section 'Food'), support is offered to new initiatives via a competition. Matters not yet

covered include the support given by the City of Ghent to associations and schools in the realization of their climate projects and educational trajectories regarding climate.

ACTION: Supporting associations and schools in the realization of climate projects

- In order to achieve the ambitious goal of climate neutrality, the City of Ghent also wishes to support associations in setting up projects to inform and inspire Ghent residents, or raise awareness regarding climate-friendly behaviour. A subsidy of maximum 1500 Euros can be requested for this purpose.
- The City of Ghent wishes to stimulate schools to set up a project to raise awareness regarding climate-friendly behaviour and to net specific environmental gains. 'Climate school' is a project subsidy for all Ghent schools starting up a project for the purpose of reducing CO₂ emissions at school. Approved projects are subsidized with 250 € or 500 €.

Children and youths are seen as a major target group. They take a place of privilege as the Ghent residents of tomorrow. We wish to closely involve them in Ghent climate city, and make them proud to live in a city with a clear climate-neutral ambition. The educational trajectories *Klimaatkids* for primary education and the *Gent 2050 game* will be continued.

ACTION: Offering educational trajectories regarding climate

- Klimaatkids is a trajectory led by a climate coach for pupils from the last two years of primary education. They investigate how they can contribute to making their schools and Ghent climate neutral.
- Gent 2050 Game is a Serious urban game on climate change, where the city is the playing field. This educational game has all of the hallmarks of a computer game. During the game, youths make choices which impact climate change. With this game we wish to encourage youths between 16 and 20 to commit to a climate-neutral Ghent. Gent 2050 game is offered to schools and youth work in Ghent.

Knowledge institutions

In addition to its creative city dwellers and companies, Ghent has another ace up its sleeve in achieving its ambitious climate objective within its territory: its many knowledge institutions. They are important and valuable partners in this story. Not only because each knowledge institution can make serious efforts in reducing its environmental impact, but - more importantly - with their innovative research which can contribute to Ghent climate city and with their enormous potential in sustainably educating the 67,000 students enjoying a higher education in Ghent. Knowledge institutions supply the employees for innovative green companies, and have an important role in thinking along and working with companies on the societal challenges caused by climate change.

UGent has understood this message loud and clear. With over 38,000 students and 8,000 staff, UGent is one of the largest universities in the Dutch language area, educating over 50% of students in Ghent, and is also an important partner of Ghent Climate City. The University of Ghent has undergone a transition, and is fine-tuning the manner in which climate is included in its approach to its own buildings, student life, its educational goals, and research themes. In late 2013, the

Administrative Board of UGent rallied behind an ambitious visionary text. For instance, a new university-wide subject 'sustainability thinking' was introduced at the start of academic year 2014-2015, sustainability is also assessed in the 2016 institution review, a new company transportation plan is drawn up in which sustainability, attractiveness, and availability are key, sustainable commuting is stimulated, a collaboration with cambio is set up for car sharing, electric cars and bicycles are purchased, the energy consumption of buildings is further reduced whereby a provision for sustainable energy measures is supplemented every year with proven savings and subsidies.

UGent is raising the bar even further since late 2013: new construction and refurbishments aspire to the nearly zero-energy principle. The Pathological Anatomy and Dissection building at the UZGent site is being built according to this principle, and will be opened in 2015. Feasibility studies are currently being conducted for the new restaurant on the Veterinary Medicine campus and the refurbishment of Block I and part of Block II of the Technicum.

In addition to the excellent energy performance of the building itself, nearby energy production should also be sought. UGent had already entered the wind turbine and solar panel story, but has now also made the move towards biomass and cogeneration (e.g. WKK campus Coupure and Ledeganck complex, biomass installation campus Coupure).

Other knowledge institutions also supply valuable efforts. For instance, the KAHO receives the Environmental Charter East Flanders every year. HoGent is continuously attentive to socially responsible enterprise, and is systematically integrating economic, social, and environmental considerations into its activities. For instance, workgroup Ecology focuses on 'ecological' studies at HoGent. This workgroup ensures that HoGent adopts an ecologically sound policy, while at the same time leading by example. The commission, of which the City of Ghent is a part, also ensures that HoGent's multidisciplinary research projects are sustainable. Ideally, a more structured transition effort will take place in these institutions as well, inspired by or in conjunction with UGent. The chance of success is tremendous as they are no strangers to collaboration between knowledge institutions.



CO2 reduction increases the quality of life in the city

1. Overview of actions and their CO₂ impact

Below is a summary of all actions covered in the chapters above, with a calculation of their CO₂ impact where possible.

Adherence to the proposed short-term objective is verified, i.e. 20% lower CO₂ emissions in 2019 compared to reference year 2007.

Compared to 2007, 2011 CO₂ emissions in Ghent had been reduced by 9.4%. The actions from this climate plan should therefore at least net a CO₂ reduction of 10.5% in 2019 compared to 2007, or 169,000 tonnes of CO₂ in numbers.

The table below lists the CO₂ impact of the various measures, and the summation thereof shows that a reduction of some 169,872 tonnes of CO₂ will be achieved. In other words, the projected goal of -20% CO by 2019 will be achieved with this package of measures.

This calculation also takes into account the impact of policy and autonomous evolutions regarding CO₂ emissions. This evolution is called business as usual⁵⁹. This corresponds with a reduction of 3% CO₂ by 2030.

In the 'Phased plan for CO₂ neutrality in 2050'⁶⁰, Vito calculated the business as usual or the reference scenario for the year 2030. For this calculation, Vito describes a series of trends resulting from a variety of other studies and contributing to this 3% reduction:

- Energy consumption by the residential sector is dramatically declining (-19% between 2009 and 2030), especially for heating and to a lesser extent for electricity. Consequently, CO₂ emissions in this sector will decline by about 20% by 2030.
- The tertiary sector is growing in square metres, but declining as to its energy consumption for heating by 13%. Electricity consumption however rises by 1%. CO₂ emissions autonomously decline by 15%.

⁵⁹ The business as usual scenario includes both autonomous evolutions and decided policy.

- Regarding autonomous evolutions, generally expected demographic (increasing population, declining family size, migration, ...) and economic forecasts until 2030 sourced from various studies were taken into account. They were complemented with data on autonomous switches (such as heating unit replacements, switching to natural gas, the current refurbishment rate, etc.)

- Regarding decided policy, a number of binding European directives were taken into account: the Ecodesign Directive (more efficient electrical devices), the nearly zero-energy building directive (energy consumption for new residences), the directive on vehicle emission standards, etc.

⁶⁰ <http://www.gentsklimaatverbond.be/study/energiestudie-0>

- The remaining companies, excluding tertiary, grow economically but decline slightly as to their energy consumption (-1%) and stagnate as to CO₂ emissions (-0.02%).
- Transportation sees the number of vehicular kilometres grow (e.g. 19% for passenger traffic), but this is compensated by among others a rise in railway transportation (7%), more sustainable fuels (e.g. electric cars) and more efficient new models causing CO₂ emissions for transportation to tend to stagnate.

The impact of the business as usual was not calculated exactly for 2019, but considering the reduction by 3% in 2030, we assume that it will net a reduction of 1.5% in 2019.

More actions by other public authorities are stated above. Eandis for instance calculated their impact regarding energy premiums in Ghent. Through actions supporting citizens, companies, and public authorities in implementing energy measures, they contributed to an energy reduction of 1.13% per year in 2013. In this context, a budget of 3.07 million Euros in premiums was paid. This will not be included in table 6 calculations on the pages below.

An overview of the actions, the budget (excluding personnel cost) if known, and the CO₂ impact of the actions in this Climate Plan

Table 6. Overview of actions						
	start	BUDGET 2014-2019 100% climate	BUDGET 2014-2019 Partial climate	CO ₂ impact (tonnes)	CO ₂ EMISSIONS IN 2011	IMPACT COMPARED TO 2011 (in %)
RESIDENTIAL SECTOR						
Developing and providing online information on energy-efficient refurbishment via websites	2014			33,459	346,506	11%
Online decision tool for energy-efficient refurbishment	2015	€ 45,000				
Awareness campaign 'New norm'	2014	€ 150,000				
Interactive digital platform	2015					
Construction advice	existing	€ 1,000,000				
Refurbishment advice delivered to your door	2014					
Unburdening for energy procedures	2015					
Assistance with financial leverage	2014					
Raising awareness, advice, guidance, and unburdening vulnerable target groups by REGent	existing	€ 1,000,000				
Cheap FROCE loans via REGent						
Energy savers OCMW for REGent						
Energy premiums	2014	€ 6,650,000				
Housing premiums	2014		€ 2,400,000			
Energy Centre	2014					
Sustainable Neighbourhoods	2014	€ 574,000				
Open data and climate	ongoing		€ 6,500			
Ghent Living Lab	ongoing		€ 10,500			
Ghent crowdfunding and participation platform	2015		€ 45,000			
Helping invest in energy-efficient measures for social residence	2015	€ 2,000,000		2,028		
Urban development projects sogent (Oude Dokken, Otten stadium, ...)	ongoing	€ 17,000,000		3,507		
Various smaller new construction projects sogent						
ROLE MODEL						
Greening the city's fleet	ongoing		€ 1,800,000	300	31,484	47%
2nd phase accelerated remediation of public lighting	ongoing	€ 2,650,000		641		

Energy optimization of technical installations at Strop swimming pool		€ 360,000				
Low-energy and passive new construction projects	ongoing		€ 32,804,423 ⁶¹			
Refurbishment package for the city's buildings (esco, construction procedures, maintenance, awareness raising, ...)	2014	€ 8,000,000		2,909		
Roof refurbishment MIAT			€ 900,000			
Purchasing 100% green energy for city buildings and public lighting	ongoing			10,880		
COMPANIES, TERTIARY SECTOR, AND AGRICULTURE						
Coaching on energy management for individual companies	2014	€ 530,000		9,350		
Stimulating the ESCO market with SMEs	2014					
Energy coaching range for small companies	2015					
Subsidy regulations for the refurbishment and embellishment of commercial buildings	2014		€ 2,100,000	2,300		
Creative neighbourhood Rabot	2014-2017		€ 365,000			
Development of business area Wiedauwkaai	2015	€ 200,000				
Energy strategy Eiland Zwijnaarde	2014				598,571	6%
Sustainability meter for economic sites	ongoing		€ 660,000			
Coaching trajectories existing business areas	ongoing					
Business area of the future	2016		€ 200,000			
Energy efficiency within the Ghent Port Company's own operation	2014-2017					
Area director sustainable projects in the port area	2014	€ 3,608,000		26,793		
Stimulating and facilitating bio-economy	2014					
RENEWABLE ENERGY						
Solar potential map in 3D	2015	€ 100,000		2,964		
Energy maps in GIS (including geothermal)	2016	€ 12,500				
Premiums for heat pumps (included in residential)	2014					2%
Investing in wind energy	2014	€ 600,000		23,714		
District heating strategy	2014					

⁶¹ Total budget for new construction projects

Extension of Ivago district heating	2015			1,422		
Collective energy systems for renewable energy - sogent projects (Otten stadium and Bijgaardepark)	2016	€ 1,000,000				
TRANSPORTATION						
Pedestrian area management	2014		€ 1,702,000			
Stimulating transfer to sustainable mobility	2014	€ 8,689,073				
Reconstruction of school environments in support of sustainable mobility	2014	€ 1,000,000				
Investments in bicycle infrastructure	2014	€ 14,899,942				
Investments in bicycle parking facilities	2014	€ 8,380,160				
Huis van de Fiets	2014	€ 2,488,000				
Tramification	2014	€ 4,519,137				
Free public transportation	2014	€ 3,857,851				
P&R and neighbourhood parking	2014	€ 15,100,000				
Development of city distribution centre	2014	€ 536,514				
Development of CNG filling options	2014					
Development of charging infrastructure for electric vehicles	ongoing					
Stimulating electric and CNG mobility through premiums	2013	€ 900,000				
Tax reduction for CNG pumps	2014					
BUSINESS AS USUAL				21,640		1.5%
TOTAL		105,850,177	42,993,423	169,872	1,442,639	11.8%
Food						
Food council, urban farming	2014	€ 300,000		32,600		

2. Smart impact of the Climate Plan

A city can be described as a smart city when investments in human and social capital, in innovative techniques regarding energy, mobility and ICT and in traditional and more innovative communication support sustainable development. This involves dealing with natural resources in a sustainable manner, and the implementation of a participatory local policy. A smart city should also be a good place to live.

Such a smart city reconnects people with their environment and city in order to establish more but also different relationships between available means, technology, communities, services, and events in the urban environment.

Reconnecting people also entails that the residents of a city once again become partly responsible for their environment. Collaboration projects with stakeholders quickly show how certain energy

measures receive more attention when they lead to a more liveable and healthy city, to economic gains, to reduced energy poverty, etc., and therefore also lead to greater commitment to roll up one's own sleeves.

The city administration has placed the focus on a number of smart projects where a combination of various forms of participation, technological innovations, and communication go hand in hand. A few of these projects:

- Oude Dokken

From the remains of a rich industrial past arises a new vibrant urban district, where old and new Ghent residents can live around the water and in green spaces. About 1,500 new residences will be built in the area between Dampoort and the Muide neighbourhood. 350 residences will be developed in an initial phase, as well as a primary school, crèche, and sports hall. Sustainability is the common theme for this new city neighbourhood. The private partner renders the new development entirely climate neutral by focusing firmly on energy efficiency and renewable energy, car-free living, and sustainable transportation, and on liveability and green spaces. Striking is the ambition to generate energy from waste water and biodegradable waste through an innovative system. The method allows for the future application of urban mining (extraction of raw materials) to such waste streams. In addition to energy neutrality, far-reaching choices were made regarding mobility, housing (kangaroo residences and cohousing), and resident involvement.

- Winter circus

Between 1894 and 1939, the building was a circus with a covered inner ring, and it will be transformed into a leading contemporary hotspot for digital media, while respecting its rich heritage. The new city functions taking place in the building will combine creativity, knowledge, and economy. The location close to a public transportation hub opens up perspectives regarding sustainable transportation towards this new digital centre. From 2015 onwards, the refurbished Winter circus will offer office spaces around a central covered inner yard to organizations and companies involved in digital innovation in media. A concert hall for about 500 people has been planned under the inner ring. Events, a café, restaurant, and foyer have also been planned. The entire refurbishment is also ambitious when it comes to sustainability. sogent aspires to a CO₂-neutral development

- Solar 3D

In the EU project MUSIC⁶², the City of Ghent develops 3D solar energy maps. Via a digital counter, Ghent residents can look up their residence and verify to what extent their roof is suited to the use of solar energy. This map will also be used in the framework of communication on energy-efficient refurbishment (see section 'residential sector') and complements other tools such as the decision tree (an IT tool to be developed which is to help Ghent families make the right choices along their energy-efficient refurbishment trajectory). This solar energy map will also make the connection with electric mobility.

- Buurzame Stroom

⁶² Mitigation in Urban areas: Solutions for Innovative Cities

The “Buurzame stroom” experiment wishes to investigate how solar power can be generated at the neighbourhood level (for instance on large roof surfaces such as schools, garage boxes, and apartment buildings) and how the power can be shared with multiple local residents. This is a way of making solar power more affordable for a larger group of people, generating more solar power, and setting up more efficient systems. Additional focus will be given to people who do not have the financial means to install PV panels on their own roof, but who will be able to enjoy cheap green energy thanks to the experiment. At the moment, solar power at the neighbourhood level is either not legally feasible or not profitable.

The project is being started up and can create a link to ICT components, smart meters, and charging posts during later development phases.

- **Modal shift in transportation**

The City of Ghent is investing a substantial budget in bicycle and pedestrian infrastructure, tramification, but also awareness raising, digital parking guidance systems, apps for travelling through Ghent in a more sustainable fashion, expanding car-free zones, ... to get more people on bicycles, have them enjoy the city on foot, or use public transportation. At the same time, the City focuses on greening the modes of transportation, and facilitates the transfer to higher levels of electric and CNG mobility.

- **District heating**

District heating systems will become part of the future energy supply. They are preferably fed by residual heat from other production processes. Ghent is investigating whether district heating can be linked to the future biomass plant of BEE, allowing numerous companies or residential projects to be heated with green heat.

3. Socioeconomic impact of climate policy

An ambitious climate policy is not only good for social reasons (both intergenerational and (inter)national solidarity such as countering energy poverty), but also has an economic impact. The longer we wait to take measures, the more they will cost. Moreover, doing nothing will cost us even more in the long term.

British economist Stern calculated that spending money now on measures to limit the emission of CO₂ (climate mitigation) would cost us 1 to 2% of worldwide gross domestic product (GDP) per year. But if we do nothing, Stern believes that in the future we will need to spend 5 to 20% of worldwide GDP every year to combat the consequences of climate change (climate adaptation). Therefore, from an economic and financial point of view, it is important to conduct an ambitious climate policy now.

Conducting a robust climate policy also yields immediate advantages for our general well-being and our economy: more companies working on innovative techniques and products, more employment, lower energy bills, more resilience against rising energy costs, a competitive advantage in the international marketplace, and on top of that - owing to better air quality - better health and a lower healthcare invoice.

Stimulating energy-efficient refurbishments, a prominent focal point for urban climate policy, also stimulates the - highly locally oriented - construction industry.

Literature shows that investing 100,000 € on average yields 1 job for one year⁶³.

Through its climate policy and the budget earmarked for this purpose, the City of Ghent wishes to create leverage to encourage its residents and companies to invest. For instance, it has been estimated that all actions geared towards housing (for a combined 8.7 million Euros) could lead to a total investment sum of 129 million Euros if the refurbishment rate in Ghent doubles, providing that 80% of these refurbishments achieve an energy consumption of 70 kWh/m², and 20% of these refurbishments achieve an energy consumption of 30 kWh/m².

The transfer towards a climate-neutral city and greener economy will cause shifts in the economic structure. That is why it is important to also pay attention to these shifts in the training being offered, be it basic training or retraining. The construction industry and the renewable energy sector will not only require more workers but also workers who have been trained differently. As construction grows more complex and new products and materials are used, more retraining will be required to cope with the changes in the sector.

In order to address these challenges, the City of Ghent is participating in the OECD study “Boosting skills ecosystems for greener jobs in Flanders”. The focus of this study lies on the specific competences required to achieve green growth and enable the transfer towards a low-carbon economy. The study is being conducted by the OECD, with Vlakwa (Flemish knowledge centre for water) as the local facilitator due to the specific case regarding water management.

It is clear: working on climate generates economic added value, innovation and jobs. In addition, it helps companies and citizens arm themselves against rising energy costs. Striving to structurally embed energy management within companies places it on the agenda for management meetings, and allows energy to play a role in developing a healthy business management.

Developing energy-efficient refurbishment guidance and the associated financial leverage for families relative to income maximally stimulates vulnerable families to actually invest in energy. This will help them keep their energy bill under control today but also in the future. This is how the City of Ghent seeks to halt and reduce poverty.

⁶³ <http://www.lne.be/themas/beleid/milieueconomie/reguleringskosten/input-output-model/hfst%204%20rapport%20milieusector.pdf>
http://www.ce.nl/publicatie/bouwen_en_banen_-_werkgelegenheidseffecten_van_energiebesparing_in_de_gebouwde_omgeving/1327
http://www.renovate-europe.eu/uploads/Multiple%20Benefits%20Study_Key%20Messages%20Brochure.pdf



Ghent signs the *European Covenant of Initiative on Adaptation to Climate Change*, October 2014

COVENANT OF MAYORS

With the signing of the Covenant of Mayors, the City of Ghent commits to monitoring CO₂ emissions. This monitoring departs from a baseline and then uses a biannual CO₂ inventory.

To underpin the Ghent climate policy, CO₂ emissions on Ghent territory for the years 2007 (baseline) and 2009 were mapped by engineering office Arcadis in conjunction with VITO, as commissioned by the City of Ghent. For the year 2011 VITO was given the assignment by the Flemish government to create a CO₂ monitor for each Flemish municipality in the framework of the study assignment 'Support for the Covenant of Mayors'. Despite the framework and guidelines offered in the Covenant of Mayors⁶⁴, different interpretations are possible. VITO ensures uniform methodology and data collection⁶⁵. This uniformity enhances transparency and reliability. The following years VITO will also supply annual data for the calculation of CO₂ emissions. By being the first Flemish city to set up a CO₂ monitor, Ghent helped pave the way for a standardized approach for all Flemish municipalities. The Ghent figures for the years 2007 and 2009 were once again recalculated according to the new method.

The guidelines of the Covenant of Mayors determine the scope. As indicated, ETS companies are not included in the CO₂ measurements, nor is shipping part of the scope.

INDICATORS

The following environmental indicators are updated annually:

Indicator: Total CO₂ emissions (excl. ETS and shipping)

Description: Emissions by the industry (excl. ETS), tertiary sector, households, agriculture, transportation (excl. shipping) and public lighting

Objective: A reduction of total CO₂ emissions by 20% in 2019 compared to 2007

Situation in 2007: 1,592 ktonnes CO₂

Objective in 2019: 1,274 ktonnes CO₂

⁶⁴ Reporting Guidelines on Sustainable Energy Action Plan and Monitoring, 2014, COM
http://www.burgemeestersconvenant.eu/IMG/pdf/Reporting_Guidelines_SEAP_and_Monitoring.pdf

⁶⁵ Handleiding Ondersteuning burgemeestersconvenant, 2013, VITO
<http://aps.vlaanderen.be/lokaal/burgemeestersconvenant/handleiding-nulmeting.pdf>

Indicator: Total energy consumption (excl. ETS and shipping)

Description: Energy consumption by the industry (excl. ETS), tertiary sector, households, agriculture, transportation (excl. shipping) and public lighting

Objective: A reduction of total energy consumption by 20% in 2019 compared to 2007

Situation in 2007: 6,761 GWh

Objective in 2019: 5,409 GWh

Indicator: Self-sufficiency level regarding energy

Description: Production of renewable energy (from wind, sun) within the territory of the City of Ghent to respond to household demand for electricity and heat

Objective: To increase the production of local renewable energy to 15%

Situation in 2007: 3.88%

Objective in 2019: 15%

Indicator: Energy consumption of city operations

Description: Energy consumption in city buildings

Objective: Annual reduction by 3% compared to consumption level in 2012

Situation in 2012: -5.46% (compared to 2003)

Objective in 2019: -20% (compared to 2003)

Indicator: Modal shift

Description: The share of pedestrians, cyclists, public transportation, and passenger cars used for trips

Objective: To increase the share of pedestrians, cyclists, and public transportation.

Situation in 2012: 14% pedestrians, 22% cyclists, 9% public transportation, and 55% passenger cars

Objective in 2019: 16% pedestrians, 30% cyclists, 13% public transportation, and 41% passenger cars

Indicator: Refurbishment rate

Description: Estimation of the number of thorough refurbishments with energy-saving measures.

Objective: 3,500 residences per year⁶⁶

Situation in 2012: 1,500 residences per year

The majority of this data is sourced from VITO. The CO₂ emissions from city buildings and public lighting are calculated on the basis of data from the energy and water note of the City of Ghent. Naturally, other research offers further insight into the numbers. The data from the research on travel behaviour is highly relevant specifically for transportation, e.g. regarding modal split.

The level of self-sufficiency is calculated annually, specifically for renewable energy. The basic data is sourced from the VREG.

⁶⁶ At the moment the calculation is based on thorough refurbishments with building permit. On the one hand a building permit for some energy-related refurbishments is not required, on the other hand not all refurbishments include energy-related procedures. The method for calculating this indicator will be further refined in the future.

LIST OF ABBREVIATIONS

B2B	Business to business
NZEB	Nearly zero-energy building
BES	Borehole energy storage
CNG	Compressed Natural Gas
CLT	Community Land Trust
CSA	Community Supported Agriculture
EPA	Energy policy agreement
EPIC	Energy performance and indoor climate
ESCO	Energy saving company
EPC	energy performance contract
ETS	EU Emissions Trading System
FROCE	Fund to reduce the overall cost of energy
HVAC	Heating ventilation and air conditioning
IWT	Agentschap voor Innovatie door Wetenschap en Technologie (agency for innovation through science and technology)
LNG	Liquid natural gas
MUSIC	EU project Mitigation in Urban areas: Solutions for Innovative Cities
PERS	Port environmental review system
PPP	Public-private partnership
P&R	Park and ride
RUE	Rational use of energy
STEP UP	EU project Strategic Energy Performance in Urban Planning
SRHA	Social rental housing agency
VREG	Vlaamse Regulator van de Elektriciteits- en Gasmarkt (Flemish regulator of the electricity and gas markets)

www.gentklimaatstad.be