



## Czech-Austrian Winter and Summer School GHG Emissions reduction policies in urban areas

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## **ABSTRACT**

More than 70% of Europeans currently live in urban areas, and they account for 70% of all energy consumption (Vienna municipality website). This concentration makes urban areas the first contributor to GHG emissions, and ultimately to climate variability. The many threats that represent climate variability for human kind make urgent an effective action for mitigating emissions responsible of these variations, while simultaneously adapting to its impact. Cities is of particular interest in this global action, as being the primary contributor of emissions incriminated. Also, an action in cities will contribute to achieve multiple benefits, beyond the climate concern, that usually provides integrated actions in ecosystems. Our motivation in this paper is to make a comparison of actions undertaken in two cities, Prague (Czech Republic) and Vienna (Austria), as a showcase of how the climate mitigation issue is addressed in different cities. Our approach consists on categorizing the different initiatives identified per sector of activity in order to ease the comparison exercise. Following this comparison, we have questioned the efficiency and effectiveness of these numerous initiatives in contributing to reduce cities greenhouse gas (GHG) emissions. Our conclusion shows a real willingness in both cities to address the climate mitigation challenge; Objectives are clearly set, implementation is effective, and effects on GHG emissions is measurable. However, there is still need to do more on evaluating the efficiency of the initiatives in terms of monetary cost to citizens, and to communicate on the impact these all initiatives have on the livability of our case study cities.

## **1. INTRODUCTION**

### **Motivation**

The paper intends to support reflection on how local initiatives for reduction of greenhouse gas (GHG) emissions, targeting different urban sectors, could contribute to improve livability and resilience of cities. It is based on case studies of the Prague and Vienna models, both cities being selected within the exchange programme that exists between technical universities established in the two capital cities. Our aim is to document existent initiatives and their impact in terms of GHG emissions reduced, and to initiate a critical thinking on how to undertake the “step after” political and citizens’ commitments, through an evaluation of the initiatives’ efficiency and effectiveness in order to engage sustainably citizens.

### **Core objective**

The main objective of this paper is to analyze to which extent current initiatives for reducing GHG emissions in Austria and Czech Republic are efficient to address the climate challenge in urban areas. To this end, we will compare initiatives in the cities of Prague and Vienna, and then we will question these policies effectiveness and efficiency.

### **Specific objectives**

The paper specific objectives, which should contribute to meet the above mentioned core objective are:

- To identify sectors targeted as levers for mitigation of cities contribution to GHG emissions;
- To compare, considering baseline in each city, the objectives in terms of sectoral contribution and resources provided for meeting them;
- To propose recommendations for improvement of existent initiatives;
- To propose measures, learning from experiences worldwide, in order to reduce effectively and efficiently the urban ecological footprint.

## Hypothesis

GHG emissions reduction policies are an effective lever for reaching climate action targets in the cities of Austria and Czech Republic

## Methodological approach

The methodology proposed is a combination of city initiatives description and evaluation, followed by comparison at country level. Different initiatives for reducing GHG emissions in the cities of Austria and Czech Republic are first identified, and then classified per target sector. The three sectors of focus are: Energy, mobility and environment. Each initiative is briefly described considering the initiative:

- Rationale
- Objectives
- Effectiveness date
- Main stakeholders
- Level of achievements

Then, the paper questions the initiatives' sustainability based on the parameters of effectiveness and efficiency. Based on observations compiled during our research, possible improvements of these initiatives that have potential to further improve efficiency and contribute to achieve targets are proposed.

## 2. BACKGROUND

Experts estimate that if greenhouse gas (GHG) emissions continue in a business as usual scenario, earth surface temperature could exceed historical values before 2050 with high probability of harmful impact on ecosystems and biodiversity (Nature, 2013). The anthropogenic component of emissions contributing to this global warming is now widely accepted by the scientific community, as well as the fact that majority of these emissions are from urban settlements. In 2015, half of the urban population lived in cities and the United Nations anticipates this share to reach 60% of the world population by 2030. As of 2015, the world's cities occupy just 3 per cent of the Earth's land, but account for 60-80 per cent of energy consumption and 75 per cent of carbon emissions (UN). As cities are part of the climate challenge, they necessarily need to be part of the solution, with actions that positively contribute to the global vision. The main challenge in implementing this vision is to reduce the material needs, and other needs of the cities worldwide, in order to close the "metabolism" and make cities more efficient and "livable". Worldwide, there exists number of initiatives targeting GHG emissions reduction in cities, which are described in following paragraphs.

## **Local Agenda 21**

This Agenda is an action plan intended to materialize the concept “think globally and act locally”. Local agenda 21 has been developed by sub-national entities, including urban areas, based on the principles of the Agenda 21, which is the Declaration on Environment and Development, adopted by more than 178 Governments at the United Nations Conference on Environment and Development (UNCED) held in Rio de Janeiro, Brazil, on June 1992.

## **UN Habitat III**

The New Urban Agenda defined by the third conference of the United Nations on Housing in December 2016 is an action-oriented document that sets global standards of achievement in sustainable urban development. The New Urban Agenda reaffirms the World global commitment to sustainable urban development as a critical step for realizing sustainable development in an integrated and coordinated manner at the global, regional, national, subnational and local levels. The implementation of the New Urban Agenda contributes to the implementation and localization of the post-2015 development Agenda and to the achievement of the Sustainable Development Goals, including the Goal 11 of making cities and human settlements inclusive, safe, resilient and sustainable.

## **Sustainable Development Goal 11 (SDG-11)**

This goal defined as part of the 17 Sustainable Development Goals to be met by 2030 aims at making cities livable considering the global agenda for reducing GHG emissions and for increasing cities resilience to climate change. Among the main objectives of SDG-11 is to increase the number of cities and human settlements adopting and implementing integrated policies and plans towards inclusion, resource efficiency, mitigation and adaptation to climate change, resilience to disasters by 2020. This action also features a reduction of the adverse per capita environmental impact of cities. Other global initiatives targeting the effectiveness of the climate agenda, including climate change mitigation, in cities are the World Bank City Energy Efficiency Transformation Initiative and the Global Initiative for Resource Efficient Cities of the United Nations Environment Programme. Also, the International Standard Organization (ISO) developed in 2014, a set of tools (ISO 37100) intended to measure environment impact of human actions in cities. These tools include the carbon footprint metric.

## **EU Covenant of Mayors Initiative**

The European Union Covenant of Mayors for Climate and Energy is a network of thousands of local and regional authorities voluntarily committed to implementing EU climate and energy objectives on their territory. The signatories pledge to reduce CO2 emissions by at least 40% by 2030. The commitments on climate action of eight (8) Austrian cities, including Vienna, have been accepted at end 2016, and the action plan of four (4) other cities are under review. Eight (8) Czech municipalities, including the capital Prague, also committed to that initiative.

## **Austria Model**

The climate action plan of the city of Vienna is managed by the Vienna Environment Department - MA 22. The department is representing Vienna in international sustainability initiatives targeting cities, including the Eurocities network. The Department implements a

number of flagship programmes intended to reduce GHG emissions and to improve the livability of the city. GHG emissions reduction initiatives in Vienna are combination of policies targeting the green spaces and life quality, including air quality and noise disturbances, enacted by public authorities and/or committed by citizens. Among these initiatives are:

- Urban Air Initiative Vienna launched in 2005 which outcomes feed back into the long-term Vienna Air Strategy;
- Position paper on biomass use;
- Local Agenda 21;
- Vienna Ecological Footprint;
- City of Vienna's environmental prize (Umweltpreis der Stadt Wien).

### **Czech Republic Model**

Czech government approved the policy for climate protection under the name “Politika ochrany klimatu v ČR” (Ministerstvo životního prostředí ČR, s. a.) in 2016. This policy is an important orientation document that should guide the adoption of subsequent initiatives by policy makers and public officials. The objective of the policy is to decrease overall greenhouse gas (GHG) emissions by 20 % between 2005 and 2020. These emissions cuts focused mainly target four (4) areas: (1) diversification of fuel mix in energy generation; (2) improved efficiency of buildings, transport and industry; (3) renewable sources use for electricity and heat generation; and (4) action on agriculture and forestry. In 2013, the municipality of Prague approved the project “Healthy capital city: Prague”. The project aims to meet certain goals laid down in regional and global documents regarding the quality of life, sustainable development and other environment related issues – including agenda 21 (Hlavní město Praha, 2013). The municipality of Prague has approved a number of documents having potential to reduce GHG emissions including:

- Action plan for education on environment,
- City energy conception,
- Diagnostic, concept and strategy for nature protection in Prague,
- Concept for waste management,
- Long-term strategy for air protection,
- Integrated program for reducing emissions and supporting the air quality,
- Principles of mobility regulations,
- Principles for development cycling transport (Magistrát hlavního města Prahy, 2013).

### **3. GHG REDUCTION INITIATIVES IN VIENNA**

There is a wide range of initiatives in Vienna that contributes directly or indirectly to reducing greenhouse gas emissions from anthropogenic activities. Considering the targets of the Smart City Wien project, this part will focus on initiatives in the energy, mobility and environment sectors. Table 1.1 (in annex), lists some of these initiatives with impact estimates in terms of GHG emissions reduction.

## Smart City Wien

The Smart City Vienna initiative is the reference strategy for Vienna sustainable growth strategy featuring responsible consumption and mitigation of climate change. The overall objective of the municipality of Vienna in terms climate mitigation is to pass from 3.1 tons CO<sub>2</sub>e emissions per capita (2016) to 1 ton CO<sub>2</sub>e per capita, meaning a decrease by 67.7% of emissions by 2050, equivalent to 80% decrease compared to 1990 levels. The general strategy programmes have specific objectives that target different urban sectors such as energy supply, mobility, waste management and green spaces. In the following paragraphs, we introduce some sectoral initiatives that aim at contributing to achieve the overall target of GHG emissions reduction in Vienna. Considering the large number of mandatory and voluntary initiatives, we focus here on flagship initiatives that give an idea of larger ambitions in the sector.

### The Vienna Energy Model

The so-called Vienna Energy Model is an environmentally friendly approach to produce electricity and heating together in a process known as cogeneration, providing energy from waste incineration, using renewable energy sources and providing comprehensive mechanisms on improving energy efficiency, energy related services and decentralized generation. Wien Energie, the city-owned energy provider, has an approach on energy generation that aims to increasing the proportion of electricity produced from renewable energy sources to 50 percent and the proportion of heating produced from renewable energy to 42 percent by 2030 compared to 2012 levels. At the end of 2015, the different initiatives have contributed to save an estimated amount of 28.98 million tons CO<sub>2</sub>e emissions. Among the initiatives are the biogas project and the energy efficiency initiative.

The Vienna Energy Model saves around 3 million tons CO<sub>2</sub>e emissions per year compared to baseline. The district cooling initiative, taken alone, contributes with 74 percent to savings. (Wien Energie)

- **Vienna Biogas Project**

The Vienna biogas project is an integrated initiative that combines waste management to energy generation through an ecologically meaningful disposal of waste in the interests of closed-loop recycling management. Within the project, energy is generated from recycling of 17,000 tons of organic waste annually, which contributes to save 3,000 tons CO<sub>2</sub>e; the resulting digested residue of the waste-to-energy process is composted.

- **Energy efficiency**

The Vienna municipality estimates that for better efficiency in use, primary energy input should drop from 3,000 to 2,000 watt per capita. In the buildings sector, energy consumption of existing buildings for space heating/cooling and water heating should decrease by 1% per capita and year.

- **Citizen's solar power plants**

Environmentally friendly energy produced close to consumers minimizes transmission losses and reduces dependency on electricity imports. The Citizens' Solar Power Plants – photovoltaic plants run by Wien Energie and financed via shares issued to the local population- also contributes to reduction of GHG emissions. This reduction is from the production source (solar PV) and from the gains of efficiency due to reduced transmission distances. As of now, twenty-three (23) of these power plants are connected to the general energy supply network of Wiener Netze. The first citizen solar power plant opened

on the site of the Donaustadt power plant in the north of Vienna on May 2012, with 2.100 photovoltaic modules and an output of 500 kilowatts peak (kWp). The energy is fed into the Vienna power grid and provides solar power to approximately 200 local households. Compared to conventional electricity production, harnessing the sun as an energy source saves around 800 tons of CO<sub>2</sub> per year. This business model on energy supply from renewable sources is the first of its kind to be implemented in an urban area, and it has proven economic feasibility, even without subsidized feed-in tariffs.

## **Mobility**

Among the most environment-friendly transport modes is the rail system, as a mass transport mode using clean energy supply. The Austrian Federal Railways (ÖBB) contributes to climate mitigation in mobility services by using a high share of hydropower (97%) for its energy supplies and by operating an increased number of electric railcars with regenerative braking. The two following initiatives contributed to reduce the mobility ecological footprint of Vienna.

- **Upgrade Central Marshalling Yard at Kledering**

In the view of upgrading the lighting system installed at the Central Marshalling Yard at Kledering, about 1,800 standard lamps were replaced by modern lighting fixtures. The installation of the new lighting system at the Kledering Marshalling Yard has cut energy consumption by 45%, thus improving CO<sub>2</sub> balance, thanks to longer life cycles of the new lamps.

- **Ökopoint Meidling**

The Ökopoint Meidling project is an initiative that aims at promoting the responsible use of energy, which positively impacts the GHG emissions related to both energy generation and operation of mass transport systems such as trains. Under the project, the use of three alternative energy sources contributes to reducing GHG emissions: (1) a wind wheel, (2) a photovoltaic plant supplying power for station operations, and (3) a thermal solar power plant for hot water supply.

## **Environment**

Additional initiatives that contribute to improve Vienna livability, featuring GHG emissions saving, include the management of green spaces and the promotion of sustainable individual mobility. The Vienna municipality ambitions to keep the share of green spaces in the city at over 50%, though contributing to the reduction of greenhouse gases concentration in the atmosphere through the sink function of green plants. The sustainable mobility ambitions target a decrease of motorized individual traffic (MIT) from 28% in 2016 to 15% by 2030. By 2050, all vehicles within the municipal boundaries will run without conventional propulsion technologies, therefore contributing to reduce car pollution and to improve climate mitigation.

## **4. GHG REDUCTION INITIATIVES IN PRAGUE**

Systematic measurement of greenhouse gases (GHG) emissions in Czech Republic has shorter history than measurement of “standard” pollutants. It started with Czech Republic approval of international agreements that intend to decrease GHG emissions, requiring from the country unified, transparent, consistent and controllable approach for



measuring national emissions and their evolution. The methodology is standardized in line with international requirements. The data recorded is primarily used for evaluating compliance with the Kyoto Protocol and the larger “UN climate action agenda”. In addition, European Union legislation requires national inventory. On the other hand, there is no baseline for measuring trend at local and regional levels, though these levels are usually compared to more recent emissions estimates (Magistrát hlavního města Prahy, 2014).

In the framework of national inventory process, the following GHG emissions are measured: carbon dioxide - CO<sub>2</sub>, methane - CH<sub>4</sub>, nitrous oxide – N<sub>2</sub>O, sulfur hexafluoride – SF<sub>6</sub> and 2 large groups of gases called fluorinated hydrocarbons. These inventories reveal huge differences of emissions with respect to relevant sectors among countries. In fact, it can be seen that in developed countries, the energy sector dominates in these statistics. The sector accounts on average for 70 – 90 % of national emissions. If we consider big cities, as Prague, the most significant contributor to GHG emissions is not only energy production, but also transport services. For these sectors, specific calculations are made in terms of CO<sub>2</sub> equivalent. Between 2001 and 2014, GHG emissions in Prague oscillate between 6.9 mil. t. CO<sub>2</sub> eq. to 8.5 mil. t. CO<sub>2</sub> eq. per annum. This is equivalent to 6-7 t. of CO<sub>2</sub>e emissions per capita. In 2014, it was measured 5.59 t. of CO<sub>2</sub> e per citizen. In recent years, there has been a significant decline in GHG emissions. In 2014, the major GHG emissions’ sources were electricity production (37%), transport (29%), natural gas combustion (18%) and heat production (13%). Between 2013 and 2014, each major sector showed significant decrease in emissions – except transport (Magistrát hlavního města Prahy, 2014). Details can be seen in annex 2 of this document.

## Energy

Since energy sector is responsible for the biggest part of emissions in Prague, the local government has initiated initiatives that target energy related issues. Moreover, Kennedy et al. (2009) conclude that reducing electricity demand in Prague could return substantial emissions reduction. The city of Prague approved the “Territorial energetic strategy 2013 – 2033” (Seven Energy, 2013), which defines four (4) primary areas of interest that are: (1) Improved efficiency of energy use in city owned buildings, (2) Energy use efficiency in the overall city of Prague, (3) support to use of renewable, secondary and prospective sources of energy, and (4) support to secure and reliable supply of energy. The first three (3) areas inherently contributes to reduce greenhouse gases emissions.

In 2011, energy consumption of all sectors (households, industry and tertiary sector) accounted for 58 PJ. The highest share is represented by households. In contrast lowest share is represented by industry (Seven Energy, 2013). The biggest potential in energy savings was identified in tertiary sector, because the city of Prague directly owns and operates majority of properties that belong to this sector. Potential of energy savings is shown in the table 1.2. The potential estimates include technical, economic and market based potentials. Technical potential is defined as savings that can be obtained by incorporating all technologically available solutions, without considering economic effectiveness. Economic potential is subset of technical potential. It considers only measures that have economic meaning before being obsolete. The latter one is subset of economic potential, and considers measures that have high economic effectiveness, such as returns from investment for improved efficiency being less than 5 years for households

and less than 3 years for industry. This category also includes solutions that do not have the best returns, but have significant other benefits.

Table 1.2 lists the potential of energy savings considering the different categories of possible solutions for Czech Republic.

**Table 1.2 Overview of potential energy savings after transformation in all sectors**

<i>Type of potential in energy savings</i>	<i>Size of savings (GJ)</i>	<i>Size of savings (%)</i>	<i>Investment costs (billions of CZK)</i>
<i>Technical potential</i>	11.2 mil	19 %	198.5
<i>Economic potential</i>	6.5 mil	11 %	85.2
<i>Market potential</i>	2 mil	3 %	10.5

*Source: Seven Energy (20130)*

More savings (in PJ per year) are possible to obtain by implementing more effective improvement solutions in production and supply of electricity and heat. In addition, “smarter” usage of electricity with more efficient electric devices and more efficient lighting, and efficient ventilation systems could contribute to savings. These individual investments also very often prove to have economic rational. Currently, three subsidy programs exist in Prague contributing to energy savings: (1) “Clean energy Prague 2017”, (2) “Boiler subsidy” and (3) “New Green to Energy Savings”. All of them target households. The first two programs provide incentive to move from polluting heating systems to more efficient systems, which complies with previous strategies. The budget of these programs are 18 mil. CZK (approx. 681 000 €) and 23.7 mil. CZK (approx. 894 000 €) in first round, respectively. The third program “New Green to Energy Savings” is designed to support transformation of houses into more energy efficient and eco-friendly buildings, mostly through improved insulation. It is also possible to use this financing mechanism to invest in solar panels. The financing of this program depends on returns from emission allowances, and it is possible to apply the program until 2021. On the other hand, the first program is effective only until the end of September 2017, the second program does not have specific term.

## **Mobility**

The Strategic Plan of Prague (IPR Praha, 2016) mainly focuses on “sustainable mobility”. The city focuses on a strategy that is acceptable in the long run with respect to social, economic and environmental issues. The aim is to create better synergies among transport, quality of environment and public areas. The Plan provides that traffic accessibility will be oriented exclusively on environmentally friendly types of transport – i.e. on rail transport, walking and biking. The goal is to raise share of public transport, walking and cycling to at least 70 %. The attractiveness of these types of transport will be higher and their promotion will impact the reduction of GHG emissions. In addition, transport will be safer and energy efficiency higher. It is also possible to mention other relevant impacts of moving from the current situation – less cars means less noise, less parking spots means more green areas. The regulation of cars use will be considered – the less distant to the downtown, the more strict the regulation. This strategy can lead to more reliable, faster and enjoyable traveling in the city. Moreover, it has valuable impact

on health and environment, what will raise the city attractiveness in general. Improved energy efficiency in transportation will have positive economic impact. The electromobility and other alternative transport means will reduce dependency to oil. The Strategic plan proposes specific indicators for measuring the trajectory of defined goals:

- The share of public, walking and bike transportation;
- The number of passengers in the public transport in Prague area;
- Additional amount of capital expenditures in Prague's budget for development of public, walking and bike transport systems;
- Additional capacity of P+R (park and ride) systems in Prague;
- Additional average speed of trams and buses;
- Reduction of the amount of cars in the inner part of the city;
- Additional passengers in suburban rail transportation.

The plan is relatively complex and proposes achievable tasks that include:

- growing a network of rails for trams and subway;
- better cooperation with operators of suburban trains;
- creating new safe routes for walking and biking transport (accessible to disabled people);
- preparing connections over rivers;
- supporting creation of charging spots for electric cars; etc.

With respect to electric cars, an attractive policy has been implemented. In Prague, like in other similar European cities, there are high parking prices resulting from the high demand for these parking. This policy should incentivize people to purchase electric cars, as parking electric cars becomes possible everywhere in the city for free (Metro, 2016). In fact, the owner pays yearly a relatively small amount - approximately 16 €- for parking in all districts of Prague. In contrast, owners of conventional cars do not have this option.

## **Waste management**

In 2016, the city of Prague approved the strategic "Plan for waste management 2025" (Magistrát hlavního města Prahy, 2016). The principal aim of the plan is to meet goals defined by European Union in waste management by 2025. Measures proposed include education of stakeholders on different aspects of waste generation (prevention), improvement of waste separation (e.g. by creating network of trash bins for biological waste) and investment in waste recycling by construction of new recycling centers.

## **Environment**

It is almost impossible to plan new green areas in the downtown of Prague, unfortunately. Hence, the main strategy of the city is to protect and maintain existent areas, and to foster their quality. Twenty five (25) percent of the city of Prague is made of green spaces. Between 1995 and 2014, more than 3,700 trees were planted, contributing to reduction of GHG emissions through the carbon sink function of green plants (Magistrát hlavního města Prahy, 2014). Moreover, between 1990 and 2014, 307 hectares of forests were planted in Prague area representing a growth of more than 6 % of forests.

## **Initiatives Efficiency and Effectiveness**

In order to assess how initiatives above listed contributes to reach initiators' targets, there is need to evaluate their effectiveness and efficiency. The many initiatives listed shows action for reducing GHG emissions in the two cities is effective. However, our intention to assess these initiatives efficiency was challenged by the difficulties of finding information on elements of computation, mainly the cost of the initiative and its implementation timeframe. This is worth being highlighted here because the non-accessibility of such information may hamper the citizens' commitments to the initiatives, which is critical to not only implementation, but also to sustainability of achievements.

## **5. CONCLUSION**

Austria and Czech Republic are at different stages of the path to greening urban areas, in terms of climate mitigation policies and initiatives for improving cities livability. However, in both cities compared in this paper, namely Prague and Vienna, there is a political willingness and a citizen engagement to improve cities livability through reduction of greenhouse gas (GHG) emissions. The actions thought and undertaken in Prague and in Vienna positively contribute to reduce the carbon footprint of urban settlements and are therefore an important contribution to the global climate action defined in the post-2015 Development Agenda. However, in these times of doubt and competing requests for public resources, there is need to undertake the "step after", by measuring the efficiency of initiatives undertaken in terms of cost to and benefits for citizens, both immediate and in the long term. Another important component of the "step after" agenda is to communicate on this cost-benefit analysis, such as to demonstrate that initiatives for reducing GHG emissions is a profitable investment for citizens. This will secure current initiatives sustainability and ensure potential upscale through an inclusive and concerted action.

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## ANNEXES

### Annex 1

The table summarizes key elements of the initiatives above listed, and others, with GHG emissions reduction impact in Vienna.

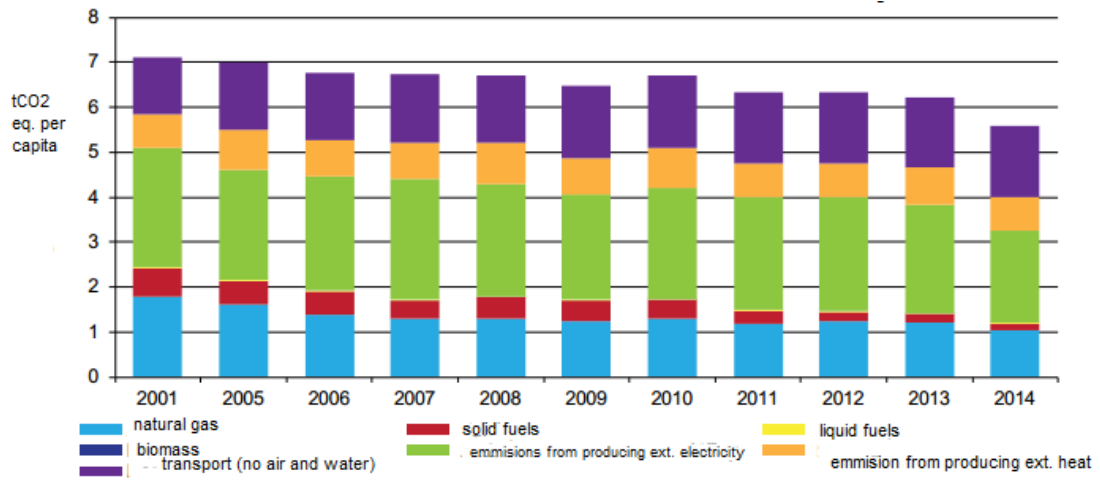
**Table 1.1 GHG emissions reduction initiatives in Vienna**

Sector	Initiative	Initiator	Starting year	Objectives (GHG emissions saving)	Status (GHG emissions saving)
Overall city	Smart City Wien	Municipality of Vienna	2013	Per-capita greenhouse gas emissions in Vienna drop by at least 35% by 2030 and by 80% by 2050 (compared to 1990)	
	EcoBusiness Vienna	MA 22	1998		331.000 tons CO2e
	klimaaktiv pakt2020	Austrian Federal Ministry of Agriculture, Forestry, Environment and Water Management	2004	620.000 tons CO2 reduction per year thanks to investment on renewable generation	
Energy	Energy and Climate policy	Austria Federal Government	October 2014	Reducing greenhouse gas emissions by 40 percent below the 1990 level by 2030	28.92 million. tons (end 2015)
	'Green heating – Sonnenwärme and Erdwärme (Decentralized options)	Wien Energie	Spring 2014	proportion of production from RE sources of electricity to reach 50%, and of heating to reach 42 percent by 2030	

	Wien Energie District Cooling	Wien Energie	August 2014		74 percent less CO2 emissions
	Citizen's solar power plants	Wien Energie	2012		800 tons CO2e per year
	Biogas Wien	Wien Energie			3,000 tons CO2/year
Mobility	Central Marshalling Yard at Kledering	Austrian Federal Railways (ÖBB)	1999		
	Ökopoint Meidling (OBB)	Austrian Federal Railways (ÖBB)	2003	4,000 kg CO2e per year	
Environment		EU Covenant of Mayor (Vienna commitment)			
		Local Agenda 21			

## Annex 2

Graph 1: Emissions of GHG in Prague, 2001, 2005 – 2014, co2 t eq. / resident



source: Magistrát hlavního města Prahy (2014)