



european post-carbon
cities of tomorrow

D2.2 GOOD CITY PRACTICES INVENTORY

IRS, ECOLOGIC INSTITUTE, ENERGY CITIES



This project has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under grant agreement no. 613286.



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With thanks to:

Monica Ridgway and Max Grünig.

Project coordination and editing provided by Ecologic Institute.

Manuscript completed in December 2014

Document title	GOOD CITY PRACTICES
Work Package	WP2
Document Type	Deliverable
Date	10 December 2014
Document Status	Final Version

ACKNOWLEDGEMENT & DISCLAIMER

The research leading to these results has received funding from the European Union FP7 SSH.2013.7.1-1: Post-carbon cities in Europe: A long-term outlook under the grant agreement n°613286.

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LIST OF ABBREVIATIONS

CHP	Combined heat and power
COM	Covenant of Mayors
CNG	Compressed natural gas
DSM	Demand side management
EEA	European Energy Award
EPC	Energy Performance Contracting
ESCOs	Energy Service Companies
HVO	Hydrogenated vegetable oils
ICLEI	Local Governments for Sustainability
ICT	Information and communications technology
LCD	Liquid-crystal display
LIT	Local Implementation Team
POC	Pilot environmental zone
SEAP	Sustainable Energy Action Plan

INTRODUCTION

POCACITO facilitates the transition of EU cities to a forecasted sustainable or "post-carbon" economic model. The project focuses on towns, cities, megacities, metropolitan areas and urban clusters larger than 1 million people as well as small and medium-sized cities. This document reports on the D2.2 Good City Practices Inventory. Although a stand-alone deliverable, it can be viewed primarily as an interim result and internal knowledge base for the project. It builds upon the work carried out in D2.1 Leading Cities Inventory, will be complemented by the D2.3 Good National and EU Practices Inventory and feeds into D2.4 Typologies Paper.

The aim of the project is to advance a post-carbon vision for cities of various sizes, regions and degrees of wealth across Europe (and ultimately beyond). WP2 identifies and collects basic information and data on leading cities in Europe in the transition to become a post-carbon city. Crucially, the aim is to include national and regional leaders, as well as European. As such, D2.1 Leading Cities Report included nationally leading cities well-known internationally (e.g. Stockholm), as well as cities (e.g. Skopje) in other member states not recognized as European leaders. For this reason, the D2.2 Good City Practices Inventory concentrates largely, but not only, on good practices in cities identified in D2.1 Leading Cities Inventory. As such, notable examples of good practices in other cities are not always included in the report.

When considering the practices included it is important to note the difference between "best practice" and "good practice": the former suggests that there is one single best practice that can be applied universally; the latter denotes a more contingent, context-sensitive notion of practices, by which one practice may be appropriate in a particular context and some practices not at all. Ultimately, cities differ considerably according to ongoing long, medium, and short-term social, economic and political processes. Pathways of individual cities are shaped by the: basic conditions and assets of cities that change only in the long-term (e.g. population density and urban form); conditions that change in the medium-term (economic situation and social capital); as well as short-term events that lead to rapid changes, such as environmental disasters (e.g. flooding) (Kern and Beveridge forthcoming).

While it is true that cities learn from other cities, they learn different things and do so in different ways and at different speeds (Rose 1993, 2005). Learning and transfer are fundamental to post-carbon transitions but they are also fundamentally dependent on contextual factors. Ultimately, transitions are, as Meadowcroft (2009) has emphasized, a very political process, defined by local conflicts as much as learning processes. However they unfold, post-carbon transitions will, then, retain a degree of unpredictability and will produce losers as well as winners.

For this reason the emphasis in our report is on municipal strategies and interventions – the municipality being the actor most capable of initiating and steering such a post-carbon transition, despite the diverse constraints on autonomy apparent across different contexts (e.g. lack of finances, extent of problem to be dealt with). Furthermore, we emphasise the social dimension and practices which ensure proper citizen participation. Hence, the list below provides proposals for practices, ranging from general governance and strategic, which focus on the overall context of action, to sectoral interventions, not all of which are feasible or perhaps desirable in every urban context. Given

there are a range of possible post-carbon practices and transitions pathways available to cities, what we provide here is a general guide, drawing on the expertise of organisations, such as Energy Cities and ICLEI, who work with practitioners in the field of urban energy, climate and environment. A number of examples of good practices are provided in each category when possible, with hyperlinks to relevant sources.

The methodology used to produce the report was adapted significantly. Originally, we planned that expert surveys (and follow-up research) conducted by partners in their own cities and regions would provide more context-related material on practices in cities across Europe. It was intended that this material would supplement desk-based research carried out on secondary sources of information regarding good practices. As the expert surveys provided inadequate results, the methodology was re-focused on the analysis of secondary sources. This had a knock-on effect on the content of the report, with consideration of different contexts and the success of practices being replaced by a detailed overview of practices based on the secondary sources. Given the nature of the sources consulted (websites of city councils and organisations such as ICLEI), we decided to make the report more policymaker and less academic focused.

I.I GOVERNANCE AND OVERALL MUNICIPAL STRATEGY: INITIATING & SUSTAINING A POST-CARBON TRANSITION

This chapter focuses on the governance and municipal strategy integral to creating and sustaining post-carbon transitions. It emphasises the importance of: establishing or responding to inclusive visions of a post-carbon city, which entails the municipality adopting an active role in partnership with stakeholders; careful planning and acquiring expertise and capacity through internal development processes and external transfer and learning in networks; and the cyclical nature of developing policy and plans, implementing them thoroughly, evaluating their results and reframing accordingly. It should be noted that many leading cities are already in their second or third iteration of transition towards more sustainable patterns of urban development.

I.I.I BASIC AND PREPARATORY STEPS

Within the notion of a policy cycle (e.g. Jänicke et al. 2000), the measures mentioned in this section are closely related to the first steps of *problem perception* and *agenda setting*. A number of factors determine how urgent changes in the development pattern and – equally important – how realistic alternative development pathways are perceived by key urban actors.

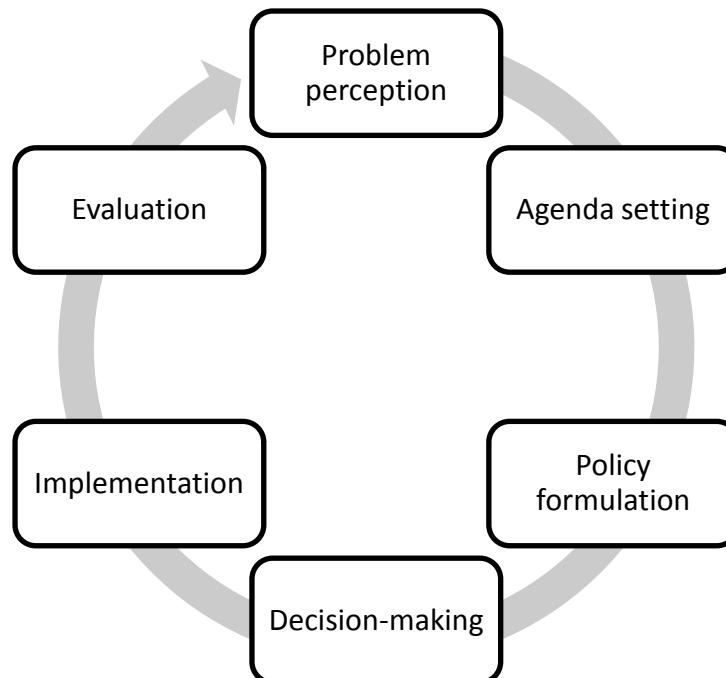


Figure 1: Policy cycle (Cf. Jänicke et al. (2000), pp. 52-64).

Enabling and restraining factors regarding both aspects include: local environmental problems and their perception; local socio-economic trends; the national / regional legal and regulatory framework; fiscal and technical capacities of the local administration; other local sources of finance and expertise; level of citizen engagement.

While these factors frame municipal action structurally, along with international trends and policy debates, all sustainability initiatives are ultimately shaped by singular local events and actors. The birth of a successful local transition process can often be narrowed down to the question of whether a group of people were able to exploit a situation to mobilise support to make change happen. In Växjö, Sweden, serious pollution of the local lake Tummen sensitised city administrators as well as citizens to environmental problems in the 1960s. This resulted in a sequence of environmental strategies, the outcomes of which make Växjö one of the undisputed leaders in the post-carbon transition¹. Similarly, in Freiburg, Germany, protests against the location of a nuclear power plant in Wyhl in the 1970s resulted in political action and the active development of technological alternatives to fossil fuel consumption. In the small town of Güssing, Austria, two visionaries were able to take the region out of a state of economic insignificance and inertia during the Cold War by mobilising support for a vision of Güssing's energy autonomy based mainly on local wood resources – now one of the best known examples of its kind.

Once a transformational idea is on the local agenda, several activities are commonly mentioned as success factors for the later formulation of a local transformative strategy. These range from communication channels across local administrative units (which can be formalised early and later in the process) and alliances with external actors to provide a sound knowledge base for the development of a local climate strategy. At this stage, local authorities with less administrative and scientific capacities can benefit particularly from the expertise offered by (international) city networks.

Develop and/ or exploit momentum for change:

- Responding to and building upon public desire for change
 - [[Freiburg](#) – cradle of anti-nuclear movement in 1970s after successful protest against nearby nuclear power station, local-regional movement]²
 - [[Växjö](#) – pollution of lake Tummen helped shape an environmental agenda in the 1960s and 1970s, supported by citizens and local politicians]³
 - [[Totnes](#) - first 'Transition Town', self-organized groups that actively participate in and coordinate projects aimed at transition to renewable energy]⁴
- Create momentum for change – forge new identity based on transition

¹ <http://www.unep.org/GC/GCSS-IX/Documents/Swedish-1A.pdf>

² http://www.carsoncenter.uni-muenchen.de/download/staff_and_fellows/projects/project_milder.pdf

³ <http://crrresearch.org/community-research-connections/climate-change-adaptation-and-mitigation/v%C3%A4xj%C3%B6-sweden-greenest-city-e>

⁴ <http://transitionculture.org/wp-content/uploads/Transition-Town-Totnes-Ashden-report-final4.pdf>

- [[Malmö](#): commitment to sustainable urban development became key driving force for new pilot projects, technical innovations, targets and policy agendas]⁵

Establish a cross-departmental lead office for environment/ energy transition:

- Municipal energy / climate protection management office
 - [[Ludwigsburg](#): Sustainable Urban Development Department formed to implement a holistic approach to sustainability initiatives]⁶
 - [[Hannover](#): (*in German*): Leading Office on Climate Protection, first large German city to merge economy and environment administrative sectors into one joint department]⁷
 - [[Freiburg](#): city administration and relevant partners meet bi-annually and are organised in a three-tier structure, splitting policy and strategy, implementation management and sectoral planning to monitor and assess projects and policies]⁸
 - [[Essen's](#) klima/werk/stadt/ SEAP engages stakeholders to help create new climate politics culture]⁹

Create a scientific / analytical basis for a local climate strategy:

- Analyse political, legal and financial bases
 - [[Nantes](#): 60 Métropole officers from range of departments are directly involved in climate actions]¹⁰
- Conduct a Baseline Emissions Inventory
 - [[Dublin2010-2020](#) SEAP aims for holistic approach to reduce carbon and water footprint of city - setting ambitious targets that will be documented and monitored]¹¹ [[Malmö](#)]¹²; and all [Covenant of Mayors](#) signatories¹³.
 - [[London](#): Borough of Sutton intends to optimise all material, energy and transport flows on its territory to reduce ecological footprint (analysis of territorial metabolism)]¹⁴
 - [[Geneva](#): prioritise action based on the flow of incoming materials]¹⁵

⁵ http://www.iclei.org/fileadmin/PUBLICATIONS/Case_Studies/7_Malmo_-_ICLEI-IRENA_2012.pdf

⁶ <http://www.annex51.org/media/content/files/casestudies/SubC-Ludwigsburg.pdf>

⁷ <http://www.leitfaden.kommunaler-klimaschutz.de/leitfaden/c1-handlungsm-glichkeiten-innerhalb-der-lokalen-verwaltung.html#toc2>

⁸ http://www.iclei.org/fileadmin/PUBLICATIONS/Case_Studies/ICLEI_cs_104_Freiburg_June_2010.pdf

⁹ http://ec.europa.eu/environment/europeangreencapital/wp-content/uploads/2014/08/MDR0763Rp0029_Good-Practice-Report-2016_F02-reduced1.pdf

¹⁰ http://nws.eurocities.eu/MediaShell/media/CASCADE_Nantes_profile.pdf

¹¹ http://www.energy-cities.eu/db/Dublin_SEAP_Baseline_Emission_Inventory_2010_en.pdf

¹² http://www.energy-cities.eu/db/Malmo_SEAP_2009_sv.pdf

¹³ http://www.covenantofmayors.eu/about/signatories_en.html

¹⁴ <http://www.oneplanetsutton.org/>

¹⁵ http://www.energy-cities.eu/wiki/index.php/Proposal_2.1#Geneva_Canton.2C_Switzerland

Partnerships & learning:

- Establish external partnerships & establish a local energy alliance
 - [[“Munich for Climate”](#)]: network of local actors and city government to develop climate projects]¹⁶
 - [[Heidelberg](#)]: ‘Heidelberg Round Table Climate Protection and Energy’ comprises stakeholder representatives and local authorities to develop local energy plans]¹⁷
 - [[Modena](#)]: creating a new energy culture based on energy savings amongst stakeholders and municipality]¹⁸
 - [[Barcelona](#)]: organised cross-departmental structures and processes centred on SEAP]¹⁹; [[Dublin energy action plan](#)]²⁰
 - [[Växjö](#)]: ecoBudget is used to ensure that sustainability goals are monitored, reviewed and achieved across all sectors]²¹; [[EcoBudget Bologna](#)]²²
 - [[Malmö](#) and [Düsseldorf](#) used town and regional twinning for learning and creation of focal point for transition activities]^{23 24}
 - Join national, European and international networks e.g. COM [[generic](#)]²⁵

¹⁶ http://www.energy-cities.eu/wiki/index.php/Proposal_1.2

¹⁷ <http://www.klimabuendnis.org/heidelberg.0.html>

¹⁸ http://www.energy-cities.eu/db/modena_573_en.pdf

¹⁹ http://www.energy-cities.eu/wiki/index.php/Proposal_4.2

²⁰ http://www.energy-cities.eu/db/Dublin_SEAPv2_2010_en.pdf

²¹ <http://www.ecobudget.org/?id=7030>

²² http://www.iclei.org/fileadmin/PUBLICATIONS/Case_Studies/ICLEI_cs_103_Bologna_September_2007.pdf

²³ http://energy-cities.eu/wiki/index.php/Proposal_4.7

²⁴ <http://wupperinst.org/en/projects/details/wi/p/s/pd/328/>

²⁵ <http://www.covenantofmayors.eu/As-a-Local-Authority.html>

HANNOVER²⁶ (518,000), GERMANY

Hannover was one of the first towns in Germany to introduce sustainable energy to its political agenda. Establishing a cross-departmental lead office for climate has been crucial to achievements.



Background

Hannover is one of Northern Germany's major cities and is an important economic and scientific centre. Since the 1980s, with the decision of the town council to promote the reduction of energy consumption and to expand renewable energies in the region, sustainable development has become a major political priority. The city has developed important numerous organisational and legal tools (e.g. Local Agenda 21 and Ecological Standards for Building Construction within the Municipality's 'Sphere of Influence').

Activities

In 1994, Hannover created the climate protection bureau within the city administration to push climate protection in Hannover. The bureau is responsible for the establishment and monitoring of climate protection action programmes and many other energy related topics. In 2005 Hannover adopted its sustainable urban development programme, "*Hannover plusZehn*" (2005-2015), which integrates actions regarding innovation, business development, social questions and environmental protection. The municipal government has been re-organised to create a single economic and environmental department. This is the first example of its kind amongst European cities.

In 2007 stakeholders from the City of Hannover developed in cooperation with the municipality a climate protection action programme and started to work in the Climate Alliance Hannover 2020, to support the city's target of a 40 % reduction of CO₂ emissions. Until now the Climate Alliance Hannover 2020 is meeting regularly.

In 2012 an ambitious project, the 'Masterplan City and Region Hannover: 100 % climate protection' started. The aim is to promote a nearly climate neutral Region Hannover by reducing 95 % of greenhouse gas emissions and to half energy consumption by the year 2050.

Results

Thanks to a diverse economic make-up, well-known universities, co-operation between business and research, business support programmes, Hannover has a strong economy and has shown a relatively good performance in recent conditions of financial crisis and budgetary constraint. Moreover, despite the intensification of urban traffic and the increment of residential space per inhabitant accompanying economic growth, energy consumption of the city dropped by 10% between 1990 and 2010²⁷.

In 2011 Hannover was awarded the title of European capital of biodiversity, acknowledging its efforts as regards urban ecology and was awarded winner of the "Local Climate Protection 2010" prize. In 2011 the city hosted a congress as preparation for Rio +20 on the subject of "Sustainable development at local level".

²⁶ <http://www.leitfaden.kommunaler-klimaschutz.de/leitfaden/c1-handlungsm-lichkeiten-innerhalb-der-lokalen-verwaltung.html#toc2>

²⁷ http://www.agenda21.de/images/stories/sustainable_hannover/SynergiesEnvironment-Economy.pdf

I.I.II DEVELOP A LOCAL ACTION PLAN

This section refers to the steps of *policy formulation* and *decision-making* in the ideal-typical policy cycle. Whether referred to as “strategy”, “roadmap” or “vision”, the quality of a local action plan is of paramount importance for a successful local transition. It needs to strike a balance between the formulation of a technically, administratively and financially sound programme and a comprehensive approach with positive local identification potential. Having identified appropriate and effective activity areas through analyses and policy dialogue, priorities need to be set. The (technical) reduction or improvement goals and sectoral targets need to be embedded in a longer term vision referring also to local social and economic impacts. The societal significance of the envisaged transformation must be clear. Societal actors will want to know how they can benefit and contribute in concrete terms. This can be integrated in a clear hierarchy of plans and targets, e.g. with one “master” strategy and several action plans in target areas or sectors. The earlier in the process a broad range of stakeholders is involved, the greater the likelihood of successful implementation. This is shown, for instance, in Bottrop (Germany), where one-fifth of the citizens petitioned their city council to become a model low-carbon city in 2009. Four years later, Bottrop reached a remarkably high 7.8% building refurbishment ratio (EU average: 1%) with a district-level support structure for house owners.

Analyse data and develop a draft plan:

- [Malmö: is setting local targets for future action to help achieve national goals]²⁸; [Tampere]²⁹; [Skopje]³⁰; [All Covenant of Mayors SEAPs]³¹

Establish and ensure democratic decision-making processes:

- Involve stakeholders in a participatory process: government officials, community members, societal organizations and activists, businesses:
 - [Kvarterloft in Copenhagen sectoral initiative for urban regeneration]³²
 - [Newcastle: government is attempting to lead sustainable initiatives, encouraging citizen involvement]³³
 - [Essen: has created multi-stakeholder cooperation structures]³⁴
 - [Nantes: ongoing multi-stakeholder participation in future city plans]³⁵
 - [Lausanne: ensuring all local authorities and citizens take actions in most sustainable ways]³⁶
 - [Modena: stakeholder participation in strategic planning]³⁷

²⁸ http://www.iclei.org/fileadmin/PUBLICATIONS/Case_Studies/7_Malmo_-_ICLEI-IRENA_2012.pdf

²⁹ <http://www.iclei-europe.org/members/member-in-the-spotlight/archive/tampere/>

³⁰ http://www.eumayors.eu/about/signatories_en.html?city_id=1424&seap

³¹ http://www.covenantofmayors.eu/actions/sustainable-energy-action-plans_en.html

³² https://www.nydanmark.dk/NR/rdonlyres/8B65A41E-79E6-4227-B08B-1B5A641CC27E/0/10_years_of_urban_regeneration.pdf

³³ http://www.energy-cities.eu/db/Newcastle_Climate-Change-Strategy_Action-Plan_2010_en.pdf

³⁴ http://www.iclei.org/fileadmin/PUBLICATIONS/Case_Studies/ICLEI_cs_170_Essen_2014.pdf

³⁵ http://www.iclei.org/fileadmin/PUBLICATIONS/Case_Studies/ICLEI_cs_145_Nantes.pdf

³⁶ <http://www.lcvb.ch/en/sustainable-city/>

³⁷ <http://www.regions202020.eu/cms/news/secnews-3-en/come2com/modena/>

Co-create a long-term vision to shape policies and outline pathways of action:

- [\[London\]](#): “One Planet Living” principles has created a clear vision for the future]³⁸
- [\[Grenoble\]](#): “Facteur 4”- one-quarter of GHG emissions by 2050]³⁹
- [\[Helsinki\]](#)’s Greater Helsinki Vision 2050 aims to encourage innovation amongst citizens]⁴⁰
- [\[Base\]](#): cutting-edge technologies to make city a “2,000 Watt society”]⁴¹

Establish and ensure cross-cutting social objectives, such as health, liveability, affordability, inclusion:

- [\[Bristol\]](#): “Healthy Bristol For All” campaign aims to merge social and environmental benefits within the city]⁴²

Align short and long term goals in a Transition Action Plan: [\[generic\]](#)⁴³

Set emissions reduction goal, indicators and targets:

- [\[European Energy Award\]](#) Gold Municipalities]⁴⁴
 - Based on a political decision
 - [\[Copenhagen\]](#) has set targets to become first carbon neutral capital by 2025]⁴⁵
 - [\[Stockholm\]](#): has set targets to become a fossil fuel free city by 2050]⁴⁶
 - [\[Freiburg\]](#)’s (*in German*) city council decision to adopt 30/30 target for city]⁴⁷
 - [\[Frederikshavn\]](#): has local plan to transition to 100% renewable energy adoption]⁴⁸
 - [\[Malmö\]](#): plans for Western Harbour neighbourhood to be fuelled by 100% renewable energies by 2030]⁴⁹
 - Based on scientific analyses
 - [\[Dublin SEAP\]](#): was based on detailed energy audits to focus resources]⁵⁰

³⁸ http://www.energy-cities.eu/wiki/index.php/Proposal_1.4

³⁹ <http://www.grenoble.fr/76-facteur-4.htm>

⁴⁰ http://www.google.de/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=0CCYQFiAA&url=http%3A%2F%2Fwww.hel.fi%2Fhel2%2Fhelsinginseutu%2FFINAL_GreaterHelsinki_200x200mm_english_03-09-2010_LOW.pdf&ei=wP9AVOaWO9Le7AaSoYHAAg&usq=AFQjCNFxeHgdfGmU0otsQqVwNkftXIsBgg&si

⁴¹ <http://doc2.energy-cities.eu/greenstone/collect/imagine/index/assoc/HASH01e3.dir/ImagineSession1Stulz2006En.pdf>

⁴² <http://www.bristol.gov.uk/press/bristol-wins-global-award-recognition-healthy-liveable-city>

⁴³ http://www.energy-cities.eu/wiki/index.php/Proposal_1.7

⁴⁴ <http://www.european-energy-award.org/gold-municipalities/>

⁴⁵ <http://denmark.dk/en/green-living/copenhagen/>

⁴⁶ <http://stockholm2006.iclei-europe.org/index.php?id=4332>

⁴⁷ <http://www.leitfaden.kommunaler-klimaschutz.de/leitfaden/c1-handlungsm-glichkeiten-innerhalb-der-lokalen-verwaltung.html#toc1>

⁴⁸ http://www.energy-cities.eu/db/Frederikshavn_100perCent_renewable_2008_en.pdf

⁴⁹ <http://www.fomento.gob.es/NR/rdonlyres/9D6A5DD0-D460-4728-9882-71E4E5EDD3EF/95899/5.pdf>

- [[Barcelona SEAP](#): based on energy audits across major sectors to set ambitious yet feasible targets and plans of action]⁵¹
- With the support of citizens
 - [[Zurich](#): has achieved support of three quarters of the city population on for 2,000 Watt Society initiative]⁵²
 - [[Bottrop](#): has 20,000 citizens sign petition to become “InnovationCity Ruhr”]⁵³
 - [Multiple cities have committed to future targets of becoming 100% renewable energy oriented through ‘[Go 100 %](#)’]⁵⁴
- Finalize plan
 - [[Frederikshavn](#): 100% renewable]⁵⁵
 - [[Växjö](#): long-term strategy “Fossil Fuel Free Växjö” supported by municipality and citizens through financing and commitment measures]⁵⁶
 - [[Bottrop](#): masterplan to turn city into a living laboratory of energy efficiency innovations]⁵⁷
 - [[Ludwigsburg](#): integrated climate protection and energy strategy agreed upon by local stakeholders to hold all accountable to reach goals]⁵⁸
 - [[Zürich](#): “2,000 Watt society” has committed authorities along with the citizens to use only the electricity they need to reach targeted goals]⁵⁹

⁵⁰ http://www.energy-cities.eu/db/Dublin_SEAPv2_2010_en.pdf

⁵¹ http://www.energy-cities.eu/db/Barcelona_SEAP_2011_en.pdf

⁵² <https://www.stadt-zuerich.ch/content/dam/stzh/portal/English/Documents/OnTheWayToThe2000WattSociety.pdf>

⁵³ http://www.google.de/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=0CCYQFjAA&url=http%3A%2F%2Fwww.icruhr.de%2Ffileadmin%2Fmedia%2Fdownloads%2FICLEI_cs_169-Bottrop_2014.pdf&ei=jclYVIGPMIKHPc3lgfAL&usg=AFQjCNFK6YKzrOR73t8w-gL2ogxtr8BOA&bvm=by

⁵⁴ <http://www.go100percent.org/cms/>

⁵⁵ http://www.energy-cities.eu/db/Frederikshavn_SEAP_2012_en.pdf

⁵⁶ http://www.energy-cities.eu/IMG/pdf/Fossil_Fuel_Free_Vaxjo_-_the_story.pdf

⁵⁷ http://www.iclei.org/fileadmin/PUBLICATIONS/Case_Studies/ICLEI_cs_169_Bottrop_2014.pdf

⁵⁸ https://www.google.de/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=0CCYQFjAA&url=https%3A%2F%2Fwww.ludwigsburg.de%2Fsite%2Ffileadmin%2Fmedia%2Fdownloads%2FICLEI_cs_169-Ludwigsburg_Internet%2Fget%2F1426644%2FEnergy%2520concept%2520Ludwigsburg%2520english%2520short%2520version.pdf&ei=x4tSVJq3NseXPJTYgZ

⁵⁹ <https://www.stadt-zuerich.ch/content/dam/stzh/portal/English/Documents/OnTheWayToThe2000WattSociety.pdf>

GRENOBLE (156,659), FRANCE⁶⁰

Factor Four - Dividing Carbon by 4 to unite for sustainability is an ambitious plan already reaping rewards. Crucial to success has been the long-term vision which has helped shape policies and pathways of action.



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Background

The city is a leader in sustainable development particularly known for its ambitious plan (Factor Four) developed in 2008 to cut its carbon emissions by 75 percent by 2050. The term “Factor Four” comes from the Club of Rome global think tank and in 1998 the concept was further developed in a book⁶¹ illustrating that the key to sustainable development is the hypothetical fourfold increase in 'resource productivity', brought about by simultaneously doubling wealth and halving resource consumption. In 2003 the French government adapted “factor four” via the engagement to divide by four national emissions of greenhouse gas emissions by 2050. Grenoble has applied this concept locally as an overall strategy and already in 2013 were able to communicate concrete results.

Activities

Grenoble has chosen to act primarily on existing buildings, with a specific focus on social multifamily buildings. By 2013, 2121 blocks of flats had undergone thermal renovation with energy savings on average of 30-40%. The development and promotion of cycling and car-sharing as well as improving the coordination of transport has resulted in the reduction by 80,000 vehicles passing through Grenoble every day. The modal share of cars was reduced from 37% to 32% between 2002 and 2010. Cycling has multiplied by 2 for the same period.

Results

In 2013, five years after implementing the plan Grenoble has reduced its emissions by 17% (compared to 1991 baseline figures). 2 million litres of fuel per year have been avoided thanks to the efforts in promoting car sharing and bicycle travel. A reduction of 25% of emissions of nitrogen dioxide has also been achieved. The Grenoble Factor Four initiative has been nationally recognised several times. In 2009, the city received the “Ribbons of sustainable development” for the “visionary and ambitious plan,” which was renewed from 2011-2013.

⁶⁰ <http://www.grenoble.fr/76-facteur-4.htm>

⁶¹ Factor Four: Doubling Wealth, Halving Resource Use - A Report to the Club of Rome, 1998, Ernst U.von Weizsacker

I.I.III IMPLEMENT THE PLAN

In most cases, the municipal government is the principal actor in local transformation processes. Local administrations need to carefully consider which priority areas are most appropriate to invest in to induce positive change. A low-carbon renewal of municipal assets – such as buildings and transport infrastructure – is certain to have an impact, as investments will pay back over time and serve to illustrate both a willingness for change and the effectiveness of the chosen measures. In the same vein, improved energy and resource use in municipal entities can push transitions forward and help to establish replicable approaches that later can be emulated by citizens and businesses. Many cities decide to establish specialised staff units – typically in the Mayor’s office – or agencies that will provide for a results-oriented and cross-sectoral management of strategy implementation. Despite the local government’s importance as a role model and coordinating unit, societal actors have to be won over to achieve major change. Businesses and citizens will need to change their behaviour and launch initiatives of their own. This cannot be enforced but only achieved through an appropriate mixture of information campaigns, consultation processes and subsidy schemes or financial incentives from which the targeted groups will benefit. While existing guidelines and communities of practice can prevent cities from ‘re-inventing the wheel’ in the implementation of their strategy, even tried and tested approaches need to be adapted to fit the unique local context. This local testing will, occasionally, create new replicable solutions.

Provide leadership with changes in municipal activities:

- [\[Dublin\]](#): council has committed to reducing their energy usage by 3% annually, 33% by 2020]⁶²
- [\[Echirolles\]](#) has reduced expensive electric heating and moved to biomass district heating]⁶³
- [\[Hannover\]](#) has outlined energy savings projects in schools]⁶⁴
- [\[Kaunas\]](#) has taken initiative to retrofit a school]⁶⁵
- [\[Vila Nova de Gaia\]](#): energy and water management in buildings]⁶⁶
- [\[Karlsruhe\]](#): green energy supply for municipality]⁶⁷
- Promote sustainable behaviour among municipal staff
 - [\[Freiburg\]](#) (in German): ‘bike king’ scheme]⁶⁸
 - [\[Hamburg\]](#) (in German): driver training programmes to reduce emissions from driving automobiles]⁶⁹

⁶² http://www.energy-cities.eu/wiki/index.php/Proposal_1.6

⁶³ http://www.energy-cities.eu/db/echirolles_582_en.pdf

⁶⁴ http://www.energy-cities.eu/db/hannover_564_en.pdf

⁶⁵ http://www.energy-cities.eu/db/kaunas_564_en.pdf

⁶⁶ http://www.energy-cities.eu/db/vila_nova_de_gaia4_575_en.pdf

⁶⁷ <http://www.european-energy-award.org/gold-municipalities/eea-gold-municipalities-re-certified-in-2014/>

⁶⁸ http://www.leitfaden.kommunaler-klimaschutz.de/leitfaden/c1-handlungsm-glichkeiten-innerhalb-der-lokalen-verwaltung.html#toc3_1

⁶⁹ http://www.leitfaden.kommunaler-klimaschutz.de/leitfaden/c1-handlungsm-glichkeiten-innerhalb-der-lokalen-verwaltung.html#toc3_1

- [\[Malmö\]](#): municipal green car fleet runs on stored wind power and is available for the employees of city's environmental department]⁷⁰

Create specialized local structures to implement strategy:

- Management agency to act as government – civil society intermediaries
 - [\[Almada\]](#) has created local energy agency to advise and promote dialogue across sectors]⁷¹
 - [\[Grenoble\]](#) has set up a local climate and energy agency to assist stakeholders and citizens in climate issues]⁷²; [\[Paris\]](#)⁷³
- Climate and energy agencies
 - [\[Berlin Energy Agency\]](#) was created to consult both public and private clients on how to tap into energy savings]⁷⁴
 - [\[Maribor Energy Agency, EnergaP\]](#): was established to give a wide-range of advice on sustainable energy through local and national projects]⁷⁵
- Research and advisory facilities
 - [\[Ludwigsburg Energetikom\]](#) works with interested parties to devise resource-conserving solutions]⁷⁶
 - [European Centre for Renewable Energy established in [Güssing](#) to create regional and community-based concepts for energy conservation and renewables]⁷⁷
- Urban renewal agencies
 - [\[Berlin\]](#): S.T.E.R.N. is a subsidiary of the Federal State of Berlin that assists in urban renewal programs]⁷⁸

Get residents and businesses on board:

- [\[Besancon\]](#) has launched the “200 climate-active families” initiative to curb domestic energy usage; in [Freiburg](#) families are participating in a project to limit their energy use and waste production]⁷⁹
- Inspire citizens to act in campaigns
 - [\[Münster\]](#) (in German): two campaigns to engage citizens in climate protection]⁸⁰

⁷⁰ http://ec.europa.eu/environment/europeangreencapital/wp-content/uploads/2013/02/MDR0763Rp00026_Good-Practice-Report-2015_F01_light.pdf

⁷¹ http://www.energy-cities.eu/wiki/index.php/Proposal_4.1

⁷² http://www.energy-cities.eu/wiki/index.php/Proposal_4.1

⁷³ http://www.energy-cities.eu/db/Paris_Agence-parisienne-du-climat_2014_fr.pdf

⁷⁴ <http://www.berliner-e-agentur.de/en>

⁷⁵ <http://www.energap.si/?viewPage=87>

⁷⁶ <http://www.energetikom.de/en/home.html>

⁷⁷ <http://www.eee-info.net/cms/EN/>

⁷⁸ <http://www.stern-berlin.com/>

⁷⁹ http://www.energy-cities.eu/wiki/index.php/Proposal_4.3

⁸⁰ http://www.energy-cities.eu/wiki/index.php/Proposal_4.3

- [[Brussels](#): citizen activism created “ PicNic the streets” campaign against car transportation]⁸¹
- [[Freiburg](#): multiple city-wide campaigns to separate waste and recycle]⁸²
- Gain citizens’ acceptance for post-carbon transition activities
 - [Co2libri in [Freiburg](#) promotes reducing personal energy consumption]⁸³
 - [[Wieselburg](#) (in German) elementary school campaigns to promote alternative transportation]⁸⁴
- Promote organisations and citizens working for change
 - [[Pamplona](#), [Heidelberg](#), [Oeiras](#), [Helsinki](#), [Växjö](#): all five of these cities have organized E.N.G.A.G.E campaigns where citizens are encouraged to share sustainable energy initiatives]^{85 86}
 - [[Barcelona](#) developing networks of schools to develop and carry out sustainable action plans]⁸⁷
 - [[Bremen](#): financial incentives for car sharing]⁸⁸
 - [[Münster](#): creating awareness on eco-mobility throughout the city]⁸⁹
 - [[Växjö](#): “Climate Idols” organization has created opportunity for citizens to work with “local celebrities” on sustainability initiatives]⁹⁰
- Create opportunities for experimentation and development of new practices
 - [Baugruppen in [Tübingen](#) allows residents to help design and construct their new neighbourhood]⁹¹
- Capacity Building in areas such as “Green Procurement”
 - [[Cascais](#): assessing the life-cycle of products and materials they wish to procure]⁹²
- Include arts and cultural activities in the transition process
 - [[London](#) has created collective public transport games to engage users]⁹³
 - [[Helsinki](#) is using art to visualise energy use in the city]⁹⁴

⁸¹ http://ec.europa.eu/environment/europeangreencapital/wp-content/uploads/2013/02/MDR0763Rp00026_Good-Practice-Report-2015_F01_light.pdf

⁸² <http://www.iclei-europe.org/members/member-in-the-spotlight/archive/freiburg/>

⁸³ http://www.iclei.org/fileadmin/PUBLICATIONS/Case_Studies/ICLEI_cs_104_Freiburg_June_2010.pdf

⁸⁴ http://www.klimabuendnis.org/fileadmin/inhalte/dokumente/ClimateStar2007_awardedProjects_01.pdf

⁸⁵ http://www.energy-cities.eu/wiki/index.php/Proposal_4.4

⁸⁶ <http://www.citiesengage.eu/>

⁸⁷ http://www.iclei.org/fileadmin/PUBLICATIONS/Case_Studies/ICLEI_cs_125_Barcelona_2011.pdf

⁸⁸ http://www.iclei.org/fileadmin/PUBLICATIONS/Case_Studies/ICLEI_cs_159_Bremen_2013.pdf

⁸⁹ http://www.iclei.org/fileadmin/PUBLICATIONS/Case_Studies/ICLEI_cs_158_Munster_2013.pdf

⁹⁰ http://www.iclei.org/fileadmin/PUBLICATIONS/Case_Studies/ICLEI_cs_116_Vaxjo.pdf

⁹¹ http://www.energy-cities.eu/wiki/index.php/Proposal_4.5#T.C3.BCbingen.2C_Germany

⁹² https://procurement-forum.eu/resource/download/267/EN_Cascais_SMARTSPP_Case-Studies.pdf

⁹³ http://www.energy-cities.eu/wiki/index.php/Proposal_4.6

⁹⁴ http://www.energy-cities.eu/wiki/index.php/Proposal_4.6

- Engage young people
 - [[Växjö](#): PV project at the Teleborg school, which installed PV solar roof panels while engaging students in the process]⁹⁵
 - [[Bottrop](#) allowed students to design their “house of the future”]⁹⁶
- Promote environmental education and awareness
 - [[Freiburg](#): increase in extracurricular environmental education programs]⁹⁷
 - [[Tampere](#): Ilmankos project has promoted the participation of citizens and organisations in mitigating climate change through R&D and awareness campaigns]⁹⁸

⁹⁵ http://www.iclei.org/fileadmin/PUBLICATIONS/Case_Studies/ICLEI_cs_116_Vaxjo.pdf

⁹⁶ <http://www.icruhr.de/index.php?id=29&L=1>

⁹⁷ <http://www.freiburg.de/pb/Lde/382993.html>

⁹⁸ <http://www.ilmankos.fi/en>

MARIBOR (114,487), SLOVENIA⁹⁹

The Energy Agency of Podravje has successfully assisted Maribor and other actors implement their energy plans since 2006.



Background

Maribor is the second-largest city in Slovenia. The city's development has been determined by its strategic geographical position connecting Central, Southern and Western Europe. Maribor has been active in energy issues since 2002, particularly in the field of energy efficiency in public buildings. In 2006 the city established the public, not-for-profit Energy Agency of Podravje (EnergaP). The Energy Agency has played an important role in assisting the local authority and other players in their energy transition.

Activities

EnergaP covers the Municipality of Maribor and 15 smaller municipalities in the Podravje region with a total of 180,000 inhabitants. The main activities carried out by the agency include energy management for the City of Maribor and the region by providing information and educational activities on renewable energy sources and energy efficiency measures. The agency supports the introduction of good energy management practices, advocates the concept of sustainability, provides information and guidance, and offers local services based on specific local energy needs. As a non-profit organisation it operates disinterestedly on specific energy demand and supply issues defending the local economic and social circumstances. EnergaP also supports the implementation of local/regional energy plans and acts as a contact point for relations with European networks and institutions as well as an intermediary for local, regional and national players. It is also much easier for Energy Agencies to participate in European projects which provide added value to the city of Maribor.

Results

EnergaP via the European project BENEFIT is helping the city of Maribor to implement its sustainable mobility initiative. It also assisted the city in the development of a sustainable urban transport plan and the proposal of a pilot environmental zone (POC). The POC is performing measures to reduce the negative impacts of traffic on air quality in the city, especially on the concentration of particles PM10, nitrogen oxides and ground-level ozone, which most affects the health of inhabitants. The city will revise transport arrangements and limit entry of vehicles, which do not have the appropriate emission class in the POC.

EnergaP has also been a partner in other European projects e.g. "Madagascar" - introduction of natural gas and biogas in cars; and the "Minus 3%" - energy efficiency in public buildings.

⁹⁹ <http://www.energap.si/?viewPage=87>

I.I.IV FINANCE THE IMPLEMENTATION OF THE PLAN

Allocating municipal budget to projects and policies is a necessary but insufficient component of financing the implementation of a local sustainability strategy. For a municipal energy transition to succeed, it is essential to find innovative governance forms that support a goal-driven use of funds. The local financial set-up also needs to be geared towards unleashing the potential of business and household-level investments in sustainable infrastructure, production and consumption patterns.

A well-documented starting point is the set-up of a special purpose municipal fund for local sustainability projects (e.g. energy-efficient building refurbishment). In the case of Hannover's ProKlima fund, 1€ in subsidies generated 12.5€ in local investments. Another model is to establish a local energy saving contracting system. The municipal administration working with state-owned entities is a "best bet" option for the development of financing solutions. In some cases, however, funds for local sustainability projects are initiated and managed privately, so this option and hybrid approaches should not be overlooked. While only a few common approaches can be presented here, the number of financing models is vast. Financial management expertise and creativity is needed to exploit this potential. Environmentally oriented budgeting and accounting systems can help to identify the most urgent and appropriate fields of future investments in low-carbon transition.

Establish dedicated municipal funds for activities:

- [[Hannover](#): dedicated budget funds for grants and local pilot-projects that aim to reduce CO₂ emissions]¹⁰⁰
- [Ecobudget [Växjö](#) has placed funds into a "master budget" that mandates spending to be used on local projects and ensures they are environmentally friendly)]¹⁰¹
- [EcoBudget [Bologna](#) was established to facilitate funds towards environmentally friendly and municipal objectives]¹⁰²

Internalise externalities in public budgets:

- [[Växjö](#) allocated financial budget to projects based on prediction of impacts on the environment]¹⁰³

Finance reduction measures through energy contracting:

- [[Stuttgart](#) has helped create more than 270 contracts between public energy agency and public entities]¹⁰⁴

¹⁰⁰ http://www.energy-cities.eu/wiki/index.php/Proposal_3.5

¹⁰¹ http://www.iclei.org/fileadmin/PUBLICATIONS/Case_Studies/ICLEI_cs_102_Vaxjo_September_2007.pdf

¹⁰² http://www.iclei.org/fileadmin/PUBLICATIONS/Case_Studies/ICLEI_cs_103_Bologna_September_2007.pdf

¹⁰³ http://www.energy-cities.eu/wiki/index.php/Proposal_1.3

¹⁰⁴ http://www.leitfaden.kommunaler-klimaschutz.de/leitfaden/a3-finanzierung-kommunaler-klimaschutzma%C3%9Fnahmen.html#toc2_1

Raise non-state funding for local sustainable energy projects:

- [\[UK\]](#) scheme by which citizens decide on funding - the “Energyshare Fund”]¹⁰⁵
- [\[Copenhagen\]](#) has formed a wind power co-operative with citizens, allowing them to buy shares in the turbines and share profits as they generate energy]¹⁰⁶
- [\[Bristol\]](#) has created UK’s first city-wide local currency, the Bristol Pound, that can be spent in the city; money generated from interest rates are reinvested into new sustainable city initiatives]¹⁰⁷

Commit human resources to financial management:

- [\[Malmö\]](#), through ELENA, has recruited eight financial experts to help design and implement specific plans around the city]¹⁰⁸

¹⁰⁵ http://www.energy-cities.eu/wiki/index.php/Proposal_3.2#Energyshare_fund.2C_United_Kingdom

¹⁰⁶ http://www.energy-cities.eu/wiki/index.php/Proposal_3.2%22/I%22Copenhagen.2C_Denmark

¹⁰⁷ <http://bristolpound.org/>

¹⁰⁸ http://www.energy-cities.eu/wiki/index.php/Proposal_3.4#Malm.C3.B6.2C_Sweden

BOLOGNA (385, 000), ITALY¹⁰⁹

Bologna's ecoBudget is an environmental management system integrating its institutional activities. It has helped coordinate financing of measures.



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Background

Very active in the field of urban sustainability, the city's decision to develop ecoBudget was based on a desire to better monitor coordinate its activities, to identify and fund the practices and contexts most conducive to sustainable development.

Activities

EcoBudget is an environmental management system designed for local governments, which aims to achieve efficient use of natural resources by employing financial planning and auditing methods. A conventional accounting system is supplemented by an environmental accounting system, in which physical environmental quantities are measured instead of money. Policymakers and senior administrators are involved in ecoBudget, allowing political governance of environmental resources. EcoBudget aims to plan, control, monitor, report on, and evaluate the consumption of natural resources (such as climate stability, air quality, land, water, raw materials, and biodiversity) for issues of significant priority within the geographical area of the municipality. Initially drawing on some EU funds (LIFE programme) to assist with the development, ecoBudget was established in 2002 with the creation of a Local Implementation Team (LIT). The team consisted of representatives from different municipal and regional departments and agencies. Their first task was to identify the local environmental resources and indicators to be included in Bologna's Master Budget and then ensure that environmental spending stays within the limits agreed.

Results

Key decisions regarding resource and territory management are now assessed in terms of their feasibility using this programme. EcoBudget has been credited with more effectively coordinating a number of municipal initiatives as it provides a better overview, the links between them and their relation to the general budget. Incorporating ecoBudget into urban planning processes is seen to have led to better relations between staff in the urban planning and environment departments, and hence the foundations for a more integrated overall natural resources use strategy within the region. The importance of providing enough staff to monitor activities has been a key lesson learnt.

¹⁰⁹ http://www.iclei.org/fileadmin/PUBLICATIONS/Case_Studies/ICLEI_cs_103_Bologna_September_2007.pdf

I.I.V MONITORING, EVALUATION, LEARNING AND REVISION

Policy evaluation is the last step in the policy cycle and, as such, provides a link to the next cycle. This is particularly important in the context of comprehensive transition strategies. Municipal governments invest considerable financial and other resources when they adopt a local sustainability strategy. They and their local constituency need to find out whether the strategic targets of the reform package have been met. While a monitoring system – at the least – serves to periodically check if implementation is on track and key performance indicators of the reform process are met, more extensive policy evaluations show in more detail what impacts the transition approaches have had on the ground, whether they were effective and efficiently managed.

Ideally, lessons learned from evaluations will lead to revisions that reduce flaws in the strategy. Not all cities can afford extensive monitoring systems and evaluations according to scientific standards – in this case, citizen feedback can be a valuable resource for learning about the effects of government action and the ‘weather-proofing’ of next generation policies.

In a broader sense, local monitoring and evaluation systems generate information that allow public discussion on progress towards post-carbon transition. This knowledge forms the basis for local governments’ campaigning efforts on this level, for networking at regional and international levels, benchmarking with other municipalities and gaining official recognition for a city’s efforts in national and international award schemes.

Monitor, Evaluate Performance:

- [\[Freiburg\]](#) monitors and reviews climate footprint every 2 years to ensure they are hitting specified targets]¹¹⁰
- [\[Martigny\]](#): monitors district heating to constantly increase efficiency of supply when needed]¹¹¹
- [\[Warsaw\]](#): ensures all sectors submit progress reports to government to keep projects in line with targets]¹¹²
- [\[European Energy Award\]](#) Gold ranked municipalities’ reviewed at particular points to ensure standards maintained]¹¹³

Publicise the benefits / “prove that it works” to the public:

- [\[Besancon and Freiburg\]](#): the “200 climate active families” reduced waste and energy, and later they shared their experiences with other communities]¹¹⁴
- [\[Brussels\]](#): engages households to participate in “Energy Challenge” to help reduce energy bill and CO₂ emissions]¹¹⁵

¹¹⁰ http://www.iclei.org/fileadmin/PUBLICATIONS/Case_Studies/ICLEI_cs_104_Freiburg_June_2010.pdf

¹¹¹ <http://www.european-energy-award.org/gold-municipalities/eea-gold-municipalities-re-certified-in-2014/>

¹¹² http://www.climateactionprogramme.org/climate-leader-papers/cop19_and_sustainability_in_warsaw

¹¹³ <http://www.european-energy-award.org/gold-municipalities/>

¹¹⁴ http://www.energy-cities.eu/wiki/index.php/Proposal_4.3

¹¹⁵ http://www.energy-cities.eu/wiki/index.php/Proposal_4.3

Share your lessons learnt with others:

- [\[Malmö\]](#): documents the lessons they have learned in their sustainability practices for replication on similar projects within the city or in others]¹¹⁶
- [\[Essen\]](#): demonstrates how to work under financial constraints towards a green economic city by being transparent in innovative initiatives]¹¹⁷

Revising Action Plan according to evaluation and monitoring results – restart the process:

- [\[Neuruppin's\]](#) municipality encourages citizens to participate in revision of urban strategy]¹¹⁸

¹¹⁶ [http://www.iclei.org/fileadmin/PUBLICATIONS/Case_Studies/7_Malmo - ICLEI-IRENA_2012.pdf](http://www.iclei.org/fileadmin/PUBLICATIONS/Case_Studies/7_Malmo_-_ICLEI-IRENA_2012.pdf)

¹¹⁷ [http://www.iclei.org/fileadmin/PUBLICATIONS/Case_Studies/ICLEI cs 170 Essen 2014.pdf](http://www.iclei.org/fileadmin/PUBLICATIONS/Case_Studies/ICLEI_cs_170_Essen_2014.pdf)

¹¹⁸ <http://www.neuruppin.de/verwaltung-politik/stadtentwicklung/neuruppinstrategie-2020-2030.html>

MARTIGNY (17,215), SWITZERLAND¹¹⁹

The European Energy Award® Gold in 2010 is recognition of Martigny's work in the field of energy over the last 25 years. The town has continued to set new and more ambitious targets based upon performance monitoring.



Credit: Reuters/Denis Balibouse/Files

Background

Martigny is a small Swiss alpine city close to both France and Italy. Martigny started investing in energy efficiency and the effective management of its energy facilities and networks and its own Energy and Municipal Research Centre (CREM) in the 1980s. The early investment in renewable and energy efficiency has allowed the city to achieve the European Energy Award® (eea) Gold award.

Activities

Eea® Gold is the highest award given for municipal energy and climate protection activities at the European level. It is awarded to municipalities that have implemented at least 75 per cent of measures within their scope of action and have thus demonstrated an exemplary commitment to a sustainable energy future.

Like quality management systems from business and industry, eea® is also based on a process of continuous improvement, which ensures that eea® municipalities continually increase their energy efficiency, the use of renewable energies and the sustainability of approaches to mobility. Martigny has already the following projects planned for the future: replacement of all streetlights with sodium vapour lamps; energy awareness raising activities with teachers and students; the development of a 2000 watts eco-neighbourhood.

Results

The investment of Martigny in renewables has resulted in an annual production of more than 22 million kWh of renewable electricity from four hydroelectric plants - three installed on the drinking water network - and participation in different wind turbines. This local renewable generation accounts for over 20% of the electricity consumed throughout the city.

Martigny, through its participation in the RhôneEole company received the 2009 Golden Watt award for building the largest wind turbine in Switzerland with a power of 2 MW. A new wind turbine, Adonis, with a power of 3 MW was inaugurated in 2012.

A third of the population is linked to the district heating system which since 2013 has a third of its fuel provided by biomass.

¹¹⁹ http://www.citedelenergie.ch/fileadmin/user_upload/Energiestaedte/martigny-vs/dateien_weitere/Fiche_informative_Martigny.pdf

I.II SECTORAL FIELDS OF INTERVENTION

As emphasized above, a post-carbon transition requires a cross-sectoral and multi-sectoral approach. While devising an integrated strategy, a municipality also needs to select concrete programmes and projects that are suitable to support the envisaged transition. Local authorities also need to carefully appraise what is feasible in the local context. While far from being complete, this section presents a wide range of proven sectoral interventions in a hopefully understandable structure, each one illustrated by key examples from European cities.

Integrated sustainability strategies often start around individual sectoral strategies e.g., in the field of energy supply, energy efficiency measures in buildings or a re-organisation of transport in a city. It can be easier to mobilise resources for policy initiatives or civic action in one priority area first; once a sectoral initiative has been successfully established and has gained momentum, the question arises whether its achievements are sustainable. This often leads to the insight that integration with other sectors, with other policy goals (e.g. social inclusion), and reaching out to more stakeholders are indispensable steps to accomplish lasting results.

Another reason to carefully consider sectoral interventions is that municipal authorities should set an example with the projects under their own control. Energy costs represent an important budget item in public expenditures e.g. in Germany, they amount to 2.5 billion Euros, some 40 percent of which stem from buildings, two-thirds of which are on the municipal level (difu 2011: 359). By showcasing effective energy saving and climate protection measures related to their assets, municipalities and their personnel play an important role as model consumers and multipliers, while benefitting themselves from cost-reductions in their operations.

I.II.I ENERGY GENERATION, DISTRIBUTION AND CONSUMPTION

Depending on the national political context, municipalities have varying degrees of power to transform the local energy production, distribution and consumption patterns towards a more sustainable system.

If municipalities are entitled to run local heat and power utilities by themselves, the energy generation and distribution sector can represent a powerful lever and entry point to sustainability transitions. By mandating public companies to increase the share of renewable energy production, through investing in their own generation facilities and distribution infrastructure, local administrations not only exert direct control over the development of this sector but also generate revenues to be re-invested in furthering the energy transition or diverted to other relevant areas.

When the municipality cannot act as a market player directly, there are still various ways in which a local government can level the playing field for increased renewable energy exploitation, energy conservation and enhanced energy efficiency. Once ambitious policy targets have been formulated, they can also be supported by service contracts that require or reward renewable energy sources; urban plans that identify suitable areas for energy production from renewable sources (e.g. wind power, biomass); an enabling local framework for service providers, commercial and private clients to implement decentralised energy supply and efficiency solutions. Local competence centres with

advisory, research and funding capabilities for innovative energy projects can act as important change agents in this process.

For a broader view on energy-related interventions, please also consider the upcoming sections, in particular the entire buildings section (I.II.II) and energy recovery in the waste section (I.II.IV).

Policy choices for a sustainable local energy supply:

- Plan shift to as much local, renewable energy as possible
 - [[Växjö](#) plans to use 100% renewable energy]¹²⁰
 - [[Güssing](#) uses domestic resources for energy]¹²¹
 - [[Copenhagen](#) is creating on and offshore wind farms to supply city with local renewable energy]¹²²
- Provide municipal energy company with a sustainability mandate
 - [[Ludwigsburg](#) has created a municipal energy and climate concept based on a urban development plan]¹²³
- Remunicipalise existing energy company
 - [[Hamburg](#): citizen action and referendum forced municipality to buy back the energy network]¹²⁴
- Eradicate local fuel poverty
 - [[Nantes](#) selecting low-income households to establish energy use and working to propose action plans with to fix inefficient energy patterns]¹²⁵
 - [[Dublin](#): through increased energy efficiency in home retrofitting and district heating the city hopes to reduce energy costs for those on low income]¹²⁶
 - [[Utrecht](#): provided free energy savings boxes for 12,000 low-income households as well as free energy consultancy to help reduce energy in the home]¹²⁷
 - [[Kirklees](#): 'Warm Zone' is a first in the UK, with funds of £21 million to offer free insulation measures]¹²⁸
- Establish a local energy agency and/or energy competence centre
 - [[Ludwigsburg](#): established Energetikom as local energy agency]¹²⁹

¹²⁰ http://www.energy-cities.eu/wiki/index.php/Proposal_1.1

¹²¹ <http://www.eee-info.net/cms/EN/>

¹²² <https://stateofgreen.com/en/profiles/city-of-copenhagen/solutions/wind-turbines-in-copenhagen>

¹²³ <http://www.ensure-project.eu/partners/city-of-ludwigsburg/>

¹²⁴ <http://unser-netz-hamburg.de/>

¹²⁵ http://www.google.de/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=0CCgQFjAA&url=http%3A%2F%2Fcarbonn.org%2Fuploads%2Ftx_carbonndata%2F11_Nantes_energy_fuel_poverty.pdf&ei=BBJBVKPMG-fv7ga0xoCgAw&usq=AfQjCNH1EQkd38QC-AU3pHZpZnaCb3t98g&sig2=bY

¹²⁶ http://www.energy-cities.eu/db/Dublin_SEAPv2_2010_en.pdf

¹²⁷ http://www.energy-cities.eu/db/utrecht2_575_en.pdf

¹²⁸ http://www.energy-cities.eu/db/kirklees_577_en.pdf

¹²⁹ <http://www.energetikom.de/en/home.html>

Develop strategies to exploit local renewable energy potential:

- Integrate renewable energy development in planning (e.g. zoning for wind turbine development)
 - [Bristol: in-house wind scheme zoning plans for 2, 2-3 Mwh wind turbines]¹³⁰
 - [Mouscron inventoried local renewable energy potential and used knowledge to exploit it through energy action plans]¹³¹
- Collaborate with surrounding rural areas (for wind power infrastructure planning, biomass use)
 - [Berlin and Brandenburg 'Joint Spatial Planning Concept for Energy and Climate' integrates capital city and surrounding area spatial planning]¹³²
- Percentage target for renewable energy sourcing
 - [Frederikshavn aims to be 100% renewable by 2015]¹³³
 - [Geneva: targets 100% renewable energy sourcing by 2050]¹³⁴
- Initiate large-scale public RES stations
 - [Litomerice: based on territorial analysis which showed geothermal potential is switching to exploit that renewable resource]¹³⁵
 - [Kötschach-Mauthen: RES self-sufficient through exploitation of hydro-power, biogas, solar and district heating for town]¹³⁶
 - [Heerlen: has turned geothermal mine water into full-scale hybrid infrastructure]¹³⁷
- Support renewable energy projects
 - [Freiburg: Green City]¹³⁸
 - [Montmélian (in French): Triangle Sud produces 80% of thermal requirements via solar]¹³⁹
 - [Barcelona: Solar ordinance to incorporate solar thermal energies]¹⁴⁰
 - [Pamplona: : installed PV panels on all schools to exploit sun energy]¹⁴¹

¹³⁰ http://ec.europa.eu/environment/europeangreencapital/wp-content/uploads/2013/02/egc_bpcatalogue_2010-2011.pdf

¹³¹ <http://www.energy-cities.eu/Renewable-energy-championship-in>

¹³² http://gl.berlin-brandenburg.de/imperia/md/content/bb-gl/energie/grk/gl_grk_produkflyer_en.pdf

¹³³ http://www.energy-cities.eu/db/Frederikshavn_100perCent_renewable_2008_en.pdf

¹³⁴ http://www.energy-cities.eu/db/Geneve_ensemble-ville-renouvelable-2050-rapport-activite-2010_fr.pdf

¹³⁵ http://www.res-league.eu/national_leagues/lig_czec/best_practices/litomerice-towards-100-res-with-geothermal-energy

¹³⁶ <http://www.100-res-communities.eu/communities/best-practices/res-have-been-used-for-more-than-hundred-years-in-koetschach-mauthen-in-austria-an-alpine-municipality-in-southern-carinthia>

¹³⁷ <http://www.sciencedirect.com/science/article/pii/S187661021400174X>

¹³⁸ http://www.greencity.freiburg.de/servlet/PB/menu/1174647_I2/index.html

¹³⁹ http://www.solar-district-heating.eu/LinkClick.aspx?fileticket=uCZL_49uMh8%3D&portalid=0

¹⁴⁰ <http://www.barcelonaenergia.cat/eng/operations/ost.htm>

¹⁴¹ http://www.energy-cities.eu/db/pamplona_564_en.pdf

Establish decentralized solutions for heat and power generation and utilisation:

- Small Heat and Power Cogeneration
 - [[Frankfurt am Main](#) using combined heat and power (CHP) stations in urban planning]¹⁴²
- Biomass usage for heating
 - [[Kaunas](#): through biogas CHP it has created 5GWh of green electricity and 4GWh of heat for city]¹⁴³
 - [[Reggio Emilia](#) has installed a new biomass heating system in city]¹⁴⁴
 - [[Brest Metropole](#) has installed a biomass boiler powered by woodchips from sawdust]¹⁴⁵
 - [[Grenoble](#) pilot project to retrofit electrical heating systems with biomass district heating using wood from near-by forest]¹⁴⁶
 - [[Kočevje](#) has replaced oil with biomass at existing district heating system]¹⁴⁷
- District heating
 - [Cities in [Denmark](#) using waste incinerators to produce heat]¹⁴⁸
 - [[Echirolles](#): has modernized its heating system in a disadvantaged neighbourhood through district heating]¹⁴⁹
 - [[Martigny](#): coordinating energy networks through district heating system]¹⁵⁰
- District cooling
 - [[Växjö](#) using CHP to produce cooling through absorption chillers]¹⁵¹
- Renewable heating and cooling, using “waste” heat e.g. from commercial operations for residential heating
 - [[Helsinki](#) uses sea water to cool underground computer centres and uses excess energy to heat residential homes]¹⁵²
 - [[Kotka](#) uses domestic pre-sorted waste for electricity and district heat, first of its kind in Finland]¹⁵³
 - [[Geneva](#): cooling with lake water in the Lac-Nations project (planned)]¹⁵⁴

¹⁴² http://www.energy-cities.eu/db/frankfurt_575_en.pdf

¹⁴³ http://www.energy-cities.eu/db/Kaunas_Half-way-through-100percent-clean-energy-production_COMO_2013_en.pdf

¹⁴⁴ <http://www.czystabydgoszcz.pl/upload/file/709.pdf>

¹⁴⁵ http://www.energy-cities.eu/db/brest-metropole-oceane_582_en.pdf

¹⁴⁶ http://www.energy-cities.eu/db/Grenoble_SESAC_La_Viscose_biomass_and_solar_energy_2011_en.pdf

¹⁴⁷ http://www.energy-cities.eu/db/kocevje1_577_en.pdf

¹⁴⁸ http://www.energy-cities.eu/wiki/index.php/Proposal_2.3

¹⁴⁹ http://www.energy-cities.eu/db/echirolles_582_en.pdf

¹⁵⁰ <http://www.european-energy-award.org/gold-municipalities/eea-gold-municipalities-re-certified-in-2014/>

¹⁵¹ http://www.energy-cities.eu/db/Vaxjo_SESAC_Absorption_cooling_in_the_hospital_and_university_2011_en.pdf

¹⁵² http://www.energy-cities.eu/wiki/index.php/Proposal_2.3#Helsinki.2C_Finland

¹⁵³ http://www.energy-cities.eu/db/kotka_577_en.pdf

¹⁵⁴ <http://www.lcube.eu.com/pdf/mc/Garbelycasesstudy0907.pdf>

LITOMĚŘICE, (24,388) CZECH REPUBLIC¹⁵⁵

A small city with a historical dependence on coal, Litoměřice is seeking to become energy-independent based on renewables, notably geothermal energy.



Background

Litoměřice is located in Northern Bohemia on the Elbe River. Formerly a port town, the city has transitioned to a service and commerce economy. While it has traditionally been relying on coal combustion for most of its energy use, the city is now taking steps towards a low-carbon future. Litoměřice is striving to reduce air pollution and to become energy independent based on renewable energy sources. To reach this objective, the city council began implementing a number of strategies in 2000.

Activities

Litoměřice's approach to the local energy transition is twofold, consisting of incentives for small-scale renewable energy applications on the one hand, and a large investment in geothermal heat and energy production on the other.

Coal-fired water boilers had been phased out and replaced with gas-fired boilers in the 1990s. When gas prices rose, people were inclined to use coal again, which would bring back smog. Thus, in the year 2000, the municipal government introduced a subsidy scheme for solar water heaters (SWH). The city offered a small, but quickly available local subsidy to apartment or house owners willing to replace coal boilers with solar water heaters, who could combine it with state grants. The council has supported the development of small hydro power plants (8.7 MW) and has installed solar thermal as well as photovoltaic systems on public buildings (1,216 MW). At the larger scale, Litoměřice's town council has decided to exploit geothermal energy. Based on an in-depth territorial analysis, preparations for an ambitious geothermal heat and electricity production plant with an output up to 40 MWt and 5 MWe were launched in 2008.

Results

As the geothermal power plant is not finished – due to financial and other constraints – Litoměřice continues to rely on coal-fired plants for most of its energy needs, and the goal of 100% renewable energy is still far away. However, the town's gradual approach to promote clean energy has yielded several positive impacts already. Litoměřice's SWH subsidy programme has earned the city nationwide attention. Litoměřice won several awards in the Czech Solar league and the European RES Champions League (2010). In 2014, around 5% of households had installed SWHs (1750 m² in total).

Inspired by local support programs in neighbouring Germany, Litoměřice's approach is now inspiring other cities. Together with three other Czech cities, Litoměřice set up a municipal energy manager association in November 2014.

¹⁵⁵ http://www.res-league.eu/national_leagues/lig_czec/best_practices/litomerice-towards-100-res-with-geothermal-energy

I.II.II BUILDINGS: MUNICIPAL, COMMERCIAL & RESIDENTIAL

Buildings account for a significant proportion of Europe's greenhouse gas emissions. Given that many of the good practices that improve energy efficiency also save money and/ or can be realised for little to no cost— this sector (focused on efficient building techniques, energy efficient appliances, and efficient lighting) has much potential to reduce quickly greenhouse gas emissions¹⁵⁶. Of course, challenges vary sharply between cities depending on the age and quality of building stock.

Enhanced energy efficiency standards and/or guidelines for new buildings:

- Increasing building energy efficiency standards and regulations
 - [[Modena](#) requires that new buildings must adhere to binding target of at least 'class B' standards]¹⁵⁷
 - [[Koprivnica](#): regulation requires low-energy or passive buildings standards for new construction]¹⁵⁸
- Highest energy standards on municipal land
 - [[Grenoble](#): 8 eco-construction projects erected with energy performance of 50 kWh per m2, which is 40% lower than applicable standards in France]¹⁵⁹
 - [[Bristol](#) has increased energy standards to ISO 14001 in six out of seven of their local municipalities]¹⁶⁰
- Enable transformative actors in the local construction industry
 - [[Berlin](#): "Baugruppen" as agents for more sustainable, affordable residential construction]¹⁶¹

Energy-efficiency retrofitting of existing buildings:

- Comprehensive retrofitting plan
 - [[Brussels](#) applied low energy standards to all retrofit plans]¹⁶² [[London's](#) programme to retrofit nearly 400 public buildings under the "RE:FIT" scheme to improve energy efficiency]¹⁶³

¹⁵⁶ <http://www.climateworks.org/network/sectors/buildings-and-appliances>

¹⁵⁷ http://www.energy-cities.eu/db/modena2_575_en.pdf

¹⁵⁸ http://www.managenergy.net/koprivnica_2013_me_award_winner.html#.VFdPWaMhCIA

¹⁵⁹ http://www.energy-cities.eu/db/Grenoble_SESAC_12_new_eco-buildings_in_de_Bonne_2011_en.pdf

¹⁶⁰ http://ec.europa.eu/environment/europeangreencapital/wp-content/uploads/2013/02/egc_analysis2010-2011.pdf

¹⁶¹ http://www.stadtentwicklung.berlin.de/bauen/baugemeinschaft/download/wohnen_in_gemeinschaft.pdf

¹⁶² http://www.energy-cities.eu/db/Bruxelles_from_eco-building_to_sustainable_city_2011_en.pdf

¹⁶³ http://www.energy-cities.eu/wiki/index.php/Proposal_5.2

- [[Bottrop](#)’s flagship project, “Zukunftshäuser+” retrofitted residential houses to become energy plus buildings]¹⁶⁴
- [[Sheffield](#)’s “Green Deal” funds energy efficient retrofitting at local level based on needs detected by thermal imaging cameras]¹⁶⁵
- [[Warsaw](#): plans to begin a thermal retrofit of schools as well as light facilities around the city]¹⁶⁶
- Support schemes for energy-efficient refurbishments
 - [[Bottrop](#)’s citizens forced city to develop retrofitting schemes resulting in a 7.8% refurbishment ratio in 2013]¹⁶⁷
 - [Through free support and audits [Bordeaux](#) allowed citizens to see advantages of refurbishments, many of which were later completed]¹⁶⁸
 - [[Freiburg](#) offered free assistance for retrofitting and home insulation]¹⁶⁹
 - [[Brussels](#) “Green Loan Project” offers 0% interest on loans for energy retrofitting plans]¹⁷⁰
 - [[Essen](#) Climate Agency with a renovation catalogue is a tool for businesses and citizens seeking to retrofit existing buildings]¹⁷¹
 - [[Wolfurt](#) offers support programmes for energy efficiency building refurbishments]¹⁷²
- Energy renovation of high-rise buildings
 - [[Freiburg](#): renovation of first high-rise building world-wide to reach passive house standard]¹⁷³
- Support schemes for building-integrated renewable energy applications: e.g. solar water heaters, PV, Solar water pumps
 - [[Aachen](#) (*in German*) offers subsidies for PV installations]¹⁷⁴
 - [[Hamburg](#) is helping to subsidize solar thermal plants]¹⁷⁵

¹⁶⁴ http://www.icruhr.de/fileadmin/media/downloads/ICLEI_cs_169-Bottrop_2014.pdf

¹⁶⁵ http://www.sheffield.ac.uk/polopoly_fs/1.3634691/file/WP1_Arch_Final_Report.pdf

¹⁶⁶ http://www.climateactionprogramme.org/climate-leader-papers/cop19_and_sustainability_in_warsaw

¹⁶⁷ http://www.icruhr.de/fileadmin/media/downloads/ICLEI_cs_169-Bottrop_2014.pdf

¹⁶⁸ http://www.energy-cities.eu/db/bordeaux-cub2_582_en.pdf

¹⁶⁹ <http://www.ecotippingpoints.org/our-stories/indepth/germany-freiburg-sustainability-transportation-energy-green-economy.html>

¹⁷⁰ http://www.energy-cities.eu/db/bruxelles_1291_en.pdf

¹⁷¹ http://www.iclei.org/fileadmin/PUBLICATIONS/Case_Studies/ICLEI_cs_170_Essen_2014.pdf

¹⁷² <http://www.european-energy-award.org/gold-municipalities/eea-gold-municipalities-re-certified-in-2014/>

¹⁷³ <http://www.ise.fraunhofer.de/en/press-and-media/press-releases/press-releases-2011/first-renovated-residential-high-rise-worldwide-to-reach-passive-house-standard-fraunhofer-ise-accompanies-the-energy-renovation-and-monitors-operation>

¹⁷⁴ <http://www.leitfaden.kommunaler-klimaschutz.de/leitfaden/a3-finanzierung-kommunaler-klimaschutzma%C3%9Fnahmen.html>

- Municipal energy advisory services on energy-efficient retrofitting
 - [[Sheffield's](#) SCEnAT locates CO₂ hotspots through technological software]¹⁷⁶; [[Hagen](#) (In German)]¹⁷⁷
 - Retrofitting of municipal buildings
 - [[Brussels](#) PLAGE programme retrofit of municipal buildings over 50,000 m²]¹⁷⁸

Energy management to reduce energy and resource consumption:

- Energy audits in municipal building
 - [[Helsinki](#) energy audits with recommendations have led to 13% reduction]¹⁷⁹
- Advisory services for household-level energy conservation including information on related subsidies
 - [With focus on low-income households, [Leipzig](#)]¹⁸⁰
 - [[Sheffield](#) SCEnAT to help homeowners locate CO₂ hotspots]¹⁸¹
- Residential home efficiency upgrades: lighting, heating/cooling, water, appliances; rainwater harvesting
 - [[Newcastle](#) “Modern Homes” retrofitting plan to recommend technology to homeowners for greater efficiency]¹⁸²
- Financial mechanisms for resource efficiency e.g. smart metering, price signals and price structuring:
 - [[Bonn](#) smart metering]¹⁸³
- Demand side management (DSM)
 - [Using ICT, [Valmeira](#), Latvia]¹⁸⁴

¹⁷⁵ http://ec.europa.eu/environment/europeangreencapital/wp-content/uploads/2013/02/egc_analysis2010-2011.pdf

¹⁷⁶ <http://www.sheffield.ac.uk/cees/news#SCRLowCarbon>

¹⁷⁷ http://www.leitfaden.kommunaler-klimaschutz.de/leitfaden/a5-%C3%B6ffentlichkeitsarbeit-und-beratung.html#toc3_1

¹⁷⁸ http://ec.europa.eu/environment/europeangreencapital/wp-content/uploads/2013/02/MDR0763Rp00026_Good-Practice-Report-2015_F01_light.pdf

¹⁷⁹ http://www.energy-cities.eu/db/helsinki1_575_en.pdf

¹⁸⁰ http://www.leitfaden.kommunaler-klimaschutz.de/leitfaden/a4-klimaschutz-als-kommunale-gemeinschaftsaufgabe.html#toc3_2_3

¹⁸¹ <http://www.sheffield.ac.uk/cees/news#SCRLowCarbon>

¹⁸² http://www.yhn.org.uk/pdf/24pp_Bus_tour_info_draft_web.pdf

¹⁸³ <http://www.leitfaden.kommunaler-klimaschutz.de/leitfaden/c2-handlungsfeld-energie.html#toc2>

¹⁸⁴ http://ec.europa.eu/information_society/activities/sustainable_growth/docs/ict4ee_wiki/ict4ee_local-reg_presentation.pdf

- Special programmes for renter-occupied homes
 - [[Brussels](#) offering up to €20 000 in zero finance loans to tenants for energy efficiency renovations with approval of owner]¹⁸⁵

Reduce energy and material consumption in housing/building industry:

- [[Freiburg](#) using recycled building materials while also implementing passive building standards]¹⁸⁶

Green roofing systems:

- [[Münster](#) implementing large-scale green roofing projects]¹⁸⁷

¹⁸⁵ http://www.energy-cities.eu/db/bruxelles_1291_en.pdf

¹⁸⁶ http://www.iclei.org/fileadmin/PUBLICATIONS/Case_Studies/ICLEI_cs_104_Freiburg_June_2010.pdf

¹⁸⁷ <http://www.muenster.de/stadt/greencapital/muenster-application.pdf>

BRUSSELS, (1,139, 000), BELGIUM¹⁸⁸

Brussels is becoming increasingly 'passive', with a focus on energy-efficient retrofitting of existing buildings



Background

The Brussels Capital Region is the largest urban area in Belgium, comprising 19 municipalities, including the municipality of the City of Brussels. The Brussels region has made significant progress over the past decade particularly in the field of sustainable construction.

Activities

Policy in Brussels has a strong focus on sustainable construction. In the early 2000s, it was noted that the region had very poor results in terms of building insulation: annual energy losses had reached 250 MJ/m² - the highest level in Western Europe.

Today, buildings account for 75% of energy consumption and 70% of CO₂ emissions in Brussels¹⁸⁹. Clear progress was made from 2004 onwards, owing to policy action by the government. At the time, none of the buildings met the 'passive house' standard. In 2013, the total surface area meeting this standard reached 520,000 m². Today, Brussels is the world leader for adoption of the passive standard for all new constructions: the "Passive 2015" agreement stipulates that all planning permission applications for construction or heavy renovations introduced after 1 January 2015 must involve highly energy efficient buildings¹⁹⁰.

The political framework is conditioned by the EPB Directive (Energy Performance of Buildings) with the short term objective of achieving "nearly zero energy buildings"¹⁹¹. Funding for individuals, local authorities and business, in the form of energy subsidies and zero rate loans, will be complemented by the organisation of training and assistance from a network of experts. Projects initiated by the state such as "Exemplary Buildings" or Local Action Plans for Energy Management (PLAGE) are designed to roll-out energy efficiency to all renovations and new constructions.

Results

The efforts made by the region have garnered recognition at the international level. Brussels received a WWF award as part of the *Earth Hour City Challenge 2014*, which awards pioneering towns and cities for their efforts to fight climate change. The prize followed on from the European Commission *Sustainable Energy Award* obtained in 2012. The standard of environmental governance is among the highest in Europe, according to the *European Green City Index 2009*.

¹⁸⁸ http://www.energy-cities.eu/db/Bruxelles_from_eco-building_to_sustainable_city_2011_en.pdf

¹⁸⁹ <http://www.villedurable.be/themas/batiments-durables>

¹⁹⁰ <http://www.villedurable.be/content/news-brussels/bruxelles-pionniere-dans-le-standard-passif>

¹⁹¹ <http://guidebatimentdurable.bruxellesenvironnement.be/fr/g-ene00-diminuer-la-consommation-d-energie-des-batiments.html?IDC=1048&IDD=5292>

I.II.III TRANSPORT

Transport is a key concern and the subject of heightened activity in municipal government. Urban planning is generally seen as crucial to reducing the negative impact of human mobility on greenhouse gas concentration¹⁹² (cf. also section I.II.V). The key objective is to achieve a switch away from private vehicles to shared or non-motorized vehicles, through, e.g. pedestrian-focused practices, and safe bicycle networks.

Improve Traffic management:

- Integrated urban mobility plans
 - [Hamburg] has created a transportation network where 98% of the population lives 300m or less from a public transport stop or bike path]¹⁹³
 - [The green wave in Copenhagen] has sequenced traffic lights for bikes]¹⁹⁴
- Traffic Flow / Transport Demand Management Systems
 - [Essen] has created LCD parking displays to publicise available parking spaces around city]¹⁹⁵
 - [Bristol] has upgraded main traffic control systems around city]¹⁹⁶

Reduce emissions and pollution from motorized transport:

- Reduce municipal vehicle fleet emissions, 'green fleet strategy'
 - [Barcelona] 34.3% of public transportation vehicles are low emission vehicles]¹⁹⁷ [Helsinki] city-wide strategy replaces diesel fuel in bus with hydrogenated vegetable oils (HVO)]¹⁹⁸
- Municipal buses powered by solar energy, biogas, compressed natural gas (CNG)
 - [Lille] using biogas for fuel in buses]¹⁹⁹
 - [Malmö] has 50% buses running on biogas]²⁰⁰
- Ban high-emitting vehicles in cities
 - [London] low-emission vehicles in city centre 2020]²⁰¹

¹⁹² <http://www.climateworks.org/network/sectors/transport>

¹⁹³ http://ec.europa.eu/environment/europeangreencapital/wp-content/uploads/2013/02/egc_analysis2010-2011.pdf

¹⁹⁴ http://ec.europa.eu/environment/europeangreencapital/wp-content/uploads/2013/02/egc_analysis2010-2011.pdf

¹⁹⁵ http://ec.europa.eu/environment/europeangreencapital/wp-content/uploads/2014/08/MDR0763Rp0029_Good-Practice-Report-2016_F02-reduced1.pdf

¹⁹⁶ http://ec.europa.eu/environment/europeangreencapital/wp-content/uploads/2014/08/MDR0763Rp0029_Good-Practice-Report-2016_F02-reduced1.pdf

¹⁹⁷ <http://ec.europa.eu/environment/europeangreencapital/wp-content/uploads/2011/06/Environmental-Best-Practice-Benchmarking-Report-Award-Cycle-2012-2013.pdf>

¹⁹⁸ http://www.iclei.org/fileadmin/PUBLICATIONS/Case_Studies/ICLEI_cs_152-Helsinki.pdf

¹⁹⁹ http://www.energy-cities.eu/db/lille_575_en.pdf

²⁰⁰ <http://ec.europa.eu/environment/europeangreencapital/wp-content/uploads/2011/06/Environmental-Best-Practice-Benchmarking-Report-Award-Cycle-2012-2013.pdf>

²⁰¹ <https://www.tfl.gov.uk/modes/driving/congestion-charge>

- [Car free zones established in [Koprivnica](#)]²⁰²
- Establish infrastructure for electric vehicles
 - [[Bonn](#): development of natural gas stations]²⁰³
- Commute trip reduction programmes
 - [[Bonn](#) companies are promoting cycle and car sharing schemes for their employees]²⁰⁴
- Car sharing, park & ride
 - [[Zürich, Bremen, Paris](#) all introduced car share programmes]²⁰⁵
 - [[Bremen](#) implemented a car share programme targeting highly populated areas]²⁰⁶

Disincentives to drive / use individual motorized transport:

- No-driving days
 - [Sunday no driving day in [Bristol](#)]²⁰⁷
 - [Vauban in [Freiburg](#) is no driving district]²⁰⁸
- Congestion charge
 - [[Stockholm](#) congestion tax]²⁰⁹
 - [[London](#) congestion charge]²¹⁰
- Free public transit tickets
 - [[Lausanne](#) hotels provide free public transport ticket for customers]²¹¹

Plan modal shift to sustainable transport:

- Improve public transport infrastructure: e.g. Bus Rapid Transit
 - [[Barcelona](#) replacing bus routes with tramways]²¹²
 - [[Judenburg](#) ADVANCE programme set up new local transport system]²¹³

²⁰² <http://www.eltis.org/discover/case-studies/all-year-long-promotion-cycling-and-walking-sustainable-mobility-city>

²⁰³ <http://www.stadtwerke-bonn.de/index.php?id=1317&eID=callbackSearch&&cmd=download&uid=9352>

²⁰⁴ http://www.iclei.org/fileadmin/PUBLICATIONS/Case_Studies/ICLEI_cs_161_Bonn_2013.pdf

²⁰⁵ http://www.energy-cities.eu/wiki/index.php/Proposal_2.6

²⁰⁶ http://www.iclei.org/fileadmin/PUBLICATIONS/Case_Studies/ICLEI_cs_159_Bremen_2013.pdf

²⁰⁷ http://www.bristol2015.co.uk/media/filer_public/43/df/43dfe687-93d1-4aab-9326-75de50005bd5/12_bristol_sustainability_facts.pdf

²⁰⁸ http://www.energy-cities.eu/IMG/pdf/Sustainable_Districts_ADEME1_Vauban.pdf

²⁰⁹ http://ec.europa.eu/environment/europeangreencapital/wp-content/uploads/2013/02/egc_bpcatalogue_2010-2011.pdf

²¹⁰ <https://www.tfl.gov.uk/cdn/static/cms/documents/congestion-charge-factsheet.pdf>

²¹¹ <http://www.lausanne-tourisme.ch/en/infos/transport/lausanne-transport-card.html>

²¹² <http://ec.europa.eu/environment/europeangreencapital/wp-content/uploads/2011/06/Environmental-Best-Practice-Benchmarking-Report-Award-Cycle-2012-2013.pdf>

²¹³ <http://eu-advance.eu/index.php?id=48>

- [Tampere new light rail system]²¹⁴
- [Upgrading of bike routes in Kiel]²¹⁵
- [Almada: Local Sustainable Mobility Strategy improves public transport to reduce use of cars]²¹⁶
- Transform railway stations into territorial hubs, integrating inner-city and regional transport system
 - [Freiburg: “Stadt-Umland-Bahn” - rail links integrated city and surrounding area]²¹⁷

Encourage non-motorized transport:

- Pedestrian and bike-friendly environment
 - [Ghent’s “CIVITAS” programme²¹⁸, Koprivnica’s “Streets for People” programme have reallocated parts of streets to pedestrians and bicycles²¹⁹]
 - [Münster has created accessible core-network of cycling roads for the city]²²⁰
 - [Newcastle has expanded new routes for cycling in highly populated areas]²²¹
 - [Schwaz: “Schwaz Mobile” is a mobility package that with over 30 measures for alternate transportation measures]²²²
 - [Zagreb SUMP improvement plans is an award to encourage and reward cities and citizens for using alternate modes of transportation]²²³
- Street code to favour walking and cycling
 - [Barcelona, London, Copenhagen are tailoring plans around eco-mobility]²²⁴
 - [Kiel: “Kiele Wege” is promoting new bike routes around the city and changing traffic lights to prioritise cyclists]²²⁵
- Bike rental program
 - [Ghent, Paris both are implementing bike share programmes around the city]^{226 227}

²¹⁴ <http://www.tampere.fi/material/attachments/t/6AlybDAOS/tamperemoderntrambrochure2012.pdf>

²¹⁵ <http://www.european-energy-award.org/gold-municipalities/eea-gold-municipalities-re-certified-in-2014/>

²¹⁶ <http://www.smartmove-project.eu/regions/almada-portugal.html>

²¹⁷ http://www.energy-cities.eu/wiki/index.php/Proposal_5.5

²¹⁸ http://www.energy-cities.eu/wiki/index.php/Proposal_5.4

²¹⁹ http://www.energy-cities.eu/wiki/index.php/Proposal_5.4

²²⁰ http://www.iclei.org/fileadmin/PUBLICATIONS/Case_Studies/ICLEI_cs_158_Munster_2013.pdf

²²¹ http://pocacito.eu/sites/default/files/Delivering_Cycling_Improvements_in_Newcastle.pdf

²²² <http://www.klimabuendnis.org/schwaz.0.html>

²²³ http://europa.eu/rapid/press-release_IP-13-202_en.htm

²²⁴ http://www.energy-cities.eu/wiki/index.php/Proposal_5.6

²²⁵ <http://www.european-energy-award.org/gold-municipalities/eea-gold-municipalities-re-certified-in-2014/>

²²⁶ http://www.energy-cities.eu/wiki/index.php/Proposal_5.4

²²⁷ http://www.energy-cities.eu/db/Paris_Paris-aux-velos_2014_fr.pdf

ALMADA, (160,000), PORTUGAL²²⁸

A municipality in the Lisbon Metropolitan Region is challenging the dominance of car-based transportation through the development of a multimodal transport system and support for cycling and walking in particular.



Background

Located on the Southern Bank of Tagus River, Almada is one of 18 municipalities in the Lisbon Metropolitan Region. Traffic in Almada doubled between 1996 and 2001, particularly affecting access into town in rush hour. Daily commuting from and to Almada was mainly based on private car use. Public transport consisted largely of a limited bus network, complemented by two boat links and an urban train line connected to Lisbon. As a result, transport accounted for 43 % of all energy consumption and greenhouse gas emissions in 2001. Almada's municipal government addressed these challenges with its Strategy for Sustainable Mobility in 2001.

Activities

Almada's Local Strategy for Sustainable Mobility (LSSM) features a vast array of measures. The LSSM included the 'Access 21 Mobility Plan', which has been implemented since 2003. This plan aims to improve traffic flow in the city centre, efficiently manage parking, define a hierarchy in the road network, restructure the public transport network in conjunction with the new South Tagus Light Rail (open since 2007) and improve public space. It is worth noting that all public transport modes in Portugal are run on concessionary basis from the national government, thus vertical coordination was necessary to accomplish this task. Other initiatives include the Almada Cycling Plan aiming to create safe and comfortable conditions for daily bike use. The city centre is being converted to a pedestrian zone with restrictions for cars. The municipal bus fleet is being modernized, favouring hybrid and electric vehicles, as well as environmental efficiency criteria based on a green purchasing scheme developed by AGENEAL. Altogether, more than 100 permanent measures have been adopted by the city council within 10 years of implementation of the LSSM.

Results

Almada won the European Mobility Week Award in 2010. An expert panel acknowledged both the promotional and the permanent measures the city had implemented. Within ten years, the city administration has successfully addressed its core local challenges in sustainable mobility. With a new tram line, light rail and other transport infrastructure, Almada today is able to offer a diversified, multimodal and interconnected transport system. This, together with policy and informational measures, has motivated local residents' behaviour towards a modal shift. Most impressively, the contribution of the transport sector to the Almada's GHG emissions has dropped from 43% (2001) to 33% (2012).

²²⁸ <http://www.mobilityweek.eu/award/hall-of-fame/>

I.II.IV WASTE REDUCTION AND RECYCLING, WASTE MANAGEMENT

Waste is being produced at ever increasing rates in European urban areas. As well as being a burden, waste can also be seen as a resource, recyclable and exploitable. The main priority should nevertheless be the reduction of waste (domestic, commercial and industrial waste, but also greenhouse gases and other environmental emissions). Given that cities are complex systems of resource and person flows, managing waste is challenging, and integrated waste management requires much research and monitoring. A systematic and integrated approach is required (e.g. Integrated Sustainable Waste Management or urban metabolism perspective), whereby flows are examined, and economic, social and environmental dynamics appreciated.

Integrated waste management:

- [\[Bristol\]](#) 100% of homes hooked up to main sewage network]²²⁹

Reduce waste (e.g. source reduction):

- [\[Brussels\]](#) 4th regional plan for waste reduction is aiming to reduce waste through demand management knowledge]²³⁰

Re-use energy and material:

- Recovery of waste material / goods
 - [\[Munich, Besancon\]](#) ²³¹
 - [\[Dublin\]](#) upcycle program through an online platform]²³²
 - [\[Brussels\]](#) reuse/recycle site that allows people to give away and get goods for free]²³³
 - [\[London\]](#) green Fund allows for the recycling of building materials]²³⁴
- Encourage synergies in energy and material flows
 - [\[Geneva\]](#) encourages the use of recycled materials with co-operation of the private sectors]²³⁵
- Methane/biogas recovery from landfill gas, wastewater treatment, agricultural waste
 - [\[Lille\]](#) has first plant to turn wastewater into biogas for bus fleet]²³⁶
- Incineration/combustion

²²⁹ http://ec.europa.eu/environment/europeangreencapital/wp-content/uploads/2011/04/MDR0763Rp00013_Good-Practice_Final2.pdf

²³⁰ http://ec.europa.eu/environment/europeangreencapital/wp-content/uploads/2011/04/MDR0763Rp00013_Good-Practice_Final2.pdf,

²³¹ http://energy-cities.eu/wiki/index.php/Proposal_2.7

²³² <http://www.upside.ie/>

²³³ http://ec.europa.eu/environment/europeangreencapital/wp-content/uploads/2011/04/MDR0763Rp00013_Good-Practice_Final2.pdf

²³⁴ http://ec.europa.eu/regional_policy/projects/stories/details_new.cfm?pay=UK&the=72&sto=2772&lan=7®ion=349&obj=ALL&per=2&defL=EN

²³⁵ http://www.energy-cities.eu/wiki/index.php/Proposal_2.5#Geneva_Canton.2C_Switzerland

²³⁶ http://www.energy-cities.eu/db/lille_575_en.pdf

- [[Malmö](#) incinerates local waste and converts to heat energy]²³⁷
- [[Copenhagen](#) provides 140,000 homes heat through domestic waste incineration]²³⁸

Re-cycle waste:

- Recycling / composting
 - [[Barcelona](#) makes use of recycled materials and compost goods at comprehensive waste plant]²³⁹
 - [[Freiburg](#): council pays for waste and recycling is free for citizens]²⁴⁰
 - [[Münster](#): free recycle scheme as an incentive and has financial reward for rubbish separation]²⁴¹

Share assets:

- Buildings
 - [A church in [Freiburg](#) has two different religious groups using it for same purpose]²⁴²

²³⁷ <http://ec.europa.eu/environment/europeangreencapital/wp-content/uploads/2011/06/Environmental-Best-Practice-Benchmarking-Report-Award-Cycle-2012-2013.pdf>

²³⁸ http://ec.europa.eu/environment/europeangreencapital/wp-content/uploads/2013/02/egc_analysis2010-2011.pdf

²³⁹ <http://ecoparcbarcelona.com/index.php?&idioma=3>

²⁴⁰ <http://www.iclei-europe.org/members/member-in-the-spotlight/archive/freiburg/>

²⁴¹ http://ec.europa.eu/environment/europeangreencapital/wp-content/uploads/2013/02/egc_analysis2010-2011.pdf

²⁴² http://www.energy-cities.eu/wiki/index.php/Proposal_2.6#Freiburg-im-Breisgau.2C_Germany

BARCELONA (1, 605,000), SPAIN²⁴³

The Ecoparc de Barcelona is an ambitious environmental facility which not only treats solid waste from the metropolitan area but aims to reuse and recycle elements through a range of techniques, such as composting and methanization.



Background

Metropolitan Barcelona produces 1.6 million tonnes of solid waste (excluding industrial waste) annually. The idea for the Ecopark emerged in 1998, following the adoption of the Metropolitan Municipal Waste Management Programme (PMGRM). The main objective was a large-scale transition from mere treatment of solid waste to a system which allowed for the recovery of materials and energy resources and the reduction of landfill waste.

Activities

Built between 1999-2001 at a cost of €48 million, Ecopark de Barcelona is a waste sorting and biotreatment plant for Barcelona and neighbouring towns. The plant's main aims are to limit the environmental impact of solid waste treatment; improve plant health and safety conditions; increase production of biogas; increase the production of compost; minimize factory discharges (waste we are unable to make use of); minimize the percentage of organic matter in factory discharges; recover the maximum amount of recyclable material possible²⁴⁴.

Ecoparc de Barcelona treats two kinds of waste: organic waste from selective collection and undifferentiated waste (residual waste). From the former biogas (methane and carbon dioxide) is produced, which is then used to generate electricity. From the latter recyclable materials (e.g. paper and glass) and organic matter (used to make compost) are extracted. Steam is also sold to a local cooling and heating network.

Results

Ecoparc de Barcelona treats approximately 12% of solid waste produced in the metropolitan area. From the c. 350,000 tonnes of solid waste treated per year, it produces 160,000 MWh per year.²⁴⁵ Around 7.6 tonnes of steam sold per year to urban heating and cooling network.²⁴⁶

²⁴³ <http://ecoparcbcn.com/index.php?&idioma=3>

²⁴⁴ <http://ecoparcbcn.com/contenido.php?id=63>

²⁴⁵ http://www.teresa.cat/en/total-municipal-solid-waste-recovery-facility_2115

²⁴⁶ http://www.teresa.cat/en/total-municipal-solid-waste-recovery-facility_2115

I.II.V URBAN PLANNING

Generally, there is potential to establish much closer links between urban planning and sustainability initiatives, particularly in the field of energy. Key challenges in urban planning are transport (see above), the segregation of urban zones, urban sprawl and the creation of green spaces²⁴⁷. Urban planning should be used as a set of instruments to guide the post-carbon transition²⁴⁸, and is crucial given the cross-sectoral, integrating impact it can have.

Integrated urban planning system for energy/sustainability transition:

- [[Barcelona, Munich](#) are using expertise of local stakeholders in urban planning initiatives]²⁴⁹
- [[Leipzig](#): internal and external stakeholders network for future urban planning, with Leipzig Charter in mind]²⁵⁰
- Green Economy
 - [[Freiburg](#): Green City Cluster with companies specialized on sustainable products and services – arts and crafts, planning, engineering, consulting, research etc.]²⁵¹

Incorporate sustainability principles in urban planning:

- Compact city planning and construction
 - [[Tübingen](#) has plans to build the city up and not out in new developments]²⁵²
- Protect green areas
 - [[Vienna](#): 50% of Vienna - green area & protected by law]²⁵³
- Keep/ establish mixed-use neighbourhoods
 - [[Stavanger](#): mix-use planning incorporates businesses, residential, service and recreation interests in urban spaces]²⁵⁴

Improve the urban natural environment:

- Tree planting
 - [[Reggio Emilia](#) Green belt strategy is incorporating natural green areas in and around urban areas]²⁵⁵

²⁴⁷ http://www.energy-cities.eu/wiki/index.php/Proposal_5.1

²⁴⁸ <http://www.energy-cities.eu/5-Urban-planning-as-a-way-of-2960>

²⁴⁹ http://www.energy-cities.eu/wiki/index.php/Proposal_5.1

²⁵⁰ <http://www.leipzig.de/stadtentwicklungskonzept>

²⁵¹ <http://www.greencity-cluster.de/?L=1>

²⁵² http://www.energy-cities.eu/wiki/index.php/Proposal_4.5#T.C3.BCbingen.2C_Germany

²⁵³ <https://www.wieninternational.at/en/content/environmental-city-vienna-50-green-space-en>

²⁵⁴ [http://www.stavanger.kommune.no/Documents/Natur og milj%C3%B8/Aktuelt/Climate_and_environment_plan_2010-2025.pdf](http://www.stavanger.kommune.no/Documents/Natur%20og%20milj%C3%B8/Aktuelt/Climate_and_environment_plan_2010-2025.pdf)

²⁵⁵ http://ec.europa.eu/environment/europeangreencapital/wp-content/uploads/2014/08/MDR0763Rp0029_Good-Practice-Report-2016_F02-reduced1.pdf

- [[Nantes](#): urban forest with an estimated 100,000 trees already in the area, the city wants to further increase green spaces in urban areas]²⁵⁶
- 'Urban gardening' schemes
 - [[Freiburg](#) (*in German*)]²⁵⁷
- Establish green corridors for urban bio-diversity
 - [[Barcelona](#)]²⁵⁸

Development of brownfield sites:

- [Limiting urban sprawl through brownfield development in [Bristol](#)]²⁵⁹

²⁵⁶ <http://ec.europa.eu/environment/europeangreencapital/wp-content/uploads/2011/06/Environmental-Best-Practice-Benchmarking-Report-Award-Cycle-2012-2013.pdf>

²⁵⁷ <http://www.leitfaden.kommunaler-klimaschutz.de/leitfaden/c4-weitere-handlungsfelder.html#toc3>

²⁵⁸ http://www.unep.org/urban_environment/PDFs/Barcelona_Final.PDF

²⁵⁹ http://ec.europa.eu/environment/europeangreencapital/wp-content/uploads/2013/02/MDR0763Rp00026_Good-Practice-Report-2015_F01_light.pdf

BRISTOL (428,100), UK²⁶⁰

The municipality has promoted the development of brownfield sites to limit urban sprawl and increase compactness. It has also made concerted efforts to make the city more 'liveable'.



Background

Bristol is the major city of the West of England. Bristol's population grew by 10% from 2001-2011 (above the UK average of 7%). This growth put pressure on the city's land and green areas because new homes and facilities for businesses needed to be developed to support the population and assist economic growth. To deal with this growth without expanding the city limits into Green Belt areas and make better use of urban sites, statutory land use planning policy was established to promote regeneration and restrict development on green areas.

Activities

An integrated planning policy was implemented focused on using planning tools to redevelop brown field sites and better protect green sites and the Green Belt around the city. The main land use plan from 1997-2011 was the Bristol Local Plan. Alongside this statutory land use planning policy programme, related action plans were also developed e.g. City Centre Strategy (1998, 2005), Contaminated Land Strategy (2001), Parks and Green Spaces Strategy (2008). The aim was to more efficiently use urban land and make the inner city denser and Bristol as a whole more compact. Inner city regeneration projects, creating high density, mixed use neighbourhoods such as Harbourside and Temple Quay. Development of new industrial areas in the suburbs, but not the Green Belt or in green areas. Previously, the municipality had allowed some industrial development on green areas to help revitalise the industrial area. This policy was cancelled in 2007 and only brownfield land resulting from recent industrial closures is now available for development. Strategic land use policy has also been adapted to assure the role of green areas for wildlife and flood risk within the city.

Furthermore, an integrated planning approach to protect green areas around the city was developed in partnership with neighbouring municipalities. The 'West of England Partnership' ensured strategic housing, transport and green infrastructure were coordinated with adjoining authorities

Results

Since around 2005 98% of business development and 94% of new homes were on brownfield sites as a result of inner-city regeneration programmes. A high proportion of new industrial development has utilised brownfields (63%) in suburban areas including Avonmouth. In total since 2007, 37 hectares of brownfields have been redeveloped within the city. Contaminated Land Strategy and regeneration initiatives resulted in 73% of derelict land being redeveloped since 1997.

²⁶⁰ http://ec.europa.eu/environment/europeangreencapital/wp-content/uploads/2013/06/Indicator-3-Green-urban-areas-incSLU_BRISTOL1.pdf

I.III DEMONSTRATION PROJECTS AT NEIGHBOURHOOD /DISTRICT LEVEL

Demonstration and pilot projects at the district/neighbourhood level are testing grounds for new approaches, technologies and practices, providing learning and transfer opportunities for policy makers, civil society and private sector. Projects can take the form of large government-led, corporate (re-)development projects, or small neighbourhood initiatives launched by engaged citizens and property owners. It is important to note that many of the projects highlighted have been criticized for not providing affordable housing or not involving residents to an adequate level. Indeed, combining green environmental development with social goals remains a challenge for most cities.

I.III.I REVITALISATION OF EXISTING DISTRICTS AND NEIGHBOURHOODS

Most cities in Europe grow at comparatively low rates. Excessive suburban growth trends of the post World War II era were reversed in many regions, while inner city areas have regained attractiveness among wealthy segments of society. Meanwhile, most inner-city industrial areas have lost their function. Compact city planning, brownfield development, and sustainable rehabilitation approaches have become mainstream concepts, particularly in the context of urban sustainability strategies. However, they remain a political challenge in practice. Where development pressure is high and real estate prices are rising, land in the city centres is often subject to fierce competition between different interest groups, ranging from commercial developers to advocates of social housing or environmental groups.

Many municipal governments are overburdened with the task of guiding urban renewal in a way that allows for economic vitality as well as social inclusion and high environmental standards. Examples of how this integration can work are often limited to the neighbourhood or district level. Urban revitalisation projects are as diverse as the physical and social systems of the cities in which they develop. This inhibits a clear-cut typology of such projects.

Conversion / Transformation of mixed-use precincts:

- [[London](#) – Greenwich Peninsula]²⁶¹
- [[Großschönau](#) has created local Sonnenplatz passive housing village project]²⁶²
- [[Barcelona 22@](#)]²⁶³

Sustainable upgrading of residential areas through participatory projects:

- [[Stockholm](#)'s Sustainable Järva, halving energy consumption in residential blocks through a major retrofit plan]²⁶⁴

²⁶¹ <https://www.london.gov.uk/priorities/housing-land/land-assets/greenwich-peninsula>

²⁶² <http://www.nachhaltigwirtschaften.at/results.html/id3219>

²⁶³ <http://en.wikipedia.org/wiki/22@>

Kalundborg (50,000)

Denmark²⁷¹

Green Industrial Municipality plan is leading environmental change in this highly industrialised area.



Background

Kalundborg is a small city with a prosperous heavy industry sector comparable to that of a much larger one. This presents a particular challenge of dealing with the high level of GHG emissions resulting from heavy industry (c.10% of Danish total) without threatening the economic prosperity of the town. To deal better with the inherent antagonisms between economic growth and environmental sustainability, Kalundborg has undertaken a number of projects to become a green industrial municipality by 2020.

Activities²⁷²

The municipality's approach is based on forming partnerships with and between key local, regional, national and even international actors. For example, in 2008 a partnership was formed with Denmark's largest energy provider, DONG Energy. The aim here is harness new sustainable technologies provided by DONG Energy to, amongst other things, green the municipality's own energy use and reduce CO₂ emissions from 4118 tons to 0. This will be achieved through buying green energy from the world's largest off-shore wind-mill farm, Horns Rev II. A further major project is *Kalundborg Symbiosis*: here the idea is that local industrial companies utilise each other's residual- and by-products on a commercial basis to reduce use of energy, water and raw materials, i.e. one company's waste becomes another's raw material.

Other projects include: *CBD a 2nd Generation Bio-refinery Cluster Initiative* is a cluster initiative promoting bio-refinery projects, at the world's largest 2nd generation demonstration plant in Kalundborg INBICON. *Energy Performance Contracting (EPC)*: the municipalities of Kalundborg, Middelfart and Gribskov have formed a partnership (*ESCommuner*) to promote and disseminate the use of Energy Performance Contracting (EPC) and Energy Service Companies (ESCO's) in Denmark. *BaltCiCA – A Climate Adaptation Project*: joined this EU project focused on Baltic cooperation on rising sea levels. Kalundborg Municipality has many agricultural and environmental interests that would be jeopardised in the event of rising water levels.

Results

Symbiosis project: Yearly CO₂ emission reduced by 240.000 tons; 3 million m³ of water saved through recycling and reuse; 30.000 tons of straw converted to 5,4 million litres of ethanol.

²⁷¹ <http://www.iisbe.org/iisbe/gbpn/documents/policies/instruments/UNEP-green-ind-zones/UNEP-GIZ-ppt-kalundborg-case.pdf>

²⁷² Kalundborg Kommune/ Klima OG Energi (2009) : Kalundborg : The Green Industrial Municipality. Available: <http://www.kalundborg.dk/Admin/Public/Download.aspx?file=Files%2FFiler%2FErhvervslivet%2FGroen+industri%2FGreen+industrial+municipality.pdf>.

I.III.II NEW SUSTAINABLE NEIGHBOURHOODS/DISTRICTS

Among the project examples in this report, newly built neighbourhoods perhaps offer the highest potential for demonstrating future sustainable urban development approaches. Without the historical burden of existing built structures, cutting-edge technologies and state-of-the-art design can be combined to form the model of a post-carbon urban system. Minimum features of new sustainable neighbourhoods include high energy efficiency standards and renewable energy applications to ensure a high level of energy independency. Beyond this, other sector concepts can come into play, such as mobility (accessibility to the local public transport network, car-free zones), water (closed water cycles, grey water re-use), heat production (decentralised heat and power cogeneration, district heating), urban planning (compact and mixed use development, green spaces). Ideally, the applied sustainability concepts go beyond physical features and ensure social and community functions, inclusion of low-income residents as well as other potentially marginalised groups.

- ‘100% renewable’ neighbourhoods
 - [[Heidelberg, Hamburg, Malmö](#)]²⁷³
 - [[Freiburg](#) Vauban district]²⁷⁴
 - [Bahnstadt in [Heidelberg](#)]²⁷⁵
- Sustainable district
 - [[Malmö](#) – Western Harbour district powered by 100% local renewable energy]²⁷⁶
 - [[Stockholm](#) – Hammarby Sjoestad]²⁷⁷
 - [[Freiburg- Rieselfeld](#)]²⁷⁸
- Waterfront rehabilitation
 - [[Berlin](#) – Rummelsburger Bucht, new urban area on reclaimed land]²⁷⁹
- Eco-buildings
 - [[Grenoble](#) eco-buildings built with plans to consume 50% less energy through architectural and technical characteristics]²⁸⁰

²⁷³ http://www.energy-cities.eu/wiki/index.php/Proposal_5.3

²⁷⁴ http://www.energy-cities.eu/db/freiburg2_579_en.pdf

²⁷⁵ http://www.energy-cities.eu/db/Heidelberg_Bahnstadt_2014_en.pdf

²⁷⁶ <http://www.citiesforpeople.net/cities/westernharbour.html>

²⁷⁷ http://www.hammarbysjostad.se/inenglish/pdf/HS_miljo_bok_eng_ny.pdf

²⁷⁸ http://www.iclei.org/fileadmin/PUBLICATIONS/Case_Studies/ICLEI_cs_104_Freiburg_June_2010.pdf

²⁷⁹ <http://www.stadtentwicklung.berlin.de/bauen/entwicklungsgebiete/en/rummelsburg.shtml>

²⁸⁰ http://www.energy-cities.eu/db/Grenoble_SESAC_12_new_eco-buildings_in_de_Bonne_2011_en.pdf

HEIDELBERG (144, 600), GERMANY²⁸¹

One of Germany's biggest urban development projects, the Heidelberg Bahnstadt is Europe's largest passive district – and continues to grow. By following a comprehensive energy plan the project has achieved impressive results with regards to energy efficiency.



Background

Located to the south west of Heidelberg's city centre, the rail freight and switch yard closed in 1997. In line with the city's integrated environmental and energy planning concepts, this site was chosen as an opportunity to redevelop inner city land, increase density, reduce non-motorized transport in the city and develop a flagship environmental project. In 2001 the municipality opened an urban planning competition for "Bahnstadt Heidelberg" (won by Trojan & Trojan). In 2003 the municipality formally approved the plans and work began in 2009.

Activities

Bahnstadt is one of Germany's largest urban development projects (comparable to Hamburg's Hafencity). Public and private investment has been €2 billion. There is continued demand for residential and commercial properties and construction continues. The Bahnstadt site covers 116 hectares, offers a mix of commercial, public and residential buildings, and is still under development. The main focus of sustainability activities is energy and environment – the development of "passive house" standard for buildings (ensuring very low levels of energy for space heating and cooling), particularly, and zero emissions for the site, generally. District heating and electricity supply based on combined heat and energy production (from a wood cogeneration plant) have been developed. Other measures include covering two thirds of Bahnstadt's roofs with vegetation to promote microclimate benefits and rainwater retention (and recycling and avoidance of discharges). Importantly, energy measures are multifaceted and rooted in the city's energy planning law²⁸². The focus is on establishing high technical standards, defining obligations through the planning law and legal contracts, energy consulting, quality management, public relations and financial incentives²⁸³.

Results

The "passive house" standard has brought measurable benefits. Energy efficiency is much below German legal requirements (Federal Energy Saving Ordinance (EnEV 2009). CO₂ consumption is below half that of conventionally constructed buildings²⁸⁴.

²⁸¹ http://www.energy-cities.eu/db/Heidelberg_Bahnstadt_2014_en.pdf

²⁸² http://www.heidelberg.de/site/Heidelberg_ROOT/get/documents/heidelberg/Objektdatenbank/31/PDF/Energie%20und%20Klimaschutz/31_pdf_energiekonzeption2010.pdf

²⁸³ http://www.energy-cities.eu/db/Heidelberg_Bahnstadt_2014_en.pdf

²⁸⁴ <http://heidelberg-bahnstadt.de/en/sustainable-living>

I.III.III SUSTAINABLE COMMUNITIES

The project type “Sustainable Communities” refers to special efforts towards integrating the economic, environmental and social dimensions of sustainability. Particularly, the social domain (inclusion, poverty reduction etc.) tends to be neglected in environmentally oriented projects. Some of the examples below describe methodologies within larger neighbourhood projects that focus on overcoming this known challenge. Intervention types include sustainable neighbourhood contracts to upgrade local facilities and services, extensive participation processes, education and awareness campaigns as well as investments in social infrastructure. Sample results include inclusive physical and environmental improvements and growth of local businesses and employment while keeping a stable composition of communities with low fluctuation of residents (cf. featured example Ekostaden Augustenborg).

Housing projects with social inclusion dimension:

- [[Hannover](#): Kronsburg neighbourhood, development project driven by the housing shortage in 1990's that incorporates environmental protection to mix of functions]²⁸⁵
- [[Brussels](#): sustainable neighbourhood contracts in integrated approach to combat poverty, reinforce social cohesion and ensure ecological transition of the existing neighborhoods]²⁸⁶
- [[Vila Nova de Gaia Vila d'Este](#): social housing energy rehabilitation]²⁸⁷
- [[Berlin](#) (*in German*): Gleisdreieck Park public participation in urban development]²⁸⁸
- Sustainable upgrading of residential areas through participatory projects [[Ekostaden Augustenborg, Malmö](#)] [[Sustainable Järva, Stockholm](#)]
- Educational projects [[Thessaloniki](#) Green schoolyards] [Carbon management in [Kirklees](#) schools]
- Using food growing to engage communities: [[Todmorden](#): Incredible Edible] [[London Borough of Sutton Urban farm](#)]
- Create neighbourhood partnerships: [[Bristol](#)]
- Community-owned energy projects [[Béganne](#)]; see other examples in [UK](#) in [France](#)

²⁸⁵ http://www.energy-cities.eu/IMG/pdf/Sustainable_Districts_ADEME1_Kronsberg.pdf

²⁸⁶ <http://www.sustainablecity.be/brusselsgreencapital/case-stories/sustainable-neighbourhood-contract-masui?context=42>

²⁸⁷ http://www.energy-cities.eu/db/Vila-Nova-De-Gaia_Refurbishment-social-housins_2014_en.pdf

²⁸⁸ https://www.berlin.de/imperia/md/content/verwaltungsmodernisierung/verwaltungskongress2012/forum_v_der_moderierende_staat_gleisdreieck.pdf?start&ts=1352281733&file=forum_v_der_moderierende_staat_gleisdreieck.pdf

MALMO²⁸⁹ (312, 841), SWEDEN

Ekostaden Augustenborg is one of Sweden's largest urban sustainability projects. With its emphasis on resident participation and equity the municipality has achieved environmental and social improvements in a low income area.



Background

Augustenborg is a low income and multi-cultural area with a population of around 3,500 people located to the south of the city centre in the district of Söder. From the 1960s onwards Augustenborg had experienced social and environmental problems. High unemployment and a highly fluctuating population were coupled with low quality housing (very energy inefficient) and a problem with seasonal flooding.²⁹⁰

Activities

Ekostaden Augustenborg was supported by the EU funding, national government's Local Investment Programme and was further financed by Malmö City municipality and the MKB housing company. In total around €22 million was invested²⁹¹. Although the main funding period lasted from 1998-2002, the project is ongoing and characterised by smaller funded projects, such as the installation of a wind power plant, and continued community-based project. A crucial dimension in Ekostaden Augustenborg activities, beyond the provision of substantial funds, has been the extensive involvement of residents in planning and implementation. One example of this is the carpool which was set up by the residents to reduce motorized transport and the design of green spaces to improve the local quality of life²⁹². Other activities focused on local energy production and efficiency, waste separation and open storm-water treatment.

Results

Around 90% of storm water from roofs is captured by the open storm water system. Biodiversity in the area has increased by 50% as a result of green roofs. Resource efficiency has increased e.g. energy efficiency by 20% since 1998, while fewer resources are used, e.g. water consumption is down by 25%. Solar energy now provides 10-15% of hot water in the neighbourhood. Around 70% of all waste is recycled.

There has been a large drop in unemployment in the area (from 30% in 1998 to 6% in 2007). Although a variety of factors have influenced this, the Local Agenda 21 office assisted residents in finding jobs. The area has become more attractive to live in and though rents have increased (as they have across Malmö), these are negotiated between the municipal housing company and the tenants union. Generally, displacement of residents (i.e. gentrification) has not been perceived to be widespread.²⁹³

²⁸⁹ <http://malmo.se/English/Sustainable-City-Development/Augustenborg-Eco-City.html>

²⁹⁰ Müller, T. (2015) Securing the social dimension of sustainability in urban development projects? Urban governance in Potsdam and Malmö. University of Potsdam Master Thesis.

²⁹¹ Ibid.

²⁹² <http://malmo.se/English/Sustainable-City-Development/Augustenborg-Eco-City/Mobility.html>

²⁹³ Ibid.

I.IV CONCLUSIONS AND RESEARCH RECOMMENDATIONS

This report has revealed the wealth of best practice guidelines and documentation available, usually online and in English. This is due to the extensive work carried out by organisations such as ICLEI, ENC and CoM. They have provided practitioners and policy-makers with insights to the activities of a huge range of cities and offered overall guidance on how to set about achieving more sustainable cities.²⁹⁴

What this report has done is to bring the advice provided in such guidance documents together, to aggregate the knowledge of these practitioners. A reference document has been created, one which can be used to shape overall plans and search for further information on relevant practices. While the result is dense, it is an extensive single-document guide which offers a comprehensive overview of, and set of links to further information on, good practices in Europe.

What has been apparent from doing this research is that the vast amount of information available on practices rarely provides the detail and quality required to draw conclusions on the actual performance of particular practices in cities. Language is a barrier to more detailed assessment, as not all cities and towns have the resources to provide such a level of online information in English. More generally, it is difficult and time-consuming to find measurable and comparable data on activities and (e.g. monetary) inputs.

To really be able to gauge the impact of practices across diverse contexts, with varying access to and quality of information, detailed fieldwork or specialist knowledge of particular cities is required. This cannot, in our opinion, be provided by desk-based inventory-type research. The same is true for questions related to the influence of different contextual factors on the success of practices. This Work Package has hoped to provide detailed knowledge on this issue, but due to the problems encountered with the original methodology we have been unable to do this. While this report does provide an inventory of practices, we feel it is important to stress that a uniform and comprehensive evaluation of all good cities practices is unrealistic within the time/budget constraints of this project.

Continuing research in WP2 towards the typology of post carbon cities (D2.4), via D2.3 Good EU and National Practices, will conduct a more detailed examination of a limited number of cities that represent different types and are well documented. The hope is that we will be able to analyse key context, activity, performance data and develop hypotheses to build the typology of post carbon cities.

We welcome feedback from all project partners on how this report could be improved and how we might develop our approach to the rest of the work package.

²⁹⁴ One example is the ICLEI-led Sustainable Cities project's "Sustainability Cycle":
<http://www.sustainablecities.eu/pathways/integratedmanagement/sustainability-cycle/>

II REFERENCES

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- Kern, K. & Beveridge, R. (Under Review) "Spatiality, temporality and experimentation: dimensions of change in urban climate and environmental governance", Urban Research and Practice
- Rose, R. (2005) Learning from Comparative Public Policy. A Practical Guide. London and New York: Routledge.
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III ANNEX B: GUIDELINES DOCUMENTS AND GOOD PRACTICE EXAMPLES

Guideline Documents

NCS - Natural Capitalism Solutions (2007): Climate Protection Manual for Cities, Eldorado Springs (CO), 319 pages.

This document provides a comprehensive, practical guidance for local climate protection action, targeting mainly municipalities in the U.S. For each area of action, there is an abundance of practical examples in the U.S. (in boxes) and links to more detailed guidance documents and templates (e.g. sample local ordinances). The document was drawn up with strong reference to ICLEI's approaches.

FCM - Foundation of Canadian Municipalities (200?): Model Climate Change Action Plan. A template for completing a greenhouse gas reduction plan in the Partners for Climate Protection, 10 pages. Partners for Climate Protection (PCP) is a program developed by the FCA. It has been operating since 1994, PCP membership accounts for more than 80 percent of the Canadian population.

UN Habitat / ICLEI (2009): Sustainable Urban Energy Planning. A handbook for cities and towns in developing countries, 80 pages

Explains typical steps for the development and implementation of a Sustainable Energy Plan; enumerates typical fields/sectors of intervention each of which are illustrated by exemplary actions in industrialized and developing countries.

Energy Cities (2013): 30 proposals for the energy transition of cities and towns.

Online version including 8 additional proposals, http://www.energy-cities.eu/spip.php?page=energy_transition_en, date: 17 October 2014

difu - Deutsches Institut für Urbanistik (Ed.)(2011): Klimaschutz in Kommunen, Praxisleitfaden, 516 pages.

Comprehensive manual on municipal climate protection for German Municipalities, jointly edited by difu, ifeu and Climate Alliance. Describes governance and administrative as well as technical requirements of a municipal climate strategy, lays out sectoral fields of activity; each section contains a number of practical examples in German cities and towns. German language only.

Download: <http://www.leitfaden.kommunaler-klimaschutz.de/download.html>

Online viewer: <http://www.leitfaden.kommunaler-klimaschutz.de/leitfaden.html>

Good practice collections and important case studies

CIVITAS INITIATIVE (Urban Mobility): <http://www.civitas-initiative.org> (not yet systematically considered here)

Climate Alliance (October 2014) Our members Activities. <http://www.climatealliance.org/594.0.html>

Covenant of Mayors. (October 2014). Benchmarks of Excellence. all cities http://www.covenantofmayors.eu/actions/benchmarks-of-excellence_en.html

European Green Capital. (October 2014.). Best practice Reports 2010-2016 Retrieved from <http://ec.europa.eu/environment/europeangreencapital/press-communications/award-publications/index.html>

Energy Cities (October 2014) Actions, Best practices from members. all reports from leading cities http://www.energy-cities.eu/cities/case_studies.php?lang=en

EU Energy Award.(October 2014) Gold Municipalities <http://www.european-energy-award.org/participating-countries/>

Green City Freiburg (October 2014) city report http://www.greencity.freiburg.de/servlet/PB/menu/1182949_I2/index.html

ICLEI Case Studies #100-172, download at: <http://www.iclei.org/resources/publications/iclei-case-studies.html>

Siemens City Climate leadership awards (October 2014) <http://www.siemens.com/press/en/events/2014/infrastructure-cities/2014-06-ccla.php>

Soot Free Cities. (Oct 2014) Berlin only <http://sootfreecities.eu/city/berlin>

Sustainable Cities EU (October 2014). Local Stories. <http://www.sustainablecities.eu/local-stories/>

Urban-LEDS (Oct 2014). European project Cities. <http://urbanleds.iclei.org/index.php?id=637>

IV ANNEX C: OVERVIEW OF GOOD PRACTICES

OVERVIEW OF GOOD PRACTICES FOUND IN LEADING AND OTHER CITIES - SEE ACCOMPANYING EXCEL SHEET