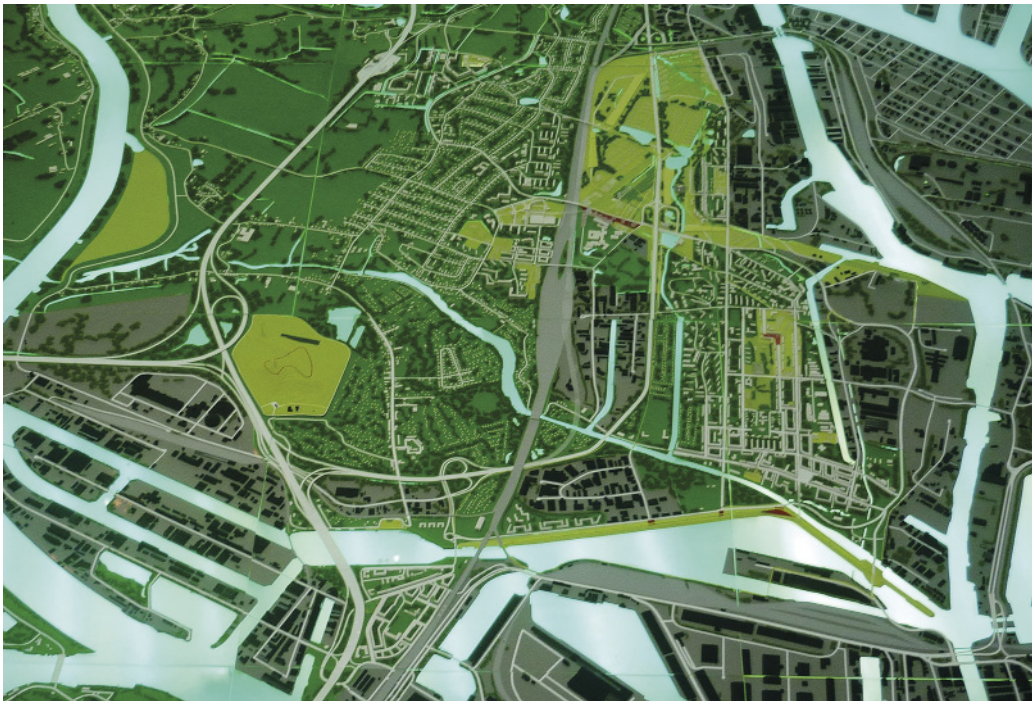
SPECIAL Expert Paper 1

SPATIAL PLANNING and ENERGY for COMMUNITIES IN ALL LANDSCAPES

Co-funded by the Intelligent Energy Europe Programme of the European Union

Energising masterplanning



An integrated approach to masterplanning for sustainable energy

By Kate Henderson

tcpa

SPECIAL
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About SPECIAL

Spatial planning has a key part to play in creating urban environments that support less energy-intense lifestyles and communities, and spatial and urban planners have a pivotal role in developing energy strategies and action plans. The SPECIAL (Spatial Planning and Energy for Communities In All Landscapes) project has been set up to help bridge the gap between climate change/energy action planning and spatial and urban planning.

SPECIAL is funded by Intelligent Energy Europe and is an exciting partnership between eight Town Planning Associations (TPAs) and planning authorities from across Europe. It is a three-year programme with a focus on spatial planning for the deployment of local energy efficiency and renewable energy solutions. The Town and Country Planning Association (TCPA) is the lead partner, with partner TPAs and planning authorities in Sweden, Ireland, Hungary, Italy, Greece, Germany and Austria.

The project has been set up to help the TPAs and planning authorities of the partner countries meet the EU's challenging energy and climate change targets for 2020. It has several objectives relating to exchanging best practice and experience; promoting integrated renewable energy strategies; and building the capacity of the partner planning associations and authorities in the planning and delivery of renewable energy solutions. Most importantly, the partners must then share that learning through their professional networks and maximise the dissemination of their training to others, in a multiplier effect.

The SPECIAL partnership:

- Provincial Government of Styria, Department of Spatial Planning Law, Austria
- German Institute of Urban Affairs, Germany
- Irish Planning Institute, Ireland
- Hungarian Urban Knowledge Centre, Hungary
- Organisation for the Master Plan and Environmental Protection of Thessaloniki, Greece
- National Centre for Town Planning Studies, Italy
- Swedish Society for Town and Country Planning, Sweden
- Town and Country Planning Association, UK

The SPECIAL project runs from March 2013 to March 2016, culminating in a final conference in London to disseminate the project outcomes, including a pan-European Guide on Spatial Planning and Sustainable Energy.

Visit the SPECIAL website at **http://www.special-eu.org**
Follow the SPECIAL project on Twitter at **@eu_special**

Energising masterplanning – an integrated approach to masterplanning for sustainable energy

By Kate Henderson

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Cover photograph: Map conceptualising how Hamburg could be planned for climate change resilience using decentralised energy sources

Foreword

The aim of this SPECIAL project Expert Paper is to illustrate how sustainable energy can be integrated into the masterplanning, design and development of both new communities and urban regeneration initiatives. The paper identifies opportunities to implement sustainable energy systems and considers the role of the planning system, communities, politicians and other stakeholders in such implementation.

Across Europe there is a growing body of examples of low-carbon or carbon-neutral developments, as demonstrated by the SPECIAL project. Some of these developments focus on reducing energy demand, while others include new or more established energy-generating technologies such as solar and wind energy and district heating supplied by combined heat and power systems. Many include a combined approach. In other places, innovative mechanisms have been used to deliver low-carbon energy generation and supply networks on a city-wide scale.

This timely Expert Paper demonstrates what is already being achieved in communities across Europe, highlighting case study examples from England, Germany and Switzerland. The case studies show how various low- and zero-carbon energy technologies can be integrated into different types of development, and highlight some of the policy approaches that have made integration possible.

1 Introduction

SPECIAL project partners at a site visit during a training week in the UK

The SPECIAL (Spatial Planning and Energy for Communities In All Landscapes) project is a dynamic partnership of eight Town Planning Associations and planning authorities from across Europe. It focuses on spatial planning, local energy efficiency, and the deployment of renewable energy solutions. The SPECIAL project aims to bridge the gap between energy action planning and spatial and urban planning by developing the capacity of Town Planning Associations and planning authorities in the planning and delivery of renewable energy solutions.

This SPECIAL project Expert Paper, the first in a series, highlights good practice in masterplanning for sustainable energy based upon three case studies drawn from across the project partnership.

1.1 Who is this paper for?

This paper is designed to highlight good practice in masterplanning for sustainable energy and is aimed primarily at local authority town planners and councillors and private sector practitioners. It is also intended to be useful to architects, energy engineers, renewable energy providers, housing developers and housing associations, and all those who want to tackle climate change and reap the positive economic benefits that solutions such as renewable energy and low-carbon living can bring.

1.2 What do we mean by masterplanning for sustainable energy?

The experience of delivering training for the SPECIAL project, both in the UK and across Europe, has made it clear that the terms ‘spatial planning’, ‘masterplanning’ and

'energy planning' are often differently interpreted in different contexts. This paper uses the following definitions:

- ***Spatial planning:*** Planning is the complex business of anticipating the future and attempting to shape it for the good of society. It is carried out by all societies everywhere. In the English context, the land use planning system has come to be defined by the statutory system of development control and plan-making and by the process, policy and governance structures that go with that. Spatial planning has a key role to play in local or regional government's delivery of low-carbon development, infrastructure and renewable energy projects. It also offers an important means of engaging with communities and stakeholders, acknowledging the interconnectedness of issues which surround the management of space and community.
- ***Masterplanning:*** Masterplanning is undertaken when there is a strategic large-scale opportunity to comprehensively plan for new development – including new settlements and sustainable urban extensions – or for the regeneration of part of a city.
- ***Energy planning:*** Energy planning is undertaken by a local authority, and for those authorities that are signatories to the Covenant of Mayors such activity is directed at producing a 'Sustainable Energy Action Plan' (SEAP). The SEAP outlines how the local authority intends to meet its 2020 carbon dioxide (CO_2) emissions reduction target, and sets out the activities and measures that will be, or are being, undertaken to meet the target, together with timeframes and assigned responsibilities.[1]

1.3 Linking masterplanning and sustainable energy

The SPECIAL project has shown that spatial planning, masterplanning and energy planning are not always integrated, with the result that the potential for energy-efficiency measures and low-carbon solutions is very often not fully understood or realised in practice.

This Expert Paper highlights the benefits of drawing together masterplanning and energy planning by presenting details of three case studies. It demonstrates what can be achieved, and identifies the key factors that apply to local and regional authorities irrespective of their local conditions, political frameworks, or energy challenges.

Based upon the case study analysis, this paper identifies three key factors in joining up masterplanning and sustainable energy:

- effective planning and energy policies;
- corporate and political leadership; and
- community and political support.

1 *How to Develop a Sustainable Energy Action Plan (SEAP) – Guidebook.* Covenant of Mayors. Publications Office of the European Union, 2010. **http://www.eumayors.eu/Covenant-technical-materials.html** See also **http://www.eumayors.eu/Library,84.html**

2 Case studies

This Expert Paper sets out three case studies:

- ***North West Bicester Eco-town, Oxfordshire in England:*** Masterplanning sustainable energy in a new community.
- ***'Renewable Wilhelmsburg', Hamburg in Germany:*** Masterplanning sustainable energy in city regeneration.
- ***Geneva in Switzerland:*** A strategic approach to integrating sustainable energy and spatial planning at the regional scale.

2.1 North West Bicester Eco-town, Oxfordshire in England

2.1.1 Context and background

Bicester is a market town in North Oxfordshire. The town has grown substantially during the second half of the 20th century, in response to the long-term policy of directing growth in Oxfordshire towards expanding market towns.[2] Today it has a population of around 31,000.

In 2009 North West Bicester was announced as one of four Government-designated 'Eco-towns' in the UK. Following this announcement those involved in the North West Bicester project have worked hard to make it a truly exemplar model of sustainable development. In 2014 Bicester was awarded 'Garden Town status' by the Government and, as a result, it is to receive funding to support the delivery of 13,000 homes, 21,500 jobs, and a new motorway junction.[3] The 2014 announcement includes the North West Bicester Eco-town as well as other sites in the area such as Graven Hill and South West Bicester.

2 J. Barker: 'Engaging the wider community in living sustainably'. *Town & Country Planning*, 2011, Vol. 80, Nov., 472-474

3 'Government awards Bicester Garden Town status'. Cherwell District Council, Dec. 2014. http://www.cherwell.gov.uk/index.cfm?articleid=10371

Impression of part of the North West Bicester development – sustainable energy use, including in transport, is key to the proposal *(Picture: A2Dominion)*

● Sustainable energy supply is fundamental to the North West Bicester Eco-town development *(Picture: A2Dominion)*

2.1.2 North West Bicester Eco-town and its energy objectives

North West Bicester Eco-town is to be a sustainable new community of around 6,000 homes and supporting infrastructure, including generous green spaces, community and social facilities, commercial premises, and leisure facilities.

The energy objectives for North West Bicester are defined by its Eco-town status and the policies set out in a UK Government policy document entitled *Eco-Towns. A Supplement to Planning Policy Statement 1*.[4] This ambitious policy, revoked in March 2015 but with an exemption for North West Bicester,[5] remains the foundation for the new community's sustainable energy objectives. The underpinning ambition, as set out in the Government *Eco-Towns* policy document (Policy ET 7.1[6]), is for the new community to be zero carbon:

> *'The definition of zero carbon in eco-towns is that over a year the net carbon dioxide emissions from all energy use within the buildings on the eco-town development as a whole are zero or below.'*

The first phase of the new community at North West Bicester is a development of 393 zero-carbon homes, a primary school, a local shop, an eco-pub, and a community centre.

2.1.3 Policy and masterplanning

While national policy set out the overarching sustainable energy standards in the *Eco-Towns* policy document, the North West Bicester Masterplan sets out the detail of how these standards will be delivered.

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4 *Planning Policy Statement: Eco-Towns. A Supplement to Planning Policy Statement 1.* Department for Communities and Local Government, Jul. 2009. **https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/7773/pps-ecotowns.pdf**

5 'Cancellation of Eco-towns policy is bad news for the green economy'. Press Release. Town and Country Planning Association, Mar. 2015. **http://www.tcpa.org.uk/resources.php?action=resource&id=1244**

6 *Planning Policy Statement: Eco-Towns. A Supplement to Planning Policy Statement 1.* Department for Communities and Local Government, Jul. 2009. **https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/7773/pps-ecotowns.pdf**

A comprehensive Masterplan Energy Strategy for North West Bicester has been produced which highlights the importance of consultation and collaboration:

> *'arriving at the final energy strategy for NW Bicester has involved an iterative process of development and testing of proposals, discussions with Local Authority officers and consultation with wider stakeholders.'*[7]

The first phase of the development is guided by four key energy principles:[8]

- ***Onsite electricity generation:*** Every home in the first phase of the development will have rooftop solar panels, making it the UK's largest domestic solar array (equivalent to two and a half football pitches).
- ***District heating:*** A gas-fired combined heat and power (CHP) district heating system will provide heating and hot water for every home.
- ***Energy-efficient homes:*** The homes will be built sustainably, using timber frames, and will be highly insulated with triple-glazing.
- ***Sustainable transport:*** The community design will give priority to walking, cycling or taking the bus, with the aim of reducing the proportion of journeys made by car down to 50%, from the Bicester average of 67.5%.

2.1.4 Key lessons

National policy has been a fundamental driver for the new community at North West Bicester. The *Eco-town* document, although no longer Government policy, has ensured that the North West Bicester Masterplan includes a comprehensive energy strategy. The preparation of the Masterplan Energy Strategy has provided a forum for planners and energy professionals to work together. To ensure that the Masterplan is successful, it has been widely consulted upon within the local authority and the community.

The North West Bicester Eco-town is setting out to be an 'exemplar', with the first phase of the development demonstrating how a zero-carbon community can be delivered at scale. There is a combined approached to achieving this goal, with energy specialists working closely with planners, and the Masterplan Energy Strategy is the key route map for delivery.

2.2 'Renewable Wilhelmsburg', Hamburg in Germany

2.2.1 Context and background

Hamburg, Germany's second largest city, is home to over 1.7 million people. It lies approximately 100 kilometres from the North Sea, on the River Elbe, and the river has been a defining feature of the city's success as a trading port.[9]

The Hamburg district of Wilhemsburg is Europe's largest river island, with a population of over 50,000 people.[10] Wilhemsburg is a former industrial area, characterised by docklands and industry as well as green spaces.

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7 *NW Bicester Masterplan: Masterplan Energy Strategy*. Hyder Consulting (UK) Limited, for A2Dominion, Mar. 2014. http://www.ecobicester.org.uk/cms/sites/ecobicester/files/folder/ecoBicester/5022-UA005241-UE21R-01-Masterplan%20Energy%20Strategy%20FINAL%20v3.pdf

8 'Energy'. North West Bicester webpage. A2Dominion. http://nwbicester.co.uk/the-first-phase/living/energy/

9 'Hamburg, Metropolis of the North. Dates and facts'. Webpage (in English). 'Official Hamburg Website'. **http://english.hamburg.de/4476362/dates-and-facts/**

10 See the International Building Exhibition IBA Hamburg website ('IBA in English' pages) at **http://www.iba-hamburg.de/en/iba-in-english.html**

The Georgswerder Energy Hill in Hamburg ***(Picture: IBA Hamburg/Aufwind Luftbilder)***

From 2006 to 2013 Wilhelmsburg formed the project area for the International Building Exhibition IBA Hamburg, along with the neighbouring island of Veddel and the 'Harburg Upriver Port'.

2.2.2 International Building Exhibition IBA Hamburg

The International Building Exhibition IBA Hamburg has been a major driver for environmentally and socially sustainable regeneration of the districts of Wilhelmsburg and Veddel, resulting in over 70 projects. These projects are characterised by three themes:

- 'Cosmopolis', demonstrating how to foster co-operation within cities in the future;
- 'Metrozones', focusing on space for growth within the city and ease of travel between home and work; and
- 'Cities and climate change', demonstrating how decentralised renewable energy and resource efficiency can help cities grow in an environmentally friendly way.[11]

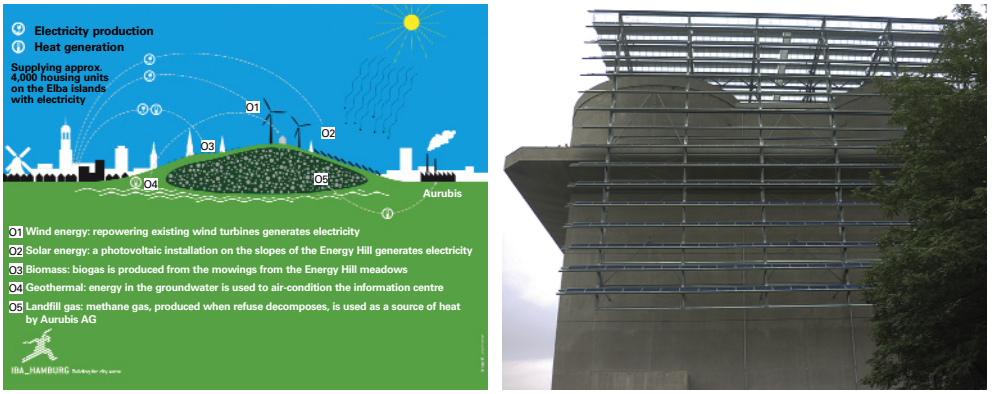
Several innovative projects have been delivered under each IBA Hamburg theme, and it was under the third theme, 'Cities and climate change', that the 'Renewable Wilhelmsburg' initiative was developed.

2.2.3 The ''Renewable Wilhelmsburg' Climate Protection Concept'

The ''Renewable Wilhelmsburg' Climate Protection Concept'[12] set out a combined approach to sustainable energy across the district, under the overarching ambition of supplying the Elbe islands with 100% renewable energy. A range of measures have

11 'Themes of the IBA'. Webpage (in English). International Building Exhibition IBA Hamburg. **http://www.iba-hamburg.de/en/story/themes-of-the-iba.html**

12 ''Renewable Wilhelmsburg' Climate Protection Concept'. Webpage (in English). International Building Exhibition IBA Hamburg. **http://www.iba-hamburg.de/en/projects/climate-concept/projekt/renewable-wilhelmsburg-climate-protection-concept.html**



Positive symbols of climate change action in Hamburg – landfill use to renewable energy generation at the Georgswerder Energy Hill *(Picture: IBA Hamburg)*, and the Energy Bunker

been implemented, including local renewable energy production, energy-efficiency standards for both new buildings and for retrofitting existing buildings, and combined heat and power plants.

A key focus of the 'Renewable Wilhelmsburg' initiative was to ensure a high level of stakeholder engagement from politicians, civil servants in government agencies, local businesses, and the community. The IBA Hamburg brought international experts together with key stakeholders through public participation platforms called the IBA Lab and the IBA Forum.[13]

Among the many projects that have been delivered are two initiatives that have helped to transform sites associated with the Second World War into positive symbols of climate change action. These are the Georgswerder Energy Hill and the Energy Bunker.

Georgswerder Energy Hill

The 45 hectare Georgswerder Energy Hill is a former landfill site which for decades was 'off limits' for the residents of Hamburg.[14] It was used as a dumping ground for rubble and domestic waste following the Second World War and was later used for toxic industrial waste.

Today, the Georgswerder Energy Hill has undergone a transformation. It is now an iconic visitor attraction (with over 60,000 visitors in 2013) and an important source of renewable energy, supplying around 4,000 households with electricity using wind and solar generation. Landfill-generated gas is also being utilised as a source of energy.

Energy Bunker

As part of the IBA Hamburg a former air-raid bunker, built in 1943, seriously damaged in 1947 and left mostly unused for over six decades, has been renovated and converted into a renewable energy power plant and heat reservoir.[15] The Energy

13 F. Woo: 'Regenerative urban development in practice: Renewable Wilhelmsburg'. Energy Transition. The German Energiewende website, Jul. 2014. **http://energytransition.de/2014/07/regenerative-urban-development-in-wilhelmsburg/**

14 'Georgswerder Energy Hill'. Webpage (in English). International Building Exhibition IBA Hamburg. **http://www.iba-hamburg.de/en/themes-projects/energieberg-georgswerder/projekt/energy-hill-georgswerder.html**

15 'Energy Bunker'. Webpage (in English). International Building Exhibition IBA Hamburg. **http://www.iba-hamburg.de/en/themes-projects/energiebunker/projekt/energy-bunker.html**

Bunker provides enough heat for around 3,000 homes and electricity for around 1,000 homes through a 'biomethane-fired combined heat and power unit, a wood combustion system, and a solar thermal unit, as well as the waste heat from an industrial plant'.[16]

To engage the community in the renovation of the Energy Bunker and the huge sustainable energy opportunities it provides, a café, called <vju> Café, has been built on one of the bunker's flak towers. The <vju> Café provides panoramic views of the city, including the Georgswerder Energy Hill, with its giant wind turbines and Hamburg's largest open photovoltaic system.

2.2.4 Key lessons

The International Building Exhibition IBA Hamburg, which took place over eight years between 2006 and 2013, has been transformative in setting Wilhelmsburg on a pathway towards 100% renewable energy generation.

As a former industrial area, Wilhelmsburg offers many transferable lessons for towns and cities across Europe on the re-use of former industrial sites and buildings for both renewable energy opportunities and community facilities.

Masterplanning at a city-district scale enables the co-ordinated delivery of multiple projects, ensuring that environmental, social and economic benefits are maximised. The projects delivered under the ''Renewable Wilhelmsburg' Climate Protection Concept' banner are not only innovative in terms of smart technologies and regeneration but also provide symbolic landmarks for climate action.

2.3 Geneva in Switzerland

2.3.1 Context and background

Geneva is the westernmost canton or state of Switzerland. With a population of over 480,000,[17] it is an economically vibrant region that has experienced population growth and consequently urban sprawl on the edge of cities.

Today, the Canton of Geneva has an ambitious growth agenda of developing 50,000 new homes by 2030 to address current housing shortages and to rebalance urban development.[18]

2.3.2 Housing, planning and energy

In Geneva there is a strong recognition of the need to move towards a low-carbon economy and an understanding that energy generation and supply must be considered alongside meeting housing need. Consequently energy policy has an elevated status, with the Cantonal Act (on regional policy) adopted in 1987 being updated in 2010 to make energy a public policy priority. By prioritising energy policy

16 'Energy Bunker'. Webpage (in English). International Building Exhibition IBA Hamburg. **http://www.iba-hamburg.de/en/themes-projects/energiebunker/projekt/energy-bunker.html**

17 'Statistiques cantonales'. Webpage. Republique et Canton de Geneve. **http://www.ge.ch/statistique/domaines/01/01_02_1/tableaux.asp#1**

18 *Embarking the Whole Territory on the Path of Sustainability*. Project description. ECTP-CEU (European Council of Spatial Planners – Conseil européen des urbanistes) 10th European Urban and Regional Planning Awards 2013-2014. **http://www.ceu-ectp.eu/images/stories/Awards2014/Entries/online/04-Switzerland-description.pdf**

the Canton of Geneva has brought sustainable energy and town planning together. Significantly, in December 2013 a new state department was established, bringing the town planning, housebuilding and energy units together in Le département de l'aménagement, du logement et de l'énergie (DALE) (Town and Country Planning, Housing and Energy Department).

2.3.3 Tools and techniques

As one of the winners of the ECTP-CEU (European Council of Spatial Planners – Conseil européen des urbanistes) 10th European Urban and Regional Planning Awards, on sustainable energy (the 2014 SPECIAL Awards), the Canton of Geneva has developed an innovative approach to integrating spatial planning and sustainable energy. Geneva's Plan directeur cantonal 2030 (Town and Country Planning Plan 2030) includes energy policy, together with resource management.

Geneva has also developed a 'Territorial Energy Concept' for each of the Canton's spatial planning procedures, to:

- identify key stakeholders and their respective roles;
- co-ordinate their activities, taking their interests and constraints into account; and
- offer energy supply strategies that best promote local resources.

The 'Territorial Energy Concept' is being used to test the approach taken in several large-scale projects in Geneva and to provide learning on the value of closer collaboration between spatial planners, energy experts and other stakeholders. One such venture is the GeniLac® project, which aims to use water from Lake Geneva to provide a district-wide thermal heating and cooling network.[19] As set out in Geneva's winning entry to the ECTP-CEU Urban and Regional Planning Awards 2013-2014, the area covered by the GeniLac® project includes three big urban planning projects, and a dedicated body has been created to co-ordinate thinking on the infrastructure opportunities in the area. The body includes 'private stakeholders as well as representatives of the Swiss Confederation, the Canton and the municipalities. This is a good example of co-ordination, where a high number of participants involved in large spatial planning projects integrate the energy issue into extensive planning.'[20]

2.3.4 Key lessons

To integrate town planning, housing and sustainable energy as a corporate and political priority, the Canton of Geneva has established a Town and Country Planning, Housing and Energy Department.

The Canton of Geneva's plan for 2030 integrates energy policy with spatial planning, demonstrating high-level political commitment and certainty.

Through the 'Territorial Energy Concept', the Canton of Geneva has a clear procedure for identifying and co-ordinating the action of stakeholders.

19 M. Monnard: 'GeniLac: A thermal network for Geneva's city centre using water from Lake Geneva'. 7th European Conference on Sustainable Cities and Towns, Geneva, Switzerland, Apr. 2013. **http://www.sustainablegeneva2013.org/wp-content/uploads/2013/04/A10-Monnard.pdf**

20 *Embarking the Whole Territory on the Path of Sustainability*. Project description. ECTP-CEU (European Council of Spatial Planners – Conseil européen des urbanistes) 10th European Urban and Regional Planning Awards 2013-2014. **http://www.ceu-ectp.eu/images/stories/Awards2014/Entries/online/04-Switzerland-description.pdf**

3 Key lessons

The three case studies outlined in this Expert Paper highlight the benefits of drawing together masterplanning and energy planning in the development of new communities, such as the North West Bicester Eco-town in England, and in city regeneration, such as that undertaken in the Wilhemsburg district of Hamburg in Germany. It also underlines the benefits of integrating governmental spatial planning and energy departments, as at Geneva in Switzerland. This paper demonstrates what can be achieved, and identifies the key factors that apply to local and regional authorities irrespective of their local conditions, political frameworks or energy challenges.

Based upon the case study analysis, this Expert Paper identifies three key factors in joining up masterplanning and sustainable energy:

1. ***Effective planning and energy policies:*** All three case studies demonstrate the effective integration of energy policies into masterplanning, but at different scales. The North West Bicester Eco-town provides an example of masterplanning energy for a new community. The Georgswerder Energy Hill in Wilhemsburg, Hamburg, highlights an innovative approach to masterplanning for a regeneration site. Geneva's 'Territorial Energy Concept' for each of the Canton's spatial planning procedures demonstrates the integration of sustainable energy at a strategic scale.
2. ***Corporate and political leadership:*** In Geneva the establishment of an integrated state Department for Town and Country Planning, Housing and Energy (DALE) demonstrates strong corporate and political leadership.
3. ***Community and political support:*** The International Building Exhibition IBA Hamburg is an excellent example of both long-term community engagement (with the initiative running from 2006 to 2013 through 70 projects) and political support (with the involvement of local politicians and the municipality). The Energy Hill and the Energy Bunker are not only innovative examples of masterplanning for sustainable energy but are also symbols of climate change action for the future.

In addition, the following three areas also need support and development to ensure that masterplanning for sustainable energy is carried out in an integrated fashion:

- planning education and skills (energy planning is not a mainstream element in the education of planners);
- the evidence base; and
- effective monitoring.

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