

Finding Your Way to Energy Actions

Guidelines for Communities on How to Set an
Energy Action Plan

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SECURE

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1. Introduction

Within the SECURE project Sustainable Energy Action Plans (EAPs) has been created for the cities of Dublin, Hilleröd and Malmö. The aim of those EAPs was to valorise European energy policies and add value to the many individual local demonstration projects in these cities.

To transfer the knowledge and experience achieved in this process to those that are still in the process of establishing an EAP the intent of this report is to create a technical guideline. In the first part of technical guidelines we would like to describe the working process. To give an idea on how the different cities addressed the situation all partners were invited to answer a set of questions around the topics of “starting the process, forming energy partnership and setting a communication plan of the EAPs”. With the questions that we posed and the answers that the partners identified we wish to give you an idea of how to structure the process of your own energy action plan better. The second part is instead focusing on how to prepare for the actual content of the EAP. The third part finally gives you a structure of an actual Energy Action Plan.

The road to energy efficiency involves a lot of different actors and demands good communication skills. We hope that this document helps you to find your way to energy actions.

Good luck creating your Energy Action Plan!

2. Designing the process

2.1 Starting the process

The aim of a sustainable Energy Action Plan is to aid the transformation of urban areas into ecological sustainability with a reduced use of energy, an increased use of renewable energy and a reduction of the environmental impacts of transport. The plans are focusing on the long term transformation of the energy systems within these cities, including measurable targets on energy use and the share of energy from renewable resources.

The idea of an action plan is to draw upon experiences gained from a number of different projects that have been implemented in each of the participating cities.

Three questions to start your process with are therefore:

- *What are the existing incentives for your city to set up an Energy Action Plan?*
- *Is there an existing Energy Action Plan and which points need to be improved the most?*
- *Which improvements in the energy planning of your city do you expect the Energy Action Plan to help you with?*

Hilleröd:

For many years the electricity utility has made energy guiding to their costumers. The utility was owned by the municipality, and therefore there were no need for an extra department regarding energy actions. Some years ago the focus changed from energy consumption to sustainability in general. A plan for sustainability was made – but the plan for energy actions was partly lost in that period. When the Secure project started in 2006 there where many experiences and a lot of activities but none of them where gathered in a plan which gave som communicational problems. The activities were there in the city but with no plans, objectives and no benchmarks point noone could tell how effective the activities were.

As there was no energy action plan the work had to begin from the very beginning, with a process that looked very similar to processes of “normal” changes of an organisation. The techniques that was used in the project, where those normally used in managing organisational changes for larger organisations.

The overall goal was to set up a strategy with some clear mission areas, in which som general objectives could be used to point out some short term energy saving goal. The strategy should then be connected to a communication plan and a cost benefit footprint for each goal.

Dublin:

The Action Plan on Energy for Dublin is being developed as a strategy that aims to create a coherent set of clear energy guidelines for the ongoing planning and development of Dublin. It will contribute to the sustainable development of Dublin through good energy management, which will benefit the environment and contribute to the quality of life for the people who live and work in Dublin.

Planning and Development: The Dublin City Development Plan 2005–2011 identifies 13 key Framework Development Areas with development principles that include economic, social, cultural, environmental, urban form and spatial objectives. Five of the Framework Plan Areas are very large, each with over 500,000 m² of new-build residential / commercial development. These five large schemes together make up about 3 million square metres of new development that offers significant potential for energy efficiency and carbon dioxide abatement over the buildings' lifespan of 60 years or more – but only if the present opportunities are taken up.

Residential Commercial: For example, the 'House of Tomorrow' standard for housing, of which there are about 1,200 dwellings already constructed or under construction in 20 different schemes around Dublin City and County, is at least 40% more energy efficient than current practice. These examples serve as valuable reference points for better energy efficient in Dublin's new buildings.

Dublin District Heating Project: A District Heating network, running from the Poolbeg peninsula to Heuston Station, and beyond, is currently being planned by Dublin City Council. This is an essential element of Dublin's infrastructure if the city is to take a quantum step forward in energy efficiency for heating and cooling city centre buildings. The advantage of District Heating is that it offers the opportunity to tap into the more efficient Combined Heat and Power (CHP) technology for electricity generation and, also, to take greater advantage of new and renewable energy sources as further new energy technologies emerge. A new network of underground pipes (red lines) will transport excess or waste heat from CHP plants and alternative energy supplies and deliver it as useful energy for heating new building developments (yellow circles).

But in order for the benefits to be realised it is important that new developments, when planned and constructed along the route of the District heating, must be made compatible for joining up with the new heating system when it becomes operational over the coming years.

Transport 21: The cost of congestion to the Greater Dublin Area is estimated to be e2.5bn per year (Dublin Chamber of Commerce, 2005). This is identified as the single greatest threat to future investment in the region and the competitiveness of the capital city. 'Transport 21' is a 10-year, e34.4bn national infrastructure project that was announced by the Ministers for Transport and Finance in October 2005. The rail-based public transport infrastructure proposed by Transport 21 represents good energy efficiency practice, as set out in the EU Green Paper on Energy Efficiency (2005). Upgrades to the rail-based public transport infrastructure include:

- DART (upgraded)
- LUAS – 7 new projects
- New METRO
- Suburban Rail upgrade

Given both the high price of oil and the high dependency on oil in the transport sector, it is vital that the maximum potential for best practice energy efficiency in transport is identified and acted upon from the start of Transport 21's implementation.

Global Climate Change: Carbon Dioxide (CO₂) is emitted from burning oil and gas to heat buildings, and in fuelling transport. These emissions are obviously produced through local activities in Dublin and the other cities and regions of the world. Yet, the result is the global problem of Climate Change and this will, in turn, affect the same cities through, for example, flooding from more severe storms and rising sea levels.

The Stern Review(2) has examined the economics of Climate Change and concludes that the scientific evidence for global warming is now overwhelming. Furthermore, Climate Change presents very serious global risks and demands an urgent global response. The Stern Review estimates that the stabilisation of greenhouse gases at levels of 500-550ppm CO₂ e will cost, on average, around 1% of annual global GDP by 2050 if action is taken now. The economic cost of not taking action to reduce CO₂ emissions will be many times higher.

Local Action: In addition to the important regulatory functions of Dublin City Council in planning and development of the city, in Buildings Control and in Traffic management, Dublin City Council can and should lead through good practice in their own operations. Examples of good practice include:

- Combating fuel poverty in Council housing stock
- Improving the energy efficiency of its Public Buildings
- Use of renewable energy sources for water and waste services
- Recycling cooking oil and fats into biofuels for vehicles

The City budget for 2007 is approximately e1.8 billion, of which about e1 billion is for capital projects and e800 million operational costs in running the City and its services. Of this sum, the 2007 estimate for its own energy consumption is e20 million and Codema is working with the different Departments in helping reduce their own energy use without reducing the quality of service.

Malmö:

We both need to follow the Swedish law on municipal energy planning and want to guarantee secure energy supply, enhance the efficient use of energy and change to renewable energy sources. Our last energy plan is from 2000 and needs to be updated in general. There also needs to be a clearer focus on climate mitigation in the energy plan. The Energy action plan will help us to get an updated overview over the energy sources and use as it is now. This gives us the chance to identify the right actions to perform. We also need to improve communication routines within the administration and with the main energy supplier.

2.2 Forming Energy Partnership

A pre-requisite to the development of sustainable Energy Action Plans is the development of energy partnerships of different stakeholders in the individual cities. This will engage the various actors who have been involved in different demonstration projects in the participating cities. This will help to create a holistic plan, drawing on the expertise of the relevant actors with experience of sustainable projects within the cities.

One of the important issues to be addressed in order to reduce energy use and to make the inhabitants willing to make environmentally friendly choices is behavioural issues. The Energy Action Plans must therefore have the participation and cooperation with the inhabitants as a starting point. Also economic incentives can be important for example companies thus another starting point could be to show that the use of environmental technology as a long term investment. Finally the production and the distribution of energy is often market drawn, so a third factor of importance could be to analyse the parameters from the political world, in order to create pressure from the citizens, costumers as well as from market leading companies.

Questions to start the process of energy partnership could then be:

- *How were the key stakeholders for your energy partnership identified and who are they?*
- *When in the process of developing the Energy Action Plan do you need to form your energy partnership?*
- *To what extent is the energy partnership group involved in the establishment of the Energy Plan?*
- *How is the process around the involvement of the energy partnership group managed?*
- *What type of involvement is expected from the participants?*

Dublin:

A first step of the development of an Action Plan on Energy for Dublin was a seminar on Sustainable Energy Action Plans where the manifold audience got informed about the Action Plan on Energy for Dublin that was being developed by the Dublin City Council in association with CODEMA. Speakers included Paul Kelly, Head of Energy Efficiency Unit in the Department of Communications, Marine and Natural Resources, pointed out the priorities of the Irish energy policy. Dick Gleeson, Dublin City Planner, presented ongoing sustainable urban developments in Dublin and Poul Weiss an expert on district heating explained the current installation of a district heating network in Poolbeg and the Docklands. Finally partners of CODEMA from Sweden and Denmark gave an overview of sustainable construction in general and action plans on energy for two Scandinavian cities.

All attendees were invited to participate and their input was considered as being of great value. Energy partnerships were considered at the very outset of the project. However, as Dublin City had no existing action Plan and no regional energy or CO2 emissions data, a significant academic study was first required. This study was carried out by Codema. To assist this process and to further introduce the concept of a Sustainable Energy Action Plan, consultation groups were formed within Dublin City Council. These groups were as follows:

- Planning department
- Transport department
- Architects department
- Local consultation (Residents community fora)
- District heating informal meeting between stakeholders



Figure 1: Sustainable Energy Action Plan - development process

Malmö:

It is important for us in Malmö to co-operate with several stakeholders. One is the Skåne Energy Agency; they have high technical expertise. Another one is the main energy (heat) supplier E.ON. Others are constructors and developers; these are reached through our sustainable building dialogues.

The energy partnership as mentioned above was formed early in the process, when the decision was taken to update the existing energy plan. They partly participate in ordinary meetings of the energy plan working group, deliver facts and material for the

plan. E.ON and the City of Malmö also meet regularly in a co-operative group called Malmö Energy.

The City Planning Office is responsible for the work of the EAP. There is a working group that consists of representatives from the Environmental Department, the Department of Internal Services, the Streets and Parks Department, Security and Safety, and the Real Estate Office. The steering group consists of heads of units or sections from the above mentioned departments.

The participants are expected to attend meetings, give input within their field of expertise and to read drafts of the energy plan and comment on them.

Hilleröd:

When we began our planning process in the project, we very rapidly realised that there were a lot of barriers, and many employees and external “ghosts” coming up. In order to get the barriers in to daylight and to kill the ghosts, some general papers discussing barriers and dissemination were created and used as corner stones in our work. We made expeditions to some of the larger construction companies, where we discussed barriers on the energy area, and together with them we formulated some general objectives in the quality plans. Afterwards we made workshops for the municipality and for the public, where citizens, private companies, ngo’s, and the municipality got together and discussed how to create an energy action plan that removed these barriers and killed the ghosts. In this process we got in contact with many stakeholders. A stakeholder analysis showed us how we could use these contacts in next phases of the project.

The energy partnerships both in the line-organisation, in the public, and the national and international partnership, have been a big help from day one in the project. The discussions with the local construction companies gave us some important information of how strict our energy goals for them could be. If the goals are too ambitious the companies would not even try to achieve them. The different persons in the energy partnership are used in different phases in the project, but nearly all are used in the end of the project when the energy action plan is made. The partners are needed to approve that the objectives and goal can be realised, and they are needed when the action plan is released to the public, to show that the action plan is not something that is made up by the municipality, but made as a common goal for all citizens and companies.

In all our communication with the stakeholders and the energy partnership, we have had a very concise scope management. The overall scope was to include their experiences into the action plan, and before we would start to define the objectives and goals in the action plan, we needed to have a certain amount of discussion of energy actions, certain amount of demonstration cases that could show that the energy actions would be realisable. Energy partnership should indirectly approve all the actions before they were written. In order of the management we had employees with different educational background to communicate with different groups of partnerships. Furthermore we had a very strict time line with some clear milestones, to which we acted with “change management”, e.g. if we realised that a milestone was not achieved we changed strategy on that exact point, to show all the stakeholders that there were some continuous progress in the project.

The involvements from the different partners have been very different. But to generalise a little, they attended workshops to tell about their visions on energy action, and we have had both formal and informal discussions with them in order to approve objections on external companies and citizens, before they were decided. Some have also been involved in the informal quality approving.

2.3 Communication Strategy for the EAPs

Of as much importance as to decide who needs to be involved in the planning process of the EAP is to decide who the EAP will address. An experience from the work within SECURE is to already at an early stage decide who are the target groups for the EAP and thereafter structure the work in such a way that this group of people will feel directly addressed. In some cases there can be a need for several documents i.e. one addressing professionals in the area and one addressing those that will be affected in their private role. It is important to be able to communicate out energy plan to all these different target groups and adapt the communication strategy to it.

Questions to start the process of a communication plan could then be:

- *Which target group is of most importance to reach with your Energy Action Plan?*
- *In what way do you think their perception of you will influence your way of communicating?*
- *What efforts will you make to the presentation format of your Energy Action Plan in order to reach out to that the defined target groups:*

Hilleröd:

Our first process with the stakeholders showed that each group needed their own kind of communication, and if we chose one layout we would only reach one part of the city. Our analysis showed that private companies would use the energy saving technologies if their customers demanded it. The same phenomena were seen in the utilities. Therefore we decided that the most important target group was Mr. Jones and his family. And then the action plans should describe how the private companies and their utilities can lower their emission of CO₂. The city planners wanted to demand more and more energy savings, as the project went on, and they learned how easily the energy saving technology could be implemented in the city. The public energy action plan can be used as the light tower that they shall try to reach. Not more nor less, because this can have a negative effect in the public. If the planners try to set too strict energy demands, some companies will maybe not fulfil the demands for free, and that would give reflected negatively in the media.

The first engineer's design of the energy action plan was changed in the last moment in order to rewrite everything in a language that Mr. Jones, could understand. In order to achieve this, the texts were rewritten by a private company. The layout was also made in order to present a serious plan to Mr. Jones. This was made with a little use of graphs and a use of large everyday photos of the energy technology that was

discussed in the text. There is also use a lot of comments from normal citizens about their experiences with energy saving technologies.

Dublin:

The target group for the Action Plan will primarily be the professional groups who also make up the stakeholder groups & the Dublin City Council professionals. The Action will also be aimed at the people who live and work in Dublin, as a strategy that aims to create a coherent set of clear energy guidelines for the ongoing planning and development of Dublin. It will contribute to the sustainable development of Dublin through good energy management, which will benefit the environment and contribute to quality of life. Their perception will be influenced by the level of professionalism with which Codema approach the process. Codema has employed a professional design company to develop report covers and to advise on the general layout and design of the report. This design strategy is aimed at the decision makers within companies. This is a very important part of the overall communication of the Action Plan.

Malmö:

The most important group to reach with the Energy Action Plan are the real estate owners.

3. The Content of the Energy Plan

Before you develop your Energy Action Plan there are a number of issues that should be cleared out, such as the existing prerequisites for the establishment of an Energy Action Plan. For example: which fiscal incentives and control instruments exist on a local, national and European level and have relevance for your Energy Action Plan? What are the possibilities for a more sustainable energy use? And finally what are the possibilities to increase the use of renewables?

Down below, a structure on how to investigate these issues is suggested in order to get a good picture of your possibilities and constrains to energy savings.

3.1 Possibilities for a more sustainable energy use

How does the energy use look like in your city in terms of:

- Energy Demand
- Energy Supply Options for electricity, heating and domestic hot water
- Security of Supply
- Energy Distribution Options

3.2 Fiscal incentives & Control instruments for creating a sustainable energy system on a local level

The analysed control instruments could include regulations, strategic framework and development plans where relevant energy issues are picked out.

To further analyse the fiscal incentives 10 Key Questions are proposed

- What is the objective of the fiscal incentive?
- Which measures are eligible?
- Who can apply?
- How much is the grant/tax relief per application?
- Who is administering it?
- Who is financing it?
- How much budget is allocated?
- When was it introduced? How long is its runtime?
- How many applications have been approved since their introduction?
- How many applications have been approved in Dublin?

3.3 Possibilities to increase the use of renewables

With the EU aim to increase the amount of renewables by 20% by 2020 an important part of your Energy Action Plan should be renewable energy systems.

An important part of investigating the possibilities for introduction of renewables is to analyze which renewables are suitable for your City. Therefore caution should be placed on promoting technologies not necessarily suited to the local climate conditions, such as the use of solar energy.

The most common renewable energy sources are:

- biomass
- biogas
- geothermal energy
- hydroelectric power stations
- solar energy
- wind energy

Tidal and wave power are also options, but not yet equally explored and used as the others.

- Which renewable energy sources fit the local climate conditions best?
- Is one type of renewable energy source enough to satisfy the need or should there be a combination of different solutions?
- In what way can they be incorporated into the existing energy system?
- What is the realistic time frame for their implementation?
- Are there any incentives for using renewables?

In some European countries district heating and district cooling systems already exist. District heating supplies 6% of the final end use of net heat and electricity or 8.9% (2EJ) of the heat end use in EU-32. However, the source of district heating is important in order to classify as a renewable energy system. Combined heat and power plants running on renewable fuels serve as good local options where district heating and cooling systems are not developed yet.

3.4 Plan for a sustainable building sector

The integration of the built environment is central in the Energy Action Plans since the building sector stands for the single largest energy use in the cities. Most buildings already exist in the cities and the regeneration of them is important to include, which creates an opportunity as well as a challenge in the work towards a sustainable buildings sector. The reliance on fossil fuel for heating and cooling must also be broken. The inclusion of the building sector and realizing the potential for energy savings in the Energy Action Plans need a well developed strategy. The strategy can be arranged in **situation today**, **future development** and **assessment of different**

paths and are described below. Examples on how the cities have done the different parts are also described through examples in the text below.

Situation today

The following questions can be asked when investigating the situation of today:

- What are the characteristics of the existing building stock? What are the characteristics of new housing? Which development plans are on their way in the city?
- Energy use data for the existing building stock? What is the baseline of today? How much primary energy is used for heating, cooling and electrical devices? What fuel mix is used and what CO₂ emission is emitted?
- What is the saving potential in existing buildings? Starting with today's situation describing the potential in different kind of buildings such as residential, commercial, official, and private and community owned buildings. A tool box for the building sector can be developed which can be applied in the Energy Action Plan.
- Energy efficiency in new buildings. New standards for low energy designs, low carbon energy supply options etc.
- What renewable energy supply options are available?

In the Secure project the use of the Energy Performance of building Directive (EPBD) as an operational tool for the cities was one goal. In the four countries, Ireland, Sweden, Estonia and Denmark the directive has been implemented in different ways and also with different time frames and the EPBD has so far not been used by the cities in the work with the EAPs. After the implementation of the EPBD the information collected can be used to describe the energy performance of the buildings of today in each city and also to describe the different categories of buildings and their potential for energy savings. In the Secure project the situation of today was described by collecting the information in other sources such as the national statistics, the City Government, institutes etc but in the format of the EPBD. In Dublin the following parameters were described:

- Built form and sort of buildings
- Age Profile
- Building material and construction techniques, new building techniques
- Behavior of the tenants
- Tenure
- Fuel mix
- CO₂ emissions
- Rate of construction and demolition

In Hilleroed the focus in the Energy Action Plan is on the following parameters to create a more sustainable building sector:

- Energy for sustainable buildings
 - Solar power and Solar cells are described together with their potential to save energy and CO₂ emissions.
 - Heat pumps are described and how it can be used.
 - Biofuels and its potential in the built environment.
- Low impact construction.
- Municipal buildings and options for energy savings in them.

Future development

- What different paths for the future are possible? Describing and simulating different energy saving potentials and more renewable options for heating and cooling.

In Dublin three different paths were described; Scenario 0 business as usual; Scenario 1 offers significant higher ranked buildings according to the EPBD system; Scenario 3 offers an even higher ranked building stock. In the figure below the energy use for the three different paths is presented.

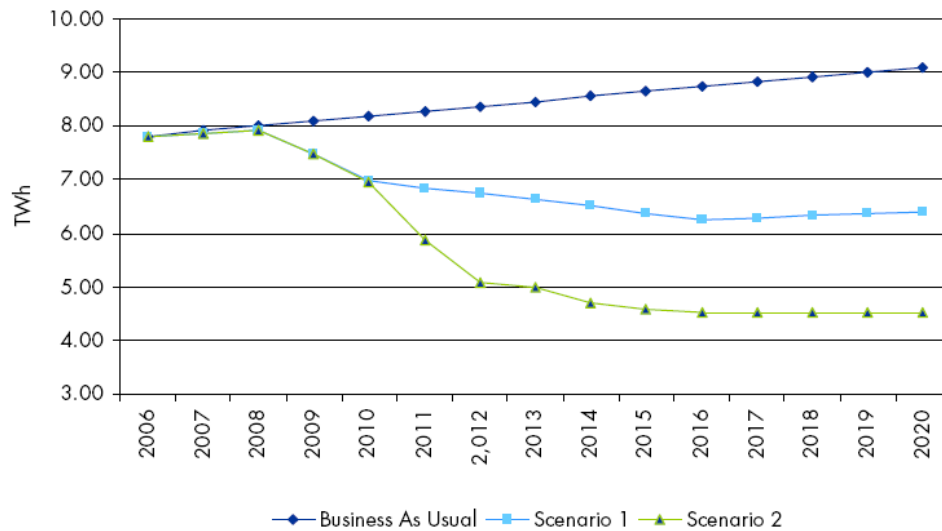


Figure 1. The three different paths described in Dublin’s Energy Action Plan. Energy Consumption 2006-2020 (1269 Demolitions per Annum)

In Malmoe a target has been set for 20% energy savings by 2020. Different energy saving strategies has been developed for industries, one detached houses, public buildings, private buildings and offices.

Assessment

- Which future paths are the most cost effective? Which path can show the greatest potential for energy savings and decreases the CO2 emissions the most at the lowest cost? What actions are needed to be taken in order to fulfill the different paths?

In Dublin the capital costs has been evaluated and compared to the energy saving potential: Costs below 347 million Euros and costs above 347 Euros, se the figures below. The low cost actions are extremely beneficial especially actions that consider user behavior. For the higher cost actions the boiler upgrade program shows the highest benefits.

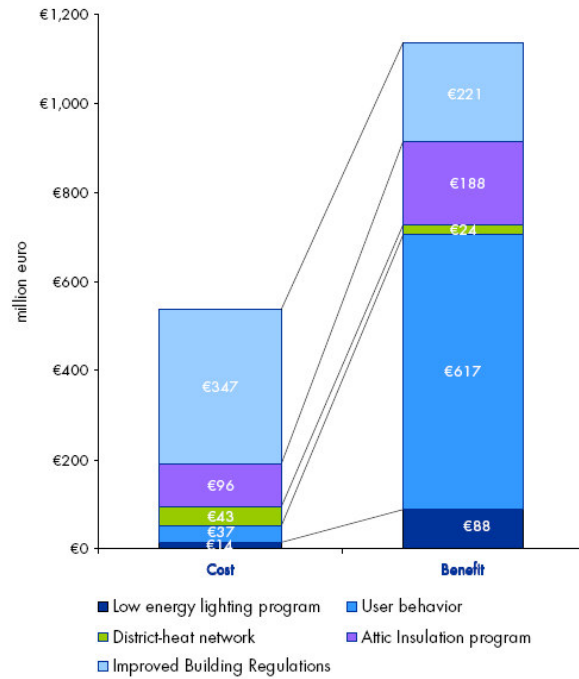


Figure 2. Benefits of low cost actions (less than 347 Euros)

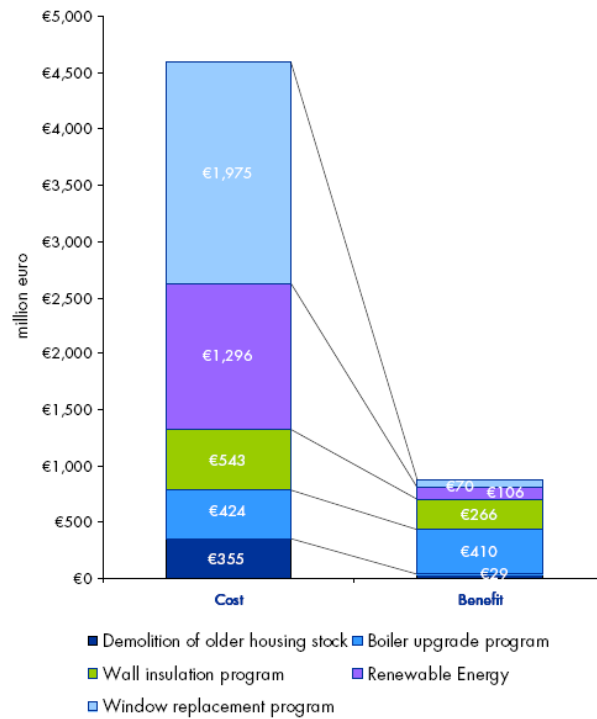


Figure 3. Benefits of high cost actions (above 347 Euros)

4. Structure of the Energy Action Plan

4.1 Malmö

- | | |
|--|---|
| 1. Introduction | <ul style="list-style-type: none"> - Assignment - What is an energy strategy? - Why do we need an energy strategy? |
| 2. Energy outside Malmö | <ul style="list-style-type: none"> - Global - National - Regional |
| 3. Energy situation in Malmö | <ul style="list-style-type: none"> - Today - Problem analysis - Challenges |
| 4. Visions and targets for Malmö | <ul style="list-style-type: none"> - 2030 - Main target - Other targets |
| 5. Energy strategy | |
| - 5a. Efficient energy use | <ul style="list-style-type: none"> - Private households - Premises - Industry - Transports |
| - 5b. Change to renewable energy | <ul style="list-style-type: none"> - Heat production - Fuel |
| - 5c. Planning, procurement, safety, economy etc | <ul style="list-style-type: none"> - Supply system - Safety and security plans - Relationships to stakeholders |
| 6. Consequence analyses | |
| 7. Action Plan (areas of actions) | |

4.2 Dublin

1. Introduction
2. Background
 - Framework
 - Impacts
 - Conclusions
3. Residential
 - Introduction
 - Methodology
 - Analysis
 - Scenarios to 2020
 - Financial analysis
 - Conclusions
4. Commercial
 - Introduction
 - Methodology
 - Analysis of the Manufacturing Sector
 - Analysis of the Services sector
 - Possibilities for Sustainable Energy
 - Scenarios for the Service Sector
 - Financial Analysis
 - Conclusions
5. Transport
 - Introduction
 - Methodology
 - Possibilities for Sustainable Energy
 - Possibilities for Renewable Energy
 - Transport in 2020
 - Financial analysis
6. Conclusions
 - Summary of options
 - Scenarios
 - Strategic options
 - Bundling of measures
 - Key questions
 - Next steps

4.3 Hilleröd

1. Introduction
2. Total balance of conservation targets
3. Energy supplies in Hilleroed
 - District heating
 - Electricity
 - Dissemination
4. Power production
 - Solar power
 - Solar cells
 - Heat pumps
 - Biofuels
5. Low impact construction
 - Municipal buildings
 - District planning and the sale of sites
 - Sustainable construction
6. Transport
 - Alternative fuels for transport
 - Public transport
7. Waste and recycling
8. Water