

## 10. CREATION OF CLIMATE-CONSCIOUS ATTITUDE AND LIFESTYLE

In addition to prevention and adaptation, the third element in the fight against climate change is strengthening climate-conscious attitude. Behind the environmental crisis, which is a result of a dysfunctional system structure, stands the inadequate operation of the socio-economic system. Being that increased consumption is the basic principle of operation of the society and the economy, its reduction would significantly menace the basic operation of the system. The reduction of the environmental burdens, and thus the fight against climate change can be successful with the reduction of consumption and the creation of a socio-economic system which differs completely from the existing one. In order to achieve this goal, the attitude of society has to change radically. We need a new climate and environment friendly society that is aware to not exceed a certain limit of consumption.

Having climate conscious individuals is not enough, climate conscious communities have to provide support for them. An important element of the present socio-economic structure is that it is too individualistic. The mainstream attitude of 'Create yourself' is most important and, as a consequence, people pay less attention to each other and their environment. In order to strengthen the climate conscious attitude and to change the present incompetent structure, the reorganisation of local small communities is very important. May it be prevention or adaptation, on a local community level it is more efficient to fight against climate change than on the individual level (may the individual be obliged for the case). With the restoration and support of local small communities, we should create a society that has less of a burden on the environment, and put emphasis, not on the satisfaction of individual consumption needs, but rather on paying attention to and caring for each other and create an environment that can finally play a role in reducing the climate change.

### 10.1. STRENGTHENING CLIMATE CONSCIOUS ATTITUDE

#### 10.1.1. The significance of changing the values of the society

The change of the values is essential in making the first step to creating an environment and climate conscious behaviour both on an individual and societal level. The change of the values of the society is a basic necessity to change the present socio-economic system which encourages even more consumption. No society can become sustainable without cutting back on the role of consumption.

More and more research shows that the more value placed on money and on material consumption along with all the status and formalities connected to it, the less attention is paid to improve the environment or climate conscious behaviour. Materialistic and selfish interests contribute to climate change. While following such internal values, such as helping others and finding roles in the community, are connected to sustainable, more climate conscious behavioural patterns. In the Western societies, as in Europe the concept of the well being and happiness is too closely connected to the level of consumption. In order to change the values we have to interpret such basic definitions

again, as 'development' and 'developed', 'economy' and 'poverty' or 'modern' and 'traditional'. This could also help to provide answers for the proper questions. During the fight against the climate change, in many cases the problem is not that we give poor answers to the questions raised, but rather the questions themselves are bad. There are questions raised even more often: How to cover the present energy need of the society? From what kind of renewable source? And, at the same time we don't even raise the question whether society really needs that much energy? (Obviously not).

Connected to the change of attitude, one of the most important ideas has to be that society is not entitled to the amount of natural resources consumed at the present time. Tim Kasser, professor of psychology, in his publication entitled the *'Structure of the World'* in 2009 states the following: 'Our world is (...) sick, however it is not burning, it is getting warmer in a dangerous speed. The more problems we have, the humanity will be before a crossroad: shall it continue its life as earlier (...), or it 'wakes up', and realizes, that only the crazy ones keep to the damaging lifestyle, and use the threatening environment changes to change the priorities and values.' (T. Kasser, 2009)

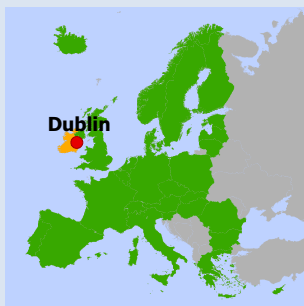
The creation of local and climate conscious values have two significant outcomes. One - the lifestyle of the local resident is less harmful for the environment. Second - in case these people understand the connection of change of the climate and they become aware of its dangers. When this occurs, they will likely accept decisions more readily, and proceed to give up something or harm their short term interests. For example, the radical reduction of local car transport is difficult to implement in a city where residents are not aware of car pollution's long-term effects.

#### 10.1.2. Possibilities to raise the climate consciousness of the society

Behind the values of the society there is a rather strong economic interest, however we still own such measures that may positively influence the thinking of humans. In order to change our values, and as a result our lifestyle, we have several possibilities we can implement everyday as well.

One of the most important steps enforcing the climate consciousness of the local society is if we introduce climate conscious values to **local education and training institutions**. This, on the one hand, may happen through the introduction of climate change topics into education material (workshops, sessions, organization of excursions, etc.), and on the other hand, in everyday practice, when the environment and climate conscious attitude emerges in everyday life of the institution.

The practice carried on in the education and training institutions may prevail in **workplaces and institutions** as well. On the one hand, it can be done in a way that the campaigns popularizing climate consciousness is integrated into the training. On the other hand, as in the case of the education and training institution, we can teach environment and climate conscious behaviour in the everyday practice as well. An example for this occurs when comparing the average use of electricity (we do not use air conditioning equipment, during the daytime we do not use lighting, and we switch off the unused computers, etc.), we collect garbage separately, we use recycled material, etc. These qualify on a grand scale as small steps, but slowly these may help to create the climate conscious attitude.



#### Ireland- Green-Schools Programme, An Taisce

The current population of Ireland is approximately 4.1 million. The number of students in primary education (2009/2010) is 505,998 and the number of students in secondary education (2009/2010) is 350,687.

Green-Schools ([www.greenschoolsireland.org](http://www.greenschoolsireland.org)) is an international environmental education programme developed by the Foundation of Environmental Education ([www.fee-international.org](http://www.fee-international.org)) and operated in Ireland by An Taisce ([www.antisce.org](http://www.antisce.org)). Green-Schools is a long-term thematic programme and award scheme that aims to make environmental awareness

and action an intrinsic part of the life and ethos of a school.

This is achieved by implementing the 7 step process outlined below:

1. Green-Schools Committee: This is primarily made up of students, teachers, parents, management, non-teaching staff and members of the wider community.
2. Environmental Review: This is the process of examining the school's environmental impacts (e.g. how students travel to school) in order to identify targets for action and improvement.
3. Action Plan: This gives specific and achievable targets, based on the findings of the environmental review, with proposed completion dates that will show real success.
4. Monitoring and Evaluation: This will ensure that progress towards targets is checked and amendments made where necessary.
5. Curriculum Work: This will integrate the Green-Schools programme with the curriculum work of the school when and where possible.
6. Informing & Involving the Wider Community: This will spread the Green-Schools message throughout the whole school and wider community through ongoing publicity and a 'Day of Action'.
7. Green Code: This aims to state the objectives that demonstrate the schools commitment to environmentally friendly actions (e.g. 'Use your feet, it's really neat!' 'Come on people, use your head, don't drive to school- walk instead!').

The Travel theme of the Green-Schools programme (other themes include Litter and Waste, Energy, Water, Biodiversity, Climate Change and Citizenship) was launched nationally in 2008 with the support of the Department of Transport and the National Transport Authority. Approximately 650 schools have worked on the Travel theme to date. The theme aims to promote sustainable travel (cycling, walking, park-n-stride, carpooling and public transport) to and from school and to raise awareness of the effects of transport on the environment.

Students, teachers, parents, An Taisce, Local Authorities and other organisations outside the school are involved in the planning and implementation of their School Travel Action Plan, promoting the formation of strong bonds within the community. Through initiatives such as cycle training, COW (Cycle on Wednesday) days, walking buses and WOW (Walk on Wednesday) days, students and teachers are encouraged to adopt a more sustainable approach to making journeys. Results from schools that undertook the programme between 2008 & 2010 indicate that over the past two years participating schools experienced a 27% reduction in private car use to more sustainable modes of travel to school. This represents over 11,800 people per day making the switch from the private car to sustainable modes of transport such as walking, cycling and park n stride.

The Green-Schools programme is operated in partnership with Local Authorities, and funded by the Department of Transport, Repak Ltd, ESB Independent Energy, The Wrigley Company and the Department of the Environment, Heritage and Local Government.

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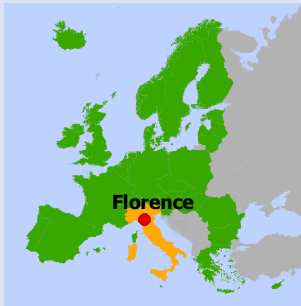
Web: [www.greenschoolsireland.org](http://www.greenschoolsireland.org)



In order to accept and support the measures taken as a consequence of the climate change and to prepare the population, the **availability of environmental and related policy information** has to be ensured as widely as possible. The **communication** between the decision makers and the members of the community is elementary.

An additional step in strengthening climate conscious attitude can be the organization of different **campaigns**. During these, on the one hand, the people have to be informed about the situation created due to the climate change and the expected future consequences. Furthermore, practical and everyday solutions have to be presented. According to the experiences, people can easily make steps for a cause and if they are aware, why those steps are necessary. It is important that the advertisements of the campaign promoting this climate conscious behaviour show information of the possible consequences of following or neglecting these behaviours. There are several ways to execute these campaigns: organization of presentations, forums, public showing of films in connection with

the climate change, games, family programs, demonstrations (e.g. bicycle processions). These campaigns may take place in different education and training institutions, workplaces, offices, community centres, and different open air spaces.



#### Florence, R.A.C.E.S. campaign for climate consciousness

Florence (approximately 365.000 inhabitants, Trento (approximately 112.000 inhabitants, Modena (approximately 180.000 inhabitants), Bari (approximately 328.000 inhabitants) and Potenza (approximately 68.000 inhabitants) are cities of Italy.

The five cities participate in a project from January 2009 till March 2011 (R.A.C.E.S. – Raising Awareness on Climate and Energy Saving). The main target of this project is to call the attention of the climate and the energy saving. The sub targets are as follows:

- draw the attention of the families, teachers and local organizations living in the neighbourhood of the city to the effects of the climate change;
- support and implement the environment consciousness into the lifestyle of the residents, especially the families;
- assist the local environment organizations and integrate the concerned ones to the program, so that they can represent their own interests, and share their different type of experiences and suggestions in connection with the prevention and adaptation.

As a preparation of the action plan, with the assistance of investigations the present knowledge and information of the people in connection with the climate was estimated. Further emphasis was laid on the information of the teachers regarding the assisting educational material in connection with the climate. Especially big emphasis was laid on the climate conscious education of the younger generations – beside the special education additional material the educational materials contains more and more material regarding the topic of the environment, and the change of the climate, e.g. as introductory experiments.

In the project exhibitions and organizations in the topic of the climate change were organized, where the residents can gain even more information. The energy consumption of the families chosen previously is estimated, further they are provided with an ‘environment-friendly package’. For the first time external advisors help them, later they have to estimate the carbon-dioxide emission themselves. In the end of the six month period the organizers again count the carbon dioxide emission of the household, and the household having the highest performance receive a gift in connection with the energy and cost efficiency of the household. Following the different programs the experiences are uploaded on the Europe Direct network, so that other cities shall also be able to adopt the project.

The project is part of the project of the European Union called LIFE, it’s total budget is 1.032.682 EUR, 49.47% (509.631 EUR) was co-financed by the Union.

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**Local transportation** may be an excellent field for forming the climate conscious attitude of the community. There are several means to popularise local transportation, bicycle riding and walking. One of these often used means is drawing attention (e.g. organization of car-free days, bicycle events), the other is showing direct example. The latter is one of the most effective measures of popularizing the climate conscious behaviours. This is especially true when leaders of the local community and other respected persons or families show a good example. The example is more effective when it comes from somebody whose opinion and acts is more noticed by people. The mayor of a big city, or the members of the board of representatives may go to work with public transportation, bicycle or on foot. This not only shows a climate conscious behaviour towards their environment, but they hold more credibility among their people. If other local respected people (e.g.

celebrities) show good examples, then this may also have a good effect. The local popular persons should be asked intentionally by the municipality so that they can popularize the climate conscious behaviour.

#### An example for the reduction of the emission of greenhouse gases on the local level

##### CO<sub>2</sub> Monitoring Tool for local authorities

There is an Internet-based software (ECOREgionsmart, that was developed by a Swiss company, the Ecospeed), and through this device the German local administrative areas, authorities and cities are able to calculate their carbon-dioxide emission. The advantage of the software is that due to the standardized method the good management and the evaluation of the data it provides comparison between the emission of certain municipalities.

Access:

[www.klimabuendnis.org/co2-monitoring0.html](http://www.klimabuendnis.org/co2-monitoring0.html)

**Local retail** also has a possibility to strengthen climate conscious attitude. The popularisation of the local products, leaving the packaging material, and the sale of environment friendly products are all such steps that may influence the attitude of local residents in a positive direction.

According to the opinion of certain psychologists, another possibility further increasing the climate conscious attitude are the **reduction of the promotions and campaigns persuading us to consume, and we should shut them out from our everyday life**. As a result of the promotions, material consumption is increasing and the load on the natural environment is growing as well. Furthermore, they transmit such values that say that the source of happiness is the even a larger amount of consumption. In certain Scandinavian countries that became aware of this, the promotions targeting the children were banned, and thus they managed to slightly stop the spread of consumption centred values (T. Kasser, 2009). These means are at the disposal of managers of the cities as well. The simplest situation is within the media maintained by the mayor's office (local printed media, radio, TV, Internet sites), since the management of the settlement may have a direct say on what kind of promotions and advertisements shall be published. Another possibility lies with the regulation, reduction of the boards, and signs to be found in the area of the settlement (in this regard the local building regulations may have a role). Part of the existing boards may be disassembled, or used for the popularization of an environment and climate conscious activity (e.g. free advertisement area should be provided for these). This may mean direct income loss for the municipalities, but the change of the attitude will be seen in the savings, and keeping the advertised climate conscious principles will strengthen the political credibility of the municipality.

The founding of various competitions or awards is very effective and can be implemented mostly with low costs. The organisation of competitions work among youngsters, especially among school children very well, out of which real tradition may evolve with related events. In case of awards, the activity of the local government or organisations is also important, but apart from these, in the most varied topics a number of international awards are widespread. Such an international recognition can mean serious honour for a large city, but smaller settlements can find such competitions, considering their possibilities, and they can apply with very good chances to succeed.

#### Examples of prizes for cities acting for preventing the harmful effects of climate change:

##### Climate Star Award

Award of the European Climate Alliance, awarded to the district, quarter, settlement, local organisation or local government for the best settlement climate protection programmes. In case of settlements there are 3 categories depending on the settlement size (over 100,000 inhabitants, between 10,000 and 100,000 inhabitants, up to 10,000 inhabitants). Apart from that, special awards may be given (e.g. in 2009 it was awarded to Vienna). The prize was first awarded in 2002 to a total of 19 cities, since then awards



were given anew in 2004, 2007 and 2009. During the last award ceremony, 11 cities received this title.

Contact:

[www.klimabuendnis.org/451.html](http://www.klimabuendnis.org/451.html)

#### European Green Capital

Initiative of the European Union that awards cities that are pioneers in establishing environmentally friendly urban life, make efforts to increase energy-efficiency, to reduce their carbon dioxide emission and to improve their environmental conditions with regard to sustainable development. The awarded cities as European Green Capitals are Stockholm for 2010, Hamburg for 2011, Vitoria-Gasteiz for 2012 and Nantes for 2013.



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[ec.europa.eu/environment/europeangreencapital/index\\_en.htm](http://ec.europa.eu/environment/europeangreencapital/index_en.htm)

## 10.2. COMMUNITY SHAPING – CLIMATE-CONSCIOUS LOCAL COMMUNITIES

Climate-conscious approach and behavioural patterns can generate significant impact especially if they are embraced by a whole community and do not remain on an individual level. If the community is large enough, then the approach or behaviour dictated by the community may have an impact on wider layers of the local society. All this brings the necessity of establishing and developing climate-conscious communities, which then will take a role in strengthening prevention, adaptation and climate awareness.

Concerning adaptation, the local level holds great importance since local communities can react to nature's changes quicker and more flexibly. Reduction of natural resource supplies and the impacts of climate change affect local levels, as well, to which, in light of the local natural and social capabilities, in various areas different answers may be necessary. In the near future the operation of large supply systems can become even more insecure. At the same time local resources and supply based on them will have increasing importance. A further argument in favour of local-level initiatives is that solution of the locally occurring environmental problems cannot be efficient without knowing the local natural and social capabilities and the local habits.

One of the most important basic conditions of a sustainable society – sustainable nature-human relationship – is that if possible, communities should exploit the locally available resources, and vice versa, the locally available resources should be used by the local communities, thus being dependent on the large supply systems to the smallest possible extent. This is crucial due to several aspects: sustaining the large supply systems require a great amount of energy, the production of which brings along a significant environmental load which strongly contributes to climate change, on the other hand a society based on local resources can better see the limits of its own consumption than a society dependent on resources from farther geographical areas. Therefore the **supply systems based on local resources** can prove to be more efficient in the fight against climate change than the large supply systems. Furthermore, independence from large supply systems helps the enforcement of local interests against external interests and has a role in generating local job opportunities.

The strengthening of the local level is possible in the long run only if local communities are reinforced, as well. For communities to be created, individuals need common goals. In the present case, the common goal must be the reduction of climate change and the preparation for the already unavoidable consequences. In order to achieve that, the reduction of climate change and adaptation to the unavoidable consequences should become common goals. Individuals must become conscious of the danger posed by climate change. Reinforcing climate awareness is therefore a key task from the aspect of **community organisation**.

For widening the environment and climate awareness of the local community, it is worth to form such local groups in the communities that are dealing with the local challenges of climate change



emphatically. Their topics correspond to those listed at shaping individual attitudes. This way e.g. cyclist, outdoor, energy-saving, etc. **movements** can be organised and communities can be created on the basis of these goals. When this happens, the attention of existing groups (e.g. local organisations) can be turned to climate awareness, which is held together by frequent (!) programs on the topic or other leisure activities.

In case of natural disasters, which are expected to occur even more frequently, quick reaction can be life-saving. However, well-organised **associations** will be necessary for this, for instance, the widespread voluntary fire-fighter associations. Based on this pattern and depending on the type of local threats, associations can be created like flood/inland water rescue associations, forest fire source vigilance network, associations which become active during heat waves, frequently visiting the vulnerable inhabitants and distributing cool drinks, etc. By organising other leisure activities, these associations strengthen community feeling, but at the same time provide protection for the inhabitants during the time of potential natural disasters. The foundation of these organisations can be proposed by the leaders of the settlements.

Beside non-governmental organizations, **local churches** may have a vast role in organising local communities. As climate change intensifies along with the environmental crisis in general, churches must take a larger role in the preparation of the local communities. This jointly relates to the mitigation of the environment and climate-damaging impact of people all the way to the adaptation to the already unavoidable consequences of climate change and the strengthening of climate awareness.

Another possibility for the development of local communities and local economy as well is to involve local or close-by food producers in the community, thereby facilitating the direct sale of their products to local consumers. The **local producing and consumer communities** formed in this way contribute to the reduction of environmental load and to the strengthening of climate awareness at the same time, furthermore, they support the reinforcement of local food producers and through this, the local self-sufficiency concerning food products, which all serve for adaptation.

The most efficient way bringing together local and close-by producers is to organise markets and fairs in the settlements. Various studies show that people talk ten times more in producers market, as well as greet each other ten times more and even establish friendships, than, for example, a large commercial centre (Halweil – Nierenberg, 2007). It may help if the opening hours of these markets are adjusted to the needs of the local people. They should not only be open during the ‘traditional’ market times (in the mornings and on weekdays), but during the late afternoon hours and on weekends. This serves the enforcement of the local community interests even more, if the markets provide opportunities only for the local and close-by producers. Similarly – beyond the reinforcement of prevention, adaption and climate awareness – the organisation of various exchange clubs or flea markets can also support in the strengthening of the local community.

An excellent tool for local community development can be restarting traditional **assistance systems based on favours** (so-called ‘bees’) or any other kinds of organised volunteer actions within the community. The ‘bees’ used to be an important institution for maintaining the local communities, which – beyond giving the feeling of community togetherness to people – was a crucial pillar of the autonomy of local communities and their independence from the external world. Extreme weather conditions caused by climate change and the ever intensifying global resource crisis may generate such situations in the future that can cause the operational disfunctioning of large supply systems. Reduction of the dependence level of settlements from the large supply system is therefore of key importance to the smooth operation of the local society. Water, food, and energy supply are the scopes on which it would be primarily necessary that settlements depend less on the large external supply systems. Organisation of ‘bees’ can extend beyond helping each other to activities serving public interests, such as planting trees, landscaping of trees, squares, etc.

A measure promoting climate-conscious attitude, adaptation and – through the reduction of energy consumption for transport purposes – mitigation of climate change is establishing **community gardens** on a part of the settlement's green areas or empty plots. Such gardens provide an opportunity for city dwellers to spend their time with a useful and creative activity. While people get closer to nature, they produce part of their own food and thereby reduce their dependence on large supply systems.

Finally, we have to mention that **settlement climate programmes** can also contribute to the strengthening of local communities. In this case, it works vice-versa. Strengthening communities support the execution of climate programmes, and also the execution of climate programmes may bring together the local people, thereby strengthening the local community. Similar actions can be integrated into environmental programmes for settlements. Based on experiences gained so far, the implementation of programmes promotes the reinforcement of local communities.

#### BRIEF RECOMMENDATIONS

- Changing social values: supporting the small community instead of individualism.
- Supporting energy-efficiency in addition to supporting the use of alternative sources of energy.
- Introduction of climate-conscious approach in local education and training institutions.
- Making local retailers more climate-conscious (e.g. sale of local goods, using environmentally friendly packaging materials).
- Organising local transport programmes (e.g. car-free day).
- Engaging honoured persons for the promotion of programmes.
- Organising campaigns stressing a climate-conscious social attitude.
- Transformation of local media; replacement of advertisements prompting consumption for those reinforcing environmental consciousness.
- Promoting the utilization of local resources.
- Strengthening of local communities for the sake of a common goal (preventing climate change).
- Promoting local/close-by producers.
- Supporting churches in preparing local communities.



## 11. SUPPORTING DEPRIVED GROUPS IN ADAPTING TO CLIMATE CHANGE

To various extents, climate change in European cities affects everyone. It is common that anomalies originating from climate changes and the resulting unpredictable weather patterns affect disadvantaged people stronger. Greater exposure and limited possibilities for preparation jointly raise the level of vulnerability and illustrate the importance of paying special attention to deprived groups with regard to their preparedness for climate change.

It is theorised that climate exposure further worsens the socio-economic position of deprived groups. Nevertheless, beyond this opinion it can be observed that the privileged and better off stratum are more active with the consumption that is responsible for the processes which generate climate change (e.g. due to larger ecological footprint). However, because of their exposure, the resulting processes and impacts generated from climate change hit poorer people living under disadvantaged positions harder. In other words, **those who suffer worse from the processes are triggers to a lesser extent**. This points all the more to the fact that the deprived group's situation requires more attention with their adaptation to climate changes.

The recognition of this fact provides an answer to the question – why is it necessary to support investments from community sources generating financial benefits (e.g. value increasing effect of insulating a home) in favour of persons not looking after themselves and their possessions (e.g. in the form of insurance)? It is important to be aware that facilitating the adaptation of deprived social groups to climate change – e.g. through insulation of buildings, increasing climate awareness – will contribute to the decrease of green house gas emissions throughout the whole city, therefore mitigating the effects of climate change. Community resources used for this purpose thus serve community goals, as well.

It is important to determine which groups can be regarded as deprived as it pertains to the effects of climate change. It modulates the definition that the present issue concerns mainly urban problems and urban inhabitants, therefore the poverty problem of rural areas is not affected. Considering all the above, we recommend defining the following urban social groups as deprived with respect to climate change:

- people living in poverty (international definitions exist in this topic, with special regard to the three types of poverty definitions of the recently approved EU 2020 document);
- minority groups – mainly due to the lack of information resulting from isolated community life, mostly secluded from the majority society;
- people with disabilities.

From the aspect of climate change, the most important characteristic of the deprived people's situation is **poverty**. All other accompanying circumstances (lack of financial means, segregated residential conditions, problem with access to public utilities, low education level) are secondary. The higher than average exposure of disabled people is relevant, since they cannot adapt fast enough due

to their physical or mental limitations, moreover to absorb the consequences of climate change (especially if these occur suddenly), and defend themselves.

The deprived group's situation can be a one-off phenomenon, for instance when people of poorer status live in a richer status area. In this case, the focused solutions must be aimed at persons and families with problems.

The deprived group's situation can be an individual or a mass phenomenon. This is observed through the inhabitants of **city ghettos, slums**, neighbourhoods of immigrants, and transitional dwellings of those with a migrating lifestyle. In these cases the solutions should not be focused on certain people or families, but should be organised on a territorial basis. The deprived group's situation should be regarded as a mass phenomenon and having a territorial projection is more characteristic of urban living than of rural areas. Due to the large populations who live in narrow spaces, certain climate effects (e.g. heat wave) can be felt more than under non-urban conditions.

An important task is to define exactly which unfavourable effects of climate change the various deprived groups are more vulnerable and more exposed to. Correspondence with the various criteria of the deprived group's situation means that the members of these groups have some kind of physical, mental or financial deficit. This means exposure already in itself, the lack of chances of making changes from their own resources. The deprived group's situation as a factor of vulnerability can be examined from several aspects:

- Vulnerability related to housing: Based on **poor housing conditions** (e.g. constructions on flood plains, general congestion, lack of green surfaces, greater exposure due to the complete lack of energy efficiency), which both, derives from the deprived group's situation and also further generates it.
- The basis of vulnerability due to the **lack of financial reserves**: The affected persons do not have any proper means for neither adapting to climatic changes, nor for mitigating the impacts and damages of the events occurred. Therefore, due to the lack of financial resources, they have a high chance of becoming victims of damages caused by the unpredictable weather phenomena.
- Vulnerability owing to the **lack of information**: Reducing the capability to adapt, since language and cultural problems or the lack of access to important information concerning the issue makes this stratum unprotected and defenceless.
- The joint presence of the vulnerability factors listed above often occurs, i.e. climate changes and their impacts may affect deprived groups from multiple aspects under urban conditions.

In the following, the intervention possibilities are presented classified according to the main areas of the climate change. The help of the town management can and must prepare the deprived groups to the expected climate changes and their consequences.

### 11.1. FACTORS RELATED TO WATER AND THE LACK OF WATER, IMPACTS AND ACTIONS

Climatic consequences related to water can be regarded as the most intensive impact trigger factor. This can be subdivided into predictable processes (e.g. rising of the level of sea water due to the melting of the ice caps) and abrupt changes (e.g. floods). The following main water related climatic impacts which affect the deprived groups are to be separated as well.

- Rising sea level – melting of ice caps (effect of higher sea level on coastal cities, lower areas, etc.).
- Sudden downpours, hail, floods, inland waters (vulnerability of buildings and residential areas exposed to these events, even located in flood areas and destruction of urban green spaces).
- Drought (devastation of green areas due to aridity, vulnerability of drinking water supply).

The possible areas of community intervention may be the following:

- **Territorial intervention**, e.g. denial of building permits to certain locations, removal of endangered buildings, relocation of endangered inhabitants and the community financing of these efforts.

- Establishment of a **risk management fund** that intervenes on the level of the endangered family (or individual), e.g. support for moving, reconstruction, damage prevention.
- Taking preventive and comprehensive measures through which adequate **preparation** can be ensured for dangerous situations. The basis of these measures is communication, which can be an effective tool in creating awareness and ensuring the preparation of both, the community and the individuals.
- Taking out **insurance**, supported either through a group or a community level, for the mitigation of potential damages. Community support when negotiating with insurance companies since they often do not want to insure buildings located in potentially dangerous areas.

The **rise in food prices** and the consequent relative shortage of food affects especially the disadvantaged groups. In Europe, despite the climate change, no problems are expected in the sufficient provision of food. However, in the era of an increasingly globalised food trade, global market changes have a more substantial influence on prices than the conditions of local production. As a consequence of poor harvests in non-European countries caused by climate change and because of the increase in oil prices, food prices go up fast even in EU states having favourable agricultural conditions. This may increase social tensions, or increased emigration, especially in cities in areas with limited agricultural potentials.

The solution is to develop the local economy and to use the possibilities offered by the green economy. This way, the production of peri-urban agriculture can also be increased, which in turn can help reduce dependence on external supplies and improve the security of supply. Also, with the ensuing new employment possibilities and higher incomes, social tensions in the cities can be reduced, too.

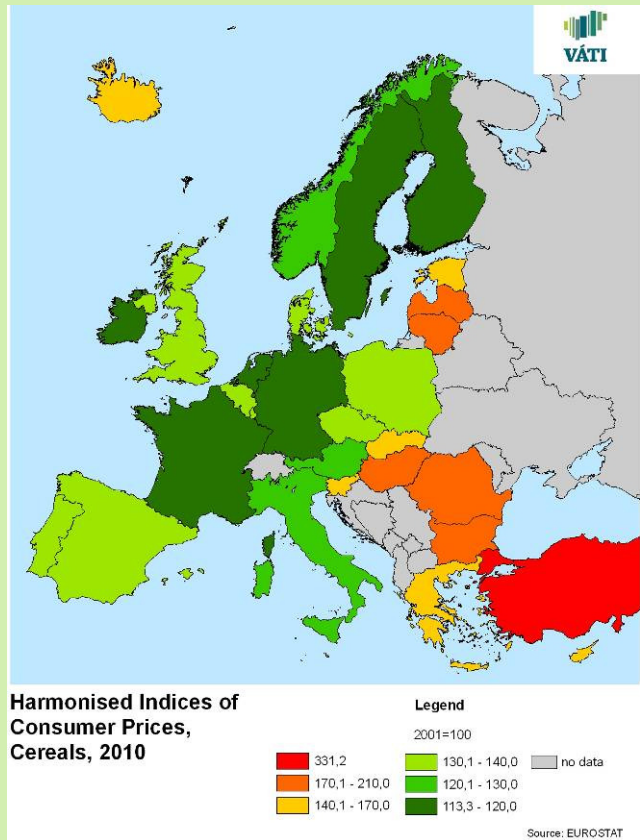


Figure 33: Harmonised indices of consumer prices, cereals, 2010

## 11.2. WIND-RELATED PHENOMENA, IMPACTS AND ACTIONS

Damages caused by wind storms are typically joined by the extreme manifestation of precipitation; they are capable of causing significant damage to buildings which can be critical and not restorable for the more vulnerable strata.

The possible areas of community interventions may be the following:

- Taking preventive and comprehensive measures, the basis of which is making the buildings resistant and supporting the related expenses from community.
- Elaboration of rescue scenarios for cases when evacuation is the only possibility with the primary focus being protection of life.

### 11.3. PHENOMENA, IMPACTS AND ACTIONS RELATED TO TEMPERATURE EXTREMES

In urban conditions, one of the greatest sources of danger is the numerous detrimental consequences of summer warming. Heat waves occurring in the hot summer periods cause problems mainly concerning the health and lifestyle of people living in densely built urban areas lacking the conditioning effect of water and green surfaces.

Heat waves (which lack of proper protection, cooling, access to water surfaces) are detrimental to health, and have an especially unfavourable effect on deprived groups. The extra costs related to cooling and its technical condition cannot be financed without external support in many cases.

Enduring an unexpectedly cold winter effects deprived groups and homeless people by endangering their everyday life. The extra costs relating to heating cannot be financed without external support in many cases. Especially the costs of heat insulation or heating modernization can prove to be impossible to finance even by people living under less deprived conditions.

The possible areas of community interventions may be the following:

- **Improvement of housing conditions:** restoration, insulation, and cooling of buildings, i.e. supporting deprived people in participating in such programmes.
- **Supporting extra costs** (heating, cooling) due to climatic changes under an arrangement adequate for people in deprived situation, so they do not become victims of these processes and not be affected by health damage as a result.
- **Improvement of residential conditions:** more green areas, water surfaces, and installation of public wells where the presence of deprived groups is large. Surveying the restoration of public spaces has especially great importance. City districts where the number of non-insulated or badly insulated buildings is large and there is not enough financial means available for the operation of air conditioning installation (which is especially characteristic for segregated residential areas) should be given priority.
- **Fast community intervention** in serious cases. Adequate information, distribution of water, and assistance on public spaces must take place during a heat alert. Typically, these actions concentrate on city centres, however, the necessary surveys referred to several times show that the segregated quarters are also in sore need of distribution of water and assistance in public spaces.

Overall, we must strive to achieve that all social groups should be prepared for and protected against the climate change processes occurring with variable predictability. In case of those initially starting with disadvantages with regard to preparation and gaining protection, much more attention, sources and communication activities should be concentrated.

The support forms and assistance should be separated between those aiming at the mitigation of already predictable extra costs related to normal lifestyle that can be traced back to climate change (e.g. colder, longer winters and demand for extra heating, which may not be affordable by the deprived family), and the arrangement of the non-affordable extra costs incurred due to a non-predictable, one-off damage arising in the urban environment.

Disadvantages deriving from the lack of information must be considered seriously; these can be tackled mainly with community intervention and primarily by active communication. In this case active communication not only means that attention is drawn to the support possibilities in the accessible media, but also that frequent communication is established with the leaders and influential members of the community in order to create better possibilities for the flow of information.



### Amsterdam, 'Step2Save' – Energy-efficiency advice for city tenants

Amsterdam is the capital of the Kingdom of the Netherlands; its population is around 755,000.

In 2006 a project was started to increase the energy-efficiency of city tenements with the objective of reducing energy consumption costs for 10,000 households, who live in social housing. Through this, the level of CO<sub>2</sub> emissions can be reduced and the energy costs of tenants will be lowered. The project includes a training that facilitates the currently unemployed tenants to find jobs. In order to implement the latter objective, the persons advising on

energy-efficiency were selected from the young unemployed, who were given one year of guaranteed job opportunity following the training. During the programme, the Labour and Social Affairs Department selected jobless people between 18-30 years that could participate in a training implemented by NUON. During one year following the training advisers had to visit the 10,000 tenements and give free energy-efficiency advice and assist with the commissioning of the new energy-saving devices.



As the result of the project, a total of 10 advisers were trained in 2006. In 2007, 107 applicants signed up for the training. During the one-year implementation the advisers rang the doorbells of every apartment. This solution proved to be significantly more efficient than the previous versions, where an appointment had to be made for advising. Nearly 6,000 'energy boxes' were distributed that can result in a saving of 200 kg of CO<sub>2</sub> on average in case of every household, reducing household energy costs by 5% on average. (Image: nieuws.nuon.nl)

Besides the City of Amsterdam, the main parties involved in the project were Energy company NUON, Housing corporation Far-West and Ymere and Philips as the sponsors.

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## 11.4. DEVELOPING THE DEPRIVED AREAS

When helping groups who suffer from the negative effects of the climate change, it is also very important to localise the areas where the assistance is needed. Supporting vulnerable social groups in the adaptation to the climate change therefore has a significant territorial aspect along social features. Hence settlement and regional development in disadvantaged areas is a very essential part of creating climate-friendly cities, the problems of deprived groups are related to the city they live in.

The negative effects of climate change tend to threaten more significantly the cities that are situated in **socially and economically underdeveloped regions**. These cities can not respond to the challenges posed by the climate change without financial and professional help of the government or other organisations.

Other types of disadvantaged cities are those situated in **environmentally vulnerable areas**. For example settlements of the Mediterranean coast realise a shortage of water. Thus these environmentally sensitive cities and their surroundings are already facing negative impacts of climate change. Solving these environmental and social problems is the challenge of the near future. There can also mixed types of areas (which face social, economical and environmental problems as well) like some regions in Greece, which are as well on the coast of the Mediterranean Sea, and also have numerous deprived groups living in the country.



Regardless of where they are situated, if there are deprived groups in the city or region, the main problems are usually the same:

- Local economy is not strong enough to ensure acceptable standard of living for the inhabitants.
- There is a high unemployment as a consequence of lower number of working places than necessary.
- Underdeveloped infrastructure.
- The city's government does not have adequate instruments to develop the settlement, and respond to the effects of climate change.

Cities where deprived groups live have to find answers for the aforementioned problems.

Hereunder there are some solutions that can help disadvantaged cities in the adaptation to the climate change:

- The development of **local economy** considering the protection of the local and global environment, especially the reduction of air pollution.
- The **green economy** helps to settle new sectors in the cities while retrofit may stimulate the local economy and create new jobs. This way deprived cities and regions can find new chance for development, as mentioned in the Chapter 12 about climate-friendly urban economy.
- The **development of infrastructure**, especially public transportation and technical infrastructure in harmony with nature reservation.
- The **employment of experts** who make policies and projects to help the city in adapting to climate change. These policies and projects can help cities to make adequate decisions in environmental issues, especially in the case of climate change.

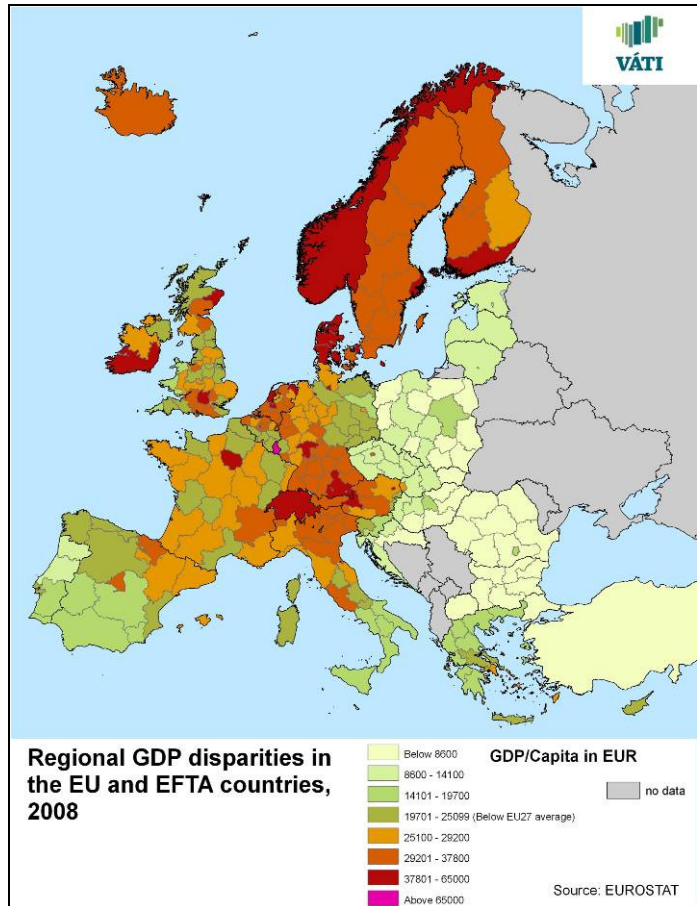
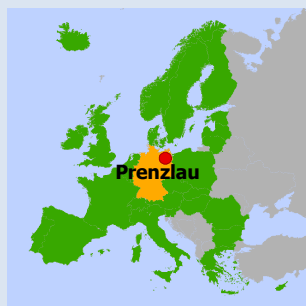


Figure 34: Regional GDP disparities in the EU and EFTA countries, 2008

- Establishing regional, national or international **co-operation between cities** that they can share their experiences, knowledge and projects in adapting to climate change and economic development in the changing environment. Creating international networks can make information flowing easier between partners.
- **Education** and improvement of the city's inhabitants' environmental awareness.
- **Monitoring and analyse** of the changes of the city's environmental state. Preparing answers for the problems which occurred.
- Monitoring the city's actions in adapting to climate change.
- Financial assistance of the cities for adapting to climate change.





### Prenzlau 'City of renewable energies'

Prenzlau, a city in the Uckermark District of Brandenburg in Germany, has a population of about 21,000. In the wake of German reunification, many businesses closed, others reduced their staff considerably. The unemployment rate of the district, is much higher, 11.7% in 2009, than the regional average.

Prenzlau shows that the environmental friendly energy supply in the context of global climate change is not only necessary but offers significant opportunities for growth as well. The city council has approved a mission statement according to which Prenzlau should be a 'city of renewable energy'. The use of geothermal energy, wind power and solar energy and the cultivation of renewable raw materials and their processing into biomass and biogas have ensured that the city now produces more electricity – from renewable sources –, as it consumes. Already around 1,000 jobs have been created in the business sector of renewable energy in the city.

The also solar AG which produces and sells solar modules using silicon cells was founded in 2001 and the production started in Prenzlau in 2002. The production capacity expanded to 180 MW by 2010.

The world's first hydrogen hybrid wind-biogas power plant is built in Prenzlau. It combines the three energy resources to provide reliable supply regardless of the weather. Wind turbines produce more electricity than currently needed and an electrolyser converts the excess into hydrogen. In low wind periods energy produced from biogas compensates the electricity production.



For heat production even geothermal power is used in Prenzlau. Today the heat is fed into a district heating system which supplies a significant part of the downtown with heat and hot water. The operation is very reliable; it has low maintenance demand and cost.

In 2010 Prenzlau won the third place in the category of 'to 20,000 inhabitants' in the competition 'Federal capital of climate protection' and got the 'Climate Municipality 2010' title.

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## BRIEF RECOMMENDATIONS

- Identification of deprived social groups in local levels.
- Motivating local governments to perform surveys that characterize the probability of preparation among the deprived groups from their own means and its extent with regard to climatic effects.
- Supporting compliance with construction standards and regulations.
- The support forms and assistance should be separated between those aiming at the mitigation of already predictable extra costs to be traced back to climate change, and helping the arrangement of the non-predictable, non-affordable extra costs incurring in urban environment.
- Elaboration of prevention and rescue scenarios in the event of danger.
- Drawing attention to support possibilities in local media.

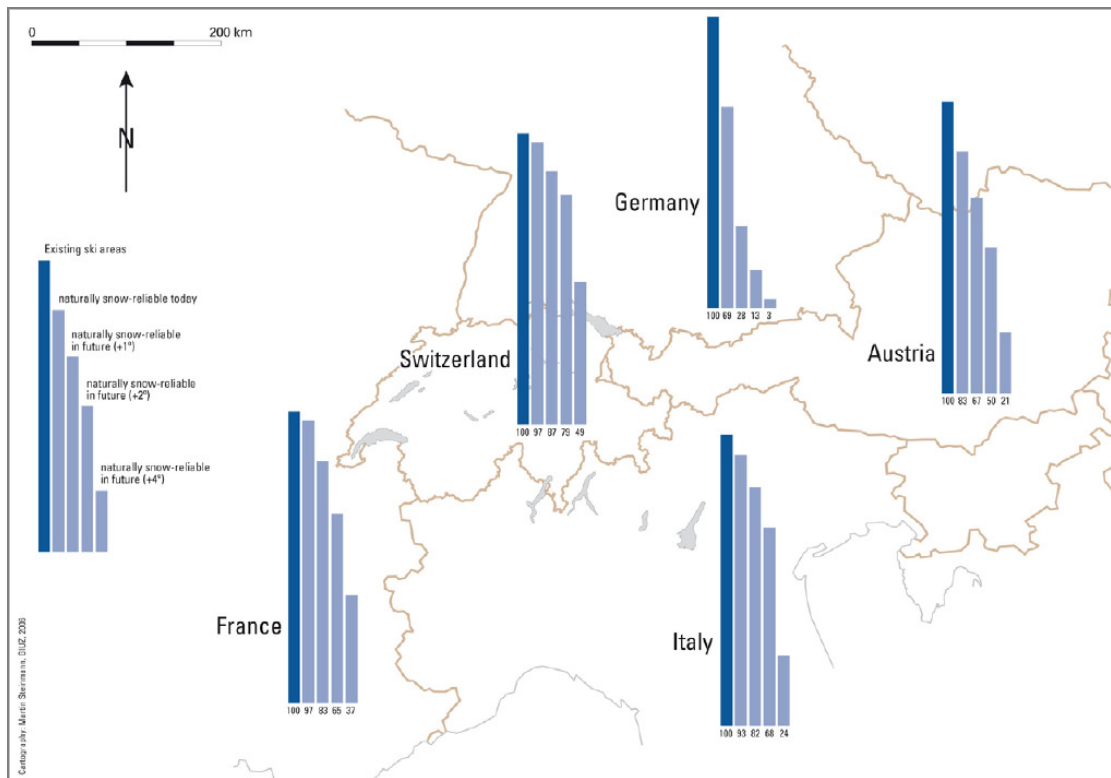
## 12. ECONOMIC EFFECTS AND THE ENHANCEMENT OF URBAN ECONOMY

The climate acting as the natural environment and providing the natural resources for economic activities affects the economy in many ways. The close interrelation between the process of climate change and the economy is especially direct in cities. The changing climate does not offer only challenges, but also economic opportunities. These opportunities may be the consequence of climate change, but the actions on managing climate change possess more significant economic development perspectives. Climate change-related economic intentions significantly affect the future of cities: how they can adapt, how they can take advantage of the opportunities instead of suffering from the changes they will face. To establish a relevant and efficient urban economic strategy, the cities have to consider all climate change aspects of their economic policy (the current chapter highlights these main aspects).

### 12.1. THE URBAN ECONOMIC IMPACTS OF CLIMATE CHANGE

The direct economic effects of climate change are easily predictable. However, their magnitude is highly dependent on the geographical location of a city, its economic structure and strength, so generally it is not possible to estimate easily.

- Very positive effects can be expected in some regions, such as the reduction in heating costs, especially in Central and Northern Europe.
- A significant improvement is predictable in the navigability of the Baltic Sea and the traffic of Baltic port cities. However, the change in the weather and stronger storms will increase shipping costs everywhere in Europe (e.g. delays, average, damaged goods).
- The strongest negative effects are linked to the extreme weather events. Floods, fires, storms, rising sea levels and increased coastal erosion, high surges themselves can cause serious damages and losses. Some of these phenomena however can occur either as a group.
- Water supply is already a major problem. It mainly affects the Mediterranean macro-region, especially the islands. Water scarcity is strengthened even more by climate change. In the most affected areas water is already the main limiting factor of many aspects of development.
- Tourism is one of the most climate-sensitive economic sectors of the cities. The summer heat waves in Southern Europe may cause a reduced number summer tourists, creating a gap during mid-season. This is offset by longer spring and autumn seasons. In cooler regions of Europe, the warmer weather would increase the development of tourism. Furthermore, tourism is a dominant economic sector in many areas suffering from water scarcity, and the demand for water of tourist attractions is high (parks, spas, hotels, etc). The winter temperature and precipitation trends have also a key role in the economy of mountain ski centres. The shortening of ski season can be very significant especially in the towns lying at lower altitudes and having southern-facing slopes. Climate change also has important impacts on other tourist destinations, e.g. the disappearance of beaches due to rising sea levels or damaged monuments.



**Figure 35: Number of natural snow reliable ski areas today and in future: +1°C (2020s), +2°C (~2050), +4°C (~2100) (Source: Abbeg, 2006)**

- Agriculture and management of urban green areas are facing some benefits in some areas, but more danger in others. The agricultural opportunities in the city's neighbourhoods may improve, particularly in the northern part of Central Europe and Northern Europe. The longer and warmer growing season in these areas can have a positive impact on urban green areas in the northern parts of Europe. Alternatively, the difficulties in water supply and the shift of bio-geographic zones, along with the northward spread of southern animals and plants cause serious threats for the agriculture in city neighbourhood and the urban green areas.

Indirect economic impacts can be experienced in most areas of life. These effects are mainly harmful as well, but they can also be favourable sometimes:

- The damages in infrastructure and transportation are highlighted by the raising the prices of most products that may weaken the city's economic development.
- The renewal and development of infrastructure (roads, pipelines, buildings) due to the threat of flooding and coastal erosion also has significant costs. However, these investments give also provide for economic production and jobs.
- The increasing damages caused by the weather increases insurance costs. The city's exposure to climate and environmental safety affects the risk of investment, and thus the opportunities for economic development.
- Agriculture affects cities only indirectly, but its reduction in productivity can have a serious impact on a city. The rural unemployed people can be urban job seekers in the nearby towns or in remote cities, even in other continents. It depends on the city's economic strength and innovation potential whether the 'climate migrants' will be new human resources or will cause a more major social problems to solve.

The economic impacts of climate change – without an active intervention – will be positive only on a few sectors and regions. For the large majority some kind of adaptation will be inevitable, and this is the only way to exploit the favourable business opportunities.

## 12.2. THE ECONOMIC IMPACTS OF MITIGATION AND ADAPTATION

The mitigation and adaptation measures are now an essential part of urban life. More and more cities are recognising and applying this discipline. However, the measures require new investments and need financial resources. The question arises: to what extent are these investments profitable? The cost of action has to be compared to the cost of doing nothing. Due to so many different conditions and risks of different locations, there is no precise figure that can be used to define the price of an action. However, there are studies in some sectors about the costs and benefits of mitigation/adaptation. A review of the economics of climate change for the UK Government (Stern, N. 2007) suggested that an average 1% of the annual GDP will be needed to adapt to climate change. While the cost of 'doing nothing' rises to 5 – 20 % of GDP in 50+ years time. The costs of 'doing nothing' will grow as the effects of climate change will become more and more critical. The wise mitigation and adaptation measures completed in perfect time will bring more profit and save more money than doing nothing. The OECD made calculations as well about the effects of mitigation policies on the economy of metropolitan regions (OECD, 2010). The evaluation is based on the OECD Metropolitan Database modelling the mechanisms of cities through a general equilibrium model. The results show that in the first 20 years the economy will decrease significantly, but this will be only a temporary state. The increased price of carbon emission leads to new technical solutions, thus in the next era the economy can grow, as the new technologies and the increasing energy-efficiency contribute to the mitigation of the vulnerability of oil prices and to saving costs.

### 12.2.1. Economic opportunities related to mitigation

Mitigation can seem to be a costly and less profitable solution for the public. There can be very high costs when mitigating, such as the transformation of urban transport or a modernisation of a district heating system. Still, mitigation can be the only solution for slowing down climate change. The lack of mitigation increases the negative effects in the future, and so adaptation will become more costly. This alone proves that reducing greenhouse gas emissions is a good investment.

However, we must take into account other associated effects. These benefits make mitigation financially profitable:

- **Reducing energy use** is a significant way to save money. The less the energy demand is, the more the reduction of the load on the supply system will be, so this can operate more safely, and costly improvements may become unnecessary. In Hungary, for example, The 'Virtual Power Station' programme aims at this. The planned energy savings by 2020, will reach the output of a small electric power station.
- Reasonably regulated urban transport and wise urban planning not only reduce transportation fuel demand, but the other costs of transportation (e.g. amortization of vehicles and roads) and the time as well.
- The **use of renewable energy sources** does not just reduce the dependency on distant energy sources, but creates labour intensive economic production (jobs for lower and higher qualified people) and increases the safety of energy supply. The cost of locally produced energy is more predictable and more economical to use.
- The **use of recyclable materials** also reduces GHG emissions, especially in the construction industry. The high energy demand of making building materials (e.g. glass, cement, concrete) and construction thus can be significantly reduced. The environmental burden (mining, construction waste) also can be reduced by the use of recycled building materials.
- A **well-managed urban development** and a climate-friendly urban structure can provide significant support for mitigation and adaptation measures, so they can improve the economy.
- The energy-efficient buildings compensate for the investment of the costs of operation.

One form of mitigation is **emission trading**. The OECD examined 10 cities worldwide, how these cities can use this opportunity to support their own climate strategy (Clapp C., A. Leseur, O. Sartor, G. Briner, J. Corfee-Morlot, 2010). The lessons are summarised below.

The carbon market has become an important mechanism for financing low-carbon technology choices. Carbon markets could offer potentially significant support to viable urban mitigation projects, working alongside other financial and policy instruments (e.g. taxes, bonds, subsidies, norms, etc). However the participation of urban authorities and of urban mitigation projects in the global carbon market remains extremely limited. The existence of carbon credits may not change the principle design of a pre-existing urban project, but can provide a supplementary revenue stream. Since the rules and legislative frameworks that create and regulate carbon markets have not been designed with urban mitigation projects in mind, various legal, technical and financial barriers to offset markets often appear to be insurmountable for urban projects. In the very rare case when the company with greenhouse gas emission allowances is in the possession of local authority (e.g. local heating or power plant) there is a chance the city to use this allowance as financial resource for mitigation measures.

The challenge is how to best tap the potential for carbon markets to offer increased levels of financial support for urban mitigation projects or programmes. Suggestions for possible solutions include: developing methodologies for urban programmatic or sectoral projects to boost the volume of urban emissions, and simplifying the project development phase to accelerate the pace of project development and approval and reduce transaction costs. Beyond existing market mechanisms, other avenues that could be explored for urban mitigation projects are domestic offset mechanisms and possibly participation in national cap and trade systems. These are already viable options in the case where national governments have taken on a national cap as they do not require changes in international market rules. Examples of existing or proposed systems include: in New Zealand, Germany, France and most new EU Member States, where the domestic offset option is technically already in place using the JI architecture; and in the US, where the idea of regional or federal domestic offset projects has been proposed. National governments and international organisations will need to act to create urban-friendly carbon markets. First steps could include: subsidising the development of relevant urban methodologies for key sectors at urban scale, working through national governments to simplify and reduce costs of the project approval and verification procedures for urban projects, and advancing internationally harmonised accounting methods and reporting guidelines for urban emissions to help cities identify potential target areas for mitigation projects and provide a consistent accounting framework to integrate with national policy frameworks.

### A new model for financing emission cuts

How could we get from climate planning to action in the local government sector? As an answer to this the Norwegian Association of Local and Regional Authorities, KS, has proposed a new mechanism for financing local emission cuts, where the state actually buys carbon cuts from the municipalities.

The mechanism, called KLOKT (*wise* in Norwegian) is based on the municipalities own climate and energy action plans. All measures selected for sale will there be formulated and calculated in a standardized system, with a calculated effect per measure in tons of CO<sub>2</sub>-equivalents and a price per ton. All calculations are to be verified by an approved third party. On the basis of this verification, a regional negotiating body, the County, will undertake the price negotiations on behalf of the local governments – and the state is free to buy the proposed cuts or not. When the measure is completed, any excess money could be kept by the local government, while deficits have to be paid on the municipality's own account.



Photo: Trygve Schønfelder

According to KS, the mechanism can easily be combined with existing grant systems. If any grant is included, the amount will be deducted from the final price. Obtained cuts will not be resold or included in international quota systems in any way. Internationally they will be registered indirectly through national statistics reported to the UN. However, all measures will be formulated according to UN-regulations.

The KLOKT-proposition is a result of a comprehensive R&D-program, totaling 500 000 euro, financed solely by KS. This program, started in 2008, also includes the pioneering development of a system for quantifying local emission cuts in a standardized manner. The proposition is included in a report, published in 2010 by a Norwegian governmental working group, on possible new measures for achieving Norway's 2020 emission target.

One of the projects resulted from this mechanism is the new light rail line (Bybanen) in Bergen. It was financed by the city, the county and the state in co-operation, and has become a great success since its opening in 2010.

The following chart summarises the economic impact of mitigation options.

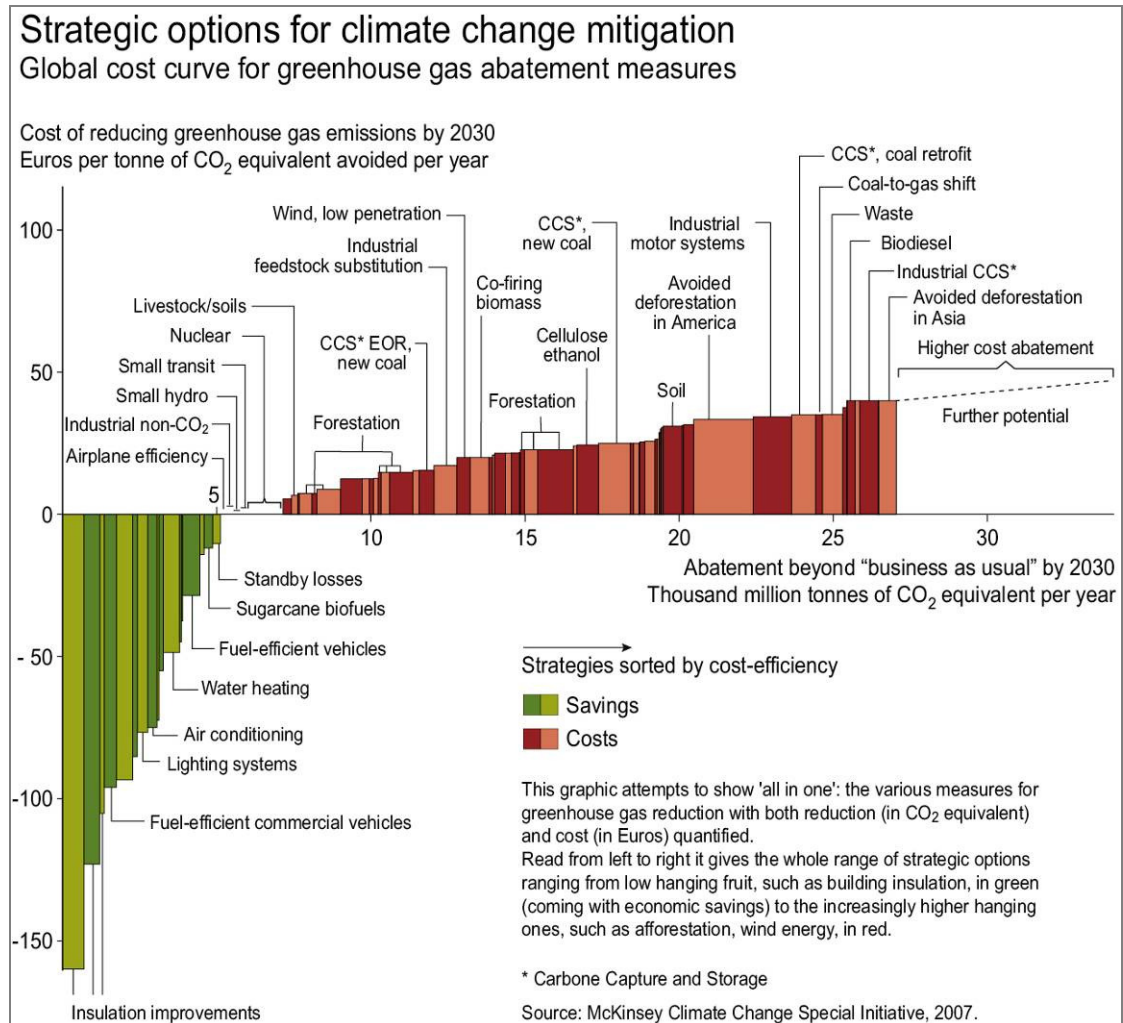


Figure 36. Strategic options for climate change mitigation (Source: Kirby, A. 2008)

### 12.2.2. Economic opportunities related to adaptation

Adaptation is necessary to maintain environmental safety and protect health. The cost is often very high, but one can find economical solutions. For instance, direct and easily measurable way to see the effects of water saving. Increasing environmental safety (flood protection, coastal erosion, technical infrastructure, road safety) can itself be profitable, if the damages caused by disasters or power outages are taken into account. However, its indirect benefits can be even more considerable. The greater environmental and transport security, the greater reduction of the insurance premiums. Modern urban structure, energy and water efficient buildings make the city more liveable and more



attractive. All this contributes to the development of the housing market and rising house prices which can bring a direct benefit to the citizens. A more liveable city in the era of increasing environmental stress will be more attractive in economic terms.

### 12.3. CITIES TOWARD NEW CLIMATE-AWARE ECONOMIC MECHANISMS

#### 12.3.1. The green economy and the cities

Bringing green economy to the forefront of action may significantly contribute to improving the climate of cities and towns. However, this requires that all actors of both, society and economy adopt a new approach.

The economic crisis emerging during 2008 has, in many ways, changed how we think about the global economy. Many have since questioned whether economic growth will be lasting at all. Experts believe that both, the crisis and the planet's ever more severe environmental problems, can be best tackled through a new economic approach, a new direction in development, one which emerges along the lines of sustainability.

If we seriously try to retrofit our life-style into a sustainable one, economic change is necessary. Up to this point, we have not reckoned with the several externalities of present-day economy, therefore we cannot recognise their absolute impact. To reduce them, the long-term solution is supporting the transition to green economy.

There are numerous definitions of what constitutes a **green economy**. It can be considered as a 'methodology of economics that supports the harmonious interaction between humans and nature and attempts to meet the needs of both simultaneously' ([www.investopedia.com/terms/g/greeneconomics.asp](http://www.investopedia.com/terms/g/greeneconomics.asp)). Green economy results in improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities (UNEP, 2011). Both expositions demonstrate the importance of this reasonable and responsible economy, which has been created by the recent global crises. Green economy has become part of the action plan of quite a few countries and governments. It is a dynamically emerging new model for organising and developing the economy, as well as managing the market.

Transforming the current economies means structural change. This is an invention for sustainability that tries to take the ecosystem into consideration. It relies on renewable energy sources, unlike the 'black economy' model that is based on fossil energy sources. Using alternative energy is not only more environmentally friendly, but it can also stimulate the economy and create relatively more jobs. (Emerging and developing countries should also change their structure, eliminating the failures of the 'developed' nations.) The main effects we expect from the green economy when compared with the current method: a less troubled and healthier environment, safer energy-supply, new economical sectors and jobs, more R&D opportunities, and innovations etc.

In most countries, cities will be important sites for the emerging green economy. The urban economic development has the potential to be a new engine of growth. This is because of three fundamental reasons (UNEP, 2011):

- First, the proximity, density, variety intrinsic to cities delivers productivity benefits for firms and helps stimulate innovation.
- Second, green industries are dominated by service activity – such as public transport, energy provision, installation and repair – which tends to be concentrated in urban areas where consumer markets are largest.
- Third, some cities will develop high-tech green manufacturing clusters in or close to urban cores, drawing on knowledge spillovers from universities and research labs.

### 12.3.2. Engine of growth: green jobs and sectors

#### *Creating green jobs*

For a dynamic green economy, trained labour is of vital importance; without this, transition will be hampered by predictable difficulties. In this respect, cities are in a favourable situation as they can train and retrain labour locally, based on a thorough understanding of the needs of the local economy.

Greening the cities can **create jobs** on a number of fronts (UNEP, 2011):

1. Urban and peri-urban green agriculture
2. Public transport
3. Renewable energy
4. Waste management and recycling
5. Green construction

The following table aggregates several examples for green firms and jobs (OECD, 2010).

Category	Sectors	Examples of jobs
Renewable energy	<ul style="list-style-type: none"> <li>– Hydroelectric.</li> <li>– Solar PV.</li> <li>– Solar thermal.</li> <li>– Geothermal.</li> <li>– Wind.</li> <li>– Bioenergy.</li> <li>– Combined heat and power (CHP).</li> </ul>	<ul style="list-style-type: none"> <li>– Energy engineers.</li> <li>– Electrician and plumbers installing the system.</li> <li>– Mechanics building the infrastructure.</li> <li>– Renewable energy plant operators.</li> </ul>
Transportation efficiency	<ul style="list-style-type: none"> <li>– Urban Public transport.</li> <li>– Railways.</li> <li>– Urban cycling amenities.</li> </ul>	<ul style="list-style-type: none"> <li>– Public transport drivers and employees.</li> <li>– Bus retrofitters.</li> <li>– Builders of rail networks, tramways and bicycle paths.</li> </ul>
Green manufacturing, construction and product design	<ul style="list-style-type: none"> <li>– Retrofitting.</li> <li>– Energy efficient building materials.</li> <li>– Building maintenance and contracting.</li> <li>– Domestic and office equipment and appliances.</li> <li>– LED (light emitting diodes).</li> <li>– Cleaner coal technologies.</li> <li>– Biodegradable products.</li> <li>– Hybrid vehicles.</li> </ul>	<ul style="list-style-type: none"> <li>– Engineers and scientists working on energy efficiency improvements (efficient lighting, smart metering, low energy monitors, advanced and efficient production processes...).</li> <li>– Chemists developing environmentally friendly packaging, cleaning products and sprays.</li> <li>– Employees of firms producing green building materials (alternative cement, recycled wood...).</li> </ul>
Waste and pollution control and recycling	<ul style="list-style-type: none"> <li>– Mobile and stationary air pollution source controls.</li> <li>– Water conservation and reuse.</li> <li>– Pulp and paper recycling.</li> <li>– Aluminium recycling.</li> <li>– Electronic recycling.</li> </ul>	<ul style="list-style-type: none"> <li>– Workers employed for renewing water infrastructure.</li> <li>– Hazardous material removal workers.</li> <li>– Recycling plant engineers and operators.</li> </ul>
Environmental analysis, training and consulting	<ul style="list-style-type: none"> <li>– Landscape.</li> <li>– Public administration.</li> <li>– Specialised consulting and marketing.</li> <li>– Green venture capital and other financial services.</li> </ul>	<ul style="list-style-type: none"> <li>– Energy contractors.</li> <li>– Specialised consultants.</li> <li>– Trainers.</li> <li>– Marketing specialists.</li> <li>– Green-civil engineers.</li> <li>– NGOs.</li> </ul>

**Table 3: Green firms and jobs (Source: OECD, 2010)**

Naturally, there will be job losses in traditional sectors such as mining, or heavy industry, moreover better efficiency and automated procedures will cause some job reduction. After all, there is a lot of potential in present labour processes, where possibilities of work can be flared. For instance, recycling is able to employ manpower in many industries. There are activities in metal-processing that depend on valuable by-products and scraps. In the pulp and paper industry, where modernised and more efficient plants require fewer workers, recycling is the fastest growing source of substitute and new green employment (UNEP, ILO et al. 2008 in UNEP, 2011). Green manufacturing gives new products to the market ranging from engineering, electrics, architecture and other sectors.



#### Manchester - Co<sub>2</sub>llective action on climate change

In 2009 Manchester City Council created a future plan aiming to reduce the city's contribution to global warming by cutting the emission of CO<sub>2</sub> by 41% by 2020 from 2005 levels so to become a truly low carbon city by 2050. In order to tackle climate change, this action required the involvement of every stakeholder; local communities, residents and the business community have also taken part in the initiative. The plan proposes to create a low-carbon culture thus gives guidelines related to all our actions: whether we are at home or we work, also it deals with the possible tools of the economy and adaptation.

Greening workplaces and the world of business play enormous role in the city's transformation. Green jobs will be supported by different ways:

- Providing a centre of excellence for green collar skills and training for the construction industry.
- Creating new recycling centres.
- Encouraging low-carbon investments in the city and taking incentive measures, such as the reduction of business rates.
- Supporting the growth of repairs and services as a part of an effort to reduce waste and energy use.

Low-carbon industries in Greater Manchester already have a market value of £4, 240 million, employing 32,600 people in 1,900 companies. Their annual growth rate is a healthy 4% despite the recession. According to a large-scale conception in 2020 major programmes of retrofitting homes, public and commercial buildings and creating new energy networks are likely to be supporting 15,000 jobs.

Low-carbon innovation and research have a strong profile in the city with the Tyndall Centre Manchester, which is at the very forefront of national and international research of climate-change. Their colleges, universities and science parks provide a highly skilled and adaptable workforce which will be critical in tackling climate change, as well as in being possible incubators of emerging enterprises in the green economy.

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#### **Investing in green sectors**

Beside broad present activities, there have been **new sectors** evolving within a green industry. Five main categories of green industries relevant to cities and metropolitan regions can be distinguished (OECD, 2010):

1. Renewable energy and energy efficiency.
2. Transportation efficiency, new modes of transport and substituting transport.
3. Green manufacturing, construction and product design.
4. Waste and pollution control and recycling.
5. Environmental analysis and consulting.

It worth highlighting some possible climate protection aspects of a green economic development, which can be organised at the level of the city:

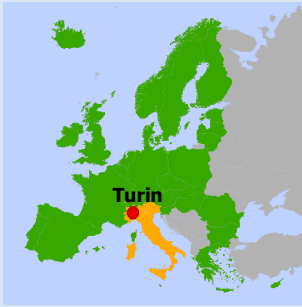
- In terms of climate protection, one of the most important interventions in cities is the **renovation of the building stock** taking into account improved energy efficiency. In addition to the obvious positive environmental effects, this also stimulates the economy as it opens opportunities for a construction industry shaken by the economic downturn.
- The production costs of green energy are still relatively higher than those of fossil energy. There are programmes called **'green pricing'** in which consumers agree to pay a surcharge on energy obtained from renewable sources, a measure that balances the higher costs of production. In several European countries, producers introducing green energy into their systems are incentivised by receiving premium rates.
- **'Feed-in-tariff'** systems offer discounts to consumers who feed renewable energy or recycled waste energy back into the network.
- Over the past decade, **industrial parks** have become common. These cater for industrial enterprises that may wish to settle in a location that offers existing infrastructure, local tax benefits, and, if possible, a range of services. A 'green' version of the industrial park is an 'ecopark' created on the basic principle that enterprises settling in close vicinity with one another rely on each other's by-products (e.g. thermal energy) in a cyclical system.

### 12.3.3. R&D and innovations for green growth

Research and development relates closely to all progressive sectors of the green economy (renewable energy and energy efficiency, transportation efficiency, green manufacturing and construction, waste management, environmental consulting). R&D has the most significant role in creating green technologies and providing solutions in every economic sector. Innovation can assist in diversifying energy sources away from those most harmful to the environment and help deliver greater energy security as well.

There are **'first mover economic advantages'** to cities that innovate and take advantage of the green economy (estimated to be worth \$500 billion globally by 2050) and avoid 'lock-in' to uncompetitive high carbon economies that may become increasingly vulnerable in a globalised world. Technological expansion employs more and more scientists and researchers of universities, think tanks and firms all over the world. It can be stated that inventing and developing green innovations have become a **self-dependent industry** at this time. Forming knowledge bases and trainings of environment-friendly and sustainable economy are not only marketable products, but foster spreading responsible attitude among people. Due to researches in the manufacturing process already are used different water and energy-saving, waste-less or zero-waste technologies, which can minimise and reuse resources without distressing wastage. Renewable energy utilization is the first base of investigations, because many other pursuits are based on it. Electricity and heat-energy production, transportation, building industry etc. can use renewable-energy converter implements.

**Small and medium enterprises** (SMEs), which play a major role in the European economy and which are favoured by EU economic policy, find it difficult to join these processes of eco-innovation because of their low innovation potential. Organising **co-operation schemes** in urban areas – where the institutions of innovation are normally concentrated – can offer one solution to this problem. Within the framework of such co-operations, research and development sites and universities can test their technologies and processes in realistic conditions while enterprises may benefit from the advantages offered by such novel solutions. City managements can play a significant role in creating and running co-operating networks of this type.



### Turin, Hydrogen Systems Laboratory (HYSYLAB)

Turin is one of the most important industrial and financial centres in Italy with a population of around 910,000 and a the metropolitan area of around 2.2 million. This is ideal for research and development activities.

HYSYLAB is located in Turin. The laboratory was funded and built between 2006 and 2008, with the financial assistance of ERDF. The laboratory's mission is the production, application and system integration of hydrogen. Hydrogen is an alternative resource for energy supply and fuel for vehicles.

The usage of hydrogen is very climate-friendly, because the emission of greenhouse-gases is very low. The institution creates and develops metal hydride storage devices, hydrogen compressors, hydrogen injectors, fuel processors, and other devices and systems. HYSYLAB also trains technicians, and does testing on hydrogen technologies. The organisation employs young and talented experts to make more dynamic researches, and to improve employment in the region.

Hydrogen System Laboratory has many projects at the same time. For example the Laboratory is creating a new scooter that runs with hydrogen. Another project promotes a cell that produces energy for heating. There is also an urban related project, the BioH2Power, which studies renewable gaseous fuels made from waste for current and future vehicles. The institution's future plan is to increase co-operation with private companies, and enforce national and international networking activities. HYSYLAB can be an exemplary project in climate-friendly research and development, and in giving technical assistance for cities in adapting to climate change.

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### 12.3.4. Raising citizen's environmental awareness for green growth

By raising citizen's environmental awareness, consumption of **green products** could be invigorated. Juristic regulation, labelling or environment-friendly marking are incentive implements to produce and buy sustainable products. It is favourable either for the economy, or the ecosystem. The social benefit, besides creating new workplaces, is public workers also would be employable for example by building regeneration. It is particularly conducive in deprived areas. Recycling materials neither need high qualified labours, so there will be several types of jobs available in the green sector for deprived groups too.

It is very important to ensure that various governance instruments are used to attain the interest of the population as well as the economic actors in developing and creating a green economy.

- One of the ways to achieve this is through the **dissemination of information** and through promotional activities. Various campaigns and special events can be useful in educating the population about this new direction in economy. (In addition, promotional events can also be organised where customers buying green products receive bonus points which they can use towards further green purchases.)
- Economic actors opting for green growth can be offered advantages through **local support policy** or **local tax policy**, which can be an even stronger incentive for them.

### 12.3.5. Responsible economic development

Responsible management has various conceptions; it includes several activities that contribute to achieve sustainability. The **fair trading** movement started in 1988 and took aim at creating a form of

trading which was more equitable. 'Fair trade is a trading partnership, based on dialogue, transparency and respect, that seeks greater equity in international trade. It contributes to sustainable development by offering better trading conditions to, and securing the rights of, marginalised producers and workers – especially in the South. Fair trade organisations (baked by consumers) are engaged actively in supporting producers, awareness raising and in campaigning for changes in the rules and practice of conventional international trade.' (European Fair Trade Association 2001. p.1.) Responsible management can also be defined as department stores purchasing their stocks from native resource. In this case, shops could support native growers and companies and there could be energy saved.

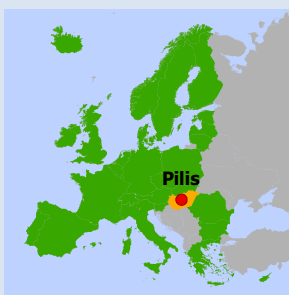
#### 12.4. CITIES FORCING LOCAL ECONOMIC DEVELOPMENT

Local economic development can be an excellent tool in climate change mitigation. Developing the local economy means that the basic products and supply vital for the local population are increasingly produced locally, which in turn significantly reduces the need for transportation, thereby curbing greenhouse gas emission.

Achieving these and similar results often does not require any financial contribution from the municipal government. It is often enough to make local regulations more favourable. Changing local regulation can in itself create favourable conditions for the emergence of a more robust local economy, and thereby can improve local self-sufficiency.

##### ***The cities as markets***

The cities have a crucial role in **organising the local economy**, as the European cities are the traditional markets of their neighbourhoods. European cities should accept this ancient role again. A city and its surrounding rural area should provide mutual services for each other affecting all the spheres of our life (e.g. providing jobs and labour, cultural and recreational experiences, industrial and food supplies, public and other services, and trading with more remote areas). Therefore, a city should be a site of stimulating the changing of local products and the purchasing of local services. A well functioning city in a close partnership with the other settlements in its region also tries to optimise the external and internal energy and material flows of the region. Although a city is a hub of long distance or global trading and purchasing, it should also work on limiting the needs of remote travelling and transport, thus satisfying demands locally.



##### **Pilis, 'Climate Friendly Business' Movement**

Pilis lies in the middle of Hungary, in the agglomeration zone of Budapest. It has 11.500 inhabitants.

The organization operating in Pilis – founded in 2007 – and called Climate Friends' Circle created a point system, and the shops of the city may become more climate friendly with the adaptation thereof. The system consists of 21 points, and at least 10 points have to be obeyed in order to win the title: 'Climate Friendly Business'. The points are as follows:

1. Continuously changing the plastic wrapping material to paper, or dissolving plastic (an obligatory task for everyone).
2. Recollect the used wrapping paper.
3. To market the domestic product in the shop-window that is aesthetically varied.
4. Production of the traditional, Hungarian products, or products made of Hungarian components.
5. Selling even more bio-products.
6. Do not pre-package the fruits and vegetables.
7. Collect the waste emerged in the shop selected.
8. Collect used batteries and printing patron.



9. Recollect the used oil, and hand them further to the sewage works or the company dealing with the collection of oil.
10. Secure a waste collector in front of the shop.
11. Carry back the household and technical equipments.
12. Raise plants before the shop.
13. Provide a bicycle holder or barrier to the buyers.
14. To sell paper bags that are proper for waste collection.
15. Use cleaning materials that dissolve into natural material.
16. Employees are not allowed to smoke.
17. Most of the employees go to work by bicycle.
18. The equipment is continuously changed to energy-saving, or one that is proper for the use of alternative energy.
19. The business is connected into the events of the city.
20. The shop organizes local shopping offer, showing what the business makes the difference.
21. Offers a 'Buyers' card' and discounts for the returning buyers.

The Climate Friends' Circle informed a meeting in July 2009 about its idea, where the shops of the city, the owners of the companies and the mayor of the city participated, who offered his support to the members, and the leaders of the shops. At the start 10 shops joined, but within a year further 14 shops joined. Their target is that within a few years they would like all Pilis shops to be climate friendly. They regularly organize meetings and the public information is published on the website of Pilis city.

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### ***Cities and their surroundings towards self sufficiency***

Local economic development is also expected to take another direction: increasing the **self-sufficiency** of individual settlements and their micro regions and reducing their dependency on large supply systems will emerge as main objectives. Currently, a large part of water, food, and energy – all vitally important – is not produced locally, but instead, is delivered through what we call large supply systems. These large supply systems represent a significant load on the natural environment. How food is supplied to us today is a good example. By the time a given agricultural product reaches the consumer as food, it has been handled by so many processing plants and commercial enterprises that the energy used during processing and transporting the product is several times more than what the given product of food industry in itself represents. From the aspect of **food safety**, suburban agriculture is more reliable, than foods transported to a further destination. It is easier to control the quality of products, which come from a closer farm. Partly because of climate change, and partly because of the energy crisis, these large supply systems will become increasingly vulnerable, a fact that can easily lead to future disruptions in supply. Therefore, settlements should aim at creating local economy and local infrastructure that can provide for the population at least in terms of their fundamental needs such as drinking water, food, and energy when large supply systems become dysfunctional.

Obviously, larger cities have more restricted possibilities in terms of genuine self-sufficiency; accordingly, this is yet another area where it is a good idea to strengthen co-operation with the less urbanised settlements surrounding them. As the true significance of self-reliance becomes more and more appreciated, the economic ties between large cities and rural areas around them are expected to become stronger and stronger in the future.

Accordingly, the local management of settlements need to adopt measures that reinforce the local economy and thereby widen the possibilities of local self-reliance. There are several ways to arrive at self-sufficiency at the level of settlements which may be followed simultaneously.

- One way is for city management to **facilitate direct sales** between local/regional producers and local consumers. Currently, most examples of this modality are seen in the field of food supply

(e.g. helping consumers and producers establish direct personal contact with each another, or making it easier for the local market to primarily serve encounters of this nature). One of the efficient instruments to strengthen the position of local producers and local production is ensuring that the settlement has a regularly functioning market. The European cities as traditional trading hubs serve perfect sites for these actions.

- It is possible to **enhance farming** even inside the city limits:
  - The municipal government must become an entrepreneur itself. Staying with the example of self-sufficiency in food production, the municipal government can be a land owner who can cultivate those lands or lease them out to other farmers. If the municipal government does not own any lands, it may purchase or rent them. Conversely, the municipal government can set up different types of processing plants (for example, slaughterhouses, mills, cheese factories, etc.) to process the agricultural products it produces or obtains from other producers. It is also reasonable to use public employment programmes for these activities.
  - Another option is when the population itself begins farming, not for commercial purposes, but instead, for its own consumption. All over the world, including in Europe, more and more city dwellers start farming either because they do not find reliable food sources and they like to spend time gardening, or simply because they do not have enough money to buy food. The latter is more typical of cities in the third world. This practice is very easy to establish in a suburban or more rural setting, but we see examples in large metropolitan cities as well.
- Turning abandoned urban areas and brown fields into cultivated land can also result in larger, more biologically active and healthier surfaces which help the climate too.

As an option, placing more emphasis on managing resources locally is not limited to achieving self-sufficiency in food production alone. In fact, it is also feasible in the case of such other fundamental necessities like energy. A great advantage of **using local alternative energy sources** is that it facilitates achieving independence in the supply of energy, which in turn, improves the settlement's security of supply in case the large supply systems should be disrupted (something that frequently occurs as a result of extreme weather events, among other scenarios). A further advantage of establishing a local energy supply system is that it can create additional jobs for the local population.

#### Local and regional economy development joined to the Amber Trail

Initiative of Amber Trail Greenways (ATG) is not a typical case of economic expansion, but through rural- and ecotourism it could be linked to the protection of environment and also of economy. A renewed spirit of co-operation along the historic corridor, called Amber Trail empowers people and communities to generate sustainable economic and social development while protecting, restoring and preserving traditional cultural and natural values and landscapes. Amber Trail Greenways program provides local, regional and cross-border co-operation attended by three Central-European nations: Poland, Slovakia and Hungary.

The motivation and goal is to help people in Central Europe to use local heritage for local development. Amber Trail has seven UNESCO World Heritage sites that travellers can visit. At these sites local artificers and other businesses like hotels, can be amplified from the incomes which they get from tourism. Not just local economy grows, but the way of travelling is also climate- friendly. Greenways Travel Club offers cycling and walking tours where people can enjoy themselves, while learning how to show respect for the environment. Creating the infrastructure for these activities also helps local employment. Constructing cycling paths, and buildings for tourism and other activities can establish many workplaces.

Another excellent project is ITD Inspiration the local agency of Lanckorona region (Poland), which sells local heritage products including a variety of carved and painted images of angels, ceramics, linen products. ITD strengthens local economy by employing a lot of people.

Amber Trail activities, initiatives and projects seek to reconcile conservation of natural and cultural values with the imperatives of economic development. It evokes the past times when trade was associated primarily with

local products of great quality, which helped to bring prosperity to the local people and the places where they lived.

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### BRIEF RECOMMENDATIONS

- The city's economic policy may be one of the most important tools in shaping an urban climate policy if it is able to follow the goals and principles of a green economy and green growth.
- The green economy helps to settle new sectors in the cities; retrofitting may stimulate the local economy and create new jobs. Even the deprived cities and urban regions can find a new chance for development in this way.
- Innovation and knowledge will be more important and the new answers for the new environmental situations are a valuable export goods of the cities' economies. Moreover, this situation offers an opportunity to build a more aware, fair and sustainable economic model.
- Cities and towns can do a lot in a very straightforward manner to help prevent climate change just by functioning as local markets and strengthening an autonomous economy that encompasses both the city and its rural environment, and which aims at satisfying local needs from local resources.
- The support of citizens' climate aware consuming behaviour and lifestyle and stimulating their sympathy towards the green economic public investments, the products and services of the local economy and the fair trade are steps to leave behind that way of life which led us to not only environmental but also economic crises.

## 13. SOCIAL EFFECTS OF THE PROPOSED CLIMATE PROTECTION MEASURES

Concerning their social effects, the majority of climate protection measures proposed in the previous chapters can be regarded as neutral, since essentially they are based on community investment. They do not require individual contribution, and the various social groups have access to the benefits of the investments equally no matter what their usage rate is (e.g. energy-efficient public lighting, separated water drainage system, installation of mobile dams, and utilization of methane gas). It is worth studying the social effects of those interventions with greater care that affect certain social groups – basically the social strata with lower financial means, people living with disabilities, the elderly, families, people living in certain dwellings – especially deeply.

### 13.1. CITY TRANSPORT

Preferring the use of community transport is an important measure not only from the aspect of climate protection and sustainable mobility, but as an intervention having significant effects from a social point of view as it provides access to effective city transportation to city dwellers who do not have or have limited access to automobiles. Effective community transport, in practice, means creating a demand-oriented and barrier-free transport which operates with the least amount of transfers. Extension of community transport can integrate social strata currently immobile or with limited mobility not only into the transport system, but this way also into social life (e.g. people with disabilities, people with children, and elderly people with limited mobility).

According to a survey conducted in Germany (Mobilität in Deutschland 2008) between 2002 and 2008, the level of young people – between 18-24 years – who use automobiles significantly dropped, while usage of community transportation increased. Above 65 years, the tendencies are just the contrary: automobile usage somewhat increased, and the usage of public transportation decreased. This demonstrates that the relationship between the elderly age group and the usage of community transportation is not straightforward. In case the conditions of public transportation are not suitable for the elderly, then the provision of community transport systems in itself does not result in positive social impacts concerning this age group.

Nevertheless the extension of community transport systems is closely related to affordability. A wide-ranging transport network providing good access in itself can have motivating and positive social effects and enable the mobilization of newer and newer social strata. This depends on if the fee of the service is affordable and the development costs generated from investments are not directly transferred to the consumers. If the improvement of service quality results in ticket and pass prices hardly being affordable, the social impacts can even be adverse: social strata with low solvency will not be able to resort to the service level that they previously could afford. Nevertheless, affordable transport is a key issue also from the deprived group's viewpoint, and is one of the most important conditions for dissolving urban segregation, especially in the case of large, run-down residential areas having disadvantageous location from urban structure aspects and located at the city outskirts. A

primary condition for increasing the labour market opportunities of the inhabitants of these areas is effective and affordable city transport. In order to strengthen positive social effects, a tariff system can be established that prefers certain social groups (students, retired, families, and people with disabilities). Preference can be focused on certain groups or age groups (especially if the related price supplementation and loss financing is settled), but can be time-limited or time-based, as well. So, given seasonal conditions are valid for certain groups, e.g. discount can be offered during trips beyond peak hours, group discounts, ensuring the travelling of several persons in a period characterised by entitlement, etc. These tariff systems operate in a number of cities, in a transport association or within a tariff community system.

In order to optimise individual transport directed to the inner areas of cities, causing problems from environmental and traffic aspects, the introduction of various entry fees, tolls, and traffic restrictions can be proposed. This measure can concern – subject to the given model – those arriving from outside, or to a certain level those living within a given fee-zone. In the case of those living within the zone, they only pay when crossing the zone border (just like those arriving from outside), otherwise they can move freely within the zone. If internal movements are subject to fees (see London), preferences can be ensured for those living within, assuming the related political will of the city exists. When setting the entry fees, decision-makers have to take into consideration that all these kinds of restrictions are automatically discriminative for automobile users of lower financial means and higher entry fees are less affordable for poorer groups. A special form of entry fees is when the tariff depends on the environmental parameters of the given vehicle and the less the vehicle load is on the environment, the lower the fee will be. However, an automobile with lower emission level is mostly younger, more modern, and more expensive. Entry fee based on environmental attributes therefore intensively place a burden on social groups with lower financial means as they typically own old cars. This fact, in our opinion, does not require the introduction of equalizing mechanisms considering that the aim is to keep down entry to the lowest possible level and further reduction of the entry of the most polluting vehicles. If the level of community transport is adequate or optimized individual transport methods (car-sharing, car-pooling) and community bicycle systems are available, then the adequate and sustainable alternative of entry based on individual transport will be established.

In many cases a parallel is drawn between the introduction of parking fees and parking systems and the entry fee, when considering the restriction of automobile end traffic. In the former case those living in the zone are given preference as they are entitled to free or low-tariff parking (in certain cities free or preference entry). These restrictions therefore in principle should not have negative effect on the inhabitants of the zone; on the contrary, they should result in positive impact since the liveability of their residential area is improved as a consequence of the restrictions. Establishment of such traffic reduction systems however requires careful planning from the aspect of the zone inhabitants, as well. If the systems are too restrictive, parking places for exclusive use are few and entry fee is high, then inner cities and residential areas may become valueless and these city areas may tend to become slum-like.

### 13.2. SETTLEMENT ENERGY MANAGEMENT

The most significant energy-efficiency measures mobilizing citizens' sources can be found under the issue of settlement energy management. Energy consumption of residential units amount to 30-40% of total energy consumption, therefore the energy modernization of dwellings can produce significant reserves for the purposes of climate policy. Energy-efficient modernization of buildings moreover reduces operational costs, and thus the currently high rate of utility costs compared to income may be reduced (where currently it is about 30-50%) for the social strata in danger of poverty, thereby reducing the volume of arrears. A phenomenon can be observed in certain countries of Central Eastern Europe that due to accumulating arrears owing to the high utility cost, tens of thousands of families are forced to sell their real estate and buy cheaper properties further away from the city. Through this, they involuntarily get further from workplaces and good-quality public services (poverty suburbanization). These negative impacts could be reduced by making dwellings more affordable.

Modernization of buildings, however, requires significant investment, the return of which – depending on a number of parameters – may be realized only decades later. Not all social strata can undertake the expenses of such investments. At best, they can be assisted by an adequate support system. Considering social aspects, principally the establishment of those constructions to be supported that finance the investment by savings originating from energy-efficient renovation. Credit constructions are the ones that are capable of harmonizing the process running in two time dimensions, however it is important, how exposed the dwelling communities are to the credit institutions, and under what conditions do they have access to credit, especially when considering dwelling houses with poor solvency located in slum areas. Local governments may have a role in establishing coordination mechanisms that help in harmonizing the interests of dwelling communities struggling with a lack of information and banks.



#### **Antwerp, targeted energy-efficiency support system**

Antwerp is a port-town of 460,000 inhabitants in the north of Belgium, the capital of Antwerp province.

In compliance with the Kyoto Convention, the city of Antwerp committed to achieve a 7.5% reduction in the energy consumption of the city by 2012. Therefore, in 2005 in order to promote energy-efficiency investments, the City Council adopted a new support scheme focusing declaredly on owners with low apartment value and making them interested in these investments.

The supported investment activities are the following:

- Extra insulation for existing windows (in the value of 20 EUR/m<sup>2</sup>; max. U= 1.3 W/m<sup>2</sup>K).
- Roof insulation (5 EUR/m<sup>2</sup>, minimally in a value of R= 3m<sup>2</sup>K/w).

In order to reach the target audience, the local government applied the following information tools:

- Circulation of special publications on environment protection and energy efficiency (3 times per year).
- Local magazine 'De(n) Antwerpenaar' (twice per month).
- Information page on the local government's web site.
- Information packages delivered throughout the city.
- Information points at the waste collection stations available in the city.
- Organization of 'Energy Week' (information, exhibition, actions).
- Creation of green number for the inhabitants.
- Organization of press conference.

Information is provided beside the above-mentioned tools by information centres. The centres assist in filling in the application forms, as well. The sum available for the support – ensured by the city and one of its non-profit organizations: vzw Recyclant – increased in every year, from 90,000 EUR in 2005 to 260,000 EUR in 2009. In the course of the two years of the project, the aggregate surface of the roofs insulated grew from 929 m<sup>2</sup> to 5,763 m<sup>2</sup>; the extent of window surface fitted with extra insulation grew from 1,396 m<sup>2</sup> to 5,169 m<sup>2</sup>. The total value of the support amounted to 30,316 EUR in 2005, 75,591 EUR in 2006 and 119,205 EUR in 2007.

The support granted by the city served as a supplement beside the state tax refund system and the benefits of energy providers, thus giving the small impetus, by which the return period concerning energy-efficiency investments reduced significantly.

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An increasing percentage of dwellings are being renovated in Europe year by year. This fact can, at the same time, result in the weakening segregation or strengthening segregation of the dwelling. Renovation actually has direct effects on the real estate value: a renovated dwelling with lower operational costs is valued higher on the market and can revalue its direct environment, as well.



Renovation of more dwellings in turn can moderate the slum characteristic of the run-down districts and stop the spiral of poorer families moving in. At the same time, during that dynamism of renovations, the buildings where no energy-efficiency measures have taken place are significantly devalued. Communities of multi-family blocks not adequately disposing of financial resources (or organizational capacities), therefore can book further losses. The danger of this phenomenon is especially great in countries where multi-apartment buildings are in private ownership and operate as condominiums. Thus even owners in the minority with low solvency can make renovation impossible and speed up the segregation spiral. It would be possible to establish a local support scheme that would provide assistance, not to the whole dwelling community, but only to the resources of the households in need. However, this solution can incur high administration costs and cannot be properly applied in several countries of the European Union since, due to the grey economy and hidden income, the real income of households cannot be determined accurately. Nevertheless, we can find a good example for the introduction of supplementary support of households in need in Budapest, Hungary. The support by the Budapest City Rehabilitation Frame to apartment buildings provides extra assistance to families receiving certain types of regular social aid. Therefore, households only have to prove that they are granted the given social aid, which results in the significant reduction of administration costs.

Using certain types of renewable energy resources (e.g. solar collectors, geothermic energy) leads to similar results in case of dwellings and the renovation of them. The long run results in lower energy costs, but the short run requires investment. Therefore, the social (outplacing) effects of using renewable energy resources largely depend on what type of support system joins their application. The mass spreading of renewable energy resources raises further affordability issues, insofar as the compulsory take-over of energy produced at high prices (e.g. wind energy) raises average energy prices, which has a negative impact on the social strata with less income.

Application of environmentally friendly heating methods, e.g. district heating in a wide range also raises affordability problems since this heating method is one of the most expensive of the possible urban heating systems in many European countries. The spread of district heating in many countries have affordability, not technical, obstacles. Therefore nowadays, not the extension, but the detachment of district heating systems is a characteristic of Central and Eastern European cities.

### 13.3. ENERGY CERTIFICATES

Energy requirements to be applied for new constructions are becoming even more stringent, both on a community and national level. (Since 2006 the system of energy certification is to be applied in all Member States in accordance with Directive No. 2002/91/EC.) However, dwellings compliant with higher technical requirements can only be installed at a higher cost level, which automatically has an exclusion effect from of poorer social strata: population with lower purchasing power can drift even further from the new apartment market.

The system of energy certification to be applied at the sale and rental of used apartments is expected to be integrated into the real estate market. Thus, the energetic parameters of a building will become price formulating factors – of course, this has been true already for the basic energy parameters. Through detailed assessment, such characteristics will become part of the price formulation that has been more or less hidden so far, and the correction of which requires investments. In case of buildings inhabited by less well-off people, and having worse energy characteristics, a new market valuation aspect can further weaken the position of part of the apartments, which will inevitably lead to the strengthening of the segregation processes.

#### 13.4. WATER MANAGEMENT AND COMMUNAL INFRASTRUCTURE

Concerning the area of communal infrastructure, proposals that may eventually have social impacts as well are aiming at broadening separate waste collection and the processing of waste, furthermore the extension of sewage networks and wastewater treatment.

In our view, the first topic – separate waste collection – implies basically positive social impacts from several aspects. On the one hand, by selecting recyclable waste the volume of communal waste is reduced, which can lower waste shipment costs. On the other hand, separate collection and processing of waste requires a generally low qualified labour force, which can assist people living in deep poverty facing difficulties in finding a job. On the whole, it can be said that a ‘green economy’ can provide real employment solutions for social groups with low status and low qualifications, as opposed to IT or other service industries requiring high qualifications which are defined as a breakthrough point and cited so many times nowadays.

At the same time, social impacts of separate collection of waste go beyond its economic aspects. The process of selective collection is one of the most efficient educational tools towards more environmentally conscious behaviour both among children and adults. With the help of the spectacular process of separate collection, receptivity to other aspects of environmental issues will grow as well.

Extension of sewage networks and wastewater treatment capacities (and the utilization of the resulting sludge) is a measure to be supported from environmental aspects without any doubt; however the investment costs – reduced by eventual support – are integrated into the waste water fee and can result in its very significant increase. The increased waste water fee then can lead to the accumulation of overdue fees or to the refusal of hooking to the network, thereby to the further reduction of the number of people bearing the fixed costs.

Generally speaking, environmental security concerns all players and all areas of society. In any area of application solutions, one must pursue the maintenance and intensification of security, since we have to prepare for a new and continuously changing system of environmental conditions. The state or the local government can take over the costs of these only partially, therefore the spreading of property insurance becomes necessary. Property differences will appear sharply right from this aspect and will somewhat intensify, since the most needy will have less possibilities to prevent the damage.

# APPENDIX: INFORMATION BASIS OF URBAN CLIMATE PROTECTION AND ADAPTATION ISSUES

## I. LIST OF INTERNATIONAL REGULATIONS, RECOMMENDATIONS, AND GUIDELINES

Environmental problems and thinking of their resolution appeared in the European community as early as 1973, just after one year of the first United Nations Conference on the Environment in Stockholm. Since then, environmental issues have been becoming more and more articulated. Environment protection got the status as a common horizontal policy by approving the Single European Act in 1986. Beside action programmes and strategies, more than 300 related legislation materials have been worked out in the EU.

Prevention became the main principle of environmental policy due to the third environmental action programme of the EU. Climate change aspects – mitigation and adaptation – have got priority since the '90s. The sixth environmental action programme deals with climate change.

As action against climate change is a top priority for the EU, it is not surprising that EU supported the two fundamental United Nations climate treaties on reducing CO<sub>2</sub> emission: the UN Framework Convention on Climate Change (UNFCCC) in 1992 and the Kyoto Protocol in 1997. According to Kyoto Protocol, the 15 EU member countries have aimed at reducing their collective emission in the period of 2008-2012 by 8% below 1990 levels. Moreover, in 2007 EU leaders made a commitment that Europe would cut its emissions by at least 20% of 1990 level by 2020. In this manner Europe could be transformed into a highly energy-efficient and low carbon emission economy.

Climate issues are also an essential part of the current development strategy of the EU, the so called EU2020. EU2020 sets up explicit climate protection targets (Target 3, the climate and energy target of '20/20/20' on cutting greenhouse gas emission, increasing energy efficiency, and supplying energy needs from renewable sources has a direct relation to cities, as focal sites of energy emission and consumption) and other related targets that are in a close connection with the strategy's sustainable and green economic development initiatives.

The following list summarizes the climate relevant EU legislations:

### **Directives and Decisions of European Parliament and of the Council**

- Council Decision of 24 June 1993 for a monitoring mechanism of Community CO<sub>2</sub> and other greenhouse gas emissions, 1993
- 93/361/EEC: Council Decision of 17 May 1993 on the accession of the Community to the Protocol to the 1979 Geneva Convention on long-range transboundary air pollution concerning the control of emissions of nitrogen oxides or their transboundary fluxes

- Council Directive 96/61/EC of 24 September 1996 concerning integrated pollution prevention and control
- Resolution on the Communication from the Commission Energy for the future: renewable sources of energy: Green Paper for a Community strategy' (COM(96)0576 C4-0623/96)
- Communication from the Commission energy for the future renewable sources of energy : White Paper for a Community Strategy and Action Plan (COM(97)599 final) (26/11/1997)
- Directive 98/69/EC of the European Parliament and of the Council of 13 October 1998 relating to measures to be taken against air pollution by emissions from motor vehicles and amending Council Directive 70/220/EEC
- White Paper on environmental liability COM(2000) 66 final
- Communication from the commission on EU policies and measures to reduce greenhouse gas emissions: Towards a European Climate Change Programme (ECCP) COM(2000)88
- Green Paper on greenhouse gas emissions trading within the European Union COM(2000)87
- Directive 2001/42/EC of the European Parliament and of the Council of 27 June 2001 on the assessment of the effects of certain plans and programmes on the environment
- Community activities in the urban environment – Cooperation to promote sustainable urban development (decision 1411/2001/EC)
- Directive 2001/81/EC of the European Parliament and of the Council of 23 October 2001 on national emission ceilings for certain atmospheric pollutants
- Communication from the Commission to the Council, the European Parliament, the Economic and Social Committee and the Committee of the Regions on the implementation of the Community Strategy and Action Plan on Renewable Energy Sources (1998 – 2000) (COM/2001/0069 final)
- Directive 2001/77/EC of the European Parliament and of the Council of 27 September 2001 on the promotion of electricity produced from renewable energy sources in the internal electricity market
- 2002/358/EC: Council Decision of 25 April 2002 concerning the approval, on behalf of the European Community, of the Kyoto Protocol to the United Nations Framework Convention on Climate Change and the joint fulfilment of commitments thereunder
- Directive 2002/91/EC of the European Parliament and of the Council of 16 December 2002 on the energy performance of buildings. (Energy Performance of Buildings Directive – EPBD)
- Climate Change in the context of development cooperation (COM(2003) 85)
- Directive 2003/87/EC of the European Parliament and of the Council of 13 October 2003 establishing a scheme for greenhouse gas emission allowance trading within the Community and amending Council Directive 96/61/EC
- Decision No 280/2004/EC of the European Parliament and of the Council of 11 February 2004 concerning a mechanism for monitoring Community greenhouse gas emissions and for implementing the Kyoto Protocol
- Directive 2004/101/EC of the European Parliament and of the Council of 27 October 2004 amending Directive 2003/87/EC establishing a scheme for greenhouse gas emission allowance trading within the Community, in respect of the Kyoto Protocol's project mechanisms (Text with EEA relevance)
- 2004/192/EC: Commission Decision of 25 February 2004 adopting the work plan for 2004 for the implementation of the programme of Community action in the field of public health (2003 to 2008), including the annual work programme for grants
- 2005/166/EC: Commission Decision of 10 February 2005 laying down rules implementing Decision No 280/2004/EC of the European Parliament and of the Council concerning a mechanism for monitoring Community greenhouse gas emissions and for implementing the Kyoto Protocol (notified under document number C(2005) 247)
- 2005/381/EC: Commission Decision of 4 May 2005 establishing a questionnaire for reporting on the application of Directive 2003/87/EC of the European Parliament and of the Council establishing a scheme for greenhouse gas emission allowance trading within the Community and amending Council Directive 96/61/EC (notified under document number C(2005) 1359)
- Communication from the Commission to the Council and the European Parliament (2006) on Thematic strategy on the urban environment; COM(2005)718, pp12

- Green Paper on energy efficiency (2005)
- Communication: Winning the battle against climate change. COM(2005) 35 final
- Commission Green Paper of 8 March 2006: 'A European strategy for sustainable, competitive and secure energy' (COM(2006) 105 final)
- Communication from the commission: Action Plan for Energy Efficiency: Realising the Potential (COM(2006)545 final)
- Directive 2006/32/EC of the European Parliament and of the Council of 5 April 2006 on energy end-use efficiency and energy services and repealing Council Directive 93/76/EEC
- 2006/780/EC: Commission Decision of 13 November 2006 on avoiding double counting of greenhouse gas emission reductions under the Community emissions trading scheme for project activities under the Kyoto Protocol pursuant to Directive 2003/87/EC of the European Parliament and of the Council (notified under document number C(2006) 5362)
- Directive 2007/60/EC of the European Parliament and of the Council of 23 October 2007 on the assessment and management of flood risks
- Decision No 1350/2007/EC of the European Parliament and of the Council of 23 October 2007 establishing a second programme of Community action in the field of health (2008-13) (Text with EEA relevance)
- Commission of the European Communities: Green Paper from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions – Adapting to climate change in Europe – options for EU action (SEC(2007) 849)
- Commission of the European Communities: Green Paper – Towards a new culture for urban mobility, 2007 (COM(2007) 1209) 551
- Communication from the Commission to the Council, The European Parliament, the European Economic and Social Committee and the Committee of the Regions: Strategy on climate change: Limiting Global Climate Change to 2 degrees Celsius The way ahead for 2020 and beyond, 2007
- Communication from the Commission to the European Parliament and the Council, Addressing the challenge of water scarcity and droughts in the European Union; (SEC(2007) 993);
- Communication from the Commission to the European Council and the European Parliament an energy policy for Europe COM/2007/0001
- Commission staff working document – Limiting global climate change to 2 degrees Celsius – The way ahead for 2020 and beyond – Impact assessment summary (COM(2007) 2 final) (SEC(2007) 8)
- Commission Communication: The mid-term review of the Sixth Community Environment Action Programme COM(2007) 225
- Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe
- Commission of the European Communities: Regions 2020. Climate change challenges for European Regions, 2008
- Commission staff working document – Accompanying document to the proposal for a recast of the energy performance of buildings directive (2002/91/EC) – Summary of the impact assessment (COM(2008) 780 final) (SEC(2008) 2864)
- European Parliament resolution of 10 April 2008 on the Commission Green Paper on Adapting to climate change in Europe — options for EU action (COM(2007)0354)
- Commission White Paper of 23 October 2007 'Together for Health: A Strategic Approach for the EU 2008-2013' (COM(2007) 630 final)
- Commission Regulation (EC) No 245/2009 of 18 March 2009 implementing Directive 2005/32/EC of the European Parliament and of the Council with regard to ecodesign requirements for fluorescent lamps without integrated ballast, for high intensity discharge lamps, and for ballasts and luminaires able to operate such lamps, and repealing Directive 2000/55/EC of the European Parliament and of the Council
- Decision No 406/2009/EC of the European Parliament and of the Council of 23 April 2009 on the effort of Member States to reduce their greenhouse gas emissions to meet the Community's greenhouse gas emission reduction commitments up to 2020
- Commission of the European Communities: Commission Staff working document, Climate Change and Water, Coasts and Marine Issues; (COM(2009) 147 final)

- Commission of the European Communities Commission Staff working document: accompanying the White paper Adapting to climate change: Towards a European framework for action, impact assessment COM(2009) 147 final)
- Commission of the European Communities: White Paper Adapting to climate change: Towards a European framework for action, COM(2009) 147
- Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC
- Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions – Action Plan on Urban Mobility (SEC(2009) 1211) (SEC(2009) 1212)
- Commission Staff Working Document Accompanying document to the WHITE PAPER Adapting to climate change: Towards a European framework for action Human, Animal and Plant Health Impacts of Climate Change; (COM(2009) 147 final)
- Communication from the Commission (2009): Fifth National Communication from the European Community Under the un Framework Convention on Climate Change (UNFCCC) (required under Article 12 of the United Nations Framework Convention on Climate Change) (EU)
- Regulation (EC) No 443/2009 of the European Parliament and of the Council of 23 April 2009 setting emission performance standards for new passenger cars as part of the Community's integrated approach to reduce CO<sub>2</sub> emissions from light-duty vehicles
- 2010/2/: Commission Decision of 24 December 2009 determining, pursuant to Directive 2003/87/EC of the European Parliament and of the Council, a list of sectors and subsectors which are deemed to be exposed to a significant risk of carbon leakage (notified under document C(2009) 10251)
- 2010/384/: Commission Decision of 9 July 2010 on the Community-wide quantity of allowances to be issued under the EU Emission Trading Scheme for 2013 (notified under document C(2010) 4658)
- 2010/253/EU: Commission Recommendation of 28 April 2010 on the research joint programming initiative on Agriculture, food security and climate change
- Directive 2010/31/EU of the European Parliament and of the Council of 19 May 2010 on the energy performance of buildings
- Communication from the Commission EUROPE 2020 A strategy for smart, sustainable and inclusive growth (COM(2010) 2020)
- Green Paper on Forest Protection and Information in the EU: Preparing forests for climate change SEC(2010)163 final

#### **Climate related European urban policy documents**

- Leipzig Charter on Sustainable European Cities, Agreed on the occasion of the Informal Ministerial Meeting on Urban Development and Territorial Cohesion Leipzig , 24 May 2007
- Toledo Informal Ministerial Meeting on Urban Development Declaration, Toledo, 22 June 2010
- EUROCITIES Declaration on Climate Change, June 2008
- Final statement by the ministers in charge of urban development, Marseille, 25 Nov 2008
- Bristol Accord Conclusions of Ministerial Informal on Sustainable Communities in Europe, Bristol, 6-7 Dec 2005
- Council for European Urbanism (2008): Oslo Declaration; 8 June 2009 – Climate Change and Urban Design

#### **Conventions**

- United Nations Framework Convention on Climate Change, UNFCCC, Rio de Janeiro, 1992
- Convention Concerning the Protection of the World Cultural and Natural Heritage, Paris, 1975
- Convention on Long-range Transboundary Air Pollution, Geneva, 1983
- Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, Basel, 1992



- The Convention on Wetlands of International Importance especially as Waterfowl Habitat (also known as the Ramsar Convention), Ramsar, 1975
- The Energy Charter Protocol on Energy Efficiency and Related Environmental Aspects (PEEREA), 1994
- Convention on the Protection and Use of Transboundary Watercourses and International Lakes, Helsinki, 1996
- United Nations Convention to Combat Desertification in Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa, Paris, 1996
- United Nations Framework Convention on Climate Change (UNFCCC) and Kyoto Convention, 1997
- Convention on Environmental Impact Assessment in a Transboundary, Espoo, 1997
- Energy Charter Treaty, Lisbon, 1998
- Convention on the Transboundary Effects of Industrial Accidents, Helsinki, 2000
- Convention on Persistent Organic Pollutants, Stockholm, 2004
- 2004/259/EC: Council Decision of 19 February 2004 concerning the conclusion, on behalf of the European Community, of the Protocol to the 1979 Convention on Long Range Transboundary Air Pollution on Persistent Organic Pollutants

### **Environment Programmes**

- United Nations Environment Program
- First European Climate Change Program (ECCP) 2000-2004
- Second European Climate Change Program (ECCP II), 2005
- Decision No Decision No 1600/2002/EC of the European Parliament and of the Council laying down the Sixth Community Environment Action Program, 2002-2012
- EU Adopts Energy, Climate Change Package, 2009

### **Recommendations**

- Council Resolution of 8 June 1998 on renewable sources of energy (98/C 198/01)
- Progress reports submitted by the Commission to the European Parliament and to the Council about inventories of GHGs, in order to monitor community GHG emissions, UNFCCC)
- European Parliament resolution on the EU strategy for the Nairobi Conference on Climate Change (COP 12 and COP/MOP 2), 2006
- Outlook opinion of the Committee of the Regions on 'How regions contribute to achieving European climate change and energy goals, with a special focus on the covenant of mayors' (2009/C 76/04)
- European Parliament resolution of 23 April 2009 on addressing the challenges of deforestation and forest degradation to tackle climate change and biodiversity loss
- European Parliament resolution of 4 February 2009 on '2050: The future begins today – Recommendations for the EU's future integrated policy on climate change' (2008/2105(INI))
- Joint EEA-JRC-WHO Report: Impacts of Europe's changing climate – 2008 indicator based assessment

## **II. SOME OF THE EUROPEAN KNOWLEDGE AND INFORMATION NETWORKS AND ORGANISATIONS ACTIVE IN URBAN CLIMATE PROTECTION AND ADAPTATION TO CLIMATE CHANGES**

### **Covenant of Mayors**

The membership of the Covenant of Mayors is composed of 1936 town and megapolises. These settlements would like to contribute to the reduction of CO<sub>2</sub> emission, increased energy efficiency, clearer energy generation, and consumption by the help of their political goals in conformity with the energy policy of the European Union. They made a covenant to reduce their CO<sub>2</sub> emission by at least 20% by 2020 through the implementation of their SEAPs (SEAP – Sustainable Energy Action Plan). According to this, they shall elaborate an urban structure in which the necessary tasks can be executed. In addition to this, they shall also mobilise the civil society to participate in the elaboration of the action plan. Other tasks: organising local 'Energy days', sharing of experiences, etc.

Contact:

Covenant of Mayors Office, 1 Square de Meeûs, 1000-Brussels (Belgium)

Helpdesk on general inquiries: +32 2 504 7862

Helpdesk on technical and scientific inquiries: +39 0332 78 3599

Media Desk: +32 2 340 3067 or +32 2 552 0851

### **ICLEI (Local Governments for Sustainability)**

The 'International Council for Local Environmental Initiatives' (ICLEI) was established in 1990. Its membership of 200 municipalities (local governments) covers 43 countries. The participating municipalities oblige the companies operating within their boundaries to implement developments aiming at sustainability, and carry various programmes and campaigns to this end. More than 1,048 towns in co-operation with several hundred local governments participate in these programmes. The Hungarian members of the organisation are the municipalities of Budapest, Miskolc and Tatabánya.

Contact:

[www.iclei.org](http://www.iclei.org)

If you want to get in touch with the organisation you can do it at the above central address. You can find the contact data of the regional offices on the website as well. They are as follows:

#### **– ICLEI World Secretariat**

ICLEI – Local Governments for Sustainability

World Secretariat Kaiser-Friedrich-Str. 7, 53113 Bonn, Germany

Phone: +49-228 / 97 62 99-00

Fax: +49-228 / 97 62 99-01

Email: Membership inquiries: [membership@iclei.org](mailto:membership@iclei.org)

Media & Web inquiries: [media@iclei.org](mailto:media@iclei.org)

Climate inquiries: [climate.centre@iclei.org](mailto:climate.centre@iclei.org)

Events inquiries: [training.centre@iclei.org](mailto:training.centre@iclei.org)

General inquiries: [iclei@iclei.org](mailto:iclei@iclei.org)

### **European Environment Agency (EEA)**

The European Union adopted a decree ordering the establishment of the European Environment Agency, and the European Environment Information and Observation Network (Eionet), but it was proclaimed only in 1993. For the time being, 32 countries are members of the EEA. Its fundamental duty is to provide unbiased information, and to act as an information resource for the EU member states.

The information available to the EEA concerning climate change (data, indices, evaluations, and forecasts) focus on the trends in the emission of greenhouse gases, the vocational policies and measures, and the European actions to be made in response to the impacts of the climate change and the adaptation thereto. By the help of this data, the Agency contributes to the fulfilment in the EU of the commitments undertaken in the Kyoto Protocol, evaluation of the environmental policies of the EU, mitigation of the climate change, and elaboration of the long term strategy of adaptation

Contact:

Kongens Nytorv 6, DK

1050 Copenhagen K, Denmark

Phone: +45 3336 7100

### **EUROCITIES**

The EUROCITIES is the network of major European cities which was founded in 1986 by mayors from six large European cities: Barcelona, Birmingham, Frankfurt, Lyon, Milan and Rotterdam. Nowadays it brings together local governments of more than 140 large cities in over 30 European countries. The network influences and works with the EU institutions to respond to common issues that impact the day-to-day lives of Europeans. Their aim is to shape the opinion of stakeholders in Brussels to

ultimately shift legislation in a way that helps city governments to address the EU's strategic challenges at the local level.

Contact:

[www.eurocities.eu/main.php](http://www.eurocities.eu/main.php)

1 Square de Meeûs, B-1000 BRUSSELS

Phone: +32 2 552 08 88

Fax: +32 2 552 08 89

E-mail: [info@eurocities.eu](mailto:info@eurocities.eu)

### **Carbon Dioxide Knowledge Sharing Network (CO<sub>2</sub>NET)**

CO<sub>2</sub>NET is a thematic European network established with a view to secure safe, reliable, sustainable, and climate-friendly European energy supply. More than 30 mammoth companies are its members throughout Europe, but also have companies from America and Australia. The main goal of the network is to inform and train the decision makers and others, and making the separation of the CO<sub>2</sub> emitted and its durable filling into the crust, that is CCS technology – emitting and storing) more familiar. This procedure is a technically viable and a socially acceptable opportunity for reducing the emission of greenhouse gases to a considerable extent. It is a key element in establishing sustainable energy systems in conformity with what has been set down in the Kyoto Treaty. Achievement will produce an even greater emission reduction. The most successful programme was accomplished between 2006 and 2008 and still continues.

Contact:

[www.co2net.eu/public/brochures/CO2NET-Public-Brochure-Hungarian.pdf](http://www.co2net.eu/public/brochures/CO2NET-Public-Brochure-Hungarian.pdf)

[www.co2net.eu](http://www.co2net.eu)

### **Climate Action Network – Europe (CAN)**

Climate Action Network (CAN) is a global network uniting approximately 500 non-governmental organisations which, through governmental and other measures, contribute to the ecological sustainability of climate change caused by mankind. Their goal is that by the help of information exchange and harmonised developments international, regional, and national strategies elaborated to reduce emission can be executed. The network has seven regional offices worldwide. They focus on healthy environment and sustainable development. A central idea and goal of the network is to protect the atmosphere and, simultaneously, to contribute to sustainable, just and equitable development worldwide. It is the leading network in Europe dealing with climate and energy issues. It has 129 members in 25 European countries. The goal of its members is to prevent hazardous climate change and to support sustainable energy and environmental policies in Europe. It authorises the civil organisations and also supports them in elaborating such efficient global strategies, which can contribute to sustainable development both on the international and the local scale through the reduction of the emission of greenhouse gases.

Contact:

[www.climnet.org](http://www.climnet.org) (CAN-Europe)

Mundo B Rue d'Edimbourg 26

1050 Brussels, Belgium

### **URBACT (Urban Actions)**

The URBACT Programme was launched in 2002 by the European Union. It is a programme facilitating education and the exchange of experiences with the goal to support sustainable urban development. The programme makes the megapolises capable of jointly elaborating solutions for the major urban challenges, and to strengthen the social role of towns facing more complex social changes. URBACT helps the towns in elaborating new and sustainable practical solutions which integrate the economic, social and environmental dimensions. URBACT makes it possible for towns to share throughout

Europe and show the best practical examples, experiences with all experts involved in urban policy. URBACT embraces 255 towns, 29 countries and 5,000 active participants.

Contact:

Phone: + 33 1 49 17 46 02

Fax: + 33 1 49 17 45 55

194, av. du Président Wilson

93217 Saint-Denis La Plaine Cedex, France

[www.urbact.eu](http://www.urbact.eu)

### **Energie-Cités**

Energie-Cités is an organisation uniting local European experts and supporting the sustainable local energy trends. The association was established in 1990 in more than 1,000 towns of 26 countries. For the time being, its Presidency is in Heidelberg (Germany) but it has Directorates in 11 other towns (Bielsko-Biała, Braşov, Cork County, Delft, Heidelberg, Helsinki, Leicester, Pamplona, Paris, Salerno, Växjö), as well. Their main targets are to strengthen the role played by sustainable energy and make motions to the European Union in the fields of energy, environmental protection, urban policy, and to facilitate the various initiatives and exchanges of experiences.

Contact:

[www.energie-cites.eu/-ABOUT-1](http://www.energie-cites.eu/-ABOUT-1), square de Meeûs

BE-1000 Bruxelles

Phone: +32 (0)2 504 78 60

Fax: +32 (0)2 504 78 61

Main office: +33 3 81 65 36 80

Bruxelles office: +32 2 504 78 60

### **Resilient City**

The Resilient City Association unites architects, urban planners, engineers and landscape architects whose goal is to elaborate creative, practical, and feasible plans and building strategies. By these, they want to contribute to getting prepared for the most important challenges of our century, namely, problems which can essentially manifest themselves in the future, among them; the effects of climate change and the energy problems caused by mankind. They publish these strategies on their website. Their fundamental mission is to increase awareness, first and foremost, by collecting studies, research materials, and to introduce such changes in the fields of planning and fulfilment as the capabilities of towns increase and they become able to adapt themselves to the economic, social and cultural impacts of energy and climate change.

Contact:

[www.resilientcity.org](http://www.resilientcity.org)

### **Climate Alliance / Klimabündnis**

Climate Alliance was established in 1990. Currently, more than 1,500 European towns are its members from 17 European countries. The organisational structure and its influence are the strongest among German-speakers in Italy and Spain.

The towns participating in the Alliance commit themselves to a sustainable and climate-friendly urban development. In order to facilitate its achievement, the Climate Alliance makes regular exchanges of experiences in the form of conferences, by operating an internet platform, and organising joint projects. The Climate Alliance assists the towns participating or wishing to participate in its work and wishing to achieve their climate friendly goals, by regular consulting, recommendations as to the action plants they adopt, and the evaluation of the impacts of interventions on the participants' level. The centre of the Climate Alliance is in Frankfurt am Main, but in order to facilitate contact and coordination it has contact points in several countries.

**Contact:**

Climate Alliance / Klimabündnis / Alianza del Clima e.V.  
 Galvanistr. 28. D-60486 Frankfurt am Main  
 Phone: (49) 69 717139 0  
 Fax: (49) 69 717139 93  
 E-mail: europe@klimabuendnis.org  
 www.klimabuendnis.org

**European Urban Knowledge Network (EUKN)**

The European Urban Knowledge Network is aimed at sharing urban knowledge and practices. It has been initiated by seventeen EU member states, the EUROCITIES network, the URBACT Programme, and the European Committee. Its primary goal is to share urban knowledge (theoretical, strategic and concrete development experiences) with the European community of professionals and to create such connections between the European towns that would contribute to their sustainable development. The Network was established in 2005 by fifteen European states with the consent of their ministers responsible for urban planning. Currently, towns of seventeen EU member states participate and, besides the member states and based on the initiative of the European Commission, also EUROCITIES and URBACT take part. The basis of the work of EUKN is the electronic library, which collects knowledge on urban development based on the uniform quality standards and norms regulating contents. In the monthly average more than 90,000 visitors read the 5,000 items — case studies, strategies and analyses — stored in this library.

**Contact:**

www.eukn.org  
 www.eukn.hu

**Transition Network**

In response to the twin pressures of Peak Oil and Climate Change, some pioneering communities in the UK, Ireland and beyond are taking an integrated and inclusive approach to reduce their carbon footprint and increase their ability to withstand the fundamental shift that will accompany Peak Oil. Transition model is a loose set of realworld principles and practices that have been built up over time through experimentation and observation of communities as they drive forward to build local resilience and reduce carbon emissions.

Transition Network is a charity formed to build upon the groundbreaking work done by Kinsale (Ireland), Totnes (UK) and the other early adopters of the Transition model. Their mission is to inspire, inform, support, network and train communities as they consider, adopt and implement a Transition Initiative. They are building a range of materials, training courses, events, tools & techniques, resources and a general support capability to help these communities. Till March 2011, 362 official transition initiatives registered from all around the world.

**Contact:**

www.transitionnetwork.org

**Cittaslow**

The movement was launched in 1999 by Paolo Saturnini, the mayor of Greve of Chianti, a township in Toscana, and the criterion system consisting of 55 points was elaborated in Orvieto. The term 'slow city' is to cover the creation of re-humanised, viable environmental conditions that are more correct from an ecologic point of view, reconsidering of the production of local foods and the relations of the settlement, renaissance of the public places (fora). The criteria outline the picture of a town which cannot have a population in excess of 50,000 people provides for the mitigation of the load from the traffic and noise, has a higher ratio of green surfaces, prefers locally manufactured products, keeps its traditions alive, has high-quality public spaces, theatres, shops, restaurant, historical monuments and unspoiled landscape. At the moment the movement has 125 members in Italy, Austria, Australia,

United Kingdom, Germany, Norway, the Netherlands, Spain, Sweden, Switzerland, Poland, Republic of Korea, the USA and Canada.

Contact:

[www.cittaslow.org](http://www.cittaslow.org)

[www.cittaslow.org.uk](http://www.cittaslow.org.uk)

#### **Large Cities Climate Leadership Group (C40 cities)**

This organisation was established in October 2005, when the heads of 18 megapolises met in London to discuss the impacts of global warming and climate change and to cooperate to handle them. They made a promise, evidenced by their signatures, that in the future they shall cooperate to reduce the emission of greenhouse gases and to improve energy efficiency. At the moment, 40 towns are the members of this organisation and 19 are on the list of those who wish to join. The members launched a website which shows the climate strategies of several selected towns, and a number of practical examples are shown (ideas in connection with buildings, energy, water, the various types of waste and lighting), that can contribute to the achievement of the above goals.

Contact:

[www.c40cities.org](http://www.c40cities.org)

### **III. INDICATOR KITS: OPTIONS TO MEASURE URBAN CLIMATE CHANGE AND INTERVENTION**

The goal of the following indices is to characterise the impacts of climate change, and the goals and measures aiming their mitigation in an objective, measurable and valuable manner. The various indices shall be applied at various levels ranging from international to local, and must comply with different requirements and criteria. The goal of the creation of these indices and the way how they approach the problems can be quite different. Their applicability, sensitivity (changeability), reliability and measurability can be different too. This is especially true for the complex indicator, which, as a rule, contains information on several disciplines which are interrelated with each other only at certain points. Nowadays all and more such indices are defined; their use entails a continuously and dynamically developing methodology. Punctually for this reason, we did not attempt to give a comprehensive introduction. Instead, we attempted to present only the most well-known and widespread indexes. Based on the above, there are several uncertainties in connection with their use, and based on one single indicator one cannot get a realistic picture, and the results shall not be certainly coherent if different data shall be used. With proper care, however they can be a very useful tool and render a direct help in the setting of tasks.

#### ***Compound Indexes***

##### **European Green City Index**

In 2009, the Economist Intelligence Unit a research and consulting world organisation made a study surveying the environmental impacts of the megapolises of Europe. The Green City Index evaluated the performance of 30 leading European towns in 30 European countries in the field of environmental protection. The complex index takes into consideration 30 individual indices in the most divergent territories of environmental protection such as, for example, environmental management, water consumption, waste management, and greenhouse gas emission. The index characterises by a complex value each town and sets their ranking in 8 categories (CO<sub>2</sub>, energy, buildings, transport, water, waste and land use, air quality and environmental management).

*Source: [www.siemens.com/entry/cc/en/urbanization.htm?section=green\\_index](http://www.siemens.com/entry/cc/en/urbanization.htm?section=green_index)*

##### **The Germanwatch Global Climate Risk Index 2010**

The global climate change risk index shows to what extent various countries are affected by events related to or caused by weather (storms, floods, and heat waves, etc.). The basis of the index is the



NatCatService database (data covering the period between 1990 and 2008) operated by the Munich Reinsurance Company. The index processes the most reliable socio-economic data available in connection with the extreme weather events but does not take into account the increase of the sea-level and the melting of glaciers. The index makes a warning forecast for each country regarding what new exposure and injury is expectable in the given place due to extreme circumstances compared to what had to be faced there before. The indirect climatic effects (e.g., heat waves) can cause much more unfavourable direct impacts (food shortage, and drought). The less developed countries are much more affected by the harmful effects and extreme weather conditions that may be caused by climate change.

Source: [www.germanwatch.org/presse/2009-12-08e.htm](http://www.germanwatch.org/presse/2009-12-08e.htm)

### Building an Environmental Quality Index for a Big City

Munich Personal RePEc Archive is a company engaged in the coordination of reports, and vocational materials collected. One of the main topics of the study prepared by the company is the environmental quality index of buildings. This complex index has been prepared either as the linear combination of several indicators, or on the basis of the analysis of the main component and is interpreted spatially. Recommendations have been formulated according to the date and that architecture noise effects and air pollution should be studied. These characteristics can be described by subjective (statistical) and objective environmental variables (data obtained from the environmental measuring stations), and can be presented in the form of a complex environmental index containing social and economic correlations as well.

Source: [mpira.ub.uni-muenchen.de/10736/1/MPRA\\_paper\\_10736.pdf](http://mpira.ub.uni-muenchen.de/10736/1/MPRA_paper_10736.pdf)

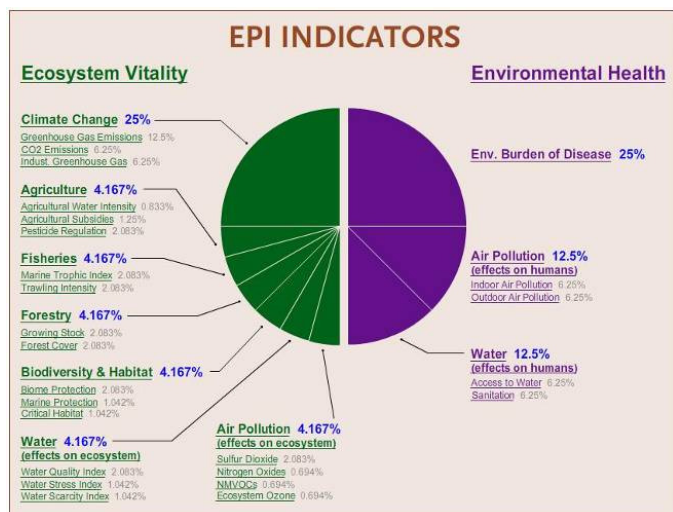
### Global City Indexes Programme (GCIF indexes)

The goal of the programme is the elaboration of a web-based database whereby the life quality and the quality of the services of various cities can be compared. There are 22 themes in this database, among them environmental protection, energy, regional planning and health. These main topics are described by 94 indexes, of which 27 are basic, 26 auxiliary indexes and 41 deal with the future.

Source: [www.cityindexes.org/Default.aspx](http://www.cityindexes.org/Default.aspx)

### The 2010 Environmental Performance Index

The 2010 Environmental Performance Index (EPI) sets the rank of 163 countries on the basis of the Environmental Performance Index, which contains environmental and public health indices. For example, per capita emission of greenhouse gases, and ratio of woods, water shortage index, and number of threatened species are shown. This index helps confirm how close the established environmental policies of the various countries are to one another.



Source: [www.greenfudge.org/2010/04/25/the-2010-environmental-performance-index-has-been-released.epi.yale.edu](http://www.greenfudge.org/2010/04/25/the-2010-environmental-performance-index-has-been-released.epi.yale.edu)

### Environmental Disaster Risk Indexes

The Secretariat of International Strategy for Disaster Reduction (ISDR) of the UNO launched the Prevention web homepage in November 2005 for sharing its information basis on the mitigation of

disaster risks for the experts but also for the public. The target audience of the homepage are basically local people who are furnished with information in this way on the main disaster territories and the mitigation of the extent of disaster. On the Prevention web homepage, one can find the risks, hazards of the natural disasters (tropic cyclones, floods, landslides, tidal waves, droughts) for several countries. The disaster risk index includes the probability of these events and their negative impacts, as well. The index also contains the number of people living in the exposed territory, the number of events, and the potential GDP fall.

Source:

[www.preventionweb.net/english/countries/europe/hun/?x=10&y=8](http://www.preventionweb.net/english/countries/europe/hun/?x=10&y=8)

[www.preventionweb.net/files/11775\\_UNISDRBriefingAdaptationtoClimateCh.pdf](http://www.preventionweb.net/files/11775_UNISDRBriefingAdaptationtoClimateCh.pdf)

### **Ecological Footprint and Ecological Deficit**

The ecological footprint measures the size of territory occupied by mankind, a nation, or certain social groups from the Earth surface for their sustenance, or on which they have direct impacts. These territories are the ones from where the resources (food, energy, etc.) necessary for maintaining human life originate, and where these can be grown without damage. Based on these, the following types of territories have been set:

- arable land (secure foodstuffs, fodder, fibres and oil);
- pastures (people use the meat, skin, wool and milk of the grazing animals);
- fisheries (fish and sea food come from there);
- woods (provide wood, wood fibre and firewood);
- carbon-absorbing regions, e.g., forests (required for binding CO<sub>2</sub> emitted as a result of the combustion of fossil fuels (coal, natural gas and oil));
- nuclear energy equivalent (the area which is required to bind the same quantity of CO<sub>2</sub> emitted as a result of the combustion of fossil fuels);
- constructed Earth surface occupied by infrastructure (roads, buildings, water power stations, etc.).

The ecological deficit is the difference between the actual available ecologically productive territory and the ecological footprint. The dependence index shows at what rate the economic and social existence of a region relies on local resources and at what rate it relies on the imported materials and energy. The examined components are: indices related to the management of local water resources and water supply, territory of soil per capita used for agricultural production as against non-productive territories (forests, natural conservation areas, where no agricultural activities are carried on), breakdown of all of the employed of the local community as per place of employment, breakdown of the budget of the municipality in terms of internal and external revenues, and the participation of the municipality and private owners in the public utilities.

**Statistical indices and indicators**

	<b>Name of indicator</b>	<b>Measurement unit</b>	<b>Chapters</b>
1	Annual winter and summer medium temperature and its changes	°C	1.2. Consequences of the climate change in European regions
2	Annual winter and summer rainfall quantity and its changes	millimetre	
3	Change in the number of drought days	day	
4	Change in the number of freezing days	day	
5	Annual number of extreme rainfall events	case	
6	Change of the groundwater level	cm	
7	Annual number of days with snow cover	day	
8	Frequency of showers	case/annum	
9	Frequency of hail	case/annum	
10	Highest absolute temperature of the year	°C	
11	Lowest absolute temperature of the year	°C	
12	Largest annual amount of rainfall	mm	
13	Smallest annual amount of rainfall	mm	
14	Highest amount of rainfall in 24 hours	mm	
15	Highest amount of rainfall in 60 minutes	mm	
16	Strongest blast of wind	m/s	
17	Annual number of snowy days	day	
18	Highest daily minimum temperature	°C	
19	Highest daily average wind speed	m/s	
20	Memberships in climate-aware networks and organisations	piece	2. Climate-friendly urban governance for forming economic and other urban policies
21	Number of climate-aware legislation and policy initiations	piece/annum	
22	Rate of green (climate-aware) public procurement actions	%	
23	Rate of public companies run by the city having climate-aware business policy	%	
24	Rate of divisions at the municipality having climate protection and adaptation tasks officially	%	
25	The total number of partners (individuals and organisations) in climate partnership initiations	piece	
26	Rate of local enterprises and firms taking part in climate partnership initiations	%	3. Integrated strategic planning for climate-friendly cities
27	Aims towards climate protection or climate adaptation at high decision making levels (policy level)	yes/no	
28	Rate of city plans and programmes incorporating principles on climate protection and adaptation to climate change	%	
29	Rate of strategic environmental assessments of the city's planning processes integrating the issue of climate change	%	
30	Number of involved partners (individuals and organisations) into climate planning actions	piece	
31	Housing density	person per hectare	
32	Height of buildings	floor	

	Name of indicator	Measurement unit	Chapters
33	The number of days on which in a three-year period (on rolling average) per annum measures had to be ordered concerning the information grade of the smog alert or the rate of alert.	day	4. Climate friendly urban structure
34	The size of covered/built in (biologically inactive) surfaces of the green areas compares to the total green area	%	
35	Change of the quantity of green areas (biologically active) in the past 5 (-10) years	%	
36	The size of green roofs	m <sup>2</sup>	
37	The size of protected nature areas of local interest	ha	
38	Registered, protected species	piece	
39	The share of green areas and nature protection areas in the vicinity of larger than 500 m	%	
40	The amount of costs spent on the maintenance of protected nature areas of local interest	currency	
41	Number of parking lots established in order to improve access to nature protection areas	piece	
42	Forest density of the settlements	%	
43	Share of protected forests	%	
44	Area of public parks	ha	
45	Number of public parks	piece	
46	Total size of community parks and public spaces	ha	
47	Total size of green surface of public purpose	ha	
48	Green area per person	m <sup>2</sup> /capita	
49	Aggregated green area cover of the settlement	%	
50	Share of domestic plants in public parks	%	
51	Share of strongly allergic plants in public parks	%	
52	Share of plants damaged from health point of view	%	
53	Total number or park objects	piece	
54	Number of park object service relaxation (benches, wells, lighting, waste bins) in public green areas	piece	
55	Number of playgrounds in public green areas	piece	
56	Number of sports facilities (sports courts, table tennis and chess tables, etc.) in public green areas	piece	
57	Visitors in public green areas	person	
58	Share of damaged plants as the result of vandalism	%	
59	Share of damaged park objects as the result of vandalism	%	
60	Number of venues held in public green areas in the vegetation period	case	
61	Change of the real values of amounts spent on the treatment of green areas	currency	
62	Number of persons participating in the maintenance/protection works of green areas	person	
63	Labour force expenditure falling on one unit of green area	work hour/m <sup>2</sup>	
64	Size of areas drawn out of cultivation	ha	
65	Share of areas drawn out of cultivation	%	

	Name of indicator	Measurement unit	Chapters	
66	Balance of land use	ha	4. Climate-friendly urban structure	
67	Functional distribution of forest area	%		
68	Composition of forests by tree species	%		
69	Share of the trees, which are losing their leaves in the forest	%		
70	Number of park objects in the forest	piece		
71	Number of reported damaged caused by wild animals	case		
72	Number of reported damage caused by storms	case		
73	Number of reported forest fires	case		
74	Number of surveyed brown field areas	piece		
75	Size of surveyed brown field areas	ha		
76	Number of surveyed areas to be mitigated separately in brown field areas in the landscape wounds	piece		
77	Size of surveyed areas to be mitigated separately in brown field areas in the landscape wounds	ha		
78	Number of mitigated areas separately in brown field areas and landscape wounds	piece		
79	Size of areas mitigated from damages separately in brown field areas in the landscape wounds	ha		
80	Visitors in the forests	person		
81	Size of green areas established on brown field areas	ha		
82	Share of utilised brown field areas	%		
83	Number of constructed sports fields	piece		
84	Length of constructed running tracks	km		
85	Number and share of local, landscape-specified products with trade mark	piece, %		
86	Number of heritage inventories of the settlement	piece		
87	Number of historical monuments under local protection	piece		
88	Number of buildings proposed for local protection	piece		
89	Number of world heritage area	piece		
90	Size of world heritage area	ha		
91	The amount spent on an annual basis for refurbishment and condition maintenance of protected buildings being managed by the settlement itself	currency		
92	The amount of funding intended to be spent by the town for the refurbishment of locally protected buildings	currency		
93	Quantity of waste collected from green areas	ton		
94	The number of exceeding the limit value ( $100 \mu\text{g}/\text{m}^3$ ) by the hour concerning nitrogen-dioxide pollution	piece		5. Climate friendly urban transport
95	The annual average concentration of PM10 (floating dust with the diameter of 10 micrometre)	$\mu\text{g}/\text{m}^3$		
96	The number of exceeding the limit value ( $100 \mu\text{g}/\text{m}^3$ ) by the 24-hour concerning nitrogen-dioxide pollution	case		
97	Pollution by fine flowing dust (PM2.5)	$\mu\text{g}/\text{m}^3$		

	Name of indicator	Measurement unit	Chapters	
98	Bicycle and pedestrian traffic in proportion of the local traffic	%	5. Climate friendly urban transport	
99	Costs spent on the reduction of air pollution	currency		
100	Number of vehicles	piece		
101	Share of utilising bio-fuel for transportation purposes	%		
102	The distribution of passenger transportation	%		
103	Greenhouse gas emission of transportation	ton CO <sub>2</sub> equivalent		
104	The total amount of sold electrical energy; of this separately to the households	TWh	6. Low carbon energy management of the settlement	
105	Total gas sales of this separately to households	PJ		
106	Gas consumption per household costumers	GJ/household		
107	Greenhouse gas inventory of towns (CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O emission and consolidation)	megaton/CO <sub>2</sub> equivalent		
108	Electricity production generated from primary energy carriers (e.g. agricultural products)	ton		
109	Primary energy generated from renewable energy source	ton oil equivalent		
110	The formation of the utilisation of renewable energy carriers	%		
111	Share of renewable energy in electricity generation	%		
112	Emission of greenhouse gases	ton CO <sub>2</sub> equivalent		
113	The sustainable heat energy demand of one apartment	kWh/m <sup>2</sup> annum		7. Climate-friendly architectural solutions
114	The sustainable electrical energy demand of one apartment	kWh/day		
115	Quantity of generated waste	l/capita		
116	Size of greening on facades	m		
117	Household water consumption/annum	m <sup>3</sup>		
118	The share of dwellings with public sewerage	%		
119	District heating provided for households	PJ		
120	Average electricity consumption per household consumer	MWh/household		
121	Average district heating consumption per household consumer	GJ/household		
122	Number of municipality institutions holding energy audit	U		
123	Temperature indicators of the heat island effect of the settlement	-		
124	Number of dwellings built	piece		
125	Share of dwellings built newly	%		
126	Share of the re-utilised construction waste	%		
127	Drinking water demand	l/capita	8. Adaptable water management and urban communal infrastructure	
128	Rainwater demand	l/capita		
129	Proportion of selective waste collection	%		
130	Waste transported to landfills	ton/annum		
131	Valuation of under surface waters in compliance with the Directive of the Water Framework	-		
132	Valuation of surface waters in compliance with the Directive of the Water Framework	-		



	Name of indicator	Measurement unit	Chapters	
133	Number of drinking water wells	piece	8. Adaptable water management and urban communal infrastructure	
134	Distribution of water generating plant by water source	-		
135	Length of drinking public water network	km		
136	Drinking water production	m <sup>3</sup>		
137	Quantity of provided water	m <sup>3</sup>		
138	Total water consumption	m <sup>3</sup>		
139	Length of public sewerage network	km		
140	Collected wastewater and rainwater	m <sup>3</sup>		
141	The distribution of the treatment of collected water quantity among the wastewater treatment plants	m <sup>3</sup>		
142	The share of biological and tertiary wastewater treatment	%		
143	Length of unified system of rainwater collection	km		
144	Length of separated system of rainwater collection	km		
145	Other rainwater collection solutions (thickening)	number of involved dwellings		
146	Open-trench rainwater collecting system	km		
147	Length of ditch system and small water flows	km		
148	The proportion of area keeping the rainwater on sport with surface drainage	%		
149	Existence of the quality control system of rainwater	-		
150	Application of rainwater utilisation systems	-		
151	Urban solid waste per capita	kg/capita		
152	Share of solid waste collected selectively	%		
153	Share of urban solid waste put in landfills	%		
154	Share of urban solid waste incinerated	%		
155	Share of the utilisation in the material of green and bio-waste	%		
156	Share of the utilisation of wastewater sludge	%		
157	Number of waste yards	piece		
158	Number of selective waste collection points	piece		
159	Surface and under-surface water abstraction	m <sup>3</sup> /annum		
160	Share of people are connected to sewerage systems	%		
161	Share of the population living in areas provided with natural type of wastewater treatment	%		
162	Healthy life years and life expectancy at age 35, by type of settlement	year		9. Preparing for disaster management and health care
163	Number of bronchitis sicknesses	piece		
164	Healthy life years and life expectancy at birth	year		
165	Share of children struggling with chronic bronchitis and asthma illnesses	%		
166	Change of the air hygienic index, Number of days of 3 <sup>rd</sup> and 4 <sup>th</sup> grade	day		
167	Allergic species in public spaces covered with plants	piece/m <sup>2</sup>		

	Name of indicator	Measurement unit	Chapters	
168	The annual total pollen concentration of weeds	piece/m <sup>3</sup>	9. Preparing for disaster management and health care	
169	Monthly change of the total pollen concentration	piece/m <sup>3</sup>		
170	Annual number of days with concentration of 30 pollen grade/m <sup>3</sup>	day		
171	NO <sub>2</sub> pollution along bicycle roads	µg /m <sup>3</sup>		
172	The quantity parameters of drinking water targeted for human use	mg/l		
173	The number of exceeds of limit values specified in the legal regulation in case of the individual pollutants	case		
174	Number of heat waves	day		
175	Number of heat days	day		
176	Number of additional deaths as the result of the heat waves	case		
177	Number of days of UV alarm	day		
178	Number of deaths due to freezing	case		
179	Number of deaths due to melanoma	case		
180	Number of detected and reported new melanoma cases per 10000 inhabitants	case		
181	The risk of the population by the atmosphere solid material emission	µg/m <sup>3</sup>		
182	The risk of the population by ozone emission	µg/m <sup>3</sup>		
183	Ageing index (60-x years/0-14 years)	%		
184	Number of health service centres operating at the settlements	piece		10. Creation of climate-conscious attitude and lifestyle
185	Number of persons participating at training preparing for emergency situations (heat wave, flood)	person		
186	Existence of forecast or rioting system concerning emergency situations (storm surge, flood, heat wave)	yes/no		
187	Number of visitors in environment protection areas	person		
188	Number of awareness and scientific dissemination programmes	piece		
189	Number of participants at awareness and scientific dissemination programmes	person		
190	Number of inhabitants achieved by shaping social attitudes of environment	1000 person		
191	Number of students at ecological schools	1000 person	11. Supporting deprived groups in adapting to climate change	
192	Number of employees participating in environment protection training in Mayor's offices and municipality institutions	person		
193	Average number of persons per dwelling	capita		
194	Number of disabled people	person		
195	Share of persons receiving social support	%		
196	Share of persons living in poverty	%		
197	Funding provided for deprived groups for the purposes of energy efficiency and construction	currency		
198	Migration balance	person		
199	Flood control costs	currency		
200	Extent of flooded area	hectare		

	Name of indicator	Measurement unit	Chapters
201	Frequency of forest fires in the urban and suburban areas	piece/year	12. Economic effects and the enhancement of urban economy
202	Irrigation costs of the public parks, urban green areas	currency	
203	Changes in the average heating costs	currency	
204	Changes in the real estate prices	currency	
205	Ratio of products sold locally	%	
206	Amount of recycled waste	m <sup>3</sup>	
207	Cost of road reconstruction	currency	
208	The number of factories producing alternative energy in the city	piece	
209	Number of factories producing environmentally friendly products	piece	
210	Number of factories applying green technology	piece	
211	Ratio of operating environmentally friendly enterprises	%	
212	The number of public workers at building renovations	person	
213	The city's environmental tax revenues	currency	
214	Public money spent on environmental protection	currency	
215	Changes in the length of tourist season	day	
216	The change in the number of guest nights spent in the city	piece	
217	Changes in tourism tax revenues	currency	

#### IV. GOOD PRACTICES OF URBAN CLIMATE EFFORTS – CONTRIBUTIONS OF EUROPEAN CITIES AND STATES

##### *Good practices included in the handbook*

	Best practice	Organisation	Country	City	Topic
1	MODEL project (Management Of Domains related to Energy in Local authorities)	Energy Cities	International	International	Settlement governance
2	London Climate Change Partnership		Great Britain	London	Settlement governance
3	Public procurement for environmentally friendly transportation	Madrid City Council	Spain	Madrid	Settlement governance
4	KLIMP (Climate Investment Programmes)	Swedish Government	Sweden	National level	Settlement governance
5	Finnish municipalities for the handling of climate change	Association of Finnish Local and Regional Authorities (AFLRA)	Finland	National level	Settlement governance
6	City of Madrid Plan for the Sustainable Use of Energy and Prevention of Climate Change	Madrid City Council	Spain	Madrid	Integrated strategic planning
7	Developing individual climate plans		France	Marseille	Integrated strategic planning
8	Integrated Urban Development Strategy		Hungary	National level	Integrated strategic planning
9	Climate Proof Adaptation Strategy	City of Rotterdam	Netherlands	Rotterdam	Integrated strategic planning
10	Regional Climate Change Plan and ECO2 Programme	City of Tampere	Finland	Tampere	Integrated strategic planning

	<b>Best practice</b>	<b>Organisation</b>	<b>Country</b>	<b>City</b>	<b>Topic</b>
11	Valladolid - III Action Plan of Local Agenda 21	City Council of Valladolid	Spain	Valladolid	Integrated strategic planning
12	GANG-group	GANG group	Hungary	Budapest	Urban structure
13	Green Ring	Geschäftsstelle Grüner Ring Leipzig c/o ISIP Weiterbildungsgesellschaft mbH	Germany	Leipzig	Urban structure
14	London 2012 project – brownfield investment	London Organising Committee for the Olympic Games	Great Britain	London	Urban structure
15	Urban farming	Dott 07	Great Britain	Middlesborough	Urban structure
16	A network for the cultivation around the city in France	Terres en Villes	France	National level	Urban structure
17	Urban regions		Netherlands	National level	Urban structure
18	Functional urban structure		Netherlands	Nijmegen	Urban structure
19	The city building towards indside' Hammarby Sjöstad (eco-district)	City of Stockholm / Glashus Ett	Sweden	Stockholm	Urban structure
20	Hammarby Sjöstad - A unique environmental project in Stockholm	City of Stockholm	Sweden	Stockholm	Urban structure
21	Light train	Veolia Transport Ireland Ltd	Ireland	Dublin	Transport
22	PEDIBUS	Magistrat der Landeshauptstadt Freistadt Eisenstadt	Austria	Eisenstadt	Transport
23	Route planner and CO <sub>2</sub> emission calculator	Helsinki Region Traffic Authority	Finland	Helsinki	Transport
24	Buses driven by biogas	Lille Metropole	France	Lille	Transport
25	Hybrid taxis	Rumeni Taxi	Slovenia	Ljubljana	Transport
26	Bicycle change network	City of Lyon	France	Lyon	Transport
27	Swiss Traffic Federation		Switzerland	National level	Transport
28	Traffic-calming	City of Nuremberg	Germany	Nuremberg	Transport
29	Promoting public and individual non-motorised transport in gaining ground	Trondheim municipality	Norway	Trondheim	Transport
30	Utilization of biogas discharging from waste water sludge	EYDAP-Akrokeramos Keratsiniou	Greece	Athens	Energetic
31	Biomass central heating plant	Pro EcoEnergia Ltd.	Bulgaria	Bansko	Energetic
32	Solar Thermal decree	Barcelona Local Energy Agency	Spain	Barcelona	Energetic
33	Modernization of public lighting	Municipality of Brasov – Office for Public Lighting	Romania	Brasov	Energetic
34	Establishment of the autonomic energy system	European Center of Renewable Energy Güssing GmbH	Austria	Güssing	Energetic
35	Geothermic district heating system	HVSZ Heating Servise Ltd.	Hungary	Hódmezővásárhely	Energetic
36	Renewable Energy Sources (RES) Champions League	Renewable Energy Sources (RES) Champions League	European	International	Energetic
37	Biomass central heating plant	PEC Lubań Sp. z. o. o.	Poland	Lubań	Energetic
38	Low capacity hydropowers	Praterkraftwerk GmbH	Germany	Munich	Energetic
39	Auroralia	LUCI	European Award	National level	Energetic
40	Pico wave energy centre	Wave Energy Centre	Portugal	São Miguel	Energetic

	<b>Best practice</b>	<b>Organisation</b>	<b>Country</b>	<b>City</b>	<b>Topic</b>
41	Cogeneration power plan	Energie AG Oberösterreich Kraftwerke GmbH	Austria	Timelkam	Energetic
42	Solar energy utilization	Solarstiftung Ulm/Neu-Ulm	Germany	Ulm	Energetic
43	Establishment of a combined wind-hydrogen system	Hydro Oil & Energy – Utsira Project	Norway	Utsira	Energetic
44	Westmill Wind Farm project	Westmill Wind Farm Co-operative	Great Britain	Watchfield	Energetic
45	Monument protection after flood		Czech Republic	Cesky Krumlov	Architecture
46	Green roofs	City of Copenhagen, Technical and Environmental, Parks and Nature	Denmark	Copenhagen	Architecture
47	Passive school	Architekturbüro Raum und Bau GmbH	Germany	Dresden	Architecture
48	Scarlet Hotel- complex sustainable architectural solutions	Scarlet Hotel Ltd	Great Britain	Mawgan Porth	Architecture
49	Programme for improving energy efficiency in Slovakian households	Ministry of Transport, Construction and Regional Development	Slovakia	National level	Architecture
50	Construction consultancy and loans	EOS Group	Belgium	Ostend	Architecture
51	The first qualified passive house in Hungary	Intervallum Ltd.	Hungary	Szada	Architecture
52	Effects of climate change on the building stock		Hungary	Tatabánya	Architecture
53	A city quarter made of wood	City of Vaxjo	Sweden	Vaxjo	Architecture
54	Sustainable water management	County Council of Cambridgeshire	Great Britain	Cambourne	Water and communal infrastructure
55	Flood action plan of Greve	Municipality of Greve	Denmark	Greve	Water and communal infrastructure
56	Complex waste treatment	NSR AB	Sweden	Helsingborg	Water and communal infrastructure
57	Usage of sewage	Symboylio Apocheteyseon Larnakas (Larnaca Sewerage and Drainage Board)	Cyprus	Larnaca	Water and communal infrastructure
58	Thames Estuary 2100 project – Managing flood risk through London and the Thames estuary	Environment Agency	Great Britain	London	Water and communal infrastructure
59	Gómeznarro Park, Madrid, park refurbishment with storm water retention	Municipality of Madrid	Spain	Madrid	Water and communal infrastructure
60	Selective communal waste collection	Riudecanyes City Council	Spain	Riudecanyes	Water and communal infrastructure
61	Use of sewage in a nursery garden	Municipality of Halmstad, Technical Department	Sweden	Tönnersjö	Water and communal infrastructure
62	Real-time regulation	Büro des Oberbürgermeisters, Wiener Kanalisation, Abwasser Management	Austria	Vienna	Water and communal infrastructure
63	Torreale - usage of treated wastewater as drinking water	Intermunicipal Water Company of the Veurne Region (I.W.V.A.)	Belgium	Wulpen	Water and communal infrastructure

	Best practice	Organisation	Country	City	Topic
64	Flood mitigation plan	Institute of Meteorology and Water Management	Poland	Gorzanów	Health and disaster management
65	Heat wave alert system	City of Paris	France	Paris	Health and disaster management
66	R.A.C.E.S. campaign for climate consciousness	City of Florence	Italy	Florence	Social attitude forming
67	CO <sub>2</sub> Monitoring Tool for local authorities	European Climate Alliance	International	International	Social attitude forming
68	Climate Star	European Climate Alliance	European	International	Social attitude forming
69	European Green Capital Award	European union	European	International	Social attitude forming
70	Green school project	An Taisce	Ireland	National level	Social attitude forming
71	Step2Save' – Energy-efficiency advice for city tenants	Municipality of Amsterdam, Environmental Protection and Architectural Department	Netherlands	Amsterdam	Deprived groups
72	Targeted energy-efficiency support system	Vzw Recyclant	Belgium	Antwerpen	Deprived groups
73	City of renewable energies	Stadt Prenzlau	Germany	Prenzlau	Deprived groups
74	Local and regional economy development joined to the Amber Trail	Amber Trail Greenways	European	International	Economy
75	Manchester – Co <sub>2</sub> collective action on climate change	Manchester City Council	Great Britain	Manchester	Economy
76	Climate Friendly Business' Movement	Climate Friends' Circle	Hungary	Pilis	Economy
77	Hydrogen Systems Laboratory (HYSYLAB)	HYSYLAB	Italy	Turin	Economy
78	A new model for financing emission cuts	The Norwegian Association of Local and Regional Authorities	Norway	National level	Economy

***Good practices, which could not be included in the manuscript of the Handbook due to the physical limits of length***

	Best practice	Organisation	Country	City	Topic
1	Climate protection		Austria	Graz	Settlement governance
2	Handbook for local decision makers to widen their knowledge about climate	PORSENNA o.p.s.	Czech Republic	Porsenna o.p.s.	Settlement governance
3	Climate Strategy for the Region of Copenhagen	Region Hovedstad – The Copenhagen Region	Denmark	Region of Copenhagen	Settlement governance
4	'Rakvere wants to be the most energy-efficient town in Estonia'	REC Estonia	Estonia	Rakvere	Settlement governance
5	Regional climate change plan	Greater Mulhouse	France	Mulhouse	Settlement governance
6	Automatic energy monitoring and coordination to save money	Leicester City Council	Great Britain	Leicester	Settlement governance



	<b>Best practice</b>	<b>Organisation</b>	<b>Country</b>	<b>City</b>	<b>Topic</b>
7	EXOIKONOMO (integrated strategic planning at local level)	Ministry of Environment, Energy and Climate Change/Department for planning and coordination of NSRF co-financed actions (Energy/Climate Change)	Greece	National level	Settlement governance
8	PRASINI EPIXEIRISI 2010 (green enterprises 2010)	-	Greece	National level	Settlement governance
9	Heat and UV-alarm plan	-	Hungary	Tatabánya	Settlement governance
10	URBAN-NET	URBAN-NET	International	International	Settlement governance
11	Sustainable energy using for communities	SEAI – Sustainable Energy Authority of Ireland	Ireland	Dundalk	Settlement governance
12	Applying an integrated approach to increase energy efficiency	Brocēni Region Council	Latvia	Broceni	Settlement governance
13	Display campaign	Kaunas regional energy agency	Lithuania	Kaunas	Settlement governance
14	Baerum uses market power	Baerum municipality	Norway	Baerum	Settlement governance
15	Energy saving and climate protection in Kristiansand	Kristiansand municipality	Norway	Kristiansand	Settlement governance
16	Green Wave – Co-operation of local stakeholders to reduce energy use	Oslo municipality	Norway	Oslo	Settlement governance
17	Climate and Energy Strategy	Sandnes municipality	Norway	Sandnes	Settlement governance
18	Energy efficiency actions focusing on geothermal energy	Sarpsborg Kommune	Norway	Sarpsborg	Settlement governance
19	A more efficient energy management	Municipal Office in Bielsko-Biała	Poland	Bielsko-Biała	Settlement governance
20	Network of urban entertainers against the climate change in the city of albacete	City Council of Albacete	Spain	Albacete	Settlement governance
21	Agenda 21 Local of the Municipality of Almería	City Council of Almeria	Spain	Almeria	Settlement governance
22	Comprehensive sustainability strategy	City Council of Antequera	Spain	Antequera	Settlement governance
23	EURONET 50-50 50/50 European Network of Education Centres	Barcelona Provincial Council (Diputació de Barcelona) Environment Department	Spain	Barcelona	Settlement governance
24	Municipal comparison circles for waste management, street cleaning & energy efficiency in street lighting - good practice benchmarking	Barcelona Provincial Council (Diputació de Barcelona) Environment Department and Programming Service Department	Spain	Barcelona	Settlement governance
25	Covenant of Mayors support to municipalities in the province of Barcelona	Barcelona Provincial Council (Diputació de Barcelona) Environment Department)	Spain	Barcelona	Settlement governance
26	Diputación provincial de Jaén like Supporting Structure to the Covenant of Mayors: 2020 horizon	County Council Jaén	Spain	Jaén	Settlement governance

	Best practice	Organisation	Country	City	Topic
27	Creation of a local management energy agency in las palmas de gran canaria	Agencia Local Gestora de la Energía de Las Palmas de Gran Canaria	Spain	Las Palmas de Canaria	Settlement governance
28	Climate change related researches and observations for action plans	Concejalía de Vías Públicas y Entorno Natural. Ayuntamiento de LAS Rozas de MADRID	Spain	Las Rozas	Settlement governance
29	The sustainable energy action's plan of Viladecans	City Council of Viladecans	Spain	Viladecans (Barcelona)	Settlement governance
30	Comprehensive sustainability program in a particular part of the city	City Of Malmö / Sustainable Urban Development Unit	Sweden	Malmö	Settlement governance
31	Local strategy against climate change	Ayuntamiento De Murcia	Spain	Murcia	Integrated strategic planning
32	Spanish network of cities for climate	Spanish Federation Of Municipalities And Provinces	Spain	National level	Integrated strategic planning
33	Finger Plan 2007- town planning as a tool to reduce CO <sub>2</sub> emission	Danish Ministry Of The Environment, Agency For Spatial And Environmental Planning	Denmark	Copenhagen	Urban structure
34	Fornebu – green-thinking model settlement	Baerum Municipality	Norway	Baerum/ Fornebu	Urban structure
35	Parking places turn to park	Drammen Municipality	Norway	Drammen	Urban structure
36	Broset, the carbon neutral district	Trondheim Municipality	Norway	Trondheim	Urban structure
37	Reforestation of degraded areas that belongs to trading estates susceptible to become uncontrolled dumps.	Ayuntamiento De Fuenlabrada (Madrid)	Spain	Fuenlabrada (Madrid)	Urban structure
38	Green belt Puertollano's	Public Company Of Environmental Management	Spain	Puertollano	Urban structure
39	Buses driven by natural gas	City of Prostějov	Czech Republic	Prostějov	Transport
40	Center for help to organise transportation	City of Pori	Finland	Pori	Transport
41	TREATISE – eco-leading	Ministry of Economy, Competitiveness and Shipping	Greece, Netherlands, Spain, United Kingdom, Austria, Belgium, Finland, France	National level	Transport
42	MOBINET– sustainable transportation	Ministry of Economy, Competitiveness and Shipping	Greece, Sweden, Portugal, Spain, Italy	Biella-It, Aranda & Miranda (Castilla y Leon)-ES, Eskilstuna-SE, Mieres (Asturias)-ES, Thessaloniki-GR, Evora-PT	Transport
43	Routing plan for workers	National Transport Authority	Ireland	National level	Transport
44	Energy efficient buildings	Energy Agency of the Republic of Macedonia	Macedonia	National level	Energetic
45	Norway's first light train	Bergen Municipality	Norway	Bergen	Transport

	<b>Best practice</b>	<b>Organisation</b>	<b>Country</b>	<b>City</b>	<b>Topic</b>
46	Bicycle shop (fixing, renting, selling)	Fredrikstad municipality	Norway	Fredrikstad	Transport
47	Evolving separated public transport lanes	Kristiansand municipality	Norway	Kristiansand	Transport
48	Reducing CO2 emission	Kristiansand municipality	Norway	Kristiansand	Transport
49	Traffic calming	Kristiansand municipality	Norway	Kristiansand	Transport
50	Supporting electric cars	Oslo municipality	Norway	Oslo	Transport
51	Supporting the climate friendly transport of workers	Porsgrunn municipality	Norway	Porsgrunn	Transport
52	Encouraging bicycle traffic	Sandnes municipality	Norway	Sandnes	Transport
53	Transport improvement and emission reduction	Sarpsborg Kommune	Norway	Sarpsborg	Transport
54	Electric cars for municipal workers	Tromsø municipality	Norway	Tromsø	Transport
55	Bici service	Instituto de Planificación y Gestión Ambiental de Alcalá de Henares	Spain	Alcalá de Henares	Transport
56	Provincial strategy for sustainable urban mobility, mobility plans for municipalities under 50.000 inhabitants of the province of Cádiz	County Council of Cádiz	Spain	Cádiz	Transport
57	Chiclana de la Frontera, traffic	City Council Of Chiclana De La Frontera	Spain	Chiclana de la Frontera	Transport
58	Special Plan for Mobility and Infrastructures of the Municipality of León.	León City Council	Spain	Leon	Transport
59	Local Covenant for Sustainable Mobility	Ayuntamiento de Pamplona (City Council of Pamplona)	Spain	Pamplona	Transport
60	Promoting cycling	Gijón City Council	Spain	Gijón	Transport
61	Energy-independent settlement	Municipality of Dobrich	Bulgaria	Dobrich	Energetic
62	Energy efficiency developments in the town	Municipality of Gabrovo	Bulgaria	Gabrovo	Energetic
63	Exploitation of renewable energy	Rakovica Municipality	Croatia	Rakovica	Energetic
64	Promoting renewable energy sources	City of Litoměřice	Czech Republic	Litomerice	Energetic
65	Public heat planning	Danish Energy Agency	Denmark	National level	Energetic
66	Innovative and climate oriented energy management of the city council	Kirklees Council Environment Unit	Great Britain	Kirklees	Energetic
67	Bill on renewable energy sources	-	Greece	National level	Energetic
68	Local energy efficiency actions	Jekabpils city municipality	Latvia	Jēkabpils	Energetic
69	Establishing a local organisation for energy affairs	Kaunas regional energy agency	Lithuania	Kaunas	Energetic
70	District heating with 90% renewable energy	Drammen municipality	Norway	Drammen	Energetic
71	'Oil-free Oslo'	Oslo municipality	Norway	Oslo	Energetic
72	70 % energy saving on lighting	Oslo municipality	Norway	Oslo	Energetic
73	District heating with bio fuels	Skien Kommune	Norway	Skien	Energetic
74	Energy and money savings	Czestochowa Municipal Office	Poland	Częstochowa	Energetic

	<b>Best practice</b>	<b>Organisation</b>	<b>Country</b>	<b>City</b>	<b>Topic</b>
75	Actions related to renewable energies and energy efficiency	Mesto Košice	Slovakia	Kassa	Energetic
76	Municipal programme for energy supply and energy using related development plans	Razvojna agencija Sinergija, d.o.o.	Slovenia	Region of Pomurje	Energetic
77	Energy modernisation	Ayuntamiento de Archena	Spain	Archena, Murcia	Energetic
78	Execution of renewable energy and energy efficiency actions in the province of Barcelona	Barcelona Provincial Council (Diputació de Barcelona) Environment Department	Spain	Barcelona	Energetic
79	Public lighting telegestion	Mataró Municipal Council	Spain	Mataró	Energetic
80	Photovoltaic installation and use of solar thermal energy at Pompeu Fabra Library	Mataró Municipal Council	Spain	Mataró	Energetic
81	Tub Verd (Green pipe: District heating)	Mataro Energia Sostenible SA	Spain	Mataró	Energetic
82	Photovoltaic pergolas in Vallveric Park	PUMSA	Spain	Mataró	Energetic
83	Molina de Segura replacing halogen traffic lights with LED technology traffic lights	Ayuntamiento De Molina De Segura	Spain	Molina de Segura	Energetic
84	Changing traffic lights to LED technology	City Council Of Monzón	Spain	Monzón	Energetic
85	Biomass logistic management	City Council Of Puente Genil (Cordoba – España)	Spain	Puente Genil, Cordoba	Energetic
86	Rivas Solar – Enhancing solar power using	Energy Agency / City Council Of Rivas Vaciamadrid	Spain	Rivas Vaciamadrid	Energetic
87	Vigo Pabellón Berbes - solar collectors on the municipal buildings	Instituto De Planificación Y Gestión Ambiental De Alcalá De Henares	Spain	Vigo	Energetic
88	Vigo Pabellón Berbes – solar collectors on a sport arena	Instituto De Planificación Y Gestión Ambiental De Alcalá De Henares	Spain	Vigo	Energetic
89	Photovoltaic panels in schools cándido domingo	City Council Of Zaragoza	Spain	Zaragoza	Energetic
90	Project Retaler – Cross-border co-operation related to renewable energy sources	Ourense Country Council	Spain/Portugal	Province Ourense	Energetic
91	Biogas production and district heating	City of Linköping	Sweden	Linköping	Energetic
92	Rebuilding old buildings to new, energy efficient buildings	Energy Institute Hrvoje Požar	Croatia	Osijek	Architectural
93	Energy efficiency actions to improve life quality	Municipal office of Nový Lískovec	Czech Republic	Brno-Novy Liskovec	Architectural
94	The most climate friendly datacenter on the world	Helsingin Energia	Finland	Helsinki	Architectural
95	Regulating energy efficiency of buildings	-	Greece	National level	Architectural
96	EXOIKONOMISI KAT' OIKON (savings at home)	-	Greece	National level	Architectural
97	PRASINES YPODOMES 2010 (green infrastructure 2010)	-	Greece	National level	Architectural
98	The most climate friendly school in Norway	Drammen municipality	Norway	Drammen	Architectural
99	Climate friendly nursery	Fredrikstad municipality	Norway	Fredrikstad	Architectural

	<b>Best practice</b>	<b>Organisation</b>	<b>Country</b>	<b>City</b>	<b>Topic</b>
100	Supporting modern heating systems	Oslo municipality	Norway	Oslo	Architectural
101	Block of passive houses	Stavanger Kommune	Norway	Stavanger	Architectural
102	Regulation of energy efficiency of urban buildings at local level	OER - Romanian Energy Cities Network	Romania	Brasov	Architectural
103	Rebuilding a XVIII. Century house to an energy efficient office building	Bistra Hiša Martjanci-Smart House Martjanci	Slovenia	Martjanci	Architectural
104	A housing block for young adults constructed according to environmental criteria	Mataró City Council	Spain	Mataró	Architectural
105	Energy audit of council buildings	City Council of Monzón	Spain	Monzón	Architectural
106	Solar collectors on the municipal buildings	City Council of Monzón	Spain	Monzón	Architectural
107	Solar energy utilisation in swimming pools	City Council of Monzón	Spain	Monzón	Architectural
108	Water-heating with solar energy	City Council of Monzón	Spain	Monzón	Architectural
109	Water-heating with solar energy	City Council of Monzón	Spain	Monzón	Architectural
110	Sustainable rehabilitation of Novelda convent house for hostel and environmental interpretation center	Concejalía de Medio ambiente, Ayto Novelda	Spain	Novelda	Architectural
111	Municipal ordinance on the collection and usage of solar thermal energy	City Council of Santander. Councillorship of Environment	Spain	Santander	Architectural
112	Implementation of photovoltaic solar energy installations in public buildings	City Council of Santander. Councillorship of Environment	Spain	Santander	Architectural
113	Implementation of solar thermal energy installations in public buildings	City Council of Santander. Councillorship of Environment	Spain	Santander	Architectural
114	Installation of photovoltaic plaques into the public equipments	City Council of Viladecans	Spain	Viladecans (Barcelona)	Architectural
115	Building affairs, renewable energy, energy efficiency	Gårdstensbostäder	Sweden	Gardsten, Göteborg	Architectural
116	Waste transportation with pipeline	Baerum municipality	Norway	Baerum	Water and communal infrastructure
117	Nappy-aid	Fredrikstad municipality	Norway	Fredrikstad	Water and communal infrastructure
118	Shop for free stuffs	Fredrikstad municipality	Norway	Fredrikstad	Water and communal infrastructure
119	Biogas production from sewage and waste	Oslo municipality	Norway	Oslo	Water and communal infrastructure
120	Heating with waste	Porsgrunn municipality	Norway	Porsgrunn	Water and communal infrastructure
121	Establishing a place where old stuffs can be exchanged	Stavanger Kommune	Norway	Stavanger	Water and communal infrastructure
122	Exploitation of rivers	Oslo municipality	Norway	Oslo	Water and communal infrastructure
123	Midgard snake – drainage	Oslo municipality	Norway	Oslo	Water and

	Best practice	Organisation	Country	City	Topic
	system				communal infrastructure
124	Chiclana de la Frontera, waste	City Council Of Chiclana De La Frontera	Spain	Chiclana de la Frontera	Water and communal infrastructure
125	Environmental awareness about recycling	Ayuntamiento De Fuenlabrada (Madrid)	Spain	Fuenlabrada (Madrid)	Water and communal infrastructure
126	EGEMASA – biomass and waste	Egemasa	Spain	Cordoba	Water and communal infrastructure
127	Self compacting semitrailer	City Council Of Puente Genil (Cordoba – España)	Spain	Puente Genil, Cordoba	Water and communal infrastructure
128	Hidric net to recover the purified wastewater for the use in the green zones irrigation and for the streets cleaning in viladecans	City Council Of Viladecans	Spain	Viladecans (Barcelona)	Water and communal infrastructure
129	Pilot project on residential composting	City Of Chrudim	Czech Republic	Chrudim	Social attitude forming
130	School of sustainable development	Environmental Education Club – Klub Ekologické Výchovy	Czech Republic	Jilemnice	Social attitude forming
131	Danish Internet portal on climate change	Danish Energy Agency	Denmark	National level	Social attitude forming
132	Norway's most environmentally friendly school	Drammen Municipality	Norway	Drammen	Social attitude forming
133	Green days in Sarpsborg	Sarpsborg Kommune	Norway	Sarpsborg	Social attitude forming
134	Green education	Trondheim Municipality	Norway	Trondheim	Social attitude forming
135	Drawing attention to the climate change, and help to understand it	Baia Mare Municipality	Romania	Baia Mare	Social attitude forming
136	Alcalá de Henares education programme	Instituto De Planificación Y Gestión Ambiental De Alcalá De Henares	Spain	Alcalá de Henares	Social attitude forming
137	Efficient schools – Climate-conscious education in schools	Environment Area. Gijón City Council.	Spain	Gijón	Social attitude forming
138	'Efficiency Shops – Energy saving, Investing Future'	Environment Area. Gijón City Council.	Spain	Gijón	Social attitude forming
139	Are you green of heart	City Council Of Santander. Councillorship Of Environment	Spain	Santander	Social attitude forming
140	Network of viladecans' environmentally responsible shops	City Council Of Viladecans	Spain	Viladecans (Barcelona)	Social attitude forming

## Cities of good practices

**Chapters and cities**

**2. Settlement governance**  
 London, Madrid

**3. Integrated strategic planning**  
 Marseille, Rotterdam, Tampere, Valladolid

**4. Urban structure**  
 Budapest, Leipzig, London, Middlesborough, Nijmegen, Stockholm

**5. Transport**  
 Dublin, Eisenstadt, Helsinki, Lille, Ljubljana, Lyon, Nuremberg, Trondheim

**6. Energetic**  
 Athens, Bansko, Barcelona, Brasov, Güssing, Hódmezővásárhely, Luban, Munich, Sao Miguel, Timelkam, Ulm, Ulsira, Watchfield

**7. Architecture**  
 Cesky Krumlov, Copenhagen, Dresden, Mawgan Porth, Ostend, Szada, Tatabánya, Vaxjö

**8. Water management and communal infrastructure**  
 Cambourne, Greve, Helsingborg, Lamaca, London, Madrid, Riudecanyes, Tönnersjö, Vienna, Wulpen

**9. Health and disaster management**  
 Gorzaniow, Paris

**10. Social attitude forming**  
 Florence, Dublin

**11. Deprived groups**  
 Amsterdam, Prenzlau

**12. Economy**  
 Manchester, Pils, Turin

**13. Social effects**  
 Antwerp

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