

Climate Change: Integrated Strategies

Case Study Munich, Germany

0. Introduction: from sectoral to integrated approaches in urban development

Climate protection has to begin in cities, where the biggest amount of CO₂-emissions is concentrated – as well as the chance of social and technological ideas and strategies to reduce carbon and energy consumption. Climate change is today and in the future one of the most important challenges for urban development – together with fundamental social-demographic, cultural and economic changes, which do not allow simple, one dimensional or merely technical solutions. Indeed, for too long a time questions of climate change have been treated isolated mostly by experts in climatology, ecology and energy-technology etc. – and not by spatial oriented and integrative planners.

Integrated strategies are today not yet common in our cities and even less practiced on higher state levels of policy and administration. There are many programmatic papers and discussions in the last years, which focus on integration, cooperation and involvement of the civil society as preconditions for a sustainable and also climate-adapted development (see REISS-SCHMIDT 2006).

The “LEIPZIG CHARTER on Sustainable European Cities” of 2007 for instance stated: “For us, integrated urban development policy means simultaneous and fair consideration of the concerns and interests which are relevant to urban development. Integrated urban development policy is a process in which the spatial, sectoral and temporal aspects of key areas of urban policy are co-ordinated. The involvement of economic actors, stakeholders and the general public is essential...Within the cope of an integrated urban development policy, we consider the following strategies for action to be of crucial importance for strengthening the competitiveness of European cities: - Creating and ensuring high-quality public spaces..., - Modernizing infrastructure networks and improving energy efficiency...Our cities must also be able to adjust to the threat posed by climate change. Well designed and planned urban development can provide a low carbon way of accommodating growth, improve environmental quality and reduce carbon emissions. Cities can achieve these outcomes through innovative prevention, mitigation and adaptation measures which in turn aid the development of new industry and low carbon business.... – Proactive innovation and educational policies...” (BMVBS 2007).

We are facing in European cities increasing average temperatures (2-4 degrees Celsius until 2100), less but heavier rainfall and more thunderstorms in summer, more rain than snow and heavier storms in winter etc. Planning and acting under these changing climatic conditions is very urgent and important for cities and regions, for the quality of life of their citizens.

Low carbon cities are in fact feasible only as part of a comprehensive and complex strategy for a sustainable urban development. Integrated strategies are needed, closely connected with spatial, economic and social strategies of urban and regional development. Not only land-use planning, but also energy-production, and –distribution, mobility and transport, urban renewal and the life styles and social situation of citizens have to be considered, as well as urban agriculture and infrastructures for waste water treatment, water supply, storm water protection etc.

The City of Munich subscribes to an integrated urban development strategy called PERSPECTIVE MUNICH that implicates strategies for a low carbon city and is fundament for an integrated action programme for mitigation as well as adaptation to the climate change - the topic of the ISOCARP Congress 2009 and of this paper.

PERSPECTIVE MUNICH is a strategic, proactive urban development concept first adopted by the City Council in 1998 (CITY OF MUNICH 1998/2001, 2005a). As Munich is one of the few still slightly growing cities and city regions in Germany, the concept, its implementation and its impacts are instructive for other prospering city regions. An innovative, external evaluation of the PERSPECTIVE MUNICH undertaken in 2006/07 demonstrates a transferable methodology and presents strategic conclusions. (THIERSTEIN, REISS-SCHMIDT 2008). A paper about this evaluation was presented at the 44th ISOCARP congress in Dalian, China.

The following paper starts with a presentation of the profile of Munich as a prospering city, embedded in a much wider context – the mega-city region. Section 2 explains the “tripod” strategy of “*urban, compact, green*” as a means for future sustainable settlement as well as for a low carbon city with short distances and a reasonably high amount of public transport, bicycle and foot mobility. Based on that strategy, section 3 presents the new ecological guideline of PERSPECTIVE MUNICH concerning strategies and model projects for mitigation and adaptation to climate change. Section 4 presents the outline of the action programme for climate protection, which is under construction and will be approved by city council in early 2010 to meet the commitment at the European “*Convent of Mayors*” 2009 in Brussels. Section 5 concludes the case study with some lessons learnt and questions for future research as well as for necessary changes of the legal and institutional framework for low carbon cities.

1. Munich: prospering city and mega-city region

The city of Munich has an area of approximately 310 km² and nearly 1.4 million inhabitants, which translates to an average population density of 4'500 inhabitants per km². It is thus rather densely populated in western European terms, although it does not compare with southern European cities or Asian megacities. Munich is the third largest city in Germany after Berlin and Hamburg and represents one of the European powerhouses of the rapidly expanding knowledge economy. The knowledge economy forms an interdependent system of advanced producer services (APS), high-tech industries and knowledge creating institutions such as universities and research establishments (THIERSTEIN ET AL. 2006a).

With almost 90'000 students in three universities (two of which are for applied sciences), almost a dozen colleges and academies for philosophy, music, theatre, cinema and fine arts, and with nearly 50'000 researchers in private companies and public institutions, Munich, the capital of the Free State of Bavaria (one of Germany's 16 “Laender”) is a major hub of the European knowledge network. The two big state universities in Munich, the Technical University (TUM) and the Ludwig-Maximilians-University (LMU), were both awarded the title of “Universities of Excellence” in 2006; they are always on top of the rankings in Germany and among the best universities in Europe and worldwide.

The national and the European Patent Organisations, with almost 6'000 employees, the headquarters of research-associations (Max-Planck, Fraunhofer-Society, GSF etc.) and many information transfer- and technology-centres are important elements of the linkages between research and industry. The APS firms in Munich specialise in media and IT-business, business consulting and services as well as specialised law firms and thus complete the picture of a very successful knowledge region. Furthermore, the “Deutsches Museum”, Germany's leading technical and science museum provides a successful bridge between science and the public. The museum has exhibits of Munich's main manufacturing sectors such as automotive, aircraft- and space-industry, medical technologies, nano-technology and optical technology.

In order to understand Munich it is necessary to look at its role within its mega-city region. For decades the outskirts of the city has expanded into the region along the main

transportation infrastructure lines, fuelled by low mobility costs, abundance of ready-to-build land and lifestyle expectations of living “in the green”. The first suburban ring within the Munich Regional Planning Region has 2.6 million people, while the wider mega-city region (“Europäische Metropolregion München”/“Munich Metropolitan Region”) is home to more than five million inhabitants, and includes medium sized cities like Augsburg, Ingolstadt, Landshut and Rosenheim.

2. “Urban, compact, green” – integrated strategies for future settlement

Today the Munich area still retains its leading edge in Germany as the economic powerhouse of the knowledge economy, thus constantly attracting people, firms and purchasing power into the area: re-urbanisation has a new show case. According to a recent forecast the population of the city of Munich will grow by a further 5 percent by the year 2020, mainly on account of immigration from other parts of Germany and Europe. Over the same period, the population of the region is expected to grow by more than 10 percent. An increasing number of commuters are expected not only from the suburban fringe, but also from the second and third rings - a distance of up to 80 kilometres. Today, only 48 percent of the more than 300’000 job commuters use public transport. Furthermore, goods traffic, shopping and leisure trips are mostly by car with the result that the total public transport ratio between region and city is only 30%. Together with through-traffic, more than 500’000 cars cross the city boundaries every day; and by 2015 this figure could increase by up to 30 percent. Unless the trends of suburbanisation, lower densities and increasing numbers of commuters with private cars can be stopped (by an integrated policy mix of using all potentials for inner urban housing development, improvement of the regional public rail transport S-Bahn; Light Rail System) and inter-modality (Park&Ride, Bike&Ride), the consequence will be increasing congestion, noise and air pollution.

Munich assumes responsibility to deal with its resources sustainably in order not to foster unwanted urban sprawl and increasing mobility with private cars. Preventing increasing CO2-emissions, facing accelerated climate change, and the increasing costs of mobility and infrastructure for a suburbanised, low-density settlement strategy, call for active co-operation between city and regional planning authorities.

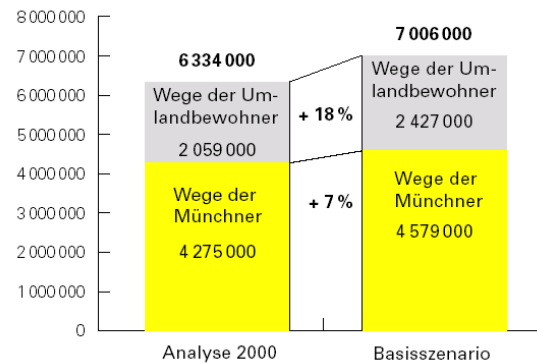
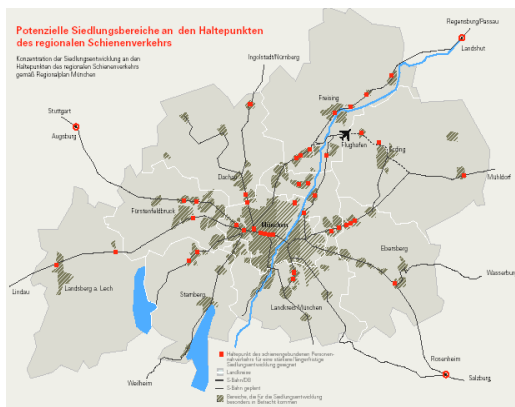


Figure 1 (left): Preferred settlement areas (red), situated at railway-stops (S-Bahn) according Regional Plan (source: City of Munich)

Figure 2 (right): Development of traffic (rides) 2000 - 2015 – city (yellow) and surrounding region (grey), scenario: Munich traffic development plan (source: City of Munich)

At local level Munich has a highly elaborated integrated development concept, namely “PERSPECTIVE MUNICH”, which is based on the principles of “sustainability and urbanity”. Some of its guidelines include economic prosperity, regional co-operation, social balance

and equity, inner city development instead of sprawl, and sustainable mobility for all citizens. The city's strategic guideline for spatial development is summarised as "compact, urban, and green". In line with its integrated, long-term-approach, which has a tradition of 45 years of integrated development planning, the guiding principles and strategies of PERSPECTIVE MUNICH focus on the city as a whole, as well as its surrounding region. Within this framework the guiding principles are given concrete form by means of path finding-projects, local and sectoral concepts, as well as action programmes. Examples include traffic development, assignment of housing and retail uses. Key to countering unwanted urban sprawl are two transverse strategies of PERSPECTIVE MUNICH: "*internal expansion*" and "*urban, compact, green*".

For more sustainability, the use of previously undeveloped, non built-up land for development of new residential areas must be sharply reduced. The focus of internal expansion is on re-use and restructuring existing built-up areas of redundant land use ("*Flächenkreislaufwirtschaft*"), for instance former industrial or railway land and former military barracks that lie within city-limits. (REISS-SCHMIDT 2007). As a result of the privatisation of the federal railway, postal and telecommunication services as well as the reduction of military force (both of the German and the Allied forces) at the beginning of the 1990s, Munich experienced a 'windfall' gain in the form of a huge amount of inner city development resources, without reducing scarce open space. More than 60'000 housing dwellings could be realised on these internal expansion sites. The existing urban context offers the chance to ameliorate neighbouring areas by new housing, more open space and a better social infrastructure. One of the city's top housing priorities is to complete 6'000 to 7'000 units annually.

The strategy - "*compact, urban, green*" - combines dense urban land use for all purposes with the promotion of mixed use developments whenever possible, instead of mono-functional commercial or housing areas. Together with the polycentric system of district-centres that spread over the entire city, the mixed use approach will also secure a diversity of social life and short distances for many citizens to get to their jobs, schools and shops. This will help to encourage walking and cycling and using public transport instead of private cars for the every-day mobility. "Internal expansion" and "compact, urban, green" seem tiny contributions to mitigating climate change and the necessity to reduce CO2 emissions. Nevertheless they are very important elements for sustainable urban growth, not only in European cities.

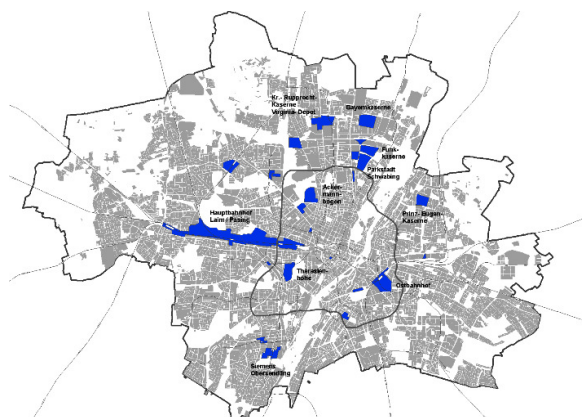
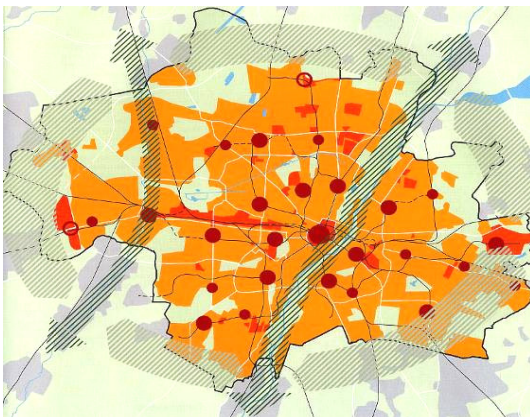


Figure 3 (left): Spatial development guideline "compact, urban, green" (source: City of Munich)

Figure 4 (right): Potential areas for internal expansion (source: City of Munich)

The compact, relatively dense built up city is not at least a precondition for low energy consumption for heating as well as for transportation. Only a dense and compact city allows the operation of effective and attractive public transport by tramways or underground metro lines. Also effective means of heating with renewable energies and power-heat-combination (district heating).

The notion of “green” in this context implies that parks and green open spaces in the city must not only be safeguarded and enhanced, but also significantly augmented. This is a very important part of the low carbon city strategy and especially of the adaptation to climate change, since the number of very hot days will significantly increase in future. Green open spaces, trees and lakes are important to avoid bio-climatic stress especially for elder people and to guarantee good living conditions even in densely built up, compact inner city areas. The rule in Munich is, that for every inhabitant in newly built residential areas, 17 m² of green open space in new public parks has to be provided. An important element of the strategy is the knitting together of a network of green open spaces. It constitutes regional green belts, big parks, green river banks, inner-city green belts or district parks and sport facilities like the world famous Olympic Park (1972 Olympic Games), which is still one of the most frequented parks in Munich for sports, leisure and entertainment.

3. The new PM - guideline “Climate Change and Climate Protection”

Today, Munich is surely not yet a *low carbon city* - but the city is on the way. From 1990 to 2000 the carbon emission grew from 6.3 to 8 tons per capita and year; since then, it slowly decreased up to 7.1 tons in 2007. That is far away from what for instance Copenhagen has reached 2006 (five tons) or from the less than two tons, which are assumed climate neutral.

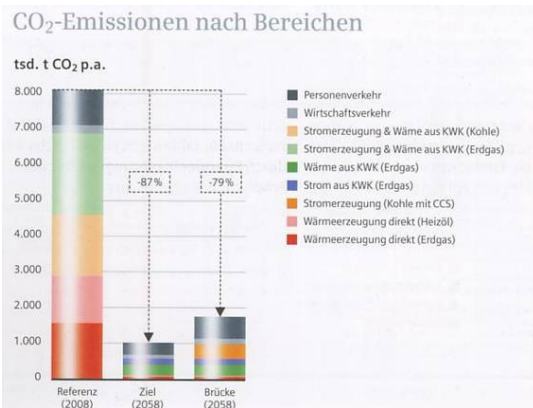


Figure 5: Carbon dioxide Emission in Munich per sector (source: SIEMENS AG)

As one of the results of the evaluation of PERSPECTIVE MUNICH (CITY OF MUNICH 2007) it became clear, that to reach this level within the next 10 to 20 years, it would be not enough to have a indeed very successful sustainable strategy for compact, mixed use spatial development and for a sustainable mobility. To meet the challenges of climate change, there has to be developed and implemented an integrated and consistent strategy of reducing energy consumption as well as increasing energy efficiency with approximately a factor of five to ten within the next 50 - 100 years. Since the City of Munich has committed herself as a member of *Climate Alliance of European Cities* and of the *EU-Convent of Mayors* to very big steps towards a *low carbon city* (reduction of carbon dioxide by 50% until 2030) it was clear, that there should be an additional guideline, focussed more intensely on the questions of climate protection within the integrating framework of the urban development concept PERSPECTIVE MUNICH.

The development of a new guideline concerning all strategies and instruments for climate and energy aspects of the development of the city starts in 2006 in an inter-institutional and interdisciplinary working group. The process was organised, inputs given and results of the

working sessions documented and developed to a consistent document by an external consultant, the Swiss office of Ernst Basler & Partner, Zürich. The new guideline as part of PERSPECTIVE MUNICH was approved by city council as a draft for public discussion with experts and the civil society in December 2008. The guideline formulates strategies as well for mitigation and adaptation and is the basis for an integrated action programme to meet the carbon-reduction aim of 50% per capita until 2030 (reference year 1990). As part of the PERSPECTIVE MUNICH the strategies are closely interwoven and linked with other strategies of a sustainable urban development such as compact spatial development, sustainable mobility, social and cultural integration, regional cooperation etc. The guideline is structured along five important fields of action:

- Energy supply
- Energy demand of buildings
- Spatial development and mobility
- Land use of open spaces and natural environment
- Consumer attitudes, life styles and health.

Handlungsfelder integrierter Klimaschutz

Herausforderungen des Klimawandels	Handlungsebene Stadt und Region Maßnahmen des Ökologischen Stadtumbaus		
Regionalisierte Klimamodelle, Risk-assessment	Stadtstruktur: Bauen, Grün	Infrastruktur: Netze, Anlagen	Lebensstile: Beratung, Service
Vorsorge: CO ₂ , Methan reduzieren	Innenentwicklung Dichte, kurze Wege Solarer Städtebau Passivhaus	Erneuerbare Energien KWK, Fernwärme ÖPNV, Radwege Elektroauto, Hybrid	Reduz. Wohnfl. Nahmobilität Lüften/Heizen Regionale Produkte
Anpassung an: Temperaturanstieg Sturm Starkregen Trockenheit „Neue“ Krankheiten	Aufforstung, Bäume Grünzüge, Öff. Raum Luftaustausch freih. Retention, Renatur. Entsiegelung Bauweise, Bauform	Nah-/Fernkälte-Netz Kühlung mit REN höhere Deiche RWRückhaltebecken Grauwassernutzg. Gesundheitsservice	Freizeitverhalten, Sportarten, Urlaubsziele... Tagesrythmus Wasser sparen Vorsorge, Impfg.

Fig. 6: Action fields of integrated climate protection policy (source: Reiss-Schmidt)

For each of these action fields the guideline formulates the main restrictions and conflicts, the most important aims, the implementation strategies and some guiding or model projects (“Leitprojekte”) as laboratories for testing and improving strategies and instruments by practical experiences.

Strategie „Weiter so“	Strategie „Integrierte Anpassung“	Strategie „Zukunftsfähige Lebensqualität“
Primär technische und organisatorische Maßnahmen	Zusätzlich: (Raum)strukturelle, soziale, ökonomische, Maßnahmen	Zusätzlich: Änderung von Werten/Präferenzen, Lebensstilen
Gleiche/geringere Qualität zu höheren Kosten	Höhere Qualität zu höheren Kosten	Nachhaltig höhere Qualität zu gleichen/geringeren Kosten
Starke soziale Selektivität	Mittlere soziale Selektivität	Sozialer Ausgleich
CO₂ +	CO₂ +/-	CO₂ -

Fig. 7: Alternative scenarios for adaptation of cities to climate change: “Business as Usual” – “Integrated Adaptation” – “Sustainable Quality of Life” (source: Reiss-Schmidt)

Restrictions and conflicts are given mostly in respect of the (short term) financing conditions of necessary actions. Investment in infrastructures, in renewable energies and in more insulation for buildings raises the question “who pays?” – and in a time of world wide financial crisis – the question “where does the money come from?” as well as conflicts with concurrent investments in education, social support or culture. Other restrictions are given with lack of legal instruments to influence private decisions about land use, mobility or energy production and –consumption. In some fields, there may be still lacking the necessary knowledge about risks, vulnerability or technical solutions.

The most important aims and strategies of the document are:

1. Safety of energy supply, 20% renewable energy until 2020, more efficiency in conventional power stations on fossil fuel base, development of district heating.
2. Reduced energy demand for heating in all buildings of city council, more financial support for energy saving actions in private housing (new built and existing), special contributions of the cities public housing companies beyond legal requirements.
3. Reduce consumption of settlement areas, reduction/avoiding of car traffic, increased share of “post-fossil mobility” (bicycle, walking, tram/train metro, electric cars etc.), integrated development of new settlement areas, sustainable mobility and energy supply concepts – also on a regional scale in cooperation with surrounding districts and local authorities, development and increasing of the network of parks and green belts.
4. Stabilising and developing of the existing forests as important fixations for CO₂, adaptation of agricultural use to climate change, increase production of biological energy supply (*Biomasse*), securing clean air areas and open spaces important for the exchange of clean/cold air.
5. Integration and motivation of all groups of the civil society to participate actively in climate protection strategies, information policy, further education strategy, better legal instruments for climate protection.

The guideline combines the fundamental paradigms of *efficiency, consistence and sufficiency*, which are generally crucial for a sustainable urban development – not only in respect of a low carbon energy strategy

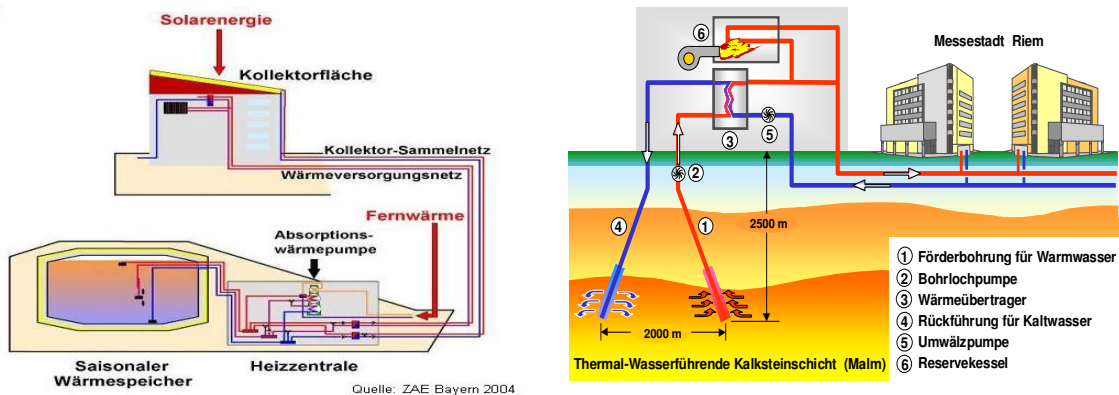


Fig. 8 (left): Model project solar district heating Ackermannbogen – principal function of solar heat storage (source: City of Munich)

Fig. 9 (right): Model project geo-thermal heating in “Messestadt Riem” new district, principal system sketch. Reduction of carbon dioxide emission: 12'000 tons per year (source: City of Munich)

Among the model projects which had been suggested by the guideline are initiatives for more renewable energies (geothermal, sun, wind, water) and better use of waste-heat from industrial processes; strategies for integrated district renewal programs to increase insulation and install more efficient heating; projects to reduce car use in commuter traffic, etc.

Two very concrete and impressive model projects are the development program for the “*Munich ClimateGreenBelt*” as an equalizing and connecting open space between the core city and the neighbouring municipalities and the further development of *Munich Building Consulting Centre*, a public information and further education hub for all questions of energy efficiency and technical improvements of private dwellings and houses. In addition a special public awareness and marketing campaign concerning climate change and the necessary actions for a low carbon city is suggested.



Fig. 10: Munich Green Belt, ecological equalization, urban agriculture and recreation between core city and neighbouring municipalities of Munich city region. (source: City of Munich)

4. The “Munich Integrated Action Programme for Climate Protection”

Based on the PM guideline “*Climate Change and Climate Protection*” in 2009 started an intensive working process with a high level steering committee directed by Munichs 3rd Mayor H. Monatzeder, an inter-institutional and interdisciplinary project group and seven thematic working groups. These working groups cover topics as “Housing – energetic building”, “Urban development, urban planning, landscape planning”, “Mobility and traffic”, “Energy-efficiency in business areas”, “Energy production and retail”, “Energy management in public buildings and infrastructure of the city”, “Procurement, official cars and journeys”.

The concept of the action program differentiates between concrete short term measures which should make it possible to realise countable “quick wins” and long term strategies whose effects are less countable and are expected in a longer range. For the short term action will be made cost-benefit-analyses which make evident, how much CO₂ could be reduced at what costs and how much money and other resources could be saved on the other hand by CO₂ reduction. On the basis of the expected reductions several CO₂ – reduction scenarios will be developed.

Together with the action program, in all relevant departments of the city administration the skills of the staff in respect to climate change issues is developed by further education and additional experts are hired, for instance to integrate climate and energy issues into all urban planning concepts and detailed plans or to develop programs of urban renewal for several parts of the city which focus on energy efficiency, climatic relevant open space and other adaptation measures for climate change.

For the action field 2, “Urban development, urban planning, landscape planning“ some examples of short term measurements and long term strategies shall be exemplified:

- *Preservation and development of Munich green belt* – accessibility, recreation, enlargement, integration of urban agriculture, renewable energy production...
- *Adaptation of city owned forests by changing composition of tree species* – climate proof forest management plan, dry and heat resistant tree-species, maximisation of carbon storage...
- *Preservation and optimisation of agricultural land in the city region* – reduce consumption of agricultural land for building and for natural compensation, regional production and marketing of food, biological agriculture for more biodiversity and water protection...
- *Introduce binding regulations for bicycle parking in private housing and office buildings* – encourage everyday use of bicycles, reduction of car traffic and carbon emissions...
- *Introduce climate and energy aspects as binding contents on all planning levels* – spatial concepts for demand and potential production of renewable energy, solar-energetic optimisation of existing and planned building structures, climate proofing of urban concepts...

Like these examples, all together approximately 80 different measurements and strategies have been developed so far in the seven working groups mentioned above. Until the end of 2009, the carbon reduction effects and the costs of each measurement/strategy will be estimated. Based on these figures, cost-benefit-factors and priorities can be developed and concluded in an integrated action program for climate protection in Munich. This medium- and long term program will be discussed and approved by city council at the beginning of 2010. Every year the results will be evaluated and the program will be adapted to new requirements.

What could be achieved, if all relevant public and private actors share the aim of a *low carbon city* and work together under the umbrella of an integrated strategy was recently demonstrated in a scenario “*Munich Carbon Free 2058*” by “Wuppertal Institute for Climate, Environment and Energy”, commissioned by Munich based SIEMENS AG. (SIEMENS 2009) The result of this study, in which researchers, strategy developers of SIEMENS and practitioners of the planning and environment departments of the City of Munich worked together was, that only with technologies which exist today a *low carbon city* is possible.

The study stated, that a reduction of CO₂ per capita and year to less than two tons until 2058 is possible - with to day known technologies. As the biggest levers to each this had been identified:

- insulation
- power-heat-coupling
- economical lightning and electric appliances
- regenerative energy production.

High investments in energy saving technologies pay by savings of energy (-costs) during the lifecycle of the project. High motivation and new strategies for financing these investments and for compensation are necessary to make these efforts feasible for households and companies.

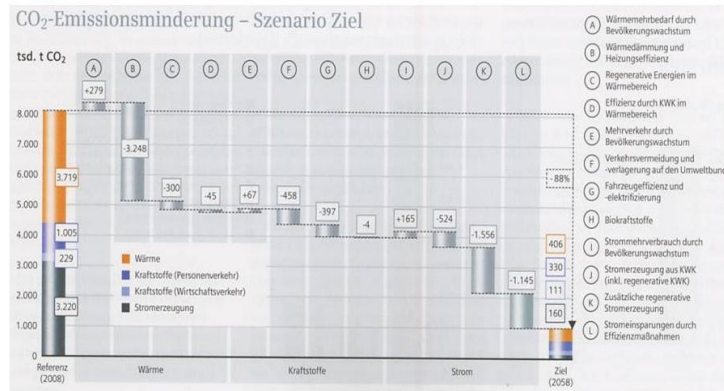


Fig. 11: Munich Carbon Free City, scenario 2058: carbon dioxide reduction per action field in 1000 tons (source: SIEMENS AG)

5. Conclusion and outlook

The Munich experience in formulating and implementing an integrated sustainable urban development strategy PERSPECTIVE MUNICH as a tool for a *low carbon city* can be concluded in the following five points:

1. The challenges of climate change are at the same time a big chance to improve the necessary sustainability of cities and regions as well as the quality of life for their citizens. Only *low carbon cities and regions*, with “energetic autarky”, producing more energy than they consume, will be liveable cities in the long range.
2. Compact, mixed used and socially integrated cities i.e. the *European City-type*, are a suitable model for the future. Density, internal expansion and short distances in attractive public spaces are a precondition for low carbon cities. The arguments against further urban sprawl and in favour of an internal expansion in growing cities are based on urban and ecological principles as well as economic cost-benefit. Structural advantages/deficits can not be substituted/compensated by technical measurements or better organisation alone.
3. Climate adapted planning and low carbon policy is not feasible as an additional and sectoral approach. The contradictions and conflicts between economic growth, social integration, ecological sustainability and quality of life can only be balanced by an integrated, cooperative and multidimensional strategy for whole regions, cities and quarters. A bundle of short term, medium term and long range measurements has to be formulated as an action program. A well organised and spatially bundled process of implementation and evaluation is needed, not (only) isolated measurements on a project level.
4. Adaptation and mitigation as the two faces of a “climate proof” city have to be combined and should have synergetic, not antithetic relations. That means: adaptation of our cities, their infrastructure and their buildings to the inevitable effects of climate change may not produce additional risks and additional carbon – as for instance cooling of dwellings and offices to compensate a greater number of hot summer days will do.
5. Integrated strategies for climate protection and low carbon cities are not mere technical, but political and societal tasks. They could not be done by experts, administrators and politicians alone, but only together with economic stakeholders and the civil society. Only in this way sustainable values and lifestyles could be developed. Low carbon cities are a cooperative project of the civil society and a product of cooperation.



Fig. 12: Integrated development concept PERSPECTIVE MUNICH: main objectives, “Ecological and Social City-Conversion” as focal strategy (source: City of Munich)

As an outlook on further tasks for planners and politicians mainly two aspects are crucial:

- The framework conditions for *low carbon cities* (money, law, technology,...) have to be developed further on international, supranational and national level. Cities can not solve structural problems of missing regulatory conditions for energy production, car-mobility etc. on the local level.
- Intelligent instruments for compensation to bridge the gap between short term costs and long term benefits of investments into low carbon infrastructure, low carbon houses and low carbon vehicles have to be developed quickly.

Nevertheless the most important question to reach the aim of climate proof, *low carbon cities* is not: do we have the technical skills, the money and the rules? – but: are we successful early enough in changing our life styles, following new priorities and values and pursue a new and sustainable definition of “*quality of life*”?

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