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Occasional Paper

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Scenarios and Potential for Settlement Development with Economy of Space and Preservation of the Countryside

Summary of a study for the Federal Environmental Agency (Umweltbundesamt)

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1. Introduction

Regional development in Germany, as in most other countries in Europe, is characterised by the continuing use of land areas for settlement and traffic purposes, by the „breaking up" of previously compact town and city structures, by a growth in traffic volumes and thus by pollution of the air, soil and water, a loss of animal and plant species, a loss of the cultural landscape and changes in the global and local climate.

Only to a small extent does this development result from a growth in population and employment. It is especially affected by changed ways of living, production methods, retail structures and patterns of traffic use. There is a close link between the dispersion of settlements and the extensive use of space for motorised private transport. Widespread settlement structures are automatically associated with a heavier use of motorised private transport, and the factual dominance of car transport in turn leads to a reduction in the density of the settlement structure and, in consequence, a further expansion of building land into the countryside. Fulfilment of the desire for a detached house in the country, as a mass phenomenon, destroys the very thing it aims to achieve: closeness to nature. As more detached houses are built around the edge of a town or city, the intact countryside moves further and further away. On the other hand, the immense disturbance and environmental pollution resulting from road traffic is a direct consequence of this exodus from the town or city – and it leads to further exodus.

There is no doubt that this development is not compatible with the environment or economically effective in the long term. „Use of land resources" is regarded as the most important indicator for the evaluation of settlement and traffic structures from the point of view of a „sustainable future development"[1]. The land resources are not actually taken away, but we use the term to refer to the use of land areas for settlement and traffic purposes. It stands for the utilisation of resources (countryside, soil, vegetation), environmental pollution and higher infrastructure and transport costs.

The major goal, and at the same time a major control factor for a sustainable development of settlements and transport, is therefore a significant reduction in the annual increase of settlement and transport areas, which was one of the goals formulated by the Commission of Inquiry on the „Protection of people and the environment"[2].

A comprehensive study is being carried out by the German Institute of Urban Affairs (Deutsches Institut für Urbanistik, Difu) on behalf of the Federal Environmental Agency (Umweltbundesamt, UBA) to determine what concepts, strategies and planning instruments can be used to reach this goal, what framework conditions exist – and how they should be changed. The most important results are summarised here.

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1 Final report by the Commission of Inquiry on „Protection of people and the environment", German Bundestag, Bonn 1998 (publication 13/11200).

2 Ibid, p. 129.

2. Indicators for settlement development with economical use of space and the environment

The question of what type of settlement development can be regarded as being economical on space and kind to the countryside must be defined more precisely by reference values (indicators). Evaluation of the extensive current literature on indicators for sustainability and the institute's own research have identified key indicators which permit a scientific and „true to life" assessment of settlement development – and which are pragmatic because of the available data base. The key indicators include the specific land area taken up for settlement and transport in square metres per inhabitant, the land area that has been largely sealed by construction, asphalt or paving (in square metres per inhabitant), the degree of fragmentation and segmentation of free space by settlement areas and traffic routes and the number of motor vehicles as an indicator of the ecological burdens resulting from traffic and parking space.

Among the key indicators, the specific land area used (settlement and traffic area in square metres per inhabitant) is regarded as the major factor. „Use of land resources" as an indicator is almost as significant as the whole set of indicators: a larger amount of settlement and traffic space per inhabitant generally also leads to a greater amount of sealed land and a greater fragmentation and segmentation of free space. Moreover, a greater „use of land resources" generally involves a greater amount of motorised road traffic, and thus a higher need for energy and greater environmental pollution. Fundamentally, a greater „use of land resources" also causes higher costs for the technical and social infrastructure and higher social costs (e.g. public security, traffic accidents).

3. Basis for a new principle in urban development

Urban development projects of recent years and the current discussion on regional planning are characterised by two conflicting concepts of the town or city: on the one hand the model of the compact city which is based on European urban culture, on the other hand the model of the widespread city or „network city", which signifies the gradual „dissolution" of European urban structures.

Density, mixed land use, concentration of settlements and public space suitable for pedestrians are the elements of the compact city which should support and reinforce each other. The model of the compact city involves turning away from the conventional car-oriented urban development concept which spreads over a wide area. It offers an ecologically justified counter-model to the segmentation of the countryside by settlements, the waste of resources and the constant growth in traffic. It also stands for a stimulating urban milieu, for cultural variety, for social networks within the local district, for a local public identity – and it opposes social and spatial segregation and its consequences.

The model of the „network city" or car-based city is mainly a reflection of present trends in urban development: less mixed land uses, less density, decentralisation, dispersed structures, growth of motorised private transport. The assumption that this development trend can hardly be influenced by planning and must be accepted as the „global mainstream" is the primary reason given for this settlement model. It is suggested that planning

capacity should aim to take the unavoidable and make something positive out of it, e.g. to interpret the „fragmentation" of the countryside positively as a „close inter-penetration of open space and settlements" and to form it into a new „urban landscape".

We are unable to accept these two assumptions which the „network city" concept is based on. First of all, major causes of the dominant trends are „home made", i.e. significantly influenced by „anti-urban" planning principles and the resulting urban developments since the 1930s and by a large number of politically imposed conditions, mainly at the national level and by various departments. Many of these conditions could be revised or reformed. Secondly, although the term „urban landscape" does have positive associations, in fact the continued dispersion of settlements and the increasing fragmentation of the edges of the settlement pattern have a negative impact on countryside ecology, traffic ecology, settlement economy and urban structures. A concentrated development of settlements in more compact units with a clearer distinction between the town or city and the countryside would be preferable.

Thirdly it must be added that in addition to the current trend to the dispersion of settlements, medium-term social changes are becoming apparent which may favour or even require a contrasting development of urban and regional structures and a renaissance of dense town or city development with a mixture of uses, such as the increase in the number of one-person households, single parents or other new types of household, the larger proportion of old people who are still active, the increase in part-time work and employees with more than one job, and finally the transformation of the social state to structures that are directed more towards the involvement of the citizens (self-help, networks, advice centres, exchange forums for services, citizens' forums, sponsoring societies etc.). These anticipated changes are better served by compact urban districts or settlement units with mixed use and with direct nearby accessibility of institutions than by monofunctional structures in car-based, dispersed settlement patterns.

4. A principle for a sustainable urban development in the region

The pure form of the compact city with high density, mixed land use and limited expansion in a surrounding area that is largely free of buildings is now almost non-existent in Europe. Up to the beginning of the 1990s, the model of the compact city was still largely intact, for example, in East Germany. In the present situation in Europe, we must speak of compact cities in a state of transition to the „network city" and dispersion of settlements. We can confirm that a continuation of this development is not sustainable from an ecological or economical point of view.

There are chances for sustainable urban development if a model is aimed for which retains important successfully established elements of the compact city and integrates the beneficial and unavoidable elements of the „network city". Successful established elements of the compact city are density of use, variety of uses, concentration of settlements, public areas suitable for pedestrians and ecologically/socially compatible mobility. The beneficial and more or less unavoidable elements of the „network city" include decentralisation and the network structure. These elements can be taken into account in the form of a rail transport network for the urban region as a basic framework for a (decen-

tralised) concentration of the development of settlements. The resulting modified model of the city comes close to the principle for „Compact and mixed cities in poly-centric regions" which was formulated in 1993 by the Commission „City of the future 2000". But there is one major difference – what is needed today is not for extra settlement areas to be designated, but a realisation of the opportunities offered by existing „brownfield" industrial, military and transport sites for the concentration of settlements.

The modified model of the compact city which we advocate, „compact cities and urban districts in poly-centric, public transport-based regions" is based on the insight that compact cities or urban districts are beneficial for an economic use of resources such as land, energy, materials and time, and at the same time enable large areas of countryside to be kept free from buildings. The compact city itself contributes little to the conservation of nature because of the large proportion of sealed land areas in the urban area. However, it makes a significant and indispensable contribution to the preservation of free space and the limiting of ecological burdens in the entire region because it creates the conditions necessary to concentrate human activities in a narrow area and combine different types of use. As a communication and activity zone with short distances, the compact city achieves an ideal economy of time, energy and land. This spatial concentration of human activities is necessary to enable coherent countryside areas around the towns and cities to be kept free.

5. Structural elements of settlement development with economy of space and preservation of the countryside

The following areas have been identified as the most important structural elements of a new principle of urban development based both on successful elements of the European city and on beneficial or unavoidable elements of the „network city":

- population density and density of use,
- variety of uses and mixed land use,
- ecological and social quality of public space,
- concentration of settlements,
- poly-centric structure and
- a transport system compatible with the environment and the town or city.

Population density and density of use

For several decades the population density in the core towns and cities has been on the decline, mainly due to a reduction in the size of households and an increase in the living space per person. The existing technical and social infrastructure and other service facilities have to be funded by an ever lower number of inhabitants, and at the same time new infrastructure must be built on the periphery. Thus, the preservation and restoration of a high population density in the core towns and cities is an important economic and eco-

logical goal. Moreover, it can be said that a certain minimum density of inhabitants, employed persons, visitors etc. per hectare of settled land is necessary, and that a density that is as high as possible while remaining socially compatible (a „qualified" density) is beneficial:

- to minimise distances to supply services, leisure facilities and workplaces in the urban district and the town or city,
- to offer an attractive public transport system which is sufficiently used,
- because a variety of uses can only be maintained or developed at a certain density, and
- because a denser building structure is more economical in its use of energy.

The implementation of a socially, ecologically and economically reasonable urban development density does not require the construction of tower blocks or mass accommodation structures. There are numerous examples where a high residential density (60 to 100 dwellings per hectare of gross building land) are associated with a high quality residential environment. It is important that a denser concentration of buildings should be accompanied by enhancements in the associated open spaces. The most serious urban development problem is the comparatively high level of cars in German towns and cities.

Variety of uses and mixed land use

Allocation of uses, mixed land use and variety of uses are significant at various levels. At the level of the town or city as a whole and the urban region it can be assumed that an allocation of uses for dwellings, workplaces, supply and leisure facilities could lead to an urban structure with less traffic than today. Mixed land use at the local and housing block level can also create the conditions for pedestrian traffic, for the street as a communal area, for a certain public openness of the local district, and thus for integration of fringe groups. Securing mixed land uses and dense structures in existing settlements is therefore a priority. And the transition zones and stages between old industrial land and future residential, cultural, service and leisure uses often represent important fields of experimentation for a new form of urban life.

Ecological and social quality of public space

An important and successful structural element of the traditional European town or city is the building structure along streets, which normally has a wide variety of uses. Such urban settings create the conditions for many different ways of moving about, spending time and meeting people. Living streets and squares – i.e. places with a minimum number of passers-by and with people spending time in one place – thus represent the major element of town or city life which can create integration, security, familiarity and, in ideal cases, identity. An important element of a strategy for a compact city is therefore the recovery of the streets and squares for such functions.

Concentration of settlements and poly-centrality

The development of settlements in the region requires a minimum concentration in a limited number of settlement zones (urban districts, suburbs) and a certain compactness of settlement forms:

- to offer an attractive public transport system which is sufficiently used,
- to ensure that sufficient local supply facilities (shops, services, schools, social facilities etc.) can be provided,
- because less settlement and traffic space is used than in a dispersed structure,
- because a more concentrated structure involves less costs for the technical and social infrastructure, less motorised private transport and thus less impairment to the environment,
- because with a more concentrated settlement structure, the open, undeveloped countryside can more easily be protected from fragmentation and segmentation, and
- because there is only a chance of preserving or developing a modest level of urban public life, at least in the larger cities in the region, if there is such a concentration.

An excessive thinning out of the town or city by greenery and the fragmentation and segmentation of the countryside with a large number of settlement zones and roads harms both: a sustainable urban development with sparing use of resources and the ecological efficiency and ecological development potential of the countryside.

The goal of regional development must therefore be to stop the process of dispersion of settlements, to concentrate urban development in the centre of cities, towns and communities, and only to permit any further extension of settlement areas in a limited number of necessary and carefully selected locations.

6. Urban development potential in existing settlement zones

Whereas the amount of land used for settlement and transport in East and West German town and city regions grew by 1.2 to 1.6 per cent annually in the decade which recently ended (and the annual growth rate is still almost as high), at the same time there is considerable potential for building and utilisation in existing settlement zones. This has been shown by case studies in the East German town and region of Cottbus (about 275,000 inhabitants) and the West German urban region of Hannover (1.1 mill. inhabitants). In an „efficiency scenario", calculations were carried out on the basis of the reutilisation of industrial, military and transport brownfield sites, the development of hardly used empty sites and a higher degree of utilisation of the possible settlement density of new buildings than at present. The potential for residential construction in the centre of the city of Hannover and the towns and local communities of the Hannover region, when calculated in this way, could meet two thirds of the entire demand for residential construction up to the year 2010. In the Cottbus region, development under the conditions of

the efficiency scenario could even exceed the estimated demand for residential buildings up to 2010 without using additional space at the edge of the settlements.

In a structural and awareness transformation scenario which assumes a dynamic development towards sustainable development in all sections of society, further potential for building development was discovered. This includes, for example, less-used commercial built-up areas, car parks, extra buildings where the buildings are spaced out, upward extension of buildings, city renewal through construction along streets, renovation, extension and conversion of single-family houses (adding self-contained flats). In the structural change scenario, the entire estimated demand for residential buildings up to the year 2010 in the Hannover region can also be met without extra settlement land.

These statements apply in a similar way to commercial and industrial land, to retail developments and to public institutions such as schools, sporting and social facilities. But it is more difficult to assess the development of innovative commercial leisure complexes.

7. The opportunities for urban development within existing urban areas

The urban areas of Cottbus and Hannover were selected for the scenarios because they can be regarded as generally representative of East and West Germany in terms of the urban structure and the dynamics of their development. In this respect, the results can be assumed to have a certain general validity (which does not, of course, cover every individual case). That means that if the conditions for the use of space are reformed, thus mobilising development reserves within the cities and towns and giving preferential treatment to ecological mobility (pedestrian and cycle traffic, public transport) rather than motorised private transport, no extra settlement land will generally be required in East Germany, and an average of two thirds of urban development in West Germany can take place within existing urban areas. If there is an even more radical reform of settlement, transport and control policies (structural change scenario), it is also possible for almost the entire urban development in West Germany to take place in existing settlement areas.

Under the conditions of such a political about-turn in the promotion of compact cities with few cars, even the goal of the Commission of Inquiry does not appear unrealistic. It wishes to reduce the rate of additional settlement and traffic space in Germany from its present level of 120 hectares per day to 10% (i.e. 12 hectares) by the year 2010. Although this goal has often been criticised, it certainly seems reasonable. Besides which, such a goal must urgently be achieved for ecological, economic and social reasons.

8. Strategies to develop potential for settlements with economy of space and preservation of the countryside

The most important strategies of settlement development with economy of space and preservation of the countryside at a mainly communal and regional level – apart from reforms in the statutory framework, which are considered separately – particularly include the following:

- continued development of residential construction culture,
- reactivation of brownfield sites within the urban area,
- utilisation of interior conversion and changed use potential in existing buildings,
- mobilisation of „gap" sites in urban contexts,
- increased density in existing settlements and mixed use in new building areas,
- enhancement of vegetation and open spaces within the urban area,
- safeguarding and development of open spaces in the urban region,
- promotion of environmentally harmless and socially compatible mobility,
- central public transport junctions and increased settlement density,
- change of use and building over traffic space,
- multiple use and more efficient time allocation for facilities,
- strengthening of local orientation.

Most of the strategies in this list will now be enlarged on.

Continued development of residential construction culture

To counter the use of further space for residential purposes and the „fragmentation" of the countryside, greater subsidies for residential property within existing urban areas, a changed design in denser settlements and garden-oriented residential settings in the towns and cities must be created and established as an alternative to „living in the country". Historical and recent examples show that residential settings with gardens and open spaces do not exclude a high „density" if the number of parking spaces is reduced, for example in the traditional Bremen house or in residential construction projects recently implemented in Amsterdam-Westerpark or Hamburg-Harvestehude.

However, the establishment of compact and garden-oriented residential forms needs to be encouraged by a change in residential ownership subsidies – building with economy of land should be made a requirement for subsidies, and development within urban areas should receive higher subsidies than development outside urban areas. To achieve this, politicians would need to have the courage to tell citizens that the dream of a „house in the country" for all can only be achieved by destroying the historic countryside.

Reactivation of brownfield sites within the urban area

A significant part of the potential building land within existing urban areas consists of industrial, military, railway and postal brownfield sites. Reactivating these sites for settlement purposes is one of the most important strategies for development with economy of space and preservation of the countryside. Brownfield sites are often close to the urban centre and conveniently situated for rail or bus transport. The existing infrastructure can

be used, and old buildings which sometimes are important architectural structures can often be integrated into the subsequent use. The following factors are also prominent in this reactivation:

- reduction of a further dispersion of settlements into the surrounding area. One hectare of reused settlement land within the urban area generally helps to save at least three hectares of settlement and traffic land in an alternative location on the periphery (due to the lower building density there and the disproportionate growth in the land needed for traffic);
- more efficient use of the existing urban infrastructure, public transport, shops and services;
- opportunities to improve the workplace-residence relationship and to reduce deficits in vegetation in the core urban area;
- development and implementation of innovative settlement and residential models, especially by a compatible mixture of dwellings, workplaces, supply and leisure facilities.

For the successful reactivation of brownfield sites within the urban area, a political decision must be made to exercise control in urban development policies and to create a management system to implement this control. Urban planning and development must be transformed even more radically from expansion planning to urban reconstruction. Moreover, because of the high preparation costs (e.g. because of inherited soil contamination), state subsidies are necessary, for example in the context of the urban building subsidies provided by the national government and the federal states. A clear signal in favour of the reactivation of brownfield sites could be given by the national government and federal states if they directed all subsidy funds for the development of building land (i.e. including business subsidies and regional structural policies) into the treatment and development of brownfield sites within urban areas. In addition, a levy is recommended on newly developed building land, the proceeds of which could go to a fund for decontamination of inherited pollution.

Utilisation of interior conversion and changed use potential in existing buildings

Building investments within existing buildings are already greater than investments in new buildings. The future of the construction industry will increasingly lie in the preservation, maintenance, conversion and changed use of existing buildings. Significant potential for extension and conversion lies in residential buildings, commercial buildings and public facilities.

In multi-storey buildings, addition of extra storeys or attic conversion as residential space are possible in many cases, and there are numerous examples in which this has been done. In some single-family houses, extra small flats or flats for old persons have been added by extension or conversion work. This has created space in the local neighbourhood for older single persons to move to, thus releasing single-family houses with more living space for families with children. It is sensible for such flats to be built from the outset in accordance with the preferences of the owner of the building so that when the

house becomes too big, the older person can move into his or her own old age residence. Until this time, the flat designated for old age can be rented as a small flat. A study from Switzerland envisages great potential in this area.

In terms of the reuse of vacant buildings, the potential in the core towns and cities of the East German federal states are of great importance. It is not reasonable that thousands of flats dating from the first industrial boom period – for example in Dresden, Leipzig and Halle – are vacant or under-used, while at the same time new residential building land is still being developed in the region. Here, the private willingness to invest in modernisation and the enhancement of the urban quality of the districts must be supported more strongly by public subsidies. Even from the point of view of the public economy, this is more economical than developing new construction areas. The significant ecological and social advantages are a further benefit.

In the commercial and industrial sector, the greatest expansion potential lies in the frequent single-storey buildings which often have extensive parking accommodation and free space. The business subsidy system could provide support here by subsidising multi-storey buildings more than single-storey buildings and the conversion of existing buildings more than newly developed sites.

The extension and conversion potential of pubic service buildings (schools, sports facilities etc.) is also considerable when we take into account that most uses can be „stacked" to a greater degree than is utilised at present. A fine example, which is also architecturally convincing, can be found in the sports halls built one above the other and integrated into the facade alignment line of Schlossstrasse in Berlin-Charlottenburg.

Mobilisation of „gap" sites in urban contexts

„Gap" sites are vacant sites situated between buildings in a road that is otherwise built up, i.e. sites which interrupt the continuity of the buildings. These sites can normally be built on without creating new zoning permits, and they represent a further urban development potential, especially for residential construction. The „gap" site potential represents up to 10 per cent of the space of residential settlements. For many years, local communities have endeavoured to mobilise this (residential) potential by providing information („Register of gap sites", „Register of building land", brochures) and advice. Here there is obviously a lack of economic incentive to return building land to the market instead of hoarding it (e.g. by changing the land tax to a tax based on the land value or the land area).

Increased density in existing settlements and mixed use in new building areas

In residential settlements from the post-war period, especially between multi-storey apartment buildings, there is often considerable potential for an increase in density because the buildings are often generously spaced out and have ample open space, parking and traffic space and a loose structure. But a retrospective increase in density is not just a strategy to save space, it also provides the opportunity to remedy deficits in urban development and to enrich the settlements by adding new functions. This assumes that the retrospective increase in density is not only used for residential purposes but also to supplement the social and cultural infrastructure, to provide space for small businesses and

offices, for example on the ground floor or in extension buildings, for small supply centres and a general revitalisation of public space. In this way, a retrospective increase in density can help to initiate a transition from the „settlement" to an urban district with a mixture of uses. The common single-storey shopping centres with large parking areas in large residential settlements are particularly suitable sites for the development of an „urban crystallisation core" in the suburban area. In view of the meagre quality of the building substance and the large surface area, these sites meet the requirements for future conversion or the construction of a new, multi-storey urban district with mixed use which can serve as a local centre.

Enhancement of vegetation and open spaces within the urban area

A major requirement, and the most important element in a strategy for a compact city, is an improvement in the design and ecological character of the vegetation and open spaces in the urban area. A high building density places high demands on the concepts for the design and quality of vegetation and open spaces. The problem often lies not so much in the quantity as in the question of how the open spaces can be ecologically improved and adapted to meet the needs of the inhabitants more fully.

Especially in districts with a dense concentration of old buildings, the streets represent the major part of the public space. If we could recover just part of this space – which is today mainly used by moving or parked cars – as an area for walking and waiting, as a play area, a space for front gardens and roadside trees, this in itself would considerably improve the proportion of open spaces which are ecologically effective and available for social use.

Further possible enhancement measures include: redesign of public vegetation areas, playgrounds, public squares, free space around buildings, courts and back yards; planting of vegetation and opening of school playgrounds and open spaces of other public institutions; creation of (temporary) parks, gardens and playgrounds on areas and squares that are temporarily unused; utilisation of potential waterside open spaces.

Safeguarding and development of open spaces in the urban region

The strategy of the compact city, which in itself helps to combine development with the preservation of the countryside, must be supplemented by regional open space concepts which coordinate the different requirements for open space from the point of view of recreation, protection of the biotope, protection of species, protection of the cultural landscape, agriculture and forestry.

A model for a new guidance concept for open space development can be seen in the regional parks developed in various urban regions. Regional parks aim to combine the ecological protection of free space with its social and economic use. The innovative approach lies in developing defensive protection concepts into proactive development plans which combine the protection and development of cultural landscapes close to towns and cities.

Promotion of environmentally harmless and socially compatible mobility

The specific space required for motorised private transport is an average of ten times greater than that required for public transport and non-motorised transport. Space for parking must also be added. The space required for traffic thus depends primarily on the proportion of the transport system taken up by motorised private transport. For example, the area taken up for traffic in the city of Amsterdam, with its relatively large proportion of cycle traffic and public transport, is 17 per cent of the total settlement area, whereas in large German cities it is between 20 and 27 per cent and in car-based North American urban regions it is 40 to 50 per cent of the total settlement area. A transport system adapted to the town or city, with fewer cars and priority for public and non-motorised transport, is thus a major element of a concept for city and regional development which makes economical use of land and helps to preserve the countryside.

Multiple use and more efficient time allocation for facilities

Public service facilities such as educational, social, cultural, sporting and transport facilities are still planned, constructed and operated for one specific purpose. But there is probably considerable potential for space savings in the multiple use of such facilities for different purposes at different times. This has not yet been thoroughly investigated. One element that is known and has been implemented in many places, for example, is the conversion of school playgrounds as general play and green areas and their opening for general use out of school hours. In Switzerland, individual sport areas are used for multiple purposes depending on the season. Football pitches, in-line skating grounds and car parks are converted to ice-skating rinks during the winter. As early as the 1970s, some sections of roads in Japan (including trunk roads in major cities) were closed to all motorised traffic for a few hours during the afternoon and used as play and leisure areas. There are other examples, which are still isolated cases, but which give us an impression of the wide range of possibilities that have not yet been utilised.

Change of use and building over traffic space

Traffic space represents a major proportion of the entire land area that is taken up for settlement and transport purposes. For Germany as a whole this proportion is 40 per cent; statistics for town and city centres place it between 20 and 30 per cent, and when private parking spaces are taken into account, this value is actually 30 to 40 per cent.

A major way of reducing the use of space by transport lies in reducing the proportion of motorised private transport in favour of forms of transport which use space more economically. In addition to the familiar transport policy strategies, this also includes urban development measures such as city renewal by creating new roadside developments wherever war damage and post-war urban development have created excessively wide street profiles. The largest project of this kind is probably the „Inner City Zoning Plan Berlin".

Considerable urban development opportunities also lie in the reconstruction of buildings on land that is used as parking space. This is particularly relevant in the inner city areas and the local centres where parking space needs to be adapted to a level of car traffic that

is compatible with the urban setting. Moreover, multi-storey or underground car parks can be integrated into the new development.

In special cases, building over transport areas is also a viable possibility. Motorways and similar roads cut through urban districts, take a lot of space and create a great deal of interference through noise. Erecting buildings above sections of roads or covering them with sports facilities and green open spaces could reduce the negative effects and help to save settlement land. The space saving potential is much greater than the direct effect of the double use of the land area. The alternative to economy of settlement land in the inner urban area – settlement in the surrounding area – requires at least three times as much space because of the extra transport land, the extra supply facilities and the frequently lower building density. In spite of high costs, such projects could be economically and ecologically viable from land prices of about DM 500 per square metre.

9. Control and guidance instruments

9.1 Planning instruments and regional reform

Regional planning and strengthening of the region

Because of spatial expansion and functional interrelationships, daily life for many employed persons and residents is no longer concentrated on the individual local community but on the region as a whole. Many communal tasks can therefore now only be rationally carried out on a regional basis, such as uniform settlement and transport planning, landscape planning, nature protection, water management etc.

Regional planning has thus become increasingly important. But as the regional development shows, its actual effectiveness is very low. Defects in regional planning are seen especially in a lack of sufficient detail, excessively long processing times, a lack of political legitimation and inappropriate zoning.

From the beginning of the 1990s, informal plans and voluntary forms of cooperative action between local communities in carefully delineated regions have been used to improve the control of regional developments. This has involved working groups on individual topics, special-purpose associations for limited technical areas, urban networks on economic and regional development issues, advice centres, regional conferences, hearings, zone development contracts etc. New forms of cooperation are evidently necessary because a sustainable regional development, as a task which increasingly needs to be fulfilled, „cuts across" traditional areas of competence (e.g. in areas such as water, waste, roads, public transport).

But regional cooperation does not replace specifically agreed goals, and it often fails if there is a serious conflict of interests. Sustainable development of settlements therefore requires a strengthening of the regional level which goes beyond the conventional forms of regional cooperation. If we regard the region as a sort of „second communal level" (in terms of scale), it is necessary to create structures with the corresponding democratic legitimation. A model in this respect can be seen in the Danish regions, which are geographical entities with a directly elected parliament and proportional tax income. The

Danish „official communities" have taken the place of the rural and urban districts and are responsible for regional planning, countryside, nature, roads, public transport etc. A similar model is now being discussed for the Hannover region, and an Act to this effect will be introduced to the Lower Saxon parliament before the end of 2000.

Strengthening the political and planning competence of the region in this way could create the basis for the application of stricter regional planning instruments. These include more precise statements on future settlement areas, e.g. by presentation of area diagrams, and the registration of settlement boundary lines, such as is already practised in Denmark, the Netherlands and Switzerland. The new instrument of the „regional zoning plan", which started the revision of the Regional Planning Act, could also be used in a strengthened region.

Zoning plan

The zoning plan is the decisive planning basis for the future use of the land and soil of a community, and thus the basis for the preservation of the natural resource „soil". This is already expressed in the Building Act (BauGB) in the form of the soil protection clause (§ 1a sub-section 1).

The zoning plans of many cities, towns and local communities date from the 1980s or 1970s and do not meet the soil protection requirements which were laid down later. Many zoning plans must be updated. For this reason, we believe that zoning plans should include a time limit for their validity. A time limit also appears generally sensible, because the preparation of a new zoning plan leads to a general discussion of the urban development goals and presents the opportunity for a radical reorientation. The updating process should begin with a planning report which evaluates the development to date and indicates where changes are necessary. We recommend that the period of validity of zoning plans should be limited to a maximum of eight to ten years (by comparison: Danish planning law envisages that the local community plan, which largely corresponds to the German zoning plan, should be updated every four years).

When new zoning plans are drawn up, it is advisable to define a priority time sequence for the use of building land. This means that the development of settlements can initially be limited to certain areas, and that the uncertainty of demand forecasts can be allowed for. It should then be stipulated in the text that building land in the second stage must only be used when the land in the first stage has been fully utilised.

Furthermore, to a great extent than at present, the basic parameters of urban development in the interest of a space-saving development of settlements should be fixed in the zoning plan. That means that statements on the type and scale of use should be more specific and detailed than at present. This includes, for example, a presentation of special types of use (building areas), definitions of the proportion of commercial premises in general residential area and the proportion of residential accommodation in mixed areas.

Development plan

As with the zoning plan, the development plan is also subject to the statutory provision that land areas must be used economically. To achieve an efficient use of land, the possi-

bility of obliging local communities to fix minimum building densities must be considered. In addition, the introduction of a time limit for the validity of development plan should be considered. As in the arrangements proposed for the zoning plan, local communities could be obliged by law to make a decision on the continued validity of the development plan every five years. Otherwise, an alteration process would be necessary or the development plan would become invalid.

Local landscape planning

For local landscape planning there are no direct intervention possibilities with legal force to control the development of settlement areas in order to make economical use of land. The evaluation of space and land areas as more or less worthy of protection according to landscape conservation and ecological standards, however, can act as a form of „negative control" and thus lead to greater preservation of the countryside in the use of land. This requires a process of cooperation between the landscape and building planning departments. The most important area of cooperation is in the zoning plan.

Numerous landscape plans in the western federal states still date from the 1970s and no longer meet the changed planning requirements, so they must be updated. Similar to the zoning plans, it is recommended that the period of validity of landscape plans should be limited in general to about eight to ten years.

Controlling the environmental impact of settlements

The revision of the German Building Act which came into force on 1st January 1998 integrated into the Building Act and widened the scope of the obligation to take into account the impact on nature and the countryside in town and country planning, which was previously contained in §§ 8a to 8c of the German Nature Conservation Act. The changes in content particularly related to the spatial and temporal separation of the environmental impact and the compensation. This separation permits local communities to combine the compensatory measures for plans which affect nature and the countryside in several development plans and to concentrate them in specific areas unaffected by the impact of the development plans themselves. Such land site pools, which can also be created across local community boundaries, permit the development of coherent vegetation systems and biotopes over a large area, and they also enable landscape maintenance measures to be focused on areas in need of special enhancement. In this connection, improvements in the quality of open spaces within towns and cities can also be carried out in the context of a land site pool. On the other hand, the implementation of compensatory measures outside built-up areas permits a higher degree of utilisation of building land, and thus a greater building density with greater economy of land areas.

The avoidance obligation requires a choice of location which preserves the countryside – new settlement sites should primarily be developed in places where they impair nature and the countryside as little as possible – and secondly it requires the local community to use land as economically as possible. In the framework of the zoning plan, various alternatives should therefore be prepared for the further development of settlements, and these alternatives should be checked and compared in terms of the eligibility of the planned sites for protection and the amount of space taken up.

9.2 Economic control instruments for the development of settlements

In addition to planning and regulatory control considerations, the use of economic regulations in the development of settlements from a market economy point of view is at present under-developed. In the light of current insights (concerning sustainable development), some of the existing economic instruments are even counter-productive. The reform of existing regulations (especially in the area of financial subsidies, tax relief etc.) and a general intensification of economic control are factors which we regard as a contribution to an ecological financial reform in which taxes, other charges and financial subsidies are more clearly used as control instruments to promote development which is more favourable from an ecological point of view.

The stronger integration of economic control instruments is not meant to belittle the importance of spatial planning. On the contrary: A good coordination of the three areas of activity (regional and local planning, infrastructure policies, economic control) is necessary to exercise an effective control over the development. Economic instruments are global in their effects, spatial planning and infrastructure policies can fine-tune the effects of these instruments to the desired locations. Therefore all three areas of activity are important and supplement each other.

Changes in property tax

The system of the existing property tax for built-up and undeveloped land sites is seriously out of date. The tax base („assessed value") only reflects 10 to 20 per cent of the current market value. This means that the property tax has no positive ecological control function. The finance authorities have been working on a fundamental reform since 1998. A commission report presented in May 1999 recommends that the property tax should be changed to a land value tax.

In principle, this is a positive measure for a sustainable development of settlements. In Denmark, a land value tax has been successfully tried. In a land value tax, the tax relates solely to the area of the plot, multiplied by an estimated land value which is up to date and close to the market value. The buildings are tax-free. That means that undeveloped plots which are suitable for development are taxed at the same rate as built-up land in an equivalent position with the same land valuation. This has the important effect that hoarding of building land would become less interesting, the immense brownfield site resources in the towns and cities would be available tot he market sooner and the interior development of urban areas would be promoted. A further positive effect of a land value tax is that the extension of the available building land within the urban area would bring down land prices, thus reducing a major obstacle to residential building within urban areas.

But these fundamental urban development and ecological effects of a land value tax are unlikely to come into effect if the commission's proposal that the reform should (initially) be „income-neutral" is accepted. That means that the total income from property tax in the individual local community would not rise. Because of the lack of adjustment of the property tax over several decades, it is so low in absolute terms and in comparison with other costs that this would not have any control function. And the control effect of promoting economy in the use of space through a pure land value tax is not sufficiently

strong in areas with low land prices, i.e. on the edges of major population centres, which is where this control effect is most urgently needed.

Both drawbacks could be overcome by a combined land value tax and land area tax. This tax model was already proposed by the German Institute of Urban Affairs in 1995. It is developed further in the present study. The model does not commit itself to a „neutral effect on income", and it supplements the land value component (percentage of the land valuation) with a land area component (DM per square metre of land area, differentiated by type of usage). For example, this model for a new property tax could be so structured that blocks of flats within the urban area are not taxed higher than at present, whereas significantly higher taxes would need to be paid for detached houses on large plots or for shopping centres which take up a large area of land in the region. This model of a combined land value tax and land area tax could thus be used to achieve both goals: an appropriate taxation of the land value, which particularly depends on services of the local community or the general public, and an economical use of building land.

Another tax model – the land use tax – would also be a suitable way of exercising a clear ecological control. The main aim of this purely land area related tax is to reduce the sealing of the soil. The tax is based on the soil areas and sealed surfaces for all utilisation types ranging from "areas left in their natural state" to built-up land, and they are assessed with different tax base figures in DM per square metre. The local communities then fix the amount of the tax payable by means of multiplication rates. They should also be granted the possibility of imposing zonal surcharges for global coverage of areas with a particularly high return.

In comparison with a land value / land area tax, the land use tax has the advantage that it offers a comprehensive tax model which includes all types of land use, and that it is not dependent on constant updating of the land valuation. A disadvantage lies in the low degree of differentiation in the tax base figures for built-up land plots.

Tax on the use of land resources

The legislation on land use could take on a further ecological control function by transforming the existing land transfer tax into a charge on the use of new, undeveloped land for settlement and traffic purposes. The charge is justified by the considerable external costs which are generally caused by the use of new countryside areas for settlement purposes. As the land transfer tax is imposed as a once-only charge, a tax on the use of land resources could and should also be imposed as a once-only charge payable at the time of the planning permission / notification of building.

The amount of the charge should be differentiated according to the situation (whether the land is within the built-up urban area or whether it is an extension of the settlement area at the expense of open countryside) and the degree of sealing of the soil.

A control instrument of this nature is therefore a particularly suitable way of stimulating planning and building with economy of land and directing urban development to land where the soil is already sealed, in other words mobilising „brownfield" sites in urban areas, car parks etc. as building land.

If only a small reform of the property tax is carried out, e.g. as a land value tax „neutral to income", then such a once-only charge is urgently necessary as a supplementary control instrument in order to reduce the present unhindered development of more and more countryside sites at a time when the potential of „brownfield" sites within urban areas is also great.

Subsidies for urban development and city renewal

Subsidies for urban development and city renewal are regarded as the most successful form of all investment subsidies provided by the national government and federal states. By contrast with residential construction subsidies and business subsidies, it has proved a suitable instrument to promote development within towns and cities, changes in land designation, mixed land use, increases in density etc. Besides their importance for urban development, subsidies for urban development have also proved to be an effective instrument of economic and employment policy. Subsidies for urban development normally represent business subsidies in the right place. An increase in such subsidies by redirecting funds towards subsidies for urban development and city renewal is therefore urgently recommended.

Furthermore, subsidies for urban development were supplemented by the programme „Districts With Special Development Needs – The Socially Integrative City" sponsored by the national government and the federal states. It aims to use funds effectively by combining investment and non-investment measures of various bodies to benefit disadvantaged urban districts. This also requires an increase in subsidies by redirecting funds and a combined use of funds from other sectors of government, especially the regional economic promotion authorities.

A new priority task in city renewal consists in repair, and renovation, changed designation and integration of „brownfield" urban development sites. The subsidy regulations developed by the federal states must be directed towards this task with the aim of promoting urban development with an economical use of land. The following components should be taken into account: economical use of space or adherence to minimum values for urban development density, preservation and promotion of mixed uses, minimum residential ratio, public transport development, reduction of road space, reopening of sealed soil areas.

Residential construction policies

Residential construction policies are currently in a phase of realignment. This must be used urgently to reform residential policies so that in future they can contribute to a development of settlements with economy of space and preservation of the countryside. Up to now this is only the case in a narrow sector of residential policy. The following areas appear particularly in need of reform:

- Subsidy policies for owner-occupied residential premises should be differentiated, for example, so that building forms with economy of space are subsidised more and the purchase of property within existing urban areas is treated at least as well as new building projects.

- The construction of residential property near the centre of urban areas or on urban brownfield sites, which is generally hindered by high land prices and/or decontamination of inherited pollution, should be subsidised more than residential construction in other locations.
- Types of development such as detached single-family houses in locations with below-average public transport connections should be excluded from subsidies.
- New, denser residential forms with owner-occupied character and concepts which envisage mixed land use should be subsidised in special ways.
- The maintenance and modernisation of existing residential accommodation and its environment in cooperation with the owners and tenants must be given priority over new residential buildings in subsidy policy.
- The contribution of owner-occupied residential accommodation to the stabilisation of urban districts must be utilised. This must be taken into account in the privatisation of publicly owned residential accommodation.

Business promotion, structural policy

Just as in residential policy, the instruments of regional structural policy must also be designed in such a way that they promote not only economic policy, but also the goals of settlement and transport policy. Besides the concentration of subsidies on priority settlement areas, an extra staggering of subsidy quotas should also be introduced to provide above-average subsidies for space-saving alternatives to the present practice, e.g. by promoting multi-storey industrial buildings as an alternative to the normal single-storey buildings, developing existing areas rather than building on „greenfield" sites, promoting rail links and public transport rather than the creation of roads in industrial areas.

9.3 Infrastructure and transport policy

The development of motorised private transport is one of the main factors which encourages the expansion of settlement areas and the dispersion of settlements. Therefore, the control instruments of transport infrastructure and control policy are also an important element of our subject.

Transport route investment policies

In the last five post-war decades, the road networks in particularly have been extended considerably. On the whole investments in the railway network, which is where there was the greatest investment backlog, only began after 1990 with the all-German projects. The investment backlog in the railway system, which accumulated over several decades, has still not been made up. Even in the period from 1991 to 1997 a total of DM 171.5 bill. was invested in the road network (national trunk roads, regional trunk roads, local community roads) – more than twice the investments in railways and communal rail transport routes, which came to DM 74.8 bill. A clearer shift in investment priorities from the road to the railway is urgently needed – not only for reasons of settlement and trans-

port ecology, but also for economic reasons. Relief for the over-burdened road network should not be sought by building more roads, but rather by traffic avoidance strategies and by shifting traffic to the railway and to bus, cycle and ship.

Control tasks for car transport

The effects of the transport system on the development of the settlement structure are to some extent a consequence of subsidised mobility, both in individual and in public transport. But as long as the open and hidden subsidies for motorised road transport (tax benefits, transfer of the lion's share of the cost of accidents to the health insurance system etc.) are not abolished and the considerable external costs of motor vehicle transport are not internalised (i.e. charged to those who cause them), public subsidies for the public transport system must not be reduced and the railway system will remain at a competitive disadvantage.

External costs of the car transport system especially arise from environmental burdens, the use of land resources and the devaluation of urban residential districts. Calculations of the external costs of the car transport system in Germany produced results in the order of at least 80 to more than 200 billion DM per year. The mineral oil tax now charges the costs of roads and a small part of the external costs to those who cause these costs. A further increase of such control costs is therefore necessary. The discussion of suitable price policy control instruments mainly revolves around key indicators such as car mileage and fuel consumption. Both key indicators stand for a series of specific indicators, i.e. energy consumption, emission of pollution and noise, space required, hindrances, dangers etc. In addition to the reduction or abolition of subsidies (mileage allowance, accident costs etc.), the topic of control by price policy should therefore focus on the following elements:

- a further increase of the mineral oil tax in stages,
- replacement of the lorry window badge by a mileage charge for lorries (heavy goods transport charge) which is not limited to motorway transport, but covers the entire mileage of the lorry,
- as a supplementary control instrument at the local level, a further development of parking space management.

Control measures for parking and the number of cars in the town or city

The enormous amount of space needed for car transport, and especially for parking cars, is a major obstacle to the implementation of a compact, lively city or town with mixed land use and plenteous vegetation. Especially in the more densely built-up urban areas, the streets and squares, which are the most important public spaces, are to some extent occupied by cars. Regaining at least some of this land for free space and vegetation is one of the most important strategies of a sustainable urban development. That requires a mixture of various measures and instruments:

- provision of information about irreconcilable goals (an urban, ecological city and at the same time a city suited for car transport),

- promotion of car-free lifestyles in the town or city.
- promotion of car-sharing,
- parking fees in the streets, including parking fees for local residents,
- separation of residential and parking costs for rented flats and owner-occupied flats,
- as a supplementary measure: promotion of the construction and operation of local district garages.

The chances for a turnabout towards a development of settlements with economical use of resources are better now than they were before. This is indicated by the immense potential which now exists for development within urban areas and by the emerging social changes which could strengthen the renaissance of urban ways of life. To ensure that these chances can really be „opened up" and effectively used, we need a number of small stimuli in various areas of politics, such as those described in this study.