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Urban transformation for resilient cities

- Renaissance of comprehensive planning systems?

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Abstract

In the last decades of neoliberal politics, urban planning had almost lost its requirement to deal with comprehensive development plans and regulated planning systems. In the face of climate change, mitigation and adaptation strategies are forcing the cities to deal with strategic climate concepts, which have a huge impact on the urban structure and urban planning policy. Meteorologists are acting as new “reformers”, demanding for a new understanding of a regulated society to control the climate change. If climate concepts would be combined with strategic urban planning concepts, the comprehensive planning system could find a renaissance, together with new models of urban planning. Although a lot of mitigation strategies are already implemented, there is the need to deal especially with the consequences of climate change. Adaptation measures have a radical impact on the urban structure. This can change the understanding of a flexible planning system of the last decades. In Germany the federal building code (“Baugesetzbuch”) gives a legal basis for a better integration of climate concepts into the regulated planning system. The “German Adaptation Strategy” focuses on comprehensive planning strategies, on integration of different stakeholders and on resilient urban structures to avoid conflicts between mitigation and adaptation. In the research project “Adaptation Strategies for Stuttgart Region” new adaptation plans and governance structures for two case studies will be developed, and how to implement them in planning instruments like land use plan and local development plan.

1. Introduction

Climate change is accelerating, the change concerns every country worldwide. In Germany the average annual temperature has risen by 0,9°C between the years 1901 – 2006, this leads to more hot days with temperatures of more than 30 °C (Bundesregierung, 2008, pp. 9; Reuter u. Kapp, 2012, pp. 64; Henninger, 2011, pp. 176). Less rain in the summers and more rain in the late winters are expected. This affects more floods in spring and drought in the summers, in general there will be more extreme weather conditions (Umweltbundesamt, 2013, pp. 37-38; IPCC, 2007, pp. 32). Climate projections show that the changes will further continue (e.g. IPCC, 2007). Due to climate change, cities have to protect against the consequences and have to adapt to the climate changes, which are actually occurred. Cities need climate action plans to reduce their vulnerability and to be more resilient – as part of a comprehensive strategy and not only the result of project-oriented measures. However these new climate action plans are often without a comprehensible method and are seldom connected with other issues of urban development, which can have an indirect impact on climate policy. As Germany has a comprehensive planning system of Zoning Planning (“Bauleitplanung”) for cities, the new climate action plans could be systematically and methodically connected with urban development strategies and a new urban governance, also as part of the general “Urban Development Policy” formulated in the Leipzig Charter of European Union 2007.

2. Regulative German planning system and governance

Although the “European Cities” have a similar tradition of urbanism and urban design, and a common context of European Union, the planning systems are very different. In West-Europe five different approaches can be differentiated (Duehr, S.; Colomb, C.; Nadin, V. 2010):

- „Urbanistic“: Focus on urban design and building design regulations (South Europe like Italy).
- “Public-Private-Partnership”: Negotiated masterplans for projects (Great Britain).
- “State planning”: Centralistic planning, state infrastructure, controlled planning (France).
- “Social welfare”: Social cohesion, state planning, balances of public interests (Scandinavia).
- “Zoning plans”: Regulation through plans, controlled development (Germany).

In comparison to other European countries Germany has a high-regulated planning system, connected with strong planning governance in the municipalities – they have the authority to decide about almost all of their planning tasks. The Federal Building Code (Baugesetzbuch) gives a formal framework for zoning plans on the level of the city and the quarter (land use plan = Flächennutzungsplan and local development plan = Bebauungsplan), so that in every city the same system and layout of plans have to be implemented. But also informal plans like urban development plans or framework plans have a strong impact on the order of the cities. Planning departments in the cities of Germany can regulate the zoning, the density and the design of all spatial and sectoral aspects of their city in their own responsibility. The German planning system has also aspects of negotiations and public-private partnerships, but all based on the strict regulated planning rules.

In the 1970s planning was seen as a comprehensive urban development approach, which covers all sectors and all spatial levels of a city, connected with strong governance in a cross-sectoral planning department. In the following decades this approach lost its power, because it was difficult to deal with too much complexity in such a planning demand. Also in the 1980s the interest in strategic planning decreased – neoliberal politics were supporting more project-oriented and investment-friendly urban planning. According to demands of sustainability and reurbanisation, development planning became more important again – as a strategic plan with a clear orientation on implementation and with participation (Albers, Wékel 1996). In the “Leipzig Charter” of European Union 2007 cities are requested to create strategic urban development plans – based on the experiences in Germany especially in cities like Berlin, Hamburg or Leipzig (European Union, 2007).

These different planning approaches are also reflected in the governance structure for planning. As in the 1970s the planning department was directly connected with the Lord Mayor or had a powerful, interdisciplinary department, it lost also its power in the 1980s and became a “normal” sectoral department like others. In the last decade again some new cross-sectoral departments for planning or sustainability had been established, as the case studies will show.

The question is, if challenges like climate change, but also demographical change and social cohesion will support a renaissance of urban development plans. Since the last decade, almost every city has launched a climate plan, mostly focused on mitigation and energy. These climate plans are not only a guideline to improve green energy. They also have to be implemented as objectives and measures into the zoning plans – the planning regulations had been expanded to climate aspects in the last years. As climate adaptation is a new approach, there are questions how to connect this with the existing planning system. Not only as task for landscape planning, but also as a general planning approach dealing with density and vulnerability. Another question is, how to deal with target conflicts between adaptation and general objectives like Compact City

3. Integration of climate adaptation strategies into urban development

To reduce climate risks, a lot of mitigation concepts had been created and mitigation measures had been implemented. But climate change and its impacts will keep up, even if anthropogenic emissions of greenhouse gases are inhibited (IPCC, 2014, pp. 17). Adaptation strategies become increasingly important, they contain efforts to reduce the vulnerability to climate change impacts (Birkmann et al., 2012, pp. 1f). Adaptation is often seen as an antithesis of mitigation, but it must be more perceived as a dual strategy (Birkmann et al., 2012, pp. 1f; Stock, Walkenhorst, 2006), adaptation and mitigation are additional strategies (IPCC, 2014, pp. 17, BMVBS/BBSR, 2009b, pp. 7ff). For this reason the German federal government published the “German Adaptation Strategy” (Deutsche Anpassungsstrategie DAS), the main goal is to create a framework for dealing with the challenges of climate change. In this context risks and also the requirement for actions should be identified, goals for dealing with the climate change should be set and adaptation measures should be developed (Bundesregierung, 2008, pp. 4). The strategy also focuses on comprehensive planning strategies, on integration of different stakeholders and on resilient urban structures to avoid conflicts between mitigation and adaptation (Bundesregierung, 2008, pp. 7, 42).

It is important to combine mitigation and adaptation strategies, but also to realize the target conflicts. With mitigation we try to reduce the human effects on climate change. Without leaving this objective, adaptation is necessary to be prepared for expected changes. Both mitigation and adaptation strategies should be part of strategic climate concepts, which have a huge impact on the urban planning policy. But these strategies can be in conflict with each other: For example adaptation measures like flood protection, extending green belts or reducing urban density have a radical effect on the urban structure – on the other side most of the mitigation plans are following a city model of more density, functional mixture and small traffic according to the Leipzig Charta (BMVBS/BBSR, 2009a, pp. 32). Anyway also synergies between mitigation and adaptation should be defined (Barker et al., 2007, pp. 748 ff).

Most of German municipalities have a formulated planning model, which sets an overall urban development strategy. Existing planning models are “Compact City” or “Sustainable City” from Leipzig Charter. The question is, if the cities are already prepared for the challenges of climate change or if they need new models like “Resilient City”, which can deal with uncertainties of consequences. Though the term “Resilience” is controversial because of varied definitions in different disciplines and fuzzy boundaries between them (Kaltenbrunner, 2013, pp. 290). Nevertheless some researches already examined different planning models regarding to climate change, founded on the concept of resilience. The term of resilience gives a basis for dealing with climate change at the city level (BMVBS/BBSR, 2009a, pp. 9ff; Knieling et al., 2012, pp. 14). The word describes resistance, robustness and adaptation capacity (Knieling et al., 2014, pp. 14). The existing planning models had been verified on their capability for climate adaptation with different criteria. The result was that no planning model was completely appropriate for climate change adaptation (BMVBS/BBSR, 2009a, pp. 17-18; Knieling et al., 2014, pp. 58ff) – but “Compact City” had the highest ranking before models like “Edge City”, “In-between-city”, “Decentralization”, “New Urbanism” and “Net City”.

Today municipalities mostly pursue the model “Compact City”. This model has to deal with target conflicts concerning adaptation and mitigation. The main conflict is between density, which is positive for the energy efficiency and with creating wide green areas, which is positive for a comfortable climate. To find a balance between these target conflicts it is important to take in account specific initial situation (BMVBS/BBSR, 2009a, pp. 32). A planning model fixing a framework for climate-optimized development could be a first approach in a comprehensive climate strategy. If climate concepts would be combined with strategic urban planning concepts and also with the formal instruments, the comprehensive planning system could be strengthened, together with new models of urban planning.

In Germany the building code with its climate adaptation amendments of 2011 already gives a legal basis for a better integration of climate aspects into the regulated planning system (Umweltbundesamt, 2012, pp. 25ff). In particular, the amendments are forming a legal framework to the municipalities; there are new tools to support the preparation and implementation of climate change adaptation measures. Mitigation and adaptation are now planning guiding principles (§§1 para. 5 sentence 2, §1a para. 5). Thereby both mitigation as well as adaptation are getting more and more an important task of formal planning. Informal plans, also sectoral plans like climate concepts can be developed, which are then incorporated as outcome-related basis in the planning process. On this basis a city-wide strategy of “Climate Zoning Plans” can be achieved, which bundles all aspects of climate mitigation, adaptation and resilience. Climate reports (Fachgutachten), climate analysis and climate adaptation concepts can be implemented into different scale levels (Figure 1: HFT Stuttgart IAF).

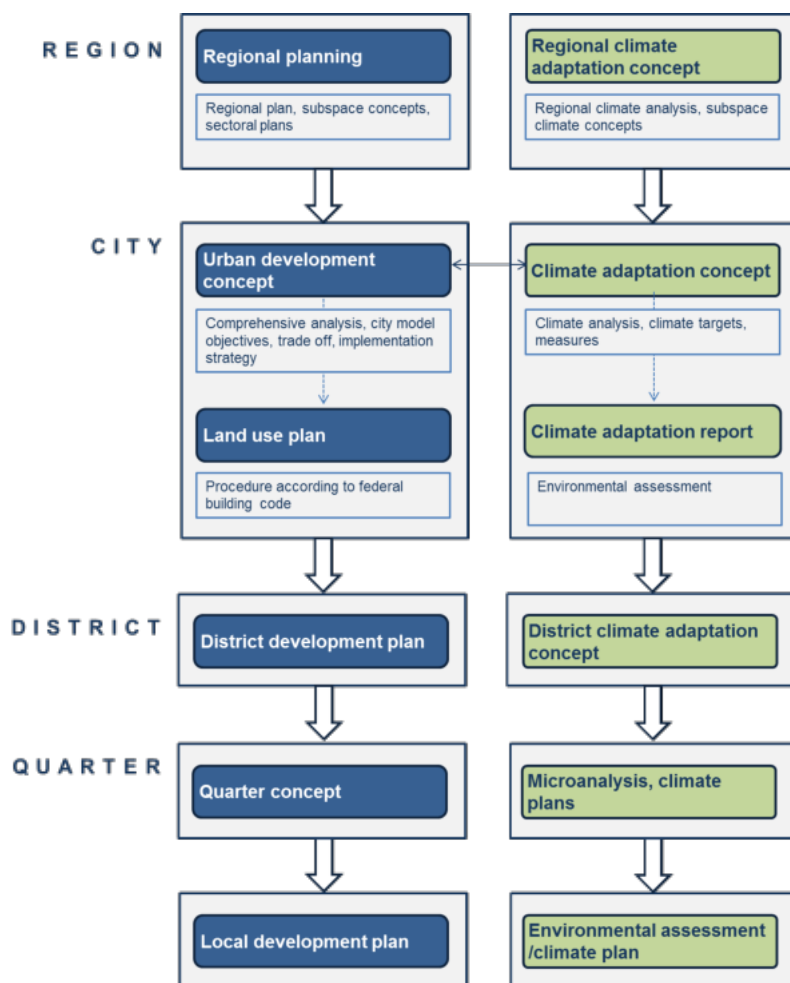


Figure 1. Climate Zoning Plan

4. Adaptation strategies of the cities of Esslingen and Ludwigsburg

The growing region of Stuttgart is located in the center of Baden-Württemberg. A valley and hillsides characterize the city structure. Because of this specific location, the climate and the building development the regular air exchange is restricted (Verband Region Stuttgart, 2008). In 2008 the Verband Region Stuttgart (VRS) has already launched a “Climate Atlas” for the whole region of Stuttgart (Regionaler Klimaatlas). Heat waves, floods, low water levels, drought, heavy storms and thunderstorms are expected impacts of the climate change in the region (Verband Region Stuttgart, 2008). These informations have already been incorporated into the regional plan; green belts and green corridors have been determined. The two case studies Ludwigsburg and Esslingen am Neckar are located next to Stuttgart, but both cities have different topographic situations. While Ludwigsburg is nearly flat, Esslingen has a valley and hillsides. The climate situation of the cities is described in the Climate Atlas. In 2011 as part of a research project a vulnerability analysis was created (Weis et al., 2011): One problem in both cities is the number of hot days, this has a high impact on the human health (Weis et al., 2011, pp. 87 ff; Verband Region Stuttgart, 2008, pp. 131ff). To encounter this problem, different measures are necessary. On this basis the two cities pursue model approaches in collaborative projects.

To face the climate change the joint project of the Verband Region Stuttgart, University of Applied Sciences Stuttgart, the cities Esslingen am Neckar and Ludwigsburg and the Energetikom - energy competence and ecodesign e.V. Ludwigsburg was initiated (Figure 2: HFT Stuttgart). The German Federal Ministry for Environment, Nature Conservation, Building and Nuclear Safety supports the research project, which has a focus on adapting to the impacts of climate change.



Figure 2. Stakeholders and project structure

The aim of the joint project "Climate Change Adaptation Region Stuttgart" (KARS) is to connect climate adaptation strategies with the urban and regional planning system, and to link them with energy concepts. In this framework, target conflicts between adaptation, mitigation and urban development will be examined. Also the existing city models will be analyzed if they are fitting to adaptation needs. In the next step a new suggested city model will be implemented on different planning levels and instruments, the climate zoning plan will be expanded with aspects of climate adaptation. Furthermore informal planning approaches such as inter-municipal cooperation, urban development concepts or climate concepts are examined and linked with the formal planning. As a result of the research project, a planning guideline is developed, which evaluates in the practice of urban and regional planning. We are also looking for new adaptation plans for the two case studies and how to implement them in planning instruments (BMUB, 2014). The approaches of the two case studies differ a lot in dealing with planning instruments.

Case study Esslingen am Neckar

The city of Esslingen goes the classical way based on the formal planning process. On the basis of a comprehensive urban development strategy and a participation process, the city is currently designing a new land use plan as a formal planning instrument. This process is part of the whole urban development strategy, which runs since 2007 combined with a comprehensive participation strategy for discussing about the future development of the city. Besides the elaboration of the new land use plan a new city model was discussed and will be implemented. The land use plan should be the instrument to fix the urban planning until 2030 (Esslingen am Neckar, 2014, pp. 4).

Esslingen has also a classical governance structure, with a strong urban planning section, which also includes climate topics. The planning section is responsible for both urban development plan and land use plan, and also for climate adaption and mitigation plans. The planners are responsible for the comprehensive approach, but they are only one section in a bigger department (Dezernat) (Figure 3: HFT Stuttgart).

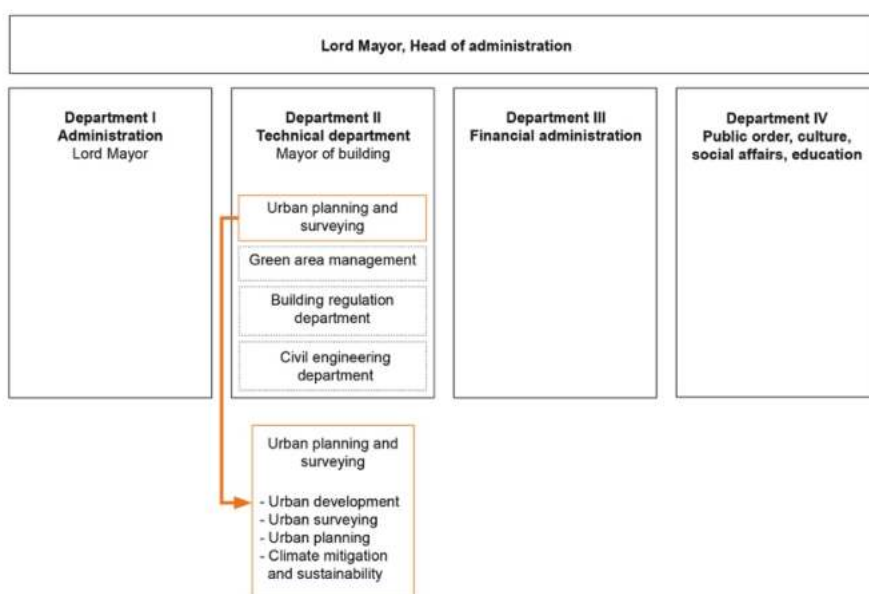


Figure 3. Planning governance in city of Esslingen

The city has already an integrated climate mitigation concept together with an energy use plan (Energienutzungsplan). These concepts are now going to be expanded on the integration of adaptation aspects. Esslingen am Neckar integrates measures to adapt to climate change at an early stage. The city council works on an innovative approach by extending the land use plan with climate aspects. Based on the planning regulation symbols (Planzeichenverordnung, PlanZV) the land use plan regulates different areas concerning the function. After a comprehensive analysis of the climate in Esslingen and suggestions from the residents, which came out of a wide participation process, more than 20 spatial structure plans were created. The plans deal with various sectoral topics, like industry, living, energy, use of energy, mobility, landscape, green areas, image and also climate (Figure 4: Esslingen am Neckar, 2012a). The most important content of the spatial structure plans for climate are fresh air corridors, which should be protected from the hillside into the valley (Esslingen am Neckar, 2012a).

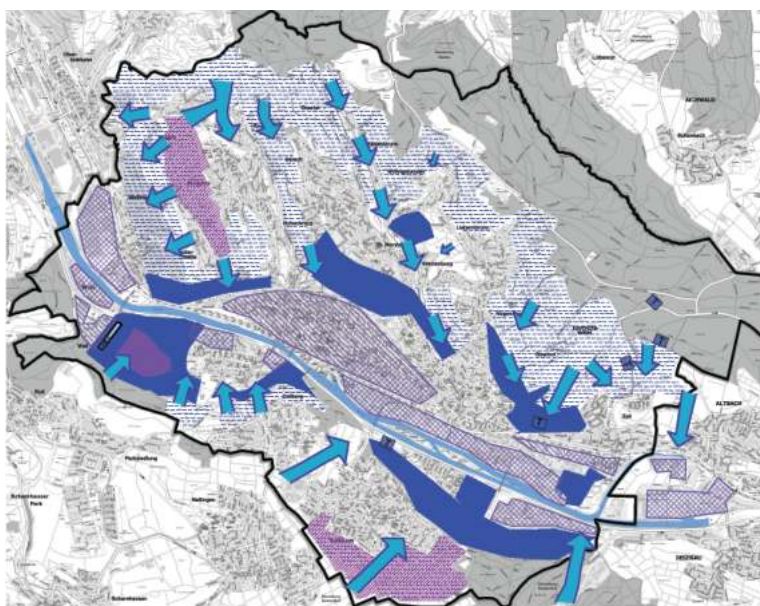


Figure 4. Spatial structure plans for the climate in Esslingen (arrow symbolizes fresh air corridors)

The main issues of the climate plan will be introduced to the land use plan with new planning regulation symbols (Planzeichen) (Figure 5: Esslingen am Neckar, 2012b). The symbols will show areas for protecting fresh air corridors and de-densification (Entdichtung), areas for expanding greenspaces especially in residential areas, areas where a densification is possible and areas where the inner development should be strengthened (Esslingen am Neckar, 2012b).

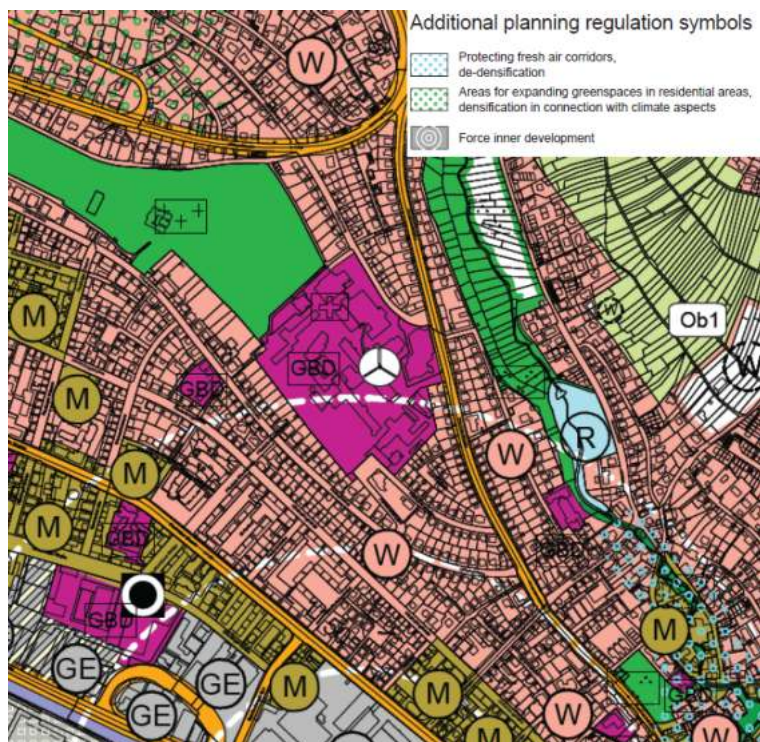


Figure 5. Preliminary draft (Vorentwurf) of the land use plan, section of the plan Esslingen

In the participation process it became clear that the questions of density and protecting fresh air corridors are crucial. Until now only a preliminary draft (Vorentwurf) exists for the land use plan, which has no legal binding yet. In 2015 an intense dialogue process has started for the future urban development, where all previous plans will be reconsidered (BMUB, 2014; Esslingen am Neckar, 2014).

Case study Ludwigsburg

The city of Ludwigsburg has a main focus on informal concepts. It operates since ten years a very intense urban development process with integrated sectoral concepts and a strong urban development department, but with less spatial concepts. However the formal land use plan is now about 30 years old. The whole urban development of the last years refers more to the informal urban development concept.

The urban development concept considers different sectoral plans, focusing various issues like cultural live, industry and employment, inner city, green in the city, mobility, energy, education, care etc. The concept also focuses district development concepts for the whole city. The whole process was accompanied by a participation strategy (Ludwigsburg, 2012). Every three years there is a big future conference (Zukunftskonferenz) open to the citizens, where the development strategy for the future is reviewed and further developed.

The governance structure of Ludwigsburg also changed following the comprehensive urban development strategy. In 2008 the new division of “Sustainable Development” (Referat Nachhaltige Stadtentwicklung) had been founded and is directly under control of the lord mayor. This division combines all cross-sectoral tasks like urban development, urban renewal, climate planning and economic promotion (Figure 6: HFT Stuttgart). As a consequence the comprehensive strategy is also part of the Governance structure, as all main measures of the city have to fit to the objectives of the urban development plan, monitored by the division. In difference to Esslingen the planning department is only responsible for the land use plan and the zoning plans, but not for the comprehensive urban development.

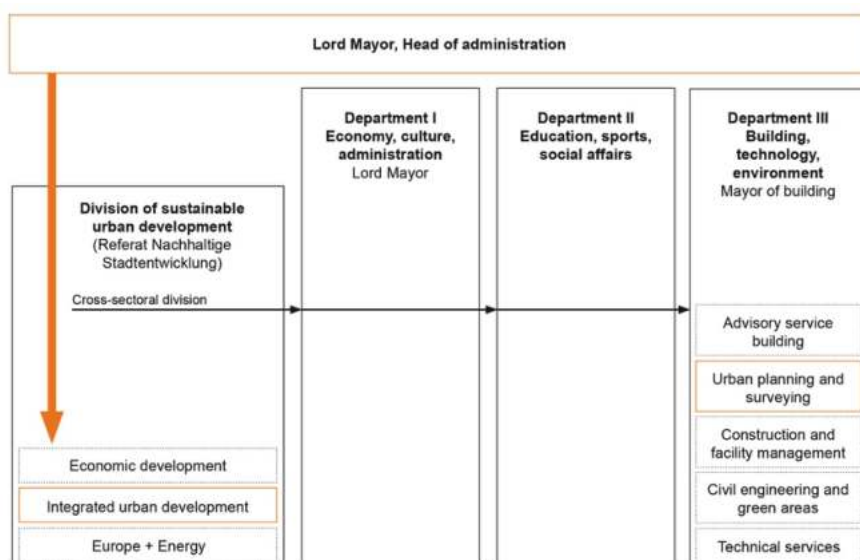


Figure 6. Planning governance in city of Ludwigsburg

In the research project Ludwigsburg is focusing on development and adapting plans at the district level for the Oststadt. A brownfield close to the stadium shall be transformed to a new housing area. On district conferences the residents had the chance to participate on the future targets. Also a design competition has been implemented in 2014 (Figure 7: Mess GbR, Urbane Gestalt, SHP Ingenieure).



Figure 7. Result of the urban design competition in the development area East of Ludwigsburg

As part of the competition a climate adaptation analysis was accomplished. Climate aspects - in form of a checklist - have already been mentioned in the examination (Vorprüfung) of the competition. To consider the climate more precise in the urban design and the height of the buildings, a microclimate analysis is implemented. At the end this should lead to a climate optimized plan for the future buildings. As an example a public space will be simulated and transformed into a climate-adapted space. Although plantings, floor covering, outdoor urban furniture and the whole design must be taken in account (BMUB, 2014).

5. Conclusions

Climate change forces the cities to develop comprehensive climate concepts for mitigation and adaptation. They have a huge impact on the city structure and the planning policy. Especially climate adaptation will get more important in the future. If climate concepts will be systematically integrated into the planning system like a climate zoning plan, the comprehensive planning approach will get a renaissance. Adaptation concepts also have to be also adjusted with mitigation strategies, because of synergies and target conflicts.

Adaptation as part of urban development also needs new governance structures, which are integrating experts of different disciplines like meteorology, urban climatology, urban planning, landscape planning and others. Departments responsible for climate planning should be close to the Lord Mayor and have a cross-sectorial approach.

Both cities are following different approaches in implementing adaptation strategies into the planning system and also in the governance structure in their councils (Figure 8: HFT Stuttgart). Both cities worked on comprehensive participation strategies, and they developed self-standing climate concepts. But Esslingen developed more formal planning instruments and integrated climate aspects (mitigation and adaptation) into the land use plan– connected with a strong planning section. In contrast Ludwigsburg worked with informal urban development plans, which are detailed in sectoral and district plans – they became powerful connected with a big division for sustainable development close to the Lord Mayor, which can implement and control main projects cross-sectorial.

The innovative approaches in dealing with climate adaptation could be a model for other cities. It is important to connect informal instruments with a formal planning strategy. If climate concepts stay informal like in Ludwigsburg, they cannot really be implemented if there are crucial conflicts on the level on a project or it can lead to a lot of approvals for exceptions. Esslingen is also starting with informal plans, but implementing them in the city land use plan, with new symbols and structural plans. This approach is more consistent, new objectives like air corridors will have a long-lasting effect.

Adaption strategies will be a main task for urban planning in the future. There are still a lot of open questions about the methods, the range and the effect on urban structure. But they will influence strongly our land use plans and our objectives of landscape planning and urban renewal. And it is still an open question, which city model considers best the climate change and strengthens the resilience, without losing objectives of mitigation and sustainability.

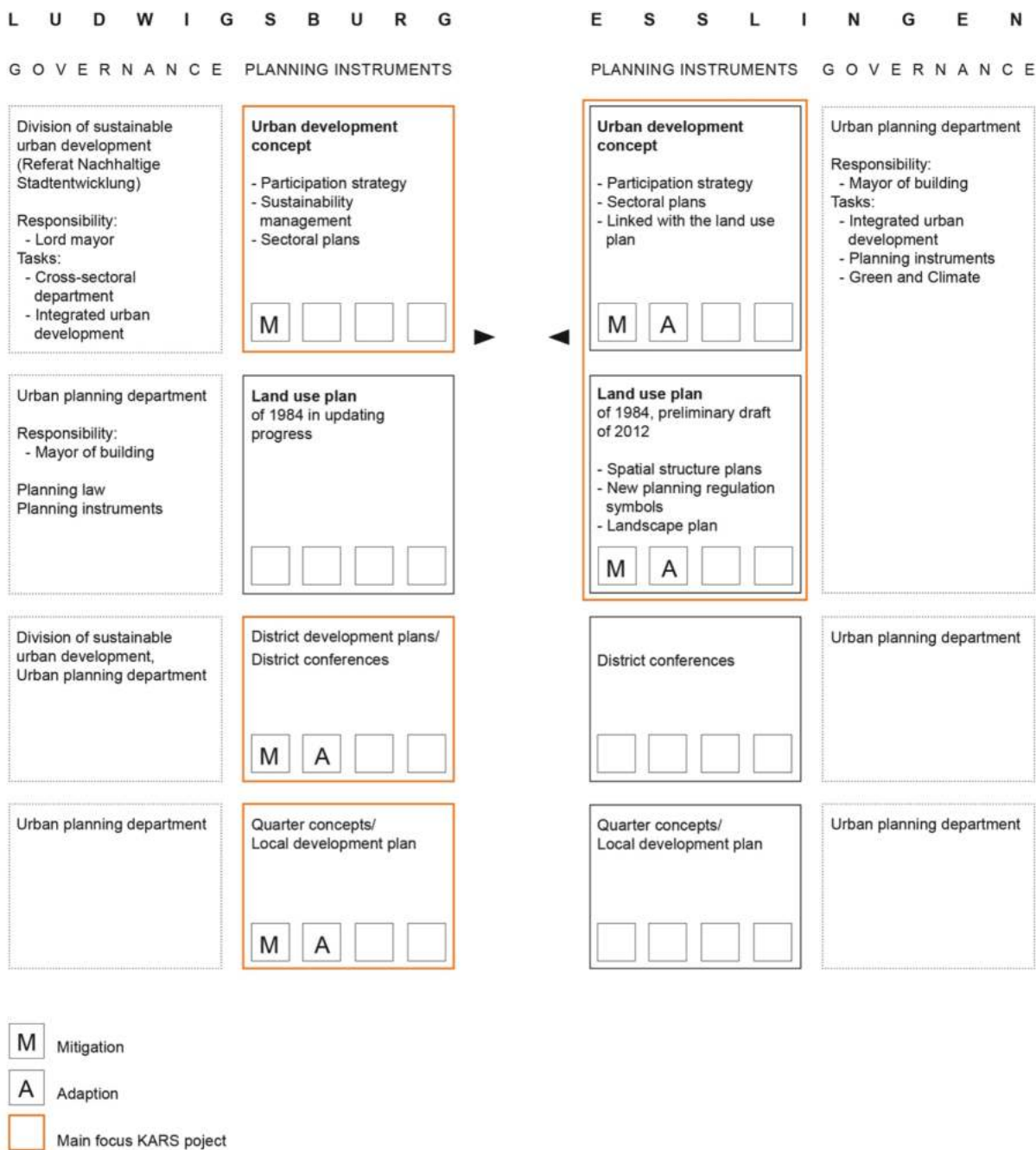


Figure 8. Case study comparison: Integration of climate adaptation measures in the urban development and governance structure

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