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Field trips to Austria and Serbia

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Photo on the cover: Urban Planning and Smart Cities – Dar Al Riyadh
Source: http://www.daralriyadh.com/en/services-2/urban-planning-and-smart-cities/

What about "Smart Planning"?

One of today's main challenges is how we should plan, design, built and live in our settlements, cities and regions in the future. The actual discourse in the field of urban and regional planning is guided by the term of "Smart City and Smart Region" with a lot of new research and planning concepts related to the energy efficiency, smart building, multimodal mobility, shared economy, 4.0 industry and last but not least environment protection. In most cases, all these concepts are following the goal to make the living area sustainable and fit for the future. With other words, to increasing the quality of life of the inhabitants.

What does smart planning mean? Is there a common definition of Smart City and/or Smart Region? Does every city and region need a Smart City development Strategy? If yes, how to promote, explain and implement these strategies? Do we have to change our planning view or the integrated planning approach to create smart cities and regions? These questions are common for planners in Europe and perhaps worldwide. One of possible definition by Prof. Rudolf Giffinger is:

> *"A Smart City is a city well performing built on the 'smart' combination of endowments and activities of self-decisive, independent and aware citizens."*[1]

In order to enhance the quality of education, we are always try to offer practice-oriented teaching by going into the field. The build environment is the laboratory of Spatial Planners and very necessary for a contemporary education. Not less important for the education of Spatial Planners is get in contact with planning practices and planning methods in other countries. Widening the horizon, means also widening your wisdom. Since nearly ten years, the University of Belgrade and the Vienna University of Technology, through exchanging staff in teaching and educating activities, cooperate in the field of Spatial Planning. This collaboration should continue with the next generation of Spatial Planners of both institutions working, thinking, acting and teaching together.

The most logical form to tackle the above-mentioned challenges of Spatial Planning in practice, with the university approaches of practice-oriented teaching is the form of student´s excursion. This frame of teaching includes lectures, workshops, on-site visiting and round table discussion. On this way, we bring experts of Spatial Planning from different countries and cultures together with the next generation for Spatial Planners and enable mutual inspiration and learning.

[1] Annalisa Cocchia, p 13-43 in "Smart City. How to Create Public and Economic Value with High Technology in Urban Space", Dameri, R-P.; Rosenthal-Sabroux, C. (Eds.), 2014, VIII, Springer, ISBN: 978-3-319-06159-7

The program and the time schedule was set, but big questions were still open. How should we channel the wealth information about smart cities and regions? There is no unique definition about the "Smart City", on which aspects should be the focus of "smartness"? Beside the knowledge gain and exchange, what should be the benefit for our students? We decided to ask students, what smart planning and smart governance mean for them in context of:

- Built environment (smart settlements, smart neighbourhoods, smart buildings …)
- Mobility (public-transport, e-mobility, low-carbon, mobility hubs, city logistic, city bike, bike routes, shared mobility …)
- Resources efficiency and environment protection (renewable energy, smart grids, green belt, green economic, green buildings, water supply, disposal of waste …)
- Smart business and smart agriculture (start-ups, industry 4.0, internet of things, vertical gardening, urban gardening …)

Their answers elaborated in mixed groups of Austrian and Serbian students, have been published in this special issue of journal PROSTOR.

Enjoy while reading….

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Marvin Mitterwallner, Christina Birett

EXCURSION REPORT „SMART PLANNING?“

The excursion „Smart Planning?“ took place as a cooperation between the Faculty of Geography of the University Belgrade and the Department of Regional Planning of the Technical University Vienna in two parts. First part was a study trip for the Belgradian students to Austria; visiting several cities as for example Graz and Ebreichsdorf, and projects in, one of the most livable citys of the world, Vienna[1]. The second part was a trip to Serbia, not only visiting the capital Belgrade, the biggest city of Serbia and one of the fastest growing cities on Balkan[2], but other major cities like Novi Sad and hotspots of development like the Golubac fortress at the Serbian – Romanian border.

The goal of the excursion was to get an overall understanding on different “smart” topics, like build environment such as smart buildings, smart neighborhoods, smart settlements and smart cities (e.g. smart city frameworks); smart mobility solutions in the field of public transport, e-mobility, city bikes, bike routes and bike sharing, mobility hubs. But also, insight of immanent topics of city development and the differences between Austrian and Serbian planning approaches in resource efficiency and environment protection, implementation of smart businesses in green economics like for example IOT, industry 4.0, or urban and vertical gardening initiatives, mainly done by start-ups.

During the excursion we learned that there is a wide range of different topics and tasks which are considered smart and there are many ways to interpret smart. To have a smart urban development it is needed to combine diverse technologies and strategies to reduce their environmental impact and raise the quality of life for citizens. In order to achieve sustainable urban development accepted by the people, it is necessary to involve the most significant factor in planning issues, the human. Information and participation of the community is essential to achieve change in our planning tradition and to raise awareness about smart urban development.

Illustration 1. Golubac Fortress (Source: https://www.serbianprivatetours.com/tag/golubac-fortress/)

For recording our experiences during the excursion, small research groups with a certain scope on one so called smart topic were built. The following paper combines received information during the excursion program, the urban planning institute Belgrade, other officials we met in Austria and Serbia at different spots and personal observations. The focus of this input is largely on comparing the different stages, levels and importance of smart city initiatives in Belgrade and Vienna and limits the scope on smart mobility topics.

[1] https://www.mercer.com/newsroom/2018-quality-of-living-survey.html

[2] http://worldpopulationreview.com/world-cities/belgrade-population/

SMART CITY VIENNA

Vienna is among the most successful cities worldwide where quality of life, infrastructure and innovation are concerned. But the City of Vienna is facing challenging times ahead. The population in the federal capital is growing and will reach the two million mark in the next ten years. This development goes hand in hand with a rising demand for energy, demand for affordable and functional housing and a need for strong traffic concepts. The aim of the city government is to hold this position in times to come. That is why the initiative of the "Smart City Wien" was launched and announced by the major of Vienna in 2011[3], ending in the Smart City Framework of 2014[4].

Illustration 2,© Vienna City Administration (Source: http://www.smartcitywien.at)

Framework strategy, Smart City Vienna

The Smart City Wien framework strategy defines goals for the development of a city that assigns priority to, and interlinks, the issues of energy, mobility, buildings and infrastructure. The framework strategy defines one meta goal for 2050: "The best quality of life for all inhabitants of Vienna, while minimizing the consumption of resources. This will be realized through comprehensive innovation.

The document defines a long-term umbrella strategy for 2050 and is implemented with the help of specific, time-phased goals, which are subject to ongoing monitoring and review. The Smart City Wien Framework Strategy identifies three main areas: Resources, Quality of Life, and Innovation. Each central aspect of the Smart City Strategy Vienna is represented by an overarching goal that is to be attained by means of detailed targets. The strategy defines ten focus areas. For example, for "Resources" the focus areas are "Energy", "Mobility", "Buildings" and "Infrastructure".

A monitoring process not only served to measure the achievement of goals but also to prepare for a corresponding update of the framework strategy was started 2017[5].

Objectives, Smart City Vienna

As the overall objective of the Smart City Wien Framework Strategy is "the best quality of life for all inhabitants of Vienna, while minimizing the consumption of resources. This will be realized through comprehensive innovation." Each of the central areas of the framework strategy and the therein specified topics (such as energy, mobility, buildings and infrastructure in the central area "resources") are underpinned through precisely defined objectives. A total of 38 specific objectives were defined in the Smart City Vienna Framework Strategy. The timeframe of the objectives is until 2050, but many objectives incorporate realization steps until 2025 or 2030.

[3] Smart City Wien, Vision 2050 – "Roadmap for 2020 and beyond", Aktionsplan zur Smart City Wien: https://www.wien.gv.at/stadtentwicklung/studien/pdf/b008218.pdf

[4] https://smartcity.wien.gv.at/site/files/2016/12/SC_LF_Kern_ENG_2016_WEB_Einzel.pdf

[5] https://smartcity.wien.gv.at/site/en/the-initiative/framework-strategy/

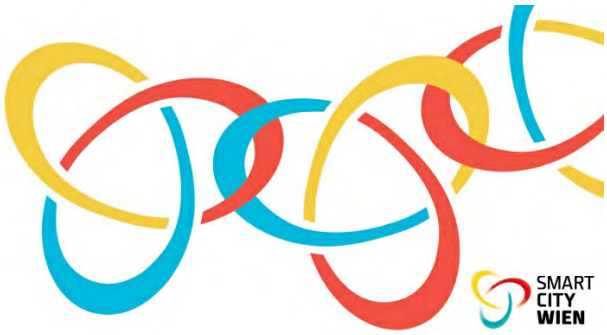

Illustration 3 and 3a. © Vienna City Administration (Source: http://www.smartcitywien.at)

Specific objectives of the Smart City Wien are among others:

- Significantly reducing emissions (CO2, greenhouse gases, …) and, as a result, achieving EU climate protection targets. Long-term objective: a zero emission city, zero emission buildings as standard
- Significantly reducing energy consumption. Long-term objective: reaching close-to-zero energy standards in new and existing buildings by 2020.
- Significantly increasing the use of renewable sources of energy (e.g. in public buildings).
- Raising awareness in the wider public about responsible use of resources (energy, water).
- Giving citizens (from consumers to prosumers) an active role by providing opportunities for actively controlling additional areas of daily life.
- Promoting multi-modal transport systems by improving the public transport network, enhancing networking between individual transport carriers, and significantly reducing individual motorized transport.
- Positioning Vienna as a model European environmental city and as a leading European centre for research and technological development at an international level.[6]

Mobility, Smart City Vienna

Vienna is growing, and so is the number of trips taken within the city. In the field of mobility, attention is paid to ensure sufficiency as well as efficiency. Both the time required by citizens for everyday mobility and the number of trips taken are subject to only minimal variations. If the mode share of motorized individual traffic remained unaltered, the population growth would also lead to a rising number of car trips by 2025, resulting in its turn in increasing energy demand and pollutant emissions due to traffic as well as in the intensified use of already scarce urban space. This does not tally with the objective of high quality of life for all urban dwellers. Short distances can be easily covered by bike or on foot. Conversely, a shift in traffic that favors walking and cycling can in the long term strengthen urban structures with manifold service, shopping and leisure attractions in the immediate surroundings. Resource-conserving mobility means combining the claim of high quality of life with short distances. If the use of motorized vehicles is a necessity, these should run on CO2-free, energy-saving propulsion types and renewable energy sources[7].

As a lot of these objectives are closely linked, key objectives in terms of new mobility behaviors and solutions were implemented in the framework:

- Strengthening of CO2-free modes (walking and cycling), maintenance of the high share of public transport and decrease of motorized individual traffic (MIT) in the city to 20% by 2025, to 15% by 2030, and to markedly less than 15% by 2050.
- By 2030, the largest possible share of MIT is to be shifted to public transport and non-motorized types of traffic or should make use of new propulsion technologies (e.g. electric-powered vehicles).
- By 2050, all motorized individual traffic within the municipal boundaries is to make do without conventional propulsion technologies.
- By 2030, commercial traffic originating and terminating within the municipal boundaries is to be largely CO2-free.
- Reduction of energy consumption by passenger traffic across municipal boundaries by 10% in 2030.[8]

Vienna tries to reach the future goals concerning mobility on an equal basis for the population and expresses this as like: "Mobility requires human-scale and eco-compatible forms of transport. The City of Vienna is committed to prioritising public transport, pedestrians and cycling as the most environmentally friendly mobility modes. Vienna embodies a future-oriented urban mobility policy that is not only ecologically, but also economically and socially acceptable and hence sustainable. It is economically sustainable because it is based on long-term investment that pays off for the city

[6] https://smartcity.wien.gv.at/site/en/the-initiative/strategy-objectives/

[7] Smart City Framework short: https://www.wien.gv.at/stadtentwicklung/studien/pdf/b008384b.pdf

[8] Smart City Framework short: https://www.wien.gv.at/stadtentwicklung/studien/pdf/b008384b.pdf

and location. It is socially sustainable because its declared goal is to ensure mobility for all citizens irrespective of their income, social position and life situation. It is ecologically sustainable because it helps to conserve natural resources and contributes to realising the Smart City Wien objective."[9]

THE SHOWCASE, SMART URBAN LAB ASPERN SEESTADT

Key target of urban labs is studying practical aspects of smart urban development in a city development area. "Aspern" and "Liesing" are used as testing grounds for implementing new ideas, technologies and concepts. The focus is on exploring innovative building technologies, smart infrastructure and sustainable mobility concepts from scratch. The experience gained in the course will be useful for other urban development areas.

Mobility in Aspern Seestadt

The focus on residents mobility behavior in the development area is part of the design of Aspern Urban Lakeside since the very beginning. 80% of all distances are to be covered on foot, by bicycle or public transport. U2 underground stations Aspern Nord and Seestadt offer direct access to Vienna's public transport network. A bike rental system for residents with currently six stations, offers different bicycles, including e-bikes and cargo bikes. Communal garages are on strategic points across the project area. Both public transport stops, and parking spaces are within the same walking distance, encouraging residents to choose for public transport as their preferred transport mode. The main roads are designed to keep car traffic away from residential areas. Efforts to minimize above-ground parking spaces in public space ensure quality public space for recreation, pedestrians and cyclists. At Aspern mobility means a mix of numerous attractive measures financed by mobility fund through fees for garage installation and operation[10].

CONCLUSION

Facing the ongoing challenges of growing, the city of Vienna committed itself to the overall objective "the best quality of life for all inhabitants of Vienna, while minimizing the consumption of resources. This will be realized through comprehensive innovation." Meta goals for 2050 as understanding of a common planning philosophy for the next decades, and in specific time-phased mobility goals and objectives are implemented and realized in city development areas - smart urban labs. Living labs like this can provide the settings in which social and technological innovations in mobility can be developed, tested and monitored in real time with citizens. It can be an opportunity to rethink, reshape and develop new patterns of innovative or sustainable mobility[11].

In our consideration and reflection, this is a straight forward approach how Meta studies can be implemented trough and with stakeholder participation. The city government defined goals and objects in the framework and carried them out in real life city development areas by involving different stakeholders and implementing projects. Visible in a holistic planning approach to achieve self-set goals.

SMART CITY BELGRADE

Facing the multiplying challenges generated by contemporary processes, cities continuously redefine their physical and functional structure in order to improve their performances. The concept of smart city, targeting efficiency, livability and sustainability of urban systems, has become one of preferred options for urban development based on the benefits of the latest technologies. However, the diversity of local circumstances often questions universal 'smartness' and applicability of the general model, demanding continuous modifications and high level of flexibility. Considering the environmental, socio-economic and technological elements of urban setting of Serbia, the smart city concept in Belgrade is still in its initial phase.[12]

Belgrade, the capital of Serbia, has introduced some elements, which could be recognized as 'smart', but most of them serve as information platforms for citizens and/or tourists or the portals oriented towards e-government. The integration of smart features into the process of urban development is still in its initial phase in Serbia and Belgrade, but some examples demonstrate a number of possibilities for their use, especially in the process of adaptation to climate change. The advanced technology - ICT, represents the foundation for the necessary upgrading, which

[9] STEP 2025

[10] https://www.aspern-seestadt.at/jart/prj3/aspern/data/downloads/170720_Mobilitaetsplan_2017-07-20_1107702.pdf, Mobilitätsplan Seestadt aspern Stand 2017

[11] http://alt.tinavienna.at/en/smartcitywienagency/projects/aspernmobil

[12] Belgrade: Smart Solutions for the Climate Change Challenges? https://www.corp.at/archive/CORP2016_45.pdf

should be conducted both on the institutional and non-institutional level, via national strategies and programs, as well as by local governments and urban policies. Additionally, the link between the smart city concept and the anticipated aims of environmental adjustments could be established on all levels, allowing multidisciplinary targeting of environmental awareness, as well as the efficiency of urban systems and energy transition.

Mobility in Belgrade

Although a smart city framework as well as a holistic mobility concept for Belgrade is missing, some smart approaches are named in "the mobility management plan of the City of Belgrade". The concept of the municipality is a summary of actual traffic conditions. The basic strategic objective is to create and develop Belgrade's traffic system which will enable sustainable mobility of citizens, provide support to rapid urban development of the city and its competitiveness in the region and in south-east Europe. The introduction says: "the overall current situation in Belgrade, regarding mobility and traffic, is unsatisfactory. Major problems are the too large number of cars, bad infrastructure and as a consequence, huge air pollution".

The mobility management plan of the City of Belgrade

Despite the concept's focus on Belgrade and its local role, it predicts with expected economic development and increase in employment rate, the existing traffic system of Belgrade will not be able to provide a suitable level of service. This system will limit economic as well as any other development, it will not provide infrastructure for the necessary mobility. Due to underdeveloped infrastructure and large numbers of private vehicles Belgrade needs an environmentally friendly, improved system of public transport and further non-motorized solutions.

The Belgrade Mobility Management Plan is a summary of activities that should provide a shorter travel time, reduction of gas emissions and promote use of bicycles as transportation means, walking to work with aim to improve quality of life for the citizens of Belgrade.

The objectives of Mobility Management Plan are:

- Creation of the conditions for alternative forms of transportation and decrease in car use.
- Increase the participation of public transport in the overall transportation of citizens particularly of trolleys, bikes and boats (river transport).
- Providing information to users on the best transport means in Belgrade.
- Construction of infrastructure (bicycle lanes, increase tram lines and introduction of river transport) at the moment are set as top priority in achieving MMP.
- A special effort should be made for the education of citizens (beneficiaries) in order to raise awareness for the importance of implementation of projects.[13]

Mobility at Belgrade Waterfront

A new city development project is rising in the heart of Belgrade located on Save river. The Belgrade Waterfront project would have fulfilled all requirements of a smart urban lab. Next to the city center most of the distances could be covered on foot, by bicycle or public transport. It would have been a great opportunity to rethink common mobility behaviors in new built areas in Belgrade. In a showcase project the implementation of some suggested activities to turn the back on car dependent mobility would have been desirable.

Illustration 4. Belgrade Waterfront Project (Source: https://www.belgradewaterfront.com)

Unfortunately, we weren't able or allowed to get further information on the project or its mobility concept during our visit. As far as known the existing old fashioned main train station of Belgrade will be

[13] Mobility Management Plan of the City of Belgrade: www.southeast-europe.net/document.cmt?id=357

demolished, replaced by another train station in Belgrade's outskirts. Other public transport stations are not planned, so it will be another missed chance for less car traffic in the center of Belgrade. "Because the first street within Belgrade Waterfront is another step toward building a circled community that provides everything residents need for a comfortable life. The street is part of the future two-kilometer-long and 40-metre-wide Boulevard, which will include a bicycle path alongside the pavement".[14]

CONCLUSION

One of the problems in the local context of Serbia and Belgrade represents a discrepancy between official documents targeting environmental issues (and their smart solutions) and actual actions leading to the improvement of the general situation. The aims are vaguely defined and it is necessary to formulate precise objectives and their (measurable) indicators. The list of locally applicable 'smart' measures and tools should also be developed, providing guidelines for the efficient implementation and monitoring of their outcomes.[15]

Although Belgrade still has to develop a smart approach to its numerous environmental problems and use it for greener mobility in its urban area, the existing applications, platforms and concepts could serve as a starting point for improving traffic in Belgrade. The introduction of more participative formats will lead to citizens involving themselves to be part of the solution – as a smart response to self-made problems. Belgrade needs a holistic smart city approach to find their way out of the traffic jam.

[14] https://www.belgradewaterfront.com/en/construction-progress-january-2018/

[15] Belgrade: Smart Solutions for the Climate Change Challenges? https://www.corp.at/archive/CORP2016_45.pdf

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© Vienna City Administration / http://www.smartcitywien.at.

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http://www.telehouse.com/wp-content/uploads/2017/06/Telehouse-blog-6-1-17.png

SUSTAINABLE LANDSCAPE MANAGEMENT - THE EXAMPLE OF REGIONAL PARK MURAUEN

Milica Lukić, Vladimir Popović, Lucija Ašanin, Katarina Pješivac

INTRODUCTION

Austria is a rich country in natural heritage. Its natural landscapes are distinguished by an extraordinary biodiversity, hydrographic, geomorphologic and geologic objects, phenomenon's and processes, so they are under special regime of planning, managing and protection (Protić et al., 2017). Preserved nature, natural resources and regional specifics are one of the most important factors for prosperity of Austrian province of Styria. High quality and authentic landscapes contribute not only to development of tourism and agriculture, but also to education about environment protection, energy production from renewable sources of energy, and regional development in total. The focus of this research is Regional park Murauen – the biggest recreational zone in the immediate vicinity of the City of Graz (Figure 1) and one of the most famous landscapes of the whole region. The biggest hydrographic object and dominative element of the landscape is river Murauen with its coastal area rich in quality forest complexes, rare species (the most important are reptiles and bats), and their habitats (Regional park Murauen – Projektberich, 2015).

The area is recognized as a good example of sustainable landscape management, that managed to improve its ecological status and become "blue and green corridor of Graz" – new green, recreational center of the region, thanks to carefully chosen planning measures, clearly defined goals and priorities of spatial development. Zoning in accordance with real potentials and capacities, both on local and regional level, provided development of different activities within the Regional park (Figure 2).

The global trend of immigration, ie intense settlement of urban areas and their spatial spreading is also present in the region of Graz, which are the main reasons of growing pressure on the environment and natural ecosystems. As number of "users" of this limited space grows, meeting their needs becomes bigger challenge. Regional park

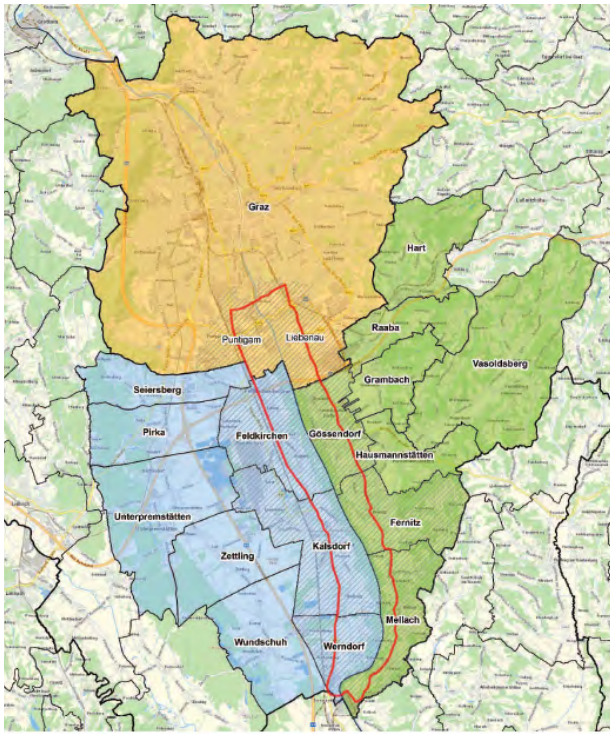

Figure 1. Regional park Murauen
(Source: Regionalpark Murauen – Projektberich, 2015)

Murauen is an attractive tourist and recreational area for local population, but also for visitors from other parts of Austria and foreign tourists. The area is located in the central part of the state of Styria and because of its optimal transportation position, position relative to the capital of the province and areas of intense demographic and economic growth, it is continually under dynamic transformation (Figure 3). As the area of the regional park is rich in high quality natural elements, it is attractive to all those who are involved in nature protection and preservation of the environment, education, culture and science. On the other hand, this area is also suitable for usage of renewable energy sources, so in the past years hydropower plants that supply local consumers with the necessary energy have been built. Considering that the construction of hydropower plants to a certain extent influences the change in the natural characteristics of the local environment,

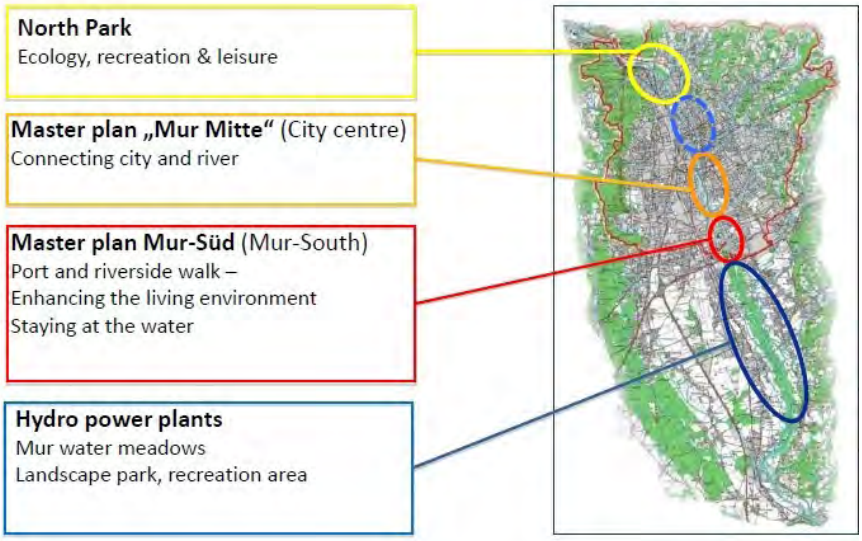

Figure 2: River Mur – green corridor in Graz
(Source: Zoning plan for City of Graz)

numerous ecological measures have been taken in order to mitigate or eliminate the possible negative consequences of the construction of such facilities. Also, there is a great impact of intense residential construction on the area of Regional park, because of limited space determined for construction of residential, infrastructural objects and other facilities in the area of Graz (Dorau et al., 2018).

THE CONCEPT OF THE REGIONAL PARK AND ITS MOST IMPORTANT GOALS

The concept of the Regional Park in Austria represents one of the instruments of regional planning which role is especially important in domain of conserving and improving of landscapes in urban areas. Priority activities and basic functions of areas promoted by this concept are: tourism, sport, recreation, agriculture, usage of renewable energy sources and environment protection (Regionalpark Murauen – Projektberich, 2015).

To provide adequate and sustainable planning, management and using of the landscapes of the Regional Park, during the period of 2013-2015 the "Regionalpark Muauen" project started in order to recognize potentials and possibilities for further sustainable development of this area, identify ecological problems and eventual conflicts of different stakeholders and space users and conserve local and regional identity. A few pilot-projects started within the main project that contribute to multifunctional development of the urban region (Dorau et at., 2018). Integral development approach will enable improving of the present state, stop further degradation of the landscapes and limit spreading of urban and built space at the expense of natural environment.

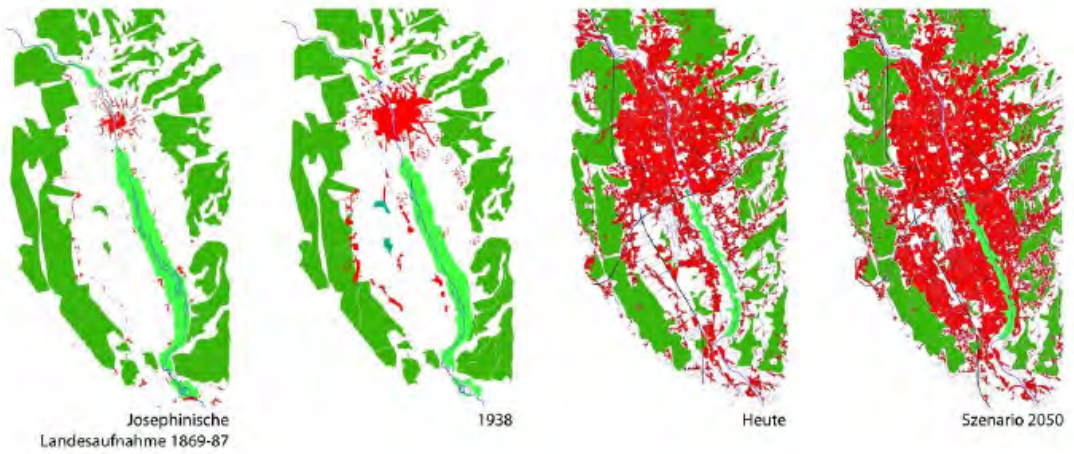

Figure 3. Expansion of urban areas of Graz, with pojections up to the year 2050
(Source: Dorau et al., 2018)

Legal and planning framework of landscape management in Styria

The Murauen Regional Park was established in 1981 by the Ordinance of the Styrian Provincial Government of the Declaration of areas of the Mur meadows Graz-Werndorf to the landscape protection area (Verordnung der Steiermärkischen Landesregierung vom 29. Juni 1981 über die Erklärung von Gebieten der Murauen Graz-Werndorf zum Landschaftsschutzgebiet). This regulation designated it as the "landscape protection area" in order to preserve the special landscape beauties and peculiarities, rare natural features, as well as the improvement of aesthetic and recreational values of the area. This landscape protection area encompasses the Mur bottomland and the costal area of the river, forest land, the agricultural land between Graz and Werndorf, as well as the core (central zone) of the regional park (Regionalpark Murauen – Projektberich, 2015).

The Murauen Regional Park ***does not belong to the category of protected areas*** (such as a nature park or a national park), but it is defined as ***a significant area*** that is determined on the basis of the natural and cultural values of the area intended for the sustainable development of tourism and recreational activities, the protection and preservation of landscapes and the environment, education, sustainable development of transport, forestry, agriculture, energy production from renewable sources etc. Planning and management of natural landscapes such as the Murauen Regional Park are regulated by a complex system of laws and regulations. The most important legal acts are: the Law on Environmental Protection (Steiermärkisches Umweltschutzgesetz), the Law on Nature Protection (Steiermärkisches Naturschutzgesetz), the Law on Strategic Environmental Impact Assessment (Strategische umweltprüfung gesetz), the Law on Spatial Planning (Steiermärkisches Raumordnungsgesetz), the Law on Tourism (Steiermärkisches Tourismusgesetz), as well as numerous other laws, ordinance, statutes and regulations that determine the protection of plant and animal species, venison and hunting, the protection of water, air and soil, waste management, energy production etc.

Although the mentioned area does not belong to the protected category, however, the basic principles and tenets defined by these laws must be respected and applied in order to ensure continuous improvement of the educational, scientific, cultural, biological and recreational value of landscapes, adaptation of economic and social development to natural processes with respect to regional peculiarities and potentials of space. It should also be noted that the laws determine the way of landscaping, land use, the construction of buildings and its prohibition in high quality and valuable areas. In the area of conservation and improvement of landscape and nature protection, laws require that natural resources should be protected, and their use should be planned and sustainable, in order to maintain sufficient quality for future generations. In particular, attention should be paid to: protection of land, flora and fauna, natural and cultural heritage, urban and rural landscapes.

Spatial planning in Austria and later landscape planning, is characterized by a complex planning system at the federal states (regional), cities and municipalities (local) level. Federal states are responsible for Regional plans, both for their drawing and implementation. These regional plans are very significant because they are crucial for setting principles of systemic and sustainable organization of space, with the aim of rational land use, preservation of specific and very important natural areas and environmental protection. Cities and municipalities are competent for land use planning, nature protection and landscape management on local level, by implementing local regulations and plans. So, land use planning is of great importance for nature protection and landscape preservation in Austria, being an interactive process consisted of dialogs between all the interested actors in order to define a sustainable form of land use (Gesetz über die Raumordnung in der Steiermark, 2010; Protić et al. 2017).

The State development plan of Styria (Landesentwicklungsplan Aps Steiermark LGBI No. 75/2009) states that natural landscapes and large green areas zones (grünzonen) are areas that serve to protect the natural and cultural values of the region, and their roles and functions are diverse. First of all, the ecological function is emphasised, then the tourist-recreational function, and besides, it is necessary to mention the role in improving the quality of life and the health status of the population of neighbouring settlements and cities, the role in protecting the source of drinking water and sustainable management of water resources etc.

Water management and the using of the hydro potentials of Mur River within the Regional Park

In the period 1995-2015, in the river valleys of the Enns and Mur in Styria, several major projects and

extensive hydrotechnical works were carried out in order to build hydropower plant and to make greater use of the hydro potentials that these rivers possess. The projects are financed by the EU funds: LIFE, Interegg and ETZ SI-AT. After 2015, the justification of the above mentioned projects has been questioned. On the one hand, the promotion of renewable energy production is one of the priorities in the field of energy and sustainable development of Austria, which is in line with the policies of the European Union. On the other hand, the construction and later operation of mini hydropower plants can cause some negative environmental effects: changes in natural characteristics of the local environment, water regime, degradation or reduction of the aesthetic value of landscapes, endangering natural ecosystems and communities that inhabit the given area etc. (Raderbauer et al., 2015). In order to overcome the conflict between the using of hydropower and environmental protection in the valley of the Mur River and in order to ensure all conditions for the sustainable development of the area, a new planning instrument "The river basin management plan" (Raderbauer et al., 2015) has been established. These plans are compliant with all legal regulations, planning and strategic documents adopted at the provincial level, as well as with more important European Directives in this area (EU Water Framework Directive, the EU Floods Directive and the Renewable Energy Directive), and represent an important part of spatial planning and management system. The basic goal of adopting these plans is to define the river basin management system or its part and to define zones that are intended for specific functions. Thus, for example, these parts of the river valleys are distinguished (as is the case with the Murauen Regional Park), which are more environmentally sensitive and which are most often intended for "green activities" that do not endanger the area, and also those areas in which the use of hydropower and performing of other hydrotechnical works without significant ecological consequences are defined.

The mentioned documents should not be considered exclusively as a "nature protection, i.e. a river system protection plan", but as a plan that offers guidelines and concrete solutions for the establishment of a balanced development of the subject area and all the activities that are represented, and above all, sustainable water resources management. The drafting and adoption of the Management plans has enabled this federal state of Austria to continue to realize its energy goals and expand its capacity to exploit the Mur river hydropotential, as well as other rivers while maintaining and

Figure 4. Hydropower plant on the Mur River (Regional park Murauen) (Source: authors)

improving the ecological status of the river and creating opportunities for improving the quality of river habitats. Also, plans significantly contribute to the achievement of the general interest of the community through encouraging interaction between all stakeholders. Today, within the Murauen Regional Park, there are several mini hydropower plants (Figure 4) that, thanks to the application of appropriate measures of protection and respect of natural environmental conditions, do not disturb river and riverside ecosystems.

SUSTAINABLE DEVELOPMENT OF TOURISM AND RECREATION WITHIN THE MURAUEN REGIONAL PARK

Tourism strategy of Styria (Strategie 2015-2020 Steiermark Tourismus, 2014) states that almost two thirds of the total area of the province are occupied by natural landscapes. The preserved nature definitely represents the basis of the development of ecological tourism in this federal state. The Murauen Regional Park with its natural resources represents a significant area that can be successfully used for the promotion of the Styria region as an attractive ecotourist destination on the international level. Tourism based on ecologically responsible behavior, where the main motive is natural and cultural heritage in many European countries such as Austria, Germany, the Netherlands, France and the United Kingdom, is an effective instrument for protecting the natural environment, establishing sustainability and improving the health of the human population, as well as local and regional economic development (Heagney et al., 2018; Picket et al., 2011; Tisca et al., 2016). This is confirmed by another important strategic document in this area: Wirtschafts und Tourismusstrategie Steiermark 2025 (Economic and Tourism Strategy Styria 2025). The Strategy emphasizes the importance of cooperation and networking of tourism activities with other sectors such as forestry, nature protection, energy production from RES and culture, to ensure the long-term and sustainable economic progress of the region, where also the example of the Murauen Park has proved to be one of the best.

Connecting different types of tourist offers and the introduction of new tourist facilities that basically rely on the natural and cultural elements of the area: sports and recreational tourism (hiking, cycling), camping, hunting and fishing, various water activities, excursion cultural and manifestation, educational tourism, etc, contribute to the improvement and promotion of tourism. The area of the regional park offers rich facilities for athletes and recreationalists: arranged bicycle and hiking trails, promenades along the river, recreational and equipped spaces intended for shorter or longer stays in nature, sports facilities (e.g. kayaking club), etc. An interesting example of the new type of the tourist offer that can in the future be more intensively promoted in this area is "energy tourism" where tourism activities are related to renewable energy sources. This form of tourism in Austria is in the initial stage of development, it is prosperous, it provides numerous opportunities and can easily be combined with educational tourism and tourist trips whose main motives are science and technological achievements in the field of sustainable development. Given that the area of the Murauen Regional Park is known as an good example of hydropower use, this potential can be used as a basis for promoting the Park as a new tourist site in the field of energy tourism. So far, in Austria, the most famous example in this field is the European Centre for Renewable Energy - EEE Gussing (Burgenland federal state).

CONCLUSION

The Murauen Regional Park represents the idea and vision of a common and balanced development of the natural environments and urban areas. An attractive, recreational area of regional significance offers a range of possibilities and space for differentiation tourist, energy and other activities that are currently represented. The Green Corridor of the City of Graz, as it is often called, also represents a model of sustainable using of natural resources and sustainable management of natural landscapes in the zones of European cities, where large pressures on the environment occur in the middle of anthropogenic activity. Experience in the world indicates that the controlled and sustainable development of tourism and recreation in combination with other complementary activities (agriculture, forestry, use of renewable energy, water management, nature protection) most contribute to the preservation of resources, natural values and the development of local communities. Positive experiences achieved by this model of natural landscape management can serve as an example for other, less developed and less environmentally conscious European countries, in order to establish in the future their own models and instruments for sustainable and efficient landscape planning and management.

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SMART SETTLEMENTS
- ASPERN SEESTADT THE 22ND DISTRICT OF VIENNA -

Alexandra Perrault, Arta Ibrahimi, Coralie Chouquet

Figure1. Neighborhood in Seestadt
(Source: authors)

INTRODUCTION

Back in 2002 with the growing demand for housing, the city of Vienna decided to develop a new district on the former Aspern Airfield site: Aspern Seestadt.[1]

In 2007 the master plan was approved by Vienna City Council to serve as the urban development concept and the basis for all planning measures.

Due for completion in 2028 the new district is connected to the city center since 2013 thanks to the early development of Seestadt U2 subway station. A connection that allow to reached the city centre in only 20 minutes making the district attractive for new residents and potential investors already from the beginning of the construction. This connection will be refined thanks to seven bus routes and a future tram link.[2]

Throughout its development Seestadt provides a unique testing ground for the future of urban manufacturing. A real laboratory scale 1:1 for Smart City Vienna.

Since 2007, the master plan has been constantly refined: in 2012 the plans for the northern section of Seestadt were elaborated in detail with the team of master planners, forming the basis for the land use and zoning plan as well for the development plan and road construction plan. The master plan was conceived as an urban design structure that is flexible and robust enough to respond to change.[3]

[1] https://www.wien.gv.at/stadtentwicklung/studien/pdf/b008206l.pdf

[2] http://www.koer.or.at/en/projects/artistic-design-of-the-aspern-nord-u2-subway-station/

3 https://www.aspern-seestadt.at/en/business_hub/planning__reality/master_plan

Figure 2. U2 Subway map
(Source:https://www.wien.gv.at/stadtentwicklung/projekte/verkehrsplanung/u-bahn/planungsergebnis/u2nord/)

SMART SETTLEMENT

ASPERN SEESTADT
A CITY-WITHIN-A-CITY

"Our ambition has been to provide a Masterplan that creates streets and public spaces that are fundamentally public, human, lively, intimate and secure."[4]

Designed for the 21st-century lifestyle Seestadt propose an attractive environment with vibrant urban life thanks to the intelligent urban design concept.

Full of "town houses" for more than 20,000 people and thousands of workplaces Seestadt brings together living and working, education and culture, shopping and leisure in a single place.[5]

"Excellent transport links and a deliberately laid-back pace – that's the mobility concept for the smart, liveable 21st-century city. aspern mobil is all about short distances, efficient public transport and lots of space for pedestrians and cyclists." Lukas Lang, Urban Development, Wien 3420 AG.

Designed as a city of short distances, Seestadt gives priority to pedestrians and cyclists. The envisaged

[4] Johannes Tovatt, master planner for aspern Seestadt.

[5] https://www.aspern-seestadt.at/

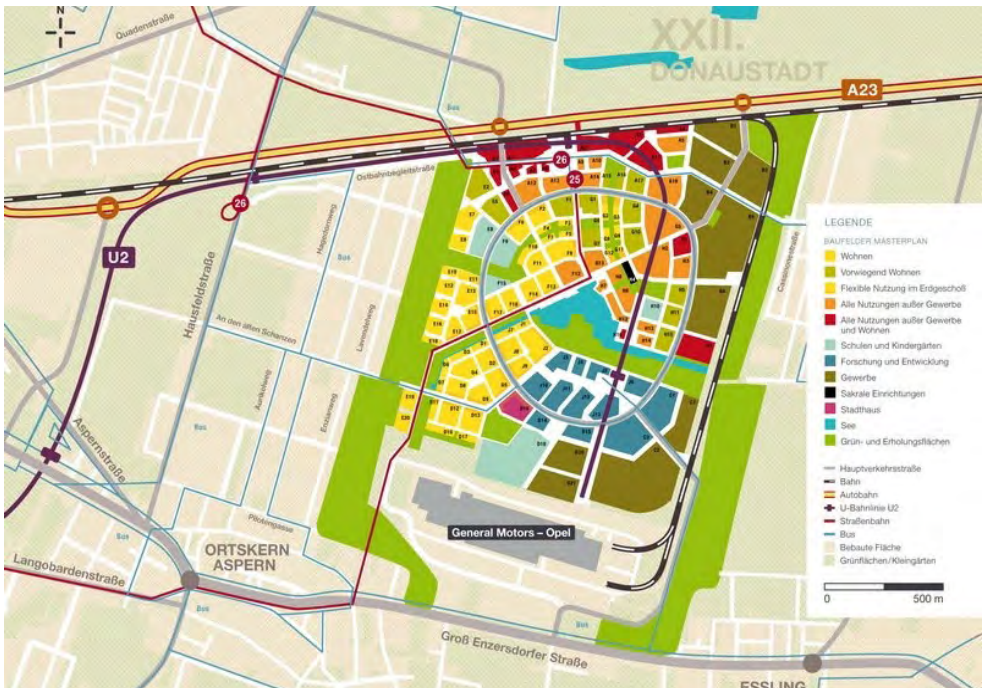

Figure 3. Basic data aspern Vienna's Urban Lakeside
(Source: http://www.weatherpark.com/aspern-lakeside)

modal split for local traffic within Seestadt is 40% cycling and walking, 40% public transport and just 20% car. Communal underground garages provide parking lots while ensuring more room in the public space for pedestrians and cyclists.

"The quality of a city's public spaces has a decisive influence on its feel-good factor. Public outdoor spaces effectively form the backbone of Seestadt."[6]

High feel-good factor with a lot of public open spaces (50% of the total site area): parks, attractively designed streets and squares and a 50,000 sqm lake that gives its name to the whole project "See-" (Lake) "-Stadt" (City).

The public spaces design to be shared by all provides impetus for many of the city's essential functions: mobility, commerce and culture, leisure and recreation.

Furthermore the public spaces are exclusively named after women. With this policy Seestadt is setting an important example. Indeed city's street names shape its identity and are the repository of its collective memory.[7]

By its Smart settlements, Aspern Seestadt is a district of Vienna offering an urban life of a vibrant city that answer to 21st-century lifestyle challenges.

SMART NEIGHBORHOOD

Street components, urban development

Based on innovative concepts, Seestadt tries to attract new inhabitants and users by combining a better quality of life, environmental awareness and economic power. Great importance given to the design of outdoor public spaces, playing a role in the development of a neighborhood life of excellence.

The district will be divided into a dozen islets. Traffic routes can be either major or open to cars or pedestrians (shared spaces). Indeed, the majority of streets are meant to be shared spaces; priority pedestrians share spaces with bicycles, skates, rollers ... In many neighborhoods, such as Seeparkquartier, floor coverings are designed to be continuous avoiding any annoying edge and thus facilitate the mobility of all (strollers , wheel chairs).

These spaces shared different types of furniture for different uses and users: benches, the famous red chairs, the planting of a large number of young trees, fountains and recreational water games We already find in together the neighborhood many playgrounds; They are strongly represented, especially on the banks of the lake, in front of the educational complex ... In addition, access to the sports grounds of the school is open to the public during the weekends. Finally, as in the rest of the city, the city has set up a sorting service with several stations and garment collection points.[8]

Interior of islets, the proposed offer

Each block has 3-4 dwelling units. Each islet adopted the strategy of confinement; no common space is facing the street. The heart of the islets can be freely penetrated via one or more passages, slopes or stairs. Indeed, some architects choose to raise the central courtyard to accentuate the delimitation of space. The heart of the islet becomes a public square, common to all inhabitants, and offering various activities: playgrounds, playgrounds, swings ..., pools reserved for residents, rest areas (amphitheater , series of benches), residential green spaces, common lawns, common vegetable gardens ...[9]

Commercial and social activities (Seestadt Aspern association)

Isolated to the rest of Vienna, the master plan of Seestadt should include local shops for everyday life. The ground floor is occupied by shops accessible to all (cafes, supermarkets, repairers ...) but also other services such as kindergarten, sports halls ...

Founded in 2014, the neighborhood social organization Seestadt Aspern consolidates the interactions and the insertion of the inhabitants. It offers consultations, additional information, events and activities for anyone who wants to contribute actively to the development of the district. Indeed, from its inception, over 6,000 people who have settled 100 have joined the Aspern Smart City Research Society research program.[10]

SMART BUILDING

Passive houses:

"The Passive House concept is a sustainable and cost-optimal solution for the Nearly Zero Energy Building. Because it functions everywhere, it is

[6] Jakob Kastner, Public Space, Wien 3420 AG

[7] https://www.aspern-seestadt.at/

[8] http://www.academia.edu/14399293/Being_a_smart_city_the_case_of_Vienna_and_Seestadt_Aspern

[9] https://www.aspern-seestadt.at/

[10] https://www.aspern-seestadt.at/en/about_us/neighbourhood_management

an opportunity to implement climate protection objectives with a high level of living comfort at the same time"[11]

Figure 4 and 5. Inside the neighborhood (Source: authors)

Sustainability is more than environmental protection; rather, it is a form of intergenerational awareness that informs resource use all around. Construction and energy technologies that save resources and do not negatively impact the climate, farsighted social responsibility for a changing society, and long-term viability are the three pillars of a sustainable city. The concept of designing buildings in Seestadt area is based in innovative and sustainable solutions. Passive House is all about energy efficient construction now and in the future. Vienna has committed itself to the Passive House Standard for many years, whether for kindergartens, student dorms, apartment buildings or offices factor because they can also cause lowering of the peak temperature during the hottest time.In Seestadt it is also planned that all the buildings will be passive houses. [12]

The example for a passive house within Seestadt Aspern is the temporary housing so-called PopUp dorms and they have recently been built there. Their location is temporary and in the future it is planned to be another construction project. Temporary housing is affordable, attractive and hip!

Material

Currently, passive and zero-energy houses have been attracting attention. For reducing the building energy, many researches of advanced building materials, including high-performance insulation materials, wood-based materials, thermal energy storage concretes, high-insulated windows, and airtight wall constructions, were developed.

Thermal energy storage systems (i.e., phase change materials (PCM)) can be used to reduce energy consumption of buildings. The application of PCM in buildings not only saves energy, but also decreases the temperature fluctuation.[13]

Pop Up dorms are made from wooden prefabricated shipping containers. An atrium acts as communal zone, in which students furniture is made from recycled materials and there is a Chill-Out Zone:

Quality of life

Expect for the fact that these buildings built in this area, are sustainable in the means of material, they also afford a good quality of life in the means of functional aspect. There is also a flexible mix of different spaces but they have respect for one another.

Aspern IQ – technology centre, is the first building of the Urban Lakeside and it was finished in autumn 2012. With a useful floorspace of 6,600 sq m, this building of the Vienna Business Agency – certified according to klima:aktiv guidelines – attains a Plus Energy standard. Aspern IQ offers approx. 23 rental

[11] Prof. Dr. Wolfgang Feist.

[12] https://www.passivehouse-international.org/upload/2017_01_25_Pressemitteilung_Tagung_Wien_Programm_EN.pdf

[13] http://www.mdpi.com/2075-5309/8/5/63/htm

units (e.g. for enterprises active in environmental technologies and energy engineering) designed as offices, commercial or production premises.[14]

Figure 7. Social infrastructure
(Source: BUILDING THE CITY. Examples for and from Vienna. PDF)

Aspern self-build co-operatives – is an impulse project where 179 flats out of the first 2,600 units are designed by self-build co-operatives on a self determined and individual basis. In the first development phase until 2015, approx. 2,600 dwellings will be built to satisfy customized requirements. Offices and around the-corner supply facilities will be embedded in these buildings. Special attention will be paid to self-build co-operatives because a pioneer sector of Aspern is dedicated to the creative potential of self-determined planning and development. Urban planners and the municipal administration expect these projects to exert an exemplary effect on the urban quarter and the city itself.[15]

ON-SITE FACILITIES AS PER 2013

Common spaces/social infrastructure:

Today, the distinction between housing- and work-specific needs can be abandoned in favor of a more flexible mix with respect to both space and time. This has become possible by modern communication technologies and the fact that work-related emissions no longer impose the spatial separation of housing, work and leisure. The mixed-use approach presupposes a certain urban development size. The utilization concept for the Urban Lakeside aims for a horizontal mix but also calls for vertical variety of uses of the different buildings.

Urban gardening is also present in this area since spring 2011. The cultural programme aspern Seestadt PUBLIK has been involving local abutters and urban gardeners of the Urban Lakeside in numerous sowing, cultivating, harvesting and cooking activities.

The Red Chord is mainly characterized by commercial and cultural activities. Active ground-floor zones are essential to ensure lively streets and squares. The Red Chord is the place to go shopping, meet friends during the weekend or watch vibrant city life while relaxing on a bench.

The local boulevard experience - **The Ring Road** is a key element of the spatial structure of Aspern. It will be much more than a traffic link, as it will

[14] BUILDING THE CITY. Examples for and from Vienna. PDF page 32

[15] BUILDING THE CITY. Examples for and from Vienna. PDF page 33

Figure 8. The blue Chord
(Source: BUILDING THE CITY. Examples for and from Vienna. PDF)

offer ambiance quality and space for urban leisure activities – street space thus becomes living space.

The Blue Chord – the heart of the Urban Lakeside: The lake with its park and promenade embodies the urbanistic concept of a centre that is open to all. The concept was to create an entire park as an island landscape with different activity zones for the neighbouring quarters – from sports and exercise to relaxation and pleasure.[16]

Figure 9. Urban Gardening; (Source: BUILDING THE CITY. Examples for and from Vienna. PDF)

CONCLUSION

The concept of Smart City is ultimately more than we think. It hides an extended action palette; it is thinking of the future city through innovations in urban planning, social cohesion, the approach to sustainable development and resilience within cities. The Seestadt project fulfills all the terms of the SMART CITY contract, testing a new approach to city life, including focusing on the integration and participation of inhabitants before-during-after completion via the Seestadt Aspern association . According to the same model, the Smart City Graz project in Graz Mitte is setting up various activities with the aim of raising awareness among the neighbors in the area of action, the future inhabitants and users or any other ordinary inhabitant of the city. Children, the elderly, workers or students are participating in order to create the citizens of tomorrow, actors of these new forms of cities.

[16] BUILDING THE CITY. Examples for and from Vienna. PDF page 31

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BUILDING THE CITY. Examples for and from Vienna. PDF, pp. 31-33.

SMART MOBILITY IN AUSTRIA AND SERBIA

Marina Rilak, Tamara Gojić, Milica Bojanović, Jovana Jevtović

INTRODUCTION

Smart City is a recent topic, but it is spreading very fast, as it is perceived like a winning strategy to cope with some severe urban problems such as traffic, pollution, energy consumption, waste treatment. Smart City ideas are the merge of some other more ancient urban policies such as digital city, green city, knowledge city. A Smart City is therefore a complex, long-term vision of a better urban area, aiming at reducing its environmental footprint and at creating better quality of life for citizens. Mobility is one of the most difficult topics to face in metropolitan large areas. It involves both environmental and economic aspects, and needs both high technologies and virtuous people behaviors. Smart Mobility is largely permeated by ICT, used in both backward and forward applications, to support the optimization of traffic fluxes, but also to collect citizens' opinions about livability in cities or quality of local public transport services. Accessibility, affordability and safety of transport systems, as well as compact urban development are essential factors in this context. The aim of this paper is to represent mobility initiatives in Vienna and to analyze the role of ICT in supporting smart mobility actions, influencing their impact on the citizens' quality of life and on the public value created for the city as a whole.

Public transport and low-carbon

With a population of nearly 2.5 million people in its greater metropolitan area, Vienna is the largest city in Austria. Its metro system sees 1.3 million passengers every single day and it is the best performing public transport system in the entire world, according to the International Association of Public Transport.

Vienna is a very livable and "smart" city, confirmed among others by the renowned Mercer Study and the Smart Cities Index of US climate strategist Boyd Cohen. Of course, it's not only the high quality of life that makes Vienna a popular travel destination: The perfect infrastructure, forward-looking mobility and "smart" offerings for guests are also what make the city on the Danube so attractive. Vienna's public transport network has to be seen – after all, it is one of the best in the world! Vienna currently has five subway lines with 104 stations on 79 km of track, 29 tram routes and 127 bus routes. The total public transportation network amounts to over 850 km in length. A total of 954 million passengers were carried in 2016. Further investments in rail transportation are planned in line with the city's future-oriented transport policy. This should allow the constant growth in passenger numbers to be managed properly in the future as well. At the same time, further outlying districts are to be connected to the city center. Wiener Linien is choosing to modernize its fleet of buses by deploying increasing numbers of electric buses. Wiener Linien was awarded the Austrian State Prize for Mobility in 2013 for the project involving "zero emissions buses", which ply throughout the downtown area. Also being undertaken is the integration of modern technology: The multiple award-winning Smartphone app „quando" let's mobile users know when the next tram, subway train or bus departs. Real-time information for all stops, integrated timetable information and disruption information enable users to get around on public transport without complication.[1]

The tickets are valid in all trams, buses and subways of the Vienna Transport Authority. Each stamped single ticket is valid up to the destination, including multiple transfers. The subway system consists of five lines - U1, U2, U3, U4 and U6. All platforms are equipped with electronic information displays that show the waiting time in addition to the destination. With a route length of 175 km, Vienna's tram network is the sixth largest in the world. In addition to the subways, 29 tram lines and 127 bus lines make their daily commutes.

Vienna achieving the number one place as a smart city is not just a local effort, but a national one. One specific example of how Vienna, as part of Austria,

[1] https://www.wien.info/en/vienna-for/smart-city-vienna

is a smart city is the Federal Ministry for Transport, Innovation and Technology's investments in e-mobility. E-mobility is the intersection of environmental protection and individual mobility. The ministry invests in key technologies and supports Austrian researchers and companies in their development and implementation of future-ready transportation technologies.

One of the goals of smart city is to reduce CO_2 emissions in the city. CO_2 emissions must be halved in half to enable the sustainable development of future generations. The switch to renewable energy sources in cities is the biggest challenge. 75% of the CO_2 emissions throughout the world is currently caused by burning fossil fuels in cities. There is an awareness of these links at European level, which has led to the Smart Cities initiative, aimed at supporting cities in achieving the European "low carbon economy" targets. Vienna is among the most successful cities worldwide where quality of life, infrastructure and innovation are concerned. The way in which a reduction in CO_2 will be achieved in a smart city is the reduction in the use of the car and the use of a bicycle. This will lead to an increase in the quality of life. In a smart city of Aspern, the reduction of CO_2 will be achieved by not having traffic in the city, but going all the way by foot or by using a bicycle. To the smart city of Aspern we can come by using the metro line, and from the station we can go on foot. The goal of the smart city of Vienna is that by 2030, 50 percent of the total electricity production for the city needs will be from solar power plants.

E-mobility

The City of Vienna is a Smart City, because of the effort that they invest in planning and making city into a healthy home. In this case e-mobility and the approach that e-mobility come with - sharing mobility, are just a small parts, but a definitely, a very important parts, of making city a better one. Hopefully, Belgrade will use this example of smart planning.

Electro mobility (e-mobility) is a general term for the development of electric-powered drive trains designed to shift vehicle design away from the use of fossil fuels and carbon gas emissions. The term electro mobility includes full electric vehicles, as well as hybrid electric vehicles and those using hydrogen fuel cell technology.[2]

The Vienna Model Region, with the "e-mobility on demand" research project at its center, is focusing on a gradual conversion to an integrated global transport system that complements public transport with electric mobility and e-car sharing in an effective way.

The aim of the research project was to try out the essential components of a practical and varied range of e-mobility options: electric vehicles, the charging infrastructure, the optimal combination of types of transport and access to them by means of a multi-modal mobility ticket for users.

In the context of the project, e-cars and charging stations were used where they can replace fossil-fuel powered business journeys and where they can provide mobility when walking, cycling and public transport are not practical.

The project's approach of deploying innovative e-mobility applications primarily at hot spots, particularly in the form of charging stations in car parks, has proved to be particularly user-friendly: this is an ideal interface where parking, charging and switching to other types of transport complement one another perfectly.

The project also focused on the issue of publicly accessible charging infrastructure in the urban area. The aim was to find alternatives, which offer parking areas and charging facilities in the private and semi-public sector. On that issue, Vienna Public Utilities seized the initiative and created a network of publicly accessible charging points in car parks, primarily in cooperation with their subsidiary companies Wien Energie and WIPARK, but also in collaboration with an e-bike rental system in the lakeside development region of Aspern.[3]

The availability of public charging stations is seen as the key for a more rapid expansion of electro mobility. The initiative of the three companies provides a vital stimulus toward an ecologically and economically sustainable future in transport.

According to the Federal Government's Electro mobility Initiative, 4.5 per cent of all vehicles on Austria's roads will be powered by an electric motor by 2020. This corresponds to 200,000 electric vehicles. This is an ambitious goal, but it can only be achieved if sufficient quick-charging stations are available in public spaces. The reason is that, apart from the now relatively high purchase cost,

[2] https://www.techopedia.com/definition/30913/electro-mobility-e-mobility

[3] https://smartcity.wien.gv.at/site/en/e-mobility-on-demand-2/

the greatest obstacle to a quicker proliferation of electric vehicles is the potential buyer's fear of getting stranded on the side of the road with an empty battery. On the other hand, the small number of electric vehicles currently registered renders the construction of expensive quick-charging stations and their operation ineffective from an economic point of view. Wien Energie has been investing in the development of charging infrastructure for years. In the Vienna model region, electric vehicle owners can already choose from a total of 150 charging points. Of these, 300 are scheduled for the model region of Vienna, and approx. 100 will be set up in the neighbouring model region "e-commuters in Lower Austria", located in the area supplied by Wien Energie.

The declared objective of the Vienna Model Region (e-mobility on demand) is a gradual conversion to an integrated transport system. This will result in a meaningful addition of electro mobility and electric car sharing to the public transport system. The focus will be placed on multimodal trip chains on the basis of public transport, the creation of hotspots offering a wide range of electric vehicles, conversion of company fleets, and the development of a multifunctional mobility map for users. [4]

As the e-mobility strategy is part of the Urban Mobility Plan, actions are derived from this plan. The benefits of electric cars lie in reduced airborne pollutants and noise emissions as well as energy efficiency. However, they do not offer any benefits in terms of space – electric cars need the same amount of space for parking as conventional cars.

The increased use of electric cars does not do away with problems such as traffic jams, obstructions, street parking, obstacles or danger to pedestrians and cyclists.

Preferably, charging stations should be installed in (semi-) public spaces such as on parking lots, at filling stations or in indoor car parks so that they do not use public space, which is limited in the city.

However, a few charging spaces in public areas make sense as they can help overcome the emotional barriers to the use of electric cars and are useful in strategic locations (e.g. mobility points, e-taxi ranks, e-car sharing locations). In this context, compatibility with the cityscape and the functions of public space must be taken into consideration (E-mobility strategy, 2016).

[4] http://at.nttdata.com/aktuelles/news/news-detailansicht//browse/4/article/with-400-new-charging-stations-vienna-is-a-capital-of-e-mobility/index.html

"Smarter Together" is the joint Smart City Lighthouse project from Vienna, Munich and Lyon. It is co-funded by the EU as part of the Horizon 2020 research program.

Smarter Together is characterized by its holistic approach. The focus is on effective Smart City measures for climate protection and more urban quality of life – such as integrated building refurbishment, climate-friendly energy systems, e-mobility and innovative data management. Smarter Together is currently the largest EU subsidized Smart City urban renewal initiative in Vienna. Smarter Together in the Viennese district of Simmering received the VCÖ Mobility Award 2017 in the category "Active Mobility and Public Space".[5]

Figure 1. E-car sharing in the Hauffgasse (Source: https://www.smartertogether.at/start-e-carsharing-in-der-hauffgasse/)

Electric vehicles are the environmentally friendly and efficient alternative when it comes to transporting goods and passengers in the city when motorized individual traffic is the only option. The great benefit of electric vehicles is that passengers and goods can be transported with zero emissions, low noise levels and more efficiently as well as more economically, thanks to independence from rising fossil fuel prices. City logistics plays an important role with a view to resource conserving mobility. In the Smart City Wien Framework Strategy, the City committed to cooperation with the logistics industry so as to optimize flows of goods and traffic with the help of e-mobility (E-mobility strategy, 2016).

Cycling

Biking has become more and more popular in Vienna and the number of cyclists is constantly rising.

One of the key tasks of any modern city lies in providing sustainable, affordable, and efficient

[5] https://smartcity.wien.gv.at/site/en/smarter-together-2

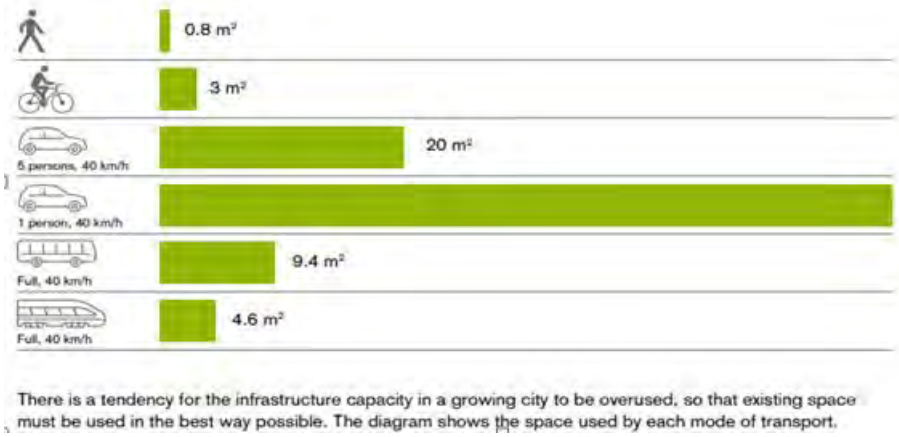

Figure 2. Space used per person according to mode of transport (Source: https://www.wien.gv.at/stadtentwicklung/studien/pdf/b008443.pdf)

mobility for its population. In addition to public transport, cycling in Vienna plays a central role in achieving this goal, especially because Vienna still presents major development potential with regard to cycling.[6] Cycling network consists of 1,298 km cycling lanes in 2015, more than 2005 (1,011 km). Today, according to existing sources about 55% of all households are bicycle availability.[7] Vienna is the city where many people use the bicycle to go to work, school, and university, for shopping and for leisure, it is a livable city for all.

Some of advantages of using a bicycle are:

- Cycling is especially efficient in terms of the space and energy they use, and the emissions they cause.
- Cycling is eco friendly, which contributes significantly to climate protection and supports reducing the emissions of greenhouse gases in Vienna.
- Cycling is healthy too, a lack of exercise is a main risk factor in many diseases and disorders. At present, about 23% of the Viennese are actively in motion for more than 30 minutes a day when they run their daily errands (not including exercise when doing sports or moving at work).

The target of Urban Mobility Plan Vienna 2025 is "80:20", which means that the citizens of Vienna shall use public transport, cycle or walk to cover 80% of the trips they need to make, whilst the share of car transport should decrease to 20%.[8] A key role in achieving this goal has government. The government needs to raise awareness of the importance of using a bicycle in the city, but first at all provide conditions for it. It means to invest in more and better infrastructure.

The one of the smartest idea in transport area in Vienna is a *Citybike*. It is innovative and environment-friendly public bike rental system that allows you to make short trips from A to B by bicycle throughout Vienna the City bikes may be rented out and returned at any of the public stations in Vienna. There are over 120 stations that are often located near subway stations or other public transportation. System is available since 2003 and system is supported by the government of Vienna. [9] This is one of the smartest idea in transport area.

Figure 3. Environment-friendly public bike rental system in Vienna (Source: https://smartcity.wien.gv.at/site/en/citybike-vienna/)

[6] http://velo-city2013.com/wp-content/uploads/The-Vienna-Cycling-Manifesto_web_bf.pdf

[7] http://www.pastaproject.eu/fileadmin/editor-upload/sitecontent/Publications/documents/AM_Factsheet_Vienna_WP2.pdf

[8] https://www.wien.gv.at/stadtentwicklung/studien/pdf/b008443.pdf

[9] https://smartcity.wien.gv.at/site/en/citybike-vienna/

Cycling is an essential connecting element for the efficient integration of different transport modes and enables the creation of intermodal routes in Vienna. One of examples which we saw on this excursion is railway station in municipality Ebreichdorfs. This railway station isn't important only for this municipality; it's some kind of regional mobility. People will come by bus or by bike to the railway station and then take a train. Completely area can be reached for 2,5 km so it's easily accessible to bikers. One of the smart strategies for the future is motivate people not to use cars and make attractive bike paths or foot paths. There is already a bike station. People can leave their bike there and then take a train to the Vienna.

Figure 4. Railway station in municipality Ebreichdorfs (Source: authors)

Cycling is important for tourism too. There are a few routes that attract tourists who like sightseeing by bikes. The famous bicycle path along the Danube leads from Germany through Austria to Hungary. Many bicyclists arrive in Vienna via this route. This route is known as EuroVelo 6 and the part of this route passes through Serbia. Another one is bicycle path Ringstrasse (around the old city). [10]

CONCLUSIONS

Global trends such as climate change, urbanization, urban sprawl, security issues, demographic changes and the huge impact on environmental sustainability make it necessary to adapt and improve the whole transport system.

In regard to the traffic policies, Vienna is in the very convenient position in Europe in this field. During the past decades, significant results have been achieved, concerning decrease in the car use and decrease in air pollution. There are a lot of pedestrians and bicycle riders in the streets and the number of commuters on public transport is also fairly big. Vienna's transport system is a good example which Belgrade should follow.

Urban mobility and accessibility represent major challenging issues in the functioning of the city of Belgrade. Decreased mobility and traffic congestion followed with air pollution; limited accessibility and dependency on car to certain urban areas especially to sprawling informal settlements at the fringe of Belgrade; spent time, effort, price and lack of comfort that many people experience on a daily bases while commuting from home to school, work, health centers, shopping malls, stores and vice versa; lack of parking represent problems which need to be solved in aim of reducing CO_2, better functioning of transport system and also better quality of life.

Despite of mentioned problems there are good examples of smart features into the process of urban development especially in urban mobility. One of them is Eko-Bus system. The system utilizes public transportation vehicles to monitor a set of environmental parameters over a large area, as well as to provide additional information for the end-user - the location of the buses and estimated arrival time to bus stops. There are also several web-sites and mobile application such as "Belgrade Plan Plus", "Bus Plus", "BelParking" that serve as information platforms for citizens.

Possibility for cycling as a mode of transport exists. Although cycling is used today mainly for recreational purposes in Belgrade along the Sava and Danube river, several projects were done, especially in the flat area of New Belgrade to use bicycles for commuting as well.

Both cities are facing with the same challenges which require a new and innovative approach. The advanced technology, particularly ICT, represents the basic foundation which should be used in aim of sustainable development for better quality of life.

[10] https://www.wien.info/en/vienna-for/sports/cycling/danube-bike-path

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SMART BUILT ENVIRONMENT IN AUSTRIA

Julia Niemand, Qiuyi Zhou

WHAT IS SMART AND SMART PLANNING?

What is a smart built environment?

The term smart can be interpreted in many ways. For the built environment there may be smart settlements and smart neighborhoods but for all of them smart buildings are the most important. A smart built environment is a big challenge for all cities to get a smart city.

For Giffinger, from the Technical University of Vienna, smart cities combine diverse technologies to reduce their environmental impact and offer citizens better lives. The most relevant designer of a smart city is the stakeholder and in practice the most important stakeholders are spatial planers. Nam, Taewoo & Pardo believe there are different factors that make up a smart city, among others the technology factors which include the technologies und infrastructure but they have to implement new technologies (Nam, Taewoo & Pardo, 2011). There are also human factors and institutional factors (Nam, Taewoo & Pardo, 2011). The most significant factor is the human part because involving and informing the community is essential in order to achieve change at all. These are necessary steps to achieve sustainable urban development.

The big question is how to renew a city? In Simmering, the 11th district of Vienna, a spatial planer from Austria showed relevant parts for a built environment. Innovative solutions and resource-saving handling are important for a smart living together. They have already implemented some measures, that are basic for future environments, for example:

- Refurbishment of old building to achieve the prescribed building standard of the "OIB-Richtlinie" (Richtlinie des Österreichischen Instituts für Bautechnik);
- Thermic and energetic measures;
- Photovoltaics and solar energy installations;
- Smart public lightening with reduced energy consumption;
- E-cars for rental housing blocs;
- Zero-energy-gym for the secondary school "Enkplatz" (photovoltaics and water heating).

He also emphasized that population participation is important to raise awareness about smart urban development.

For the built environment, the power supply must also be considered. We have to achieve more renewable energy but irregular forms of energy complicate the management of the networks. For that, the network must be stable. The needs a constant balance between power generation and consumption. Part of the future sustainable urban development is not only the better energy standard but also a regulated energy supply. In the future, more and more attention could be paid to the built environment for energy storage.

OTTO WAGNER: SMART PLANNING IN EXPANDING VIENNA AT THE TURN OF THE 19TH AND 20TH CENTURIES

The number and size of cities are increasing all over the world. Today a number of cities – New York, Tokyo, London, Shanghai, Paris and others – their population are approaching ten million or have even exceeded it. The old layouts of cities seem not to satisfy the requirements of contemporary life, modern needs and transport even though there are many so called "smart plannings" in these metropolis. As Otto Wagner said in 1912: "In the light of our present experience the expansion of a city must be unlimited" (Geretsegger, et al., 1979; Wagner, 1912: 485-500).

Looking into Vienna, at the turn of the 19th and 20th centuries, Otto Wagner made a great progress for Vienna's development and life quality of Vienneses even nowadays on the basis of this expanding precondition. In the area of city planning, his principal is more forward-looking and providing more possibilities for expanding cities, and meanwhile concerns sustainable development.

To ensure that the big city "would be able to go on developing in the future", which is still "smart" nowadays. Consequently, he not only made no attempt to induce the expanding but also was opposed to overcrowding in any form (Geretsegger, et al., 1979; Wagner, 1912: 485-500).

Wagner's design for Vienna was based on ring and radial roads, which divided the entire city into several districts, each of which would be able to accommodate between 100000 and 150000 people. In addition, Wagner designed more than 30 stations for the "Wiener Stadtbahn", which built around 1900. It seems he "created" the city with a 40km long transport structure (Geretsegger, et al., 1979; Wagner, 1912: 485-500).

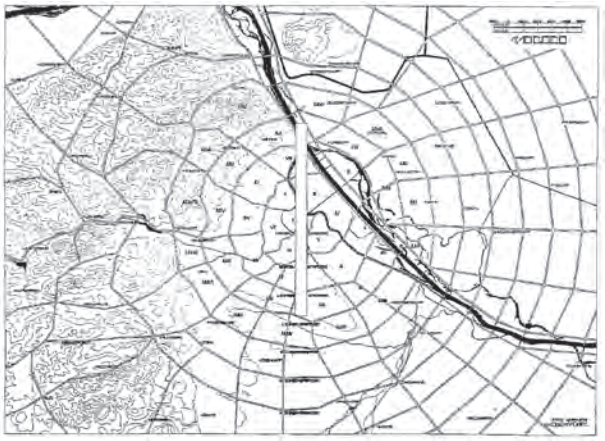

Figure 1: Project of unlimited growth metropolis (1911) [O. Wagner, Die Großstadt, Vienna] (Source: http://urbanplanning.library.cornell.edu/DOCS/wagner.htm*)*

Besides this, Wagner was also aware of the disappointing outcome of Haussmann's green belt project for the city of Paris, which was never put into effect. However, the provision of a green belt around the whole city would simply be a kind of restriction, not only for recreation, which is the general understanding of green space, such as parks, gardens or playgrounds (Geretsegger, et al., 1979; Wagner, 1912: 485-500).

Figure 2: Model of the Wiener Landes-Heil- and Pflegeanstalt for Vienna Am Steinhof Mental Hospital, Scale 1:640, around 1908, Studio of Erwin Pendl, Technisches Museum Wien; (Source: authors)

As an imortant and intelligent architectect, Wagner's buildings are today regarded as milestones on the way from historicism to modernity. His concepts in architecture were based on function, construction and material, consistently taking "modern life" as its model. The exhibition guide introduced two remarkable architecture project of Otto Wagner, one is the planning of the psychiatric hospital "Am Steinhof" in a total free area, the other one is the Postsparkasse, as a main administration monumental construction in the inner city. As to the hospital "Am Steinhof", Wagner thought of the interaction between patients, buildings and environment, and made some evaluation for future capacity. As to the Postsparkasse, In addition to the new technological facilities such as the ventilation system with the legendary objects or the light, built as a diaphanous iron and glass canopy cashier hall in the courtyard of the building, Wagner also dealt with the "outer skin" in order to connect the relationship between tradition and modernity (Geretsegger, et al., 1979; Wagner, 1912: 485-500).

Figure 3: The design of Otto-Wagner-Spital, photo: Gerhard Hadinger, (Source: https://www.diezeitschrift.at/content/furunkel-am-verlaengerten-steissbein)

Smart planning seems a very new topic in 21st century, which would always be related to information and science technology, but from the point of the planning master in the old days without these technology, the concepts and the way of thinking played a deadly decisive role on the development of one city.

BUILT ENVIRONMENT IN SEESTADT ASPERN, 22ND DISTRICT OF VIENNA

Beginning with the construction of a building, a conscious handling and use with the materials used is essential. When using resources, one of the things that can be taken into consideration is to use regional goods. This means promoting regional businesses and, moreover, short transport routes and less CO_2 pollution for the environment. At the same time, directly generated resources can be used on site for new buildings, for example, the reuse of components through the removal of a building. Furthermore, sustainable raw materials play a role in smart urban development. These require to be obtained from renewable sources and are therefore replaceable. Above all, the required period of recovery is important. In Seestadt Aspern, many buildings were increasingly used with wood.

Figure 4: Seestadt Aspern exhibition (15.05.2018) (Source: authors)

A smart city also includes the presence of green spaces as well as the awareness of their significance for the urban climate. It is important to create sufficient areas where green spaces can unfold. These can be implemented both green areas such as parks, but also on the building. Whether it's certain plants that spread along the building without damaging it, or offer residents the opportunity to have more green space through balconies and terraces.

The "urban gardening" approach offers everyone the opportunity to rent space and garden according to their mood. For this purpose, separate areas are shown in Seestadt Aspern. This is also popular on the rooftops for big cities. So no extra area must be expelled and if it allows, the attic of the building can also be made retrospective urban gardening. The green space between the buildings along the streets contributes just as positively to the urban climate. Special feature in Seestadt Aspern are the raised beds along some sections of the streets. In order to ensure sustainable urban development, a city must have enough green spaces, as these are essential for an ever-growing city.

Figure 5: Seestadt Aspern exhibition (15.05.2018) (Source: authors)

For a smart built environment, the building and technology standards should not be ignored. New buildings must be within a certain tolerance range with regard to their energy requirements. Sustainable energy supply can help meet this standard. The Seestadt Aspern relies predominantly on solar energy on the roofs of the buildings. For example, solar systems are installed at the technology center or at the school. A future challenge for Austria is the build-up of energy storage systems to store energy and only use it when needed. The difficulty lies above all in the provision of energy at peak times, which currently could not be covered without external energy inflows. Energy storage enables urban development in the long term an autonomous energy supply.

BUILT ENVIRONMENT IN EBREICHSDORF, LOWER AUSTRIA

With the emergence of agriculture, or the knowledge of man that he can produce food on his own, there has been a change in the way people have lived so far. The nomadic way of life replaced the first forms of permanent settlements. This tells us that the change in the main activity of people changed the forms of the settlement. This fact has been confirmed over the course of history several times, for example with the emergence of agriculture, the first permanent settlements were created,

the development of industry was created by the cities, and the development of information and communication technologies was created by global cities. However, it does not strive for all settlements to urbanization and global connectivity. Rural settlements are the the best example. One of the many definitions of rural settlments and rural areas is the following: "The populated and uninhabited space, that is, the area with settlements that have no urban character, is called a rural or rural area" (Tosic, 2011). This is a simple definition of rural settlements that can be applied globally. What is common to all rural settlements is mono functionality, that is, the dominance of agriculture in the structure of activity.

There is a global problem in the development of rural settlements. The process of deagrarization is resettlement of the population from the village to cities. States have dealt with this problem in different ways, or not, such as the Republic of Serbia where this process may even be completed. Serbian villages are "aging", with the dominant old population. Working-age and young people in Serbia are not motivated to live in the countryside and engage in agriculture. This has many reasons. One of the main reasons is that Serbian villages are not equipped even with basic infrastructure and suprastructure. In many villages of Serbia there is not even a local store! The quality of life in the Serbian villages is not even closer to the quality of life in the city. In addition, the state stimulates the import policy, especially agricultural products, which are sold at much lower prices than domestic products. That absolutely and permanently demotivate the population to deal with agriculture and "revive" the Serbian villages.

One positive example for development of rural settlements is Ebreichsdorf, which is located at the lower Austria. According to the 2011 Population Census, 9976 inhabitants lived in the village. According to estimates from 2016, about 10762 inhabitants lived in this village[1]. So Ebreichsdorf is an example of a village where the number of inhabitants rose rapidly. One of the main reasons is that this village is located near Vienna, about 30km away. In addition to the fact that this settlement is located near a large metropolis, the local administration is actively working on its development.

Ebreichsdorf created a one-year pilot project, the "Smart City Ebreichsdorf". This project provides for the reconstruction of an old railway station and the construction of a new railway that will connect Ebreichsdorf better with Vienna. Due to the better connection, more residents from Ebreichsdorf would work in the city. A completely new route has been set up for the railway line according to spatial plans. Development scenarios have shown that this new route will enable the evenly spatial development of Ebreichsdorf. A large and active participation of local government was observed, where the principle of subsidiarity was absolutely applied (lowering of responsibilities from the state to local levels of administration). Local government and project developers also paid great attention to the involvement of villagers in this project. A lot of workshops were organized where the villagers were introduced to the project. They had a chance to know the projects theme better and more easily. On the other hand, the problem with land speculation which is almost unavoidable in Serbia is also present in this village. In Ebreichsdorf the owners of agricultural plots which are located near to the planned of the new railway station don't want to sell their plots. The assumption is that they are waiting for the moment when the price of their land will reach the highest level. It remains to be seen how the local government will solve this problem, as there is no system of expropriation (forcible purchase of property from individual persons, which is implemented by the state for its own needs), as in Serbia.

So, what makes the Smart City project Ebreichsdorf a "smart" project?

Not only the technical solutions are important. The nice thing is that actually "two heads are better than one". In other words, by integrating all the key stakeholders at local level into the planning process (including residents, not just spatial planners and experts), a project can be created that unites many needs. This also makes it easier to clarify the term "smart" together first and to lean on urban development projects.

BUILT ENVIRONMENT IN GRAZ, STYRIA

Graz is the second largest city in Austria and the capital city of Styria. It lies on the banks of the river "Mur". According to the 2003 data, Graz has about 285000 inhabitants. The Greater Graz area has about 340000 inhabitants. The area of the city is about 127km^2, of which 50% of the city's area is covered by a green belt[2]. Graz is known throughout Europe for its educational function, as evidenced by the fact

[1] Ebreichdorf (2018): https://www.ebreichsdorf.at/

[2] Graztourismus (2018), https://www.graztourismus.at/en

that 62000 students live in the city. The golden age of the city was in the 16th century, when the University of Graz was founded.

It is assumed that the South Slavs settled in the area of today's Graz about 800 a. d. In the 12th century, the Germans settled in this area and founded Styria. In the 14th century, Graz became the center of the Habsburg authorities. In the 16th century, the influence of the Italian Renaissance, which is still visible in the city matrix and the old buildings, is felt in the city. During the 18th and 19th centuries the city expanded, industrialization began and the railway arrived. The city is enriched with new boulevards, palaces, churches, parks and avenues.

The rich history of Graz is depicted in its urban form. In order to preserve the historical value of the city, improve the quality of life in the city and ensure sustainable urban development in the future, local authorities, spatial planners and citizens decided to develop "smart" development of the city through various strategies and projects.

The latest research shows that the number of inhabitants in Graz is constantly increasing, while at the same time the space for new construction is limited. In addition, the city is located in the hills enclosed by a basin, which limits its possibilities of further spatial expansion. Key components of the new development strategy for Graz are low CO_2 emissions, sustainable use of resources and energy efficiency. This new "smart" development strategy has been applied for the first time in a part of the city called *Waagner Biro street*. This city district is conceived as a compact part of the city with mixed land, attractive public spaces and high quality of life.

This new energy self-sufficient city quarter will be built in the former industrial zone, near the main railway station. In the construction of this district, for the first time, sustainable construction and transport technologies will be used. Buildings that were built to demonstrate this project are partly funded by national subsidies. National subsidies have also been funded by testing photovoltaic cells located in the "Science Tower", then the local energy network for the *Waagner Biro*, as well as multimodal transport solutions.

The project envisions that the high-quality public space of the city connects modern residential buildings and business offices with a new school campus. By 2025, it is expected that an additional 3800 residents will live in the "smart" district of the *Waagner Biro*. In addition, about 1500 new jobs will open. Up to now, about 330 million euros has been invested in this new city quarter by the project partner and the city of Graz.[3]

[3] Smartcitygraz (2018), http://www.smartcitygraz.at/

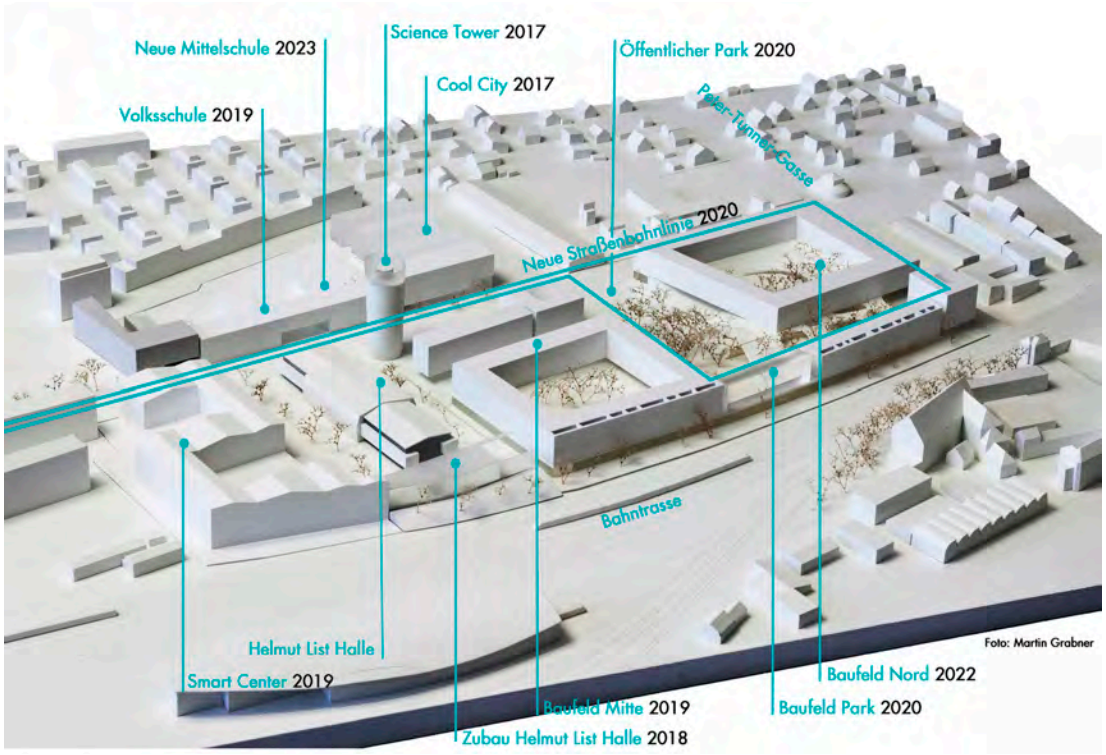

Figure 6: Development area Waagner Biro, Smart City Graz; (Source: http://www.smartcitygraz.at/moretext/)

The construction of the "Science Tower" by *SFL Technologies* is the first step towards creating the "smart" quarter of the *Waagner Biro*. This 60m high tower will be the home of scientific research. The "Science Tower" has a double facade made of photovoltaic cells. This innovative technology is used for the first time to a large extent in this project. Part of the facade of the "Science Tower" is set as a "test zone" for the development of new facade elements that produce energy. In this way, the applied technology is simultaneously used and perfected.

Figure 7: Plan from Waagner Biro street, Smart City Graz; (Source: http://www.smartcitygraz.at/moretext/*)*

A very important aspect of the "smart" development of a city is the applied technology in its construction. Cities of the modern age are faced with major environmental pollution problems. One of the main causes of pollution is "dirty" energy is products from fossil energy sources. Therefore, the "smart" development of cities in the future must be based on clean sustainable energy sources. The Graz project can serve as a positive example of such a clean energy source.

RESUME ABOUT SMART PLANNING AND ABOUT SMART BUILT ENVIRONMENT IN AUSTRIA

After the two excursions in Austria and Serbia it is clear to us that the term "smart" cannot be differentiated clearly and depend on the context in which the term is considered.

At the turn of the 19th to the 20th century the built city of Austria was particularly influenced by the architect Otto Wagner. He was considered the "father" of Modernism, who, despite some unexecuted projects, set important milestones from historicism to modern times. Particularly noteworthy is his new architecture of Art Nouveau buildings, in which he was primarily on function, construction and material value. The main advances are his reflections on modernity and his designs for an "unlimited city". The traditional building structure is slowly fading into the background. Wagner showed new views on the function of a big city. The interplay of built-up structure and generous green areas also gained in importance. Among his accomplishments are his main works: the Postsparkasse, the Kirche am Steinhof and the Wiener Stadtbahn. His unexecuted works, such as his design for a city museum on Karlsplatz, also shaped modern urban planning.

The new district in the northeast of Vienna "Seestadt Aspern" trumps mainly because of its modern architecture with the latest thermal and technical standards. When planning the Seestadt, the conscious handling and use of the resources used is very important. In addition, attention is paid to the origin, transport routes and thus to the CO_2 pollution. The use of regional goods is thus assigned a high priority, which is essential for the standard of a "smart" city. In particular, the sustainable use of resources (wood) and the use of sustainable energy sources (such as photovoltaics) are an essential part of the built-up structure in Seestadt Aspern. It is equally important that in every apartment a balcony or a terrace is integrated. This has been made possible above all by the Red-Green Government in Vienna. This shows that sustainable raw materials also help to improve the quality of life. For some, this may be your own parking lot on your doorstep, but environmentally thought this may just as be your own piece of garden. The topic of quality of life is also listed by name as an integral part of a liveable and sustainable city in the "Smart City Rahmenstrategie" of Vienna.

In addition, the green space in both the area and on the buildings a great value is awarded. Whether elevated beds along the road, green facades, green roofs or large-scale "urban gardening" areas. In addition to transport infrastructure and traffic flows, the built-up structure has a significant impact on the CO_2 emissions of a city. That is why approaches to improving these areas are desirable in order to be able to achieve the goals of a Smart City and thus make a positive contribution to climate change in the long term. This is precisely where urban planning can make a big impact. This is not only desirable for Vienna and Austria, but other states should also keep this in mind and, above all, give the largest importance to the built-up structure and city traffic. Awareness raising is not enough on a Europe-wide or supra-local level, also in the awareness raising on the spot with the inhabitants should not be saved. In the end, each individual is part of a large whole and can thus make the most of it.

With the seaside city of Aspern emerged and still build huge building complexes. On the other hand, such a major project also highlights the growing importance of energy storage. Especially in a growing city with a lot of built-up area is accordingly the area a scarce and valuable asset. The incorporation of energy storage devices must be taken into account, especially in new buildings, since energy storage systems can be included in the planning right from the start. The problem is the coverage of energy demand at peak times. Thus not only sustainable energy production is essential for a city, but also energy storage in order to be able to provide energy from its own production as sustainable as possible (short pipeline routes).

The "Smart City" project in Ebreichsdorf serves to expand non-motorized private transport in order to achieve a better connection to the city of Vienna. As I mentioned earlier, both built-up space and traffic have a significant impact on the carbon footprint of our world. By expanding the non-motorized private transport, I may reach the goal of giving up more on the car. Equally essential for a Smart City is the expansion of the bicycle network. In Vienna a lot has happened in this regard in recent years. What can be further expanded is the expansion or extension of the bicycle network not only to the adjacent communities of Vienna, but also beyond. The better connection of public transport locally and supra-local is again an essential step to counteract climate change and to make a positive contribution to CO_2 reduction. At the community level, an improved connection against urban sprawl is effective. Nevertheless, there are still new considerations in Austria regarding the expropriation of land. As a result, many new traffic or housing projects often fail or are delayed. However, what is not desired are examples such as "Belgrade Waterfront", where from one day to the next the residents within the planning area were evicted from the homes to implement the project.

A new energy self-sufficient city quarter in Graz is *Waagner Biro street* which is also part of the "smart" development strategy. In the construction of this district, for the first time, sustainable construction and transport technologies will be used. The project envisions that the high-quality public space of the city connects modern residential buildings and business offices with a new school campus. A special feature of the urban area is the "Science Tower", which offers extensive photovoltaic systems on two facades. The test zone makes it possible to use and develop sustainable energy sources at the same time. Again, this is a novelty in technology, demonstrating that not only is it essential to deploy new sustainable technologies, but also the potential of a test zone can be important for achieving progress in the first place.

In conclusion, it can be said that smart built environment in Austria not only means the use of the latest technical and thermal standards. Smart planning also means the use of sustainable energy sources and resources, the reuse of existing resources on the ground, or the extra supply of public space and green space. The development of public transport infrastructure and the built-up area of a city should be paramount to urban development, as these contribute significantly to our ecological footprint. As the "Smart City Rahmenstrategie" of Vienna shows, smart planning and smart built environment contribute to an improved quality of life in a city. Thus, by "smart" urban development, not only the energy consumption can be reduced, but "smart" solutions can also raise the quality of life of the population.

Figure 8: Eco friendly
(Source: http://nexoservices.net/wp-content/uploads/2015/09/efriend.jpg, *own editing)*

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SMART BUSINESS IN AUSTRIAN CITIES

Sanja Katanić , Đorđe Radinović Kapralović

INTRODUCTION

Today more than half the world's population and two-thirds of Europeans are living in cities or urban areas; the figure for Austria is 64%[1]. The global trend in urbanization is upwards; the process will continue in the future, and the city will become the dominant environment in social and economic terms throughout the world. Europe's cities generate the bulk of our affluence although, at the same time, they face huge economic, ecological, and social challenges.

Climate change, migration, secure energy supply systems, and sustainable mobility are among the issues calling for pioneering strategies and solutions. The hallmark of Smart City is an intelligent system design, bringing together new technologies and services for buildings and infrastructure, generating and distributing energy, mobility, industrial production, and trades. In the future, all relevant sectors should be linked and attuned to one another with the help of integrated planning and modern communications technologies. Tomorrow's cities will combine climate protection with a high quality of living, making them attractive as business locations and contributing to a permanent reduction in energy and resource consumption. At the EU level, the issue of sustainable urban development plays a key role in the Strategic Energy Technology Plan (SET-Plan), in the Horizon 2020 framework program for research, in the European Innovation Partnership Smart Cities and Communities (EIP SCC), in the transnational Joint Programming Initiative JPI Urban Europe, and in various transnational cooperation schemes and initiatives.

Austrian Activities Since late 2010, the Federal Ministry of Transport, Innovation and Technology (BMVIT) and the Climate and Energy Fund have collaborated on funding the development of strategies, technologies, and solutions for climate-friendly, energy-efficient urban economic activities and lifestyles. In step with EU initiatives, a pilot called "Smart Cities Demo" has been launched in Austria to support trendsetting pilot projects. In addition, the BMVIT successfully started the JPI Urban Europe in 2010, a transnational research program under the aegis of the EU Council of Ministers, which tackles basic system-relevant issues related to urban development. Within the framework of Building of Tomorrow, BMVIT supports flagship construction projects, and the recently launched BMVIT program City of Tomorrow is intended to accelerate the development of new technologies, technological (sub) systems, and urban services.

In this program, Austrian towns and cities are developing strategies and arrangements for the Smart City and have already started to successfully implement these in specific pilot projects. Here are some examples of the initiatives mentioned above that show the wide range of Austrian activities: Smart City Vienna: Model for Intelligent Urban Development in Europe All over the world, the city of Vienna with its 1.7 million inhabitants is seen as an example of exceptional urban quality of life. The city aims to secure this status in the long term by means of comprehensive measures for a sustainable future in terms of energy and climate. Under Mayor Häupl's aegis, the department responsible for urban development and urban planning launched "Smart City Vienna" in 2011. As part of the Climate and Energy Fund's program Smart Cities Demo, Vision 2050, a Roadmap for 2020 and beyond, and the Action Plan for 2012-2015 have been implemented in a stakeholder process.

VIENNA

Vienna's Smart City activities are embedded in various transnational and European programs. Vienna cooperates with other European cities and international business and research partners, e.g. in the project TRANSFORM (Transformation Agenda for Low Carbon Cities, partially funded within the EU's 7th Framework Program for Research). "TRANSFORM plus" pilot projects

[1] Website: http://www.un.org/en/development/desa/news/population/world-urbanization-prospects-2014.html

are implemented in "smart" city districts, and the overall urban strategy is advanced with the support of the Climate and Energy Fund. Aspern – Vienna's Urban Lakeside In Aspern, a 240-hectare site, once an airfield, is being developed into a brand-new, multifunctional city district with residential accommodations, offices, and a section for small-scale businesses, science, research, and education.

The Aspern Urban Lakeside is one of the largest urban development projects in Europe[2] (Figure 1), where affordable accommodations for 20,000 people, plus 15,000 jobs, and top-rated public transport and infrastructure are underway. As part of the BMVIT funding program Building of Tomorrow, the central project Aspern – Vienna's Urban Lakeside addresses the issues of open space and microclimate, inter-building energy distribution and consumption, implementing specific demonstration buildings to surplus- energy standards, and monitoring systems to evaluate the buildings' performance[3].

As a first pilot project, the Vienna Business Agency's Aspern IQ Technology Center went up in 2012. Liesing Mitte – Zero Emission and Urban Farming The Liesing Mitte project connects three dissimilar urban areas ("In der Wiesen," the Liesing Industrial Zone, and Atzgersdorf Zentrum) to create a model Smart City district[4].

The focus, among other things, is on deploying intelligent building technologies in new construction and renovation and on setting up smart grids, thus making it possible to tie in surplus-energy buildings as suppliers of energy[5]. The goals are to reduce the district's carbon-dioxide emissions step-by-step to zero by 2050; to lower energy and raw-material consumption by a factor of 10; and to shift to 100% renewables as sources of energy. Social considerations, such as making these innovations affordable for low-income households, play a key part here. Around 100 different individual projects have been slotted into a road map. One important aspect is designing the open spaces as areas that the future residents can use.

Urban farming projects in subsidized housing construction are intended to improve the quality of the surroundings, dissuade people from moving to the country, and to re-establish their awareness

[2] Website: https://viennabusinessagency.at/property/industrial-areas/properties-in-vienna/aspern-viennas-urban-lakeside/

[3] Website: https://nachhaltigwirtschaften.at/resources/nw_pdf/eia/eia_134_en.pdf

[4] Website: https://www.energy-innovation-austria.at/article/smart-city-wien/?lang=en

[5] Idem.

Figure 1. The Aspern Urban Lakeside is one of the largest urban development project (Source: https://smartcity.wien.gv.at/site/en/aspern-viennas-urban-lakeside/*)*

of what makes good food[6]. TRANSFORM plus: Smart Urban Labs For Aspern Urban Lakeside, a "Smart Citizen Assistant" is being developed – a tool to provide data to (mobile) terminal devices about residents' energy consumption and important local information. In the pilot project "e-delivery on demand," a low-cost logistic pooling model for electric-powered vans is being thought out for the Liesing Industrial Zone.

GRAZ

Smart Future Graz: "Urban building blocks" Self-Sufficient in Energy Graz, Austria's second largest city, is fast-growing with limited space for settlement[7]. That is why urban development in Graz is focused on packing more into parts of the inner city with excellent infrastructure. These areas are to be made into energy-efficient, resource-conserving, low-emission residential areas with a very high quality of life. In the strategic project "I live Graz", future actions have been defined for the Smart City Graz in the areas of the economy, society, ecology, mobility, energy, and facility management. Apart from providing grade-A accommodations, the city's main aims are to provide attractive public spaces to set up a network of attractive routes for walking and cycling, to mesh development with public transport facilities, and to reduce motor traffic's share of travel.

Smart City Project Graz Mitte a new urban district self-sufficient in energy is to take shape in the heterogeneous area (once an industrial zone) near Graz's main railway station. Here, energy technologies for the intelligent "Zero Emissions" city will be demonstrated for the very first time via an inclusive planning process.

The project involves:

Testing new components and systems such as new solar modules, solar cooling, urban solar power generators, façade-integrated elements, mini-CHP units, and Smart Heat Grids

Implementing demonstration facilities (the research-oriented Science Tower, the pilot PV unit "Grätzel-Zelle," a power center plus local power grid, a solar updraft tower, and housing developments and premises for small-scale businesses featuring pioneering building technologies)

Strategies for sustainable urban mobility, including electric-powered vehicles. Citizens are brought into the process by actively organizing the community, providing information and ways to participate, as well as via an interdisciplinary panel of experts. Constant dialogue with partner cities in Austria and abroad is intended to promote learning processes, reflection, and the dissemination of results.

ECR Energy City Graz Reininghaus As part of the flagship project Building of Tomorrow, an overall energy strategy has been worked out for Graz Reininghaus, as well as strategies for structuring, building, and running the district as an urban region self-sufficient in energy. Here, pilot facilities are intended to become internationally trail-blazing "building blocks of urban sustainability."[8] The overall energy strategy is primarily focused on linking up surplus-energy buildings (which produce more energy than they consume) and feeding the surplus energy into a communal grid. Energy consumption, supply, and distribution, building services engineering, and urban development aspects (e.g. geothermal energy, suitable orientation of a structural shell, solar exploitation of roofs and facades, using process heat, CHP facilities, etc.) have been investigated for the energy framework plan.

The surplus-energy cluster Reininghaus Süd (Figure 2) was one of the first construction projects to be implemented. Here, twelve separate blocks of apartments have been coupled together into a multifunctional cluster of buildings. An office and shopping complex in front screens the project from a nearby busy road. The surplus-energy approach dividual buildings have been designed to take maximum advantage of renewables (geothermal energy tapped via energy piles, and photovoltaics), while synergies have been created between the blocks of apartments and the office complex.[9] To even out peaks in generation and consumption, the power centers in the individual blocks of apartments have been linked and power sharing with the office and shopping complex has been implemented.[10]

Vienna achieving the number one place as a smart city is not just a local effort, but a national one. One specific example of how Vienna, as part of Austria, is a smart city is the Federal Ministry for Transport, Innovation and Technology's investments in

[6] Website: https://www.austria.org/green-cities/

[7] Website: https://www.energy-innovation-austria.at/article/?lang=en

[8] Website: https://www.thegef.org/topics/sustainable-cities

[9] Website: https://www.nextroom.at/building.php?id=37026#&gid=1&pid=201157

[10] Idem.

Figure 2. The surplus-energy cluster Reininghaus Süd (Source: https://www.nextroom.at/building.php?id=37026#&gid=1&pid=201157)

e-mobility. E-mobility is the intersection of environmental protection and individual mobility.[11] The ministry invests in key technologies and supports Austrian researchers and companies in their development and implementation of future-ready transportation technologies.[12]

[11] Website: http://publications.jrc.ec.europa.eu/repository/bitstream/JRC97690/eur_27468_en_online_v3.pdf

[12] Publication: https://www.bmvit.gv.at/innovation/publikationen/verkehrstechnologie/downloads/physical_internet_and__transport__logistics.pdf

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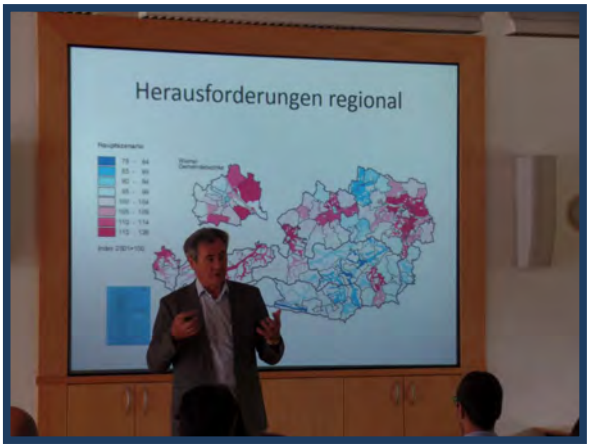
PHOTO ALBUM

FIELD TRIPS TO VIENNA AND GRAZ, AUSTRIA


Leben in Wien
Arbeiten in Europa


Siegerprojekt
Burtscher-Durig ZT GmbH, Wien


Herausforderungen regional

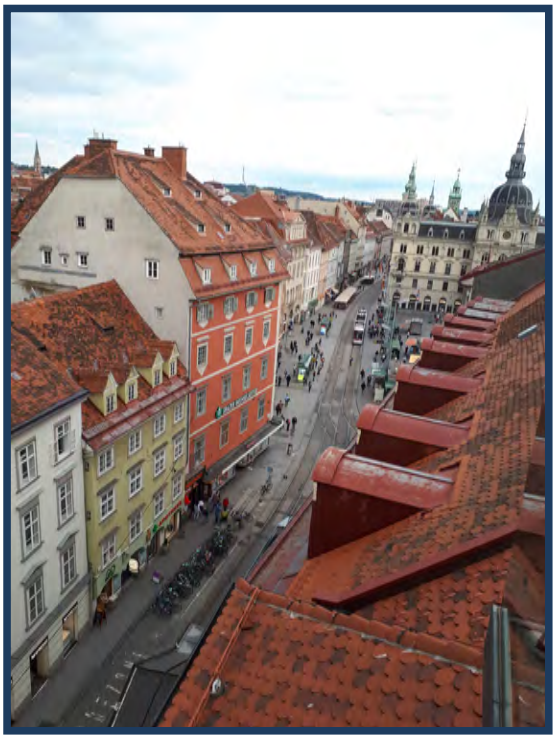

Neudorf
Thondorf
Dörfla
Gössendorf
Fernitz
Enzelsdorf
Mellach
Feldkirchen
Lebern
Kalsdorf
Großsulz


OTTO


Feinkost Rolenec
Hundeschule
STOP


SMCE
Herausforderungen regional


Herausforderungen regional



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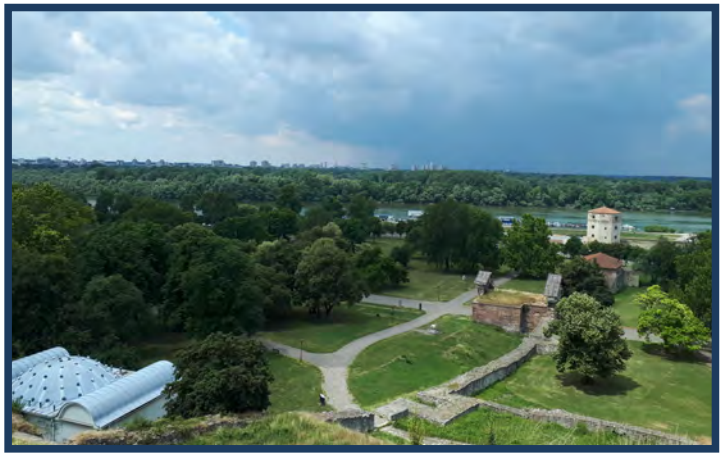

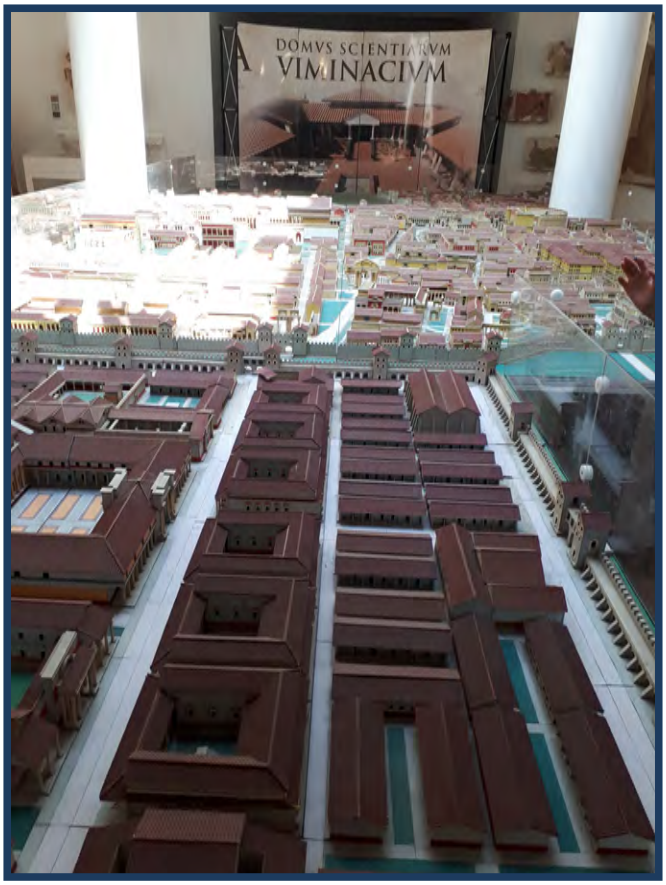
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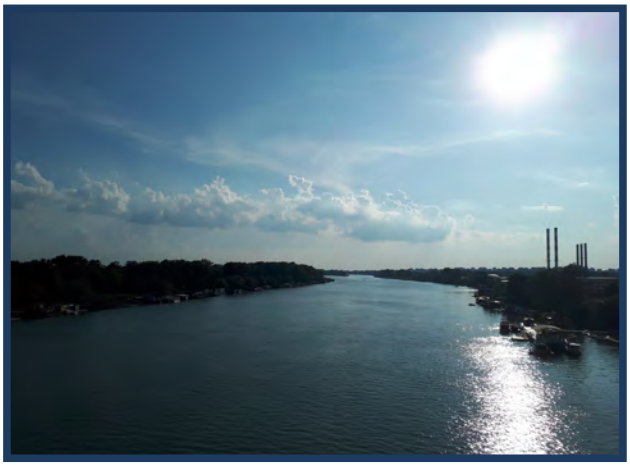

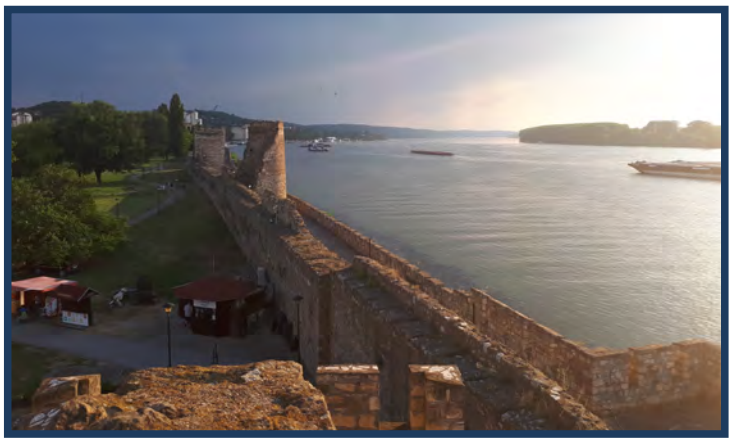

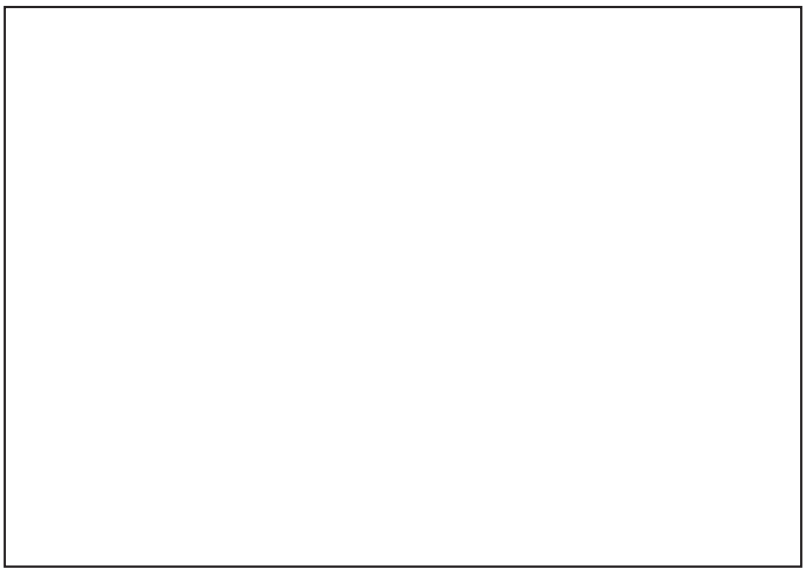


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