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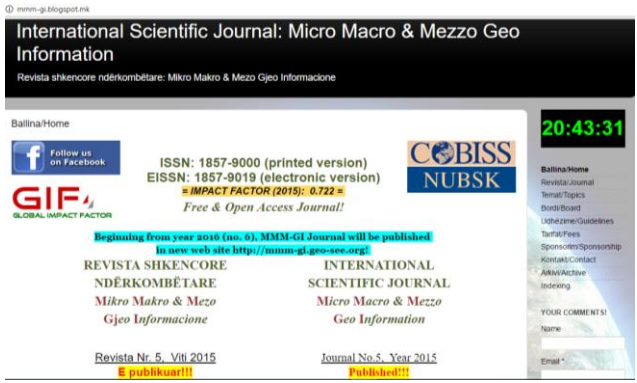

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AWARENESS RAISING ON EO/GI/SDI FOR SDGS – THE CASE OF HUNGARY

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SUMMARY

Approved by the UN General Assembly, the UN 2030 Agenda is a global program for the years 2016-2030 to achieve the selected Sustainable Development Goals (SDGs). Associated targets and indicators have been set up to be monitored and reported yearly in multi-sector collaboration of national level stakeholders together with the national statistical offices. Majority of the targets and indicators have spatial nature and Earth observation is inevitable to ensure their cost-effective measurement in order to tracking the progress of implementation of the SDGs. It was explicitly stated in the Resolution of the UN General Assembly, that the indicators have to be disaggregated by geographical location where appropriate.
It became obvious, the following aspects will play vital role in the success of the program:

- Geospatial information, Earth Observation data and data sharing
- spatial data infrastructures, Earth observation information infrastructure
- related capacity building
- open data, open source tools and advanced data access architecture
- partnership between data custodians and other stakeholders.

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The early engagement of the stakeholders is critical. Awareness raising campaigns are needed form local to global, where the EO4SDGs Strategic Implementation Plan could serve as a guideline (GEO, 2017).
The Hungarian approach in the awareness raising calls the attention of the geospatial community and stakeholders, how their technologies and services can contribute to the support of the achievement of SGDs. Started in February 2017, the awareness raising campaign was executed by volunteer members of the Hungarian Society of Surveying, Mapping and Remote Sensing (MFTTT).

Key words: UN 2030 Agenda, Sustainable Development Goals, Earth Observation, Geographic Information, Spatial Data Infrastructure, Statistics, SDG Awareness Raising in Hungary, SDG Engagement of stakeholders in Hungary

FLASHBACK: THE WAY WHICH LEAD TO THE UN 2030 AGENDA

Human activities besides their economic and societal impacts affect unprecedented manner our environment as well. The crucial importance of the environmental protection was formally recognized widely first by a high-profile international conference organized by the UN, hosted by the Swedish government. 4 decades of follow-on actions lead the way to the formulating and adopting the UN 2030 Agenda on the Sustainable Development (SD) in 2015, and an international consensus on the Climate Change was reached by state heads in the Paris Agreement in 2016 (UN FCCC, 2017). Table 1 provides an overview of the milestones.

Table 1: Milestones on the way toward the UN 2030 Agenda (Scott, Rajabifard, 2017, Anderson et al, 2017)

Action	*Location, date*	*Features*
UN Conference on Human Environment	Stockholm 1972	Formulating the concerns Participated by 113 countries
UN World Commission on Environment and Development (WCED)	Geneva 1983	Established by the UN General Assembly Getting a political mandate
Our Common Future	New York 1987	Definition of SD Adopted by the UN General Assembly,
Earth Summit UN Conference on Environment and	Rio de Janeiro 1992	Rio Declaration on ED with 27 principles Agenda 21 with 40 chapters

Development (ED)		signed by 178 countries
The Millennium Summit	New York 2000	Agreed in 8 Millennium Development Goals with deadline 2015 signed by 189 countries
International Summit on Sustainable Development	Johannesburg 2002	Role of EO/ geospatial data and technologies mentioned
Rio +20 Conference Earth Summit on the SD	Rio de Janeiro 2012	The Future We Want – common vision. Importance of EO/GI and technologies acknowledged 192 countries presented

LESSONS LEARNED AND SETTING UP THE WAY FORWARD

By revisiting and evaluating the achievements and shortfalls of the UN Millennium Development Goals program, it was recognized that for future actions the goals have to be widened, an indicator framework has to be establish and yearly monitoring and reporting is needed to ensure better established, disaggregated information- and evidence-based decision making.

The SDGs and their associated targets were elaborated by the UN Open Working Group on Sustainable Development Goals co-chaired by Ambassadors and Permanent Representatives of Hungary and Kenya to the United Nations Csaba Kőrösi and Macharia Kamau respectively, between 2014-2015 and prepared for the UN Sustainable Development Summit held in New York between 25-27 September 2015. The 2030 Agenda for Sustainable Development was adopted by 193 Member States of the United Nations unanimously on 25 September 2015 (UN, 2015a). The document was published on 21 September, 2015 entitled Transforming Our World: The 2030 Agenda for Sustainable Development (UN, 2015b).

On 19 February 2016 the UN Economic and Social Council distributed a proposal elaborated by the Inter-Agency Expert Group of the UN Statistical Division on data and indicators in the 2030 Agenda context for discussion and decision at the 47th Meeting of the UN Statistical Commission held between 8-11 March 2016.

The major steps of the approval mechanism of the current 230 indicators associated with the 169 targets (4-20 per SDG elaborated also by the Inter-Agency Expert Group of the UN Statistical Division) include the (1) Preparatory phase by IAEG-SDG, (2) Review and approval by the Meeting of the UN Statistical Committee (UNSTAT in March every year), (3)

Approval by the Meeting of the UN Economic and Social Council. (UN IAEG, 2016).

THE IMPACT OF SDGS ON THE GEOSPATIAL AND EO COMMUNITIES

The implementation of the UN 2030 Agenda provides opportunities, challenges and responsibilities not only for the member countries of the United Nations, but for custodians and stakeholders of a wide range of data communities including the Earth Observations and geospatial ones, because these latters' data, information, infrastructures, services and related technologies offer cost-effective support of the statistics in monitoring the targets and indicators and achieving the SDGs.

About data, monitoring and accountability the Resolution 70/1 of the UN General Assembly (25.9.2015) explicitly mention (UN, 2015a):

"17.18 By 2020, enhance capacity-building support to developing countries, including for least developed countries and small island developing States, to increase significantly the availability of high-quality, timely and reliable data disaggregated by income, gender, age, race, ethnicity, migratory status, disability, geographic location and other characteristics relevant in national contexts "

Disaggregated by geographic location: this is why the already recognized role of EO/geospatial data, spatial data infrastructure including related services and technologies will be significantly upgraded, generating impacts on national-level strategy formulation, improving data policies, capacity building and need for interdisciplinary/multi-agency coordination and collaboration, including public-private cooperation. It is anticipated, the geospatial and EO-related industry will steadily grow generating high-tech jobs providing value-added products and services from local to global markets.

Location matters. In this context the international terrestrial reference frameworks such as International Celestial Reference Frame, (ICRF), International Terrestrial Reference Frame (ITRF), European Terrestrial Reference Frame, (ETRF), Hungarian Datum 1972 (HD72) and the Global Geodetic Observation Systems (GGOS) as well as their geometric, gravimetric and oceonagraphic measurements systems as well as the metrology standards have fundamental role in the spatial and temporal monitoring of the indicators (Altamini, 2012).

As far as the Earth observation and geospatial information support of the official statistics in monitoring and achieving the 2030 Agenda is concerned, the GEO and UN GGIM publication (GEO, UNGGIM, 2017) and presentation of Steven Ramage of GEO Secretariat held at the recent

European Forum on Geography and Statistics are relevant references (Ramage, 2017)..

INSTITUTIONS, ORGANISATIONS, SUPPORTING SDGS BY PROVIDING AND/OR USING EO/GI

Table 2 shows some major players involved in SDG related actions

Table 2: Examples of governmental, academic, industry and NGO stakeholders in EO/GI areas supporting the achievement of SDGs directly on indirectly

	Examples
Some EO institutions	GEO, GEO EO4SDGS, CEOS, ISDE etc.
Some Geospatial institutions	OGC, USGS, JRC IES DERD etc.
EO/geospatial programmes of space/governmental agencies	ESA (Copernicus, Galilei, LTDP), GADC, NASA, USGEO, etc
UN institutions	UNEP, UNDP, FAO, HABITAT, etc
UN-related bodies	ECOSOC, UNSTAT IAEG-SDG, IAEG-WGGI, UN Commission on SD, UN-GGIM (Academic Network, Geospatial Societies, Industry, Regional Networks), Data4SDGs, etc.
Other institutions, alliances	The World Bank, IISD, Regional and national Statistical Offices
Global Geospatial Societies/Organisations	International Federation of Surveyors (FIG), International Society of Photogrammetry and Remote Sensing (ISPRS), International Cartographic Association (ICA), International Association of Geodesy (IAG), International Standard Organization, Technical Committee 211 (ISO TC/211), Open Geospatial Consortium (OGC), Global Spatial Data Infrastructure Association(GSDI), Open Source Geospatial (OSGeo) etc.
Regional institutions, platforms	EU, countries of V4
Regional frameworks, programs	Danube Region Strategy,
Regional alliances	Europe: EuroGeographics, UNECE WPLA, EUROGI, EuroSDR, GEE-See, EULIS, etc.

The intergovernmental Group on Earth Observation (GEO) alone attracted so far 105 countries and 118 participating organizations as member . The

importance of the progress of SDGs is reflected by the fact, that the report on advancements is announced by the UN Secretary General. The second annual SDG Progress Report was announced in June 2017.(Risse, 2017)

EO/GEOSPATIAL DATA FOR SDGS – GEO/UN-GGIM EXAMPLES USED FOR AWARENESS RAISING

The proven applicability of the Earth observation in support of the Sustainable Development Goals and some selected application areas were introduced at the Statistics-Geospatial Information Forum, a side event of the 47th Meeting of the UN Statistical Committee in March 2017 as shown on Table 3 and Table 4.

Table 3: EO/GI data supporting the achievement of SDGs in some selected application areas. Source: (GEO, UN-GGIM, 2017). Its translated version was used in the Hungarian awareness raising campaign

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Table 4: Earth observation and geospatial information linkages to SDG Goals, Targets and Indicators Source: (GEO, UN-GGIM (2017) [♣].Its translated version was used in the Hungarian awareness raising campaign

Target (Contribute to progress on the Target, not necessarily the Indicator)									Goal	Indicator (Direct measure or indirect support to the Indicator)					
							1.4	1.5	1 No poverty	1.4.2					
						2.3	2.4	2.c	2 Zero hunger	2.4.1					
					3.3	3.4	3.9	3.d	3 Good health and well-being	3.9.1					
									4 Quality education						
								5.a	5 Gender equality	5.a.1					
		6.1	6.3	6.4	6.5	6.6	6.a	6.b	6 Clean water and sanitation	6.3.1	6.3.2	6.4.2	6.5.1	6.6.1	
					7.2	7.3	7.a	7.b	7 Affordable and clean energy	7.1.1					
								8.4	8 Decent work and economic growth						
					9.1	9.4	9.5	9.a	9 Industry, innovation and infrastructure	9.1.1	9.4.1				
						10.6	10.7	10.a	10 Reduced inequalities						
	11.1	11.3	11.4	11.5	11.6	11.7	11.b	11.c	11 Sustainable cities and communities	11.1.1	11.2.1	11.3.1	11.6.2	11.7.1	
				12.2	12.4	12.8	12.a	12.b	12 Responsible consumption and production	12.a.1					
					13.1	13.2	13.3	13.b	13 Climate action	13.1.1					
		14.1	14.2	14.3	14.4	14.6	14.7	14.a	14 Life below water	14.3.1	14.4.1	14.5.1			
	15.1	15.2	15.3	15.4	15.5	15.7	15.8	15.9	15 Life on land	15.1.1	15.2.1	15.3.1	15.4.1	15.4.2	
								16.8	16 Peace, justice and strong institutions						
17.2	17.3	17.6	17.7	17.8	17.9	17.16	17.17	17.18	17 Partnerships for the goals	17.6.1	17.18.1				

EXAMPLE FOR USING OPEN EO/GEOSPATIAL DATA AND OPEN SOURCE TOOLS FOR SDGS

The yearly arranged European Challenge for students and young professionals of SMEs to take part in innovative application development in competitive environment using the NASA-ESA developed Web World Wind open source virtual globe attract challengers from all over the world as it was presented at the 10th Digital Earth Symposium and Locate 17 Conference hosted by CRCSI (Hogan et al, 2017). Growing number of projects are using open Earth observation and geospatial data (eg. Sentinel, OpenStreetMap). For example, the DelBianco CitySmart project provides multipurpose analysis and visualization capabilities, using wide range of open EO/geospatial data to support more evidence based decision making

envisaged for Local Governments in the SDG 11 associated targets and indicators context (Remetey-Fülöpp, 2017).

Figure 1: The SDG 11: Sustainable cities/ communities with the associated targets

In the World Wind Europa Challenge 2017 hosted by the Digital Finland Forum and Nokia in Espoo, one of the award winner project AgroSphere is capable incorporating and analyzing any number of spatiotemporal geographically-accurate data from multiple sources for agriculture and atmosphere enabling the analysis and visualisation of the effect of climate change on agriculture using a large collection of global agriculture and climate data and the free, open source Web World Wind Software Development Kit. By handling disaggregated data by location, such tool might contribute to SDG target/indicator monitoring and reporting. (NASA, 2017).

INSTITUTIONAL BACKGROUND OF THE IMPLEMENTATION OF THE UN 2030 AGENDA ON SUSTAINABLE DEVELOPMENT GOALS IN HUNGARY

Actors are shown on the Table 5.

Table 5. Actors playing major role in the decision making related to the implementation of SDGs in Hungary

Hungarian National Assembly, Committee on Sustainable Development
National Council for Sustainable Development
Office of the President of the Republic, Directorate for Environmental Sustainability
Prime Ministership

Ministry of Foreign Affairs and Trade
Ministry of Agriculture
Ministry of National Development
Representatives of Parties of the Hungarian National Assembly
Universities, Academic institutions, Foundations, Boards and Councils
Non-governmental Partner Organisations e.g. National Society of Conservationists - Friends of the Earth Hungary (MTVSZ), Hungarian Society of Surveying, Mapping and Remote Sensing (MFTTT) etc.

NATIONAL SUSTAINABLE DEVELOPMENT FRAMEWORK STRATEGY

In Hungary, Governmental degree 1888/2016. (XII. 29.) prescribes the implementation of the National Framework on Sustainable Development (NCSD, 2015). Reporting is the task of the Ministry of Agriculture in collaboration with other governmental agencies. The report prepared for the National Assembly is submitted to the National Council on Sustainable Development first.

During the past 12 months events have been arranged in Hungary, which dealt with the 2030 Agenda on the Sustainable Development including the Plenary Meeting of the Executive Committee of the UN GGIM:Europe in Budapest, 5.10.2016. participated among others the prime geospatial data provider Department of Land Administration and Geo-information of Ministry of Agriculture, National Statistical Office, from abroad the UN-GGIM Secretariat, EuroGeographics, GSDI, EUROGI, UNECE and others. Katalin Tóth, Deputy State Secretaryof the Ministry of Agriculture, expressed her view: „The operation and achievements of the Hungarian Land Administration are well known and acknowledged in the European Union and beyond, consequently we can contribute to the professional issues addressed such as the visions, formulation of regulations and standards" (Tóth, 2016).

For example, the support of the achievement of the first two SDGs using GI/EO data, services and technologies in Hungary are provided as follow:

SDG 1 No poverty. Important indicators are the land and real estates

Inventory and cadastral surveys as well as TAKAROS, DATR, FÖNYÍR, Land Information Systems

SDG 2 Zero hunger. Indicators related to food security, traceability, sustainable agriculture are supported by land use land cover monitoring, MePAR, CwRS, VINGIS, wide range of EO data acquisition (satellite, airborne, UAV, in-field), food-chain systems etc.

Another SDGs-related Conference was arranged by the National Council for the Sustainable Development in conjuction with the Hungarian Society of Conservationists - Friends of the Earth Hungary
on 7 February, 2017 with the aim to identify the progress and setting up tasks to be done e.g. the amendment of the present National Framework on Sustainable Development document. (Zentai, 2015).
The Hungarian National Assembly was the very first who ratified the Paris Agreement on Climate Change in 2016 paving the way for the elaboration of the 2nd National Strategy on Climate Change whereas efforts have been made by the Department on Climate Policy and the Hungarian Space Office of the Ministry of National Development to emphasize the Earth Observation and related issues such as the EU Copernicus programme as well as the utilisation of the national Earth Observation Information System. The document prepared was submitted by the Ministry of National Development to the National Council of Sustainable Development for discussion.

Table 6. GI/EO authorities in Hungary

Mandate	Authority
The supervisory authority In the field of Geodesy, Surveying, Mapping, Remote Sensing, Land administration, geo-information and Earth Observation	Department of Land Administration and Geo-information of the Ministry of Agriculture.
Since 1 January 2017, the successor of FÖMI, providing a wide range of GI/EO services for users from citizens to private sector and from governmental agencies to academia.	Department of Surveying, Remote Sensing and Land Offices at the Budapest Capital Governmental Office
Services provided on sub-national level in surveying, mapping and land issues	Land Offices on County and District
Military mapping:	Geoinformation Service of the Home Defence Forces
Supervises the space research programs and major projects in Earth Observation and has wide range of international relations in EU and beyond with special emphasis on cooperation with national/ regional space agencies (e.g ESA) and intergovernmental organisations such as GEO and UN bodies	Hungarian Space Office at the Ministry of National Development

Some sectors and branches having geospatial capabilities are playing dominant role in achieving the Sustainable Development Goals include: potential cooperative partners, custodians of the reference and thematic data provided for and by the National Spatial Data Infrastructure in sectors such as the Water Management, Transportation, Meteorology, Geology, Energy, Soil. Screenshots of some thematic information systems are shown on Fig. 2.

Figure 2 Some thematic geospatial information systems used in Hungary

In standardization: Hungarian Standards Institution, Working Group on Geo-informatics MB818

Non-governmental Organisations: Hungarian Society of Surveying, Mapping and Remote Sensing (MFTTT), Hungarian Association for Geo-information, Gita Hungary

Market actors of the GI industry (private sector from start-ups up to SMEs)

They are many players who will be potentially involved in the achievement of SDGs taking active part in the target and indicator monitoring and or reporting to the Central Statistical Office (KSH) who will provide the reporting for UN.

Scientific and research labs, academic institutions, R+D workshops and the institutions of the higher education (Universities, Colleges) are significant importance driving also the international relations, cross-border or international projects and programs.

THE ENGAGEMENT OF STAKEHOLDERS CAMPAIGN IN HUNGARY

The Multi-stakeholder partnerships are part of the Sustainable Development Goal 17. The Resolution 70/1 of the UN General Assembly (25.9.2015) describes the related tasks (UN, 2015a):

"17.16 Enhance the Global Partnership for Sustainable Development, complemented by multi-stakeholder partnerships that mobilize and share knowledge, expertise, technology and financial resources, to support the achievement of the Sustainable Development Goals in all countries, in particular developing countries

17.17 Encourage and promote effective public, public-private and civil society partnerships, building on the experience and resourcing strategies of partnerships"

Accordingly, in March 2017, an awareness raising campaign was launched by volunteer members of the Hungarian Society of Surveying, Mapping and Remote Sensing (MFTTT), actually the former and present national INSPIRE delegate as well as the national correspondent to the Group of Earth Observations (GEO) and liaison of the Global Spatial Data Infrastructure Association (GSDI) to the Working Group of Information Systems and Services (WGISS) of the Committee of Earth Observation Satellites (CEOS).

This action is in line with the firm commitment of the President of the 71st Session of UN who by taking his office on 13 September 2016 expressed his commitment to strengthen momentum for SDG implementation on the first place by "Raising the global public's awareness of the critical importance of SDG implementation. Now, the best start to begin it with awareness raising to engage the stakeholders.(Thomson, 2016).

Table 7: Awareness raising campaign of MFTTT to engage stakeholders at domestic and cross-border conferences and meetings on EO/GI/SDI for SDGs participated by representatives of governmental organisations, NGOs, academia, private sector (start-ups, Nano- and SMEs) as well as students.

Presentation at event of	Communities attracted	Participants
Day of the European Surveyors and Geoinformatics Budapest, 22 March, 2017 (Mihály et al, 2017a)	Surveyors, experts in geoinformatics	180
GIS Open 2017	Land Administration,	150

Székesfehérvár, 11-13 April, 2017. (Mihály et al, 2017b)	surveying, mapping, remote sensing, experts in geoinformatics	
18th Conference on Geodesy. Tușnad , 18-21 May, 2017 (Mihály et al, 2017c)	Geodetists, Surveyors, experts in geoinformatics	140
8th GIS Conference and Exhibition. Debrecen, 25-26 May, 2017. (Mihály et al, 2017d)	Experts in geoinformatics	150
31st Roving Conference of MFTTT. Szekszárd, 6-8 July, 2017 (Mihály et al, 2017e)	Land Administration, surveying, mapping, remote sensing, experts in geoinformatics,	170
Mini Conference Devoted to the 70th Anniversary of Prof. Béla Márkus. Székesfehérvár, 11 July, 2017 (Mihály, 2017)	Experts in geoinformatics from universities, colleges, students, private sector, governmental agencies and NGOs	45
Fény-Tér-Kép (Light-Space-Image) Conference Gárdony, 12-13 October, 2017 (Mihály et al, 2017f)	Experts in photogrammetry, remote sensing, Earth Observation, image processing, geoinformatics	100
Meeting with representatives of the National University of Public Service. Budapest, 7 November, 2017 (Mihály et al, 2017g)	Authoritive experts of 'Good State and Governance', state efficiency indicators, as well as sustainable development in areas water governance, climate change, food security, social capital, culture of sustainable living	

Documents are downloadable from the repository (Mihály et al, 2017h)

WIDER VISIBILITY OF THE EO/GI FOR SDGS-RELATED AWARENESS RAISING IN HUNGARY

Through the GSDI Association, which is Participating Organisation in GEO, has liaison with CEOS WGISS, reached special consultative status with UN ECOSOC, supports the UN Global Geospatial Information Management (UN GGIM) and active in the Geospatial Societies and Academic Network the Hungarian efforts promoting the EO/SDI for SDGs were mentioned in the GSDI's Liaison Report for the CEOS WGISS plenaries in 2017 hosted

by NASA and RADI in this year (GSDI, 2017a, GSDI, 2017b). It was highlighted by the column Insider's View of the GIM International magazine in its September 2017 issue (Remetey-Fülöpp, 2017b)
The MFTTT actions have been reported to the GEO EO4SDGS Team in August 2017, describing its contribution as follows: "Awareness raising to assist engagement of the geospatial and EO data stakeholders in the 2030 Agenda context. Three members of the Hungarian Society of Surveying, Mapping and Remote Sensing (MFTTT) decided to launch a volunteer-based awareness campaign, in form of a series of steadily updated and enhanced presentation, calling the attention of the geospatial and EO community on the SDGs-related challenges and opportunities."

FOLLOW-ON ACTIONS

The envisaged steps towards the achievements of tangible results in the stakeholders engagement incude a preparatory, introductory meeting with experts of the Sustainable Development and Resources Research Center at the National University of Public Service, where following the methodology of the periodically published Good State and Governance Report (NUPS, 2017), they are focusing on developing state efficiency indicators related to state reform priorities. Beside this, they are conducting research on sustainable development in areas water governance**,** climate change**,** food security**,** social capital**,** culture of sustainable living. The aim is to exchange of information and to discuss the feasibility how EO/geospatial information together with other data where location is matter, could be support the targets, indicators monitoring reporting including visualization based on spatial data infrastructure and services.
Another actions are anticipated with EO experts of the Hungarian Space Office of the Ministry of National Development, where the multi-agency and interdisciplinary project Earth Observation Information System (FIR) will be supervised (Zboray, 2017). Based on the deliverables of the recent GEO Week (Washington DC, 24-27 October, 2017) documents including the Strategic Implementation Plan of the GEO Initiative 18: Earth Observations in Service of the 2030 Agenda for Sustainable Development (EO4SDGs) will be reviewed and discussed with emphasis on the issue, how the existing and enhanced geospatial data infrastructure could support target indicator monitoring and reporting. Another issue to be addressed is the fact, that EO data, information infrastructure and integrated observations are applicable for the mitigation, adaptation and practical support of the implementation of the Paris Agreement, which was entered into force on 4 November 2016. (UN FCCC, 2016 At the UN Climate Change Conference (COP23) taking

place in Bonn, Germany, between 6-17 November, 2017, GEO is arranging side event and exhibition devoted to EO4ClimateChange.

CURRENT SITUATION OF THE IMPLEMENTATION OF INSPIRE AND NSDI

The purpose of Directive 2007/2/EC – known as the INSPIRE (Infrastructure for Spatial Information in Europe) Directive – is to lay down general rules aimed at the establishment, management and maintenance of the Infrastructure for Spatial Information in the European Community and of its computerised, Internet-based services, and to establish this infrastructure between 2009 and 2020 in order to ensure that the enforcement of Community policies, the coordination of the activities that have an impact on the environment, and the management of, and feedback from, the political mechanisms of action are smooth, simple and efficient.

The development and functioning of the information society requires the establishment, processing and use of immeasurable amounts of data. Spatial information is a tool of the information society which plays a crucial role in the improvement of processes and modernisation of services worldwide. The objective of the National Spatial Data Infrastructure (NSDI) is to systematise the tasks of this specific field. The development of the NSDI is especially timely in terms of the necessity to join the INSPIRE programme, i.e., the European spatial data infrastructure action.

A significant proportion of the data generated in the public sphere is data that can be related to spatial location, i.e. spatial data. In Hungary, these spatial data currently belong to more than one ministry or ministerial support institution. The harmonisation of these spatial data is incomplete and cooperation between the databases is a problem; therefore, we must establish the National Spatial Data Infrastructure, one basic element of which is Directive 2007/2/EC of the European Parliament and of the Council establishing an Infrastructure for Spatial Information in the European Community (INSPIRE).

Hungary is in the backdrop of implementation of the NSDI and the INSPIRE compared to EU Member States.

THE BOTTLENECKS RELATED TO NSDI IN HUNGARY

Currently, Hungary does not have a nationally harmonised National Spatial Data Infrastructure. Each field manages the data within their own scope of

action in accordance with the legal requirements but no rule is in force regarding their harmonisation.
Therefore, it needs to establish a standing committee to steer the operation of the National Spatial Data Infrastructure in order to ensure a more efficient use and harmonisation of the national spatial data and spatial information systems and in order to establish the National Spatial Data Infrastructure itself.

With the exception of certain data themes, the Hungarian data policy does not allow free data uses at the moment. This prevents cooperation between the different sectors of the State several times because the funds necessary to pay the data supply service fee are often missing.
Another obstacle is that the land administration sector does not receive funds from the central budget, which forces this sector to cover the costs of operating, maintaining and improving the land administration system from data sales revenues.

CONCLUSION

The INSPIRE Directive plays an important role in the establishment of the National Spatial Data Infrastructure of Hungary. The creation of a supporting Committee is necessary for the establishment of the National Spatial Data Infrastructure, for the monitoring of its operation and for the related reporting tasks of SDGs.
The National Spatial Data Infrastructure is the entirety of the spatial data, spatial information systems and registries managed by the State. The establishment of the National Spatial Data Infrastructure will allow an efficient and coordinated use of the spatial data and spatial information systems by the Government, which is indispensable for ensuring proper decision-preparation, for managing emergency situations, for establishing a better environmental status, for improving the quality of State services and for establishing a better service-providing State, which support of the SDGs.
Establishment of the National Spatial Data Infrastructure is necessary on the governmental level with the cooperation of the different Ministries and the Hungarian Central Statistical Office, with the involvement of the academy, the educational institutions, the private sector and the civil society organizations. It needs at the same time implementing a more favourable data policy at national level.

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THE SPACE AND THE HUMAN RIGHT TO HEALTHY LIVING ENVIRONMENT

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ABSTRACT

Living space includes land and air space above the earth to the greatest heights, underground - from the surface to the greatest depths and water reservoirs - from their surface to the greatest depths to which living beings, reach them, staying alive and they lives. Part of the living space where man lives is human living space.

Living space in which the man lives with object, flora and fauna on it is a human living environment. The space that is not polluted by harmful agents, emissions of harmful radiation, noise, which does not have excessive humidity, unbearably high or low temperatures is a healthy environment. Man as a creation of nature can live normally and happily in a healthy environment. He has the right to do so. This right is guaranteed to him by the international legal acts and the constitutions of the states. Among them is the Constitution of the Republic of Macedonia.

In order for a person to enjoy the rights of the complex of the right to a healthy environment and the rights to protection of the natural environment, he must have information on environmental pollutants. In the function of informing the person about polluters or endangers of the environment are the records and information services or information and documentation services, abbreviated as INDOC services. In the ranks of these services, from the aspect of environmental protection, the Environmental cadastre comes first.

The Ministry of Environment and Physical Planning establishes and maintains a single Cadastre for the environment (ecological cadastre). This cadastre, as unique, includes several cadastres, as follows: Cadastre of air pollutants, waters and the soil, Cadastre of the noise producers, Cadastre of the Waste Generators, Cadastre of protected areas and other cadastre determined by the special laws which contain provisions for the protection of the environment.

Keywords: space, right, healthy, environment, pollution, cadastre.

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INTRODUCTION

Space and time are the basic determinants of matter in motion. The matter in motion constitutes the objects in the space. Every object, every part of matter, even the smallest, takes up some space and lasts for a while. The whole cosmic space is filled with matter. Stars, comets, planets, and other heavenly bodies are huge agglomerations of matter in the cosmic space. The Planet Earth is one of those agglomerations. It occupies part of the cosmic space. Her substance is shaped in a large number of inanimate and living beings. Inanimate beings are divided into natural and artificial forms of matter. Natural: mountains, rocks of rivers, seas, lakes and other are a product of nature. Artificial: buildings, roads, bridges, vehicles and other objects are product of man. Living beings-plants and animals are always natural. Science has not yet managed to artificially create living matter. The plants make up the flora of the Planet Earth and the animals its fauna. The space in which a man lives, the objects, the flora and fauna of him is a human environment. The space that is not polluted by harmful agents, emissions of harmful radiation, noise, which does not have excessive humidity, unbearably high or low temperatures is a healthy environment. Man as a creation of nature can live normally and happily in a healthy environment. He has the right to do so. This right is guaranteed to him by the international legal acts[1] and the constitutions of the states.

One of the fundamental values of the constitutional order of the Republic of Macedonia is the arrangement and humanization of the space and the protection and promotion of the environment. Under Article 43 of the Constitution, everyone has the right to a healthy environment. Everyone is obliged to promote and protect the environment and nature. The Republic provides conditions for the exercise of the right of citizens to a healthy environment.

The environment affects human life directly, by improving or reducing its quality and indirectly, by strengthens or weakens his physical and mental health.

A healthy living environment is one that is not degraded. Degraded environment is a result of the degradation process. Degradation of the living environment is a process of impairing its quality resulting from natural or human activity or from failure to take measures to eliminate the causes of impairing the quality or damage to the environment.[2]

Man's living environment is a set of natural and artificially created values whose complex interrelationships make space and conditions in which man lives.[3]

The environment, as man's living space, contains several values that are important for the quality of human life whose use and enjoyment of man has a natural right. These are healthy and aesthetically beautiful space with all the facilities on it, a healthy natural food, healthy and clean air, clean water, beautiful and diverse flora with diverse fauna, etc. Bearing this in mind, it can be concluded that the right to a healthy environment is a complex human right. It includes several values that man, as a natural being and as a social and legal entity, is entitled. Thus, a man has the right to live and walk in the clean and secure soil, to see in front of him beautiful scenery, to enjoy the blue sky and sea expanse, the right to breathe clean air, the right to drink clean water and enjoy swimming in it, the right to use forests and forest goods, the right to reside in a clean and safe space, the right to use the benefits of the flora and fauna in the space where he lives and resides, etc. All these and other environmental human rights,[4] which, for obvious reasons, we could not here to name, can be classified into two basic rights which actually represent two basic groups of environmental law. These are the right to a healthy space with buildings on it and the right to a healthy and non-degraded flora and fauna in the space.

1. HEALTHY LIVING SPACE AND THE RIGHT TO HEALTHY LIVING ENVIRONMENT.

Living space includes land and air space above the earth to the greatest heights, underground - from the surface to the greatest depths and water reservoirs - from their surface to the greatest depths to which living beings, reach them, staying alive and they lives. Part of the living space where man lives is human living space. He lives on the continents and islands of the Planet Earth with both natural and man-made objects on it - individual or in groups as seas, rivers, lakes, mountains; then home, industrial buildings, settlements, roads, railways, airports, ports, etc.

Nature has arranged and arrange part of the living space with natural objects on it in accordance with its laws. The man must intervene and intervene in the natural landscaped space only in the event of natural disasters (catastrophic earthquakes, catastrophic floods and catastrophic droughts and the like.), when there may be a number of human victims, significant material damage to human property and destruction of flora and fauna in the area. For this, he has a moral and legal right.[5]

This right is regulated by the Law on Protection and Rescue from Natural and other Disasters. In the Republic of Macedonia, it is regulated by the Law on Protection and Rescue. This act may to blame because it has not regulated as far as the man can go with interventions in the natural space in order to

save himself from elementary and other disasters and does not cause other harm, because nature is implacable. She does not tolerate excesses and regularly punishes them.

The biggest problems in terms of the right to a healthy living environment come from human exploitation of space in order to meet human needs. He exploits the space for the construction of diverse facilities as well as to perform the most varied activities in all areas of economic and social life.

Citizens live on the geographical space of the state. All objects that are built on this space in different ways directly touch their interests. That is why they are always the most directly interested in the problems of spatial and urban planning and the building of objects in the space.

With the spatial and urban planning and the arrangement of the space, the rational organization of the space and the settlements is envisaged and the construction of the settlement of the populated spaces and the wider spatial units in accordance with the policy of the socio-economic development is directed, for the promotion of the material basis of the life and work of the citizens and for the improvement of general living and living conditions of the space. In this connection, it can be said that the basic goals of spatial planning and space arrangement are:

- The achievement of the highest level of functionality of the space in the realization of the interests and satisfaction of the needs of the citizens, in accordance with the principles of economy and rationality;
- The protection and promotion of the values of the space, as well as the natural, as well as those created by man;
- construction and arrangement of settlements and areas of space in accordance with the natural needs of people for a healthy environment, and in connection with this, for unmet and correct psychophysical and spiritual (cultural and aesthetic) development of the human person.

One of the basic imperatives of modern planning and arrangement of space is providing the maximum level of functionality in meeting the needs of the citizens.

The functionality of the settlements, the space around them and the wider space will be achieved if they best suit the needs of the citizens as places for becoming, for work and for rest. Then, if they provide their physical and mental health, if the costs of building and maintaining the facilities, installations and devices in them are in accordance with the material possibilities of the citizens and the local self-government units, and if their formation and aesthetics provide them with pleasure and joy which is important for their mental health.

The construction of buildings on the space of the Earth soil are often performed without take into account or slightly takes account of their impact on the environment. Unplanned construction of buildings first of al attacked

the human right to breathe clean air. Industrial facilities spewing into the atmosphere harmful gases and vapors are being built near the village, on the direction of air flow. Therefore, harmful gases and vapors miserable life of citizens and damage their health.[6]

The right of man to live and stay in a clean and unpolluted soil is threatened by uncontrolled discharge of industrial and municipal waste on the terrain. Over the years, near to many of our towns and villages, have been created numerous smaller or larger landfill waste. Toxic substances from these waste penetrate the soil and pollute the groundwater. The rains washed away soil and refer this matter in surfactant waterways - streams and rivers whose waters flow into the lakes and the sea, and so pollute lakes and coastal area of the sea and destroy the living world in them.[7] In addition, the waste pollutes the aesthetic space. Gloomy and heavy image make large areas next to the landfill on which the wind blew plastic bags, paper and other debris. It is hard to watch the bushes near the river banks dotted with countless plastic bags and plastic bottles stuck in its branches.[8]

Construction of roads and streets, as well their expanding, destroy green spaces (parks and greeny) that are the lungs of cities and quarts within them.

In the race for money,construction mobsters easy get construction permits from corrupt authorities and build housing facilities without taking into account the needs of the citizens for the area and its ventilation. In the small space crowded with parked cars, on which there is the moving crowd of people, the man feels anxiety that makes his life uncomfortable. Discomfort is increased by difficulty ventilated area, especially during the cold days in the winter period.[9] In such conditions quality of life is undoubtedly reduced, and the right to life threatened, because life means quality of life, and not usual subsistence and survival. Reduction in the quality of life is a direct result of the denial of the right to space.

The right of man to drink clean, healthy water, the right to bathe in it and the right to enjoy other benefits that water provides (to eat freshwater fish, delicious and healthy fruits of lakes and the sea, to enjoy watching the silvery ripples of water and silvery-golden glow from numerous fish and fish in a stream, river or lake) is threatened by the enormous pollution of watercourses and water reservoirs due to the discharge of waste water into them[10].

The noise especialy impair the right of a man to a quiet and peaceful life and peaceful sleep. Residents of districts who live near busy, and therefore noisy streets were regularly exposed to noise whose intensity exceeds several tens of decibels and that is why it becomes difficult bearable or unbearable. Worse still feel the residents of villages and suburban areas near the large aerodroam with whom, and where, each time take off and land aircrafts.

Their right to a pleasant rest calm sleep is limited, and in addition to the long living near airport, they are quite accustomed to the plane noise.[11]

Big problem represents radioactive contamination of space, as direct adverse effects on human health. It directly threatens the human right to health and healthy offspring because his direct destructive effects on healthy cells of human organism and mutatonal adverse effects on fetal development in the womb. The consequences of the bombing of the many facilities in Serbia, Kosovo and Montenegro by bombs filled with depleted uranium will feel several generations of people in Serbia, Kosovo, Montenegro, north Macedonia, and other border areas of neighboring countries, because the water and the wind blown the radioactive materials away from bombed objects.

A special problem represent a waste of radioactive substances from radioactive materials and equipment used in hospitals, institutes and other organizations that work with them. Numerous information about their inadequate transporting, storing and depositing say that the legal provisions that regulate the handling of them are not respected.

Law on Protection from Ionizing Radiation and Radiational Safety of the Republic of Macedonia provides a solid normative - legal basis for the protection from radioactive materials and other sources of ionizing radiation.[12] However, there is no doubt, because of the race for money and quick profits, that is not enough respected.

It is not enough studied the effect of electromagnetic pollution of space because of excessive use of radio and television transmitters, mobile transmitters and mobile phones. Some data show certain harmful effects of excessive use of mobile phones on human health. There are indications that the antenna mobile telephone transmitters that are often seen on the roofs of tall buildings and high ground near the road, may adversely affect the health of the surrounding population.[13]

Harmful effects of electromagnetic radiation transmission lines on human health has already been proven. However, despite this, are not rare cases that power lines cross the residential buildings, that violate the right of tenants of these buildings to healthy living space.

2. HEALTHY AND NON-DEGRADED FLORA AND FAUNA IN THE LIVING SPACE IN FUNCTION OF THE RIGHT TO HEALTHY LIVING ENVIRONMENT

Flora and fauna vivify space. Without them, the Earth would be desolate planet. They are condition for the survival of man on Planet Earth, because they are a source of food. Flora is especially significant, because the plants

that constitute it, converted inorganic matter into organic. Animals, directly or indirectly, food organic matter produced by flora.

Due to the impact of humans in the reproduction and breeding of flora and fauna they are divided into wild and tame (cultivated) flora and fauna.

Wild flora and fauna with the space on which they are located form the basis of man's natural environment, because in relation to cultivated flora and fauna they are predominant. Elements of wild flora and fauna (plants and animals) spring up, or are born, grow, live and disappear (die) by the laws of nature. The man exploiting the resources of the space, living beings and objects on it, has a huge impact on flora and fauna. He, by unplanned and uncontrolled use of wild flora and fauna, degrades human nature and deprives himself of the right to a healthy living environment. The most illustrative example is merciless destruction of the Amazon rainforests for which the biologists say that it represents the lungs of the Planet Earth.

On our Balkan region forests are also unscrupulous destroyed. Corrupt forest authorities easy issue permits for forest cutting and close the eyes to the excessive deforestation. Forests have become sources of enrichment for many, money rapacious, inhabitants of towns and villages in their vicinity.

The man, by deforestation, destroys the habitats of many forest animals and plants.[14] Thus, a man deprives himself and his future generations the right to use the many natural resources and denies itself the right to a safe and peaceful life in the present and the future.

With excessive and improper exploitation of forest fruits, plants and fungi, man destroys the entire plant species in certain areas.

Forest fires often swallow huge forest areas. Their cause is usually gross neglect, and very often people cause them with intent to reach inexpensive firewood and building materials,[15] as well as a room for livestock grazing. Lukewarm response by forestry companies and government bodies and their incorrect policy regarding the use of wood from burnt forests, encourage reckless and irresponsible attitude of the citizens towards forests.

Regardless of whether they are caused by unintentional (manslaughter) or intentional (premeditated), forest fires represent the crudest assault on nature and the crudest form of deprivation of man to a healthy living environment. This is because in a short time vast areas of forest are destroyed, often by several hundred hectares. The consequences are terrible: destroyed vast amounts of forest trees and other forest plants, destroyed habitats of forest animals, created conditions for intensive soil erosion, emission huge amounts of smoke in the atmosphere, increasing the degree of warming of the soil, reducing the amount of water in forest water courses, etc.

As for the wild fauna, besides it is destroyed by the destruction and degradation of its natural habitat, it is destroyed and by excessive and illegal hunting and fishing. Thus, by excessive hunting has been reduced to a

minimum the number of rabbits in the fields, field and forest partridge, deer and wild boar in the forests of Macedonia

A similar situation is with the fish stocks in Macedonian rivers and lakes. Excessive and illegal fishing reduced the number of fish. The waters of Ohrid and Prespa lakes were full of small fish Plashica. Now, it was considerably rarefied. Ohrid trout and the Prespa carp were far known for its excellent taste. Now, Ohrid trout is reduced to a minimum, and the fishing is banned at her.

Several times during the year, Macedonian TV stations, radio and newspapers horrible citizens with information about enormous proportions of poisoning of fish in the rivers. They induce unscrupulous businessmen who emit toxic wastewater into the river beds. Smaller rivers and streams are devoid of fish, and other animal world in them.

Tame flora and fauna is also threatened by man by improper cultivation and use. So, tame flora is compromised by excessive use of pesticides, a tame fauna (livestock) by genetic interventions and nutrition.

By excessive treatment with pesticides plants obtained for eye a beautiful and large fruits, vegetables and grains, but harmful to human health. Thereby, the man's right to health is directly threatened and, over it, his right to life, because health is most directly a function of life.

The Law on Plant Protection of the Republic Macedonia[16] normatively regulates the protection of plants from fungal, bacterial and viral diseases, as well as from harmful insects, but not from man. Not only that, the legislator clearly, above all, bearing in mind the plants belonging to tame flora, ignores the protection of plants belonging to the wild flora.

The Law on the Protection and Welfare of Animals of the Republic of Macedonia[17] only protects domestic animals. The legislator has obviously dropped out of sight wildlife. Their protection is left to the Law on Nature Protection,[18] to the Law on Environment, and to special laws on hunting and fishing.[19] However, these laws do not contain sufficiently precise norms on the protection of wild flora and fauna, because obviously are not primarily intended for their protection. The need for effective protection the nature space with all facilities, plants and animals on it, require normative extension of these laws in order to create quality normative base for effective protection of the man's living environment, and thus for the full exercise of his right to a healthy living environment.

3. ENVIRONEMENTAL CADASTRE IN FUNCTION OF CONTROL OVER THE POLUTERS OF THE SPACE

In order for a person to enjoy the rights of the complex of the right to a healthy living environment and the rights to protection of the natural environment, he must have information on environmental pollutants. In the function of informing the person about polluters or endangers of the environment, the records and information services or information and documentation services, abbreviated as INDOC services are necessary. In the ranks of these services, from the aspect of environmental protection, the Environmental Cadastre comes first. The Law on Environment, Article 5, item 15 defines the cadastre of the environment as a quantitative and qualitative record of pollutants and sources of pollution that release pollutants and substances in the environmental media, which includes the map of pollutants. The Law on Environment in Articles 42 and 43 in detail regulates the competence for the establishment and maintenance of the unique Environmental Cadastre. As regards the competence for establishment and maintenance of this cadastre, according to the Law, the body of the state administration responsible for the affairs of the environment is competent. This body is the Ministry of Environment and Physical Planning.

The Law stipulates the contents of the Environmental Cadastre with the provisions of Article 42.

According to Article 42 of the Law on Environment, the Ministry of Environment and Physical Planning establishes and maintains a single Cadastre for the environment (ecological cadastre). This cadastre, as unique, includes several cadastres, as follows: Cadastre of Air, Waters and the Soil Pollutants, Cadastre of the Noise Producers, Cadastre of the Waste Generators, Cadastre of Protected areas and other cadastre determined by the special laws which contain provisions for the protection of the environment.

According to the Law (Article 42), the Environmental Cadastre contains data on the activities and installations that endanger environment and can endanger it, especially for:

- The name or the nomination of the operator and the address of the location of the installation;
- Brief description of the activities and the technical process;
- significant data pertaining to emissions, hazardous substances present in the plants, generation of waste, use of natural resources and energy, and

- For the issued licenses and for the amendments and additions to the licenses and the control carried out, for the significant results and for taking measures.

The form and the content of the cadastre shall be prescribed in detail by the Minister of Environment and Physical Planning.

For the purpose of completing and updating the cadastre, the Law obliges physical and legal entities to submit to the Ministry of Environment and Physical Planning data on their activities of importance for the keeping cadastral records.

The Law, with a dispositive norm, especially gives the opportunity for the municipalities on the territory of the Republic, the City of Skopje and its municipality, to establish and maintain environmental cadastres for their spaces. The mayors of the municipalities, the City of Skopje and the municipalities in it, are obliged to submit the data from these cadastres to the Ministry of Environment and Physical Planning at least once a month.

The establishment and maintenance of the ecological cadastre is an imperative of the contemporary protection of environmental rights. The Constitution of the Republic of Macedonia, as the hierarchical highest legal act, raises the right to inform citizens about all issues that are in their interest at the level of basic constitutional law.

The Law on Environment contains a principle that encompasses the obligation of all organs of state government, municipal bodies, and the City of Skopje to prescribe procedures that ensure the right of access to information of importance for the protection and improvement of the environment. In addition to this principle, this Law in the provisions for specific obligations and measures also contains provisions for informing the public about environmental pollution and for undertaking and introducing mandatory measures for the most protection. Finally, this law contains provisions for the establishment of a separate environmental information system and its threats (Article 40 -50). Similar provisions also include the Law on Nature Protection in Article 158. There is no doubt that informing citizens and other environmental actors about environmental threats will be far more efficient if a digital ecological cadastre is established. Its establishment will allow the data on environmental threats to be available to every social entity and at any time. With such data available, the social entities, the citizens and their associations, the inspections and other control and protective institutions of the society will be able to timely undertake the necessary measures for the protection of nature, and thus for the fulfillment their ecological rights.

Timely and quality informed citizens, directly or through the authorized social institutions, react with the taking of environmental protection measures, usually as soon as the information about its pollution and

degradation. This is because of the notorious fact that the protected environment allows a person to live in a healthy environment as the most immediate condition for a healthy life. Only a healthy life can be happy and long-lasting. There is no healthy life without a healthy living environment. There is no healthy living environment without its protection. With the protection of the living environment, the citizens' environmental rights are directly realized and protected.

A natural characteristic of a person is to react to the danger as soon as he finds out about it. Precisely because of this, the provision of timely and thorough information on environmental threats is of existential significance for the citizens and for every social entity. By timely informing the citizens about the threats to nature we will ensure the existence of one of the fundamental values of the constitutional order of the Republic of Macedonia declared in Article 8 of the Constitution. That is the arrangement and humanization of space and the protection and promotion of the environment and nature.

INSTEAD OF A CONCLUSION

The right to life is the ultimate human right. It is his birthright. All other rights of man are in its function. As the ultimate human right, that is directly or indirectly subject to regulation of all international legal acts on human rights. Thus, the Universal Declaration of Human Rights recognizes the right to life in the first place along with the right to liberty and security of person. The right to liberty means life free from fear, anguish and anxiety. A man can be freed from fear only when he will be safe. He will be safe if he lives in a safe space.

The space, in which he lives, with all the objects on it, both natural and artificial, with the flora and fauna that inhabit it, is its living environment. Thus, man's living environment is a space where he lives and by living he performs all of his life activities. In it he does, rest, recreate, fun etc.

There is no doubt that the right to a healthy living environment is the most directly function of right to life. This is because the man with the environment most directly communicates. Living environment, as well as its most immediate natural surroundings, represents a dialectical unity of the conditions for his life. If these conditions are favorable or healthy, human life will be healthy. Healthy life produces good health, both physical and spiritual. Good health is a guarantee of long life. A long and healthy life in terms of a healthy living environment means a long-term enjoyment of the natural rights of man as a natural being.

But, unfortunately, today, man's living environment is more or less degraded. Degraded environment is not a healthy living environment,

because living conditions in it are not healthy. Environmental degradation is caused primarily by improper exploitation of natural resources by man; their over-exploitation; then space pollution by emission of harmful gases and vapors; by land pollution with waste materials and nitrates from fertilizers; by rivers, lakes and seas pollution with wastewater and other harmful liquids discharges; by forest fires caused by man; by radioactive and electromagnetic space contamination; by excessive noise etc. Having this in mind, in terms of natural law, improper exploitation of natural resources in the space and its pollution of man is denying many natural rights including: the right to a healthy climate as a natural product, the right to clean air, the right to unpolluted water, the right to the products of nature free from harmful chemical composition, the right to a natural space that is not contaminated by hazardous and noxious waste, the right to protection from noise in the area, the right to security from radioactive contamination and electromagnetic radiation, the right to a living space that is not loaded with inhumane and dense accumulation of buildings, apartments, people and vehicles which reduce a possibilities to live a life with the necessary satisfaction, the right to enjoy the beauty of the space and other rights.

By degradation and damage of living space the flora and fauna are destroyed. Flora and fauna directly do space available in the function of man's existence, because finding in dialectical unity with space it consists man's living environment. Damaged and destroyed flora and fauna both wild and tame, are on the parts of the space in which the man lives, hinder his life on it, make it less enjoyable, give less products for food and satisfying other human living needs and a products that they give are of lower quality.

Damage or destruction of the flora and fauna deprives the man of many rights that are in the immediate link with the right to life. These are primarily the right to healthy food, the right to fresh air, rich with oxygen, the right to enjoy the harmony of life in the area, the right to enjoy the beauty of plants and animals, the right to security from the genetic manipulation with plants and animals, the right to security of use chemical composition for faster and greater production of fruits and vegetables and farming domestic animals and other rights.

Environment is a dialectical unity of space and flora and fauna on it. The life is an activity of living beings - plants and animals in the area. In contrast to life is death as its negation, and as the end of existence of every living being. Life and living environment constitute a dialectical unity. If on the area there is not living beings, so if there is not life there, there will not be living environment. The man is a living being. Having lived in the space where there is life as an overall activity of living beings, he lives in the living environment. Healthy living environment, as a complete natural and socio-economic space makes his life full and quality. Thus, a healthy environment

is a function of human life. It is the material basis of the right to a healthy living environment. If a healthy living environment is in function of human life, then it is the right to a healthy living environment in the function of the right to life. Therefore, without realizing the right to a healthy living environment it could not exercise the right to a healthy life. A healthy life is the true life, because it is in a dialectical unity with a healthy living environment. Unhealthy life is difficult, unhappy and incomplete. It leads to the disappearance, to death as a dialectical contradiction of life. Maintaining a healthy living environment is in function of life - a healthy, full and happy life. It enables man to live in harmony with nature, which means to be a true natural man, not a being alienated from nature. Alienation from nature leads humanity to annihilation. Humanity must not allow it.

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[1] the Stockholm Declaration of 1972 which states that "Man has the fundamental right to freedom and equality in satisfactory conditions of life, in an environment whose quality should enable him to live in dignity and prosperity."

[2] See Article 3, paragraph 17 of the Law on Environmental Protection ("Official Gazette of RS", No. 135/04).

[3] In this connection see the definition of living environment given in Article 3, paragraph 1 of the Law on Environmental Protection ("Official Gazette of RS", No. 135/04) and definition given in Article 5, paragraph 1, item 1 of the Law on Living Environment of the Republic of Macedonia ("Official Gazette of RM" No. 33/05).

[4] See Đorđević J .: Socialism and Freedom, Prosveta, Belgrade, 1982 p. 99-104.

[5]See "Official Gazette of RM" No. 36/04.

[6] In city of Veles factory for processing of lead and zinc was built in the immediate vicinity of the town, in the direction from which the wind blows mostly to the city. Therefore, smoke and toxic fumes are almost always covered 4/5 area of the city and a maximum hindered the lives of citizens. Quality of their life was down to insupportable level. The percentage of respiratory diseases among the citizens has increased substantially. The frequent occurrence and malformations in newborns due to the mutagenic effects are result of harmful lead and cadmium fumes.

[7] Flotation of iron ore in v. Sopotnica, near Demir Hisar at once destroyed life in Crna Reka, second largest river in the Republic of Macedonia.

[8] Gloomy and painful impressions gained every remotely sensitive man who had the opportunity to travel by train and watch the coast through Taorska Gorge of the Vardar (between Skopje and Veles) and the coast of South Morava through Grdelica Gorge.

[9] Therefore, many citizens of Skopje with anxiety and fear welcome rainy spring, autumn and cold winter days when the smog and fog covered the streets and quarts of Skopje for which the amount of oxygen in the air drops to a minimum, making it difficult to breathe and causes headache. Skopian housewives and hygienists after weekends and holidays regularly removed from furniture greased thin layer of dark dust.

[10]The author of these lines had the opportunity a few years ago to see the Strumica river which flows through the Strumica valley, Macedonia. Water with gray-green color, without life in it hard hited his soul, especially when the memory led him fourty five years ago when the same water was clean as a whistle, and when the number of fish kicked at it and lit by sunlight gave the silvery glow with its scales,

[11] From talking with peasants from a village near the airport Petrovec near Skopje, the author of these lines has received information that the cows t give less milk and rearing pigs eat less because they are dusturbed by aircraft noise.

[12] See: Law on Protection of joniziračko radiation and radiation safety ("Official Gazette of RM". No 48/02).

[13]See www.bkosa.rs - Mobile phones and health effects www.telenor.rs,

[14] On the mountain Kozjak near the town of Prilep the habitat of mountain tea are destroyed which, forty years ago, there was abundant.

[15]In the Republic of Macedonia, a tree from burnt forests were sold significantly cheaper than other wood though often in quality - as well as firewood, but also as a building material is not much lag behind the tree from uburnt forests.
[16] Official Gazette of RM ". No 25/98.
[17]Official Gazette of RM ". No 113/07.
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CROSS-BORDER COOPERATION AS A MECHANISM FOR SUSTAINABLE DEVELOPMENT OF WATER RESOURCES

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SUMMARY

Water systems are dynamic, complex, do not recognize political boundaries, and it is their nature to overlap borders between political entities and states. Since antiquity, people, even on opposite sides of borders, have been forced to organize the collective exploitation of water resources in order to coordinate trade, communication and irrigation. The evolution of political organizations went hand-in-hand with organizing and rationalizing water system use and minimizing fragmented allocation and management of water resources while developing ever more integrated management of water resources. Over the last thirty years, integrated water management has become an important element of transnational, integrated management of water resources. This paper presents the political and natural conditions that prevail in the question of trans-border water management between the Republic of Kosovo and bordering states. The purpose of this paper is to explore the national and international challenges associated with transnational water system management, and analyse the legal foundations, local, national and international administrative structures, cooperation between states, and coordinated efforts made by state actors to meet these challenges. The Republic of Kosovo is located in the central part of the Balkan Peninsula, bordering with Albania (112km), Macedonia (161 km), Serbia (352 km) and Montenegro (77 km). It has an area of 10.907 km^2, with 1,739,825 inhabitants. The catchment area is 11.645 km^2, which of 6.5% is bigger than the administrative political space. About 95% of the water springs are inside Kosovo and only 5% come from neighbouring countries. Waters within the Kosovo territory are divided into five river basins; Drin i Bardhë, Ibri, Morava e Binçes, Lepenci and Plava, who discharge the water into three seas: the Adriatic Sea, the Black Sea and the Aegean Sea. The management of Water Resources in the Republic of Kosovo is based on the concept of integrated management as defined in the Water Law and Water Framework Directive 2000/60 of the European Commission. Cooperation with neighbouring states to coordinate

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water management is in line with the Constitution of the Republic of Kosovo, the Law on International Agreements, Kosovo Water Law, Memorandums of Understanding, Conventions, Protocols and other international norms. The institutional structure is represented by the civil society institutions at the national and local levels.

Key words: Water, structure, cooperation, cross-border managment, integration.

INTRODUCTION

In recent decades, there has been a growing concern for the protection, conservation and quality of global water resources. This concern has been debated in many fora, conferences and seminars where representatives and participants from many countries have agreed with the principle, "*Water resources must be managed and stored in a manner to meet the requirements of the present without compromising the opportunity for future generations"* (Economic Commission for Europe). In the 1990's, numerous initiatives and international fora were organized to promote the theory and practice of integrated management, including transnational co-operation in managing natural resources. In almost all relevant international fora, a near unanimous consensus has supported a united approach to water resource management, and especially in the EU, emphasis has been laid on the requirement for "global access" to river basins (WFD 2000/60KE) using cross-border cooperation as a mechanism for integrated management of water resources. In this sense, river basins are considered as the most appropriate geographic base for planning and co-operation. In today's developments, it is clear that no community, country or alliance of countries can be isolated and deal alone with the protection and conservation of water resources. Therefore, regional and cross-border cooperation is one of the most advanced mechanisms for addressing and resolving complex issues, which is meant to rationally separate and manage natural resources that are divided by political administrative borders between two or more countries. As the Republic of Kosovo moves toward EU membership, it faces many challenges arising from meeting the requirements of Directive 2000/60 EC, and implementing the obligations imposed by the UN Convention on the Protection and Use of Transboundary Watercourses and International Lakes. The Republic of Kosovo is located in the southeastern part of Europe, central part of the Balkan Peninsula. It lies in the northern geographic amplitude of 41°50′ 58″ to 42°15′ 42″, and eastern geographic longitude of 20°01′02″ up to 21°48′02″ (KSP, 2010-2020+). It has an area of 10.907 km², with 1,739,825

inhabitants, (KSA, 2011). It borders with: Albania, Macedonia, Serbia and Montenegro. The highest altitude is 2656 m, while the lower is 273.5 m. The hydrographical network is divided into five watershed lines creating five catchment basins which discharge the water into three seas: the Adriatic Sea, the Black Sea and the Aegean Sea (IH "Jarosllav Çerni", 1983). The catchment basin area is 11.645 km^2, of which of 6.5% is bigger than the administrative political space. About 95% of water springs within the country and only 5% come from neighbouring countries. Water systems are complex, dynamic and recognize no borders, and their integrated management represents a challenge not only at the national level but beyond.

CROSS-BORDER COOPERATION

Cross-border cooperation can be defined as neighbourly relations between local communities and authorities on both sides of land and sea borders (Practical Guide for Cross-border Cooperation). This simple definition covers a complex reality that has evolved steadily since World War II and which is linked inseparably to political and historical developments in Europe. Cross-border cooperation appeared in European countries after World War II and was considered a means of overcoming cross-border and regional problems and challenges. Co-operation promotes economic, social and cultural ties, strengthening shared confidence at the regional level. Cross-border cooperation is considered an effective tool to reduce the inequalities between bordering, regional countries. It is based on principles of equality and reciprocity, in particular through bilateral and multilateral agreements to achieve a sustainable development of policies, strategies and programs which cover river basins aiming at the prevention, control and reduction of negative impacts as well as rational use with common benefits on both sides of the border. The EU in 1999 launched the Stabilization and Association Process as main policy framework for the administration of Balkan countries. In June 2000, the European Council recognized the Western Balkan countries as potential candidates for membership in the EU, and cross-border cooperation in the Western Balkans is supported by the EU, the United Nations and the World Bank in order to help candidate and potential candidate countries to revive their economies and to overcome their differences stemming from past wars and conflicts. Cross border cooperation has been implemented through policies, laws, strategies, national programs, in order for neighbouring regional states to benefit through joint management, and the sharing of benefits through the integrated management of cross-border water resources.

LEGAL AND ADMINISTRATIVE STRUKTURES IN THE REPUBLIC OF KOSOVO

Legal Basis

The most important documents outlining the legal bases for international cooperation are the Constitution of the Republic of Kosovo, the Law on International Agreements (OGRK No. 28, 16 December 2011), the Law on Kosovo Waters (OGRK No. 10, 29 April 2013), Memorandum of Understanding between the Ministry of Environment, Forestry and Water Management of the Republic of Albania and the Ministry of Environment and Spatial Planning of the Republic of Kosovo (date: 04.07.2008), the Memorandum of Understanding between the Ministry of Environment and Spatial Planning of the Republic of Kosovo and the Ministry of Environment and Physical Planning of the Republic of Macedonia (date: 09.03.2012). Article 17 paragraph 1 of the Constitution of the Republic of Kosovo says that the Republic of Kosovo (CRK, 2018) may conclude international agreements and become a member of international organizations, strengthening Article 18 which explains the ratification of international agreements and Article 19 stipulating the applicability of international law. Article 6 of the Law No. 04/L-052 clarifies the legal basis for concluding international agreements, and Article 12, paragraph 1 of this law clarifies the memoranda of understanding between the two Ministries mentioned above. Special importance is given to cross-border cooperation in the Kosovo Water Law; chapter IV of Article 25, paragraph 1, sets out that the administration of cross-border river waters and international flows shall be carried out in accordance with this Law and cross-border agreements ratified by the Republic of Kosovo with neighbouring countries and beyond. All users of surface water and groundwater are required during the discharge of used water to eliminate harmful actions on the surrounding environment and other environmental areas. The competent authorities at the state level should coordinate plans and programs of measures for the administration and management of international waters. River basins that cover the territory of Kosovo and one or more of the Border States and beyond is defined as a region of international basins. Article 26 states that in case of the risk of pollution from contamination and unexpected contamination or discharge of wastewater or other impacts from a river that crosses the borders of the Republic of Kosovo, the Ministry of Environment and Spatial Planning in cooperation with relevant ministries, informs parties, countries at risk from the arising situation. The Ministry is obliged to identify the causes and effects of contamination and other negative impacts. As soon as possible, regional actors should begin to take sanitary measures and to start procedures for negotiating and harmonizing actions with the competent

authorities of bordering countries. The countries should then implement measures to minimize the risk, and to eliminate the risk at the pollution's source and any other negative effect on the water. Article 27 states that in cases of disorders-accidents or threats of negative impacts on water from any of the neighbouring countries, the Ministry of Environment and Spatial Planning in cooperation with relevant ministries, is immediately obligated to inform any affected neighbouring state about the problem and its potential impacts. If a neighbouring state does not act in accordance with bilateral or international agreements for the protection of cross-border waters, the ministry, in collaboration with other relevant ministries, initiates procedures at the level of competent international bodies, so that a neighbouring state that threatens water can be compelled to respect the international agreements. Signed environmental memoranda use recognized principles, conventions and international directives that stress equality, reciprocity and mutual benefit in environmental agreements. They seek to achieve cross-border cooperation to improve and protect natural resources, exchanges of expertise, public health, as well as strengthening the development and sustainable management of natural resources.

Also, point 2.1.3 of the Action Plan for an European Partnership, 2009, emphasizes the commitment of the Republic of Kosovo to the relations with other regional states. The aim is to strengthen cooperation, coordination and exchange of experiences with border countries in the management of natural resources that overlap the administrative and political boundaries between Kosovo and its neighbours. EPAP 2009 also emphasizes Kosovo's readiness to implement international norms to address environmental issues, including water resources. As we have said, this legal base is a strong foundation that shows the commitment and active approach of Kosovo to its responsibilities in all issues related to cross-border and regional co-operation.

ADMINISTRATIVE STRUCTURES

Since the Thessaloniki Summit in 2003, Kosovo has been strongly involved in the Stabilization and Association Process Framework. On 20 April, 2005, the European Council adopted the communication *"European Future for Kosovo,"* which strengthened further the EU's commitment to Kosovo. In 1999, the EU created the Stabilization and Association Process as a policy framework for the Balkan countries. In June 2000, the European Council recognized the Western Balkan countries as potential EU members and now the Republic of Kosovo, based on its progress towards membership, is expected to sign the Stabilization and Association Process Dialogue. This journey to join the EU is very challenging because it requires meeting the political, economic and institutional criteria (EPAP, 2006) established by the

Council of Europe. At this time, the Republic of Kosovo seeks to align its national legislation with EU norms, and to continue with capacity building and administrative reforms required by EU standards and directives.

An important step was also the division of powers and institutional responsibilities for the administration and management of water resources. The responsible agencies for direct and indirect water management include the Inter-ministerial Water Council (Law No.04/L-147), the Ministry of Environment and Spatial Planning, the Ministry of Agriculture, Forestry and Rural Development, the Ministry of Economic Development, the Ministry of Finance, the Ministry of Health, the Ministry of Local Government Administration, the National Institute of Public Health, the Water Regulatory Office and Municipalities, the Ministry of Environment and Spatial Planning, the Ministry of Agriculture, Forestry and Rural Development, the Ministry of Economic Development, the Ministry of Finance, the Ministry of Health, the National Institute of Public Health and Municipalities. The Ministry of Environment and Spatial Planning is responsible for the management of water resources. The Ministry of Agriculture, Forestry and Rural Development is responsible for the development of irrigation policies. The Ministry of Economic Development is responsible for water management policies for water supply, regional water supply and sewage companies. The Ministry of Finance is responsible for financial aspects of water management. The Ministry of Health-National Institute of Public Health (Regulation No.02/2011) is responsible for monitoring the quality of drinking water. The Ministry of Public Administration and Local Government have oversight powers according to Law No.03/L-040 and the Water Services Regulatory Authority has oversight powers under Law No. 05/L-042**.**

CROSS-BORDER WATERS MANAGRMENT

Since antiquity different peoples have communicated, collaborated and coordinated a wide variety of policies and programs for cross-border water management in order to minimize fragmented water management and to replace it with integrated water resource management. Today, when, water is facing the increased pressure from rising demand and declining supply on a global scale, the European Environment Agency in November, 1995 issued a report (WFD 2000/60EC), which stated the need for measures to protect water resources. A month later, the Council adopted the report which included drafting a framework to establish basic principles for integrated water management. In October 2000, the Council issued the Water Framework Directive 2000/60EC which provides a legal framework for European Community policy and actions in the field of water policy. This

Directive aims to protect and improve the aquatic environment and mainly will deal with water quality to achieve good water quality. The Water Framework Directive's principles advance, promote and encourage the joint needs of cross-border water management at high governmental levels for the purpose of sustainable use, control, and preservation of aquatic ecosystems. In terms of water management, it emphasizes the need of water management at the river basin level, requiring states to identify individual river basin districts. (Article 3 WFD 2000/60EC) and building institutions that are competent to implement the provisions of this Directive in order to protect the aquatic environment, and enhance communication, coordination and integration, especially in river basins where water use may have cross-border effects (request for achieving environmental objectives set by the WFD 2000/60EC). Cross-border water management based on WFD 2000/60EC, also clarifies the obligations arising from international conventions, in particular the United Nations Convention on the protection and use of Transboundary Watercourses of international waters. The Convention on the Protection and Use of Transboundary Watercourses and International Lakes (Water Convention) aims to protect and ensure the quality and sustainable use of water resources by facilitating cross-border cooperation. It provides an intergovernmental platform to develop and promote day-to-day, cross-border cooperation. First, it was negotiated as a regional instrument, but it became a universal legal framework available for cross-border cooperation of water, after the February 2013 amendments and its adoption by all member states of the United Nations Organization. According to Vision Up to 2025, three objectives have to be achieved in connection with the integrated management of water resources including cross-border cooperation in the "management of international [river] basins." The management of cross-border waters is governed by principles of equality and reciprocity, established through bilateral and multilateral agreements to achieve sustainable development policies, strategies and programs that aim to prevent, control and reduce negative impacts and encourage rational use to the mutual benefit of both sides. The European Community and donors consider cross-border cooperation a mechanism for maintaining peace and strengthening international security, including the exchange and sharing of information by both sides of the border about water resources and their state.

NATIONWIDE ACTIONS AND ACTIVITIES

The hydrographical network of the Republic of Kosovo is divided into five watershed lines with five catchments that discharge water into three seas, the Adriatic Sea, the Black Sea and the Aegean Sea (IH "Jarosllav Çerni", 1983), and which run from the territory of the Republic of Kosovo to

Vërmica and Çaljan in the Republic of Albania, to Hani i Elezit in Macedonia and Pllavkovë and Koncul in the Republic of Serbia (Fig.1.).

Fig.1. *Division of Kosovo Territory-watershed line*

About 58% of the territory of the Republic of Kosovo drains waters toward the West Morava River Basin (icpdr & iksd, 2009), running out in the territory of Serbia at Pllavkovë (Ibri Basin) and Konçul (Moravës e Binçës Basin) Fig.2.).

Fig. 2. *Contribution of Kosovo water in the Basin of Black Sea*

Kosovo is part of water bodies No.26 and 27 (UNECE, 2007. First Assessment of Transboundary Rivers, Lakes and Groundwaters (Fig.3.).

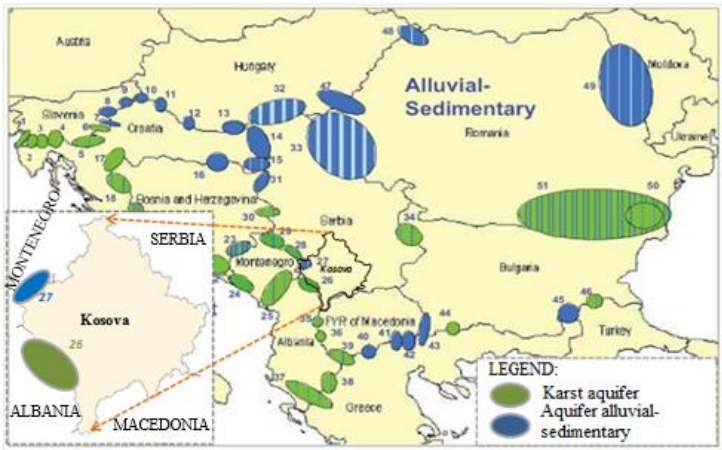

Fig. 3. *Ground water bodies within the region of Southeast Europe*

Among the actions that have been taken to create cross-border cooperation are the signing of two Memoranda of Understanding with the Republic of Albania and Macedonia. At the level of regional cooperation, the Memorandum of Understanding in the process of Dialogue Drini (The Drin: A Strategic Shared Vision, 2011), includes negotiating a cooperation agreement for the exchange of data on flood warnings in Drina River Basin. Also, this year, the Republic of Albania and Kosovo in order to increase cross-border cooperation launched a proposal to evaluate cross-border natural values of the embouchure Drin i Bardh River (Vërmicë), Pashtrikut mountains and Fierza Lake. So far, the most progressive steps toward cross-border cooperation have been achieved with the Republic of Albania and Macedonia, while less success has been achieved with the Republic of Montenegro and the Serbia. The best case of cross-border cooperation between the ministry of Environment of Kosovo and Macedonia is the implementation of the project, "River Lepenc Protection-a successful example of bilateral cooperation" which was implemented with financial support from the Regional Environmental Centre based in Hungary and supported by regional offices in Pristina and Skopje. The development of joint projects have considerable potential to expand to exploit new opportunities, and grow cross-border cooperation and mutual engagement in the integrated management of water resources, including the development of management plans for cross-border river basins. Cross-border cooperation is an important mechanism for sustainable development, not only in terms of

water resources but beyond. The importance of cooperation consists in the fulfilment of international obligations arising from conventions, directives, and internationally agreed standards as well as the need to share information and to take measures, actions and activities to preserve and protect sustainable water resources from both sides of border.

CONCLUSIONS

There are several transboundary aquifers, involving two or more countries. Research on transboundary aquifers is significant for the management of shared groundwater resources of neighboring countries or regions.Waters from the Republic of Kosovo drainage/discharge in three neighbouring countries necessitating cross-border cooperation. Efficient aquifer management in transboundary areas and their protection requires all the countries which share an aquifer to implement uniform cooperation principles. This requires the introduction of appropriate legal mechanisms which would regulate in a legible manner the rights and duties of the particular states and provide the basis for the relevant bilateral or regional agreements. Communication and coordination institutions must be developed to achieve this goal, with special emphasis on integrated management of water resources. Such institutions are the best means to secure cross-border cooperation and sustainable management of water resources. Such cooperation must incorporate reciprocity, the sharing of expertise and information in order to undertake joint measures to prevent negative impacts on cross-border water flows. Such cooperation should be developed and implemented as much the possible through cross-border joint projects. Benefits from this mechanism are the elimination of potential sources of conflicts and, in general, the common benefits of using transboundary waters.

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URBAN REPARCELLING - EFFICIENT METHOD FOR URBAN DEVELOPMENT AND LAND MANAGEMENT

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ABSTRACT

One of the ways by which the urban plans can provide their full practical realization, is the application of the procedure of urban reparcelling (reallocation, readjustment, reallotment etc). It represents an instrument for solving the problems that occur during production and realization of urban plans, which by their nature are documents of technical, legal, and economic significance. Because of the fact that these problems have not been treated in the frames of Macedonian legal regulations, in this article, in general terms, an effort has been made to describe the way in which a procedure of urban reparcelling can be applied and carried out, using experiences of some other countries where it represents a legal instrument for realization of urban settlements.

Key words: urban reparcelling, urban planning, spatial planning, local self-government.

INTRODUCTION

The spatial planning has an essential significance in people's lives. Man, by his nature, is a conscious, social being that exists in a social community out of which his needs for living by certain standardized conditions arise, thus from here, the need for organization of homes, houses, neighborhoods and working surroundings, as well as the living environment in general arises.
Today, the spatial organization and urbanization cannot survive as an independent process isolated by itself. Here, we must mention that the spatial organization in a broader sense, not only for the large urban surroundings, but wider regions as well, presents basics for establishing a sustainable development of the planet in global frames.
Implementation of contemporary spatial and urban settlements means engaging human and technical resources which makes this whole process

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complex. In this direction, besides the appliance of the experiences and knowledge of many scientific disciplines, geodesy as a science and technical discipline gives a great contribution to the realization of these objectives. With the development of I.T. the process of acquisition and services of geo special data is significanlly faster, which is a basic for production of all the spatial and urban plans.
This without a doubt leads to improvement of legal/technical settlements in quantitative and qualitative sense, where freely the process of urban reparcelling can be involved.

SEMANTICS

In Macedonian, the direct translation of urban reparcelling would be *"урбана комасација"*, as it was named in the text so far. But, of course, the final choice of the right translation should come out from the rules about forming neologisms, considering the basic meaning of the word and its usage in our conditions. As an option, in this direction, we can think about (re) naming this word to *"урбана препарцелација"*, as it is actually used in some countries.

REPARCELLING

Reparcelling presents an action in the spatial planning with a purpose of grouping the parcels in a mass out of which a repartition is made afterwards in a way with which their usage is improved in an economic and agro-technical aspect.
When it comes to reparcelling in general, today, for majority of people in Macedonia it is seen as a non-popular action that draws its roots from the ex-socialistic structure of a society, within which the right of the private property is limited. But, of course, this is not the matter. Reparcelling as an activity is expanded almost in all society structures and is conveyed throughout centuries.
If we approach the reparcelling scientifically, it can justify its aims on a multiple levels. According to the place of implementation, the reparcelling can be conveyed on agricultural or urban area (building grounds). In literature, we can find divisions of reparcelling which are based on the way of action of the one, the ambit etc.

AIMS AND OBJECTIVES

With the process of urban reparcelling, building parcels are being formed with strictly defined shape and area according with the urban plan, and if the participant in the reparcelling participates with relatively big land registry parcels, he/she can get several building parcels which don't have to be grouped.

According to this, urban reparcelling, as a basic aim has to shape the building land in building parcels according to urban plans, throughout which there is a protection in the realization of contemporary urban standards as well as accomplishing thriftiness during their realization. All of this is based on the fact that the building land is consisted of land registry parcels whose shape and size are almost always inadequate for conveying urban settlements. Also, with the appliance of urban reparcelling, besides the solving of the urban/technical details, related to the planning, proprietorial and other legal-property relations are solved as well. With all of this, the basic task of the urban reparcelling is realized and it secures an adequate approach to all the building parcels to public areas-streets, as well as planed schedule of the contents of public character.

Realizing, in this way, the set aims and objectives with the urban parceling it could be reached proper outside and inside ambit throughout which all the building parcels get a proper form and appropriate size foreseen with the detailed plan and because of that the form of the urban block itself is defined.

At the same time, requisites for adequate schedule and realization are created for:

- All kinds of thoroughfares (main, congregated, serviced etc.)
- Public areas (parks, promenades, squares and other)
- Areas for common and public needs (schools, sports object, malls and business centers, kindergartens etc.)

As it was mentioned before, with the process of conveying of the urban parceling, a very important segment is solved, i.e. proprietorial and other legal-property relations. Namely, the empirical experiences gained from everyday work show us that often we have very big differences between the real state of affairs on the field and the condition evidenced in the public books. In this sense, the urban reparcelling can speed up the processes of updating and realization of all sales and purchases, barters, partitions, heritages, reallocation of holdings, and all other kinds of legal circulation and legal changes related to real estate in the region of interest.

BASIC CONCEPTS OF THE PROCESS OF URBAN PARCELLING

Pursuant to community conditions, polity, as well as the surrounding, every country has its own specificities and specialties(Ivković and al., 2010), so the reparcelling appears as a dominant model for development, usual and secondary.
Considering the experiences of some countries in this area, we will point a frame of foreseen procedures for starting and realization of the process of urban reparcelling.

Object and ambit of urban reparcelling

The region where the urban reparcelling can be carried out must be in frames of the urban ambit of the cities or settlements and it is compulsory conveyed on areas defined with detailed urban planning.
As a subject of urban reparcelling appear all areas in the frames of ambit considered with the plan for conveying the urban parceling. As an exception to this it is possible to omit the areas and buildings which are congruent with the detailed urban planning and for which the owners have clean documents, as well as buildings which are with coordinance with the detailed plan, for which there isn't a previous standard procedure for gaining a building permission.

Procedures for starting and conveying urban reparcelling

In realization of these kinds of urban attempts, the main task is given to the units of the local self-government. In this sense, among other, the municipalities have authorities for production, carrying out and realization of urban planning which, on the other hand, are a basic for conveying urban reparcelling.
The local self-government also starts the initiative for conveying the urban reparcelling which is submitted to a special organ which is especially formed for solving these kinds of issues and which will make decisions for the ones. This organ can have municipal, regional or central authorities. There must be a state organ which will decide upon appeals. In some countries it is considered starting the process of urban reparcelling by individuals or group of people who have interest for conveying.
After carrying a decision for reparcelling, we approach towards establishing the market price of the land. This is managed with a special procedure during which a special organ can be specified that will covey the evaluation,

thereto, considering the market conditions and legislations. When the evaluation is finished, all of the ones who own and rule a certain real estate in the frames which is considered for urban reparcelling are called with a purpose to be personally notified about the aim, the rights and the responsibilities. After this, a phase follows where building parcels are allotted and/or are being money recompensated. At the end, it is necessary to carry a settlement which will be conveyed when it becomes effective.

Expenses and participants in the urban reparcelling

The expenses related to urban reparcelling which can arise while conveying the one, are classified in three groups, ones for:
- preparation
- conveying and
- additional expenses.

In expenses for preparation work are expenses which come out from conveying the preparation things necessary for starting the procedure for reparcelling like, for example, the evaluation, collecting of necessary documentation basis etc. Geodetic expenses which are in the phase of preparation works belong in these expenses as well, and these works are done by authorized individuals or companies for geodetic activities. All these expenses are on charge of the units of the local self-government. Money allowances are the only expenses that belong in the expenses for conveying urban reparcelling. Additional expenses are expenses that can appear during the procedure of reparcelling. The expenses for conveying the procedure as well as the additional expenses are on the charge of the unit for self-government and/or the participants of the procedure.

As parties in the procedures during conveying the urban reparcelling are all participants who have a status of an owner or are bearers of other entity rights upon the land, the buildings and the standing plants. With other words, participants in urban reparcelling are people with given building parcel in coordination with the detailed urban planning as well as the units of the local self-government that should be initiators of the procedure of urban reparcelling.

If on the region considered for urban reparcelling there are objects or parcels that match with the considered in the detailed urban planning, the ones overlap so the individuals don't participate in the reparcelling. The same goes for the objects which are built without constructive-technical documentation and completely fit in the detailed urban planning. The other land registry parcels as well the standing plants are expropriated in benefit of the units of local self-government that convey the urban reparcelling, during

which from the total reparcelling mass insulates for public and joint needs and from the rest, building parcels are being formed.

The role of the unit of self-government

In accordance with the above mentioned, in front of the unit of the self-government, which initiates and coveys the procedure for urban reparcelling, sets a responsible and complicated task for whose successful realization clearly defined legal requisite should exit.
These requisites reflect in carrying rules and guarantees of instruments for their conveyance in the segment of space organization and building legal-property relations and the financing.
The interdiction for giving building permission, and with that an interdiction for starting building actions and legalization of illegally built objects, represents a first step with which the unit of local self-government can protect itself in the period while it carries out the acts for detailed organization in the region considered for urban reparcelling, and with that a successful conveying is ensured.
The expropriation of the land in benefit of the unit for self-government is a measure that ensures consistent conveyance of space-planning settlements. Namely, this kind of repurchase can be on voluntary basis or obligatory. In case where upon the land an object has been projected where the current owner cannot realize a property right upon the considered building and s/he cannot own it (school, streets, squares etc.), the one is obliged on market conditions or appropriate interchange to retreat the land in favour of the unit for self-government.
Also, in order to get a building parcel, the participant in the reparcelling must retreat (obligatory) to the unit of self-government a part of his parcel which will be intended for communal infrastructure building that will be in function of the building parcel.
If it is necessary, the participant in reparcelling has an obligation (obligatory) to accept certain kind of officiality or other kind of limitation.
The change of the ownership of the land can have a reverse direction when the unit of self-government can sell a part which serves to put a building parcel into right shape without a public announcement, in coordination with the detailed urban planning.
In this sense, an expropriation can be considered if on a certain building parcel that is in ownership of the unit of self-government there is an illegally built object that totally matches the conditions regulated in the detailed urban planning, during which it is important to note that a requisite for this kind of sale is to get all the proper documents and all communal taxes to be paid for the built object.

The legislator can consider a primal right for the land buying in the favour of the unit for self-government throughout which, the seller must offer the land to the unit of self-government. If the unit doesn't accept the offer the land can be estranged for other interested party under the same conditions or better than were previously offered.

The financing of the expenses for starting and realization of urban reparcelling can be shared with other interested parties like private or legal individuals. In this direction, the model for public-private partnership can successfully be applied. This can be realized with signing a writing contract in which the rights and the responsibilities of the interested parties should be defined, and in which all of the participants will find their own interest. In case of more interested parties an appliance of the regulations from the Law of public suppliances can be considered.

GEODESY PART OF THE PROCEDURE – PROJECT FOR URBAN REPARCELLING

This location is one of the few through leading these kinds and similar procedures where surveyors should have the main role because of the fact that their realization must be practically executed by authorized surveyors, with scientific and practical methods, on field as well in the office.

Here, we talk about a land with big value so the procedure and the way of approach towards realization of this kind of action must be completely professional. In order to get high levels of practical conveyance of the urban settlements, it is extremely important to involve authorized surveyors right from the beginning for production of urban settlements which is quintessence in the procedure of preparation of updated geodetic base which is further on a foundation for application of urban solutions.

During preparation of the project for urban reparcelling it is necessary to establish the current condition of the terrain and in public books, in order to make comparison with the unpredicted settlements. After that, the detailed urban planning is analyzed as a foundation of the reparcelling terrain. In this phase, an evaluation of the value of the real estate which forms the reparcelling mass is made. Stake out of so called building blocks follows, where after the requisition of the considered lands for building objects from public interest, a definite value of new-created parcels is established.

After this, the building parcels are given away by introducing the owners with the adverse possession and finishing up the legal procedures for realization of this action.

The giving away of the parcels can be done in two basis:

- Value or

- Size

During the giveaway of parcels based on their value, it is necessary every participant in the process of reparcelling to be given a new building area that will have at least the same value as the one he owned before the process begun. Here, it should be noted that there can be difference in the market value as a result of possible emerging conditions, and also care should be taken about the deductions which are inevitable while providing a land for public needs. Eventual differences are paid in money.

If the giveaway of the new building parcels is developed by principles area for area, it is necessary the new, given area to be decreased for the part which is necessary for forming areas for public needs. The compensation which should be given in eventual case of differences, should be regulated with money or equalizing the areas.

Another characteristic that follows the urban reparcelling is its gradual realization, so in this direction it is important to ensure univocal defining of the space contents and their application from the planning documents directly on field. This means ensuring a continuity of traffic settlements and other infrastructural objects in all phases of the building process.

BENEFITS FROM THE URBAN REPARCELLING

Urban reparcelling is the most rational and most effective process for implementation of urban settlements. Considering the fact that this is a method that by its nature is more effective than the force requisition (expropriation), the benefits have big socio-economic impact and are very significant. A moderate balance is made with it between the protection of the private properties and the public interest.

Using foreign experiences we can notice some benefits which the procedure that conveys the urban reparcelling has upon the participants and the community itself.

The economic effect counts as a basic leverage. Namely, this procedure is almost always conveyed by the principles of self-financing. This means that the participants in the reparcelling mass assign around 30% from their land, and on that account they get smaller building area that have higher market value. On that account, the unit for self-government gets areas for public usage and can interruptedly realize actions from the communal infrastructure.

Also, it is a great benefit that the procedure conveys with mutual allotment of deficits and gains. This advantage makes it real for all the participants in the reparcelling to get to a building area, unlike the classical way when from certain owners almost all the real estate can be taken because of realization

of buildings for public needs and afterwards they are compensated with money or building area on an inappropriate (unattractive) location.
A great benefit, with also economic sign, is the omission of circulation taxes for the real estates, which is implemented in almost every country where urban reparcelling is conveyed. This brings great deal of benefits because with this procedure property-legal relations are being solved in a regular/institutional way and you won't have to pay taxes which are usual practice for every real estate transfer.
Not less important benefit from the urban reparcelling is the social moment as well, because to all the participants a certain building entirety symmetrically with their investment is guaranteed, of course decreased for previously mentioned areas for public needs.
Active role of all the participants in the urban reparcelling and the given possibility for them to participate actively in the process is another social characteristic of this procedure.
At the end let's mention the advantages of this method which enables the urban planners to shape the space freed from the chains that limit their creativity because of the inappropriate shapes and schedule of the land registry parcels in the frames of one, beautiful wholeness. Here, we must also mention that a lot of detailed urban planning stay locked in the municipality desks because the ones are not conveyable (completely or some of their parts), just because of the fact that solving property-legal relations is a very complicated and expensive procedure.

URBAN REPARCELLING THROUGH NUMBERS

According to sources on United Nations (Department of Economic and Social Affairs/Population Division) , the World urban population from 2.86 billion inhabitants in 2000 will rise to 4.98 billion up to 2030,where it is prognosed that 60% of the World population will live in urban surroundings.
These graphs In figure 1 show an increase of a million per week which for a comparison is similarly big as the cities Hanoi or Pittsburg. This is beneficiary for the cities with over million citizens where in 2003 there were 39 cities with over 5 million citizens and 16 cities with over 10 million citizens.
These are prodigious facts which are subject of analyses for the experts in charge for demographic planning for the Organization of UN as well as others international organizations which come out with recommendations and action planning.

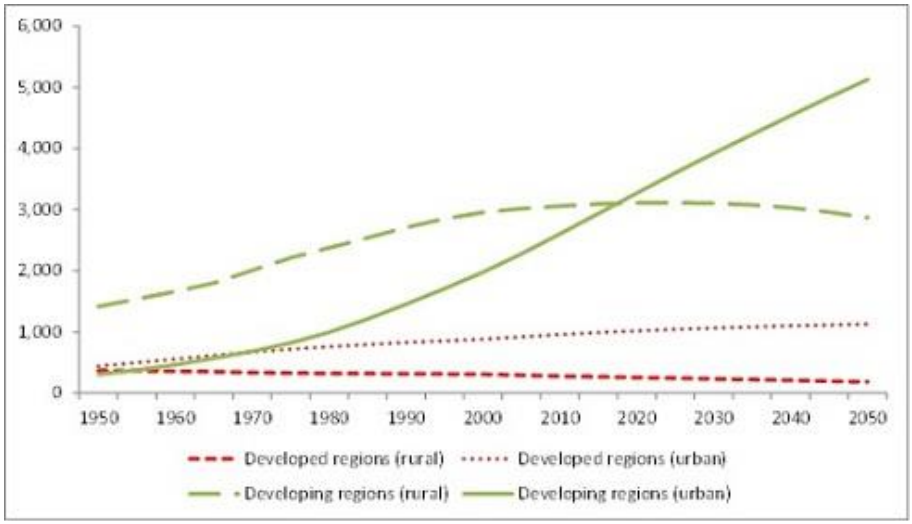

Figure 1: World urban population (based on UN, Department of Economic and Social Affairs/Population Division)

All of this indicates that the spatial planning must be rationally and its usage to be on an optimal level. These requisites should be canalized, of course, through certain and previously determined rules during which the interests of the individuals and the community should be maximally respected with appliance of quality legal/technical settlements.

Urban reparcelling, by its nature is a long-term process, so for analyses of certain experiences a certain period of time is needed.

Germany is one of the leading European countries regarding realized procedures for urban reparcelling. Because of this fact, German experiences are precious when we discuss this matter and it is a reason for some countries from our neighbourhood to use these experiences to a higher extent. A big number of conveyed procedures with which an urban reparcelling was done are a guarantee for the justification and the success of this process.

As an affirmation of these allegations, in table 1, we will present several numerous examples for realized procedures.

Table 1: Data for urban reparcelling in Germany(based on Dieterich,1996)

Urban region/ City	Period	Area (ha)	Number of procedures	Note
Hidelsheim	1962-1987	267	20	
Frankfurt/ Main	до 1987	1260	232	1/3 from all new building areas are treated with urban reparcelling
Götingen				Almost all detailed planning are treated with urban reparcelling
Main-Taunus-Kreis	до 1982		280	
Kaiserslautern		545	58	1932 new building parcel are ensured, almost all detailed planning are treated with urban reparcelling
Köln	до 1983	912	147	
Stuttgart	1926-1944	1391	345	

In Slovenia in the period 2002-2007, 20 agreed reparcelling are conveyed or are in the phase of conveying and one so-called administration reparcelling. Their experiences, mostly, are positive considering the procedure itself and the benefit of it, but there are certain parts from the legislative and under-legislative acts where it should be intervened in order the process to become more productive (Borštnar and Foški, 2008).

Urban reparcelling in our close vicinity (Croatia, Serbia) is a relatively new process, and maybe this is the reason why we can rarely get experiences from there. If we consider that these kinds of processes usually last from 2 to 3 years, a certain period of time will be needed to sublime the results. But in the lack of concrete publicized information, we can use some data from which it can be seen that in Serbia, on the level of local self-government, procedures for preparation and conveying of urban planning based on the rules of urban reparcelling are currently in action with the support of the German government and German Society for International Cooperation (GIZ) GmbH.

These facts are basic indicators which can serve us to conclude that urban reparcelling is starting to revive on the Balkan grounds as well, slowly but certainly.

CONCLUSIONS

Treating urban reparcelling in Macedonia doesn't have a tradition at all and doesn't succumb under none of positive legislative so from that aspect, if it is confirmed that it can be applied in our conditions as well, legal/technical frames should form that will create the necessary requisites for practical appliance of the one. That's why it is important to analyze experiences from other countries and these to be accommodated to our own conditions with a purpose of conveying an activity which will prepare and convey contemporary urban settlements freed from limitations that come out from the inappropriate schedule, the form and the owner's structure of the land registry parcels, not settled legal-property relations etc.

Thus, the procedures, the steps as well as the legal status of the parties which will anyhow participate in realization of this kind of action, should have appropriate legal frame in coordination with our legislatives, especially with the laws for spatial and urban planning, for building, local self-government, administrative procedure, expropriation, privatization, building land etc. Of course, most of these laws should change or be edited in order to make requisites that would revive the urban reparcelling.

All this makes us conclude that the investors at this moment, must make all the necessary transactions by themselves in order to form a building parcel, considered with the detailed urban planning, so they could start the process of getting a building license. Of course, this can be problematic and can stuck the conveyance of the detailed planning, and with difficulties that municipalities have when it comes to realization of actions from the communal sphere, like expropriation and realization of objects for public needs and communal infrastructure (streets, drains, squares, schools, kindergartens etc.).

That's why, I believe, that urban reparcelling, in the near future will become a part of our legislatives, and with that it can revive in our practices, with what it will become applicable on the level of self-government, bringing benefits for the citizens as well as for the community. With this, the authorized surveyors will create requisites for active participation in one completely new activity, so far not practiced on Macedonian grounds.

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MEASURES FOR PRESERVATION OF ADMINISTRATIVE TERRITORY OF FUSHE KOSOVA MUNICIPALITY

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SUMMARY

In the historical perspective, human beings have chosen set up their settlements near river valleys, reckless of the risk that rivers may bring forth. As a consequence of this, they had to cope many times with severe floods, which even caused casualties in many cases. It's almost impossible to find a place upon earth that people are not concerned about the eminent risk of being flooded. Floods are natural phenomena that mainly take place in all types of rivers and that cannot be prevented but the authorities responsible for this sector are obliged at least to well-manage them. Floods are commonly defined as a phenomena that water covers the soil that is not usually covered with water. This paper reveals and scrutinizes the attained outcomes relating the measures that have been carried out for prevention of floods in the administrative territory of Fushe Kosovo from 2014 to September 2016. Fushe Kosovo Municipality is located in the central part of Kosovo Republic and is comprised from a surface of 84,3 km^2. As far as the morphological aspect is concerned, it is characterized from a mountainous relief. Approximately 47% of the surface it is located in a oversee height varying from 500 - 800 m. The continental climate. The average annual rainfalls are 628 mm, while the annual temperature is 9.8 °C. The hydrographic network is developed. The main rivers are that of Sitnica and Drenice. The rivers meet high levels of water during May, April, November, and December. Meanwhile the lowest levels of water are registered in August, September, January and February and January. The floods take place every year and their longevity is from 3 - 5 days. But there are some specific regions where the duration is up to ten days. The most endangered regions are that of (Henc - Miradi, Vragoli - Kuzmin - Lismir (Sitnica River). Graboc i Poshtem - Bardh i Madh - Pomazotin - Bardh i Vogel - Kuzmin (Drenica River).

Key words: Floods, measures, area, locality, Fushe Kosovo.

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INTRODUCTION

Floods are an environmental phenomena that cannot be prevented (Directive 2000/60/EC), and may be evident in all types of rivers. It can be barely found a place upon earth that are not concerned about this destructive phenomena. They are mainly caused by intensive rainfalls for long period of time but there are even other underlying factors apart from excessive rainfalls that foster the occurrence of floods, such as the morphology of the terrain, topography. Usually the floods take place after some hours or even days, but there are cases that they occur quite rapidly a thing that does not permit the inhabitants of the respective region to take the necessary measures of evacuation. The vast majority of soil in Kosovo republic is affected by floods. Undoubtedly, due to this are caused innumerable economic problems which tend to be worrisome, both in public and private sector. The most affected region is that of Fushe-Kosovo. The central part of Kosovo has a flat terrain, while the suburbs is surrounded by a relatively mountainous terrain. The vast majority of the territory is comprised of mountainous relief 47%, 500 meters oversea. This hypsometric change of the terrain during the periods of intensive rainfalls and when the snow melts can cause rapid floods in some particular regions such as Henc-Miradi e Poshtme-Vragoli, Kuzmin-Lismir (Sitnica river), Graboc i Poshtem-Bardh i Madh-Pomazotin, Bardh i Vogel-Kuzmin (Drenica river).

LEGAL FRAMEWORK

The administrative territory administered from the municipality of Fushe Kosovo, is based on Law Nr. 03/L 041 (GZRK year III/Nr.26/02, October 2008), while the implementation of competences is in accordance to Law Nr. 03/L-40 GZRK Year III/Nr28/04 October 2008). On the basis of article 17, Law Nr.03/L-40, Municipality of Fushe Kosovo, is responsible for exercising a wide range of public services. Beside this, it also is also entitled to exercise competences and responsibilities which are delegated to other Laws. A good example to illustrate this, may be considered the delegation of competences to Law Nr.04/L-147 (GRKZ Nr. 29/10/2013). This law has delegated a big number of competences and responsibilities for the municipalities for the articles 40, 46, 51. 55, 57, 68, and 72. In accordance to Law 46, the Municipality of Fushe-Kosovo, is delegated the competence to preserve the water from intoxication. Based on the paragraph 1 Article 47 Law Nr. 04/L-147. The municipality has raised the finance and has a certain budget to meet the needs in cases of misfortunes. The source of the budget

are commonly the grants and donations. Consequently, as matter of fact the municipality and has increased the scope of services in the private and public sector properties. The municipality has also encouraged and fostered activities which are closely related to cleaning, maintenance of some segments of Sitnica, Drenica, Graçanka rivers.

HISTORICAL DATA

The territory of Fushe-Kosovo, has been frequently entangled from environmental phenomena such as floods etc. The historical data, witness that during 1979, Sitnica river has been subject to severe floods. The destructive consequences which have derived from these floods have severely damaged the agriculture and infrastructure of the land. The floods that took place in 2006 (Fig.1, 2, 3, 4), have caused the flood of 1159 inhabitants. (The Directory of Emergency of Fushe Kosovo, 2006). As consequence of floods many villages remained without drinking water, and to make the matter worse there have been also evidenced cases of gastrointestinal diseases and local-based diseases (QKFM, 2006). In 2014-2015, the floods have devastated many lands, settlements, lands, and contaminated the wells of drinking water. (AKMM, 2015). According to this estimations the damages caused by the floods in Fushe Kosovo are estimated to be about 300,000 euros. This sum was required to rehabilitate the and repair the destructed areas.

Figure 1: Floods in Drenica river, 2006

Figure 2: Floods in Sitnica river, 2014

Figure 3: Floods in Sitnica river, 2015

Figure 4: Action of evacuation team, 2015

STUDY AREA

Fushe Kosovo Municipality located in the central part of Kosovo, with a surface of 84,7 km^2. The population in this part is 34,827 with a density of 412.8 inhabitants for km^2. (ASK, 2011). The hydrographic network is relatively developed with a length of 95 km (Fig. 5). The main rivers that come across the territory of Fushe Kosovo, are Sitnic, Drenica, Graçanka, and Prishtevka. (PBHK, 1983), while the main streams are that Gjelbezaku, Zagona, and Jazi. They divided in streams with temporary and permanent flow. The region of Fushe Kosovo is characterized by a mediterranean climate (Pllana 2015). The hydrographic is in relevance to the fluctuation of relief that drains the water in the north. The water flows, are characterized by a nivalo-pluvial regime with high levels of water in May, April, November, and December. The lowest levels are recorded in August, September, and in the upcoming months January and February. According to the hydrologic regime, the a wide range of rivers that come across Fushe-Kosovo have the regime of streams. The average of annual flow is 13,94 m^3/s (AKMM, 2015). The average flow in Drenice is 2.0 m^3/s (Qyqalla E, 2012). The

average annual rainfalls are 620 mm (PZHK, 2013-2023), whereas the average annual temperature is 9.8 ℃ (SKZHE 2016-2020).

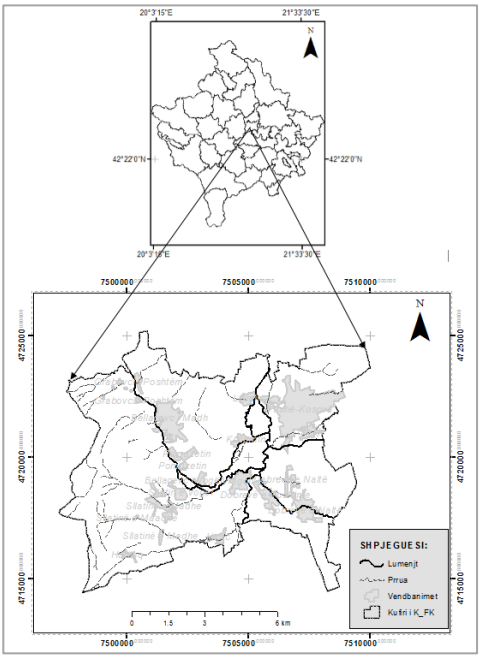

Figure 5: Position of territory in Fushe-Kosovo Municipality

METHODOLOGY AND MATERIALS

It has been applied a developing methodology which reflects a systematic work based on observations that have been carried out in terrain, by also using the most up-to-date analog practices. The Anaysis Method is mainly a quantitative one, with the utilization of precise quantitative data. The type of reseach or Inquiry is related to the aspect of that has to do with institutial gathering of institutional and scientific materials (Jakupi A., 2005). There are exploited documents taken from archives, strategic documents, developing plans, normativ acts, as well as relevant data provided by governmental and academic institutions.

Fulfillment of the paper is done following the steps as below :

- Gathering, systemizing and analyzing the data and preliminary materials that are closely related to floods, water flows, data of the previous years.

- Observations in terrain and floods that aimed to identify and determine the segments of rivers in order to take preventive measures
- Elaboration of analytic material and observations from terrain.

RESULTS

The activities that were elaborated aimed to aid and contribute to the prevention of floods during 2014-2015, in the territory of Fushe-Kosovo municipality. There were taken certain measures to provide protection from the Drenica river.In order to achieve satisfactory results, were taken important steps such as a general cleaning of the river bank in the village called Graboc i Eperm with a length of 200 meters, as well as in the segment called Bardh i Madh until Grbovce with a length of 500 m. In this segment are carried out many interventions, including the throwing of the waste, wastes that come as a result of buiding and paring the plants in both sides of the river, due to the systematic diggings aiming a further widening and deepening of the river bank. Nevertheless, there have been taken efforts to repair and cleaning the segment of Pomazetin village until the village Bardh i Vogel with a length of 300 m, and Bardh i Madhe with a length of 500 m. In addition to the activities with a special focus on repairing this segment and is also built a an engineering object responsible to outerwear the escarpments in both sides of the rivers of the village Bardh i Vogel. The measures for protection from river flows in the river of Graçanka as well measures for prevention from Graçanka have been constructed and planned in a length of 2 km. The wide range of these measures were committed with the purpose of cleaning, deepening and repairing the river bank. There have also been taken measures for minimizing the consequences of flows and in the floods Zanoga in the Hence village, with a length of 3 km, the flow that continues in the Sllatina e Madhe and Sllatina e Vogel village 3km. beside this, there have been carried out repairing processes even in Bardh i Vogel and Kuzmin village with 4.5 km (Fig.6).

In this perspective there have been taken respective measures for facilitating the consequences caused by the floods and the excessive water flows. The measures were closely related to undertaking actives that had to do with the evacuation, providing the first aid and supplying the inhabitants of these areas.

In the framework of this measures taken after the occurrence of floods aimed to aid the endangered persons from floods, to fulfill their rudimentary needs, including rehabilitation, estimation of damages etc. Moreover there have

been carried out measures to minimize the consequences, the high economic cost etc.

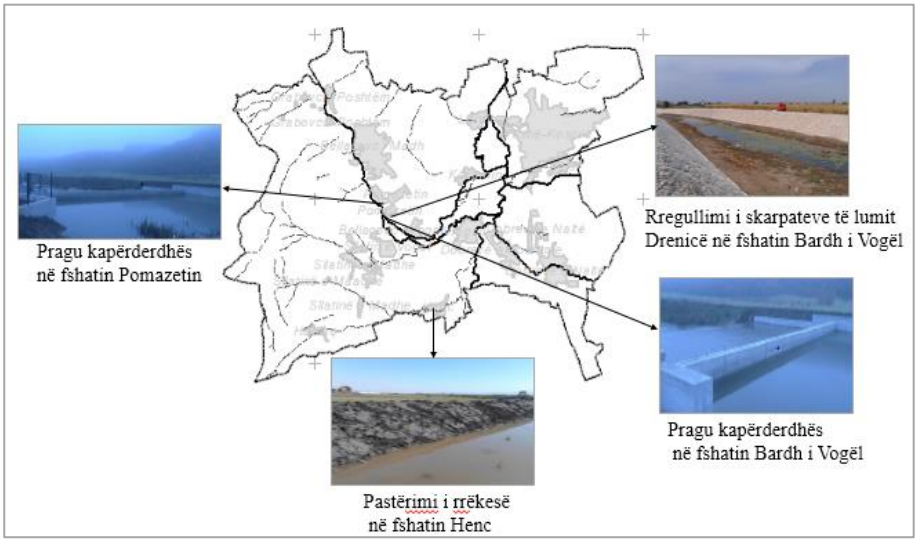

Figure 6: Graphic reflection of some river segments have taken the necessary measures to preserve the soil from floods.

CONCLUSIONS

The territory of Fushe Kosova Municipality throughout its history, but is also affected by floods. Firstly, it is important to take measures, which are mainly focused on the protection of human health and life. Secondly the preservation and protection of material goods such as economic, agricultural, environmental, cultural, heritage, etc. It has been concluded that through carring out measures for regulating and expanding the river beds and shores to a certain extent, has minimized the possibility of occurance of floods in the territory of the Municipality of Fushe Kosova. There is also witnessed an increased range of safety levels, which are taken from the community members who live near the segments that are endangered from floods. This prevents the possibility of contamination of wells which preserve the drinking water , and that the community in the vicinity of the flooding segments that use for water supply, considerably reduced of the overgrown and floody areas of agricultural lands. The measures taken have also resulted in the reduction of the operational and financial costs for the municipality's own budget, which in such cases went to compensate the community affected by floods. These measures will also serve as a lesson for the further

steps and other actions that will be taken in the framework of minimizing damages from floods in the administrative territory of the Fushe Kosovo Municipality.

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SUSTAINABLE URBAN DISTRICTS: EUROPEAN ENVIRONMENTAL SHOWCASE MODELS

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SUMMARY

Starting from the 90s, the design of new districts having strong environmental and energy sustainable profiles has gained attention among public administrations and project teams. These co-operations have brought new lines of research oriented towards the definition of different energy strategies at the urban and local scales. This paper analyzes the importance of local polices to create sustainable districts: main European case-studies; The research has been conducted on main European ecological showcase models; Compact city, solar and wind design, mobility and car free development, environment, biodiversity, green and water infrastructures, role of the inhabitants (public participation processes) are the focus areas in which the districts can be allocated. Common aspect of the different projects is the compact city concept, which joins the nowadays debate around dense urban areas. Several conclusions can be drawn related with the sustainable design of new settlements. In general the high density and compact city concepts are applied in the entire analyzed projects, which recognize the positive effects related with the installation of DER systems, public transport, and public services in accordance with principles of effectiveness and efficiency. The compact city is linked with the increase of functional mix and that has positive effects on reducing energy demand peaks.

Key words: European Eco Cities, Sustainability, New Districts, Compact Cities, Environment, Energy Efficiency, Resilience

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INTRODUCTION

Starting from the 90s, the design of new districts having strong environmental and energy sustainable profiles has gained attention among public administrations and project teams. These co-operations have brought new lines of research oriented towards the definition of different energy strategies at the urban and local scales.

Over the past twenty years, a growing attention to the sustainability of cities and neighborhoods has emerged, gaining space in the political and design debate. Cities are identified as best starting point for apply the targets of sustainable development and sustainable energy set by international agreements and national policies (Commission of European Communities, 2007; IPCC, 2007). In particular, the role of the design of new and existing areas has shown the potentiality for adapt the urban grid to the climatic and environmental characteristics of a place (Breheny, 1992; Jenks et al., 2000), contributing in changing energy and environmental performance of a settlement, thanks also to the feasibility for installing energy saving and production technologies (Bell et al., 2003; Steemers et al., 2000).

Despite the studies undertaken in the field of urban sustainability, it is still possible to identify an imbalance of knowledge between city and building, with the latest prevailing in the technical and design point of view. Since the city is not formed by the mere sum of single buildings, and their energetic performances – although high – do not necessarily bring to high performances at the urban scale. Studies related with the energetic role of urban morphology thus need to focus and strength to a different level (Droege, 2006). At the same time, also the energy certifications and rules developed for the housing sector, as well as the simulation models, do not find similar equivalents at the urban level, where governmental directives define quite unspecific strategies of demand control and energy reduction.

The city and its districts, moreover, are required to be used in different moments by different users, and this organization cannot be controlled only at the architectural level (Jenks et al., 2000). Different forms of mobility, use of open spaces and services are significant points whose management seems to be very difficult, if not impossible, without a coordinating actions and plans.
Identify design parameters – based on morphological and typological variables – that can affect energy performance, as well as technologies applicable at the neighborhood scale (such as cogeneration and district

heating or cooling, reuse of waste products, water cycle, etc.) become thus a central point of the research (Bell et al. 2003; Steemers et al., 2000).

Understanding the connections between urban form and energy – the energetic urban metabolism – is becoming increasingly important. In particular, the micro-scale of the neighborhood holds potential for improving the energy performance by acting on the morphology of the built environment (Breheny, 1992), control the energy peaks by calibrating the mix of uses (Burchell et al. 1982; Banister, 1997), mitigate the microclimate by greenery and water (Voogt, 2002), exploit local energy resources and identify the most appropriate solutions (Beatley, 1999).

Since the need of a shift in the design of urban areas towards sustainable concepts – using the keywords social, ecological, and energetic – has risen, many cities around the world have engaged projects for renewing their built environments and improving their management procedures. Define urban density, morphology of the built environment, natural and technical solutions can significantly contribute to energy savings, both in terms of energy consumed and supply of goods and services. The positive factors related with neighborhood design, and the application and test of policies identified at higher levels, have led different municipalities to promote new eco-sustainable projects (Eco-Valle, 2006).

Among the different experiences of sustainable districts, some projects have gained general awards thanks to the improvement and innovation in the introduced planning, design and management procedures. Though sharing some common ideas – such as the importance of embodied technologies in buildings and a general concept of reducing CO_2 emissions and ecological footprint – each of the districts here selected is characterized by specific focus points, which can help to understand limits and capabilities of different approaches and solutions for achieve sustainability in city.

Focusing on sustainable districts characterized by high interrelation of human and natural factors and mix of functions – fundamental elements that can lead to a change in the energy and environmental performance of a city – it is possible to point out three main categories of site choice: conversion of brownfields, renewing of existing urban areas, development on green fields (SOURCE, 2008). Moreover, it is possible to indentify projects specifically focused on energy performance of buildings, thus missing out the concepts of integration with the city and its nets, and therefore losing the full potentialities for enhancing the quality of life in cities.

In particular, at the European level, it is possible to point out for the contribution given in the sustainable planning the districts of:

- BedZed and Greenwich Millennium Village (London, United Kingdom). The first one, although not characterized by a significant dimension of the development plot, and thus reducing the impacts at the city level, is one of the first projects which has approached the eco-design in a holistic way.
- Hammarby Sjöstad (Stockholm, Sweden), and Bo01 (Malmö, Sweden). The Swedish approach is characterized by a strong relation between energetic regulations (at national and local level) and project outputs. The case of Stockholm has demonstrated the importance of a management model (The Hammarby Model), while Malmö is characterized by a learning-by-doing process and an innovative use of urban morphology for wind regulation.
- Viikki (Helsinki, Finland). The preservation of natural areas and their integration into the urban grid have characterized the design process.
- GWL-Terrain and Ijburg (Amsterdam, Netherlands), Leidsche Rijn (Utrecht, Netherlands). Focussed on compact city in order to reduce the consumption of natural land, the projects are strongly influenced – especially GWL – from the public and bicycle transports that characterize the Netherlands.
- Vauban (Freiburg, Germany). Widely recognized as one of the first and most important sustainable projects of Europe, the planning procedures have underlined the role of the inhabitants, both in the designing and management phases, has a key point for reducing energetic and environmental impact of urban areas. Moreover, the project enhances the role of cross connections between research, industry and application/development, with a focus on solar energy, in which the city is one of the leaders of the European market.
- solarCity (Linz, Austria). The optimization of solar energy is the key point of the design. The masterplan had a fundamental leading role for the decisions undertaken and the targets achievement.
- eco-district CasaNova (Bolzano, Italy). Characterized by the design of an urban morphology able to enhance solar gains. Moreover, the project focuses on the connection with green and infrastructure nets between city and development area.

Compact city, solar and wind design, mobility and car free development, environment, biodiversity, green and water infrastructures, role of the inhabitants (public participation processes) are the focus areas in which the districts can be allocated.

Common aspect of the different projects is the compact city concept, which joins the nowadays debate around dense urban areas. The idea of designing a denser city aims to reduce land usage, economic costs connected with urban infrastructures implementation and air pollution related with car-based transport. The majority of the sustainable projects are, indeed, characterized by medium/high urban density, in a range from 60 to 100 dwelling per hectare. Moreover, they are mostly located in brown fields, accomplishing both the function of urban renewal and natural land conservation.

Among the other countries, Sweden and Netherlands have promoted in the last decades polices oriented towards an increasing compactness of the urban areas and a strong connection with the public transport system.

In the beginning of the 50s the City of Stockholm based large part of its development on new suburban self-contained centers, connected with the public transport. The new districts were characterized by high density of the built environment in the areas close to the station (usually 500 meters), while the dwellings for the middle-upper classes – having less density – were located in a ray of 900 meters. Despite the innovative concept of this policy, there have not been reductions in commuting trips to the capital, although the high rate of public transport usage has contributed to reduce gas emissions.

Similar strategy was undertaken, from the middle of the 60s to all the 80s, by the Dutch government, supporting actions for sprawl containment, while endorsing compact developments in – or close to – existing areas and transports nodes. Thanks to this policy, known also as concentrated deconcentration or clustered deconcentration (Beatley, 1999), 15 new urban centers, generally located in the Randstad area, were created. National funds partially subsidized the projects.

Solar gain is a well known and extensively used concept for districts and buildings design thanks to the significant energy reduction achievable, both active (i.e. solar and photovoltaic panels) and passive (i.e. reduced need of artificial light and heating). Nevertheless, some projects have adopted the solar concept as key point of their development strategy, testing a new way of designing and thinking urban areas. In particular, solarCity (Austria), Vauban (Germany) and BedZed (United Kingdom) have deepened this aspect, and are nowadays considered as best practices.

Solarcity, 32 hectares and 3 thousands inhabitants, is particularly interesting in connection with the holistic approach adopted, the innovation of the design process, and the technologies installed, which allows an easier reproducibility in other contexts.

Vauban, although similar for dimension (38 hectares and five thousands inhabitants), is characterized also for the connection with the urban polices and the strong role in the decision process of the dwellers-to-be. BedZed, although the choice of the morphology comes from detailed analyses of solar maps, is a small scale project (1.7 hectares and 250 inhabitants), reducing broader scale outcomes.

THE INFLUENCE OF URBAN DEISGN ON ENGERGY AND ENVIRONMENTAL SETTLEMENTS: PARAMETERS AND INDICATORS FOR EVALUATING THE ENERGETIC SUSTAINABLE LEVEL OF NEW SETTLEMENTS

As shown by best practices and sustainable projects, it is clear that the energy and environmental sustainability of new districts can be reached in several ways, implementing different aspects that contribute to improve the performances of the settlements. Thus it is important to define a common way to compare the development processes, understanding under which aspect they can be considered sustainable (energetic, environmental, social, and so on) and indentifying the role played by urban design in improving the energy performance of new settlements.

Basing both on research achievements (theories and studies related with energy and urban morphology) and field applications (sustainable districts), it is possible to identify five thematic groups that help to underline the relations between design choices and sustainable outputs. The thematic groups are related with compact city and mix of functions; solar gain and wind design; mobility; green and water design; technologies.

The first group *Compact city and mix of functions* includes aspects related with high residential density, reuse of urban areas, land use and functional mix, presence of public services. The second group *Solar gain and wind design* includes aspects of passive solar design, solar collection for energy production, thermal properties of building and natural materials, control and modification of the microclimate, dispersion of pollutants, and power generation. The third group *Mobility* includes aspects related to accessibility improvements (internal and external connections), wakability, the street and urban grid design, behavior of the inhabitants (modal choice). The fourth

group *Green and water design* includes aspects of climate mitigation and heat island effect control, green infrastructures, water management, and energy generation (biomass and waste). The fifth group *Technologies* includes aspects of DER – distributed energy resources, in particular regarding CHP plant, district heating and cooling, incinerators plant and waste recycle, solar and photovoltaic panels, and characteristics of building materials.

After identifying the thematic groups, assessment tables have been developed for evaluate with common methodology the case studies, overcoming particularities. The tables identify for each area optimal design elements, as coming from research and best practices. Each of them constitutes an indicator of performance and evaluation, to which correspond different points, according with the performances achieved by the project.

Three score levels have been defined:

- Low, the project achieves partially the requirements.
- Medium, the project requires further development and integration.
- High, the project incorporates the key elements identified by the indicator, and attains high energy performances.

Some indicators are based on the presence / absence criteria (yes / no), as it is not possible to have an intermediate level (e.g. in case of district cooling, either it is realized or not).

The maximum achievable points for each indicator are related with the influence that it plays in influencing the level of energy sustainability of a settlement. When an indicator has strong impact on other elements of the project and to the global energy performance, greater weight (points) was given.

The points are then assigned to the project in relation to the level reached for each parameter. The maximum obtainable score for each thematic group is 10, with a global score of 50 points in the five areas. The proposed method refers to the one developed by LEED ND, but it focuses specifically on the interaction between urban design and energy, and thus simplifying and merging some areas of analysis.

COMPACT CITY AND MIX OF FUNCTIONS

High residential density Increasing the compactness of transformations	Low units /hectare ≤ 50	0

and units per hectare. The main characteristics of the urban grid are based on the traditional city model, integrated with the nowadays socio-economic conditions and the need to achieve better energy performances.	Medium units /hectare between 51 and 70	1
	High units /hectare ≥ 71	2
Reuse of urban areas Reuse of brownfield sites (industrial, harbor, rail, etc..), decrease of land consumption.	No	0
	Yes	2
Mix of land uses and social classes Creation of functional (residential, commercial, offices) and social mix thanks to different accommodation types (ownership, rent) and price range (social housing, private market).	Low Only residential	1
	Medium Residential and at least one other function. Social housing among the other form of rental/ownership.	2
	High Mix of functions and users, with the aim of create a new area of the city (liveable city concept)	3
Presence of public services Public services and meeting places having both local and urban scale, connceted to the transport system and pedestrian network (distance 500 m).	Low Only local services	1
	Medium Local public services connected with public transport net	2
	High Local and urban public services connected with public transport net	3
Score		10

SOLAR GAIN AND WIND DESIGN

Solar gain	Passive Solar Design Road network and urban design defined to optimize solar gain. Attention to the liveability of urban spaces: avoid summer overheating and provide sunlight during winter time.	Low Only limits imposed by law	1
		Medium Passive solar design	2
		High Passive solar design (indoor) and urban comfort	3
	Solar energy Use of solar and / or photovoltaic panels for energy production, and increased	No	0
		Yes	1

	exploitation of renewable sources.		
	Thermal characteristics of building and natural materials Attention to the characteristics of urban materials (green, water and artificial elements) in relation to albedo (reflection coefficient) and thermal transmittance.	Low No specific attention to the used urban materials	0
		Medium Green areas and basins	1
		High Thorough choice of the materials. Design based on studies and simulations.	2
Wind design	Microclimate and dispersion of pollutants Design of the road section, orientation of the urban grid, and use of natural materials to protect settlements from winds, reduce winter heat losses, and improve outdoor/indoor comfort in summer.	Low No specific attention to the design of the urban grid	0
		Medium Wind used to disperse pollutants and / or for summer climate mitigation	1
		High Preliminary studies and simulations to define the correct grid orientation (wind protection and exploitation of air flows)	2
	Power generation Use of micro wind turbines stations, wind turbines plant, passive ventilation of buildings as part of the urban renewable energy mix.	No	0
		Yes	2
Score			10

MOBILITY

Increased accessibility of the connections (within the development and to the city) Construction of new public transport connections, evenly distributed within the neighbourhood and within walking distance (maximum distance 500 meters). Distances to train and subway stations can be higher (800 meters), but must be served by public transport or bicycle-pedestrian paths. Reduction of physical barriers and construction of new infrastructures (bridges, roads), if necessary.	Low Private mobility prevails on public transports	1
	Medium Public transports net	2
	High Variety of public transports means (subway, bus, tram, etc.). Reduction of the barriers	3

	in the district and to the neighbour areas.	
Increase cycling and walking (short distance) Construction of pedestrian and bicycle paths to major urban functions and public services. Creation of public transport interchange points.	Low Low rate of pedestrian and bicycle paths	1
	Medium Pedestrian and bicycle net used also as connection between public services	2
	High Pedestrian and bicycle net connected with public services and transports.	3
Design of the road section and urban grid Design of the road section to separate the different traffic flows, protected trails for walking / cycling. Green areas along the roads used also as ecological corridor. Development of car-free settlements.	Low No specific attention to the design of the road section	0
	Medium Design of different lanes for different transport means.	1
	High Car-free developments, street's net used as green corridors, separation, and separation of different traffic flows.	2
Behaviour of the inhabitants (choice of transport means) Promotion collective transport modes (car sharing, mobility manager), reduction of car ownership, increase soft mobility for short trips (800 m / 5 km). Reduction of parking plots: minimum threshold for significant reductions is 0.7 lots / units, further results are obtained with a ratio lots / units of 0.2.	Low Inhabitants are not involved	0
	Medium Car sharing and/or reduction of car lots/units (≥ 0.7)	1
	High Polices to reduce the car ownership rate between the inhabitants, car sharing, reduction of car lots/units (≥ 0.7), car-free development	2
Score		10

GREEN AND WATER DESIGN

Climate control and heat island effect reduction Heat island effect reduced through green areas and water elements, winds can be conveyed within the settlements for cooling purposes.	Low Design of green areas and/or basins with low impact on the micro-climate	1
	Medium Design of green areas and/or basins with impact on the district's micro-climate.	2
	High Interconnection of green and water systems, able to reduce the district's temperature and cooling energy demand.	3
Green Infrastructures Protection of existing natural areas, inclusion of new green areas, lakes and canals in the development site to create ecological corridors. Streets are used to create ecological networks between cities and outdoor areas.	Low Green areas and basins not connected to each other.	0
	Medium District ecological net	1
	High Ecological net between city and outdoor areas.	2
Water management Implementation of a water "closed" circle, district sewage treatment plant, runoff reduction (green roofs, increase of permeable areas), and rainwater reuse. Water consumption reduced by new sanitary systems, wastewater quality increased thanks to public information campaigns.	Low Only one system (sewage treatment, *runoff* reduction, water consumption reduction)	1
	Medium Design of at least two systems	2
	High Comprehensive management of the district water cycle	3
Energy from waste and sewage Reuse of heat coming from waste/sewage treatment processes, biogas production, dried sludge use as fertilizer. Use of the neighborhood biomass (green waste) for electricity production. Increasing of the local energy mix from renewable sources.	Low No use of biogas/biomass	0
	Medium Use of at least one outcomes of the sewage treatment (biogas, biomass, heat from sewage treatment, etc.)	1

	for energy production.	
	High Comprehensive use of the energy from sewage and waste treatment.	2
Score		10

TECHNOLOGIES

District heating and CHP plant District heating and / or CHP plant for the whole neighborhood, powered (totally or mainly) with local energy resources (not less than 20%).	Low District heating doesn't cover the all development site	0
	Medium District heating, CHP plant fuelled with local renewable sources (≤30%)	1
	High District heating, CHP plant mainly fuelled with local renewable sources (>30%)	2
District cooling District cooling – propelled with local energy resources (i.e. water purification) – primarily used for public services, offices and shopping malls.	No	0
	Yes	1
Termovalorizzatori e riciclo dei rifiuti Realizzazione di centrali di termovalorizzazione, alimentate con energie rinnovabili prodotte localmente (completamente o parzialmente, con quote non inferiori al 30%). Riciclo dei rifiuti prodotti e riduzione dei materiali inviati in discarica (≥ 70%) Definizione di politiche di accompagnamento ed informazione alla popolazione per il corretto riciclo dei materiali. Incinerators and waste recycle Incineration plants powered by local renewable sources produced locally (totally or mainly, with shares not less than 30%). Waste recycle and reduction of waste for infill (≥ 70%). Definition of policies and public information campaigns for improve recycle.	Low CHP plant fuelled with local renewable sources (≥30%) or reduction of waste for infill (≥50%)	1
	Medium CHP plant mainly fuelled with local renewable sources (≥30%) and/or reduction of waste for infill (≥50%)	2
	High CHP plant mainly fuelled with local renewable sources (≥50%) and reduction of waste for infill (≥80%)	3

Solar and photovoltaic panels Use of solar and / or photovoltaic panels. Increase exploitation of local energy mix from renewable sources.	Low No use of solar energy	0
	Medium Use of solar and photovoltaic panels (no smart grid)	1
	High Solar and photovoltaic panels integrated in a smart grid.	2
Characteristics of building materials Use of high-performance materials, Life Cycle Analysis.	Low	0
	Medium Building consumption according to the standards set by law	1
	High Building consumption lower (at least 20%) than the standards set by law.	2
Score		10

To enlighten the different characteristics of the analyzed case studies, their level of sustainability and strength areas, comparative tables and spider charts have been developed. Aim of the tables and charts is therefore to presents in an easy-to-read language the evaluation processes, improving the results communication. The scores achieved for each area are displayed as colored dots - red, yellow, green - depending on project outcomes and/or presence within the design process of different elements. The assignment of the green color represents not only the attention to a specific aspect of design, but also to the correspondence between project objectives and achievements. The yellow color represents intermediate situations, arising both from the lack of certain aspects in the design phase and/or weak results. The red color represents the complete lack of specific issues related with energy sustainability and/or the failure of the set goals.

For each thematic area a synthesis of the achieved results is reported. Spider charts complete the evaluation, allowing a fast comparison of the different case studies and showing strength and weakness areas of the projects. The charts show in each axe, which represents one of the thematic groups, the score reached by the project.

Photo: Ijburg – Amsterdam and Leidsche Rijn, atelier GROENBLAUW, Madeleine d'Ersu, 2009, Reproduced by Permission

The importance of local polices to create sustainable districts: main European case-studies.
COMPACT CITY CONCEPT

Ijburg – Amsterdam and Leidsche Rijn – Utrecht, Netherlands

Policies and actions for promoting urban compactness have been carried on from the City of Amsterdam since 1978, as tool to contrast the sprawl phenomena. The development and reuse of lands close – or into – the border of the city has thus been the main results of these policies.

The district of Ijburg, an on-going project of 430 hectares spread over six artificial islands, partially newly realized and partially former industrial docs, is located in the heart of the city and close to the

		Main results
Compact city and mix of functions		
High density of residential - working places	○ ○ ●	Brown field renovation, reduction of the mobility-related energy. Technical and economical feasibility for district heating.
Brown field reuse	○ ○ ●	
Mix of functions	○ ○ ●	
Public services	○ ○ ●	
Score	8/10	
Solar gain and wind design		
Passive solar design	○ ● ○	Sun radiation in accordance with the standards imposed by law: no further use of solar energy.
Use of solar energy (active/passive)	● ○ ○	
Microclimate control	● ○ ○	
Energy production from wind	● ○ ○	
Score	1/10	
Mobility		
Improvment of accessibility and connections	○ ○ ●	Reduction of the numbers of car lots /apartment, creation of pedestrian areas. Public transport and bicycle-pedestrian lanes increased within the district and to the city.
Walkability	○ ○ ●	
Urban grid and street design	○ ○ ●	
Effectiveness of the policies among the residents	○ ● ○	
Score	9/10	
Green and water design		
Microclimate control	● ○ ○	Connection of the new development with the natural areas by green corridors and green infrastructure. Biotopes protection. Green areas increased to 16 smq /inhabitants.
Green infrastructures	○ ○ ●	
Water management	● ○ ○	
Energy production (biomass, purification)	● ○ ○	
Score	2/10	
Technologies		
District heating and CHP plants	○ ○ ●	Decrease of building energy demand.
District cooling	● ○ ○	
Energy from waste (incineration)	● ○ ○	
Solar and photovoltaic panels	● ○ ○	
Building materials and energy performances	○ ● ○	
Score	2/10	
Global score	22/50	

central station. The green areas will occupy a surface of 53 hectares, while 40 hectares will be dedicated to commercial and office functions, aiming to create a new autonomous centre, although strongly connected with the city.

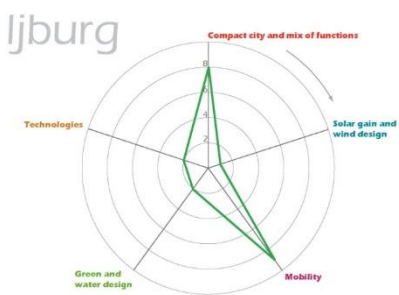
Launched by the City Council in 1997 to respond to the increasing need of new dwellings, in 2025 – forecasted date of the conclusion – the district will have eighteen thousands apartments and forty-five thousands inhabitants. To improve the social mix, 30% of the dwellings will be rented out at low fares, supporting young and new families, while the others will follow market prices.

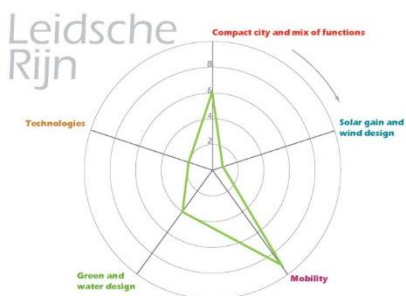
		Main results
Compact city and mix of functions		
High density of residential - working places	○ ○ ●	Technical and economical feasibility for district heating. Creation of a new urban center, reduction of mobility and heating-related costs and energy.
Brown field reuse	● ○ ○	
Mix of functions	○ ○ ●	
Public services	○ ○ ●	
Score	6/10	
Solar gain and wind design		
Passive solar design	○ ● ○	Sun radiation in accordance with the standards imposed by law: no further use of solar energy
Use of solar energy (active/passive)	● ○ ○	
Microclimate control	● ○ ○	
Energy production from wind	● ○ ○	
Score	0/10	
Mobility		
Improvment of accessibility and connections	○ ○ ●	Creation of pedestrian areas. The mobility in the district is wakability-based. Public transports increased and connected with the regional net.
Walkability	○ ○ ●	
Urban grid and street design	○ ○ ●	
Effectiveness of the policies among the residents	○ ● ○	
Score	9/10	
Green and water design		
Microclimate control	● ○ ○	Connection of the new development with the natural areas by green corridors and green infrastructure. Runoff reduction and use of rain water for non-drinking purposes.
Green infrastructures	○ ○ ●	
Water management	○ ○ ●	
Energy production (biomass, purification)	● ○ ○	
Score	4/10	
Technologies		
District heating and CHP plants	○ ○ ●	The district heating covers 80% of the all district: energy consumption per square meter is reduced. Low energy buildings.
District cooling	● ○ ○	
Energy from waste (incineration)	● ○ ○	
Solar and photovoltaic panels	● ○ ○	
Building materials and energy performances	○ ● ○	
Score	2/10	
Global score	21/50	

The design concept is primary based on compactness of the built environment (60 to 100 units/hectare, plot usage 42-50%) and conservation/creation of green areas and green infrastructures. Public transport, services, and schools are equally distributed in the area, while commercial and offices are located at the transport nodes, maximizing the accessibility.

Due to the dimension of the district, the construction of new infrastructure lanes and bridges, both pedestrian and driveway, assumes a key role for create connections within the borough and to the city.

The mobility needs of the district are also supported by an extension of the





public transport net. Following a policy of car trips reduction, adopted at the city level, the public functions are connected through bicycle lanes and pathways, while car speed is reduced to 30 km/h, and the ratio parking place/unit is decrease to 1.08-1.25 (half of the average value of the city).

The building energetic standards are based on the Environmental Protection Act, and tested using the indicators of EPC evaluation. All the buildings are going to be connected to the district heating.

Concepts of urban densification, localization of main functions nearby transport nodes, predominance of bicycles and pedestrian connections, and conservation of green areas are leading principles also for the new development area of Leidsche Rijn, located in Utrecht. The development site, which will contain 75% of the expansions of the entire region, is strongly connected with the Randstad Green Heart, enhancing the biodiversity of the project.

The energy reduction is achieved through district heating and low energy buildings, reuse of rainwater for non-drinking purposes, reduction of car trips by new train stations, busses and commuting parking areas.

SOLAR DESIGN AT DISTRICT SCALE
Linz-Pichling, Austria

Photo: Linz Solar City, Esther Vidal Bartoll, 2011. Reproduced by Permission

The project of solarCity, started in 1992 with the definition of the masterplan and concluded in 2005, has among its aims the creation of a research pole for energy solutions in the building sector. Funds coming from the European Union, which contributed to the realization of the district, influenced the choice of strong integration between development and energy.

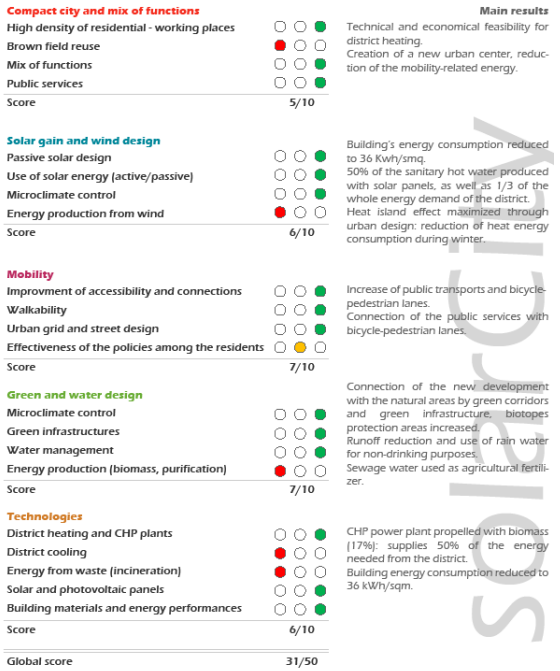
A general agreement to the main focuses of the project – economic growth, social progress and ecological balance – and the set up of a management team are the main factors that contributed to the success of the initiative. Added value of the development is related with the public ownership of the land, which avoided conflicts between public choices and developers needs. Important international architects – such as Norman Foster, Richard Rogers, Thomas Herzog e Norbert Kaiser, who constituted the READ group - Renewable Energies in Architecture and Design – were part of the design group, increasing the international interested on the area.

Solar energy has been a guide parameter both for urban and building design, that followed the guidelines of the *European Charter for Solar Energy in Architecture and Urban Planning* (1996). Quality agreements were stipulated between municipality and construction companies, setting the reference values for energy production and maximum energy demand for each building. As results, all the constructions have a low energy design and high resistance against overheating during summer time, while solar panels provide energy supply. The urban grid has been defined in order to take full advantage of the solar energy, providing equal amount of solar light to all the apartments and avoiding shadowing. Geomorphology of the site and natural characteristics were taken into account during the planning process, and integrated in the urban grid. Strong correlations between buildings orientation, height, glazing surfaces in the south façades, and choice of the materials contributed to enhance the energy sustainability of the project.

In this project, the densification has been used as mean for increase the heat island effect, since thermal losses play an important role in the yearly energy balance compared with cooling needs, due to the local climatic conditions.

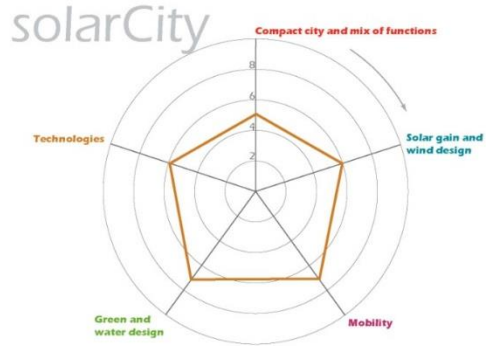
As for the other case studies, social integration, sustainable mobility, and functional mix were integrated in the planning process.

Green areas and infrastructures were designed to reduce the anthropic pressure on nature and conserve the biodiversity. Moreover, they have a water filtering function, being connected with the local purification plant. At the same time, a closed cycle water system was developed, creating separated pipelines for sewage and rain water, and reusing the organic material in the agricultural sector. Green areas play thus an important role for groundwater regeneration and filtering.



The area is connected with the district heating net of the city, the integration between new development and existing net was undertaken since the beginning of the planning process, reducing cost and technical problems. At the same time, energy losses along the pipes were reduced by 8% (measured from the plant to the flat), thanks to better isolation materials. In 2004 a new biomass power plant[3] was installed, supplying 17% of the annual heat demand. Thanks to the CHP plant (combined heat and power plant) economic benefits (i.e. cost reduction and environmental quality improvements) were achieved. Additionally, 50% of the warm water demanded is produced by 3.500 m^2 of solar and photovoltaic panels.

[3] 1/3 biomass and 2/3 oil and gas.



Linz, innovative in its concept of solar design at district level, is part of the Austrian social housing process of low energy buildings construction. The nowadays average energy demand is 36 kWh/m^2, lower than 44 kWh/m^2 initially set from the project.

These results show the importance of a clear design strategy, both at urban and building scale, for reducing the energy demand.

The global development costs amount to 190 million of euro: 125 for residential buildings and public services, 65 for infrastructures. The European Union General Directorate XII for Research and Development funded the project with 600 thousands euro. Furthermore, the City of Linz subsided solar system in public buildings with 720 €/ m^2, plus 150 €/ m^2 for solar panel.

Vauban-Freiburg, Germany

Photo: Der Freiburger Stadtteil Vauban: Foto: Ingo Schneider, 2009. Reproduced by Permission.

During the 70s the City of Freiburg started the first actions for promoting sustainability in the urban planning system, aiming to reduce car trips while increasing public transports. The concept of "energetic planning" appeared in the middle of the 80s when, after strong public oppositions against new nuclear power plants, the city launched an holistic energy policy, based on cross cooperation between environmental organizations, economic sector and researchers. This cooperation aimed to develop energy solutions based on solar technologies and create a leadership role for the region of Freiburg (also called SolarRegion Freiburg). Energy saving, new technologies and renewable sources are the three points of the energy policy of the city. Final goal is to reorient the energy production towards sustainability and reduce gas emissions of 25% during 1992-2010.

Different action for increasing the urban sustainability were undertaken, coordinated by a comprehensive plan for energy saving and production. Existing buildings were retrofitted and the isolation improved, while the new constructions had to increase the energy efficiency by one third comparing with the standards for eco-buildings. Cost analyses showed an increasing of 3% of the construction prices, which is compensate by 30% reduction of CO_2 emissions.

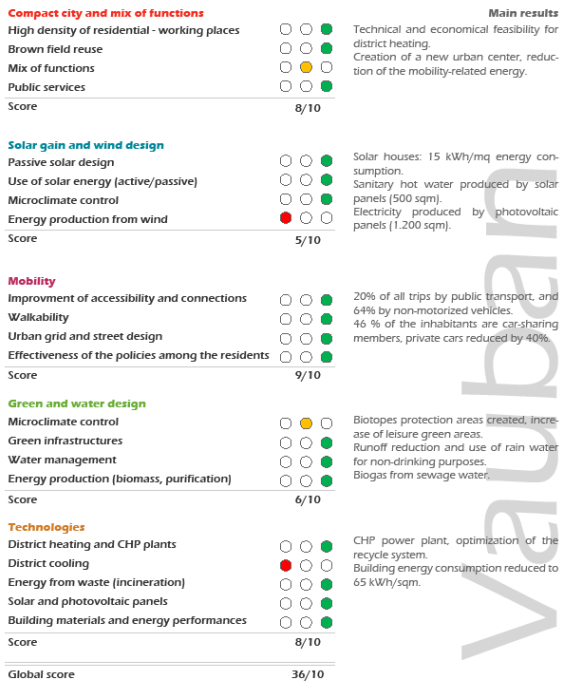
Projects correlated with solar technologies were launched, testing the applicability at the urban scale of solar and photovoltaic panels, solar cooling, and passive solar building.

The possibility to extensively apply solar solutions is also related to a favorable geographic localization of the city (south of Germany), which avail of 1.800 solar hours per year[4], equal to an annual solar radiance of 1.117 kWh/m^2. This value is lower than the one available at higher latitude (i.e. United Kingdom), which enlighten and enforce the opportunities coming from solar technologies.

[4] The Solar Economic Factor (http://www.fwtm.freiburg.de/servlet/PB/menu/1174647_l2/index.html)

Thanks to the key role of the sun in the management of the City, large part of the industry sector is connected with solar technologies, and there are well established agreements between the industries and the research centers here located.

A dedicated web-site, Forum SolarRegion Freiburg, is a "virtual" meeting place where citizens can obtain information related with solar design, technologies and researches.



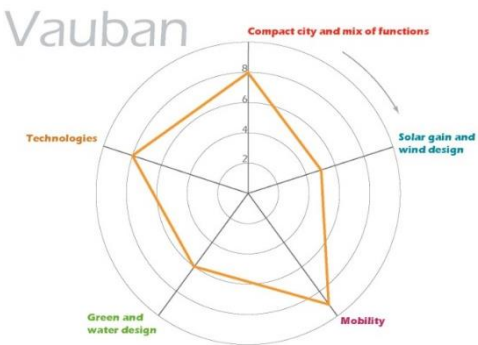
Other initiatives adopted by the municipality are related with reduction of car trips, started in the 80s with polices for increasing public transports; waste sorting and reuse of organic materials; reduction of land consumption and protection of 42% of the green fields.

In 1993 the City of Freiburg launched a renovation process on the area of Vauban, former army district of 38 hectares located at 3 kilometres from the city centre. The development was based on the idea of ecological, social, economic, and cultural sustainability, able to promote a different quality of life and long term progress. Thanks to public ownership of the land, it was possible to define the characteristics of the project without any pressure from the private sector, and promote actions related with urban density control, rigid energetic standards for building, and design of a car-free development.

Public participation of the inhabitants-to-be in the design process is considered one of the most important characteristics of the project. The association Forum Vauban was established in 1995 with the aim of constitute a link between people, designers and administrators, helping not only during the development phase, but also with the management processes,

increasing in the population consciousness level around urban sustainability. The Forum Vauban, subsided by the European Union, closed in 2004 due to lack of funds. During the years of activity, it helped to promote among inhabitants and workers (5,000 and 600, respectively) energy measures and sustainable style of life.

Guide principles of the project are connected with functional mix; partition of the land in small plots, afterwards developed by local small scale construction companies; involvement of the inhabitants in the design phases; conservation of the existing biotopes and natural elements; mobility based on public transport and pedestrian-cycle; CHP plant and co-generation close-by the development, in order to reduce thermal losses; low energy houses and passive houses; renewable materials; solar energy systems integrated in the buildings; supporting actions for increase social life, services and commerce.



The building density identified as optimal, both for technical supplies and public services provision, is 90-100 apartments/hectares.

The building energetic standard is 65 kWh/m^2, lower than the level of 100 kWh/m^2 set by law, which was already restrictive if compared with the previous consumption standard of 200 kWh/m^2. Hundred apartments have also been realized following the principles of passive house, with consumption of 15 kWh/m^2 and no need of extra heating, except for few weeks during winter time.

A district heating system covers the all area. The needed energy is produced through a cogeneration plant powered by woodchips, while solar and photovoltaic panels (500 and 1.200 m^2, respectively) contribute to produce hot water.

Thanks to green roof, permeable surfaces and reuse of waste water, the district has water autonomy quote of 80%. Biogas for cooking purpose is produced by sewage treatment plant, while the purification process is completed by using phytodepuration. Waste is collected into different

fractions by the inhabitants, and the organic waste is used to produce biogas and fertilizers.

Reduction of car ownership, improvements in public transports and pedestrian-cycle trips are other key factors for decrease the energy consumption and environmental impacts. In particular, car ownership was reduced by designing Vauban as a car-free development, dipping the ratio parking plot/unit to 0.5. The only collective garage is located at the entrance of the district, and the rent for a parking plot is higher than the city average. Thanks to these measures, it has been possible to reduce by 40%car ownership, which corresponds to a ratio car/inhabitant of 1/4 - 1/5.4.
Average yearly commuter trips with public transports are 20% of the total. 64% of the all journeys use not motorized transports. This value can be explained if distance is taken into account, 84% of the trips are indeed shorter that 6 km, which enhance the competitiveness of bicycles. 46% of the residents are car-sharing members, which covers 6% of the all trips. Private cars are used for 16% of the journeys, mainly for leisure purposes (Scheurer, 2008).

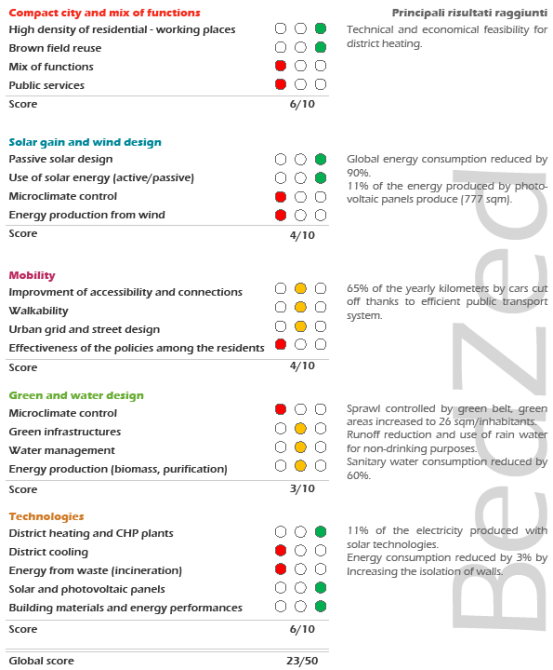
The annual energy saving or *CER - cumulative energy requirements* of the district were calculated by Öko-Institut of Freiburg in 28 GJ, corresponding to 2.100 tons of CO_2 equivalent.

BedZed-London, United Kingdom

Photo: Beddington Zero Energy Development (BedZED) London, Tom Chance from Peckham, 2007 Reproduced by Permission.

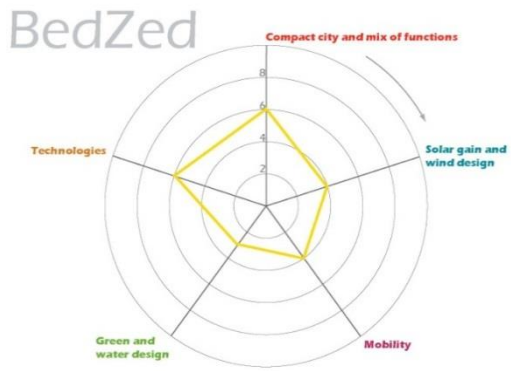
Beddington Zero Energy Development – BedZed, built in London in 1999, is focused on the creation of a new way of life in the urban context, having zero consumption of fossil fuel and high quality standards.

The neighborhood is realized on a former brown field, and it is characterized by high density, energy autonomy, green areas and green belt. According with the aim of the designers, the district should constitute an easy-to-reproduce and economically competitive urban model.



The reference morphological concept is the garden city, in which green, technologies and energy are integrated to the idea of traditional outskirt development to reduce the ecological footprint. The chosen building density is 100 units/hectares (excluding 18 units whit mixed function dwelling/work) and 200 job places/hectares; total surface is 1.7 hectares. The density is higher than normal sub-urban residential areas, and it was defined to obtain higher economic, environmental, and energetic benefits. At the moment roughly 250 people are living in BedZed.

Three main target groups – morphological design and social services, urban and financial sustainability, environmental impact reduction – were defined at the beginning of the process, guiding the development and design.



Urban and social mix, optimal building density for services provision, wind and solar design, car trips reduction and promotion of an environmental sustainable life-style are the main factors of the first group. The second target group includes living cost reduction by using renewable energies, energy saving thanks to a different urban design, and land value increase. The actions for reaching the fossil fuel target are contained in the third group, in particular passive design, reduction of water consumption (-50%), creation of distributed energy resources, and use of recycled building materials.

As for the other districts, public participation was seen as important element for improve the design and achieve better results.

Energy demand has been reduced by focusing on solar design, both at urban and building scale, and realizing constructions with high thermal performance. Thanks to that, the district energy demand is 90% lower than similar areas realized in the same period. A biomass powered plant produces, besides other renewable sources (i.e. solar and photovoltaic panels), the energy needed by the inhabitants.

The mix of functions allowed a car trips reduction of 65% on the total amount of driven kilometres, although car-sharing has not been successfully integrated in the district.

According with the data released in 2003 by the English agency BioRegional, in charge of the monitoring, the project showed better results than expected, in particular related with the use of water and fossil fuel. Due to technical problems, related with the installed experimental technologies, heating and cooling did not achieve the expected performances.

After monitoring the global performance of the project in 2007, it was shown that benefits directly related with architectural solutions contributed only for 3% of the total reduction, while significant role is played by urban design and DER systems. Generally, the district –compared with others realized in

the same period – is 16% more energy efficient, 30% more water saving and reduced of 40% the CO_2 emissions.

Thanks to the achieved results, the houses are valued 15% more than the surroundings.

WIND DESIGN AND GREEN AREAS

Bo01- Malmö, Sweden

Photo: Bo01 - Malmö stad, Malmö Townplanning Office, 2011, Reproduced by Permission.

Built on a former industrial and harbor area, Bo01 represents a new economical and development phase of the city of Malmö, which is moving from maritime and industrial sectors to services (bio-tech companies, IT companies) and high education (Malmö University). Moreover, with the completion of the Øresund Bridge in the year 2000, one of the major Trans-European Transport Networks (TEN-T Priority Axes and Projects - Øresund fixed link), new opportunities for economic exchange with the metropolitan area of Copenhagen have been open up.

The Swedish tradition of eco-villages is here applied at the urban scale, focusing on technologies and built environment design for energy production and consumption reduction. In order to combine built environment quality, natural aspects and energy production, a Quality Programme was developed by the City of Malmö, with the contribution of various experts. Aim of the programme was to constitute a guideline for the design and evaluation of the quality level of the new buildings. Eight focus areas have been defined by the Quality Programme, related with planning a dense neighborhood, provided with services and leisure activities; decontamination of the soils; energy system supplied with 100% of local renewable sources; urban waste management; alternative forms of transportation, as well as reduction of travel needs (telecommuting or teleworking); increase of bio-diversity within the compact city, in particularly through the inclusion of green areas and green infrastructures; social integration thanks to implementation of different housing solutions.

Morphologic and typological aspects were studied to protect the settlement from the winds blowing from the Öresund strait. A row of seven floors high buildings – higher than all the other constructions – faces the sea and constitutes an artificial barrier that prevents the occurrence of turbulences along the streets, protecting both houses and public spaces. Thanks to that, the microclimate of the whole district significantly improved, reducing the heat energy demand of the buildings.

The transport net was designed for decrease the dependence on cars and, thus, the impact on air quality. Among the different actions the most important are promotion of pedestrian and cycle paths, public transport (the distance between accommodation and bus stop is not more than 300 meters), and discouragement of car ownership. This goal was achieved by reducing the ratio parking plot/units to 0.7. Moreover, the city has launched a campaign to promote hybrid vehicles, applied also at the public transport vehicles.

The promotion of biodiversity is one of the distinguishing features of the project and influenced both the design of open spaces and the buildings materials. The majority of the constructions have green roofs and/or green walls, used also for thermal balance. Moreover, different habitats and biotopes have been created, while green and wet areas contribute to purify rainwater and melted snow before their release in the sea.

A system called *Green Area Factor*, imported and adapted from previous experiences in Germany, was introduced to ensure that all the developers would reach the needed standards for supporting biodiversity and environmental high profile. Approval of the project was subjected to the fulfillment of actions for enhance and strength the biodiversity in private green spaces and courtyard. A list of 35 "Green points" was defined by the Municipality, from which the private developers could freely choose (at least) ten of them, corresponding to the actions to undertake. The green space factor, measured on the whole development plot, has values ranging from 0.0 to 1 in relation with the type of surface. For residential areas the green space factor cannot fall below the target level of 0.5. This value is calculated by multiplying the area of each surface type for the correspondent factor, summing all the values obtained, and then dividing by the courtyard area. To ensure variety and encourage higher quality, the points assigned to each action are weighted with the functionality of the green area.

		Main results
Compact city and mix of functions		
High density of residential - working places	○ ○ ●	Technical and economical feasibility for district heating; reduced heat energy consumption. Site renovation and soil decontamination.
Brown field reuse	○ ○ ●	
Mix of functions	○ ○ ●	
Public services	○ ○ ●	
Score	7/10	
Solar gain and wind design		
Passive solar design	○ ○ ●	Winter microclimate control through a barrier of buildings: reduced speed and changed wind direction. Solar energy production by solar (1,400 sqm) and photovoltaic panels (120 sqm). 2 MW wind turbines of (6,300 MW/year)
Use of solar energy (active/passive)	○ ○ ●	
Microclimate control	○ ○ ●	
Energy production from wind	○ ○ ●	
Score	7/10	
Mobility		
Improvment of accessibility and connections	○ ● ○	0.7 car lots / unit. New connections to the city by public transport and pedestrian/bicycle lanes. High walkability index in the district.
Walkability	○ ○ ●	
Urban grid and street design	○ ○ ●	
Effectiveness of the policies among the residents	○ ● ○	
Score	8/10	
Green and water design		
Microclimate control	● ○ ○	Biotopes protection areas and increased biodiversity in the district. Heat pumps for heating and cooling. Runoff reduction and use of rain water for non-drinking purposes. District sewage treatment plant.
Green infrastructures	○ ○ ●	
Water management	○ ○ ●	
Energy production (biomass, purification)	○ ○ ●	
Score	9/10	
Technologies		
District heating and CHP plants	○ ○ ●	Biogas from waste as fuel for public transports. Natural caves used as water storages for heat pumps. Solar and photovoltaic panels. Reduction of energy demand not achieved for first phase buildings, the results have been used for improvements in the other phases.
District cooling	○ ○ ●	
Energy from waste (incineration)	○ ○ ●	
Solar and photovoltaic panels	○ ○ ●	
Building materials and energy performances	● ○ ○	
Score	8/10	
Global score	39/50	

Construction companies had to submit plans for the maintenance and management of the green areas, while the landscape project and the subsequent planting of trees was developed since the early stages of the expansion under the supervision of Malmö Green Department. The result of this operation led to a wide variety of environments, including small lakes, water retention basins, different natural habitats and green corridors between parks and gardens.

Environmental initiatives were funded through a Local Investment Programme (25 million of euro) and European Union funds (roughly 2 million of euro).

The Green space Factor, after the pilot experience of Bo01, has been integrated in the environmental building programme of the cities of Malmö and Lund, and it is applied to all the new developments (Kruuse, 2001).

Other aim of the project regards the use of 100% renewable resources locally produced, the quote is calculated on an annual cycle. The energy supply system is based on a smart grid concept. The energy networks of the district and the city are thus connected and can exchange energy: when the quote produced by the district exceeds the demand, it can be redirected to the urban net, and vice versa.

The accomplishment of this ambitious target has required different technologies for energy production, based on solar, wind and geothermal sources, as well as natural gas and biogas from waste. The installed geothermal heat pumps exploit water from sea and aquifers, which is then stored in natural caves to facilitate the conservation of heat or cold, depending on the season. In addition, part of the energy is produced by 1,400 m^2 of solar collectors, 120 m^2 of solar panels installed on the roofs, and 2 MW wind power station (annual production of 6,300 MWh).

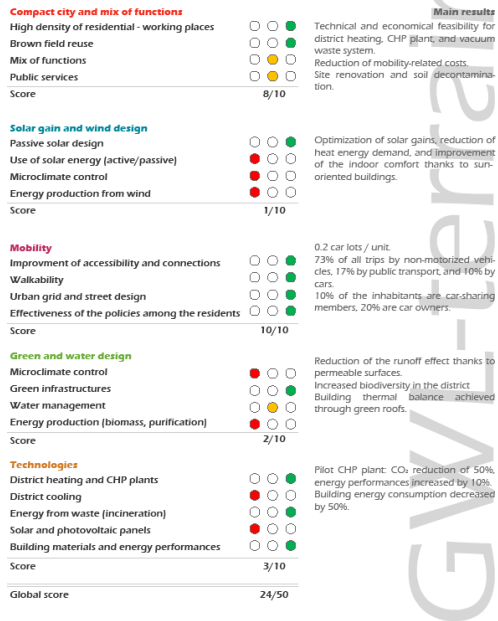
Biogas, used in the heating system and as fuel for vehicles, is produced fermenting the organic waste. The waste is collected both using traditional systems and through a pilot technology of garbage disposals integrated in the sinks (200 dwellings involved).

The energy consumption threshold of 105 kWh/m^2/year was not achieved by the dwelling realized during the first phase of the project, due to underestimation of the thermal bridges. The level of energy consumption was 127 kWh/m^2/year for buildings with heat recovery systems and 186 kWh/m^2/year for those without, an increase of 40-60% on the expected consumption.

The higher levels of energy consumption were also related with social factors. In particular, was underestimated the role played by energetic habits and use of the buildings by their inhabitants. Using the data coming from the first constructions, important improvements could be included in the following buildings. Data collected in 2008 after the conclusion of the development, shown the achievement of the energy consumption/m^2 initially set.

MOBILITY

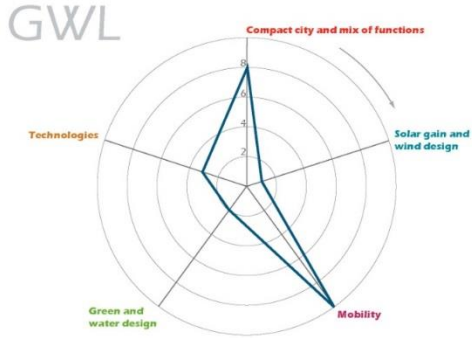
GWL-terrein - Amsterdam – The Netherlands



Promoted by the city of Amsterdam in 1989 and completed in 1998, the project is located in the west part of the capital, on an area of 6 hectares. Although characterized by ecological and energetic sustainability, the central focus of the project is connected with the reduction of motor vehicles. This target has been achieved by radically sinking the available car plots (110 parking lots for a population of 1,500 inhabitants, plus 25 lots for visitors), improving the public connections, and introducing car sharing. Besides, rent or buy a flat includes also subscribe special agreements between municipality and future inhabitants, who accept to reduce cars usage as mean for improve the quality of urban areas.

To strength this policy and avoid that the GWL-residents, although bounded by contract, use the surroundings plot areas, all the neighbor districts are subjected to a strict allocation of parking spaces. Nevertheless, the car ownership rate is roughly 20%, higher than expected, although the proportion of trips in rather low and mostly related with long distances. Car rental from other areas of the city, share of parking spaces or cars with friends or relatives, and a private use of the working place parking lot, can explain the elevated percentage of residents owning a vehicle despite the limitations imposed

The use of motor vehicles, however, appears limited. Only 2% of the residents can be considered as car-dependent (car trips above 50% of the total), while 57% of the residents can be regarded as car-free (car trips less than 10%).



Other targets for improving the district sustainability were related with energy saving and production, water recycle, conservation of green areas, and waste recycle. Each target was then applied through specific projects, including, for example, rainwater recovery, green roofs, waste separation at source and maximization of the recycle, passive solar technologies, and cogeneration power plant.

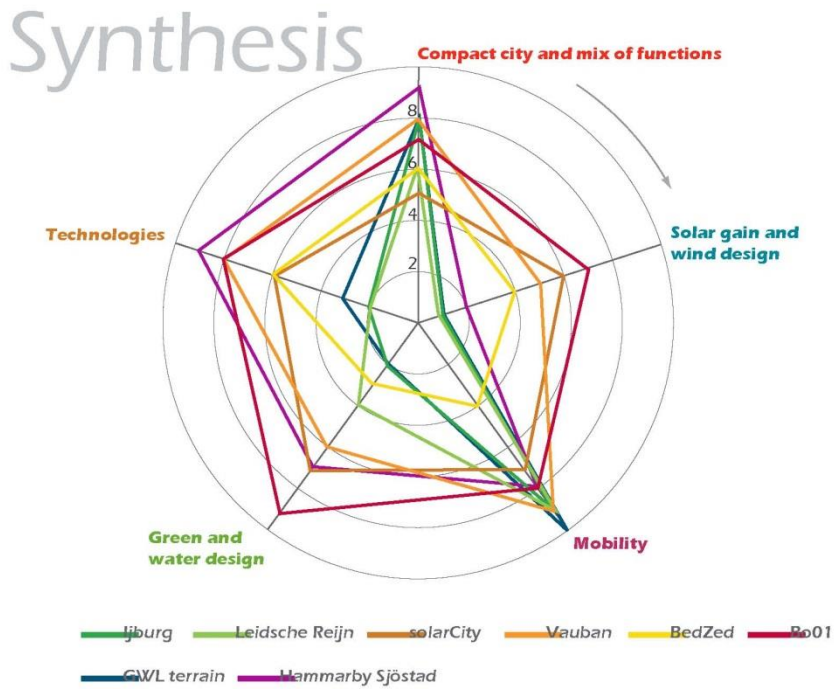
Different building types and mix between rental and property apartments was created to encourage social mix. Of the 600 units produced, 300 are rented as social houses, 150 sold at subsidized price and 150 at market value.

The chosen built environment density is 100 dwellings per hectare, while the height of the buildings is between 5 to 11 floors for those located along the north and west perimeter, so that they can perform a noise barrier function, while the inner buildings are oriented to optimize passive solar gains, further increased by glazing surfaces. Winter heat retention and summer temperature control are improved through green roofs and local high thermal performing building materials.

Stormwater management is meant to provide water for non-drinking purposes. Rainwater collectors were installed during the first years, but then removed due to negative results both in terms of duration and increase of energy consumption. Green roofs and green areas are nowadays the two used systems. The high percentage of permeable surfaces (about two thirds of the all area) drastically reduced the run-off phenomena. Water management involved also installation of sanitations able to cut off 30% of the water consumption.

The energy performance of the buildings is 50% lower than referent buildings, with 730 m^3 of natural gas per year equivalent compared with 1.400 m^3 of the referents. Energy reduction was attained also by installing a district cogeneration power plant.

RESULTS



Comparing the obtained results of the case studies, it is possible to recognize good or satisfactory results for all the thematic areas, with the exception of the solar design, which seems to have lower application within the design choices. This have aftermath for passive solar gains, which results in increasing energy demand in winter, and installation of solar and photovoltaic panels, which do not have suitable exposure conditions. Overlapping the spider charts are provided both an effective comparison of the different experiences and useful information related with the theoretical areas that had stronger influence on the design and/or the challenging elements still existing. In particular, the projects obtaining a pentagonal shape give the best results, as all fields (thematic areas of the design) have received the same development into the project.

Several conclusions can be drawn related with the sustainable design of new settlements. In general the high density and compact city concepts are applied in the entire analyzed projects, which recognize the positive effects related with the installation of DER systems, public transport, and public services in accordance with principles of effectiveness and efficiency. The

compact city is linked with the increase of functional mix and that has positive effects on reducing energy demand peaks. Some case studies present limited functional mix, which can be explained either with the limited dimension of the plot (as for GWL-terrain and BedZED) or with the on-going transformation, which does not allow an overall assessment. Reuse of former industrial or urbanized areas has been applied in most cases, with the only exceptions of SolarCity and Leidsche Rijn, due to shortage of available land compared with the needs of the cities.

General focus is directed towards the exploitation of passive solar gains, by identifying optimal building / urban grid orientation and optimal relationship between buildings and road section. Even though the energy reduction achievable by passive solar gains is widely known, some projects did not focus on its exploitation, centering more the development on the urban design aspects. The use of wind as source of energy, as well as the protection of the settlement by modifying the urban grid and/or introducing green areas, has a rather poor implementation, with the only exception of Bo01 (Malmö) where urban morphology was used to control air flow and modify urban microclimate. Green and water design, such as creation of green infrastructures, green roofs, and water cycle management, are mainly directed towards the increase of permeable surfaces, increase of biodiversity, and ease water treatments. The micro-climate mitigation effect provided by green areas and corridors is usually not considered within the design goals, as well as in monitoring phases, except in cases of SolarCity and Vauban. There may be a need for additional evaluations focusing on the final development stages of each of the urban districts. Such evaluations could determine whether these case studies have influenced the construction process in the final stages of the project and also decide whether there has been any progression in the use of technical innovations (Iverot and Brandt, 2011).

The infrastructure grid (public transport net, bicycle and pedestrian lanes, etc.) has been deepened in all the case studies, which especially concentrated to the morphological and functional conditions that ensure effectiveness to non-motorized transport. Less attention was paid to implement measures and policies that support changes in the behavior of the inhabitants, particularly in relation with reduction of car ownership/use. It follows that, in most cases, the potential arising from a different urban grid design does not reach fully results in car reduction.

Technologies are mainly related with district heating and CHP plant, considered among the most effective means to reduce energy demand.

Improvements in the building envelopes and building energy performance are adopted to decrease energy consumption per square meter. At the end of the day Sustainability in its full scope applies to the construction, the life-style, habits, patterns & behavior of occupants. A full vision of sustainability and resilience when it comes to these urban districts has to be one of holistic ecological design & management in terms of: Energy consumption & CO2 emissions, production of renewable energies, material cycles & material sourcing with local ecosystem enhancements, social responsibility: social & (local) economic development, and happy cities: healthy and happy life-styles.

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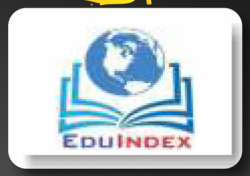

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