

Report on the regional potential of the Karlovy Vary Region

EMERGING INDUSTRIES

- Active Aging
- Sustainable Development / Green Economy
- Sustainable / Intelligent Mobility

CROSS-CUTTING ISSUES

- Internationalization
- Technology & Knowledge Transfer
- Gender in Innovation, including diversity aspects

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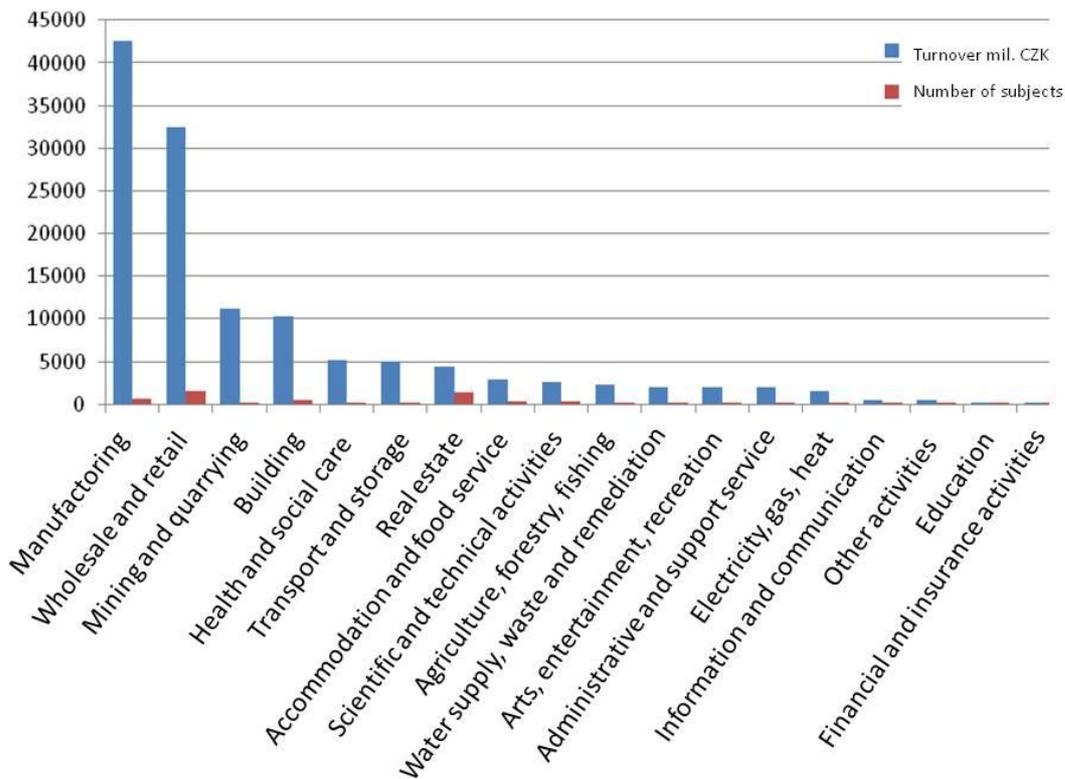
1) Introduction

The Karlovy Vary region is the smallest region of the Czech Republic with respect to the area and the number of inhabitants. It has 301,000 inhabitants (2012) and this number has been slightly decreasing in the last few years, even though the balance of external migration has been positive in a long term.

The economic performance and the growth dynamics of the Karlovy Vary region are on the low level and the region has dropped behind the other Czech regions in the long term. Especially between the years 2003–2007, when the Czech Republic and its regions rapidly economically grew, the growth of the region Karlovy Vary was slower and steadily lagged behind.

GDP/inhabitant achieved only 70.1 % of the national average (259,000 CZK per inhabitant) in the region in 2011, though it was more than 87 % in 2000. In the comparison of the GDP in the purchasing power parity, which takes into account different prices levels, the Karlovy Vary region achieves 57 % of the EU 27 average, particularly 14 100 PPP while EU 27 average is 24 500 PPP.

Graph 1: Economic subjects/activities in the Karlovy Vary region, 2012



Source: Albertina 2012, own modifications

Note: The graphs show only the point stock companies Graph or Ltd. Companies with stated turnover in the Albertina database – 5,700 subjects in the region in total.

There is lower rate of manufacturing companies than in the other parts of the Czech Republic in the Karlovy Vary region (lower employment rate, GVA creation, revenues). The manufacturing industries share on the employment was 25.8 % in the Karlovy Vary region in 2012, the third lowest rate after Prague and the Central region. The Czech average is 26.6 %, but this number is strongly influenced by Prague. In the other regions besides Prague the average of employment in manufacturing industries creates 30.4 % of the national economy (according to labour force survey). The share of manufacturing in the gross value added (GVA) is only 20.6 % in the Karlovy Vary region, which is the lowest number besides Prague. The average of the other regions is 30.5 %. The values of the shares of GVA and employment rate also show, that in the Karlovy Vary region the activities in the manufacturing are activities with lower value added and knowledge demand (this conclusion is approved by the findings described in the text below).

The reason of the lower share of manufacturing in the economic structure is especially developed mining industry (its share has been slightly decreasing in the long term), electricity production (its share has been conversely increasing) and the tourism and related services, which creates roughly 10 % of regional GDP. These are the most important specifics of the regional economic structure. In the inner arrangement of the manufacturing which is usually considered to be the main driving engine of the economy, the main role play metalworking industry, glass, porcelain, ceramic and building materials production. The automotive industry has had the growing importance; its real share in the regional economy is much higher than the aggregate statistic data shows. Many companies from other industries (plastic production, electric devices production, textile production, etc.) are suppliers of automotive industry production networks according to in-depth investigation¹ carried out.

Innovative system of the Karlovy Vary region suffers from the low level of inputs as well as the outputs. Although the high rate of innovative inputs does not automatically guarantee also the adequate rate of innovative system outputs, very poor attention paid to the innovations and innovative system inputs is seen to be a problem in the Karlovy Vary region.

The region occupies the last position among other Czech regions with remarkable distance in the expenses on R&D, in the number of researchers and in the ratio of Universities and expert employment². Only 102 employers worked in R&D in the public and private sectors in the Karlovy Vary region in 2011 (according to Full Time Equivalent) which represents only 0.2 % of the overall capacity of the Czech Republic. Aggregate expenditure on the R&D of all the three sectors reached only 0.15 % GDP, which is again the worst result among the other regions. **This condition is mainly influenced by the nature of the economic activities of local companies.** They, with some exceptions, do not deal with systematic research and

¹ Analysis of innovative potential of the companies of the Karlovy Vary region (2010); Analysis of the economic characteristics of the biggest companies in the Karlovy Vary region (annex of Strategy of competitiveness of KV Region 2012)

² Expert employment respond to the ratio of the specialist positions (2nd class) and technical and expert workers (3rd class) to the overall employees according to CZ-ISCO classification.

development or realize the development on the lower stages of the value chain – the most commonly by products modifications for the local market or they use innovations only to catch up with the competitors. The situation is worsening by the absence of the universities or strong research organizations which generate expert knowledge and can help their application in the company practice by various means (technology transfer, establishment spin-off companies, etc.). **The direct result is low rate of innovative outputs and outputs formally secured by the intellectual property laws.** Subjects in the Karlovy Vary region submit only single units of patent applications at the Industrial property office (4 applications in 2012); the situation is similar also for utility models. Further important result is prevailing simple nature of the innovative activities, which only exceptionally result in new product launch or new markets establishment.

In the present only one cluster exists in the Karlovy Vary region - ENWIWA. It joins towns, villages and companies of the region and its main objective is to support effective methods of waste management with a special emphasis on the secondary use. The cluster is not unfortunately according to available information very actively performing.

The corporate environment of the Karlovy Vary region is typical for its high rate of internationalization. Although the number of foreign investments (especially the big ones) did not come into the region from many causes, regional economy is significantly oriented on export and the foreign capital plays very important role in regional economy, especially for SME's. **The dominant market Germany absorbs 60 % of the export. Germany also prevails in the foreign companies' ownership.** – 110 companies out of 203 foreign companies with more than 20 employees and the annual turnover higher than 30 million CZK operating in the region has majority of German owners. They are mostly middle-sized production branches of the German companies which entered the region in the 1990s due to the combination of low-cost production, geographical proximity and the good workforce technical competences. **From the perspective of the size structure, there is a lack of big, strong companies in the Karlovy Vary region.** There are two main reasons – The region was not very attractive for the big FDI coming into the Czech Republic after 2000 and the big companies in traditional sectors were forced to strongly reduce their production capacity because of restructuring reasons. The most dynamic segment in the region is middle-sized, mainly foreign companies which based their growth on fast work productivity increase and production efficiency. They are mainly low- and medium-tech companies without any innovative potential. Even though there are some big companies in the production sectors of manufacturing and spa sector which increasingly influence the regional economy by its importance and (Sokolovská uhelná, Witte Nejde, spa companies etc.). The most important industries are engineering, spa/wellness and related services, glass, ceramic, building materials production and electrical industries related to automotive industry.

2) Emerging Industries

The three chosen industries have the different importance in the economy of the Karlovy Vary region; respectively individual regional economic activities are somehow related to them.

The Karlovy Vary region emerging industries description and their role

Active aging has the biggest developing potential out of the other emerging industries in the Karlovy Vary region. The regional economy is specialized on spa sector which is the important kind of tourism and is concurrently the important part of the health system. Spa sector participates by roughly 10 % on the regional GDP. Regional spa treatment is famous and its positive health effect is internationally known which is approved by the prevailing foreign clientele (75 % of visitors), mainly from Germany, Russia, Ukraine, Israel and Asian countries. Local spa treatment covers many activities – spa treatments, drinking cures, balneology treatments and hydrotherapy. There is an increasing number of relating services like beauty treatments, easier health interventions, and wellness/fitness programs, touristic and sport activities which make the stay more attractive and try to aim at the new market segments.

Sustainable development/green economy would be seen as potentially very interesting and important field for the Karlovy Vary region. The region was historically focused on the heavy industry and the mining; nowadays there have been new, more considerate economic activities and natural source management development with the participation of the heavy industry regional subjects. So far there have been developing only isolated and embryonic activities with insignificant influence on the regional economy, but they have very big growth potential because some of the companies have been developing unique know-how and competences in the new progressive emerging industries especially in the field of the **use of biomass** as the local source for the heating like in Žlutice, where the experimental research and testing of the new technologies and burning procedures have been carried out. The biggest company in the region Sokolovská uhelná pursues the growing and energetic use of biomass. The company operates its own fully automated biogas station in Vintířov. The company also started with growing of special crops for biogas station.

The next field which is possible to include in the green economy is **the residential and industrial waste management and its secondary use**. The regional company Montstav CZ operates in this sector and specializes in the tires and rubber recycling and their secondary use in the building industry (building materials, non-slop materials), in the transport (the additives into asphalt mixtures for decreasing of the noise), in sport (Hipotex - parkur). The company belongs to the most important companies in this field in the Czech Republic and cooperates with universities and other partners on the systematic research and development of the recycling and the secondary use of the rubber materials. The company is also connected with the field of **sustainable mobility** by the subject of its business because its products decrease negative impacts of road transport. The company AMT Příbram

(branch Nové Sedlo) specializes in the glass recycling and its secondary use, the company produces glass powder to be used for production of glass fibers and the foam glass, roof tiles and the colors. In the field of waste management the growing interest of the dominant player in the regional economy - Sokolovská uhelná - has been remarkably increased. The company has started to built the regional center of the waste treatment in Vřesová where the company will be processing the waste into granulate and transforming it to the energy gas for the energetic use in the power plant in Vřesová. Thus the company tries to diversify its activities portfolio in the connection with the steady decreasing lignite mining and concurrently utilizes its specific know-how, technologies and electric energy production capacity.

The field of **sustainable/intelligent mobility** is negligible in the Karlovy Vary region and it is not possible to take it in the notice as the emerging industry.

Weaknesses and strengths of emerging industries

The future development of emerging industries has essentially three main aspects by which it is influenced most. The first of them are the ambitions of the company's management and the strategic management quality which is closely related to the company position in global production networks (manufacturing companies). They are crucial for the setting of growth targets and the capability to achieve them. The strength of the key subjects operating in the spa sector, tourism and related services, which are considered to be the main parts of the sector of active aging in the Karlovy Vary region, is the strategic management quality based on long-term experience in the sector. It is seen that the ambitions and the efforts to promote the sector in the region higher, as well as the advantages of the new opportunities, are not sufficient. This is reflected by insufficient cooperation of key players and connectivity of individual activities, limited markets orientation and very slow transformation of spa sector and tourism into the new, attractive forms. Companies operating in the area of green economy / sustainable development conversely have ambitions which have not been met by the smaller subjects yet. There are more reasons for that fact, but one of them is possibly absence of higher quality company strategic managements which is connected with their insufficient size and the fact that the companies are relatively young.

The second aspect is the technologic development and the intensity of R&D activities, which is very important especially for emerging industries coming through fast technologic development. The medical and treatment methods in the spa sector are highly advanced and they are the main competitive advantage of local spas. Some deficit can be seen in the treatment objectification and the treatment positive results verification by the research. This would represent strongly usable marketing element. The research activities are being carried out but it is not possible to consider them to be sufficient or finished. The sector of green economy/sustainable development includes only separate, individual activities/subjects. These subjects provide systematic research/development activities which are completely new in many areas in the frame of the Czech Republic (Montstav CZ – recycling and

secondary use of tires and rubber materials; Žlutická teplárenská – cooperation on research of new boilers and technologies for biomass burning).

The third aspect fundamentally influencing the future development assumptions is the quality of the business environment and the cooperation of all triple helix members. It is not only related to the emerging industries. Public interventions can easily influence this area and simulate its positive development. Many analysis on the business environment or strategies suggesting systematic solutions how to empower competitiveness of the business sector in the region have been carried out in the Karlovy Vary region. Some of the suggested activities have already started (e.g. innovative vouchers), but for the real business environment impact it is necessary to extend the intensity, range and the quality of these activities and to carry them out systematically, coherently and long-term. Their efficiency is low nowadays because the policy makers do not perceive the importance of this issue and do not pay it enough attention. As evidence, for example, Regional Assembly constantly delays the approval of the building of The Science and Technology Park in Karlovy Vary. The Park would help to develop research and innovative activities of the companies in the region and attract/ retain desired qualified human resources in the region. Activities of the Park should be beside others aimed at spa treatment, renewable energy sources, that is why it has direct connection to the emerging industry of active aging and green economy.

Potential for the future development of emerging industries

The biggest potential of the mentioned emerging industries can be find in the area of active aging in the Karlovy Vary region. Spa sector and balneology are crucial already developed areas connected with the topic. This existing regional potential has not been sufficiently utilized yet, especially in the connection with other activities already developing or activities with suitable conditions in the region like wellness, easier health/beauty and cosmetic treatments, offer of sport activities (golf, cycling, skiing) and stays in the nature. It is also important to build partnership of all subjects – spas, health/medical facilities, travel agencies and public sector subjects. For the future development it is crucial to support development of research capacities, development of spa treatment results objectification and develop educational capacities aimed at spa treatment and medical care, especially the tertiary level (but not only at universities). For the region inhabitants it is important to build a network of social care services and services for handicapped people with special needs which are needed in the region.

In the area of the green energy/sustainable development the biggest growth potential can be found in recycling, waste secondary use and biomass processing for the electricity and heat production. The new already prepared or realized investments (Sokolovská uhelná) will help to develop this area. Among the key activities belong the increasing of the separated part of the residential waste which is on the very low level now. In 2011 there was separately collected only 11.5 % of the residential waste in the Karlovy Vary region which is the second lowest number among the Czech regions after Central region where it was only 9.5 %. The next region in the chart is South Moravia region with 12.9 % separated waste

part. In the Czech Republic the ratio is 14.4 %. Next suitable activity could be connection of the subjects and their isolated production and research and development activities. The companies operating in biomass processing should coordinate their activities with biomass producers to ensure sufficient sources. Distinctive development potential also has the company Montstav CZ with its know-how in the area of tires and rubber materials recycling and secondary use. Its importance also extends into the area of sustainable mobility (noise barriers, „silent“asphalt). It will be necessary to support the development by the legislative policies and setting off the system of redemption, recycling, secondary use and application as well as bigger preference of these materials use for public constructions.

Examples of good practice in the region

Green economy/sustainable mobility

Subject: Montstav CZ, Ltd.

The company Montstav CZ deals with ecologic recycling of used tires and other rubber materials with further secondary use. E.g. anti-noise bricks and anti-vibration rugs are produced from the rubber granulate and they are used on road constructions for noise elimination. Further the material is added into the asphalt mixture to decrease noise on the roads. The company products are also aimed at sport (golf) and free time (curbs, anti-slippery rugs). The company systematically cooperates on the research of its new products with external partners from business and R&D sectors (universities, Sokolovské strojírný a.s. etc.).

Green economy/sustainable development

Subjects: Žlutická teplárenská, a.s.; Sokolovská uhelná, právní nástupce, a.s.

Žlutická teplárenská (ŽT) was the outrider in biomass processing for the heat production in the Czech republic (heat mass production and its distribution). The town Žlutice is distant from the gas pipeline and needed the solution of heating for its inhabitants. The director of ŽT studied the subject of biomass processing at the university. In 2009 the research activities of ŽT, University of Chemistry and boiler producer VERNER were started to solve the burning operating technology and problems with boilers sediments which decreased the life cycle of the boilers and decreased efficiency of the facility. The research achievements are the new biomass burning plant with the protection layer preventing ash sticking on the boiler walls and biomass mixture which are protected by the utility models. In 2012 the company Sokolovská uhelná opened a biomass station as well. SU will grow the biomass on the unused areas after the mining. Thus it helps not only to develop electric energy and heat production ecologically, but also helps to reclaim and utilize areas destroyed by superficial lignite mining.

3) Cross-cutting issues

Cross-cutting issues and their importance for the Karlovy Vary region

The first chosen issue in the frame of the project is a **gender**. According to existing surveys and analyses the topic of gender in the Karlovy Vary region is often connected with **insufficient offer of part-time jobs during the maternity leave and further return to the job. The accessibility of primary child care services is negatively perceived.** It makes it difficult for the parents to return on the labor market and worsen economic standard of families, especially single parents. In some parts of the region there is insufficient or unattractive offer of secondary education for the girls (too many schools are oriented on the industries). Existing statistic figures show that the rate of women in the academic sector and R&D sector is quite high, reaches more than half, in the tertiary education reaches even 90%. According to the minimal importance of these two sectors in the regional economy it is not possible to draw any conclusions out of these numbers.

The second topic is **internationalization**. It is possible to perceive as the subjects, institutions, companies and the inhabitants involvement in international networks and partnerships and as the degree of openness of the Karlovy Vary region for the processes and knowledge coming from outside. The economy of the Karlovy Vary region as mentioned above is highly export oriented and is connected to neighboring Germany. The nature of the cooperation is more unilateral – the capital, competences and limitedly knowledge and know-how coming from Germany and use the accessible and relatively cheap workforce in the region. The positive effect is the increase of employment rate and economic growth, but the simple nature of the activities and low technologic demand cause lagging behind of the economy and dependency on „import“ of enterprise and competences from outside. It complicates the development of knowledge oriented economic activities, does not create job opportunities for highly specified experts with university degree and does not develop business activities of local inhabitants. The problem is also very low level of the connection of regional companies into the global production networks which implicates their subordinate position and dependency on the companies managing these networks. Neither openness nor the rate of internationalization of the public and educational institutions are not very high or have been still developing and do not bring sufficient results. The biggest barriers are the low level of knowledge of foreign languages and insufficiency of human resources. While the legislative policies and opportunities for workforce mobility and public institutions connectivity are rated as sufficient.

Chart 1 Expenses/revenues - import/export of technologic services in CZK/inhabitant, year 2011

		Computing services	License fees and trademarks	R&D	Technical services	Property rights
Import	Czech republic	1834	1515	671	1018	246
	Karlovy Vary Region	12	2032	1	22	0
Export	Czech republic	2605	152	304	1587	343
	Karlovy Vary Region	12	0	143	133	0

Source: Czech statistical office 2011 – data R&D

Knowledge and technology transfer, as the third cross-cutting issue, is very important area for the Karlovy Vary region, although it is not the priority of policy makers. The players in the region have not been interested in this topic much yet. Existing data (see the chart above) also approves that the technology and knowledge transfer in the Karlovy Vary region is on the low level (rated by the number of licenses, patents, companies and research institutions/universities, establishing spin-off companies). This situation is mostly influenced by the weak business sector (lack of strong domestic companies and above described foreign companies characteristic), lack of research centers/institutions (public or private) and universities in the region and the absence of good working intermediate institutions aimed at technology transfer. According to the existing findings the technology and knowledge transfer in the region is ensured mainly by employees’ migration (work placement/change), workshops, seminars and conferences. Soft factors – personal relations, informal meetings play the big role. Technology and knowledge transfer is connected with internationalization and that is why it is necessary to perceive these two cross-cutting issues together. Existing rate and especially the nature of the economic activities internationalization in the region do not support the transfer of the top technology and knowledge transfer.

Potential for the Karlovy Vary region resulting from the Cross-cutting issues

The most important issue in the question of gender is increasing of the opportunities for the women on the labor market – especially the return of the women from the maternity leave on the labor market, involvement in the part time jobs during the maternity leave and improvement of the primary child care services. It enables decrease women disadvantages on the labor market and improves their economic and social status. The key activities can be e.g. the support of part-time jobs, support of the employers, who offer part–time or full-time jobs the women on or after maternity leave, support of the company kindergarten opening and other alternative child care services. Respondents reported in the frame of the survey, that the cluster or other cooperation initiatives can bring the examples of the good practice and experience from other regions how to solve this problem. Most of the respondents would appreciate activities supporting gender balance.

Another two cross-cutting issues, internationalization and the knowledge and technology transfer and their potentials are necessary to perceive in interaction, if not, the internationalization will stay on a low level (low-road) and the knowledge transfer will be isolated. In relation to the above described lack of knowledge (limited possibility of knowledge creation and its commercial evaluation) and a bad accessibility of the best technologies in the region it is necessary to focus on their transfer from outside. The Karlovy Vary region is located close to the developed Bavaria. The regions are besides others connected by the common specialization in some industries and economic coherence, but only unilaterally. This situation creates the potential for the knowledge, technology and competence transfer which should finally lead to the increase of internationalization and company upgrade in global production networks. The most desired is so-called function upgrade – increase of the knowledge role in single companies' activities and the development of functions with higher added value. Further cross-sector upgrade (respond to the principal of related variety), which means use of the existing company know-how in different or related sectors. This has been achieved by the Bavarian ceramic and porcelain producers who focused their production more on technical ceramic/porcelain and opened geographically new, growing markets. Internationalization and the technology and knowledge transfer must not be limited on the local level, but there must be better connection relating to international projects and the subjects must stay in touch with globally important knowledge centers in given sectors and must observe world trends in related sectors.

Further potential can be find in the cooperation with neighboring regions (Plzeň, Central, Ústí nad Labem) which have more knowledge providers (universities, R&D centers). The cooperation with the neighboring region extends the offer of knowledge for the companies in the Karlovy Vary region and can indirectly lead to the cooperation extension on the international level.

Strengthening of the activities of the institutions supporting business and cooperation of business subjects with research and educational institutions is the key element for the development and the transfer of knowledge and technology. Such institutions are especially (not existing yet) The Science and Technology Park and Innovative incubator (offering not only premises, but especially highly specialized assistance services) and the Business Development Agency of KV Region. Equally important will be the development of the „soft“ infrastructure like cluster initiatives and cooperation platforms (inside of the region as well as internationally). Their activity should be created from „bellow“, the establishment should not have conditional purpose, e.g. obtaining grants. Next key aspect is ensuring highly qualified human resources – their retain/attraction/return to the region. One of the solutions is developing of the cooperation system of the companies working with the students and young researchers while they are studying at the university. This will help to build the relations and confidence among them and in the end the company acquires educated employees with university degree who are aware of the company environment and his or her responsibilities without need of expensive training.

Examples of good practice in the region

Knowledge and technology transfer

Innovative vouchers (BDA): Innovative vouchers are the financial tool supporting knowledge and technology transfer and cooperation between business and research sector. This is a one-off grant to the companies from the Karlovy Vary region for the particular projects of cooperation with research organizations, departments of Academy of Sciences of the Czech republic or universities in the Czech republic. The science knowledge or technology transfers leading to companies' competitiveness empowering in the Karlovy Vary region are supported. Grant provider is the Regional authority and implementing agency is the Business Development Agency of KV Region, the public tender is held once a year. The purpose of innovative vouchers is besides financial support in hundred thousands of CZK for the particular project also the support of partnership between the company and the research organization which can generate further long-term common activities.

4) Conclusions and pilot activities recommendations

In the area of **active aging**, which has the biggest growth potential for the Karlovy Vary region, would be appropriate to aim at **strategic partnership building of all players – in the region and outside as well** – spa treatment providers, medical centers, travel agencies, cities and other subjects focused on tourism. It is necessary **to create comprehensive marketing communication strategy and define main development direction and resulting target groups and markets** with tailored marketing activities. There is no need of establishing new institution, there is rather need of finding new strong leader/mediator that would be able to connect all the players in the region and build one team. The second key activity should be **research activities development** (in the region or partnership with the institution outside the region) focused on **spa treatment positive effects on patients/visitors health objectification**. One common R&D center in the region would be beneficial for this purpose. The other option would be to intensify cooperation with the existing Research Institute of Balneology. Cooperation of all subjects can result in foundation of cluster/cluster initiative or network with suitable conditions for the area of spa/active aging in the region. This initiative would not be limited only to spa sector, but should include related services like medical care, beauty and cosmetic treatment, wellness and subjects operating in this sector.

In the area of **green economy/sustainable development** it is necessary to finish isolated projects of some subjects (Žlutická teplárenská, Sokolovská uhelná) for biomass energetic use. It would be beneficial to establish functional units and benefit from the specific local conditions – e.g. **connect the system of biomass combustion/gasification with undeveloped system of usable energy crops cultivation on the areas after the superficial lignite mining.**

The role of ICT is very important in this process, the role of key technologies enabling efficient functioning of the whole system. The next task is to support secondary use of the recycled waste, there have already been some companies operating in this sector – cluster ENWIWA, Sokolovská uhelná, Montstav CZ and others. They realize unique and in the Czech Republic sporadic activities of energetic waste use, production secondary products, e.g. for building materials. The next resulting important activities connected with the secondary waste use are increasing amount of the recycled waste. Its rate is unsatisfactorily low in the region. The good practice - transfer from the regions where the waste collection system works efficiently - can help with the setting of the waste collection system in the Karlovy Vary region.