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## PERSPECTIVES FOR INDUSTRY DEVELOPMENT IN SKOPJE

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### ABSTRACT

The text explains the results of the conducted research and the proposed measures for future spatial industry development in Skopje, as denoted in the Study "Development of Industry in the City of Skopje for the General Urban Plan 2022-2032." The subject of the Study was development, spatial arrangement and transformation of industry in Skopje during the post-socialist period, with a particular attention to the previous ten years. The central focus of the Study was the outcome of industrial enterprises spatial restructuring and the new spatial industry patterns in the city that emerged during the post-socialist period. Within the scope of the research the processes of deindustrialization, transformation and renewal of the industry are analyzed, along with the emergence of new sites of industrial activity and new spatial development models. The temporal framework of the research was post-socialist period that spans from 1991 to 2022, encompassing significant transformation of urban and industrial space. The objective of the Study was two-fold, to obtain scientifically confirmed, classified and precise information about the current industrial space in Skopje, and to use these findings for the planning document the General Urban Plan for 2022-2032. The main goals of the Study include investigating the current state of industry and its spatial distribution, exploring the processes that determine directions of spatial development of industry, analyzing urban planning documents related to industrial spatial planning in the city and identifying strategic areas and specific objectives that should serve as recommendations for planners in the development of the General Urban Plan for 2022-2032. The aim of this text is to contribute to the understanding of the newly established spatial arrangement of industrial locations that result from sustainable city development planning, where industry is regarded as one of the pillars of economic and social development.

**Keywords:** Industry; Industrial space; Deindustrialization; Renewed industry; New industry.

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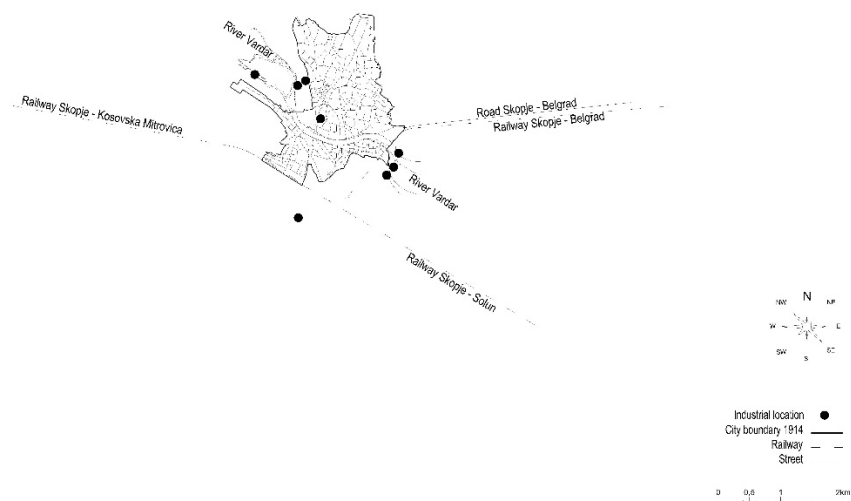
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## 1. INDUSTRY DEVELOPMENT 1880-1991

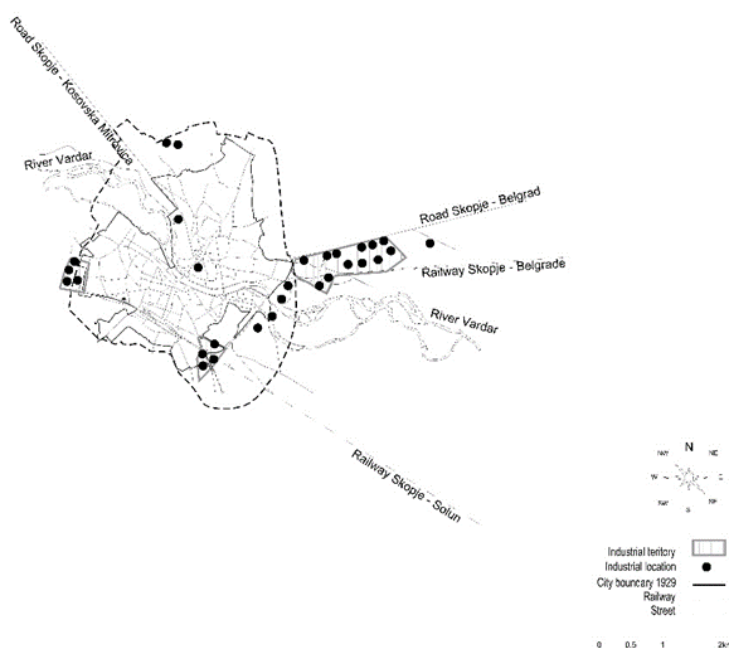
First industrial enterprises in Skopje appeared in the 1880s when Macedonia was part of the Ottoman Empire. At the beginning of the 20th century, specifically in 1904, as Uzunov (1970) mentions, Skopje had 5 industrial enterprises, and by 1912, the number of enterprises had doubled. These industrial enterprises (Sidovski, 1980) were located within the city territory, with a tendency to concentrate near the river Vardar (Figure 1).

Industry in Skopje 1914



**Fig. 1** Industry in Skopje 1914

After World War I, significant changes occurred in Macedonia that would greatly influence the future industrial development of the city of Skopje. In 1918, the territory of present-day Macedonia became part of the Vardar Banovina within the parliamentary monarchy of the Kingdom of Serbs, Croats and Slovenians (SHS), later the Kingdom of Yugoslavia. At the beginning of this period, Skopje was declared as administrative center of Vardar Banovina and for short period became a dominant urban center and center of industry. During this period, due to establishment of capitalist socio-economic system conditions for industrial development became more favorable. The new political and social circumstances facilitated capital concentration, presence of banks, foreign investments, formation of professional associations and chambers, schools for training the workforce for industry, thus leading to an increase in the number of industrial enterprises (Sidovski, 1961). In this period in 1929 the first urban planning document for Skopje, the "General Regulatory Plan of 1929", was developed (Mihajlović, 1929). The plan proposed program zoning of the city, including the designation of an "industrial area." In 1941, at the beginning of World War II, there were 45 industrial enterprises operating in Skopje and its surroundings (Sidovski, 1980). The location of industry (Map 1) during this period was characterized by: (1) concentration of industry in so-called "industrial area" near the Skopje-Belgrade railway line, (2) agglomeration of industry near the Skopje-Kosovska Mitrovica railway line, and (3) location of enterprises within the city territory (Figure 2).



**Fig. 2** Industry in Skopje 1941

After World War II, the Socialist Republic of Macedonia became an equal part of the newly formed federal state, the Socialist Federal Republic of Yugoslavia. Skopje as capital of Macedonia experienced intensive economic and industrial development during the socialist period. This was result of socialist policies for growth and development through industrialization, where the industry become a dominant activity, contributing the most to the overall production and labor employment. Three urban planning documents were adopted for the city during this period. In 1948, the "General Regulatory Plan of 1948" was developed through collaboration between Yugoslav and Czech architects led by Czech architect Luděk Kubesh. The plan confirmed the industry as factor in urban development and as function integrated into the urban territory. For the first time the location of the industry was planned according to its character: heavy industry was designated in the new southeastern part of the city, near the Skopje-Thessaloniki railway line, while light industry and services were located in the "industrial area" designated as such in the previous period, near the Skopje-Belgrade railway line. After the earthquake in 1963 a new planning document, the "Basic Urban Plan of 1965," was developed for the reconstruction and development of Skopje, led by architect and planner Adolf Ciborowski. The plan included the establishment of enclosed industrial zones: (1) the industrial zone Zhelezara formed with the construction of the "Rudnici i Zhelezarnica Skopje" complex, (2) the industrial zone East, (3) the industrial zone South, and (4) the new industrial zone West. The spatial distribution of the industry in Skopje from 1945 to 1991 was characterized by: (1) expansion of industry along the Skopje-Belgrade and Skopje-Thessaloniki railway lines, (2) concentration of industry in existing territories, (3) construction of the " Rudnici i Zhelezarnica Skopje" complex, and (4) further concentration of industry within the city, making it an industrial center (Figure 3).



**Fig. 3** Industry in Skopje 1991

## 2. TRANSFORMATION OF SOCIALISTIC INDUSTRY AND EMERGENCE OF NEW INDUSTRY 1991-2020

In 1991, with independence of the Republic of Macedonia (RM) and introduction of the new economic and political system, comprehensive changes occurred in the industry, which were also reflected in the spatial aspect. The economic situation in the country was highly unfavorable with a dramatic decline in industrial production index (Table 1) and decrease in industry employment (Table 2).

**Table 1. Index of total industrial production in RM, for the period 1989-2010**

Year	1989	1990	1991	1995	2000	2001	2005	2008	2009	2010
Index 1989=100	100	89,4	74,0	42,9	47,4	45,9	47,7	55,1	50,3	47,9

Source: Goran Mickovski, Transformacija industrijskih prostora u kontekstu post-socijalističke tranzicije grada Skoplja, doktorska disertacija (Univerzitet u Beogradu, Beograd, Srbija, 2015).

**Table 2. Total number of industry employment in RM, for the period 1989-2010**

Year	1989	1990	1991	1995	2000	2001	2005	2008	2009	2010
No. of industry employment (%)	213.525 (100)	206.191 (97)	188.873 (88)	136.577 (64)	114.359 (54)	109.193 (51)	125.721 (59)	125.018 (59)	121.136 (57)	119.518 (56)

Source: Goran Mickovski, Transformacija industrijskih prostora u kontekstu post-socijalističke tranzicije grada Skoplja, doktorska disertacija (Univerzitet u Beogradu, Beograd, Srbija, 2015).

In 2002 the "General Urban Plan of Skopje 2002" was adopted, prepared by the Public Enterprise for Spatial and Urban Planning (PESUP), marking the first urban planning document in the post-socialist period. The Plan emphasizes the need for rational and efficient use of space and land, based on the postulate of a "sustainable city," which "...is integrated into the natural environment, takes from nature only as much as it

can give back, and emits negative effects within the limits determined collectively by the surrounding area" (JPPUP, 2002). Sustainability is achieved through a "pluralism of development lines" as opposed to the previous emphasis on industry as the sole driver of economic development, although industry remains a dominant economic activity. The Plan does not define "heavy" or "light" industry, nor production versus services, but rather divides activities into "clean" and "dirty."

In 2012, the "General Urban Plan of Skopje 2012" was adopted, prepared by the Agency for Spatial Planning (ASP), serving as the latest planning document for the urban development of Skopje. This Plan (APP, 2012) maintains the industrial areas where production activities historically predominate, such as industrial zones, services, warehouses and terminals. However, it also emphasizes the need to locate industry outside the city while providing a smaller area for industry within the city territory. With this plan the trend of reducing the area designated for industry, which began with the General Urban Plan of Skopje 2002 is confirmed. From the initial 1,269.6 hectares of planned industrial areas in the "Basic Plan of the City of Skopje: Modification and Supplement 1985," the area was decreased to 1,050.29 hectares in the "General Urban Plan of Skopje 2002," and further decreased to 782.19 hectares in the "General Urban Plan of Skopje 2012."

For the purposes of the Study and to determine the actual spatial characteristics of industrial development from 1991 to 2022, an update of a previously conducted research (Mickovski, 2015) was carried out. This update was focused on the purpose and activity of 163 individual industrial locations in Skopje that origin from socialist period, with the data as at 2022. The following research methodology was used (Mickovski, 2015): (1) Location analysis through information gathering on urban characteristics - location area, percentage of built-up area, utilization ratio; activity status - being either abandoned industry, functionally transformed industry and renewed industry; location within the city - proximity to city center and direct access to major traffic routes; and degree of pollution (LEAP, 2011) - low, medium, or high; (2) Data use from digital georeferenced maps; and (3) Field research. The summary results of the transformation of the researched locations are presented in (Table 3).

**Table 3. Summary overview of transformation of researched locations of socialist industry in Skopje, 2022**

Transformation	Abandoned	Renewed	Functionally transformed	Total
Area (ha) / No. Of locations	(382,25) / 42	(383,04) / 84	(84,50) / 37	(849,79) / 163
% of participation	44,98%	45,07%	9,94%	100,00%

Source: Goran Mickovski, Transformacija industrijskih prostora u kontekstu post-socijalističke tranzicije grada Skoplja, doktorska disertacija (Univerzitet u Beogradu, Beograd, Srbija, 2015).

The conducted research on former socialist industrial locations showed that the industrial zones in the city are fragmented and are becoming multifunctional. Formerly exclusively industrial areas are undergoing transformation due to processes of deindustrialization, functional transformation and industrial renewal.

Deindustrialization is a result of tendency to abandon industrial activities (Mickovski, 2015) in specific production locations and/or tendency of functional transformation of location. Through the conducted research, the status of the locations was mapped and the total area of abandoned industrial land was determined, along with identifying the boundaries of abandoned industry. It was found that out of a total of 42 abandoned industrial locations, 26 locations or 256.44 hectares have no activity and are completely abandoned, 14 locations or 116.97 hectares are underutilized, and 2 locations or 8.84 hectares are used intermittently. Functional transformation of industry involves change in the function of former industrial locations and facilities. These are locations where industrial activities have ceased and have been replaced by other economic activities and programs, often commercial, service-oriented, residential, administrative functions, as well as education, recreation, tourism, logistics and others. As per newly functions assumed by transformed socialist industry, commercial use dominates with 19 locations or 39.19 hectares of land, followed by residential use with 12 locations or 34.01 hectares, and other functions such as education with 3 locations or 2.50 hectares and green spaces with 3 locations or 8.81 hectares. Industrial renewal, or the continuity of production activities within enterprises, is conditioned by processes of modernization and reconstruction, through introduction of new production technologies, innovations, adaptation to market changes, new distribution methods, management and organization of enterprises. Industrial renewal includes

the continuity of production activity in locations of former pre-socialist and socialist enterprises, mainly within the three industrial zones.

Based on the updated research on socialist industry and analysis of trends in the location of new industries, the following spatial characteristics of industrial development from 1991 to 2022 can be identified, as presented on Figure 4 - Industry in Skopje and the Skopje Region in 2022: (1) Despite the pronounced deindustrialization, industry in the city remains concentrated in the three industrial zones: Northeastern (previously defined as Zhelezara and industrial zone East) , Southeastern (previously defined as industrial zone South), and Western (also known as industrial zone West); (2) New locations outside the industrial zones are emerging on undeveloped areas within the urban territory, in places close to transportation routes and unattractive for other purposes. These new industries take the form of industrial-economic zones like Vizbegovo and Pintija-Drachevo; (3) Multifunctional fragmentation of production activities within industrial zones, including presence of non-industrial activities, primarily commercial, service-oriented, administrative, educational, and logistic activities; and (4) Emergence of new industrial sites predominantly outside the city boundaries, along major transportation corridors in the country, in non-urban municipalities of Skopje region, Ilinden, and Petrovec; and (5) Emergence of new industry in the so-called Technological-Industrial Development Zones (TIDZ) Skopje 1, 2, and 3, where multinational companies are located.



**Fig. 4** Industry in Skopje and the Skopje Region in 2022

### 3. PERSPECTIVES FOR FUTURE INDUSTRY DEVELOPMENT

Based on the comprehensive analysis of current state of spatial distribution of industry within and outside the city, the level of implementation of urban planning documents, the relationship between industry and other urban functions, and the potential for industrial development in Skopje, the Study proposes the following strategic areas (objectives) for future industrial development:

1. Consolidation and renewal of industrial space in the city
2. New spatial models of industrial activity
3. Industry and environment

#### 3.1. Consolidation and renewal of industrial space in the city

With the emergence and development of digital information technologies, the industry is undergoing changes that enable increased efficiency, collaboration with various services, application of innovations, and exploration in the production process and trade. In the developed countries the industry engages significantly more services and relies on them. Hence, there is a need to redefine the role of industry for future economic, socio-cultural and spatial development of the city.

The industrial space in Skopje is distributed in three industrial zones and single industrial locations and facilities outside these zones. The industrial zones are result of several decades of planning, and are confirmed in all planning documents from 1948 to 2012. The single industrial locations are territories that were initially located outside the city and over time, due to expansion of urban area, especially after the earthquake in 1963, are now surrounded by other programs, predominantly residential settlements. As confirmed by the Study, the planned industrial territory has been consistently oversized compared to the actual needs and capacities of the industry. This resulted in underutilization of space within the zones and presence of large unused areas within designated industrial locations assigned to enterprises, which have never been fully utilized. A specific aspect of industry renewal is the reuse of abandoned industrial locations due to deindustrialization. This shall enable rational use of territory designated for industry and preserve the free areas (construction and agricultural land) within the city limits and the undeveloped areas surrounding the city.

This strategic objective can be achieved through the following specific objectives:

### **3.1.1. Consolidation of industrial space**

Spatial reshaping of industrial zones through defining potential for marginal development capacity of each zone in order to enhance the quality, compactness and density of construction, aiming to improve the utilization of space allocated for that purpose. Any potential conversion of industrial space should exclusively support purposes of social infrastructure, such as schools, kindergartens, healthcare facilities, etc., where the transformation effect shall be beneficial for the widest group of city residents.

Planning of vacant space in the zones in a way that enables flexibility of location area and adaptability to different needs of investors and compatibility with commercial content (production-sales-exhibition-education) that attract labor force and consumers, serving the purpose of increasing the economic activity of the locations. This simultaneously enables the presence of industrial activity, in small or larger scale, alongside with other purposes, thus raising their attractiveness and vitality.

Utilization of vacant areas in industrial zones through creation of policies, zoning mechanisms and incentives to attract medium and large-scale production enterprises and logistic centers, for which proximity to consumer centers is important. By occupying the industrial space and connecting it with existing residential and economic purposes, it becomes open, visible, and accessible to wider public. This enables the attraction of various small suppliers and service providers and their interconnection, wherein the optimization of work processes also influences space optimization.

### **3.1.2. Utilization of abandoned industrial locations**

Determining the potential for reuse of abandoned industrial locations that depends mainly on their location, size, transportation connectivity, degree of pollution, etc., and requires confirmation or change of the purpose in the planning documents. The utilization of these areas and facilities for industrial activity is linked with the urban regeneration of space and the overall social costs to achieve it, considering that the remediation costs for that land are lower due to lower standards compared to standards for other urban programs (commercial, residential, etc.).

Changes in the legal framework (fiscal incentives, lower communal taxes, land consolidation opportunities, public-private partnerships, etc.) for reuse of these locations providing them with an advantage over the so-called greenfield investments, aiming to encourage investors towards proactive utilization of these sites.

### **3.1.3. Spatial and functional integration of industrial territory in the city space**

Construction of urban road infrastructure for easy and quick access to industrial zones, planning of multiple road connections that lead to industrial zones, transit routes and public transportation to industrial zones. Development of local traffic network, provisioning stationary traffic, i.e. parking spaces, terminals and logistic infrastructure for transportation. Utilization of existing railway infrastructure (Northern Ring Railway) for development of fast urban and suburban passenger transportation to industrial and economic zones.

### **3.2. New spatial models of industrial activity - promotion and support**

The traditional forms of organizing industrial activity in the city, represented by large facilities located in single-purpose industrial zones, shall not be the most significant driver of industrial and overall urban development of the city in the coming period. The new industrial enterprises established in the last 30 years are small and medium-sized, with a small number of employees and production volume, with requirement of constant adaptation due to changing market conditions. Within the urban space there is a significant increase in the number of industrial locations, a decrease in the area of industrial land and combination of production with commercial and service activities. This industry is present in existing industrial and economic zones located near the city (Vizbegovo, Pintija) and in municipalities of the Skopje region (Ilinden, Petrovec). A distinct spatial form is represented by technological industrial development zones (TIDZ), where subsidiaries of foreign companies, primarily from the automotive industry, are located as part of the national strategy to attract foreign direct investment. The new forms of spatial organization of industry, depending on the prevailing activity, the size of complexes and facilities, the environmental protection requirements and locational advantages, can be represented by industrial parks (where industrial activities dominate along with its supportive activities) and by business-technology parks (such as scientific research centers, business incubators, technology parks, etc., where emphasize is on the use of innovation, new technologies, knowledge and entrepreneurial skills development). The space for the new industry is not an end in itself but merely a means to achieve the end. Hence, national plans for development of science, technology and innovation can be spatially implemented in specialized technology-industrial parks. In these parks, the new industry should be supported through various forms of financial and non-financial incentives, such as tax exemptions, fees, and compensations for municipal and communal services, support in the planning and permitting domain, subsidization of rents, and costs for employee training and education.

This strategic objective can be achieved through the following specific objective:

#### **3.2.1. Planned spatial development for new industry**

Planning space for innovation and technological activities aims to support new services that emerge through collaboration between industry, scientific research community (universities) and education. Business-technology incubators aim to connect knowledge, new technologies and innovation by creating and developing new startup ventures. As accompanying activities within the space for innovation and technological activities emerge consulting firms specializing in business services and technologies, marketing, educational programs and entrepreneurship training. The ultimate effect is clustering of companies with desired activities, high degree of networking and collaboration. It should be particularly supported their integration into locations and facilities of abandoned industry, as it can achieve content flexibility for the needs of new industries in the simplest and most cost-effective way.

Planning space in close proximity to TIDZ and establishing criteria for location in order to use the opportunities for collaboration between large export-oriented enterprises and domestic suppliers in complementary and high-tech industrial sectors. They can be organized in so-called industrial parks (established and managed by specific private/public enterprises, public-private partnerships, government agencies, etc.), which, in addition to providing space and infrastructure for activities, offer other supporting functions for industry, such as logistics, distribution, transportation and storage.

Introducing flexibility in zoning supports innovative activities that can take place at any location in the city. The new creative industries, IT industry, design, media, medical technologies and others is located in urban environment, benefiting from highly educated workforce, connectivity to information technologies, social media and access to local and global markets.

### **3.3. Industry and environment**

The main goal of future industrial development in the city is to reduce environmental pollution, space degradation, waste generation, promote resource reuse, utilize renewable energy and improve environmental efficiency. This means introduction of new clean technologies in production, measures for remediation of contaminated areas, transformation of brownfield sites, protection and reuse of construction industrial facilities and transition towards circular economy. Expansion and increase of capacities within existing locations for heavy industry in Southeastern and Northeastern zones of the city is not acceptable. Heavy

industry, which is major polluter despite implemented environmental protection measures, should be relocated outside the urban territory in the medium to long term. Industrial facilities within the city that cannot comply with regulatory environmental protection standards should be relocated.

This strategic objective can be achieved through the following specific objectives:

### **3.3.1. Sustainable industry development**

Planning to integrate small, quiet and non-polluting work activities into residential areas and living facilities. This would enable the inclusion of various functions performed by people within the same building or neighborhood, overlapping workspaces with living spaces. The flexibility of the programs is conditioned by the environmental impacts of work activities (noise, pollution, traffic and parking) and location-specific conditions. Measures should be taken to support energy-efficient buildings and use of renewable energy sources. Support to be provided through subsidies for investments in constructions that integrate new technologies and materials that enable lower energy consumption, for renewable energy self-production, lower communal taxes for industrial facilities with energy efficiency certificates, etc.

### **3.3.2. Environmental protection**

Redefining industrial purposes in existing locations with tendency to prospectively relocate existing industrial capacities outside the city to new locations established by urban planning documents. This prevents agglomeration and concentration of undesirable industries within the city limits.

Planning space for municipal infrastructure (such as recycling yards), specifically designated locations for accepting, collecting, separating and initial processing of secondary materials that would further be transformed into semi-finished or finished products. Measures and policies to develop new products and services, packaging and transportation, waste treatment, utilization and distribution of raw materials and natural resources aimed to reduce the harmful impact of industry on environment and to align with international environmental management certificates.

## **4. CONCLUSION**

Today, the question often arises whether industry is necessary for the city, given that the city is increasingly becoming a place for consuming goods produced elsewhere. Despite its reduced significance in overall economic and social development, industry shall remain an integral part of the city, integrated into everyday life. Industrial activity will survive as combination of modern and traditional production in close proximity to other urban functions. Instead of "industrial monocentrism," the urban space can be seen as a "continuous productive industrial landscape" (Davis, 2020) where certain subspaces have varying degrees of industrial activity. Traditional factories will dominate in some parts of the city, while small workshops and crafts, new high-tech industries and start-ups, as well as informal economy activities taking place in residential units, and service sector closely linked to production activities shall prevail in other parts. The development of new industry shall be based on the development of digital technologies and the new industrial workforce. New industrial branches such as digital manufacturing, biotechnology, non-material production and services are reshaping the concept of "production and industry," while the new generations of industrial workers are highly educated and skilled.

Therefore, the industrial development of Skopje in the coming period shall be based on industry efficiency increase, renewal and investment in new technologies, and competitive production supported by environmental protection standards. The long-term goal for industrial development of Skopje is to increase competitiveness and efficiency through utilization of resources and advantages of specific locations and the region, guided by the principles of sustainable development. This can be achieved through the following: (i) creating favorable spatial and other conditions for industrial development; (ii) spatial development of industry in line with principles of sustainable development that are compatible with development of efficient infrastructure and transportation; (iii) stimulating development of small and medium-sized enterprises in non-polluting, innovative and creative industries; (iv) attracting foreign direct investments and retaining existing ones in technological zones; (v) knowledge-based economic development and application of modern technologies; (vi) industrial development through renewal of existing locations and stimulation of new industrial capacities through combination of measures and market mechanisms to evaluate the potentials of

specific locations in the most efficient way; and (vii) providing appropriate urban planning documentation to create favorable spatial conditions for industry development and distribution and to accelerate the investments in the industry.

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