

## ENERGIEWENDE TWINNING TOWNS

### Kozani welcomes Braunsbedra for local exchange about structural change

24. – 27th of February 2020 in Kozani



Structural change is characterised by challenges, opportunities and changes. The cities of Braunsbedra and Kozani are exchanging their experiences on the coal phase-out in order to facilitate the path towards a sustainable energy supply. The project Energiewende Partnerstadt supports the two coal regions in making energy system transformation tangible beyond national borders and in exchanging ideas with European partners.

Braunsbedra is located in a former lignite mining area in Saxony-Anhalt. Mining has been going on in the region for 300 years. In the 20th century the cheap energy from lignite attracted companies from the chemical industry. In the course of the German reunification, however, these industries collapsed within a very short time. Even though this structural change initially had negative economic consequences, new opportunities have also arisen: local environmental pollution has improved massively, new companies from the chemical industry have settled in the surrounding area.

The structural change in Kozani is still at its beginning. The coal mining area currently still supplies raw materials for 20 percent of Greece's energy needs. Nevertheless, Kozani shows that the future is renewable: the city already generates 65,000 kilowatt hours from solar and wind energy. Private investors are also installing additional renewable energy plants. Many solar power plants are located on the roofs of schools and other public buildings.

#### 24th of February 2020

On the day of arrival, the mayor Mr. Maloutas Lazaros personally welcomed his guests from Germany at a meeting of the city council. The German delegation consisted of the mayor of the city of Braunsbedra, Mr. Steffen Schmitz, the head of the building authority in Braunsbedra, Mr. Holger Geithner and the managing director of the Merseburg Innovation and Technology Center, Mrs. Kathrin Schaper-Thoma. The delegation was accompanied by the organisation team from "Energiewende PartnerStadt" of Christina Hülsken from AEE and Anne Höh from HVGP.

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25th of February 2020



Mayors Maloutas Lazaros and Steffen Schmitz

The organizers from the Directory of Environment of the city administration around Mrs. Eleni Trikoilidou and Mr. Papathanasiou Vasilis brought together all relevant departments, city councils and municipal companies from the fields and energy from Kozani for the two workshop days. In addition, representatives of the University of Western Macedonia, Centre for Research and Technology Hellas (CERTH) and a scientific cluster on bioenergy (CLUBE) were invited.

After an official welcome by the two mayors, Kozani first presented the current energy supply structure of the city and the activities to date on energy system transformation. The German delegation learned, for example, that lignite has been mined for energy production in the region around Kozani since the 1950s, leading to an enormous economic upswing and population growth in the city. In the meantime, the region produced 70 percent of Greece's electricity needs. Today this figure has fallen to about 25 percent. So Kozani has already completed part of the structural change away from lignite. The representatives of the city from Kozani emphasized that the structural conditions predestine the "energy city" Kozani as a suitable location for the production of new energies in the future. Thus, on the one hand, the skills of the employees are available, and on the other hand, the necessary high-voltage transmission lines are also available. In addition, the region is characterised by trade as well as university and research centres and has a logistically interesting location due to its connection to the central motorway. Since the financial crisis, Kozani has had to contend with a population decline of 7 percent due to a decline in the birth rate and a brain drain. Braunsbedra has also had to deal with the emigration of mainly younger workers since the political turnaround and still faces the challenge of an aging society.

In 1993 a district heating network was built in Kozani, which supplies 28,000 households with heat. This network is still fed by lignite-fired combined heat and power plants, but with a local heating network, the foundations have been laid for converting the city's heat supply to renewable energy sources. Braunsbedra has already successfully managed to feed its heating network from a thermal power station with substitute fuels.



Map of potential solar-sites in Kozani

With the recent announcement of the Greek Prime Minister, Mr. Kyriakos Mitsotakis, that the generation of electricity from lignite in Greece should be completed by 2028, the transformation of the energy supply of

Kozanis has taken on a new urgency. Existing power plants are to be taken off the grid by 2023 and a power plant under construction is to burn the remaining quantities by 2028.

The planners of the former state-owned energy supplier Public Power Corporation SE (PPC) have so far assumed significantly longer operating periods and are now faced with the challenge of shaping a structural change in which not only will 4,500 direct coal jobs and at least three times as many indirect jobs be lost, but at the same time the local electricity and heat supply must continue to be guaranteed. The economy in

the region is currently still heavily dependent on coal. The loss of jobs is also feared to result in low purchasing power within the municipality.

In this context the experiences from Braunsbedra were of course in demand. Braunsbedra in Saxony-Anhalt looks back on more than three hundred years of mining history and is located in the middle of the "Central German chemical triangle". With the political turnaround not only the energy generation from lignite but also the chemical production of the region collapsed within a very short time. Since the end of the GDR, the number of jobs in the chemical industry in the region has fallen from 40,000 to 4,000 today - despite the successful relocation of global chemical companies such as Total and Dow. Even though a new settlement of chemical companies created jobs after reunification, the company headquarters are mostly located in West Germany, and tax payments do not remain in the region. The German delegation was therefore able to share first-hand experience of massive structural change with its Greek partner city. However, Mr. Schmitz and Mr. Geithner pointed out that due to the special situation of German reunification not all experiences can be transferred to the Greek situation. Nevertheless, the conversion of the local heating network from lignite to a thermal power station with substitute fuels with a capacity of 30 MW, for example, met with great interest. Braunsbedra converted its combined heat and power plant from coal to wood as early as 2010 and later also to the combustion of residual and waste materials. The Greek participants asked interested questions about how the necessary plastic waste is collected and processed and where the power plant gets the waste from. The heat supply on the basis of bioenergy was also discussed. However, in the rather barren region of Kozani there is not enough biomass available, so that a heat supply based on bioenergy was only planned for a village with an existing heat network in the region of Kozani.

The German delegation was also asked about their experiences with municipal participation in the transformation process. Here the German colleagues pointed out that the transformation process during the period of reunification took place largely without the participation of the regions and municipalities. Nevertheless, the municipalities concerned had informally networked with each other in order to jointly submit proposals to the state government.

As the day progressed, it became clear that both municipalities can point to a number of good projects for successful implementation of the energy system transformation. Braunsbedra has largely completed the dismantling and recultivation of the open-cast mines and with its "[Marina](#)" on the flooded quarry ponds has created a local recreation area around the Geiseltalsee that is attractive for tourists. The region is connected to the "European Route of Industrial Heritage" with some preserved industrial plants.

Kozani has also implemented various measures in cooperation with the University of Western Macedonia to reduce the energy consumption of the energy community. For example, numerous public buildings have been energetically renovated. In addition, intelligent street lighting has been installed, which dims by 30 percent from midnight. Mr. Spyros Voutetakis and Mr. Kyriakos Panopoulos from the Centre for Research and Technology Hellas (CERTH) presented extracts from their work. These included pilot plants for hydrogen production by electrolysis: currently, production, storage and economic efficiency are challenging the players, while use is problem-free. In addition, 18 public buildings in the city have been equipped with photovoltaics, and more than one megawatt of photovoltaics have also been installed on private roofs and on open space systems. But this is still far from the goal. Current plans envisage not only further wind turbines in the region but also the expansion of up to two gigawatts of photovoltaics on the site of the former open-cast mines.

Furthermore, work is currently being carried out on a control instrument for the coordination of small hydroelectric power plants, the construction of pumped storage power plants and net metering models.



Representatives of Braunbedra und Kozani in Ptolemaida

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Furthermore, work is currently being carried out on a control instrument for the coordination of small hydroelectric power plants, the construction of pumped storage power plants and net metering models, and there is also a geothermal PV project for the energy supply of a school. The municipality itself operates three electric cars for its employees and participates in other circular economy projects (SYMBI-INTERREG EUROPE) and energy transformation projects, such as the Stardust network. In this network, seven European municipalities exchange information on digital solutions for sustainable development and sustainable energy supply.



West Macedonia Lignite Center

In the afternoon of the first workshop day, visitors from Germany and interested local administrative staff were able to gain their own impression of the dimensions of structural change during a visit to the Ptolemaida open-cast mine and the West Macedonia Lignite Center.

Specifically, the Ptolemaida opencast mine, covering an area of 135,000 hectares, produced 25 million tonnes of lignite in 2019. For this purpose, the landscape is ploughed up to a depth of 200 meters. According to the operators, up to 4.5 tons of soil must be moved to extract one ton of lignite. During the visit, it became impressively clear that the politically decided short-term phase-out date is causing enormous challenges and excitement for the operator Public Power Corporation SA. For example, compensation was recently paid to homeowners in villages that are to be resettled. Now the compensations have been paid, but the houses can remain standing because the land is no longer needed for open-cast mining. Acute environmental impacts caused by the abrupt termination of mining activities must also be avoided. Among the challenges cited here were the release of gases and stabilisation of the groundwater level. The

recultivation plans must be fundamentally revised and it is still open how the land will be reused (primarily suitable for agriculture or the production of biomass or the use of solar energy?)

The Waste Management System of Western Macedonia (mixture of private and state funding, 13 municipalities are members. There is a 25-year contract, after which it passes into the ownership of the municipality) has set itself the goal of implementing waste incineration for electricity generation on municipal land. The waste could also be collected from other regions. The Cluster of Bioeconomy and Environment of Western Macedonia is working on solutions to supply the district heating network in Kozani with sustainable heat. The aim of the cluster is to provide bioenergy as an energy source for the district heating network, currently still in combination with coal. The cluster coordinates bioenergy activities in the region and is involved in various research projects on bioenergy. In addition, it aims to develop a European bioenergy network.

### Ilarionas hydropower plant

The 150 megawatt Ilarionas hydropower plant, located southeast of Kozani, went into operation in 2014. The location was identified as suitable because the Aliakmonas River is already dammed by an older dam and the mountainous region offers little land suitable for agriculture. The electricity generated by the Ilarionas hydropower plant is not sufficient for the base load, but will step in as soon as there is a demand: (usually for 2-3 hours at lunchtime). Compared to coal-fired power plants, the renewable power plant can be switched on and off much more flexibly. Only ten employees are needed to operate the hydropower plant and the operators expect the investment to pay for itself after 12 years. There is a potential for a further 150 megawatts in terms of water use for electricity generation on the Aliakmonas River in the Kozani region. However, as the approval procedures are difficult and materials have to be imported, it is still unclear whether this potential can be exploited. At the foot of the hydroelectric power plant, the impact of the construction work is being reduced and the area is soon to be recultivated for two million euros; cycle paths and parks are planned.



Ilarionas

### Evaluation and outlook

In the last item of the programme the two municipalities evaluated the workshop days and their future cooperation. The representatives found that despite the immense differences in financial and time conditions, it is worthwhile to continue the exchange. For further cooperation, the aim is to involve industry to a greater extent. Kozani is interested in a detailed insight into the process of the coal phase-out in Braunsbedra in order to benefit from the experiences regarding stakeholder participation and socially just energy system transformation. Both municipalities praised the harmonious relationship with each other, which is an important basis for further cooperation. Mayor Schmitz emphasized that Kozani is facing similar challenges as Braunsbedra at that time regarding the coal phase-out, but the time pressure is much greater. Kozani can benefit from a strong network within the municipality, from the existing energy expertise and

the already existing infrastructure. Based on concrete ideas that can be implemented in a timely manner, Braunsbedra is looking at the potential of hydropower in the region and learning from the energy saving and rehabilitation measures implemented in Kozani. Kozani in turn plans to examine waste incineration for heat generation in a combined heat and power plant, as the cultivation of energy crops is limited due to geographical conditions. Kozani would like to create greater awareness and acceptance on site with climate protection education measures. Both municipalities agree that only a technology mix can ensure a supply of 100 percent renewable energy. The Renewable Energy Agency and the HUMBOLDT-VIADRINA Governance Platform presented the most important points for a socially just transformation strategy, according to their experience: Structural change regions need sustainable jobs, investment, new ideas, investment and new infrastructure to create a competitive region. An effective structural policy should not be limited to reducing negative impacts, but should proactively and systematically exploit development potential. Broad participation of a wide range of local stakeholders from the administration, local businesses, educational institutions, local associations and environmental protection organisations can help to develop sustainable and widely accepted solutions.

The following priority topics for future cooperation were identified:

- Tourism: Kozani is aware that other tourism regions in Greece are more attractive due to their location by the sea. However, post-utilization concepts of lignite infrastructures like in Braunsbedra are conceivable. Braunsbedra has used the process of structural change to establish new economic sectors such as tourism: The former coal mining holes have become a lake landscape and ports, restaurants and inns have settled, ERIH Industrieroute (industrial tourism). Also, Kozani has included in its touristic action plan and is interested in exploiting the different renewable sources developed in the area for attracted tourists and experts' groups on this field.
- Cultural change - From the lignite identity with its associated tradition to new shores to achieve energy independence.
- Science (e.g. expansion of the university in Kozani)
- Waste management and the associated raising of awareness among the population: Braunsbedra noted that the acceptance problems with customers are relativized by economic reasoning.
- Sector coupling: Power to heat and power to gas
- Plastic waste as an energy source for a combined heat and power plant

Since the project Energiewende PartnerStadt is limited to one workshop, both municipalities would now like to look for other subsidies in order to be able to realise a return visit to Braunsbedra. The municipalities want to learn from the mistakes made in the past: away from dependence on one energy source (coal) and towards a renewable technology mix.