

# Case Studies and examples of good practice

## WP4 – D4.3

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## List of abbreviations

BPS	Biogas plant
THU	Central heat supply
WWTP	Wastewater treatment plant
VAT	Value added tax
EPC	Energy services with a guarantee of savings
PV	photovoltaic power plant
PLA	Protected Landscape Area
LTO	Light fuel oils
OICT	ICT operator
ZD	Agricultural cooperative
ZEVO	Waste-to-energy facilities



## 1 Introduction

In this document, you will find a set of concrete examples of good practice in the field of energy, environmental management and sustainable development in the Czech Republic. The aim is to show that the transition to low-emission and efficient energy is not just a theoretical concept, but a realistically feasible process that is already taking place in various types of settlements – from small municipalities to farms and large cities.

The selected examples cover a wide range of approaches – from the use of geothermal energy, biogas and biomass, through photovoltaic systems and battery storage, to community energy, modern school buildings in a passive standard or comprehensive smart city strategies. The common denominator of these projects is the emphasis on the efficient use of local resources, the reduction of greenhouse gas emissions, economic sustainability and increasing the quality of life of residents.

The following chapter aims not only to describe individual projects, but also to point out their broader context – legislative, technical and social. Examples show that success often lies in a combination of technological innovation, a proactive attitude of local governments or businesses, and the ability to plan for the long term. These experiences can serve as inspiration for other municipalities, cities and organizations that are looking for a way to greater energy self-sufficiency and sustainable development.



## 2 Individual examples of good practice

### 2.1 Geothermal Heating Plant Děčín

The term geothermal energy is an unknown concept for many people in the Czech Republic. This is also reflected in the fact that there are almost no larger power plants or heating plants that would use this energy. However, each rule has its exception, in this case it is a geothermal heating plant in the city of Děčín, which heats almost 136 households.



Image 1: Geothermal well site <sup>1</sup>

The first test borehole was carried out in 1998, and four years later the heating plant was put into full operation. Gas cogeneration engines and gas hot water boilers are also included. The plant was successful in a survey conducted by the District Heating Association of the Czech Republic in 2012, in which it took first place in the Project of the Decade category based on the voting of professional journalists and second place in the category

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<sup>1</sup> Source: <https://mapy.com/>

of energy experts.

The secret of this facility lies in the underground thermal lake, which is located under the city itself. A 545-metre-long borehole was introduced into it, through which water flows at a temperature of 30 °C at natural pressure. This water is then further processed using a modern system of heat pumps, which heat it up to 72 °C and is then distributed to end customers.

In total, 42.66 MWt and 2.74 MWe of sources are installed in the area, as follows:

- 2 heat pumps - each with an output of 3.28 MWt,
- 2 gas cogeneration engines - one with an output of 0.8 MWe and 1.01 MWt, the other with an output of 1.94 MWe and 2.09 MWt,
- 2 gas boilers, each with an output of 16.5 MWt.

After its establishment, the heating plant itself, with an output of 6.5 MW, replaced 7 boiler rooms for brown coal and heavy fuel oils. This is an estimated saving of about 200 thousand tons of CO<sub>2</sub> emissions, and most importantly, it has improved the air in the city itself.



Image 2: Technical equipment of the heating plant <sup>2</sup>

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<sup>2</sup> Source: <https://www.termodecin.cz/predstaveni-spolecnosti>

How does a geothermal heating plant work? A geothermal heating plant is based on the use of thermal energy of the rock environment at greater depths below the earth's surface. The basis of the system consists of a pair of deep boreholes – a technological (production) borehole and a borehole for water reinjection. A technological borehole pumps geothermal water heated by the Earth's natural heat to the surface, usually from depths of about 1,500 to 2,000 meters.

On the surface, geothermal water is fed to the central boiler room, where it transfers its heat through a heat exchanger to the secondary district heating circuit. The exchanger ensures that geothermal water does not come into direct contact with the heating water in the distribution network, thus protecting the technology and quality of the heat distribution. If necessary, the system also includes a buffer and backup boiler to cover peak consumption or as a safety backup.

After heat transfer, the cooled geothermal water is led back underground through a re-injection borehole. The water is returned to approximately the same geological layer from which it was taken, which maintains the balance of the underground reservoir and the system operates in a closed circulation mode. The horizontal distance between the boreholes, which can be approximately 1,000 meters, ensures sufficient time for the water in the rock environment to be reheated.

The heat produced is then distributed through a district heating system to individual buildings – apartment buildings, public buildings or industrial customers. The advantage of this solution is a stable and long-term available heat source with minimal emissions and high operational reliability, independent of climatic conditions.



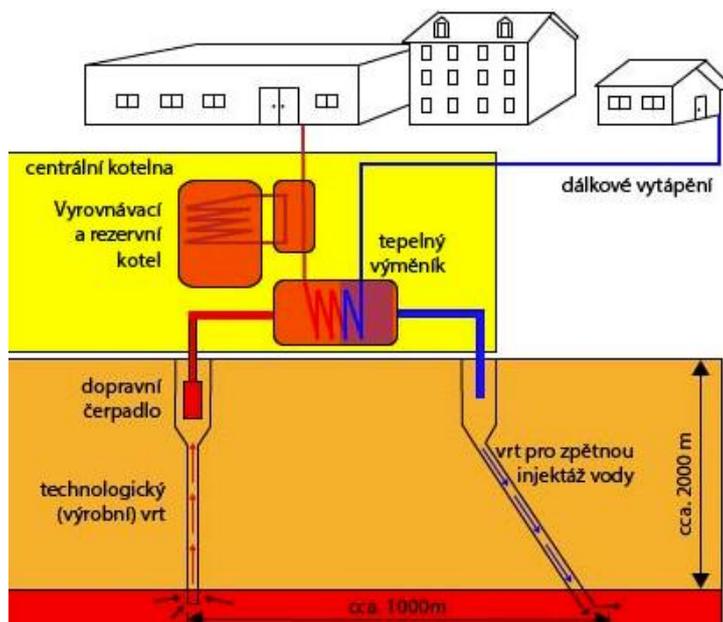


Image 3: Diagram of a geothermal heating plant <sup>3</sup>

In the Czech Republic, the use of geothermal energy is only at the beginning. Of the facilities that use it, it is also worth mentioning the RINGEN research center in Litoměřice, which contains a test borehole with a depth of 2 km. This centre is used for research mainly by the Faculty of Science of Charles University in Prague, but also by other organisations such as the J. E. Purkyně University in Ústí nad Labem. However, the center cooperates with experts not only from the European Union, but also from overseas.

The potential for the use of this energy in the Czech Republic is considerable, as can be found on the map. The problem, however, is the fact that these sites are typically more suitable for deep geothermal heating plants, i.e. the boreholes must be relatively deep (1,500 to 3,000 m).

Although the implementation of geothermal resources in the Czech Republic is associated with higher initial investment costs, especially for deep boreholes and geological exploration, geothermal energy represents an economically and strategically meaningful solution in the long term. Its main advantage is a stable and uninterrupted source of heat that is not dependent on climatic conditions or fuel price fluctuations. A significant contribution is also the positive impact on the environment, especially the reduction of greenhouse gas emissions and local pollutants, especially in the heating sector. Thanks to the long lifetime of the equipment and the possibility of operation in the base-load of district heating systems, geothermal energy can significantly contribute to the decarbonization of the heating industry and increase the energy security of the Czech Republic in the future.

<sup>3</sup> Source: <https://publi.cz/books/93/03.html>



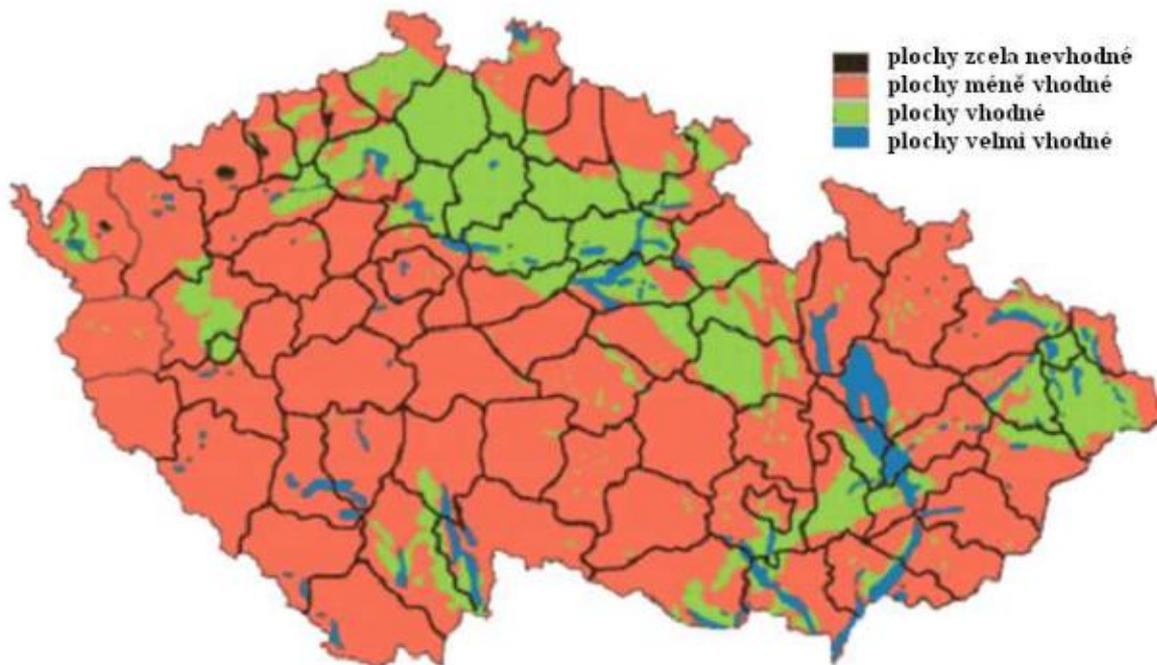


Image 4: Map of the potential of geothermal energy use <sup>4</sup>

## 2.2 Agricultural Cooperative Haňovice

One of the most famous examples of good practice in the field of energy and the environment in the Olomouc Region is the agricultural cooperative in Haňovice. In this small village located in the fertile area of Haná, approximately 15 km northwest of Olomouc, a biogas plant was first built and then a Dutch-type greenhouse with an area of 3 ha.

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<sup>4</sup> Source: <https://publi.cz/books/93/03.html>



Image 5: Agricultural Cooperative Haňovice <sup>5</sup>

The first plans to build a biogas plant with a cogeneration unit were created in 2009, but it was not put into operation until 2012. During the implementation of the project, it was necessary, among other things, to focus on educating the inhabitants of Haňovice, who initially did not have a positive attitude towards the project. However, after the commissioning of the cogeneration unit, it turned out that a significant part of the heat output remained unused. Which led to the idea of expanding the cooperative. This expansion took place in 2016, when a Dutch-type greenhouse was built next to the cooperative premises, used for growing tomatoes. After this extension, up to 90% of the heat produced by the device can be used.

ZD Haňovice is engaged in both livestock and crop production. From livestock production, it is cattle and pig breeding. From crop production, the cooperative became famous for growing cherry tomatoes in the already mentioned greenhouse, but it is also engaged in the cultivation of food wheat, malting barley, oats, sugar beets and fodder plants for animals such as corn or clovergrass.

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<sup>5</sup> Source: mapy.com





Image 6: Biogas plant ZD Haňovice <sup>6</sup>

The biogas plant itself is located on the cooperative premises. It includes a cogeneration unit with an output of 1,000 kW<sub>e</sub> and 928 kW<sub>t</sub>. Although the initial technical solution required the addition of LTO for operation, after the modernization it now works only on biogas. Maize silage accounts for the largest share in biogas production, followed by pork and beef slurry, and haylage and beet pulp are used to a limited extent.

The energy produced in this way is used mainly in the already mentioned greenhouse, but it is also used to heat the buildings of the cooperative and the municipal office. However, at the time when the lights are on in the greenhouse, basically the entire production of the cogeneration unit is used here, yet only approximately 40% of the heat consumption in the greenhouse is covered in this way.

Production of a biogas plant			
Electricity produced (MWh)	Purchased electricity (MWh)	Electricity sold (MWh)	Heat Produced (GJ)
8 606	1,5	7 099	17 624

Table 1: Biogas plant production <sup>7</sup>

What is a biogas plant anyway? A biogas plant is a technological equipment that processes biomass (materials

<sup>6</sup> Source: <https://www.rajcathanovice.cz/zemedelske-druzstvo-hanovice#prettyPhoto>

<sup>7</sup> Source: <https://www.ec-ok.cz/hanovice>



and raw materials of organic origin) in fermentation tanks through a controlled process of anaerobic digestion (a process in which microorganisms decompose organic material without access to air). A synonym for anaerobic digestion is the more common term fermentation (fermentation). The product of the fermentation process is mainly biogas and digestate (the rest after fermentation). The biogas produced is treated and burned in a facility where combined heat and electricity production takes place in a so-called cogeneration unit. While electricity is supplied to the grid, the heat generated can be used to heat buildings or heat domestic water. The digestate is then used as a high-quality fertilizer in the fields.

You can see how BPS can look and function, for example, on the website of the virtual tour of ČEZ company available [here](#).



Image 7: Greenhouse ZD Haňovice <sup>8</sup>

The greenhouse itself is also worth mentioning. Cherry tomatoes grown here are often compared to organic products and have won many awards, such as: Klasa Quality Mark, Regional Food of the Olomouc Region, 1st place in the competition for the best crop in the fruit vegetable group (Flora Olomouc Exhibition Centre), GLOBAL GAP Certification, PESTICIDE-FREE Certification, or the "D Award" for a significant contribution to Czech food.

Rainwater obtained from the roof of both the greenhouse and the cooperative buildings is used for watering the plants. The water thus obtained is collected in the lagoon and covers 70% to 90% of the greenhouse's total consumption. The use of bioagents instead of pesticides is also interesting. Among other things, 75,000

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<sup>8</sup> Source: <https://www.rajcathanovice.cz/zemedelske-druzstvo-hanovice#prettyPhoto>

predatory bugs and 7,100,000 parasitic wasps were used to combat pests in the past period. 79,500 bumblebees were then planted for the purpose of filing.

The whole project therefore combines both economic usability and improvement of the ecological situation in the area. The living conditions of the citizens of the village have also improved, thanks to the new method of slurry processing, the odour that spread from the cooperative premises in the past has been significantly reduced.

## 2.3 Municipality of Hostětín

Hostětín is a small village in the southeastern part of the Zlín Region, in the district of Uherské Hradiště, directly in the area of the White Carpathians. It is located in a hilly landscape near the border with Slovakia and is one of the typical Carpathian villages with scattered buildings and a significant proportion of forests and meadows in the area.



Image 8: Municipality of Hostětín <sup>9</sup>

Due to the location of the village, the village has not been connected to the gas pipeline, even the electricity distribution network is not rounded, which leads to less reliability of electricity supply. Perhaps these circumstances also lead the municipality to implement a large number of ecological and energy projects at the same time.

These projects have brought the municipality many awards, especially in the field of environmental benefits, for example: Energy Globe 2007 and 2020, Czech Solar Award 2009, Climate Star 2012. The village was even

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<sup>9</sup> Source: <https://mapy.com>

visited in 2010 by the prince, now king, Charles III.

The first project is the Veronica Centre. After its completion in 2006, it was the first Czech public building to meet the passive standard. A building in the passive standard has very low energy consumption for heating. Thanks to high-quality insulation, tight windows and a well-thought-out design, it retains heat mainly "passively" - i.e. without the need for conventional heating. It gets heat from the sun, appliances and from the presence of people in the house and loses it only minimally.

In addition to traditional technologies, such as air conditioning with heat recovery or high-quality opening fillings, less traditional ones were also used, such as green roofs or the use of straw bales up to 40 cm thick to insulate the building. Solar water heating and rainwater utilization systems are also included.

The centre serves as an educational centre, where educational seminars are regularly organised not only for schools, but also for other municipalities and businesses. It is estimated that more than 3,000 children arrive here in this way every year. Environmental advice is provided here and it is also possible to stay there.



Image 9: Veronica Center <sup>10</sup>

If it is necessary to heat the center, central heating from the municipal heating plant with an output of 732 kW is used. It has been in operation since 2000 and burns wood chips, i.e. basically waste from nearby sawmills. About 80% of households are connected to this heat source, to which it supplies about 3,500 GJ of heat per season.

The heating plant not only boosts the local economy by using local fuel sources, but also saves the environment - it is estimated that it saves 1,500 tons of CO<sub>2</sub> per year.

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<sup>10</sup> Source: <https://www.pasivnidomy.cz/domy/centrum-veronica-11>

Photothermal panels are installed on 9 buildings of the municipality for the production of hot water. Photovoltaic panels can be seen not only on roofs, but one with an output of 56 kWp can also be found on the slope above the boiler room.

In addition, the municipality has also focused on the insulation of buildings or the modernization of public lighting.



Image 10: Sewage Treatment Plant <sup>11</sup>

Interesting projects were also carried out in the field of ecology, when in 1996 a root wastewater treatment plant was established in the village, the first of its kind in East Moravia. For its functioning, an artificial wetland with common plants such as common reed or reed scab was created, and bacteria live on the roots of these plants, which are responsible for cleaning organic pollution. There are also so-called composting toilets, which use the composting process to process urine and faeces. These toilets are cheaper to build than regular toilets, they use less water, and in addition, their use produces humus that can be used as fertilizer.

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<sup>11</sup> Source: <https://hostetin.veronica.cz/korenova-cistirna>



Image 11: Biomass storage <sup>12</sup>

The main goal of all these measures is to achieve carbon neutrality from the point of view of the municipal council. If we focus on the Veronica Centre, we find that according to measurements in 2014-2016, the carbon footprint of this building is 7-8 times smaller than the average institution of this type. It is also interesting that all emissions tied to this building fall under the so-called Climate Change. Scope 3, which are other indirect emissions generated, for example, from the purchase of appliances, office equipment or the disposal of community waste.

In 2020, the municipality commissioned a study "*CARBON FOOTPRINT OF THE MUNICIPALITY OF HOSTĚTÍN Local contribution of the municipality to global climate change*", which is available, for example, from [hostetin.veronica.cz](https://hostetin.veronica.cz). The result was the average carbon footprint of one citizen of the municipality of Hostětín. According to the study, this citizen produced 2.512 tons of CO<sub>2</sub>, while the average citizen of the Czech Republic produced 12.2 tons of CO<sub>2</sub>.

In the past, the village of Hostětín had the opportunity to remain one of the many quiet villages in which, as they say, "foxes say good night", but it decided to change that. Today, it is proof that even a small municipality can be a role model for large cities, if it finds the courage to start and citizens who are willing to lend a hand to the work.

## 2.4 Solar Sludge Dryer

The project, which is unique in the whole of Moravia, and only the second of its kind in the Czech Republic (after Mariánské Lázně), took place in the town of Litovel in the Olomouc Region. A solar sludge dryer was built in the area of the wastewater treatment plant.

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<sup>12</sup> Source: <https://www.pasivnidomy.cz/domy/centrum-veronica-11>



Image 12: Litovel Wastewater Treatment Plant <sup>13</sup>

Litovel is a town in the Olomouc Region, located about 20 km northwest of Olomouc. The Morava River flows through it with a number of branches, thanks to which Litovel is called the "Venice of Haná". The town has a rich history, a well-preserved historical center and is also known for its brewery and the proximity of the Litovelské Pomoraví Protected Landscape Area.

The city management decided to build a sludge drying facility on the premises of the treatment plant. The project responds to the tightening legislation in the field of the use of sludge from wastewater treatment plants and at the same time offers a long-term economically and environmentally efficient solution.

The total costs amounted to CZK 120 million, 85% of which was covered by subsidy funds. However, given that sludge treatment accounts for up to 50% of the costs of WWTP operation, the expected return on this investment is about 5 years.

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<sup>13</sup> Source: [www.mapy.com](http://www.mapy.com)



Image 13: Drying Room Hall <sup>14</sup>

Two greenhouses 120 meters long and 13 meters wide were built within the complex, into which wet sewage sludge from the Litovel wastewater treatment plant is already being transported by means of a screw slide. The mass on the floor of the greenhouse is continuously raked by a special machine.

The solar dryer, only the second of its kind in the Czech Republic and the first in Moravia, uses renewable energy to significantly reduce the water content of the sludge, thus reducing transport costs and enabling its further energy use. The result is up to 80% dried sludge. It will be handed over to CEMENT Hranice a.s. for energy use.

Sewage sludge is generated as a by-product of wastewater treatment at wastewater treatment plants. They contain organic matter, nutrients, but also a number of undesirable substances, and their amount has been growing in recent years. Sludge management is thus becoming a significant technical, economic and environmental problem.

The main risk of sewage sludge is its possible pollution. In addition to microorganisms, they may contain heavy metals, drug residues, antibiotics, hormonally active substances or other micropollutants. It is these substances that pose a major problem when applying sludge to agricultural land, as they can accumulate in the soil and gradually enter the food chain. For this reason, the agricultural use of sludge is gradually being reduced and legislative requirements are being tightened.

<sup>14</sup> Source: <https://www.idnes.cz/olomouc/zpravy/solarni-susicka-kalu-spalovna-solarni-energie-Litovel>

Another problem is the high water content of fresh sludge, which increases the costs of handling, storage and transport. Without further treatment, the sludge is difficult to use and its disposal is financially demanding.

Therefore, modern methods of sludge treatment are currently being promoted. The most important include drying and sanitation, which significantly reduce the volume of sludge, reduce health risks and prepare the sludge for further use. Sludge is increasingly used for energy purposes – for example, by incineration, co-incineration in cement plants or in waste energy facilities. The dried sludge thus becomes an alternative fuel with energy value.

Another option is material use, such as obtaining phosphorus, which is a strategic raw material for agriculture. In the future, further development of technologies is expected to enable the safe and efficient use of sewage sludge with minimal impact on the environment. The modern approach to sewage sludge management is thus moving from its simple disposal to its use as a source of energy and raw materials, which corresponds to the principles of the circular economy.



Image 14: Screw conveyor <sup>15</sup>

## 2.5 School LOŠBATES

The joint efforts of people often lead to something remarkable. When a survey in 2016 showed that the capacities of local schools were in place, representatives of local municipalities decided to take matters into their own hands and build a new union school LOŠBATES in the village of Louňovice, about 15 km southeast of Prague.

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<sup>15</sup> Source: <https://olomoucky.denik.cz/galerie/litovel-zprovoznila-solarni-susarnu-cistirenskeho-kalu>



Image 15: School building <sup>16</sup>

The Voluntary Union of Municipalities LOŠBATES was established in April 2017 and **Louňovice, Štíhllice, Babice, Tehovec and Svojtice joined** with the aim of building a primary school, but Babice later withdrew from the association. The union has approximately 3,000 inhabitants at its current occupation.

The new school complex was planned on a 2.5 ha building plot in the village of Louňovice. The school has 2x 9 classes and a capacity of approximately 540 pupils and 60 employees. However, it was designed with the possibility of expanding to 3x 9 classes with a capacity of 700 pupils.

But that's not all, within the complex we can also find an apartment for a caretaker, small-sized apartments for employees and premises for art schools. It also includes a clubhouse and Auditorium spaces, which can also be used for organizing public events.

The building itself was then built in a passive standard. A building built in a passive standard is designed to have very low energy consumption for heating and cooling. Thanks to high-quality insulation, airtight construction, minimization of thermal bridges and the use of controlled ventilation with heat recovery, it maintains a stable indoor temperature with minimal energy losses. Much of the heat needed comes from passive sources, such as sunlight or heat produced by people and appliances. Passive buildings thus ensure high thermal comfort, low operating costs and a lower environmental impact.

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<sup>16</sup> Source: <https://www.losbates.cz>

In addition, the building is equipped with photovoltaic systems, which further increase the building's independence from external energy supplies. This is further enhanced by the use of heat pumps as low-emission heat sources. In addition, these devices are connected to an intelligent control system that further optimizes energy consumption. Rainwater, which is used repeatedly as part of the circular economy, is also not forgotten, saving on drinking water costs.



Image 16: The first day of school at the LOŠBATES Primary School <sup>17</sup>

The process that eventually led to the construction of this building was also interesting. Already at the end of 2017, the "Single-phase open design architectural competition" was announced. 108 teams from 38 countries signed up for it, whether from Europe (Great Britain, Spain, Italy), the USA, Canada, but also from more exotic countries such as Lebanon, Japan, Indonesia, Uruguay or the Arab Emirates.

The first place in the competition was achieved by the project from Canada, its description is available, among other things, on the <https://www.losbates.cz/o-projektu/architektonicka-soutez/1-cena-1/website> and reads: *"The proposal aims to create a new heart and symbol for the community of the voluntary union of municipalities LOŠBATES. It is therefore conceived as an open "monastery", whose rugged multifunctional cloister corridor connects four programmatically different parts into one volume surrounded by a small forest. This space is flexible both visually and functionally. It serves as an entrance, hallway, covered outdoor space, meeting place, informal classroom, and much more. Compared to the traditional concept of the cloister corridor in monasteries,*

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<sup>17</sup> Source: <https://www.losbates.cz>

*this corridor is open and permeable, framing the central courtyard, which, unlike the free paradise courtyards of the monastery typology, is filled with trees, which are trapped fragments of the nearby forest. The yard is intentionally large. The aim is to blur the boundaries between the figure of the building and the terrain. The yard acts as a green buffer and climate control tool for the interior space that surrounds it. By spreading out the building and bringing nature inside on a large scale, the silhouette of the building becomes softer and friendlier. This refinement also provides a blissful feeling of expansiveness and openness. The school has no dead ends. Movement in it consists of a loop – an interconnected circuit that generates a sense of continuity and infinity. It allows children and visitors to move freely throughout the building in non-linear/non-linear paths and promotes a sense of continuity by visually connecting through the inner courtyard."*

After the announcement, there was a meeting with the representatives of the winning party to sign the Contract for the creation of project documentation, the performance of engineering activities and the author's supervision of the project. The negotiations were successfully concluded on 8.2.2019. The school itself then welcomed the children in September 2025.

The LOŠBATES Primary School is an example of how the cooperation of several municipalities can lead to a long-term meaningful and high-quality result. The project was not created "from above", but as a direct response to the real problem of insufficient capacities of schools in the region, and thanks to a joint approach, it was possible to prepare a school that meets not only current needs, but also counts on future development.

At the same time, it is a building that combines modern architecture with an emphasis on sustainability and low operating costs – the passive standard, photovoltaics, heat pumps and rainwater management make it an exemplary public building for the 21st century. LOŠBATES is thus not only a school, but also a new community center and a symbol of the fact that even smaller municipalities can jointly implement an ambitious project with a supra-regional overlap.

## 2.6 ENERKOM Slovákko

One of the biggest topics in the energy sector in recent years is electricity sharing. This is one of the key tools of modern energy, which enables more efficient use of locally produced energy, especially from renewable sources. Thanks to the development of community energy and gradual legislative changes, space is opening up for new models of cooperation between electricity producers and consumers, whether at the level of municipalities, company premises or apartment buildings.

In the Czech environment, electricity sharing is made possible mainly by the LEX RES II legislative package, which has significantly strengthened the legal framework for community energy. This package introduced and specified institutes such as active customers and energy communities, which create conditions for the



generation, consumption and sharing of electricity between multiple consumption and production points. Sharing takes place through the distribution system on the basis of data from continuous metering and evaluation by the electricity market operator.

To engage in electricity sharing, it is necessary to meet several basic legislative and technical requirements. The key requirements include the registration of the entities involved, the provision of continuous metering at all participating consumption and production points, and the contractual setting of relationships between the participants in the sharing. Defining the rules for the distribution of electricity produced, the responsibility for deviation and ensuring compliance with market and distribution rules also play an important role.

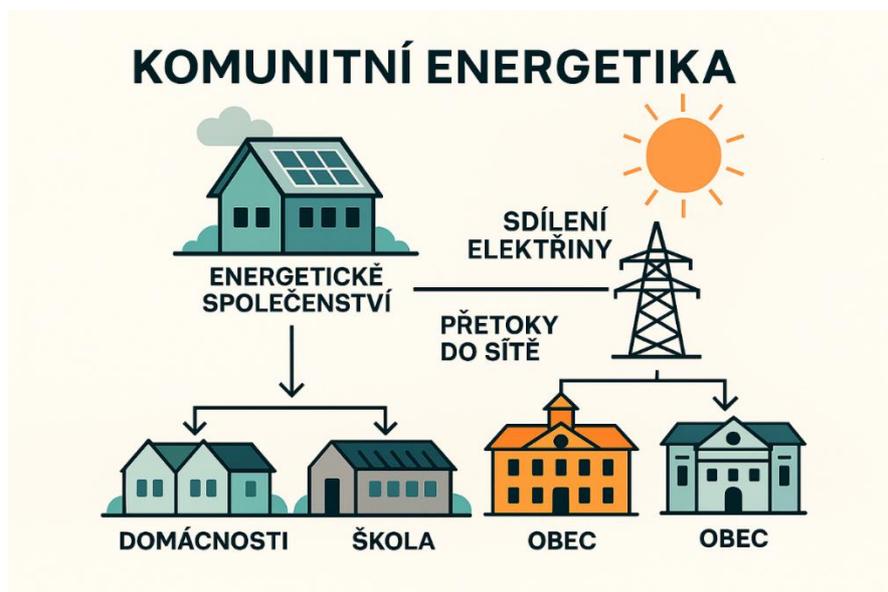


Image 17: Sharing Scheme <sup>18</sup>

The creation of communities dedicated to electricity sharing has several effects in many areas. It provides financial benefits to its members, whether for sold surpluses or cheaper purchased electricity. As a rule, renewable energy sources are part of these communities (photovoltaic power plants are the most common source), thus reducing the environmental impact of the actors involved. Communities also contribute to the independence of their members from external sources, often the goal is complete independence, which, however, is rather a utopian goal in the current conditions.

One of the first communities was established in Slovácko, where the ENERKOM Slovácko association was established in 2023. It has set itself the goal of making the production of electricity from renewable sources accessible to the general public and thus contributing to the decentralization of energy, reducing dependence

<sup>18</sup> Source: <https://www.energie.cz/zmari-sdileni-30-50-elektriny/>



on traditional, often fossil, sources of electricity, and also trying to support innovative solutions in these areas. In doing so, it relies mainly on three pillars. The first is community energy, which we will focus on the most and in which they try to integrate not only community members, but also the general public. For example, it offers alternative financing options, or within the second pillar, which is consulting, it offers the necessary know-how. The third pillar is building a community or connecting those who have already been built. Within it, emphasis is placed on cooperation not only between partners, but also municipalities, organizations and even individuals. ENERKOM started sharing at the end of 2024, i.e. shortly after the introduction of LEX RES II, according to the active customer model on a small test group. This procedure seems to be ideal for preparing for the creation of a full model of community energy. As part of this test operation, the subject can "touch" the basic principles of sharing. In addition, the electricity meters will be replaced with continuous meters, which will provide them with data in the required 15-minute interval. This data is then an ideal basis for further optimization of sharing and the creation of the so-called allocation key.

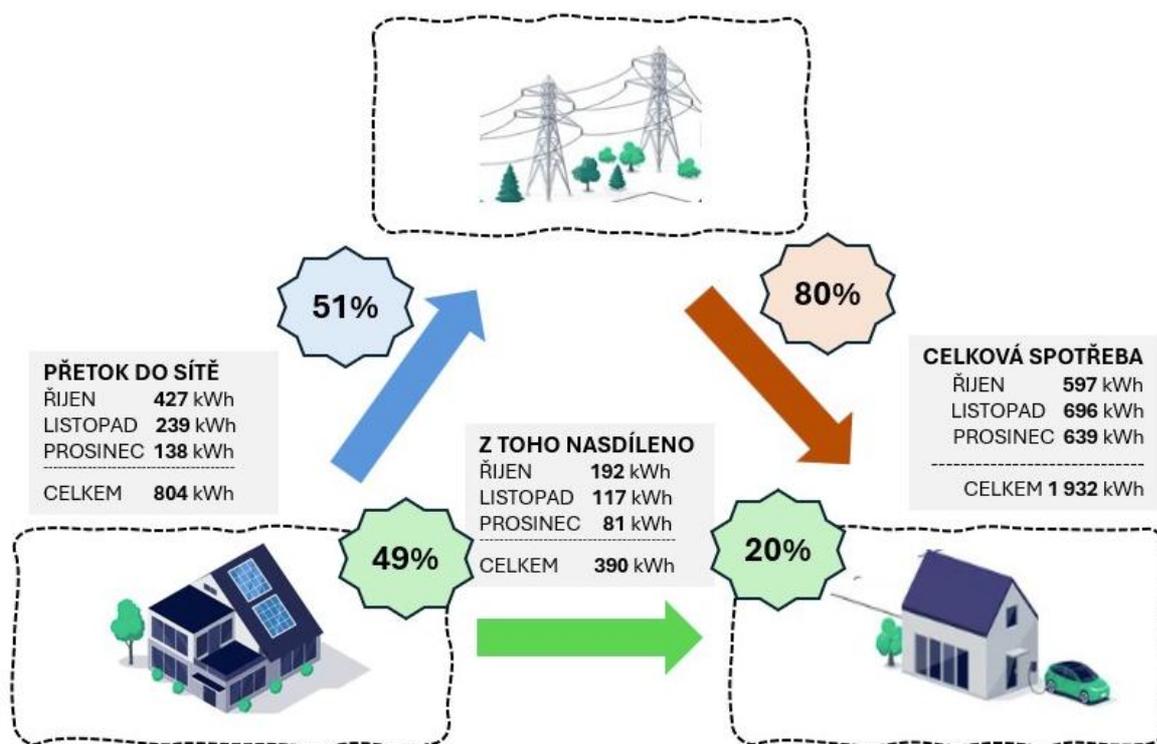


Image 18: Sharing Test Group ENERKOM Slovákco <sup>19</sup>

The energy community model was then launched on 1.4.2025. As of January 2026, 117 members have already joined the community, of which almost 70% are citizens, 195 registered EANs, 130 consumer and 65

<sup>19</sup> Source: <https://enerkomslovacko.cz>



manufacturing. These are divided into 8 sharing groups. A total of 1,050 kWp is installed.

Electricity is purchased from producers for CZK 1/kWh, CZK 0.83/kWh after deduction of VAT. ENERKOM then charges CZK 0.60/kWh for each shared kWh and then uses this money to ensure its operation. This system is attractive both for producers, who would most likely sell surpluses for CZK 0-0.5/kWh, and for customers, the price of power electricity at the turn of 2025 and 2026 is between CZK 2 and 3/kWh.

The diversification of sources is also very interesting for the community, ENERKOM Slovácko plans to connect 2 biogas power plants. These are often the first choice for this diversification, providing renewable peak power that is able to at least partially suppress the instability of other renewable sources. Another option is typically hydroelectric or wind power plants. An interesting project is the construction of a battery storage facility.

ENERKOM Slovácko has set itself a very ambitious goal of up to 1,000 members by 2026 and share more than 2 GWh of electricity per year.

At present, the establishment and optimization of the operation of energy communities is a topical issue. Technology and legislation are changing dynamically, providing new and new tools every year. In the Czech Republic, for example, the introduction of a dynamic/hybrid allocation key, the removal of restrictions on the size of sharing groups or the number of factories that can share into one consumption are now pending.

In the Czech Republic, we often look for examples of good practice in these sectors and abroad, which has its pros and cons. We can find many inspiring projects in this way, but the problem is that the conditions are often diametrically opposed to ours, for example in terms of distribution fee reliefs. It is sometimes forgotten that there are entities in our territory that have already solved these problems and often solved them. And this is in our conditions.

ENERKOM Slovácko is clearly one of them, which is an example of good practice, especially in the large number of private individuals involved, which is not a common phenomenon. The reason for this is the instability of these consumption – turning on the washing machine can be a problem for the community. Other examples of good practice can be mentioned, for example, in the town of Litultovice, where the concept of energy sharing was tested in cooperation with the ČEZ Group or ENERKOM Opavsko.

## 2.7 Smart Prague

In 2017, the City of Prague approved the strategic document "Smart Prague Concept by 2030", which is of fundamental importance for the transformation of the metropolis towards a modern, efficiently managed and sustainable city. This document is part of a broader international Smart City strategy and reflects global trends in the digital transformation of cities, but at the same time it is based on specific challenges and needs in Prague. However, Prague developed this concept earlier than, for example, Barcelona, Amsterdam or Vienna.





Image 19: Prague panorama <sup>20</sup>

This concept of the strategy for the period 2017-2030 aims, among other things, to improve the energy situation of the city, the quality of life of its citizens, or digitization and data availability. Prague should thus become a smart, sustainable and efficient city by 2030.

The strategic document was prepared and approved by the Prague City Council. The City Hall together with municipal organizations, especially the ICT Operator (OICT), played a key role in its creation and subsequent update. OICT is the project coordinator of the concept, management and implementation of innovative projects across city organizations. However, the Concept works as a living document, continuously updated to maintain its relevance in terms of both measures and objectives.

Prague is mainly top-down in the implementation of the Smart City concept, which is to some extent different from some European cities, where the citizens' initiative plays a more significant role. The key role here is played by the already mentioned municipal company Operator ICT, which prepares, proposes and implements project plans in the main thematic areas of the Smart Prague strategy.

At the same time, the city is trying to complement this model with elements of a bottom-up approach, i.e. public involvement. Suggestions from residents are collected through the Smart Prague website and other communication channels. Although citizen participation is declared as one of the important pillars of the entire concept, the number of projects that have been directly initiated by the public remains relatively limited.

By mid-June 2024, a total of 64 larger and smaller projects had been implemented in Prague as part of the Smart City agenda.

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<sup>20</sup> Source: [https://cs.wikipedia.org/wiki/Praha#/media/Soubor:Prague\\_panorama.jpg](https://cs.wikipedia.org/wiki/Praha#/media/Soubor:Prague_panorama.jpg)



## Vize Prahy pro rok 2030

Dnes → 2030

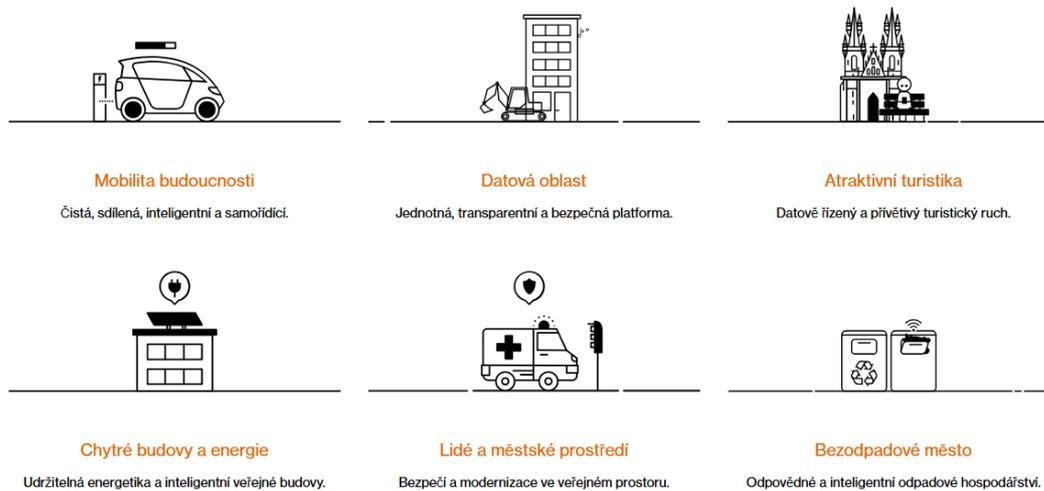


Image 20: Vision of Prague by 2030 <sup>21</sup>

Specific projects implemented under this strategy include, for example, Golemio, which is a municipal data platform that enables data centralization, analysis and visualization operated by the municipal company Operator ICT. It also includes an extensive set of technical tools for working with data. This data is collected from all areas of the city's functioning. Its goal is to make it easier to work with data and make it available to relevant entities. These include mainly self-government entities.

Golemio manages and stores data for sensors, camera systems, urban applications, urban transport systems, and other inputs. Data is further worked with in order to obtain knowledge and analysis for various industries, thus becoming an ideal tool for deepening the principle of data-driven policy. The platform allows data from various sources to be connected and comprehensively analyzed. Such a platform is a basic and absolutely necessary building block for a deeper understanding of the context within the functioning of the city and the identification of areas for optimization.

Another interesting example from the Smart City area was a project focused on intelligent waste collection. Its main objective was to develop and pilot validate a tool that will allow continuous monitoring of the level of filling of containers for separated waste (paper, plastic, glass, beverage cartons and metal packaging). The data obtained was then to be used for analyses, the result of which would be the optimization of collection routes

<sup>21</sup> Source: <https://smartprague.eu/>



and the adjustment of the frequency of collections according to real needs.

As part of the pilot project, a total of 424 sensors were installed to measure the level of occupancy. These were placed in 380 underground and 44 above-ground containers with a bottom discharge intended for sorted waste. Sensors in up to 700 underground collection containers and 6,500 above-ground collection containers with a bottom discharge are planned for full operation.



Image 21: Waste collection Prague <sup>22</sup>

One of the projects was the processing of data on energy consumption in buildings owned by the City of Prague. This data is now available online at: <https://smartprague.eu/projekty/energetika-v-budovach-hlavniho-mesta-prahy>. This data comes mainly from other projects such as Energy Ecosystem, Comprehensive Energy Management and EPC, then not only the visual aspect was processed, but the building data was expanded to include energy and CO<sub>2</sub> saving potential.

It is also worth mentioning the Energy Savings using EPC project, which in 2019 won the second prize in the eighth year of the competition organized by the Association of Energy Service Providers. The project, designed on 6 buildings, will save at least 11% on electricity, gas, heat and water consumption.

In total, it is possible [to find 66 projects on the https://smartprague.eu/projekty#all website, which can affect several areas.](https://smartprague.eu/projekty#all)

In conclusion, Smart Prague represents a systematic effort of the capital city to respond to the growing demands of the modern metropolis through technology, data and innovation. It is not just about individual projects, but about a long-term strategic framework that connects the areas of transport, energy, the environment, digitalization of public administration and urban infrastructure.

However, the success of this concept is not only based on the introduction of new technologies, but above all

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<sup>22</sup> Source: <https://smartprague.eu/>

on their meaningful use in practice. The key will be whether it will be possible to really interconnect the individual projects, systematically evaluate their benefits and involve a wider range of actors in the development of the city – including the residents themselves.

Smart Prague is not a target state, but a process of gradual transformation of the city. If its principles are fulfilled in the long term and consistently, Prague can become not only a technologically advanced metropolis, but above all a city that is more efficient, sustainable and more liveable.

## 2.8 Use of renewable energy in the municipality of Střeň

The village of Střeň is located in the middle of forests in the Litovelské Pomoraví Protected Landscape Area, approximately 10 km northwest of the city of Olomouc. Despite its modest size, it can be given as a model in the field of PV use for much larger municipalities.

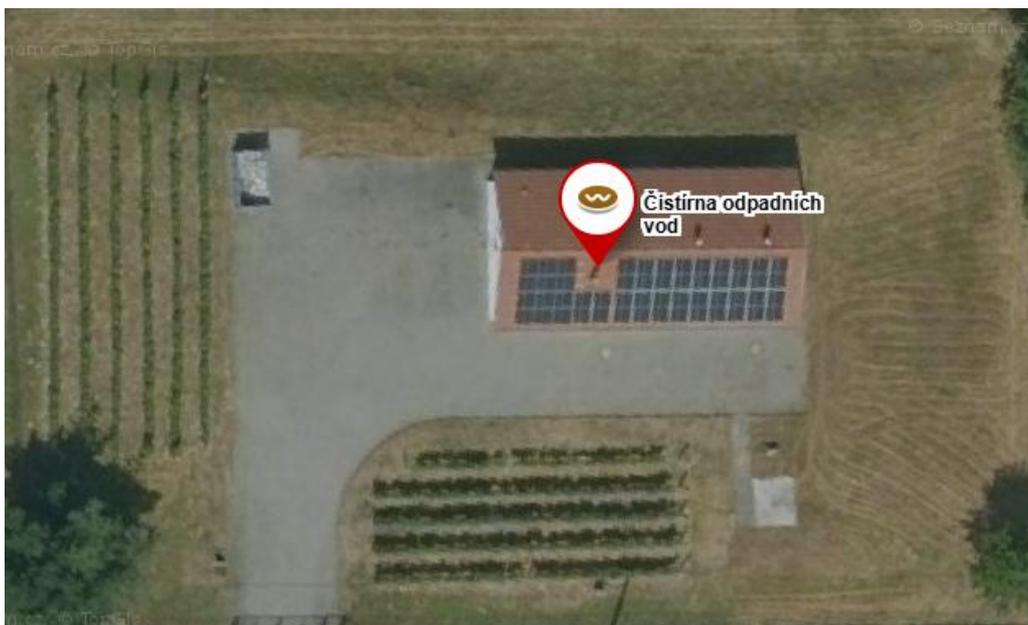


Image 22: Wastewater treatment plant Střeň <sup>23</sup>

The municipality of Střeň built a wastewater treatment plant on its territory in 2011. As is known from practice, these facilities are one of the largest consumers of electricity for each municipality. Around 2021, in response to rising energy prices, representatives of the municipality decided to look for a way to reduce the costs of

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<sup>23</sup> Source: <https://mapy.com/>

operating the wastewater treatment plant.

In the end, they decided to build a photovoltaic power plant on the roof of the building. An installation with an output of 10 kWp without battery storage with a purchase price of less than CZK 220,000 without VAT is able to save the municipality 60 – 80% of electricity costs for this building.

However, the representatives of the municipality did not stop there and found another way to use the energy from the photovoltaic power plant, namely to charge the ALKÉ ATX340EH electric vehicle (category N1), which they bought for almost CZK 1,250,000, with approximately half of this amount paid from the subsidy. This vehicle is used by the municipality for basic cleaning and maintenance.



Image 23: Wastewater treatment plant with electric car <sup>24</sup>

However, this was not the end of it. Solar energy has also found another use in combination with a compressor, which allows residents and visitors to the village to inflate their bikes for free. This compressor is equipped with an underground battery, so it can be used even after dark.

For cyclists traveling through the Morava River, the village of Střeň is a frequent stop, so in addition to the possibility of inflating tires, they can also enjoy the possibility of using a solar charging station for e-bikes. Both services are available free of charge to visitors.

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<sup>24</sup> Source: <https://obec2030.cz/novinky/stren/>





Image 24: Solar Power Compressor <sup>25</sup>

In 2024, the municipality then launched 2 more projects. The first of these was the construction of photovoltaic power plants on the municipal office building, with an output of 22.24 kWp and battery storage of 18 kWh, and on the municipal house building, with an output of 4.14 kWp and a battery storage facility of 3.1 kWh. Out of the total eligible expenditure of CZK 1,392,000, CZK 821,872 was paid through a subsidy from the Modernization Fund.

The second was the installation of a battery storage system with a capacity of 34.8 kWh, expandable to 46.4 kWh, on the WWTP building. This installation is further expanded by HW, which allows the building to be connected to the community energy and is equipped with modern technology for consumption management. The costs climbed to CZK 650,000, this intention was supported by the Olomouc Region with an amount of CZK 36,400.

In conclusion, the municipality of Střeň can be described as an extremely successful example of good practice in the field of the use of renewable energy sources and energy management at the municipal level. Through the systematic and gradual development of photovoltaic power plants, supplemented by battery storage, electromobility and publicly available services, the municipality has been able to significantly reduce its operating costs, increase energy self-sufficiency and at the same time offer added value to its residents and visitors. The approach of the municipality of Střeň shows that even small municipalities can be leaders in the field of sustainable energy if they have a clear vision, a long-term strategy and are able to effectively use the available subsidy instruments.

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<sup>25</sup> Source: <https://obec2030.cz/novinky/stren/>



## 2.9 ZEVO Malešice

An interesting project from the point of view of the combination of waste management and energy is the construction of a facility for the energy recovery of waste, abbreviated as ZEVO. One example of such a facility can be found in the capital city of Prague.



Image 25: ZEVO Malešice Area – Top View <sup>26</sup>

What is a ZEVO anyway? It is a device that uses otherwise unusable waste to produce heat and electricity. This is a fundamental difference from ordinary incinerators, which only dispose of waste. The exact definition is then given in the Waste Act. In addition, ZEVO is subject to very strict conditions in terms of ecology and emission production, and modern facilities are more environmentally friendly than conventional sources in this regard. In addition to the production of heat and electricity, other reusable products such as scrap iron or slag are also produced during waste processing in the ZEVO. Another benefit is also the reduction in the amount of waste that is removed by landfilling.

Currently, there are 4 of these plants operating in the Czech Republic, namely in Prague, Brno, Liberec and

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<sup>26</sup> Source: <https://mapy.com>

Chotikov near Pilsen.



Image 26: ZEVO Malešice <sup>27</sup>

The ZEVO Malešice was gradually put into operation between 1996 and 1998 as a replacement for the incinerator in Vysočany and is therefore the second oldest facility of this type in the Czech Republic. Originally, it produced only heat, but it was not until 2010 that electricity production began. It then supplies approximately 20,000 households with these commodities.

A major turning point in the operation of this facility was the Golem project. In the spring of 2018, a complete reconstruction of all 4 boilers began. The operation of ZEVO was thus limited for the next few years. The year 2021 was crucial for this project, but not in a good way. Only 2 months before the planned completion, a fire occurred that damaged almost half of the incinerator. So the return to full operation did not take place until 2023.

Year	Waste processed (thousand tonnes)	Electricity produced (MWh)	Heat Produced (GJ)
2017	295	35 221	848 822
2018	272	22 308	802 723
2019	278	27 305	821 716
2020	288	34 900	815 565
2021	282	35 758	844 217
2022	271	31 015	747 398
2023	355	76 662	709 606
2024	371	77 448	798 981

<sup>27</sup> Source: <https://www.cez.cz>



Table 2: Operation of the ZEVO Malešice <sup>28</sup>

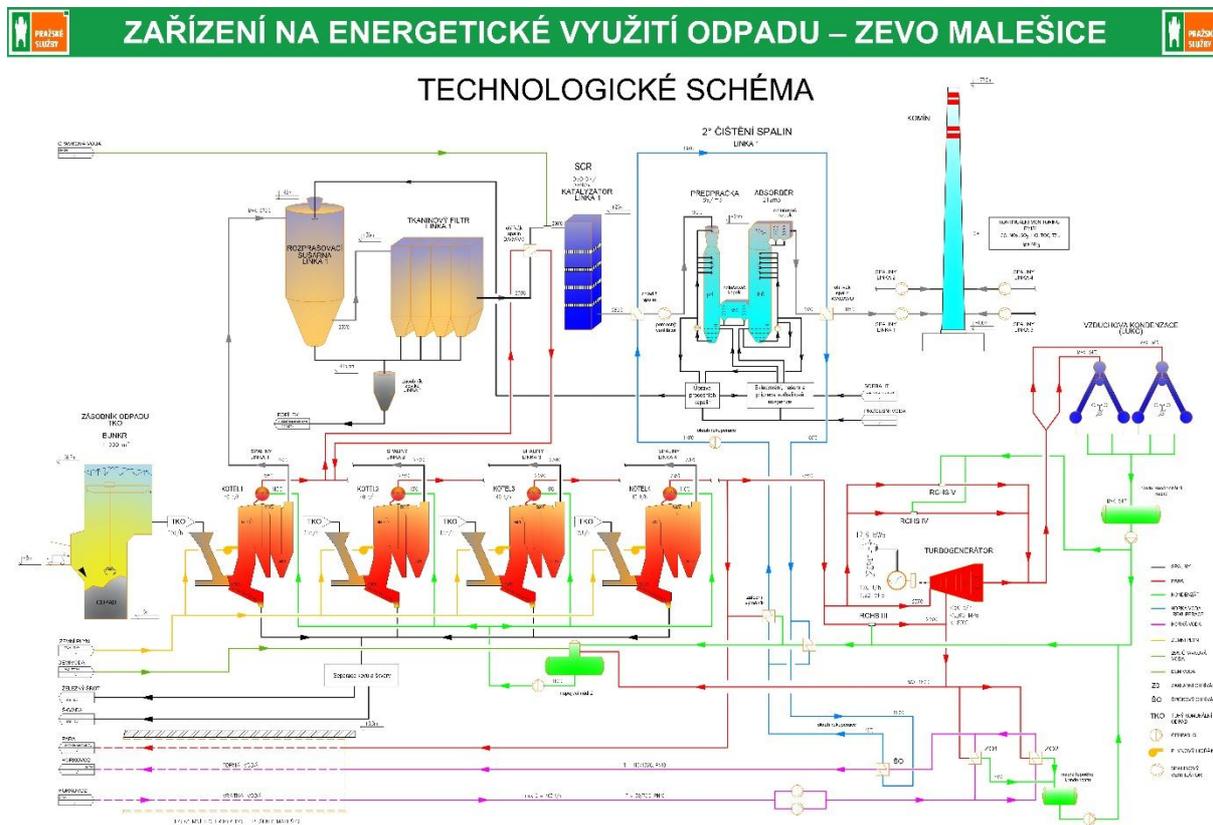


Image 27: Technological diagram <sup>29</sup>

After inspection and recording, the waste is stored in a bunker, where it is mixed and then dosed into combustion boilers. Incineration takes place on an inclined grate at temperatures of 900–1200 °C with primary and secondary air supply, which ensures complete combustion of waste and slag. The heat generated is transferred to the water in the steam boiler, from which steam is produced. This then drives a turbogenerator that produces electricity, while part of the heat is used for supply to the central heat supply system. The residual slag is cooled, processed and the metals for recycling are separated.

An integral part of the ZEVO technology is multi-stage flue gas cleaning, which ensures compliance with strict emission limits. The flue gases first pass through a spray dryer and a fabric filter, where dust particles are captured, then through a DeDiox/DeNOx catalytic stage to remove dioxins, furans and nitrogen oxides. The next

<sup>28</sup> Source: own processing

<sup>29</sup> Source: <https://www.psas.cz>



step is a wet lime scrubber, which removes acidic gases, heavy metals and organic matter residues in both acidic and neutral environments. The treated flue gases are then safely discharged through a high chimney with continuous emission monitoring. The ZEVO technology thus enables environmentally friendly waste management while simultaneously producing electricity and heat for public consumption.

## 2.10 Klučice

One of the municipalities whose goal is energy independence is Klučice in the Sedlčany region. The village located in the southern part of the Central Bohemian Region is inhabited by approximately 480 inhabitants. Nevertheless, we can find several interesting projects in the field of energy and ecology.



Image 28: Village of Klučice in the Sedlčany region <sup>30</sup>

One of these projects is also visible when looking at the village aerially. It is the construction of a biogas plant on the cooperative's premises near the cowsheds. The facility with a thermal and electrical output of 0.703 MW has been in operation since 2010, at that time it cost CZK 67 million, of which CZK 20 million was covered by a subsidy. About 60% of the fuel is beef slurry, but maize, rye, wheat or grass haylage are also used.

Waste heat from the biogas plant is used to heat municipal apartments, 19 family houses, both shops, a fire

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<sup>30</sup> Source: <https://mapy.com>

station, a post office and a kindergarten. The station supplies around 2,500 GJ to these places every year. There is currently interest in connecting to the heat pipeline, but the problem is that the biogas plant has reached its capacity and it would be necessary to transport fuel from elsewhere to expand it.

The main attraction is the price, in 2024 one GJ of heat supplied in this way cost CZK 350, so the total cost of heating was almost a third of conventional alternatives such as wood, coal or gas. In addition, compared to wood and coal, there is no work to operate the equipment and the need to store fuel in each building.



Image 29: Biogas plant Klučice <sup>31</sup>

From the point of view of the municipal representatives, the school is also crucial, despite the fact that the local nine-year school is attended by only about 60 children. Here, too, we can find an alternative source of heat, namely a wood chip boiler, which replaced the original coal boiler. The municipality produces the wood chips itself and therefore has it at the price of the diesel consumed and the wages of the employees who produce it. However, the modernization of the school did not end there.

The municipality had the building insulated and in 2024 it also had an 11.83 kWp photovoltaic power plant with battery storage installed on it with a capacity of 8.3 kWp. The second power plant was then installed on the wastewater treatment plant building, with an output of 24.75 kWp with a battery storage capacity of 18.4 kWp. The municipality is now dealing with the possibility of sharing electricity between its own buildings. Representatives of the municipality would like to achieve a state in which they produce most of the energy themselves. They are also considering the construction of a local distribution network.

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<sup>31</sup> Source: <https://obec2030.cz/novinky/klučenice/>

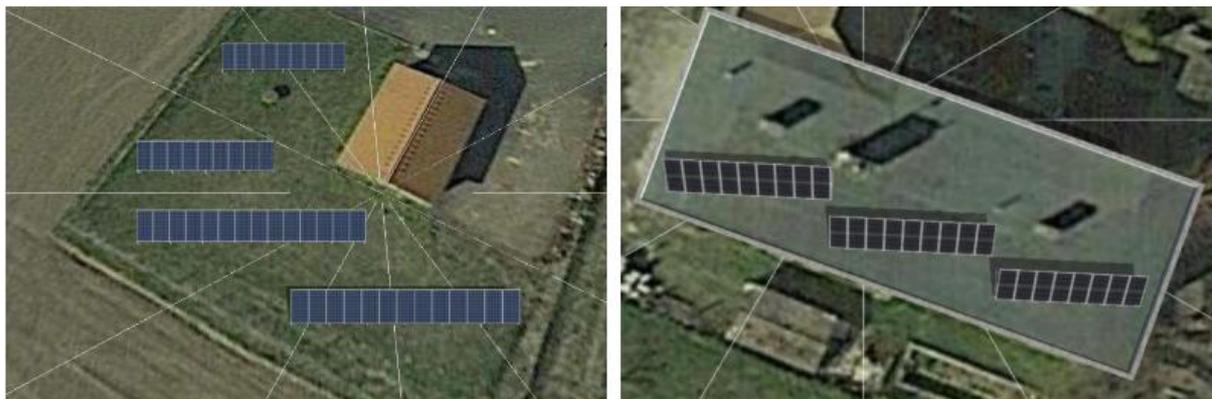


Image 30: PV plant at the wastewater treatment plant and on the school building <sup>32</sup>

In short, the municipality is trying to create an environment where as many people as possible will want to move permanently in. With this vision in mind, the municipality is not only reconstructing its existing apartment buildings, but also planning to build new ones. It also renovates older municipal houses and prepares building plots.

Ecology is a big topic in Klučice. This is evidenced by the revitalization of the collection yard, where it is possible to discharge, for example, bio-waste, tetra pak, metals or paper. The municipality then collects and processes the paper and plastic itself, which is then transported for further use. This effort does not go unnoticed, since 2024 it has been part of the Hall of Fame of the "We Sort the Best" competition, and in 2025 it won 3rd place in the national Green Municipality of the Year competition.

<sup>32</sup> Source: <https://obec2030.cz/novinky/klucenice/>





Image 31: Collection yard Klučice <sup>33</sup>

Klučice is a very good example of a municipality that approaches energy independence systematically and in the long term. The chosen combination of technologies – a biogas plant using waste heat, a wood chip boiler, photovoltaic power plants with battery storage and planned electricity sharing – shows that even a smaller municipality can significantly reduce its dependence on external energy supplies.

A great benefit is the efficient use of local resources and waste. The biogas plant not only produces electricity, but also provides cheap heat for municipal buildings and households, which has a direct impact on the quality of life of residents. At the same time, it turns out that energy projects in Klučice are not isolated – the municipality connects them with the development of housing, the improvement of public services and environmental activities.

Thanks to a combination of investments in energy, buildings and the environment, Klučice is moving towards a modern and more self-sufficient municipality, which can also be an inspiration for other municipalities of similar size.

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<sup>33</sup> Source: <https://obec2030.cz/novinky/klucenice/>

### 3 Conclusion

The presented examples of good practice prove that the energy transition and the transition to more sustainable forms of energy management are taking place in the Czech Republic across various regions and sectors. Whether it is a geothermal heating plant in Děčín, biogas plants in agricultural cooperatives, community energy in the Slovácko region, a solar sludge dryer in Litovel, or a comprehensive approach of small municipalities such as Hostětín, Střeň or Klučice, all these projects confirm that change is possible even in the conditions of Czech legislation and economy.

Several common elements emerge from the examples. A long-term vision, a willingness to invest in modern technologies and the ability to combine different energy sources so that they complement each other are key. Equally important is public outreach, awareness-raising and trust-building – especially for projects that represent a new or lesser-known approach.

It also turns out that energy projects are not isolated technical solutions, but have a direct impact on the economy of municipalities, social cohesion and the quality of the environment. They contribute to reducing operating costs, increasing local self-sufficiency and supporting the development of regions.

The document thus confirms that good practice in the field of energy and sustainability already exists and can serve as an inspiring basis for the further development of similar projects. The future of the Czech energy sector will not be based only on large central sources, but increasingly on a combination of local initiatives, innovative solutions and an active approach of municipalities, businesses and individuals.



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## 6 Additional resources

- ENETIQA , available from: <https://m.enetiga.cz>
- Obec2030, available from: <https://obec2030.cz/novinky/geotermalni-energie>
- Termo Děčín, available from: <https://www.termodecin.cz/predstaveni-spolocnosti>
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