



# Energy renovation of buildings

**PETROL**

Energy for life

# A better environment and optimal costs through the energy performance of buildings



Sustainable resource management, clean renewable energy, redevelopment of degraded urban areas, sustainable development and carbon footprint reduction are the key issues for many. Here at Petrol, we strive for the optimum use of energy and water in buildings

while meeting the relevant user standards (comfort), with optimal costs and minimal environmental burdens. We take care of the whole process of comprehensive or technological energy renovation, enabling our partners to save time and money.

Energy contracting is the most common contractual model for implementing energy projects. It is designed to improve the financial leverage of cities as well as to ensure more efficient use of public funds, which is why it is a very common form of cooperation where improvements to energy efficiency are needed.

## COMPREHENSIVE ENERGY RENOVATION AND MANAGEMENT

- Renovation of the entire building envelope, mechanical and electrical systems within the building and implementation of other energy efficiency improvement measures
- Affects the exterior of the building and room comfort (lighting, temperatures, humidity, ventilation)
- Reduction of heat required for building heating, energy savings and lower maintenance and energy product costs
- Combining with additional resources is needed (own resources of a public partner, cohesion funds, other sources)

### COOPERATION MODELS:

- Energy contracting in the form of Energy Performance Contracting (EPC)
- Private-private partnership
- Investment with a guarantee of savings, where the implemented investment is financed by a public partner with a private partner guaranteeing the savings

## TECHNOLOGICAL ENERGY RENOVATION AND MANAGEMENT

- Implementation of individual measures or a series of measures on the building envelope and mechanical and electrical systems in the building to improve energy efficiency
- Affects room comfort (lighting, temperatures, humidity, ventilation)
- Fastest effect: energy savings and lower maintenance and energy production costs
- Additional resources are often not necessary

### COOPERATION MODELS:

- Energy contracting in the form of Energy Performance Contracting (EPC) or Energy Supply Contracting (ESC)
- Investment with a guarantee of savings, where the implemented investment is financed by a public partner with a private partner guaranteeing the savings

## PLANNING

- Examination of and familiarisation with the building
- Investment optimisation
- Preparation of technical documentation (project design)

## CONSTRUCTION

- Implementation of measures to reduce energy use, eliminate energy losses and increase comfort
- System optimisation
- Installation of new devices
- Financing of measures

## MANAGEMENT

- Comprehensive energy management
- Continuous monitoring and optimum control
- Maintenance and repair
- Fast elimination of interferences
- Delivery of contractually agreed objectives

We use advanced software tools in building energy management that allow energy managers to take appropriate steps in managing the energy use of buildings. For this purpose, Petrol uses **Tango**, an open aggregation platform that addresses the challenges of modern business.



## We provide energy renovation of

Publicly-owned buildings (hospitals, schools, kindergartens, public buildings, etc.)

Industrial buildings

Service buildings (business, commercial and tourist buildings)

Multi-apartment buildings

FINANCING

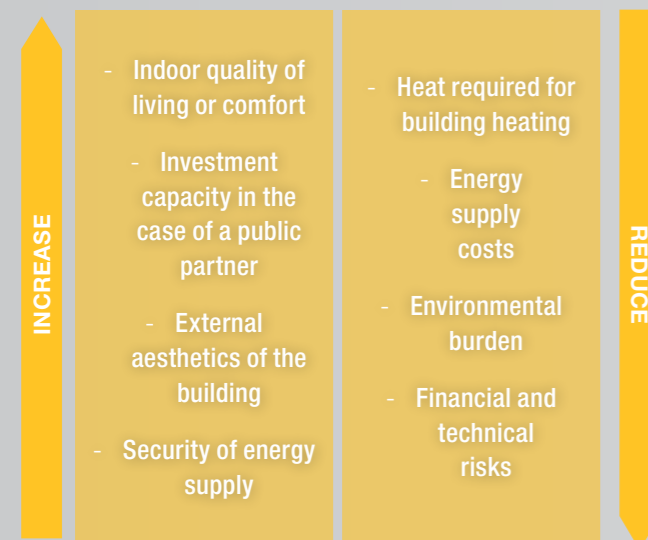
GUARANTEE

COMPREHENSIVE TREATMENT AND MEASURES

# Comprehensive energy renovation of buildings

A comprehensive energy renovation of a building encompasses the renovation of the entire building envelope, mechanical and electrical systems in the building and implementation of other energy efficiency improvement measures.

**Our partners opt for comprehensive energy renovation when they want to:**



## COMPREHENSIVE ENERGY RENOVATION – EXAMPLES FROM PRACTICE

### City of Ljubljana (project EOL-1)

In the City of Ljubljana, we renovated 48 buildings under the energy contracting model, together with a consortium partner. Annually, the project helped save over a million euros and reduce CO<sub>2</sub> emissions by approximately 3000 tonnes per year, equivalent to the amount absorbed annually by 350 ha of forest or 150,000 trees. After the renovation, all comprehensively energy-renovated buildings receive at least 25% of their energy from renewable sources.



### City Municipality of Kranj

Petrol has been working with the City Municipality of Kranj on sustainable projects since 2001. The City Municipality of Kranj was the first municipality to start an energy contracting project. Together with consortium partners, we renovated 36 municipally-owned buildings. As part of our latest energy renovation project, as many as 22 schools and kindergartens have been renovated. This enabled the municipality to reduce its greenhouse gas emissions by 1321 tonnes a year, which is the amount absorbed annually by 150 ha of forest or 65,000 trees.



# Technological energy renovation of buildings

Technological energy renovation of the building includes measures to improve its energy efficiency, mechanical and electrical systems, or, if the level of savings is appropriate, the implementation of individual measures on the building envelope. For each building, we look for the energy renovation solution that is optimal in terms of investment and the client's needs, and that delivers the highest energy product and maintenance savings. These investments can have the following effects: **savings on energy consumption and maintenance costs or lower energy product costs and increased room comfort.**

### Heating and ventilation systems

Heating and cooling have a major impact on the energy consumption of buildings, which is why technological renovation measures commonly include heating, cooling, air conditioning and ventilation solutions. The buildings are also equipped with a central control system to enable monitoring of consumption and achievement of set parameters. Technological measures allow us to considerably improve the energy performance of individual buildings and reduce their carbon footprint.

### Renovation of boiler rooms in multi-apartment buildings

Technological renovation measures also include the renovation of boiler rooms in accordance with the Energy Supply Contracting (ESC) model. It encompasses planning, financing, installation of modern boilers, system management and maintenance, and heat supply during the contract period.

## TECHNOLOGICAL ENERGY RENOVATION – EXAMPLES FROM PRACTICE

### City Municipality of Novo mesto

As part of the project of energy renovation of buildings in Novo mesto, both comprehensive and technological energy renovation measures were carried out, whereby technological renovation was carried out on 16 buildings. The energy management of these buildings was implemented by upgrading their central control systems, optimising the operation of heating and cooling systems, renovating boiler rooms by integrating renewable energy sources and renovating interior lighting. As a result of the technological renovation of the buildings, the municipality reduced greenhouse gas emissions by 550 tonnes per year, which is equivalent to planting more than 25,000 trees.



# Energy management of the building following a comprehensive energy renovation is key

To make the best of a comprehensive energy renovation, proper and efficient energy management must be ensured after all planned measures have been implemented in the building. This means:

**- Users of the building operating the new devices or systems correctly, with equal or better comfort:**

- Introducing appropriate heating schedules
- Adapting lighting intensity according to use
- Appropriate indoor temperature and air quality settings

**- Providing proper maintenance for new systems or devices**

In the case of energy contracting, these works are taken care of by the contractor during the contract period (15 years as a rule) who also guarantees that the cost-savings will actually be achieved.

**Energy efficiency projects have positive effects on the environment**

In the European Union, buildings represent one of the largest consumers of energy, accounting for as much as 40% of total energy consumption. Energy efficiency measures, including energy renovation of buildings and management, reduce greenhouse gas emissions and achieve a greater proportion of renewable sources in gross final energy consumption<sup>1</sup>.

At Petrol, we invest in energy efficiency and renewable energy source projects in the regions and municipalities because we are aware of the impact of energy efficiency on competitiveness, energy security and on meeting climate change commitments. In recent years, we comprehensively renovated more than 390<sup>2</sup> public sector buildings of various intended uses: schools, kindergartens, sports halls, primary care centres, cultural institutions, nursing and healthcare buildings.

**Smart training of users to achieve even better results**

After the energy renovation of buildings, appropriate training of users, especially maintenance workers, must be carried out. Proper ventilation and energy behaviour are vital for good results.

<sup>1</sup>[www.mzi.gov.si/si/delovna\\_podrocja/energetika/energetska\\_prenova\\_stavb/](http://www.mzi.gov.si/si/delovna_podrocja/energetika/energetska_prenova_stavb/)

<sup>2</sup>Status in June 2019.

# What makes us a trustworthy partner?

The transition to a low-carbon society is part of our vision

400+ energy experts

Guaranteeing effects through contractual and financial instruments

One partner in the conversation on comprehensive energy and environmental systems solutions

Diverse know-how and rich experience

Latest software

Competences and technological equipment

Long-term market presence and numerous reference projects

Investment capacity – risk-free performance of investments



The Petrol Control Centre at Bled

## Cooperation between the City of Ljubljana and Petrol

*Alenka Loose, Energy Manager, City of Ljubljana:*

“As part of energy efficiency, the City of Ljubljana has been performing energy renovation of its buildings since 2013. Since 2017, we have increasingly been carrying out renovations through the public-private partnership model. Within the framework of the Ljubljana energy renovation project (EOL-1), together with our partners Petrol and Resalta, we have comprehensively renovated 25 buildings, following the approach of energy contracting. The project has been extremely demanding, as we have been breaking new ground in this area. But now, the Ljubljana energy renovation project is a case-study of good practice, not only in Europe, but also more broadly. We are very proud of the project, and we will continue with such projects and partnerships in the future.”



The Jože Moškrič Primary School in Ljubljana after energy renovation

## PETROL PROJECTS DRIVING SMART CITIES

We have introduced our smart solutions in 80 cities in the region.



### CITIES IN SLOVENIA

- Bled, Celje, Črnomelj, Hoče - Slivnica, Hrastnik, Hrušica, Ivančna Gorica, Jesenice, Kamnik, Kidričevo, Koper, Kranj, Kranjska Gora, Ljubljana, Maribor, Metlika, Mojstrana, Murska Sobota, Oplotnica, Piran, Postojna, Ravne na Koroškem, Ribnica, Sladki Vrh, Trbovlje, Velenje
- Idrija, Kranj, Ljubljana, Maribor, Murska Sobota, Novo mesto, Postojna, Ptuj, Trbovlje, Velenje
- Bled, Bohinjska Bistrica, Brda – Dobrovo, Celje, Cerkno, Črnomelj, Destričnik, Hrastnik, Hrvatini, Jesenice, Kamnik, Kidričevo, Kojsko, Koper, Košana, Kranj, Kranjska gora, Krško, Ljubljana, Ljutomer, Majšperk, Maribor, Medvode, Metlika, Novo mesto, Piran, Poljčane, Postojna, Sečovelje, Slovenska Bistrica, Sv. Peter, Sv. Trojica, Šmarje pri Jelšah, Trnovska vas
- Ankaran, Bled, Brda – Dobrovo, Črnomelj, Gorje, Hoče - Slivnica, Hrastnik, Ivančna Gorica, Izola, Koper, Litija, Mengeš, Miren - Kostanjevica, Piran, Poljčane, Postojna, Radlje ob Dravi

- Smart district heating systems
- Smart water systems
- Smart buildings
- Smart and efficient public lighting

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