

AUSTYN International: Lowering the energy requirements of the heating/cooling of production halls and technical thawing processes

At present, the philosophical trend in the area of building heating is for investors to make every effort to invest as little as possible into new heating systems. This is objectively caused by the existing methods of ordering and constructing new buildings. Manufacturers have adapted the products they offer to this trend, and heating system design has changed into a price-centred competition between participants in tenders, the providers of solutions and subsequently the producers of cost effective products. The effort to save money is particularly noticeable when it comes to choosing control systems, as energy expenditures in the hundreds of thousands of Euros are being controlled by simple regulation systems worth mere hundreds.

The operator of the building saves money on the initial investment but then has to deal with the subsequent burden of energy costs for the period the system is in use, i.e. approximately 15 to 20 years, during which their financial outlays will greatly exceed the savings they made due to the low acquisition costs of the inefficient devices and control systems they have bought. AUSTYN International is a company engaged in the area of the heating of industrial buildings and materials, with a focus on the optimization of energy-related operating costs. Their activities include reconstruction work and the design and realization of new heating systems, with a maximum emphasis on achieving low operating costs for new or reconstructed systems and providing a fast return on investments. Executed designs by AUSTYN International have the following common attributes concerning the cost of heating and operating buildings:

- The lowest priced solution – the sum of investment costs and the price of energy used over 3-5 years.
- High quality components – top quality components with a long warranty period are used.
- Versatility – capable of adapting to changes in the requirements for the operation of heating.
- Comprehensiveness – the design also includes systems affecting energy consumption such as ventilation, cooling, etc.

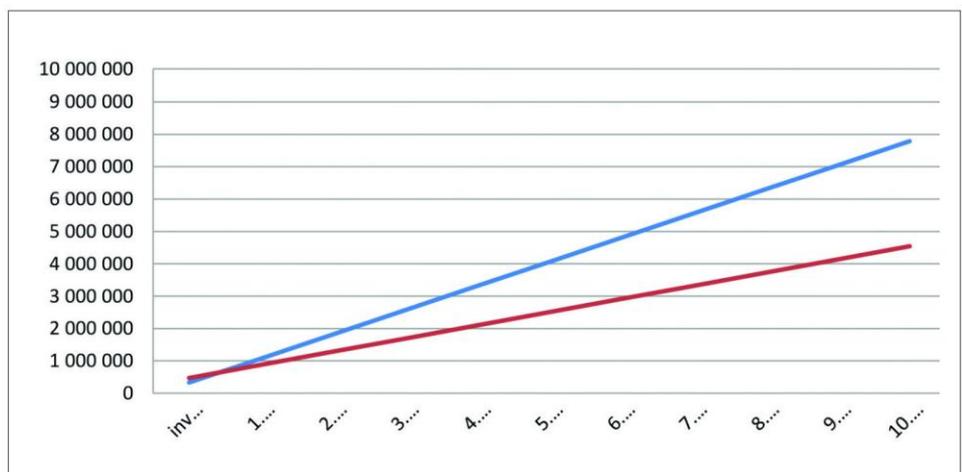
*Motto:
It is advantageous to implement an intelligent system for the heating of buildings and materials which will pay for itself thanks to the savings it brings.*

- Automation – a means of control that enables intelligent operation without an attendant.

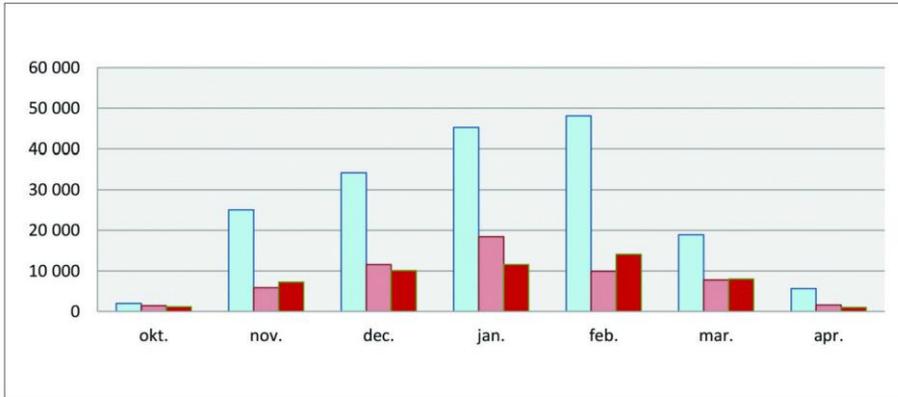
The solution is based on an intelligent means of regulation and the choice of efficient and physically suitable components for the conditions of a given application.

Intelligent regulation can optimally (i.e. economically) control the process of heating and ventilation without any human input – independently of external temperatures which change

every day, and other conditions affecting the utilisation of the building. At the same time, it can detect changes in the system, learn from them and adapt itself to new conditions. Inputs by people into the regulated process are undesirable and are therefore kept to a minimum – the attendant only enters data which are known to them, arise from the needs of the production process and do not cause undesired energy consumption - i.e. the period during which the area is used and the required temperature, and changes to these if needed. When using a regulation system without internal intelligence, attendants are forced to decide on parameters whose effectiveness they cannot assess and evaluate. When heating buildings, we need to determine the height of the temperature in the period when the building is not being used (at night, at weekends, etc.) and, analogically,



A cumulative comparison of the investment and operating costs of two realized heating systems for the client AI over a period of 10 years.



A comparison of the original and new costs incurred by the client AI after the reconstruction of a heating system in an industrial building.

Power Station) for a new thawing system for railway wagons were demanding and uncompromising as far as the maximum time and the protection of wagons against damage are concerned. If these requirements were not met, the result could be serious damage to the wagons themselves or their rotating parts during the thawing process.

If the required thawing time factor was not fulfilled, the performance or operation of the power station could also be affected negatively under



Details of the execution of a thawing tunnel

choose the time when heating should commence before the start of the period when the room needs to be used.

The selection of heaters takes place via the evaluation of their efficiency and the prices of available energy sources, which enables the use of the best quality equipment available on the market as efficient devices almost always exhibit the best ratio between value and price. When evaluating the final design for its clients, AUSTYN International places emphasis on the need to evaluate the price of the solution as an investment along with the sum of 3-5 years of energy costs needed for heating.

In practice, the process of finding a solution starts with the monitoring of existing heating system operation and a discussion with the investor about their current or expected future requirements for such a system.

In the case of a more complex design or a solution for the whole premises, temperature monitoring of the premises can take place at the beginning, with the data being recorded in graphic form. Its evaluation is used as a basis for the design of measures to

be taken, the selection of devices needed, and the prediction of savings and return on investment.

The procedure used enables the realization of a design with guaranteed savings and return on investment, and possibly the provision of a solution in the form of an EPC contract. Heating cost savings are achieved without the costly thermal insulation of industrial buildings, for which obtaining a return on investment is a long term business. All currently executed projects have their own specific characteristics, as original solutions have been created for each individual client based on the determined savings potential. The results of lowering the operating costs in practice – www.austyn.sk – usually confirm a maximum investment return period for the realized solutions of within three or four years.

A DESIGNED RAILWAY WAGON THAWING SYSTEM FOR NOVÁKY POWER STATION

The initial requirements of the investor Slovenské elektrárne, a.s. (at Nováky



Heating elements used

adverse weather conditions.

The solution was based on the experience of AUSTYN International with the use of energy transfer via infrared radiation, the selection of a suitable temperature gradient for the heated metal surfaces of the railway carriages, and the selection of an appropriate effective device for the heating.

The AGS control system is produced by AUSTYN International.

The principle of intelligent control which the AGS system uses in order to function as an automatic thawing machine was taken from building heating practice. After the wagons enter the heating area, the control system calculates the thawing period for the given wagon set without the

participation of attendants. Once the prescribed safety tasks have been performed, the attendant in charge confirms the start of thawing via remote control. After the initial tests, ECOSUN-type radiant panels from the Czech producer of electric heating systems, FENIX GROUP, were selected for use as heaters.

The panels were evaluated according to the efficiency by which they transform electrical power into infrared energy, the surface temperature of the active surface, the ability to emit radiation into the surrounding area in a uniform manner, and their resistance to adverse conditions – operation in a humid environment with dripping water, or even short periods of exposure to running water.

With regard to the heating control plan, we evaluated the thermal inertia properties of these devices, which would enable the control system to regulate temperatures in a “soft” and smooth manner in heated sections.

The fulfilment of the conditions we had set, the excellent certified emissivity parameter and, last but not least, the ability of the manufacturer to provide a

sufficiently long warranty period for the demanding work environment in the thawing tunnel, led to the confirmation of the selection of these devices. Infrared monitoring of the surfaces of the wagons during pilot operation and test thawings during the first months of operation confirmed the even coverage of the surfaces of the wagons with the infrared energy flow from these radiators, and simultaneously the achievement of the desired temperature gradient of up to 50°C there. Thanks to this, the protection of critical areas on the surface of the wagons against overheating was achieved and, at the same time, the energy needed for the thawing of the frozen load could be transferred within the required period.

The implemented solution is absolutely unique in the EU. According to the available information, this method of electric infrared heating has mainly been seen in the USA up to now, but with the employment of qualitatively different sources of radiation that often result in damage to the surfaces of the wagons. Thanks to the design conception, the components and control system of the process used,

exceptional energy savings have been achieved and the safety of the surfaces of the wagons and their bearing components has been confirmed. After the evaluation of the results from the first season, it can be stated that energy consumption dropped by more than 30 times (!) in comparison with the original hot air thawing system. Simultaneously, there was an increase in the quality of the evenness of thawing of the material over the whole surface, and throughout the whole volume of the thawed wagons.

The thus-realized heating system has also eliminated the inevitability of the planned fitting of thermal insulation onto the buildings used – the rate of return of that project would place it far beyond the borders of realizability.

This example of an executed thawing tunnel and other realized systems utilizing infrared heating unambiguously confirm that such systems are the most advantageous option for the provision of heating due to their parameters and financial results.