REBUILT

RESULT 3 – A1 – TEMPLATE

Company Name:	Cheh Plast Ltd
Professional sector and company size:	Cheh Plast Ltd. is a certified manufacturer and authorized Rehau partner, offering production and installation of aluminum joinery, German PVC joinery, suspended facades, ventilated facades with composite panels, ceramics, HPL, ethernet, glass doors and windows, winter gardens, blinds, and polycarbonate roofing. Established in 2000, the company employs 67 professionals' engineers and workers, and has a 12,100 sq.m. property with 2900 sq.m. built-up area.
Need/problem/challenge addressed:	Reducing the energy used for heating and cooling and reducing the consumption of electrical energy.
Sort presentation of the company:	It works with PVC profiles REHAU - Germany and aluminum joinery from companies ETEM, SCHUCO, REYNAERS, and ALUMIL. For the construction of curved facades SCHUCO and ETEM profiles are used.Since 2004, the company has been involved in ventilated facades, ceramics, HPL, wood as building lining as well as roofing structures made of glass and polycarbonate boards. Clients of Cheh-Plast Ltd. can be defined as more demanding and although the company is based in the small town of Vratsa, its production is well known throughout the country. The company has offices in Sofia, Lovech and a representative in Burgas who have been working successfully for more than 5 years. Since the beginning of 2003, the company has been a certified manufacturer, since it has been certified by the Austrian and German representatives of the company as a quality certificate for the production of PVC joinery REHAU, and since May 2009 has been "Authorized REHAU partner". All this is due to the compactness of the company and the excellent professional training of the staff. Thanks to the above mentioned, Cech-Plast Ltd. Became a well-known name in the cities: Sofia, Lovech, Burgas, Mezdra, Sevlievo, Varna, Sozopol, Kozloduy and abroad (Raiffeisenbank, Belgium, France and Austria). The company definitely has experience in working with banks as clients. "Cheh-Plast" Ltd. has made over 200 branches of Raiffeisenbank as well as separate branches of UniCredit Bulbank, Postbank, Alpha Bank, Piraeus Bank, Cooperative Bank and Allianzbank. "Cheh-Plast" Ltd. is a member of "Bulgarian Doors, Windows and Facades" Association from 2004. The Association includes more than 100 companies from the builders branch, who are positive, tat the only way to achieve results matching the client's demands is to invest in the business itself. In 2016 and 2017, the company invested over 3 million Bulgarian levs in a new hall, machinery and equipment. In order to have the latest in the industry. To meet the new requirements of architects and investors, Cheh-Plast Ltd. does not miss professional exhibitions specializing in the branch of the joinery manufacturers in Nuremberg and Munich, Germany, and to keep in touch with the latest innovations its regularly sending its experts to Thessaloniki, Greece and Istanbul, Turkey.https://chehplast.eu/

Initial Process and CO2 Emission Profile (tools, methodologies, theories, references):	The task consists in achieving even temperature at every point of the hall area (1345,5m2, heated volume 14238,73 m3), where joinery is manufactured, while optimizing the use of available energy resources, in this case natural gas. Until now, in the older halls warm-air heating has been used, and those with lower ceiling heights (around 3m) rely on heaters elements placed along the walls. The result is that in the inhabited zone (working area), not only is a consistent temperature is not achieved, but there are significant temperature differences, leading to discomfort and increased air currents."
Strategic Decision of the company:	The project began with the construction of the new hall (in 2016), and the heating system was radical changed to achieve the goals. Instead of the practices described above an industrial floor was built for heating
Process reengineering on selected waste (resources, methodologies, tools):	In many of its characteristics the industrial floor is similar to underfloor heating, but given the more serious loads on the floor in a production its construction method has more special requirements regarding the materials used and the construction itself. At the same time, laying of the system- the separated heating circuits made of Pex-A pipes, united in separate collector groups, is done almost simultaneously with the constriction of the concrete floor of the hall, which, in compliance with the technology in the first place, saves time, the laying of the system is fast, the system itself is “invisible” and does not occupy valuable space, unlike the older methods and does not interfere with internal factory transport. The calculation of the industrial floor has been known as a methodology since the 1920s (Kolmar, Ritchel-Reis), but its widespread industrial application began in the 1970s with the discovery of на Pex-A pipes by WIRSBO. Over time, manufacturers develop the system and offered products for complex solutions of these systems, which make their design and construction even easier. In this case, REHAU pipes, manifolds and fittings were used, and the distribution network was built with KAN STEEL materials. The latter was chosen from the point of view of compactness (smaller outer diameters of the metal pipes compared to Pex-A pipes). Because, unlike the hot air devices and heating elements so far, which use a high-temperature heating source, the applied system implies the use of low-temperature source- in our case 45°C. This allows the use of condensing gas boiler or heat pumps, which, when they are of quality and from verified brands, significantly save energy duo to precise control and the processes of their automation. In this case, we decided on a VIESSMANN condensing boiler An additional hidden bonus of this system is that, due to the physics of surface heating, the perceived temperature by individuals is usually 2°C higher than the dry bulb temperature shown on an dry thermometer in the room. This allows for a 2°C lower temperature to be used in the calculations of the room, saving energy compared to older systems under the same conditions, without compromising people's comfort. Of course, in order to achieve long-term cost savings (in gas expenses in this case), in addition to quality equipment and proper execution, we also took care of the enclosure of the hall, using Mineral wool panels with a 12 cm thickness on the walls and roof, where U=0.26 W/m²K, and the glazed parts of the hall were produced with U=1.1 W/m²K. Thus, reduced heat losses also led to a reduction in the heat required for heating, and from there a smaller boiler, as well as to larger steps for laying the floor coils, resulting in fewer used pipes. These measures saved money and made the overall solution more sustainable.

	Another bonus of implementing such a system is that, if necessary, a heat pump can easily be integrated into the installation without significant modification. It can replace gas as a fuel source on the one hand, and on the other – to use the existing system of the industrial floor to cool the hall in the summer, and instead of hot water, the floor is supplied with cooled water.
Re-engineering outcome and results. Emission profile improvement and other success evidence:	Since it's a new project from the very beginning, its challenging to compare it to itself, but: 1) The hall in the working area was and is heated evenly to 16°C in every point, which ensure the comfort of the people in the working process and fulfills the requirements of the automation of the high- tech machines for production of joinery. 2) Due to the negligibly low convection of the industrial floor, unlike all other heating systems, the phenomenon where heat rises and accumulates under the roof, forming a 'cushion' and increasing the losses through the roof, while the working area is frankly cold, is not observed in this case. Here, at a height of 2m, the temperature in every point meets the requirements. 3) Thus, taking into account the climate data for the region and the operating mode of the site (3 changed), the efficiency of the boiler (99,1%) turns out that the energy consumption for heating is 123,6 KWh/m2 or annual consumption of 166 307 KWh/a. 4) The primary energy for the use of gas is 135,96 KWh/m2, and that for the circulation pump and the boiler (electricity) is 1,2 KWh/m2 5) The carbon footprint from the use of gas is 33,59 tons CO2/a, and the used electricity for the system gives 1,22 tons of CO2/a respectively.
Please identify the sustainability goals (SDGs) and the specific targets achieved in the described case:	The installation has been running smoothly for 7 years and meets its requirements and proving a healthy working environment.