PROJECT RURES

D.T2.2.1 Template for Pilot action report June, 2020

1. Introduction

Project index number and acronym	CE933 RURES
Responsible partner (PP name and number)	City of Leisnig PP2
Project website	http://www.interreg-central.eu/RURES
Pilot action number and title	D.T2.2.2 Report of Pilot action (PA1) to test HRV system to increase EE and RES in Saxony
Pilot action location	Chemnitzer Straße, 101, 04703, Leisnig
Delivery date	30.06.2020

2. General information on the pilot action

The old heating and ventilation system of the sports hall in Leisnig was based on technology installed in 1991. The heating system was based on oil. The ventilation system was inefficient compared to the current standards.

An update of these technical devices was therefore overdue. Since a natural gas network is available in the district, it was decided to use a new boiler with gas condensing technology for heating and to combine it with a new ventilation system with efficient heat exchangers.

The new ventilation system is equipped with a combined supply and exhaust air unit with a highly efficient cross-flow plate heat exchanger for heat recovery. The location of the ventilation system is the ventilation centre of the old system on the upper floor of the building. Parallel to the renewal of the ventilation system, a gas condensing boiler is used to supply the building with heat. The installation site is on the ground floor of the central heating. The nominal heating capacity of this boiler plant is 184 kW. Hot water is produced by means of two storage water heaters, also installed in the central heating plant.

The total investment costs amount to 96.742,28 €. This includes only the costs for the air-conditioning-system and architectural and engineering services. The costs are refunded by the RURES project with 55.000,00 €. The remaining costs were financed by the City of Leisnig.

With the implementation, energy cost savings of 24 % will be reached.

3. Timeframe of the pilot action

Start date (dd.mm.yyyy.)	28.03.2020
End date (dd.mm.yyyy.)	22.06.2020
Remarks on timeframe:	

It was planned to install the ventilation system in the calendar weeks 45 to 51 2019, but the project was delayed by urgently needed preparatory work, such as the installation of the new heating system and the cleaning of the existing ventilation ducts, but also by the supply bottlenecks caused by the Corona crisis and the TÜV approval, which could not be carried out immediately after completion of the construction work.

The installation of the new ventilation system was carried out as follows:

14th-17th week 2020	Dismantling of the old ventilation system; bricklaying and painting work in the ventilation centre
18th -19th week 2020	Supply and installation of ventilation unit and switch cabinet; installation of fire dampers; bricklaying work for fire dampers
20th-21th week 2020	Checking the statics of the construction
22th-23th week 2020	Final assembly of ventilation unit and switch cabinet; installation of air ducts, thermal insulation and electrical installation
24th- 25th week 2020	Commissioning of ventilation unit, switch cabinet, complete system; expert opinion; painting work; cleaning; site supervision

4. Information on preparation of the pilot action

In preparation for the pilot project a feasibility study was conducted. For this purpose, an on-site inspection was carried out in which the building shell and the technical installations were photo documented and evaluated. On the basis of the inspection and the building information, a simulation model of the building was created, the heating load was calculated, and an energy and economic evaluation was carried out. Subsequently, the ventilation system was planned by a planning office.

Finally, a heating and ventilation scheme and a cost estimate were drawn up. Furthermore, the timeframe of the implementation was fixed.

The following current standards and guidelines were taken into account in the planning and implementation of the ventilation system:

- EU-VO 1253/2014/EG – “Anforderungen an die Energieeffizienz von RLT-Geräten”
- DIN 1946 – “Lüftungstechnische Anlagen (VDI-Lüftungsregeln)”
- DIN EN 13779 – “Lüftung von Nichtwohngebäuden”
- DIN 18379 – “ATV für Bauleistungen Raumlufttechnische Anlagen (VOB/C)”
- VDI 3803 Blatt 1 – “Raumlufttechnik, Zentrale Raumlufttechnische Anlagen”
- VDI 3803 Blatt 5 – “Raumlufttechnik, Wärmerückgewinnungssysteme”
- VDI 6022 – “Hygieneanforderungen an Raumlufttechnische Anlagen und Geräte”
- Muster- “Richtlinie über brandschutztechnische Anforderungen an Lüftungsanlagen”
- The maintenance and repair of the ventilation system is carried out in accordance with the
- standards DIN EN 15239 "Leitlinien für die Inspektion von Lüftungsanlagen" and DIN EN 15240

5. Information on implementation of the pilot action

The project was delayed by two urgently needed preliminary studies. In the first preliminary investigation it should be clarified whether the existing concrete ducts for the supply and exhaust air can be cleaned and reused for the new plant. In the second preliminary investigation, the fire protection separation of the gymnasium and the changing room will be examined. In order to prevent fire spreading through the ventilation system, the exhaust air ducts are to be routed through the roof of the sports hall. It must be checked whether the statics of the roof structure are enough for the installation of the exhaust air ducts.

Following the preliminary studies, detailed planning could take place, which was the prerequisite for tendering and awarding the contract. Public contracts were award in accordance with the General Public Procurement Ordinance (VgV). As the investment sum was below the threshold value and was subject to the award of the contract, it was subject to federal state law.

With the invitation to tender for the construction work, the maintenance work for the plant was also put out to tender. As a rule, the plant constructor carries out a sifting inspection once a year. In addition, a fire protection inspection must be carried out every three years by an expert in accordance with the Saxon Technical Inspection Ordinance (SächsGVBl.).

6. Cost of the pilot action

Planned cost of the pilot action as in the last approved project Application Form (in Eur)	55.000,00 €
Planned ERDF funding rate (in %)	80 %
Planned ERDF funding (in Eur)	44.000,00 €
Total real cost of the pilot action (in Eur, excl. VAT)	96.742,28 €
Total real ERDF funding of the pilot action in Eur	77.393,82 €
Notes (if necessary):	

The actual cost of 96.742,28 € includes only the 1st construction phase, the sports hall itself. The 2nd construction phase, the sanitary facilities, are not included here, in contrast to the planning.

It was not possible to implement everything as planned, since the actual costs considerably exceed the cost of planning and the city of Leisnig was not able and still is to finance the remaining works only from its own funds.

Planned work was either postponed to a later date with support/financing from other support programs. Necessary preliminary works for the installation of the ventilation system with heat recovery function were financed by the City of Leisnig itself and are therefore no longer part of the settlement.

7. Comparability of the pilot actions (according to the results of the pilot actions)

The impact of the pilot action (local, regional, national, global)	Leisnig itself has a large number of active sports and cultural clubs and two schools. The whole region will benefit from the new energetic and structural improvement of the public facilities in order to have a supportive influence on the cultural infrastructure. A well-air-ventilated gym gives schools and clubs the opportunity to maintain their sporting activities or even use them for cultural events. Sports facilities are an important part of a well-functioning society and thus of a well-developed environment.
Number of potential users	1200
Number of population in city/municipality	8586
The ratio of investment cost and potential users (€/per user)	130 [€/per user]
The ratio of investment cost and city/municipality population (€/per capita)	18,17 [€/per capita]
Impact on the population - No of potential users/Total population * 100 (%)	14 [%]

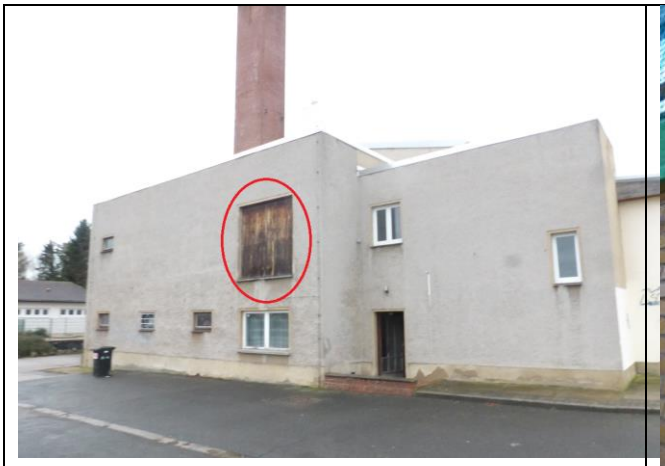
8. Transferability of the pilot action

The knowledge gained is not limited to the region. The building type of the Karl Zimmermann gym is widespread in Eastern Europe. In most cases, the buildings are in a similarly poor energetic condition as the Karl Zimmermann sports hall.

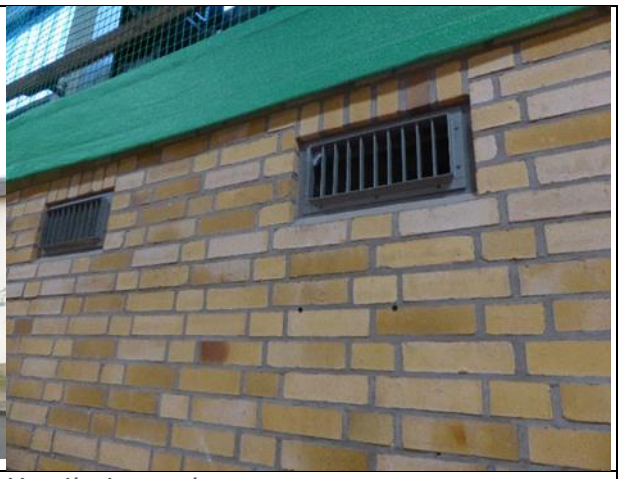
The installed plant technology corresponds to the state of the art. Their use is reliable and has been tried and tested several times. The technology is available throughout Europe and also in non-European countries. The installation can be carried out on site by any local specialist company. Similar projects in other EU and non-EU regions can make rural areas more attractive and counteract urbanisation.

9. Photos of the pilot action

The first following four Photos demonstrate the old ventilation system and other old details and Circumstances, the other ones of the following photos the new ventilation system.

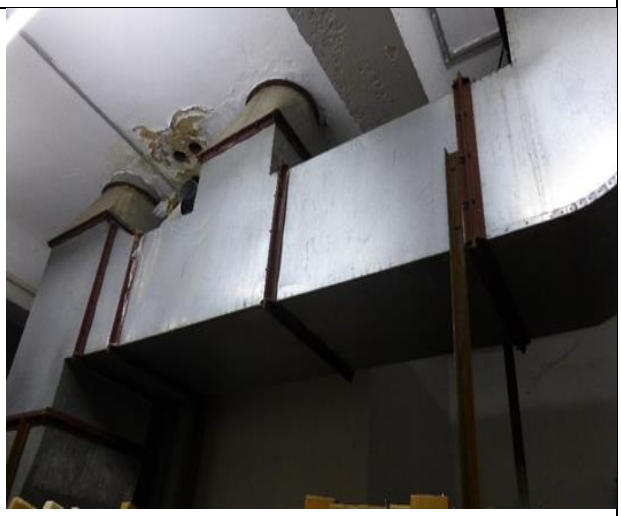


Central heating and ventilation unit.
The large opening in the ventilation centre facilitates the dismantling of the old system and the installation of the new system.

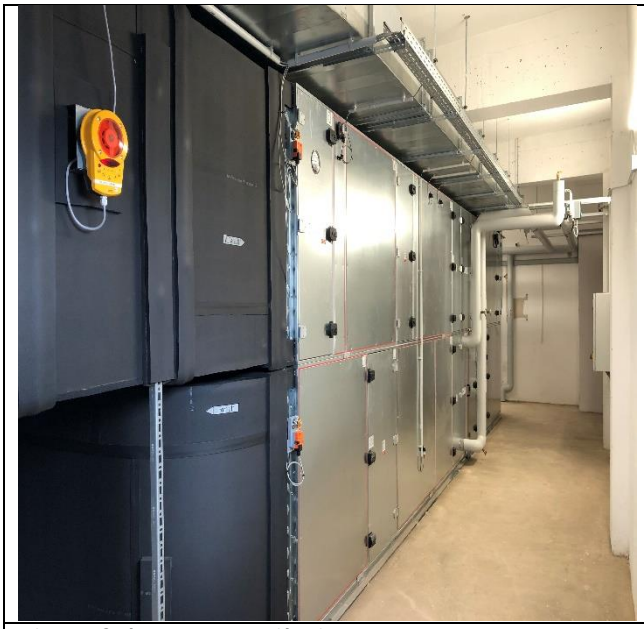


Ventilation outlets

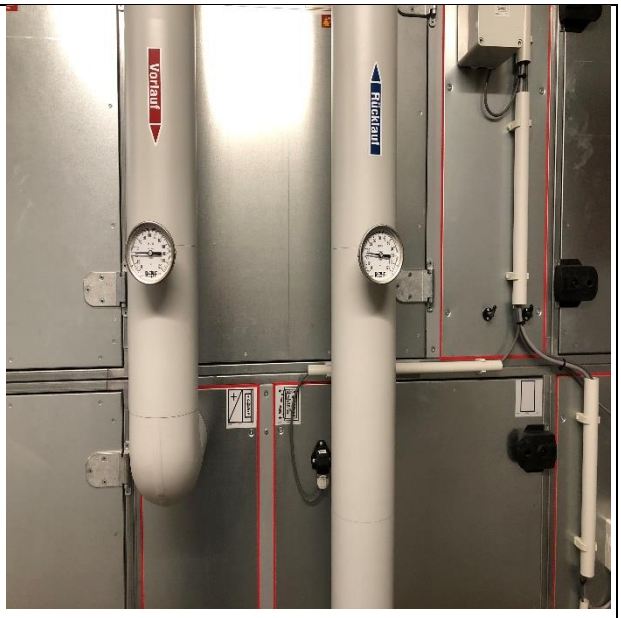
Interior view of the gym



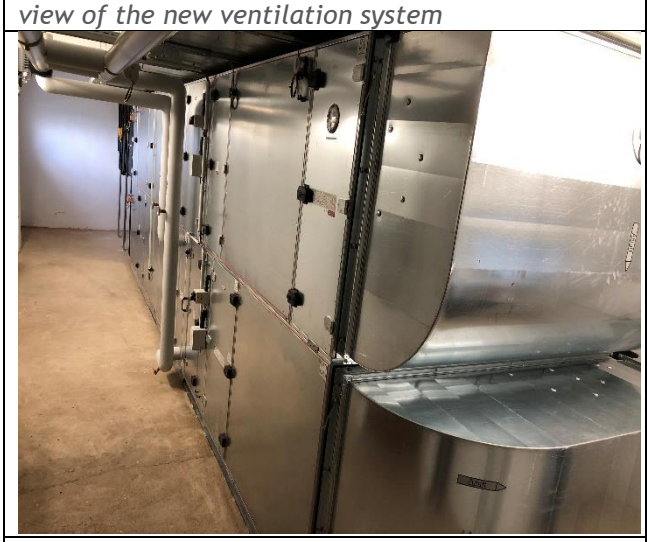
View of the old ventilations system



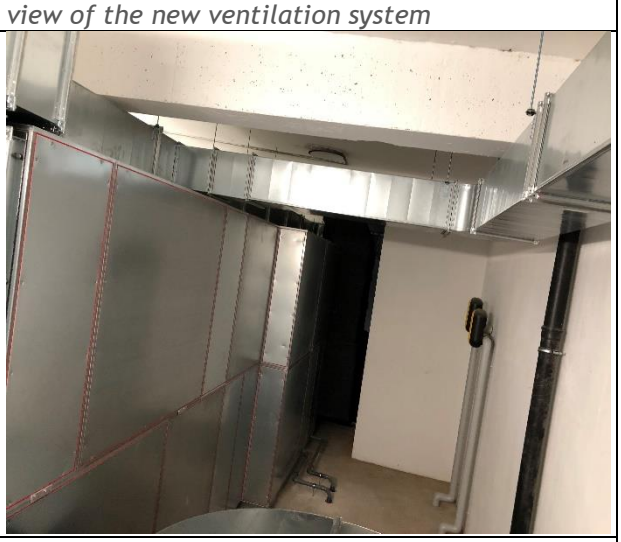
view of the new ventilation system



view of the new ventilation system



view of the new ventilation system



view of the new ventilation system

10. Conclusion and further suggestions

In this pilot action, the existing heating and ventilation system of the Karl-Zimmermann gym in Leisnig was replaced by a ventilation system with a highly efficient cross-flow plate heat exchanger for heat recovery.

The old heating and ventilation system was installed in 1991. The heating system based on oil and the ventilation system was inefficient compared to the current standards. An update of these technical devices was therefore overdue.

As there is a natural gas network in the district, it was decided to use a new boiler with gas condensing technology for heating and to combine it with a new ventilation system with efficient heat exchangers. This was realised end of 2019.

The new built-in ventilation system is equipped with a combined supply and exhaust air unit with a highly efficient cross-flow plate heat exchanger for heat recovery.

Through the pilot action, the energy costs can be reduced from 33,678 € to 27,103 € per year. That corresponds to a saving of 23,7 %. Beyond that 22 % of the CO2-Emissionen can be saved. The calculated savings refer to the actual consumption. With the current heating system, it is not possible to heat the hall sufficiently during the winter months, which is why higher consumption is possible.

The total investment costs amount to 96.742,28 €. This includes only the costs for the air-conditioning-system and architectural and engineering services. The costs are refunded by ERDF with 55.000,00 €. The remaining costs were financed by the Town of Leisnig.

The costs for the installation of the new heating system amount to 77.286,51 € excl. VAT, the costs for demolition work in connection with the conversion of the ventilation system amount to 12.571,04 € excl. VAT, the cost of the statics amounts to 1.929,96 € excl. VAT and the costs for cleaning the old ventilation ducts amount to 18.706,53 € excl. VAT. The costs of the preparation works total were financed by the Town of Leisnig.

Without subsidies it would not be possible to make the investment. A main reason for the implementation of the measure was that the ventilation system had to be replaced anyway. Furthermore, the high investment is not only offset by the energy savings, also the benefit for the entire rural region.

The installed plant technology corresponds to the state of the art. Their use is reliable and has been tried and tested several times. The technology is available throughout Europe and also in non-European countries. The installation can be carried out on site by any local specialist company. Similar projects in other EU and non-EU regions can make rural areas more attractive and counteract urbanisation.

Compared to the other pilot actions, this pilot action is the only energy efficiency measure. The building type of the Karl Zimmermann gym is widespread in Eastern Europe. In most cases, the buildings are in a similarly poor energetic condition as the Karl Zimmermann sports hall. So, there is also a high potential for many other municipalities to improve the attractiveness of extensive renovations of run-down buildings and to counteract urbanisation. Often the building shell is in an unrefurbished condition and the heat generator is outdated. With better and new sports facilities, it is expected that the attractiveness of a rural area will increase and become an important economic factor. It can create jobs and decisively influence the image of the region.