DELIVERABLE T1.3.3

D.T1.3.3 – Estimation of heating losses from thermal data / PA8

03/2020

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A.T1.3 Estimation of PV potential and heating losses

Issued by: Partner Nr. 12
Date: March 2020

Circulation RE – public

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1. Introduction and aims

The deliverable T1.3.3 belongs to the activities related to estimation of PV potential and heating losses (A.T1.3). In particular for each Pilot Action, a report has been created reporting some information gathered from onsite thermal acquisitions or data owned by local energy agencies. The overall idea is to report the heating loss situation in the pilot buildings and, if possible, the improvement after the investment activities. According to Application Form, the quantification of D.T1.3.3 is 7 but we created 8 documents corresponding to the 8 locations of the Pilot Actions (one cross-border). The various deliverables reports information and graphical results of thermal analyses in all PAs with (public or internal) and without investments. In this latter case, despite the lack of investment, thermal and energetic analyses were performed in any case to provide useful material to the local municipalities and inform them of possible energy efficiency actions they could undertake to improve the energy performance of buildings.

In the following section the activities related to PA8 in Lubawka (Poland) and Zacler (Czech Republic) are reported.

2. Thermal acquisitions in the BOOSTEE-CE pilot action #8

In the following tables, we report the acquired thermal data with some metadata and comments, to facilitate comprehension and understanding of the situation. In PA8, despite the lack of investment, thermal acquisitions were acquired to provide some material to the local stakeholders (policy and energy makers) and let them understand the way to advance with energy performances in Lubawka (Poland) and Zacler (Czech Republic) municipalities. The document is created with data and information from winter 2018-2019.

PA8: Lubawka area, PL

Acquisition date	**26.02.2019**
Time and ext. temperature	**23:16, 1 deg**
Distance from building [m]	**20**
Type of building	**Town hall**
Owner	Municipality of Lubawka
Description of the composition of the outer wall	Brick
Heat transfer coefficientfor external wall [W/m2K]	0,69
Heat transfer coefficient- windows [W/m2K]	2,6
Energy consumption (heating) [GJ/year]	1650
Type of energy source	gas boiler
Annual utility energy demand EU [kWh/m2/year]	788,90

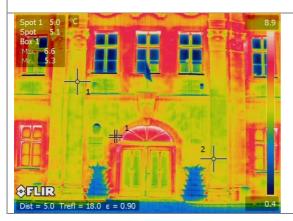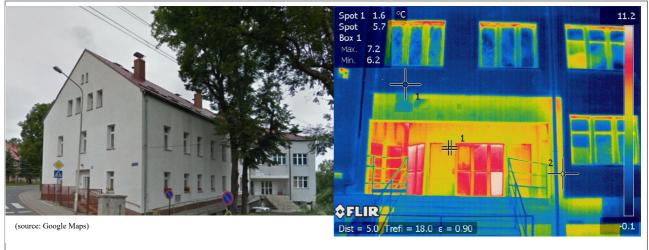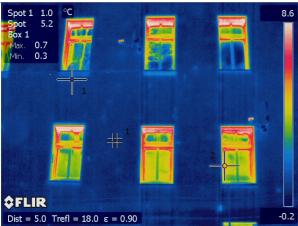(source:https://pl.wikipedia.org/wiki/Plik:Lubawka,_pl._Wolno%C5%9Bci_R atusz_DSC_0031-1.JPG)

- Clear heating looses around the windows and the entrance;
- Thermal bridges in the upper floor between the windows

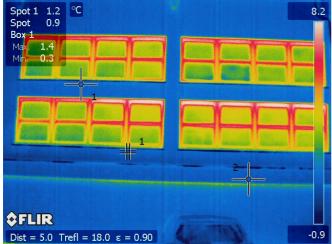| Acquisition date	26.02.2019
Time and ext. temperature	23:50, 1 deg
Distance from building [m]	15
Type of building	Public health care institution
Owner	Municipality of Lubawka
Description of the composition of the outer wall	MAX blocks, styrofoam, air gap, hollow blocks
Heat transfer coefficient for external wall [W/m2K]	0,20
Heat transfer coefficient- windows [W/m2K]	-
Energy consumption (heating) [GJ/year]	445,375
Type of energy source	gas boiler
Annual utility energy demand EU [kWh/m2/year]	179,71

(source: Google Maps)

- The building is after the thermo-modernization works and doesn't show anomalies

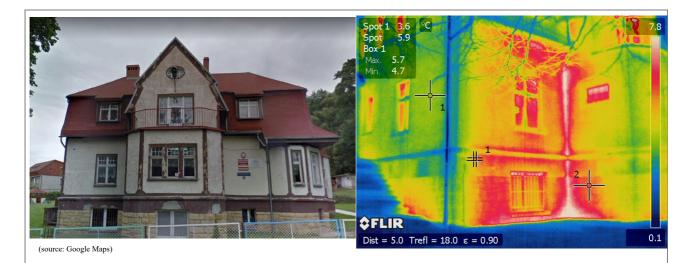| Acquisition date	27.02.2019
Time and ext. temperature	00:45, 1 deg
Distance from building [m]	30
Type of building	School
Owner	Municipality of Lubawka
Description of the composition of the outer wall	Porotherm blocks on cement and lime mortar, styrofoam, fiberglass mesh, mineral plaster, plaster mosaic
Heat transfer coefficient for external wall [W/m2K]	0,20
Heat transfer coefficient- windows [W/m2K]	1,1
Energy consumption (heating) [GJ/year]	2 374,58
Type of energy source	coal boiler
Annual utility energy demand EU [kWh/m2/year]	294,11

(source: http://fotopolska.eu/foto/927/927275.jpg)

- The building is after the thermo-modernization works and doesn't show anomalies

Acquisition date	27.02.2019
Time and ext. temperature	01:20, 1 deg
Distance from building [m]	10
Type of building	Kindergarden
Owner	Municipality of Lubawka
Description of the composition of the outer wall	Brick, cement-lime internal plaster
Type of energy source	gas boiler

(source: Google Maps)

- Clear heating looses around the windows and the walls;
- Visible significant heat loss at the bottom of the building (basement);
- Thermal bridges in the walls

PA8: Zacler area, CZ

Acquisition date	27.02.2019
Time and ext. temperature	22:10, 6/7 deg
Distance from building [m]	20
Type of building	Primary school
Owner	Město Žacléř
Energy consumption (heating) [GJ/year]	3 241
Type of energy source	gas boiler
Annual final energy demand EK [kWh/m2/year]	1064,11

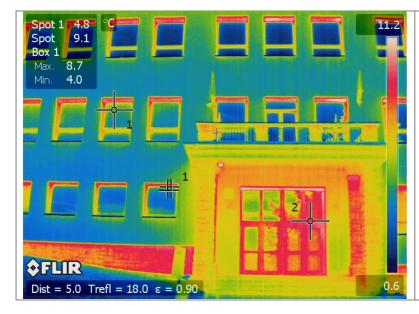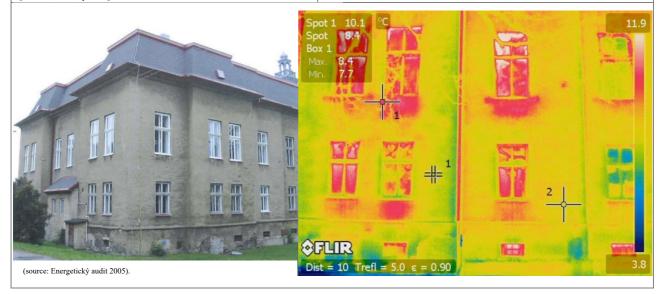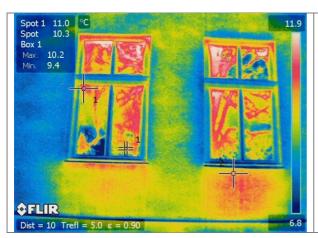(source: https://mobatime.cz/zs-zacler/)

- Thermal bridges between the windows
- When interpreting photos, it is important to know the absorption properties of the material – the visible red spots represent fake heat losses

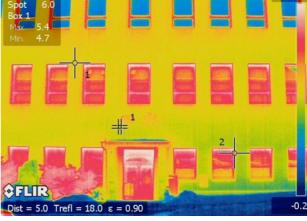| Acquisition date	**27.02.2019**
Time and ext. temperature	**22:50, 6/7 deg**
Distance from building [m]	**15**
Type of building	**Elementary Art School in Žacléř**
Owner	Město Žacléř
Description of the composition of the outer wall	Brick
Heat transfer coefficient for external wall [W/m2K]	1,17
Heat transfer coefficient - windows [W/m2K]	2,7
Energy consumption (heating) [GJ/year]	737,01
Type of energy source	gas boiler
Annual utility energy demand EU [kWh/m2/year]	110,2329

(source: Energetický audit 2005).

- Thermal bridges below the windows
- Clear heating looses around the windows and the walls

Acquisition date	**27.02.2019**
Time and ext. temperature	**22:50, 6/7 deg**
Distance from building [m]	**15**
Type of building	**Městská knihovna Žacléř**
Owner	Město Žacléř

(source: Google Maps)

- The building is after the thermo-modernization works and doesn't show anomalies
- The visible »anomalies« (the windows on the 3rd floor) are caused by unheated rooms on the 3rd floor