



**TREN/07/FP6EN/S07.70442/038514 SEMS**

**SEMS**

**Sustainable Energy Management Systems**

Instrument: **Integrated Project**

Thematic Priority: **No. 6: "Sustainable development, global change and ecosystems (including energy and transport research)"**

**D 3.09.3 Report on saved energy through retrofitting**

Due date of deliverable: **M36**

Actual submission date: **M48**

Start date of project: **1<sup>st</sup> June 2007**

Duration: **5 years**

Organisations name of lead contractor for this deliverable: **ESCO**

Revision **00**

Project co-financed by the European Commission within the Sixth Framework Programme (2002-2006)		
Dissemination Level		
PU	Public	PU
PP	Restricted to other programme participants (including services)	
RE	Restricted to a group specified by the Commission (including the Commission Services)	
CO	Confidential, only for members of the consortium (including the Commission Services)	

# Report on saved energy through retrofitting

Out of the implemented projects three schools were selected. These buildings are representative for the project area .

## Selected objects:

Elementary school Fels, Schulplatz 1, 3481 Fels  
Elementary school Pressbaum, Hauptstraße 77, 3021 Pressbaum  
Secondary school Pressbaum, Funkhgasse 45a, 3021 Pressbaum

## Object 1: Elementary school Fels

Concerning retrofitting the following measurements were implemented in the elementary school in Fels/Wagram:

- The outer walls were insulated with 16 cm expanded polystyrene.
- The old countersash windows were replaced by thermal protection windows with three glass panes.

The energy index in accordance to the energy certification was reduced from 143 to 54 kWh/m<sup>2</sup> and year.

The gross floor area (BGF) amounts to 1.134 m<sup>2</sup>.

The difference of 89 kWh x BGF results in the savings of 100.926 kWh per year.



Abb. 1: Photo during the insulation of the outside wall



Abb. 2: Front side

## **Object 2: Elementary school Pressbaum**

In the elementary school in Pressbaum the following refitting measurements were implemented:

- The top floor ceiling was insulated with 24 cm cellulose.
- The outer walls were insulated with 6 cm expanded polystyrene.
- The old windows were replaced by thermal protection windows with three glass panes

The energy index in accordance to the energy certification was reduced from 170 to 90 kWh/m<sup>2</sup> and year.

The gross floor area (BGF) amounts to 2.335 m<sup>2</sup>.

The difference of 80 kWh x BGF results in the savings of 186.800 kWh per year.



Abb. 3: View from the front

## **Object 3: Secondary school Pressbaum**

In the secondary school in Pressbaum the following refitting measurements were implemented:

- The outer shell of the building was insulated in conformance of the most recent findings.
- All existing windows were replaced by thermal protection windows with three glass panes.

The energy index in accordance to the energy certification was reduced from 162 to 59 kWh/m<sup>2</sup> and year.

The gross floor area (BGF) amounts to 4.014 m<sup>2</sup>.

The difference of 80 kWh x BGF results in the savings of 413.442 kWh per year.

Projekt: 164

**ENERGIEAUSWEIS OIB**

Schule - Sanierung Konzept 4 = *nahe Fertig!*

cad | plan      kracmar  
**K** Bautechnisches Zeichenbüro  
3500 Krems      Hohensteinstrasse 63  
Tel. 02732/70893      Fax 02732/70893  
email: cad.kracmar.krems@aon.at  
www.kracmar.at

<b>Gebäudeart</b>	Schule	<b>Erbaut im Jahr</b>	1974
<b>Standort</b>	Funkhgasse 3021 Preßbaum	<b>Grundstücksnummer</b>	109/4
<b>Katastralgemeinde</b>	Pressbaum	<b>Einlagezahl</b>	1768
<b>Eigentümer/Errichter</b> (zum Zeitpunkt d. Ausstellung)			



WÄRMESCHUTZKLASSEN		ENERGIEKENNZAHL
Niedriger Heizwärmebedarf	Skalierung	HWB <sub>BGF</sub>
<b>A</b>	HWB <sub>BGF</sub> ≤ 30kWh/(m²a)	
<b>B</b>	HWB <sub>BGF</sub> ≤ 50kWh/(m²a)	
<b>C</b>	HWB <sub>BGF</sub> ≤ 70kWh/(m²a)	
<b>D</b>	HWB <sub>BGF</sub> ≤ 90kWh/(m²a)	
<b>E</b>	HWB <sub>BGF</sub> ≤ 120kWh/(m²a)	
<b>F</b>	HWB <sub>BGF</sub> ≤ 160kWh/(m²a)	
<b>G</b>	HWB <sub>BGF</sub> > 160kWh/(m²a)	
Hoher Heizwärmebedarf		

<b>Volumsbezogener Transmissions-Leitwert P<sub>TV</sub></b>	<b>0,14</b>	<b>W/m³K</b>
<b>LEK-Wert</b>	<b>18</b>	
<b>LEK<sub>eq</sub></b>	<b>37</b>	
<b>Flächenbezogene Heizlast P<sub>1</sub></b>	<b>32</b>	<b>W/m²</b>
<b>Flächenbezogener Heizwärmebedarf HWB<sub>BGF</sub></b>	<b>59,10</b>	<b>kWh/(m²a)</b>
<small>(Energiebezugsfläche: 4.013,56 m²)</small>		

**Ausgestellt durch**  
Bautechn. Zeichenbüro Ulrich Kracmar      Tel.: 02732/70893  
Hohensteinstrasse 63      Fax: 02732/70893  
3500 Krems      E-Mail: cad.kracmar.krems@aon.at

**Geschäftszahl**  
**Bearbeiter**      Kracmar      **Datum**      09.09.2008

Ulrich Kracmar-Bautechnisches Zeichenbüro-Hohensteinstraße 63-3500 Krems-email:cad.kracmar.krems@aon.at-www.kracmar.at  
GEQ von Zehentmayer Software: www.energieberechnung.at      Bearbeiter Kracmar  
Version 2007,0419 REPEAW - Niederösterreich      Datum 09.09.2008      Seite 1

Abb. 4: Front side of the energy certification

### Average savings per object:

Object 1: 100.926 kWh per year

Object 2: 186.800 kWh per year

Object 3: 413.442 kWh per year

---

$$701.168 / 3 = 233.723 \text{ kWh/year}$$

The average savings per year and object are 233.723 kWh.

If the „Niederösterreichische Energiebericht 2008“ (= Lower Austrian energy report 2008) would be taken as a basis, 0,23 kg per kWh would be the CO<sub>2</sub>-emission.

Therefore 53.756 kg CO<sub>2</sub> per year can be avoided (233.723 x 0,23).