Comparative analysis of gathered data

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1. Aim of the document

The aim of this report is to summarize the energy and environmental data gathered in each partner country and analyse and compare the relevant differences and similarities.

2. National and local legislation

2.1. Energy efficiency regulation in the public buildings and specifically in the school

AUSTRIA	CROATIA	CZECH REPUBLIC	HUNGARY	ITALY	POLAND	SLOVENIA
Yes	Yes	Yes	Yes	Yes	yes	yes

All partners have energy efficiency regulations for public buildings. Italy, as Czech Republic, Croatia has not specific energy efficiency regulations on school buildings, that are included in the definition of public buildings.

There are no homogeneous energy efficiency regulations for all schools in some countries as Austria, Italy, as they are, according to their level (kindergarten, primary, secondary) under different reference norms (federal, national or regional). In Italy, all regions have the obligation to transpose the National Law but each region has the option of issuing a local standard provided that it is more restrictive than the National one.

2.2. Local schools regulations

AUSTRIA	CROATIA	CZECH REPUBLIC	HUNGARY	ITALY	POLAND	SLOVENIA
Yes	no	No	No	Yes, regional	No	No

2.3. Promotion measures for energy efficiency in public buildings

All countries have funding and promotion measures for energy efficiency in public buildings

AUSTRIA	CROATIA	CZECH REPUBLIC	HUNGARY	ITALY	POLAND	SLOVENIA
Yes	Yes	Yes	Yes	Yes	Yes	Yes

2.4. European directives level of implementation

Both Energy Performance of Buildings Directive (EPBD) and Energy Efficiency Directive (EED) have been transposed in national legislation in the partner countries.

AUSTRIA	CROATIA	CZECH REPUBLIC	HUNGARY	ITALY	POLAND	SLOVENIA
Yes	Yes	Yes	Yes	Yes	Yes	Yes

2.5. Green Building Rating and Certification Schemes

In general certification schemes that consider not only energy, but also environmental aspects are quite uncommon in public buildings.

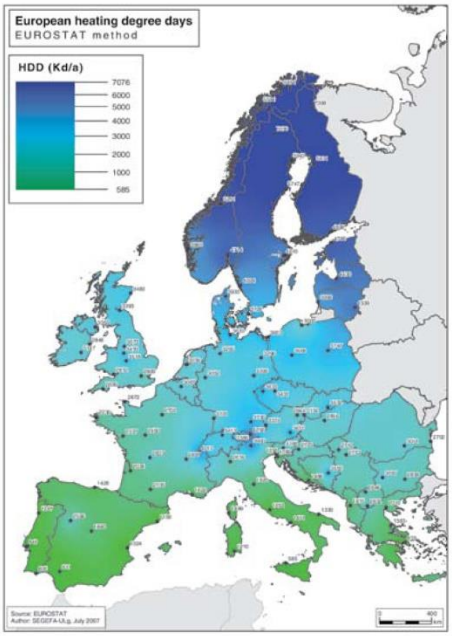
AUSTRIA	CROATIA	CZECH REPUBLIC	HUNGARY	ITALY	POLAND	SLOVENIA
Several	No	BREAAM, LEED, SB Tool CZ, Energy Performance certificates	BREAAM, LEED	ITACA, LEED, Energy Performance Certificates	LEED, BREAAM	Yes

3. Climatic data

3.1. Monthly external temperature data and degree days

Hereafter a map of heating degree days (HDD) in Europe. Considering the cities in which should be performed the pilots, HDD varies between 1580 of Split and 2881 of Prague

Figure 5: European heating degree days map (EUROSTAT method)



(Source: https://www.eurima.org/reports/u-values-for-better-energy-performance-of-buildings/3-background

3.2. Information about heating system requirements

	Project minimum temperature	Period of operation	Daily hours of operation
AUSTRIA	In theory: Start heating at an average outdoor temperature below 12°C. In practice: Average outdoor temperature below 15/16°C Indoor air temperature (from OISS guideline): 22°C for classrooms and lounge rooms 18°C for central wardrobes and sports halls 10-15°C for corridors (not used for lessons)	Regularly from Sept. 1st to end of April/beginning of May depending on the outdoor temperature	24 h (reduction of temperature during the night is possible)
CROATIA	20°C	October/01 – April/30	14 h

	Project minimum temperature	Period of operation	Daily hours of operation
CZECH REPUBLIC	13°C The "heating season" for purposes of central heating systems is defined by national law. It starts when the average daily temperature during two following days drops below 13°C and according to the forecast won't raise the following day. (The end of heating season is the exact opposite.) When the temperature temporarily rises, the central heating supply can be temporarily cut off for such a period.	See	The heat supply is usually reduced during nights and weekends.
HUNGARY	min. 20 Celsius	7 month	10hours - 14 hours
ITALY	20° C	15th October - 15th April	14 hours/day
POLAND	20° C (according to the standard PN-EN 12831)	Theoretically: 09/01 - 04/30 (dates used in energy performance certificate calculations) Practically, it depends on the energy manager of the building and the weather conditions. Usually the heating is turned on when the external temperature drops down below 10oC during three consecutive days.	There is no general rule. It depends on local conditions and awareness of the people responsible for the energy management in a school
SLOVENIA	The first day of the heating season shall be considered the day after the air temperature is lower or equal to + 12 ° C for three days in the second half of the year at 9 pm (Central European winter time).	The last day of the heating season is the third consecutive day in the first half of the year when, at 9 pm, the air temperature is higher than + 12 ° C, and after that day at 9 pm, mercury does not fall below the mentioned air temperature value three times in a row. The duration of the heating season is the number of days between the first and last days of the heating season	The heat supply is usually reduced during nights and weekends.

4. Building Types

4.1. Building Types according to the construction period

It is difficult to summarize and rationalize the different school building stock characteristics in the partner countries as they depend on several different parameters, as national, regional and local traditions, construction techniques, climatic conditions, laws.

In some cases, such as in Italy, different construction types may occur within the same region depending on whether the building is built: in the mountains, on the plain or on the sea.

In general all countries still have school buildings older than a century (historical buildings) together with very modern ones. Usually historical building have been partially renovated with new windows and insulated roof.

Buildings built till the mid-seventies in general do not have insulation on walls and roof. In that years were in fact introduced the first laws with mandatory requirements on energy efficiency. Buildings of that period have a minimum thermal insulation and in general have been renovated substituting windows with double glazing ones. Hereafter the situation by countries

Austria

Types	Period
3 floors, massive brick walls (> 45cm), no insulation, single glazed double windows (sometimes renovated with modern glazing), saddleback roof (mostly not used space), upper ceiling: plastered wooden construction, basement ceiling: vaulted or cap ceiling (bricks and steel beams), mostly protected monuments	1840-1918
Similar to the above type, mostly protected monuments	1918-1938
1-2 floors, massive brick walls and hollow brick walls (ca. 30cm), no insulation but sometimes already renovated to actual standards (> 10cm insulation), ceilings: reinforced concrete, upper ceiling originally with 5-10cm of insulation, mostly renovated with > 15cm insulation. Windows typically renovated with double-glazing	1945 – 1962 (reconstruction after WW II)
2 or more floors, concrete walls (sometimes prefabricated) and combination of concrete pillars and hollow bricks, low insulation standards, mostly renovated with insulation. Windows typically renovated with double-glazing	1962 – 1970
1-2 floors, concrete walls (sometimes prefabricated) or combination of concrete pillars and hollow bricks or insulated panels and big windows, low insulation standards, rarely renovated with insulation. Windows typically renovated with double-glazing	1970
Typically 2 or more floors, different constructions, energetic mid standards (insulation existing, U-value of the exterior walls 0,30 - 0,35, upper ceiling ca. 0,20), double-glazing windows	1981-2000
Energetic mid to high standards up to passive houses. Double or triple glazing windows, different construction types. Typically 2 floors.	Modern schools (> 2000)

Croazia

Period	Types
Before 1940.	*Brick or stone walls (30,45,60 cm), plaster, wooden ceilings, Floor – wooden blocks, single or double glass windows, no insulation.*
1940. - 1970.	*Reinforced Concrete structure, brick walls, stone blocks, double plaster, concrete roof, concrete floor, single or double glass windows, no insulation.*
1970. – 1987.	*Reinforced Concrete structure, brick, concrete roof, plaster, Floor – concrete + insulation 3 cm, double or triple glass windows, insulation – 2-4 cm.*
1987. – 2006.	*Reinforced Concrete structure, brick, concrete roof + insulation 8-12 cm, Floor – concrete + insulation 3 cm, double izo - glass windows, insulation – 4-8 cm.*
2006. -	*Buildings are in compliance with Tehnical regulation on energy economy and heat retention in buildings (Official Gazette 128/15)*

Czech republic

Period	Types
Historical buildings - older than 100 years	Brick structure/walls, saddleback roof, 2-3 floors, usually not insulated (because of protection as historical heritage), but already with new energy efficient windows and insulated roof
Buildings from 70s and 80s of the last century	Pavilion houses, panel construction, flat roof, 1-2 floors, overwhelming majority already insulated and windows changed

Hungary

Period	Types
40-50s	*2- or 3 floors, , brick walls, no insulation*
70s	*2- or 3 floors, Reinforced Concrete structure, brick walls, no insulation*
85 -90 years	*2- or 3 floors, Reinforced Concrete structure, brick walls, no insulation, central heiting*

Italy

BUILDINGS BUILT BEFORE 1976

Construction type:	MASONRY
Envelope characteristics:	BRICKS WITHOUT INSULATION SINGLE GLASSES WINDOWS ROOFS WITHOUT INSULATION BASEMENT WITHOUT INSULATION
Heating System:	NO ZONING SYSTEM NO TEMPERATURE REGULATION EQUIPMENT HIGH TEMPERATURE BOILER NO INSULATING PIPES
Renewables sources:	NO PHOTOVOLTAIC SYSTEMS NO SOLAR HEATING SYSTEMS NO OTHER RENEWABLES SOURCES SYSTEMS

BUILDINGS BUILT FROM 1976 TO 2005

Construction type:	RENFORCED CONCRETE
Envelope characteristics:	POT BRICKS WITHOUT (OR VERY LITTLE) INSULATION DOUBLE GLASSES WINDOWS ROOFS WITHOUT (OR VERY LITTLE) INSULATION BASEMENT WITHOUT (OR VERY LITTLE) INSULATION
Heating System:	ZONING SYSTEMS NO TEMPERATURE REGULATION EQUIPMENT HIGH TEMPERATURE BOILER NO (OR VERY LITTLE) INSULATING PIPES
Renewables sources:	NO PHOTOVOLTAIC SYSTEMS FEW SOLAR HEATING SYSTEMS FEW OTHER RENEWABLES SOURCES SYSTEM (BIOMASS)

BUILDINGS BUILT AFTER 2005

Construction type:	RENFORCED CONCRETE, WOOD, OTHER
Envelope characteristics:	POT BRICKS WITH INSULATION DOUBLE AND TREATED GLASSES WINDOWS ROOFS WITH INSULATION BASEMENT WITH INSULATION
Heating System:	ZONING SYSTEMS TEMPERATURE REGULATION EQUIPMENT LOW TEMPERATURE BOILER INSULATING PIPES
Renewables sources:	PHOTOVOLTAIC SYSTEM SOLAR HEATING SYSTEM OTHER RENEWABLES SOURCES SYSTEMS (BIOMASS)

Poland

Period	Types
Before 1939	1-3 floors, brick walls, no insulation, gable roof, usually new windows
1950-1990	2-3 floors, prefabricated reinforced concrete structure (usually insulated in last years), flat rooftop, usually new windows
1990-now	2-3 floors, reinforced concrete structure, flat rooftop, new windows, sometimes RES installed

Slovenia

Period	Types
Example '60s	*2 floors, Reinforced Concrete structure, brick walls, no insulation*
Before 1920	thick mixed stone-brick walls with a thickness of 38 to 65 cm, box windows, ornamented and often monumental protected facade, arched cellars and wooden ceilings.
Until 1940	38 cm thick brick walls, including wooden ceilings with wooden windows. The first concrete ceilings appear. The façade, roofs and attics are non-insulated.
Buildings in the '70s	Buildings built up to the mid-seventies are worse or equally high-quality buildings than buildings that were built until 1940. The walls are thinner to 30 cm, there are no insulating materials, the facades are simple. The walls are built with modular bricks or concrete.
Buildings in '80s	Buildings with a minimum thickness of thermal insulation. Bricks walls or concrete construction. Windows are large with a wooden or aluminum frame with single or double glazing - mostly unsuitable.
'90s and new buildings	Constructions - brick walls with thermal insulation or prefabricated construction. Windows are wooden, aluminum and PVC - double glasses till 2000 specially "thermopan". Roofs without or bad insulation.
Present	New buildings are designed and constructed according to the provisions of the *Regulations on energy efficiency in buildings*.

4.2. Energy indicators by type of school (kindergarten, school ...)

Hereafter the average energy indicators for different kind of school buildings are reported for each partner country

Austria

Types	Energy Indicator (kWh/m^2)
Modern schools and kindergarten (> 2000)	15 kwh/m² – 50 kWh/m² (heating), < 20 kWh/m² electricity
Period up to 1945	80 – 100 kWh/m²
1945 – 1979	120 kWh/m² - 200 kWh/m²
1980 - 2000	70 – 120 kWh/m²

Croazia

General database of energy indicators by type of school is not available.

Czech republic

Types	Energy Indicator (kWh/m^2)
Kindergartens	not-insulated: 180 insulated: 110
Schools	not-insulated: 140 insulated: 80

Hungary

Types	Energy Indicator (kWh/m^2)
school -	150 kWh/m^2

Italy

Types	Energy Indicator (kWh/m^2)
All types of schools built before 1976	200-250
All types of schools built from 1976 to 2005	90-150
All types of schools built after 2005	50-70

The consumption shown refers only to heating system and use of domestic hot water. In Italy, until 2015 no consumption assessment was expected in other sectors. Because of the explained reasons, there is no national reference benchmark for using electricity in school buildings

Poland

The energy performance of schools in Warsaw ranges from between 50 kWh/m²a (G3 – Middle School) up to 700 kWh/m²a (PS 188 – Primary School). Most of schools consume final energy from range 110-300 kWh/m²a.

Slovenia

Types	**Energy Indicator (kWh/m^2)**
Kindergartens	not-insulated: 160 - 240 insulated: 60 - 110
Schools	not-insulated: 120 - 160 insulated: 60 - 90

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4.3. Materials of the main building systems

Hereafter the most commonly used construction materials are reported for each partner country

Austria

Building System	Materials	Period of construction
Structure	Massive bricks	Up to 1945
	Massive and hollow bricks	1945 – 1960
	Hollow bricks and combinations with reinforced concrete pillars	1960s
	Prefabricated Concrete elements or concrete pillars with panels/bricks	1970 – 1990
	Different constructions (wood, bricks, concrete)	after 1990
Roof s	Saddleback roof	until 1962
	Flat roof	1962 until now
Envelope	See structure, bricks, concrete, wood	
Windows	Single glazing in double/box-windows	Until 1950
	Single glazing in coupled windows	60s, early 70s
	Double glazing	1975 – 2010/15
	Triple glazing	now
Floor	Typically isolated	Since 50s
	U-value 0,50	60s and 70s

Croazia

Building System	Materials	Period of construction
Structure	*Brick, stone*	*Before 1940.*
Roof s	*Wood, no insulation*	*Before 1940.*
Envelope	*Brick or stone walls, no insulation*	*Before 1940.*
Windows	*Single or double glass windows*	*Before 1940.*
Floor	*Wooden blocks*	*Before 1940.*

Building System	Materials	Period of construction
Structure	*Reinforced Concrete structure*	*1940. - 1970.*
Roof s	*Concrete, no insulation*	*1940. - 1970.*
Envelope	*Reinforced Concrete structure, brick, no insulation*	*1940. - 1970.*
Windows	*Single or double glass windows*	*1940. - 1970.*
Floor	Concrete	*1940. - 1970.*

Building System	Materials	Period of construction
Structure	*Reinforced Concrete structure*	*1970. – 1987.*
Roof s	*Concrete*	*1970. – 1987.*
Envelope	*Brick, insulation 2-4 cm*	*1970. – 1987.*
Windows	*Double or triple glass windows*	*1970. – 1987.*
Floor	*Concrete, insulation 3 cm*	*1970. – 1987.*

Building System	Materials	Period of construction
Structure	*Reinforced Concrete structure*	*1987. – 2006.*
Roof s	*Concrete, insulation 8-12 cm*	*1987. – 2006.*
Envelope	*Brick, insulation 4-8 cm*	*1987. – 2006.*
Windows	*Double izo – glass windows*	*1987. – 2006.*

Czech republic

Historical buildings - older than 100 years

Building System	Materials	Period of construction
Structure	Brick	
Roof s	Saddleback roof usually insulated	
Envelope	Brick	
	usually not insulated	
Windows	Double-glazed (usually)	
Floor	Poured floor	

Buildings from 70s and 80s of the last century

Building System	Materials	Period of construction
Structure	Reinforced concrete	
Roof s	Flat usually insulated	
Envelope	Concrete usually insulated	
Windows	Double-glazed (usually)	
Floor	Concrete	

Hungary

Building System	Materials	Period of construction
Structure	brick, concrete, monolith	1960-1985 - Existing school building, made of prefabricated locks of panel 1930 - Existing school building, built of brick
Roof s	flat roof, tile	Independent of construction age. After 1990, stone and plastic casings with smaller occurrence.
Envelope	ceramics, stone, plastic	Independent of construction age. After 1990, stone and plastic casings with smaller occurrence.
Windows	wood, plastic, glas (one layer)	Independent of construction age. Prior to 1990, it is typically wood, after renovation, it has a plastic structure, is insulated.
Floor	Wood and steel structures, interior wood or plasterboard.	Independent of construction age.

Italy

BUILDINGS BUILT BEFORE 1976

Construction type:	MASONRY
Envelope characteristics:	BRICKS WITHOUT INSULATION SINGLE GLASSES WINDOWS ROOFS WITHOUT INSULATION BASEMENT WITHOUT INSULATION
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Heating System:	ZONING SYSTEMS NO TEMPERATURE REGULATION EQUIPMENT HIGH TEMPERATURE BOILER NO (OR VERY LITTLE) INSULATING PIPES
Renewables sources:	NO PHOTOVOLTAIC SYSTEMS FEW SOLAR HEATING SYSTEMS FEW OTHER RENEWABLES SOURCES SYSTEM (BIOMASS)

BUILDINGS BUILT AFTER 2005

Construction type:	RENFORCED CONCRETE, WOOD, OTHER
Envelope characteristics:	POT BRICKS WITH INSULATION DOUBLE AND TREATED GLASSES WINDOWS ROOFS WITH INSULATION BASEMENT WITH INSULATION
Heating System:	ZONING SYSTEMS TEMPERATURE REGULATION EQUIPMENT LOW TEMPERATURE BOILER INSULATING PIPES
Renewables sources:	PHOTOVOLTAIC SYSTEM SOLAR HEATING SYSTEM OTHER RENEWABLES SOURCES SYSTEMS (BIOMASS)

Poland

Building System	Materials	Period of construction
Structure	brick	Before 1939
	prefabricated reinforced concrete structure	1950-1990
	reinforced concrete structure	1990-now
Roofs	gable roof, made out of roofing tiles	Before 1939
	flat rooftop, made out of prefabricated reinforced concrete structure	1950-1990
	flat rooftop, made out of reinforced concrete structure	1990-now
Envelope	Brick, usually not insulated	Before 1939
	prefabricated reinforced concrete structure, usually insulated (styrofoam, 10-20 cm)	1950-1990
	reinforced concrete structure with breeze blocks, insulated with styrofoam or mineral wool	1990-now
Windows	2-glazed, PCV or wood, usually new one	Before 1939
	2-glazed, PCV or wood, usually new one	1950-1990
	2 or 3-glazed, PCV or wood	1990-now
Floor	Ceramic and wooden	Before 1939
	Reinforced concrete structure	1950-1990
	Reinforced concrete structure	1990-now

Slovenia

Building System	Materials	Period of construction
Structure	Brick	All periods (the type of brick differs)
	Concrete structure	After '50s
	Prefabricated lightweight construction	In '70s and later
Roof s	gable roof, made out of roofing tiles	All periods
	flat rooftop, made out of reinforced concrete structure	After 2000
Envelope	Brick, usually not insulated	1920 - 1980
	Styrofoam insulation - max. 5 cm	'80s
	Styrofoam insulation max 10	'90s
	Styrofoam insulation, Mineral wool – up to 20 cm	After 2000
Windows	Box window	Before 1940
	double glazing window (simple)	1940 -1970
	double glazing window (simple) and single glazing "thermopane" window	1970 - 1980
	Double "thermopane" glazing	1980 - 1990
	First "efficient" windows with double glazing with gas filling, wood and PVC frame.	1990 -2000
	Energy efficient wood, PVC or aluminum windows with double or triple glazing with gas filling.	After 2000
Floor	Ceramic and wooden floor	Up to 1980
	Ceramic and PVC flooring	From 1980

4.3.1. Available services

	Canteen	Gym	Library
AUSTRIA	Refectory	all	All
CROATIA	Yes	Yes	Yes
CZECH REPUBLIC	Yes	Yes	Usually not
HUNGARY	Yes	Yes	Yes
ITALY	Refectory	Some	Almost all
POLAND	Refectory	All	All
SLOVENIA	Refectory	Almost all	Usally yes

5. Ownership and management of schools

AUSTRIA	Ownership and management of schools depends on the type of school. Higher schools and universities are federal owned and managed
CROATIA	Public elementary schools involved in a project are owned by municipality of Split
CZECH REPUBLIC	Kindergartens and elementary schools are owned by municipalities Schools at secondary level are owned by regions.
HUNGARY	County owned
ITALY	Kindergartens and Primary schools, are property of the municipality that covers all expenses. High schools are owned by the Province
POLAND	The city owns school buildings and pays energy bills
SLOVENIA	Public Schools are in Slovenia established by local community or state. There are few private schools.

There is a quite complex situation in each country: different type of schools are owned by different local Authorities. In general kindergarten and primary schools are owned by Municipalities and secondary schools by provinces, counties, or, as in Austria, at federal level. As other institutions own school buildings and pays energy bills, thus school managers are rather not motivated to implement any energy efficiency measure.

5.1. Roles and key people to be involved

Key persons to be involved reflect the owner situation and can vary according to the grade of the schools. In general the schools managers and the technical office of the institutions which owns the building are the key person to be involved.

5.2. Energy manager availability and his/her role in schools energy management

Generally, there is no obligation for schools to have a person specifically dealing with energy issues. This task is covered by a technician of the institution which owns the school building. The technician who has the task of acting as an energy manager can be an employee of the municipality or may have an external assignment given by the Municipality. In bigger cities typically there is an energy manager which is often in charge of other environmental issues), in municipalities only partly. In the municipalities the energy manager is very often responsible not only for schools but for all public buildings and other environmental and financial tasks. In some regions (with several smaller municipalities) there is an active energy manager existing for the whole region. (in Austria these regions are called “Climate and Energy Model Regions”)

5.3. Schools buildings daily operation time

Table below summarize the situation in the partner's countries.

AUSTRIA	Typically from 7:30 am to 2:00 pm, but the need for care in the afternoon is rising fast (nearly each school in bigger cities has at least one classroom with afternoon care). Sports halls are very often rented after school during the week, therefore they are used until late in the evening (10 pm). The schoolyear has typically 182 school days
CROATIA	From September 1 to June 30: from 6.00 to 22.00 - a total of 16 hours per day. From 1 July to 31 August: from 7.00 to 15.00 - a total of 8 hours per day.
CZECH REPUBLIC	The whole school is usually occupied from 8 am to 2 pm; classes of higher grade and after-school care classes to 4-5 pm. From Monday to Friday. From September to June. School sports halls operate until about 9 pm and often during weekends.
HUNGARY	Each institution is different. Part time training, evening classes, workshops etc. 10 -14 hours
ITALY	There is no fixed time for the operation of schools Some schools make a single round from 8:00 to 13:30; other schools also have a afternoon shift from 14:00 to 18:00 and some schools have a third round, from 19:00 to 23:00.
POLAND	A typical school building is occupied on a regular basis from September 1 to the third week of June, and usually is operated from 6 am to 8 pm. Use of a specific school during weekends and holidays strongly depends on local needs and infrastructure availability.
SLOVENIA	During the year operating time of schools is till 7 a.m. usually until 4 p.m., at evenings. There are some activities in gym till 9 p.m. and also during weekends. Schools are closed in summer (July and August).

6. Environmental Data

Tables below summarize the existence of environmental data in the partner countries.

	AUSTRIA	CROATIA	CZECH REPUBLIC	HUNGARY	ITALY	POLAND	SLOVENIA
Latest National electric mix	Available	Available	Available	Available	Available	Available	Available
National Emission Factors*	CoM	CoM	CoM	CoM	CoM	CoM	Yes
Additional indicators related to energy certifications	Yes	Yes	Yes	Yes	Yes	Yes	Yes
National free life cycle assessment (LCA) databases on construction materials	Yes	No	Yes	No	No	No	No
National dismantling legislation	No	No	No	No	No	No	No

* CoM= Covenant of Mayors

AUSTRIA	Waste without excavation (27 mio. t in 2015):65% recycling rate (materially recovered); 3% backfilling: 9% deposited; 16% thermal treatment; 7% other treatment
CROATIA	According to the official statistics of the Croatian Environment Agency for the 2016, 21% of waste is recycled.
CZECH REPUBLIC	C&D waste, it is even 98%. However, it is not a real picture of recycling because it includes also waste used for backfilling, and technical material for landfills,
HUNGARY	Hungary produces 16,7 million/ tonnes of waste every year. First most popular method was recycling (24%).
ITALY	Data concerning the recycling percentage for each material, in particular on inert waste, are reported in the annual report edited by ISPRA (http://www.isprambiente.gov.it/it/archivio/eventi/2017/ottobre/rapporto-rifiuti-urbani-edizione-2017)
POLAND	According to the Main Statistical Office7, the main method used in Poland for the municipal waste treatment is landfilling - 37% waste was deposited on landfills in 2016. The second most popular method was recycling (28%), followed by thermal treatment in incineration plants (19%) and by biological processing (16%).
SLOVENIA	In 2016, the construction sector has created 535.686 tons of waste. That represents 11,86 % of all produced waste. 46 % of total processed waste has been recycled

7. Behavioural change

7.1. Energy efficiency knowledge

AUSTRIA	The general knowledge is rising fast among the pupils and teachers. Some model kindergartens already have playful lessons with the small children (3-5 years) on energy and environmental topics. There is still some knowledge and/or willingness missing in finding specific energy saving potentials and realizing them
CROATIA	In Split Within the UNDP project "Systematic Energy Management in Cities and Counties" (SEM) there was organized education and training through various workshops covering different aspects of energy efficiency and energy management
CZECH REPUBLIC	Schools are not so active in energy issues; it is mostly interest of owners. So, also interest and knowledge about energy efficiency is low at the level of schools organization, while rather high at the level of owners (municipalities, regional authorities).
HUNGARY	Training for engineers, advisers and contractors should be enhanced, placing the focus on low energy consumption in buildings.
ITALY	In the last 5 to 6 years, with the introduction of specific courses in schools, and by introducing tax deductions for building efficiency, the average citizen and students have become more aware of the energy issue. The desired results have not yet been achieved but the school institutions are activating themselves
POLAND	School managers do not put much attention to the energy management, so it could be assumed that the knowledge about energy efficiency is rather low
SLOVENIA	There are no official data about the level of energy efficiency knowledge and environmental awareness yet. In our experience, staff responsible for energy systems in schools are rather insufficiently trained in energy efficiency and the efficient use of technical systems (Heat pumps, new high efficient boilers, etc.). In many cases, it has been shown that after the energy renovation of the building there were no desired energy savings, which was related to the insufficient knowledge of staff.

Generally speaking, the interest and knowledge on energy efficiency issues is steadily increasing in the last years. In some countries remains the problem of the scarce interest of school organizations as they are not directly affected by costs and savings (paid by municipalities and regional governments). The problem of insufficient training of the technical staff responsible for maintenance and use of heating devices in schools has been highlighted.

7.2. Local measures about behavioural change

	Contents and beneficiaries
AUSTRIA	In Graz the initiative “Energy Saving goes School” is made by the local school owner, the environmental department and the department for education and integration. Several workshops (“action days”) and teaching lessons have been held and will be continued in the season 2017/2018. The beneficiaries are the pupils; trainers are from the local building management company and the environmental department plus some external experts
CROATIA	Every year, there is a regular educational seminars for children of the first grades of elementary schools of the City of Split, where animated film "Think about Tomorrow" is presented. Workshops for citizens on the topic of energy efficiency and renewable energy sources are organized

	Contents and beneficiaries
CZECH REPUBLIC	The Czech Republic has paid a lot of attention to the topic of energy efficiency in public buildings (including schools) for a long time. For schools the training and capacity building events are organized for and attended by representatives of municipalities and regional authorities as school owners; not by schools as such
HUNGARY	Several workshops were held for target group citizens.
ITALY	Workshops and event organized by National and regional agencies, Technical staff of Municipalities for schools students
POLAND	Since 2014 the Communication Centre of the City Hall implements a project called "Warsaw Energy - from knowledge to ECO-action", aimed at increasing knowledge about energy conservation among children and teenagers (from 4 to 13 years old). The project consists of workshops for teachers (train the trainer) and students as well as location-based urban games.
SLOVENIA	Numerous trainings, workshops or similar events related to energy topics are frequently organized within EU funded projects and national projects and are of promotional or awareness raising nature.