WP 3.3.5 (ex 3.3.7)

MONITORING SYSTEM AND

FINANCIAL EVALUATION

FRAMEWORK

INDEX

1. GOVERNEE MONITORING SYSTEM

In the GovernEE framework we are trying to introduce a kind of monitoring system.

The methodology is based on carrying out energy audit of building and comparing the reduction of heat consumption (kWh/m^2 year and kWh/m^3 year) or GHG following energy efficiency measures. Then the result is compared with several indicators, for example with the cost of the action.

This tack has some limitations relating to:

- preservation of cultural and historic identity;
- conservation of historical elements;
- respect of legal obligations;
- use of traditional materials and technique.

In existing and/or historical buildings there is much less flexibility in the design and layout of energy efficiency measures. For this reason it may be difficult to compare the goodness of energy efficiency measures in different buildings.

Also the energy analysis performed on existing buildings, particularly on historical ones, is often based on inaccurate data (lack of information on building components and systems). For this reason the analysis is often not realistic.

We took into account different criteria and indicators to define energy and environmental performance of buildings aiming at monitoring energy efficiency trends and policy measures in public heating. The parameters included within the system cover sustainable building issues: environment, social and economic sectors.

The monitoring system is then supported by an excel file (see the attached example): each criteria is described through indicators and for each indicator value score and weight are assigned.

In order to assign a value to the indicators, Likert scale has been introduced:

SCORE	DESCRIPTION
-2	**Much worse**: relevant negative deviation from the status quo
-1	**Worse**: negative deviation from the status quo
0	**Benchmark**: respect to the status quo
+1	**Better**: compliance with the PA (public authority) aims
+2	**Much better**: better than the PA aims

In particular, the score:

- "**-2**" means that the performance is significantly below the standard and current practice;

- "**-1**" means that the performance is below the standard and current practice;

- "**0**" represents the standard of comparison (benchmark) which could be for example the current construction practice in accordance with laws (European, national, local) or regulations in force and therefore represents the minimum acceptable performance defined by laws or regulations (for example, the Covenant of Mayors), or if there are no reference regulation is the current accepted practice;

- "**+1**" represents an improved performance compared with existing regulations and practice;

- "**+2**" represents a considerably advanced performance compared to the current best practice.

For each criteria and each indicator (sub-criteria) a weight is assigned expressed as a percentage and chosen by the PA.

The final value is the weighted average of the considered indicators.

The following list describes some indicators and for some of them a rating scale is proposed as example:

- **Environmental context (cityscape)**
  - ✓ Integration into the surrounding cityscape
  - ✓ Potential environmental impact of development
  - ✓ Saving protected section of the historic building
  - ✓ Cultural heritage compliance

- **Energy efficiency**
  - ✓ Primary Energy Savings (PES) for heating
  - ✓ Energy Balance (EnB)
  - ✓ Tonnes of Oil Equivalent (TOE)
  - ✓ Renewable Energy Sources (RES)

- **Environmental loading**
  - ✓ Greenhouse Gas emission (GHG)
  - ✓ CO_2 avoided emissions
  - ✓ SOx/NOx avoided emissions

- **Technical aspects**
  - ✓ Adoption of Best Available Technologies (BAT)
  - ✓ Space requirements/availability
  - ✓ Employment of not high qualified worker/technician
  - ✓ Systematic maintenance

- **Economic aspect**
  - ✓ Net Present Value (NPV)
  - ✓ Internal Rate of Return (IRR)
  - ✓ Payback Period (PP)
  - ✓ Cost-Benefit Analysis (CBA)
  - ✓ Management costs

The list is not exhaustive and the identified criteria and indicators could be implemented or deleted (assigning a 0% weight) by the PA for the definition of the Strategic Toolkit or for other uses.

1.1 Environmental context (cityscape)

The production, distribution and use of energy create environmental impacts: gaseous emissions from the burning of fossil fuels pollute the atmosphere; large hydropower dams cause silting; both the coal and nuclear fuel cycles emit some radiation and generate waste; wind turbines can spoil pristine countryside; gathering firewood can lead to deforestation and desertification. For the comparison of different projects, the one with the lower environmental impact should be chosen.

1.1.1 Integration into the surrounding cityscape

Human projects and energy activities have economic, social and environmental impacts and may result in cityscape degradation. Urban area is in itself an important resource to protect.

The intervention must promote the integration of the building into urban and environmental context, increase the value of high-quality elements, reduce or mitigate the possible negative effects. In particular the existing buildings, the streets, the orography, the existing vegetation, the morphological and typological features must be considered, also in relation to the location of business activities and public services (social, commercial, recreational, accommodation, catering, administrative).

This indicator is qualitative and its value will be fixed from time to time by the PA in accordance with the planning rules.

As an example, the realization of different public services for the community (shop, market, paper shop, book shop, ...) inside or near the building is proposed as an indicator.

Score = number of public services inside or near the building

The benchmark is equivalent to one public service.

Project improvement	Much worse	Worse	Benchmark	Better	Much better
Score	-2	-1	0	+1	+2
Integration into the surrounding cityscape	n.a.	0	≥ 1	≥ 3	≥ 5

For the comparison of different projects, the one with the higher integration performance in the surrounding cityscape should be chosen.

1.1.2 Potential environmental impact of development

All projects require resources to be made. However, it is also true that the depletion of resources does not necessarily imply unsustainable development. If an energy source is not renewable, any use of it is irreversible. But this does not mean it should never be used. The use of local building materials, the utilization of semi-finished products made by company site, the reduced use of potable water (dual system, ...), the collection and treatment of stormwater (using marine plants...), the ground permeability (drainage systems, filter strips, buffer areas, green roofs, permeable pavements, ...), the waste recycling (selective waste collection, waste storage areas, self-composting area, central or selective pneumatic collection, ...), the possible reuse of materials and components in the end of life building are just some indicators that should be considered in view of reducing environmental impact.

This indicator is qualitative and its value will be fixed from time to time by the PA in accordance with the planning rules.

As an example, the local material use is proposed as indicator.

Score = sourcing of raw material used (distance in kilometre)

The benchmark is equivalent to 200 km.

Project improvement	Much worse	Worse	Benchmark	Better	Much better
Score	-2	-1	0	+1	+2
Potential environmental impact of development	> 500 km	≤ 500 km	≤ 200 km	≤ 100 km	≤ 50 km

For the comparison of different projects, the one with the lower environmental impact should be chosen.

1.1.3 Saving protected section of the historic building

The impact of the projects on historic buildings and their contexts is important to assess. The project have to comply with the instructions of the Cultural Heritage Protection Office in order to preserve the historical, cultural and anthropological value of the building.

Some projects which ensure a high level of energy efficiency, at the same time can also cause serious damage to the building heritage. Qualitative assessment should be done, in order to analyse case-by-case the cultural and historical value of the building and its surroundings. The choice should be made considering that the final condition of the building and its surroundings should be guaranteed by the project.

Score = (Number of architectural elements protected by the project) / (Number of total architectural elements of the building).

The benchmark is equivalent to a protection percentage of 75%.

Project improvement	Much worse	Worse	Benchmark	Better	Much better
Score	-2	-1	0	+1	+2
Saving protected section of the historic building	< 0,50	≥ 0,50	≥ 0,75	≥ 1,00	≥ 1,20

Please refer to the following table in order to decide how to choose.

If	It means that
Indicator ≤ 0,50	the intervention causes the loss of many valuable parts, reducing the peculiarity of the building and of the environment
Indicator ≤ 0,60	the intervention causes the loss of some valuable parts
Indicator = 0,75	the project preserves the fundamental part of the building/environment, as planned
Indicator ≥ 1,00	the achieved objectives of preservation are higher than the one minimum fixed
Indicator ≥ 1,20	total integration of the project, increase of the conservation status, protection together with the landscape and the surrounding environment

For the comparison of different projects, the one with the higher preservation of building heritage or with the higher respect of the instructions of the Cultural Heritage Protection Office should be chosen.

1.1.4 Cultural heritage compliance

Assessing the compliance of the project respect to the cultural value of the building is very important.

The Cultural Heritage Protection Office provides the requirements that the project have to follow for each building or urban environment, such as the use of local materials or local architectural materials, in order to preserve the distinctiveness of the historic building.

Qualitative assessment should be done, in order to compare the Cultural Heritage Protection Office requirements and the ones observed by the project.

In order to assess the indicator through the score scale, the PA gives a percentage value to the minimum requirements to follow – considering the Cultural Heritage Protection Office requirements – and compares them to the ones fulfilled by the project.

The use of local materials and techniques is important for the replacement of damaged parts with new ones, in order to assess the compliance to the original element and to ensure the maintenance of the distinctiveness of the building.

Score = (Number of the restored architectural elements or replaced elements assessed as similar to the original) / (Number of total of the restored architectural elements or replaced elements)

The benchmark is equivalent to a protection percentage of 75%.

Project improvement	Much worse	Worse	Benchmark	Better	Much better
Score	-2	-1	0	+1	+2
Cultural heritage compliance	< 0,50	≥ 0,50	≥ 0,75	≥ 1,00	≥ 1,20

Please refer to the following table in order to decide how to choose.

If	It means that
Indicator ≤ 0,50	significant deterioration of the cultural heritage peculiarities occurred
Indicator ≤ 0,60	a decrease of the compliance to the cultural heritage occurred
Indicator = 0,75	the essential compliance, fixed by the project, of the building/environment is maintained
Indicator ≥ 1,00	an increase of the compliance of the project to the cultural heritage occurred
Indicator ≥ 1,20	total compliance of the project, increase of the compliance with relation to the environment and the urban context occurred

For the comparison of different projects, the one with the higher compliance to the cultural context of the project should be chosen.

1.2 Energy efficiency

1.2.1 Primary energy savings (PES) for heating

The European Union has a primary energy savings target by 20% by 2020. The indicator is a measure of energy performance of buildings and is calculated as a percentage of primary energy reduction after the energy efficiency intervention.

The following table proposes a rating scale of the indicator.

Project improvement	Much worse	Worse	Benchmark	Better	Much better
Score	-2	-1	0	+1	+2
Primary Energy Savings (PES)	< 10%	≥ 10%	≥ 20%	≥ 50%	≥ 80%

For the comparison of different projects, the one with the greater primary energy reduction should be chosen.

1.2.2 Tonnes of Oil Equivalent (TOE)

As heating indicator the unit consumption (Tonnes of Oil Equivalent, TOE) per surface (m^2) or volume (m^3) at standard climate is considered.

In order to compare in a meaningful way the energy efficiency performance of the projects, indicators are based on a common definitions of energy consumption. Therefore electricity is converted into Tonnes of Oil Equivalent (TOE) according to the IEA[1] methodology:

- 0.26 toe/ MWh for nuclear;
- 0.086 toe/MWh (3.6 GJ) for hydro, wind and electricity consumption;
- 0.86 toe/MW for geothermal;
- biomass is included in energy consumption figures;
- non-energy uses are excluded from final energy consumption.

The following table proposes a rating scale of the indicator.

Project improvement	Much worse	Worse	Benchmark	Better	Much better
Score	-2	-1	0	+1	+2
Tonnes of Oil Equivalent (TOE)	< 10%	≥ 10%	≥ 20%	≥ 50%	≥ 80%

For the comparison of different projects, the one with the lower TOE production or greater percentage reduction should be chosen.

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[1] URL: http://www.iea.org/methodology.html

1.2.3 Renewable Energy Sources (RES)

The promotion of energy, and in particular of electricity from renewable sources of energy (wind energy, small hydro, photovoltaic, solar air heating, biomass heating, solar hot water heating, passive solar heating, ground-source heat pumps), is a high priority for sustainable development for several reasons, including the security and diversification of energy supply and environmental protection.

In according with the European Union targets by 2020, the 20% of gross final energy consumption should be produced by renewable sources.

The indicator is calculated as a percentage of energy produced from renewable sources compared to the energy demand.

The following table proposes a rating scale of the indicator.

Project improvement	Much worse	Worse	Benchmark	Better	Much better
Score	-2	-1	0	+1	+2
Renewable Energy Sources (RES)	< 10%	≥ 10%	≥ 20%	≥ 50%	≥ 80%

For the comparison of different projects, the one with the higher Renewable Energy percentage should be chosen.

1.3 Environmental loading

1.3.1 CO_2 avoided emissions

The EPBD/2002 defines that "*the energy performance of a building shall be expressed in a transparent manner and may include a CO_2 emission indicator*". A numeric indicator of

carbon dioxide emissions from fuel combustion is calculated by multiplying the energy use for each fuel type by an associated CO_2 emission coefficient.

Wherever possible, CO_2 emission should be measured directly at the source of energy use. More commonly, however, measured data are incomplete or unavailable. In the absence of measured data, the emission is calculated by multiplying some known data, such as coal production or natural gas throughput, by an associated emission factor derived from a small sample from a relevant emission source or through laboratory experiments.

In according to *Building Regulation 2000* (and following changes) the CO_2 emission factors for the main fuels are given below:

- Natural gas = 0,200 kg CO_2/kWh;
- LPG = 0,225 kg CO_2/kWh;
- Biogas = 0,025 kg CO_2/kWh;
- Oil = 0,270 kg CO_2/kWh;
- Biomass = 0,000 kg CO_2/kWh.

The following is proposed a rating scale of the indicator.

Project improvement	Much worse	Worse	Benchmark	Better	Much better
Score	-2	-1	0	+1	+2
CO_2 avoided emissions	< 10%	≥ 10%	≥ 20%	≥ 50%	≥ 80%

For the comparison of different projects, the one with the higher environmental balance percentage, which means with the higher CO_2 saving potential should be chosen.

1.3.2 Greenhouse Gas Emission (GHG)

Developed Countries are the largest emitters of CO_2 from energy combustion. In the last two decades the EU managed to stabilise its emissions and to use energy sources with lower CO_2 emission factors (e.g. gas, renewables, nuclear). The Kyoto Protocol covers a basket of six greenhouse gases produced by human activities: carbon dioxide (CO_2), methane (GH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF_6). Greenhouse gas emissions are central to the debate on whether humankind is changing the climate for the worse. The European Union has a Greenhouse Gas Emission reduction target of 20% by 2020.

This indicator takes into account not only CO_2 emissions but also methane (GH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF_6).

Projects which require large amounts of fossil fuels or consume too much energy would not be considered sustainable.

The following table proposes a rating scale of the indicator.

Project improvement	Much worse	Worse	Benchmark	Better	Much better
Score	-2	-1	0	+1	+2
Greenhouse Gas Emission (GHG)	< 10%	≥ 10%	≥ 20%	≥ 40%	≥ 60%

For the comparison of different projects, the one with the higher GHG saving potential should be chosen.

1.3.3 SO_2 and NO_2 pollution

By increasing energy efficiency air pollutant emissions from fossil fuels power generating stations are reduced. Carbon dioxide (CO_2), Sulfur Oxides (SO_x) and Nitrogen Oxides (NO_x) are the main key air pollutants.

Sulfur Dioxide (SO_2) and Nitrogen Dioxide (NO_2) are two very common contaminants, especially in areas where outdoor air pollution has particularly high values[23], for this reason these two indicators are used in the analysis.

Weekly average values are expressed in parts-per-million (ppm), in according with the EPBD.

Project improvement	Much worse	Worse	Benchmark	Better	Much better
Score	-2	-1	0	+1	+2
SO_2 emissions[2]	< 10 ppm	< 4 ppm	< 2,5 ppm	< 0,4 ppm	< 0,1 ppm
NO_2 emissions[3]	< 30 ppm	< 20 ppm	< 10 ppm	< 5 ppm	< 2 ppm

Please refer to the following table in order to decide how to choose.

If	It means that
Indicators SO_2<10ppm NO_2<30ppm	High number of complaints. No ventilation system. High risk of harmful gases presence.
Indicators SO_2<4ppm NO_2<20ppm	Significant number of complaints. No sufficient ventilation system. significant risk of harmful gases presence.

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[2] The limits have been developed from the Fifth Framework Programme of the EU funded project: "Preventive Conservation Strategies for Protection of Organic Objects in Museums, Archives and Historic Buildings".

[3] The limits have been developed from the Fifth Framework Programme of the EU funded project: "Preventive Conservation Strategies for Protection of Organic Objects in Museums, Archives and Historic Buildings".

Indicators $SO_2<2,5ppm$ $NO_2<10ppm$	Acceptable complaints. Sufficient ventilation system. Low risk of harmful gases presence.
Indicators $SO_2<0,4ppm$ $NO_2<5ppm$	Contained complaints. Adequate ventilation system. Sporadic presence of harmful gases.
Indicators $SO_2<0,1ppm$ $NO_2<2ppm$	No complaints. Good air circulation and ventilation systems. No leaks or possible formation of harmful gases.

For the comparison of different projects, the one with the lower SO_2 and NO_2 pollution should be chosen.

1.4 Technical aspects

To asses a project we should consider if the chosen technology complies with the most modern standards, through the control of certificates or usage tests which testify the effective functionality.

It is also important to asses the project impact on the historic building in terms of space requirements and if it requires high qualified workers for its installation and maintenance.

With regard to the last, moreover, the minimum frequency of the maintenance should be considered.

1.4.1 Adoption of Best Available Technologies (BAT)

The use of BAT-Best Available Technologies is an important aspect that must be taken into account to assess a project. However, it is important to consider not only the costs, but also the actual effectiveness of suggested technologies.

The energy efficiency certificates, and their certification body (for energy efficiency indicators see paragraph 4.2), and test certificates should be considered to assess the efficiency of the suggested technologies. The latest new technology might be valuable, but

might have no best practice to check. In this case, for example, the PA might assess two possibilities: a) the PA should discard it because of a lack of reliable data or b) should become itself the test sample(if this involves to a cost cut).

This indicator is qualitative and its value will be fixed from time to time by technician of the PA.

The PA should assign percentage scores to chosen characteristics in order to evaluate the BAT (year of production, number of energy certificates, the number of best practice, test certificates, prizes, environmental conservation) and compare this with the minimum required by the PA, which will be the 100%.

Project improvement	Much worse	Worse	Benchmark	Better	Much better
Score	-2	-1	0	+1	+2
Adoption of BAT	< 0,60	≥ 0,60	≥ 1,00	≥ 1,10	≥ 1,30

Please refer to the following table in order to decide how to choose.

If	It means that
Indicator ≤ 0,60	Out-of-data, unknown, not certified technology
Indicator ≤ 0,80	Valuable, but out-of-data technology. There are better technology on the market
Indicator = 1,00	Technology in line with the requests of the PA
Indicator ≥ 1,10	More efficient that the ones required by PA
Indicator ≥ 1,30	The best certified technology on the market

For the comparison of different projects, the one with the best available technology should be chosen.

1.4.2 Space requirement/availability

The space requirement of the project should be compared with the available one in the building: for example, nothing could be installed on the walls of a building with frescoes, in order to not damage them.

In order to assess this indicator, the percentage ratio between the space requirement for the new project and the available space (or space of the whole building) should be considered. Otherwise, the percentage ratio between the space requirement for the new project and the space requirement of the old one that will be replaced (for example, pipes and systems) should be considered.

For example, in the renovation of a historical building the new partition walls must be made only when they don't compromise the structural and distributive major elements (bearing wall, stairway, ...). The living space in the attic can be realized only if the necessary plants is not in conflict with the architectural elements that may be present in the below spaces.

Score = (Space requirement of the project) / (Space available of the project).

The benchmark is equivalent to a space requirement percentage of 90%.

Project improvement	Much worse	Worse	Benchmark	Better	Much better
Score	-2	-1	0	+1	+2
Space requirements / availability	< 1,00	≤ 1,00	≤ 0,90	≤ 0,75	≤ 0,60

Please refer to the following table in order to decide how to choose.

If	It means that
Indicator > 1,00	the space availability is not in line with the space requirement
Indicator ≤ 1,00	the space requirement is about the same of space availability
Indicator ≤ 0,90	the space requirement is less than the space availability
Indicator ≤ 0,75	the space requirement is more less than the space availability
Indicator ≤ 0,60	the space requirements is more and more less than the space availability and the free space can be used for other functions

For the comparison of different projects, the one with the less space requirements should be chosen.

1.4.3 Employment of not high qualified worker/technician

A project which requires for its implementation a high number of high qualified workers will be more expensive. At the same time, if a technician is required for the daily working of a heating system, then the PA have to bear the high cost and to solve organisation problems.

In order to assess this indicator, a percentage ratio should be chosen and then compared with the other indicators. Indeed, if a heating system installation needs many high qualified worker, but the system will run only with the supervision of the building users, then the PA should assess it positively, even though the initial cost is high.

Percentage score = (Number of high qualified workers or technicians) / (Number of not qualified workers)

Project improvement	Much worse	Worse	Benchmark	Better	Much better
Score	-2	-1	0	+1	+2
Employment of not high qualified worker/technician	> 30%	≤ 30%	≤ 15%	≤ 10%	= 0%

For the comparison of different projects, the one with the less number of high qualified worker or technician should be chosen.

1.4.4 Systematic maintenance

A project that requires frequent maintenance implies higher cost for the PA, as well as entails uncomfortableness to the users of the building. Furthermore, the energy efficiency aims would be no achievable because of malfunction.

Project improvement	Much worse	Worse	Benchmark	Better	Much better
Score	-2	-1	0	+1	+2
Systematic maintenance	≥ 3 per year	= 2 per year	= 1 per year	= 1 every 2 years	= 0 maintenance after several years

For the comparison of different projects, the one with the less required maintenance should be chosen

1.5 Economic aspect

The economic issue takes in consideration the investment costs, amortization, ordinary and extraordinary costs, fuel price, any income, etc. Some main economic indicators have been described.

Three indicators are suggested and supplied with tables and annexes for the calculation: the Net Present Value (NPV), the Internal Rate of Return (IRR) and the Payback Period (PP). The PA could take in consideration other indicators, for example: Modified Internal Rate of Return (MIRR), Cost-Benefit Analysis (CBA) or Management costs.

In order to calculate the NPV, IRR and the PP please refer to the file WP3.3.7_Annex4.5.xls.

1.5.1 Net Present Value (NPV)

In finance the Net Present Value (NPV) of a time series of cash flow is a valuation methodology defined as the sum of the Present Values (PVs) of the individual cash flows of the same entity.

NPV is a standard method for using the time value of money to appraise long-term projects and it is an indicator of how much value a project adds.

The following table proposes a rating scale of the indicator[4].

Project improvement	Much worse	Worse	Benchmark	Better	Much better
Score	-2	-1	0	+1	n.a.
Net Present Value	n.a.	< 0	= 0	> 0	n.a.

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[4] Because of the NPV discriminates respect to 0, there are only 3 feedbacks available: equal to zero, greater than zero, and lower than zero. Therefore we decided to consider a reduced scale considering only 3 rates: -1, 0, +1.

For the comparison of different projects, the one with the higher NPV should be chosen. Please refer to the following table in order to decide how to choose.

If	It means that	Then
NPV > 0	the investment would add value to the PA	the project may be accepted
NPV < 0	the investment would subtract value from the PA	the project should be rejected
NPV = 0	the investment would neither gain nor lose value for the PA	we should be indifferent in the decision whether to accept or reject the project. This project adds no monetary value. Decision should be based on other criteria, e.g. strategic positioning or other factors not explicitly included in the calculation.

1.5.2 Internal Rate of Return (IRR)

Internal Rate of Return (IRR) calculates the rate of return of a project while disregarding the absolute amount of money to be gained. It measures and compares the profitability of investments. In more specific terms, the IRR of an investment is the discount rate at which the NPV of costs (negative cash flows) of the investment equals the NPV of the benefits (positive cash flows) of the investment.

The following table proposes a rating scale of the indicator.

Project improvement	Much worse	Worse	Benchmark	Better	Much better
Score	-2	-1	0	+1	+2
Internal rate of return	More than 1 point < cost of capital	1 point < cost of capital	= cost of capital	1 point > cost of capital	More than 1 point > cost of capital

For the comparison of different projects, the one with the higher IRR should be chosen.

1.5.3 Payback Period (PP)

The Payback Period (PP) measures the time required for the cash inflows to equal the original outlay. It measures risk, not return. It is easy to apply and easy to understand but is considered an analysis with serious limitations (for example the time value of money is not taken into account), therefore it is better to assess also other indicators.

The following table proposes a rating scale of the indicator.

Project improvement	Much worse	Worse	Benchmark	Better	Much better
Score	-2	-1	0	+1	+2
Payback Period (PP)	> 20 years	≤ 20 years	≤ 10 years	≤ 6 years	≤ 3 years

For the comparison of different projects, the one with the lower PP should be chosen.

2. CONCLUSION

Undoubtedly, poor data drastically limits the applicability of the indicators and therefore the scope and relevance of country energy efficiency assessments. There is an urgent need to establish, at the international level, the minimum basic data requirements that would allow relevant country evaluations and comparisons between countries in terms of energy efficiency, particularly in view of international debate on CO_2/GHG effects.

The project partners are expected to adjust default weights, benchmarks and emission values throughout the system.

3. Attachment

Instructions: modify, if necessary, the weights; put the score in the equivalent cell (for each indicator put only one score); read the final score and its evaluation in red cells.

Project improvement	Much worse	Worse	Benchmark	Better	Much better	Weight
Value	<<	<	=	>	>>	
Score	-2 [a]	-1 [b]	0 [c]	1 [d]	2 [e]	
Score x weight	a x w	b x w	c x w	d x w	e x w	w
Environmental context						**10%**
Integration into the surrounding cityscape					2	20%
Potential environmental impact of development				1		20%
Saving protected section of the historic building				1		30%
Cultural heritage compliance					2	30%
Energy efficiency						**30%**
Primary energy savings (PES) for heating				1		40%
Tonnes of Oil Equivalent (TOE)				1		20%
Renewable energy sources (%)			0			40%
Environmental loading						**15%**
CO_2 avoided emissions				1		40%
Greenhouse Gas Emission (GHG)				1		40%
SO_2 and NO_2 pollution		-1				20%
Technical aspects						**20%**
Adoption of Best Available Technologies (BAT)				1		30%
Space requirements/availability			0			25%
Employment of not high qualified worker/technician		-1				20%
Systematic maintenance				1		25%
Economic aspect						**25%**
Net Present Value (NPV)		-1				30%
Internal Rate of Return (IRR)		-1				30%
Payback Period (PP)	-2					40%
TOTAL	$A=\sum a_i w_i$	$B=\sum b_i w_i$	$C=\sum c_i w_i$	$D=\sum d_i w_i$	$E=\sum e_i w_i$	A+B+C+D+E
	-0,200	-0,220	0,000	0,460	0,100	0,140
						Benchmark