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AFFIRMATIVE INTEGRATED ENERGY DESIGN ACTION

AIDA

IEE/11/832/SI2.615932

D3.2: Public buildings tenders for the several case studies with the nearly zero energy target – ANNEX I

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List of acronyms

NZEB	Net Zero Energy Building
nZEB	nearly Zero Energy Building
IED	Integrated Energy Desing
IEQ	Indoor Environmental Quality
IEA	International Energy Agency
SHC	Solar Heating and Cooling
ECBCS	Energy Conservation in Buildings and Community Systems
EPC	Energy Performance Certification
DHW	Domestic Hot Water
RES	Reneable energy source

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ANNEX I

In this Annex are collected the collaborations realized within AIDA project without the case studies included in the text above, Deliverable 3.2.

The case studies are divided for topics, in relation with the typology of offered support in relation with the administrative procedure phase, final state of the collaboration, and obtained results, such as:

- public design tenders, already finished and published;
- feasibility case studies finished with the definition of minimum energy performance requirements to introduce in next public design tenders;
- feasibility case studies that identify technical solutions to increase the high-energy efficiency and reduce the emission of CO_2. In these cases, the municipalities have small projects or small budgets to do some actions related to increase the energy efficiency, so they not plan organised public tender (only private contracts). This reasons have motivate the realization of recommendations reports to be included in future tenders, or supply contracts.
- oral agreements;
- participation at design tender, like a participant[1].

[1] This was possible because some partners of AIDA project are 'private' company, usually involved in the design tenders like 'active supporter' to the design teams.

1. Tenders Finished

In this group of case studies there are the results obtained through an active collaboration with public administration involved in this work package.

Some of these examples have achieved very positive results, through a punctual definition of the nZBE target and the method for the energy balance calculation, and with a detailed description of the energy efficiency criteria and the related award scoring points to assign to the best energy design proposals close to the nZEB target. Furthermore, these examples highlight how the energy strategy introduced in the tenders' changes in relation with the public design contract chose.

In Merano, Brixen and Barcelona case studies, have been used with different public design tender procedures but in all these case study contain the necessary information and tool to allow participants to use the same method for the energy balance calculation. This permits to collaborate with the jury in the evaluation of the energy part proposals and make comparable performance results coming from different architectural and engineering proposals. So, the 'Energy performance requirements part' is completed of:

- objective: nearly Zero Energy Building Design (NZEB o nZEB
- method for the Energy balance calculation
- the Physical boundary of the building system
- the integration of the RES systems
- weighing factors
- the minimum energy performance (fixed within AIDA Project)
- energy simulations and proposed tools
- the integrated Energy Design, IED
- the energy criteria

In the other two case studies (Communauté de Communes d'Amplepuis Thizy and Hartbeg Municipality), it was not possible to introduce all this 'recommendations' in the design tender. This means less efforts required at the participants, in the developing of energy strategy to achieve the nZEB target, but a first knowledge on nZBE target and IED process learned from the public administrations.

In Table 1 are reported finished collaborations with 'Design tenders achieved', two of them, Merano and Barcelona, have been already included in the report.

Table 1: Design tenders realized

Partner	Municipality involved	Building	Kind of tender	State of the tender	Action carried out	n of bids	Participation on the Jury
*EURAC (IT)**	*Merano, Italy:* *Signed agreement* *Signed Letter of affirmation*	*New elementary school*	*Service Competition: negotiated tender to choose the design team*	*1) Tender published in April 2013* *2) Deadline for proposals: 22.05.2013* *3) October 2013, evaluation of the offer proposals. Eurac joins in the jury, in the evaluation of the energy strategy section. Number 14 were the design teams participants evaluated.* *4) Support the IED process in the next design phases (preliminary definitive and executive design) during 2014.*	*Tender planning realization:* *1) establish energy efficiency and tool* *2) award criteria* *3) collaboration within the jury to evaluate the energy performance achieved by design proposals* *Collaboration with the design team winner and the municipality:* *Manage of IED*	*16*	*Yes, supporting the Jury in the evaluation of the energy strategy.*
EURAC (IT)	Brixen, Italy Signed agreement Signed Letter of affirmation	New school of music	IDEAS COMPETITION TENDER	1) Tender published on 03.02.2014 2) Deadline for pre-selection of the participants: 17.03.2014 3) Evaluation of the participants May.2014 4) Presentation of the design competition 04.07.2014	Tender planning realization: 1) establish energy efficiency and tool 2) award criteria 3) collaboration within the jury to evaluate the energy performance achieved by design proposals Collaboration with the design team winner and the municipality: Manage of IED	15	Yes, supporting the Jury in the evaluation of the energy strategy.

*IREC (ES)**	*Barcelona Spain*	*New Civic Center-District Head Office, library and city archive.*	*IDEAS COMPETITION TENDER Harmonized tender to choose the design team by graphical and technical proposal*	*1) Ideas competition tender published 28/08/2013, Deadline for proposals: 26/09/2013. 2) Participation in the Jury in October/November 2013, where 58 graphic and technical proposals were evaluated. 3) Support the IED process in the next design phases (preliminary, definitive and executive design) during 2014/2015.*	*tender planning realization: 1) establish energy efficiency 2) integrate the jury to evaluate the proposals (energy efficiency specifications) 3) collaborate in the next design and tender phases, monitoring C. evaluation of the results: collaboration with bimsa and design team winner:*	*58*	*Yes, supporting the Jury in the evaluation of the energy strategy.*
AEE INTEC (AT)	Hartberg, Austria Signed agreement	Energy renovation of a school	DESIGN COMPETITION TENDER	Develop retrofit strategy for future building tender Feasibility study finished & confirmed by the municipality. PLANNING:Energy performance calculation of different retrofit measures, also calculation of LCC of the retrofit measures, presentation of the results to the municipality and the architect.	Due to budget constraints the renovation of the school building was postponed.	-	
HESPUL (FR)	Communauté de Communes d'Amplepuis Thizy (joint local authority)	New Hotel d'Entreprise, Shared office and workshop spaces	Design team tender	Tendered 06/06/2012 Closed 27/06/2012 Selection finalised 09/2012	Convince / assist building owner to include obligation to study RES sources for design team tender After the design team was selected, Hespul convinced the building owner to insist on design changes to increase building performance and include RES sources		no

Note: these two experiences, highlight in Italic font, have been already presented in the Document, so they are not included in this Annex.

1.1 Italy: Brixen Municipality

1.1.1 Generic information

AIDA AFFIRMATIVE INTEGRATED ENERGY DESIGN ACTION

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EURAC research

Public design tender for a nearly zero energy building story card

German Music School,

New Building
Brixen, IT

GENERAL INFORMATIONS

Owner:	Municipality of Brixen
Use:	German Music School for about 1.300 students, divided into practice rooms, theaters, auditoriums and administrative offices.
Heated surface:	3.500 m^2
Gross volume:	14.350 m^3
Cost:	Total budget € 5.400.000,00 divided into: • Building construction €1.890.000,00 • Building structure €1.188.000,00 • Hydrothermal systems €540.000,00 • Thermal system €810.000,00 • Electric system €540.000,00 • External planning €432.000,00
Method of financing:	Municipality of Brixen.
Typology of design tender adopted	Public design competition, with the pre-selection of 15 design teams.

TENDER

Public competition tender to find the best design proposal

ENERGY PERFORMANCE CRITERIA:

By Local Energy Performance Law (DP 632/2013):

- CasaClima A, for the local energy performance calculation (heating demand < 30kWh/(m^2y))
- minimum periodic thermal transmittance (Yie) for summer season
- CO2<100kg/m^2year
- 40% of the total primary energy produced by RES
- 60% of the DHW load covered by RES
- minimum of 20W (of for each square meter covered) of electric production system from RES

Other restricted energy performance requirements:

- CO2<3-8kg/m^2year

TOOLS FOR THE ENERGY PERFORMANCE CALCULATION:
Energy performance: CasaClima Pro tool*(*dynamic version able from January 2014) modified by EURAC. This version is able to calculate the energy balance and the energy performance requirements required by the tender.

OTHER CRITERIA
Use an IED process during the definitive and executive design phases.

RAKING POINTS:
The evaluation criteria consist of:

- urban integration and design architectural quality (volume, shape, internal space, external surface) max. 40 points;
- functional quality aspects (dimension, useful areas, dimension) 35 points;
- construction, maintenance and operating costs, max. 20 points;
- Energy criteria (to achieve nZEB target) max. 5 points.

The design team has to calculate the energy balance of the design proposal, using dynamic simulation tools for the energy consumption of the building.

The design competition tendering procedure aims to find the best design proposal, from the architectural and functional quality, landscape integration, construction, maintenance, operating costs, energy performance etc.. In this case, the Municipality of Brixen has decided to use a pre-selection of the participants through a valuation of them experience (curriculum) and open the competition to 15 teams.
Energy performance requirements have been included in the tender and a necessary requirement to win the tender was the evaluation of the energy balance of the design proposal.
To support the design teams in this analysis, energy guidelines were included into the tender documents.

NEGATIVE ASPECTS: in the pre-selection phase any experiences or knowledge on energy efficient buildings and tools, was required. While other restricted requirements, about costs of precedent realizations and minimum numbers of staff (fixed at 8 employments), reduced the possibility to participate.

RESULTS OBTAINED

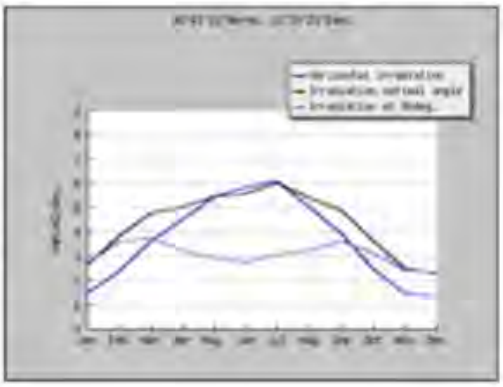
EURAC will evaluate each project from the energy point of view and presented the results to the Municipality's evaluation jury.

ENERGY PERFORMANCE RESULTS OBTAINED	
Primary energy consumption, considering heating, cooling, lighting, and other electric consumption without RES production	49,06 kWh/m^2anno
Primary energy consumption, considering heating, cooling, lighting consumption without RES production.	42,37 kWh/ m^2anno
PV production	29,20 Kg CO_2/ m^2anno
CO_2 emission saving with PV system	12,90 Kg CO_2/ m^2anno
Estimated saving of primary energy/year	73,28 MWh/anno
Estimated saving of CO2 emissions /year	21,81 Tn CO_2/anno

German Music School,
New building
Brixen, IT

DESCRIPTION OF THE CLIMATE:
Municipality of Brixen

Address:	Via Brennero, Bressanone
GPS:	46.72012, 11.65736
Altitude:	560 m
Yearly solar radiation: (graphic)	3.63 kWh/m² *day (Average sum of horizontal global irradiation per square meter received) 1320 kWh/m² (Average sum of horizontal global irradiation per square meter received) (http://re.jrc.ec.europa.eu/pvgis/apps4/pvest.php)
HDD20 :	HDD20= 3131 Bolzano, IT (11.33E,46.46N) (http://www.degreedays.net/)
CDD26 :	CDD26= 106 Bolzano, IT (11.33E,46.46N) (http://www.degreedays.net/)
HDD20, Italian Classification: (italian law: n. 412 26/august/1993)	HDD20= 3.507 Brixen



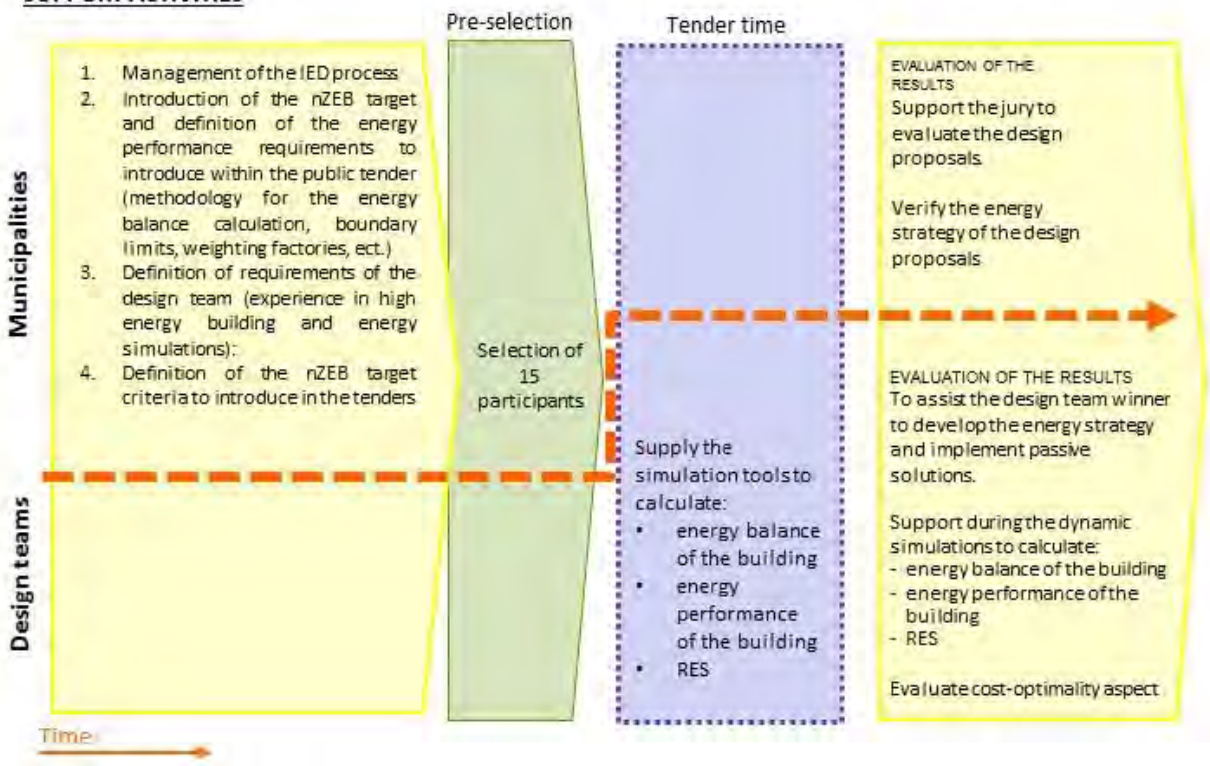
IED PROCESS

Composition of the team to realize the tender: EURAC team
Representatives of the Municipality of Brixen (tenants, owner, ...)
15 design teams pre-selected

Work done by EURAC team:

- Management of the IED process
- Support the Municipality to introduce in the public tender competition:
  - Definition of the nZEB target and the method of the energy balance calculationGuide Lines for the energy strategy to support the design teams with the energy performance requirements, minimum energy performance requirements, ...)
  - Definition of the Limitation of the electric energy demand and definition of the weighting factors
  - Definition of the energy performance criteria and nZBE target criteria
- elaboration of the simplify tools for the energy balance calculation (for the valuation of the energy performance of the building and the energy production from RES)
- valuation of the energy results of the design proposal

SUPPORT ACTIVITIES



German Music School,

New building
Brixen, IT

SUPPORT TO THE MUNICIPALITY AND DESIGN TEAM

2010

The Municipality of Brixen needs a new German Music School.
The Municipality decides to use a design competition tender procedure to chose the best design proposal over 15 applications.

September 2012

Municipality of Brixen signed an agreement to participate into AIDA project. At this time any new building or refurbishment one was available.

June 2013

The Municipality found a budget to finance the construction of the new German Music School of Brixen.
A close collaboration between the Municipality and EURAC team started, in order to introduce the NZEB objective within the public tender.
EURAC organized some meeting to introduce the meaning of the NZEB target (high energy efficiency building and RES) to the staff of the Municipality involved.

September-December 2013

The Municipality decided for a design competition tendering procedure with a pre-selection of the participants. The maximum number of design teams selected to participate at the design competition was fixed on fifteen and the valuation of them experiences will be done by curriculums.
This kind of tendering selection procedure aims to find the best design proposal over a wide number, from the architectural and functional quality, landscape integration, construction, maintenance, operating costs, energy performance target.
Eurac, with the support of the Municipality, has elaborated an operational strategy to force the work-teams to elaborate a design proposals achieving the NZEB target.
Energy guidelines, about minimum energy performance requirements, methodology to calculate the energy balance and simulation tools, was linked to the tender documents to support the design teams in this analysis.
Negative aspects: in the pre-selection phase any experiences or knowledge on energy efficient buildings and tools, was required. While other restricted requirements, about costs of precedent realizations and minimum numbers of staff (fixed at 8 employments) of the design teams, are parameters that reduce the possibility to participate a younger architects and engineers.

Endorsement of the tender and the "Energy guidelines".
Translation of the design tender in German language.


Winner: Arch. Carlana, Arch.Mezzalira, Arch. Pentimalli

German Music School,

New building
Brixen, IT

Winner: Arch. Carlana, Arch.Mezzalira, Arch. Pentimalli

3 February 2014	Publication of the design tender design.
17 February 2014	Deadline for explanation questions of design tender requirements
24 February 2014	Publication of the explanation questions, with answers of design tender requirements
3 March 2014	Open enrollment
17 March.2014	Deadline for the enrollment to the design competition
May - June	Open the participants demands and pre-selection of the participants
04 July 2014	Deadline for protocols submissions and question replies
25 July 2014	Presentation of the design tool realized by EURA. The too realized modifying the CasaClima Pro 2014 is able to calculate automatically the nZEB target and to evaluate automatically if the minimum energy performance requirements are been achieved.
September 2014	Deadline for design proposals submission.
October 2014	Evaluation and results. EURAC team evaluated each project from the energy point of view and presented the results to the jury's Municipality.
December 2014	Definition of the Winner: **Arch. Carlana, Arch.Mezzalira, Arch. Pentimalli**

1.1.2 Energy performance requirements part introduced in the public tender

Guidelines for the energy concept of the new German music school of Brixen (IT)

The present document aims at define the Integrated Energy Design (IED) procedure that will be use during the design phases and explain the energy performance calculation methodology that the design teams have to use to verify the building's energy performance requirements.

The objective of the IED is to realize a nearly zero energy building (with a null energy balance) with a high indoor thermal comfort level.

a) Legislative framework

Law n. 90, of the 3rd August 2013, 'Conversion, with revisions, of Legislative Decree-of the 4th June 2013, n. 63 Urgent regulations for the Directive 2010/31/EU of the European Parliament and the Council of 19 May 2010 implementation on the energy performance of buildings, infractions proceedings (…)', reports the energy performance of buildings methodology calculation and the minimum energy efficiency requirements for new buildings

Law 90/2013 define a "'nearly zero energy building' like a building that has a very high energy performance, as determined in accordance with this decree, and that respects the requirements defined within this decree art. 4, subsection 1. The nearly zero or very low amount of energy required should be covered to a very significant extent by energy from renewable sources produced within the boundary of the system", Art. 2.

In March 2013, the Province of Bolzano approved a province deliberation n.362//2013 to implement the European Directive 2010/31/EU on the energy performance of buildings in the local procedures.[2]

The Deliberation 362/2013 defines the limit of the energy performance of the building at Province level (see **Error! Reference source not found.**).

b) Objective: nearly Zero Energy Building Design (NZEB o nZEB)

The goal for the new German music school of Brixen is to achieve the energy performance target of nearly zero energy building through an Integrated Energy Design (IED).

A nearly zero energy building produces as much energy from renewable sources that it consumes. The RES generation plants must to be integrated in the buildings or at least installed within the boundary system (delimited by the point of connection to energy grids).

The higher the energy efficiency of the building the lower the energy demand to be met (see Figure 1)

[2] **Deliberation of the Province of Bolzano, no. 362 of the 04.03.2013. Energy performance of buildings - Implementation of Directive 2010/31/EU of the European Parliament and of the Council of 19 May 2010 on the energy performance of buildings and revocation of the resolution n.939 of 25/06/2012.**

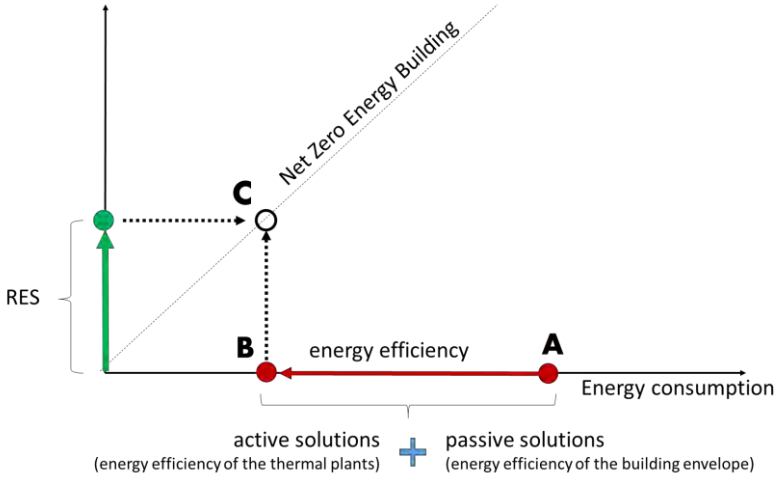


Figure 1: Net Zero Energy building definition. Source: Aelenei L.E., 2011

Figure 1 describes how increase the energy efficiency of the buildings starting from the state of the art of the actual building stock (point A). On the x-axis there is the energy consumption of the buildings and on the z-axis the on-site energy production (thermal and electric) from RES. Through active and passive solutions is possible to increase the energy efficiency of the buildings and move from point A to point B. To achieve the NET zero energy target (identify with the bisector, point C) it is necessary to cover the energy consumption from energy (thermal and electricity) on-site generation plants from RES. When the point C exceed the bisector the building is called 'active building' because produce more than it consume.

c) Energy balance calculation

During the design phase will be calculate the energy balance between the thermal and electric energy produced by RES within the system boundary and the energy loading by the grids to maintain a high level of indoor thermal comfort (Category II, UNI EN 15251).

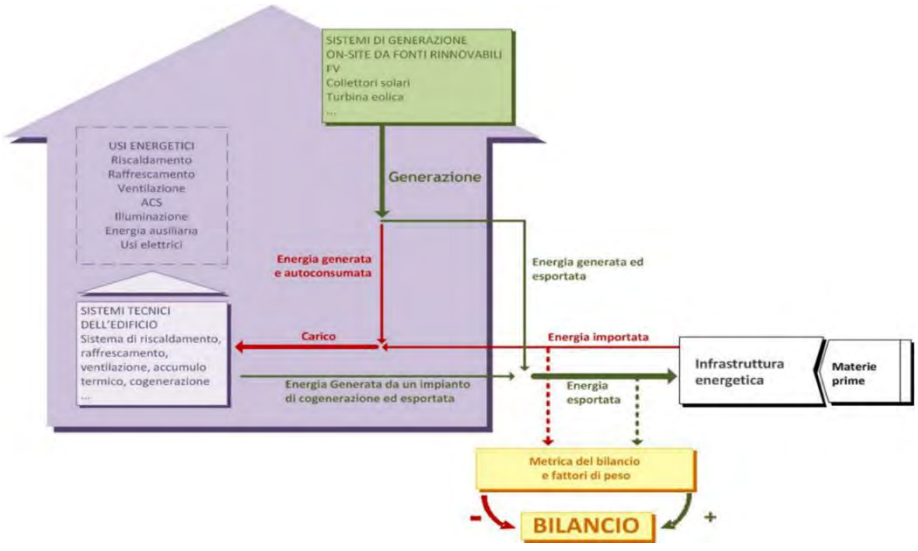


Figure 2: Energy balance between the delivered (loaded) energy from the grid and the exported (generated) energy.

In the energy balance calculation the with negative values there are energy consumption of the building for the heating, cooling, domestic hot water, ventilation, lighting and auxiliaries. Such as positive values there are the energy production (electric and thermal) generated from plants integrated in the building or installed in architectural elements within the system boundary (or) by RES (solar panels, wind turbine, biomass, PV panels, etc.).

The energy balance between imported and exported energy is an approach, to evaluate the building-grid interaction, in particular for deducting the quantity of energy generated and directly utilized on-site.

$$\sum_i g_i \cdot w_{e,i} - \sum_i l_i \cdot w_{d,i} = G - L \geq 0$$

where:

i = energy carrier
gi = generation of the i-th energy carrier
li = load of the i-th energy carrier
we,i = weighting factor for exported i-th energy carrier
wd,i = weighting factor for delivered i-th energy carrier
G = weighted generation
L = weighted load

The energy balance is a yearly balance and will been calculated by dynamic simulation during the design phase.

According on Law 90 the annual energy demand is calculated for each energy service, expressed on primary energy on monthly base. With the same method is determined the renewable energy produced within the boundary of the system. During the design phase the energy balance will be calculated using the data obtained from the dynamic energy simulations.

The energy balance metric must be primary energy and CO2 emission, using the weighting factors from Table 2, Table 3, Table 4 and Table 5 or updating.

Table 2: Weighting factors symmetrically equivalent CO2 emissions. Source: Province of Bolzano, Resolution 362 GP of March 2013.

Energy vectors	**kgCO2eq/kWh**
Electricity	0.647
Liquid fuel	
Fuel oil extra light	0.290
Fuel oil light	0.303
Liquefied petroleum gas (LPG)	0.263
Rapeseed oil	0.033
Gas fuel	
Natural gas	0.249
Biomass	
Wood chips	0.035

Briketts	0.055
Pellets	0.042
Heat from district heating plants:	
Fuel oil	0.410
Natural gas	0.300
Fuel oil with cogeneration	0.280
Natural gas with cogeneration	0.270
Rapeseed oil	0.150
Rapeseed oil with cogeneration	0.180
Wood with a natural gas boiler for peak	0.125
Wood with oil boiler for peak	0.150
Wood boiler with rapeseed oil for peak	0.100
Waste to energy (WTE)	0.150

Table 3: Primary energy factors for energy delivered. Source: CTI 14:2013 prospectus A.1

Energy vector	**Delivery Energy**		
	$f_{P, nren}$	**$f_{P, ren}$**	**f_P**
Natural gas	1	0	1
Liquid Petroleum Gas (GPL)	1	0	1
Fuel oil	1	0	1
Solid, liquid and gaseous biomass	0.3	0.7	1
Electricity from grids	2.174	0	2.174
Heat from district heating	**	-	-
* as defined in Annex X of the Decree 152 of 3rd April 2006 **value declare by the energy company			

Table 4: Primary energy factors for energy temporarily exported to and reloaded from the grid.

Source: CTI 14:2013 Prospect A.2

Electricity energy temporarily exported to and reloaded from the grid on an annual basis $f_{P, el, rdel}$	0

Table 5: Primary energy factors for energy temporarily exported from the grid.

Source: CTI 14:2013 Prospect A.2

Electric energy exported by PV panels $f_{P, el, exp, FV}$	0
Electric energy exported by cogeneration plants $f_{P, el, exp, CG}$* (non-renewable fuels)	2.174
*factor to be used for the calculation in 9.2.2. The factor is based on national production efficiency of the electric grid. It corresponds to 0.46 without-renewable fuels	

The Physical boundary of the building system

The physical boundary of the building is used to identify the location of generation systems, so-called "on-site", and energy demands. A generation system within the boundary of the system is defined on-site.

The physical boundary of the system coincides with the urban area, as defined in Resolution of the Province of Bolzano No. GP. 4179 of 19.11.2001 Art. 1. In this way installations which are not integrated into the building are allowed only if located in the building area before the point of connection to the power grid. The primary energy demands have to be calculate through 'CasaClima Pro 2013' tool, supplied to the participants. The monthly output could be copy and paste in the Excel tool for the energy balance calculation developed by EURAC for this case study.[3]

Another important goal is to achieve high energy efficiency building requirements together with a good cost-optimal level, considering the lowest cost of the estimated economic life cycle. The European Directive 2010/31/EU defines that 'the lowest cost is determined taking into account energy-related investment costs, maintenance and operating costs (including energy costs and savings, the category of building concerned, earnings from energy produced), where applicable, and disposal costs, where applicable'. The cost-optimal level shall lie within the range of performance levels where the cost benefit analysis calculated over the estimated economic lifecycle is positive.4

The technical solutions will be discussed during the integrated energy design process within the evaluation of cost-benefit.

d) Integrated Energy Design, IED

The architects or/and the design team is committed to use an integrated energy design (IED) process, a collaborative multidisciplinary procedure to analyse different solutions developed during all phases of the process.

Into the IED process different professional figures (owner, design team, tenants…) work together in team for integrating efficiently the personal knowledge in order to analyse and valuate a wide number of solutions and interactions.

[3] Foglio di calcolo simile allo struemtno Net ZEB Evaluation Tool: http://task40.iea-shc.org/net-zeb

[4] European Directive EDB 2012/31/EU of 19th May 2010 on the energy performance of buildings (recast).

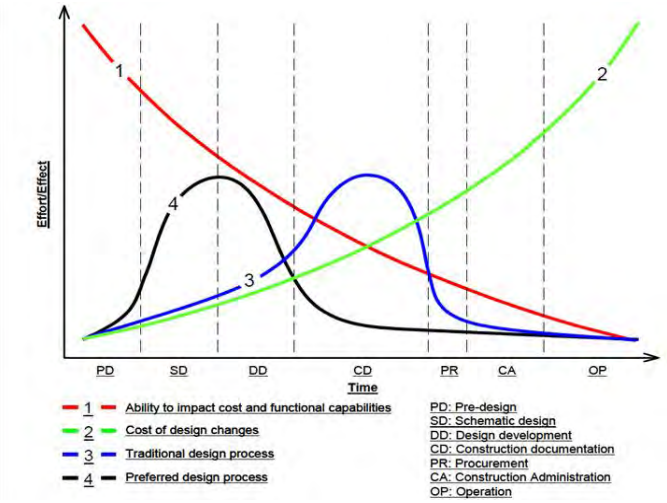


Figure 1: Difference between traditional design process and preferred (integrated) design process. Source: "Collaboration, Integrated Information, and the Project Lifecycle in Building Design, Construction and Operation," CURT, Construction Users Roundtable, 2004

Figure 1 shows the difference between a traditional approach (blue line) and an integrated design process (black line). Within the integrated design process, the design phase requires more effort than the construction and documentation phase. At the same time, the cost's curve trend changes with the decision-making moment, in the IED approach it is high during the design phases (red line) while in a traditional approach (green line) during the construction phase due to the project changes.

Thanks to the AIDA[5] project, EURAC team will support the design team during the preliminary and definitive phases. Specific meetings and workshops will be organize and active assistance will be offered to evaluate energy simulations and indoor comfort.

Definition of the energy optimization parameters

During the design phases the facilitarotor (in this case EURAC) will be organized meetings in order to discuss and share different topics and proposals able to increase the energy efficiency of the new building. The final objective is to achieve the best balance between tenant's needs and technic/functional requirements:

- Aesthetic /architectonic quality
- Functionality
- Energy and environmental impact (active and passive systems)
- Indoor environmental quality (temperature, relative humidity, day lighting, CO2, acoustic, etc.)
- Other needs for increasing the internal comfort or specific necessities of the tenants or the Municipality of Brixen.
- Durability and maintenance.

e) Energy minimum requirements of the new building

[5] Progetto 'AIDA', Affirmative Integrated Energy Design Action (www.aidaproject.eu) promosso dall´Intelligent Energy Europe (http://ec.europa.eu/energy/intelligent/).

The energy concept of the new German music school of Brixen will achieve to the national and local energy performance requirements as well as nearly zero energy building target.

In Table 6 the minimum requirements of energy performance of the new building and the minimum of energy production from RES, according to the Deliberation of Province of Bolzano n.362//2013 to implement the European Directive 2010/31/EU on the energy performance of buildings in the local procedures. These are the energy performance indexes minimum, but it is not sufficient to achieve them to reach the nearly zero energy building target (energy balance calculated according to the paragraph 6.2).

Table 6: Minimum requirements of the energy performance of the new building and energy production from RES, according to the Deliberation of Province of Bolzano n.362//2013.

Minimum energy performance	Use of renewable energy
Energy efficiency of the building envelope: Classe CasaClima A (art. n. 4.3 comma a)	40% of the primary energy covered from RES, by 01.01.2017 (art. n. 4.3:3)*
Limit of CO_2 Emissions 100 kg CO_2/m^2y (art. n. 4.3:b)**	60% of the Domestic Hot Water produced by RES (art. n. 4.6)***
Minimum values of the thermal coefficients of summer heat transmission in building's elements according to Annexes 4 and 5 of the Guidelines (art. n. 4.8)	At least 20 W/m^2 of peak power of electricity production plants from renewable energy sources (art. n. 4.7)****
*exception: when level of optimal costs cannot be reached or KlimaHouse Gold **within IEE-AIDA project the maximum value of the CO_2 emissions was fixed 3-8 Kg CO_2/m^2year *** exception: when level of optimal costs cannot be reached or the thermal energy comes from district heating **** exception: when level of optimal costs cannot be reached or the 905 of the electric energy comes from RES	

The jury of the design competition should require the CasaClima Certification[6] during all the design phases, from preliminary to executive phase, in order to check the energy performance of the design proposal.

EURAC will support and assist the design team for the dynamic energy simulation required to analyse indoor comfort, day lighting and overheating values during the summer season.

f) Documentation required

Pre-selection phase of 15 participants

The participants, signing the model of design competition participation, declare in case of win, that within the design team there will be an energy expert in integrated energy design (IED) such as reported in chapter A.4 of the 'Design tender competition', with competence and knowledge of the dynamic simulation tools (such as EnergyPlus, Trnsys, etc.)

Public Tender Phase

The 15 participants must evaluate the energy balance of them design proposal. In order to evaluate the energy performance with the same criteria, please use the regulation defined by the 'Protocollo

6

CasaClima'(for the definition of the heating building envelope and technical plants…)[7]. Each participants has to present maximum n.4 page in A3format:

- Fronts and sections, in which is identify the heating surfaces and volumes and the dispersion architectural elements, opaque and transparent, such as the 'KlimaHouse technical drawing;
- The results (month to month) of the primary energy demands and the on-site (thermal and electric) energy production from RES will be calculated with KlimaHousePro 2013 tool, supplied to all the participants.
- The outgoing data, from KlimaHouse Pro 2013 on a monthly basis, will be copied into a simplify tool realized by EURAC, like to the Net ZEB Evaluation Tool*http://task40.iea-shc.org/net-zeb*[8]. It will be able to calculate the energy balance of the primary energy demand and CO^2 emissions.

Further design phases (definitive and executive phases)

The use of the calculation program KlimaHouse Pro 2013 is mandatory requested, like some other dynamic tools (Energy Plus, TRNSYS, etc...) to verify the energy balance and the internal comfort level.

1.1.3 Results of energy criteria evaluation

Evaluation of the energy strategy results of the 'Design competition for the new music school of Brixen'

This relation explain how the evaluation commission has assigned the energy citeria points to the design proposals.

Starting from the nZEB target, defined by a high energy efficiency building able to consume very low amount of energy (thermal and electric) required, covered on site by energy produced from RES. It is assigned an high number of points to the design proposals with the energy strategy close to the nZEB target. The achievement of the nZEB target is checked analysing the the energy performance results obtained from the CasaClima 2013[9] tool supplyed to the participants. The tool, modificated and simplified by EURAC, is been used by participants in order to check the energy performance reults and the number of points achieved by different technical solutions in relation with these parameters:

- Standard Klima A
- CO_2 emissions
- 40% of Primary Energy produced from RES
- At least 20 W/m^2 of peak power of electricity production plants from RES (…).

[7] Direttiva Tecnica CasaClima, local energy regulation (http://www.agenziacasaclima.it/)

[8] Net ZEB Evaluation Tool: http://task40.iea-shc.org/net-zeb

[9] CasaClimaPro 2013, realized by the Energy Agency of the Province of Bozen.

The final score assigned takes account of the points achieved fromt the calculation tool and the passive strategies included in the design proposal, in order to save energy (daylighting and natural ventilation, monitoring system, water recovery and reutilization, natural materials, …).

The design proposal pre-selected were 15, and 14 the proposals evaluated.

Unfortunatly the proposal n.14 (320618) was not be anonymous, for this excluded.

a) RESULTS OBTAINED

The results obtained were very positive because all the participants have elaborated an energy strategy in order to achieve the nZEB target.

A wide number of the proposals have charachterized by an high energy efficiency of the building envelope with a reduced energy consumption often covered by on site production from RES. Furthermore, solar chimney, internal courtyard and vertical cut in the building permit to the natural light to go deep into the building and reduce the energy demand. In some cases the orientation of the building increases the energy efficiency of the building facades reducing the glare and internal overheating problems. The architectonical elements have an high energy efficiency, with an energy trasmittence of opaque elements between U=0,10-0,30 W/(m^{2}K) and transparents between Uw=0,6-1,4 W/(m^{2}k). The thermal plants proposed vary from district heating produced in the SPA (close to the project area), geothemal plants and heating pumps.

The graph 'Estimated import/export balance primary energy' shows how the design proposal is close /far to the Net ZEB target.

In Table 7 the results achieved by the design proposal from the energy performance part, dvided by:

- Primary Energy
- Target nearly Zero Energy Building
- Other minimum energy requirements

The final score is defined in the last column.

Table 7: Results of the energy strategy proposal

Project		Points: First Phase					Second phase
Nr.	Code	Architectonical quality and urban integration (max. 40 Points)	Functional aspects (max. 35 Points)	Economic, technologic and architectonical feasibility (max. 20 Points)	Energy concept (max. 5 Points)	TOTAL	In this phase have participated nr.5 and nr.9 because they resulted co-winner
1	41379	22	30	14,5	3,5	**70**	
2	10263	22	20	13,5	4,5	**60**	
3	000000	15	15	12	1	**43**	
4	31113	25	20	15,5	4,5	**65**	
5	000777	40	27,5	19	3,5	**90**	**Winner**
6	535504	12	12	12	4	**40**	
7	707707	30	27	9	4	**70**	
8	637268	38	28	10	4	**80**	

9	220114	38	30	18	4	**90**	
10	000001	16	15	15	4	**50**	
11	213141	30	25	11,5	3,5	**70**	
12	720100	20	11,5	10	3,5	**45**	
13	413927	18	16,5	15	3,5	**53**	
~~14~~	~~320618~~	-	-	-	-	**-**	

1.2 Austria

1.2.1 School in Hartberg Municipality. AT

AIDA AFFIRMATIVE INTEGRATED ENERGY DESIGN ACTION

Co-funded by the Intelligent Energy Europe Programme of the European Union

AEE INTEC

Definition of the minimum energy performance parameter to introduce within the future tender

School Building,

Thermal renovation

Hartberg, AT

GENERAL INFORMATIONS

Owner:	HSF Hartberg Sport- und Freizeitbetriebe
Use:	School Building
Heated surface:	7.834 m² (gross floor area of the existing building)
Gross volume:	28.947 m³
Cost:	12 Mio. EUR
Method of financing:	Municipalities of Hartberg region with support of Province of Styria

The design competition tendering procedure aims to find the best design proposal, from the architectural and functional quality, landscape integration, construction, maintenance, investment and operating costs, energy performance etc.
Energy performance criteria have been included in the tender and also requirements to improve the Indoor Environmental Quality were defined.

ENERGY REQUIREMENTS DEFINED FOR THE FUTURE TENDER

Public competition tender should lead to optimized comfort and energy related design proposal!

ENERGY PERFORMANCE CRITERIA:

- *Calculated heating demand after the renovation < 15,6 kWh/(m²year)*
- *Calculated cooling demand after the renovation < 2,0 kWh/(m²year)*
- *Calculated final energy demand according to the national-regional law for the energy performance requirements (OIB guideline 6)*
- *Calculated total primary energy demand after the renovation ~ 95 kWh/(m²year)*
- *Requirements for the U-values of the building components according to the national-regional law for the energy performance requirements (OIB guideline 6)*
- *50%-70% of the primary energy consumption will be covered by renewable energy sources*
- *Calculated CO_2 emissions < 22 kg_{CO2}/(m²year)*
- *Improvement of the visual comfort (natural lighting, shading system, glare shield) and indoor air quality*
- *Improvement of the thermal comfort (higher surface temperatures, reduction of draught, reduction of overheating, ...)*

TOOLS FOR THE ENERGY PERFORMANCE CALCULATION:

GEQ (the software tool "GEQ " is one of the several tools in Austria to calculate the energy performance of residential and non-residential buildings according to the national-regional law for energy performance requirements – OIB guideline 6; more information on the software tool can be found on the website of the distributor: http://www.geq.at/)

OTHER CRITERIA

Use an IED process during the definitive and executive design phases.

RANKING POINTS:

The evaluation criteria consist of:

- compliance with the defined energy performance requirements
- compliance with the available budget

The energy performance in the design stage has to be verified with appropriate calculations, corresponding to the OIB guideline 6 and the therein defined calculation methodology and weighting factors.

TOOLS USED DURING THE DESIGN PHASES TO EVALUATE:

- The energy performance: GEQ
- The energy production: PV simulation tool of the Austrian Energy Agency (http://www.pvaustria.at/wp-content/uploads/2013/07/PVTOOL_AE_Priv_04.14_Vers.5.3.xls)
- The Indoor Environmental Quality: iDbuild (http://www.idbuild.dk/index.php/idbuild2)

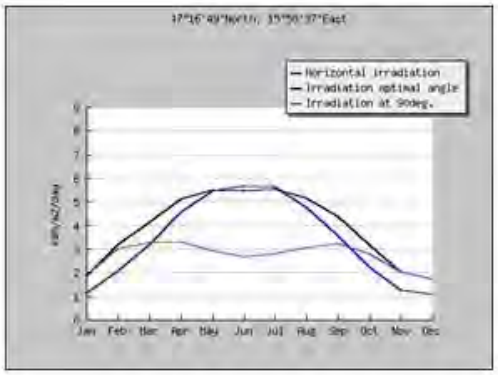
School Building

Thermal renovation

Hartberg, AT

DESCRIPTION OF THE CLIMATE:
Municipality of Hartberg

Address:	Edelseegasse 18, Hartberg
GPS:	47°16'49'' N, 15°58'37'' E
Altitude:	325 m
Yearly solar radiation: (graphic)	3,92 kWh/m² *day (Average sum of horizontal global irradiation per square meter received) ( )
HDD20 :	HDD20= 3.733 Kd, IT (15.444 E, 46.995 N) http://www.degreedays.net)
CDD26 :	CDD26= 38 Kd, IT (15.444 E, 46.995 N) (http://www.degreedays.net)
HDD20, National Classification:	HDD20= 3.579 Kd



IED PROCESS

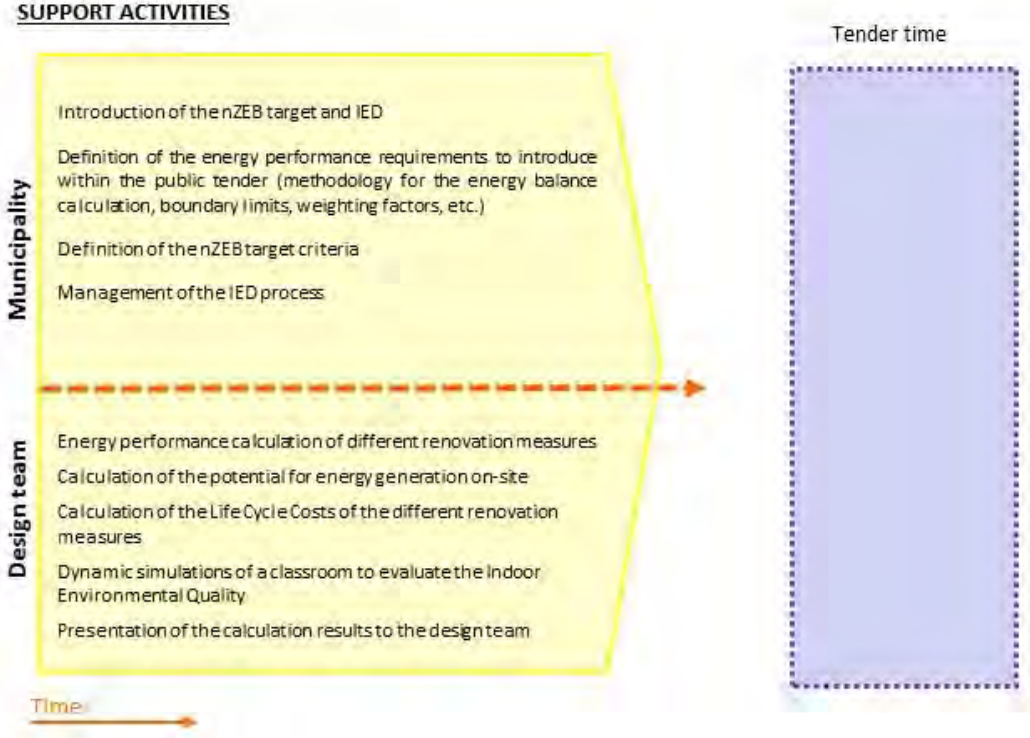
Composition of the team: representatives of: AEE INTEC
Architects
Technical Office
Municipality

Management of the IED: Municipality / AEE INTEC

Benefits and critical aspects

The support of the municipality in defining, calculating and assessing retrofit strategies was possible. Thereby requirements of the retrofitted school building and life cycle cost aspects could be "translated" to the municipal representatives. The technical knowledge of the municipality (representatives) could also be improved by the collaboration.

SUPPORT ACTIVITIES



School Building

Thermal Renovation
Hartberg, AT

SUPPORT TO THE MUNICIPALITY AND DESIGN TEAM

July 2012 Contacting the head of the environmental department to get to know possible building projects of the municipality

September 2012 Meeting with the head of the environmental department to discuss detail tender and energy criteria actions of nZEB for municipality

December 2012 Working meeting with head of environmental department and architect to discuss the renovation of the school building "Edelseegasse".

January 2013 LCC – study for Edelseegasse and energy performance calculation results for the school building were send to heat of environmental department, architect and technician.

August 2013 Discussion with head of the environmental department about the progress and the schedule of the renovation – start of the renovation still has to be determined

October 2013 Meeting with architect and last revision for school renovation

Working meeting with head of building and construction department and with architects to discuss the criteria for the renovation of the school building and also the financial model of the renovation.

Due to budget constraints the renovation of the school building was postponed.

June 2014 Decision of municipality to forward the renovation of the school building. First meeting with the municipality and the architects were organized to discuss the objectives of the building renovation.

September – October 2014 Based on this discussion renovation measures and options were defined to be in line with the requirements of the municipality and the defined AIDA criteria. For these renovation measures different calculations were performed to analyze the expected renovation results. Those calculations and simulations comprised following activities:

- Energy performance calculation of different renovation measures
- Calculation of the potential for energy generation on-site
- Calculation of the Life Cycle Costs of the different renovation measures
- Dynamic simulations of a classroom to evaluate the Indoor Environmental Quality

Several meetings with the municipality, architect and technical office were organized regularly to discuss the progress of the criteria definition and the results of the different performed calculations.

1.2.2 Energy performance requirements part introduced in the public tender

English translation of nZEB criteria in tender document of the school renovation „Edelseegasse, Hartberg“

German text (on p.2) :

„Gebäuden wird bei der Energieeinsparung und CO2-Reduktion in Bezug auf die EU Gebäudeeffizienzrichtlinie 2010/31/EU (EPBD 2010) eine wichtige Rolle zugeschrieben. Aus diesem und Klimaschutz-Gründen wird zur Vorbildwirkung für die Bürgerinnen und Bürger der Stadtgemeinde Hartberg das Schulgebäude in der Edelseegasse 18 saniert. Der geringe Energiebedarf sollte zu einem ganz wesentlichen Teil durch Energie aus erneuerbaren Quellen, am Standort oder in der Nähe erzeugt, gedeckt werden. Das von der Stadtgemeinde Hartberg sanierte Schulgebäude erfüllt die nationalen OIB-Richtlinien im Sinne eines nZEB Standards und damit folgende Kriterien:

- Gesamt-Primärenergiebedarf wird bei rund 95 kWh/m²BGF und Jahr liegen (das ist etwa die Hälfte des im „Nationalen Plan“ geforderten PEB für 2016)
- Dieser geringe Primärenergiebedarf wird dabei zu 50-70% über erneuerbare Energieträger gedeckt werden.“

English translation:

„According to Energy Performance of Buildings Directive (Directive 2010/31/EU – EPBD) buildings play a major role in reducing energy and CO2 emissions in the European Union. For this reason and also for the reason of climate protection the municipality of Hartberg renovates the school building in the Edelseegasse 18. The renovation of the building should serve as model for all citizens of the municipality. The low energy demand of the building should be covered to a very significant extent by energy from renewable sources, including energy from renewable sources produced on-site or nearby. The renovated building fulfills the national requirements of the OIB guidelines in the sense of nZEB standards and therefore following criteria:

- The total primary energy demand of the building will be around 95 kWh/GFA and year (this is approximately the half of the primary energy demand required by the “national plan” for 2016)
- 50-70% of this low primary energy demand will be covered by renewable energy sources.”

1.3 France, Communauté de Communes d'Amplepuis Thizy

1.3.1 Generic information

AIDA AFFIRMATIVE INTEGRATED ENERGY DESIGN ACTION

Co-funded by the Intelligent Energy Europe Programme of the European Union

HESPUL

Public design tender for a nearly zero energy building story card

New Hotel d'Entreprise,
Shared office and workshop spaces
Thizy, FR

GENERAL INFORMATIONS
Owner: Communauté de Communes d'Amplepuis Thizy (joint local authority)
Use: Shared office space in a public owned building in a commercial development zone for established companies who cannot find adequate office space in the commercial zone.
Heated surface: 1020 m²
Cost: Total budget € 13.393.000,00

Typology of design tender adopted: Advanced Design Tender (APD)

07 - VUE A Perspective depuis l'angle Nord Est du bâtiment.

TENDER
TYPOLOGY OF THE TENDER:
- Advanced Design tender (APD)

ENERGY PERFORMANCE CRITERIA:
- **National Law :**
  - 2005 (office space) and 2012 (tertiary areas) Thermal Regulations (RT2005, RT2012)
  - Maximum 50kWh/m2/year for DHW, heating, cooling, auxiliary and ventilation
- **Minimum energy performance requirements fixed *by* Municipality in AIDA project framework**

Additional requirements
- Feasibility study for different energy sources
- Dynamic thermal simulation for 2 different rooms (no mandatory tool specified)

Provide an option :
- "BBC" level performance, ie 20% less consumption than RT2012 levels in the office spaces
- Include at least one renewable energy
- Calculate and display consumption of end uses (computers etc)

TOOLS USED TO EVALUATE:
The energy performance :
- THCE (regulatory tool)
- Pleiades (dynamic thermal simulation : http://www.izuba.fr/logiciel/pleiadescomfie

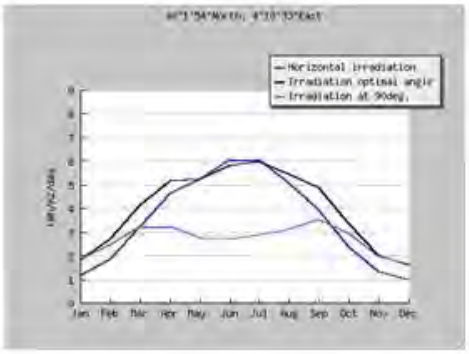
The energy production: PV GIS
Others: excel

New Hotel d'Entreprise,

Shared office and workshop spaces
Thizy, FR

DESCRIPTION OF THE CLIMATE:
Municipality of thizy

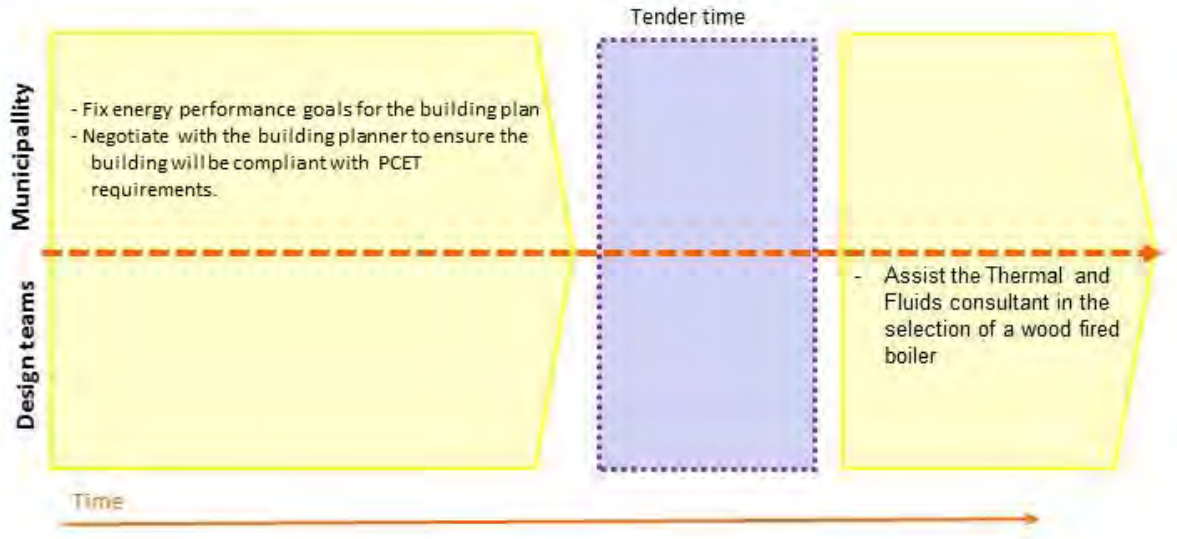
Address:	Avenue de la pépinière, ZAE des Portes du Beaujolais, 69240
GPS:	Location: ..... North: 46.033 Est : 4.313
Altitude:	504 m
Yearly solar radiation: (graphic)	2,69 kWh/m² *day (Average at 90 degglobal irradiation per square meter received) 3,49 kWh/m² (Average sum of horizontal global irradiation per square meter received)



IED PROCESS

Composition of the team: Municipality teams - Technical services, Economical Development Officer (who will be managing the building), the PCET (climate action plan) Officer, Hespul, architect, thermal and fluids consultants, project planner

SUPPORT ACTIVITIES



New Hotel d'Entreprise,

Shared office and workshop spaces

Thizy, FR

SUPPORT TO THE MUNICIPALITY AND DESIGN TEAM

Mars 2012	The joint local authority Amplepuis -Thizy contacts Hespul wishing to integrate Hesul into the process for the planning of a new Shared office and workshop space.
March 2012 to May 2012	Hespul works with the building Planner to include nZEB energy performance criteria in the project, in compliance with the PCET (roadmap) goals. The Planner does not wish to reach these goals, the justification being that the obligatory thermal regulations in place since January 1st 2012 are already extremely costly and going beyond would be completely out of budget. The new regulations require a reduction by 2 of energy consumption compared to previous thermal regulations, and at 50kWh/year/m2 for 5 uses is very close to nZEB anyway, explains the Planner. After much negotiation, the obligation to study the incorporation of a woof fired boiler to supply 100% of heating needs and a photovoltaic system to cover 50% of electricity needs is included in the preliminary design brief. An obligation to include low grey-energy materials (ie bio-sourced) in the preliminary study is also included.
September 2012	The winning tender for the architect and his team is finalised, and an architect with little interest in energy performance but known to the municipality elected officials is chosen – Hespul is not associated with the choice. The thermal and fluids consultant in the team has experience in the field of energy performance.
November 2013 to march 2013	Hespul works with the design team and municipality to approve the preliminary design and to assist in the dimensioning and costing of the renewable energies (wood fired boiler and heating system, photovoltaics)
End of March 2013	The preliminary design is approved. The project will meet 2012 thermal regulations, and include photovoltaics to cover 50% of the building electricity consumption, and 100% of heating needs will be supplied by 2 wood pellet boilers installed in series. **Despite the initial reluctance of the building planner and the municipality, the building will be nZEB !** Over costs due to the renewable energies have been absorbed by a modification in the project (reduction in width of the building roof overhang that had been planned to create a covered strip around the buildings exterior).
March 2013- August 2014	The project continues. However the architect has not included the joint local authority PCET Officer and Hespul in project meetings since the obligation to modify the building design to incorporate renewables was acted.

2. Next public design tenders planned

Feasibility case studies finished with the definition of minimum energy performance requirements to introduce in next public design tenders are collected in Table 8.

Table 8: Feasibility case studies finished with the definition of minimum energy performance requirements to introduce in next public design tenders

	Partner	Municipality involved	Building	Typology of next tender	Action carried out	Justification
211	EURAC (IT)	Bolzano, Italy Signed agreement Signed Letter of affirmation	New elderly protected residential building	SERVICE COMPETITION: Negotiated tender to choose the building enterprise	DESIGN TENDER PLANNING: Manage the IED process Introduction to the Municipality and the design team the nZEB target and definition of the energy performance of the new building. Elaboration of the energy balance of the design proposal and definition of technical solutions able to improve the energy performance of the building, from the bioclimatic design side, to the introduction of passive strategies (daylighting and natural ventilation), to the thermal insulation. Definition of the available RES on-site and the generation system, form solar panels (thermals and electrics) to geothermal heat exchangers. Definition of the BMS in order to manage and control the whole building systems. The minimum value of the parameters of the building envelope and the thermal plants, defined from this preliminary study, should be introduced in the next design tender like the minimum requirements of the bids.	Due to administrative procedure timing, sometime slowly and large.
221	IREC (ES)	Figueres, Spain Signed agreement Letter of affirmation	New sport hall (dedicated to archer and social center)	WORK CONCESSIONS TENDER to choose the builder and service concession.	The preliminary studies are finished and the final report was presented to the Municipal architects in October of 2013.. The report includes five scenarios, conclusions and detailed simulation data about: energy consumption (annual), thermal performance (heating, cooling, ventilation), artificial lighting load, control systems, daylighting and visual comfort probability (daylight conditions). Also, include recommendations to improve the thermal performance and the generation by RES.	Support to the design team of the Municipality during the development of the definitive and executive design to include some improvements in the energy performance. The objective of this collaboration is to justify some decision to going to be part of Energetic part of

					The construction tendering (work concession services), for now, is pending of realization. Support the constructions tendering and monitoring IED process (only if the tender is held during AIDA project time, 2014 and beginning of 2015)	the tender for the construction services.
222	IREC (ES)	Tarragona, Spain	New Olympic pool building	TENDER COMPETITION (planned for 2014-2015).	Expected to collaborate to support the municipal technician introducing the nZEB target and the IED process in the tender. Draft version of three ways of collaboration presented (potential work plan) Several conversations were established to propose a work plan, taking in account the possibilities of collaboration into the framework and during of AIDA project. A new work plan proposal was presented in February –March and adjusted in June of 2014, offering a report with nZEB targets, recommendations and explains the IED guideline (Deliverable 3.1) to include the IED process in a future tenders (definitive, executive design phases and works). After that, the design office and Energy Agency of the Municipality made a new proposal.	TIMING REASON: the municipality wants support during the definition of the Ideas and preliminary design. Also, not have a clear definition about the different tender process schedule and deadlines in the framework of AIDA project.
231	CRES	Amaroussion	New High School Building (8th Gymnasium and 9th Lyceum of Amaroussion)	PUBLIC TENDER FOR CONSTRUCTION	Close collaboration with the Municipality team to introduce energy performance requirements, method for the energy balance calculation, energy award criteria for the ranking points, and other necessary specifications in the public tender. Preliminary technical requirements of tender have been included in the preliminary study	Seeking financing

2.1 Italy

2.1.1 Bolzano Municipality, IT

AIDA AFFIRMATIVE INTEGRATED ENERGY DESIGN ACTION

Co-funded by the Intelligent Energy Europe Programme of the European Union

EURAC research

Public design tender for a nearly zero energy building story card

Apartment building for the elderly, with annexed health District Service and Community development Center

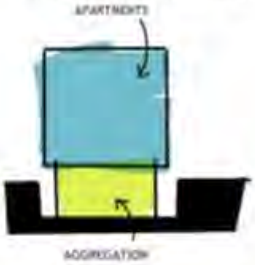
New building, Bolzano, IT

GENERAL INFORMATIONS

Owner:	Municipality of Bolzano
Use:	Residential, office building, and garage for 30 car boxes
Heated surface:	2607 m²
Gross volume:	7252 m³
Cost:	Total budget Building construction costs € 3.393.000,00 divided into: • Civil works cost €746.460,00 • Structural works costs €339.300,00 • Thermal plans cost € 509.950,00 • Electric plants € 339.300,00 • External works € 100.000,00 Design cost €107.840,03
Method of financing:	Financed by Municipality of Bolzano and Province of Bolzano

Typology of design tender adopted, in a first phase:
- *Public service contracts for design service*

And in a second phase will be adopted:
- *Public service contracts for construction design*



TENDER

TYPOLOGY OF THE TENDER:
- Negotiated design tender to find the design team

ENERGY PERFORMANCE CRITERIA:
- CasaClima A, standard A of the local energy performance certification (heating energy demand < 30kWh/(m²y))
- Minimum periodic thermal transmittance (Yie) for summer season
- CO2<100kg/m²year
- 40% of the total primary energy produced by RES
- 60% of the DHW load covered by RES
- minimum of 20W (of for each square meter covered) of electric production system from RES

Supplied tools for the energy performance calculation:
- CasaClima Pro 2014

OTHER CRITERIA
- Use an IED process during the design development

TOOLS USED TO EVALUATE:
The energy performance: Energy Plus....
The energy production: Pvsol

Masterplan of the building (Source: StudioCLEAA, 2013)

RESULTS OF THE DESIGN TENDER

Describe the results obtained, from the number of participants to the energy strategies proposed, positive aspects, issues and barriers.

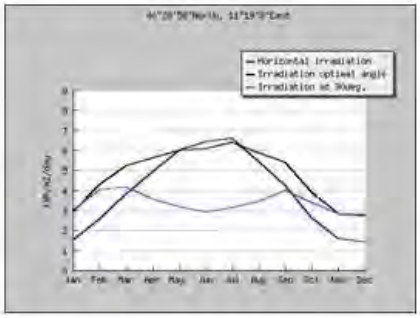
ENERGY PERFORMANCE RESULTS OBTAINED	
Primary energy consumption (without considering RES production)	68,8 kWh/m²y
PV production	38,60 MWh/y
CO_2 emission saving with PV system	3,41 Tn CO_2/y
Estimated saving of primary energy/year	38,60 MWh/y
Estimated saving of CO2 emissions /year	3,41 Tn CO_2/y

Apartment building for the elderly, with annexed health District Service and Community development Center

New building, Bolzano, IT

DESCRIPTION OF THE CLIMATE:

Address:	Via Ortles, District CasaNova, Bolzano
GPS:	Location: Bolzano, 46.48335, 11.31860
Altitude:	262 m
Yearly solar radiation: (graphic)	4.76 kWh/m² *day (Average sum of horizontal global irradiation per square meter received in a day) 1740 kWh/m² (Average sum of horizontal global irradiation per square meter received) ( )
HDD20 ( ):	HDD_{20}= 3131 Bolzano, IT (11.33E,46.46N)
CDD26 ( ):	CDD_{26}= 106 Bolzano, IT (11.33E,46.46N)
HDD20, Italian Classification: (Italian law: n. 412 26/august/1993)	HDD20= 2791 Bolzano, IT (11.33E,46.46N)



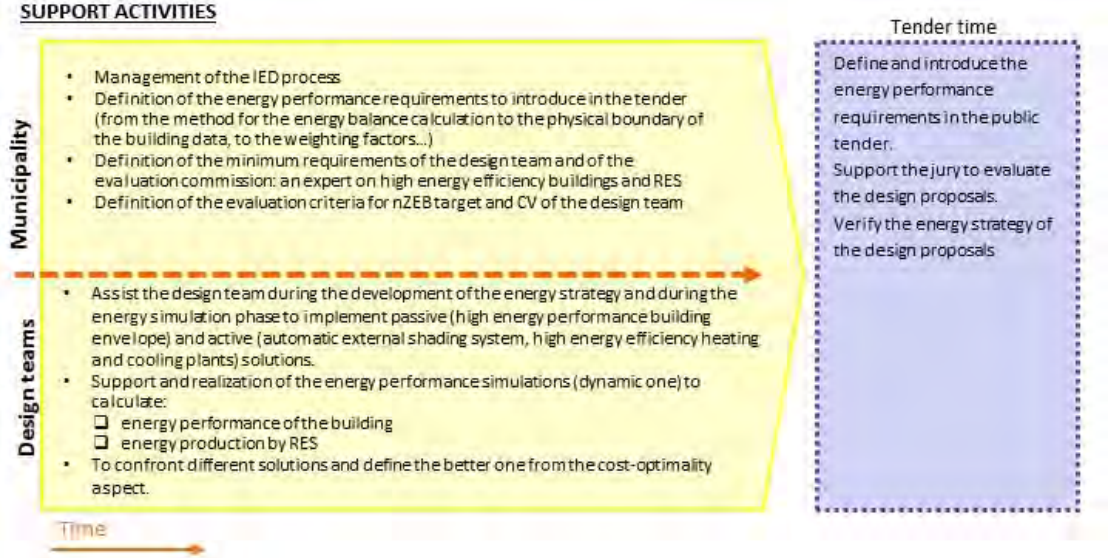
IED PROCESS

Composition of the team: EURAC team
representatives of the Municipality of Bolzano
design team (architects, structural and mechanics engineers)

Work done by EURAC team:

- To define the technical specifications of the nZEB energy target from the methodology to calculate the energy building performance, the definition of the boundary limit, etc. to require an energy balance calculation.
- Supporting the Municipality and the Design team into the IED process in the preliminary and basic design phases (meetings, recommendations, etc).

SUPPORT ACTIVITIES



Apartment building for the elderly, with annexed health District Service and Community development Center

New building,
Bolzano, IT

SUPPORT TO THE MUNICIPALITY AND DESIGN TEAM

2011

The Municipality of Bolzano needs a new Apartment building for the elderly, with annexed health District Service and Community development Center in the new neighborhood CasaNova in Bolzano.
The Municipality decides to use a negotiated tender design procedure to chose the design team that will design the building. Costs for the design service Euro 107.840,03

Beginning 2012

CI&aa, Claudio Lucchin & architetti associate, won the public competition.

29.06.2012

Contract between Bolzano Municipality and CI&aa, Claudio Lucchin & architetti associate.
(180 days for the elaboration of the preliminary design)

September 2012

Municipality of Bolzano signed an agreement to participate into AIDA project.
The Municipality decided to achieved the NZEB target for the new Apartment building for the elderly, with annexed health District Service and Community development Center in the new neighbour CasaNova in Bolzano. A close collaboration between EURAC team and Municipalities' representatives starts.

October/Februar y 2012

Organization of workshops to introduce the nZEB concept (high energy efficiency building and RES) to the staff of the municipality involved into the project and to the design team.

The Municipality changed some 'dimensional' requirements, such as the minimum heating areas of the houses and the office part. The design proposal was suspended during these months.

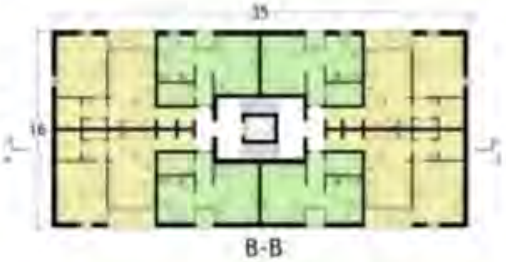
6 March 2013

IED meeting: The design team presented a design proposal.
Underground floor: a garage for 30 cars. Required adding: 5 technical rooms.
Basement: Community development Center with independent entrance, composed by a big hall of 170 mq (with windows on the upper part of the walls), n. 1 administrative office (45mq), n. 1 kitchen. N.1 storage, and other room. Required adding: bikes parking and minimum n.3 parking places.
Ground floor: Health District Service with n. 4 offices for the doctors, n. waiting hall, n. 2 storages, and other rooms.
Upper floors: apartments.

Plant system: heating district for heating and cooling. Ventilation system with heating recovery.

Ground floor plan (StudioCLEAA, 2013)

Basement plan (StudioCLEAA, 2013)

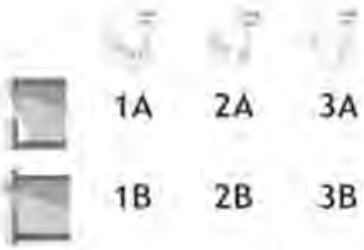


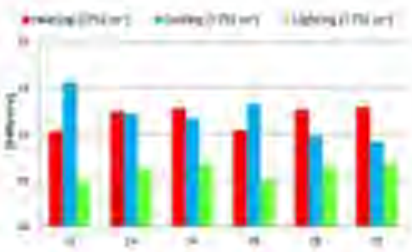
Upper floors plan. StudioCLEAA, 2013
- 65m² apartments are colored brown
- 45m² apartments are colored green

Apartment building for the elderly, with annexed health District Service and Community development Center

New building, Bolzano, IT

March 2013	Updates of the design proposal
July 2013	IED meeting: EURAC presented the first energy performance results. The sensitivity analysis on the Energyplus model of the building, considering the following variables of the architectural façade composition: - Glass to wall ratio (GWR) 38%, 20%, 16%; - Overhang dimension 25 cm, 80cm. The results showed the difference between annual consumption comparison (heating + cooling +lighting)





Annual Energy Consumption comparison (heating + cooling + lighting)

06 August 2013	Validation of the preliminary design from the Municipality. The preliminary project is rejected from the technical commission for the validation of the elderly structure for problems with the toilets dimensions. Modification of the preliminary project.
24 October2013	Validation of the preliminary design from the technical commission for the validation of the elderly structure. The preliminary project is rejected from the Provincial Technical Committee because they are not informed (by the Municipality) about some changes, such as the increasing of the volume.
22 May 2014	The design project was blocked for Provincial election, until the definition of the new administrative organ. Validation of the preliminary project from the Provincial Technical Committee.
June-July 2014	Validation of the final proposal of the preliminary project from the technical commission of the Municipality.
7 July 2014	Beginning of the definitive design project, elaborated by arch. Lucchin (available 90 days).
July - September 2014	Organization of meetings to discuss the energy strategy elaborated by the design team, in particular for the elimination of the thermal bridge and thermal insulation.
October 2014	Enrolled the definitive design
November - December 2014	Organization of meetings to discuss the introduction of passive system, such as natural ventilation.
17 February 2015	Meeting with the municipality manager to discuss how the IED process can continue after the AIDA project finished.

2.2 Spain

2.2.1 Municipality of Figueres, ES

AIDA AFFIRMATIVE INTEGRATED ENERGY DESIGN ACTION

Co-funded by the Intelligent Energy Europe Programme of the European Union

IREC Institut de Recerca en Energia de Catalunya Catalonia Institute for Energy Research

Preliminary study card

Municipality of Figueres

New Sports hall building (Archery and Social Centre)

Vilatenim, Figueres, Spain

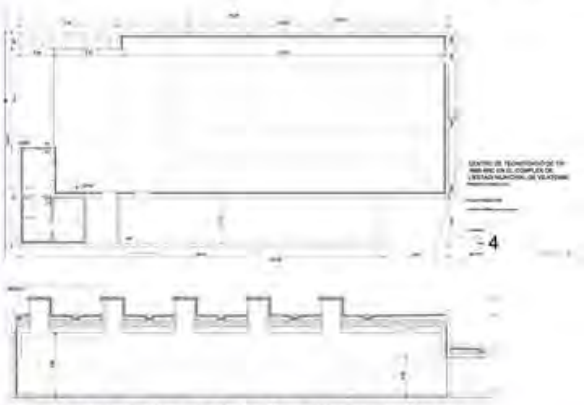
GENERAL INFORMATIONS

State of the art:

Owner:	Municipality of Figueres
Use:	Sports hall building, dedicated to archery and social centre (*Sala de tecnificació de Tir amb Arc*)
Heated surface:	312 m² (only the main room, without facilities and services)
Gross volume:	1413 m³ (only the main room, without facilities and services)

OBJECTIVE OF THE PRELIMINARY STUDY:

Support to the Municipality design team during the development of the definitive and executive design to include some improvements in the energy performance. The objective of this collaboration is to justify some decisions going to be part of Energetic specifications in the future tender of work concessions (to choose the builder and service concession). Also, improve the level of the certification in energy consumption (from B to A level). Realize dynamic simulations to justify some improvements in energy performance and nZEB target. Present a report to the Municipality with results and conclusions (thermal and daylighting simulations).



Plan and cross section (executive design). Source: Municipality of Figueres.

Dynamic simulation model. Source: IREC.

Justification:

The Municipality of Figueres has planned to built a new sport hall and social centre in Vilatenim (Figueres, Alt Empordà), near to the existing Football Stadium: "Centre de tecnificació de Tir amb Arc en el Complex de l'Estadi Municipal en Vilatemim". The project has been developed by the Technical Office (Àrea de Arquitectura i Espai Public). Also, the Municipality planned to do a work concessions tender to choose the builder and service concession, but finally, not this year. The simulations and conclusions, included in the preliminary studies' report, finished and presented to the Municipality, has been made to support the Energy Performance target in the future tender.

OBJECTIVE OF THE PRELIMINARY STUDY:
ENERGY PERFORMANCE REQUIREMENTS

National-local laws of energy performance requirements for office building (REAL DECRETO 235/2013):

- The Basic Procedure for Efficiency Certifications on Buildings. The object of this basic procedure is the establishment of conditions for energy efficiency certification on new and existing buildings. Refer to the CTE Technical Building Code for new building and existing building.
- *Mandatory energetic certification (CALENER, LIDER or justified software)*
- *Limit energetic primary demand (depending of different climatic zones).*

Minimum energy performance requirements fixed by AIDA project:

- *The higher Class (usually standard Class A) of the National or Local Energy Performance Classification of the building;*
- *The 50% of the primary energy consumption has to be covered by energy produced from renewable energy sources;*
- *Total primary energy consumption limit: 60 kWh/m2year;*
- *CO2 emission limit: 8 Kg CO2/m2year.*

TOOLS USED TO EVALUATE:

The energy performance: TRNSYS, DAYSIM
The energy production:
Others:

DESCRIBE IN POINTS THE METHODOLOGY TO IMPROVE THE ENERGY PERFORMANCE OF THE BUILDING:

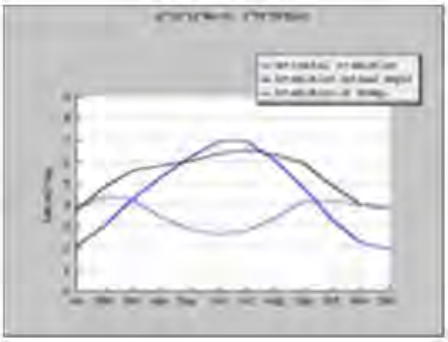
- Define the objectives of nZEB target and work plan.
- Establish the baseline model
- Dynamic simulations with different scenarios (improvement of the envelope and daylighting optimization)
- Discussion of results and conclusions to reduce the energy demand, taking in account the users comfort.

New Sports hall building (Archery and Social Centre)

Municipality of Figueres

DESCRIPTION OF THE CLIMATE:
Municipality of Ordis

Address:	Plaça Camp de Futbol, Vilatenim, Figueres, Girona, Spain.
GPS:	Latitude: 42° 16' 12'' N, Long: 2° 59' 58'' E (42.270021, 2.999461)
Altitude:	17 m a. s .l
Yearly solar radiation: (graphic)	4,41 kWh/m² *day (Yearly Irradiation on horizontal plane)
HDD20 ( ):	HDD20= 2010, Closa den Llop, L' Escala, GIRONA, SPAIN (3.13E,42.12N)
CDD26 ( ):	CDD26= 71 , Closa den Llop, L' Escala, GIRONA, SPAIN (3.13E,42.12N)



IED PROCESS

Composition of the team:	Figueres' municipality architects of the Architecture Area Public Space Office (*Área de Arquitectura i Espai Public*) IREC team
Management of the IED:	IREC team

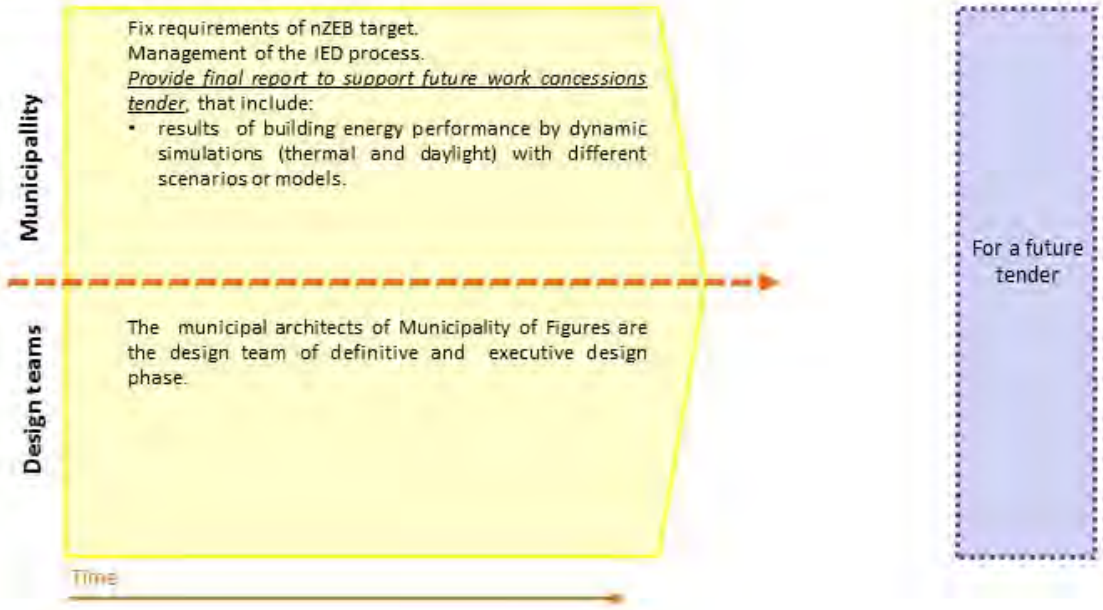
Benefits aspects:

- Very good interchange of technical data, detailed information and interest to find the best solution to achieve nZEB target by the architects of Municipality of Fiqueres.
- Knowledge and implication to include bioclimatic, passive and active solutions by the municipal architects.

Critical aspects and barriers found:

- The definition of the program use, facilities, timetables, etc. by offices of the Municipality of Figures were chanced during the collaboration with IREC. Some changes affecting directly the scenarios or models to adjusts the dynamic simulations.
- In Cataluña and Spain context there is very little new construction and nZEB opportunities in building retrofits are more limited.
- The impossibility to adjust the IED assisting in terms of time during AIDA project realization to the municipalities projects (start to work, deadlines, etc.).

KIND OF SUPPORT ACTIVITY

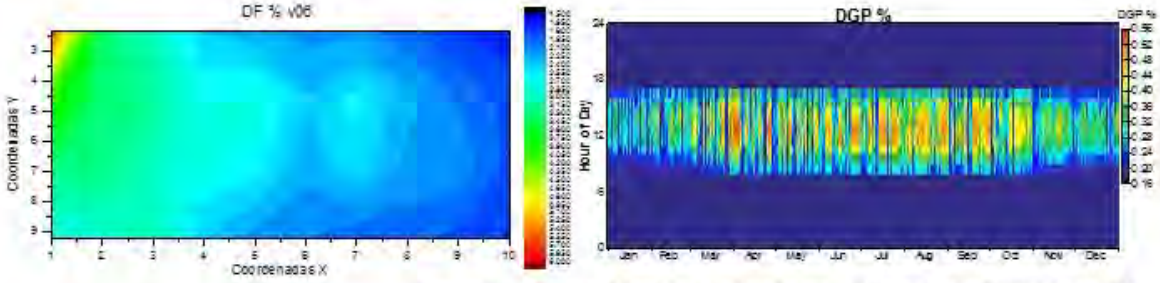


New Sports hall building (Archery and Social Centre)
Municipality of Figueres

SUPPORT TO THE MUNICIPALITY AND DESIGN TEAM

(describe the collaboration with the Municipality to introduce energy performance requirements into the design tenders and how the integrated design process (IED) works

September 2012	Sign of agreement of collaboration in the framework of AIDA project (WP3 and WP4).
October 2012	Start the conversations with Municipality of Figueres (municipal architects) about the collaboration and support of the realization of executive design phase to the New sports hall (dedicated to Archery and Social Centre) in Vilatenim, Figueres, to reduce the energy demand and introduce nZEB target. Discuss possible work plan and objectives.
November 2012	The architects sent information and details about the project as a orientation of skylights, thermal insulation, and the model of certification process (mandatory procedure: level A).
December 2012	Agreement on: 1) possible data for future meeting to establish energetic objectives, 2) sent more information by the municipal technicians (construction details, schedule of time use of the building, etc) 3) several interchange of information about the project. was started to establish the simulation models. Dynamic simulation by TRNSYS and DAYSIM were started by IREC, with 4 possible models (different skylights orientation, insulate thickness, artificial control strategies, etc)
January – February 2013	Meeting with the municipal architects (*Área de Arquitectura i Espai Public)* in the Municipality of Figueres. Discussion with the architects about preliminary results.
March – July 2013	Some changes in the timetable of building use (14h instead 3h). New dynamic simulations were carried out (with the adjustments) and final report and analysis of results have been started.
September/October 2013	The preliminary studies are finished and the final report was presented to the Municipal architects. The report includes five scenarios, conclusions and detailed simulation data about: energy consumption (annual), thermal performance (heating, cooling, ventilation), artificial lighting load, control systems, daylighting and visual comfort probability (daylight conditions). Also, include recommendations to improve the thermal performance (increase the insulation in +50 mm= -21% energy consumption) and the generation by RES.



Results of Daylight Factor (%) and Daylight Glare Probability (%), simulated by DAYSIM. Source IREC.

January 2014	Unfortunately, due to financial problems, the construction tendering for the new building is not carried out during these year (2014), so the collaboration concluded, for the moment, at the executive design phase. The preliminary studies' report, finished and presented to the Municipality, will support the future construction tender.

2.2.2 **Municipality of Tarragona, New Olympic pool building**

AIDA AFFIRMATIVE INTEGRATED ENERGY DESIGN ACTION

Co-funded by the Intelligent Energy Europe Programme of the European Union

IREC Institut de Recerca en Energia de Catalunya Catalonia Institute for Energy Research

Preliminary study card

Municipality of Tarragona

New built and retrofitting of Municipal Sports Hall of Campclar. Tarragona, Spain

GENERAL INFORMATIONS

State of the art:

Owner:	Municipality of Tarragona
Use:	New Olympic Pool building (and dressing and locker rooms).
Heated surface:	2800 m² (estimated)
Gross volume:	- m³

OBJECTIVE OF THE PRELIMINARY STUDY:

Support the Municipality of Tarragona by elaborating a report and facilitate material of AIDA project with recommendations to introduce nZEB target and IED process that will be include in future definitive and executive tender competition.

Justification:

The Municipality of Tarragona wants to built a new Olympic Pool (with others two new buildings) and retrofitting the Municipal Sports Hall in Campclar, to the next XVIII Mediterranean Olympic games, that will be held in 2017 in Tarragona.

The project is developing by the Technical Design Office (*Oficina de Projectes*) of the Municipality of Tarragona. Also, the Municipality planned to do a definitive, executive and works competition tender to choose the design team and builder (expected in 2014/ 2015). The financing source has to be defining.

Due to the complexity of project (volume of works, use, dates, actors involved, financing sources, provisional tender dates etc) and the framework of AIDA project (time duration, workload), IREC offers to do a report with recommendations which be include in future tenders (definitive, executive and works competition tender).

OBJECTIVE OF THE PRELIMINARY STUDY: ENERGY PERFORMANCE REQUIREMENTS

National-local laws of energy performance requirements for office building (REAL DECRETO 235/2013):

- The Basic Procedure for Efficiency Certifications on Buildings. The object of this basic procedure is the establishment of conditions for energy efficiency certification on new and existing buildings. Refer to the CTE Technical Building Code for new building and existing building.
- *Mandatory energetic certification (CALENER, LIDER or justified software)*
- *Limit energetic primary demand (depending of different climatic zones).*

Minimum energy performance requirements fixed by AIDA project:

- *achieve the highest class of the national standard of the National or Local Energy Performance Classification of the building; usually called Standard/Class A;*
- *minimum of 50% of the primary energy consumption must be covered by energy produced from renewable energy sources;*
- *total primary energy consumption limit of 60 kWh/m2year*
- *CO_2 emission limit of 8 kg CO_2 /m²year.*

TOOLS USED TO EVALUATE:

The energy performance:

The energy production:

Others:

DESCRIBE IN POINTS THE METHODOLOGY TO IMPROVE THE ENERGY PERFORMANCE OF THE BUILDING:

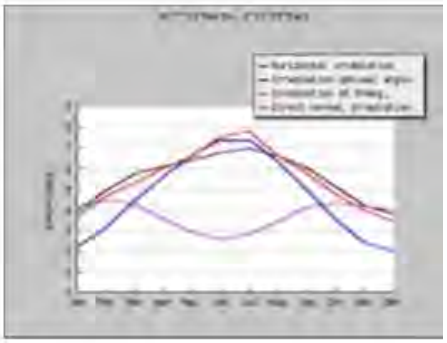
- Discuss the feasibility of collaboration by IREC in the framework of AIDA project.
- Elaborate a report and facilitate material with recommendations introducing nZEB target and IED process (that will be include in future tender competition).

New built and retrofitting of Municipal Sports Hall of Campclar.

Municipality of Tarragona

DESCRIPTION OF THE CLIMATE:
Municipality of Ordis

Address:	Riu Ciurana, s/n, Tarragona, Spain
GPS:	Latitude: 41° 7' 12.9864'' N, Long: 1° 12' 28.5264'' E (41.120274; 1.207924)
Altitude:	22 m a.s.l.
Yearly solar radiation: (graphic)	kWh/m² *day (Yearly Irradiation on horizontal plane)
HDD20:	HDD20= 1079 Salou, CATALUÃA, SPAIN (1.12E,41.08N)
CDD26:	CDD26= 100 Salou, CATALUÃA, SPAIN (1.12E,41.08N)



IED PROCESS

Composition of the team: IREC team, Energy Agency and Design Office of the Municipality of Tarragona.
Management of the IED: IREC team.

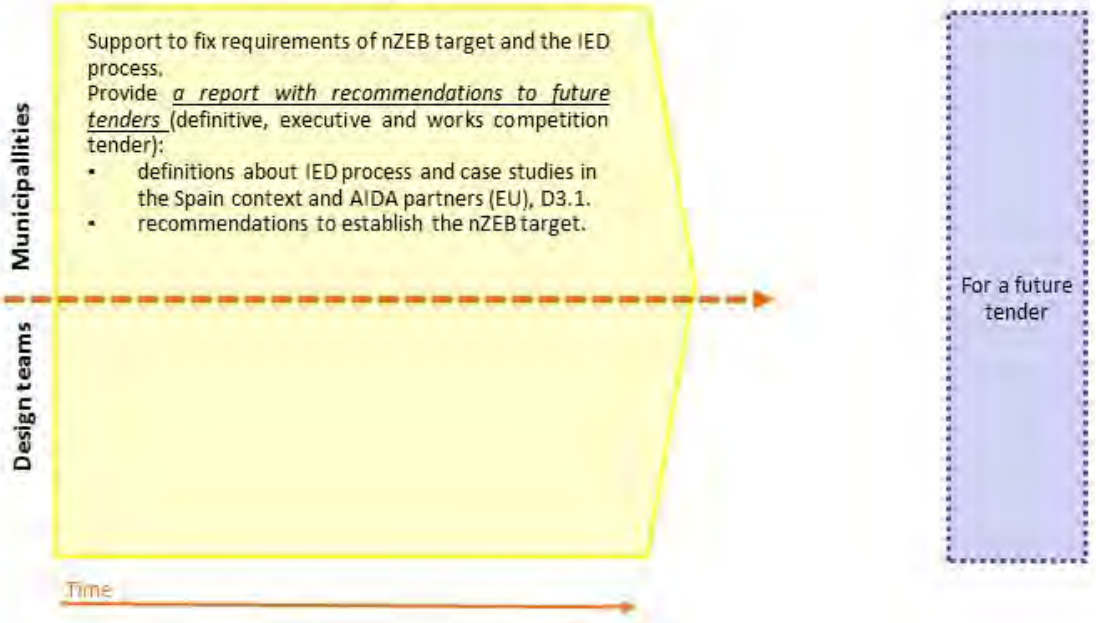
Benefits aspects:

The Energy Agency and Design Office of the Municipality of Tarragona are very interested in the nZEB objectives and generation of RES at town and building level.

Critical aspects and barriers found:

- Lack of knowledge and experience in nZEB, and RES generation into the municipality (design and administrative team).
- The impossibility to adjust the IED assisting in terms of time and workload during AIDA project realization to the municipalities projects (start to work, deadlines, etc.).
- The AIDA project has a specific time line (duration) and in most of cases doesn't match with the plan of realization of large scale municipality projects.

KIND OF SUPPORT ACTIVITY



SUPPORT TO THE MUNICIPALITY AND DESIGN TEAM

January -February 2013	Start the conversions to collaborate in reduce de energy demand (nZEB target and IED process) in the Municipality of Tarragona with the Energy Agency of Municipality of Tarragona (*Agencia d'Energia de Tarragona*). Possible meeting with the municipal architects of the Technical Design Office (*Oficina de Projectes).*
May 2013	Meeting with the municipal architects (*Oficina de Projectes*) and the Energy Agency in the Municipality building of Tarragona. IREC presented the AIDA project and explain the possible ways to collaborate They explain the complexity of the new buildings for the Mediterranean Olympics Games (3 new buildings) in an existing sports facilities plot (Campclar). The design team will be the Technical office for the ideas and preliminary design. The Municipality looking for integral advice on nZEB topic (RES generation a district level, energy performance of different solutions, etc) which is difficult to reconcile with the time duration and the workload assigned by the AIDA project. IREC explain others IED assisting, as a Figueres or Ordis Municipalities (in terms of objectives, definition, workload, capabilities, etc.)
June –July 2013	Request them for more information (detail) and important dates to future tender, to fit the collaboration (IREC have the availability to start this collaboration in October 2013): Possible ways to collaboration: • Definition of Energy targets; • Requirements of the Energy specifications to Ideas Tender Competition; • Organization of workshop to explain the IED process and concept and context of nZEB (Municipality and consulting teams); • Dynamic simulations (simplified model) to support the design team, in preliminary design, in a specific energy aspect; • Special requirement from Municipality (will be studied).
October-November 2013	The Municipality sent the planning about the different dates and planned tenders.
January – March 2014	IREC propose to do a report with recommendations and explain the IED guideline (Deliverable 3.1) introducing nZEB target and IED process in the future tender. This recommendations can be support the energy specifications in a future tender (definitive, executive design phases and works). The agreement with the Municipality is expected as soon to start to work from March/April 2014.
May 2014	The Municipality sent 3 possible ways to collaborate in the framework of AIDA to will be studied and a master plan of the project: • Energy targets and Energy specifications; • Find the best option and technical and economic analysis, to generate energy for the conditioning pool; • Find the best option and technical and economic analysis, to insulate the roof.
June -July 2014	IREC adjust the proposal of the Energy target and Energy specifications and required some information to start the collaboration (if there is an agreement): • Energy demand of similar sports buildings (reference) in Tarragona; • Meeting with the design team to establish energy limits values (2 or 3 meetings). Expecting to do a meeting or communication to agree the work plan. There were several communication problems and misunderstandings with the municipal technicians (the design team and the Energy Agency of Tarragona Municipality), from the beginning of the conversations to establish the collaboration.

2.3 Greece

2.3.1 Maroussi Municipality, GR

AIDA AFFIRMATIVE INTEGRATED ENERGY DESIGN ACTION

Co-funded by the Intelligent Energy Europe Programme of the European Union

ΚΑΠΕ CRES

Preliminary study card

Municipality of Amaroussion

New High School Building (8th Gymnasium and 9th Lyceum) Amaroussion, Greece

GENERAL INFORMATIONS

State of the art:

Owner:	Municipality of Amaroussion
Use:	High school building, sports hall.
Total surface:	5.600 m²

OBJECTIVE OF THE PRELIMINARY STUDY:

Support to the Municipality design team to proceed with a tender for a new school including nZEB criteria, and improve the level of the certification in energy consumption and also the comfort level achieved inside throughout the year.
Due to lack of project financing, the procedure has been delayed.

Plan section of ground floor (prefeasibility study design).
Source: Municipality of Amaroussion.

Justification:
Municipality of Amaroussion has planned to built a new building school. The technical team of the municipality has drafted a tender for a preafisibility study for the school. In the prefeasibility study the necessary requirements of the final tender, which will lead to the final study, have been identified and outlined (design requirements, special requirements for school building etc). General guidelines were given by CRES to the Municipality team in order to include in this tender energy aspects as well. The project is being developed by the Technical Department of the Municipality.
Simulations will be carried out by CRES to determine actual potential.

OBJECTIVE OF THE PRELIMINARY STUDY:
ENERGY PERFORMANCE REQUIREMENTS

National laws of energy performance requirements for new buildings:
- National Buildings' code regulation on energy performance in the building sector (KENAK, Ministerial Decision D6/B/5825).

Minimum energy performance requirements fixed by AIDA project:
- *The higher Class (usually standard Class A) of the National or Local Energy Performance Classification of the building;*
- *50% of the primary energy consumption has to be covered by energy produced from renewable energy sources;*
- *Primary heating energy demand limit: 40 kWh/m2year*
- *Total primary energy demand limit: 60 kWh/m2year;*

TOOLS USED TO EVALUATE:

The energy performance:	TEE-KENAK (Greek EPBD tool)
The energy production:	TEE-KENAK

Potential use of the following tools: EnergyPlus, gEnergy tool

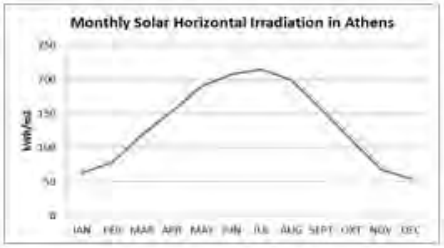
New High School Building (8th Gymnasium and 9th Lyceum)
Municipality of Amaroussion

DESCRIPTION OF THE CLIMATE:

Address: Athens, Greece.

GPS: Latitude: 42° 16' 12'' N, Long: 2° 59' 58'' E (37.983, 23.728)

Yearly solar horizontal irradiation: (graphic) 1,613 kWh/m² *year (source: National Technical Specification TOTEE20701/3)



HDD20 ( ): HDD_{20}= 1663 Athens, GR

(HDD_{18}= 887 Athens, GR, source: TOTEE 20701/3)

CDD26 ( ): CDD_{26}= 220 Athens, GR

(CDH_{26}= 5534 Athens, GR, source: TOTEE 20701/3)

IED PROCESS

Composition of the team: Amaroussion' municipality architects and engineers
CRES team

Management of the IED: CRES team

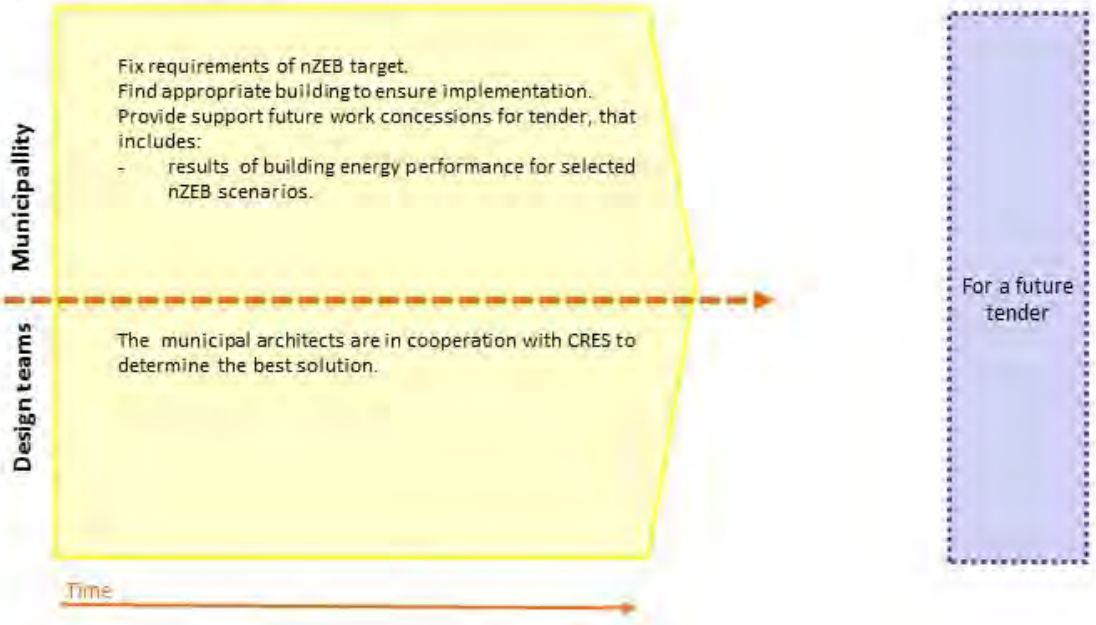
Benefits aspects:

- Good technical cooperation, increased interest to integrate nZEBs and very low energy buildings in common practice, trying to alleviate all organisational and financial barriers.
- Knowledge and implication to include bioclimatic, energy efficiency and RES solutions by the municipal architects and energy engineers.

Critical aspects and barriers found:

- It is not very clear how and to what extend energy aspects (stricter than the ones forced by the Law for new buildings) can be introduced to the final tender.
- The construction of a "nZEB" that will lead to a larger total budget for the construction of the school, can be a reason for the relevant authority not to fund the construction of the school. (The assessment is not based on life-cycle cost analysis).
- The timing will be critical to come to final decision if the municipality can proceed with this preliminary study or choose another building.

KIND OF SUPPORT ACTIVITY



SUPPORT TO THE MUNICIPALITY AND DESIGN TEAM

(describe the collaboration with the Municipality to introduce energy performance requirements into the design tenders and how the integrated design process (IED) works

July 2012	Signed commitment of collaboration in the framework of AIDA project (WP3 and WP4).
September – November 2012	Start conversations with Municipality of Amaroussion (municipal architects). Discussion about possible collaboration aspects under WP3. The municipality plans on building two new buildings. Discussion about which could be designed based on NZEB concept.
December 2012	Personal meeting at the municipality's office. The architects give information and details about a new school that the municipality plans on building.
January 2013	Personal meeting in CRES's office. Discussion about the tendering procedure that the municipality has to follow in order to build the new school. Identification of the stage that CRES team has to be involved so as to introduce energy aspects for nZEB in the tender procedure. A prefeasibility study has to be drafted, identifying the necessary design requirements of the final tender (which will lead to the final study).
January – February 2013	CRES's team gives to the Municipality general guidelines in order to include in the tender for the prefeasibility study, energy aspects as well.
March – July 2013	Negotiations with the relevant authority of the Ministry in order to approve this tender for the prefeasibility study. Unfortunately, no funding was available in order to conduct the tender for the prefeasibility study.
July 2013	The preliminary studies have not been finalised. In the next period there are two options: either proceed with the energy study, or try to find another building.

3. Oral agreements

Municipalities or public authorities use “oral contracts” within the Construction Tendering process when the size of the construction project is not too big, and if the municipality or public authority wishes to employ a regional company (case study reported in Table 9).

Table 9: Oral agreements

	Partner	Municipality involved	Building	Typology of next tender	Action carried out
311	AEE INTEC (AT)	Hartberg, Austria Signed agreement	Energy renovation of a kindergarten	DESIGN COMPETITION TENDER	Develop retrofit strategy for future building tender ANALYSIS DONE: Energy performance calculation of different retrofit measures. RESULTS OBTAINED: Feasibility study finished & accepted by the municipality. It will be used in future tenders Presentation of the results to the municipality and the architect.

3.1.1 **Kindergarten in Hartberg Municipality. AT**

AIDA AFFIRMATIVE INTEGRATED ENERGY DESIGN ACTION

Co-funded by the Intelligent Energy Europe Programme of the European Union

AEE INTEC

Definition of the minimum energy performance parameter to introduce within the future tender

Kindergarten,

Thermal renovation
Hartberg, AT

GENERAL INFORMATIONS

Owner:	Municipality of Hartberg
Use:	Kindergarten
Heated surface:	501 m^2
Gross volume:	1.830 m^3
Cost:	300.000 EUR
Method of financing:	Municipality of Hartberg with support of the Province of Styria

The design competition tendering procedure aims to find the best design proposal, from the architectural and functional quality, landscape integration, construction, maintenance, investment and operating costs, energy performance etc.
Energy performance criteria have been included in the tender and also requirements to improve the Indoor Environmental Quality were defined.

ENERGY REQUIREMENTS DEFINED FOR THE FUTURE TENDER

Public competition tender to find the best design proposal

ENERGY PERFORMANCE CRITERIA:

- *Calculated heating demand after the renovation < 24,3 kWh/(m^2year)*
- *Calculated cooling demand after the renovation < 2,0 kWh/(m^2year)*
- *Calculated final energy demand according to the national-regional law for the energy performance requirements (OIB guideline 6)*
- *Calculated total primary energy demand after the renovation < 135,0 kWh/(m^2year)*
- *Requirements for the U-values of the building components according to the national-regional law for the energy performance requirements (OIB guideline 6)*
- *Minimum of 50% of the primary energy consumption is covered by renewable energy sources*
- *Calculated CO_2 emissions < 22 kg_{CO2}/(m^2year)*
- *Improvement of the visual comfort (natural lighting, shading system, glare shield) and indoor air quality*
- *Improvement of the thermal comfort (reduction of thermal bridges, higher surface temperatures, reduction of draught, reduction of overheating,...)*

TOOLS FOR THE ENERGY PERFORMANCE CALCULATION:
GEQ (the software tool "GEQ " is one of the several tools in Austria to calculate the energy performance of residential and non-residential buildings according to the national-regional law for energy performance requirements – OIB guideline 6; more information on the software tool can be found on the website of the distributor: http://www.geq.at/)

OTHER CRITERIA
Use an IED process during the definitive and executive design phases.

RANKING POINTS:
The evaluation criteria consist of:

- compliance with the defined energy performance requirements
- compliance with the available budget

The energy performance in the design stage has to be verified with appropriate calculations, corresponding to the OIB guideline 6 and the therein defined calculation methodology and weighting factors.

TOOLS USED DURING THE DESIGN PHASES TO EVALUATE:

- The energy performance: GEQ
- The energy production: GEQ

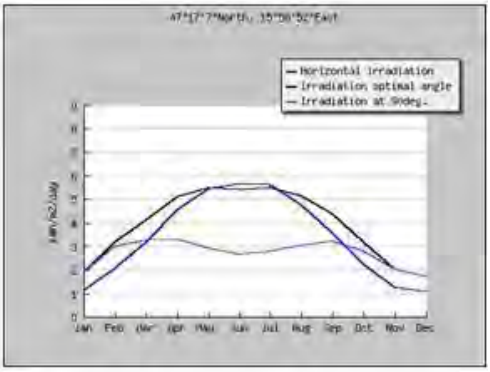
Kindergarten

Thermal renovation

Hartberg, AT

DESCRIPTION OF THE CLIMATE:
Municipality of Hartberg

Address:	Angerstraße 10, Hartberg
GPS:	47°17'7'' N, 15°58'52'' E
Altitude:	333 m
Yearly solar radiation: (graphic)	3,93 kWh/m² *day (Average sum of horizontal global irradiation per square meter received) ( )
HDD20 :	HDD20= 3.733 Kd, IT (15.444 E, 46.995 N) http://www.degreedays.net)
CDD26 :	CDD26= 38 Kd, IT (15.444 E, 46.995 N) (http://www.degreedays.net)
HDD20, National Classification:	HDD20= 3.579 Kd



IED PROCESS

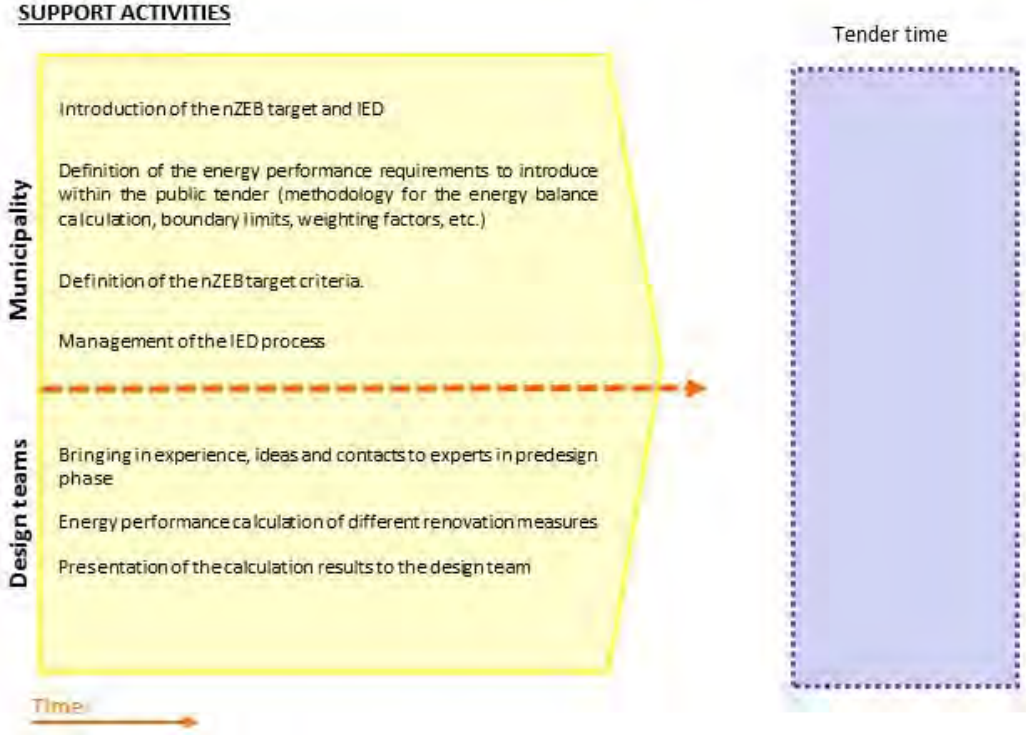
Composition of the team: representatives of AEE INTEC
Architects
Main contractor
Municipality

Management of the IED: Municipality / AEE INTEC

Benefits and critical aspects

The support of the municipality in defining, calculating and assessing retrofit strategies was possible. Thereby requirements of the retrofitted Kindergarten could be shown and tried to implement in the minds of the municipal representatives. The technical knowledge of the municipality (representatives) could also be improved by the collaboration.

SUPPORT ACTIVITIES



Kindergarten

Thermal Renovaiton
Hartberg, AT

SUPPORT TO THE MUNICIPALITY AND DESIGN TEAM

July 2012

Contacting the head of the environmental department to get to know possible building projects of the municipality

September 2012

Meeting with the head of the environmental department to discuss detail tender and energy criteria actions of nZEB for municipality

January 2013

Working meeting with head of environmental department, the architect and the possible main contractor to discuss the renovation of the Kindergarten building "Kindergarten II".

Energy performance calculation results for the Kindergarten were send to heat of environmental department, architect and technician.

The software tool GEQ was used to calculate the energy performance of the building. Different scenarios were defined and calculated to find the best (energetic and financial) solution.

The reference scenario was the existing building. The calculations were necessary to define the reference situation for all renovation options. The defined renovation scenarios were compared to the reference scenario to evaluate the energy and CO_2 emissions savings.

The first scenario included only the renovation of the existing roof because this measure can be implemented easily without great costs and shows also a certain energy reduction potential.

The second scenario included the comprehensive renovation of the whole building (exterior wall, roof, windows and ground floor) as well as the installation of a mechanical ventilation system with heat recovery.

Summer – Autumn 2013

Renovation of the kindergarten according to the defined criteria:

- Calculated heating demand after the renovation < 24,3 kWh/(m^3year)
- Calculated cooling demand after the renovation < 2,0 kWh/(m^3year)
- Calculated final energy demand according to the national-regional law for the energy performance requirements (OIB guideline 6)
- Calculated total primary energy demand after the renovation < 135,0 kWh/(m^2year)
- Requirements for the U-values of the building components according to the national-regional law for the energy performance requirements (OIB guideline 6)
- Minimum of 50% of the primary energy consumption should be covered by renewable energy sources
- Calculated CO_2 emissions < 22 kg_{CO2}/(m^2year)
- Improvement of the visual comfort (natural lighting, shading system, glare shield) and indoor air quality
- Improvement of the thermal comfort (reduction of thermal bridges, higher surface temperatures, reduction of draught, reduction of overheating,...)

October 2013

Visit of the renovated building with the general contractor

Discussion of lessons learned and deducted improvement potentials for further building renovations:

- Experiences could be used for the other tender in Edelseegasse 18 in Hartberg
- It was good to have a pre-planning meeting because otherwise a comprehensive renovation would not have been carried out
- The quality of renovation measures increases when the planning phase is intensified

4. Feasibility Case studies

The collaborations concluded in feasibilities studies are described in Table 10. Feasibility/ preliminary studies aim to define energy measures able to increase the energy efficiency of the building case studies and to calculate the energy balance in order to achieve the nZEB target.

Table 10: List of feasibility studies potentially leading towards municipal tenders

	Partner	Municipality involved	Building	Objective of the feasibility/ preliminary studies	Action carried out	Justification
411	AEE INTEC (AT)	Gleisdorf, Austria Signed agreement	Energy renovation of a school building	Develop retrofit strategy with the main focus on **building ventilation**	ANALYSIS DONE: Measurements in classrooms of the school building were carried out to analyse the air quality in the existing building. Calculations were carried out to analyse the potential for natural night ventilation. Additional potential for energy savings was identified. Preparing talks for the classroom ventilation were also hold. RESULTS OBTAINED **Test of the ventilation system proposal**. **Organization of two different mechanical ventilation systems (of two different manufacturers) which are going to be tested in two classrooms.**	Due to budget constraints, the tender is currently on hold. After the analysis, the Municipality has decided to test the 'ventilation system' in two classrooms.
412	AEE INTEC (AT)	Hartberg, Austria Signed agreement	Energy renovation of the town hall	Develop retrofit strategy for FUTURE BUILDING TENDER	PLANNING: Definition of retrofit criteria. Discussion with municipality and architect. RESULTS: Any action is possible due to the economic limitation of the public budget	Economic crisis
413	TU Wien (AT)	Maiersdorf, Lower Austria Signed agreement Letter of affirmation	Municipal office, kindergarten & municipal house used as office	Building refurbishment; **geothermal and solar heat supply & energy storage**	ANALYSIS DONE: Calculation of the case study, simulation of the energy system, scientific presentation and discussion of results. RESULTS OBTAINED: Definition of the energy measures for the building refurbishment, such as geothermal and solar heat supply & energy storage	**Due to budget constraints the tender is currently on hold**; the Bundesland Lower Austria (NÖ) does not provide sufficient funds

414	TU Wien (AT)	Gutenstein, Lower Austria Signed agreement Letter of affirmation	Two municipal multi-family houses, public swimming pool	Building refurbishment; **geothermal and solar heat supply & energy storage**	ANALYSIS DONE: Building refurbishment; geothermal and solar heat supply & energy storage	**Due to budget constraints the tender is currently on hold;** the Bundesland Lower Austria (NÖ) does not provide sufficient funds
421	IREC (ES)	Ordis, Spain Signed agreement Letter of affirmation	Retrofitting in municipality building and nZEB balance and strategy at town/district level.	Building envelope refurbishment	Dynamic simulations carried out to find the best solution in reduce energy demand for retrofit the envelope of the Municipality building. The retrofitting project have two phases (1st **improve glazing surfaces and frames**, 2nd improve **opaque surfaces)**. Also, developed a nZEB balance and future strategy at town/district level. Preliminary reports have been presented in June of 2013 to support the private tender for 1st phase retrofitting and will support the 2nd phase tender. The private supply contract for 1st retrofitting phase and works are concluded in November of 2013. Monitoring the 2nd phase of the public or private tender (only if the tender is realised during the AIDA project, 2014 and beginning of 2015)	The municipality had win a grant for the renovation in windows and **not have the budge**t to do the total of retrofit of the envelope in the Municipality building, The volume of the works in retrofitting not justify a tender for the 1st phase (improvement of glazing surfaces).
431	HESPUL (FR)	Municipality of Saint Lagerl	Evaluate the possibility of renovating the school to high energy performance standards.			
432	HESPUL (FR)	Municipality of Vaugneray	transformation of private hospital into housing	Improve energy design goals	Hespul assists design team and local authority to improve energy deisgn goals specifiy nZEB targets, and assisst in the search for qualified companies for differnt construction phases	Tenders for design team already made, mediation and expert advice supplied

433	HESPUL (FR)	Communauté de communes de l'Arbresle, Municipality of St Bel	Aquacenter	Improve energy performance and include renewable energy sources	Hespul encourages the project management consultants and architects to include•heat recovery from waste water•Renewable energy (wood fired boiler)•High performance dehumidification (air treatment)•Exterior insulation on building Economic simulation with excel file to demonstrate financiale viability of different technical solutions proposed Hespul assists in the request for subsidy dossier to finance the wood fired boiler	Financing for wood fired boiler obtained, the building owners assistant wrote the tenders and selected tender winner
434	HESPUL (FR)	Municipality of Les Olmes	Extension to school and authority administrative building	Ensure feasibility of proposed designs and coherence of specialist studies	Ensure feasability of innovative renewable energy source design, confirm energy perforamnce goals of architects design	Election resulted in change of mayor, high performance goals abandoned
435	HESPUL (FR)	Municipality of Pommeys	School and 2 community halls	Demonstrate feasibility of integrating nZEB goals and RES sources into renovation project	Memo on feasibility of integrating RES into project, and high performance energy goals	A joint local authority Energy Officer wrote the tender, with assistance from Hespul with a knowledge transfer goal
441	CRES (GR)	Thessaloniki, Greece	4th Elementary School	To include nZEB building in SEAP and proceed with tender, when funding is available	Preliminary study finalised	Financing has not yet been secured
442	CRES (GR)	Farsala, Greece	Frasala City Hall	Include nZEB building in SEAP and proceed with tender, when funding is available	Preliminary study under way	Financing has not yet been secured
443	CRES (GR)	Farsala, Greece	Cultural center	Include nZEB building in SEAP and proceed with tender, when funding is available	Preliminary study under way	Financing has not yet been secured
451	Geonardo	Municipality of Gödöllő	City Hall	The main objective of the preliminary study was to check whether a comprehensive retrofitting action is a viable and economically feasible option to reduce the energy need of the building, and also to provide a solid foundation for future energy and/or building tenders.	• Consultation and on-the spot survey is conducted (thermal imaging, building engineering diagnosis etc). • Acquisition of other, miscellaneous, primarily operational data (such as building usage, consumption data etc) • Annual energy need of the target building is modeled and calculated representing its current state	The municipality declared early on in the cooperation that they cannot allocate any human or financial resources to this cooperation with AIDA, still the project team decided to continue because Gödöllő was literally the one and only municipality which was open enough to discuss the subject with the AIDA team and

					• The six modules along with the potential realms of savings are assessed (architecture, building engineering, electricity, water, utility bills, human factors) • A number of draft plans are developed suggesting potential development routes complemented by capital investment costs, annual savings and rate of return calculations, thus supporting an optimum decision making	showed some support towards the planned activities despite their insufficient resources. In addition, the preliminary study will provide a solid basis for the municipality to effectively submit potentially winning applications to future tenders, because the baselines are very well defined in this study. So eventually the municipality will benefit from the action in spite of the failed delivery of an actual tender procedure.
452	Geonardo	Municipality of Gödöllő	Petőfi Sándor Elementary School	The main objective of the preliminary study was to check whether a comprehensive retrofitting action is a viable and economically feasible option to reduce the energy need of the building, and also to provide a solid foundation for future energy and/or building tenders.	• Consultation and on-the spot survey is conducted (thermal imaging, building engineering diagnosis etc). • Acquisition of other, miscellaneous, primarily operational data (such as building usage, consumption data etc) • Annual energy need of the target building is modeled and calculated representing its current state • The six modules along with the potential realms of savings are assessed (architecture, building engineering, electricity, water, utility bills, human factors) • A number of draft plans are developed suggesting potential development routes complemented by capital investment costs, annual savings and rate of return calculations, thus supporting an optimum decision making	The municipality declared early on in the cooperation that they cannot allocate any human or financial resources to this cooperation with AIDA, still the project team decided to continue because Gödöllő was literally the one and only municipality which was open enough to discuss the subject with the AIDA team and showed some support towards the planned activities despite their insufficient resources. In addition, the preliminary study will provide a solid basis for the municipality to effectively submit potentially winning applications to future tenders, because the baselines are very well defined in this study. So eventually the municipality will benefit from the action in spite of the failed delivery of an actual tender procedure.
461	Greenspa ceLive (UK)	Pairc Community Trust, Isle of Lewis, Scotland, UK	Pairc Sports Hall and Community Offices	To assess the benefits of solar PV panels, wind turbines and ground source heat pump and to select the best combination	Analysis of predicted energy consumption to produce energy usage profile. Comparison of energy use profile with projected outputs from solar and wind power to	The project is in its final stages of design. Not all funding is yet in place. The Community Trust have a strong desire to achieve nZEB and even to go beyond this by increasing the size of

				of these to satisfy the building demands to achieve NZEB	select the best sizes of solar array and wind turbine to match demand gEnergy was used to analyse building energy use and renewable generation.	the wind turbine to generate additional power for export to provide revenue for the maintenance of the building.
462	Greenspa ceLive (UK)	Cothram, South Uist, Scotland, UK. (Community Enterprise)	Cothram Re-Store Community Workshop.	To assess the best combination of solar PV and heat pumps or direct electric heating and also lighting controls to achieve NZEB	Modeling of predicted building energy use using gModeller and SBEM tools. Seelcting a suitable size of solar array to provide the required output to achieve net zero annual energy. The relative costs and efficiencies of solar array, lighting controls, air source heat pumps and direct electric heating were analysed to determine the most cost effective way to achieve nZEB. With high levels of insulation creating a low heating demand it was found that direct electric heating with an increased solar array was more cost effective than using a heat pump. Much of the building energy is for lighting so lighting controls will be critical to achieving nZEB	The project is in the early design stage. The Client are keen to achieve an nZEB building for both economic and environmental reasons.

4.1 Austria

4.1.1 Municipality of Gleisdorf, Energy renovation of a school building

AIDA AFFIRMATIVE INTEGRATED ENERGY DESIGN ACTION

Co-funded by the Intelligent Energy Europe Programme of the European Union

AEE INTEC

Preliminary study card

Municipality of Gleisdorf

Thermal renovation of a School Building

Gleisdorf, AT

GENERAL INFORMATIONS

State of the art:

Owner:	Municipality of Gleisdorf
Use:	School Building
Heated surface:	3.772 m² (gross floor area of the existing building)
Gross volume:	15.659 m³

OBJECTIVE OF THE PRELIMINARY STUDY:

The main target of the preliminary study was to check if comprehensive renovation is possible and if not to develop different retrofit strategies for the future building tender with the main focus on the building ventilation.

ENERGY PERFORMANCE REQUIREMENTS

National-regional law of energy performance requirements for this specific school building would be *(OIB guideline 6):*

- *Heating demand < 15.3 kWh/(m²year)*
- *Cooling demand < 2.0 kWh/(m²year)*
- *Primary energy demand < 135 kWh/(m²year)*
- *For the U-value of the building components e.g. exterior wall ≤ 0.35 W/m²K, roof ≤ 0.20 W/m²K,...*

Minimum energy performance requirements fixed by AIDA project activities are:

- *Achieving the highest class of the national standard of the National or Local Energy Performance Classification of the building, usually Standard/Class A;*
- *A minimum of 50% of the primary energy consumption should be covered by energy produced from renewable energy sources;*
- *Total primary energy consumption limit of 60 kWh/m²year*
- *CO_2 emission limit of 8 kg CO_2/m²year.*

Others:

- Energy performance requirements according to the national law described above
- Installation of a PV system
- Installation of a solar thermal system for hot water (gym)
- Installation of a mechanical ventilation system with heat recovery

Justification:

Due to budget constraints the tender for this building is currently on hold.

The chance for a tender regarding comprehensive renovation is very low at the moment, only single renovation measures will be carried out. Therefore the preliminary study was extended to be a substitution for the tender. Following actions were carried out, but the works are still on-going:

- Measurements in classrooms of the school building to analyse the air quality in the existing building.
- Calculations to analyse the potential for natural night ventilation.
- Identification of additional potential for energy savings with low investment necessary.
- Preparing talks for the classroom ventilation were hold and opportunities for such ventilation strategies were developed.
- Implementation of two different decentralized mechanical ventilation systems in classrooms and initiation of a pupils´ school project learning from that.

TOOLS USED TO EVALUATE:

The energy performance: GEQ (www.geq.at)

Methodology to improve the energy performance of the building:

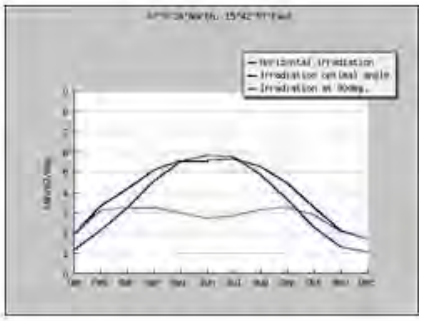
- Insulation of all existing building components
- Replacement of existing windows and installation of new windows
- Installation of a PV system
- Installation of a solar thermal system for hot water (gym)
- Installation of a mechanical ventilation system with heat recovery

Retrofitting in Municipality of Gleisdorf

Municipality of Gleisdorf

DESCRIPTION OF THE CLIMATE:
Municipality of Gleisdorf

Address:	Alois Groggergasse 12, Gleisdorf
GPS:	47°6'24'' N, 15°42'57'' E
Altitude:	364 m
Yearly solar radiation: (graphic)	4,00 kWh/m² *day (Average sum of horizontal global irradiation per square meter received) ( )
HDD20 ( ):	HDD20= 3.733 Kd, IT (15.444 E, 46.995 N)
CDD26 ( ):	CDD26= 38 Kd, IT (15.444 E, 46.995 N)
HDD20, National Classification:	HDD20= 3.584 Kd



IED PROCESS

Composition of the team: representatives of: AEE INTEC
Municipality
Principal of the School "NMS Gleisdorf"
Manufacturers of the mechanical ventilation systems
Representative of the municipal utilities company of Gleisdorf

Management of the IED: Municipality / AEE INTEC

Benefits and critical aspects:
Although the nZEB-renovation of the school building (and so the building tender) is currently **on hold due to budget constraints**, the municipality however aims at improving the energy performance and the air quality of the building as well as in any way possible.

KIND OF SUPPORT ACTIVITY

Municipality

Management of the IED process

Measurements in classrooms of the school building were carried out to analyse the air quality in the existing building.

Calculations were carried out to analyse the potential for natural night ventilation.

Additional potential for energy savings was identified.

Preparing talks with manufacturing companies for the classroom ventilation were hold.

Organisation of two different mechanical ventilation systems of two different manufacturers to test them in two classrooms as the basis for future school buildings (incl. school building renovations).

For a future tender

Time

SUPPORT TO THE MUNICIPALITY AND DESIGN TEAM

July 2012	Meeting with mayor of the municipality to discuss possible tenders.
November 2012	Meeting with the head of municipal utilities to discuss possible nZEB tenders.
April 2013	Meeting with the head of the department "heat and water" and one employee of this department to discuss necessary works for the retrofit strategy of one school building (before "Europahauptschule", now "NMS Gleisdorf").
June 2013	Elaboration of a retrofit strategy for the school building was conducted. In consideration of the existing (building) situation following renovation criteria and goals were defined: energy performance of the renovated building according to the national law, which defines requirements for the heating demand, the final energy demand and the U-values of the building components. This would bring a heating energy reduction of at least 30% compared to the existing building. Additionally it was suggested to install a photovoltaic system and a solar thermal system for hot water preparation on the roof of the building. Due to this energy generation on-site further energy and CO_2 emissions saving would be achieved. Furthermore the installation of a mechanical ventilation system with heat recovery was suggested. This renovation measure would reduce the heating demand and more importantly improve the Indoor Air Quality in the classrooms.
July 2013	Meeting with the head of the department "Heat and Water" and one employee of this department again to discuss the results of our study and define next steps.
September 2013	Due to budget constraints the renovation of the school building was postponed. For the municipality the improvement of the Indoor Air Quality was absolutely necessary and should be realized earlier than the rest of the building renovation. Therefore mechanical ventilation systems should be tested for further renovations. Meetings with manufacturers of mechanical ventilation systems were organized to discuss possible solutions for the classroom ventilation.
September 2013 – January 2014	Ongoing coordination and discussion with municipality representatives and municipal utilities about the installation of the mechanical ventilation systems Measurements of the CO_2-concentration in the existing classrooms were performed to evaluate the existing situation in the school (as reference situation) and meetings with representatives of the municipality and of the municipal utilities were organized to discuss and highlight the importance of mechanical ventilation systems in classrooms.
March 2014	Discussion with responsible employee of the municipality about the conception and installation of the mechanical ventilation systems
April 2014	Meeting with vice-mayor and principal of the school about the installation of the mechanical ventilation systems and the performed pupils´ school project, future measurements
October 2014	Meeting with head and employees of municipality and municipal utilities about the measurement devices in the classrooms to monitor the functionality of the mechanical ventilation devices and the indoor air quality in the classrooms

4.1.2 Municipality of Hartberg, Energy renovation of the town hall

AIDA AFFIRMATIVE INTEGRATED ENERGY DESIGN ACTION

Co-funded by the Intelligent Energy Europe Programme of the European Union

AEE INTEC

Preliminary study card

Municipality of Hartberg

Thermal renovation of the Town Hall

Hartberg, AT

GENERAL INFORMATIONS

State of the art:

Owner:	Municipality of Hartberg
Use:	Town Hall
Heated surface:	2.382 m² (gross floor area of the existing building)
Gross volume:	8.843 m³

OBJECTIVE OF THE PRELIMINARY STUDY:

The main target of the preliminary study was to develop different criteria for comprehensive **future renovation of the building.** These criteria should not only include energetic parameters, instead the criteria should allow a comprehensive assessment and improvement of the (working) situation in the **historical building.**

ENERGY PERFORMANCE REQUIREMENTS

National-regional law of energy performance requirements for this specific school building would be: OIB guideline 6, *but the town hall is protected as a historic building. The national-regional law for the energy performance-requirements excludes these buildings from fixed targets. In fact no energy performance requirements for the renovation of the building exist, only when asking for federal subsidies.*

Minimum energy performance requirements fixed by AIDA project activities there are:

- achieving the highest class of the national standard of the National or Local Energy Performance Classification of the building; usually Standard/Class A.
- minimum of 50% of the primary energy consumption should be covered by energy produced from renewable energy sources;
- total primary energy consumption limit of 60 kWh/m²year
- CO_2 emission limit of 8 kg CO_2/m²year.

Others:

- Improvement of the thermal and visual comfort
- High indoor air quality: low CO_2 concentration -> max. 1.400 ppm in winter
- High indoor air quality: 40-50% rel. humidity in winter
- No overheating in summer, but no active cooling
- Reduction of the delivered energy from the district heating by 45%
- Reduction of the electricity demand by 25%
- Primary energy demand: < 135 kWh/(m²year)
- Minimum of 50% of the primary energy consumption will be covered by renewable energy sources
- Calculated CO_2 emissions < 22 kg_{CO2}/(m²year)

Justification:

Due to budget constraints the tender for this building is currently on hold.

The chance for a tender regarding comprehensive renovation is very good, but will be shifted into the future.

Therefore the preliminary study was extended to be a prerequisite for the future tender and synchronised with the municipality.

TOOLS USED TO EVALUATE: GEQ

The energy performance: Analyzed consumption!

Methodology to improve the energy performance of the building:

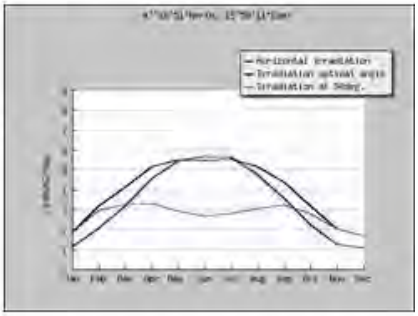
- Suggestion for measures regarding the building components, electric devices and heating system
- Asking the employees about measures to be taken into account
- Questions have been sent to municipalities to ask the "right" questions on user comfort requirements)
- Examples of historical building renovations were sent to municipality to have bench marks

Retrofitting in Municipality of Hartberg

Municipality of Hartberg

DESCRIPTION OF THE CLIMATE:
Municipality of Hartberg

Address:	Hauptplatz 10, Hartberg
GPS:	47°16'51'' N, 15°58'11'' E
Altitude:	333 m
Yearly solar radiation: (graphic)	3,38 kWh/m² *day (Average sum of horizontal global irradiation per square meter received in a day) ( )
HDD20 ( ):	HDD20= 3.733 Kd, IT (15.444 E, 46.995 N)
CDD26 ( ):	CDD26= 38 Kd, IT (15.444 E, 46.995 N)
HDD20, National Classification:	HDD20= 3.579 Kd



IED PROCESS

Composition of the team: representatives of: AEE INTEC
Municipality
Architect

Management of the IED: Municipality / AEE INTEC

Benefits and critical aspects:
Although the renovation of the town hall (and so the building tender) is currently **on hold due to budget constraints**, the **municipality** however **aims at improving the energy performance and the air quality of the building** in a comprehensive way, also including mobility of employees etc.

KIND OF SUPPORT ACTIVITY

Municipality

Management of the IED process with municipality.

Criteria for the renovation were set-up with pre-design team.

Investigations were carried out to analyze the current consumption.

Additional potential for energy savings was identified.

Questions for a questionnaire among employees about future situation were sent.

For a future tender

Time

SUPPORT TO THE MUNICIPALITY AND DESIGN TEAM

August 2013

Working meeting with head of the environmental department, an employee of the technical administration of the municipality and the architect to define the requirements for the renovation of the town hall.

September 2013

Elaboration of renovation criteria considering also the monument protection of the building.

Especially the monument protection of the building has to be well-considered in the definition of the renovation criteria. Due to different restrictions a comprehensive renovation of all building components is not possible. Therefore the focus of the renovation measures was mainly on the improvement of the (thermal) comfort in the building but also on the energy performance, as far as practicable.

Based on these considerations following renovation criteria and goals were defined:

- Improvement of the thermal and visual comfort
- High air quality: low CO_2 concentration -> max. 1.400 ppm in winter
- High air quality: 40-50% rel. humidity in winter
- No overheating in summer
- No active cooling
- Reduction of the delivered energy from the district heating by 45%
- Reduction of the electricity demand by 25%

Questions for a ***internal questionnaire of the employees*** in the town hall were prepared for the municipality.

December 2013

Discussion with head of environmental department about the building services criteria for the renovation of the town hall.

4.1.3 Municipality of Maiersdorf, Municipal office, kindergarten & municipal house used as office

AIDA AFFIRMATIVE INTEGRATED ENERGY DESIGN ACTION

Co-funded by the Intelligent Energy Europe Programme of the European Union

Energy Economics Group

Preliminary study card

Municipality of Hohe Wand

Energy retrofit of three public buildings

Hohe Wand, Austria

GENERAL INFORMATIONS

State of the art:

Owner:	Municipality of Hohe Wand
Use:	Three public buildings: 1. multifunctional office building (year of construction 1984) 2. Kindergarten (year of construction 1986 and 2002) 3. club house (year of construction 1900)
Heated gross surface:	585 m² + 705 m² + 217 m² [total: 1507 m²]
Gross volume:	3005 m³ + 2314 m³ + 729 m³ [total: 6048 m³]

Justification:

For the case study Hohe Wand a very innovative heat supply system was planned. For this reason, there was a need for further research, which has not yet been funded. It's about to perform a dynamic simulation of the overall system and carry out a pilot hole for a geological analysis. As the project team was not able to obtain a national funding for additional research effort, also other options were considered for the case study Hohe Wand.

OBJECTIVE OF THE PRELIMINARY STUDY:

Investigation of the feasibility of an innovative heat supply system for three public buildings based on seasonal storage of heat from solar thermal collectors in vertical geothermal ground storages including retrofit measures for the involved buildings. The thermal insulation of the 3 buildings is very different. The old club house has no thermal insulation at all, the other buildings have minor insulation measures but by far not sufficient for NZEB.

ENERGY PERFORMANCE REQUIREMENTS

Proposed AIDA energy performance requirements are:

- *To achieve the highest class of the national standard of the National or Local Energy Performance Classification of the building; usually is called Standard/Class A.*
- *At minimum the 50% of the primary energy consumption has to be covered by energy produced from renewable energy sources;*
- *Total primary energy consumption limit to 60 kWh/m²year*
- *CO_2 emission limit: 8 kg CO_2/m²year.*

Starting point

- *Very inhomogeneous energy efficiency performance of involved buildings [111 kWh/(m²*y), 56 kWh/(m²*y) and 468 kWh/(m²*y)];*
- *Individual heat supply equipment per building based on oil boiler (kindergarten) and direct electricity heating (office building and club house);*
- *Therefore low share of renewable energy sources;*
- *No need for retrofit from a construction physics point of view.*

Innovative approach by AIDA project:

- *Building energy efficiency measures (selective measures per building; target 35 kWh/(m²*y))*
- *Strategic measures (construction of a low temperature micro heat grid for these buildings with an option to connect further buildings in the future)*
- *Use of renewable energy sources (solar thermal collectors on all involved buildings)*
- *Seasonal heat storage (vertical geothermal borehole storage for the storage of solar thermal heat)*

TOOLS USED TO EVALUATE:

The energy performance: GEQ (Zehentmayer Software http://www.geq.at/)
The energy production: EEG made tools on EXCEL surface
Others: geothermal storage calculated with FEFLOW

POINTS TO IMPROVE THE ENERGY PERFORMANCE OF THE BUILDING:

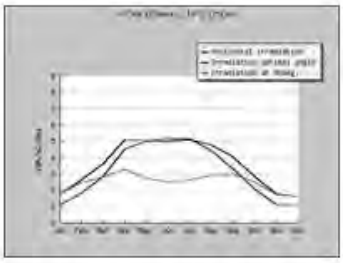
- full thermal insulation of outside walls
- replacement of windows and outside doors
- installation of low temperature heat distribution systems

Retrofiting in Municipality of Hohe Wand

Municipality of Hohe Wand

DESCRIPTION OF THE CLIMATE:
Municipality of Hohe Wand

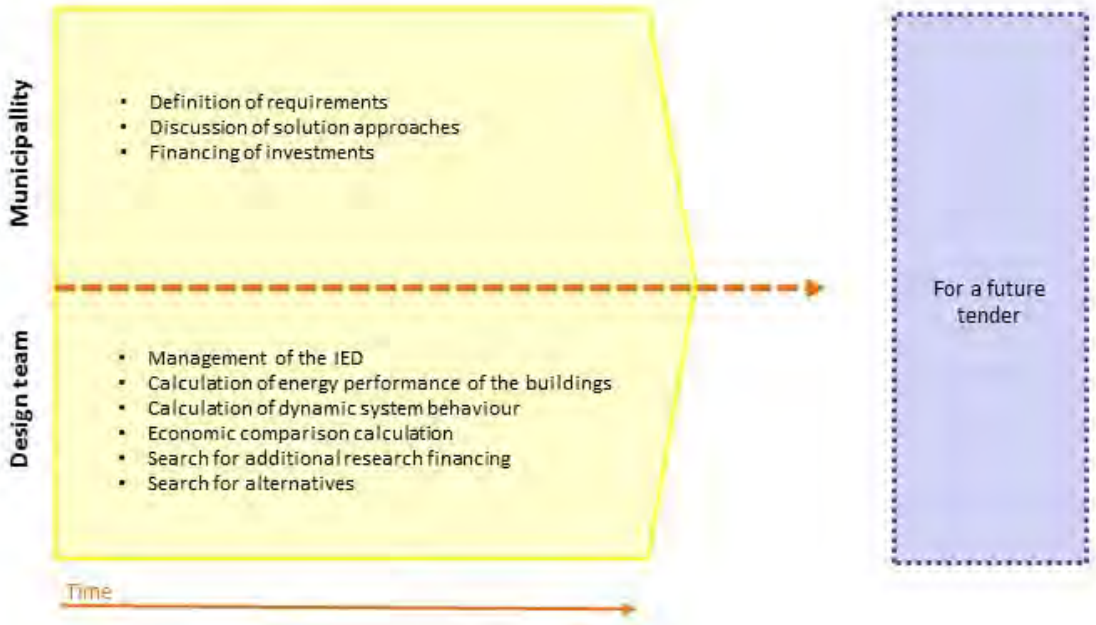
Address:	A-2724 Hohe Wand – Maiersdorf 33, 33a, 48a
GPS:	Location: 16.053679 E, 47.820200 N
Altitude:	459 m
Yearly solar radiation: (graphic)	3.120 kWh/(m²*day) (Average sum of horizontal global irradiation per square meter received) 1139 kWh/(m²*a) (Average sum of horizontal global irradiation per square meter received) ( )
HDD20 ( ):	HDD20= 3335
CDD26 ( ):	Not relevant for the climate at this location



IED PROCESS

Composition of the team:	Vienna University of Technology Energy Economics Group(EEG) Geological survey of Austria HTBLuV Wiener Neustadt Municipality of Hohe Wand.
Management of the IED:	EEG
Benefits and critical aspects:	The target is to implement an innovative heat supply solution mainly based on efficiency measures and the use of renewable energy. The degree of innovative aspects is very high (seasonal storage of solar heat in geothermal heat storage). Therefore it was not possible to put the system into practice so far. Further research on system aspects (dynamic simulation of total system) and measures for the reduction of the geologic project risks (probe drilling) are needed.

KIND OF SUPPORT ACTIVITY



SUPPORT TO THE MUNICIPALITY AND DESIGN TEAM

September 2010	First contact with the municipality of Hohe Wand.
November 2010	Technical concept draft.
January 2011 – December 2012	Calculation of the case study, simulation of the energy system, scientific presentation and discussion of results.
February 2013	Definition of further research and financing needs, draft of an additional research proposal on national level.
March 2013	Presentation of the research proposal at the provincial government of Lower Austria and search for suitable research programmers on national level.
September 2013	Latest status presentation at municipality level and discussion of alternative resolutions.
September 2014	Still no financing possibility for the additional research work needed to put the innovative approach into practice. Information to the municipality of Hohe Wand that in short term the realization of the proposed innovative solution is unlikely. Search for alternative solutions: a promising approach seems to be a central biomass heat supply system with a micro heat grid for the three buildings and maybe some close buildings more. A major hindering factor for an upgrade of the thermal insulation of the younger buildings is the very good technical condition of the facades and partly the windows .

4.1.4 Municipality of Gutenstein, Two municipal multi-family houses, public swimming pool.

AIDA AFFIRMATIVE INTEGRATED ENERGY DESIGN ACTION

Co-funded by the Intelligent Energy Europe Programme of the European Union

Energy Economics Group

Preliminary study card

Municipality of Gutenstein

Innovative heat supply system and retrofit of two municipality multifamily dwellings Gutenstein, Austria

GENERAL INFORMATIONS

State of the art:

Owner:	Municipality of Gutenstein
Use:	Residential Buildings
Year of construction:	1959
Renovation measures:	Minor facade retrofit measures
Heated gross surface:	815 m²+ 675 m² [total: 1490 m²]
Gross volume:	2347 m³ + 1922 m³ [total: 4269 m³]

Justification:

For the case study Gutenstein a very innovative heat supply system was planned. For this reason, there was a need for further research, which has not yet been funded. It's about to perform a dynamic simulation of the overall system and carry out a pilot hole for a geological analysis.

As the project team was not able to obtain a national funding for additional research effort, also other options were considered for the case study Gutenstein. Up to now the most promising option is an ambitious thermal insulation of the buildings combined with a central heat supply system based on a wood chip boiler and a micro heat grid.

OBJECTIVE OF THE PRELIMINARY STUDY:

Investigation of the feasibility of an innovative heat supply system for two multifamily dwellings and an open air bath based on seasonal storage of heat from solar thermal collectors in vertical geothermal ground storages including retrofit measures for the involved multifamily dwellings. The construction year of the buildings was 1959. Except for minor facade renovation measures the buildings are still in original stage (not thermal insulated brick walls and the original old double glazed wood framed windows).

ENERGY PERFORMANCE REQUIREMENTS

Proposed AIDA energy performance requirements are:

- *To achieve the highest class of the national standard of the National or Local Energy Performance Classification of the building; usually is called Class A.*
- *At minimum the 50 % of the primary energy consumption has to be covered by energy produced from renewable energy sources;*
- *Total primary energy consumption limit to 60 kWh/m²year*
- *CO_2 emission limit: 8 kg CO_2/m²year*

Starting point

- *Low to medium energy efficiency performance of buildings [162 kWh/(m²*y) and 112 kWh/(m²*y)];*
- *Individual heat supply equipment per dwelling based on solid or liquid fuels or electricity;*
- *Low share of renewable energy sources;*
- *Retrofit needs from a construction physics point of view (esp. windows and doors).*

Innovative approach by AIDA project:

- *Building energy efficiency measures (full thermal insulation, replacement of windows and doors; target 35 kWh/(m²*y))*
- *Strategic measures (one central heat supply system for both buildings because of the homogenous demand)*
- *Use of renewable energy sources (solar thermal collectors on both buildings and additional collectors on the buildungs of an open air bath)*
- *Seasonal heat storage (vertical geothermal borehole storage for the storage of solar thermal heat)*

TOOLS USED TO EVALUATE:

The energy performance:	GEQ (Zehentmayer Software, energy pass, heat load)
The energy production:	EEG made tools on EXCEL surface
Others:	geothermal storage calculated with FEFLOW

POINTS TO IMPROVE THE ENERGY PERFORMANCE OF THE BUILDING:

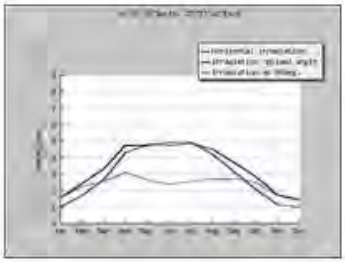
- full thermal insulation of outside walls
- replacement of windows and outside doors
- installation of low temperature heat distribution systems (problematic)

Retrofiting in Municipality of Gutenstein

Municipality of Gutenstein

DESCRIPTION OF THE CLIMATE:
Municipality of Gutenstein

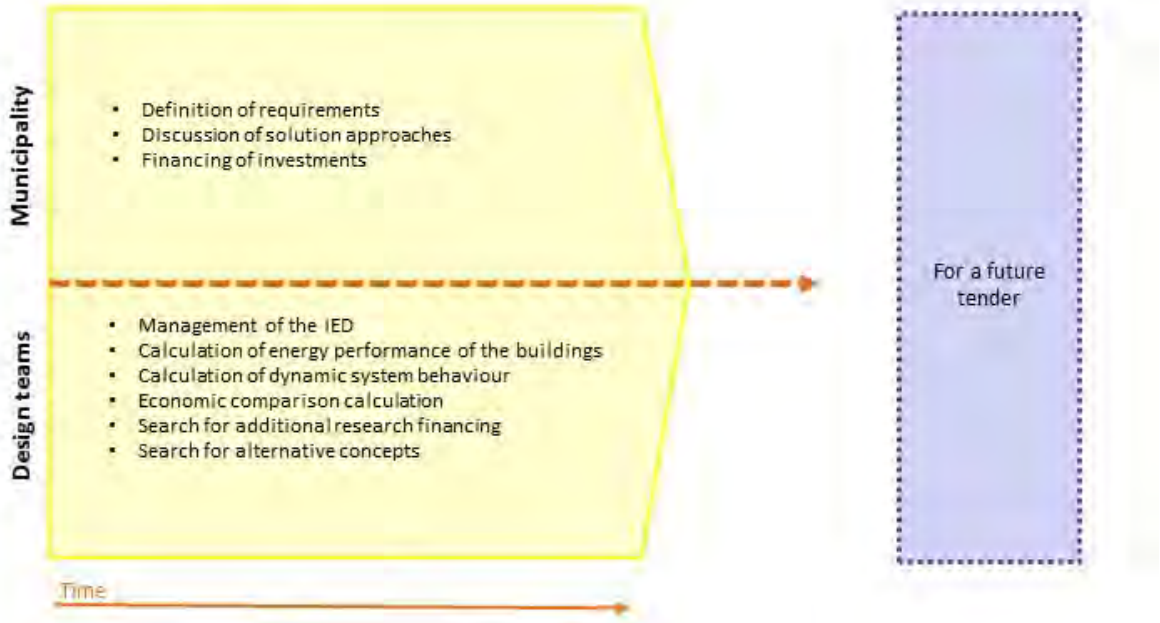
Address:	A-2770 Gutenstein Markt 111 and 112
GPS:	Location: 15.894443 E, 47.876697 N
Altitude:	482 m
Yearly solar radiation: (graphic)	2.970 kWh/(m²*day) (Average sum of horizontal global irradiation per square meter received) 1084 kWh/(m²*a) (Average sum of horizontal global irradiation per square meter received) ( )
HDD20 ( ):	3720 Kd
CDD26 ( ):	Cooling is not relevant for this climate and this building type



IED PROCESS

Composition of the team:	Vienna University of Technology Energy Economics Group (EEG) Geological survey of Austria HTBLuVA Wiener Neustadt Municipality of Gutenstein
Management of the IED:	EEG
Benefits and critical aspects:	The target is to implement an innovative heat supply solution mainly based on efficiency measures and the use of renewable energy. The degree of innovative aspects is very high (seasonal storage of solar heat in geothermal heat storage). Therefore it was not possible to put the system into practice so far. Further research on system aspects (dynamic simulation of total system) and measures for the reduction of the geologic project risks (probe drilling) are needed.

KIND OF SUPPORT ACTIVITY



SUPPORT TO THE MUNICIPALITY AND DESIGN TEAM

September 2010	First contact with the municipality of Gutenstein.
November 2010	Technical concept draft. The objective of the cooperation was to integrate an innovative heat supply system in two municipality owned multi family dwellings and an outdoor bath in the municipality of Gutenstein.
January 2011 – December 2012	Design and calculation of the case study. The calculation of the buildings` heat load and the heat demand was performed with the software package GEQ of Zehentmayer software in cooperation with students of the HTL Wiener Neustadt. Based on these results different options for thermal building renovation were investigated. Furthermore, the surface potential for solar thermal systems and the potential for geothermal heat storage were studied. The outdoor bath offers an additional option for heat management and storage, mostly in summertime. The technical and energy balance feasibility of the innovative heat supply system could be demonstrated theoretically. The main barriers were given by the degree of innovation of the proposed system. Therefore it has been looking for ways to reduce the investment risk, especially because of the uncertain geological situation in the underground. The scientific partners proposed a dynamic system simulation and a test drilling for the underground heat storage.
February 2013	After a presentation of the latest findings in the city council, the whole working group decided to provide a national proposal for financing the additional research needs. In the following a draft of a research proposal on national level was prepared on both case studies, Gutenstein and Hohe Wand.
March 2013	Presentation of the research proposal at the provincial government of Lower Austria. The provincial government signaled interest in the project and support for investment, but the funding of research could not supported. Therefore the working group started a search for other suitable research programmes on national level.
June 2013	Status Presentation at municipality level and discussion of the following alternative solutions: i) The municipality does nothing and waits until a possibility of additional research financing appears. In this case the residents have to pay the present high individual heating costs and accept the low comfort given by the individual single stove heating devices for a longer time. ii) Other technical possibilities are considered. First of all a thermal insulation of the buildings [present indicators 162 kWh/(m^2*y) and 112 kWh/(m^2*y)] and the installation of a central wood chip boiler with a micro heat grid connecting the two multifamily dwellings would be attractive. Furthermore a water-based heat distribution system must be installed. In this scenario the target value for the specific heat demand would be about 35 kWh/(m^2*y) for each of the buildings. iii) In addition to ii) a solar thermal system for water heating during summertime and for the heat supply of the outdoor bath can be considered.
September 2014	There is still no financing possibility for the additional research work needed to put the innovative approach into practice. Information to the municipality of Gutenstein that in short term the realization of the proposed innovative solution is unlikely. Search for alternative solutions: the surrounding of Gutenstein shows a big solid biomass potential. Therefore the heat supply of the concrete buildings could also be based on a central biomass boiler and a micro heat grid. The implementation of this option seems to be much more realistic. Not only because there would be no more need for additional financing of research work. Also the installation of a new heat distribution system is much easier because it would not be necessary to install a low temperature heat distribution system.

4.2 Spain

4.2.1 Municipality of Ordis

AIDA AFFIRMATIVE INTEGRATED ENERGY DESIGN ACTION

Co-funded by the Intelligent Energy Europe Programme of the European Union

IREC Institut de Recerca en Energia de Catalunya Catalonia Institute for Energy Research

Preliminary study card

Municipality of Ordis

Retrofinting in Office building

Ordis, Spain

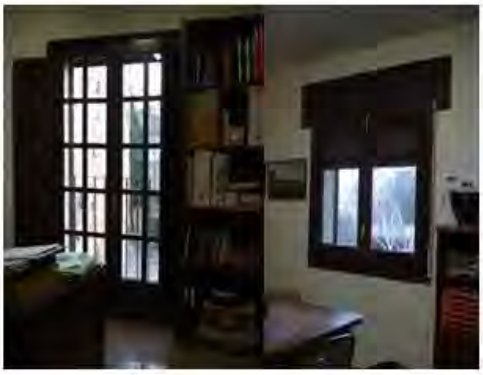
GENERAL INFORMATIONS

State of the art:

Owner:	Municipality of Ordis
Use:	Office building.
Heated surface:	230 m²
Gross volume:	700 m³

OBJECTIVE OF THE PRELIMINARY STUDY:

Realize dynamic simulations to find the best solution in reduce energy demand (nZEB) for retrofit the envelop of the Municipality building, taking in account the comfort of users. The retrofitting project have 2 phases (1st improve glazing surfaces, 2on improve opaque surfaces. Also, elaborated a nZEB balance for strategy at town/district level (all the public buildings loads and generation of RES)



Justification:

The Municipality of Ordis is small (379 habitants, 2011) with specific needs, but the municipal policy of Ordis have the objective of improve energy management at the town or district level, including energy audit in housing and renewable energy facilities. For this reason it is considered that the participation of Ordis in the AIDA project is an opportunity to promote nearly zero energy balance, not only in terms of buildings, but on the scale of village or town (public buildings, lighting public and generation distributed power).

The Municipality of Ordis had win a grant for the renovation in windows and not have the budget to do the total of retrofit of the envelop in the Municipality building, The volume of the works in retrofitting not justify a tender for the 1st phase (improvement of glazing surfaces).

OBJECTIVE OF THE PRELIMINARY STUDY:
ENERGY PERFORMANCE REQUIREMENTS

National-local laws of energy performance requirements for office building (REAL DECRETO 235/2013):

- The Basic Procedure for Efficiency Certifications on Buildings. The object of this basic procedure is the establishment of conditions for energy efficiency certification on new and existing buildings. Refer to the CTE Technical Building Code for new building and existing building.
- *Mandatory energetic certification (CALENER, LIDER or justified software)*
- *Limit energetic primary demand (depending of different climatic zones).*

Minimum energy performance requirements fixed by AIDA project:

- *The higher Class (usually standard Class A) of the National or Local Energy Performance Classification of the building;*
- *The 50% of the primary energy consumption has to be covered by energy produced from renewable energy sources;*
- *Total primary energy consumption limit: 60 kWh/m2year;*
- *CO2 emission limit: 8 Kg CO2/m2year.*

TOOLS USED TO EVALUATE:

The energy performance:	TRANSOL
The energy production:	TRANSOL

Methodology to improve the energy performance of the building:

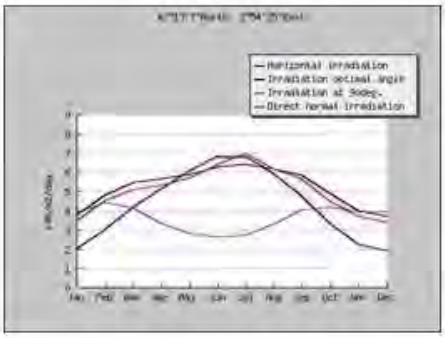
- Define de objectives of nZEB target and work plan.
- Establish the baseline model
- Dynamic simulations with different degrees of improvement of the envelop (retrofitting)
- Discussion of results and conclusions to reduce de energy demand.

Retrofiting in Municipality of Ordis

Municipality of Ordis

DESCRIPTION OF THE CLIMATE:
Municipality of Ordis

Address:	Plaça de l´Església, 1,(17.772), Ordis, Alt Empordà, Spain
GPS:	Latitude: 42° 13' 7.3164'' N, Long: 2° 54' 24.2568'' E (42.218699; 2.906738)
Altitude:	m
Yearly solar radiation: (graphic)	4,35 kWh/m² *day (Yearly Irradiation on horizontal plane) ( )
HDD20 ( ):	HDD20= 2234, City of Mianegues, Girona, Catalunya, Spain (2.76E, 42.10N)
CDD26 ( ):	CDD26= 90, City of Mianegues, Girona, Catalunya, Spain (2.76E, 42.10N)



IED PROCESS

Composition of the team:	IREC team Municipality architect Major (Ordis)
Management of the IED:	IREC team

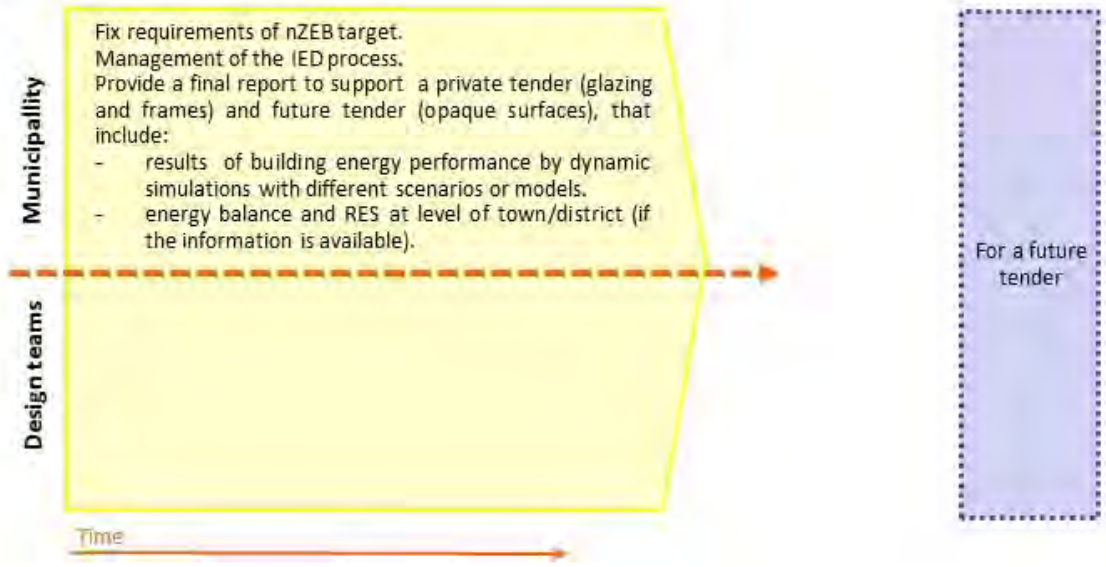
Benefits aspects:

- The Municipality of Ordis is small with specific needs, but the municipal policy of Ordis have the objective of improve energy management at the town or district level, including energy audit in housing and renewable energy facilities;
- The Major and the municipal architect of the Municipality of Ordis are very involve in the nZEB objectives and generation of RES at town and building level.

Critical aspects and barriers found:

- Lack of nZEB knowledge into the municipality (design and administrative team).
- There is very little new construction and nZEB opportunities in building retrofits are more limited.
- The impossibility to adjust the IED assisting in terms of time during AIDA project realization to the municipalities projects (start to work, deadlines, etc.).
- The AIDA project has a specific time line (duration) and in most of cases doesn't match with the plan of realization of large scale municipality projects.

KIND OF SUPPORT ACTIVITY



SUPPORT TO THE MUNICIPALITY AND DESIGN TEAM

(describe the collaboration with the Municipality to introduce energy performance requirements into the design tenders and how the integrated design process (IED) works

September 2012	Start the conversions to collaborate in reduce de energy demand (nZEB) in the Municipality of Ordis (IED and PAES).
October 2012	Sign of agreement of collaboration in the framework of AIDA project (WP3 and WP4).
December 2012	Interchange of information about the building and the possibilities of RES generation at town or district level.
February 2013	Meeting with the Major and municipal architect in the Municipality building of Ordis. Discussion with the municipality authorities of comfort problems and photographic survey. The Municipality wants present to a call for grants for glazing and frames renovation.
March 2013	The municipality had win a grant for the renovation in glazing areas and frames in the Municipality building.
April 2013	Dynamic simulations were carried out and preliminary reports have been started. The nZEB balance at town level have been started.
June 2013	The preliminary studies report of the retrofitting of Municipality building of Ordis are finished (1st phase and 2nd phase) and presented to the Municipality. The report includes energy performance calculation of different retrofit measures by dynamic simulation: the baseline model (actual situation) with 5 different models with improvements in glazing (as solar protection an Low-e glazing) area and opaque surfaces (different thickness of thermal insulation). Also, includes recommendations about daylighting optimization, solar and glare protection. The improvement of the energy performance were detailed (maximum: -75% energy saving with 900 mm thermal insulation thickness and low-e glazing).
July-November 2013	Supply contract in private tender to choose the product and builder -1st phase realised. Works of 1st phase were done (improvement of the glazing area and frames).
December 2013	The users (Major and municipal employees) of the building are very satisfied with the 1st phase of retrofitting concluded (improvement of the glazing area). Due to some problems to achieve more information to conclude the nZEB balance at town level, IREC ends the collaboration with the Municipality of Ordis until receive more information about.

4.3 France

4.3.1 Saint Lager, FR

AIDA AFFIRMATIVE INTEGRATED ENERGY DESIGN ACTION

Co-funded by the Intelligent Energy Europe Programme of the European Union

HESPUL

Preliminary study card

Renovation of a school

Saint Lager FR

GENERAL INFORMATIONS

Owner:	Municipality of Saint Lager
Use:	School
Heated surface:	750 m²

OBJECTIVE OF THE PRELIMINARY STUDY:

Evaluate the possibility of renovating the school to high energy performance standards.

ENERGY PERFORMANCE CRITERIA:

- **National Law:**
  - 2005 element by element thermal regulations (RT2005)
- ***Energy performance target : BBC EFFINERGIE RENOV + renewables (nZEB equivalent)***

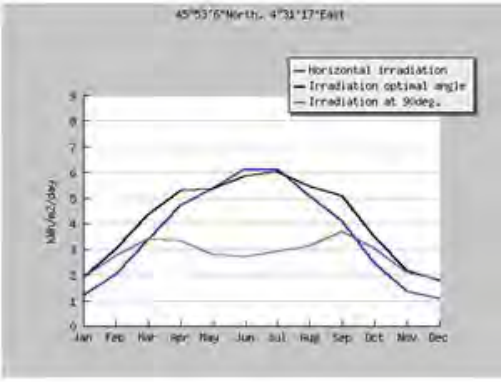
In the framework of their climate action plan (PCET) the goal of joining the TEPOS network (100% RES communities) and in light of the results of the joint local authority CCBVS's energy audit on local public buildings, the St Lager municipality decides to renovate the school

Renovation of a primary school

Saint Lager FR

DESCRIPTION OF THE CLIMATE:
Municipality of St Lager

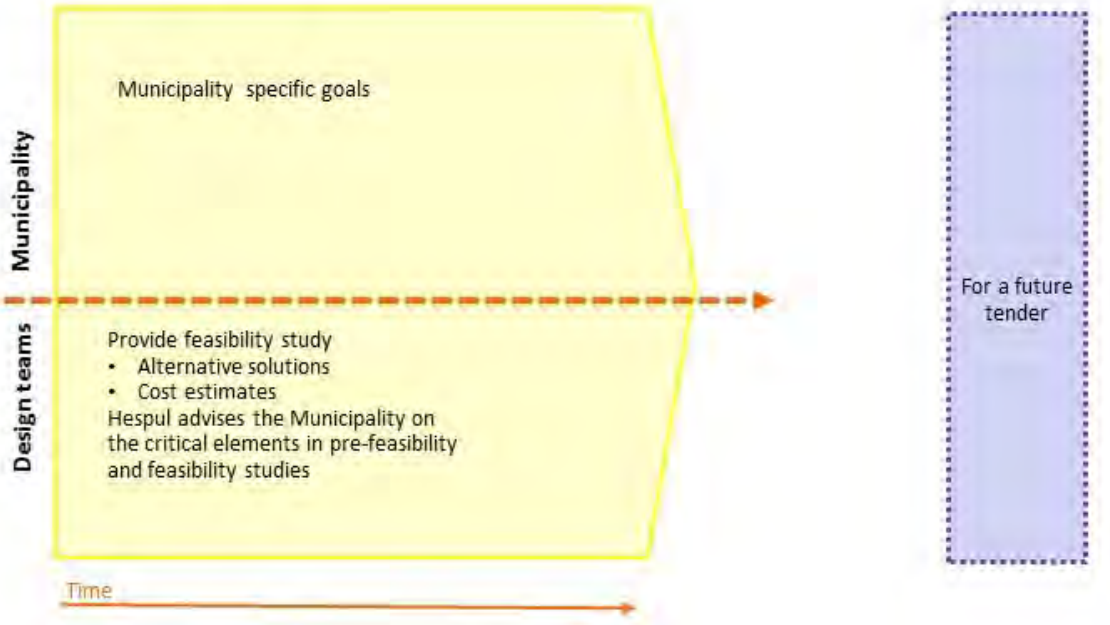
Address:	Route des brouilly St Lager 69220
GPS:	Location: 44.694 North 4709 Est
Altitude:	200 m
Yearly solar radiation: (graphic)	2,8 kWh/m² *day (Average at 90 deg global irradiation per square meter received) 6 kWh/m² (Average sum of horizontal global irradiation per square meter received) ( )



IED PROCESS

Composition of the team: Municipality, Hespul, architect from the public Architecture ad Urban planning Advice Centre (CAUE)

KIND OF SUPPORT ACTIVITY



SUPPORT TO THE MUNICIPALITY AND DESIGN TEAM

May 2013	Hespul meets the municipal team who wish to renovate the school to nZEB standards
December 2013	After some delays, Hespul obtains the information necessary to write the Tender documents that will indicate energy performance requirements
January 2014	The tender documents are handed over to the municipal team, but no tender is called
May 2014	Municipal elections, a new Mayor is elected
June 2014	After renewing contact with the municipal team and mayor, the project is continued.

4.3.2 **Clinique, Vaugneray FR**

AIDA AFFIRMATIVE INTEGRATED ENERGY DESIGN ACTION

Co-funded by the Intelligent Energy Europe Programme of the European Union

HESPUL

Renovated housing
Transforming a hospital into housing and commercial space
Vaugneray, FR

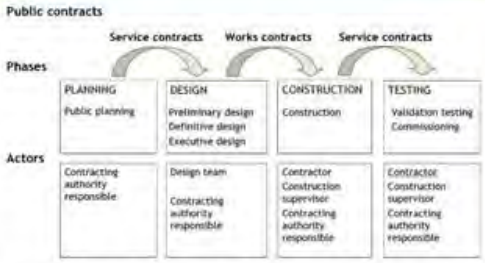
GENERAL INFORMATIONS

Owner:	Municipality of Vaugneray
Use:	Housing and commercial
Heated surface:	666 m²
Price of the projetc	1 million euros

OBJECTIVE OF THE PRELIMINARY STUDY:

Help the Municipality to clarify their energy performance goals, ensure that the design team complies and verify and control, at every phase, that the municipalities performance goals are priority goals of the design team.

Hespul was present after the planning phase but before the preliminary design phase. The tender for and architect was already completed but preliminary designs had not yet been drafted.



The municipality only displayed interest in AIDA after the tender was called and the architect selected, hence the study / accompaniment role of Hespul within the AIDA program.

OBJECTIVE OF THE PRELIMINARY STUDY:

ENERGY PERFORMANCE CRITERIA:

- **National Law** :
  - Renovation Thermal Regulations (RT2005)
  - Maximum 250 kWh/m2/year for DHW, heating, cooling, auxiliary and ventilation
- ***Minimum energy performance requirements fixed by Municipality in AIDA project framework***
- ***Other requirements:***
  - Reach BBC Effinergie Renov performance level
  - Maximum 104 kWh/m2/year primary energy consumption
  - Summer comfort levels : no more than 40h over 28°C without air conditioning
  - Air tightness : maximum 1m3/h/m2 for the thermal envelope - A Class measurements (3 times more stringent than measures on equivalent buildings)
  - Air tightness test imposed on the ventilation
  - A comparative study of energy use costs will be provided
  - 4 Air tightness tests will be performed
  - The energy equipment supplier will provide 1 years service contract to ensure commissioning is efficient.
  - The project manager will provide a clear and practical instruction book on equipment use and maintenance in the building to ensure continued best performance

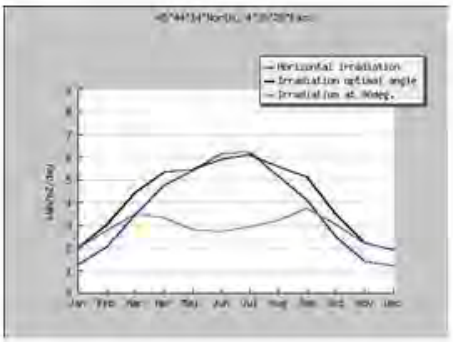
TOOLS USED TO EVALUATE:
Energy performance will be demonstrated with a dynamic thermal simulation or through a mix of design choices imposed on designers by Hespul
In the preliminary design phase, a dynamic thermal study will be conducted using **Pleaide + Comfy**

RESULTS OBTAINED:
The Municipality required performance levels much higher than those imposed by national thermal regulations.
Refurbishment works began in September 2013 and the renovation was inaugurated in September 2014

Renovated housing
Transforming a hospital into housing and commercial space
Vaugneray, FR

DESCRIPTION OF THE CLIMATE:
Municipality of Vaugneray

GPS:	Location : North: 45738 Est : 4658
Altitude:	414 m
Yearly solar radiation: (graphic)	2,82 kWh/m² *day (Average sum at 90 deg per square meter received) 3,63 kWh/m² (Average sum of horizontal global irradiation per square meter received) ( )



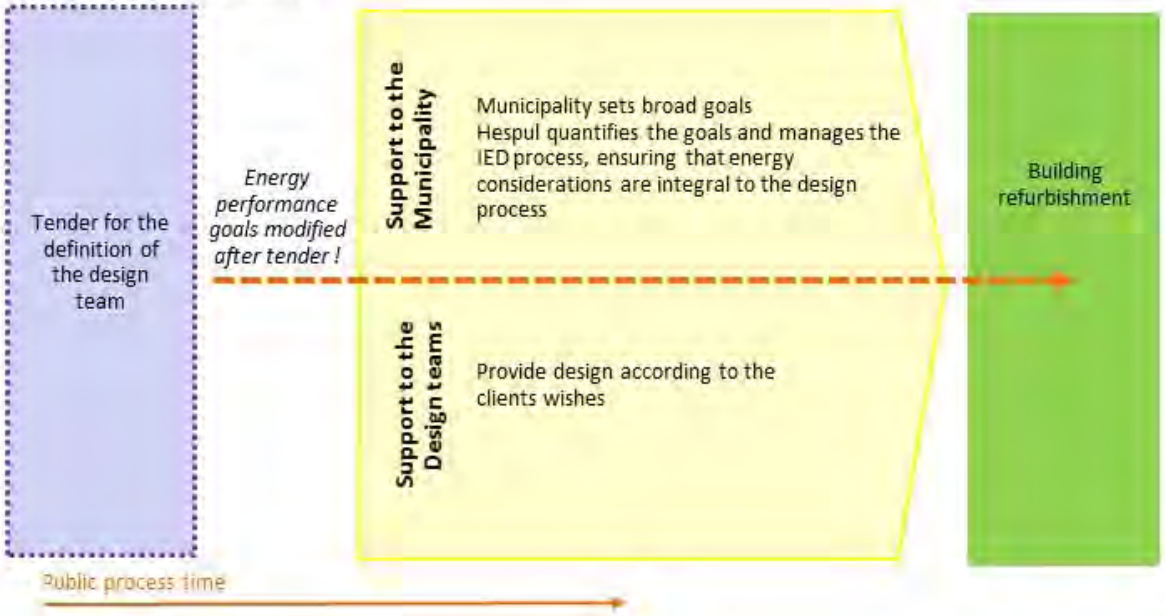
IED PROCESS

Composition of the team: Municipality, Hespul, architect, Programmer, thermal and Fluids consultants

Hespul has worked to accompany the building owner to help them to **define obligatory energy performance criteria**. This was quite difficult as the architects had already been selected as well as the initial specifications accepted. Hespul's mission was **to assist the architect to reach nZEB standards** without modifying or increasing the project budget. Whilst the goals were only partially reached, Hespul's participation in the project has meant that the quality of the works undertaken, and the quality of the controls and checks, was sufficient to reach a high energy performance, despite the use of standard building practices.

1. *HESPUL coaches the Municipality and design team to set nZEB goals*
2. *HESPUL accomanied the design team through the design phase to reach the nZEB goals*
3. *HESPUL accompanied both the municipality and the design team during the refurbishement to find skilled companies for the works.*

KIND OF SUPPORT ACTIVITY



Renovated housing
Transforming a hospital into housing and commercial space
Vaugneray, FR

SUPPORT TO THE MUNICIPALITY AND DESIGN TEAM

September 2012	The Municipality, having already chosen an architect and consultants, calls on Hespul to help integrate high energy performance goals into the project
October to November 2012	Hespul studies the project and provides a memo indicating nZEB equivalent energy performance targets and possible subsidies to finance energy related over-costs
November 2012	Hespul and the consultants have many discussions to compare different heating and ventilation systems and designs. That are compatible with nZEB targets. Renovation constraints related to the physical building configuration exclude solar thermal domestic hot water and heat recovery ventilation. A lengthy debate concerning the possible use of a heat pump on exhaust ventilation air for heating domestic hot water occurs.
29 november 2012	After much discussion concerning investment costs and quality requirements necessary to reach high energy performance goals, the municipality agrees to increase their energy performance target to nZEB standards (BBC Effinergie renov)

January 2013 to August 2013	Many discussions with the design teams to reach a definitive design and submit subsidy requests.
September 2013	Works start
September 2013 to June 2014	Hespul regularly called on for advice, specifically with regards to the air tightness tests, the thermal envelope and the ventilation networks. Hespul was called on to assist in finding a properly qualified air tightnesstester with the necessary certification.
September 2014 2014	Hespul involved in a pre-inauguration visit held in September with project stakeholders including financers and government representatives. The 2 blower door tests indicated good results, with a notable improvement between the two (from 1m3/h/m2 to 0.00072 m3/sm2) Several defects were identified by Hespul during this visit, including - Insulation defect in the roof space - Ventilation problem in the commercial space at ground level - Unidentified sections of the hydraulic network in the heating locale that may complicate running and maintenance work

4.3.3 **Aquacentre de Grand Champ,St Bel, FR**

AIDA AFFIRMATIVE INTEGRATED ENERGY DESIGN ACTION

Co-funded by the Intelligent Energy Europe Programme of the European Union

HESPUL

Preliminary study card

Aquacentre de Grand Champ

Renovation – extension of swimming pool

St Bel, FR

GENERAL INFORMATIONS

Owner:	Communauté de communes de l'Arbresle - joint local authority
Use:	Swimming Pool
Heated surface:	2671 m2
Cost of the project	5 million euros

Etanchéité bicouche bitumineuse à rénover

The Municipality expects to secure financing for the inclusion of over costs related to energy performance for the renovation.

The municipality only displayed interest in AIDA after the tender was called and the architect selected, hence the study / accompaniment role of Hespul within the AIDA program.

OBJECTIVE OF THE PRELIMINARY STUDY:

Hespul support the Municipality to increase the energy efficiency of the existent swimming pool.

Hespul encourages the project management consultants and architects to operate improving:

- heat recovery from waste water
- renewable energy (wood fired boiler)
- high performance dehumidification (air treatment)
- exterior insulation on building

ENERGY PERFORMANCE CRITERIA:

- National Law :
  - None applicable to aquatic centres
- ***Minimum energy performance requirements fixed by Municipality in AIDA project framework***
- ***Others:***

TOOLS USED TO EVALUATE:

Excel to demonstrate the financial viability of different technical solutions. The excel file simulates and compares investment and operation costs, CO2 emissions and primary energy consumption.

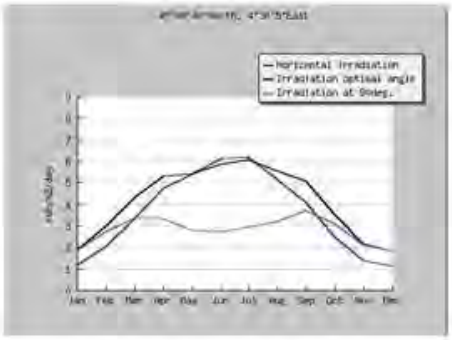
RESULTS:

Hespul encourages modifications to the pre-design concerning the energy systems to improve performance, specifically regarding boiler dimensions and the ventilation system. During the design phase is validated and a wood fired boiler is included in the design, a dramatic improvement in CO2 emissions for the building will result from this decision

Aquacentre de Grand Champ
Renovation – extension of swimming pool

DESCRIPTION OF THE CLIMATE:
Municipality ofSaint Bel

GPS:	Location: ..... North: 45.812 Est : de 4.599
Altitude:	245m
Yearly solar radiation: (graphic)	2,79 kWh/m² *day (Average sum at 90 deg global irradiation per square meter received) 3,59 kWh/m² (Average sum of horizontal global irradiation per square meter received) ( )

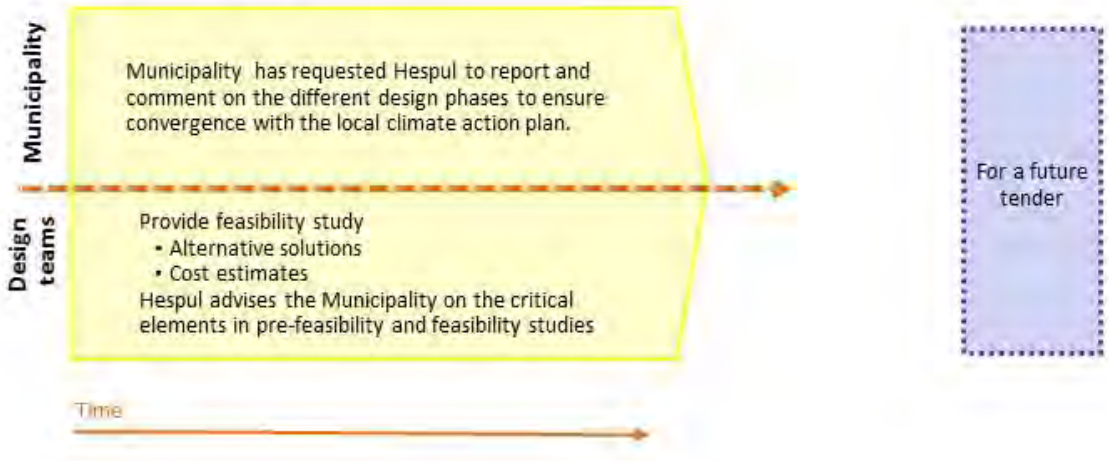


IED PROCESS

Composition of the team: Municipality, Hespul, architect, fluids consultants, assistant to building owner

Hespul's involvement in the project consisted of technical advice on technologies and choices to be adopted in the pre-program phase (heat recuperation on waste water and ventilation, wood fire boiler for heating needs...) This work involved showing examples of buildings having integrated these technologies, and providing different economical scenarios demonstrating the financial viability of the different technologies.
Once the project reached preliminary design phase, Hespul's role was to ensure that the energy performance goals were not abandoned for cost reasons. This consisted in helping the design team find appropriate technical solutions and products, and ensuring that the eventual over costs could be integrated into the project or be partially financed through subsidies.
Experience has shown that without someone (such as Hespul) to insist that energy goals remains as primary goals throughout the project they can be easily loose priority.

KIND OF SUPPORT ACTIVITY



Aquacentre de Grand Champ
Renovation – extension of swimming pool
St Bel, FR

SUPPORT TO THE MUNICIPALITY AND DESIGN TEAM

2012	The municipality tenders for a Consultant to accompany them for the renovation of the Aquacentre
September 2012	Hespul exchanges with the municipality to encourage them, and their consultants, to include specific recommendations regarding energy performance and sources for the renovation project. Whilst it does not seem feasible to reach nZEB standards for an aquatic center, as the aquatic center is the building with the highest energy consumption and emits the most CO2 of all municipal buildings, it is a priority in terms of energy management. Hespul has accompanied the municipality with the goal of promoting nZEB standard for parts of the Aquacentre, for example in the thermal envelope, ventilation and heat source and systems. Hespul, within the framework, has encouraged the municipality to study wood fired boilers as a renewable energy source for the heating needs.
July 2013	The Municipality officially integrated Hespul into the steering committee fro the project with a specific mission to advise on energy aspects.
August 2013	Hespul provides a memo in the pre-design phase to include plans for wood fired heating and reserving space for wood product storage etc
Nov 2013	Exchanges are ongoing, the pre-design phase is validated in November.
February 2014	Hespul provides a memo encouraging modifications to the pre-design concerning the energy systems to improve performance, specifically regarding boiler dimensions and the ventilation system.
February 2014	After several rounds of discussion between Hespul, the consultants and the architects, the next design phase is validated and a wood fired boiler is included in the design, a dramatic improvement in CO2 emissions for the building will result from this decision
Feb to April 2014	Hespul has accompanied the municipality in establishing the financing for the over costs for the wood fired boiler. The possibility of local and regional subsidies make a wood fired boiler a viable economic solution.

4.3.4 Extension to School and Town Hall, Les Olmes, FR

AIDA AFFIRMATIVE INTEGRATED ENERGY DESIGN ACTION

Co-funded by the Intelligent Energy Europe Programme of the European Union

HESPUL

Preliminary study card

Extension to School and Town Hall
and modernisation of heating source
Les Olmes, FR

GENERAL INFORMATIONS

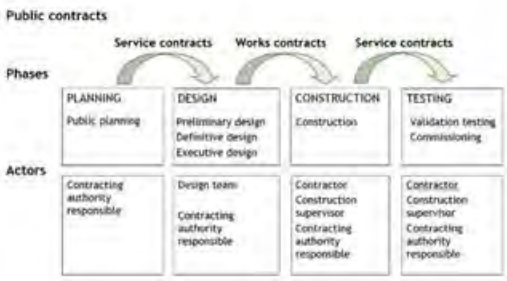
Owner:	Municipality of Les Olmes
Use:	Administration and School
Heated surface:	200 m² new 1074m² existing
Cost	New building : 600 000 € Refurbishment : 500 000 €

OBJECTIVE OF THE PRELIMINARY STUDY:

Evaluate the feasibility studies on the use of seasonal heat storage associated with either an air-water heat pump or ground sourced heat pump in the context of the extension of a school / town hall.

The change in local government after elections leads to the abandon of the high performance objectives of the project

The municipality only displayed interest in AIDA after the tender was called and the architect selected, hence the study / accompaniment role of Hespul within the AIDA program.



OBJECTIVE OF THE PRELIMINARY STUDY:

Help the Municipality to clarify their energy performance goals, ensure that the design team complies and verify and control, at every phase, that the municipalities performance goals are priority goals of the design team.

Hespul was present after the planning phase and worked with the municipality during the design phase. The tender for an architect was already completed but preliminary designs had not yet been drafted.

ENERGY PERFORMANCE CRITERIA:

- ***National Law :***
  - 2005 (office space) and 2012 (tertiary areas) Thermal Regulations (RT2005, RT2012)
  - Maximum 50kWh/m2/year for DHW, heating, cooling, auxiliary and ventilation
- ***Minimum energy performance requirements fixed by Municipality in AIDA project framework***

TOOLS USED TO EVALUATE:

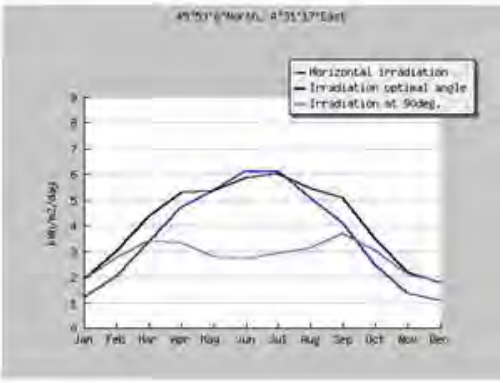
The feasibility of inter-seasonal heat storage in bedrock to provide renewable heat to a building is innovative and specific tools must be used.

Extension to School and Town Hall and modernisation of heating source

Les Olmes, FR

DESCRIPTION OF THE CLIMATE:
Municipality of Les Olmes

Address:	Le Bourg 69490 Les Olmes.
GPS:	Location: 45833 North 4517 Est
Altitude:	356m
Yearly solar radiation: (graphic)	2,8 kWh/m² *day (Average at 90 deg global irradiation per square meter received) 3,59 kWh/m² (Average sum of horizontal global irradiation per square meter received) ( )



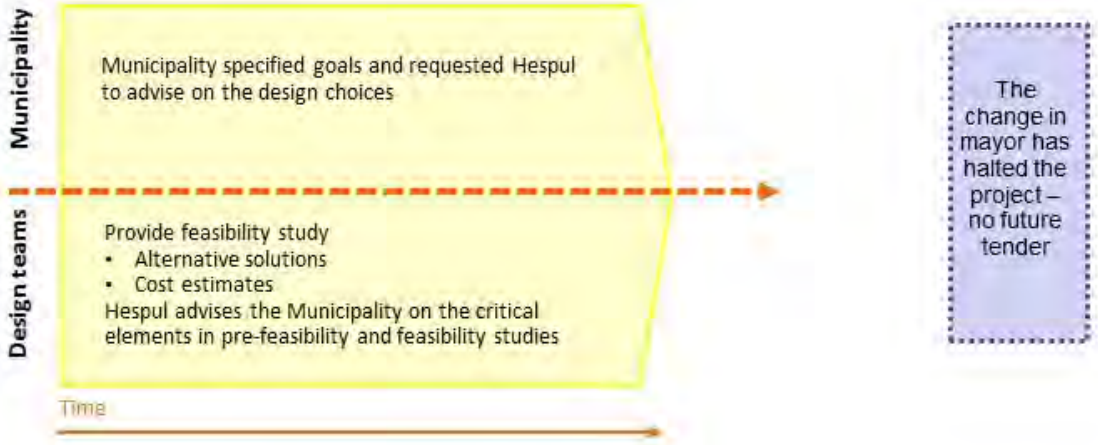
IED PROCESS

Composition of the team: Municipality, Hespul, architect, fluids consultants, national environment agency (ADEME)

HESPUL was approached after the project architect had already been chosen, as the project went into preliminary design. The Mayor was very keen to build to passive energy standards, in association with innovative inter-seasonal solar heat storage in the local granite.

Hespul's role was to confirm that the architects project complied with nZEB standards, and that the technical solution planned for the inter-seasonal solar hot water storage was viable, plausible and could be eligible for financial subsidies.

KIND OF SUPPORT ACTIVITY



Extension to School and Town Hall and modernisation of heating source

Les Olmes, FR

SUPPORT TO THE MUNICIPALITY AND DESIGN TEAM

September 2013	The local PCET coordinator contacts Hespul to request us to advise the local municipality on the project The Municipality wishes to renovate and extend the local school. The Mayor has an understanding of the PCET goals and, from the beginning, plans to the project to be to nZEB standards. The architect and fluids consultants have already been selected. However, the Municipality requests an accompaniment as they wish to use an innovative technique for inter seasonal storage in granite bedrock of solar heated water. The stored warm water will be heated to the required temperature by a heat pump for use in the school and town hall heating systems. A specialist completed a study to validate the capacity of the local bedrock to store heat and calculate heat losses.
September 2013 to January 2014	Many exchanges between Hespul, the PCET coordinator, the Themal consultants and the municipality to ensure the correct design of the innovative heating system, and to obtain financing subsidies for this innovative and exemplary project.
Mai 2014	The previous Mayor is not re-elected in the municipal elections, and the new Mayor abandons the nZEB/heat storage project and plans to undertake works to national thermal regulations only.

4.3.5 **Primary school renovation, Pomeys FR**

AIDA AFFIRMATIVE INTEGRATED ENERGY DESIGN ACTION

Co-funded by the Intelligent Energy Europe Programme of the European Union

HESPUL

Preliminary study card

Primary school renovation

creation of a small wood-fed heating network

POMEYS FR

GENERAL INFORMATIONS

Owner:	Municipality of Pommeys
Use:	School and 2 community halls
Heated surface:	290 m² + 250 m2 + 400m2
cost	1 million€

In the framework of the SIMOLY (joint local authority) PCET, and in line with their TEPOS (100% communities) ambitions, the small municipality of Pomeys decides, after a complete energy audit, that the primary school should be renovated

OBJECTIVE OF THE PRELIMINARY STUDY:
Determine the possibility of renovating to nZEB standards and creating a small heating network for the school and adjoining community halls.

ENERGY PERFORMANCE CRITERIA:

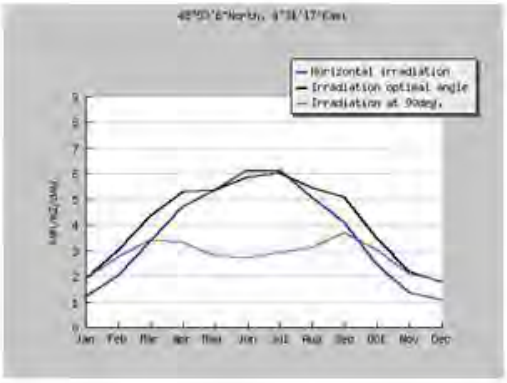
- **National Law:**
  - RT 2005 (school renovation) element by element
  - 250kWh/m2/year 5 usages
- ***Minimum energy performance requirements fixed by Municipality in AIDA project framework***
- Energy performance target : BBC EFFINERGIE RENOV + renewable energy production to reach NZEB standards
- 96 kWh/m2/year 5 usages
- Wood fired boiler and photovoltaics RES production

Before the tender was written for the School renovation, Hespul provided a memo concerning the feasibility of a small heating network fed by a wood fired boiler for the school and adjoining community halls.

Primary school renovation creation of a small wood-fed heating network
POMEYS FR

DESCRIPTION OF THE CLIMATE:
Municipality of Les Olmes

Address:	Le Bourg 69590 POMEYS, France
GPS:	Location 45.6506° N, 4.4447° E
Altitude:	657m
Yearly solar radiation: (graphic)	2,7kWh/m² *day (Average at 90 deg global irradiation per square meter received) 3,57kWh/m² (Average sum of horizontal global irradiation per square meter received) ( )



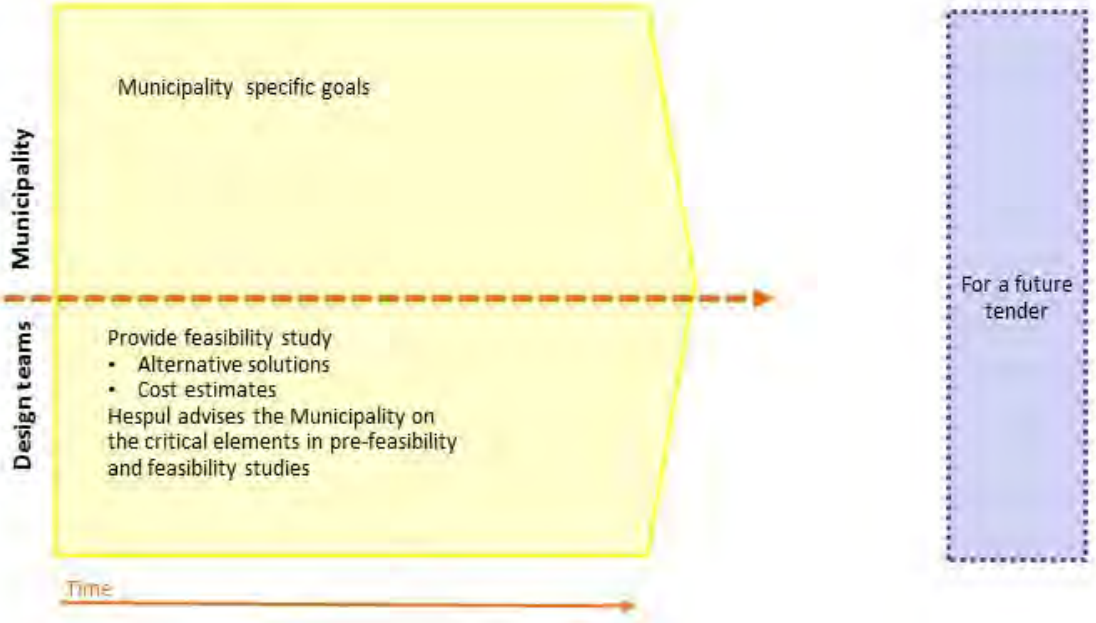
IED PROCESS

Engaged in a PCET (climate roadmap), the joint local authority (SIMOLY) of which Pomeys is a member created a position for an Energy Officer shared by several member municipalities. This Energy Officer is charged with following energy consumption in the different municipalities. After a presentation of the state of energy consumption and an energy audit, Pomeys elected to renovate the Primary School, one of the principal sources of energy consumption for the municipality that was described as being a relatively uncomfortable environment.

The Officer that accompanied Pomeys contacted Hespul for assistance drafting specifications for tendering the project with the goal of a high energy performance renovation including renewable energies

Composition of the team: Municipality, Hespul, SIMOLY shared Energy Officer, SIMOLY PCET/TEPOS Officer

KIND OF SUPPORT ACTIVITY



Primary school renovation creation of a small wood-fed heating network
POMEYS FR

SUPPORT TO THE MUNICIPALITY AND DESIGN TEAM

May 2014	First meeting Hespul / Pomeys.
June 2014	Hespul provides a memo on the possibility of integrating renewable energies (wood and photovoltaics) into the renovation project.
June 2014	**The municipality is taken with the project memo and decide to integrate high performance energy targets and renewable energy into the tender specifications for the project**
September 2014	**Hespul works with the shared Energy Officer to draft the specifications for the tender**. Hespul integrates a knowledge and competency transfer into the work, with the aim of giving the local Energy Officer the necessary skills to reproduce the integration of energy performance goals into any future work undertaken with other municipalities implicated in a PCET. The tender documents describe the mission for the architect / consultants role for each phase of the project, and include the reports to be supplied to the municipality at each phase. • The performance requirements are : BBC EFFINERGIE RENOV + renewable energy production to reach NZEB standards • 96 kWh/m²/year 5 usages and Wood fired boiler and photovoltaics RES production • Dynamic simulation results must be supplied at the preliminary design phase to demonstrate proof of concept • Economic simulations on the costs of different heat sources, including renewable energies (wood) must be supplied • Detailed reporting on design choices and detailed implementation of solutions for potential thermal rupture points to be provided, air tightness and insulation in general • Detailed list of the number of air tightness test and other building performance quality control tests. • A specific meeting for the commissioning of technical equipment will be provided, • A validation meeting after 1 year of operation to confirm energy performance, to ensure that corrective works can be undertaken within the guarantee period.
January 2015	Tender for architect

4.4 Greece

4.4.1 Municipality of Thessaloniki

AIDA AFFIRMATIVE INTEGRATED ENERGY DESIGN ACTION

Co-funded by the Intelligent Energy Europe Programme of the European Union

ΚΑΠΕ CRES

Preliminary study card

Municipality of Thessaloniki

New Building, extension of the 4th Elementary School
Thessaloniki, Greece

GENERAL INFORMATION

State of the art:

Owner:	Municipality of Thessaloniki
Use:	School
Construction year:	2014
Total surface:	744,38 m²

OBJECTIVE OF THE PRELIMINARY STUDY:

Support to the Municipality design team to proceed with a tender for energy retrofitting using nZEB criteria, and improve the level of the certification in energy consumption and also the comfort level achieved inside throughout the year.
The suggested refurbishment solutions aim to achieve better energy performance according to the National Building's Code regulation, and in specific aim to achieve A+ certification (A is foreseen for the 1st phase of the construction). The municipality has included this and other nZEB buildings in the SEAP submitted and aims at promoting the concept to all new buildings.
Due to lack of full financing, the second phase (including RES integration) has been postponed.

Justification:
The Municipality of Thessaloniki has decided to improve the energy performance of a new building by adding nearly zero energy requirements. The 1st phase of the construction is expected to take place by the end of 2014. The building to be built is already an A rating low energy building, meeting the requirements set for energy efficiency, but without renewable energy systems.
The energy conservation achieved in the building to be built in the 1st phase, compared to the reference building (as specified by KENAK regulation) amounts to 51 %.
Technologies that will be implemented are
- *High insulation*
- *Shading louvers*
- *Energy efficient HVAC system*

Additional nZEB specifications will be included in a new tender, when additional financing has been secured.
The building will be upgraded from A to A+ with the integration of solar energy technologies.
With integration of the RES systems, energy saved amounts to 68% compared to the reference building.
Additional RES technologies for meeting nZEB are:
- *Solar thermal for space heating connected to fan coils*
- *5 kWh of PV with net metering*

Floor Plan
Source: Municipality of Thessaloniki

OBJECTIVE OF THE PRELIMINARY STUDY:
ENERGY PERFORMANCE REQUIREMENTS

National laws of energy performance requirements for new buildings:
- National Buildings' code regulation on energy performance in the building sector (KENAK, Ministerial Decision D6/B/5825).

Minimum energy performance requirements fixed by AIDA project:
- *The higher Class (A+) of the National or Local Energy Performance Classification of the building;*
- *50% of the primary energy consumption has to be covered by energy produced from renewable energy sources;*
- *Primary heating energy demand limit: 40 kWh/m²year*
- *Total primary energy demand for heating and cooling limit: 60 kWh/m²year;*

TOOLS USED TO EVALUATE:

The energy performance:	TEE-KENAK (Greek EPBD tool)
The energy production:	TEE-KENAK

RESULTS OBTAINED

Heating (kWh/m²)	36.30
Cooling (kWh/m²)	2.80
Lighting (kWh/m²)	14.60
RES production (kWh/m²)	71,00
Total	34,20
CO_2 (Kg/m²)	10
Rating	A+
Saving of primary energy (kWh/m²)	72,4
Saving of primary energy (%)	68

4th Elementary School
Municipality of Thessaloniki

DESCRIPTION OF THE CLIMATE:

Address:	Thessaloniki, Greece
GPS:	Latitude: 40° 31' N, Long: 22° 58'' E
Yearly solar horizontal irradiation: (graphic)	1,466 kWh/m² *year (source: National Technical Specification TOTEE20701/3)
HDD20 ( ):	HDD_{20}= 1,398 (HDD_{18}= 1,677 Source: TOTEE 20701/3)
CDD26 ( ):	CDD_{26}= 319 (CDH_{26}= 2,795 Source: TOTEE 20701/3)

IED PROCESS

Composition of the team:	CRES municipality architects and engineers CRES team
Management of the IED:	CRES team

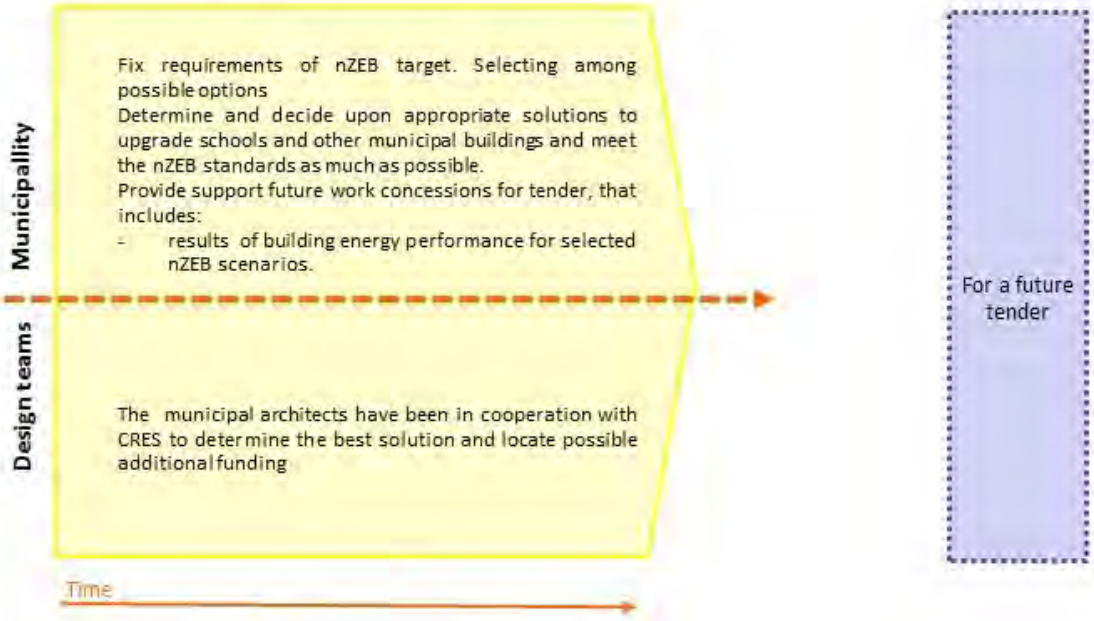
Benefits aspects:

- Good technical cooperation, increased interest to integrate nZEBs and very low energy buildings in common practice. Municipality technical team highly focussed on bioclimatic design
- Expanded technical knowledge and to move from "bioclimatic" to Nearly Zero Energy Buildings practice.

Critical aspects and barriers found:

- Timing and lengthy procedures for tenders and also financing limitations allow for partial implementation of envisaged solutions.
- Financing for the full project has not been fixed yet.

KIND OF SUPPORT ACTIVITY



SUPPORT TO THE MUNICIPALITY AND DESIGN TEAM

(describe the collaboration with the Municipality to introduce energy performance requirements into the design tenders and how the integrated design process (IED) works

April 2013	1st contact for Municipal SEAP development
May- September 2013	SEAP development with municipality team. Examination of potential new and existing buildings to be converted to NZEB and inclusion in SEAP. Examination of plans, review of technical design study, solutions and specifications.
October 2013	Meeting in Thessaloniki. Discussion of preliminary study, decision on specifications and inclusion in municipal Sustainable Energy Action Plan.
March 2014	Meeting in Thessaloniki, approval of specifications and SEAP by municipality.
April 2014	Final meeting in Thessaloniki with municipality technical team and vice-Mayor and discussion of potential financing schemes. SEAP approved by Municipal Council

4.4.2 **Municipality of Farsala, GR**

AIDA AFFIRMATIVE INTEGRATED ENERGY DESIGN ACTION

Co-funded by the Intelligent Energy Europe Programme of the European Union

ΚΑΠΕ CRES

Preliminary study card

Municipality of Farsala

Existing Town Hall Building
Farsala, Greece

GENERAL INFORMATIONS

State of the art:

Owner:	Municipality of Farsala
Use:	Town Hall
Construction year:	1989
Total surface:	1446 m²
Gross volume:	5670,50 m³

OBJECTIVE OF THE PRELIMINARY STUDY:

Support to the Municipality design team to proceed with a tender for energy retrofitting using nZEB criteria, and improve the level of the certification in energy consumption and also the comfort level achieved inside throughout the year.
The suggested refurbishment solutions aim to achieve better energy performance according to the National Building's Code regulation, and in specific aim to achieve A+ certification (C is the existing certification of the building).

Due to lack of project financing, the tender has been delayed.

Justification:
The Municipality of Farsala has decided to proceed with energy retrofitting of its municipal buildings, and through its participation in AIDA has come to the decision to include this in its Sustainable Energy Action Plan submitted for the Covenant of Mayors.
The municipality has conducted a preliminary study and specifications for nZEB have been set in collaboration with CRES. This has lead to a selection of most appropriate technologies for retrofitting. Financing will be sought through various sources, including Regional Funds and possible private investments but has not been secured yet.

Suggested solutions for upgrading the building to A+ rating according to KENAK:
- Replacement of old windows with energy efficient new ones with double glazing (Uvalue < 2.8w/m²K) and thermal break.
- *Green roof.*
- *Upgrading of the lighting systems with replacement of existing lights with LEDs.*
- *Installation of central VRV HVAC system.*
- *Installation of ceiling fans.*
- *Installation of BMS.*
- *Installation of PV system.*

View of the City Hall.
Source: Municipality of Farsala

OBJECTIVE OF THE PRELIMINARY STUDY:
ENERGY PERFORMANCE REQUIREMENTS

National laws of energy performance requirements for new buildings:
- National Buildings' code regulation on energy performance in the building sector (KENAK, Ministerial Decision D6/B/5825).

Minimum energy performance requirements fixed by AIDA project:
- *The higher Class (usually standard Class A) of the National or Local Energy Performance Classification of the building;*
- *50% of the primary energy consumption has to be covered by energy produced from renewable energy sources;*
- *Primary heating energy demand limit: 40 kWh/m2year*
- *Total primary energy demand for heating and cooling limit: 60 kWh/m2year;*

TOOLS USED TO EVALUATE:

The energy performance:	TEE-KENAK (Greek EPBD tool)
The energy production:	TEE-KENAK

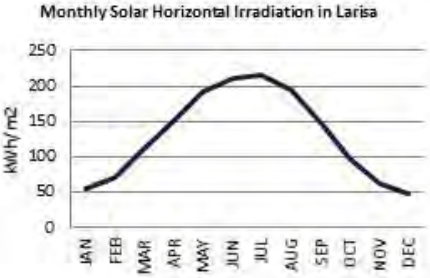
RESULTS OBTAINED:

Primary energy per use	Existing Building	Suggested scenario
Heating (kWh/m²)	67,0	23,3
Cooling (kWh/m²)	58,5	28,1
Lighting (kWh/m²)	123,6	81,1
RES production (kWh/m²)	0,0	76,7
Total	249,1	55,8
Rating	C	A+
Saving of primary energy (kWh/m²)	-	193,3
Saving of primary energy (%)	-	77,6
Reduction of CO2 (Kg/m²)	-	61,2

Existing Town Hall building
Municipality of Farsala

DESCRIPTION OF THE CLIMATE:

Address:	Larissa, Greece (No data are available for Farsala. Larissa is a nearby city with available climate data.)
GPS:	Latitude: 39° 39' N, Long: 22° 27' E
Yearly solar horizontal irradiation: (graphic)	1,554 kWh/m² *year (source: National Technical Specification TOTEE 20701/3)
HDD20 ( ):	HDD_{20}= 2026 Larissa, GR (HDD_{18}= 1718 Larissa, GR, source: TOTEE 20701/3)
CDD26 ( ):	CDD_{26}= 280 Larissa, GR (CDH_{26}= 3856 Larissa, GR, source: TOTEE 20701/3)



IED PROCESS

Composition of the team:	Farsala municipality consultant and architects and engineers CRES team
Management of the IED:	CRES team

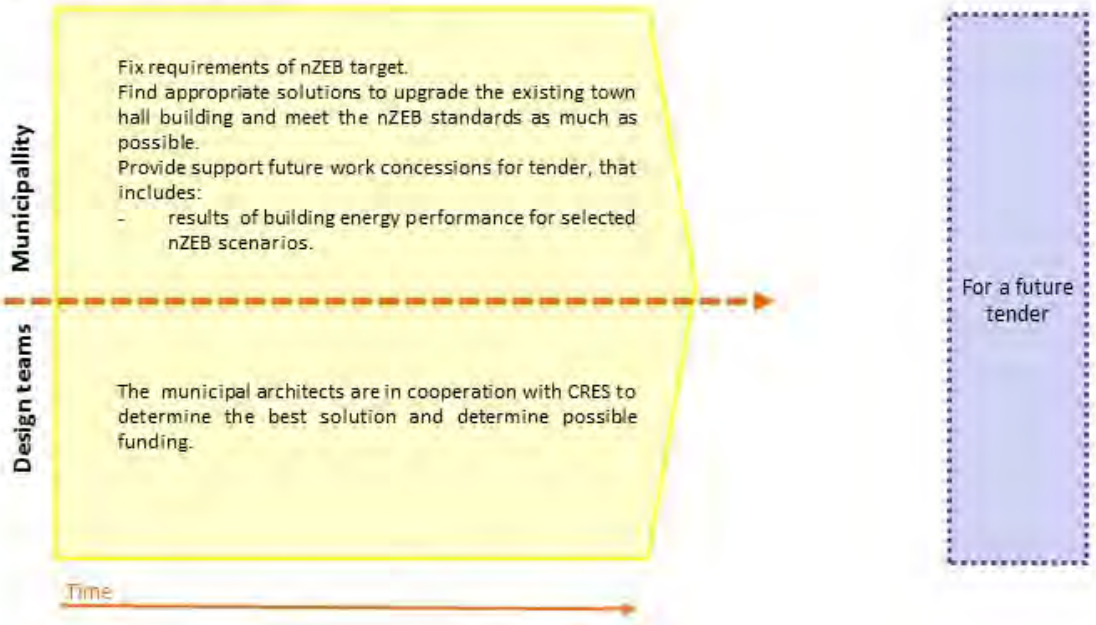
Benefits aspects:

- Good technical cooperation, increased interest to integrate nZEBs and very low energy buildings in common practice
- Knowledge and to include bioclimatic, energy efficiency and RES solutions by the municipal architects and energy engineers.

Critical aspects and barriers found:

- It is not very clear how and to what extend energy aspects (stricter than the ones forced by the Law for new buildings) can be introduced to the final tender.
- Financing has not been fixed yet.

KIND OF SUPPORT ACTIVITY



SUPPORT TO THE MUNICIPALITY AND DESIGN TEAM

(describe the collaboration with the Municipality to introduce energy performance requirements into the design tenders and how the integrated design process (IED) works

February 2014	Start conversations with Municipality of Farsala (municipal consultant). The municipality plans retrofitting. Discussion about which could be designed based on nZEB concept.
March 2014	Personal meetings in Thessaloniki and Athens. The municipal team give information and details about the building. Review of technical design study, solutions and specifications.
April 2014	Finalization of preliminary study and inclusion in municipal Sustainable Energy Action Plan.
May 2014	Meeting at CRES. Discussion about possible financing options. Possible financing through the Operational Programme Environment and Sustainable Development, Axis 1: "Protection of Atmospheric Environment and Public Transport – Abating Climate Change – Renewable Energy Sources".
June- November 2014	Negotiations with the relevant authority of the Ministry in order to approve this tender for the prefeasibility study. Unfortunately, no funding was available in order to conduct the tender for the prefeasibility study. Alternative financing discussed, to be sought mainly through Structural Funds in the next Programming Period.

4.4.3 **Municipality of Farsala, GR**

AIDA AFFIRMATIVE INTEGRATED ENERGY DESIGN ACTION

Co-funded by the Intelligent Energy Europe Programme of the European Union

ΚΑΠΕ CRES

Preliminary study card

Municipality of Farsala

Existing Cultural centre Building
Farsala, Greece

GENERAL INFORMATIONS

State of the art:

Owner:	Municipality of Farsala
Use:	Cultural centre
Construction year:	1992
Total surface:	1.534,16 m²
Heated surface:	1.250,50 m²
Gross volume:	6453,08 m²

OBJECTIVE OF THE PRELIMINARY STUDY:

Support to the Municipality design team to proceed with a tender for energy retrofitting using nZEB criteria, and improve the level of the certification in energy consumption and also the comfort level achieved inside throughout the year.
The suggested refurbishment solutions aim to achieve better energy performance according to the National Building's Code regulation, and in specific aim to achieve A+ certification (D is the existing certification of the building).

Due to lack of project financing, the tender has been delayed.

Justification:
The Municipality of Farsala has decided to proceed with energy retrofitting of its municipal buildings, and through its participation in AIDA has come to the decision to include this in its Sustainable Energy Action Plan submitted for the Covenant of Mayors.
The municipality has conducted a preliminary study and specifications for nZEB have been set in collaboration with CRES. This has lead to a selection of most appropriate technologies for retrofitting. Financing will be sought through various sources, including Regional Funds and possible private investments but has not been secured yet.

Suggested solutions for upgrading the building to A+ rating according to KENAK:
- Replacement of old windows with energy efficient new ones with double glazing (Uvalue < 2.8w/m²K) and thermal break.
- *Upgrading of the lighting systems with replacement of existing lights with LEDs.*
- *Upgrading of the HVAC system with the installation of central VRV system.*
- *Installation of BMS.*
- *Installation of PV system (not connected to the grid).*

View of the Cultural centre
Source: Municipality of Farsala

OBJECTIVE OF THE PRELIMINARY STUDY:
ENERGY PERFORMANCE REQUIREMENTS

National laws of energy performance requirements for new buildings:
- National Buildings' code regulation on energy performance in the building sector (KENAK, Ministerial Decision D6/B/5825).

Minimum energy performance requirements fixed by AIDA project:
- *The higher Class (usually standard Class A) of the National or Local Energy Performance Classification of the building;*
- *50% of the primary energy consumption has to be covered by energy produced from renewable energy sources;*
- *Primary heating energy demand limit: 40 kWh/m2year*
- *Total primary energy demand for heating and cooling limit : 60 kWh/m2year;*

TOOLS USED TO EVALUATE:

The energy performance:	TEE-KENAK (Greek EPBD tool)
The energy production:	TEE-KENAK

RESULTS OBTAINED:

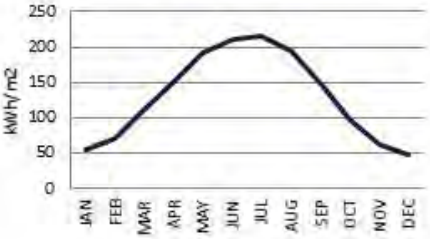
Primary energy per use	Existing Building	Suggested scenario
Heating (kWh/m²)	76,6	28
Cooling (kWh/m²)	41,8	21,2
Lighting (kWh/m²)	51,5	27,2
RES production (kWh/m²)	0,0	43,1
Total	169,9	33,4
Rating	D	A+
Saving of primary energy (kWh/m²)	-	136,5
Saving of primary energy (%)	-	80,3
Reduction of CO2 (Kg/m²)	-	42,6

Cultural centre building
Municipality of Farsala

DESCRIPTION OF THE CLIMATE:

Address:	Larissa, Greece (No data are available for Farsala. Larissa is a nearby city with available climate data.)
GPS:	Latitude: 39° 39' N, Long: 22° 27' E
Yearly solar horizontal irradiation: (graphic)	1,554 kWh/m² *year (source: National Technical Specification TOTEE 20701/3)
HDD20 ( ):	HDD_{20}= 2026 Larissa, GR (HDD_{18}= 1718 Larissa, GR, source: TOTEE 20701/3)
CDD26 ( ):	CDD_{26}= 280 Larissa, GR (CDH_{26}= 3856 Larissa, GR, source: TOTEE 20701/3)

Monthly Solar Horizontal Irradiation in Larisa



IED PROCESS

Composition of the team:	Farsala municipality architects and engineers CRES team
Management of the IED:	CRES team

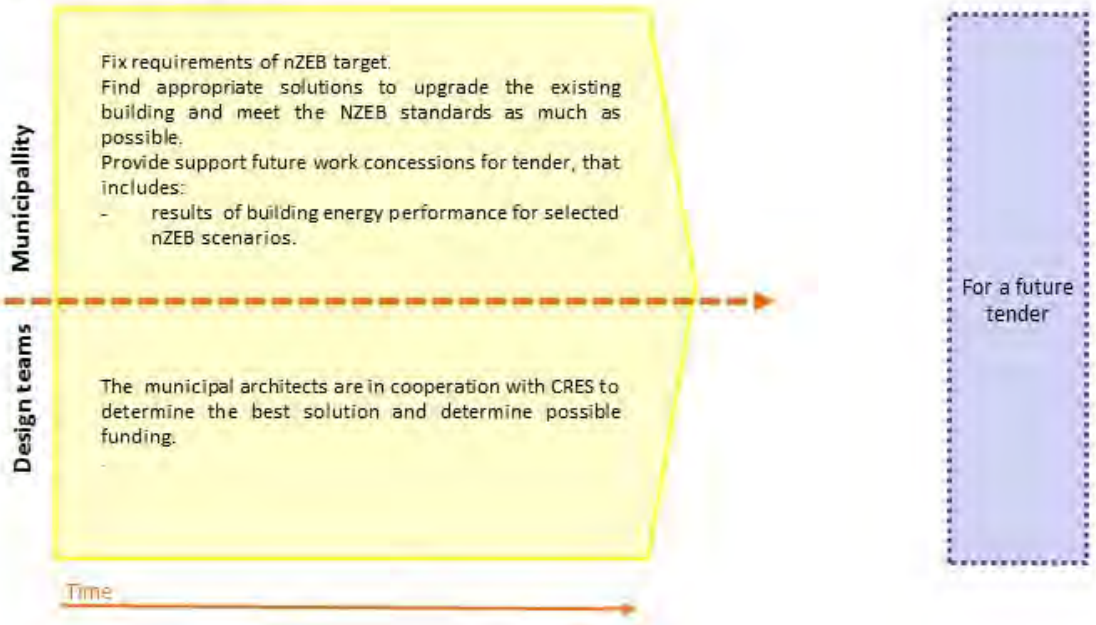
Benefits aspects:

- Good technical cooperation, increased interest to integrate nZEBs and very low energy buildings in common practice, trying to alleviate all organisational and financial barriers.
- Knowledge and implication to include bioclimatic, energy efficiency and RES solutions by the municipal architects and energy engineers.

Critical aspects and barriers found:

- It is not very clear how and to what extend energy aspects (stricter than the ones forced by the Law for new buildings) can be introduced to the final tender.
- Financing has not been fixed yet.

KIND OF SUPPORT ACTIVITY



SUPPORT TO THE MUNICIPALITY AND DESIGN TEAM

(describe the collaboration with the Municipality to introduce energy performance requirements into the design tenders and how the integrated design process (IED) works

February 2014	Start conversations with Municipality of Farsala (municipal consultant). The municipality plans retrofitting. Discussion about which could be designed based on nZEB concept.
March 2014	Personal meetings in Thessaloniki and Athens. The municipal team give information and details about the building. Review of technical design study, solutions and specifications.
April 2014	Finalization of preliminary study and inclusion in municipal Sustainable Energy Action Plan.
May 2014	Meeting at CRES. Discussion about possible financing options. Possible financing through the Operational Programme Environment and Sustainable Development, Axis 1: "Protection of Atmospheric Environment and Public Transport – Abating Climate Change – Renewable Energy Sources".
June- November 2014	Negotiations with the relevant authority of the Ministry in order to approve this tender for the prefeasibility study. Unfortunately, no funding was available in order to conduct the tender for the prefeasibility study. Alternative financing discussed, to be sought mainly through Structural Funds in the next Programming Period.

4.5 Hungary

4.5.1 Municipality of Godollo, CityHall

AIDA AFFIRMATIVE INTEGRATED ENERGY DESIGN ACTION

Co-funded by the Intelligent Energy Europe Programme of the European Union

GEONARDO STATE OF THE ART AND BEYOND

Preliminary study card

Municipality of Gödöllő

Overall energy performance evaluation of the city hall

Gödöllő, HU

GENERAL INFORMATIONS

State of the art:

Owner:	Municipality of Gödöllő
Use:	City Hall
Heated surface:	4.334 m²
Gross volume:	12.378 m³

OBJECTIVE OF THE PRELIMINARY STUDY:

The main objective of the preliminary study was to check whether a comprehensive retrofitting action is a viable and economically feasible option to reduce the energy need of the building, and also to provide a solid ground for future energy and/or building tenders.

ENERGY PERFORMANCE REQUIREMENTS

National-regional law of energy performance requirements this specific building as of 01.01.2015 would be *(1246/2013. (IV. 30.) Korm. határozat and 7/2006 (V. 24.) TNM rendelet):*

- *Specific heat loss coefficient q_m< 0,24 W/m²K (currently 0,37)*
- *Primary energy demand < 144 kWh/(m²year) (currently 159,73)*
- *For the U-value of the building components e.g. exterior wall ≤ 0.30 W/m²K, roof ≤ 0.20 W/m²K, glazing ≤ 0.1 W/m²K ...*

Minimum energy performance requirements fixed by AIDA project activities are:

- *Achieving the highest class of the national standard of the National or Local Energy Performance Classification of the building, usually Standard/Class A; (currently Class D)*
- *A minimum of 50% of the primary energy consumption should be covered by energy produced from renewable energy sources;*
- *Total primary energy consumption limit of 60 kWh/m²year*
- *CO_2 emission limit of 8 kg CO_2/m²year.*

Justification:

The municipality declared early on in the cooperation that they cannot allocate any human or financial resources to this cooperation with AIDA, still the project team decided to continue because Gödöllő was literally the one and only municipality which was open enough to discuss the subject with the AIDA team and showed some support towards the planned activities despite their insufficient resources.
In addition, the preliminary study will provide a solid basis for the municipality to effectively submit potentially winning applications to future tenders, because the baselines are ver well defined in this study. So eventually the municipality will benefit from the action it is just not that a full tender has been realised.

TOOLS USED TO EVALUATE:

The energy performance: GEQ (www.geq.at)

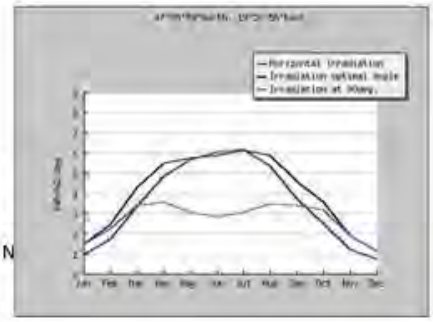
Methodology to improve the energy performance of the building:

- Insulation of all existing building components
- Replacement of existing windows and installation of new windows
- Installation of thermostatic regulation valves to optimize the output of the radiators connected to the city distrit heating system.
- Installation of a PV system (350m2)
- Replacement of lighting fixtures

Retrofitting in Municipality of Gödöllő
City Hall

DESCRIPTION OF THE CLIMATE:
Municipality of Gleisdorf

Address:	Szabadság tér 7, Gödöllő, H-2100
GPS:	47°35'59'' N, 19°20'57'' E
Altitude:	206 m
Yearly solar radiation: (graphic)	3,53 kWh/m² *day (Average sum of horizontal global irradiation per square meter received) ( )
HDD20 ( ):	HDD20= 3.330 Veresegyhaz,HU (19.29 E, 47.65 N
CDD26 ( ):	CDD26= 58 Veresegyhaz,HU (19.29 E, 47.65 N)



IED PROCESS

Composition of the team: representatives of: Geonardo
Contractor
Municipality
Representative of the municipal utilities company of Gödöllő

Management of the IED: Geonardo/ Contractor/ Municipality

Benefits and critical aspects:
The potential development routes that are drafted during the process are developed in a technology-independent manner ensuring an objective decision making. In addition due to the same methodology that is used to assess the buildings it provides a solid base of comparison between the various public buildings. Furthermore, the survey generates a baseline, a step zero which can be carried on to effectively respond to various building energy tenders in Hungary in the future within their usual 30-days deadline.

KIND OF SUPPORT ACTIVITY

Municipality

Management of the IED process

consultation and on-the spot survey is conducted (thermal imaging, building engineering diagnosis etc).

acquisition of other, miscellaneous, primarily operational data (such as building usage, consumption data etc)

annual energy need of the target building is modeled and calculated representing its current state

the six modules along with the potential realms of savings are assessed (architecture, building engineering, electricity, water, utility bills, human factors)

a number of draft plans are developed suggesting potential development routes complemented by capital investment costs, annual savings and rate of return calculations, thus supporting an optimum decision making

For a future tender

Time

SUPPORT TO THE MUNICIPALITY AND DESIGN TEAM

November 2013	First meeting with the deputy mayor of the municipality to discuss possible cooperation with AIDA within WP3 and WP4.
February 2014	Meeting with the head of the municipality's city development office about AIDA's involvement and apointing contact persons for future collaboration.
June 2014	Meeting with the apointed contact person to discuss and finalise the municipality's needs and expectations towards the collaborative work and potential outcome as well as identifying the two target buildings for the action (City Hall, Petőfi Elementary School).
July 2014	Aquiring the necessary preliminary data on the subject buildings to be sent for the contractor to get a quote/price offer on their involvement in the cooperation
October 2014	Meeting with the selected contractor to discuss the expected outcome of the evaluation process, their involvement in the process and to define next steps.
November 2014	Signing the contract with the selected contractor, and apointing the contact points at each of the target buildings for future liaison.
December 2014	First visits to the target buildings to carry out the following tasks at both sites: •Aquisition of floor plans, blueprints and consumption data/usage data on the various utilities •Thorough walkthrough of both buildings •Registering the main parameters of the building enrgineering systems
January 2015	Conducting thermal image survey and assessment of the lighting system. Processing of the baseline data
February 2015	Questionnaire survey among the teachers and municipal staff at the city hall to get a better idea about their awareness towards energy efficiency and to determine how much they are engaged towards such measures. Delivery of the reports

4.5.2 **Municipality of Godollo, Petofi School**

AIDA AFFIRMATIVE INTEGRATED ENERGY DESIGN ACTION

Co-funded by the Intelligent Energy Europe Programme of the European Union

GEONARDO STATE OF THE ART AND BEYOND

Preliminary study card

Municipality of Gödöllő

Overall energy performance evaluation of the Petőfi Elementary School Gödöllő, HU

GENERAL INFORMATIONS

State of the art:

Owner:	Municipality of Gödöllő
Use:	Petőfi Sándor Elementary School
Heated surface:	3.954 m²
Gross volume:	14.919 m³

OBJECTIVE OF THE PRELIMINARY STUDY:

The main objective of the preliminary study was to check whether a comprehensive retrofitting action is a viable and economically feasible option to reduce the energy need of the building, and also to provide a solid ground for future energy efficiency tenders.

ENERGY PERFORMANCE REQUIREMENTS

National-regional law of energy performance requirements this specific building as of 01.01.2015 would be *(1246/2013. (IV. 30.) Korm. határozat and 7/2006 (V. 24.) TNM rendelet):*

- *Specific heat loss coefficient $q_m < 0{,}245$ W/m³K (currently 0,293)*
- *Primary energy demand < 96,52 kWh/(m²a) (currently 130,39)*
- *For the U-value of the building components e.g. exterior wall ≤ 0.30 W/m²K, roof ≤ 0.20 W/m²K, glazing ≤ 0.1 W/m²K ...*

Minimum energy performance requirements fixed by AIDA project activities are:

- *Achieving the highest class of the national standard of the National or Local Energy Performance Classification of the building, usually Standard/Class A; (currently Class E)*
- *A minimum of 50% of the primary energy consumption should be covered by energy produced from renewable energy sources;*
- *Total primary energy consumption limit of 60 kWh/m²a*
- *CO_2 emission limit of 8 kg CO_2/m²a.*

Justification:

The municipality declared early on in the cooperation that they cannot allocate any human or financial resources to this cooperation with AIDA, still the project team decided to continue because Gödöllő was literally the one and only municipality which was open enough to discuss the subject with the AIDA team and showed some support towards the planned activities despite their insufficient resources.
In addition, the preliminary study will provide a solid basis for the municipality to effectively submit potentially winning applications to future tenders, because the baselines are ver well defined in this study. So eventually the municipality will benefit from the action it is just not that a full tender has been realised.

TOOLS USED TO EVALUATE:

The energy performance: GEQ (www.geq.at)

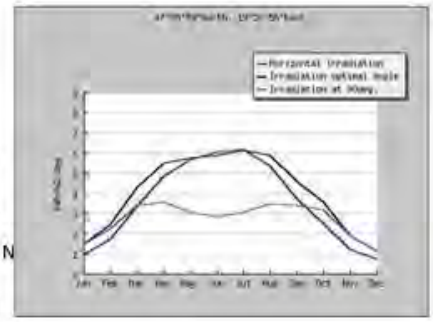
Methodology to improve the energy performance of the building:

- Insulation of all existing building components
- Replacement of existing windows and installation of new windows
- Installation of thermostatic regulation valves to optimize the output of the radiators connected to the city distrit heating system.
- Installation of a PV system (350m2)
- Replacement of lighting fixtures

Retrofitting in Municipality of Gödöllő
City Hall

DESCRIPTION OF THE CLIMATE:
Municipality of Gleisdorf

Address:	Munkácsy Mihály út 1, Gödöllő, H-2100
GPS:	47°36'35'' N, 19°21'15'' E
Altitude:	208 m
Yearly solar radiation: (graphic)	3,52 kWh/m² *day (Average sum of horizontal global irradiation per square meter received) ( )
HDD20 ( ):	HDD20= 3.330 Veresegyhaz,HU (19.29 E, 47.65 N
CDD26 ( ):	CDD26= 58 Veresegyhaz,HU (19.29 E, 47.65 N)



IED PROCESS

Composition of the team: representatives of: Geonardo
Contractor
Municipality
Representative of the municipal utilities company of Gödöllő

Management of the IED: Geonardo/ Contractor/ Municipality

Benefits and critical aspects:
The potential development routes that are drafted during the process are developed in a technology-independent manner ensuring an objective decision making. In addition due to the same methodology that is used to assess the buildings it provides a solid base of comparison between the various public buildings. Furthermore, the survey generates a baseline, a step zero which can be carried on to effectively respond to various building energy tenders in Hungary in the future within their usual 30-days deadline.

KIND OF SUPPORT ACTIVITY

Municipality

Management of the IED process

consultation and on-the spot survey was conducted (thermal imaging, building engineering diagnosis etc).

acquisition of other, miscellaneous, primarily operational data (such as building usage, consumption data etc)

annual energy need of the target building was modeled and calculated representing its current state

the six modules along with the potential realms of savings were assessed (architecture, building engineering, electricity, water, utility bills, human factors)

a number of draft plans were developed suggesting potential development routes complemented by capital investment costs, annual savings and rate of return calculations, thus supporting an optimum decision making

For a future tender

Time

SUPPORT TO THE MUNICIPALITY AND DESIGN TEAM

November 2013	First meeting with the deputy mayor of the municipality to discuss possible cooperation with AIDA within WP3 and WP4.
February 2014	Meeting with the head of the municipality's city development office about AIDA's involvement and apointing contact persons for future collaboration.
June 2014	Meeting with the apointed contact person to discuss and finalise the municipality's needs and expectations towards the collaborative work and potential outcome as well as identifying the two target buildings for the action (City Hall, Petőfi Elementary School).
July 2014	Aquiring the necessary preliminary data on the subject buildings to be sent for the contractor to get a quote/price offer on their involvement in the cooperation
October 2014	Meeting with the selected contractor to discuss the expected outcome of the evaluation process, their involvement in the process and to define next steps.
November 2014	Signing the contract with the selected contractor, and apointing the contact points at each of the target buildings for future liaison.
December 2014	First visits to the target buildings to carry out the following tasks at both sites: •Aquisition of floor plans, blueprints and consumption data/usage data on the various utilities •Thorough walkthrough of both buildings •Registering the main parameters of the building enrgineering systems
January 2015	Conducting thermal image survey and assessment of the lighting system. Processing of the baseline data
February 2015	Questionnaire survey among the teachers and municipal staff at the city hall to get a better idea about their awareness towards energy efficiency and to determine how much they are engaged towards such measures. Delivery of the reports

4.6 UK

4.6.1 Pairc Community Trust, Isle of Lewis, Scotland, UK

AIDA AFFIRMATIVE INTEGRATED ENERGY DESIGN ACTION

Co-funded by the Intelligent Energy Europe Programme of the European Union

greenspaceLive™

Public design case study for a nearly zero energy building story card

Pairc Sports Hall, Nursery & Community Offices

New building

Isle of Lewis, UK

GENERAL INFORMATION

Owner:	Pairc Community Trust
Use:	Sports Centre, . The building provides the Trust with its own office accommodation. A nursery will provide pre-school care for children. The sports hall and gym provide a leisure facility that will also be used as a venue for community events.
Heated surface:	900m²
Gross volume:	3200 m³
Cost:	Total budget €2,000,000 divided into: • Building construction cost €1,700,000 • 30kW Wind Turbine & 30kW solar PV €300,000
Method of financing:	Funded by: BIG Lottery, Western Isles Council, EU LEADER programme, Highlands and Islands Enterprise, Community Energy Scotland and the Trust's own fund-raising.
Typology of design tender adopted	Negotiated tender to find the design team to design the new building Competitive tenders will be issued for construction. Wind turbine and PV array will be tendered separately from the building construction.

GreenspaceLive were engaged by the design team to evaluate the energy performance of the design. The design of the building by the architect was to a very high standard of energy efficiency. The annual profile of energy demand was calculated and the capacity of wind turbine and solar PV array was calculated to give the best match to the demand throughout the year.

TENDER

The design team were appointed following a selection process considering their experience in similar Community based projects.

The project is in its final design stages. The design incorporates a wind turbine and solar PV array. The required capacity of wind and PV have been calculated to provide the best match to the annual building energy use. The wind turbine has been oversized to provide excess energy for export in order to generate revenue to pay for maintenance of the system.

Tenders for construction will be issued soon. The works tenders will not include an energy performance requirement as this is incorporated in the design.

ENERGY PERFORMANCE CRITERIA:

- Net Negative annual energy use
- A balance of wind and solar power to provide a best match for the building energy demand.
- Sea water source heatpump for space heating and hot water.
- Very high levels of insulation and energy efficiency.

TOOLS FOR THE ENERGY PERFORMANCE CALCULATION:

- gEnergyEPC

TOOLS USED DURING THE DESIGN PHASES TO EVALUATE:

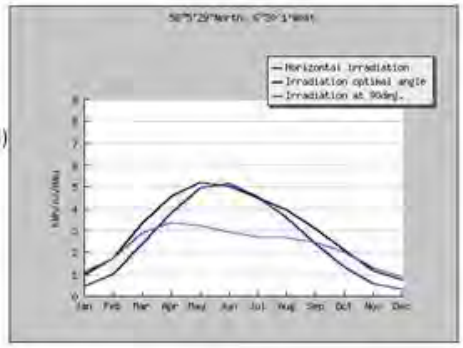
The energy performance: gEnergyEPC

DESCRIPTION OF THE CLIMATE:
Isle of Lewis

Pairc Sports Hall, Nursery & Community Offices

New building
Isle of Lewis, UK

Address:	Pairc Sports Hall, Isle of Lewis, UK.
GPS:	Location: Pairc, South Lochs, Isle of Lewis, UK 58.43421 N, 6.40039 W
Altitude:	30 m
Yearly solar radiation: (graphic)	2.54 kWh/m² /day (Average sum of horizontal global irradiation per square meter received) 927 kWh/m² (Average sum of horizontal global irradiation per square meter received) ( )
HDD20 ( ):	HDD20= 3856 Lewis, UK (6.26W,58.50N)
CDD26 ( ):	CDD26= 0 Lewis, UK (6.26W,58.50N)



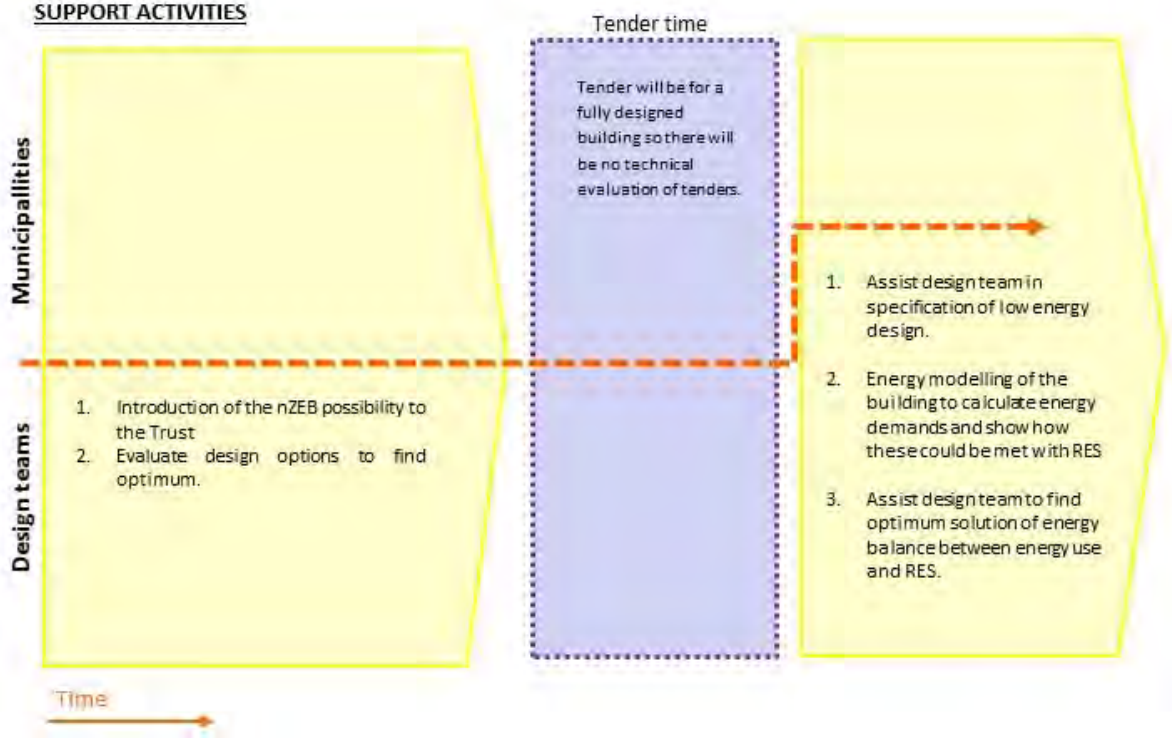
IED PROCESS

Composition of the team to realize the tender: Architect, Trust Representatives, GreenspaceLive.

Work done by GreenspaceLive:

- Evaluation of energy performance of design
- Recommendations report on optimum energy preformance
  - Improvements to lighting efficiency and control.
  - Inclusion of a sea water source heatpump providing all space heating and domestic hot water.
  - Inclusion of a wind turbine and PV array to provide energy to an "All Electric" design.

SUPPORT ACTIVITIES



Pairc Sports Hall, Nursery & Community Offices

New building
Isle of Lewis, UK

SUPPORT TO THE MUNICIPALITY AND DESIGN TEAM

(describe the collaboration with the Municipality to introduce energy performance requirements into the design tenders and how the integrated design process (IED) works)

2013	A steering group was formed with the intention of procuring a new building to provide a sports facility and events venue, nursery care for pre school children and office accommodation for the trust.
2014	Following a competitive selection process an architect was appointed to design the building and manage the project.
2014	GreenspaceLive were engaged by the architect to provide advice on the energy design of the building
March 2015	Final design is being costed. Not all funding is in place yet. It is expected that all funding will be secured and tenders issued late 2016 or early 2016.
March 2015	Consideration is being given to using existing funding to bring forward the erection of the wind turbine on the site in order to secure a higher rate of feed in tariff, and to generate income for the project by generating electricity for export to the grid.

4.6.2 **Cothram, South Uist, Scotland, UK**

AIDA AFFIRMATIVE INTEGRATED ENERGY DESIGN ACTION

Co-funded by the Intelligent Energy Europe Programme of the European Union

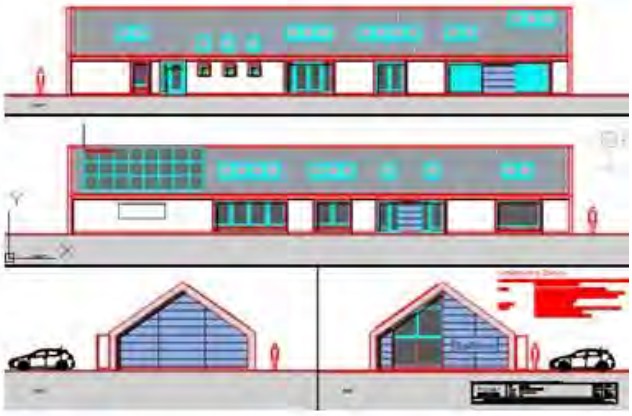
greenspaceLive™

Public design case study for a nearly zero energy building story card

Cothram ReStore

New building

Isle of South Uist, UK



GENERAL INFORMATION

Owner:	Cothram Ltd
Use:	Furniture Restoration Workshop. The building will be used as a workshop to restore furniture as part of a Social Enterprise, employing people with disabilities and teaching skills.
Heated surface:	270m²
Gross volume:	860m³
Cost:	Total budget €700,000
Method of financing:	Applications will be made to various public funding bodies. Also the Trust's own fund-raising.
Typology of design tender adopted	Negotiated tender to find the design team to design the new building Competitive tenders will be issued for construction. Wind turbine and PV array will be tendered separately from the building construction.

GreenspaceLive were engaged by the design team to evaluate the energy performance of the design. The design of the building by the architect was to a very high standard of energy efficiency. The annual energy demand was calculated and the capacity solar PV array estimated to match the demand.

TENDER

The design team were appointed following a selection process considering their experience in similar Community based projects.

The project is in its early design stages. The design will be "all electric" with solar PV panels installed to provide net zero energy demand averaged over the year

Tenders for construction will be issued in 2016. The works tenders will not include an energy performance requirement as this will be incorporated in the design.

ENERGY PERFORMANCE CRITERIA:

- Net zero annual energy use
- The most cost effective use of energy efficiency and solar PV.
- Very high levels of thermal insulation.

TOOLS FOR THE ENERGY PERFORMANCE CALCULATION:

- gEnergyEPC, iSBEM

TOOLS USED DURING THE DESIGN PHASES TO EVALUATE:

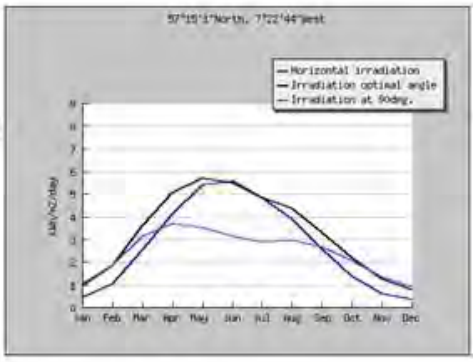
The energy performance: gEnergy

DESCRIPTION OF THE CLIMATE:
Isle of Lewis

Cothram ReStore

New building
Isle of South Uist, UK

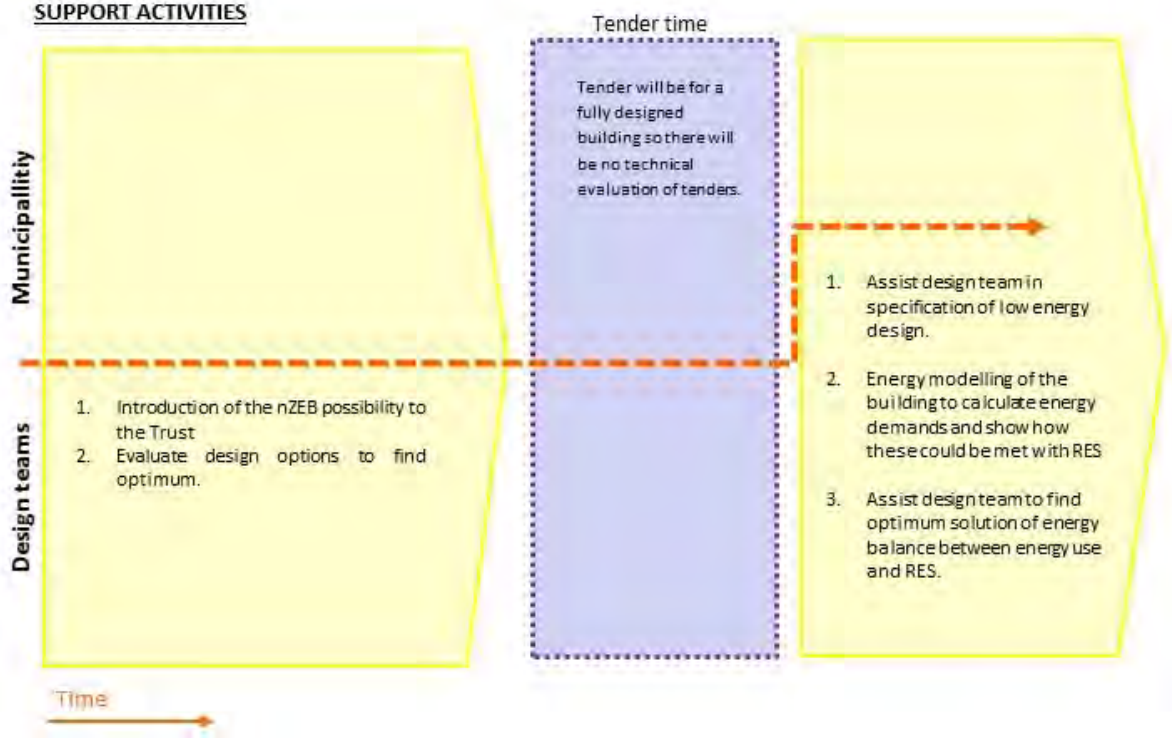
Address:	Pairc Sports Hall, Isle of Lewis, UK.
GPS:	Location: Pairc, South Lochs, Isle of Lewis, UK 57.25040 N, 7.37910 W
Altitude:	10 m
Yearly solar radiation: (graphic)	2.73 kWh/m² /day (Average sum of horizontal global irradiation per square meter received) 996 kWh/m² (Average sum of horizontal global irradiation per square meter received) ( )
HDD20 ( ):	HDD20= 3856 Lewis, UK (6.26W,58.50N)
CDD26 ( ):	CDD26= 0 Lewis, UK (6.26W,58.50N)



IED PROCESS
Composition of the team to realize the tender: Architect, Trust Representatives, GreenspaceLive.

Work done by GreenspaceLive:
- Evaluation of energy performance of design
- Recommendations report on optimum energy preformance
  - Improvements to lighting efficiency and control.
  - Evaluation of the most cost effective combination of heating system, lighting & control and PV to provide an nZEB building
  - Inclusion of a PV array to provide energy to an "All Electric" design.

SUPPORT ACTIVITIES



Cothram ReStore

New building
Isle of South Uist, UK

SUPPORT TO THE MUNICIPALITY AND DESIGN TEAM

(describe the collaboration with the Municipality to introduce energy performance requirements into the design tenders and how the integrated design process (IED) works)

2014 Cothram Ltd, a social enterprise specialising in adult learning provision decide to expand their existing building to create a furniture restoration workshop and retail outlet.

2014 Following a competitive selection process an architect was appointed to design the building and manage the project.

2014 GreenspaceLive were engaged by the architect to provide advice on the energy design of the building

2015 A building model was developed in gEnergy and analysed to evaluate energy demands. The heating requirements were very low due to high levels of insulation. A direct electric heating system was compared with a heat pump and it was found that direct electric with additional PV to offset the additional energy would be more cost effective than a heat pump

Lighting was calculated to be the most significant energy use. Extensive use of glazing and rooflights are incorporated in the design to maximise daylighting and it was shown that this together with automatic dimming lights would greatly reduce energy demand.

An nZEB building can be achieved with direct electric heating, high levels of daylighting and a 15kW PV array.

2016 Project expected to go to tender.

5. Participation at design tender

In this case studies, a partner of AIDA has participated at a design tender (work service design) supporting the design team to define the best solution and achieve an high energy efficiency reducing the CO_2 emissions.

Table 11: Participation at design tender

Partner	Municipality involved	Building	Kind of tender	State of the tender	Action carried out	Award criteria
Green-spaceLive (UK)	Comhairle nan Eilean Siar	Community Business Centre	Tender for works only (design completed by design team)	FINISHED	Energy evaluation of design Appraisal of options Energy calculation of RES	

5.1 UK

5.1.1 Community Business Centre, Isle of Lewis, UK

AIDA AFFIRMATIVE INTEGRATED ENERGY DESIGN ACTION

Co-funded by the Intelligent Energy Europe Programme of the European Union

greenspaceLive™

Public design tender for a nearly zero energy building story card

GENERAL INFORMATION

Owner:	Urras Oighreachd Ghabhsainn (Galson Estate Trust)
Use:	Business Centre. The building provides the Trust with its own office accommodation and provides a venue for community functions and business/community seminars. Also short-term letting space for local businesses and organisations.
Heated surface:	250m²
Gross volume:	900 m³
Cost:	Total budget €720,000 divided into: • Building construction cost €600,000 • 20kW Wind Turbine €120,000
Method of financing:	Funded by: BIG Lottery, Western Isles Council, EU LEADER programme, Highlands and Islands Enterprise, Community Energy Scotland and the Trust's own fund-raising.
Typology of design tender adopted	Negotiated tender to find the design team will design the new building

A selection of Contractors whose work and reputation was considered to be very good were invited to tender.

The final selection was based mainly on price.

Galson Business Centre

New building
Isle of Lewis, UK

TENDER

The design team were appointed following a selection process considering their experience in similar Community based projects.

The tender for the Works was for a fully designed and specified building, all the design work having been carried out by the design team. The tender selection was made mainly on price.

The wind Turbine was tendered separately from the building contract. Here the contract was awarded based on the price and the performance data for the proposed turbine based on a specification of 20kW minimum output.

ENERGY PERFORMANCE CRITERIA:

- At least a C rated UK EPC for the building.
- Building CO_2<45kg/m²year
- 100% of the annual energy use to be matched by the annual output of the wind turbine

TOOLS FOR THE ENERGY PERFORMANCE CALCULATION:

- gEnergyEPC

TOOLS USED DURING THE DESIGN PHASES TO EVALUATE:

The energy performance: gEnergyEPC

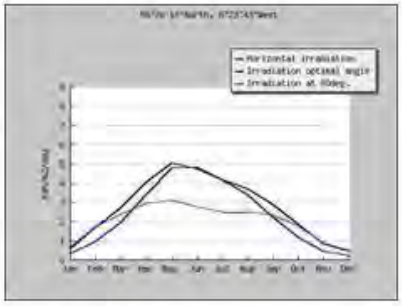
GreenspaceLive were engaged by the design team to evaluate the energy performance of the design. Recommendations were made to reduce the energy used by the building as far as practical and it was shown that a 20kW wind turbine on the site would produce more electricity than the building would use each year.

Galson Business Centre

New building
Isle of Lewis, UK

DESCRIPTION OF THE CLIMATE:
Isle of Lewis

Address:	Galson Business Centre, Galson, Isle of Lewis, UK.
GPS:	Location: Glason, Isle of Lewis, UK 58.43421 N, 6.40039 W
Altitude:	50 m
Yearly solar radiation: (graphic)	2.70 kWh/m² *day (Average sum of horizontal global irradiation per square meter received) 987 kWh/m² (Average sum of horizontal global irradiation per square meter received) ( )
HDD20 ( ):	HDD20= 3856 Lewis, UK (6.26W,58.50N)
CDD26 ( ):	CDD26= 0 Lewis, UK (6.26W,58.50N)



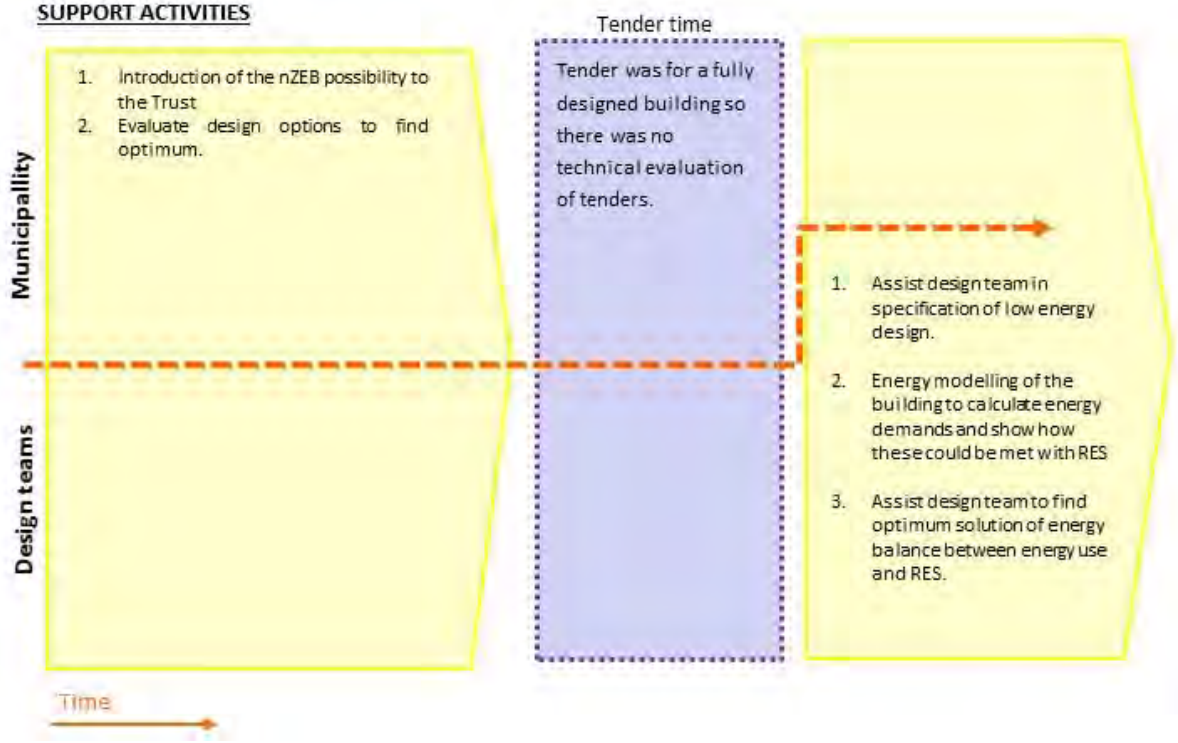
IED PROCESS

Composition of the team to realize the tender: Architect,
Trust Representatives
GreenspaceLive

Work done by GreenspaceLive:

- Evaluation of energy performance of design
- Recommendations report on optimum energy performance
  - Improvements to insulation
  - Inclusion of a ground source heat pump providing all space heating
  - Inclusion of a wind turbine to provide energy to an "All Electric" design

SUPPORT ACTIVITIES



Galson Business Centre

New building

Isle of Lewis, UK

SUPPORT TO THE MUNICIPALITY AND DESIGN TEAM

2001	A steering group was formed with the intention of effecting a community buy-out of the 22,260 hectare, privately-owned Galson Estate
12th January 2007	The Trust concluded the purchase of the Estate following a major fund-raising campaign
February 2011	Work begins on design of Business Centre. The building was to be a low energy sustainable building using energy efficient and natural materials as much as possible
June 2012 to December 2012	Building completed (wind turbine not yet installed). Energy usage monitored **•26.4 kWh per day from grid** **•Equates to 9650 kWh per year** **•38.6 kWh per m^2 per = 98.8 kWh PRIMARY Energy**
January 2013	Wind Turbine commissioned. Also an electric vehicle purchased and a charging point installed.
September 2013	Wind turbine generated 26,497 kWh in 9months, equates to over 35,000kWh per year which is 3.5 time the building consumption. The excess electricity is used in part to charge the electric vehicle with the remainder exported to grid providing revenue income for the Trust in Feed in Tariff. The Building is a net producer of energy.