

# AIDA

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## Nearly zero energy target integration in public design tenders

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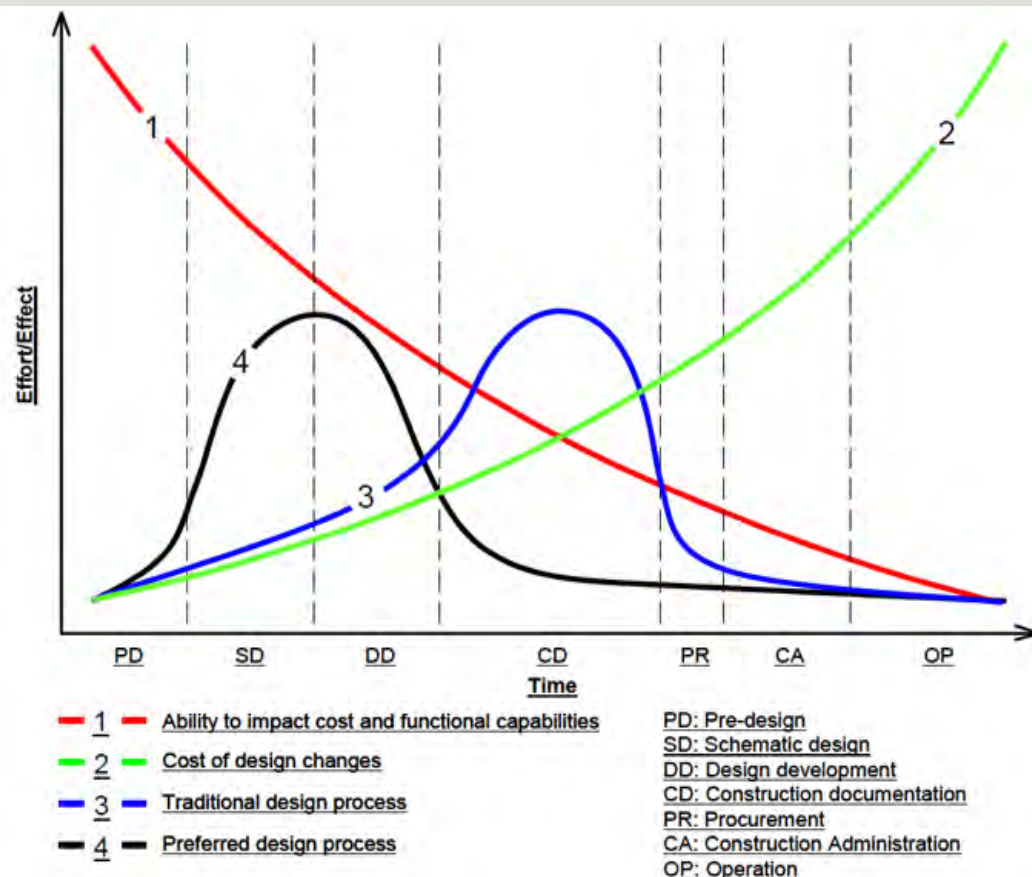
## *Objective*

To increase the number of nZEBs (Directive 31/2010/EU)

To introduce the nearly zero energy target within the public design tender for new buildings (or for building renovation)

One of the key approaches suggested is to enhance the decision making process through an Integrated Energy Design (IED) process

## Integrated Energy Design process (IED)



The IED is a multidisciplinary, collaborative process that analyses the whole building process and integrates different aspects and knowledge during all phases of development of the building.

***The main advantage of the IED is that the design decisions can be taken when the cost of design changes does not influence the overall construction cost.***



To define the most effective rules and points of attention that municipalities or public administrations must consider in the tender elaboration phase it is necessary to analyze:

## **Methodology**

### **Design tenders**

+

### **nZEB definition**

- Directive 2004/18/EC and updates

Define technical, legislative and economics aspects that rules the process and the relations between public and private sector.

- Directive 2010/31/EU
- International project “IEA SHC Task 40– ECBCS Annex52: *Towards Net Zero Energy Solar Buildings*”.

- Definitions
- Methodology for the energy balance calculation
- Physical boundary of the building data
- Integration of the energy generation systems
- Energy simulations and Tools
- Weighting factors



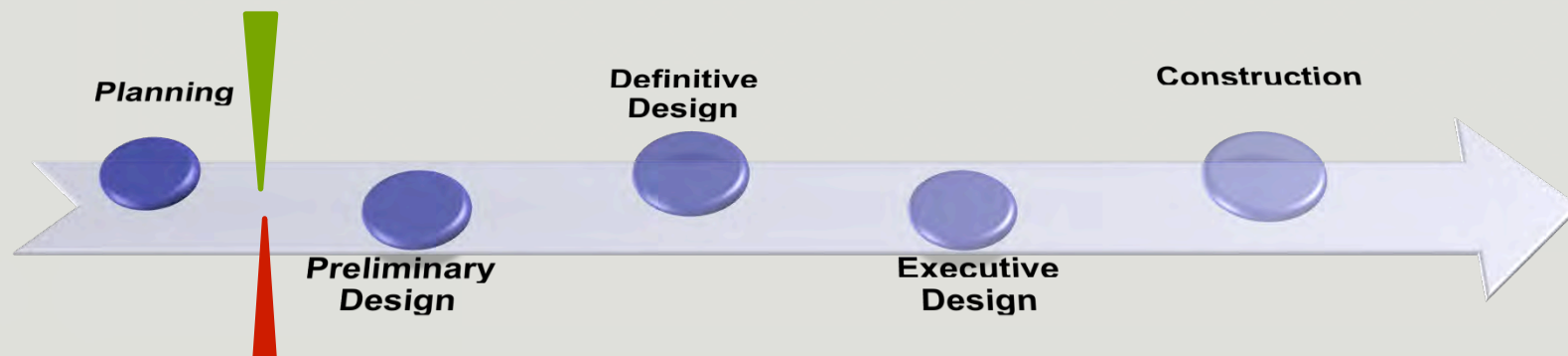
## *Two experiences*

### *Public tenders for ideas or design competitions*

- To find the best design proposal within a wide number of projects
- **Three alpine huts design competition (Province of Bolzano)**

### *Public tenders for a specific service*

- To find the most economically advantageous offer and evaluate the design team experience (curriculum), without enquiry any design proposals
- **Negotiated tender to design a new elementary school (Merano Municipality)**  
**Realized within IEE-AIDA project**





## *Two experiences*

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**Tender** + Energy guidelines about energy concept and minimum energy performance requirements

+ two simplified tools

+ Other specifications





Design tenders for three new mountain huts  
Province of Bolzano

**The design teams have to demonstrate that the fixed targets are reached.**

**Tender + Energy guidelines about energy concept and minimum energy performance requirements included in the tender**  
**two simplified tools to estimate the energy performance indicators**

Minimum Energy performance targets fixed:

- heating load  $\leq 50\text{kWh/m}^2\text{y}$  (CasaClima B);
- 50% of DHW produced by RES
- 20% heating and DHW produced by RES;
- 20% of electric energy demand produced by RES.



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## Design tenders for three new mountain huts Province of Bolzano

Two simplified tools to quantify:

- Heating energy demand, by CasaClima pre-filled Excel sheet
- Production of RES, by Excel sheet to calculate (from PV panels and solar thermal panels)

**Calcolo Indici Termici\_rifugi.xls**

Dati dell'oggetto	
oggetto:	Inserire rifugio oggetto del concorso
tipo di costruzione:	costruzione media
dati climatici del comune:	Edelrauthütte - Rifugio Ponte ghiaccio
differenza di altitudine rispetto al municipio del comune in m:	-300
superficie lorda riscaldata nei piani in m²	BGF <sub>B</sub> =
superficie netta riscaldata nei piani in m² (opzionale)	NGF <sub>B</sub> =
volume lordo riscaldato dell'edificio in m³	V <sub>B</sub> =
volume netto riscaldato dell'edificio in m³ (opzionale)	V <sub>N</sub> =
peso specifico dell'aria in kg/m³	p <sub>a</sub> = 1.184
capacità termica specifica dell'aria in J/kg K	c <sub>a</sub> = 1.006
somma di radiazione solare con orientamento a sud in kWh/(m²a)	I <sub>S</sub> = 553
somma di radiazione solare con orientamento a est/ovest in kWh/(m²a)	I <sub>0/N</sub> = 651
somma di radiazione solare con orientamento a nord in kWh/(m²a)	I <sub>N</sub> = 592
somma di radiazione solare con orientamento orizzontale in kWh/(m²a)	I <sub>orizzontale</sub> = 879
numero di giorni di riscaldamento nel periodo di riscaldamento in d/a	HT = 184
temperatura media interna in °C	θ <sub>i</sub> = 20.0
temperatura esterna di progetto in °C	θ <sub>ne</sub> = -8.5
temperatura media esterna nel periodo di riscaldamento in °C	θ <sub>a</sub> = 3.15
gradigiorno nel periodo di riscaldamento in Kd/a	HGT = 2.812
potenza termica media degli apporti di calore interni	q <sub>i</sub> = 3.5
grado di utilizzo degli apporti di calore	η = 0.98

**Calcolo % FER\_it\_dealsm.xls**

Autonomia Provinciale Bolzano - Sudtirolo  
Abteilung 11  
Hochbau und technischer Dienst  
Amt 11.5 - Amt für Bauaufträge

Provincia Autonoma di Bolzano - Alto Adige  
Ripartizione 11  
Edilizia e servizi tecnici  
Ufficio 11.5 - Ufficio appalti

Cambia lingua: Italiano

Selezionare rifugio: Ponte ghiaccio - Edelrauthütte

Superficie riscaldata: 300 m²  
Fabbisogno riscaldamento: 25 kWh/m²st

Energia finale riscaldamento: 9375 kWh/st  
Energia finale acqua calda sanitaria: 3079 kWh/st  
Consumi elettrici: 2828 kWh/st

Copertura da FER dei consumi di riscaldamento e ACS: 23% > 20%  
Copertura da FER dei consumi di ACS: 97% > 50%

Produzione energia elettrica da PV: 744 kWh/st

Copertura da FER dei consumi di energia elettrica: 26% > 20%

Collettori solari termici  
Superficie collettori: 10 m²  
Inclinazione: 0°-30°  
Orientamento: SE/SW

Moduli fotovoltaici  
Area impianto fotovoltaico: 20 m²  
Inclinazione: 60°-90°  
Orientamento: S

FER = Fonti Energetiche Rinnovabili, ACS = Acqua Calda Sanitaria  
st = stagione di apertura dei rifugi (dal 1 luglio al 30 settembre)





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## Design tenders for three new mountain huts Province of Bolzano

### Results- Benefits

Since the early design concept phase the design teams have considered energy efficiency issues, in order to guarantee:

- Reduced heat losses (compact building envelopes)
- Use of RES for thermal and electric energy production (wide roof surfaces)
- Located technical rooms: to contain storage, batteries and system equipment
- High integration of energy generation systems (landscape integration)

### Winner projects



*Ponte ghiaccio / Edelrauthütte*  
Arch. Matteo Scagnol  
Arch. Sandy Attia



*Vittorio Veneto / Schwarzensteinhütte*  
Arch. Helmut Stifter  
Arch. Angelika Bachmann



*Pio XI / Weisskugelhütte*  
Arch. Höller & Klotzner



## Design tenders for three new mountain huts Province of Bolzano

### Results - Critical aspects

- Planning mistakes: orientation, misunderstanding of compact shape
- Localization of the heating generation system
- The energy concept development was no mandatory, because there were no award criteria for energy requirements achieved → some design proposals had no energy strategy.

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**Public tender for design service for a new elementary school in Sinigo  
Comune di Merano**

Collaboration within IEE-AIDA project

- The winner is determined by the **most economically advantageous offer** and by its **experience (curriculum)**. Design teams participate at the tender without any design proposals.

**We defined the requirements to participate at the competition and the future requirements that the winning design team will have to use during the design development.**

Tender      **Energy guidelines** about energy concept and minimum energy performance requirements included in the tender  
+ **Other specifications**



**Public tender for design service for a new elementary school in Sinigo  
Comune di Merano**

**Energy guidelines:**

**Minimum energy performance requirements (DP 362/2013)**

- Heating demand lower than 30kWh/m<sup>2</sup>y (CasaClima A)
- CO<sub>2</sub> emission < 20kg/(m<sup>2</sup>year)
- 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 specification:**

- Competitors requirements
- A mandatory use of the IED approach
- Method of energy balance calculation (IEA-Task 40-Annex52)
- Award score criteria: points for the energy strategy able to achieve nZEB target and Experience of the Energy Adviser/Certifier and design team curriculums



**Public tender for design service for a new elementary school in Sinigo**  
**Comune di Merano**

Actually, we are working with the Municipalities,  
within the evaluation commission.





### **Positive results**

- Design teams have developed the strategy from the early phases of the design process
- IED process is a necessary approach to increase the quality of the design proposal

### **Conclusion**

### **Suggestions**

To introduce the energy performance requirements, it is necessary:

- to know the typology of tender and administrative procedure
- to insert in the raking points the energy performance requirements criteria
- to confront the results or energy performance indexes prefixed, it is necessary to define a common methodology to calculate them



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**Thanks for the attention!**

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