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Introduction to Integrated Design (ID)



MaTriID

Market Transformation Towards Nearly Zero
Energy Buildings Through Widespread Use of
Integrated Energy Design



**INTELLIGENT
ENERGY**

E U R O P E

FOR A SUSTAINABLE FUTURE



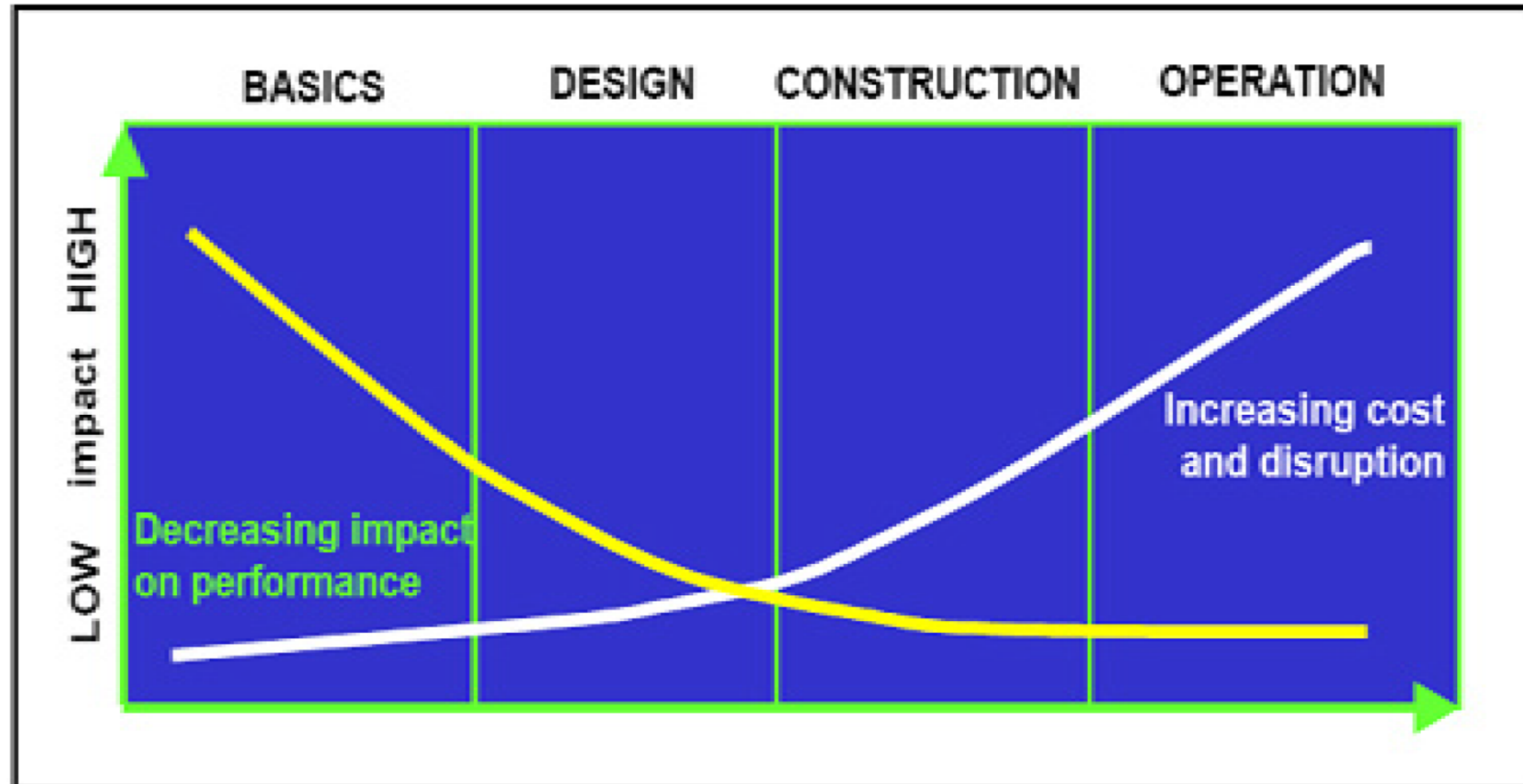
Presentation Milano, 08 May 2013



nZEB require ID

- **Nearly Zero Energy Buildings (nZEB) are challenging**
 - increasing energy performance requirements
 - integration of renewables
 - further sustainability criteria → sustainability certificates
 - cost-optimality over the life-cycle → need for comprehensive life-cycle cost assessment
- **Integrated Design (ID) becomes indispensable for *larger and complex* nZEB**
 - non-residential buildings

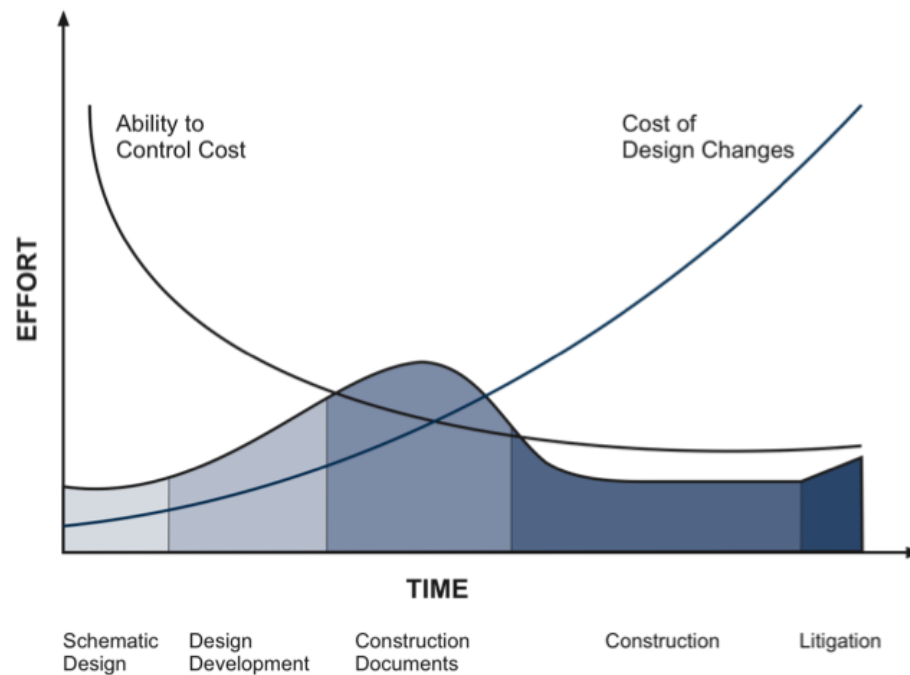
Why integrated design?



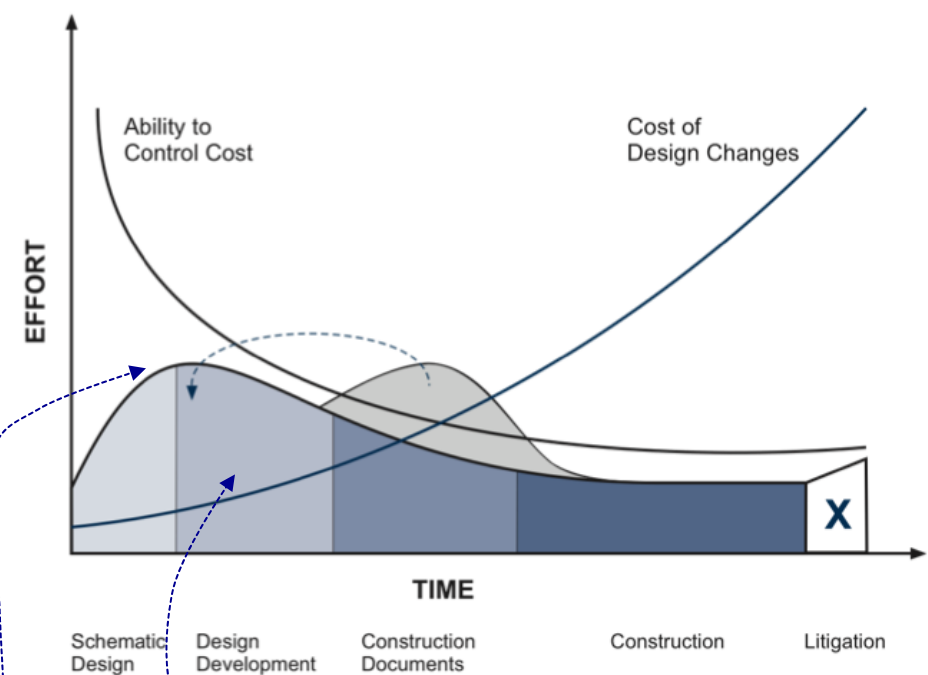
→ early design phases are decisive!



Focus on early design phases



Increase of work-load in **concept design**



Increase of relevant **know-how and competences**



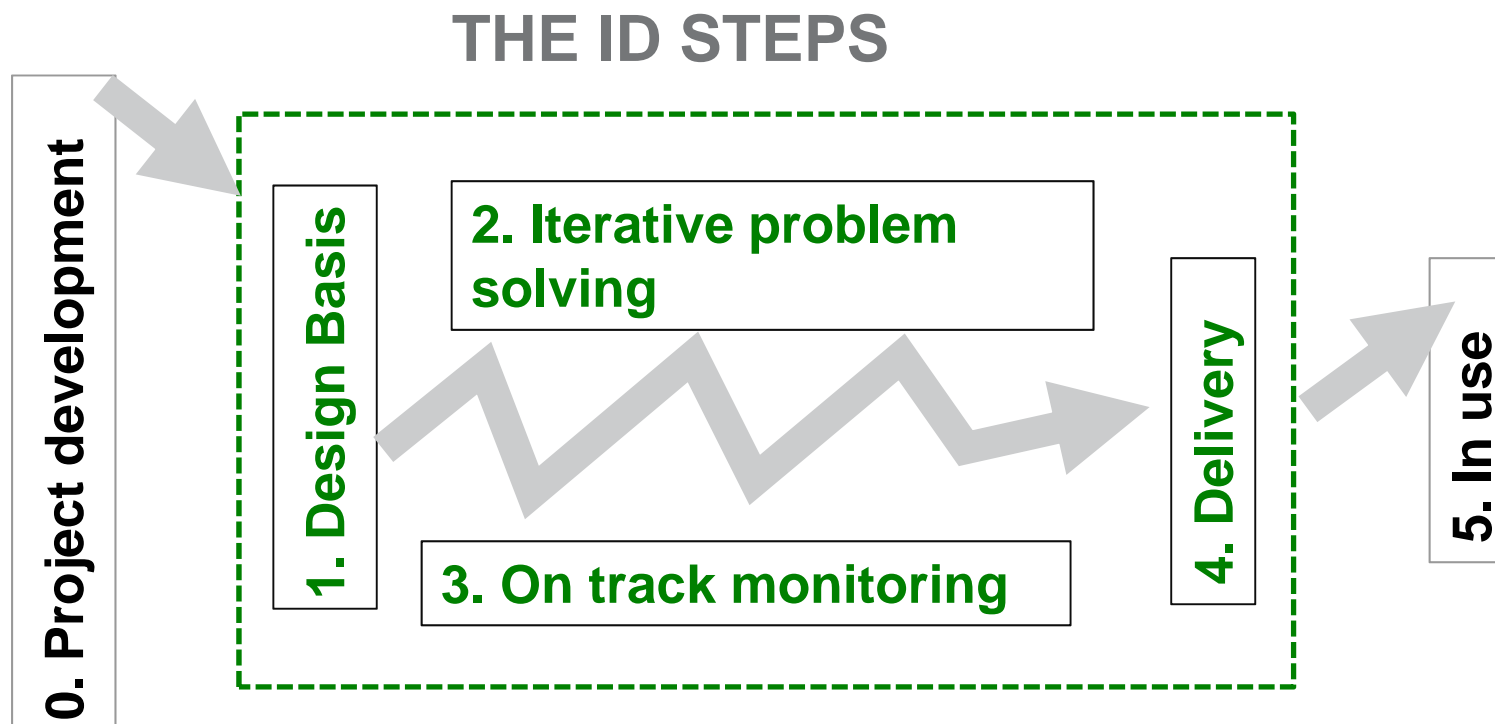
ID – let's try a definition

ID is defined as a combination of:

- 1. Collaboration between stakeholders (client, architect and other consultants, and eventually users) from early on in the design process.**
- 2. In achieving high energy/ environmental ambitions, the implementation of integrated architectural solutions or passive qualities are prioritized before active systems.**



The ID steps - overview





Step 0: Project development

- 1. Discuss project ambitions, and challenge initial Client Presumptions (initial brief)**
- 2. Initiate ID process, and preferably make partnering contracts**



Step 1: Design Basis

- 1. Select a multi-disciplinary design team, including an ID facilitator, motivated for close cooperation and openness**
- 2. Make analyses of the boundary conditions**
- 3. Refine the brief and specify the project goals and targets**



Step 2: Iterative Problem Solving

- 1. Facilitate close cooperation between the architect, engineers and relevant experts through co-localization/ workshops**
- 2. Use both creative and analytical techniques in the design process**
- 3. Discuss and evaluate multiple concepts**
- 4. Finalise optimised design**



Step 3: On-Track Monitoring

- 1. Use goals/ targets as means of measuring success of design proposals**
- 2. Make a Quality Control Plan**
- 3. Evaluate the design and document the achievements at critical points/ milestones**



Step 4: Delivery

- 1. Ensure that the goals are properly defined and communicated in the tender documents and building contracts**
- 2. Motivate and educate construction workers and apply appropriate quality tests**
- 3. Facilitate soft landing. Make a user manual for operation and maintenance of the building**



Step 5: In Use

- 1. Facilitate commissioning and check that the technical systems etc. are working as assumed**
- 2. Monitor the building over time regarding e.g. energy use, user satisfaction etc.**



Costs and Benefits of ID

Tasks	Costs	Comments
Concept and pre design	5 -10 % more	Based on experience
Detailed engineering	< 5 % more the first projects 5-10% less in the next projects	Based on experience – smoother process caused by more detailed concept design
Building costs	5 – 10 % more	3-6 % for Passive houses
Operational costs	70 – 90 % less	Based on experience
Building faults	10 – 30 % less	Because of better planning and better follow up during construction



Cost and risks of ID

- **During design ID focuses on the early design phases (programming and concept design)**
 - need to define in detail the goals of the project (including energy performance, sustainability criteria and life-cycle cost)
 - need to design and assess several different variants against the goals
 - need to involve the whole range design competences already from the very beginning → additional organisational complexity
 - independent cross-check of fulfillment of defined goals at defined check-points
 - additional assessment needs (pre-check for sustainability criteria, LCCA etc.)
- **→ Shift of work-load and costs**
- **→ risk for client increases due to higher upfront cost**



Impacts on the scope of services

- **Programming (definition of project objectives) → e.g. by using the criteria of sustainability certificates as „checklists“**
- **Concept design**
 - Identification of different variants to achieve the defined objectives
 - Checking the impacts of the variants on:
 - energy performance goals → dynamic simulations
 - cost → Life-cycle cost assessment
 - other (sustainability) criteria → pre-check as required in the applied sustainability certificates
- **Technical design**
 - continuous on-track monitoring
 - focus on specific issues such as thermal bridges, air tightness etc.
- **Commissioning phase**
 - monitoring of real performance: e.g. blower-door-test, energy consumption monitoring etc.



Changed roles and responsibilities

Design team

- Higher input in concept phase
→ needs to get remunerated
- The thorough analysis of (innovative) variants → has to be covered by remuneration

Client

- Clear definition of project goals
- More intensive engagement in the concept phase
- event. contracting an ID facilitator

ID facilitator

- Cost for programming, detailed definition of goals and required cross-checking have to be covered
- Event. additional cost for facilitating the process have to be covered



Just a few examples...

Power-house Sandvika, Norway

«All of this is known technology. The secret is the way in which we work and put things together. Because nobody can build a plus-house alone. The innovation lies in the collaboration»
Project leader, Skanska (contractor).



Administration building Bruck/Mur – district court and fiscal office, Austria

Focus on clear goals and on track monitoring beginning already with the architectural competition

The GreenBuilding ID Award



- **Giving European visibility to outstanding ID-processes**
- **contributing to spreading the ID-approach**
- **supporting the market diffusion of nZEB and highly sustainable buildings**
- **The awarded organisations are allowed to use the GreenBuilding/iD-Logo in their printed material and/or in their headquarters**

How to submit to the ID Award?



- **open call dedicated to all public and private organisations**
- **only non-residential projects**
 - fulfil the minimum requirements of the GreenBuilding-Programm
 - design process covering (most of) the elements of ID
- **ID process report according to a predefined structure**
 - core data on the project (energy performance, sustainability, cost-effectiveness etc.)
 - composition of the work-team / communication among team members
 - Instruments applied to manage the ID process
 - Elements of the ID-Workflow
 - etc.
- **call open till end of February 2014**



Contact and information

The MaTrID project



GreenBuilding ID Award



iet.jrc.ec.europa.eu/energyefficiency/greenbuilding

For further information on
ID: www.integratedesign.eu

