

# Integrated Design

## A Client's Guide



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



**MaTriID**

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

Integrated (Energy) Design (ID) is the general term for a collaborative approach aimed at optimising a scheme's design so that it can better deliver the Client's brief whilst requiring the minimum operational energy.

ID brings benefits cost and risk reduction to clients adopting the approach, as well as to end-users occupying the buildings.

This summary is intended to introduce these benefits and encourage Clients to embed ID as a requirement in the appointment documents of their building design consultants.

This approach is being promoted across Europe as a preferred means of achieving the requirements of the Near Zero Energy Buildings (NZE) Performance Objective, a commitment on the UK government.

## Summary

Integrated Design (ID), previously referred to as Integrated Energy Design, is an evolution of current best practice for building design development in the UK construction sector. Working in tandem with the Client and their Brief, the core design team is incorporated into the earliest stages of the design process to refine and interrogate the Brief. With ID, the core design team and the Client engage regularly to consider iterative concept designs that satisfy the Brief whilst exploring the Client's ultimate requirements. In this way, ID has the capacity to deliver a better building operation and low energy design solution than traditional design routes.

## Background

For the UK, Integrated Design looks to combine two design agendas – Sustainability and Partnerships. The UK's drive for sustainable, low energy buildings has had a direct, incremental impact on building regulations and has led to the adoption of a variety of construction assessment schemes such as BREEAM (including minimum BREEAM ratings for public buildings) and Code for Sustainable Homes, as well as the introduction of EPCs with future introductions of minimum EPC ratings for new and refurbished buildings. This drive is further reinforced by the European Union's Near Zero Energy Buildings Performance Directive, which obliges the UK government to steer legislation toward very low energy demand buildings between now and 2020.

The drive for partnership or collaborative working is also a subject of concerted effort within the UK construction industry, with government reports such as the Latham Report and the Egan Review calling for increased collaboration and a reduction in confrontation across the construction sector, and the recent Government Construction Strategy report, calling for continuous collaboration throughout construction processes. For decades, such reports have identified the benefits to all parties of adopting a collaborative, rather than a competitive, approach to delivering construction projects in line with the Client's Brief.

ID's scope is to combine both agendas in order to provide a valuable, efficient design approach for implementation during the earliest project stages, leading to the delivery of low-carbon buildings to Clients.

## Client benefits – capital cost reduction

The integration of ID into a project's design process can be proven to reduce the net capital cost by project's completion. Through engaging more regularly with the Client, as well as adopting energy modelling and hosting collaborative workshops in the early concept design stages (RIBA Stages 1 & 2), the adoption of the ID approach by a core design team understandably leads to slightly higher costs earlier in the project. Overall cost reductions are realised later in the project, however, through shorter construction times (due to refined designs established early in the process) and briefer time spent under technical and specialist design review.

As such, the slight increase in core design team costs are offset through the improved design delivered through the ID process. Typically, an ID approach will add 5-10% to the project costs before planning, but deliver 10-30% cost savings on the overall capital spend, as well as 40-90% savings in operational costs over a standard build.

Cost reductions are realised through a more coordinated and rationalised design that is better understood by the core team, with potential for notably better interaction between architectural envelope and internal services often yielding some of the largest savings.

The process of ID can also work well with the adoption of Building Information Modelling (BIM). BIM is a coordinated set of data about the design (often, but not necessarily in 3D) which is developed by the whole design team, and as such fits within the collaborative approach of ID. This lies in conjunction with UK government directives, with all new public builds requiring BIM to be adopted within the design and build processes by 2016. The recently passed EU Public Procurement Directive (2014) also demonstrates the EU's commitment to the future use of BIM within the construction sector.

## Client benefits – delivery risk reduction

The ID approach reduces potential risks to the Client throughout the overall delivery of a project. By bringing the core design team together more often and more productively in the early design stages than a standard design approach, along with calling for more integration of the Client within the design discussions, collaboration and mutual understanding of the project's underlying design principles is ensured, resulting in a significant reduction in confusion or misunderstandings as the project evolves.

## The ID process

The ID process is more of a 'framework,' with no obligatory requirements around its structure; the Client can choose how best to fit the ID framework into their project according to their priorities. In light of this, a typical ID framework which could be adopted is presented below, highlighting each step and accompanying support information.

### STEP 1.1 – Design basis

What sets the ID approach apart from standard design contracts is the appointment of a core design team from the outset whom are instructed to work collaboratively and openly throughout the concept design stage to ensure the encapsulation and delivery of the Client's objectives and low-energy building aims. Pursuant to this, Clients should thus aim to ensure the core design team is appointed at the very outset of the project, and are incorporated into any partnering contracts, whenever possible.

### STEP 1.2 – Site analysis

In line with Stage 1 of the RIBA Plan of Work, the design team has the responsibility to gather all possible information about the site's environmental factors and present the information in a clear format to all parties. Indeed, a comprehensive site analysis study is critical to the consideration of any low-energy design strategy; therefore, Clients should ensure any and all appropriate surveys, data collection and studies are undertaken as early within the design process as possible with copies made available for the Client.

### STEP 1.3 – Refine brief & targets

Invariably, there will already be expectations for the site (especially if the Client/ land/ building has already been agreed, along with a potential Tenant). This step formalises the brief and gives the design team the opportunity to review elements that may be restricting the optimum design or cost outcome. In practice, and within the scope of RIBA Stage 2, this is often best approached as an open forum meeting or workshop with the original Client Brief circulated in advance with an invitation to feedback at the meeting. Clients should secure both time and budget allowances within the Brief to allow for this stage to develop in full. Clients should also ensure any future Tenant is integral to this process as well.

The second part of this step is to translate the agreed Brief into clear targets for the design team to deliver through the design stage, construction and with the completed project. These form key waypoints for the success of the scheme, and provide a means to hold the design team to account. Where possible, these clear targets should be contractually embedded.

Secondary to the review of the Brief is the definition and identification of specific targets to serve as waypoints from the design and construction stages through to project completion. These targets will serve as a sub-framework against which the success of the project can be measured, as well as securing the responsibility of the design team to deliver the project within a rigid framework.

### STEP 2.1-2.3 – Multiple concept designs

RIBA Plan of Works Stage 2 revolves around the concept design discussion and preparation. ID proposes that, within this stage, the selection of a chosen concept design is informed through the instigation of collaborative workshops and early-stage building energy modelling. This integration of ID within the concept design stage requires the design team present several alternative designs, which aims to reduce the risk of any one design becoming too 'precious' and ensure different approaches are explored.

Clients, therefore, should require the engagement and input of future Tenants within this stage. The Client would also be wise to ensure the core design team's appointments reflect the constraints associated with the ID approach within this stage are accounted for, in terms of moderate time and cost implications.

In terms of energy modelling, existing Plans of Work look to perform thermal and sustainability modelling during Stage 3, after the final design has been defined and established. ID brings this process forward into Stage 2, with modelling performed 'live' during design workshops or prior to them, with results presented clearly and alongside each developed design concept. The concept developments and the energy modelling results are encouraged to be combined as concept 'packages', the advantages and disadvantages of which are discussed concurrently and collaboratively in a series of workshops. These workshops which assess designs both creatively and analytically, along with simultaneous design-stage energy modelling, are the tangible differences of the ID approach.

### STEP 2.4 – Design finalisation

The series of workshops held throughout the ID process should culminate in the selection of the optimum design for the Client Brief during the final session. In this session, Clients ought to ensure the core design team presents all the relevant information required to make such a decision, and that any known Tenants or End-Users of the building are invited and encouraged to contribute their input into the final selection for the scheme.

### STEP 3.1-3.3 – On track monitoring

Moving into RIBA Stage 3 of work, it is important the Client's Brief and targets are updated to define what is intended on being delivered; Tenants should also ensure their long-term contract is similarly updated. In this way, contractual obligations, incentive payments, and delivery metrics can be fixed against the design team and the contractor. The Client Brief should also feed directly into the development outline and detailed specifications, and the specific targets reflected in these documents.

### STEP 4.1-4.3 – Delivery

In order for the ID approach to lead to a truly successful construction project, the Client Brief and its targets need to be communicated clearly and effectively across the entire construction team. Thus embedding the ID goals into the tender contract and associated documentation is critical, as well as the continued communication and dissemination of the project's goals through on-site workshops and tool-box talks. On-site training in relevant skills should be considered as necessary.

ID is also reliant on communicating the presumptions and optimum usage methods to the end users of the project as well. Already encouraged through sustainable frameworks such as BREEAM, Building User Manuals as well as "Soft Landing" contracts and early engagement with the building management personnel are critical to the safeguarding of the delivery of a low energy building as devised in the Concept Stage.

For more information, please see:

<http://www.bsria.co.uk/services/design/soft-landings>

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