Report on Integrated Design
“asernen IQ”

Reporting template
GreenBuilding Integrated Design Award 2014

INSERT YOUR CONTACT DETAILS
Your name: Mr. Rainer Holzer
Name of your institution: WA Business & Service Center GmbH
Address: Ebendorferstraße 2, 1010 Vienna
Country: Austria
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1 Information

Dear applicant for the GB ID Award 2014

Thank you for your interest for submission to the GreenBuilding Integrated Design Award 2014.

The aim of this Integrated Design Report is providing the jury with an insight into the integrated design process during your early planning phase of service buildings. Please try to answer the sections below in a brief. It is not required writing a novel on each section, however, highlight key issues with respect to the design goals, work organisation, communication among team members, ID strategy and innovative approaches. If there is nothing to highlight or report, leave the specific section blank.

Kind regards

Your GreenBuilding Integrated Design Award team

2 About this pilot project

Name/acronym of the pilot project: aspern IQ
Owner: WA Business & Service Center GmbH
Name of contact person: Mr. Rainer Holzer
Function of contact person: Head of Real Estate Department
Location: Vienna
Type of the building: technology centre (office, research facilities)
Gross floor space in m²: 11,850
Investment costs in EUR: ~15 million
More information: http://www.asperniq.at/
3 Design goals

Describe the design goals that are inspiring the design effort. For each of them you may report target values or the acceptability conditions in a brief.

Table 1: Design goals per design phase.

<table>
<thead>
<tr>
<th>Design goal</th>
<th>Describe the goal and the set-point values if applicable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aesthetics</td>
<td>The building volume is structured in an H-form which takes into account the optimal depths and the allowable heights of the differentiated building volumes and which, thereby, establishes the urban setting of the plot and, hence, the flexible campus design of the technology centre.</td>
</tr>
<tr>
<td></td>
<td>The street front of the ensemble is accentuated by an “add-on” façade construction which carries a number of additional functions. The open space can be seen from all sides and acts as a half-open area which invites passers-by to enter.</td>
</tr>
<tr>
<td></td>
<td>The compact, energetically-optimised building volume with lower central element and two edge volumes of different heights is held together by a uniform metal façade. The skin consists of vertically-hung aluminium bronze panelling. The additional perforation of one side of the profile means that the appearance of the façade changes with the angle of the light.</td>
</tr>
<tr>
<td></td>
<td>The continuous two-metre high and column-free strip windows (with opening lights for ventilation and external solar protection in the form of venetian blinds) offer optimum daylight and thermal and solar protection. These windows are further enhanced with additional external metal shades.</td>
</tr>
<tr>
<td></td>
<td>Along the street the façade has additional add-on functions. Continuous flower troughs supported on a steel substructure establish an urban accent and contain reeds which improve the microclimate. The reeds transform the façade into a reference to the water meadows which used to occupy the area of the Seestadt. The robust plants which are easy to care for make the streetscape more attractive. Waving gently in the wind in front of the metal façade, the reeds change the appearance of the building both during the day and across the seasons. From within they add psychological value and improve the microclimate thanks to their ability to absorb dust and humidity.</td>
</tr>
<tr>
<td></td>
<td>On the southeast façade of the building, cantilevered glass-photovoltaic elements complete the add-on construction. Additional areas of photovoltaic panel which are integrated into a single piece of equipment are fixed to the flat roof, the façade and the roof of the technical plant.</td>
</tr>
<tr>
<td>Design goal</td>
<td>Describe the goal and the set-point values if applicable</td>
</tr>
<tr>
<td>------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| **Accessibility** | *urban design concept*

The basic design idea is to reject the traditional notion of building up the perimeter of the urban block. This creates “cracks” which break the building volume down into a series of smaller volumes adapted to the project phases.

The plaza – the open space in the centre of the development from which all buildings can be accessed - provides an area for communication.

By opening up the blocks forming the complex, the large central open space is connected with the surroundings, producing many possible routes through for pedestrians and cyclists.

By arranging the entrances to the individual blocks and offering common spaces (restaurant, canteen, seminar rooms and cycles stores) around and within the open space, a thriving urban campus space is created; a plus for “asern: Vienna’s Urban Lakeside”.

**traffic situation/connections**

Seestadt Aspern is connected to the motorways and public transport networks of the CENTROPE Region. Key elements of this include the extension of the U2 underground line by two stations to the Seestadt which was completed in 2013, connections to two tramway lines, park & ride facilities, a station for the S80/R80 suburban and regional trains and an Intercity connection to Bratislava. A high capacity trunk road connection to the A23 motorway should be completed by 2017.

| Cost-effectiveness | A detailed element-based cost estimate was prepared to accompany the design process from the very early preliminary design phase. All relevant system variants, especially in the areas of the building envelope, structure and m&e services were evaluated and then selected in this preliminary design phase, as a result of which the process of system optimisation could begin at the same time as the main design phase. Various cost-saving items were determined together with the client and then classified in terms of value.

The organisation of simultaneous tender processes for the three packages – General Contractor construction, mechanical engineering and control systems and electrical engineering ensured a high level of cost certainty. |
<table>
<thead>
<tr>
<th>Design goal</th>
<th>Describe the goal and the set-point values if applicable</th>
</tr>
</thead>
</table>
| Energy efficiency| **Passive house quality and Plus Energy standards**  
  **Building envelope - façade**  
  A highly insulated building envelope with optimised treatment of warm bridging lifts the building to the level of a passive house: especially regarding issues of orientation, glazing and solar protection. Attention is drawn to the façade by the add-on elements, which also have other uses: as a suspended façade it provides fixed shading in summer; reeds, planted in flower troughs, provide solar protection and improve the microclimate and the add-on façade also serves as a substructure for parts of the photovoltaic panels.  
  **Mechanical and Electrical Services**  
  The required heating and cooling is provided by means of the concrete core activation of the slabs and from the district heating network and the groundwater. This low temperature system permits high levels of both comfort and energy efficiency. In addition to this, the building has a highly efficient ventilation system. The DEC plant with double rotation heat exchanger and moisture recovery attains heat recovery levels of 90% for an energy consumption of 0.51 Wh/m³ of extracted air. Air is fed into the offices via floor-mounted swelling air diffusers – a solution which permits the level of hygienic air change to be reduced. Volumes of air are controlled where needed via CO₂ monitoring. The energy requirements of the other mechanical services plant were reduced as far as possible in line with the applicable norms.  
  **Lighting**  
  Alongside efficient daylight design, highly efficient standard lamps with presence and daylight control are used. These supply workplaces with 500 lux with only minimal lighting loss.  
  **Choice of materials**  
  As the project is required to achieve the highest possible quality levels not only in terms of energy but also in terms of building ecology, the design process was accompanied by a detailed product management programme. This meant that ecological aspects were also addressed during the design and execution phase. The objective of this work was the reduction of the environmental impact of the building via the choice of materials and, above all, the avoidance of emissions from building materials during its use.  
  **Interior space**  
  Low emissions floor materials, low emissions installation materials, the avoidance of emissions into the internal air from insulation materials, the avoidance of formaldehyde emissions from timber products, the avoidance of VOC and SVOC emissions from timber products
### Design goal

**Functional/Operational goals**

The central entrance hall, main staircase and connecting corridor with balcony combine to give the building an attractive circulation system with high daylight levels and extensive possibilities for communication. 24 office units, each with a dedicated core of sanitary and ancillary spaces can be flexibly accessed and combined. The architectural detailing and building services permit all office solutions - from cellular to open-plan. The range of offices available on the upper floors with floor-to-ceiling heights of 2.90m is complemented by special areas at ground floor level: Three rental units with a floor-to-ceiling height of 4.0m for laboratory and workshop use, a seminar centre with three seminar rooms for both internal meetings and external events and a restaurant which both meets internal needs and is the first such facility in the Seestadt designed to bring life to the ground floor zone.

Special attention was also paid to the quality of the open spaces. The alignment of the building along the street contains the restaurant terrace while, facing the park, areas of seating arranged among islands of greenery offer a place to relax to during the lunch hour...

The terrace at first floor level with its timber deck and greenery acts as a continuation of the offices. A further special feature of the building design is the attention paid to sustainable transport: a large number of covered bicycle parking spaces with a shared shower – and charging stations for e-bikes and e-cars.

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**Historic preservation**

The building is the first high-rise building of an ambitious masterplan which is intended as an example of sustainable urban development. (Dedicated advisory committee on quality, early public transport connections, high quality of public spaces, minimal earth movement, constructional logistics centre, etc.)

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**Productivity**

High User Satisfaction

The perfect infrastructure for research and development and start-up-companies with flexible office units and hot-working workspaces

Research Laboratory - researchTUb: the subsidiary of the Vienna University of Technology builds bridges between innovative small and medium-sized companies and applied solutions developed via research in the areas of measuring and production technology

• Research Company - Aspern Smart City Research: a “real-time” laboratory researching the energy behaviour of the users of the Seestadt

• Mingo offices for start-up companies: small areas with a complete infrastructure yet without investment requirements and long-term tie-ins for innovative young companies

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**Secure/Safety**

In line with the regulations
<table>
<thead>
<tr>
<th>Design goal</th>
<th>Describe the goal and the set-point values if applicable</th>
</tr>
</thead>
</table>
| Sustainability | aspern IQ is conceived as a flagship project which showcases an approach to creating a Plus Energy building which is adapted to locally available materials and offers the highest possible level of user comfort while meeting the demands of sustainability.  

In order to assure the quality of the building, the entire design phase was evaluated in line with klima:aktiv criteria and the TQB tool of the ÖGNB. This accompanying evaluation of the design process was partly responsible for the building achieving such a high design quality. The technology centre received the highest number of points in the klima:aktiv declaration (klima:aktiv Passivhaus and klima:aktiv Gold) and was additionally awarded ÖGNB building quality certification.  
klima:aktiv is a quality certificate for buildings which meet the highest standards for energy efficiency, ecology and comfort. It is awarded to residential and service buildings across Austria which meet the highest standards for design and execution as well as quality of materials and construction, comfort and air quality.  

aspern IQ also received the TQB (Total Quality Building) certificate of the ÖGNB: “The Technology Centre of the Vienna Business Agency is designed as a flagship project for the Seestadt Aspern. The Plus Energy building which is adapted to the locally available resources and offers optimum user comfort meets all sustainability requirements. As it is intended that the building also meets all requirements in terms of building ecology and interior air quality, a programme of product management (including quality assurance on site) was carried out.” (TQB project documentation of the ÖGNB)  

the strategy and concept with regard to sustainability:  
- Energy Plus standard (the building produces more electrical power than it consumes)  
- Passive House standard (energy demand a sixth of that of buildings built conventionally)  
- External solar shading throughout, with daylight function  
- Photovoltaic cells designed into the building concept  
- Add-on vertical landscaping façade with reed  
- Intelligent building services control: activation of the most efficient system for a given situation  
- Workplace lighting responding to need.  
- Charging stations for electric vehicles in the underground garage, as well as electric car sharing  
- Choice of materials (Low emission bitumen substances, free from KMR materials, Substances free of heavy metal, SVOC-free substances, Avoidance of free formaldehydes, Avoidance of acid-curing coatings, Substances free of aromatic hydrocarbons, Low VOC substances, Low emission sealing materials) |
4 Work organisation

Please try to answer each section with a couple of sentences.

4.1 Team composition

Has the design team been the same during the whole process?
Yes

The client’s project leader and the integrated designer’s overall project leader and design team have accompanied the entire project from inception to handover.

In addition to this, the mechanical and engineering services design team was also responsible for the site management work in this area.

The teamwork was characterised by lean organisation, direct communication, clear responsibility and well defined tasks.

Has the multidisciplinary team increased the effectiveness of the design phase?
Yes

The EU-wide competition won by ATP Architects and Engineers in January 2010 focused on an energy-efficient constructional approach which minimised the use of harmful substances as well as addressing functional and aesthetic issues.

Only by means of the integrated design process with early incorporation of buildings science, thermal building simulation, daylight simulation and building ecology during the preliminary design stage, was it possible to realise outstanding sustainability features. Apart from the client, the responsible facilities manager was also already involved in the preliminary design process, especially in terms of building services.

Has the multidisciplinary team anticipated interferences between activities and avoided problems?
Yes

Do you consider useful the constitution of a multidisciplinary team from the beginning of the design activities?
It is desirable that a multidisciplinary team is responsible for a project from the competition design onwards in order to ensure that every aspect of the design of a building is taken into consideration. This is also a precondition for sustainability.

4.2 ID facilitator: role and function

Describe the role and level of involvement of the ID facilitator during the development of the pilot project.

Table 2: Role of the ID Facilitator per design phase.

<table>
<thead>
<tr>
<th>Design phase</th>
<th>Describe the role and level involvement (no, little, medium, high) of the ID Facilitator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial planning phase</td>
<td>The integrated designer’s overall project leader coordinates and “conducts” the entire project team (architecture, structural design, building services, site manager, consultants and is the planning responsible for the client from the concept to the completion – high involvement</td>
</tr>
<tr>
<td>Competition phase</td>
<td>- “ “ -</td>
</tr>
<tr>
<td>Concept design phase</td>
<td>- “ “ -</td>
</tr>
<tr>
<td>Detailed design phase</td>
<td>- “ “ -</td>
</tr>
<tr>
<td>Construction phase</td>
<td>- “ “ -</td>
</tr>
</tbody>
</table>

4.3 ID facilitator mandate

Has the ID facilitator received a mandate from the owner?

In terms of the planning order.
5 Communication among the team members

5.1 Use of Building Information Model (BIM) tools

In case more than one BIM tool was used during the design, there were problems in sharing the numerical model among the team members?

Can you briefly report your experience in using BIM tools, basically by referring to the lessons learnt?

Since 2012 all ATP projects have been developed using BIM supported by “Autodesk Revit” software. The “aspern IQ” project was developed with the conventional use of Autodesk Autocad ADT.

5.2 File sharing system

Which kind of file sharing system did you use?

Internal Server

How do you evaluate the efficiency of your file sharing system?

On the base of the experience gained during this project, would you take in consideration the adoption of more advanced systems to share files?

5.3 Information sharing

How do you evaluate the efficiency of sharing information during this project?

On the base of the experience gained during this project, would you take in consideration the adoption of more advanced systems to share information?

For this project, the integrated project team was brought together in the office in order to assure that internal data-sharing was accompanied by the sharing of professional experience and maximum direct communication together with a reduction in e-mail usage.

5.4 Transfer of knowledge

Transfer of knowledge is about how the ID process increases understanding and knowledge of all specialists work conditions. The aim of transferring this knowledge is that by increasing awareness and knowledge during all stages of the planning process it should provide even better ID processes in the future.

Describe briefly how transfer of knowledge took place among architects, engineers and developer.
6 ID Strategy – Workflow

6.1 Quality assurance plan & Quality control plan

A Quality Assurance Program describes the overall goals for the building. The values have to be described both as goals and demands. It may also be useful to weight the goals or rank them. It is important that the Quality Assurance Program is deeply rooted in the decision makers of the project and it should be given the same status as the budget and time schedule for the project.

The Quality Assurance Program has to be followed up by a Quality Control Plan. This plan is a tool for the project team and a document that makes it possible for the building owner to control and follow up the goals. The quality control plan defines goals and related sub goals, defines milestones through the planning and construction phases, and specifies who is responsible for each task.

6.2 Setting responsibles, milestones and highlighting critical points per each design phase

The responsible in charge for a given design phase helps the ID facilitator in managing the whole process. He/she has the responsibility for the correct implementation of the tasks planned in a specified phase and for the on-time execution of the activities.

A milestone is a formal checkpoint defined by the whole design team during the initial planning phase. It can be a formal approval by the owner or the delivery of one or a set of documents. The approval of a milestone allows access to a subsequent phase.

A critical point is an unexpected situation that has occurred during a given design phase. Please report the solution discussed within and proposed by the design team.
Table 3: Responsibilities, milestones, critical points and outcomes per design phase.

<table>
<thead>
<tr>
<th>Design phase</th>
<th>Responsible(s) in charge for the phase</th>
<th>Milestone(s)</th>
<th>Critical point(s)</th>
<th>Outcome(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial planning phase</td>
<td>integrated designer’s overall project leader</td>
<td>-</td>
<td>-</td>
<td>Checklist for basic informations</td>
</tr>
<tr>
<td>Competition phase</td>
<td>integrated designer’s overall project leader</td>
<td>-</td>
<td>Decisions of systems considering a lot of parameters in a short time</td>
<td>Competition documents</td>
</tr>
<tr>
<td>Concept design phase</td>
<td>client’s project leader; integrated designer’s overall project leader</td>
<td>Preliminary design (approval client)</td>
<td>To design the building services for an energy efficiency building with high flexibility by an unknown tenant. (definition of different parameters)</td>
<td>-Technical report (architecture, structural design, building services, building physic, dynamic building simulation, klima:aktiv building assessment, landscape architect) -plans -Cost estimate -Time schedule for planning and construction phase -catalog of samples</td>
</tr>
<tr>
<td>Phase</td>
<td>Roles</td>
<td>Documents</td>
<td>Notes</td>
<td></td>
</tr>
<tr>
<td>-----------------------</td>
<td>--------------------------------------------</td>
<td>----------------------------------------------------</td>
<td>-----------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Detailed design phase</td>
<td>client’s project leader; integrated designer’s overall project leader</td>
<td>Tender document (approval client)</td>
<td>Tender document with Technical report, Execution drawings for 3 parts of a general contractor, document for the security</td>
<td></td>
</tr>
<tr>
<td>Construction phase</td>
<td>client’s project leader; integrated designer’s overall project leader; site manager</td>
<td>-Carcass finished -air tight envelope -operating test</td>
<td>Reports from the site manager, product-manager Documentation Enrolment</td>
<td></td>
</tr>
</tbody>
</table>
# 7 Innovation

What lessons have you learned during the ID process?

The complex requirements of sustainable targets in building projects can nowadays only be satisfied inter-disciplinary. The strategy of additive design is obsolete.

The integrated design philosophy is the logical representation of causal connection: sustainable building development pre-supposes consideration of life-cycle; this pre-supposes an integrate design approach supplemented by the advantages of the integrated design tool BIM.

Why is this project innovative?

From the first design idea onwards, the ideas of all team members flew into an holistic building concept. This ensured the timely consideration of all design aspects from the project start, through scheme design, approval submissions and working information up to site supervision. The result is an optimised building in terms of the targets with high degrees of operational and user comfort.

By means of a simultaneous start by all design disciplines, all have the same knowledge and contribute innovation and creativity. The simultaneous working on the design ensures optimal results and efficient processes.

Integrated design is design from a single source: An overall responsible project manager as contact who understands all design disciplines, their responsibilities, interfaces and interaction and an experienced team from all design disciplines, which works free of interfaces and professionally towards defined and coordinated project targets.

What kind of problems did occur during the ID process and how did you solve it?

The ID process was characterized by constructive teamwork to find the best solution between an ideal and a practicable design.

What would you do differently during the next ID process?

There for we optimize the original process and the communication in the project team. This is done on two levels - the first one is the direct communication between the team members and the second on the digital level. That means that every one of the project team has the same digital data at the same time.
# National contact points

For questions please get in touch with your national contact points.

<table>
<thead>
<tr>
<th>Country</th>
<th>National Contact Point</th>
<th>Contact person</th>
<th>Email address</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austria</td>
<td>IBO - Austrian Institute for Healthy and Ecological Building</td>
<td>Tobias Waltjen</td>
<td><a href="mailto:tobias.waltjen@ibo.at">tobias.waltjen@ibo.at</a></td>
</tr>
<tr>
<td>Bulgaria</td>
<td>The Chamber of Architects in Bulgaria</td>
<td>Nicholas Galabov</td>
<td><a href="mailto:architecture.bg@gmail.com">architecture.bg@gmail.com</a></td>
</tr>
<tr>
<td>Croatia</td>
<td>Energy Institute Hrvoje Požar</td>
<td>Željka Hrs Borković</td>
<td><a href="mailto:zhrs@eihp.hr">zhrs@eihp.hr</a></td>
</tr>
<tr>
<td>Finland</td>
<td>Motiva Oy</td>
<td>Tapio Jalo</td>
<td><a href="mailto:tapio.jalo@motiva.fi">tapio.jalo@motiva.fi</a></td>
</tr>
<tr>
<td>France</td>
<td>ADEME Ecole des Mines de Paris</td>
<td>Alain Anglade Jerome Adnot</td>
<td><a href="mailto:alain.anglade@ademe.fr">alain.anglade@ademe.fr</a> <a href="mailto:jerome.adnot@ensmp.fr">jerome.adnot@ensmp.fr</a></td>
</tr>
<tr>
<td>Greece</td>
<td>Centre for Renewable Energy Sources (CRES)</td>
<td>Minas Iatridis</td>
<td><a href="mailto:miatri@cres.gr">miatri@cres.gr</a></td>
</tr>
<tr>
<td>Italy</td>
<td>eERG - Politecnico di Milano</td>
<td>Lorenzo Pagliano</td>
<td><a href="mailto:lorenzo.pagliano@polimi.it">lorenzo.pagliano@polimi.it</a></td>
</tr>
<tr>
<td>Poland</td>
<td>Polish Green Building Council (PLGBC) - Polskie Stowarzyszenie Budownictwa Ekologicznego</td>
<td>Agnes Vorbrodt-Schurma</td>
<td><a href="mailto:agnes@plgbc.org">agnes@plgbc.org</a></td>
</tr>
<tr>
<td>Portugal</td>
<td>ADENE - Agência para a Energia</td>
<td>Diogo Beirao</td>
<td><a href="mailto:diogo.beirao@adene.pt">diogo.beirao@adene.pt</a></td>
</tr>
<tr>
<td>Slovenia</td>
<td>Jozef Stefan Institute</td>
<td>Marko Pečkaj</td>
<td><a href="mailto:marko.peckaj@ijs.si">marko.peckaj@ijs.si</a></td>
</tr>
<tr>
<td>Spain</td>
<td>Universitat Rovira i Virgili National</td>
<td>Joan Carles Bruno Nora Quince</td>
<td><a href="mailto:juancarlos.bruno@urv.cat">juancarlos.bruno@urv.cat</a> <a href="mailto:noria.quince@urv.cat">noria.quince@urv.cat</a></td>
</tr>
<tr>
<td>Sweden</td>
<td>Sweden Green Building Council / Building Green in Sweden AB</td>
<td>Linda Kjällén</td>
<td><a href="mailto:linda.kjallen@sgbc.se">linda.kjallen@sgbc.se</a></td>
</tr>
</tbody>
</table>