

## DESIGN METHODS FOR YOUNG SUSTAINABLE ARCHITECTURE PRACTICE



Daniel Jauslin, Architect MSc  
ETHZ, Landscape Architect<sup>1,3</sup>

Prof. Hans Drexler, Architect  
MSc ETHZ, M.Arch (Dist.)<sup>2</sup>,



Freddy Curriel, Architect MSc  
and Landscape Architect  
Politécnico di Milano<sup>3</sup>

<sup>1</sup>Researcher/Lecturer at Chair of Landscape Architecture, TU Delft University of Technology, Delft, The Netherlands

D.T.Jauslin@tudelft.nl, jauslin@dgj.eu

<sup>2</sup>Replacement Professor Sustainable Building at Münster School of Architecture, Germany

drexler@fh-muenster.de, drexler@dgj.eu

<sup>3</sup>Principals of DGJ Architects & Landscapes, Zürich, Frankfurt & Rotterdam, Hong-Kong

curiel@dgj.eu

## Summary

This paper introduces landscape aesthetics as an innovative design method for sustainable architecture. It is based on the framework of a recent paper where the young and unfamous authors criticized three of the most prominent architects today in regard to sustainable architecture and its aesthetics. Leading architects expressed their skepticism as to whether there is such a thing as aesthetics in sustainable architecture, or for that matter, if architecture can indeed be sustainable at all. Against such a setting, DGJ will illustrate what we believe to be the landscape perspective's inherent relationship to the natural environment, the principles behind it as well as the potentials that these landscape perspective holds for sustainable design. After first discussing the kind of professional and political impetuses that have made sustainability one of the most compelling changes to face the profession of architecture, we argue that the mandate for a sustainable environment did not come about by choice of the architects and planners, but rather, that sustainability is imposed on the profession by the necessary, external forces that influence it. To bridge the existing gaps between current practice and sustainability, we will trace some thoughts and principles of landscapes and territories. Our approach views the landscape as a human interface with nature, as a basis for the design of sustainable architecture and a new context for sustainable aesthetics. It will be illustrated with practical work samples from a small but globally operating practice DGJ Architects & Landscapes. They will demonstrate how sustainable design happens in practice, throughout its evolutionary process, with some of our recent projects.

**Keywords:** landscape, sustainable design, architecture, design methods, aesthetics, born globa

## 1. Sustainable Architecture, theory or practice?

In contributing to Sang Lee's book "Aesthetics of Sustainable Architecture" we stumbled upon several ongoing discussions in the academic discourse about Architecture. In our contribution (Jauslin 2011) we discussed the main question of that book - which was to reveal, explore and further debate, the aesthetic potentials of sustainable architecture and its practice in general. This opened up a discrepancy between our own architectural research, practice and teaching, and the current discussion of some of the leading figures of our discipline. We became aware of a rather wide gap between sustainability in one hand and architecture on the other.

The single project and its coherence is the key to a practice and formulates its theoretical position as well as its social relevance. Our recent participation in "Aesthetics of Sustainable Architecture", being an academic book, omitted personal experience or references to the authors' own work, this practical part we intend to bring up to discussion at this conference, as practice is not discussable without the project

Architecture is a profession in crisis in many parts of the formerly established countries since 2009. Alongside the profession shifts from large, egocentric, hierarchical and globally present stars to rather small, collaborative, networked and globally connected but locally acting practices could be a saving trend to the disciplines. Typically such future practice might also involve leaner forms of production with less importance to the status of the individual architect.

*No, No and No. Three times No is the answer to the question: is there currently such a thing as aesthetics in sustainable architecture? This answer is drawn from the discussions of three architects who are acclaimed practitioners and thinkers in the field. If we assume that aesthetics is something that all architects pursue in one form or another, it would appear that, currently, sustainability is not an integral part of it. One of the acclaimed architects considered in this chapter is Rem Koolhaas, a Pritzker laureate and one of the founders of OMA, a highly regarded practice in Rotterdam, the Netherlands. He opened his keynote lecture at a Harvard University conference on sustainability in 2009 with the following statement: (the following paragraphs in italic are all quoting the previous publication Jauslin 2011 unless otherwise noted.)*

"I did not assume that anyone in the academic world would ask a practicing architect in the 21st century, given the architecture that we collectively produce, to participate in a conference on ecological urbanism." (Koolhaas 2009)

*During his lecture, Koolhaas showed a photomontage of a Massive wall of skyscrapers set in the desert, including some of OMA's own designs. If we asked Koolhaas the hypothetical question: 'Does the aesthetics of architecture contribute to a sustainable world and its ecology?' He might answer: 'No. Architecture is rarely sustainable as a human activity'. (Jauslin 2011)*

*The second acclaimed architect considered in this chapter is Peter Eisenman. During the Eisenman + Wigley IV lecture at Columbia University in 2009, he made the following statement regarding the US Green Building Council's rating system (GGGD 2007) while discussing the meaning of architectural practice in the context of the current financial crisis*

"Some of the worst buildings I have seen have Gold, Silver or Platinum LEED Certificates ... and they are awful, architecturally. They are depressing ... They may optimize ecological constraints today but they don't do anything for the culture in terms of the excess required for architecture ... Architecture has always been about an environmentally possible way of being. Hence the buildings that last throughout the history of architecture." (Eisenman 2009)

*Although Eisenman might agree that great pieces of architecture – the kind that last for centuries – possess certain aesthetic qualities, if we asked him the hypothetical question: 'Does sustainable architecture possess durable aesthetics?' Eisenman might answer: 'No. Sustainable buildings do not possess lasting aesthetics.' (Jauslin 2011)*

*The third acclaimed architect considered here is Wolf Prix, co-founder of the Coop Himmelb(l)au in Vienna. He presented a striking statement during the opening lecture for the 2009 Münchner Opernfestspiele (Munich Opera Festival):*

"Sustainability belies signification – and it is therefore not possible to generate 'aesthetics' from the term sustainability. There is no such living aesthetics of sustainability as that of modernist architecture". (Prix 2009, translated in Jauslin 2011)

*This statement led to a major uproar among German Architects and a policy debate or "die Grundsatzdebatte" in the prominent German newspaper, Die Süddeutsche Zeitung, Comparable to political editorials in English-speaking newspapers. If we asked Prix the hypothetical question: 'Is there such thing as aesthetics in sustainable architecture?' He might answer: 'No. By definition, there cannot be.' (Jauslin 2011)*

*To summarize current debates on the aesthetic possibilities of sustainability in architecture, we may conclude that today, there is no consensus as to what these possibilities are or whether they exist at all. At least this is the conclusion that may be drawn from the unauthorized summaries of three of the most prominent architects in the field, all stated in 2009. Their remarks are quite recent – made within the past few years – and quite behind schedule if we consider that sustainability has grown to become a firmly established and often compelling issue in the fields of science and politics over the past two decades.*

*On a wider scale, the United Nations committed itself to the goal of sustainable development and environmental protection on a global scale when it passed Resolution 38/161 in 1987. In the process, the UN established its own definition for sustainable development:*

"Sustainable development is a development that meets the needs of the present without compromising the ability of future generations to meet their own needs." (Brundtland 1987)

*One decade later, the Kyoto Protocols (UNFCCC 1998) established energy efficiency as an important policy agenda of many of the UN member states. While definitions of sustainable development and energy efficiency were established at the level of international policy making more than 20 years ago, it seems that on the whole, the profession of architecture still disregards the impact of sustainable development, while failing to connect the notion of sustainability to the notion of aesthetics.*

*As a practicing architect, it is clear that these problems may stem from the fact that environmental destruction does not appear to be a matter that can be ameliorated or resolved through architectural aesthetics. And in fact, that addressing environmental destruction would curtail aesthetic possibilities. For many architects, sustainable design has become an issue not because it is integral their own desires for aesthetic experimentation or development, but because of the new legalities imposed by building regulations and the economic ramifications of the real estate market. As of 2011/2012, we could say that current architecture is not willing to meet the challenges of sustainable development, environmental protection and energy efficiency in a proactive manner, given the widespread assumption of the substantial aesthetic compromises that would be required to do so.*

*In order to advance the cause of environmental consciousness in architecture, what appears necessary is neither an exclusive commitment to sustainability nor a commitment to another avant-garde aesthetic. However, playing up the polemics of opposition between sustainability and the avant-garde will not lead to a resolution. Rather, a renewed environmental consciousness may be triggered with an aesthetic sensitivity towards the natural environment that provides the context for each piece of architecture, developed in tandem with a wider understanding of the human dimensions and aesthetic qualities implemented in the built environment.*

*A very different way of dealing with the polarity of nature and culture can be seen in the perspective of landscape. German art theorist and activist Bazon Brock defines landscape as the aesthetic human appropriation of nature (Brock 1977). The role of aesthetics in landscape is not to separate natural forms from the cultural realm, but to reconnect them. Drawing inspiration from the inherent terms of aesthetics in landscape, the architectural discipline could develop a real alternative to the invasive practice of architecture where the dichotomy of nature and culture is profound. With inspiration from the landscape perspective, it may be possible to shift the position and approach of architecture toward nature, moving from an approach of opposition to one of integration. Such a renewal is clearly outside the scope and potential of avant-garde aesthetics alone.*

*A common recognition of where our efforts should lead in terms of environmental consciousness seems to be absent from the education, socialization and profession of architecture. In fact, the question of how a building, city or landscape will be perceived by its users and inhabitants is the key question that underlies most of our design work. Designs that please human perception tend to trump the consideration of the natural environment. However, no matter which side of the discourse they fall on, most architects agree that architecture should contain certain *aesthetics*, and most decision makers agree that finding a sense of sustainability is a prerequisite of any planning or architectural activity. But the relation between these two priorities – *aesthetics* and sustainability – changes according to the theoretical and practical views of different actors in the process of building.*

*The landscape perspective may be able to unite the seeming dichotomies of nature versus culture, aesthetics versus sustainability, showing that these dichotomies do not have to reside at the core of the discipline. Already, some practitioners of contemporary architecture have been strongly influenced by the concept of landscape. In 1966, Vittorio Gregotti postulated that architects should focus on territories rather than architectural space (Gregotti 1966). And since the late 1980's, architects have developed a wide range of process-oriented approaches to architectural design that include cartographic methods such as mapping, and surface-oriented methods such as folding. These methods expanded beyond the academic circles and into professional practice during the 1990's. Although most of these methods took compositional and philosophical detours and do not implement a purely territorial approach, they are fundamental to a consciousness that is changing the discipline in significant ways: a consciousness that views the organization and composition of architectural space as landscape.*

*Concomitant with this rise in landscape-oriented consciousness is a research framework that can be characterized as the 'architecture of landscape methods' (Jauslin 2010), developed to investigate and understand architecture that has been designed as landscape. Within this research framework, the interior volume of a building and the exterior landscape surface surrounding a building do not merely interact. Instead, the building is designed as an artificial landscape, as a continuation and augmentation of the natural one. This idea of landscape defines the exterior surfaces as well as the interior surfaces, and through these methods, the relation of landscape to architecture is in fact turned inside out.*

*A specific focus of landscape architecture is placed on understanding the formative elements and qualities implicit in the landscape, and on developing architectural design methods and strategies in consideration of them. With the implementation of this approach, landscape architecture consists of a range of natural, cultural, urban and architectonic constituents. (Steenbergen 2003) There is an obvious correlation between content and form: the location where the content resides is what connects the landscape to the architectonic in terms of material, topographic, technical, cultural and economic substance. Form involves the way in which the elements are assembled into a composition, based on the development of a variable but intimate relationship between object and context. In this way, the modalities of landscape architecture are employed in the design of architectonic constructs, in order to formulate a set of design tools that are appropriate to the challenges of designing the built environment in relation to the natural one. The idea of landscape in fact defines an aesthetic mediation between the natural and the artificial worlds. The design methods of landscape architecture are particularly useful; they can*

be contrasted to architecture in terms of how they strategically approach spatial design. While most pieces of architecture carry a distinct building program forward from the outset of the design work, landscape approaches start from the topography of the site.

*Developing the aesthetics of sustainable architecture is necessary. It is probably the only path left in the future of architecture – aside from complete the absence thereof – that can begin to address the impacts of providing architecture and infrastructure to the world's population of 7 billion. Designing for sustainability is a unique opportunity. It does not indicate the end of architecture as an aesthetic system, nor does it indicate an imposition on architecture's creative enterprise. In fact, designing for sustainability is an aesthetic project at its heart, where aesthetic systems can be used to form a symbiotic relationship between the city and its surroundings. If we understand architecture as part of the topological space of landscape, we will also be able to understand our place within the relational system between the natural and built environments. This new approach cultivates an understanding of landscape as a human interface with nature, presenting a means by which to design architecture in a sustainable manner, along with a renewed context of sustainable Aesthetics. If we cultivate our spatial relationship to the environment as both a design method and a context, we will be able to gain a much wider understanding of architecture in terms of its range and scale, thereby reclaiming the responsibility for its programmatic and contextual correlations as a discipline. (End quotation Jauslin 2011)*

## 2. Landscape Methods in Sustainable Designs at DGJ Architects & Landscapes

### 2.1. DGJ164 Two sustainable house types for Jenfelder Au, Hamburg, Germany, 2011

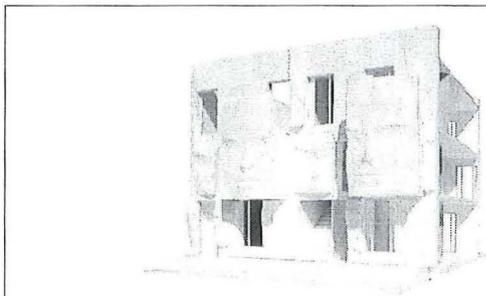


Fig. 1 DGJ164 Jenfelder Au façade with inhabitant children's faces robot brickwork recycled brick

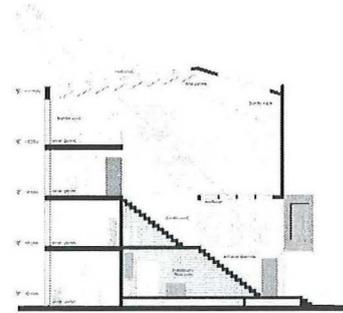


Fig. 2 DGJ164 Jenfelder Au section with principle solar gains

In 2011 DGJ together with 8 other younger practices from The Netherlands and Germany got invited to develop some of the house typologies in West 8's plan for a sustainable neighborhood of 29'000 square meters in Jenfeld near Hamburg. West 8 has developed the project after the awarded competition entry into a legally binding planning document called *Bebauungsplan* until 2011. It was awarded the International Urban Landscape Award ILAU in 2009. The Master plan is based on sustainable development integrating mutinously designed green structures and an intense reflection on public space and street quality. The plan has a high demand for lively and diverse Architecture based on a clear set of rules. (Hamburg 2011)

The ILAU award was entirely reinvested by West 8 into developing the project further down to the scale of an architectural study, and in this DGJ was able to participate. The Architects where to prove that projects with overly low energy consumption would be possible within the tight financial and legal framework of Hamburg's publicly subsidized private ownership (*Wohnbauförderung* in German). DGJ developed two types each in a row and corner position in the plan. One row house and one house with 2 double floor maisonettes. Both types were designed to use a set of common principles, elements and materials. The goal of this standardization within two different types was to make the energy saving passive-house standard not an extra but a starting point for subsidizable low cost housing.

The volumes of the two brick houses are building up of floor-high timber-frame elements clad in recycled bricks. Brickwork is typical for Hamburg's Architecture. Unified proportions in façade and plan measure systems build brickwork in several scales. The general spatial system of the apartments is based on the traditional cross bond (Flemish) brickwork pattern.

15 times live size portraits of children's in bas-reliefs are integrated into the facades. The faces of the first generation of occupants would frame the image of the new neighborhood. The façade would be built up in a specially designed process of digital fabrication of modules designed with ROK Architects and ETH Zürich. The standardized digital workflow would allow individually customized finishing. Each family's house get's its individual brick faces. Mass customization is our proposition against mass housing or massively individualistic architect's design excesses.

We propose variation in types composed of common basic elements. Special details allow strong adaptability to inhabitant's demands. Vertical openings in the multi storey houses are bringing daylight into a relatively deep and energy efficient plans and enhance the spatial experience. The multifold usability of the floor plans is enhanced through the strategically position of the doors that pivot in two spatial zones each. The system is designed to allow different kinds of enclosures with the same structural walls even during the course of a day and night in use. (DGJ 2012)

## 2.2. Plus Energy House boarding school Schloss Hansenberg, Germany, 2011-2012

Depending on the geographic position an average of 30% to 40% of all the energy consumption goes into operating and maintaining buildings. The idea that buildings are maintained and operated using vast amount of energy is in the grander scale of history a comparatively new one and only arose due to the availability of cheap fossil energy. In the face of exponential growth of population and economies in sync with the dramatic shorting of resources and environmental destruction a decoupling of growth and resource consumption is the only way to a sustainable future. We have asked ourselves why that is and what could be done about it. Therefore during the last two years we developed three Plus-Energy-Buildings for different contexts that would produce energy rather than consuming it.

To achieve that goal it is important to prioritize measures taken in the planning process. Since it is difficult and sometimes questionable in respect to the over all efficiency to maximize the production of energy on site designing Plus-Energy-Buildings is mostly about reducing the energy consumption of the building as far as possible. For the three cases discussed in the following we used energy simulation software (PHPP 2007) to calculate the energy consumption. During design we compared the performance of different options and used the result of the simulations to adjust parameters of the buildings as its shape, facade design, insulation or shading. Integration of these tools not only helps to reduce energy consumptions of the buildings but also actually improves its performance with leads to higher quality and comfort of the spaces we create.

A building that reflects this attitude well is an additional dormitory for a boarding school closed to Frankfurt Germany. Our design mainly focused on saving as much energy as possible during the heating season: The building is highly insulated and the windows are in size and orientation optimized for solar gains during winter. The building was design in the Passive-House-Standard of a very low 15 kWh/sqm\*a (average in Germany is 80 kWh/sqm\*a for heating new buildings). The remaining energy demand of the building was low and easier to cover. The building produces energy with a photovoltaic system, which is integrated into the roof. The challenge in Germany is, that the moderate climate with cold winters leads to a heating demand, which occurs at the time, when solar radiation is low and therefore there is very little possibility to cover the buildings energy consumption throughout the year. The advantage is that the building is part of a sophisticated electricity grid, which on the one hand can be used as a long-term buffer to absorb surplus energy produced by the building and on the other hand provide energy during period of low solar radiation. In consequence the system has a positive energy balance over the year but depends on the grid. (DGJ 2012)

## 2.3. Obelisque Visitor's Centre Frankfurt Airport, Germany 2013 1st in Competition

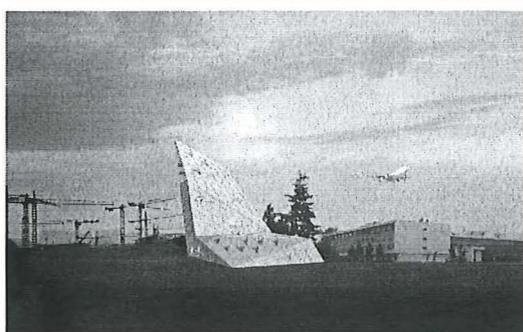


Fig. 3 DGJ140 "Obelisque" Visitors center and viewing tower for Frankfurt airport perspective

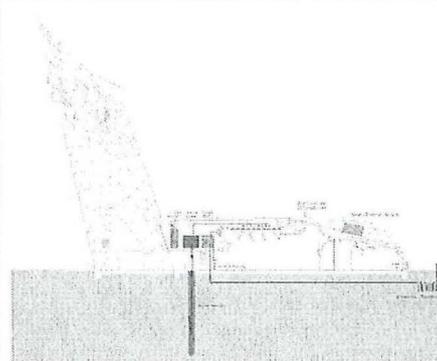


Fig. 4 "Obelisque" climate design and energy supply scheme

The last building designed by DGJ we would like to present here is a visitor center and viewing tower at the Frankfurt airport. Here the challenge is, that the operation of the building including an exhibition and conferences are energy intense uses. The energy consumption related to the operation of the building was reduced throughout the design process. As a result, most of the energy is used for the exhibition conference function of the building rather than the operation of the mere envelope. In our design we try to integrate energy systems into the architectural strategy rather than adding technologies to an otherwise conventional building design. On one side this integrative approach is reflected in the carefully and ongoing monitoring and simulation of the energy

performance throughout all design stages. On the other side we integrate energy production into the expression of the architecture. With the visitor center a large portion of the skin of the building is the photovoltaic that thereby serves two purposes: It produces energy and forms the protective skin of the building. These synergies are important. They help to understand the energy systems as integrate part of the architecture and the design. But there is an economic benefit, too. Rather than paying for be cladding and an additional PV-systems on top of it, the savings for the cladding lowers the investment costs for the energy systems. This integrated strategy is what we need for a future in which buildings will be producing energy rather than consuming it: Be part of the solution and not the problem. (DGJ 2012)

### 3. Conclusions for an evolving sustainable practice of architecture

In traditional designs, ecological and sustainable issues are often superimposed on the project like a new layer, ecologically correct, on a classic aesthetic-driven design. This mostly happens because previous generations of architect, did not raise and deal with such issues, and therefore sustainability is a variable affecting certain well-driven rules of their creative process, and hard to integrate into it without affecting drastically the rule of their game. In this cases sustainability is still a mere technological layer for which a certain external expertise and know-how is required, and therefore it cannot be easily mingled in the very early stage of the design. As said before, the question rising approaching the problem for an experienced architect over his 50s is often "why should I?"

Our attitude, adopted in both research and design, is to take into account the technical challenges for a sustainable development, not just as a layer which is superadded afterwards to the project, but as the motor of a radical renewal on different levels, inventing new functions and new landscape types, generated by the existing context and integrated with cutting-edge technologies. It is important in our opinion, at least in our practice, to cultivate both reflection and experimentation as a vivid cultural component of architecture. Considering space as human interface to the environment, we could come to more sustainable practical solutions if we take into account the experiential quality of space making as well as its impact onto nature.

A separation of scale, range of action and competence is not an issue any more, we need to think across our professional boundaries and disciplines, and go beyond the standard reach of our profession as mere aesthetic problem solvers. We need to be aware, at the same time, of how a building works and its surroundings, of Architecture and Landscape, space and dynamics, local needs and potentials, energetic and economical issues, in both local and global perspectives: only in this way we could give shape to the urban environment in a sustainable way! Sustainability is not – and should not be - just a layer added to the design afterwards but rather the starting point from which the optimal transformation of any space, of any scale, is generated.

Different questions bring, and will always bring, different answers, hopefully better ones. The younger and upcoming generation of architects is about to lay the foundations for a sustainable practice of architecture and landscape planning, in both the shrinking and the expanding economies of our global future. They will raise and be though in an era of awareness, where there will no need of sustainability, as it will be an integrated standard. And the questions of the new generations looking back at our days will be "what have been they waiting for? We will be committed and convinced to do the right thing, which makes ours a persistent, maybe slow but utterly undefeatable strategy.

In a sense, architecture practiced as a landscape method will be closer to an art form more than to a technological accomplishment, and indeed, "Yes" will be the certain answer to the question: is there such a thing as AESTHETICS of sustainable architecture?

The new theoretical ground we established on our journey towards our long time set goal of designing and building sustainable environnements is to name our practice DGJ Architects & Landscapes from this year on. The expression Architects & Landscapes contains both the subject (us as Architects) and the object (Landscapes) of our doing. While the first domain (Architecture) would predominantly be object oriented (designing objects) we turn it into the subject, as it is focusing on processes rather than preconceived solutions. The object of our design is the utter non-object Landscape, always scale-less and limitless. It is like in a painting the background to devote to that has become active. We tend to cultivate such oppositions in daily practice. Unsolved oppositions and contradictions will keep in balance, and we remain curious to find a new answer and to ask ourselves a new question every time.

We trying her to relate or theoretical and practical position as architects and academics we truly hope we could inspire your own doings with our paper. We would be happy to gain one or two companions in our journey's next steps to exchange ideas, give us tips, help us avoid traps and share our promising trails. A more sustainable architecture should be to the benefit to all of the falling stars, the enduring strugglers, the enthusiastic youth and us and those ignorant of all of these.

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