URBAN+

Multi-disciplinary innovation competition, Lilletorget 1, Oslo Norway

JURY PRONOUNCEMENT

Stage 2

Oslo, 23 September 2015

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1. URBAN+

1.1 Competition Goals

The main goal of the competition is to find the proposal that
- best shows outstanding, innovative design and urbanism quality,
- best answers to FutureBuilt and Cradle to Cradle criteria, and
- fulfils Entra's ambitions of being a frontrunner in environmentally friendly and sustainable development and construction.

Criteria follow the goals and form three main groups:
- Innovation
- Architecture and urbanism
- Market and economy.

1.2 Jury

The Jury has had the following members

Kristin Haug Lund, Executive Vice President, Entra Eiendom ASA (Jury Chair)

Sonja Horn, Executive Vice President, Central Oslo Region, Entra

Henrik Melder, Director of Property Rent, Entra

Fritjof Salvesen, chartered engineer, Asplan Viak Department of Energy and Environment, nominated by RIF (Association of Consulting Engineers, Norway)

Stein Stoknes, M.Arch. MNAL; Project leader FutureBuilt, nominated by FutureBuilt

Kristin Jarmund, M.Arch. MNAL, nominated by NAL (The National Association of Norwegian Architects)

Kasper Guldager Jensen, partner and architect MAA (3XN, Denmark) nominated by NAL.

Dag Christer Øverland, Project Leader for Entra, has been advisor to the jury.

Asplan Viak, Department of Energy and Environment, have acted as advisor to Entra in general and the jury in particular on evaluations of the entries' environmental concepts and calculations.

In addition, the jury has used other external experts when assessing the proposals. External experts have not participated in the decision-making.

Secretary for the jury has been Øystein Grønning, M.Arch. MNAL, Migrant, Norway. Competition Secretariat has been NAL.

1.3 Stage 1

Winners, Stage 1

16 entries were submitted in the Competition's Stage 1, all with sufficient documentation for adjudication. The Jury was faced with the task of naming three to four winners to proceed to Stage 2. By unanimous decision, the following 4 entries were pronounced winners and made public March 26th 2015:

"Supertree"
SAAHA AS (N), LALA Tøyen AS (N), Degree of Freedom AS (N), Gether AS (N)

"Ripple Effect"
schmidt hammer lassen architects (DK), LOOP Architects (DK), COWI (DK), COWI NOR (N), TRANSSOLAR Energietechnik GmbH (D), Vugge til Vugge Danmark (DK)

”OSLOSOLAR”
Code Architecture (N), Rambøll (N, DK), Institute For Energy Technology (N)

”GreenWaterLand”
Narud-Stokke-Wiig AS Architects MNAL (N), Multiconsult AS (N), Green Gas AS (N), B16 Architecture & Landscape (N), Norsam AS (N), RIFT AS (N).

Prizes

The prize for winning Stage 1 and going on to the finalist Stage 2 is NOK 400.000 to each team, one half to be paid after the end of Stage 1, the remainder to be paid after Stage 2 on the condition that the entries meet programme and recommendations requirements.

1.4 Stage 2

Stage 2 was open in the sense that the identity of the four finalist teams was known.

Hence, the general and specific remarks of the Jury were discussed with the four in separate meetings between each participant team and the Jury’s advisers, in order to direct Stage 2 work.

In addition, mid-term meetings were undertaken, separately with all four teams between the teams and Jury advisers. The goal was to ensure that teams were proceeding according to recommendations, discuss new findings and possibilities, and possibly adjust the course of the on-going work to reinforce the aims and goals of the competition.

1.5 Jury Decision and Recommendation

Submissions

All four Stage 2 contestants duly submitted their revised proposals. All were formally recognised as sufficient for adjudication by the Jury. It is noted that the proposal named “Supertree” in Stage 1 entered Stage 2 under the name “Sunflower”, which the Jury found acceptable.

All four submitted physical models in addition to the required material. These were accepted but formally not considered part of the competition.

Winner, Stage 2

The Jury has unanimously arrived at the following decision:

Winner of the URBAN+ Competition is **OsloSolar,** submitted by a group headed by Code.

Prize Recommendations

The Jury recommends that Entra pay the remaining NOK 200.000 of the prize to each of the four teams.

The Jury recommends that Entra initiate negotiations on the commission for the project design with the winner team partners.

2. JURY REMARKS ON THE COMPETITION

2.1 General Remarks

Documentation of performance and outputs are aimed at credibility, to make plausible that the building and surroundings will meet environmental and other requirements.

2.2 Innovation

Technology, Energy, Plus-House

All entries meet the environmental technological challenge by a good margin. Some proposals may seem “obvious”, such as a combination of PV cells and district heating (“fjernvarme”). OsloSolar meets the performance requirement with an uncomplicated energy supply system consisting of district heating and PV cells. This adds robustness to the proposal in a manner the Jury finds commendable. The other entries have proposed more complex energy supply systems.

Sunflower is consistent in investigating alternative principles for energy balance. The Jury sees this as both interesting and asked for. The scope of the competition has aimed for a variety of options for further discussion. Their solution for energy supply and distribution is novel and unchartered on the scale in demand. By use of available standard products, exceptionally high heat-pump efficiencies are achieved with very small temperature differences. Sunflower clearly represents innovative potentials that should seek implementation on at least a medium-scale level in the near future.

Two proposals have PV as the sole source of local electricity production. The others apply a combination of mainly PV and additional CHP (Combined Heat and Power, using biogas from sewage and food waste as fuel) to meet requirements. Sunflower argues against leaning on district heating as this may conceptually undermine the Plus-House principle.

To achieve Plus-House status on an urban core scale represents true innovation. In addition, the competition has brought forth alternative principles of great potential. In terms of technological innovation, the competition has been a success. As such, the project may become a pilot for sustainable urban redevelopment in dense city core situations.

In general terms, all four teams have shown solutions that answer to specifics of the requirements, some well and some reasonably well, but with potential shortcomings. All have documented that the goals can be met, but when annual output for solar cell production is normalised (same kWh/m2/y production with present technology), one team may have problems meeting demands. Nonetheless, Stage 2 has seen an in-depth investigation of these elements compared to Stage 1.

The task of designing a building that is a generator of energy, and simultaneously can stand as an example of excellence in architectural design, is not an easy one. The Jury maintains that all four have met this challenge satisfactorily and with a diversity that bodes well for the rapidly emerging demand on energy balance.

Several additional sources of energy have been proposed and are discussed. Local waste handling can be an interesting source of additional energy, and can solve a waste management task on a neighbourhood level. Such proposals have not had a decisive role in the deliberations of the jury. The advice would be to opt for the less complex solution. The Client should, however, keep additional energy options in mind during the development of the project design, and in deliberations with public authorities and neighbours.

Energy balance, as submitted by the teams, ranges between +2,6 and +4,8 kWh/m2/y. When modified for harmonised outputs to represent present-day technology (and corrected

for mistakes in calculations), the range is between +2 and +5,5. The PV industry is rapidly developing. It can safely be assumed that solar cells will be significantly more efficient than to-day, when the time comes for actually building.

CO_2 Emissions and Material Use

The goal is to minimise carbon emissions from energy consumption, materials and transportation. Due to Plus-house status, city core location and no conventional parking, all proposals will have high scores on energy and transport.

All four teams have good descriptions regarding materials, and all have adjusted to requirements and recommendations after Stage 1. A 50% reduction of carbon emissions from materials is made plausible through some of the proposals. There are still margins to be investigated, but the Jury is convinced that all proposals can meet environmental requirements, if modified in a combination of other materials and less concrete.

In order to compare on equal bases, the material calculators have been adjusted. Some solutions are omitted as they will eventually be equal, irrespective of entry differences, and thus do not represent actual differences. Emissions for solar cells are added for all, where only two had included these. All entries are given the best possible material types (low-carbon concrete, 100% recycled aluminium) for actual comparisons.

As reference the Jury has used a building of 108 metres height, BTA approx.48 200 m2, and with emissions of 13.000 T CO_2. Results from calculations show emissions ranging from 7450 T (GreenWaterLand) to 14.545 T CO_2 (Sunflower). Sunflower's result is explained by the use of steel. GreenWaterLand and OsloSolar (8250 T) are both essentially conventional concrete buildings. Ripple Effect has three cores, which give a revised total of 11.685 T CO_2. Two cores would reduce this to 10.300 T, but there is still a great deal of concrete in the cores.

One must bear in mind that the product situation is rapidly adapting to tougher environmental requirements, and that materials are constantly improving so that the situation by the time of construction will be better than today, possibly far better. For example, PV cell efficiency is improving at a steady rate. But one can also expect that concrete with far lower carbon intensity will be available.

Bicycle as Generator of Activity

A ground-braking bicycle strategy is of the utmost importance. Good proposals are shown in the competition. This is much needed. Some use the potential innovatively as part of a very ambitious adaption to bicycling for both job travel and general urban transport.

The best proposals, as in OsloSolar, show strong promotional solutions for bicycle parking, rentals, and bike service and repair, for tenants and visitors as well as the general public. All have the capacity to elegantly adapt the best proposals.

Cradle to Cradle and Biodiversity

C2C strategies vary in quality and depth. OsloSolar has an interesting strategy where building form, energy production, harvesting and storage of snow and rain, use of water and plants and inner climates are closely connected. GreenWaterLand has a comprehensive 10-point strategy. Ripple Effect is good on the material use strategy. Sunflower uses massive-wood floors and includes biodiversity. The Jury concludes that all proposals can meet requirements.

BREEAM-NOR

Competitors were asked to supply a preliminary BREEAM-NOR Pre-assessment to sub-

stantiate that the rating “Outstanding” is achievable, i.e. 85 % of the available scores in the BREEAM-NOR manual.

The BREEAM pre-assessments by all teams show that the necessary preparations to meet “Outstanding” have been made. It will be necessary to revise the pre-assessment in collaboration with Entra when the project starts.

The most detailed pre-assessments were submitted by Ripple Effect and OsloSolar.

FutureBuilt

FutureBuilt criteria concern climate issues and innovation. All four proposals answer well to these. The minimum criterion of 50% carbon gas total reduction is well within reach. The innovative element is, among others, in the Plus House standard in the urban context, zero conventional car parking, and an ambitious bicycle strategy as an integrated design parameter.

Innovation is less pronounced in material use in all entries. This can, however, be easily developed by the project team in the coming process, given a clear mandate by the client.

2.3 Architecture and Urbanism

Architecture

The four finalists show a variety of high-rise designs, both as main shapes and in how facade and form interact to add character. Each in its own way, the entries show fine proposals for visual profile and façade expressions.

Two use tilted roofs. This is motivated by the need to optimise PV cell effects. The two are, however, quite different. Whereas GreenWaterLand shows the roof as a way of architecturally nuancing a semi-triangular column, OsloSolar makes the inclined roof into a main architectural feature, thus removing the building from any notion of the conventional vertical high-rise. The two flat-roof proposals are also quite dissimilar, with Sunflower as a classical skyscraper with considerable elegance, and Ripple Effect more of a “Flatiron Building” imagery, complete with rounded corners.

The Jury finds this divergence in conceptual expression remarkable, given the rigour of the environmental requirements of the competition. This is, in the opinion of the Jury, highly promising for the coming rise of investigation into environmentally sustainable high-density architecture.

Urbanism

Compared to Stage 1, GreenWaterLand has radically altered the base to meet recommendations from the Jury. OsloSolar and Sunflower show improvements to already good solutions. Ripple Effect is the one with fewest alterations. The Jury concludes that all four can be modified to give excellent solutions.

Climate

The Jury has asked that facades and roof solutions be modified to prevent critical effects of falling snow and ice. Stage 2 entries show important improvements but still leaves some questions unanswered. Notably, OsloSolar has straightened out the folded facades but retained their “striped” character, and solutions have been found for the large, inclined roof area that will remove the risks through a system of melted snow-water collection.

Universal Design

Stage 1 left Universal Design to some extent unanswered. Improvements leave the Jury with the impression that the proposals all have the capacity to meet demands.

2.4 Market and Economy

Costs

Stage 2 has seen a harmonising of the BTA, so that this no longer constitutes significant differences. Important modifications have also been made to meet cost reduction requirements, in accordance with recommendations in the Stage 1 report and client-participant discussions.

The Jury has concluded that the same pile foundation technology be applied for all four entries, so as to minimise differences at this stage.

It is notable, then, that Sunflower has maintained the size of the larger lower floors, which significantly adds costs compared to the other proposals. Also, their solution for the top floor construction is costly, but could probably be omitted with slightly altered principles. Ripple Effect has high underground floors down to C-6. This requires a considerably more expensive, watertight sheet-pile curtain for the foundation cavity.

Market prospects

The ambition is to make this building a market leader, not merely due to its location but also because of qualities in rental space.

In Stage 2 the teams have adapted solutions to the recommendations of the Jury after Stage 1. It is the opinion of the jury that all proposals have qualities that will prove necessary adaption to market demands on area efficiency and spatial qualities an easy task.

It is to be noted that proposals for particular office profiles for lower floors are clearly innovative, targeted at setting new standards for commercial rental space, and can be adapted to all and any proposal.

3. SPECIFIC REMARKS

These remarks are aimed at emphasizing qualities in the four proposals as summarised by the Jury, in order to clarify what has lead to the Jury's decision.

3.1 OsloSolar

A. Innovation

Technology, Energy, Plus-House

OsloSolar scores very high on PV energy outputs, due to a combination of the architectural character of the building, with well-oriented facades and the large, inclined roof. Production exceeds energy needs by close to 5 kWh/m^2/y. Cooling demands are solved by local cooling machines in every ventilation room.

Recommendations from Stage 1 have been followed. The façade is fundamentally simplified from the formerly folded principle. Material use gives emissions of 8250 T CO_2, far below the reference building's 13.000 T, due to reasonably conventional concrete constructions with slim floors. OsloSolar is innovative in these achievements, and in the way the architectural and environmental concepts merge. Their C2C strategy is considered best in the competition.

Bicycle as a trademark for urban sustainable transport has seen an important improvement from Stage 1. This is now a prominent feature in the building's public realm.

B. Architecture and urbanism

Architectural concept

OsloSolar stands out with trademark qualities as a frontrunner for a new generation of environmentally friendly commercial office buildings. It does not invite replicating, because of the intimate connection between the particular architecture and the inherent site qualities. This is a unique design aimed at optimising energy production in a particular setting.

OsloSolar lends quality to the two adjacent but older high-rise buildings, with its pointed and inclination. The prominence of the inclined roof orchestrates the transition between the high-rise cluster at Oslo Central Station and the lower surroundings.

The roof should be modified to become much more of a fifth façade with terraces that give daylight and panorama viewpoints for the upper floors, combined with extensive PV-panel-cladding.

The building is spectacular without being "fancy", formally simple without becoming banal. Broken geometrical façades plays up to the neighbourhood, both at close encounter and at distance. The integrated atriums, the "grottos", downplay the dimensions of the elevations to mediate the scale of the immediate surroundings. The grottos create an openness between the building's inner life and the surroundings and contribute to emphasising the project's green profile. This is excellently done.

Façades

Horizontal bands of windows in combination with solar cell bands in between create en interesting "stripe" character, even with a relatively restricted windows area (17%). The narrower of two window bands per floor ensure good daylight conditions deeply into the floor areas.

There is, however, a definite danger of creating just another banal glazed façade where windows and solar panels merge visually. In the coming design process, it will be a central task to hold on to the intensions of the horizontality of the windows-solar cell solution in

order to enhance it and enrich the potential of branding solar cell production in contemporary architecture.

Green grottos create a welcome contrast to the otherwise large bulk of the outer shapes. These are the elements that distinguish the building from a more schematic attempt. For any and all observers, the building's large-scale architectural elements will be easily and immediately conceived. OsloSolar identifies environmental sustainability in an excellent manner.

Urbanism

Ground level connectivity is excellently solved, inside as well as outside, with browsing areas of comfortable proportions, clear communication lines and an entrance lobby which also serves as the passage between the building's two main exposures. At the same time, the reception area is well defined and can function separately from the urban lobby.

Double ground floor height is decisive for a sense of openness towards the grand plaza park to the river, emphasised by the elegantly generous canopy that marks this transition, but also close connection, between busy inner browsing and the outer urban realm.

The proposal integrates bicycle activity as a vital part of the building's architecture. The bicycle hub and ramp to underground bicycle parking is best in the competition.

No side of the building is a "back side". The proposal for public activities on all corners underlines the urban qualities of the building. A proposal for short-time rental space for various cultural purposes and related events and activities underline the concept of the building as an "urban dynamo".

C. Market and economy
Competitive market edge

OsloSolar investigates "edge" in a very successful manner. Atriums are fine elements. They revolve and enrich the main L-shaped plan. Green grottos harbour positive surprises. However, floor plans seem rational but are schematic, and need considerably more study. Ample depths and construction dimensions allow for a variety of office sizes and solutions.

Vertical green grottos give a unique inner space variety, allowing for transparency and visual contact spanning the floor plans. This three-dimensional spatial reflection gives qualities that are unique in the competition. The grottos can be connected to enhance the three-dimensional quality of the inner building. By enlarging the northern grotto on the upper floors and expanding the skylight area, both spatial and daylight qualities will be enhanced.

Simultaneously, the inside-outside browsing qualities of the ground floor, underground bicycle parking and the surrounding pavements, park and squares, help brand the building as unique in Oslo and rare for a commercial office building in the international context.

Cost

The construction is largely conventional. It can probably be easily modified to meet cost reduction demands.

3.2 Ripple Effect

A. Innovation

Technology, Energy, Plus-House

Ripple Effect pursues energy balance through a complex mix of sources, predominantly using PV cells combined with solar heating, a bio-digester producing both heat and electricity (CHP), plus district heating. Cooling is solved by use of a central cooling plant. This means that both heating pipes and cooling pipes are needed throughout the building. The investigation of sources is interesting and well argued.

Ripple Effect has used significantly lower electricity production per m2 PV in their calculations than the other entries. When adjusted to the same level, calculations show that neither solar heating nor PV panels on the north façade are necessary in order to meet the +2kWh/m2 requirement. By these adjustments the net gain is improved from +3,4 to +5,5 kWh/m^2/y, best in the competition.

On the negative side, emissions amount to nearly 12.000 T CO_2, very close to the reference building's 13.000 T. This is largely due to a very high proportion of concrete in construction cores (can be reduced to 10.300 T by reducing 3 cores to 2). It is noted that the solar energy gain from the northern façade loses all its effect through the negative CO_2 impact of the PV cell panels. However, as these PV panels are not necessary to meet plus house requirements, their emissions are not included in the revised calculations.

Nevertheless, the concept is robust and well argued. Interestingly, the building has a classical elegance that in no way announces its environmental qualities. As such it is an excellent example of high quality office building architecture with cutting-edge environmental solution discreetly integrated. The Jury finds this angle refreshing and promising, in addition to innovative.

B. Architecture and urbanism

Architectural concept

The timeless elegance of Ripple Effect's architecture has largely remained throughout both stages. It has a dominantly "high-end" appearance that would be welcome anywhere in Oslo, and particularly in this sector of the city. The project will add to the neighbourhood something that definitely is not presently there, but much needed. The way the large format is articulated is very good.

On a more critical note, the Jury holds that although ground level façades reflect high quality, "bustling streets" design, the proposal fails to fully grasp the potentials of the exposure to the park. This calls for a different solution, more in line with those of the three other finalists.

After Stage 1, the Jury remarked that the way PV panels were integrated with the windows as a sort of cassette solution, albeit innovative, raises questions on risks of falling ice and snow. This has been a recurrent point of discussions with three of the proposals. The Stage 2 solution has seen a modification in order to meet recommendations, but the Jury maintains that whereas the problem is only partially solved, the overall impression may have been somewhat weakened. This might indicate that the authors have been too attached to the first attempt to fully investigate alternatives that would move the proposal forwards.

In addition, the Stage 1 recommendations indicated that the large "openings" (atriums) in the façades seem to contradict the architectural concept. The Jury called for a critical reinvestigation of this element. The Stage 2 entry appears to have ignored this recommendation.

C. Market and economy

The strong architectural quality makes Ripple Effect an attractive market object. The floor plans are elegant and efficient. The building has the potential of setting new standards.

Cost reduction recommendations after Stage 1 have largely been followed. The exception is the number of constructive cores. With some simplifications, however, Ripple Effect should have the capacity to meet cost limit demands.

3.3 Sunflower (Stage 1: Supertree)

A. Innovation

Technology, Energy, Plus-House

The energy concept is innovative and novel, and quite different from the other entries. The Jury and its advisers have spent a great deal of time discussing the concept with the authors and between themselves, in order to assure that the concept is fully understood and appreciated. On a critical note it must be said that the outputs of the PV cells are too optimistic. When adjusted to the same outputs as the others, it may seem like Sunflower falls short of Plus-house requirements. However, expert controls of calculations show that the building's energy demand is lower than calculated and Sunflower will possibly meet Plus-house requirements.

On the positive side, this concept represents a simplified system for ventilation. Very low temperature differences between heating and cooling, in the same pipelines, results in very high heat-pump efficiency (COP = 5). The alleged improvement in employee absence due to better working environments than with conventional systems needs further documentation but seem plausible.

The jury sees risks in experimenting with novel solutions on this magnitude, but is of the opinion that the system deserves to be tried for at least a medium size project in the near future.

Construction

The Stage 1 design saw a wooden high-rise construction. The Jury saw this as an example of positive audacity, but maintained that it would pose the client with a time-line due to the experimental character that would make it unfeasible. Stage 1 recommendations for construction have largely been met and the result is good, but cots remain high.

B. Architecture and urbanism

Architectural concept

Supertree has a monumental and elegant verticality combined with an almost classic lightness. The lower floors are gradually widened to form a "root" which lifts the building safely over the potentially banal vertical column. Public, private, cultural and commercial areas are successfully merged in a fine composition with a clear "edge" quality. On the critical side, this also poses a threat to project economy, due to the foundation cost with this kind of extreme ground conditions.

The orientation to Stenersgata, Lilletorget and Brugata, and the Vaterland Park remains one of the competition's most convincing.

The bicycle pathways are very well planned. They provide good connectivity with known goals, and good circulation without right of way conflicts between pedestrians and bicyclists.

C. Market and economy

The floor area has been slightly expanded after Stage 1, allowing for very simple and efficient, and highly adaptable office floor plans.

The architectural concept of the “tree” gives a wider base that necessitates added piles. Although these are slimmer than the core ones, high distances to the rock bottom add a relatively high cost. In addition, the spectacular top-floors steel construction adds costs beyond what is deemed competitive.

3.4 GreenWaterLand

A. Innovation

Energy and environment

The proposal scores high on environmental indicators. Emissions of 7450 T CO_2 are the lowest in the competition. A production of +2,6 kWh/m^2/y places the proposal above minimum requirements. The areas for PV cell panels have expanded and a very informative diagram showing the extent is shown.

B. Architecture and urbanism

The main architectural concept has remained largely unaltered. The building’s shape is a kind of hybrid, half triangular, half circular. The central daylight shaft from Stage 1 is gone and columns have been added to the facades to avoid cantilevered floors. Façades have been simplified and are articulated with more architectural stringency. Corner gardens have been significantly improved, in accordance with Stage 1 Jury recommendations.

In spite of improvements, the Jury feels that this proposal still could have undergone a more thorough improvement. A high-rise in Oslo is still being met with opposition, and this attempt may be held to fall short of the requirements for a truly convincing architectural statement.

The C2C strategy remains one of the best in the competition.

The ground level solution has seen important improvements since Stage 1. The proposal has a very interesting solution to connections to adjacent streets, Lilletorget and the Vaterland Park. In accordance with alterations, GreenWaterLand shows a capacity to make a very positive difference in profiling Lilletorget 1 as a hub in the urban context.

C. Market and economy

GreenWaterLand has an efficient economy. Floor plans are flexible and easily adjustable to differing purposes and sub-divisions. Office floors offer very good panoramic views in different directions.

The building has cost-drivers in the inner Green Rooms, material use in the core construction, an expensive roof construction, and large basement volumes. The constructive system, however, is favourable, the façade are simplified compared to Stage 1, and the building is compact.