BAS SMETS

Bas Smets, Bureau Bas Smets, © Jade Quintin

ARCHITECTURE FOR SURVIVAL

In 2022, Bas Smets led the team that won the competition to redesign the public spaces around Notre-Dame in Paris. This year, he will represent Belgium at the 19th Biennale Architettura in Venice, together with biologist Stefano Mancuso. Nikolaus Hirsch, director of CIVA, met the landscape architect in Brussels to discuss microclimates, plant intelligence and building for a warming planet.

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Interview by Nikolaus Hirsch

NH (Nikolaus Hirsch) For the Venice Architecture Biennale, you will turn the Belgian pavilion into a biosphere. It seems as if you radically question the role of architecture.

BS (Bas Smets) The project for the Biennale is the logical next step of landscape projects I have been conceiving for the last 20 years. Both in my projects and in my work with students, I've been studying the city as a juxtaposition of microclimates, with buildings that change the wind and solar exposure and hardscapes

Bas Smets and Stefano Mancuso, 'Building Biospheres', Belgian pavilion at the 19th Biennale Architettura, from 10 May through 23 November 2025, Venice, labiennale.org

that change the permeability. Once you understand the city as a combination of microclimates, you can look for a similar natural microclimate and bring its vegetation into that artificial environment. For our proposal for the Belgian pavilion, we understand the building itself as a microclimate — and not necessarily as architecture.

NH Does this approach go beyond the traditional dichotomy between architecture and nature, built and non-built?

BS The process has expanded my way of looking at space: not as a dichotomy between built or unbuilt, but as a composition of microclimates. In the pavilion there is less sun exposure, there is no rain, there is less humidity, but it still produces a microclimate. The question is: what kind of natural microclimate does it correspond to? The project questions the role of architecture in a fundamental way. We spend 80 to 90 per cent of our time in buildings we have made for ourselves, cut off from the biosphere that supplies the air we breathe. Once you start thinking about that fact, it seems paradoxical that we make spaces that are cut off from what keeps us alive.

Visualisation of 'Building Biospheres', Belgian pavilion 2025, © Bureau Bas Smets

NH Central to your pavilion are trees — how would you describe the role of trees, both in the past and in the future?

BS In the nineteenth century, we started planting trees in cities as embellishment; today, 200 years later, we plant trees in cities as an ecosystem. They are beautiful, but they also capture fine particles, sequester CO2, produce oxygen, lower temperature through evapotranspiration; and they store rainwater. Trees are inserted into the fabric of the environment for all these services. Yet in buildings, we still use plants to embellish the space and not for their ecosystemic services. Now, in the Belgian pavilion we bring those plants into an interior to make use of the services they provide for us outside.

NH What do you actually do in the pavilion to make that possible?

BS We started by looking at the conditions of the pavilion. Designed by Léon Sneyers, it was the first foreign pavilion built in the Giardini, in 1907. It has a big central hall with a big skylight. We took the horizontal

projection of that skylight on the ground — five by eleven metres — and planted that area with subtropical plants. Humankind came from subtropical forests, which have a constant temperature of about 20 degrees. It is the environment humans later created everywhere on the planet. It is striking to think of the man-made building as a reproduction of the subtropical forest.

NH This idea of a constant, controlled environment — a 'well-tempered' environment, as the architectural historian Reyner Banham would say — formed a ubiquitous standard in the modern architecture of the twentieth century.

BS I re-read Banham's *Architecture of the Well-Tempered Environment* in preparation for the Biennale. The fact is, we've gotten better and better at producing our own climate that is cut off from the outside — whether on the North Pole or in the desert. Since we need an enormous amount of fossil fuels to maintain these artificial environments, you can draw a direct link between these human-made climates and the climate crisis.

NH How do you produce the subtropical climate in the pavilion?

BS We measure the sap flow — the water that comes from the roots and goes into the leaves; we measure the expansion and contraction of the stem with a dendrometer; we measure humidity and temperature in the soil and air. Basically, we measure the whole installation. From that data, we understand what the trees need. For example, if we see that there's no more water in the ground, it starts to rain. When we see that photosynthesis stops because there's no direct sunlight, artificial light pops on. If we see that photosynthesis and evapotranspiration stop because of too much humidity in the air, the humidity gets extracted. These three actions — ventilation, irrigation and lighting — are decided by the plants themselves. The idea is that the plants create a microclimate, a kind of 'bio-air conditioning' that is a combination of what the plants need, what we humans want and what the building can take. We programmed these three parameters into an AI which merges with the NI, the natural intelligence of the plants, to form a collective intelligence.

NH In the architectural field one can see a new interest in science. This seems to contrast with the period in which you started your career, when the disciplines of architecture and landscape architecture were dominated by a rather formalistic approach.

BS As landscape architects, we've always been working with living material. Today, we use sensors in climatically challenging projects, like in Paris or Arles; there, for every ten trees, we designate one 'witness tree', which has sensors installed in the root ball so we know where the roots are going. We've always used science to better understand how these living organisms are doing and what they need. Instead of just giving them water every two weeks, we try to read what the plants need and cater to that.

NH In the age of climate crisis, it seems as if architects and landscape architects also have to become — whether they like it or not — some kind of climate engineers. The Belgian pavilion is a climatic prototype on the scale of an individual building, while your project for LUMA in Arles aims for a climatic impact on an urban scale.

BS The project in Arles was about the production of a microclimate, with the help of 80,000 plants — but I like to imagine each of our projects as a prototype. Arles was our most ambitious attempt so far, in that we wanted to change the microclimate of a ten-hectare site.

Visualisation of Notre-Dame project © Studio Alma for Bureau Bas Smets

NH Can you describe the project in more detail? What was the particular challenge in Arles, a city in Southern France, with an extreme climate.

BS The two biggest factors in Arles are the heat — very hot, long days with sun in the summer — and the mistral wind. The heat sucks all the humidity out of the leaves, which creates a very difficult situation for plants to survive in. The challenge was how to build an organism on a platform that was dug out of the rocks in the nineteenth century — there was no soil, no water, no life at all. It was a zero-degree starting point, we had to rethink everything from scratch. We decided to study what nature would have done over time, by accelerating that process on the site. Over time, the wind would have brought sediments to the site and shaped a topography, and the plants would grow from the shallow soil into the richer soil, into the next ecological succession. We planted 80,000 plants, measuring them, giving them the water they need. Today, 87 per cent of the trees and plants are completely independent, meaning they've grown out of their root ball and can continue growing with the rainwater.

NH What did you take from Arles to Venice?

BS The project in Arles has shown me how much we can do with plant agency, and how we can use this natural force to produce microclimates — whether at ten hectares, like in Arles, or over a couple hundred square metres, in the space of the Belgian pavilion. For the Biennale, we selected the plants from mostly Italian nurseries in October and brought them to Ghent, where our partner, the University of Ghent, found a glasshouse that has the same dimensions as the space of the Belgian pavilion in Venice. Since November we've been working with a one-to-one mock-up, registering the measurements, testing the mechanisms — I can actually see on my phone right now what's happening, such as reading the perceived temperature of the space. That is what we are bringing to Venice. We will have six months of data from the glasshouse in Ghent and six months of data from the pavilion during the Biennale in Venice, and then we hope to bring the project to a third location so that we can continue developing the prototype and harvesting new data.

NH You mentioned the notion of perceived temperature, a term we know from the daily weather forecasts. Essentially, there's a difference between the measured temperature on a thermometer and the temperature that your body *feel*s.

BS Humans are animals. What we *feel* in our bodies is much more than just the temperature on a thermometer. If it's cold and there's a chill wind, you *feel* much colder than if it's cold and there's no wind. There's a way to measure perceived temperature, called UTCI — universal thermal climate index — which includes temperature, but also wind, humidity and radiation. These elements together determine what you as a human body *feel*. In Arles we focused intensely on this aspect. In the summer you want a cool breeze, because it's refreshing, but in winter you try to block it. If the wind comes from different directions, you can use landscape design to create a better perceived temperature. You want shade and evapotranspiration in the summer; in winter, you don't want shade, you want the sun so that you can work with leafy trees, and so on. For the Notre-Dame project in Paris, we implemented these things as parameters of the design itself, working with the winds coming from the Seine, working with the reflection, blocking winds in the winter, calculating the evaporative cooling by bringing a thin layer of water on the plaza. These UTCI parameters became tools to guide the design, not just something we calculated afterwards. And because these parameters measure mostly invisible things, we had to find a new method of representation.

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NH Thinking about the aesthetic dimension of projects such as Notre-Dame in Paris and the Venice Biennale pavilion, one senses a search for a new language. Architecture comes from a visual, object-driven culture, which *feel*s quite limiting in terms of the environmental challenges of today. When we showed your Notre-Dame project in the exhibition 'Power' in 2024 at CIVA in Brussels, we tried out a combination of more traditional tools, like models, and visualisations of advanced scientific data — an aesthetics that makes you see climate.

BS It's about representation, but it's also about producing the ideas and giving them new form. How do you show climate in a section? How do you show perceived temperature? I often think about Alexander von Humboldt coming back from South America with his data, sections and elevations of the Chimborazo — he had so much information that he needed a new way of representing it. That kind of research is essential to what we do. At CIVA, for the first time we projected perceived temperature onto the model and also on the wall at the same scale. And something happened where you would see the information on the wall and on the model at the same time, and you could almost *feel* it.

NH How do you address the question of representation in the Venice pavilion? Or is the emphasis on the physical experience?

BS My hope is that you will step out of the sweltering summer heat of Venice and into the Belgian pavilion and breathe the fresh air, the air that these plants are making; that you will *feel* the evaporative cooling of the water of their leaves; and that, for me, will be the best proof. Since it's such a highly controlled environment, we project everything we're doing on the far wall, so visitors understand what's going on. For example, we install a weather station on top of the pavilion, another one in the reference room that is cut off from the plants, and a third one in the plants. You'll be able to compare the humidity, temperature and perceived temperature from all three weather stations. We also show the parameters that determine when it starts raining,

you'll see an animation showing rain and you'll hear the rain behind you. When the lights are on, you'll see which tree is asking for light. A better understanding of what plants *feel* can give us so much information about the environment and help us put them to work in different ways. Plants are not shaped by the environment, plants shape the environment. It's about seeing plants as agents and not just as objects in space.

NH While the pavilion is forward-thinking in its use of new technologies, there is also a sense that it references almost pre-architectural conditions, when humans created their first habitats on the planet.

BS Essential for me is that the pavilion redefines architecture — not as form or volume, but as a condition for life to coexist. Then architecture becomes what it was at first, a means of creating the possibility for life. It goes back to the central question: What do we need architecture to do for us to survive? Now, with an uncertain climatic future hanging above us like the sword of Damocles, architecture is once again about survival.

Landscaped park at Luma Arles, © Michiel de Cleene