The Sand Engine project by the Advisory Committee Delftland Coast, Province of Zuid-Holland, represents building with nature as civil engineering for the advanced. Some 21.5 million cubic meters of sand are situated at a strategic place on the coast. The sea currents will erode the artificial dune and sedimentation will strengthen the weak spots.
Resilient Urbanisation as a Landscape Architectural Question

People are urban by nature. Most global environmental problems have urban roots. If we want to solve these problems we have to solve our urban problems.

In 1969 the French writer Georges Perec wrote *La Disparition*, a literary thriller on the disappearance of the letter “e”. In his novel of over 300 pages that letter is not used once. The IABR 2014 *Urban By Nature*, which I curated, was a biennial that, with regard to the three “P”s (People, Prosperity, Planet), concentrated on the “planet” angle of urbanisation. We did that in over 100 projects without using the word “sustainability” once. In our case – admittedly – this was not as difficult a feat as Perec pulled off. Not that I am a denialist and want to suggest that there are no problems, nor do I reject the basis of the sustainable agenda, on the contrary. It’s not even because the term sustainability has lost much of its significance due to its ubiquitous and everyday green “washing”. One can even buy biodegradable, lead-free bullets for sustainable warfare these days. My avoidance of this term is mostly informed by the subtexts it seems to convey: stability, everlasting equilibrium, endurance of systems and steady state, (and for the metaphor resilience: bouncing back to a former state). These terms are strangely at odds with the reality of our condition. Paul Crutzen, who coined the term “anthropocene”, meaning the age of man, observed that the changes mankind has unleashed, like the influencing of geo-chemical cycles, sediment transport in rivers we dam, the acidity of oceans and even changes in the climate are measurable on a geological scale. I would like to add that they are irreversible in the sense that we can mitigate the effects, but these complex systems will never exactly return to their point
of departure. We can’t go back, just as we can’t go back to the weather of last month. The relentless arrow of time points in only one direction: to the future. We are moving amidst mobility, changing a changing medium. We urgently need to learn how to ride this tiger.

Very much in concurrence with this anthropocene vision, at the Urban By Nature biennial we took a geographical look, both in terms of space and time, at our biggest artefact, the urban landscape. Not at the city in the traditional sense, not even at the dispersed Zwischenstadt, but at the complete conglomerate of built-up areas, airports, industries, intensive food production, parks, strip mining areas, nature reserves, infrastructure and so on.

Two boundaries are being blurred here: The boundary between the city and the countryside is an idée reçue of course, but the boundary between nature and society is also fading. One of the fascinating aspects of our time is the hybridising of the techno-sphere at large with the biosphere. Hence the observation that urban landscapes form our habitat, i.e. ecology and nature all rolled up in one. We are a species with a propensity to cluster together and to build cities: we are Urban By Nature. This positive angle on urbanisation as a highly successful model of spatial organisation also allows for the observation that most global environmental problems have urban roots. If we want to solve these problems we have to solve our urban problems. And to solve these problems these urban landscapes have to help themselves to be more resilient to the ecological, physical, social, and economic challenges ahead.

Approaching urbanisation this way is, admittedly, rather abstract but it sheds some light on the kind of projects that landscape architecture faces and on the professional attitudes connected to these new tasks. This also makes it possible to construct a threefold interface with “resiliency”, in a way that is analogue to the three major sub-themes of Urban By Nature.

If we consider the urban landscape as a hybrid made of elements of the techno-sphere and of the biosphere, overall resilience has its first buffer in the capacity of the underlying ecosystems to respond to perturbations or disturbances (storms, flooding, quakes or fires) by resisting damage and recovering quickly.

An important role for landscape architects (and ecologists) in this respect is to bring nature-based solutions into the planning discourse. If we take a closer look at the urban landscape we can see all kinds of ecosystem services being rendered, such as the supply of potable water, the mitigation of the urban climate, food production, etc. The areas in the urban landscape where ecosystem services are provided can be enhanced by targeted planning and design. And, the other way round, natural processes like erosion, sedimentation, herbivory and succession can be used for human goals. Building with nature might be considered civil engineering for the advanced. Furthermore,
When the energy transition to CO₂-poor sources exceeds a 30 per cent share, infrastructure to store energy becomes necessary. Solar and wind energy are not always available. For the Rotterdam Region this infrastructure could be installed in the form of a marine energy station built up by a ring dyke ("Rotterdam Fallingwater" by Dirk Sijmons et al.). When energy is abundant, the water is pumped out. When demand increases, the difference in level is used to generate electricity again.
The 2012 research by design project "Ridge City" for Istanbul Arnavötköy by H+N+S, 51N4E and AWB showed that creating a sustainable fresh water cycle for Istanbul can be formative for the spectacular expansion of the megacity. Waste water is processed and reused for precision agriculture that will protect the basins that can supply the city with sweet water.
systematically learning from the ways nature "answers" human interventions, we can internalise that knowledge in our designs and promote biodiversity as a planned side effect in our projects. All this is of course the traditional role of landscape architecture – mediation between society and nature – in a new guise. Mediating can take up a broader meaning in this context. Not in a pathetic way, where a scared humanity wants to be reconciled with an indifferent nature, but simply because landscape architecture finds itself in the middle, now that we face problems where hard engineering and life sciences have to meet. This calls for an approach where design and planning processes take the form of a dialogue with ecosystems (or social systems for that matter) rather than single, hit-and-run, interventions. Perhaps as important is rethinking the possible role our traditional ways of mediating has. What could the significance of gardens, parks and nature conservation be for the inhabitants of the urban landscape?

Being resilient also means the ability and the buoyancy to keep life support systems functioning under the stress of sudden disasters or slow disasters like the effects of climate change. These life support systems are synonyms for the vital flows of urban metabolism that keep the social tissue alive. To name but a few: the flows of energy, food, potable water, information, building material, freight, people, heat exchange and waste, etc. They represent the process-side of urban society. Addressing these flows propels us to the scale of the urban landscape as a whole (or beyond) because they do not limit themselves to the administrative urban boundaries but instead stretch their spatial influence far out into the region. Hence, planning resilience means planning on a regional scale. All these processes have spatial components that make them, in at least three ways, into pivotal challenges for designers, engineers and policy makers. First of all, the infrastructures that carry these flows are often neglected spatial design commissions. From wastewater treatment plants to complicated nodes of transport, they all have their own fascinating programme, and on top of that very specific demands when it comes to being resilient and robust enough to withstand critical situations. Perhaps the most challenging flow, when it comes to resiliency, is energy because it is conditional for many urban life support systems.

Energy is a perfect example of the second angle of how metabolism could be an interesting design topic. Thinking in flows makes it possible to improve the environmental performance of the urban landscape. The energy sector is in a trajectory of transition from fossil fuels to sustainable sources. Technical infrastructure such as solar PV fields, wind turbines, high voltage DC transmission lines and intermittency infrastructure might be the single most important agency of change to the landscape of the 21st century and thus a new working field for landscape architects. Apart from
that, the resilience imperative aims to be more energy self-supporting on a regional scale when it comes to mitigating the effects of blackouts in national base load systems, whether or not they are caused by disasters.

Thirdly, the infrastructure of metabolic flows might be used as (indirect) planning and design instruments following the 19th century wisdom that the spatial order tends to set itself to the infrastructure: "The line is always in the right place". This hidden capacity can be used in situations where master planning doesn’t work. This is a condition of the dynamic planning context in fast growing megacities and in urban landscapes, where the scale ignores administrative borders and governance questions arise. Metabolic flows can literally be formative with regard to the shape of cities in this sense.

When optimal resilience can only be reached by retrofitting on a regional scale, we are confronted with towering governance questions. It is hard to see these border-crossing urban carpets as an object of comprehensive policy or planning, let alone design. We are in the research stage of mapping this new phenomenon, working out the legends for these maps and finding a vocabulary for the strange hybrids of land use that seem to be endemic to urban landscapes. Planning and design will always be incremental and piecemeal engineering. It is about retrofitting, repairing, patching, making insertions and about reweaving the urban carpet. But these incremental changes and improvements can also be highly strategic choices. At the IABR 2014 projects were displayed that dealt with the defragmentation of landscapes that were cut up by infrastructure. Projects were exhibited that showed how peri-urban agriculture can be a success, how water might be the vital link in striking new coalitions between different forms of land use and how urban carpets can be reweoven gradually using only education and capacity building as instruments. One project showed the spatial expression of a radical idea: a decentralised taxation of CO₂ exhaust that in the long run will deeply influence the spatial order of the urban landscape. Here lies a future frontier of research and design. We might be Urban By Nature but we are not yet very good at urbanisation when it comes to reducing the ecological footprint of this process. It might be very abstract and ultra complex, but to my mind as a profession we have to persist in identifying and conceptualising the possibilities for configurations of the complete artefact, where all the forms of land use that are needed to keep up our life support systems will find a lasting and functional place. We must first be able to conceptualise the urban landscape that will resiliently maintain these life support systems and only then look at questions of governance. Or rather, let's not mix up governance with politics, and look at these configurations from a truly political angle and ask ourselves: are these the desired urban landscapes we want to live in?
Reweaving the urban carpet is always a piecemeal operation, but the choice of the bottom-up interventions can be very strategic. During the IABR 2014 the Project-atelier Brabantstad by AWB, Floris Alkemade Architects & LOLA Landscape Architects chose six programs of the Waterboards to link “urban” with “rural” programs to start desirable social-spatial processes, and identified the regions where these strategies would be most likely. The polemic about the possibility of designing the urban landscape as a whole is approached ironically by weaving the final proposals into a tapestry 3 x 12 metres in size.