

# Eco-Speculation: Envisioning a Sustainable Future in the 'Eco-Architectures' of Stefano Boeri and Vincente Callebaut

Sanchar Sarkar

## Abstract

This paper intends to explore into the projection of a reality where architectural designs become an embodiment of balance between nature and urban planning. In the context of mindscapes, the speculative sensibility manifests itself in a perspective where memory and imagination functions to create a seemingly unimaginable future. 'Solarpunk' future conceives this seemingly unimaginable future of 'fantastical worlds' and projects a vision of equitability which can dissolve the dualism between humans and nature. The architectural designs of the Italian architect, Stefano Boeri and the Belgian architect, Vincente Callebaut has a dimensional impact on reorienting and reconfiguring our ecological and cultural consciousness. This paper will focus on Stefano Boeri's 'vertical forest', a new format of architectural biodiversity which harbor humans, birds and trees. Vincente Callebaut's 'city trees' are phenomenal architectural designs which resembles the DNA structured high rise buildings that are covered with greenery cascading down with a 360 degree panoramic view. Both the architects have influenced the idea of 'green sustainability architecture' and their efforts are fundamentally important to the envisioning and internalizing a solarpunk mindscape that will be a consciousness taking humans and nature one step closer to a sustainable and progressive equitability.

**Keywords:** City Trees; Eco-architecture; Eco-speculation; Embodiment; Futuristic; Imagination; Progress; Solarpunk; Sustainability; Vertical Forest.

Reconceptualization of architectural designs has become functional in the context of mapping the synergy between nature and urban planning. Modern architecture takes a step forward from being just another blueprint of

living and work places. The architectural sensibility of the 21<sup>st</sup> century has paved the way for envisioning new forms of habitat that can harbor nature and humans in a proper balance. The questions regarding the concerns of sustainability, efficient and minimal uses of energy have shifted the focus of architecture to recreate spaces that can perform a process of continuous reinvigoration in the natural environment. The advent of eco-architecture has un-parallel possibilities that can merge the rift between technological-industrial advancement and concerns regarding the conservation of ecology. The eco-architectural vision embodies a consciousness for preserving and sustaining the environment that can look forward to a future of sustainable urban planning and landscape management. This mode of architecture will be fundamentally responsible for effacing the idea of urban planning as a form of encroachment on natural environment. It will be instrumental in erasing the dispensability of nature and ecology in the face of rapid urbanization.

Eco-architecture locates itself at the disjunction of what we understand as natural environment and the built environment. It has the potential to redefine the capability of built environment and what it can achieve. Constructed environment can reorient and correct the apparent imbalance that has always been so explicit when nature and urbanization collides. In this context it must be considered that futuristic architecture sets a trajectory where the concept of collision between human and nature is not the concern. Futuristic architecture attempts to function with the environmental concerns in a more synchronous and mutually dependent manner. It contests the pre-existing dualism and binary between the existing environment and constructed environment. The transformation of the environment and its impact on ecology have been much argued upon based on the notions of exploitation, consumption and overuse of natural resources. Urbanization and resettlement have been accused of its landscape changing effects and hence falls under the category of a process detrimental to nature. Green architecture perceives an altogether different approach to the re-envisioning of civilization and its coexistence with nature.

The conceptualization of this architecture is fundamentally dependent on the economy. In fact economy channelize the very approach of modern urban planning in terms of the raw materials, energy and production management. Green sustainability architecture functions as a mode of resistance to the degenerative economy. A degenerative economy is responsible for the overuse of resources and consequently massive production of wastes. This kind of economy is characteristically linear in nature. Here

the non-renewable resources like fossil fuels initiates the entire process. Humans 'take' the resources. 'Taking' includes all the processes like mining, excavation, quarrying, drilling and all other that help humans to extract resources and materials for further production. In the very beginning when humans 'take' they create wastes. So, the initial process of taking and gathering resources produce a considerable amount of primary waste. In the next process, the resources are used to 'make' the desired produce. 'Making' includes all forms of construction and production. The 'made' product is supplied to the market that becomes instrumental in satisfying the varying demands of the people. This process produces what we know as the secondary waste. Finally, the process comes to an end where humans consume and dispose their post-purpose objects as wastes. The linear process divided in three divisions; 'take-make-consume and dispose' is predominant in most of the economies around the world. This consumption and disposal sensibility has initiated a mismanagement of resources and produced wastes in massive quantities. The degenerative economy is explicitly anthropocentric and it excludes, by all means, the concern for nature and its balance.

Eco architecture facilitates the functioning of a regenerative economy which is circular in nature. In a regenerative economy the key factor is renewable energy. This economy can function through two processes, 'the biological cycle' and 'the technical cycle'. Both the processes are restorative, sustainable and energy efficient. We can observe the biological cycle in agriculture and organic farming. Permaculture and gorilla gardening can be taken as the best examples where the energy is drawn from the sun rays. The process continues as 'harvest-consume-regenerate'. The waste that is produced is not disposed. It is used as organic manure, fertilizer and fodder. Similarly, in the case of the technical cycle we can observe it as a 'make-use-maintain, reuse or recycle' process. Green sustainability architecture is dependent on this form of production process. It is interesting to observe the fact that the idea of money and capital will also be redefined in the context of a regenerative circular economy. There will be a huge production of natural capital in terms of the 'post-purpose' objects. The waste which is usually disposed can be reused and recycled to create new materials and objects for building construction.

The impact of eco architecture is immense in the context of eco-speculation. The very idea where architectural designs and living spaces can become an identity in itself. Its performance as an embodiment of nature conservation, sustainability and balance is yet to see its complete praxis. Nonetheless it is a visionary attempt to pragmatize our situation in

terms of population, living conditions, technological advancement and environment. It has created a promising and progressive visual narrative that can integrate the seemingly impossible visions of equitability. The limitations of eco-speculation are often characterized by its tendency to project ideas and visions which may seem 'utopian' and far from the understanding of reality. Eco-speculation uses a form of venture hypothesis that assumes possible outcome and probable scenarios that may exist in the future. It is a different perspective that accepts the uncertainty that is so essential to an age and consciousness torn apart by the conflict of disillusionment and hope. But it never limits itself within the problematic discourses and understanding of the contemporary. Eco-speculation never focuses singularly on critiquing reality. It creates visions and scapes of 'alternative reality' which challenges the predominant pessimism that the condition of ecology and environment is beyond recovery. Eco-speculation directs itself to create mindscapes that can re-enchant the mundane acceptance of the normative. It revitalizes the possibility of a better future where the elements of nature and human can share and develop.

Lawrence Buell's *The Environmental Imagination* portrays how literature represents the natural environment. Buell gives us an extensive account of environmental perception with reference to Thoreau's *Walden*. He elaborates on the possibilities of literary scholarship that imagines a more eco-centric way of existence. He explains and looks into the visionary themes such as the embodiment of nature, place and memory interrelationship and foresight of ecological collapse in the near future due to anthropocentric excesses. Central to this observation is the realization for the need of a better ecological understanding that can chart a new trajectory to conceptualize a unique anthropo-ecological imagination and reality. Eco-speculation derives much of its functional tenets from Lawrence Buell's idea that with the ecological crisis comes a crisis of imagination and rethinking and there is an utmost requirement to chart new and revolutionary ways to balance nature and human relationship. Eco-speculation is an 'avant garde' in the field of imagining the environment, ecology and civilization of the future. Thus, it manifests as the new age understanding of the environmental imagination that was fundamentally articulated by a writer like Buell.

Eco architecture is the manifestation of eco-speculative visions that will influence time and space with tangible reality. It has the potential to literally terraform and create sustainable cities and living spaces that will thrive and breathe with the environment. Green sustainabili-

ty architecture will transform the reality of 'manufactured landscapes'. It can erase the disposed, abandoned and extracted landscapes and create structures that will complement the living nature and instead of being an obstacle to the process of nature will act as the reinvigorating reservoir for nature. Simon Schama in his book, *Landscape and Memory* writes,

"For although we are accustomed to separate nature and human perception into two different realms, they are in fact indivisible. Before it can ever be a repose for the senses, landscape is a work of the mind. Its scenery is built up as much from strata of memory as from layers of rock" (Schama 7)

### **Dendrophilic Eco-Speculation**

Memory and embodiment are quintessential to the existence of green architecture. Dendrophilic ecospeculation can be understood as a new wave of speculating possible urban futures where construction of 'arcologies' will become the predominant form of architectural establishments. The word arcology, a portmanteau of architecture and ecology was introduced by Paolo Soleri in his book, *Arcology: The City in the Image of Man* (1969). Soleri elaborates on the concept of arcologies as a neo-natural phenomenon where architectures are considered as vast biological entities, an organic extension of the human who are residing in it. Soleri explains that an arcological design should be conceptualized in a comprehensive manner so that it can house everything that makes human habitation possible. The structure must possess an advanced space management planning that can accommodate residential quarters, green zones, freight systems, water and power supply, transportation, reuse and recycling units and most importantly a functioning biodiversity where weather systems can be coordinated with human habitation, flora and fauna. It goes without saying that an arcology must be a multistoried structure; an expansive habitable sheltering construction that will divide three dimensional areas in several configurations of huge and medium subspaces. The arcology will be able to regulate its own weather and will have its own cityscape. Arcology bridges the distinction that rests between the structure of nature and the structure of humans. Arcology situates itself in such a position where ecology can be modified according to the living conditions of the humans.

If we observe Stefano Boeri's concept of 'vertical forest' we will find his attempt to recreate green cities that can harbor both human and nature. His architectural blueprint of the vertical forest primarily focuses on the idea of synthesis. Boeri's simulated structures are representative of the new determinants of eco-architectural designs and perception. There is

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an extension of huge overhanging balconies around the living quarters that are constructed to create ample space for agriculture and vegetation. These balconies can also provide area for the growth of trees with canopies that in turn adds to the beautification of the outer walls of the buildings. The contrast of concrete and greenery is maintained through the use of white stoneware that allows the presence of plants to be highlighted if it is seen from a distance. Vertical Forest stands as a living example of modern city structures that attempts to bridge the natural and the human. The Bosco Verticale or Vertical Forest project was influenced by Italo Calvino's novel, *The Baron in the Trees* (1957). In this novel the protagonist chooses to withdraw from his property and reside permanently in the trees amidst nature. Boeri's architectural marvel is located in Milan, Italy comprising of 11000 perennial plants, 900 trees and 5000 shrubs. This extensive vegetation and green-scape have improved the quality of air in the surrounding areas. This architecture has one of the most efficient ways of mitigating the increasing carbon di oxide in the district. The building's biodiversity consists of more than ninety flora species that can facilitate the growth of new fauna in the district. The canopies of the trees protect the building and its inhabitants from extreme climatic conditions. It is a very pro-ecological structure that has reinvigorated ideas of the neo-metropolises. It strives to achieve newer and bolder forms of life sustaining systems, an eco-polis that will become the future cities; pro-environmental in their own existence.

Vincente Callebaut has taken dimensional strides in creating simulations and blueprints of 'City Trees' that will harness energy and will be effective in modifying the living experiences for humans. It is similar in its objective and ideas to Stefano Boeri's 'vertical forest'. The blueprint of 'city trees' are created with the sole purpose of putting forward ecologically sustainable architectures. Like Boeri's 'Vertical Forest', Callebaut envisioned his architectural designs to curtail the unnecessary energy consumption. Most importantly, the project enhances the expansion of green zones in urban spaces that can help to reduce the carbon footprint in the cities. It is fascinating to observe how the juxtaposition of opposite elements like nature and urbanization can become so contradictorily coherent. Eco-architecture has landmarked itself as one of the most stirring modes of cultural reception. The study and analysis of eco-architecture transcends textuality. It is a systemic discourse which foregrounds materiality. As a futuristic effort that is still predominantly considered to be speculative and visionary, it constructs an apparently unreliable narrative in the most realistic way. It is very postmodern in its approach and entails the suspicion that postmodernism generates. Perhaps this

apparent unreliability is the most significant principle that guides the functioning of eco-speculation. A powerful visual narrative like the eco-architectural designs can actually efface the materiality and transcend into the questioning of the metaphysics of presence.

### **Urban-Nature**

In the prologue of his book, *Beyond Romantic Ecocriticism: Toward UrbanaturalRoosting* (2011) Ashton Nichols used a portmanteau word known as 'urbanature'. He elucidates the idea of 'urbanature' with reference to the 19<sup>th</sup> century painting that shows Mount Parnassus in Greece, considered to be sacred to the poets as the abode of the muses. The green architects who envision eco-districts and eco-polis in the future are instrumental in the extension of an imagination, a possibility that has persisted diachronically. Hence the contemporary visions are somewhere interconnected to the memories from a distant past that had once speculated a future which can be characterised by 'urbanature'.

Eduardo Gudynas in his essay, 'Environmental Ethics in Latin America: In Search of a Utopian Vision' states the idea of a unified relationship that integrates research and praxis to provide a solution to the question of equitability. This integration can produce a draft for autopian vision that can help us advance on a path of reconciliation with nature. He writes,

"Here is a challenge for our ideals and it is our duty to search for such a utopian vision and project." (Gudynas, 'Environmental Ethics in Latin America: In Search of Utopian Vision')

There are traces of such visionary sensibilities that has manifested itself in course of time. This very idea of speculating future that can be a tangible reality or a transcendental realization has passed through time, narratives and disciplines. It is deeply rooted in the history of ecological writing, criticism and theory. Hence the evolution of perspectives from 'urbanature' to green sustainability architecture is a process of unpacking the intentions and concerns of the anthropocene. Through this evolutionary process we can observe how humans are reacting to the major concerns of climate change and ecological crisis with changing times and changing circumstances. Eco-speculation portrays anthropocene's attempt to merge with the environment. It brings out the latent capacities of the human mind-scape that can actually contribute to dimensional changes in the field of sustainable development and equitability.

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