

Green Architecture and the Concept of Sustainability in the Capitalocene

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ABSTRACT Not long after its introduction, the term *Anthropocene* faced academic criticism, and *Capitalocene* was proposed as a more suitable alternative. Rather than the notion that humans, as a biological species, have a decisive impact on nature, a far more precise proposition is that such phenomena are inherently produced by capitalism – with its modes of production of commodities and space, exploitation of resources, and growth fetish – in which the human species is “trapped”. Contrary to the widespread illusion that capitalism is the only possible and acceptable socioeconomic system, the importance of critical theory lies in demonstrating that it is essentially a system of limitless destruction of the human environment. In view of the fact that even environmental protection has now been turned into a huge market driven by ethical manipulations misrepresenting the environmental performance of products, the so-called *green* or *sustainable* architecture has become a source of massive and lucrative investments, transforming spatial production into a detached and self-satisfied activity disconnected from biophysical reality and the metabolism between the human species and nature. This paper challenges and offers an ideological analysis of the manipulation mechanisms associated with the concept of sustainability in contemporary architecture on two levels: (1) the financialization of architecture via the real estate market, and (2) the dogma of environmentalism and the so-called *greenwashing* of architecture as the lever of green capitalism.

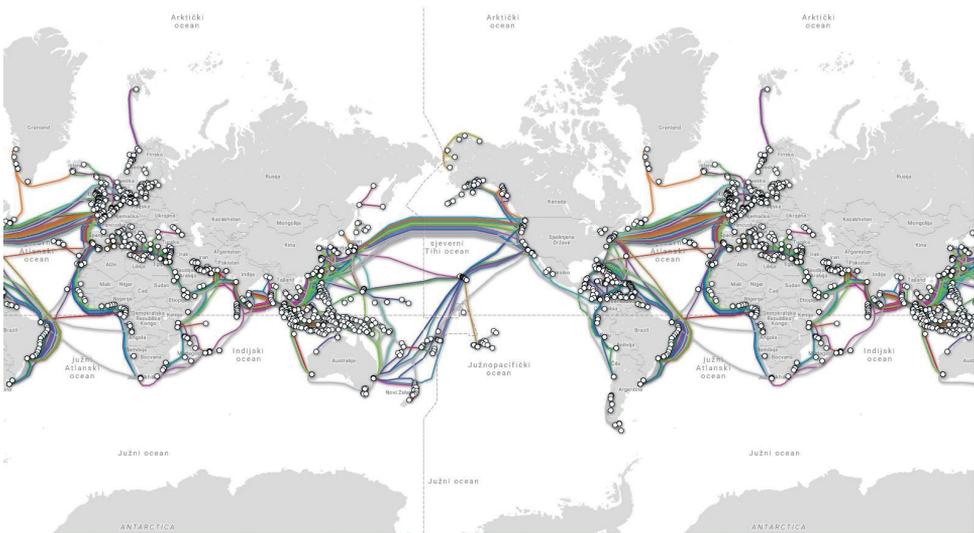
Key words: Capitalocene, limits to growth, greenwashing, financialization, degrowth.

1. Introductory Discussion: The Myth of Infinite Growth in the Capitalocene

Today, it is nearly impossible to distinguish between nature that is completely untouched by human activity and nature that has been (directly or indirectly) shaped by humans. We have exerted so much influence on and created our environment through urbanization to such a degree that it has become increasingly difficult to single out any part of the planet that might be regarded as “untouched” nature. Since urbanization is not limited to cities or urban areas but is a global process that exerts a cascading influence on the entire planet, we rightly speak of *planetary urbanization* today. Far beyond city limits, it encompasses rural areas, suburbs, natural environments, infrastructure systems, atmosphere, stratosphere, countless server farms, satellites, and transoceanic internet cables (Diagram 1). Urbanization affects the entire world, shaping the modes of organization of space, resources, and the whole population on a planetary level. However, this process is often driven by appropriation of and conflicts over urban metabolic processes.

Diagram 1.

Map of installed submarine internet cables



Source: submarinecablemap.com

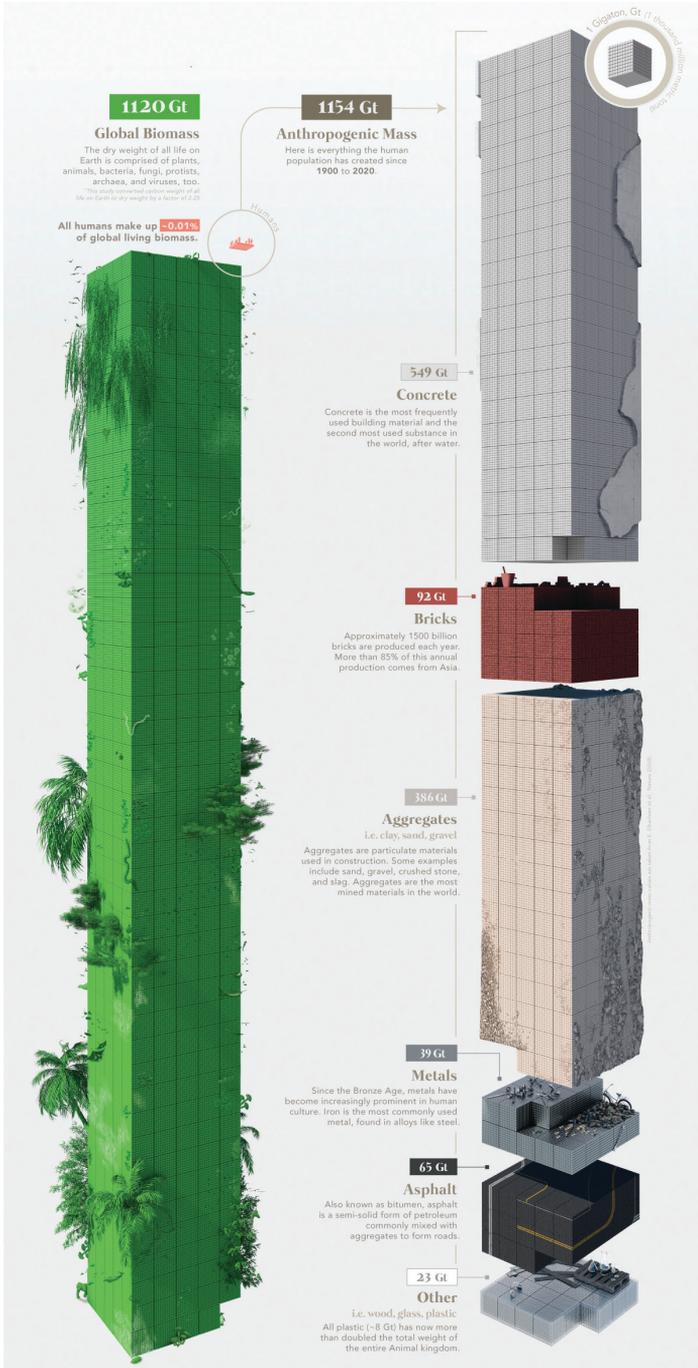
Research shows that, since the start of the 20th century, *anthropogenic mass*, or the totality of materials embedded in inanimate human-made objects (largely associated with construction: concrete, aggregates, bricks, asphalt, metals), roughly doubles in size every 20 years. At the onset of the 20th century, it constituted only about 3% of the Earth's total *biomass*, the total dry mass of all life on the planet: from plants, animals, and fungi to bacteria, viruses, and microorganisms (Schmelzer, Vetter and Vansintjan, 2022). A shocking discovery shows that *anthropogenic mass* surpassed the total *biomass* on Earth around the year 2020 (Diagram 2).

The concept of anthropogenic mass has gained significance following the 2020 study, which revealed the overshoot mentioned above. The calculation is based on production statistics from the United Nations, International Energy Agency, and other sources. Since different materials have different lifespans – buildings are used for decades, while plastic is often disposable – losses due to degradation or demolition are deducted from accumulated production. For consistency of comparison between the anthropogenic and the biomass, the so-called dry mass, i.e., mass after the removal of all water content, is used. Additional precision is ensured by using *material flow analyses* (MFA), tracking the movement of materials within the economy, and the results are checked against data on construction and infrastructure activities, such as the total length of roads or the number of buildings. In short, anthropogenic mass is calculated as the total production multiplied by the persistence factor and density, adjusted for material degradation and removal. The 2020 study estimated the total anthropogenic mass at approximately 1.1 Tt, with concrete accounting for more than half of the total mass (Elhacham et al., 2020).

This transformation of nature from its pre-existing state into an artificial environment leads us to the term *Anthropocene*, which refers to the geological epoch characterized by the decisive human impact on Earth. As soon as it came into use, it faced considerable criticism, and alternative terms emerged, including *Capitalocene*. Rather than the idea that humans, as a biological species, produce nature and disturbances thereto to such a large extent that this creates new geological conditions, a far more precise proposition is that it is capitalism that does so, with its mode of production and resource exploitation requiring infinite growth. Although there has been much discussion about the impact of the human species as a whole, the species as a biological entity needs to be distinguished from abstract systems, like capitalism, operating through specific human agents and their social practices. It is obvious that the Capitalocene does not operate autonomously, but is mediated through human activities, decisions, and interactions of individuals and groups. This is why the agency of the human species manifests through the activities of actual subjects within a given socio-economic structure. As the surface of the entire planet is covered with the effects of capital, it should be analyzed as the organizational principle of planetary metabolism.

Andreas Malm and Alf Hornborg point to fetishism as a potential fallacy in the Anthropocene narrative, presenting the origins of the current ecological crisis as derived from an essential human trait. This essentialist view then prevents us from examining environmental crises in relation to the contemporary social system and its specific relationships of power, hegemony, and technology. The way that the concept of Anthropocene portrays humanity as the singular subject of planetary transformation disguises economic inequality under capitalism. The “*Anthropos*” in Anthropocene, responsible for the environmental crisis, is an abstract term; the human species as a uniform entity is an idealistic fabrication (Malm and Hornborg, 2014). According to the authors, this narrative denaturalizes the current ecological crisis by emphasizing human impact, only to renaturalize it in a way that prevents critical examination of the social relations constituted by capitalism.

Diagram 2.
The ratio of anthropogenic to global biomass



Source: visualcapitalist.com

Given its immense elasticity, whether capitalism will collapse before the Earth remains an open question. There is no good reason for the optimistic belief that capitalism will collapse under increasing costs or worsening conditions of nature and production, as it can easily profit even from natural degradation by finding new opportunities for investing in disasters, as reflected by the phrase *disaster capitalism* coined and popularized by Naomi Klein (Klein, 2007). The oxymoron of *green growth* is even more debatable given that capital has found a way to turn even environmental protection into a huge and profitable business.

Capital keeps profiting from the current ecological crisis by manufacturing new business opportunities in domains like geoengineering, GMOs, renewable energy sources, eco-technologies, or natural disaster insurance plans. Today, all of the above is a source of massive and lucrative investments. Ecological disasters thus create ample opportunities for such capitalism to continue profiting. Mass destruction of nature, human, and animal habitats alone will not necessarily upset capital precisely because a large portion of the global population has already become redundant and replaceable in terms of labor anyway (from the standpoint of capitalist investments). Ceaselessly endeavoring to delay the final rupture, capitalism can continue delaying its confrontation with the natural limits to growth, all the while accumulating increasing amounts of wealth. According to the logic of capital accumulation, estranged from human life and ecosystem sustainability, the system could hypothetically continue to exist even if certain essential biophysical planetary boundaries are overstepped. In short, there is no empirical evidence that ecological pressures will directly lead to a global economic crisis anytime soon. For the capitalist system to persist and apparently reproduce itself infinitely, it has to “(...) *incrementally gobble up more and more. It must continually overturn any balanced cycles, as they can lead to stagnation and lost opportunities for growth. (...) The imperative to grow and the need for unrestricted license to devastate are two sides of the same coin—not only mutually dependent but structurally essential*” (Moreno, 2013).

This perspective invites us to understand capitalism as a system that voraciously appropriates the energy and resources of everything it encounters, driving all phenomena toward inorganic dissolution within this universal process. Depletion and disintegration emerge as the fundamental mechanisms that invariably accompany capital's relentless drive for growth—and, by extension, underpin the enduring myth of its perpetual expansion. Capitalism, in its tireless and insatiable logic, draws all entities, objects, and phenomena into its orbit: natural resources, communities, ways of life, communal values, plants and animals, social organizations, symbolic systems, public spheres, and social safety nets alike. Andreas Malm captures the insatiable character of capital as “*super-ecological*” because it is not constrained by the natural limits of ecosystems but operates as a flying „*biophysical omnivore with its own peculiar social DNA*“ (Malm, 2018).

The fundamental capitalist order principle is based on the delusion that the world is just a dead stack of materials, resources, and things to be extracted, processed, and discarded, supported by the idea that the world is separate from humanity as inanimate matter. The root of the problem lies in the fact that nature is necessarily seen as capital and, as such, divided into sets of private properties guaranteed by the state. This is the mechanism employed by capital to create its own particular and distinct ecosystem, where property holders can extract wealth through their ownership of such commodified nature. David Harvey explains this delusion in the following terms: “*Capital cannot, unfortunately, change the way it slices and dices nature up into commodity forms and private property rights. To challenge this would be to challenge the functioning of the economic engine of capitalism itself and to deny the applicability of capital’s economic rationality to social life. (...) The concept of nature that underpins various philosophies of environmentalism is radically at odds with that which capital has to impose in order to reproduce itself*” (Harvey, 2014).

The capitalist logic facilitates the problematic exchange of (previously incommensurable) realities by means of money, resulting in a universal commodification of nature, work, and life, which “...*symptomatically stands for the abstract logic of capitalist modernity: the practice of the – scientific, and above all economic – production of equivalences between completely different concrete realities. (...) Growth, in this sense, is also a process of the relentless and often violent commodification and repeated colonization of natures, life worlds, and reproductive activities, all of which became increasingly shaped by market-mediated social relations...*” (Schmelzer, Vetter and Vansintjan, 2022). Since the capitalist ecosystem “*is constructed out of the contradictory unity of capital and nature, in the same way that the commodity is a contradictory unity between use value (...) and exchange value*” (Harvey, 2014), if we take the ecological movement as seriously as it deserves, it should constitute a major threat to the reproduction of capital. Green critique is thus important precisely because it asserts that capitalism is in fact a system of limitless destruction of the human environment, contrary to the widespread illusion that it is the only viable socioeconomic system and unrivaled cosmic order.

It was as early as 1972 that *The Limits to Growth* report warned that the exponential growth of the economy and population was unsustainable due to finite resources and predicted a possible collapse – using the then-revolutionary computer model *World3* – if the way in which Earth’s resources were used didn’t change radically (Meadows et al., 1972). Despite sharp criticism and questioning following its publication, subsequent research has confirmed that its basic predictions remain relevant, persistently showing that a global growth of the supply of resources was unsustainable. Although some specific predictions turned out not to be entirely accurate, the fundamental thesis that infinite growth on a finite planet was not possible remains valid. The material limits to growth also imply that there are limits to economic growth as such, and today we keep finding ever more scientific evidence supporting doubt about the prospects of

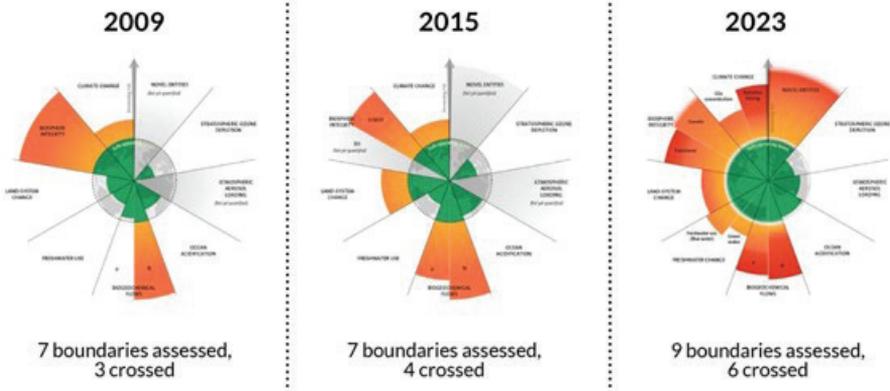
continued biophysical growth in resource stocks, materials flow, or energy use in the following decades.

The challenge of the 21st century is to ensure that everyone can live with dignity within the limits of the planet, i.e., to satisfy all basic human needs without exceeding the capacities of Earth's vital systems (such as a stable climate, fertile land, and ozone layer). The concept of planetary boundaries, introduced in 2009 by scientists led by Johan Rockström from the Stockholm Resilience Center and Will Steffen from the Australian National University, defines the safe operative space within which humanity can continue its growth and development without endangering the stability of Earth's systems.

The model identifies nine planetary boundaries crucial for preserving the planet's stability and resilience: climate change, biosphere integrity, biogeochemical flows, land-system change, freshwater change, ocean acidification, atmospheric aerosol loading, stratospheric ozone depletion, and introduction of novel entities into the biosphere (e.g., chemical pollution and plastics). Crossing these boundaries increases the risk of abrupt and irreversible large-scale environmental changes. The latest estimates suggest that several boundaries have already been breached, particularly those relating to climate, biodiversity, and biogeochemical cycles, highlighting the urgent need for more sustainable global management. The concept of planetary boundaries is a scientific framework for preserving Earth's resilience and maintaining stable living conditions for future generations. The so-called *doughnut* model of social and planetary boundaries presented by economist Kate Raworth is also one of the proposed frameworks for understanding the above challenge (ensuring a dignified life for everyone within planetary boundaries) that offers a route to sustainable development. The outer limit of the diagram consists of the nine planetary boundaries, defined by Johan Rockström and contributors, whose breach triggers irreversible degradation of the environment (Rockström et al., 2009), while the inner limit comprises twelve social dimensions derived from the 2015 Sustainable Development Goals. Between these limits lies the space in which humanity can live both in a socially just manner and within the planet's ecological limits.

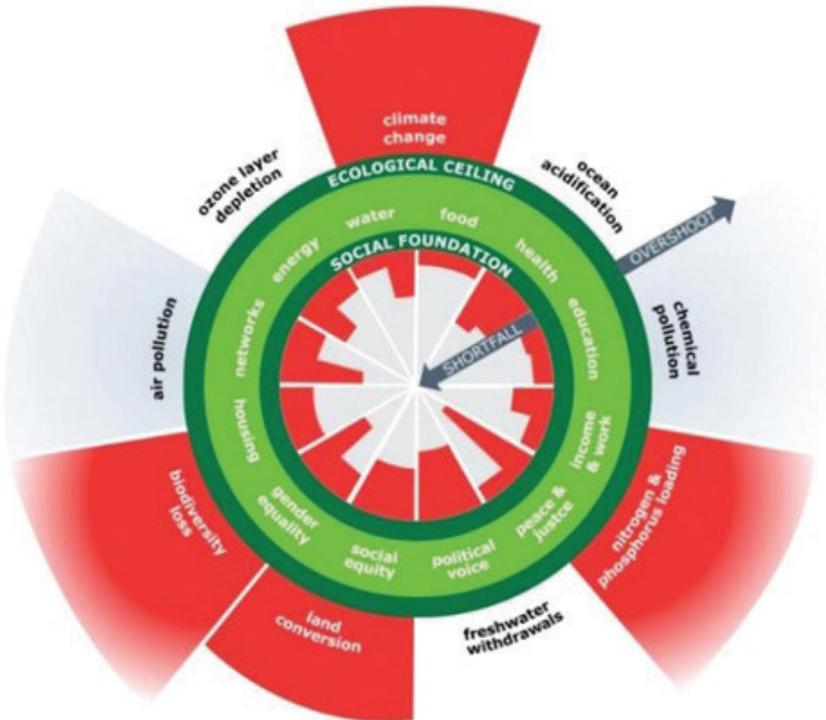
Furthermore, the paper entitled *Providing Decent Living with Minimum Energy: A Global Scenario* (Millward-Hopkins, Steinberger, Rao and Oswald, 2020) analyzes and calculates the amount of energy really needed to provide an adequate material living standard to the entire global population by 2050. The authors have estimated the minimum final energy consumption required for basic human needs, including decent housing, nutrition, mobility, and healthcare.

Diagram 3.
Development of the planetary boundaries framework



Credit: Stockholm University. Based on Richardson et al., 2023; Steffen et al., 2015; and Rockström et al., 2009

Diagram 4.
The “doughnut” of social and planetary boundaries

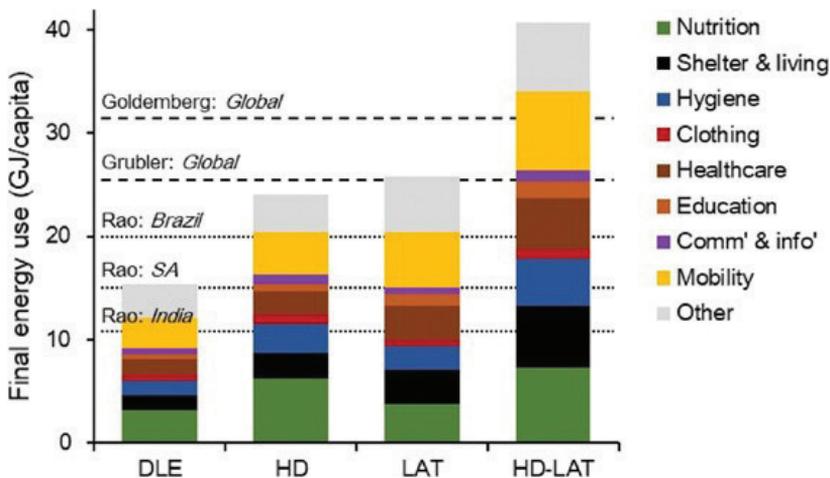


Credit: Kate Raworth, 2017

The shocking conclusion is that, even with a population three times larger, global energy consumption could be reduced to the levels of the 1960s if advanced technologies were successfully implemented and unnecessary consumption were radically reduced. The authors add that, according to the International Energy Agency scenario, almost 130 EJ of final energy will already be provided by renewable sources by 2050 – nearly sufficient to meet their estimated requirement of 149 EJ.¹ In short, the paper presents a scientifically valid and realistic plan for a world with a population of 10 billion to achieve decent living conditions with significantly lower and cleaner energy consumption – provided that technological progress and a moderate consumption culture are globally accepted. As the authors put it, the research paper is a mathematical response to the old platitude about environmentalists proposing that we go back to living in caves, and ironically conclude that – even if this were true – these caves “*have highly-efficient facilities for cooking, storing food and washing clothes; low-energy lighting throughout; 50 L of clean water supplied per day per person, with 15 L heated to a comfortable bathing temperature; they maintain an air temperature of around 20 °C throughout the year, irrespective of geography; have a computer with access to global ICT networks; are linked to extensive transport networks providing ~ 5000–15,000 km of mobility per person each year via various modes; and are also served by substantially larger caves where universal healthcare is available and others that provide education for everyone between 5 and 19 years old*” (ibid.).

Diagram 5.

Globally averaged decent living energy per capita in 2050 and three scenarios with rolled-back ambition, i.e. higher demand (HD), less advanced technologies (LAT), and higher demand and less advanced technologies together (HD-LAT).



Source: Millward-Hopkins, J., Steinberger, J. K., Rao, N. D. and Oswald, Y. (2020): Providing decent living with minimum energy: A global scenario. *Global Environmental Change*, 65

¹ 1 EJ (*exajoule*) equals 10^{18} joules (J), approximately equivalent to the amount of energy in 24 million tons of oil.

A critical theory of growth necessarily involves analyzing how growth manifests in the material processes and how its expansive nature generates social and ecological contradictions. As exemplified in an in-depth study of physics and economics of growth, Vaclav Smil argues that all available evidence indicates that growth is finite (Smil, 2019). In his comprehensive and multifaceted analysis of growth, Smil emphasizes that, in all systems – from biological to artificial – growth may appear to be exponential but, eventually, tends to exhibit declining rates until it reaches its material and thermodynamic limits. Smil thoroughly and exhaustively demonstrates that all economic activities are ultimately subject to material, ecological, and physical limitations, and that any society relying on infinite economic growth will eventually confront final limits in the form of the collapse of complex ecosystems on which growth necessarily relies (ibid.). Technological progress can indeed push nature-imposed boundaries to a degree; however, the total entropy of the system still increases, natural resources are depleted, and available energy is reduced. These are objective biophysical facts of the world, which are independent of our social relationships, false beliefs, and economic delusions. Because there is nothing natural or inherent in capitalism or the productive behaviors we associate with *homo economicus*, as both these phenomena are the product of systematic, centuries-long cultural reprogramming. Portraying it as inevitable, i.e., as the “natural” order, is in fact a symptom of ideology at the very highest level (Fisher, 2009).

In the remainder of the text, I endeavor to provide arguments supporting the central thesis of this paper: that the so-called *green* and *sustainable* architecture is a source of huge and lucrative investments, and that this has transformed spatial production into a self-righteous activity disconnected from biophysical reality and the metabolism between humanity and nature. Sustainable architecture thus finds itself in a paradoxical situation today. Although it portrays itself as the savior of the environment, its rise is increasingly dictated by the logic of financialization and the so-called *greenwashing*:

- (1) Pervasive financialization of architecture embodied by the real estate market has brought forth many ways in which capitalism, in its infinite plasticity, transmutes space and bends spatial planning rules in order to keep creating new profit opportunities. Today, architecture is the primary medium of financial capitalism, since real estate is its dominant vehicle of investment and accumulation.
- (2) Furthermore, the fact is that the mask of architectural sustainability theories often hides the operations of corporate *greenwashing* ideology, as one of the latest mutations of capitalism in the ruthless strategy of survival and transformation into its “green” version. With its *appeal to nature*, the new environmentalist dogma is nothing more than a utopia manufactured by the capitalist system, which takes on the appearance of a second nature to survive and perpetuate its relations. In practice, the expressions of this dogma are usually purely formal or concern only marginal improvements in the management of a building’s operational energy.

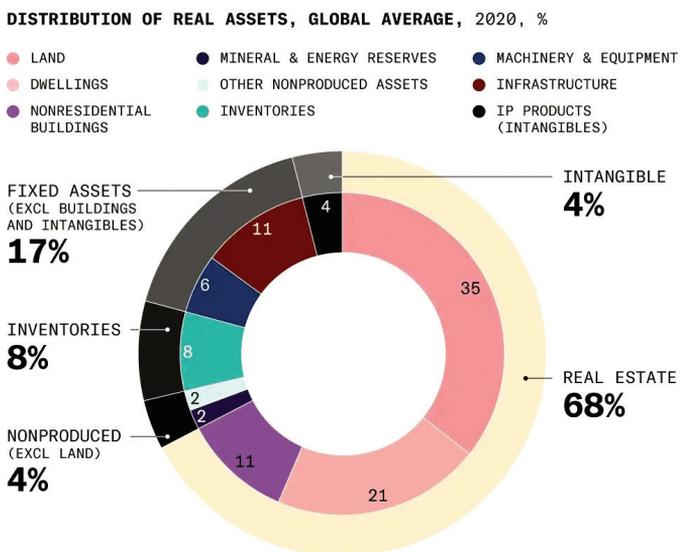
2. Architecture as the Primary Medium of Financial Capitalism

As a reaction to capital over-accumulation resulting from post-Fordist globalization, investing in real estate has become a *spatial fix* of a sort, as David Harvey terms it, where capital is being increasingly directed into speculative developments and shifts away from investments in primary or secondary production, i.e., resource extraction or factory production (Diagram 6). Geographer, urban planner and housing policy analyst Samuel Stein coined the fitting term ‘*real estate state*’, denoting the deep inter-connection between government policies and the real estate market in urban design (Stein, 2019). This state of affairs facilitates gentrification, displaces lower-income residents, and prioritizes profit-driven development, thus contributing to the financialization of housing (which accounts for approximately 80 % of buildings) and, consequently, increasing inequality.

Stein claims that, statistically, „(...) *global real estate is now worth \$ 217 trillion, thirty-six times the value of all the gold ever mined. It makes up 60 percent of the world’s assets, and the vast majority of that wealth—roughly 75 percent—is in housing*“ (ibid.). While profit rates plunge across many formerly dynamic sectors of the economy, real estate (and especially housing) becomes the last resort in the capital’s eternal pursuit of profitability. Moreover, land is not traded like other products as it is a prerequisite for the production and circulation of commodities of any kind, but also, at the same time, a specific form of commodity in its own right. Land is „... *a fictitious form of capital that derives from expectations of future rents*” (Harvey, 1982).

Diagram 6.

Real estate accounts for two-thirds of real assets



Source: McKinsey&Co

Housing financialization mechanisms, rising rents, expansion of short-term tourist rentals, and institutional passivity shape the urban landscape where the right to housing becomes dependent on socioeconomic class and access to it becomes a luxury rather than a fundamental requirement for a dignified life. When profit rates in the key industrial sectors start to decline, as noted by urban geographer Neil Smith, financial capital shifts toward alternative investment areas – where profits remain relatively high, and the risks are low. At such times, capital flows into the built environment increase, resulting in the notorious property market booms (Smith, 1996).

When housing becomes a globalized and financialized commodity, the gap between market prices and actual social housing needs widens increasingly. Investment companies, driven by the desire for fast profits, move the housing system even further away from the interests of the local population. In this context, transnational speculation increasingly dictates what will be built and where, and who will be able to afford it (Madden and Marcuse, 2016). Housing is thus increasingly becoming part of the financialization process, accompanied by a growing domination of players and companies that earn profit through money management and financial instruments. It is the managers, banks, and rentiers that profit from real estate through purchase and sales, financing, ownership, or speculation.

These market participants often operate virtually, without any contact with the physical spaces they profit from, although their activities have real and often serious consequences, especially for people living in these spaces. David Madden and Peter Marcuse thus conclude that luxury housing „...*should barely be considered housing at all. Many luxury buildings are not built primarily to provide housing but to make profits upon resale. The value of super-prime real estate is secure because of the ease with which it can be converted into money through loans, debentures, mortgages, and other complex financial transactions. Whether anyone will ever make a home in such buildings is irrelevant*“ (ibid.).

The hypothesis that architecture is not just the result of financial capitalism, but is financial capitalism has been presented and thoroughly expounded by architect and urbanist Matthew Soules. According to Soules, architecture can be considered the primary medium of financialization because real estate is the principal medium through which financial capitalism operates. „*Architecture is finance and finance is a fictional dimension of capitalism*“ (Soules, 2021). The process of financialization manifests in various forms through architectural design, as well as urban phenomena. Financialization necessitates a simplification of architecture so that it can be more easily owned and traded like an asset. This process standardizes and homogenizes architecture, but also, paradoxically, endeavors to make it unique and locally specific. The specific thus becomes standardized, and the unique becomes generic. Soules explains that some of the key financialization operations include the following: „*(...) to simplify and universalize architectural properties, making them into more standardized assets. A fundamental tension of real estate's role in finance capitalism is that real estate must become in many*

ways less real without relinquishing its defining realism: physicality. Financialization is how architecture acquires certain physical characteristics that approximate a universal immateriality“ (ibid.).

With capitalism moving from industrial through consumer to financial and today's late (or digital) capitalism, the principal token of exchange is increasingly dematerialized and virtualized. This has affected architecture as well, as the principal vehicle of financialization. Soules thus concludes that the virtualization of architecture via the real estate market should not come as a great surprise, since the entire economic system is becoming ever more virtual. An odd paradox lies in the fact that buildings may not appear physically less material; in fact, in some cases, they may even appear more monumental. However, like monuments, buildings have lost their functionality in the traditional sense of architectural purpose and, electronically mediated in the form of virtual images in investor portfolios, they operate like immaterial post-havens: *“The architecture of finance capitalism is a real abstraction - a real virtuality. It functions as a device at the liminal space between material, concrete existence and the seemingly mystical, abstract, complex, and immaterial realm of finance” (ibid.).*

Thus, capitalism in its infinite plasticity transmutes space and bends spatial planning rules as it strives for new opportunities to profit. Finally, *zombie urbanism* occurs, often cited as an illustrative example of the impact of finance on space, with a topography shaped by ever-changing investment flows, where radical growth in one place results in degradation in another, leaving behind settlements, and sometimes entire villages and cities, devastated by speculation (Figure 2). Until recently, paradigms of rapid growth or sudden contraction (e.g., the so-called *shrinking city* phenomenon) were viewed as separated in space and time: growth occurs at a specific time and in a specific place, while decay takes place sometime later and somewhere else. The expansion of capital gives rise to the phenomenon of the so-called shrinking world or time-space compression, as capital strives to overcome all spatial barriers to its own expansion, in a process that Karl Marx aptly called *annihilation of space by time* (Marx, 1973). The distinctiveness of financial capitalism in terms of this *zombie* phenomenon lies in acceleration, which increasingly compresses the spatial-temporal distances. The reason for this increasing proximity between reckless growth and degradation is the ever faster and larger pool of money and its 'flow' through architecture.

The idealistic (or virtual) nature of capital described above stands in complete opposition to concrete spatiality and materialism as such, and thus to any objective understanding of sustainability, because *“(...) capital carries away what it needs and pours it out in places where the production of more exchange-value can best proceed. Capital produces abstract space, as a matrix of nodes and arteries that evolve not through their revealed biophysical attributes, but through the circuits of capital itself”* (Malm, 2018). The ecological implications resulting from devastation of space due to the above delusion are immeasurable.

In conclusion, the financialization of housing and architecture exemplifies the extent to which late capitalism has abstracted, virtualized, and commodified space itself. Buildings are no longer primarily sites of habitation but instruments in a global system of capital circulation, designed to maximize liquidity and speculative profit. The materiality of space becomes subordinated to the imperatives of abstract capital, and the built environment functions as both a repository and accelerator of wealth concentration. Financial capitalism, thus reveals itself not merely as an economic system but as a spatializing force, capable of reshaping both cities and the very conditions of human life according to the logic of profit.

Figure 1.

Ghost town of 260 abandoned mansions near the city of Shenyang in China



Source: Jade Gao / AFP / Getty images

3. Greenwashing: Nature as the Ideology of “Green” Capitalism

In the broadest sense, *greenwashing* is the act of misleading consumers regarding the environmental responsibility of a company or the environmental benefits of its products and services. In recent years, *greenwashing* has become more common due to several reasons. To start with, consumer demand for eco-friendly products is on the rise, which in turn boosts the production and sales of such products. What is more, high government incentives for eco-friendly production are at stake. Architecture and construction sector have not remained immune to such marketing spins and manipulations. This also involves false apologetics, emphasizing even marginal improvements in the building *operating energy* management in relation to much more complex (systemic) energy impacts.

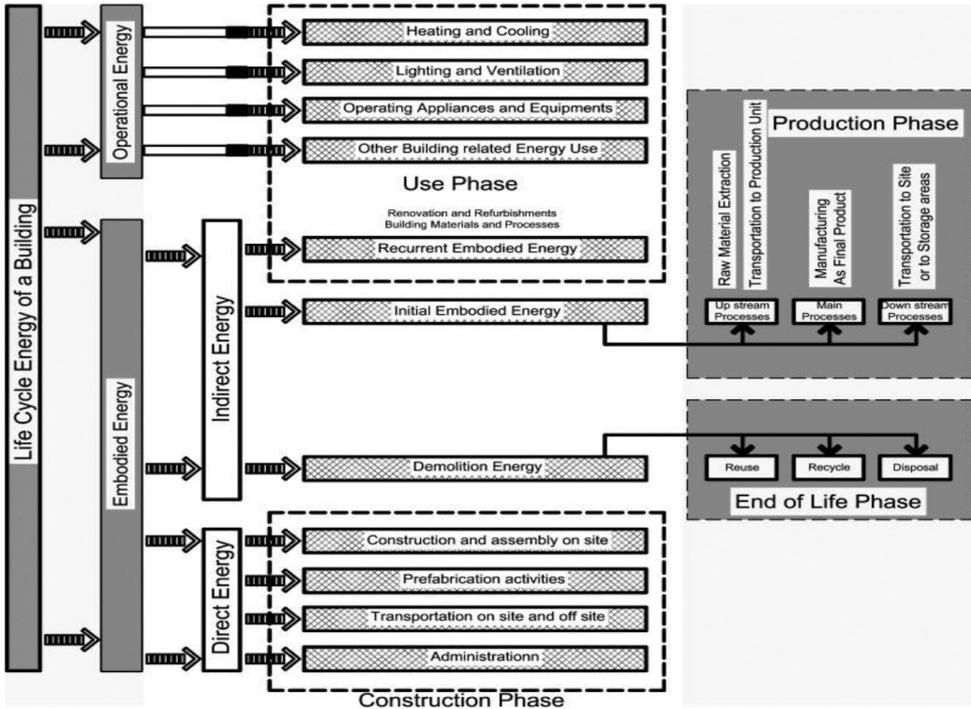
The global green building market, expected to expand from USD 523.85 billion to USD 850.01 billion by 2030 (TechSci Research, 2024), is not growing due to the real environmental emergency, but due to tax reliefs, real estate overvaluation, and corporate branding. Green certificates – e.g., LEED in the US or BREEAM in the UK – the standards once considered the height of ecological responsibility, are increasingly reduced to mere marketing tools that prioritize technological cost-reduction solutions and disregard more profound environmental obligations (Cole, 2012). Research shows that such systems typically emphasize operational savings – for example, about 25 % lower annual operating energy costs – while ignoring important issues, such as embodied carbon or material toxicity. Smart systems, recycled materials, and symbolic biophilic materials are used as aesthetic alibis, not as systematic solutions. This market-based logic transforms sustainability from a complex project into a complacent financial operation, where ecological criteria are secondary to return on investment. Although certain solutions, when applied consistently, can yield genuine environmental benefits, the fundamental irony persists: architecture, which often positions itself as a savior of the planet, achieves this while simultaneously profiting from its degradation.

The construction sector consumes nearly one-third of global fuel production, and its systemic energy impact is even bigger. Significant emissions of carbon dioxide from aluminum, steel, and concrete should compel architects to reexamine the very nature of the materials they use. The methods for reducing energy consumption in our everyday lives put too much emphasis on reducing *operational energy* used for heating, cooling, and lighting, rather than the so-called *embodied energy* (Diagram 3). In recent years, the concept of embodied energy has gained popularity; it is calculated as the total amount of energy consumption – from the extraction of materials, their processing, transport, assembly and installation, to maintenance, decay, and demolition that are part of any artifact's lifecycle – also known as the *cradle to grave approach*. In general, approximately 80% of the systematic energy associated with a building relates to raw material extraction, construction, manufacturing, maintenance, demolition, and decomposition, while the energy consumed during its use only accounts for the remaining 20% (de Monchaux, 2019). This means that incremental improvements in operational energy management are less important than the processes associated with construction, maintenance, and demolition of buildings, especially considering the global (alarming) trend of declining lifespan of buildings.

Certain sustainable features in architectural projects can indeed represent incremental improvements; however, their significance is frequently undermined by a broader reluctance to engage with the underlying ecological crises. The rhetoric of architectural sustainability often functions as a veneer, obscuring a more pervasive cultural and economic force—capital itself—which initially mobilized the discourse of sustainability. Corporate *greenwashing* emerges as one of the latest iterations of this logic, a strategic adaptation that prioritizes survival and profitability over genuine environmental responsibility. Concurrently, the escalating impacts of climate change have increasingly

compelled architects, urbanists, and designers to recognize that the partial interventions they typically propose—ranging from allegedly recycled construction materials to popular green roofs and photovoltaic systems—cannot constitute an adequate response to the deeper environmental emergency.

Diagram 7.
Life cycle energy of buildings



Source: Renewable and Sustainable Energy Reviews, vol. 16(6), 2012

Although these phenomena may initially appear tangential, the substantial flows of capital into architectural ventures and the climate crisis are in fact mutually reinforcing and structurally intertwined. Large architectural firms offer affluent investors—who might otherwise be compelled to adopt stringent waste reduction protocols or invest in environmentally robust materials—a far more palatable alternative: the creation of projects that appear “green” without compromising profitability or corporate identity. It is therefore no surprise that the term “nature” has gained an ever more important role in capitalist architecture.

This is perfectly illustrated by the famous *Bosco Verticale* project in Milan by architect Stefano Boeri, which is often hailed as a pioneering example of sustainable architecture, and yet it actually embodies every aspect of *greenwashing*. Although the skyscrap-

ers do abound in greenery and create a visual impression of environmental awareness, their actual contribution to sustainability is highly doubtful – the large quantity of concrete and glass used in construction, high plant maintenance costs, and the exclusive nature of luxury housing indicate that the green is primarily a marketing tool used to add a symbolic value to a luxury housing project, a far cry from a real solution for the urban environmental crisis (Figure 2). Marketing strategies that promote care for the environment are ubiquitous in modern everyday life, and this is the reason why the ecological pretensions of architecture are often also aligned with greenwashing marketing strategies, regardless of whether they offer any objective environmental benefits or not.

Architectural environmentalism focuses on technological solutions in design, developed as a response to ecological threats, proposing high-tech design methods that rely on material and formal principles of the natural world (from molecular structures, through crystal geometry, to formulas of leaf growth and plant branch formation etc.), thus linking evolution to design. Although the development of some new technologies is rightly considered necessary for ensuring sustainability and avoiding climate disasters, idealizing nature has its dangers, as it can entail conceptual risks. Advocates of this approach thus usually turn to organic geometry as the suitable language of contemporary architecture.

Figure 2.
Bosco Verticale by architect Stefano Boeri, Milano, March 2025



Photo by the author

Theoretician of architecture Douglas Murphy dissects the misconceptions inherent to this approach: *„... the synthesis of the ‘industrial’ and the ‘natural’ is a genuinely desirable condition, but it unfortunately presupposes the answers to questions of design; many of the ‘smart materials’ and other bio-engineering technologies currently being developed have*

no formal quality of their own; they are visually indistinguishable from existing materials. As a result the designers of this techno-environmentalism tend to resort to previously established languages of complexity or 'nature' when it comes to actually expressing a form" (Murphy, 2012).

It is therefore necessary to critically examine this approach to modern architecture, especially explicated in the so-called *parametric design*. For example, Patrik Schumacher, the main proponent and prophet of this design approach, proclaimed parametricism to be "*an avant-garde practice*" and "*the new international style*", emphasizing the aesthetic elegance of inherent complexity and fluidity characteristic of natural systems. Between the lines of his arguments lies the logical fallacy of appealing to nature, as cynically remarked by Murphy, "(...) *as if it were self-evident that nature required mimicry*" (ibid.). Moreover, according to architectural theoretician Douglas Spencer, the new dogma of environmentalism is nothing more than "*a Utopia produced by a capitalist system that assumes the appearance of a second nature in order to survive and perpetuate itself under the pretext of nature*" (Spencer, 2016).

Take, for example, the morphologies of Zaha Hadid's and Patrick Schumacher's architecture, which ostensibly spring from forms and patterns observed in natural systems—systems whose "laws" they eagerly co-opt—where every curve supposedly results from the lawful dance of competing forces. In their hands, mimicking natural folding and smoothing becomes a license to imagine new social structures and personal experiences, all conveniently labeled as progressive. This philosophy manifests in the spatial trope of the *artificial landscape*, where ground planes, walls, and envelopes merge, apparently warped by some invisible environmental forces (Figure 1). Claiming that the complexity of their architecture mirrors the equally dizzying complexity of contemporary life, Hadid and Schumacher dismiss simple Platonic forms as hopelessly inadequate, presenting their formally extravagant creations as politically progressive (Hadid, 2004).

The formal gestures of the "naturalist" style emerge from a logic that seeks to internalize prevailing cultural forces within architectural form. Architects and theorists like Alejandro Zaera-Polo and Farshid Moussavi locate progressive potential in the self-organizing and emergent capacities attributed to matter itself, valorizing any outcome that appears to follow its materialist logic as "progressive." For them, emerging complex orders are not merely aesthetic phenomena but the engine of contemporary urban dynamics, where productivity, invention, and novelty arise intrinsically from matter. Spencer argues that this relocation of architectural agency to the material realm carries fraught consequences, as the provisions of this new order "*are circulated (...) until they mesh with the new doxa of neoliberalism*" (Spencer, 2016). Moussavi contends that capitalism is no longer purely homogenizing but actively produces difference and novelty (Moussavi, 2009). Schumacher goes further, proposing that the free market should determine the most productive assortment of land uses through evolutionary mechanisms of mutation, trial and error, selection, and reproduction—a self-correct-

ing, self-organizing process that eliminates the need for state planning or centralized regulation (Schumacher, 2013). These arguments collectively naturalize the market, portraying it as a post-ideological, adaptive force capable of orchestrating urban order, democratizing choice, and mediating a self-regulating, evolutionary system.

Figure 3.

Zaha Hadid, Galaxy SOHO – an urban complex building located in Beijing, completed in 2012



Source: Forgemind ArchiMedia, via Creative Commons

Today, architectural theory abounds in terms such as genetic algorithms, morphogenetic design, emergent complexity, continuous variation, self-organization, non-Euclidean, fractal geometry, nonlinearity, swarm intelligence, dynamic equilibrium, gradient morphologies, responsiveness, fluidity, flexibility, curvilinearity, diversity... Proponents of these design principles valorize the free market for its supposed adaptability, presenting it as a democratizing force and naturalizing it as an evolutionary process of self-regulating order. Architecture is thus tethered to the dogma of the market as a spontaneous, self-evident law of nature: the naturalist architectural vocabulary is harnessed to legitimize capitalist flexibility, masking neoliberal imperatives as immutable truths. In practice, these theories turn architecture into a handmaid of the market, producing spatial forms that materialize neoliberal logic. Parametric design, often deployed in “green” architecture and *artificial landscapes*, exemplifies this formal *greenwashing*, translating market adaptability into visible form. Yet parametricism is merely one symptom of a broader shift: the algorithmization of architecture itself, driven by financial capitalism’s desire to shape space according to consumer demand and real estate trends. Capitalist architecture need not be literally parametric—its formal vocabulary is very diverse—but the underlying logic of algorithmic mediation persists. However, the problem of *algorithmization* of architecture is beyond the thematic framework of this text.

4. Closing Discussion: Urban Metabolism and Degrowth

Historically, the emergence of capitalism cannot be understood as a natural, spontaneous, or inevitable development. Rather than unfolding gradually or peacefully, its consolidation was predicated on organized violence, the intensive appropriation of natural resources, and the systematic dismantling of self-sufficient economies and communities (Hickel, 2021). By contrast, Marx's ecological analysis centers on the key conceptual category of *metabolism* (germ. *Stoffwechsel*): human labor, a fundamental Marxist category, is viewed as the metabolism between humans and nature, which is transformed by humanity through production and tools. This metabolic process is primarily natural and ecological, historically specific, but also eternal and universal, seeing as human society cannot exist without working upon nature through labor and consequently transforming it, thereby transforming humanity itself in turn. Therefore, labor is “a process by which man, through his own actions, mediates, regulates and controls the metabolism between himself and nature. He confronts the materials of nature as a force of nature. He sets in motion the natural forces (...) in order to appropriate the materials of nature in a form adapted to his own needs. Through this movement he acts upon external nature and changes it, and in this way he simultaneously changes his own nature” (Marx, 1867).

This position is neither technophobic nor primitivist. Marx and Engels explicitly rejected sentimentalized notions of pristine nature and the romanticized ideal of returning to a state of original harmony and abundance. At the same time, they recognized both the destructive consequences of environmental degradation and the constraints imposed by natural processes. Consequently, any rational organization of production must take into account the metabolic interaction between society and nature, which necessarily implies its sustainable regulation. Commenting the inescapability of this ‘universal metabolism of nature’, in *Marx in the Anthropocene*, pointing to the importance and inevitability of the concept of metabolic interaction between nature and society, Kohei Saito writes that: “(...) humans cannot produce *ex nihilo* but always *ex materia*. Food, clothes, houses and even the most high-tech goods that ‘dematerialize’ the economy use energy and natural resources without exception. In this sense, human metabolism with nature is a ‘natural necessity’ that can never be suspended” (Saito, 2023). Moreover, John Bellamy Foster – one of the leading theoreticians who has contributed to the popularization of the Marxist concepts of metabolism and metabolic rift – insists that the violation of nature-imposed conditions of sustainability needs to be viewed in light of the fact that global-scale capitalist society created a pronounced metabolic rift between humanity and nature. In his work, he thoroughly explores the concepts of metabolism as the fundamental: “(...) basis on which the complex web of interactions necessary to life is sustained, and growth becomes possible. Marx employed the concept of a “rift” in the metabolic relation between human beings and the earth to capture the material estrangement of human beings within capitalist society from the natural conditions which formed the basis for their existence—what he called ‘the everlasting nature-imposed condition(s) of human existence’” (Bellamy Foster, 2000).

Seen from this perspective, the debate on metabolism inevitably pens up normative and political questions about how such flows ought to be organized in light of ecological limits and social justice. This is precisely where the discourse on degrowth enters, offering a critical framework that links the analysis of socio-metabolic processes to proposals for alternative economic, societal, and spatial arrangements. In this context, the expanded notion of urban metabolism – understood as “*a global circulatory process of socio-natural relations that transforms and (re)creates urban ecosystems through the exchange of resources, capital, humans, and non-humans into and out of the spaces of global urbanization*” (Newell and Cousins, 2015), holds particular relevance for architecture and spatial planning. Complementarily, the concept of *industrial metabolism* has been invoked to describe the circulation of materials and energy within industrial systems. By analogy with biological metabolism, it encompasses the integrated set of physical processes through which raw materials are transformed into finished products by human labor. Scholars emphasize that the totality of material and energy flows sustaining the material foundations of civilization, and thereby enabling the reproduction of human societies, must be conceptualized as constitutive elements of this expanded metabolism (Fischer-Kowalski, 1999).

Degrowth could be defined as “*(...) the democratic transition to a society that – in order to enable global ecological justice – is based on a much smaller throughput of energy and resources, that deepens democracy and guarantees a good life and social justice for all, and that does not depend on continuous expansion*” (Schmelzer, Vetter and Vansintjan, 2022). Degrowth is a radical critique of the economy as such, as it questions the dogma of growth and economism as the dominant worldview. Also, Hickel defines it as “*(...) a planned reduction of energy and resource use designed to bring the economy back into balance with the living world in a way that reduces inequality and improves human well-being*” (Hickel, 2021). Hence, the concept of degrowth articulates both a normative critique of the dominant paradigm of perpetual economic expansion and a concrete proposal for the deliberate downscaling of social metabolism. Advocates of degrowth call for a transition toward a more equitable economic order predicated on substantially reduced material and energy throughput. Central to this perspective is a reorientation away from market- and state-centered mechanisms, emphasizing instead the cultivation of social solidarity, local community resilience, and collective forms of cooperation.

Therefore, it is important to expand the theoretical framework beyond Henri Lefebvre’s *right to the city* to include a far more encompassing *right to metabolism* (Heynen et al., 2006) and sustainable degrowth defined as “*equitable downscaling of production and consumption that increases human well-being and enhances ecological conditions*” (Schneider et al., 2010). Focusing on the right to *metabolism* – understood as a demand for access to and control over urban/industrial metabolism – the concept of urban commons, the foundation of the right of metabolism, can be used as a launch-

pad for introducing a degrowth framework for managing urban resource flows, which would surpass traditional models.

Planning is undeniably a keyword within this discourse. Yet, scholarship addressing the contours of a planned degrowth economy remains relatively scarce, partly due to the aversion of many degrowth advocates toward hierarchical and bureaucratic structures, in favor of decentralized and participatory alternatives. Nevertheless, questions of urbanism, spatial planning, and the design of appropriate forms of human settlement for a society oriented toward sustainable degrowth are gaining increasing traction. Given its intrinsic concern with planning, design, and coordination, the architectural professions hold the potential to bridge this persistent gap between the theoretical debate and practical implementation.

If the imperative of capitalist development has been to extract ever more while returning ever less, the ethical imperative of contemporary architectural practice should be: to achieve maximal value with minimal intervention. Just as the natural environment is understood as a fragile and finite resource requiring stewardship, the built urban environment must equally be regarded as deserving of preservation, care, and thoughtful renewal (in line with the aforementioned concepts of urban and industrial metabolism). In an era marked by climate crisis, ecological overexploitation, and deepening social inequality, degrowth is not merely an economic concept but also a crucial framework for reimagining the spaces we inhabit. Contrary to the growth-driven architectural models that dominate media representation, many contemporary practices in architecture, urbanism, and spatial planning are already shifting toward more sustainable, localized, and modest approaches—prioritizing quality of life over quantitative expansion.

At the same time, it is crucial to critically interrogate the ideological operations that underpin the commodification and instrumentalization of sustainability in architectural discourse. The ubiquity of ‘green’ narratives often functions less as a solution than as an obstacle, obscuring the structural transformations required. It is thus the task of critical architectural theory to rigorously expose these ideological distortions, marketing strategies, and philosophical misconceptions. At its core, capital and sustainability remain structurally irreconcilable. If architecture is to transcend its complicity in the cycles of commodification and greenwashing, it must reorient itself away from the pursuit of exchange value and symbolic capital, and toward the cultivation of forms of spatial practice that acknowledge both material limits and social needs. This entails not merely technological adjustments or the adoption of new aesthetic vocabularies, but a fundamental rethinking of architecture’s role within broader political economy. The challenge ahead lies in reclaiming architecture as an agent of ecological and social responsibility rather than an accessory of speculative finance. Only by critically interrogating the ideological operations that naturalize market logics and by foregrounding alternative modes

of practice can architecture contribute meaningfully to the urgent task of constructing more just and sustainable futures. Such an architecture, grounded in the principles of sustainable urban/industrial metabolism, informed by scientific knowledge, and oriented toward collective planning and the rational management of material/energetic flows, offers a possible pathway toward a degrowth-mode of spatial production.

References

1. Bellamy Foster, J. (2000). *Marx's Ecology – Materialism and Nature*. New York: Monthly Review Press.
2. Cole, R. J. (2012). Transitioning from green to regenerative design. *Building Research & Information*, 40 (1): 39-53.
3. Elhacham, E.; Ben-Uri, L.; Grozovski, J.; Bar-On, Y. M.; Milo, R. (2020). 'Global human-made mass exceeds all living biomass'. *Nature*, 588 (7838): 442-444. Available at: <https://doi.org/10.1038/s41586-020-3010-5>
4. Fischer-Kowalski, M. (1999). Society's metabolism – The intellectual history of materials flow analysis. *Journal of Industrial Ecology*, January 1999.
5. Fisher, M. (2009). *Capitalist Realism*. London: Zero Books.
6. Hadid, Z. (2004). *Pritzker Prize Laureate Acceptance Speech, 2004*. https://www.pritzkerprize.com/sites/default/files/inline-files/2004_Acceptance_Speech.pdf. (Accessed on 9 August 2024)
7. Harvey, D. (2014). *Seventeen Contradictions and the End of Capitalism*. London: Profile Books
8. Harvey, D. (1982). *The Limits to Capital*. Oxford: Basil Blackwell.
9. Heynen, N. C.; Kaika, M. and Swyngedouw, E. (2006). 'Urban political ecology: Politicizing the production of urban natures', in: Heynen, N. C.; Kaika, M. and Swyngedouw, E. (Eds.). *In the Nature of Cities: Urban Political Ecology and the Politics of Urban Metabolism*. London and New York: Routledge
10. Hickel, J. (2021). *Less Is More – How Degrowth Will Save the World*. London: Penguin Books.
11. Hickel, J. (2021). What Does Degrowth Mean? A Few Points of Clarification. *Globalizations*, 18, Issue 7.
12. Klein, N. (2007). *The Shock Doctrine – The Rise of Disaster Capitalism*. Toronto: Knopf Canada.
13. Madden, D. and Marcuse, P. (2016). *In Defense of Housing – The Politics of Crisis*. London: Verso.
14. Malm, A. (2018). *Fossilni kapital*. Zagreb: Fraktura. (English: Fossil Capital, London and New York, Verso, 2016)
15. Malm, A. and Hornborg, A. (2014). The Geology of Mankind – A Critique of the Anthropocene Narrative. *The Anthropocene Review*.
16. Marx, K. (1973). *Grundrisse: Foundations of the Critique of Political Economy*. Translated by Martin Nicolaus. Harmondsworth: Penguin.

17. Marx, K. (1867). Kapital I, in: *Glavni radovi Marxa i Engelsa*. Zagreb: Stvarnost, 1979. (English translation: Capital, Volume I. Penguin Books, London, 1976, translated by: Ben Fowkes).
18. Meadows, D. H. et al. (1972). *The Limits to Growth – a Report for the Club of Rome’s Project on the Predicament of Mankind*. New York: Universe Books.
19. Millward-Hopkins, J.; Steinberger, J. K.; Rao, N. D.; Oswald, Y. (2020). Providing decent living with minimum energy: A global scenario. *Global Environmental Change*, 65.
20. Monchaux, T. de. (2019). A New Idea in Architecture? No New Buildings. *Metropolis Magazine*. (Accessed on 9 August 2024)
21. Moreno, G. (2013). Notes on the Inorganic – Accelerations, in: Johnson, J. (Ed.). *Dark Trajectories: Politics of the Outside*. Hong Kong: [NAME] Publications.
22. Moussavi, F. (2009). *The Function of Form*. ACTAR. Harvard Graduate School of Design.
23. Murphy, D. (2012). *The Architecture of Failure*. London: Zero Books.
24. Newell, J. P. and Cousins, J. J. (2015). The boundaries of urban metabolism: Towards a political industrial ecology. *Progress in Human Geography*, 39 (6): 702-28.
25. Olsen, E. S.; Orefice, M. and Pietrangeli, G. (2019). From the ‘Right to the City’ to the ‘Right to Metabolism’, in: Nelson, A. and Schneider, F. (Eds.). *Housing for Degrowth: Principles, Models, Challenges and Opportunities*. 73-88. London: Routledge.
26. Rockström, J.; Steffen, W.; Noone, K.; Persson, Å.; Chapin III, F. S.; Lambin, E. F.; Foley, J. A. (2009). A safe operating space for humanity. *Nature*, 461 (7263): 472-475.
27. Saito, K. (2023). *Marx in the Anthropocene – Towards the Idea of Degrowth Communism*. Cambridge University Press.
28. Schneider, F.; Kallis, G. and Martinez-Alier, J. (2010). ‘Crisis or opportunity? Economic degrowth for social equity and ecological sustainability: Introduction to this special issue’. *Journal of Cleaner Production*, 18 (6): 511-18.
29. Schmelzer M.; Vetter A. and Vansintjan A. (2022). *The Future is Degrowth – A Guide to a World Beyond Capitalism*. London: Verso.
30. Schumacher, P. (2013). Free Market Urbanism – Urbanism beyond Planning, in: Verebes, T. (Ed.). *Masterplanning the Adaptive City – Computational Urbanism in the Twenty- First Century*. Abingdon, Oxford and New York: Routledge.
31. Smil, V. (2019). *Growth – From Microorganisms to Megacities*. Cambridge: The MIT Press.
32. Smith, N. (1996). *The New Urban Frontier – Gentrification and the Revanchist City*. London: Routledge.
33. Soules, M. (2021). *Icebergs, Zombies and the Ultra Thin – Architecture and Capitalism in the Twenty-First Century*. Princeton Architectural Press.

34. Spencer, D. (2016). *The Architecture of Neoliberalism – How Contemporary Architecture Became an Instrument of Control and Compliance*. London: Bloomsbury Academic.
35. Stein, S. (2019). *Capital City – Gentrification and the Real Estate State*. London: Verso.
36. TechSci Research (2024). Green Building Market – Global Industry Size, Share, Trends, Opportunity, and Forecast, 2018–2030F. Available at: <https://www.techsciresearch.com/report/green-building-market/13729.html>. (Accessed on 8 June 2025)

Zelena arhitektura i pojam održivosti unutar kapitalocena

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Sažetak

Ubrzo nakon svojeg etabliranja, koncept *antropocena* naišao je na akademske kritike i dobio primjereniju alternativu kroz pojam *kapitalocena*. Od teze da čovjek kao biološka vrsta vrši presudan utjecaj na prirodu, daleko je preciznija tvrdnja da navedene pojave inherentno proizvodi kapitalizam – svojim načinima proizvodnje roba i prostora, eksploatacije resursa i fetišom rasta – unutar kojeg je ljudska vrsta „zahvaćena“. Nasuprot rasprostranjenoj zabludi da je jedini mogući i prihvatljivi društveno-gospodarski sustav, značaj kritičke teorije leži u dokazivanju tvrdnje da kapitalizam suštinski predstavlja sustav neograničenog uništenja ljudskog okoliša. Obzirom da su danas i sama pitanja zaštite okoliša pretvorena u golemo tržište pogonjeno etičkim manipulacijama u pogledu ekoloških performansi proizvoda, takozvana *zelena* ili *održiva* arhitektura predstavlja izvor masovnih i unosnih ulaganja, čime je proizvodnja prostora postala neovisna i samodopadljiva djelatnost nevezana za biofizičku stvarnost i metabolizam između ljudske vrste i prirode. Ovaj rad preispituje i ideološki razlaže mehanizme manipulacije vezane uz pojam održivosti u suvremenoj arhitekturi na dvije razine: (1) financijalizaciju arhitekture kroz tržište nekretnina te (2) dogme environmentalizma i takozvani *greenwashing* arhitekture kao poluga zelenog kapitalizma.

Ključne riječi: kapitalocen, granice rasta, *greenwashing*, financijalizacija, odrast.