

# DREAMING OF DENSITY

*premise*

*Urban density is physical and has a shape and location*

*Urban density is dynamic and has a speed and trait of dispersion*

*Urban density has gravity that generates context and is affected by context*

*Its force is universal and its outcome (increasingly) predictable*

## 1. DEFYING DENSITY

The world is now half urbanized, or so the mantra goes. As of 2008, half of over seven billion people have been tallied as living in cities. This moment has been widely heralded as a victory for the city and the advancement of the urban societies it facilitates. Seamlessly stitched together into the intricate structures of the global economy, culture, information and mobility networks, the urban condition has become the leitmotif for a contemporary global identity. This vortex of global urbanization has sucked up not just the bulk of the people and most of mankind's critical activities, but also the attention of researchers across the sciences.

This scientific fascination with the city is very timely. Cities have come to define our hopes, as well as our fears for the future. They are the epicenters of our most daunting challenges—from bellowing sources of greenhouse gases and environmental degradation, hotspots of inequality, poverty, social tensions, even war. Conversely, as Geoffrey West notes, cities are “the crucibles of human civilization” and the logical focal point for finding comprehensive future solutions. Multinationals across the board, from car brands to energy corporations, seem to agree and have promulgated cities as panacea for a greener, healthier future. Indeed West's research suggests few things in nature are as robust as cities. Increasing urban densities has become a precursor for sustainability through energy efficiency and a precondition for lasting economic growth and ostensibly the rise of a *creative class*\*. As cities expand, forging new physical and socioeconomic connections, the urban system is only becoming more resilient and more intelligent. Like neural networks, with every new connection the system grows stronger and opportunities to trade, share information, build knowledge and enhance culture further increase—a process as old as civilization itself.



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Cities are the crucibles of human civilization, and the epicenters of the global combat for sustainability, but the maps of the battlefield have to be redrawn. While West's metaphor clings to an image of the city as a finite entity, a singular point in space-time, urban networks have spawned to operate at a global scale. NASA's famous night-time satellite image of the world burning in bright clusters drives home the reality of this immense scale jump, as it does the comparison with neural networks. Spun together along strands of infrastructure, the light patterns resemble the tree structures of our braincells. Though largely planned and entirely fueled by human activity, the long tentacles of the global urban networks describe a distinctly higher order, more closely resembling organic or fractal hierarchies. A handful of mega urban regions dominate the continents, each made of powerful local clusters, surrounded by countless strings of smaller nodes—our cities. One by one, every 'crucible' has been absorbed in the swelling constellation that is the global cityscape, or what Neil Brenner calls planetary urbanism.

### **#the\_grey\_zone**

This NASA image perfectly illustrates the reality of a metropolitan dominance. Without concerted planning, cities have grown to form a daunting, contiguous system pulsating across the globe in long corridors of infrastructural connections running across land, sea and skies. However, there is much this image inadvertently obscures. Although a clear indication of human activity, many brightly lit areas, such as harbors or industrial zones, barely account for substantial habitation. Conversely, somewhere in between these bright stellar networks the vast dark regions accommodate the other 3.5 billion people of the global population. This other half is not finely dispersed over the natural hinterland living nomadic lifestyles. Instead, its population is settled in a fog of millions of towns and villages, simply too faint to be observed by this satellite, often too small to be classified as a city. Yet, these millions of settlements are an increasingly critical part of the global economic engines (Sassen, Taylor, et al.). Unlike the black and white division that this night-light image suggests, the urban condition has become an intricate and constantly shifting gradient of greys. It is across this gradient that densities rapidly dwindle and then again scintillate seemingly at random. Arguably the total footprint of cities in this cloud of urban activity amount only to (a cursory estimate of) 2% of global land use. However, as the command and control centers of the industrialized global economy, their sphere of influence has exploded, permeating the entire habitable and increasingly the entire natural environment.

Stoermer's concept of the *Anthropocene Epoch* defines the current geological age as determined by human activity. This is now virtually irrefutable, more importantly, it is likely irreversible. The dramatic loss of ecosystems in recent decades is a basic indicator, when some scientists argue that the growth of biodiversity itself has halted. Simultaneously, we are eroding the livability of our own immediate habitats. Disconcerting new phenomena such as *Solastalgia* (Albrecht) describe an existential distress caused by environmental change. Notably severe air and water pollution has given rise to an explosive increase in environment related diseases and mounting mortality rates in many urban regions. However, as former CCTV anchor Chai Jing powerfully elucidates in her documentary 'Under the Dome', many prominent causes of pollution have been relocated from the city centers to far flung peripheries. But natural systems will inevitably transport these pollutions back to our living environments and into our lifestreams. The indiscriminate dumping of waste Wang Jiu-liang documented for over 500 landfills wedged between the subcenters of sprawling Beijing, is a stark reminder the fate of the city and its fleeting suburbs are inextricably linked. Entirely diffused and spawning below the radar, beyond the scope of common perception or even sophisticated density studies, the global grey zone is both pervasive and virtually impenetrable. And yet is the final frontier of global urbanization and the long-term battlefield for urban sustainability and the wellbeing of urban society as a whole.

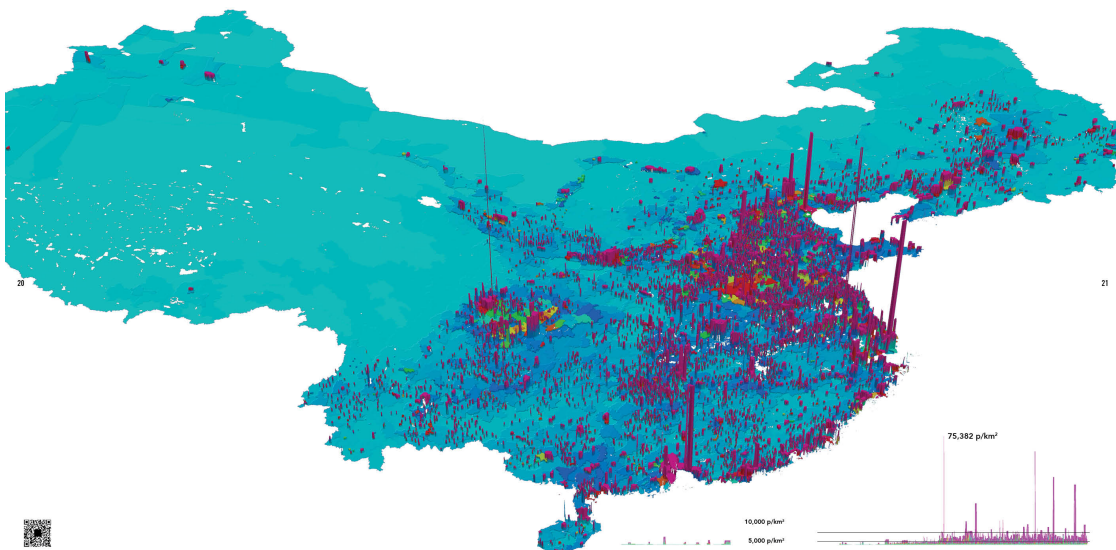
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### #event\_horizon

Nowhere has urbanization been more aggressive and more chaotic than in Asia. The *Asian Tigers* produced some of the most intriguing juxtapositions of functions, spatial complexities and surprising intensities, but pushed along by extreme economic pressure these fertile contrasts proved hard to maintain. As urban cores inflate, absorbing, like black holes, anything of significant mass and value, mega-suburbia—the event horizon in this analogy—expands, swirling around the insignificant, mundane and immaterial. Where central planning dominates, new frontiers of monotonous housing are on offer in large quadrants along the fringes. They remain mono-functional or even unoccupied, until anxiously the first hubs of branded consumption cling to their market potential. As this binary system matures, it becomes entangled by highways and smothered by industry and (industrialized) farming. Asia's frail democracies, on the other hand, are dominated by parcel-driven growth, crystalizing in long, jagged urban patterns. Emanating from the countryside, these rural ribbons form inconspicuously along rivers and other ecologies, until they are indistinguishable from the city.

As two basic forces driving urbanization, they should produce a coherent and predictable urban form. However, the intense centripetal pull of the core is immediately diffused by a mounting number of centrifugal forces—congestion, pollution, privatization, spiraling living costs and safety concerns to name a few. Born out of antithetical forces, Asian peripheral patterns form hybrid fields of extreme density and refractory dispersion. The Asian suburb can quickly morph from granular, disconnected and outside the field of view, to glaring, gentrified and congested. This successful adaption puts it on track to become a universal condition. Fed simultaneously by an influx of migrants seeking opportunity and by an middle-class fleeing from the centers, the periphery pushes on, swallowing villages and spawning new cores. This is the formation of the endless city, where center and suburb casually swap roles and centrality is at best ambiguous.

However spectacular Asia's urbanization at times may be, the denouement of its megacities comes as an anticlimax. As cities flourish, urban edges fizzle out ever deeper into the countryside. Relinquished as a corollary of urban expansion, fragmentation is generating cityscapes beyond comprehension, and quite literally beyond our means to plan them. Urban forms shift faster than planners can trace them, and edges are stretched to point they are indiscernible. This partly explains why urban populations are tallied along fickle administrative boundaries that have little resemblance to the settlements they try to quantify. Multicultural, often transient and unregistered, modern urban communities are as fluid as the contours of their habitats. As the Asian cities shed their twentieth-century mould, the question *what* is urban, is as hard to answer as *who* is urban.



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### **#half\_done**

This illusive formlessness de facto heralds the end of the city as it is commonly perceived: a finite entity on a cartesian plane. Edgeless and globalized, traditional notions of planning, which understand urbanity in static or singular terms, are dismantled. That's not a lighthearted statement, nor is it bombastic rhetoric. There is a proud tradition in recent history of planning skeptics. Koolhaas leads the way: "Too many architects' 'visions' have bitten the dust to propose new additions to this chimerical battalion." He continues: "The built is now fundamentally suspect. The unbuilt is green, ecological, popular. If the built — *le plein* — is now out of control — subject to permanent political, financial turmoil — the same is not yet true of the unbuilt; nothingness may be the last subject of plausible certainties."<sup>[S,M,L,XL; 1995]</sup> Many have since followed. Counterintuitively, planners who blame the failures on the discipline's inherent inadequacies (including undersigned), often also proclaim a profound optimism about the city as a self-determined entity. "Cities grow in their own way" states Vlaskamp in 2010. He concludes "Cities heal themselves". But is this evolutionary prowess attributed to the city just postmodern sentimentality, or an intrinsic quality planners can rely on, when *le plein* determines all future outcomes; when human impact has become omnipresent? In China, the notion its vast landmass is a communal tabula rasa still to be developed, lingers on, keeping a planning culture in place that is essentially a greenfield operation. Even relatively independent new town projects often exacerbate rather than improve an existing city's problems. The reality is that China, like the planet, is now half urbanized; half way done. No project, however large or remote can still be conceived in isolation from (a latent urbanized) context. Efforts to tame these monster cities become remedial; overarching design ideas are immediately subjected to influences of encompassing tangible and intangible densities. Even detailed blueprints of large-scale planning visions are, once realized, subjugated by only superficially sophisticated metropolitan systems.

### **#fail\_better**

We could attempt to unplug the city from an invariably doomed compulsion to plan its onslaught top-down. Asia's urbanization is largely *in situ* and unregulated, and yet, incorporating even cautious *laissez-faire* tactics into new projects remains too radical a proposition. Densities, development speeds, politics, culture and ecologies all render western urbanism all but irrelevant within the Asian context. And yet, ambitious urban projects generally demand importing so-called *global best practices*—be it a German eco-town or a Dutch smart city. If we are indeed condemned to stack plan upon imperfect master plan, could we at least circumvent the *best practice* obsession and conceive a kind of *best laissez-faire* strategy? Can we align local knowledge to address higher-order complexities? This implies a strategic adaptation to the city's natural urban gravity and direction. Could we even nurture densities in order to stop future expansions and make urban patterns coherent? In short, can we learn to let the city fail better?

## **2. PERCEIVED DENSITY**

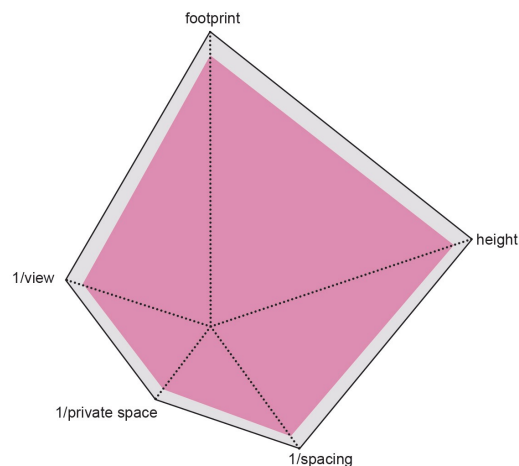
### **#density\_is\_not\_a\_formula**

Cultural consciousness grants density a metropolitan aura. The iconography of an advanced society, leaning cupidinously toward science fiction, invariably assumes ultra-dense structures of close-knit mathematical brilliance, through which inhabitants surge as multitudinous as electrons (BBT\*). The average residential consumer however, despises density and moves to the suburbs. The disparity between different cultural notions of density is growing starker. Yet for professionals density is mostly a simple numbers game: for developers, a relationship between land costs and unit retail value; for planners, one between anticipated population growth and

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desired urban footprint. Among architects, density numbers are revered almost as pure ideals—models like mountains fill museums and galleries, depicting the ambient densities across major capitols, always supported by a technophilic animation acting as a springboard into their abstract datascares. However engaging, even for the general audience, actual prospective residents, when considering what a place might be like to live in, are seldom concerned with such numbers—in part because the numbers in themselves do little to describe the condition.

Questions as to whether an area feels vacant, neighborly, or crammed—even whether it feels dense or not dense—are given little by way of satisfactory response by the figures. Traditional single story courtyards in the alleys of old Beijing tally a similar number of people per square kilometer as its suburban counterpart, walls of thirty story towers, when obviously they represent radically different environments. Equally, the floor area ratio (FAR) of six story social housing slabs is very close to that of a luxurious four-family ‘urban villa’ typology. Clearly the experience on the ground of space and density elude conventional density metrics. The sensory information you receive on a certain location so often trumps the underlying density numbers. Density perception, rather than relating to a single number, is contingent upon a set of whole environment factors, and therefore requires a holistic and intuitive approach.



The ‘perceived density diagram’ is a first attempt to chart these soft measures of density for a particular community or architectural typology—as gleaned by living in it. It incorporates five variables: the height of the surrounding buildings; the spacing between them (with narrow spacing producing a higher perceived density); the footprint of the buildings (do they present massive objects on the ground?); the viewing scope to which residents have access (with shorter views producing higher perceived densities); and the amount of outdoor private space available to residents (e.g. courtyards, gardens; with smaller private spaces producing higher perceived densities). Plotting points on the five axes yields the perceived density profile.

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### 3. DYNAMIC DENSITY

#### **#bell\_curve**

In the West, the term suburbia still congers up images of a lush comfortable monoculture that offers ample personal space. In Asia, more and more remote projects are extremely compact. This is unusual and counterintuitive to a western-centric understanding of the city, and it is important. In theory, a density distribution that continues to the edge of the city holds real promise. A dense suburb would be a hallmark of the *compact city*—the theoretical cornerstone of sustainable planning. Its premise: compact population densities provide support for high-end public transit and public services and facilities, which in turn shorten commute times and lowers energy demand. Density numbers regain relevance when trying to engineer the compact city.

The *compact city*, however, relies on the mathematical improbability that population densities across the city will not level out. In other words, the *compact city* describes a neat density 'cube', rather than a bell curve—no density fall off occurs between center and suburb, and thus no spatial distinctions to speak of. But urban systems, both at the local and global scale, reveal very different sections. A more likely assumption is that any urban core brings about its own periphery, its own event horizon. City and suburb are tied to the hip. As one moves away from the core, more land becomes available at an exponential rate. Consequently pressures drop, scarcities and rent gradients dwindle and densities follow suite. So have Asia's suburbs flouted the universal urban hierarchy? From Beijing to Manila, tightly-packed walls of residential towers of extreme (built-up and population) densities are cutting through the landscape in hard lines. Surrounded by green space they seem to demarcate the edge of the city. But zoom out on a satellite image and the city reveals this green particular patch was only a momentary remission. An organic system analogy—nerve cells, trees structures, natural fractals—is temporarily defunct. Sheer speed of change impacting on vast cheap land has effected a radical break. Though often compact, projects are perfectly disintegrated—the rational city, however general, is not achieved. Spatial products compete on the basis of the city they are superseding, not on the future city they are collectively creating. The designer is left to work on the level of the hyper-meticulous—microplanning the windy road within the gated compound—while the sum of these meticulously designed moments—i.e. the system itself—remains undesigned\*.

China's flash urbanization has generated the laboratory conditions required to observe these urban interdependencies practically in real-time. Within the span of a single generation it has nurtured consecutive ideologies of planning, conceptually abandoned upon completion. Observing these formations fractures persistent beliefs in both the grassroots city and the orchestrated landscape. While at street level china's new urban realms look perfectly microplanned the same polished island settlements at the scale of the metropolis merge together to reveal macro-organic systems. The city, both organic and coarsely structured, is now the spatial derivative of Market-driven Unintentional Development; or, MUD\*.

MUD\* is capable of producing urban forms faster than planners can map them, cities absorb them, or consumer-inhabitants reject them. MUD\* formations follow the path of least resistance, producing at Chinese speed essentially static urban space of instant real estate projects. However immediate, a single iteration of the boom-bust cycle within city-building will have long term consequences for city shape and performance. Ultimately MUD\* defines form and redefines the core notions of urban versus rural, compactness and fragmentation and thus density itself.

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Under MUD\* conditions traditional notions of planning equally become inadequate with urban expansion occurring faster than the plans that aim to control it. Instead it is driven by constructions at the two ends of the spectrum: The macro-planned and the micro-organic. Across Asia and the Global South the planner-policymaker is presented with a fraught dilemma—to pursue the clean modernity of the economic miracle; essentially trying to emulate the Chinese formula for space production at hyperspeed, which China's political leaders have already abandoned. Or, instead he can aim to stimulate organic growth and unleash the potential of Asia's entrepreneurialism and grass-roots communities. But this is no more than the illusion of choice. These forms of growth both fear each other and feed off each other. Stepping stone projects trample swaths of insignificant developments, while bigness gets circumvented by fluid spawning efforts of home-grown urbanism. While we deliberate, MUD\* moves on.

As MUD\* spreads, fear takes hold. Growth of burgeoning cities is curbed with policies that deflect the influx of migrants. With the objective to deflate core densities these policies are essentially anti-urban, but ironically they spur accelerated growth everywhere around the cores. The mega-city should not be feared. The sole purpose of a city is to facilitate contact between large numbers of people, its markets and mobile labor force. However, inflated too fast, its fabric becomes coarse and overstretched. The city ceases to remain linked to itself. It fails its main purpose. Therefore any overarching plans must address the key concern of maintaining efficient flows—both in terms of duration and cost. The organization of densities throughout an urban region is pivotal to the efficiency of trip processing and to the safeguarding of urban interactivity. Tracing densities in real space, as apposed to along political borders, and real time, as apposed to mapping a static slice, must form basis of any comprehensive flow-orientated planning strategy. While boosting the density of people per square kilometer, they diminish the density of services per person, and vitiate diversity. Analysis of prevalent urban distribution patterns suggests a normative density curve with two essential components. First: high performance density is composed of a contextual matrix of densities, including people, programmatic mix, and functionality. Second: density occurs within a temporal continuum of urban expansion and shifting densities. Planning density cannot be regarded in terms of static achievements, but must incorporate an understanding of fluid interactions in space and time: Dynamic Density\*.

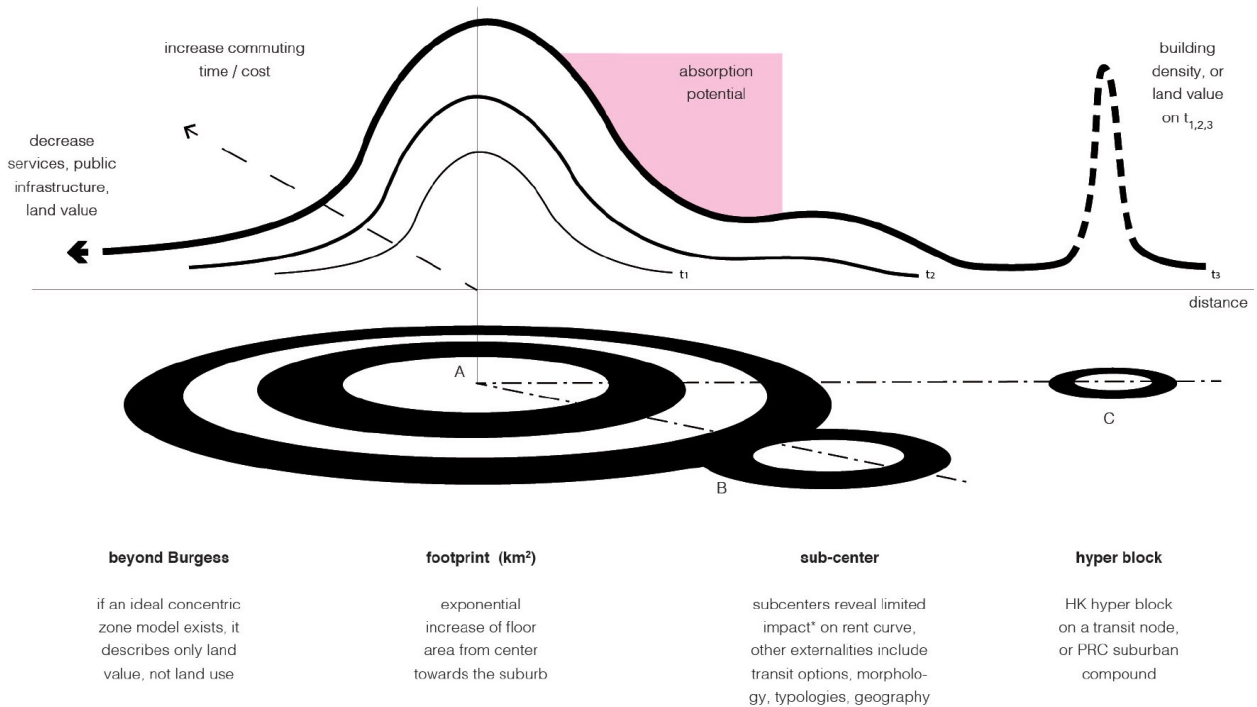
### DYNAMIC DENSITY PRESCRIBES PLANNING

DYNAMIC — anticipating change over time

DENSITY — promoting compactness as an unambiguous goal to coordinate planning

Dynamic Density\* (DD) conceives of an optimal relationship between footprint and population. This is much less the result of floor area ratios but more of average population densities per square kilometer of built urban footprint. Resulting urban expansion patterns that are intelligible and should conform to stage of growth modeling. To embrace Asia's reality of extreme peripheral population densities, the scales must extend from village to metropolis, and span from rural to urban economy. The resultant framework provides objectives in terms of size, shape and urban texture for developments across a wide regional network of hierarchies and interdependencies. This facilitates future planning. In place of remedial measures (e.g. transporting densities outwards as is the custom), DD serves to render more integrated urban flows and schemes that can anticipate continuous change even after completion. DD goals are frequently unattainable in cities that have formed under systems of slow evolution. Defensive historical imperatives have focused more on inculcating a politicized sense of place than on integrating the inevitability of flux.

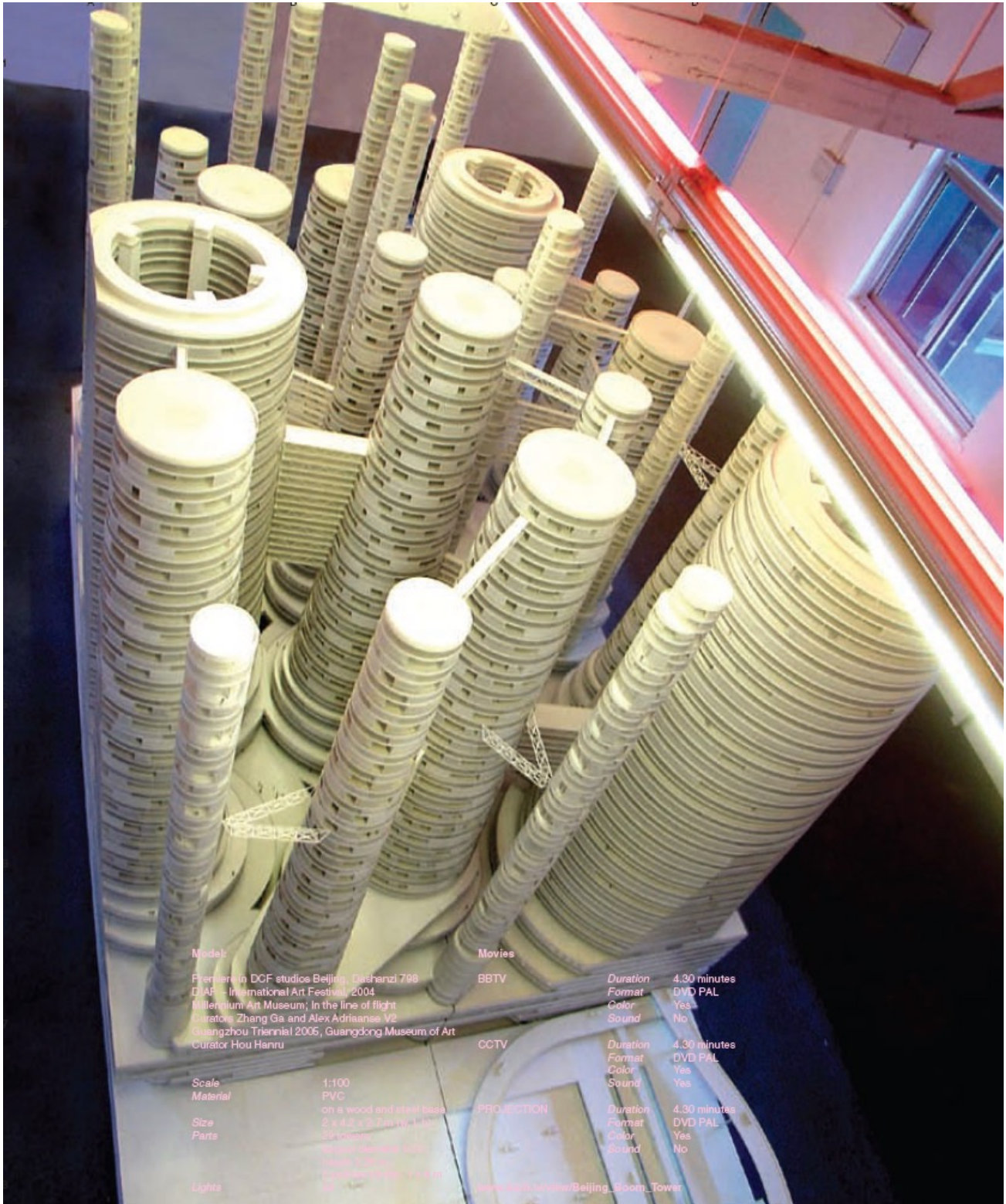
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The situation across Asia now is different. Density itself is irrecusable. Population and building densities are among the highest in the world, and MUD\* defined interactions produce naturally compact typologies. Applying dynamic planning logic to the phenomenon of MUD\* offers the opportunity to harness Asia's predilection for high-rise high-speed development and set it toward the production of future-proofed configurations. In stark opposition to evolution's multi-generational urban monster, for whom theoretical approaches to density are not backwards compatible, it becomes conceivable to build cities which are forwards compatible: urban structures created by flash ventures, which through an understanding of DD incorporate within their fabric the possibility for future adaptation. Immediate instantiations of MUD\* forms can be harsh, but anticipate further change. Read-respond operations are performed after the fact of construction, but upon layouts which envisage subsequent evolutions. What traditionally has been patchwork becomes refinement. What initially appears to be brutally inorganic becomes humanized and colorized. The sheer attraction of the city becomes a means to surpass its harsh urbanization. Over time density nurtures not merely physical, but social densities—the ecologies of knowledge, services, cultures and mobility. In time DD makes the grey zone work for you.



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BBT - Beijing Boom Tower 2005 Guangzhou Museum of Art

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