

# The Environmental Paradox of the City, Landscape Urbanism, and New Urbanism

Douglas Kelbaugh  
Taubman College of Architecture and Planning  
University of Michigan, Ann Arbor, Michigan  
[kelbaugh@umich.edu](mailto:kelbaugh@umich.edu)

## Abstract

“The City Council, as you can well imagine, swallowed this line whole. Who wouldn’t? Landscape is good; building is landscape; therefore building is good. One hears this three-car train of logic constantly in architectural discourse today...Nothing sells like landscape. It’s our sex” (Heymann, 2011). “If you love nature, live in the city” (Glaeser, 2011). As the first quote above suggests, the proponents of Landscape Urbanism have been winning design competitions and commissions, as well as gaining professional and academic acclaim. Closely associated with hallowed ecological values, it has been given a wide berth in the media and public process. However, it has received limited analysis and criticism in the professional and academic worlds. New Urbanism, on the other hand, is an older and more organized movement whose agenda has been repeatedly dissected and critiqued. A critical comparison of the two is illuminating and timely in an era of increasing ecological degradation and climate disruption, as well as of rapid urbanization. Before comparing the two, the *environmental* merits and demerits of urbanism in general will be discussed.

## 1. The Environmental Paradox of Urbanism

It’s obvious that cities consume enormous amounts of resources and produce prodigious amounts of pollution and waste – far more per acre than suburban sprawl. Yet, cities are surprisingly greener than their more verdant suburbs. This paradox can be explained in a number of ways for different audiences:

For the *average citizen*: The average urbanite’s carbon and other eco-footprints are smaller than the average suburbanite’s. Leafy suburbs may *look* greener, but on a *per capita* basis they produce more pollution and waste than cities, and consume more energy, water and natural resources.

For the *economist*: Measuring carbon and other footprints on a per capita basis is the equitable way to measure environmental costs and level the playing field in a world of wildly uneven wealth (For instance, a large LEED Gold house isn’t very sustainable if only two people live there.). Cities are also more efficient in terms of land consumption, infrastructure, and the mechanical heating and cooling of buildings, as well as transportation. Placing people in the denominator of the metric is the key that unlocks this paradox, however narrowly or widely it is applied.

For the *climate scientist*, the environmental paradox is more complex: On top of producing a higher amount of greenhouse gas (GHG) per acre, the city also tends to warm the *local* climate. Its extensive dark rooftops and pavements absorb solar radiation and release heat into the atmosphere. There are fewer trees than in

suburbia to provide shade and evaporative cooling; there is more waste heat, i.e., hot gases spewing from tailpipes and chimneys that heat the air. This “anthropogenic heat” raises the temperature of the climate in the city higher than in its suburbs and countryside, producing the “Urban Heat Island Effect” (UHIE or UHI). GHGs produced in the city contribute to *global* Climate Change (CC) as opposed to *local* warming. However, the city’s GHG production is smaller *per capita* than its suburbs, paradoxically making urbanization an environmentally beneficial trend.

For the *local government official*: Urbanism is a powerful and under-utilized strategy to mitigate global CC. And because mitigation strategies for global CC are complementary to UHI mitigation strategies, the more immediate impacts of local climate change can be used in already-hot cities to motivate people to simultaneously address both problems. Urban deforestation is a major contributor to local warming. For instance, metro Atlanta lost almost half its trees in the last quarter century; replanting these trees would cut its UHI in half, dropping average summer temperature about 3 degrees F and shaving up to 12 degrees F off the daily highs (Stone, 2012).

Last, for the *urban planner* it would be no surprise that residents in a dense city have less impact on global climate change than automobile-dependent sprawl. What might surprise her is that a city of *the same statistical density* that does not have a wide mix of uses, a well-connected road grid, walkable streets, and good transit produces a per capita impact on CC much like suburbia.



Figure 1: Cities like Dubai with a superhighway supergrid can be “highrise sprawl,” a compromise that provides neither the space and privacy of suburbia nor the walkable and transit benefits of urbanity. This relentless overlay of the Emirate-wide grid of

superhighways encourages making every trip by car. It is indifferent to natural topography and ecology, while encouraging the continuous, undifferentiated sprawl and monoculture of Modernist development.

*In short, the ecological footprint and environmental impacts of cities are larger per acre but smaller per capita than suburban sprawl; and the footprint with a mixed use network of small blocks is even smaller than fragmented cities with cul-de-sacs, superblocks and limited access highways.*

## 2. Three Relevant Benefits of Urbanization

*A. The environmental paradox is central to this comparative study, as well as a very relevant benefit to a rapidly urbanizing planet.* The phenomenon is supported by current scientific research at the Santa Fe Institute. (West, 2011) Its work, which is based on big data, indicates that the *metabolism* of cities increases in a sub-linear manner — that is, due to the inherent efficiencies, their metabolic rate grows at a slower rate than their increase in size. Similar to Kleiber's Law for animal metabolism, doubling the size of a city with a commensurate increase in density has been shown to increase energy consumption by about 70%—not 100% as might be expected. Bigger cities are more efficient at using and conserving energy—like the elephant, which has a slower heartbeat and metabolism than the beaver, whose heart in turn beats slower than a hummingbird.

The increasing energy efficiency arises from higher rates of walking, biking and transit ridership, as well as fewer and shorter automobile trips. Larger buildings are typically more efficient per square foot to mechanically heat and cool (although more difficult to *naturally* light and ventilate). To solarize, whiten, or vegetate their roofs and walls costs less per occupant to build and operate, as does urban infrastructure—from streets, bridges, tunnels, utilities and transit, to sanitary and solid waste systems. The metabolic benefits are less in new or expanding cities, where the energy and material flows resulting from construction are much higher than in mature cities.

As aggressive interventions in the landscape, cities could be called ecological sacrifice zones. This may be inflammatory terminology, but even the greenest of cities inflict local environmental wounds that nature must heal; they leave scar tissue that must be compensated or justified with other trade-offs and benefits that outweigh the ecological costs. This compromise is illustrated in countless cities, vividly so in cities like Venice, Italy and Charleston, South Carolina. These virtuoso examples of compact, traditional urbanism were built on landfill in sensitive environments, ones where development would be highly regulated if not prohibited today.

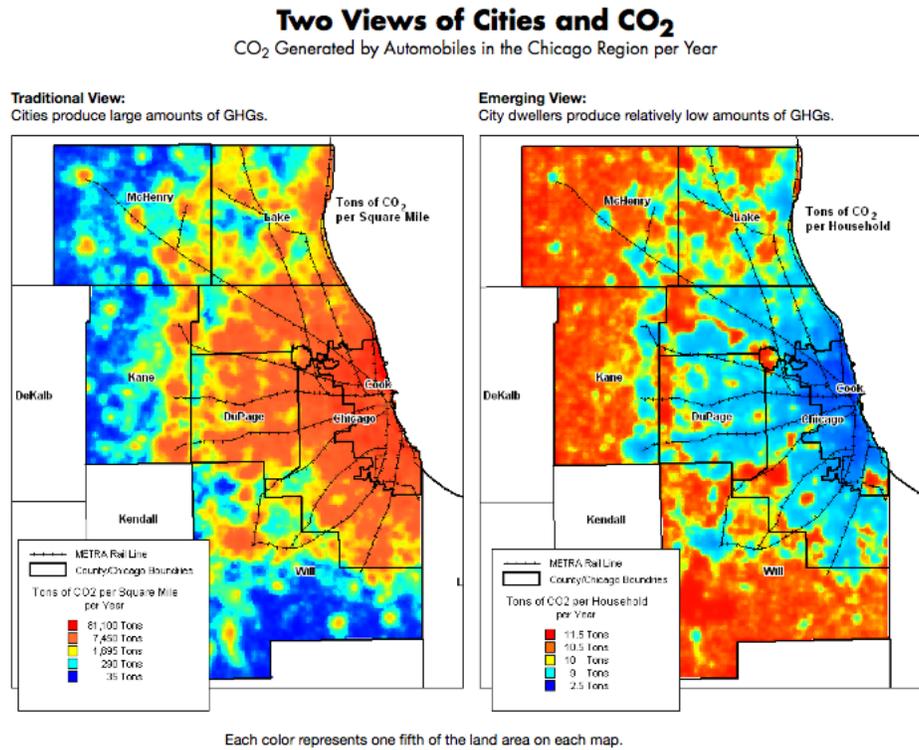


Figure 3: This map of metro Chicago’s GHG production illustrates the environmental paradox of cities. While vehicular travel in the center city produces more emissions per acre, it produces less per person. The paradox would be even greater if the per-capita heating and cooling of buildings were also included, not to mention water consumption as well as the capital and maintenance costs of infrastructure (Center for Neighborhood Technology).

Any visitor to or resident of these cities can attest to the many ways that the merits of these and other cities compensate for their intrusion into local ecological systems. This is not to say that *new* cities should be built in sensitive areas. We should select development sites as mindful of ecological constraints as possible, while also recognizing that humans need and want to be in proximate contact with “nature.” On the other, hand physical distance is no guarantee of protection; indeed, humans can disrupt ecologies without living in or near them.

Cities are better understood in a broader meta-ecological way, and seen not as *metaphors* for ecological systems but as *actual* ecological systems. They can be as or more negentropic than forests and estuaries. And as seats of human ecology – from Muppets to Mozart to metaphysics – their culture can be profound, even operatic in their complexity and intelligence.



Figure 4: Charleston as built (left), and as a hypothetical non-urban/anti-urban configuration that contemporary regulations might require it to be built today (right). Cities unavoidably entail environmental trade-offs and sacrifices, but the myriad benefits of good cities seem well worth the deficits. (DPZ)

Although not central to this study, the following two important benefits of cities are also relevant:

*B. Cities are on average more productive and creative per capita than suburban and rural communities.* Kleiber's Law is inverted – doubling the density increases creativity roughly 2.8 times, as measured in metrics like patents and publications per capita. (West, 2011) Per-capita productivity and income also enjoy a better-than-linear rise. Jacobs (1961) has written about this phenomenon, as have Florida (2004) and Glaeser (2011).

*C. Cities sponsor a positive social paradox: they can maintain socio-cultural diversity within a large population while simultaneously providing a sense of identity for neighborhoods, social groups and individuals.* They can promote tolerance and absorb the social chafing and competition of everyday urban life without homogenizing the variety of a city or bleaching out difference. Their public realms bring people closer together – while keeping them apart – much like a dining or conference table simultaneously connects and separates people (Arendt, 1958). Social and demographic inclusiveness is essential to sustainability; without it, civilization will not endure.

Before discussing Landscape Urbanism (LU) and New Urbanism (NU), some of the environmental *downsides* of cities should be mentioned. As suggested above, “cities are acts of violence” (Krier, 2011). They are getting bigger and more environmentally disruptive, requiring more resources and land to support their appetites and absorb their voluminous wastes. Cities are typically not as resilient or self-reliant in times of environmental crisis as more self-sufficient rural communities. Urban living can disconnect our species from the wild nature that runs deep in our

genes, and it can be stressful with more concentrated crime, disease, pollution, noise and social friction, as well as impersonal and alienating to newcomers.

Despite these downsides, cities have become the primary habitat of, by, and for the human species, soon to surpass 60% of the world's population and rising rapidly. Can growing cities contribute to the ongoing success and happiness of our species, without compromising thousands of other species and fouling the ecological systems that we share with them and mutually depend on? If, as climatologists claim, the ten-thousand years of near-perfect climatic conditions for humans to flourish are now giving way to a less stable and less hospitable climate, how can cities help our species continue to thrive? LU and NU offer answers that both coincide and differ.

### 3. Landscape Urbanism and New Urbanism, Their Similarities and Differences

These two primarily American movements of academicians and professionals have a number of values and aspirations in common. In the broadest sense, both LU and NU are reactions to Modernism and the impacts of its static, mechanistic view of the natural world. Each purports to be empirical and pragmatic, claiming to be evidence-based and outcome-based, which is why there is the potential for rational discourse between. Each considers environmental sustainability and resilience to be a very consequential *design* issue – and cares fervently about *form* – believing design has a basic agency in life and an indispensable role to play in addressing society's problems. They feel that sustainability as an ongoing ethic and that practice isn't sustainable if it doesn't result in aesthetically pleasing places, ones that are expressive of community sensibilities and tastes. A designed environment that is ugly and unpleasant isn't beloved, and if people don't *love* it, they aren't motivated to care for and sustain it.

To a varying degree, each rejects Post-Structuralism and the academy's endless critiques of society's flaws in favor of more "projective," proactive theory and performative practice. Both eschew the nihilism, subjective relativism, and "critical project" of the late 20th C., but in different ways, with LU deploying more *imaginative* solutions to problems and NU more *proven* solutions. LU has raised the ecological bar, or at least the conversation on urban infrastructure, just as NU has on suburban retrofit, Transit-Oriented Development (TOD), and, more recently, urban infill.

Each rejects the rational reductionism and the one-variable-at-a-time, one-size-fits-all engineering syndrome common to Modernism. Both seem to repudiate the human-nature dichotomy — whether the Cartesian duality of mind and body, or the Emersonian distinction of "rural strength and religion" vs. "city facility and polish." Essentially, they both believe cities are as "natural" as beehives, anthills, and coral reefs, albeit with more elaborate gizmos and props. Both would no doubt agree with Jane Jacobs that *people watching* in cities is as much about "nature" as bird watching in the wilderness, or, for that matter, *birds watching people* in cities.

Both movements focus on public space and infrastructure, LU almost exclusively. LU seems to embrace the walkable neighborhood that is the bedrock of NU, although LU's ideal neighborhood is typically more campus-like, with pedestrian routes through the park rather than along the street. NU rejects the Modernist dendritic, tree-like network of streets, and unabashedly promotes the

connected grid/network. However, LU leader Charles Waldheim champions Detroit's Lafayette Park, a superblock urban renewal project by Mies van der Rohe and Ludwig Hilberseimer. Its campus-like setting of townhouses and few high-rises may be a lush green sanctuary in a distressed city, but its suburban-like density and cul-de-sacs do not make for a repeatable building block of urbanism.

Each movement embraces a more *regional* approach to urban planning, preferring to coherently address the entire metropolitan area and bioregion. Both are also putatively *regionalist* in design. For instance, LU believes in native plants and permaculture, just like NU aspires, if not always successfully, to traditional and passive solar architecture rooted in local climate and local building materials and practices. Despite celebrating regionalist design, NU's Charter also advocates underlying if not universal patterns and structure in design, aiming to reject arbitrary or capricious form.

Here the similarities between the two movements end and the differences begin. LU is professionally and academically "hot", with strongholds in several Ivy League design schools, which generally avoid NU as nostalgic, retrogressive, and dismissive of their avant-garde tendencies.<sup>1</sup> Waldheim (2012) claims to disassociate the movement from most of the rarefied, relativistic literary and art theory that dominated the architectural academy for a generation and that openly criticized normative practice. This high theory has given way in the last decade to "a shift toward collaborative, practice-based research," often focused on the environment and urbanism. (Allen, 2012) But LU seems to be still enthralled with forms that look Post-Structuralist. The fractal geometries, in particular the flowing, interweaving stream forms may be ecologically inspired, but these large-scale landscapes seem to be as much about style. When formal audacity is obligatory in every project – as is usually the case with starchitecture – inventiveness has become more slavish than liberating.



Figure 4: James Corner's firm Field Operations designed these parks in Santa Monica, California, and Seoul, South Korea. The smooth, curvilinear mounds of land (left) and the sculpted towers in a park/superblock (right) are more elegant than NU, but will they be as empty of pedestrians and denuded of trees as depicted? Despite rhetoric to the contrary, is LU still in the thrall of Post-Structuralist formalism? For

<sup>1</sup> Architecture programs at Notre Dame, U. of Miami, Andrews University, and U. of Maryland, have included NU to varying degrees in their pedagogy, as well as the Urban Design degree program at U. of Michigan for the decade while the author was dean.

formal clarity and contrast must it be embedded in the ordinary urban fabric that LU seems unable to deliver? LU is often accomplished, exquisite landscape *architecture*, but is it urban enough to be landscape *urbanism*?



Figure 5: Two well known LU projects are the redevelopment and restoration of the Lower Don River in Toronto (left), and the highly popular High Line in New York City (right), in two of North America's densest cities, despite LU's alleged focus on decentralized cities. In Toronto, the high-rise towers are set amidst parks more than streets. In Manhattan, the elevated park cuts through the traditional, dense, street-based urbanism that LU dismisses in theory but needs in practice for counterpoint.

LU has direct roots in Ian McHarg, downplayed as it has been since his view of nature has been shown to be too static. LU touts the fluidity and indeterminacy of natural systems more than their stability. It has embraced ecological theories and practices that emphasize more dynamic ecosystems with the rapid changes and oscillations that rattle longer periods of equilibrium (most significantly the increasing climate wobble that has not been seen for over ten thousand years). NU has also become very concerned about climate flux, but is much less fluid and continuous in its formal vocabulary, with its roots more in traditional urban syntax and figural urbanism.

The original East Coast contingent of NU grew out of a European formalism and has consistently promoted traditional architecture, Traditional Neighborhood Development (TND) and the NU Transect. The original West Coast contingent (including the author) arose from the environmental/passive solar movement and regionalism, and has been less insistent on traditional architecture. It has focused more on the regional scale and on (TOD), and has tended to be more accepting of high-rise buildings.

Although NU has refrained from inventive or flamboyant form, it has been urbanistically skillful, even bold. George Baird suggests that Peter Calthorpe's

regionalism is arguably more radical and critical (in a positive sense) than the work of Peter Eisenman, the arch-champion of discomfiting “critical design” that challenges convention and leaves issues like sustainability to others. (Fishman, 2005) Despite its too-frequent architectural mediocrity and pasty historicist tectonics, NU *is* in some senses more radical than avant-garde design, in which audacious urban form often cloaks the socio-economic status quo and even complicity with entrenched power and privilege. I agree with Stan Allen that LU stars – and their clients – are well “aware of the branding and marketing potential of the avant-garde mood that adheres to the work” (Allen, 2012).

There is a basic difference in the way that the two movements think about urbanism and nature. Not surprisingly, landscape design comes first in LU and urban design comes first in NU. The latter doesn’t believe in *maximizing* the amount of “nature” per se in the city, but in *balancing* it with human priorities. It opts for less open space, streams, forest or grasslands than LU, which has criticized NU for promoting a “parks desert”. NU would rather concentrate development *within* the city than spread or dilute it with conventional suburbs. Neither is LU in favor of conventional sprawl, but it prioritizes open space and parkland.

Since the Great Recession, NU has dramatically shifted its focus from large greenfield projects to smaller, greener and leaner urban infill (and to reform of policy and standards). Although it has come to fully embrace environmental sustainability later in its trajectory than LU, it believes the first obligation and role of towns and cities is to provide livable, resilient human habitat that is compact enough to reap the inherent benefits of urbanism and *leave intact as much of a region’s wilderness and natural habitat for other animal and plant species*.

This host-guest distinction can be seen as an ironic return to the compartmentalization of Euclidean land-use zoning that NU has so roundly rejected—this time separating the built habitat of humans from the wild one of animals. The separation varies in intensity across the urban gradient or the Transect, as explained below. Nor is it exclusive; there is room for urban food growing, and a place for domesticated animals and wild species, some of which thrive better than in the wild (e.g., the Peregrine Falcon and the Red-tailed Hawk, and the more ubiquitous squirrel, rat, and pigeon.) Habitat separation is like zoning land by *species* rather than by *function*, as an act of community building and of respect for other species. This interpretation may be stretching the zoning analogy, but compact human habitat intensifies the environmental paradox of cities: density not only shrinks per-capita eco-footprints but also human intrusion into animal and plant habitat.

Every contemporary urban theory seems to agree that the city is a network in some manner or form. However some think of the city as a network of *flows*, while others think of it as a network of *places*. Typically, LUists embrace and celebrate flows, especially water flows in the landscape, whereas NUists champion place, both streets and plazas/squares. Indeed *the* most salient design difference between these two schools of thought may be their attitude toward the *street*, which NU sees as the most important public infrastructure – the city’s vascular system, commercial locus, social stage, and “the river of life for the city” (Whyte, 1980). As one NUist says about this debate: “It is more than being about ‘two movements’. It is about the primacy of the ‘street’ as opposed to the primacy of the ‘park’ as the primary setting

for a civil society. The distinction is stark and nothing is more fundamental in urbanism."<sup>2</sup>

LU takes us back to the tower-in-the park urbanism and CIAM's early death warrant on "the street" written several generations ago. It is the apex of a long list of differing design tendencies: dendritic street hierarchy vs. highly connected networks; freestanding, object buildings vs. background, fabric buildings; high-rise vs. low-rise density; artistic license vs. norms and codes; artist vs. artisan; void-dominated vs. solid-dominated urban fabric; less consistent urban patterns vs. the Transect; surface vs. mass; and abstract vs. figural form and composition—all of which reveal that LU has not left Modernist urbanism or Post-Structuralist architecture as far behind as claimed.

On the other hand, NU should incorporate more contemporary geometries, such as fractal and parametric form, on top of the Euclidean/Platonic circle, square, and ellipse. Nor should it ignore technological breakthroughs such as digital fabrication; or the contemporary tectonics of glazed transparency that seamlessly connect interior and exterior space; or the apparent weightlessness of contemporary structures that visually defy gravity, an effect that can uplift the human spirit. Each movement should embrace the full range of local/low/vernacular design to high design, remembering that an urban fabric of many modest background buildings is needed to set off the few iconic ones. Indeed, what seems most promising going forward is street-oriented, walkable, mixed-use, socially diverse fabric *that is realized with contemporary architecture* and *punctuated with iconic buildings that are of contemporary, sometimes avant-garde design*. It's the best of what the design professions have to offer. Even new urban fabric realized in *traditional* architecture with contemporary/avant-garde foreground buildings – the original promise of Seaside – is a fuller, more culturally and tectonically authentic urbanism. But formal audacity shouldn't be obligatory in every foreground building – as is usually the case with starchitecture – or inventiveness and originality will be more slavish than liberating.

It is easy for the neo-traditional New Urbanists to blame their often mediocre, even banal, architecture on middle-class taste and the market economics that dominate speculative development (where, admittedly, one failed project can bankrupt a developer). However, they *could* fight for better design with the same fervor with which they've battled for mixed use, walkability, and transit. A loyal minority of NUists has been pushing since the movement's birth over two decades ago for more contemporary architecture.<sup>3</sup> A standard response has been that NU is beyond style, but very few CNU Charter awards have been given to contemporary buildings. A more convincing response has been that you can move public taste and the market only so far so fast, and that *urban reform* is more important and impactful than *architectural style*—a tactical argument to use familiar styles as a Trojan horse in which to hide less acceptable social and environmental programs. This argument is less compelling with wider public acceptance of NU principles.

These aesthetic comparisons focus on more emotive, subjective and less discursive preferences that tend to run deeper and change slower than more rational

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<sup>2</sup> Email from Paul Murrain, January 9, 2011.

<sup>3</sup> A number of in-house NU activists, most notably CNU founder Dan Solomon, current CNU Board Chair Ellen Dunham-Jones and the author, have long argued for both higher quality and more contemporary architectural design.

positions and constructs. Formal sensibilities are no doubt at the crux of the friction between LU and NU; they often speak louder than words. The difficulty of verbally unpacking aesthetics notwithstanding, LU is more enthralled with surface and “thick”, continuous horizontal form, especially folded, abstracted ground planes or interweaving, curvilinear landscapes and feathery wetlands. The geometries are neither finite nor finitely composed – without borders or frames – and they are more inspired by fractals than, say, the proportions of the human body. However voluptuous and biomorphic, the palette can be as formulaic as NU’s formalistic master plans of grids, radials, and terminated axes (another criticism that is often deserved). Nor do LU building designs define the outdoor rooms of plazas and streets, which people from all cultures seem to find spatially comfortable and sociable. And like suburbs, there tends to be too much open space devoted to grass and not enough to trees, with the universal sense of refuge and prospect that tree canopies provide. This lack of enclosure brings into question Waldheim’s assertion that LU has “the ability to produce urban effects traditionally achieved through the construction of buildings simply through the organization of horizontal surfaces.” (2006) Will the vast, open green spaces actually attract the many pedestrians photo-shopped into the exquisite renderings, or will they become empty “border vacuums” (Jacobs, 1961)?

#### 4. Learning From and Moving Beyond the Differences

The built habitat needs to function in a way that is beneficial to its host species. Curvy *biomorphic* shapes and patterns may *appear* to be more natural than rectilinear ones, but they are not necessarily more *biophilic*, which is design that makes humans innately feel alive, comfortable, and secure. Biophilic environments need not be biomorphic in shape or literally full of greenery (e.g., the Alhambra in Granada, which primarily consists of rectilinear forms and patterns). They are sustainable because they *resonate* with humans. Both movements need biophilic design to achieve lasting cultural relevance.

LU’s focus has been more on *water* in the city, whereas NU has paid more attention to *fire*, i.e., the inherent energy conservation of cities. NU can learn more about hydrology, as well as ecological infrastructure, habitat, and horticulture, from LU, which in turn could profit from NU’s detailed knowledge of street networks, TOD, its higher walk scores, form-based codes, and the public/private declension of urban space. NUist principles are based on millennia of city design, updated and methodically refined over 25 years of frequent conferences, writings, debates, and built projects. It’s inspired by enduring precedents like Nolli’s Rome, which is held up as a quintessential setting for human ecology.

Like TOD, the *Transect* is basic to NU, with its gradient of density, use, and height that builds from wilderness to rural to suburban zones to three zones of urbanism, plus a special District zone for uses that don’t easily fit in neighborhoods (warehouse districts, industry, airports, etc.). This six-zone gradient works across both the metropolis and the individual neighborhood, which typically consists of two or three T-zones. It includes a sliding repertoire of habitat for plant and animal species, as noted earlier. The urban end of the Transect promotes social diversity, in keeping with NU’s increased focus on urban redevelopment. LU’s large open spaces

promote ecological diversity, but its less granular urbanism is not as likely to induce socio-economic mixing.

If sociocultural diversity increases with density while natural/ecological diversity decreases, a more sustainable urbanism would keep sociocultural diversity AND natural/ecological diversity as high as possible in all zones. Illustrated in the chart, this balance would take fuller advantage of both the environmental and the social paradox of cities.

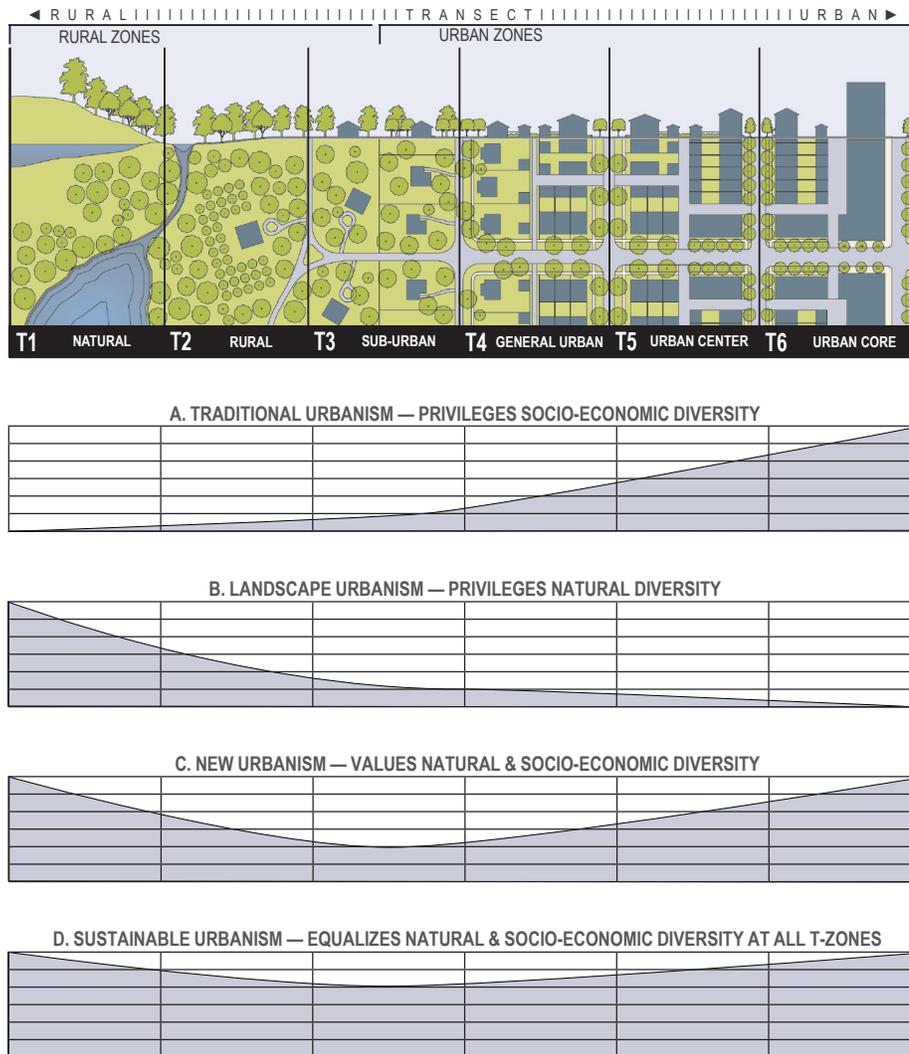


Figure 6: The natural and socio-economic Transects of the city. If NU learned more from LU about the ecology of the low-density Transect zones, and vice versa at the urban end of the Transect, it would produce a more ecologically *and* socially diverse city, as shown in chart D. (DPZ)

*In short, there's not enough urbanism in LU, and not enough ecology in NU. To be more specific, at the urban end of the Transect there's not enough human habitat, figural space, socio-economic diversity and street life in LU, and not enough natural diversity and hydrology in NU. Because both social diversity and natural diversity are*

weak in suburban sprawl, both movements should minimize its spread and aggressively retrofit it with urban interventions.

Even with these changes, both movements are *transitional* steps to a world that needs to be far less carbon based and consumptive than current versions of LU and NU, as well as much denser and leaner, more democratic and inclusive, and more racially and ethnically equitable. Reducing carbon and consumption needs to be particularly dramatic in North America, where voracious consumption and rapacious lifestyles typically yield ecological footprints that exceed their planetary fair share by a factor greater than three, and where inequalities are expanding. LU and NU may both represent advances, but ultimately they are not transformative enough to mitigate and adapt to the ongoing, compounding impacts of CC, resource depletion, and world-wide cultural, economic and socio-political stresses. The deeper and more immediate the mitigation, adaptation and transformation, the less costly and disruptive they will be.

## 5. The Global Challenge

The world can no longer afford the time or the resources to produce and insatiably consume endless novelty and needless change, for which industry needs ongoing avant-garde design. The need for variety and change, as well as for some fantasy and spectacle, may be in our DNA, but frenetic, unquenchable love of the new – neophilia, if not neomania – is unsustainable. We don't have enough time or wealth to address all our problems one at a time; we need to deal with multiple problems at the same time, synergistically and mindfully. Designers are especially adept at elegantly integrated solutions, and can help show the way toward a more holistic urbanism.

We are hardwired by evolution to respond to more immediate problems and less abstract threats than CC, as well as driven by our desire for immediate pleasures and attachments. It is genetically easier to focus on short-term gratification and on closer, more tangible crises, such as poverty, corruption, terrorism, extreme weather events, unemployment, pollution, or diminishing resources.<sup>4</sup> It's socially and psychologically challenging to deal with the slow tragedy of the global environmental commons, the biosphere's atmospheric blanket that now traps too much of the sun's otherwise beneficent energy. Market economies and electoral politics have trouble rallying to long-term problems. This is where UHI can help motivate behavior change. As a city's hot season becomes more uncomfortable and unhealthy, there are ways to mitigate and adapt to local climate change more quickly than global CC. Residents can focus on a five- to 10-year local challenge with more direct, measurable feedback, rather than dither on a 50- to 100-year global challenge that offers vague, indirect feedback. Because the local adaptation and global mitigation strategies are typically complementary, these cities can focus on UHI while tackling global CC at the same time. Although without air conditioning and being less

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<sup>4</sup> It is also more politically effective. For instance, the ozone hole and selected species decline and loss have been sufficiently mitigated or reversed in less than a lifetime through government intervention and behavior change. Problems as big as global poverty, many diseases, and the universal provision of clean water could be solved in a lifetime with sufficient political will. (A popular example is universal clean water might cost less than the money spent globally on bottled water every year.)

acclimated/more vulnerable to heat waves, urbanites in cool climates may *welcome* warmer weather; so residents of Stockholm and Seattle will need to find other ways and reasons to motivate themselves to deal with CC and do their share of stewardship of the global commons. In all cases, a sense of planetary citizenship, fair play, and altruism are needed to help those unlucky areas of the planet most devastated by CC, especially in the countries that have contributed least to the problem.

The built environment is *the largest* single contributor to both local and global climate change. Billions of lights – powered by primeval hydrocarbons taken from the Earth’s crust – keep the planet glowing in the night sky. This gossamer veil of urban lights visible from outer space is perhaps the grandest testimony to what glorious marvels and desperate challenges humans have wrought.

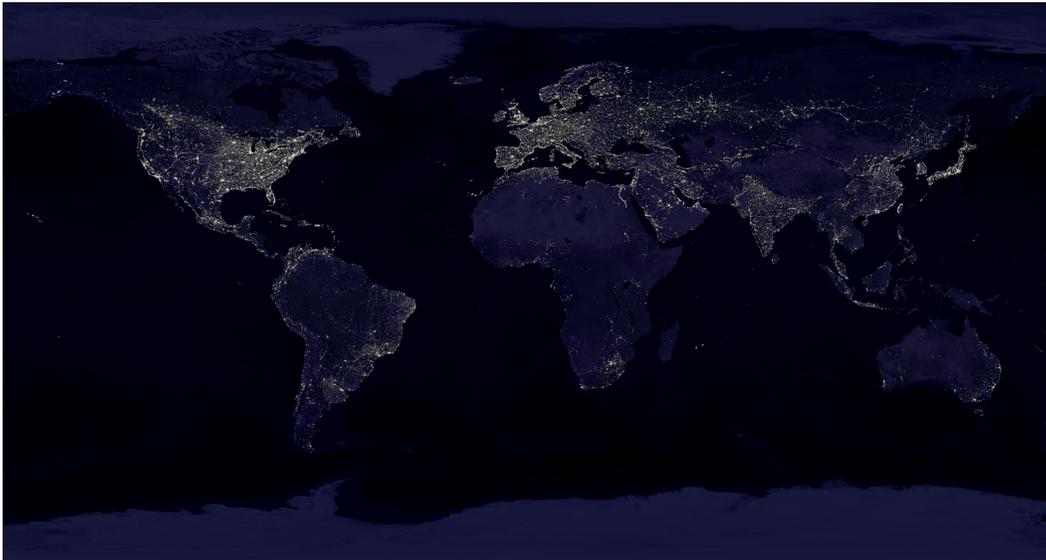


Figure 7: The diaphanous twinkling of our earth aglow at night – the picture of a planet intentionally on fire – closely maps cities that consume immense resources but paradoxically reduce per-capita GHG production for half of its human inhabitants.

New green technologies and helpful scientific breakthroughs are sure to emerge, thanks to the intelligence and resourcefulness of our ingenious, adaptive species. They will bring benefits that hopefully will exceed their unintended but unavoidable negative consequences. Our planet, which has been through far bigger changes, and its hardiest, most adaptive species, will survive if not thrive. The big question is whether the most advanced and powerful of its species will survive CC and live fulfilling lives in numbers anything like today’s seven billion inhabitants.

Paul Hawken lost count when the tally approached a million organizations devoted to the environment and social, from tree planters to micro-loan programs to 350.org to the United Farm Workers. He describes their loose agglomeration as the *largest social movement ever*. (Hawken 2007) The sooner LU, NU, and the multitude of other movements get their acts together – both within and between themselves – the better they can act together. It will take every bit of collaboration we can muster to sustain humankind and its civilization.

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