RegenLA:
Los Angeles Beyond Sustainability

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Abstract
The Los Angeles basin has been living well outside its carrying capacity for decades. At the same time that the entertainment industry has been proliferating the American dream with a Southern California backdrop, quality of life in Los Angeles has been slowly deteriorating as an increasing number of people vie for its finite resources. Once a perceived utopia that to this day draws people from around the world to its climate, amenities, and natural setting, Los Angeles’ economic and cultural success has created the context for environmental and social failures. It is too late and simply not enough for the L.A. region to think about sustaining its current condition, but instead must collectively begin to repair its natural and man-made systems in order to provide for its long-term prosperity. This paper outlines nine city design principles that are essential to defining the concept of a regenerative city, and considers how each of these principles could be applied in the context of Los Angeles.

Introduction

While the idea of the “regenerative city” is not new or unique, a comprehensive definition has not yet been fully developed. This ambiguity must be rectified in order to give elected officials, decision makers, and the general public the ability to comprehend the overarching concept, and thereby to begin applying it in real, meaningful ways. This manuscript provides an ideological framework consisting of nine different city design principles that can be used to initiate and facilitate this much needed public dialogue. Such a definition would also give clarity to the broader message about regenerative design. Learning from experience with the implementation of sustainability (originally defined in the United Nations’ 1987 Brundtland Report) and, more recently, with the slow adoption of resiliency, it is imperative to clearly and concisely define the problem, and to consider how viewing decision-making through a regenerative lens can expedite the process of its ultimate implementation.

This paper describes nine city design principles that are essential to defining the concept of a regenerative city: Livability, Economy, Ecology, Food, Mobility, Waste, Water, Resiliency, and Energy. Each principle is accompanied by an infographic, which seeks to clearly convey a complex and multi-faceted concept, strategy, and/or approach. While the description of each principle is general in nature, the infographics focus on each principle’s meaning within the Los Angeles context. The result is a sort of “call to action” for the regenerative city, using the City and County of Los Angeles as a case study. It is important to note that this manuscript is not purely scientific, but uses data to describe how non-regenerative decisions of the past have made a cumulative impact on the built environment of today. The only way to undo these past decisions is to rethink how we move forward in a new, data-driven, and ultimately regenerative way.

So, in order to define how to build a regenerative Los Angeles, we must first ask the question: what is a regenerative city?
**Livability**

A regenerative city takes every opportunity to improve itself.

For the first time in history, there are more people living in cities than not¹. This nascent century of the city has replaced the previous century of nations, and as a result, metropolitan regions are becoming the new drivers of a global shift towards stewardship, equity, and social cohesion². Engineering this growth to improve quality of life will require cities to design and self-define their own unique futures. Instead of a piecemeal, often contentious approach to each new development, cities must leverage market demands to improve infrastructure, expand affordability, restore and protect natural environments, and enhance livability. Essentially, they must plan.

All cities utilize infrastructure investments to optimize economic growth and development. Infrastructure remains one of the best available tools for fostering community activity, bringing people together, and improving quality of life³. In short, strong streets are the most powerful tool in the urban design toolkit, and all great cities globally have strong, flourishing streetscapes that define the very image of their respective city⁴.

Los Angeles, too, is a city of corridors. If you look at the City of Los Angeles’ land use map, you can see some of its most well-known roadways, like Sunset, Wilshire, Van Nuys and Figueroa. These corridors framed Los Angeles’ growth for over a century and remain the city’s strongest potential catalysts for urban activity, public interaction, inspiration, and commerce. Yet, for nearly a century Los Angeles has turned its back on these corridors through policies that have incentivized stasis, pushing new investment away from the city’s most important framework elements⁵. The development along these commercial corridors has thus included minimal reinvestment outside of the West Side, Hollywood, and more recently Downtown⁶. While the residential neighborhoods directly behind these streets remain intact for the most part, their commercial counterpoints remain ripe for future reinvestment, as described in the Compass 2% Blueprint Plan by the Southern California Association of Governments (SCAG), the region’s Metropolitan Planning Organization (MPO)⁷.

Moving forward, L.A. must use its highly recognizable infrastructure corridors as a way to shape livable, sustainable growth, rather than disaggregating the two. Driving redevelopment along these established rights-of-way will not only redefine and re-establish entire neighborhoods, but provide much needed housing and stimulate economic development. This approach leverages existing infrastructure investments to become more dynamic, walkable, and ecologically diverse places and pathways, incorporating tree canopies and other green streets initiatives described below.

**Economy**

A regenerative city facilitates equitable prosperity.

Cities are economic engines that drive innovation and productivity⁸. This economic dynamism offers the opportunity to facilitate the social and economic mobility necessary to support living wages and a fair marketplace. And, as a human-built system, its output—who and how it impacts—can be shaped by the political design of our urban areas. Optimizing capital through the creation of efficient, integrated development patterns gives citizens more disposable income and supports neighborhoods with synergistic local economies⁹.

It is well documented that the density of urban areas is proportional to economic output and innovation¹⁰. Cities organically form economic clusters as more people bring more ideas. When more people come into closer contact with one another, it not only produces more sustainable living patterns and behaviors as energy use per capita are reduced¹¹, but also encourages more social interaction, allows for more chance encounters, and facilitates a public dialogue that creates a more collective culture. Encouraging a carefully considered and designed intelligent density throughout the Los Angeles region, by building upon the concept of redeveloping
commercial corridors along an ever expanding transit system, will allow for a unique built form and identity for Los Angeles, and also a means to facilitate economic and social connectivity.

Ecology

A regenerative city has a symbiotic relationship with nature.

From the dawn of civilization, humankind has sought to control nature. Population growth has tested our ability to effectively develop cities in a truly sustainable way, as most interventions come with a cost to the natural environment\(^2\). The degradation of natural systems must be reversed as cities shift the decision-making process to one that seeks to heal and contribute to our shared ecosystem. Learning from nature, the built environment must not be seen as a value added to it, but as the baseline for all that is possible. Instead of engineering nature to meet the needs of our world, cities must find the appropriate balance to live within natural constraints.

When studying Los Angeles as an example, one sees a city significantly degraded by its built environment. With its car-centric culture and approach to land use development over the last 50 years, a significant proportion of land has been dedicated to the automobile\(^3\). By simply changing the priorities around transportation modes—through increasing transit ridership, encouraging walkability, and even technological advances in shared-use mobility and autonomous vehicles—the region could reassign much of this land to more regenerative, economically beneficial, and ecologically supportive uses.
Food

A regenerative city is never hungry.

Through advances in technology and the industrialization of agriculture, humankind has never had a problem with food supply. Food scarcity and hunger is, and has always been, a distribution and access issue. With consumers’ growing preference for locally-sourced, organic foods, cities can help meet this market demand and reduce travel costs by integrating food production with development. Preserving agricultural lands and retrofitting cities for urban farming will not only protect the integrity of our cities and build resilience in the local food chain, but contribute to alleviating poverty and reducing food scarcity. Edible open spaces, rooftop and vertical gardens, community co-ops, and a regional network of farms can feed Los Angeles and continue as a sustainable part of the local economy.

Los Angeles was once one of the most agriculturally productive counties in the United States. Originally settled as approximately 50 ranchoes, many of these vast properties have been transformed into neighborhoods made up predominantly of single-family residential buildings. Even at high densities, this typology provides the most physical space to support subsistence farming. And, when considering the amount of vacant land throughout the county—an estimated 57,000 parcels—this space alone could be opened up to support and accelerate an already robust agricultural community and urban gardening culture.

Mobility

A Regenerative City is open and accessible.

A city’s dominant transportation mode has the greatest impact on the form and function of its built environment. With an increased focus on the automobile in the 20th century, cities became proportionally...
more dependent on fossil fuels and consumed more land for development, with diminished public health as a consequence\textsuperscript{19}. Transitioning our highest transportation priority back to the movement of people, and not cars, will balance all mobility options across the spectrum, simply by deemphasizing the throughput of often single-occupancy vehicles. Equalizing the role of the car will make the existing transportation system more efficient for the movement of goods and services by opening up capacity on our roadways. Public rights-of-way must be retrofitted to improve their function and increase their value as open spaces, all while building a more collaborative, opportunity-driven city around human interaction and individual lifestyles.

Los Angeles doesn’t have a congestion problem—it has a capacity issue. That is to say, mobility is not just a matter of transitioning people from the automobile to transit, but of decreasing the use of single-occupancy vehicles. The existing built environment of Los Angeles, developed around the car, facilitates this socially, economically and environmentally destructive behavior. To address this issue, the region should encourage a new type of development that maximizes convenience for transit riders. Transit-oriented development (TOD) and transit-oriented communities (TOCs) are already emerging around existing transit stations and stops across the region. However, there is a missing link in the Los Angeles transit mode portfolio (which includes bus, rapid bus, light rail, subway, heavy commuter rail, passenger rail, and soon, high-speed rail). It also happens to be the transportation mode that the city was historically built upon: the streetcar. Learning from the success of the system implemented in Portland, Oregon, a new streetcar system, which is understood to function as a people mover, has the opportunity to expand the revitalization of Downtown Los Angeles out to its inner ring of communities within a two- to three-mile range, creating a zone of opportunity for redevelopment\textsuperscript{20}. A neighborhood-serving streetcar system is an excellent mobility choice for Downtown, as it would provide seamless transit to adjacent communities, all while aligning with streetscape retrofits.

![Figure 5: Induced Streetcar Development](image)

**Waste**

*A regenerative city is a closed-loop system.*

Any externality of a system results in wasted energy, effort, and time. Transforming waste into a resource is a challenge for cities, as it requires a shift in both perception and approach. From procurement to disposal, eliminating waste means improving processes, effectively delivering services, and ensuring citizen satisfaction. Technology, smart city networks, and quality customer service all have an influence on the business of running a city, but cities cannot eliminate waste in a vacuum. Cities must also engage the private sector to leverage their knowledge, know-how, and capabilities in order to partner in the design and realization of a more profitable city.
Due in large part to state mandates, both the City and County of Los Angeles have a strong trend of diverting waste from landfills. As diversion rates move closer and closer to 100%, it becomes increasingly difficult to attain the ultimate goal of zero waste. While the county’s few remaining landfills still have decades of capacity, the region has already looked ahead to the closing and reclaiming of these sites and developed a strategy to ship waste out of the county via train and truck. In order to prevent this inevitability, the region has previously and can in the future consider waste-to-energy, for example. This system holds the potential, albeit with some of its own challenges, for Los Angeles to achieve zero waste.

**Water**

*A regenerative city cleans more water than it consumes.*

Fresh water is the earth’s most precious resource. Unfortunately, it is critically undervalued as a commodity and is often costly and over-engineered, to the detriment of its natural functionality. Minimizing impermeable surfaces, maximizing natural recharge, and utilizing stormwater as a resource, as opposed to a threat, creates an opportunity not only to deepen our human connection to nature, but also to engage water ecology for the betterment of the built environment. Additionally, our buildings must go beyond simply managing water on-site to become themselves infrastructure for water recycling.

With the vast majority of water in Los Angeles being imported from either Northern California or the arid Western United States via three aqueducts, the region is already well beyond its carrying capacity.

In order to reduce its reliance on imported water, Los Angeles can change its perception of the very limited rainfall that does occur in this Mediterranean climate, and upgrade its water recycling infrastructure. A report

Figure 6: City of Los Angeles waste diversion rates

Figure 7: Where L.A. Metro draws its water
from the National Resource Defense Council (NRDC) stated that a fully realized stormwater management system in Los Angeles could supply approximately a third of the city’s water needs at nearly a third of the cost of imported water. For decades, stormwater was viewed as a nuisance, and the goal was to maximize its flow out into the ocean to prevent damage and injury caused by flash flooding. Using best practices in complete, green streets to retrofit existing roadways will improve the livability and ecology of Los Angeles. Public rights-of-way should be appreciated as more than a system for mobility, but as the region’s most valuable open space, with the potential to serve as a link between large regional parks and park-poor urban neighborhoods. A system of permeable surfaces and recharge areas will reduce the risk of flooding, while allowing for the naturalization of the County’s channelized waterways.

Resiliency

A regenerative city is responsive.

From natural disasters to broken water mains, cities must be nimble and address many issues at once. More than being prepared, cities must also be proactive in order to generate real, meaningful, and positive progress. The role of big, open data becomes incredibly important as it represents a wealth of information that cities can leverage with the private sector to improve communications, foster innovation, and generate economic activity. An informed decision-making process is critical to maximizing a city’s impact with increasingly constrained resources.

In Los Angeles County, there is relatively little undeveloped land that is not susceptible to some form of natural hazard. And when you layer upon that map the existing, under-construction, and planned transit system, what you see is a region that must focus development inward to optimize existing infrastructure.
while minimizing the costs of putting its citizens in peril. Using information to prioritize where to grow is important for future development. In high hazard areas, future development could be restricted through regulation or open space acquisition, and an overlay of contextually sensitive design guidelines could be employed for future redevelopment.

**Energy**

*A regenerative city produces more energy than it consumes.*

How to produce clean, renewable energy is the dilemma of the 21st century. Cities must diversify their power systems, thereby equally distributing risk, production, and storage. Cities must also remain connected, but begin to decouple themselves from a national grid distribution network so that they can become energy independent and more resilient during power failures.

In sunny Southern California, the most obvious opportunity for renewable energy production is solar power. With a focus on solar, there is enough identified rooftop area across the existing built environment to power the entire region, on top of the nearly 1400 megawatts of renewable energy currently being produced in the county.

**Conclusion**

*Is a regenerative city a utopian idea?*

Absolutely. It provides a vision to which all municipalities and communities can aspire. As with all things, incremental implementation is the best way, and sometimes only way forward. Each city and region will have to define how its unique position in the world contributes to its own regenerative identity and strategy. What it means to be regenerative is equally diverse as the uniqueness of each city.

In Los Angeles, these nine city design principles are applied across both the City and County using the above infographics to display each principle’s intended purpose and application. Each is meant to transcend policy, design and direct action. While the above description of a regenerative city advances a larger discussion, its application to a specific context, in this case Los Angeles, allows for examples and other strategies to be thoroughly developed in the future. It also provides a connection from a modernist perspective on problem solving, its unintended and cumulative consequences, and how an approach that goes beyond sustainability is needed to address these often structural civic issues.

Regardless of the context, monitoring progress will require an ongoing conversation about which data sets best illustrate trends and lead to the most informed decision-making process moving forward. Cities, including Los Angeles, must not only collect and mine big data (existing, new, and sensor data), but also go through a process to define the desired outcomes and then set up a “smart city” dashboard to monitor implementation.
There are any number of data sets that would point to progress in creating a more regenerative city. Each of the nine principles could have their own data sets. Some key inputs may include, but are not limited to: citizen satisfaction, small business generation, air quality, obesity rates, vehicle miles travelled, diversion rates, stormwater runoff, response times, and energy demand. Future research is needed to develop an effective monitoring program.

This manuscript was the first step in the process of envisioning Los Angeles as a regenerative city. An infographic has also been developed that holistically combines all nine principles into the context of Los Angeles. SOM will continue to engage in a dialogue of discovery within the firm, with our peers, with city leaders, and among the general public in order to expand and appropriately frame the conversation around Los Angeles as it moves from the past, to the present, and into a regenerative future.

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References

The information used to develop the above infographics is cited within each image. These sources are included again in the reference section below in the order of their use in the paper, along with several important readings that inspired our city design thinking.


