

RENEWAL THROUGH REGENERATIVE DESIGN

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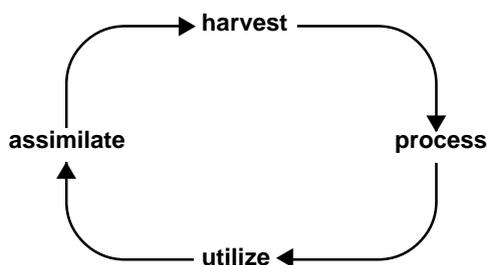
The Department of Landscape Architecture at Cal Poly Pomona hosted a Regenerative Design Symposium “Building Sustainable Communities for the 21st Century” chaired by Takeo Uesugi and Mark von Wodtke. This paper draws from the presentations made at this symposium and design charrette addressing pollution in the South Coast Air Quality Management District. Endnotes identifying these presentations have been omitted for the sake of brevity; however they are available from the author. Out of this symposium came some insights and ideas as well as a rekindling of the regenerative spirit we wish to share with educators, policy makers, and the general public. Its implications for cleaner air and a better quality of life hopefully will carry the strength needed to transcend words and translate into actions.

Introduction

Each day, oil oozes from wells as far away as Alaska or even the Middle East and moves by pipelines and ships to refineries in southern California. From there, gasoline reaches service stations where millions of people pump it into cars and consume it in the Los Angeles airshed. Despite the latest in the state-of-the-art of emission controls, automobiles contribute significantly to smog in the region as well as to the global greenhouse effect. There is a similar pattern of extraction, consumption, and pollution from using other resources as well. We are all familiar with the linear degenerative paradigm of our industrial society:

mine → refine → consume → pollute

In contrast to this linear degenerative paradigm, there is a cyclical regenerative paradigm we find in nature. It involves cycling resources—harvesting, processing and utilizing them in many ways, and then assimilating them by natural processes to be harvested again. Assimilation and harvesting are part of a continuum. It is sustainable. There is no waste and no pollution.



On a daily basis the Los Angeles Region basks in sunlight. Technology is emerging that can enable us to use the sun more effectively through both new and traditional methods. This region could shift to a more cyclical regenerative paradigm. This would involve harvesting more renewable energy. Photovoltaic collectors convert sunlight to electricity that can charge batteries or produce hydrogen to use as fuel. Better organization of land use and transportation could utilize energy and other resources more efficiently. Nurturing and enhancing natural processes could help assimilate emissions from human activities. More of the revenue spent on transportation and utilities could stay in the region creating jobs. This regenerative paradigm could become the mainstream of region’s ecosystem and economy.

Regenerative design approaches could improve air quality by avoiding consumption of nonrenewable resources and the production of polluting wastes. Air pollution is really a

symptom of much deeper problems we need to address. Sustainable communities not only maintain good air quality, but also a better quality of life and a more secure future.

Deeper problems also have to do with how, as a culture, we value the ecosystem and account for it in our economic system. What is economically smart should also be ecologically wise. More comprehensive pricing could enable the economic engine of a free market to drive the renewal of regenerative designs.

The Regenerative Movement

While it is a test tube for air pollution, the Los Angeles Region is not the only urban area with major environmental problems. The need for fundamental changes in the way we plan, build, and operate communities is becoming well documented. The quality of life is deteriorating in many urban areas. Consumptive technologies and degenerative designs are contributing to air and water pollution around the globe. Poorly conceived settlement, transportation, agricultural, and industrial patterns continue to deplete limited resources. Many communities need to address these problems.

Emerging technologies have the potential for using resources more effectively. Regenerative design strategies can draw upon renewable resources. Information technologies enable the optimization of designs to use less material and energy. Social, cultural and political change can be a catalyst for helping these approaches become more widely accepted and more successful in the market place. Raising public consciousness of regenerative design strategies could help bring about changes needed to make communities more livable and sustainable.

Regeneration brings about renewal. We see this in the beauty of nature. Regeneration can resonate deeply in our soul. A regenerative movement is emerging that is evident in many endeavors to improve the quality of life, growing from different cultures and disciplines. Here are some examples:

- Ecological design
- Sustainable landscape architecture and resource planning
- Pedestrian-oriented urban design
- Green architecture and natural building
- Resource conserving engineering
- Solar and other soft energy paths
- Organic agriculture, permaculture and natural gardening
- Holistic health and nutrition
- Ecology and biological sciences
- GAIA and whole earth systems thinking
- Interactive information systems
- Ecologically-based commerce
- Environmental art
- Nature-based philosophy and spirituality

Los Angeles inadvertently has become the epitome of the air pollution problem; it also might become a showcase of solutions through implementing clever regenerative strategies making it a new "technological frontier." For better or worse much of the world carefully observes what is happening here. There is much we could do.

Strategies for Harvesting and Processing Renewable Resources

Mainstream natural buildings with daylighting, and passive heating and cooling thereby reducing energy needs. We can renovate old buildings improving indoor air quality. We could even liberate people from electrically lit, buzz-and-blow environments thereby enhancing their happiness and productivity. Emerging technologies in natural, earth-based

construction systems are inherently more regenerative in design, more energy-efficient, resource conserving, and environmentally sound than conventional wood and steel frame construction. Bioregionally appropriate and locally derived materials may include plastered strawbale, straw-clay, cob, adobe, rammed earth and pise, superadobe and ceramic, earth-sheltered, underground, bamboo, and hybrid building systems. "Natural building colloquia" aimed at engendering a sense of community are bringing down barriers and making available new ideas that have synergistically furthered the state of the art. Natural buildings, using waste material like rice straw, avoid the air pollution caused by agricultural burning. Using less wood helps preserve forests that, among other things, assimilate carbon dioxide and produce oxygen.

Shift to cleaner fuels thereby reducing non-stationary emissions. We can power equipment and vehicles with electric batteries, fuel cells, or hydrogen, deriving energy from solar and other renewable resources. Garage roofs, parking lots, and air-rights over highways provide places to collect solar energy close to where it will be used. Safer, smaller vehicles could be more energy efficient, rechargeable, and recyclable. We could create a market in a number of ways: require fleet purchases of cleaner cars; make emission-clean rental or lease cars available at reasonable prices; or provide cash incentives to trade in conventional cars. Through public investments, we could jump-start an infrastructure of electrical recharging and hydrogen refueling stations.

Strategies for Better Utilization of the Land and Other Resources

Link built landscapes with each bioregion reducing the need for artificial fertilization, herbicides, pesticides, and irrigation. Organic gardening can change the typical practices of mowing and blowing, and carting green "waste" to the dump. We can close the nutrient cycles and grow more food in urban areas using intensive biodynamic techniques to provide an abundance of wholesome fresh produce undamaged by processing and preserving. Multi-level polyculture systems use annual and perennial plants in varied canopy levels. Industrial ecology farming systems create the opportunity to provide workers with high quality food while reducing costs of managing an industrial landscape.

Integrate more jobs and shops, as well as schools, into the fabric of local settlements making it easier for pedestrians and human-powered vehicles or public transit to reach them. We could provide a better quality of life than is currently available in parts of the Los Angeles Region that dedicate as much as 80% of the land to the automobile. We need to focus on human scale and the sense of community and amenities this provides. Pedestrian pockets are human-scaled communities where people do not have to drive. Connecting these pockets with public transportation can provide considerable mobility and much cleaner air. This could be done by promoting mixed-use zoning, both for infill/redevelopment projects and new development.

Set up online information systems that help people to work and learn anywhere and anytime they wish. This could promote more professional collaboration, reduce the need for service workers and students to commute, and enable people to enjoy more time at home. We are seeing this pattern emerge in southern California and elsewhere. The Internet makes it possible to access knowledge and ideas online.

Use online communication like a central nervous system to provide feedback and better control of the way we use resources in our urban infrastructure. We can evolve cities that function like higher-level organisms. We could use our information infrastructure to monitor energy and water needs making development more sustainable. Similarly, we are seeing transportation management centers emerge to monitor traffic, provide emergency response, and transmit messages to re-route motorists around congested areas, thereby saving time and fuel while reducing air pollution.

Build an integrated, multimodal transportation system that provides greater mobility to people of all ages, costs less to ride, is safer, and has less negative impact on the quality of life than the present freeway system. Many visitors to Los Angeles no longer see the freeway system as an asset, but more as a liability. Transportation has implications for improving both air quality and the quality of life. We could do the following. Improve regional bike trails that connect homes to schools and places of employment. Provide seamless links for pedestrians and bikes with busses and trains. Find ways to establish true cost pricing to make lower impact alternatives more attractive by accounting for externalized costs such as air pollution, noise, and expansive highways and parking areas, and helping pay for other more environmentally friendly modes. Provide incentives to use public transit including amenities such as convenient cafes, shops, public plazas, promenades, and parks typically found in livable cities.

Strategies for Assimilation of By-Products

Enhance the “green lung capacity” of urban forests by growing more trees to filter dust, absorb carbon dioxide, and produce oxygen. We could enhance urban forests within communities and along their fringe, improving their capacity to purify air and water, and provide urban cooling and outdoor recreation. Communities like the City of Claremont, which recently acquired a 1200 acre nature preserve in the foothills, have the opportunity to regenerate oak woodlands that can help improve the airsheds and watersheds while enhancing wildlife and reducing wildfire hazards. Parklands have also proved to be an important refuge during earthquakes. This could be an important basis for the distribution of open spaces and greenery in cities. Green walls of trees, shrubs, and even algae curtains sustained by reclaimed water could help assimilate air pollution along freeway corridors.

Use bioremediation in landscaped soil beds and water elements to digest particulates and other pollution from the air in outdoor plazas, and along busy highways. We could integrate landscaped soil bed reactors onto parking garages cleaning the air coming from exhaust fans. We could also introduce water elements that wash pollutants from the air and digest them biologically using aquatic ecosystems. This would both cool and improve air quality in outdoor urban environments and along congested highways.

Protect the riparian areas of this region to increase plant assimilation of air and water pollution. We could preserving flood plains and use natural banks to provide flood control, while keeping these life-giving natural arteries alive, sustaining biologically-rich habitats for wildlife. Reducing pavements and other hard surfaces like concrete channels permits rainwater to percolate. This would also help reduce heat islands that can make urban outdoor places uncomfortable.

Shifting from Emphasizing Regulation to Emphasizing Renewal

Address refinement and improvement of the quality of life by renewing urbanized areas and not just rampant growth and new development that exceed the carrying capacity of local airsheds and watersheds. We need better ways to account for ecological considerations and to help developers use sustainability to improve the value of their projects.

Empower people to do more for themselves by engaging them in the renewal process. If we want to improve the quality of urban life for coming generations and create sustainable communities, people should be involved more closely in the planning process. There are lessons to be learned by comparing how different cultures respond to similar environments. We need to examine how cultures accept or reject innovative sustainable technologies. We could also develop visual models of the air basin so people could see how their choices affect air quality. Identify and publish major contributors to poor air quality such as airports, automobiles, lawn mowers, etc. Have a smog-reduction web site that contains information on pollution-reducing life style changes and facilitates the development of

solutions. Develop a simple “litmus test” that would enable people to easily monitor air quality at their homes to improve their awareness and participation in a campaign for reaching regional air quality goals.

Increase production within local bio-regions reducing long distance transport of goods. We can retain capital spent on goods to maintain meaningful jobs and to reinvest in local communities. It could result in a more secure infrastructure and stronger local economy. There is also potential to become more energy, water, and food self-sufficient which is especially beneficial in the event of natural disaster or economic disruption. We could even link financing to regenerative design strategies: Better mortgages for living and working in the community; better business loans for enterprises that improve the local ecology and economy; special loans to invest in energy efficiency paid back through long term savings in operating costs and emission controls.

Catalysts for Change

Change occurs through both pushes and pulls. Shifting circumstances, such as the depletion of fossil fuels, can push change. Innovations, such as photovoltaics and the World Wide Web, can pull change. New beliefs and attitudes may also bring about change. Better understanding all facets can help us to deal with change so that we can leave a better world for future generations. Let’s examine some of the catalysts for change.

Personal choices are beginning to change health care, and nutrition as well as environmental quality. Individuals can take responsibility for maintaining good health through appropriate nutrition, exercise, mental attitude, and treatment. This has to do with a regenerative mindset. Many people are seeking ways to avoid degenerative diseases related to air pollution and other environmental stresses. Many people are gardening, using bio-intensive organic techniques to provide an abundance of wholesome fresh produce undamaged by processing and preserving, while enjoying more connection with nature. They are seeking ways of closing nutrient cycles and overcoming modern malnutrition caused by the typical American diet laden with excess fats, refined sugars, and salt, but lacking in essential vitamins and minerals. Health conscious people are including exercise, like walking, as part of their daily activities to prevent obesity and maintain their vitality. Many people want to protect natural processes and prevent deadly toxins (not just air pollution) from entering living systems to assure a safe environment in the future.

Family and community interaction, public education, voter awareness, and market sophistication can instill regeneration and natural wellness in cultures. The public could make more sustainable choices when electing leaders, purchasing products, and shaping their home and community lifestyles. To do that requires whole systems thinking that addresses root causes of problems and not just quick fixes of symptoms. There are many places where this is beginning to occur. We need to deal not only with the parts of these problems, but to combine those parts into a whole design that could fuel a regenerative society.

Ecologically-based commerce can use renewable resources to produce more regenerative products for a sustainable future. Producers could be responsible for recovering and recycling their wastes. We can develop industrial ecologies using a regenerative “cradle to cradle” concept, where the byproducts of one industry become resources other industries use for production. While landfills are a legacy of degenerative design, there are efforts to recycle materials and to recover methane. Generating electricity, using methane extracted from the landfill, avoids air pollution. We can use waste water and waste heat from industrial processes for greenhouse agricultural production. Resource recovery could function as a demonstration, education, and research center. We could integrate technologies into a comprehensive waste processing system that includes wetlands and wildlife habitat as well as recreation open space. Having the facility close to the waste source reduces cost and saves

energy because of less piping and trucking. Septic waste is a valuable resource which, through regenerative design, can safely provide useful water and nutrients. Treating wastewater onsite and using the existing sewer system as a distribution system could recycle water. This could save the public hundreds of millions of dollars in centralized treatment and redistribution infrastructure.

Paying at the pump for the full cost of fuels can account for local and global pollution as well as the cost of international conflicts over resources. Revenues generated from consumption could stimulate necessary market adjustments and return revenue needed for investments in public infrastructure and the common good. Combustion uses air, yet no one pays for it. Collecting a fee, to use air for producing carbon dioxide and releasing it to the atmosphere, would make the market price more accurately reflect the cost of consuming fossil fuels. The revenues generated from such a fee could help stimulate the transition to renewable energy sources such as solar-electric and hydrogen. In Japan and Germany the cost of gasoline is three to four times as high as it is in the United States. Yet their economies are vibrant and they operate with much greater energy efficiency. They also have developed much better public transportation systems.

There might also be market adjustments to account for scarcity of resources. We now pay for petroleum only on the basis of current supply and demand even though the United States government projects that present demand will deplete available supplies in the next century. National defense spending to protect access to this limited supply is not accounted for in the price of gasoline. Similar self-regulating concepts could also apply to auto insurance if we were to pay for it at the pump. That way everyone would be insured for the driving they do. Paying for emissions, scarcity, and insurance at the pump would make pricing more accurately reflect externalized costs of using gasoline.

Long-Term Commitment

Changes in technology and approaches to design may occur relatively rapidly. It takes longer for people to accept different ways to deal with circumstances and to change their habits. Yet these changes do occur. Consider the change in smoking habits over the past ten years. Yes, we have a smog producing habit, but at least it is not addictive.

Regenerative designs can provide a better living environment with clean air, as well as provide potable water, wholesome food, and comfortable shelter. These approaches would help communities address economic upheavals such as recessions and ecologic disasters like wild fires, floods, earthquakes, and droughts. Regenerative design strategies are keys to a more livable and sustainable future.

Natural beauty is not just visual scenery. It is also what we taste. This is the natural beauty of regenerative design. It is clean air, sparkling water, and fresh food—the simple uplifting experiences that people thrive upon—like the total involvement that is part of the wabi sabi of the Japanese tea ceremony.

We need to move beyond emphasizing regulation of pollution—treating symptoms and not the root causes. The challenge that lies ahead is to mainstream regenerative approaches. These are long-term strategies that require long-term commitment on the part of educational institutions like Cal Poly Pomona. Educational institutions could establish partnerships with private entities and governmental organizations helping to provide innovative ideas and leadership to implement them. Together, we could stimulate renewal.

References

See http://www.csupomona.edu/env/LA/Regenerative_Design_96/ for an expanded version of this paper including end notes with references. Abstracts and selected papers from Regenerative Design '96 will be published on CD ROM, available through the Cal Poly Pomona Department of Landscape Architecture.