

Planning Methods for a Sustainable Future

Anthony J. Herrington

California Polytechnic State University, San Luis Obispo

June, 2019

Today, climate change, pollution, poor health, and economic crisis pose a threat to Earth and its inhabitants. If these global threats are left unmitigated, serious economic, environmental, and social consequences will occur. Earth's future currently rests in the hands of urban planners and policy makers. It is their responsibility to develop and implement methods that ensure a sustainable future. Sustainability is defined as meeting the needs of the present without compromising the ability of future generations to meet their own needs. The current effort to achieve global sustainability needs to be improved as conditions continue to decline. Urban planners and policy makers, at all levels of government, from jurisdictions around the globe, need to share their innovative, sustainable planning methods with one another. Their combined effort will help humans and the environment better cope with existing threats and protect the planet from irreversible damage.

In 1962, conservationist Rachel Carson published the book *Silent Spring*. *Silent Spring* highlighted the environmental consequences of industrial pollution. The book became known as the first catalyst in advancing the global environmental movement as it allowed society to become more aware of pollution's negative effects (Stofleth, A Short History of Sustainable Development). On January 28, 1969, an oil spill occurred five and a half miles off the coast of Santa Barbara. Birds and sea lions, covered in sludge, washed ashore as oil covered thirty square miles of the ocean's surface. The beautiful Santa Barbara coastline became unrecognizable and images of the aftermath spread across the country through newspapers and television broadcasts (Carson, The 1969 Santa Barbara Oil Spill: An Environmental 'shot heard around the world'). The combination of devastating, environmental events and society's increased concern for a sustainable future led to a series of environmental protection laws enacted by the U.S Government.



Oil piled up along sea wall of Santa Barbara Harbor.(USGS)

On January 1st, 1970, less than a year after Santa Barbara Oil Spill, the United States Government enacted the National Environmental Protection Act (NEPA). NEPA was

“established to foster and promote the general welfare, to create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans.” (nepa.gov)

Federal agencies were now required to consider environmental factors throughout their decision making processes. Being the first federal, environmental law of its kind, NEPA kickstarted a domestic and global push towards environmental protection. Domestic laws regulating water and air pollution, and the creation of the Environmental

Protection Agency, followed shortly after NEPA's enactment. In addition, other countries and non-governmental organizations began using NEPA as a model to create their own environmental protection programs (nepa.gov). Despite NEPA's ground breaking push towards a sustainable future, fifty years later, plenty of work remains as new threats continue to arise.

Climate change is the main global issue threatening sustainability. Scientists strongly believe that recent changes in Earth's climate is a consequence of burning fossil fuels, deforestation, and other industrial activities. These activities result in the excess atmospheric accumulation of water vapor, carbon dioxide, methane, nitrous oxide, and chlorofluorocarbon, collectively known as greenhouse gasses (GHG). In the phenomenon called "the greenhouse effect" these gasses cause the atmosphere to trap heat radiating from Earth towards space (climate.nasa.gov). Negative effects that have been linked to the greenhouse effect include: increasing global temperatures, melting glaciers, rising sea levels, and changing weather patterns. The combination of these negative effects threaten a sustainable future. For example, increased global temperatures melt glaciers, snow and ice. Melting "causes sea level rise, which erodes the coast, and involves the destruction of many economic means of subsistence." (activesustainability.com) This is only one of the many problems humans face as climate change worsens. A global effort in reducing greenhouse gas emissions will ultimately slow the negative effects of climate change; in the meantime, the implementation of sustainable planning methods and policies will allow humans to adapt their living conditions to cope with a changing climate.

Like most coastal cities in the United States, Washington D.C is threatened by all of climate change's negative effects listed in the previous paragraph. The city's average annual

temperatures have increased 2°F since 1950, water levels of tidal rivers adjacent to the city have risen 11 inches since 1920, and the intensity of the one in 100-year precipitation event is expected to become a one in 30-year event by mid-century (p. 3-4, Climate Ready D.C). In 2013, Washington D.C adopted *Climate Ready D.C*, a climate adaptation plan with the goal of becoming more resilient to climate change. In addition, the city plans to reduce its contribution to climate change by cutting GHG emissions by 50% by 2032 and 80% by 2050 (p.1, Climate Ready D.C). *Climate Ready D.C* outlines measures for coping with the effects of climate change.

“The plan’s 77 actions range from increasing the number of green roofs (already incentivized), collecting stormwater, creating micro-grids for energy and water, incorporating resilience in building and zoning codes, and identifying ‘cooling centers’ where those who may not have access to air conditioning could retreat during scorching summer heat—the city projects two to three times as many dangerously hot days” (Kolczak, Five Trends Influencing the Future of Our Cities)

Washington D.C is a solid example of a city facing major environmental threats who is proactively seeking to ensure a sustainable future. *Climate Ready D.C’s* vision statement states that, in 20 years, the city will be “the healthiest, greenest, and most livable city in the United States” (sustainabledc.org). Adopting a climate adaptation plan is a critical tool when it comes to maintaining sustainable development. Cities around the globe should follow in the footsteps of Washington D.C and its ambitious strive towards a sustainable future

Excessive use of fossil fuels and high GHG emissions are common characteristics among densely populated cities; yet, this is not the case for Singapore. With a population of 5.6 million people in an area roughly half the size of Los Angeles, the island city-state of Singapore is one of the most densely populated cities in the world (visitsingapore.com). Its high tech, sustainable planning methods have led Singapore to become known as the most forward-thinking green city in Asia. Since 2005, the city-state has retrofitted several thousand buildings to meet energy efficient standards. Today, most electricity is generated by burning fossil fuels which results in the release of greenhouse gasses into the atmosphere. According to Earthday.org, buildings in the United States use 79% of the country's total electricity; hence, energy efficient buildings are the most effective method for reducing GHG emissions. Singapore aims to retrofit 80% of its buildings by 2030 to meet their goal of increasing energy efficiency by 35% (Frangoul, *Sustainable Singapore: A Model to be Replicated*).



Singapore Skyline (Bioedge.org)

To further decrease GHG emissions and increase energy efficiency, Singapore has also made changes in transportation. The city-state has placed limits on car ownership.

“To make this possible, Singapore's government built effective public transportation systems and established regulations that discourage causal or unnecessary car ownership. In light of these restrictions, most Singaporeans walk, bike or use public transportation to navigate the city.” (Singapore Tourism Board, 3 Ways Singapore Models Green City Living)

Emissions from the use of automobiles is another major contributing factor to GHG emissions. Using alternate, sustainable modes of transportation such as walking, biking, and public transportation results in both reduced crowding and pollution.

Unfortunately, most countries still rely on the automobile as their main mode of transportation. For example, 60 years ago in the United States, the American middle class left inner cities for spacious, safer, and cheaper real estate in newly developed suburban neighborhoods on the outskirts of cities. Their commute to the inner city relied heavily on the automobile and, over the next 60 years, cities have been built and retrofitted to accommodate the automobile first (Chemblette, Here's What the Future of City Planning Looks Like). As the United States pushes for a sustainable future, it cannot simply copy the Singaporeans and put restrictions on car ownership to reduce GHG emissions. In the article, “Here's What the Future of City Planning Looks Like,” author Alexis Chemblette interviews City Planner, Jeff Speck, about weaning Americans off their automobile dependence and implementing more sustainable methods of transportation and development. Speck claims that, “urban, areas need to be walkable... meaning that

schools and housing need to be reintroduced in downtown areas.” “For decades the answer to congestion was to widen and expand road infrastructure, resulting in a feedback loop of increased traffic and reduced walkability.” The author then refers to Oklahoma City whom was voted “the worst walking city in the country” in 2015. Since then, Oklahoma City planners have rescaled the main roads, from 6 lanes to 2, and implemented car and ride sharing programs.

“Combined with the rising number of bike commuters and increased public and private spending on public transportation, car sharing practices are slowly eliminating the need for parking space, allowing cities to transform garages and parking structures into things like affordable housing, public parks, [schools], and sidewalk space.”

In addition to reducing GHG emissions, decreasing automobile use allows for areas formerly used as roads or parking lots to be converted into uses that increase the land’s utility. Additionally, reduced pollution and active modes of transportation increase human health.

Efforts to increase sustainability mean nothing if humans are not healthy enough to live and reproduce future generations. Climate change can cause negatively affect human health in two ways. First, health problems that are affected by weather factors and climate change can increase in severity as climate conditions worsen. Secondly, climate change can create unanticipated health problems where they have previously not occurred (globalchange.gov). For example, Malaria has spread into the

“highland regions of East Africa, where this disease previously did not exist. This spread occurred in the setting of weather that was much warmer and wetter than usual; it resulted in high rates of illness and death, because the disease was introduced into a largely nonimmune population. (Schuman, Global Climate Change and Infectious Diseases)

Increased temperature and precipitation created a climate that allowed malaria transmitting mosquitos to reproduce in East Africa, an area whose climate was mosquito free before climate change.

Climate change can also negatively affect air quality. Changes in temperature, cloudiness, precipitation, and humidity can keep unhealthy particles suspended in the air where they are then breathed by humans. These particles damage the respiratory and cardiovascular systems. Many countries have regulated the emissions of unhealthy particles such as carbon monoxide, ozone, particulate matter, and sulfur dioxide to name a few. “Normal” exposure to pollutants from industrial activities and vehicle emissions in countries with air quality regulations can still result in a variety of acute and long term health effects (Godish, p.156) Acute symptoms include eye, nose, and throat irritation. Some sensitive individuals experience asthma attacks. Long term, unhealthy exposure levels can result in respiratory and cardiovascular disease, neurotoxicity, and cancer. (Godish, p.156) Sustainable measures aimed towards efficient energy use will also improve air quality. The reduced burning of fossil fuels lessen the amount of GHG emissions in the air, thereby allowing humans to breathe healthier air.

China's capital, Beijing, has tried a unique approach to fight the dense smog that hovers over its population. The city worked with Dutch artist and innovator, Daan Roosegaard, to build The Smog-Free Tower. At just 7 meters tall, the tower uses a minimal amount of energy to clean 30,000 cubic meters of air per hour. To engage the city's population with the project, "the smog particles are compressed and used to make things like cufflinks and rings" (Fourtané, Reducing Air Pollution in Smart and Sustainable Future Cities) Allowing the public to engage in the emission reduction efforts of the tower has the potential to influence individuals to do their part in reducing emissions. Heavily polluted cities should seek unique and innovative methods to further protect the health of its citizens and future generations.



The Smog-Free Tower (dailymail.com)

Urban planners and policy makers, at all levels of government, from jurisdictions around the globe, need to share their innovative, sustainable planning methods with one another. Their combined effort will help humans and the environment better cope with existing threats and protect the planet from irreversible damage. NEPA's enactment kickstarted a global push for increased environmental awareness and still acts as a model for other environmental programs created today. Washington D.C's climate adaptation plan sets a great example of an ambitious yet effective effort to cope with the threats of climate change and reduce GHG emissions. The cities of Singapore and Beijing are protecting the health of their citizens by implementing innovative methods that have never been done before. Sharing these sustainable methods on a global scale will allow more cities to cope with the planetary threats of climate change, pollution, poor health, and economic crisis. Jurisdictions from around the globe should model their efforts after these cities and adopt the methods that meet the sustainable needs of their own. Sharing these sustainable methods on a global scale will allow more cities to cope with the planetary threats of climate change, pollution, poor health, and economic crisis.

References

- A Short History of Sustainable Development. (2015, May 20). Retrieved from <http://rethinkingprosperity.org/a-short-history-of-sustainable-development/>
- Anmar Frangoul | Special to CNBC.com. (2013, December 17). Sustainable Singapore: A model to be replicated? Retrieved from <https://www.cnbc.com/2013/12/17/sustainable-singapore-a-model-to-be-replicated.html>
- Carlson, C. (2019, April 22). The 1969 Santa Barbara oil spill: An environmental 'shot heard around the world'. Retrieved from <https://www.vcstar.com/story/news/special-reports/outdoors/2019/01/24/santa-barbara-oil-spill-1969-environmental-movement-california-offshore-drilling-epa/2486352002/>
- Chemblette, A. (2017, February 22). Here's What the Future of City Planning Looks Like. Retrieved from https://www.vice.com/en_us/article/53vymk/impact-heres-what-the-future-of-city-planning-looks-like
- Five Sustainable Cities Making a Difference for the Planet. (n.d.). Retrieved from <https://www.climaterealityproject.org/blog/five-sustainable-cities-making-difference-planet>
- Global Climate Change and Infectious Diseases | NEJM. (n.d.). Retrieved from <https://www.nejm.org/doi/full/10.1056/NEJMp0912931>
- Godish, T., Davis, W. T., & Fu, J. S. (2015). *Air quality*. Boca Raton: CRC Press, Taylor & Francis Group.
- How Do Buildings Contribute to Greenhouse Gas Emissions? (2016, January 26). Retrieved from <https://www.earthday.org/2013/09/06/how-do-buildings-contribute-to-greenhouse-gas-emissions-see-more-at-httpwww-earthday-orgblog20130906how-do-buildings-contribute-greenhouse-gas-emissionssthash-musfprt1-dpuf/>

Impacts of climate change. (n.d.). Retrieved from <https://www.activesustainability.com/climate-change/impacts-climate-change/>

Kolczak, A. (2017, December 13). Five Trends Influencing the Future of Our Cities. Retrieved from <https://www.nationalgeographic.com/environment/urban-expeditions/green-buildings/design-trends-sustainability-cities-wellness-climate-change/>

Leading the Way: Singapore's Sustainable Future. (n.d.). Retrieved from <https://www.visitsingapore.com/mice/en/bulletin-board/leading-the-way-singapores-sustainable-future/overview/>

NEPA | National Environmental Policy Act. (n.d.). Retrieved from <https://ceq.doe.gov/>

Singapore Tourism Board, & Singapore Tourism Board. (2016, March 07). 3 ways Singapore models green city living. Retrieved from <https://mashable.com/2016/03/07/singapore-urban-sustainability/#eYoW9HFVmuqj>

Sustainable DC Plan. (n.d.). Retrieved from <http://www.sustainabledc.org/about/sustainable-dc-plan/>

The Causes of Climate Change. (2019, May 22). Retrieved from <https://climate.nasa.gov/causes/>

Usgcrp. (2016, April 04). The Impacts of Climate Change on Human Health in the United States: A Scientific Assessment. Retrieved from <https://health2016.globalchange.gov/>

Figures

Mailonline, S. W. (2016, October 07). Beijing installs 'world largest purifier' as smog season starts in China. Retrieved from <https://www.dailymail.co.uk/news/article-3826856/23-foot-tall-pollution-fighting-tower-installed-Beijing-smog-season-starts-Chinese-capital.html>

Summer school in bioethics. (2016, April 21). Retrieved from <https://www.bioedge.org/bioethics/summer-school-in-bioethics/11844>

Zhang, S., & Zhang, S. (2015, May 23). Not Again: How a 1969 Oil Spill Devastated the Santa Barbara Coast. Retrieved from <https://gizmodo.com/not-again-how-a-1969-oil-spill-devastated-the-santa-ba-1706372278>