

# **A Sustainable Future**

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Sustainability is one of the more popular buzzwords of the new century. Although the concept was envisioned in the late 1980s, the word has become much more popular over the past 20 years (Vesilind et al 2007). Also becoming more popular is the concept of sustainable development. According to the ASCE Code of Ethics, "Sustainable Development is the challenge of meeting human needs for natural resources, industrial products, energy, food, transportation, shelter, and effective waste management while conserving and protecting environmental quality and the natural resource base essential for future development" (ASCE 1996-2009). The concept of sustainability was added to the ethics code less than 15 years ago.

As a result of the interest in sustainability, Americans are taking a more active role in promoting the practice. However, this practice is still not that common. The average lifestyle of an American today is neither sustainable nor ethical, given the ethics code of the civil engineering profession. As citizens of the world, a sustainable lifestyle should be strived for every day. Such a lifestyle is certainly attainable, if examined carefully.

The manner in which Americans live today is not compatible with the principles of sustainability; too many resources are being depleted and wasted. This is true for the civil engineering industry as well. In an article published in the *Proceedings of the National Academy of Sciences of the United States of America* by Wackernagel et al (2002), researchers estimated the level of resource usage by humans. They found that in 1961, human demands for natural resources were 70% of the biosphere's capacity. By 1999, this percentage had increased to 120%. They further revealed that usage had roughly exceeded capacity since the 1980's. From the U.S. perspective, resources are consumed in what many would consider a reckless manner. According to the U.S. Environmental Protection Agency (EPA 2008), the demand for water has

tripled between 1950 and 2000 even though the U.S. population has only doubled over this same period. In the transportation industry, Americans are not practicing sustainable transportation solutions. Thus, air pollution problems have gotten worse and greenhouse gas emissions have increased. In a 2006 report titled "Greenhouse Gas Emissions from the U.S. Transportation Sector, 1990-2003", the U.S. EPA's Office of Transportation and Air Quality reported that the vehicle miles traveled per person increased twice as fast as the population. In particular, travel by vehicles used primarily for personal use, increased by 34%.

These examples demonstrate that Americans are not practicing sustainability. If they were taking responsibility to conserve resources and apply alternative transportation solutions, then statistics like these would show the opposite trend. Although evidence shows that our current way of living is not sustainable, it is possible to achieve a more sustainable lifestyle. Evidence supports the fact that engineers are reluctant to embrace sustainability as well. According to an *Engineering Times* survey conducted by the National Society of Professional Engineers (NSPE), most design professionals do not believe that they incorporate sustainability in their designs (Bilec et al 2007). One way to have a sustainable lifestyle is to have civil engineers lead by example through their designs.

It is imperative for civil engineers to lead the way toward sustainability because their actions can help influence and shape society. Civil engineers have active roles in both the public and private sectors. They are responsible for designing, building, and managing the entire infrastructure (Leiper et al 2007). Infrastructure represents a major area where the natural resources are consumed. Buildings consume forty percent of our natural resources. Fifty-four

percent of the U.S. energy consumption directly or indirectly relates to buildings or their construction (City of Portland Energy Office 1999). In buildings alone, several opportunities in planning, designing, and construction exist for civil engineers to implement sustainable solutions. Civil engineers can and should influence society in a way to affect the sustainability agenda because they have such a huge impact in it.

ASCE members should also make every effort possible to achieve a sustainable lifestyle. After all, the ethical code spells this out specifically. However, this should not be the only reason to lead a sustainable life. Fundamental Principle 3 of the ASCE Code of Ethics (1996-2009) states “Engineers uphold and advance the integrity, honor and dignity of the engineering profession by striving to increase the competence and prestige of the engineering profession.” Civil engineers have the ability and the experience to acquire the knowledge and the skills necessary to apply sustainable solutions. It is their responsibility to use these tools to implement sustainable development to protect the environment, the natural resources, and the human welfare. Since civil engineers can influence and are required to address the sustainability agenda, they should be the leaders towards striving for a sustainable and ethical lifestyle.

Living a sustainable and ethical life is achievable only when everyone works together to incorporate, promote, and educate society on sustainable development. This includes engineers, developers, educators, and policy makers. These key groups play an important role in society and can influence the implementation of sustainability practices. Civil engineers especially should be the leaders within this group since they are well-educated and strong communicators. Educators can encourage their students to think about sustainability and incorporate it into their work.

Policy makers can mandate sustainability through appropriate laws and incentives. In return, developers can insist on a greener design at the encouragement of the government. Engineers can then incorporate the ideas of sustainability from the education they received (Bilec et al 2007). If everyone works together, we can make the American lifestyle one that is sustainable and ethical. We can improve the quality of life and protect the environment and the natural resources.

One can argue that a sustainable lifestyle is attainable. In fact, communities like Portland, Oregon are implementing sustainability programs. According to the 2008 SustainLane U.S. City Rankings, Portland, Oregon is the most sustainable city in the U.S. (Monti 2008). The city has made the choice to be sustainable and has taken an active role in pursuing it. The policy makers in Portland have led the sustainable movement in many ways. For example, in 2001, the city adopted a green building policy so that newly constructed and major renovation projects met the U.S. Green Building Council's LEED Silver standard. By 2005, the city changed this policy to meet the LEED Gold standard (City of Portland Bureau of Planning and Sustainability (CPBPS) 2008). Portland has also provided incentives for developers to build green buildings. In addition to a tax credit given by the Oregon Department of Energy (2008) for LEED certified buildings, Portland has its own incentive, the Green Investment Fund (GIF). The GIF is a five-year, \$2.5 million grant program that helps finance projects that use innovative ideas in green buildings (Stork and Finn 2007). The incentives provided by Portland's policy makers help promote sustainability and represent a step forward in the effort to achieve a sustainable lifestyle.

Portland also provides many educational resources to help educate its citizens on sustainability concepts. These resources include an annual 16-week course titled "ReThink,"

which educates citizens about green building (City of Portland Office of Sustainable Development 2003), as well as a Green Building Hotline and Resource Center (CPBPS 2009). The city is doing much to help its residents understand the benefits of green building. It provides residents with the resources that are necessary to build a green building, education being an essential skill for this purpose. The more people understand green buildings, the more likely they will want to incorporate it (Bilec et al 2007). A progressive community, Portland has done an excellent job in leading sustainability and working toward a sustainable lifestyle.

Many developers and engineers have moved the sustainability agenda forward by taking responsibility for protecting the environment and conserving natural resources. The Groundwater Replenishment (GWR) System in Orange County is an example of how these people have taken responsibility for sustainable development. In January 2008, the Orange County Water District (OCWD) received approval to implement the GWR System, a system that treats sewer water for indirect drinking purposes. This action was a direct result of Orange County's projected water shortage for the year 2020 (OCWD and OCSD 2003-2004 Facts). As of January 2008, the GWR system produces recycled water as a supplemental water source to the existing groundwater basin. Through the development of newer technology, this project provides a sustainable solution to meet the current and future water demands.

For this project to be successful both engineers and the OCWD had to work together. It took extensive research and experience to successfully implement this project. Engineers and the OCWD used their knowledge and experience from the Water Factory 21 project, an OCWD project since 1976 that purified sewer water for nondrinking purposes (OCWD and OCSD 2004).

Engineers and the OCWD took responsibility for protecting the environment and natural resources. The OCWD not only has implemented a system that provides water for future generations and conserves the current water supply, but it has also taken responsibility in educating people about the system by providing tours to the public (OCWD and OCSD 2003-2004 Tours). The creation of the GWR system shows that engineers and developers are taking their ethical responsibility seriously. It shows how they became educated in a sustainable sewer treatment process; how they applied it to conserve resources and provide a solution for future generations; and how they continue to educate others about the system so that future applications can be investigated and implemented.

In addition to policy makers, developers, and engineers, some educators have also made a commitment to teach their students about sustainability. Eugene Jud (n.d. Résumé), a transportation professor at California Polytechnic State University, San Luis Obispo (Cal Poly SLO), has taken a very active role in educating his students about incorporating sustainable solutions in transportation design. In Professor Jud's most recent Public Transportation course, he had students design transportation systems that would encourage residents to use public transportation from Cal Poly to the San Luis Obispo airport. Students designed both short-term and long-term solutions. The students worked with airport management and other city and regional agencies to develop different design alternatives, and they presented their reports at the City/County library in front of San Luis Obispo residents and airport representatives (Jud n.d. CE). Professor Jud has taken responsibility both as a licensed civil engineer and as an educator to promote sustainability. Using his 47 years of experience in the transportation industry and his experience in sustainable mobility, he continues to teach students the importance of

sustainability. He has encouraged his students to design alternative forms of transportation to help reduce the impact on the environment and the natural resources. In an interview with Professor Jud, he said that one of the most frequent comments that he had from students on his course evaluations was students thanking him for making them aware of sustainability (Eugene Jud, personal communication, Jan. 14, 2009). Students can only incorporate sustainability if they know what it is and why it is necessary. Education is an important aspect in the sustainability movement. If more educators would teach their students about sustainability, then a more sustainable lifestyle is possible in the future.

All three of the discussed examples show that it is possible to be sustainable and ethical, but for the American lifestyle to be sustainable and ethical, the actions taken today are not enough. We need to advance sustainability to a higher level. More policy makers, developers, engineers, and educators need to incorporate and promote sustainability in their work. Civil engineers especially need to be at the forefront in implementing sustainability because they have such a huge impact in many of the critical areas. When everyone works together, a sustainable and ethical lifestyle is attainable in the near future.

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