Written Assignment 1
C.E.L.P. Gardens
Cole Moore Eric Messer Luke Barber Philip Entrekin

There are many cases why fuel-cell technology is regarded as the greatest advancement of the future. However, with every great thing comes along with it some detrimental factors. The rise of fuel-cell technology is an exciting idea that could and most likely will change the entire world, good or bad. These changes have consequences that can have immediate and long-term effects on a scale never seen before.

Social changes are a prevalent part of life that many people pay attention to. Social aspects of our culture surround us everyday with positive and negative connotations. With the fuel-cell technology, the social cues are already showing us hints of how society will change over time. With the introduction of this technology, a large shift in traditional cars will have to follow and it will not be easy. The gigantic oil companies that invest in gasoline systems will have a large amount of their investments lost due to the incredible amount of dependency of oil for the last century. These companies include domestic and foreign, which both will have lasting effects on the United States society for instance.

Along with the social issues of the fuel-cell technology, political issues could arise as well. Similar to the last paragraph stating how the major investments in oil companies has been driving the world for a good century now, the same could be said in a political environment. For example, wars have been raging on for the last several decades over oil. The potential for military conflict over the control of oil is as high as ever as the resource becomes used more and more each year. With the rise in renewable fuel-cell technology, a withering of global dependence on the Middle East could be achievable. This would allow for a more decentralized form of power generation.

The economics of fuel-cell technology cross a broad range of positive to negative. For example, the price that the consumer must pay to use this technology in 1998 was around $4,000 to $7,000 extra on top of an already expensive car. However, the “fuel-cell race” could bring more competition which could in return eventually bring down these prices, not to mention the reduced maintenance costs for these renewable energy powered cars. This sudden shift in fuel technology will not be easy for the normal consumer to take part in; it would take years for prices to come down due to more investments from major car manufacturers. Speaking of investments, also, major oil companies have their well developed infrastructure with a $200 billion investment into gasoline. This would be a major shift that these oil companies would certainly not want to happen if the fuel-cell technology were to be more prominent in the fuel business.

Another hot topic of discussion for renewable energy is its positive effect on the environment. Environmental benefits/issues are among some of the most important to explore when talking about fuel sources. With the use of fuel-cell technology, the possibility of a renewable energy source with zero emissions is able to exist. The use of a renewable energy engine allows for a process to be “two to three times more efficient than an internal combustion engine.” Along with this jump in efficiency comes the fact that the only output of these engines is water and air,

nothing that is harmful to the environment. Compared to today's combustion engines, this is a monumental leap as an environmental benefit.

EPEAT

EPEAT, or Electronic Product Environmental Assessment Tool, is a global rating system that evaluates the environmental impact of electronic products, including computers, laptops, and televisions. It was developed by the Green Electronics Council, a non-profit organization, in collaboration with stakeholders from the electronics industry, environmental organizations, and government agencies.

EPEAT evaluates products based on a set of criteria that address various environmental aspects, including the reduction of hazardous materials, energy efficiency, product lifespan, and end-of-life management. The criteria are divided into eight categories: (1) reduction or elimination of hazardous materials, (2) product longevity and upgradeability, (3) energy efficiency, (4) end-of-life design for reuse and recycling, (5) packaging, (6) corporate performance, (7) supply chain sustainability, and (8) social responsibility.

Each product is assigned a rating of Bronze, Silver, or Gold, depending on how many of the criteria it meets. The ratings are meant to help consumers and organizations make more informed decisions when purchasing electronic products, by providing a clear indication of their environmental impact.

The EPEAT program has been widely adopted by governments, educational institutions, and corporations around the world, who use it to promote the purchase of environmentally responsible electronics. By encouraging manufacturers to design and produce more sustainable products, EPEAT also helps to reduce the environmental impact of the electronics industry as a whole.

However, some critics argue that the EPEAT program is not comprehensive enough, and that it does not address all of the environmental and social issues associated with electronic products. They also point out that some manufacturers have been able to manipulate the criteria to achieve higher ratings, without necessarily improving the environmental performance of their products.

IEEE Std 1680-2006

IEEE Standard 1680-2006 is a set of environmental performance criteria and assessment procedures for electronic products. The standard was developed by the Institute of Electrical and Electronics Engineers (IEEE) in order to encourage the design and production of more environmentally friendly electronic products.

The standard covers a range of environmental factors, including the use of hazardous substances, energy efficiency, product packaging, and end-of-life management. It sets out specific criteria for each of these factors, which electronic products must meet in order to be considered environmentally preferable.

One of the key aspects of IEEE Standard 1680-2006 is the restriction of hazardous substances in electronic products. This includes substances such as lead, mercury, cadmium, and hexavalent chromium, which are known to be harmful to human health and the environment. The standard requires that electronic products comply with the European Union's Restriction of Hazardous Substances (RoHS) directive, which limits the use of these substances in electronic products.

Another important aspect of the standard is energy efficiency. It sets out specific criteria for the energy consumption of electronic products, including requirements for standby power consumption, power management, and energy efficiency during use. This is intended to reduce the environmental impact of electronic products by reducing the amount of energy they consume.

The standard also addresses product packaging, requiring that electronic products be packaged in a way that minimizes environmental impact. This includes requirements for packaging materials, packaging weight, and packaging volume.

Finally, the standard includes requirements for end-of-life management of electronic products. This includes requirements for product take-back and recycling, as well as guidelines for the design of products that make them easier to disassemble and recycle.

Overall, IEEE Standard 1680-2006 provides a comprehensive framework for the design and production of environmentally friendly electronic products. By complying with the standard, manufacturers can demonstrate their commitment to environmental sustainability and provide consumers with products that have a reduced environmental impact.

Good

RoHS

RoHS stands for Restriction of Hazardous Substances. It is a European Union directive that restricts the use of certain hazardous substances in electrical and electronic equipment (EEE) in order to reduce their impact on human health and the environment. The RoHS directive restricts the use of six hazardous substances in EEE. These substances include lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls (PBBs), and polybrominated diphenyl ethers (PBDEs). These substances are known to be harmful to human health and the environment, and their use in EEE can result in significant pollution and waste.

The directive requires that EEE sold in the European Union (EU) comply with the restriction of these substances. This includes not only finished products, but also components and materials used in the production of EEE. The directive applies to a wide range of products, including household appliances, computers, lighting equipment, and toys. Compliance with RoHS is typically achieved through testing and certification of products, as well as by implementing manufacturing processes and supply chain management systems that ensure compliance with the directive. Non-compliance with RoHS can result in significant fines and legal consequences.

Overall, RoHS is an important environmental regulation that helps to protect human health and the environment by limiting the use of hazardous substances in EEE. It is an important part of

the EU's broader environmental policy framework, which aims to promote sustainable production and consumption practices.

EPEAT, IEEE Standard 1680-2006, and RoHS are all related to the design and production of environmentally friendly electronic products. While they are distinct, they share common goals and principles.

IEEE Standard 1680-2006 sets out environmental performance criteria and assessment procedures for electronic products. It covers a range of environmental factors, including the use of hazardous substances, energy efficiency, product packaging, and end-of-life management. One of the key aspects of the standard is the restriction of hazardous substances in electronic products, which includes complying with RoHS.

RoHS, as mentioned earlier, restricts the use of certain hazardous substances in electrical and electronic equipment, including lead, mercury, cadmium, hexavalent chromium, PBBs, and PBDEs. RoHS is an important regulatory framework for reducing the impact of electronic products on human health and the environment. Compliance with RoHS is typically achieved through testing and certification of products.

EPEAT, or Electronic Product Environmental Assessment Tool, is a global ecolabel that evaluates electronic products based on their environmental impact. EPEAT is based on IEEE Standard 1680-2006 and sets out specific criteria for electronic products, including energy efficiency, product packaging, and end-of-life management. EPEAT also requires that products comply with RoHS.

Overall, IEEE Standard 1680-2006, RoHS, and EPEAT all aim to promote the design and production of environmentally friendly electronic products. While RoHS is a regulatory framework that sets out specific requirements for hazardous substances, IEEE Standard 1680-2006 and EPEAT provide more comprehensive environmental criteria for electronic products. Compliance with all three frameworks can help manufacturers demonstrate their commitment to environmental sustainability and provide consumers with products that have a reduced environmental impact.

Sustainability

Sustainability is a fundamental consideration that can greatly influence or affect design projects. In recent years, there has been an increasing focus on sustainable design, which takes into account the environmental, social, and economic impacts of a project over its entire lifecycle.

From an environmental perspective, sustainable design seeks to minimize the impact of a project on the natural environment. This may involve using materials and resources that are renewable, recyclable, or biodegradable, as well as designing buildings and products that are energy-efficient and produce minimal waste. Sustainable design also considers the impact of a project on local ecosystems, air and water quality, and climate change.

From a social perspective, sustainable design seeks to create projects that are accessible, equitable, and safe for all users. This may involve considering the needs of marginalized or vulnerable populations, as well as promoting social equity and community engagement. Sustainable design also considers the health and well-being of users, promoting healthy living and providing access to nature and natural light.

From an economic perspective, sustainable design seeks to create projects that are financially viable over the long-term. This may involve designing buildings and products that are cost-effective to build, operate, and maintain, as well as considering the lifecycle costs of a project over time. Sustainable design also considers the economic impact of a project on the local community, such as job creation and economic development.

Overall, sustainability is an important consideration that can greatly influence or affect design projects. By considering the environmental, social, and economic impacts of a project over its entire lifecycle, designers can create projects that are more environmentally friendly, socially equitable, and financially viable, while also meeting the needs and expectations of their clients and users.