

Why is it Easier to Change a Lightbulb than it is to Change People's Behavior?

The Forces behind Science and Technology as a Solution to Climate Change

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Chapter 1: Introduction

My journey in examining climate injustice and my participant role begins at a U.S. Consulate General in India. Overseas, the U.S. Department of State maintains approximately 19,000 facilities across 190 countries (United States of America. Department of State. Bureau of Overseas Building Operations i). The amount of energy needed to power these buildings accounts for 40% of all of the Department's CO2 emissions (United States of America. Department of State. Bureau of Overseas Building Operations i). In light of the growing international concern over climate change, the continued depletion of finite natural resources, and finally, in response to the President's 2009 call for more sustainable operations among U.S. federal agencies (United States of America. Office of the Press Secretary), the U.S. Department of State is shifting towards *eco-diplomacy*. Under eco-diplomacy, the Greening Diplomacy Initiative (GDI) emerged, and Green Teams across the Department of State's embassies and consulates formed to implement the GDI.

India's economy is booming, however, this economic growth, which is based on increased manufacturing and higher consumerism, is rapidly impacting the natural environment (Molinas 132). Recognizing the impact this growth has on the environment, the U.S. is attempting to "lead by example" through the practice of eco-diplomacy in order to encourage India to engage in climate talks. As a Foreign Service Officer in New Delhi stated in an email dated 1 September 2015:

... what we are really looking to do [is] publicize this [greening effort] so that we can show the public that, as a Mission, we are serious about Greening. This is particularly important as environmental issues are a significant part of our policy

platform here in India and being able to demonstrate our own Greening efforts will help lend credibility to our diplomatic efforts. (Fitzgerald)

Eugene Cho, a pastor and social justice advocate, believes that in order to effect change, we must live righteously and with integrity. He challenges us to not “ask others to do what you’re not willing to do yourself” (171-188). Cho and Fitzgerald seem to agree that before the U.S. can credibly, through diplomacy and engagement, encourage other countries to operate more sustainably, the U.S. must be willing to do so as well.

1.1 Science and Technology: The mainstay of the U.S. Department of State’s Greening Diplomacy Initiative (GDI)

In 2015, the U.S. Mission in India, composed of an embassy in New Delhi and consulates in Mumbai, Chennai, Kolkata and Hyderabad, won the *People’s Choice Greening Diplomacy Initiative Award*. The award recognizes the Mission’s achievements in reducing energy and water consumption across its facilities. At the Embassy in New Delhi alone, through technological advancements in energy and water efficiency and infrastructural upgrades, its efforts resulted in reduced water usage by 23% and energy usage by 5% in 2014 (United States of America. Department of State. U.S. Embassy, New Delhi). The Embassy installed 5,400 LED lamps/fixtures and low-flow aerators and shower heads, as well as solar-powered equipment including water heaters, air-conditioners, and LED outdoor lighting. The Embassy also installed automatic water faucets and motion sensor light switches, as well as water and energy meters to help monitor the use of these resources (United States of America. Department of State. U.S. Embassy, New Delhi). As the 2015 People’s Choice GDI winner, many embassies and

consulates look to Mission India and previous GDI winners for inspiration and ideas in reducing their own environmental footprints.

In their book regarding social entrepreneurship, David Bornstein and Susan Davis posit, “...what you count determines what you do. So it’s important to count the right things” (64).

Consider the GDI targets, with its emphasis on operational efficiency:

- “Reduce energy intensity by 30% by 2015...”
- “Reduce potable water consumption intensity by 26% by 2020...”
- “Reduce fossil fuel consumption by 30% by 2020...” (United States of America. Department of State. Bureau of Overseas Building Operations ii).

Moreover, consider what the U.S. Department of State considers successful outcomes under the GDI. The following are taken from the 2015 Strategic Sustainability Performance Plan:

- “Energy Efficiency”: defined as energy savings achieved through the implementation of energy and fuel upgrades and retrofits, and the installation of “smart” meters to track consumption and improve building efficiency performance.
- “Green Building”: Is an internationally recognized standard of construction that incorporates a high level of energy efficiency practices. The U.S. Department of State requires all new construction and major renovations be LEED Silver Certified. So far the U.S. Department of State has seven LEED Silver projects, one LEED Gold and one LEED certification. Three LEED Silver projects were constructed in 2015 while 13 LEED projects are planned for 2016.

- By exceeding its renewable energy goals through the use of solar and wind power, and waste-to-energy technologies, the U.S. Department of State cites “renewable energy” as another desirable outcome. Encouraged by these results, the Department plans to install geothermal heat pumps and wells in some of its buildings (United States of America. Department of State “Executive Summary”).

These “successful” outcomes emphasize one message: science and technology are the answers to reducing greenhouse gas emissions in order to slow down global climate change. However, what is more telling is what a Foreign Service Officer, responsible for maintaining building operations at the U.S. Consulate, observed: “It is a lot easier to change a light bulb than it is to change people’s behavior” (Richard). It is this insightful observation that forms the basis of my thesis.

1.2 Thesis Statement

As a member of the Green Team at the U.S. Consulate General, I want to understand why it is “easier to change a light bulb than it is to change people’s behavior.” What are the forces that encourage the use of science and technology to address global climate change? Are Americans ready and willing to “lead by example” and reduce their environmental footprint? What will it take for them to change their high-consumption, indulgent lifestyles that greatly contribute to climate change?

This thesis will argue the following: Our preference for technological solutions is based primarily on convenience and the desire to not change the status quo. This preference for technological solutions is motivated by our hesitation to fundamentally change our relationship with Earth and those who inhabit it. In other words, we advocate for technological advances in energy efficiency to maintain a high consumption lifestyle while also absolving ourselves of

shame and guilt by believing we are doing something “good” for the planet. Science and technocratic solutions to climate change and greenhouse gas emissions allow privileged societies to continue wasteful behavior by making them more efficient wasters, while pardoning these societies of the guilt of creating social inequality. Further, I will argue that science and technology is woefully inadequate to address global climate change because solutions driven by science and technology do not recognize climate change as a moral issue. In other words, I argue that we need to start thinking of global climate change as not just a change in temperature as a result of increased carbon emissions in the atmosphere. If we limit ourselves to understanding global climate change in such limited categories then our solutions, including those that are driven by science and technology, will be limited to addressing just these issues. In acknowledging that climate change is a moral issue that is a result of social inequality perpetuated by broken relationships and self-interest, only then can we begin to address the root causes of global climate change.

At this point of the thesis, I acknowledge that there are other causes of global climate change besides human activity.¹ Since the Earth’s formation some four billion years ago, its climate has periodically changed from warm to cool and back again and yet these periods of climate change happened over thousands, and hundreds of thousands of years (Hardy 23). On the

¹ From a longitudinal perspective, scientists believe that the first appearance of photosynthetic plants; the presence (and lack) of concentrated tectonic activity, such as earthquakes and volcanic eruptions; the fluctuating patterns of the Earth’s orbit around the Sun and the Earth’s “wobble” as it turns on its axis; and lastly, changes in solar activity, have contributed to global climate change since the formation of the Earth.

For more details on natural, non-manmade causes of global climate change, please refer to John T. Hardy’s book, *Climate Change: Causes, Effects, and Solutions*, 2003, John Wiley & Sons (pages 23-29); or J. Kutzbach’s 1989 paper titled, “Historical Perspectives: Climatic Changes throughout the Millennia” found in R.S. DeFries and T.F. Malone, Eds. *Global Change and our Common Future*, 1989, Washington DC National Academy Press, pages 50-61.

other hand, in just the past 150 years, the Earth's average temperature has increased by 0.8 degrees Celsius mainly due to human activity (Hardy 27). Although incremental compared to other periods of change in the Earth's climate, this rapid rate of increase is extraordinary, given the Earth's long history (Hardy 29). As Kutzbach observes in his paper, "Historical Perspectives: Climatic Changes throughout the Millennia, "[t]he potential magnitude of climatic change in the next century, caused by human activities, is comparable to that of some of the large natural climatic changes of the past, but human-caused changes may occur at much faster rates" (60). From this discussion I conclude that although the Earth's climate does change due to natural (non-human) causes, these changes occur *slowly* - over a period of thousands of years. What seems to be different now is that climate change is happening faster mainly due to human activity.

It is acknowledged that technological solutions have made an impact on reducing greenhouse gas emissions. The stated goal of the GDI is to reduce greenhouse gas emissions and the Department's environmental footprint (United States of America. Department of State. Bureau of Overseas Building Operations iii), and as a member of the Green Team, I would be remiss to not include technological interventions as part of the Green Team's portfolio. However, as Dr. Philip Brey, a lecturer on the ethics of technology, insightfully observes about those who believe technology is the answer to global climate change, "they depend on the false idea that social problems can be solved by means of a technological 'fix'" (361). In other words, we must acknowledge the limitations of science and technology in addressing the essentially social existential threat posed by climate change. We must acknowledge that climate change, primarily caused by affluent societies, is unjustly impacting the poor societies who have little responsibility for creating climate change. The Green Team must recognize that science and

technology are just *tweaks* in comparison to the fundamental and profound self-transformation required to live a more sustainable, less materialistic, and moral lifestyle.

The first part of the thesis will describe the context in which my study was conducted. I will explore the concept of climate injustice and will illustrate how institutions perpetuate climate injustice through personnel policies and practices. The second part of the thesis will look at factors that contribute to environmental degradation and climate change, and highlight why and how science and technology is the preferred method to address global climate change. The last section of the thesis will highlight the limitations and misguidedness of such reliance on science and technology and will describe the psychological and social barriers as to why it is so difficult to change ourselves towards a more sustainable lifestyle.

Chapter 2 Context of the Study

What is the difference between energy conservation and energy efficiency? Energy conservation is saving energy by cutting back on the amount one uses, while energy efficiency is using less energy to produce the same output. For example, turning lights off is a form of energy conservation, while replacing an incandescent lightbulb with a more efficient LED lightbulb is a form of energy efficiency. Energy conservation is achieved by behavior modification, while energy efficiency is achieved by technological mitigation. In understanding the fundamental difference between *conservation* and *efficiency* we can begin to understand why science and technology is the Consulate's preferred approach to reducing its environmental footprint.

In this section of the thesis, we will take a closer look at the context in which the Green Team is implementing the Greening Diplomacy Initiative. The examination of the U.S.

Department of State's personnel policies and practices will shed light on why Green Teams tend to promote energy efficiency rather than energy conservation.

2.1. *Morale and Greening Initiatives*

While collecting qualitative data for this thesis, I surveyed Consulate employees to identify greening activities they would like to promote. Whenever the discussion turned to changing our behavior in order to reduce energy and water consumption among the Consulate community, the concept of *morale* kept coming up. While one officer thought greening initiatives would help boost morale, (Officer 1), other officers saw it as an initiative that would harm or impact *morale* at the Consulate:

“ . . . It's also all these things that impact *morale*. A lot of this is how we would present it as opposed to a ‘you must’, which people might take in terms of, ‘My life is hard enough here . . . don't make it harder for me’ . . .” (Officer 2).

“ . . . might also be a *morale* issue at the house. If the kids or the spouse has a lot of issues with the weather or the temperature, and the A/C or having lights on helps, then they figure that it's [conserving energy] the least of [their] worries . . .” (Officer 3).

Interviewer: “I know there are issues of *morale*, too.”

Officer: “That is what I was going to say. Do you mind if we don't record this part . . . ?”

[Interviewer turns off recording device] (Officer 4).

Another officer, without specifically mentioning *morale*, stated that it is important that he and his family are happy at home, otherwise his productivity at work suffers (Officer 5).

How does a conservation or “greening” initiative, such as the GDI, which seeks to encourage the Consulate community to consume less energy, water, fuel, etc. become a morale issue?

To understand this, I turn to research that examines factors that influence an expatriate’s morale. The purpose of this line of inquiry is to determine the connection between conservation initiatives and morale within the context of a U.S. Consulate. By examining the factors that impact expatriate morale and how organizations/employers mitigate these factors, I seek a better understanding of the issues raised in the interviews.

2.2. *Culture and Culture Shock*

For the purpose of this thesis, an expatriate is defined as an individual who lives outside of his/her home country for a duration of two to three years, often for work reasons. These individuals move around the world, relocating every few years, and occasionally visit their home country, but rarely return on a permanent basis (Hindman 664). Not only does this describe the context in which Foreign Service Officers (or “professional” diplomats) function, this could also describe, at a certain level, international development workers and employees of multinational corporations as they find themselves moving from one assignment to another.

An assessment of ratings and reviews from the website, *Indeed*, a job recruitment website that allows past and current employees to rate companies and organizations and post reviews online, highlights the positive aspects of working for the U.S. Department of State. These include

opportunities to live overseas, learn a new language, and experience different cultures (Indeed).

Typical responses on the *Indeed* website include:

The Department of State is an excellent employer. If you are looking for international experience and a U.S. Government agency who takes care of you and provides you with the skills to succeed, look no further than the State Department.

Senior Coordinator for International Support, October 13, 2015 (Indeed)

The opportunity to work and experience cultures, customs and people of different nations is truly a career unlike any other . . . You will be asked to serve at one of any of the more than 265 embassies, consulates and other diplomatic missions in the Americas, Africa, Europe and Eurasia, East Asia and Pacific, Middle East and North Africa, and South Asia. Some of these posts are in difficult and even dangerous environments, but working in them affords great challenges and rewards.

Foreign Service Officer, October 15, 2013 (Indeed)

Interestingly, what could be perceived as a strength of the organization, can also be construed as a negative aspect of the job. As one former Foreign Service Officer laments, “[M]oving every 2-3 years, uprooting, and facing world challenges of *culture shock*” is a downside of the job [emphasis added] (Indeed).

Is there a relationship between morale and culture shock in this context? Before we can understand culture shock, I will first address the concept of culture.

Culture reflects our “personalized” view of the world. It represents core values that we develop from our social environments and collected life experiences, e.g. family, friends, country, ethnicity, religion, education, work, etc. (Robertson, Gagiotti and Low 210). In explaining culture, Hofstede, Hofstede and Minkov use the analogy of the way computers are programmed; the “patterns of thinking, feeling, and acting” are our mental programs, therefore, Culture is the “software” of our minds (5).

Culture manifests itself in different ways. Hofstede, Hofstede and Minkov posit that these manifestations of culture can be described by the following: symbols, heroes, rituals, and values (7). Symbols are words, gestures, pictures or objects that carry a particular meaning that is recognized by those who share the culture (Hofstede, Hofstede and Minkov 8). National flags are one example of a symbol employing colors, shapes, emblems, etc. that hold symbolic meanings to those who are part of the same culture. Heroes are persons, dead or alive, real or imaginary, who possess characteristics that are idealized in a culture and serves as a role model for behavior and conduct (Hofstede, Hofstede and Minkov 8). Rituals are collective actions, such as ways of greeting, how to bury the dead, or how/when to get married that differentiates one society from another (Hofstede, Hofstede and Minkov 9). These three manifestations of culture can be categorized under practices, since they can be observed by an “outsider” of the culture. What is important to note, however, is that for the “outsider” or expatriate, the cultural meaning of these practices are invisible, only understood by those who are “insiders” (Hofstede, Hofstede and Minkov 9).

This discussion leads to the fourth and last manifestation of culture: values. Values are fundamental feelings about life and behavior; they are broad preferences of ways of being (Hofstede, Hofstede and Minkov 9, 19). Values are primarily acquired early on in our lives and

learned from those around us. Oftentimes, values remain unconscious to those who hold them; “...they [values] cannot . . . be directly observed by outsiders . . .” and “. . . can only be inferred from the way people act under various circumstances” (Hofstede, Hofstede and Minkov 11).

Therefore, adjustment to a new culture requires that the expatriate learn the practices of his/her new environment as well as gain an understanding of the underlying values of the members of the new culture. However, as Hofstede, Hofstede and Minkov argue, because values are learned at an early age from those around us, it “. . . is unlikely that [the expatriate] . . . can recognize, let alone feel, the underlying values” of these interactions (384). In a way, the expatriate is expected to “return to the mental state of an infant, in which the simplest things must be learned over again” (Hofstede, Hofstede and Minkov 384). Triggered by the need to adapt, it is during this cultural adjustment period when feelings of distress, helplessness, frustration, and hostility develops within the expatriate (Hofstede, Hofstede and Minkov 384). This period of adjustment is called *culture shock*. In other words, culture shock is associated with the “disappointment to the extent that expatriates see a gap between their expectations based on their own cultural background and the reality of a new situation of culture” (Robertson, Gagiotti and Low 212).

Imagine, then, a Foreign Service Officer or a diplomat within the context of a consulate or embassy. This person’s main responsibility is to interact with foreign governments and peoples with the aim of advancing the interests of his/her country. Imagine the potential damage to tenuous diplomatic relationships caused by a diplomat dealing with culture shock. As Hofstede, Hofstede, and Minkov posit, “Intercultural communication skills [or lack, thereof] can contribute to the success [or failure] of negotiations, on the results of which depend the solutions to crucial global problems” (384). In this case, it would behoove foreign ministries and

departments, such as the U.S. Department of State, to facilitate the quick adjustment and adaptation period of their diplomats, given their key role in fostering and maintaining diplomatic relationships.

Therefore if culture shock coincides with the gap between an expatriate's expectations based on their cultural background and values and the reality of their new situation, how do international organizations, such as the U.S. Department of State, assist their expatriate employees and their families to narrow the gap in order to adjust/adapt to their new assignment? Laine suggests that "keeping the expatriate workers satisfied and providing them meaningful and correct means of support from pre-departure phase to the end of the overseas assignment is the key to make the expatriate program a successful one" (36). Therefore, for international organizations and multinational corporations, providing support to the expatriate over the life of the overseas assignment is vital.

International organizations and multinational corporations implement various strategies to assist their expatriate employees' adjustment. For example, a study which looks at organizational dynamics, expatriate's career, workplace diversity, etc. across fifty research papers published between 1984 and 2014, suggests that organizations need to build their employee's and family members' cultural intelligence or a "high degree of awareness and sensitivity to local culture" in order to have a successful overseas assignment (Krishnaveni and Arthi 138-139). As these studies suggest, a strategy that the U.S. Department of State employs to assist officers and families to adjust, is to provide cultural training. Officers and their families are afforded access to specific knowledge of the other culture through "expatriate briefings" (Hofstede, Hofstede and Minkov 420-421). These briefings include information on the new country's history, mores, customs, and traditions. In addition to these briefings, officers and their

families have access to the Foreign Service Institute's (FSI) vast library and resources to build their knowledge of their foreign assignment. Before moving to India, I spent hours in FSI's library, researching India's history, politics, cultural practices, and food. Additionally, Foreign Service Officers and their spouses can access language training that can take anywhere from three months to a year, depending on the complexity of the language or one's previous exposure to the language. These are common examples of pre-departure preparations expatriates engage in (Winkelman 123). Although this preparation was helpful, it only expanded my understanding of the practices of the culture (symbols, rituals, and heroes), and not the values of the culture. A few months after arriving in India and feeling the frustration and stress of culture shock, I realized the inadequacy of "expatriate briefings" in preparing for overseas assignments.

Another way in which expatriate employees manage the stress associated with culture shock is through maintenance or reparative behaviors (Winkelman 124). These are behaviors that allow the expatriate to maintain or to re-establish aspects of one's self that are being lost in the context of the new cultural setting. These behaviors include speaking in one's own language ("Tamil is really hard to learn!"), eating the foods from one's own culture ("Where's the beef?!?"), reading literature and news from home and phone calls/Skype sessions to family and friends in home country ("Thank goodness for internet!"), hanging out with others from your culture ("Shall we meet at Starbucks?"), etc. (Winkelman 124). The U.S. Department of State facilitates these maintenance and reparative behaviors through various programs and services. For example, the Community Liaison Offices organizes American community events such as trivia nights, handicraft shopping, hiking and touring trips, etc. at overseas assignments. Meanwhile, there are employee benefits and compensation packages which pay for rest and recuperation (R&R) travel and for shipment allowances for products and food items shipped

from the U.S. Although these practices and support services reinforces one's sense of self while reducing the stresses associated with culture shock, it should also be noted that they hinder or slow down the progress of fully adjusting to the new culture (Winkelman 124).

Lastly, another strategy that international organizations and multinational corporations employ to alleviate culture shock is to provide resources to maintain a semblance of the expatriate's standard of living back in their home country (Kraimer, Wayne and Jaworski 76). According to the U.S. Department of State's "Housing Abroad Policies":

The objective of the housing program is to provide safe and secure housing that is adequate to meet the personal and professional requirements of employees at a cost most advantageous to the U.S. Government. For the purposes of this policy, *adequate housing is defined as that comparable to what an employee would occupy in the Washington, DC Metropolitan Area*, with adjustments for family size and locality abroad [emphasis added]. (United States of America. Department of State. Foreign Affairs Manual 1)

Taking into account all of the support services that help us deal with culture shock in India, Foreign Service Officers and their families are afforded a standard of living equal to that of "Washington, DC Metropolitan Area." The Department goes to great lengths to support Foreign Service Officers and their families living overseas by recreating "American comforts" in their residences in India. For example, we are provided with air conditioners, air filters, and dehumidifiers to counteract the discomforting heat, pollution, and humidity of the local environment. We are given huge refrigerators and freezers to store our food shipped from the U.S. This State Department remediation practice (which consumes tremendous amounts of

energy) transforms the inside of our houses from an unbearably hot, humid, polluted Indian environment to a clear, cool, spring day in Washington DC.

2.3 Is this really about Low Morale or is it about Lack of Morality?

In order to maintain our standard of living, and our physical and mental well-being (through air travel for short vacations, the shipment and consumption of American foods and products, and through manipulating our indoor environment), expatriates burn fossil fuels to escape an environment ruined by the burning of fossil fuels. In essence, in order to “feel at home,” Americans have to transform their personal environment at a great cost to the environment.

Alternatively, consider the study from the Center for Science and Environment which highlights the stark differences in lifestyle and consumption habits between Indians and Americans: an American consumes 34 times the electricity at home that an Indian consumes, while 9 out of 10 Americans commute using a car compared to 1 in 10 Indians (McCarthy). Additionally, the average per capita consumption in the U.S. is 36 times higher than in India (McCarthy). As McCarthy further explains, “...if you’re poor in India, you don’t own appliances. You don’t own a car. If you’re lucky, you have enough electricity to charge a mobile phone,” and yet Indians are exposed to more pollution and are disproportionately impacted by environmental degradation (McCarthy). This is *climate injustice*.

Climate injustice occurs when those, who contribute most to ecological degradation experience disproportionately less the negative impact of climate change or global warming (Moe-Lobeda 36). Environmental racism is claimed when people who are marginalized based on race, gender, class, etc. are disproportionately impacted by ecological degradation and pollution

(Moe-Lobeda 36; Pellow 98-99). Combined, these concepts are referred to as “ecological imperialism” whereby countries of the Global North continue to benefit/profit from polluting the earth and depleting her natural resources, while countries of the Global South remain poor and acutely suffer the consequences of ecological degradation and climate change (Moe-Lobeda 38). Ironically, it seems apropos that Foreign Service officers, whose main aim is to advance the interests of their countries, are committing ecological imperialism in some form or another in foreign lands as described earlier.

However, are Foreign Service officers and their families *willfully* engaging in ecological imperialism, which leads to the exploitation and suffering of others and of the Earth? If I were to ask the hardworking diplomats at the Consulate if they would assist countless Indian farmers to commit suicide (Gruere and Sengupta 334) ², would they? Would I? Of course not, and yet, “we continue living according to economic practices and policies that effectively, albeit, indirectly, follow [this] unacknowledged” command (Moe-Lobeda 25). Dr. Cynthia Moe-Lobeda, professor of Christian ethics at Seattle University asks, why we would continue to live this way and contends that it is because of “hegemonic vision.”

...the constellation of socially contracted perceptions and assumptions about “what is,” “what could be,” and “what ought to be” that maintains the power, or privilege of some people over others, and “blind” the former to that privilege. (86)

² Drought, combined with specialization in high-cost crops, low market and support prices, and the absence or failure of the credit system, are strong factors that have led to the uptick in suicides among cotton farmers in India (Gruere and Sengupta). Clothing consumes 60% of the world’s cotton production, with Europeans and North Americans accounting for 75% of these imports (Laird). Therefore, by buying an incredibly inexpensive cotton t-shirt from India, have we unknowingly helped Indian farmers commit suicide?

Hegemonic vision is a way in which we (diplomats) indiscriminately go through our lives, sustaining an unequal distribution of power and privilege. It is being ignorant of the negative impact our lifestyle has on “others”, e.g. other humans, animals, plants, rivers, lakes, oceans, air, etc. Hegemonic vision partly explains why a “greening” initiative at the U.S. Consulate, whereby, Foreign Service officers and their family members are asked to voluntarily reduce their energy consumption, becomes a *morale* issue and not a *moral* issue despite what we know about the inherent inequality associated with climate change and environmental degradation. Lastly, I further contend that hegemonic vision is the reason why we continue to turn to technological solutions/fixes to address global climate change.

In summary, I have established the following:

- Poor morale is a concern among Foreign Service Officers when discussions turn to voluntarily reducing energy and water consumption among consulate households as an approach to reducing the Consulate’s environmental footprint.
- The Foreign Service’s transitory nature, which requires officers to relocate every two or three years for assignments, can be challenging for the officer and her family as they are exposed to culture shock with every move.
- Culture shock and morale are related in that in order to maintain a high morale at the workplace, international organizations and corporations implement ways to mitigate culture shock. In the case of the U.S. Department of State, providing language and cultural training, and a living space or environment comparable to American standards is how the Department assists its officers in dealing with culture shock.

- Therefore, if the Green Team advocates for officers and their families to voluntarily reduce their energy and water consumption at home, we are asking people to give up key coping mechanisms, entitlements, and benefits needed for adjusting to the new culture and environment, and as a result this negatively impacts morale.
- Lastly, I highlighted some of the moral challenges the U.S. Department of State is confronted with due to their personnel policies.

My study into culture and international human resource management sheds light on the *context* in which the GDI is being implemented at the Consulate. The widely accepted and endorsed personnel policies and practices used for dealing with culture shock and providing officers the support considered essential for them to do their jobs effectively often encourages diplomats to maintain an unsustainable lifestyle that greatly contributes to greenhouse gas emissions. Within this context, the next question that arises is, how does a Green Team at a U.S. Consulate reconcile the need to reduce the Consulate's energy consumption and the need to maintain an American diplomats' lifestyle that is considered so critical for sustaining mission morale? In the next chapter, we will consider this question and discuss why we turn to science and technology.

Chapter 3: *"It's a lot easier to change a light bulb than it is to change people's behavior"*:

Factors of Environmental Impact, the IPAT Equation, and *Why* and *How* Science and Technology became the Preferred Method to Address Global Climate Change

...the Federal Government can and should lead by example when it comes to creating innovative ways to reduce greenhouse gas emissions, increase energy efficiency, conserve water, reduce waste, and use environmentally-responsible

products and technologies. –President Barack Obama, October 5, 2009 (United States of America. The Administration. GreenGov)

The solution to the unintended consequences of modernity is, and has always been, more modernity – just as the solution to the unintended consequences of our technologies has always been more technology. - Michael Shellenberger and Ted Nordhaus

We cannot solve our problems with the same thinking we used when we created them. – Albert Einstein

Together, these three quotations crystalize the conflict I feel when advocating for technological solutions as part of the Green Team’s approach under the GDI. I reiterate what a Foreign Service officer told me many months ago when I started my research: *“It is a lot easier to change a light bulb than it is to change people’s behavior.”* The first part of the statement implies that the overall preferred approach in dealing with climate change is to turn to science and technology. As discussed in the introduction to this thesis, this is the preferred modus operandi of the U.S. Department of State. Governments are turning to technological solutions that result in higher energy efficiency and increased usage of renewable energy to reduce our greenhouse gas emissions. However, let us consider the second part of the statement, “... than it is to change people’s behavior.” By focusing too much on technological solutions or “fixes,” are we ignoring the simple fact that perhaps the main driver of global climate change, social injustice, and environmental degradation, is our indulgent lifestyle and our unwillingness to change the status quo because we benefit from this unequal relationship?

Shellenberger and Nordhaus state that, “The solution to the unintended consequences of our technologies has always been more technology,” (2011) and yet, this statement does not sit well with me. As Dr. Albert Einstein once said, “We cannot solve our problems with the same thinking we used when we created them.” With these two statements in mind, this chapter will

examine how we have become reliant on science, technology, and innovation as they relate to addressing environmental impact, and consider the implications of turning to technological solutions to address the challenges of global climate change.

3.1 “It is a lot easier to change a light bulb...”- The “Greening” of the U.S. Government

Annually since 2010, a year after President Obama announced the presidential executive order, the “Federal Leadership in Environmental, Energy, and Economic Performance,” which mandates that all federal agencies make reductions in greenhouse gas emissions, the GreenGov Presidential Awards acknowledges and celebrates achievements in meeting the President’s executive order on federal sustainability. The award honors, “federal, civilian and military personnel, agency teams, agency projects and facilities, and agency programs that exemplify President Obama’s charge to lead by example towards a clean energy economy” (United States of America. The Administration. GreenGov). There are six categories under the GreenGov awards:

Awards	Description*
Good Neighbor Award	Recognizes a federal agency team or facility for its exemplary engagement with local or regional communities to promote one or more of the goals of the President’s challenge to agencies to become leaner, greener, and cleaner.
Building the Future Award	Recognizes the federal civilian or military facility or installation which demonstrates success in implementing the policy and performance goals of the President’s Executive Order.
Green Dream Team Award	Recognizes outstanding collaboration and teamwork that successfully puts an exceptional federal sustainability idea into action.
Green Innovation Award	Recognizes an innovation or idea with the potential to

	transform the federal community's overall energy and environmental performance.
Lean, Clean, and Green Award	Recognizes outstanding organizational achievement in building or fleet energy efficiency or renewable energy development and deployment.
Sustainability Hero/ Climate Champion Award	Recognizes a federal employee who is a sustainability champion and agent of change within his/her agency.

* (Slack)

Using Miles', Huberman's and Saldana's approach to qualitative data analysis as described in Keith Punch's book, *Introduction to Social Research: Quantitative and Qualitative Approaches* (171-177), I examined the project descriptions of past GreenGov Presidential Award winners (United States of America. The Administration. GreenGov). In doing so, I wanted to uncover trends and patterns in order to understand the kinds of approaches the federal government uses to reduce its greenhouse gas emissions.

I found that the winning projects can generally be divided into three categories: (1) infrastructural and operational upgrades, including shifting to net-zero energy facilities; (2) "green" purchasing; and (3) behavior change/awareness/training. The majority of the projects involved infrastructural upgrades, i.e. converting facilities over to renewable energies (solar, wind, geothermal, bio fuels) or improving upon energy efficiency (i.e. LED and motion detection lighting, switching to hybrid cars, installation of electric vehicle charging stations, "smart" meters, LEED certified buildings, etc.). Additionally, in order to reduce water usage, agencies cite turning to low-flow showers, motion sensor toilets and faucets, and to reverse osmosis technologies. A few projects focused on improving the government's capacity for "green" purchasing. For example, one project created a software tool to measure the environmental performance of building material and bio-based products that the government purchases, while

another project, the “Substances of Concern Reduction Initiative,” “...resulted in a technology solution to inform a procurement of possible health, safety, security, and environmental impacts that may occur from general and specific uses...” (United States of America. The Administration. GreenGov). The third (and smallest) category focused on lifestyle/behavior change and awareness, including strategic planning, and trainings on composting, recycling, sustainability planning, and developing the infrastructure to help facilitate the adoption of cleaner forms of transportation, i.e. installation of showers and bike racks to help facilitate the use of bicycles for commuting (United States of America. The Administration. GreenGov).

Another way in which the GreenGov Presidential Award winning projects can be categorized is by adaptation versus mitigation activities. The IPCC (The Intergovernmental Panel on Climate Change) defines *adaptation* and *mitigation* as follows:

Adaptation: In human systems, the process of adjustment to actual or expected climate and its effects, in order to moderate harm or exploit beneficial opportunities. In natural systems, the process of adjustment to actual climate and its effects; human intervention may facilitate adjustment to expected climate. (556)

Mitigation (of climate change): A human intervention to reduce the sources or enhance the sinks of greenhouse gases. (561)

While the majority of the GreenGov Presidential Award winners focused on mitigation activities (as described above), two projects focused on adaptation strategies. One project titled, “Preparing for a Changing World,” conducted a series of workshops for federal agencies to review the impacts of possible climate scenarios on infrastructure in order to facilitate

organizational readiness. The other project, involving the Department of Commerce, U.S. Army Corps of Engineers, Department of Homeland Security, and the U.S. Global Change Research Program, created an interactive sea level rise mapping and calculator tool that helps city planners identify and prepare for future flood risks. According to the GreenGov website, "...the tool uses the most up-to-date scientific information by providing assessments of future risks beyond current conditions..." to help state and local planners make better informed decisions which consider the risk in location and design of redevelopment projects (United States of America. The Administration. GreenGov.).

Based on this exercise, I offer two conclusions. The first conclusion is, among federal agencies, there is a strong reliance on science and technology in adapting to and mitigating the impacts of climate change. The second (and most telling) conclusion is highlighted by the *absence* of certain kinds of data, i.e. none of these projects seek to necessarily *reduce* consumption, however these projects seek to leverage science and technology to facilitate *efficient* consumption. In other words:

... the most visible and common expressions of faith in ecological salvation are *new forms of consumption*. Green products and services — the Toyota Prius, the efficient washer/dryer, the LEED-certified office building — are consciously identified by consumers as things they do to express their higher moral status. [emphasis added] (Shellenberger and Nordhaus)

In fact, as described in the introduction of this thesis, this reliance on technology is the same approach the U.S. Department of State uses, through eco-diplomacy and the Greening Diplomacy Initiative, to engage other countries in climate talks (United States of America.

Department of State. Bureau of Public Affairs). However, why is it we believe that the best way to deal with climate change is to turn to science and technology, which invents new ways of consuming, when the root of the problem is over consumption itself?

3.2 “It is a lot easier to change a light bulb...”- *Techno-optimism*

Samuel Alexander, a research fellow with the Melbourne Sustainable Society Institute and co-director of the Simplicity Institute, defines *techno-optimism* as:

the belief that science and technology will be able to solve the major social and environmental problems of our times, without fundamentally rethinking the structure or goals of our growth-based economies or the nature of Western-style, affluent lifestyles. In other words, techno-optimism is the belief that the problems caused by economic growth can be solved by more economic growth... provided we learn how to produce and consume more efficiently through the application of science and technology. (2)

Alexander goes on to contend that techno-optimists believe that further innovation in design and technology, along with the markets, will eventually lead to a separation of economic activity/growth from environmental impact, “... avoiding the implication that economic growth has biophysical limits...” (Alexander 2; Schut, *The Eight-Hundred Pound Gorilla* 74-82). That is to say, technological advances such as wind and solar power are touted as one of the solutions which will allow economic growth and consumption to continue without depleting fossil fuel reserves since these energy sources are renewable.

It is easy to see how one might be seduced by the notion that science and technology can address the existential threats of global climate change and environmental degradation. The

pioneering spirit that drives scientific inquiry and technological advances has allowed humans to achieve unimaginable “wonders,” such as producing electricity, traveling into outer space, curing cancer, harnessing the power of the sun, designing computers and the internet, and mapping out the human genome.

When I think of the major “revolutions,” e.g. the Industrial, Green, and Digital Revolutions, it is science and technology that are the common threads throughout these events. For example, it was the technological advancements during the Industrial Revolution that increased humanity’s capacity to produce and manufacture mainly through the harnessing of energy from fossil fuels and creating machines that enhanced our manual labor (Alexander 1). During the 1960’s and onwards, the widespread adoption of the so called ‘Green Revolution’ technologies (improved seed varieties, fertilizers, irrigation systems, etc.) averted the predicted large-scale famines and social and economic upheavals (Khush 646). More recently, it is the Digital Revolution that is transforming our lives; nanotechnology and computer-aided manufacturing techniques are allowing us to build more efficient solar and wind technology, while genetically engineered algae is being developed to produce an oil based fuel. Additionally, the digitization of retail (“e-commerce”), has grown 400% between 1999 and 2009, allowing us to consume more with a convenient click-of-the-mouse (Satell). In short, science and technology have allowed a selected segment of the earth’s people to enjoy a certain lifestyle of material comfort, convenience and wealth; “... we now own more clothes, more labor-saving devices and more entertainment items than our predecessors would ever have dreamed possible...” (Clawson 146). And as mentioned before, science and technology has allowed U.S. Consulate Foreign Service officers to live an “American” lifestyle in the middle of some of the poorest and environmentally harshest places.

In their book titled, *Creative Confidence: Unleashing the Creative Potential Within Us All*, the Kelleys contend that one way to spark creative action is to constrain it; "... constraints can spur creativity and incite action..." (126). This theory explains why techno-optimists tend to be optimistic in the face of global climate change since they believe that "free markets" and high prices will incentivize more research and development of substitute resources if/as/when natural resources become scarce (Alexander 2). In this case, techno-optimists are hedging humanity's continued existence on this planet on the idea that dwindling natural resources will spur creative action in the form of new technologies and innovation in order to find solutions to either slow down the rate in which we consume Earth's natural resources or to completely replace the scarce resources.

3.2.1 Waste to Energy (WtE) as 'Techno-Optimism'

An example of techno-optimism at play is in the case of waste to energy technologies (WtE) in India. It is clear that India's economy is growing (Rapoza). With economic growth and urbanization comes increased consumption and waste (Pellow 32). With 1.2 billion people, India produces approximately fifty-five million tons of solid waste annually. Although consumption per capita in India is still lower than in most countries of the West (McCarthy), many fear that India's continued rapid economic growth, urbanization, and large population, will result in the accumulation of extraordinary amounts of waste (Batist). Additionally, besides the sheer volume of waste being generated, another growing concern is how wealth changes the composition of the waste. Therefore, with more money comes more electronics, packaging, imports, broken toys, disposables (diapers, water bottles, paper products, etc.) and appliances - - items that do not readily break down in landfills or that are toxic for the environment (Hoornweg, Bhada-Tata and Kennedy 616). Combined, these factors are putting a huge strain on India's waste management

systems and especially their landfills (Pulakkat). Confronted with a waste management system struggling to cope with this new reality, and a growing need to meet the energy/electricity requirements as India becomes more “modern” as a result of its economic growth, the country is turning to waste to energy (WtE) technology. WtE is the process of generating electricity through the burning of waste (Chaturvedi, Khan and Sen 1).

Are those who advocate for the use of WtE technologies techno-optimists? Taking into account Alexander’s definition of techno-optimism, I believe so (2). For example, in the context of India, WtE technology aims to solve major environmental problems (landfills filled to capacity, and the leeching of toxins into the land and water sources, etc.) without rethinking the structure of capitalism, which relies heavily on growth and consumerism. In fact, WtE technologies is very suitable for an economic system that encourages consumerism since it is the act of consuming that provides the raw materials to be burned to generate electricity. Additionally, as it becomes more difficult and expensive to find and extract fossil fuels to generate electricity, burning waste becomes a more attractive alternative to the techno-optimist (Alexander 2).

3.2.2 Is all this ‘Advancement’ Making for a Better Humanity?: The Dark Sides of Science and Technology, and Techno-Optimism

Despite the positive outcomes that technological and scientific advancements have promised, there are well-known social and environmental “dark sides” that come from this sort of development (Schut, *The Eight-Hundred Pound Gorilla* 81). As Dr. Moe-Lobeda asserts, “Our ways of life and the economic policies that make them possible, contribute to severe, even deadly, poverty and ecological degradation on massive scales” (3).

To illustrate the “dark side” of technological and scientific advancements, I return to the WtE example in India. Many Indians will be affected by the decision to move towards WtE technologies. First, consider the environmental consequences incinerator technology brings. Even the most technologically advanced incinerators release thousands of pollutants that contaminate the air, soil and water (Environmental Justice Organisations, Liabilities, Trade). For example, municipal waste incinerators emit more mercury and contribute more to climate change by emitting more carbon dioxide than coal-fired power plants (Global Alliance for Incinerator Alternatives). Far from eliminating the need for a landfill, waste incinerator systems create toxic byproducts such as ash, sludge, and wastewater that needs to be disposed of in landfills (Global Alliance for Incinerator Alternatives). Meanwhile, the informal waste recycling sector, made up of waste pickers who are being displaced by the adoption of WtE technologies, contribute to the economy and to the protection of the environment by diverting 118,000 tons of materials resulting in the diversion of 22% of recyclable materials from landfills. This calculates into a net environmental benefit totaling US \$3 million annually (Chikarmane 3).

In addition to having detrimental impacts on the environment, WtE technologies adversely affects society. First, there is the public health component. Studies have shown that the burning of solid and medical waste generated by health care facilities emit dioxins into the air, which are linked to cancer, immune system disorders, diabetes, birth defects and disrupted sexual development. These pollutants affect communities hundreds or thousands of miles away (Gautam, Thapar and Sharma 1). Second, burning waste for energy is threatening the livelihoods of thousands of people. These are the waste pickers who are some of the poorest people on Earth and who are the *invisible* entrepreneurs on the frontline of climate change; they earn a living from recovering recyclable materials. In Pune, India, where there are 8,000 registered waste

pickers, the majority are from marginalized groups. Most are women (90%), under the age of 35 (50%), are widowed or deserted (25%), illiterate (90%), and the majority are from the scheduled castes (i.e. the untouchables) (Chikarmane 4). When technologies such as WtE undermine the waste pickers' ability to earn an income by severely limiting their access to the waste, this is what Pellow means when he says that, "ecological modernization is possible precisely as a result of global environmental inequality and racism" (34). I agree with Pellow. A study which looked at the impact of a WtE plant in New Delhi on 450 waste pickers concluded that, since waste provides a crucial source of livelihood to a segment of the urban poor, technological solutions such as WtE plants can push them further into poverty (Chaturvedi, Khan and Sen 2).

The negative impacts of WtE technologies and its criticisms are real, yet, despite all the evidence, a report indicates that India recently built one WtE plant and plans to build five more to meet its energy needs and to deal with its growing trash problem (Pulakkat). Is this optimism towards science and technology misplaced? On the one hand, I highlighted how scientific and technological advances have led to some positive changes for humanity, while on the other hand, we have seen an example of where optimism for technological solutions lead to greater injustice and inequality. Even with the Green Revolution, despite enabling us to feed millions of people and to spur the economic growth of countries, including India, there are environmental and social costs associated with such modernization of agricultural practices (Willis 169-171; Pellow 147-184). Again, I am reminded of the following statement: "The solution to the unintended consequences of modernity is, and has always been, more modernity – just as the solution to the unintended consequences of our technologies has always been more technology" (Shellenberger and Nordhaus).

I began this section with the intention to answer the following questions: Why is it easier to change a lightbulb than it is to change our behavior? Why do we turn to science and technology for efficiency's sake, rather than just conserving? Techno-optimism or the belief that science and technology will solve any major social and environmental problem of our time, is a partial answer to these questions. For example, there are other possible solutions to reducing the amount of CO₂ we emit into the atmosphere, such as controlling population growth or, as mentioned before, reducing the overall amount we consume. Perhaps by studying the origin of techno-optimism, I will gain a better understanding of the factors behind the resistance to energy conservation initiatives at the U.S. Consulate; in other words, I hope to get a better understanding as to why American Consulate Foreign Service officers link low morale to energy conservation efforts.

3.3 *"It is a lot easier to change a light bulb..." - The IPAT Equation*

During the 1970s, at a time when society was influenced by the seminal book, *Silent Spring* (Carson), which led to the creation of the U.S. Environmental Protection Agency (EPA) and Earth Day, a professor of biology at Stanford, Dr. Paul Ehrlich, and a physicist at the Lawrence Radiation Laboratory, Dr. John Holdren, developed an equation which mathematically expresses the three factors that lead to environmental impact. Environmental Impact (*I*) is the product of Population (*P*), Affluence (*A*) and Technology (*T*) (1212-1213; Chertow 14):

$$I = PAT$$

For many scholars and policymakers, this equation served as a starting point to examine and discuss the interactions between population, economic growth, and technological advances in relation to environmental impact (Alexander 3). In their paper titled, "Impact of Population

Growth: Complacency Concerning this Component of Man's Predicament is Unjustified and Counterproductive," Ehrlich and Holdren used the IPAT equation to counter the growing acceptance (at the time) of the notion that population is a *minor* contributor to environmental impact (Chertow 15). Meanwhile, Dr. Barry Commoner, in a paper titled, "Economic Growth and Ecology-a Biologist's View", applied the equation to illustrate how technological advances in production capacities accounted for the sharp increase in environmental impact in the U.S. post World War II (12). He argues that improved production capacities led to more consumption and economic growth, thus negatively impacting the environment (12). Therefore, via the IPAT equation, these scholars demonstrated how, respectively, continuous population growth and high rates of consumption can intensify environmental impact unless technology and innovation can offset those impacts through efficiency gains (Alexander 3).

In applying the IPAT equation to the U.S. federal government's efforts in reducing its carbon footprint, U.S. federal agencies currently favor sustaining economic growth (production and consumption), and maintaining a certain standard of living while reducing its impact through efficiency gains made by technological solutions. However, regarding the use of technology to mitigate environmental impact, Ehrlich and Holdren warn that there is a caveat to technological solutions: they "pose environmental costs [that] must be weighed against those they eliminate" (1216). In examining the adoption of waste-to-energy technologies in India and its impact on the environment and society, we considered the "costs" of turning to science and technology and disputed their legitimacy as a solution to India's social, environmental and economic challenges.

Moreover, in principle, the IPAT equation suggests there are other options to tackling environmental degradation. For example, individuals, societies and governments who want to address environmental challenges, can seek ways to reduce their populations, or can choose to

change their lifestyles and to consume less (Alexander 3). Yet, despite these revelations, the majority of proposed solutions to climate change do not involve controlling population size, or changing our lifestyle; they revolve around technological solutions. Why?

Let us consider the statement that has guided my thesis thus far: *“It is a lot easier to change a light bulb than it is to change people’s behavior.”* This statement has elements of the IPAT equation built into it and can be represented as follows:

$$I (\text{Impact}) = PA (\text{“people’s behavior”}) T (\text{“light bulb”})$$

However, it turns out that having options is a “mixed blessing”; if governments and/or societies are unwilling or unable to address certain variables of the IPAT equation, they can consider reducing their environmental impacts by focusing on other aspects of the equation (Alexander 3). As we can see, according to the IPAT equation, population control (P) and changing our inherently high-consuming lifestyles (A) are possible solutions, yet, they are not devoid of controversy and complexity as we will discuss below.

3.3.1 Population Control (P): A Feasible Response to Reducing Carbon Emissions?

According to a United Nations’ report, the world’s population reached 7.3 billion as of mid-2015, suggesting that approximately one billion people were added to the world’s population in a span of twelve years (1). By the years 2050 and 2100, the world’s population will increase to 9.7 and 11.2 billion, respectively, with most of the increases coming from African and Asian nations, and the U.S.A. (United Nations 2-4). Within the context of climate change and depleting natural resources, these projections are alarming. However, population control is a complex issue and forms of it have been employed and continues today with detrimental results,

costing lives and infringing upon human rights, with little evidence to show that it is slowing down population growth rates (Frey; Burke). Let us consider, again, how India continues to experience climate injustice,³ this time within the context of population control.

In his paper titled, “Essay on the Principle of Population (1798),” cited in Willis’ book, *Theories and Practices of Development*, Thomas Malthus wrote about the effects of rising population on natural resources. He argued that the world was doomed unless limits were placed on population growth rates as the growing population would surpass the food supply and lead to mass starvation (Willis 164-165). The belief was that rapid population growth creates a barrier to economic development, particularly in the least developed countries (Grimes 377). Prior to the development of the IPAT equation, during the mid-1960s, the neo-Malthusian movement evolved. This movement promoted family planning programs and fertility reduction programs to control population growth in poor, developing countries. These policies, having elements that were developed as much by self-interest on the part of developed countries (since they were concerned about their own economic interests) as by sincere concern for alleviating poverty in developing countries, progressed to be more coercive overtime (Grimes 375, 377).

For example, in 1975, in response to an economic crisis brought on by massive crop failure and rising oil prices, Indian Prime Minister Indira Gandhi declared a state of emergency which evolved into an extensive sterilization campaign. By 1976, a total of 8.26 million sterilizations were conducted, most of them vasectomies on poor Indian men (Frey 94). To put

³ Remember, climate injustice occurs when those who contribute most to ecological degradation experience disproportionately *less* the negative impact of climate change or global warming. For another illustration of climate injustice, please refer the following article from the Guardian, “Delhi’s air pollution is a classic case of environmental injustice” (Boyce and Shrivastava). Climate injustice encompasses the social, economic, and environmental injustices experienced by certain members of society grouped along lines of race, gender, class, nation, etc.

this number in perspective, the amount of Indian men permanently sterilized through this campaign equals approximately to the total population of Switzerland in 2015.⁴ To “encourage” Indians to “volunteer” in the campaign, some states implemented coercive measures, such as withdrawing food rations from couples with more than three children. In Uttar Pradesh, teachers with large families were forced to undergo sterilization, otherwise, they lost a month’s pay. Meanwhile, in Maharashtra, couples with three children were also forced to undergo sterilization. Police officers, railway ticket collectors, and other government employees were forced to select a male family member to undergo sterilization (Frey 93). Anthropologist Emma Tarlo, who conducted extensive field research in India at the time, concluded:

They [the poor] submitted their own bodies for sterilization, not out of choice or, on the whole, for financial incentives, but rather in order to gain or retain access to basic civic amenities such as work, housing, hospital treatment and education. For many of those at the bottom end of the socio-economic heap, life in Delhi without a sterilization certificate became untenable, if not impossible. (qtd. in Frey 93)

Yet, in India, these coercive programs continue today (Burke), targeting the poorest of the poor and women, despite the existence of growing evidence that demonstrate how raising the standard of living of the poor, especially through better health outcomes for children, rather than reducing fertility, is the more humane, immediate and effective solution in addressing population growth (Rosling; Bradshaw and Brook).

⁴ According to the U.S. Central Intelligence Agency’s World Factbook: Country Populations (<https://www.cia.gov/library/publications/the-world-factbook/rankorder/2119rank.html>)

This example of population control in India highlights the ethical challenges of such programs (Kuumba). Fertility reduction programs pay little regard to human rights and civil liberties. It is because of these injustices that make advocating for population control an unattractive option in dealing with climate change, especially when other, non-intrusive options exists, i.e. technological solutions or changing our consumption habits. Finally, in the context of the U.S. Department of State, it would be hard-pressed to find any Green Team willing to enforce such draconian measures upon their co-workers in order to reduce our environmental footprint.

3.3.2 The Intersection of A (Affluence) and T (Science and Technology) of the IPAT Equation

Assuming we have established, for now, that population control (P) is not a viable option to mitigate global climate change, this leaves the A and the T of the IPAT equation to examine. As discussed earlier, the environmental movement of the 1970's under which the IPAT equation developed, was based on the premise that environmental damage and natural resource depletion limits economic growth. What changed this paradigm was the World Commission on Environment and Development (WCED). Formed in the late 1980's and independent of political or corporate influence, the WCED's aim was to examine the global challenges of the environment and development. Its objective was to come up with development solutions that not only considered the current generation, but whose solutions considered the needs of future generations (Willis 177-178). The WCED published its findings, "Our Common Future," (or "The Brundtland Report") highlighting how "environmental destruction would limit forms of economic growth, but also how poverty and disadvantage contribute to environmental destruction..." (Willis 178). Since the report's release, governments and the rest of the international community concluded that if humanity were to have a positive future, the economy

and the environment had to be more compatible, giving rise to the concept of “sustainable development” (Willis 178).

This was an important moment for science and technology; sustainable development directs and defines the role science and technology will play within the context of the environment and the economy. Further, having established that population control is not an option most governments are willing to implement for reasons stated earlier, and through the “Brundtland Report”, there is now a mandate to focus on economic growth, while ensuring that Earth’s natural resources are protected and conserved. Therefore, in a context where improving the standard of living (which also has an added benefit of stabilizing population growth) is a near-universal development goal, reducing the environmental impact of the world’s production/consumption-intensive economy via efficiency gains from the use of science and technology becomes the only feasible factor to manipulate (Chertow 21). Alexander further elaborates:

The IPAT equation . . . had within it the ‘win/win’ solution that people seemed to be seeking: efficiency improvements [T] . . . The IPAT equation provided a theoretical framework that showed that it was nevertheless possible to reduce environmental impact through technological advancement [T] . . . This ‘technofix’ approach [is] a much more politically, economically, and socially palatable way to address environmental problems . . . It provide[s] governments and individuals with a means of responding to environmental problems without rethinking population growth or questioning affluent lifestyles . . . (4)

To illustrate Alexander's point, for transnational corporations, the IPAT equation endorses a "strategy" in which they can respond to environmental challenges in ways that do not interfere with their growth and wealth accumulation. As long as Earth's natural resources can keep up with demand and society (mainly the rich and the privileged) is content with the status quo, transnational corporations view population growth and "development" as favorable because these factors equate to more consumers and more cheap labor, allowing transnational corporations to maximize profits (Alexander 4). Therefore, there is no incentive for transnational corporations to support efforts to encourage less consumption and more birth control. Further, as an outcome of the IPAT equation, transnational corporations favor 'techno-fixes' and the development of 'green' products which can be sold to the growing number of environmentally-aware consumers, such as the U.S. government via the Greening Diplomacy Initiative and the President's GreenGov initiative (Alexander 4). It is within this context, maximizing profits and where emphasis is placed on using science and technology to make us more efficient consumers, that has led to the emergence of techno-optimism among society (Chertow 20-21).

Chapter 4: Moving Beyond Just Changing Lightbulbs: The Limitations of Science and Technology and the Need to Recognize that Global Climate Change is a Moral Issue

Science and technology has its limitations. As Ehrlich and Holdren observe:

Technological attempts to ameliorate the environmental impact of population growth and rising per capita affluence in the developed countries suffer from practical limitations . . . Not only do such measures tend to be slow, costly, and insufficient in scale, but in addition they most often *shift* our impact rather than remove it . . . electric automobiles would simply shift part of the environmental

burden from personal transportation from the vicinity of highways to the vicinity of power plants. (1215-1216)

To further Ehrlich's and Holdren's point, the hybrid automobile industry, governments and society must now contend with the disposal of the increasing number of spent battery modules from hybrid vehicles, thus *shifting* the environmental impact of auto transportation from the air, as associated with CO₂/pollution, to land, as associated with the chemical leaching from spent batteries into landfills (Kim et al.). In other words, science and technology only *shifts*, not *eliminate* the problems; "just as the solution to the unintended consequences of our technologies has always been more technology" (Shellenberger and Nordhaus).

Theoretical physicist, philosopher and humanist Dr. Albert Einstein stated that, "We cannot solve our problems with the same thinking we used when we created them." Einstein's words still resonate. In order to break Shellenberger's and Nordhaus' *circular* logic/argument in support for technological solutions to global climate change, we need to start thinking *differently*.

We need to start thinking of global climate change as not just a change in weather patterns or increased temperature as a result of increased carbon emissions in the atmosphere. If we allow ourselves to understand global climate change in such limited categories, our solutions, including those that are driven by science and technology, will be limited to address these issues. From our examination of the social and environmental impact of waste-to-energy technology, and the coercive measures taken to control population growth rates in India, we recognize that global climate change is a complex environmental *and* social issue caused by the global elite and affluent, and which disproportionately impacts the poor (Schut and Helmiere; Groody 117). We must begin to acknowledge that more efficient consumption through energy

efficiency does not address the inherent social inequality and environmental degradation that exists as a result of our capitalistic economic system. Recall Dr. Philip Brey's observations, regarding technology and techno-optimists: "they depend on the false idea that social problems can be solved by means of a technological 'fix'" (361). Consequently, Brey distinguishes climate change and environmental degradation as a social challenge to be confronted at a human, personal level, and not just through science and technology.

Returning to the IPAT equation, it has been established that (*P*) population control initiatives, which seek to reduce fertilization, exacerbates social injustice; it is not a viable or humane solution to reducing our carbon emissions. Moreover, regarding science and technology (*T*), I conclude the following: (1) climate change/environmental degradation and social injustice are interconnected and (2) "changing lightbulbs" is an inadequate response to confronting complex social issues brought about by climate change and environmental degradation. As Jim Collins observes in his book, *Good to Great: Why Some Companies Make the Leap...and Others Don't*:

Thoughtless reliance on technology is a *liability*, not an asset. Yes, when used right – when linked to a simple, clear, and coherent concept rooted in deep understanding – technology is an essential driver in accelerating forward momentum. But when used wrong – when grasped as an easy solution, without deep understanding of how it links to a clear and coherent concept – technology simply accelerates your own self-created demise. (159)

This now leaves us to examine (*A*) Affluence of the IPAT equation, as represented by our materialistic tendencies. To move beyond "just changing lightbulbs," we need to change

ourselves and what we value as a society in order to address global climate change and to combat climate injustice. However, personal transformation is difficult. We will next examine why this is the case.

4.1 “It is a lot easier to change a light bulb than it is to change people’s behavior” - Barriers to Behavior Change

As an environmental psychologist at the University of Victoria in Canada, Dr. Robert Gifford dedicates his life to answering the following question, “If so many people are concerned about climate change, the environment, and sustainability, why are more of us not doing what is necessary to ameliorate the problems?” (290). In his paper titled, “The Dragons of Inaction: Psychological Barriers That Limit Climate Change Mitigation and Adaptation”, Gifford contends there are twenty-nine psychological obstacles (or “dragons”) to taking action in changing our behaviors (292). Twenty-nine! According to Gifford, there are three phases to environmental inaction. First, there is a lack of awareness whereby ignorance usually precludes taking action. Second, if there is awareness, psychological barriers hinder taking action. Finally, if these barriers are addressed and action is taken, the action may be insufficient to actually make an impact because the behavior does not sustain itself, makes little difference in reducing one’s own carbon footprint, or is actually counterproductive⁵ (291).

Although it is very likely that, to a certain degree, all twenty-nine psychological obstacles are relevant within the context of the U.S. Consulate community, for the purpose of this thesis, I

⁵ For more information on actions that are counterproductive in reducing one’s own carbon footprint, refer to studies and discussion on Jevons Paradox and the Rebound Effect. Please read, “Recycling gone bad: When the option to recycle increases resource consumption” by Jesse R. Catlin and Yitong Wang. *Journal of Consumer Psychology*. 22.1 (2013), 122-127.

will only focus on the “dragons” that are most relevant based on my fieldwork: Technosalvation, (Lack of) Place Attachment, and System Justification.

4.1.1 Technosalvation

Technosalvation is Gifford’s term for techno-optimism, which we have examined in detail in this thesis. Gifford supports my contention that our overconfidence in science and technology “appear to serve as a barrier to [people’s] own climate mitigating behavior” (293).

4.1.2 (Lack of) Place Attachment

Lack of place attachment is a theory whereby people are more likely to care for a place for which they feel a connection than for one for which they do not. Weaker “place attachment” acts as an impediment to climate-positive behavior (Gifford 295). In other words, people who relocate frequently are expected to care less for their present environments. This may further explain the challenges the Green Team encountered as we attempted to implement energy and water conservation activities among the U.S. Consulate community. Diplomats and their families move from one assignment to another every two to three years, oftentimes knowing where their next assignment will be a year into their current assignment. This nomadic mindset and lifestyle provides little incentive or motivation to fully invest efforts to feeling connected to or caring for any one place.

4.1.3 System Justification

One of the underlying themes of this thesis is that science and technology maintains the “status quo”. System justification or the tendency to justify the societal status quo, can be applied to not only the U.S. Consulate community, but can be observed at a global scale (Pellow 116-

119). For example, techno-optimism emerged from combining the need to address environmental degradation with the need to maintain an affluent, consumeristic, unsustainable lifestyle.

Corporations profit greatly in not challenging this status quo. Gifford observes that “when citizens are fortunate enough to have a comfortable lifestyle, the tendency to not ‘rock the boat’ or, perhaps more important, to not have *others* change the way things currently operate, grows” (293). We see this dynamic play out in this thesis’ discussion regarding the extent to which international organizations sustains the expatriate employees’ high-consuming lifestyle in order to help the expatriate cope with culture shock. Additionally, this dynamic is evident when the suggestion to implement energy or water conservation activities at the Consulate becomes an issue of morale. These examples illustrate how the affluent and privileged essentially do not want to change the way things are, even if their current lifestyle is detrimental to Earth’s environment or perpetuates the poverty of the poor.

This thesis argues for moving beyond just “changing lightbulbs.” This entails perceiving global climate change as a social and moral issue. In doing so, it would help to approach the challenges from a theological perspective. As Groody contends, “When done in a spirit of humility, as faith seeking understanding that generates knowledge born of love, theology offers reflection on what it means to be authentically human in the world” (21). Therefore, let us consider two important concepts: *structural sin* and *structural evil*.

4.2 Structural Sin and Structural Evil: System Justification’s Theological Counterparts

Structural sin and *structural evil* are system justification’s counterparts. Moe-Lobeda describes structural sin as the “disorientation from right relationships with God...with self, others and all of creation” (58). Although the concept of sin is usually associated with the

individual, it can be expanded to include the social level, as the way the privileged become “curved in on” their self-interests (Moe-Lobeda 59). Capitalism, consumerism, and ecological injustice are just a few examples of structural sin, and support the argument that structural sin exists when broken, un-equal relationships are formed or are present (Moe-Lobeda 59).

Structural injustice contends that evil has the ability to “hide itself from the consciousness of its perpetrators,” and becomes normalized within society (Moe-Lobeda 66). Evil’s ability to “hide” or to become accepted in a society explains why we continue to be complicit in engaging in structurally “sinful” activities that perpetuate inequalities and ecological damage (Moe-Lobeda 66). Because of this hidden nature of systemic inequality, it becomes harder for us to challenge and change the “status quo.” Moreover, structural sin and structural evil coincides with Moe-Lobeda’s assertion regarding hegemonic vision which are deep-seeded, structural assumptions about “what is,” “what could be,” and “what ought to be” which sustains the privilege of some people over others (86). Therefore, hegemonic vision is a way in which certain members of society indiscriminately go through life, sustaining an unequal distribution of power and privilege. It is being ignorant of the negative impact our lifestyle has on “others.”⁶

These forces - system justification, structural sin, structural evil, and hegemonic vision - are formidable challenges that makes it so difficult for us to change our materialistic, high consuming ways. From where do these forces originate?

⁶ Structural sin and structural evil are concepts that stem from Christian theology to help develop theoretical frameworks for conceptualizing life within social systems. Please refer to liberation theology references, such as Daniel G. Groody’s *Globalization, Spirituality, and Justice*, chapter 7, pages 182-211. Liberation theology focuses on freedom from systemically imposed oppression. What Moe-Lobeda contributes to this conversation, regarding structural sin and structural evil, is that *salvation* does not only mean liberation from oppression, but it also refers to “liberation from *committing or perpetrating* it” (Moe-Lobeda 59).

4.3 Poverty of the Non-Poor and the Myth of Scarcity

In his book, *Walking With the Poor: Principles and Practices of Transformational Development*, Dr. Bryant Myers, professor of transformational development at Fuller Theological Seminary, talks about the poverty, or the marred identity, of the non-poor, (145-148).⁷ He says:

When the non-poor play god in the lives of other people, they have stopped being who they truly are and are assuming the role of God. Losing sight of their true identity leads the non-poor to misread their true vocation as well. Instead of understanding themselves as productive stewards working for the well-being of their community, they act as if their gifts and position are somehow rightfully theirs, or earned, and hence are solely for themselves and for their well-being.

(146)

In other words, the non-poor have developed a notion of themselves as superior, displaying a god-complex of sorts. They are tempted to “play god” in the lives of the poor and the marginalized, creating and using institutions and systems to maintain positions of power and privilege.

Additionally, similar to the concept of the god-complex of the non-poor, the notion of *scarcity*, or the idea that “there is not enough,” perpetuates the development of unjust systems

⁷ Myers credits Dr. Jayakumar Christian’s theory of poverty as a disempowering system and for the development of the following concepts: god complexes of the non-poor, and marred identity - or poverty of the non-poor. Please refer to Dr. Christian’s Ph.D. thesis, “Powerlessness of the Poor: Towards an Alternative Kingdom of God Paradigm of Response” (1994) from Fuller Theological Seminary, Pasadena, CA and to Dr. Christian’s book, *God of the Empty-Handed: Poverty, Power, and the Kingdom of God* (1999), MARC.

and institutions. Lynne Twist, author and activist, notes that scarcity is more than just lacking something:

. . . but that scarcity as a chronic sense of inadequacy about life becomes the very place from which we think and act and live in the world. It shapes our deepest sense of ourselves, and becomes the lens through which we experience life.

Through that lens our expectations, our behavior, and their consequences become a self-fulfilling prophesy of inadequacy, lack, and dissatisfaction. (32)

Recall our earlier discussion regarding culture and values. Culture reflects the prism in which we see the world and represents the core values that we develop from our social environments and collected life experiences. Values imply a need to make a judgement, whereby values are about moral and immoral, decent and indecent behavior (Hofstede, Hofstede and Minkov 158). Therefore, “morality is in the eye of the beholder, not in the act itself . . . there is no one best way . . . *any solution is the best according to the norms that come with it*” [emphasis added] (Hofstede, Hofstede and Minkov 158). Therefore, if Twist suggests that scarcity - the idea that “there is not enough” – holds a place deep within our core values and manifests itself in our cultural practice (symbols, heroes, and rituals) of wealth and material accumulation, then I conclude that scarcity is what feeds our greed and reflects the way in which we live our lives; “we respond to the fear that there is not enough by creating systems that favor us or exclude others from access to basic resources” (Twist 35). Based on the idea of scarcity, we have developed an enduring culture of inequality where our technological “fixes” for climate change are “acceptable” to us, even though they are woefully inadequate in dealing with climate injustice, because our norms and values, convinces us so. Hofstede, Hofstede and Minkov observe:

. . . there are many things in societies that technology and its products do not change. . . There is no doubt that dazzling technological changes are taking place. . . but people put these new technologies to familiar uses. Many of them are used to do much the same things as our grandparents did: to make money to impress other people, to make life easier, to coerce others, or to secure potential partners . . . (19-20)

The concepts of the *poverty of the non-poor* and *scarcity* are the foundations on which forces such as system justification, structural sin, structural evil, and hegemonic vision exists. Together, these forces perpetuate our faith in technological solutions because technological advances in energy efficiency allows us to continue our standard of living while allowing us to believe (erroneously) that we are doing something “good” for the planet. These forces and the technological solutions they create prevent us from looking inward towards self-transformation to change our privileged, high consuming ways. This, I believe, is why it is easier to “change a lightbulb” than it is to change people’s behaviors.

Chapter 5: Conclusion

This thesis is a result of my efforts to understand the dynamics surrounding the implementation of a “greening” (environmentally friendly) initiative in a U.S. Consulate General in India. The aim of this thesis was to explain why, “It is easier to change a lightbulb than it is to change people’s behavior”; why is it more challenging to implement energy conservation initiatives than it is to implement energy efficiency initiatives.

First, I considered the personnel policies and practices of international organizations and corporations designed to maintain high-consuming lifestyles so as to bolster morale associated

with adjusting to a new culture and environment for expatriate employees. Then I examined the emergence of *techno-optimism*, and how and why science and technology became the preferred solution in reducing our carbon emissions. Lastly, I considered the psychological and social barriers to changing our behavior in order to live more simply and to conserve more.

In all consideration, I conclude the following: we favor technological “fixes” because these approaches do not challenge us to *reduce our consumption*. Rather, we leverage science and technology to facilitate *efficient* consumption, which allows us to maintain a high consumption lifestyle while also absolving ourselves of shame and guilt by believing we are doing something “good” for the planet. I conclude that the root cause to climate change is not our capitalistic economic system – in fact our economic system is a manifestation of the real cause of climate change. The reason way we favor science and technology to help us reduce our carbon emissions is because technological solutions or “fixes” allow us to ignore the simple fact that perhaps the main driver of global climate change, social injustice, and environmental degradation, is our affluent, indulgent lifestyle and our unwillingness to change the status quo because we benefit from this unequal relationship.

This thesis mainly focused on understanding the challenges and barriers to implementing a “greening” initiative within the U.S. Department of State. As for suggestions for further research within this context, I would advise that subsequent research focus on Green Teams who have been able to successfully implement energy conservation efforts, rather than energy efficiency programs.

In the 1972 book titled, *The Limits to Growth: A Report for the Club of Rome’s Project on the Predicament of Mankind*, Meadows et al. observes that:

Our present situation is so complex and is so much a reflection of man's multiple activities, however, that no combination of purely technical, economic, or legal measures and devices can bring substantial improvement. Entirely new approaches are required to redirect society toward goals of equilibrium rather than growth. Such a reorganization will involve a supreme effort of understanding, imagination, and political and moral resolve. (193)

The researchers further contend that:

As soon as a society recognizes that it cannot maximize everything for everyone, it must begin to make choices. Should there be more people or more wealth, more wilderness or more automobiles, more food for the poor or more services for the rich? Establishing the societal answers to questions like these and translating those answers into policy is the essence of the political process . . . (181-182).

Ultimately, what this thesis attempted to convey is that we cannot rely on science and technology, alone, to address the social and environmental challenges of global climate change. We need to look within ourselves and change, because, “while individuals’ actions will not alone dismantle systems of evil, those systems will only be dismantled if individuals do act” (Moe-Lobeda, 96).

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