Global Warming: The Predicament, Contributions and Initiatives

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Section 1: A Global Predicament

In 1896, a Swedish scientist first claimed that fossil fuel combustion may eventually lead to enhanced global warming; little did he know that his claim was only the beginning of one of the biggest global issues the world has ever encountered. This claim however, did not result in immediate action and concern, but rather, the topic was forgotten for a very long time. This is because it was thought that human influences were insignificant and the effects of carbon dioxide emissions and air pollution are not seen immediately and thus the issue was pushed aside. It wasn't until around the 1940's that the global warming effects of carbon dioxide emissions were proven and later in the 1980's that the global mean temperature rise was noticeable. In was during this time that "the curve began to increase so steeply that global warming theory began to win terrain fast… Environmental NGO's started to advocate global environmental protection to prevent further global warming" (Madore). Global warming has become a major international concern because of its many consequences such as rising temperatures, the melting of icecaps and decreased agricultural activity; which all have a crucial impact on the health and livelihood of millions of people around the globe.

The causes of global warming are found in the multiple consequences of industrialization. Emissions pollution, overpopulation and deforestation are double-duty issues because while they are the negative *effects* of industrialization, they are also the main *causes* of global warming. Most scientists agree that, the "blame for air and land pollution, global warming and ozone depletion have all been laid at the door of industrialization. These issues of pollution have been intensified in the large urban areas which developed as a result of industrialization" (Japanese). Industrialization is an ongoing process in modern society and its effects are long lasting, which is why the problem of global warming persists today. Another reason why there is no solution, as pointed out in a New York Times article, is that "the technological, economic and political issues that have to be resolved before a concerted worldwide effort to reduce emissions can begin have gotten no simpler" (Global Warming and Climate). The solution to this global issue will take a collaboration of forces from around the world which is easier said than done. With all the differing opinions around the globe, it is evident why no solution has been reached and the problem persists.

Sir John Houghton, Co-chair of the Scientific Assessment Working Group of the Intergovernmental Panel on Climate Change, describes energy consumption in his book on global warming. He states that, as industry has developed, since 1860, "the rate of energy use has multiplied by about a factor of 30, at first mostly through the use of coal followed, since about 1950, by rapidly increasing use of oil" (Houghton 189). He also gives examples of the disparities that exist in various parts of the world with regards to the amount of energy used per person. For example, in 1990, the highest energy consumption was in North America, where the average rate of consumption was about 11

kilowatts per person. In comparison, the average Indian's rate of consumption was 0.5 kilowatts (mainly in the form of traditional fuels) which is about one twentieth of North America's average. His book also describes the main uses of the energy we consume, stating that 20% is used in transportation, 45% by industry and the remaining 35% in commercial activity and homes. Despite its use and the country it is consumed in, energy consumption produces harmful emissions (191).

Perhaps the biggest cause of global warming is this emission of pollutants, especially greenhouse gases. As explained by *Cultural Wars: An Encyclopedia of Issues*, the green house effect is "whereby the atmospheric buildup of excess concentrations… of green house gases prevents infrared energy from escaping and traps the heat at the earth's surface" (Global). Inevitably, this trapped heat has lead to a rise in the earth's temperature over time. Author Bruce, E Johansen, notes that the detectable increase of these harmful gases, such as carbon dioxide, methane and nitrous oxides can be traced back to the beginning of the 19th century. He states that "since the beginning of the industrial age… an increasing world population has made more widespread use of fossil fuels to aid economic development as well as to augment human comfort, convenience, and financial profit." Johansen adds that the combustion of oil, coal and natural gas have produced emissions that are changing the earth's atmospheric balance and that these harmful emissions are retaining heat in the atmosphere (Johansen 5-6). The combined effect of all the greenhouse gases, as noted in the U.N. General Assembly's Intergovernmental Panel on Climate Change's Second Assessment (1995) was a warming greater (in terms of its speed) than any other climatic event in the last 10,000 years (Johansen 7).

Adding to the devastating effects of greenhouse gases is deforestation, which causes global warming in two ways. First, trees have the ability to absorb carbon dioxide – one of the biggest greenhouse gases – and when forests are clear-cut for urban purposes, they are no longer able to absorb that carbon dioxide. One specific example of this is the Amazon rainforest, which, according to a MSNBC article, is being "destroyed by cattle ranchers, by landless peasants slashing and burning to create cropland, by illegal lumbering, and increasingly by large agribusinesses planting lucrative soybean." The loss of this region is invaluable to the human population, because as the article states, the Amazon forest is believed to remain a sink," meaning that it still absorbs slightly more carbon than it emits (Hanley).

Second, trees contribute to global warming when they are burned. Since they are made of 50% carbon, when burned for energy, trees actually release the carbon dioxide that they store back into the atmosphere (Deforestation). The Royal Society (a Fellowship of the world's most eminent scientists, as described on their website) reinforces these causes of global warming, by stating: "we know from looking at gases found trapped in cores of polar ice that the levels of carbon dioxide in the atmosphere are now 35 per cent greater than they have been for at least the last 650,000 years. From the radioactivity and

chemical composition of the gas we know that this is mainly due to the burning of fossil fuels, as well as … the widespread burning of the world's forests" (Climate). These gases, especially carbon dioxide, can stay in the atmosphere for up to 100 years which is why this issue has not disappeared and is guaranteed to continue into the future.

The rapid population growth associated with industrialization is also a cause of global warming because of the increased levels of harmful emissions. A professor at King's College in London, Sue Grimmond, notes that "the extent and rate of global environmental changes… are driven largely by the rapid growth of the Earth's population" (Grimmond). A larger population leads to increased demand for products, higher levels of production and consumption and, inevitably, elevated levels of greenhouse gases. John Bongaarts, Population Council vice president and distinguished scholar, confirms the effects of the population growth by stating that "further population growth and economic development are expected to be the principal factors putting upward pressure on annual CO2 emission rate" (Bongaarts). The table below, which is used in his article, reinforces this theory by comparing the population size with emission levels in both developed and developing nations. The table demonstrates that if trends continue, the population growth will contribute to higher levels of carbon dioxide emissions.

TABLE 2 Estimates for 1985 and assumed trends through 2100 in population size, CO_2 emission per capita, and total CO_2 emission for the developing and developed world

	Developing world	Developed world	World total
Population size (billions)			
1985	3.64	1.23	4.87
2025	6.76	1.43	8.19
2100	8.95	1.47	10.42
CO_2 emission per capita			
1985	0.59	3.13	1.23
2025	1.01	3.88	1.51
2100	1.58	8.13	2.50
Total carbon dioxide emission[a] (Pgr of C/year)			
1985	2.15	3.85	6.0
2025	6.85	5.55	12.4
2100	14.15	11.95	26.1

[a] Including emissions from deforestation and cement production.
SOURCE: Adapted from EPA (1990b), no response (RCW) scenario.

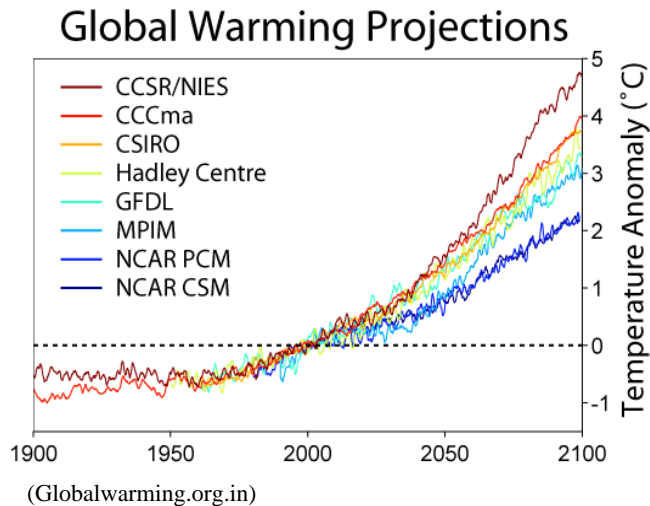(Bongaarts, John. "Population Growth and Global Warming.")

The amazing thing about global warming is its scope. It is truly a *global* issue, in that it is present in every country and the actions of one country affect other nations as well as their own. Its presence has nothing to do with politics, specific cultures, or individual nations. It is a universal issue that intertwines countries all across the globe. To put its effects into perspective, Oxfam, a charity focused on fighting poverty warns that "natural disasters caused by climate change will affect up to 400 million people within six years" (Gray). Not only is the scope far reaching across cultures, but the predicted direction of global warming could produce many consequences.

Certainly, awareness and recognition of the expansion of this issue has surged. In 1988, it was finally acknowledged that the climate was warmer than any period since 1880. In fact, 1988 was globally the warmest year ever recorded and the 10 warmest years have all occurred since 1990. As discussed by the Royal Society, "the Intergovernmental Panel on Climate Change (IPCC) – the world's leading
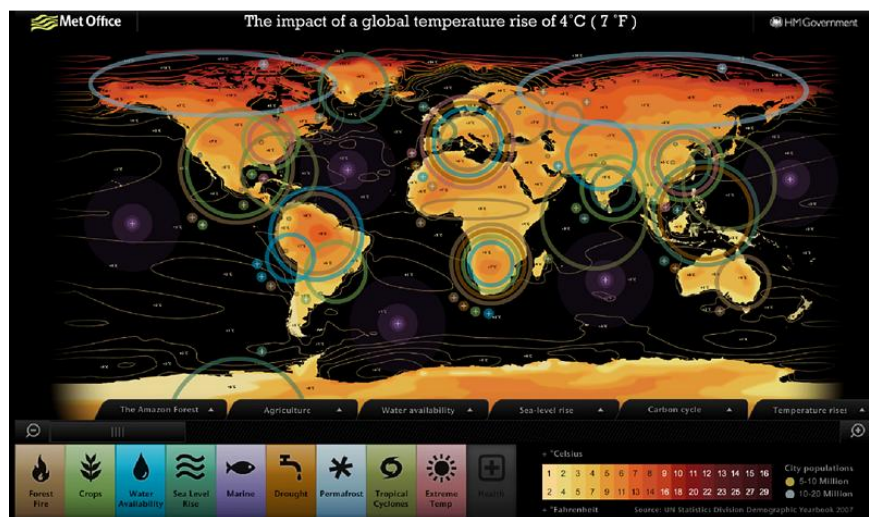
authority on climate change – has projected a global average temperature increase this century of 2 to 3 ℃. This would mean that the Earth will experience a larger climate change than it has experienced for at least 10,000 years" (Climate). It is predicted that under a "business as usual" scenario, this temperature rise will only continue in the future.

The graph below shows that many of the world's leading climate modeling organizations agree with this. These organizations include: Center for Climate System Research, Univ. of Tokyo (CCSR), Canadian Centre for Climate Modelling and Analysis (CCCma), Commonwealth Scientific and Industrial Research Organization (CSIRO), to name a few. Although their projected temperatures do vary slightly, it is clear that they all agree on the steady rise of earth's temperature over the next 100 years, due to a "business as usual" scenario, where no efforts are made to reduce emissions.

(Globalwarming.org.in)

The effects of global warming extend far beyond pollution of the air and temperature rise. Along with these consequences comes a host of predicted sub-issues involving agriculture, human health and welfare, natural disasters, drought and a change in sea levels. The national weather service in the UK, MET Office, has been focusing on climate change for more than two decades and provides an interactive map (left) on their website to illustrate the possible sub-issues of global warming. In terms of agriculture, for example, this map demonstrates that climate change directly affects agricultural productivity and food production. MET Office estimates that if the average temperature increases beyond

(Met Office: Four Degree Interactive Map)

3 degrees Celsius, then there will be a decrease "for all major cereal crops in all major regions of production." More specifically, they note that this could result in a 20% decreased yield in crops and increase the number of people at risk of hunger by 10-20% or tens to hundreds of millions of people

(Four).

The effect on agriculture in Africa is a specific example of this issue. Even without considering the effects of climate change, agriculture in Africa is already threatened by water supply variability, soil degradation, recurring drought events, limited agricultural technologies and a lack of funds. The authors of an article concerning agriculture in Africa, state that many experts are concerned about the impact that global warming will have on the African agricultural industry. The article claims that, "even in the moist tropics, increased heat is expected to reduce crop yields [and] agronomic studies suggest that yields could fall quite dramatically in the absence of costly adaptation measures" (Mendelsohn). The agriculture sector is a major contributor to the current economy of most African countries, averaging 21% and ranging from 10% to 70% of the GDP (Mendelsohn et al., 2000a). The exact toll that global warming will take on Africa is still uncertain, but it is probable that agriculture's contribution to Africa's GDP will be reduced in the years to come.

The far reaching effects of global warming can also be seen with regards to water. The increased global temperatures will cause icecaps to melt and thus there will be a rise in sea levels throughout the world. This is not a projected future outcome, rather, it is already taking place. For example, a CNN article discusses how NASA has been "utilizing satellite technology that measures changes in mass in mountain glaciers and ice sheets." NASA has found that "between 1.5 trillion and 2 trillion tons of ice in Greenland, Antarctica and Alaska have melted at an accelerating rate since 2003" (Grinberg). The article states that NASA contributes these findings to the latest signs of global warming and that water demonstrates in a "very real way" how the climate is changing. Also relating to water, the MET Office predicts that even without climate change, in the year 2080, three billion people out of a global population of 7.5 billion could be living with limited per capita water (Four). Adding the effects of climate change into the equation would only worsen this negative prediction.

There is much controversy surrounding the topic of global warming and a variety of opinions about its causes and consequences. On one side of the debate are organizations like the IPCC, MET Office and the Canadian Center for Climate Modelling and Analysis (CCma) who have been tracking the causes and effects of global warming through extensive research and computer modeling. For example, the MET Office argues that "the impacts of climate change could be widespread across the globe. Emissions of greenhouse gases have already altered the Earth's atmosphere and the climate is already changing… future climate change depends on whether we continue to emit greenhouse gases into the atmosphere at the rate we currently do, or whether we take effective steps to dramatically reduce our emissions" (Lewis). Their view is that global warming is caused by humans and they are ready to outline specific steps to take in order to combat its effects.

This view is also shared by individuals and countries as well. One such individual, John Harte, a

Professor of Environmental Science at the University of California at Berkeley, states that "we often hear criticism of global warming science from non-scientists who like to point out that there's uncertainty in the climate models, and that maybe the effect won't be as bad as we project. But what this scientific experiment is showing us is that if anything, our current climate models are underestimating the magnitude of future warming" (The Political). An illustration of the actions being taken by specific countries is Japan, which established The Global Warming Prevention Headquarters. Its aim is "steadily implementing the Kyoto Protocol adopted at the Third Session of the Conference of the Parties to the United Nations Framework Convention on Climate Change (COP3) and to comprehensively advance concrete and effective measures for the prevention of global warming" as stated on their website (Global). These few examples show that global warming's effects are experienced at a global, national and local scale and different actions are being taken at each level.

On the opposing side, there are major corporations who have funded skeptics in their efforts and research against global warming. The oil, manufacturing and automobile industries, to name a few, would suffer as a result of laws and restrictions to reduce energy use and emissions, thus they are supporting skeptics to protect their businesses. There are also skeptics who oppose that carbon dioxide is the main gas responsible for global warming. Rather, as James Hansen states, they challenge that, "rapid warming in recent years has been driven mainly by non- Carbon dioxide greenhouse gases…not by the products of fossil fuel burning" (Hansen). Also opposing scientists on the issue of global warming are individuals like Petr Chylek, Professor of Physics and Atmospheric Science, Dalhousie University, Halifax, Nova Scotia. He suggests that "scientists who want to attract attention to themselves, who want to attract great funding to themselves, have to (find a) way to scare the public…and this you can achieve only by making things bigger and more dangerous than they really are" (The Political). This statement directly counters the belief by some scientists that computer models are actually *underestimating* the effects of global warming.

There are some scientists that directly oppose the viewpoints of the above mentioned stance, believing that global warming is caused by natural occurrences, that it will have few negative effects and that the use of computer models is an inaccurate way to track and predict global warming effects. In terms of the general public, a poll of 1,500 adults by the Pew Research Center for the People & the Press found that "only 57 percent believe there is strong scientific evidence the Earth has gotten hotter over the past few decades, and as a result, people are viewing the situation as less serious. That's down from 77 percent in 2006, and 71 percent in April 2008" (CBSNews). Andrew Kohut, the director of the research center, suggested that this decline in interest in the topic of global warming by the public is a result of the economic dip. He believes that people have other issues on their minds and "when the focus is on other things, people forget and see these issues as less grave" (CBSNews).
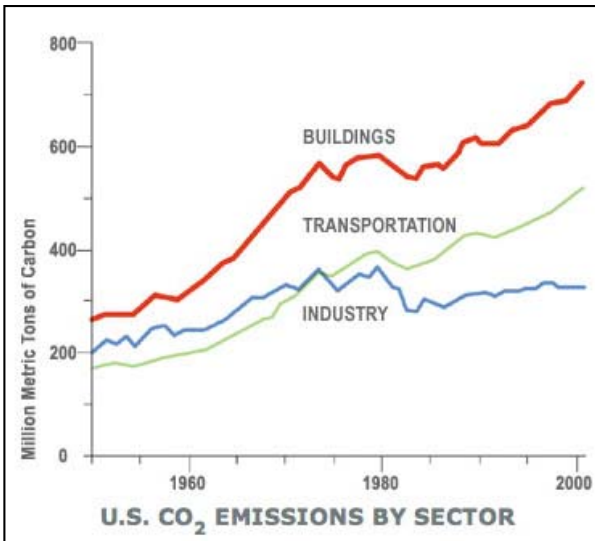
Despite the complexity and opposing opinions on the issue of global warming, there are some things that are known to be true. There is no doubt that the industrial age produced a great number of benefits to the human population, nor can it be denied that these new technologies and processes resulted in negative consequences. A statement issued in Toronto in 1988 representing the views of scientists, policy makers, the United Nations and international organizations serves as the perfect summary. It warned that' "humanity is conducting an unintended, uncontrolled, globally pervasive experiment whose ultimate consequences could be second only to nuclear war. The earth's atmosphere is being changed at an unprecedented rate by pollutants resulting from human activities, inefficient and wasteful fossil fuels and the effects of rapid population growth in many regions. These changes area already having harmful consequences over many parts of the globe" (Abrahamson 1989, 3). That last sentence also points to the fact that this is a far reaching *global* issue. The debates and opposing viewpoints may make it seem that global warming is an issue that creates division. But rather, since this is a global issue, it *intertwines* all nations, individuals and cultures in one of the largest global issues the world has ever encountered.

Section 2: An Industry's Contribution

Just as global warming is an issue that is evident on a global scale, its intersection with the interior design industry can also be seen around the world. As accurately stated by the American Society of Interior Design (ASID), "building interiors are fitted with materials, products and systems from a network of raw materials that stretches around the globe" (Beyond). The processes involved with the manufacturing and transportation of these materials and products can sometimes produce negative consequences that contribute to global warming. Since all areas of the world are connected in this interior design "network" it is logical that they are all connected, also, to its contributions to global warming.

The three main causes of global warming are rapid population growth, emissions/pollution and deforestation. The interior design industry has added to the amount of emissions and pollution in the atmosphere as well as levels of deforestation. Thus, it can be seen that the interior design industry contributes to the causes of global warming. Interior designers are focusing their efforts on sustainable design in order to curb their contributions to global warming. They are doing this in multiple ways, including the selection and use of materials, energy efficient systems and education. Chemical emissions and pollution are the byproducts of interior design and a huge cause of global warming. From the manufacturing of a material and its transportation to the installation on site, chemicals are emitted into the atmosphere at every stage. During each of these stages, fossil fuels are often burned for energy to produce materials, transport them and to run the building itself. The chart below reinforces the high level of emissions (specifically, carbon dioxide) in the building and transportation sectors, both of which

Source: Architecture 2030

play a major role in the interior design Industry.

Findings from the Australian Sustainable Built Environment Council (ASBEC), confirm the significant amount of emissions that are attributed to the building sector. ASBEC's President, Caroline Pidcock, stated that "the building sector is responsible for almost a quarter, or 23 percent, of Australia's greenhouse gas emissions, but there is huge potential to make our buildings energy efficient." Studies in Australia are similar to those in other parts of the world with results showing that greenhouse gases from the built environment could more than double by 2050 if no actions are taken to create efficient and sustainable buildings (Kelly).

The interior design industry also contributes to the levels of pollution in the environment by their inefficiency. As the ASID mentions, "construction, operation, maintenance and renovation of buildings and interiors generates waste and pollution in many forms, creating local and global changes" (Beyond). Irresponsible manufacturing methods can create a waste of materials and an inefficient use of energy. As the ASID points out, the effects of this pollution is global, despite what country the wastes were produced in. The global effects of pollution are reinforced by the Law of Conservation of Matter. Simply put, this law states that "matter can neither be created nor destroyed." This means that the matter which existed at the beginning of time is the same matter that is on the earth today. Let's think about this in terms of our material wastes. Waste may change form or location; we can bury it, burn it, dilute it in the river or send it "away," but ultimately, according to the law of conservation of matter, "away" does not exist (Conservation). Since earth, water and air all interact with each other, the problem of pollution is compounded and its effects can suddenly appear far from the sources, again proving that this is a global issue where the actions of one group affect the whole world.

Deforestation, another cause of global warming, is sometimes amplified by the actions of the interior design industry. The ASID points out that "buildings and their interiors are responsible for widespread depletion of natural resources, including the use of land, raw materials and water" (Beyond). The German Sustainable Building Council confirms these findings in a study which showed that worldwide, buildings are responsible for 30% of raw material use (German). Not only are forests destroyed for the land that they occupy, but those trees are sometimes burned for energy, creating a double negative effect of deforestation and increased amounts of carbon dioxide, both of which cause global warming.

Although it may seem as though the interior design industry has nothing but negative effects on the environment, there has been a recent surge in Environmentally Responsible Design (ERD) which helps to reduce the industry's contributions to global warming. As defined by Louise Jones, a Professor of Interior Design at. Eastern Michigan University, ERD is a "comprehensive perspective that addresses both the health and well-being of people in the built environment and the health and well-being of the global ecosystems that support life for both current and future generations" (Jones, 4). In her book, Jones quotes Laura Dodge, who describes a number of reasons as to why there has been a significant increase in interest in ERD. These reasons are a "greater awareness of and sensitivity to the world's limited natural resources; a growing demand for healthier, more energy-efficient and environmentally responsible homes and work places; the establishments of policies and programs for the implementation of green building projects;… municipalities offering incentives to go green, such as tax credits…" (Jones 86).

At the international level, an agreement titled the Kyoto Protocol was negotiated in Japan in 1997. This agreement, ratified by more than 156 countries (with the notable exceptions of the U.S. and Australia) was an amendment to the United Nations Framework Convention on Climate change (adopted at the Earth Summit in Rio de Janeiro in 1992) and took effect in 2005. Countries who agreed to the protocol, including Germany, France, UK, China, Japan, Australia and Russia, committed to reducing their greenhouse gas emissions. As Jones describes, "the objective was the stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system" (Jones 74). Although this initiative is not specific to the interior design industry, its efforts can be seen in sectors such as industry, transportation and manufacturing, which all play a major role in the interior design industry.

Other international initiatives, more closely related to interior design, is "Elogico." Thir is "a sustainable design initiative set on raising environmental consciousness in the design of products and buildings" as stated in an article featured on the "Environmental Leader Website (Environmental). This project was begun by Italian design branding firm Brandit, and the School of the Art Institute of Chicago (SAIC) in response to "consumers who increasingly consider environmental sustainability and ethical production when making purchases," as the article states. This project demonstrates that environmental concerns are global issues and that it takes international collaboration and cooperation to come up with effective solutions. This initiative is driven by over 20 companies and involves scientific and academic institutes, all "who consider ecological sustainability a fundamental part of the future of design" as stated on Elogico's website (Partners).

Environmentally friendly initiatives have been taken at all levels of the interior design sector: by product/material manufacturers, interior designers themselves, educators, and other organizations. At the production level, manufacturers in the interior design industry are not only creating more sustainable

products, but they are using energy efficiently and reducing wastes and emissions while doing so. By looking at a few products and manufacturers specifically, one can get a sense of the initiatives being taken by thousands of other manufacturers around the world.

InterfaceFLOR is a world leader in the production of modular floor coverings. Their global head office is located in Atlanta, USA, but they have employees all over the world, with significant manufacturing operations in the USA, the UK, the Netherlands, Australia and Thailand. In Europe, InterfaceFLOR has manufacturing facilities in Craigavon, Northern Ireland; Halifax, West Yorkshire and Scherpenzeel in Holland, as well as sales offices in most major cities. As stated on their website:

"In 1994 Interface Chairman Ray Anderson recognized that the way industry worked was fundamentally unsustainable. Ray could see how much of the Earth's valuable natural resources industry used up and threw away, with too little regard for the future…He saw that waste from industrial processes polluted the environment and emissions from energy use were causing global warming. His conclusion: this culture cannot continue without serious environmental and social repercussions" (Mission).

Thus, the company adopted what they call "Mission Zero" with the goal of becoming the first company to become fully sustainable –with zero negative impact – by 2020. Their ambition is "to work in equilibrium, with no negative effects from our people, process or products." InterfaceFLOR is taking their initiatives beyond just reducing negative emissions, they are even focusing on *giving back* more than they take away from the environment and community (Mission).

Textiles play a huge role in interior design. Upholstery, drapery, wall coverings, fabric wrapped panels, rugs and carpeting are just a few examples of the materials that are present in most interior design projects. Textiles are the area of materials and products that have come closest to the perfect green lifecycle. Companies in the textile business have found ways to implement "wastes equals food" which creates eco-friendly textiles that can be later reused in the manufacturing process at the end of their useful life. DesignTex is an excellent example of a green textile manufacturer. Many of the components of the fabric, such as wool and ramie, are completely compostable and their scraps serve as mulch for local gardens. The manufacturing process is now free of wastes and toxins and the building itself has become a water filtering plant, where waster is cleaner when exiting rather than entering the building.

Interior designers are looking for 3 qualities when it comes to specifying materials. The first is to choose materials with recycled content such as steel, concrete, carpet and countertops, which reduce the harmful effects of extracting, processing and transporting raw materials. The second thing interior designers look for when specifying materials is to look for local materials that are manufactured or harvested close to the site, which reduces the amount of energy needed to transport the materials. The third thing they look for are materials made from renewable resources such as cork, bamboo and cotton. This avoids using resources that cannot be replaced (Beyond). Organizations such as UK's BRE Group,

provide information on how to make the best environmental choices when specifying building materials and components. In their online Green Guide, "materials and components are assessed in terms of their environmental impacts, within comparable specifications, across their entire life cycles," as stated on their website. The Green Guide rating, which is a measure of overall environmental impacts, covers the following issues: climate change, water extraction, mineral resource extraction, human toxicity, toxicity to freshwater and land, waste disposal and fossil fuel depletion among other topics (BRE).

In terms of building equipment, designers can use HVAC systems that eliminate the burning of fossil fuels for energy and use their energy very efficiently. Today's markets offer numerous ways for designers to create efficient buildings that extend beyond applied materials; energy efficient appliances, light fixtures, rainwater collection systems and solar panels, are just a few examples of these products. Education of clients as well as students is another way in which the interior design industry is doing its part to become more environmentally friendly. Designers can present sustainable material and appliance options to their clients and urge them to make eco-friendly design decisions. In terms of the education of students, sustainable design is often incorporated into studio projects and its importance and impact is emphasized in schools around the world. There are also schools that offer sustainable programs in interior design as a specialty, in which they focus all of their design projects on green initiatives.
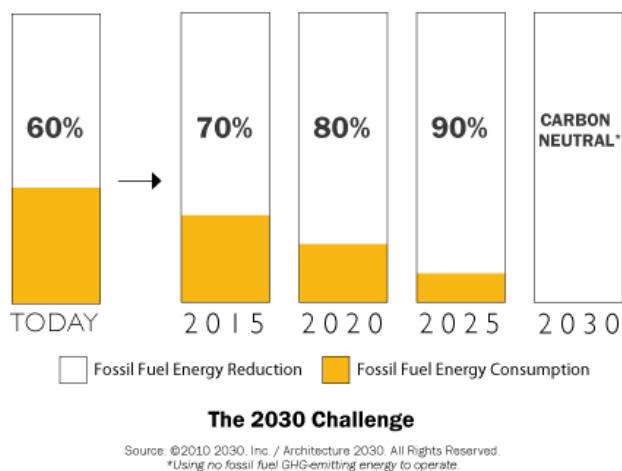
Numerous organizations and programs have been created in order to assist and encourage interior designers in their efforts to reduce their contributions to global warming. Looking at the initiatives of a few of these organizations will give you a sense of the variety of efforts being made. One example is the Forest Stewardship Council (FSC) which was established in 1993 as a response to concerns over global deforestation. It is an independent, non-governmental, not-for-profit organization established to promote the responsible management of the world's forests and certify wood products for designers' use. The FSC has Network Partners in over 50 countries around the world including, Italy, China, multiple African countries, Brazil and Australia, with its International Center located in Bonn, Germany.

Another organization, Leadership in Energy and Environmental Design (LEED) was developed in 2000 by the U.S. Green Building Council (What). LEED "is basically a third-party certification program. It is a nationally accepted organization for design, operation and construction of high performance green buildings. This ensures the buildings are environmentally compatible, provide a healthy work environment and are profitable" (LEED). The fact that LEED projects are in progress in 120 different countries – among these Canada, Brazil, Mexico and India, proves the global scope of this initiative. In Germany, there is a similar organization called the German Sustainable Building Council (DGNB). As stated on their website, the DGNB has "one primary goal: the ongoing pursuit of sustainable, and therefore economically efficient, building practice." Quite similar to LEED, they have established a rating and certification system that scores rates buildings in a number of categories to ensure that buildings are

"environmentally friendly, economically efficient, and user-friendly." This initiative was launched in Germany in 2009 and shortly after it spread to the international level and has certified over 270 buildings in its short existence (German).

The final illustration of initiatives being taken in the building industry is Architecture 2030, which was established in response to the climate change crisis by architect Edward Mazria in 2002. As stated on 2030's website, their mission is as follows:

"To rapidly transform the U.S. and global building sector from the major contributor of greenhouse gas emissions to a central part of the solution to the climate change, energy consumption, and economic crises. Our goal is straightforward: to achieve a dramatic reduction in the climate-change-causing greenhouse gas (GHG) emissions of the building sector by changing the way buildings and developments are planned, designed and constructed."

The 2030 Challenge

Source: ©2010 2030, Inc. / Architecture 2030. All Rights Reserved.
*Using no fossil fuel GHG-emitting energy to operate.

Their plan to achieve this goal is "The 2030 Challenge" and its course of action is demonstrated in the graph to the left. Along with the goal of becoming carbon-neutral in 2030 (using no fossil fuel GHG emitting energy to operate) the challenge includes a list of fossil fuel, GHG-emitting and energy consumption performance standards that must be met as well. There is a long list of individuals from different countries that have adopted the 2030 challenge, proving that this is a global initiative. Some of the countries include: the United States, Germany, Italy, Hong Kong, South Africa, Spain and the United Kingdom (Architecture 2030).

As previously illustrated, the issue of global warming can be seen on a global scale and the effects of one country's actions go far beyond its borders. Numerous organizations around the world are joining together, which further proves that despite different cultures, location and design styles, the end goal of these countries is the same: to reduce the interior design industry's contributions to global warming.

Section 3: A Country's Initiatives

To better illustrate the impact that global warming has on the interior design industry and the initiatives being taken in response, it is best to take a look at a specific country as an example. Japan is an

industrialized country with a flurry of interior design activity as well as sustainable initiatives, and can thus serve as a good model. Certainly, Japan's energy efficiency could only be achieved through the combined efforts of government initiatives, business firms, manufacturers as well as individuals. With environmental efforts being taken at every level of the sector, it is evident that Japan's interior design and building industries, are reducing their contributions to industrial pollution and global warming.

Again, the causes of global warming stem from the effects of industrialization, thus it is necessary to get a little background information on development and industrialization in Japan. Advances in technology and the transition from "agrarian-based production to manufacturing and technologically sophisticated service sector activity," allowed Japan to achieve a sustained growth in per capita income from 1880 to 1970, as described by the Economic History Association (Japan). Perhaps the main advancements that allowed Japan to experience this development was "enhancing human capital, massive accumulation of physical capital including infrastructure and private manufacturing capacity, the importation and adaptation of foreign technology, and the creation of scale economies" as stated on the Economic History Association website (Japanese). Other factors that contributed to its mature industrial economy were Japan's industrial leadership and technicians, industrious and well-educated work force and high investment and savings rates.

However, with these advancements and benefits of industrialization also came negative side effects. In the book "Environmental Policy in Japan," the authors discuss Japan's history of industrialization and how it has impacted its present and future. Compared to other countries, Japan was a latecomer to industrialization, but when it did catch on in the 1960s, there was a rapid expansion that led to "unprecedented growth rates with serious side effects," as discussed in the book. The authors discusses that there was a "blindness" to the environmental costs and damages that were being incurred as a result of this hasty industrialization. Japan accumulated large amounts of pollution that caused both humans and nature to suffer the consequences of their industrial actions. This eventually led to a process of learning by ordinary people, academia and the government and it is a learning process that is still continuing today. Learning from its destructive past, Japan has developed a "unique kind of environmental governance" and is now on the path toward green, sustainable development. Today, Japan enjoys one of the most energy-efficient developed economies in the world (Simonis).

Not specifically related to interior design, but definitely indirectly affecting the industry, are the initiatives of Japan's government leaders. Perhaps the country's most major endeavor is its goal in "Becoming a Leading Environmental Nation" as discussed by Japan's Ministry of the Environment (Becoming). On June 1st, 2007 Japan's cabinet decided upon its future direction regarding strategic environmental policy. As stated by Japan's Ministry of the Environment, their plan is as follows:

"The strategy proposes that we aim to build a sustainable society through comprehensive measures integrating the three aspects of the society, specifically, A Low Carbon Society, A Sound Material-Cycle Society and A Society in Harmony with Nature. We can apply our wisdom and tradition of living in harmony with nature to present-day use and utilize our world renowned environmental and energy technologies, our experience and knowledge of having overcome serious pollution, and our abundant human resources full of earnestness and abilities to create a driving force that can bring forth environment-oriented economic growth and invigorate local communities."

In order to assist Japan in reaching this goal, the Ministry of the Environment describes eight strategies that are to be implemented. For example, Strategy 1 focuses on climate change and proposes an initiative titled "Cool Earth 50," to address this issue. Strategy 2 addresses the conservation of biodiversity and proposes the "Satoyama Initiative" which "enriches the biodiversity of the area through traditional and sustainable use of natural resources." Strategy 3, "focuses on sustainable material cycles through the 3Rs (Reduce, Reuse and Recycle) and proposes domestic and international actions to promote the 3Rs" (Becoming). Below are two charts provided by Japan's Ministry of the Environment which sum up environmental issues and Japan's strategy.

(http://www.env.go.jp/en/focus/070606.html)

The 3Rs initiative by the government is more closely related to the interior designindustry, because it deals with products and materials –which are both key components of design. The goals of this initiative, other than reduce, reuse, recycle is to "foster materials management through the development, use, and disposition of products and services. These policies, through the efficient use of resources and materials, integrate both environmental and economic approaches to achieve sustainable development goals in a sound "material-cycle" society," as stated by the U.S. Environmental Protection Agency (Sustainable). As is illustrated on the chart above on the left side, threats of climate change was one of the global issues identified by Japan and their government's actions and policies is a direct response to limit those threats. The Japanese government is not alone in taking sustainable initiatives to combat global warming. Manufacturers of products and materials in Japan are also reconsidering the products they make

and the way that they are produced. This is demonstrated by the sustainable expos in Japan that exhibit environmentally friendly product alternatives. Japan holds an eco-product expo in Tokyo annually where initiatives have been taken to create interior design products and materials that are eco-friendly. For example, the Eco-product Exhibition was first launched in 1999 and features over 180,000 businesses. In theme-based displays, the expo exhibits projects that convey a low-carbon vision to visitors. It features proposals for the future, symposiums, environmental technologies and the latest information on eco-products. The chart to the right, taken from the exhibition's website, presents the concept and purpose of the expo.
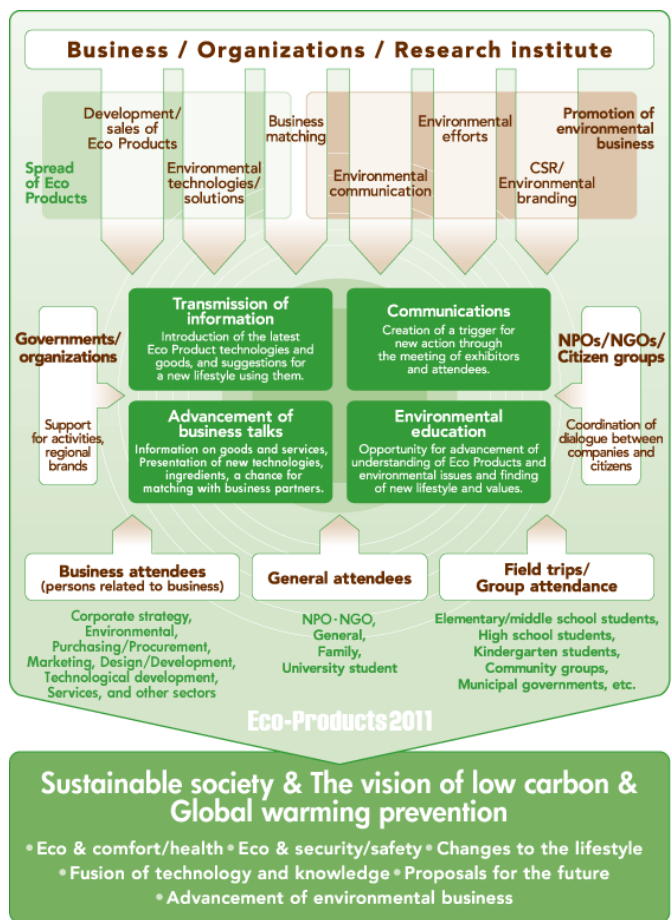
An eco-product that successfully adheres to the government's policy of reduce, reuse, recycle is the "Pile Chair" by designer Fumi Masuda. The chair is made of old and discarded furniture that would have otherwise been put into a landfill. Instead, Masuda takes these pieces and turns them into the raw materials for new pieces of furniture. In an interview with Inhabitat.com, Masuda gives the follow response regarding his concept of sustainable design:

"Sustainable design is not design to sustain our society – because our society is not sustainable anymore. So we have to re-think and start again, to build something new. We should come back to learn from nature. The concept of waste is something that mankind has created. There is no waste in nature. Everything just goes in circles; everything is recycled, including us. So, it is our

(http://inhabitat.com/interview-with-fumi-masuda/)

responsibility to reuse products again and again until they cannot be used like a product anymore, but as a material. This is recycling. I am quite optimistic in this way. In Japan there are good efforts from big companies: Ricoh is recirculating the actual copy machines they made years ago and have reappropriated

and repaired them; Fuji is producing recycled film. That is what we have to do. is not necessary to excavate natural resources anymore, there is enough material available to us already."

As illustrated by Masuda's comment about "learning from nature," as well as the government's initiatives to "apply our wisdom and tradition of living in harmony with nature" it is evident that the Japanese find nature to be of great importance. Their relationship and respect for nature is deeply rooted in their culture, and so it seems only natural that Japan's global warming initiatives would revolve around the responsible use of natural resources. Another example of utilizing the nature responsibly is the use of local and readily available materials, which, for the Japanese is bamboo. This is a chance for designers to reduce the emissions associated with transportation of materials, thus assisting the government in its goal of becoming a low carbon society. Bamboo is an extremely fast growing renewable resource which, on average, reaches maturity at heights well over 50 feet in about 5 years. It is considered a grass which means that it is harvested again and again from the same plant, which reduces the area needed to grow new plots of this material. It can be used both structurally as well as a finish material and does not require any pretreatments or processing like traditional building lumber (Bonda 133-135). Using renewable resources, like Bamboo has allowed Japan to lessen its contributions to deforestation, which, as previously discussed, is a cause of global warming. Also, the fact that it does not require harmful processing and chemicals or a lot of transportation (since it is grown locally) reduces the release of harmful emissions and carbon dioxide, which is also a cause of global warming.

Bamboo is sustainable solution that is tailored to Japan not only because of its local availability, but also because of the significance that bamboo has in the Japanese culture. As described in an article regarding bamboo in the Japanese culture, bamboo "represents strength, integrity, bravery and flexibility. In a violent storm all the trees are blown down but the bamboo bends with the wind and is not uprooted like a principled man. Bamboo stands firm while bending with the forces of nature." Bamboo also plays a significant role in some Japanese religions and children's tales.

The Bamboo House, by Kengo Kuma and Associates (pictured left) is a home in Japan made mostly of Bamboo. As previously mentioned, bamboo is a renewable material and utilizing this material instead of lumber is an environmentally responsible decision. Kengo Kuma also began the East JapanProject, which is an initiative to

encourage people to live a sustainable lifestyle. Their vision is "of a sustainable new lifestyle in which local culture, climate, industry and people are embraced by communities… philosophy of life in which we embrace the place in which we live, and a mission to value sustainability and quality over cheap, disposable and damaging mass-produced goods"(Loadman). This initiative encourages people to return to their roots and learn from their past ways of living, which were more sustainable. This is perfectly aligned with the Minister of the Environment when he said that we (Japan) should "apply our wisdom and tradition of living in harmony with nature" in order to create a more sustainable environment. Through Kengo Kuma's East Japan Project, designers and distributors offer a variety of eco-friendly products and exhibitions to help encourage a traditional and sustainable community.

While eco-products are a small and beneficial step towards the government's goal of "Becoming a Leading Environmental Nation" actions are also being taken on a larger, residential scale to promote efficiency and sustainability. Japan has goals in mind like making 40% of housing energy efficient by 2015, which will cut down on emissions and wasted energy. Another goal is to increase the life span of housing to about 40 years, up from 30 years as of 2003, which will reduce the amount of wasted building materials, making houses more sustainable. The Architectural Institute of Japan (AIJ) defines a sustainable building as one that is designed: "[1] to save energy and resources, recycle materials and minimize the emission of toxic substances throughout its life cycle, [2] to harmonize with the local climate, traditions, culture and the surrounding environment, and [3] to be able to sustain and improve the quality of human life while maintaining the capacity of the ecosystem at the local and global levels" (Smith).

Demonstrating the possibilities in sustainable residences is a home by Sekisui House, Ltd., a major Japanese home builder. This company began marketing a Carbon Neutral House in early 2008 which was an ultra energy-efficient, prefabricated structure that produced almost zero net carbon dioxide emissions. As described in an article from United Nations University, "the Zero Emission House features the same excellent insulation and airtight performance but is also chock-full of alternative energy technologies. These include a photovoltaic system, fuel cell technology, energy efficient LED lighting, and state-of-the-art power saving household appliances" (Smith). Similarly, Shikoku International Corp.'s interior wall coatings that resemble plaster but are made from diatomaceous earth and are able to absorb odors and VOCs and moderate indoor air humidity. The company also sells a ready-made (no construction required), low-maintenance green roof system, "Green Shade", which blocks heat from sunlight to reduce the amount of air-conditioning needed (Smith).

After assessing its past and wanting to benefit its future, Japan has taken serious strides towards greening its development and reversing its accumulated industrial pollution. Since the

building industry is a big contributor to the causes of global warming, Japan's interior design industry needed a transformation in order to achieve the government's vision of "Becoming a Leading Environmental Nation." Efforts have been successful, as sustainable initiatives are evident at every level of the sector; by the government, product manufacturers, business firms, as well as individual designers. Through the combined efforts and common vision of the government and interior design industry, Japan is a model for reducing contributions to global warming and is likely to become an important leader in sustainability in the future.

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