Spring 5-10-2023

A Greener Shade of Blue and Yellow: Sweden's Path to Environmental Leadership

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Abstract

In 2021, Sweden was identified as the world's most sustainable country and coined as a leader in global climate action. This paper analyzes the approach that Sweden takes to maintaining their sustainability as a nation and establishing environmentalism as a core value. Sustainability has deep roots in the country's political and economic sectors, giving Sweden potential to be the world's first net-zero nation. The first chapter demonstrates Sweden's proportionately low environmental impact compared to other developed nations. The United States is used as a point of comparison throughout this paper in order to emphasize the progressiveness of the Swedish government and society. The second chapter analyzes the history of environmentalism in Sweden and reiterates their title as pioneers of the environmentalist movement. The third chapter examines environmental policy implementation by the Swedish parliament throughout the past several decades, including their framework for achieving carbon neutrality. Chapter 4 highlights Sweden's dedication to sustainable economic development and their plan for transition to the circular economy model. The final chapter further evaluates comparisons between environmental action in Sweden and the United States, and provides policy recommendations for the United States based on the Swedish model.

Keywords: Carbon neutral, sustainable investment, renewable energy, circular economy, climate policy, ecological turn, policy framework

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Introduction: The Face of the Climate Movement

In 2019, Swedish environmentalist Greta Thunberg became the youngest person in history to be named Person of the Year by time magazine. The Swedish environmental activist had become a household name for her outspoken advocacy on climate change and her youth-led Fridays for Future movement. But how did Thunberg become such an influential figure and what role did Sweden's environmentalist movement play in her rise to prominence?

Thunberg first gained international attention in August 2018 when she began a solo protest outside the Swedish Parliament, calling for stronger action on climate change. She would sit on the steps of parliament every Friday, skipping school and demanding that politicians take the issue seriously. Her efforts quickly gained traction, and soon other students across the country and the world began joining her in their own protests. What started as a solo-protest quickly gained momentum, and became a weekly ritual for thousands of students across the country, then across Europe, before becoming a world-wide movement. Students from across the globe began participating in the youth-led climate strike, skipping class at the end of every week in support of the “Fridays for Future” movement. A reported 250,000 students protested in New York, 100,000 in London, and millions more across other large cities. Youth everywhere put pressure on local policymakers to implement policy to protect the Earth from climate change.

In September 2019, Thunberg spoke at the United Nations Climate Action Summit in front of many of the world’s most powerful leaders. With the support of millions of activists across the globe, she condemned politicians for their reckless inaction, notably stating “The eyes of all future generations are upon you, and if you choose to fail us, I say, we will never forgive you”. The speech brought to action an entirely new audience of activists - and what had now

become a worldwide movement, started with a single Swedish protestor planted on the steps of Parliament.

For decades, Sweden has been named a nation at the forefront of the environmental movement, with activists like Thunberg shining light on the nation's unprecedented climate efforts. The country has a long history of environmental prioritization, which has made its way into its economic and governmental policy and become a central value of the nation's inhabitants. These combined aspects have turned Sweden into a hub for environmentalism, particularly when compared to the United States.

Sweden consistently ranks as the most sustainable country in the world, with an environmental ethos deeply ingrained throughout their society. The nation has implemented various policies and initiatives promoting sustainable development while also showing steadfast dedication to reducing greenhouse gas emissions and preserving natural resources. This paper will examine Sweden's efforts towards achieving this status and provide policy recommendations for the United States to follow suit. Chapter 1 will start by outlining quantitative data showcasing significant disparities between greenhouse gas emissions of both countries. Even after adjusted to account for the variance in population size, the large difference in emission levels highlights the effectiveness of Sweden's environmental policies. Chapter 2 will delve into Sweden's history of environmental engagement and progressivism, dating back to the mid-20th century. Sweden was among the initial nations acknowledging the significance of environmental conservation and sustainability; it has been a trailblazer in global environment advocacy. The country is deeply committed to preserving nature due to its ingrained culture, values which are well reflected by their policies and initiatives.. Chapter 3 will delve into how Sweden's implementation of comprehensive environmental policy has adjusted the lifestyle of its inhabitants and enforced

sustainability as a mandatory practice. Sweden has accomplished noteworthy progress in promoting renewable energy, waste reduction and fostering sustainable transportation alternatives. The country's policies have facilitated the adoption of eco-friendly lifestyles while instilling a sense of environmental consciousness within its population. Chapter 4 will analyze Sweden's economic structure and its transition to a circular economy model. The country's economy is based on innovation and efficiency, with a strong emphasis placed on sustainability. Sweden remains committed to sustainable practices that have not hindered but instead contributed to long-term economic stability and prosperity while ensuring ample growth opportunities for the nation. In the final chapter, recommendations on policies will be provided for the United States to achieve carbon neutrality by 2050. These proposals shall depend on effective initiatives and guidelines implemented in Sweden while incorporating regulatory measures as well as incentives that promote sustainable development. The US has a chance of following Sweden's example consequently becoming an environmental champion globally; however, significant changes have to happen within its environmental policy framework.

Chapter 1. The World's Most Sustainable Nation

Global Sustainability Ranking. In the recent Robeco Country Sustainability Ranking (CSR) released in 2021, Sweden secured the top position as the most sustainable country globally. This achievement was not unexpected, as Sweden has consistently been among the leading nations in sustainability rankings and often holds the top spot[1]. The CSR assessed and ranked 150 countries based on their environmental, social, and governance (ESG) profiles. The rankings took into account various ESG factors such as emission levels, environmental policy,

[1] Robeco Investment Management. 2021. "Country Sustainability Ranking." https://www.robeco.com/media/3/2/5/325dd63882d778324dd13ad2122d8ecb_202108-country-sustainability-ranking_tcm17-31263.pdf.

and energy use. The results were then used to calculate the country's sustainability score, which ranged from 1 to 10, with 10 being the highest achievable ESG ranking. The primary goal of these rankings is to provide investors with a tool to analyze a country's investment risks and opportunities regarding ESG practices.

Over the past decade, an increasingly large percentage of investors have pinpointed climate change as a material risk. Countries which heavily rely on unsustainable practices are more vulnerable to climate and ecosystem fluctuations, which makes investing within those countries a greater risk.[2] In order for countries to reach carbon neutrality in the coming decades, it is essential for investors to view them as feasible for investment. Climate investment brings funding for renewable power sources, and will help countries' inhabitants adapt to climate change impacts.

Sweden's ranking landed them in first place, with an ESG score of 8.92 out of 10. Their neighboring Nordic countries - Finland, Norway, Denmark, and Iceland - tailed closely behind, filling the top five spots. Europe as a whole proved their ESG commitments, with European Nations filling 10 out of the top 13 spots. Although strong scores were obtained by many, Sweden was highlighted as a true leader in the environmental movement based on their low carbon emission levels and prioritization of renewable energy sources. The country is viewed as a reliable investment location which will bring in further climate funding going forward.

Sweden's commitment to sustainability extends beyond its energy policies. The country has consistently been at the forefront of gender equality, and it boasts a high standard of living that makes it an attractive location for investment.[3] Additionally, Sweden's corporate governance

[2] Global Investor Coalition on Climate Change. 2013. "Global Investor Survey on Climate Change." Mercer Asset Management Firm.

[3] Swedish Institute. 2021. "Sustainable Business in Sweden." Sweden.se. April 6, 2021. https://sweden.se/work-business/business-in-sweden/sustainable-business.

practices are top-notch, which has helped to build trust among investors. These factors, coupled with their excellent ESG performance, make Sweden an appealing location for investors seeking sustainable investment opportunities.

It is important to note that the CSR ranking is just one of many sustainability rankings available to investors. However, these rankings serve as valuable tools for identifying sustainable investment opportunities. More importantly, they help raise awareness of ESG practices and their importance in achieving global sustainability goals. With climate change posing significant risks to economies worldwide, it's essential for both countries and investors alike to prioritize ESG practices. Doing so will mitigate potential risks leading towards a more secure future with improved standards for environmental responsibility across all sectors of industry.

Sweden and United States Comparison. The *Our World in Data* CO2 and Greenhouse Gas Emissions database estimates current and previous emission levels, both globally and nationally.[4] This resource allows you to compare environmental progress between nations. In 2021, the United States produced an estimated 5.01 billion tons of carbon dioxide. In the same year, Sweden produced an approximate 35.85 million tons. These statistics are often deemed incompatible due to the large influence that population size has in annual emissions. Sweden's progress is often wrongly attributed to their comparatively small population size, but the falsity of this pretext is easily uncovered when the data is adjusted accordingly. As of 2021, the United States population was approximately 35 times larger than that of Sweden - 331.9 million[5] and 10.4 million,[6] respectively. Although the US has only 35 times more inhabitants, they have an annual carbon emission level nearly 140 times greater than that of Sweden. This can not be

[4] Ritchie, Hannah, and Max Roser. 2021. "CO2 and Greenhouse Gas Emissions." *Our World in Data*. https://ourworldindata.org/co2-emissions.

[5] United States Census Bureau. 2021. "US Population Estimate." https://www.census.gov/quickfacts/fact/table/US/PST045221.

[6] The World Bank. 2021. "Population, Total - Sweden." https://data.worldbank.org/indicator/SP.POP.TOTL?locations=SE.

attributed to population size, but rather a difference in environmental achievement. This emission database documents that there is a distinct gap in per capita carbon emissions between countries as well. The ecological footprint of the average person in the United States is over 4 times greater than that of the average person in Sweden - 14.86 tons and 3.42 tons, respectively (Figure 1). America's high ecological footprint can be immediately tied to residential living trends and transportation methods, among several other lifestyle factors. Over the past few decades, houses in the United States have grown in size while reporting to have fewer residents, increasing the energy intensity per capita. Americans also have an average vehicle occupancy of 1.5 persons, whereas more sustainable countries often utilize public transportation and carpooling.[7] Statistics like these explain why the average Swedish citizen has a comparatively low ecological footprint.

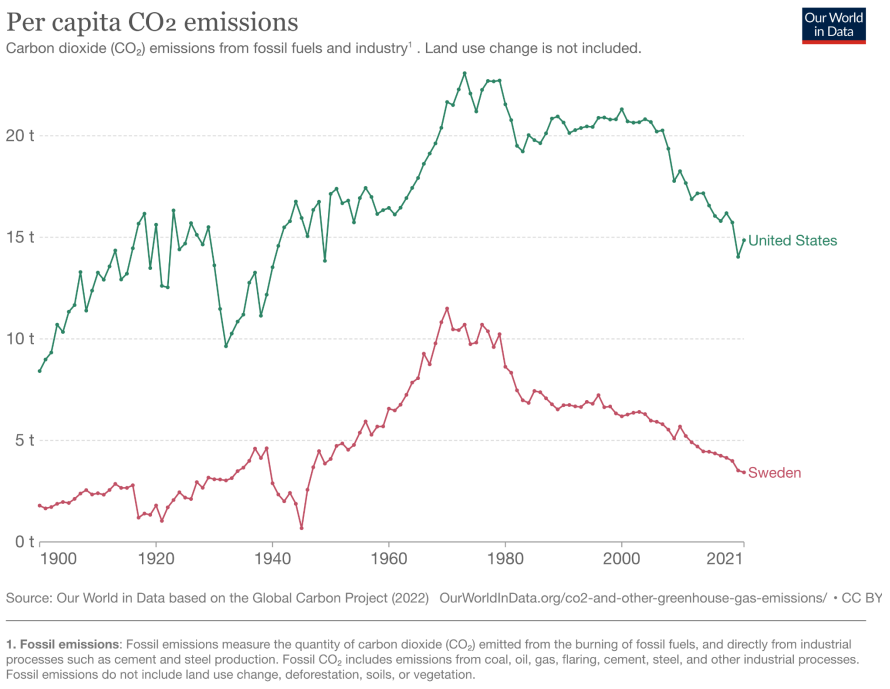

Figure 1, United States and Sweden CO_2 Emissions Per Capita, Our World in Data

[7] University of Michigan. 2022. "U.S. Environmental Footprint Factsheet." Center for Sustainable Systems. 2022. https://css.umich.edu/publications/factsheets/sustainability-indicators/us-environmental-footprint-factsheet.

The Our World in Data database provides statistics on energy consumption by country. In 2021, the United States relied on fossil fuels like coal, oil and gas for 81.38% of its yearly energy consumption.[8] The use of these non-renewable resources is considered a main cause of irreversible climate change and has been directly linked to global warming as well as changes in precipitation patterns and rising sea levels. When compared to Sweden's approach that involves more government intervention when regulating energy-related markets; the US follows market-driven policies with minimal direct interference from governmental entities. Though this makes innovations possible while also reducing costs, it can make incentivizing renewable development difficult especially if they are not cost-competitive enough compared against traditional options like fossil fuel. In 2021, Sweden relied on fossil fuels for only 28.07% of its energy consumption while the rest was derived from renewable sources (Figure 2). The primary source of renewable energy in the country is hydroelectric power which accounted for just under 30% of total energy consumption. Over several decades, Sweden has been transitioning away from fossil fuels with hydropower playing a key role in this shift towards clean and sustainable sources of energy. This move to more extensive utilization Hydropower resulted as an outcome of government policies promoting environmental concerns by taking advantage of advancements made in technology along with emphasizing local power generation practices. Whilst wind and solar also play important roles within Swedish electricity production systems they are not yet being utilized at the same scale as hydroelectricity; As Sweden increases its use of intermittent renewables like wind and solar it will become increasingly essential that there are viable options available for managing periods where these resources may be unavailable (when supply exceeds

[8] Ritchie, Hannah, and Max Roser. 2021. "CO2 and Greenhouse Gas Emissions." *Our World in Data*. https://ourworldindata.org/co2-emissions.

demand); Energy storage will therefore gain increasing significance when considering how best to manage excess supplies effectively.

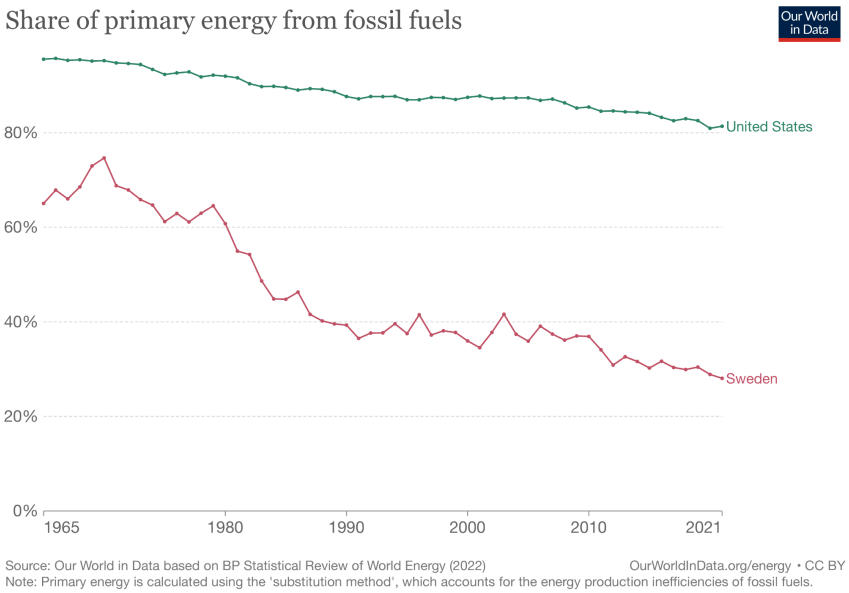

Figure 2, Share of primary energy from fossil fuels in United States and Sweden, Our World in Data

The United States' sustainability performance ranking reached an all-time low in the Robeco 2021 report because of the lack of environmental prioritization during Trump's administration.[9] At the beginning of his time in office, the US ranked 18th globally with a score of 7.64; however, by its end it had dropped out from within top twenty countries and was given a rank at number twenty-one along with receiving a reduced score of 7.38.

Throughout the Trump administration, policies were implemented which adversely affected environmental conditions and impeded efforts to mitigate greenhouse gas emissions. The withdrawal of the United States from the Paris Agreement on climate change was among one of its most consequential actions taken by this administration. This agreement, adopted in 2015 at a global level addresses issues related to limiting temperature increases well below

[9] Robeco Investment Management. 2021. "Country Sustainability Ranking." https://www.robeco.com/media/3/2/5/325dd63882d778324dd13ad2122d8ecb_202108-country-sustainability-ranking_tcm17-31263.pdf.

maximum thresholds- with a cap set for 2 degrees Celsius above pre-industrial benchmarks. The agreement was signed by 196 countries and territories including the United States. However, in June 2017, President Trump announced that the United States would withdraw from the Paris Agreement, citing concerns about the potential impact on the economy and jobs[10]. The process of withdrawal took effect on November 4, 2020 - a day that followed the U.S. Presidential election. Many environmental advocates and world leaders criticized the decision to withdraw from the Paris Agreement since it was viewed as an undermining move towards global efforts to fight climate change.

Ecosystem Services. Ecosystem services are divided into four distinct categories based on the specific way that each service contributes to human wellbeing.[11] Supporting services create an environment that is able to promote genetic diversity and healthy habitats, which are necessary in maintaining global biodiversity. Provisioning services describe the material benefits that humans obtain from their natural ecosystems, including food, freshwater, and medicinal agents. Regulating services maintain ecosystem processes such as climate regulation and biogeochemical cycles (eg. the carbon cycle). They ensure the ecosystem is existing at a balanced level viable for life - this includes moderating extreme weather conditions, promoting pollination, and maintaining healthy air quality levels. Finally, cultural services describe nonmaterial benefits that humans obtain from their environment. Cultural and spiritual ties to nature, as well as recreational or aesthetic enjoyment in nature, are considered cultural ecosystem services.[12] Sweden, through progressive sustainability efforts, has shown its dedication to preserving all essential ecosystem services. However, all four categories of services are put at

[10] Hersher, Rebecca. 2020. "U.S. Officially Leaving Paris Climate Agreement." NPR.org. November 3, 2020. https://www.npr.org/2020/11/03/930312701/u-s-officially-leaving-paris-climate-agreement.

[11] Millennium Ecosystem Assessment, 2005. *Ecosystems and Human Well-being: Synthesis*. Island Press, Washington, DC.

[12] Food and Agriculture Organization of the United Nations. 2022. "Ecosystem Services and Biodiversity." *Https://Www.fao.org/Ecosystem-Services-Biodiversity/Background/Cultural-Services/En/*. United Nations.

risk if other developed nations, notably the United States, continue down a trajectory of unsustainable living practices.

To reflect on the previously discussed data, the United States' high energy consumption levels, which rely heavily on fossil fuels and little on renewables, poses risk to all ecosystem service types- supporting, provisioning, regulating, and cultural. Global warming caused by the heightened levels of carbon dioxide emissions in the atmosphere has been detrimental to agricultural productivity, posing significant threats to both food availability and quality. The United States is among those who have begun experiencing severe effects on the farming sector due to climate change, particularly within regions like the Midwest. Unfortunately, rising temperatures are responsible for reducing crop yields significantly across specific crops like soybeans and corn farms alike.[13] Warmer temperatures can also lead to increased insect and pest pressure, damaging crops and further reducing yields. Additionally, changes in rainfall patterns can cause more frequent and severe flooding and droughts with devastating impacts on water-limited areas especially for crop production. If these trends persist, food production in the United States as well as other countries could be severely impacted resulting in food shortages; which may pave the way for low quality of life due to price increases. Moreover, climate change can cause various health issues such as rising temperatures encouraging harmful bacteria growth.

Increasing global temperatures also raise the likelihood of heatwaves and natural disasters, as has been observed already in previous years.[14] These cases of severe weather harm and potential destroy important habitats that are vital for biodiverse ecosystems. Biodiversity is essential for the functioning of ecosystems and the provision of ecosystem services, including the

[13] Lobell, D. B., W. Schlenker, and J. Costa-Roberts. 2011. "Climate Trends and Global Crop Production since 1980." *Science* 333 (6042): 616–20. https://doi.org/10.1126/science.1204531.

[14] Malhi, Yadvinder, Janet Franklin, Nathalie Seddon, Martin Solan, Monica G. Turner, Christopher B. Field, and Nancy Knowlton. 2020. "Climate Change and Ecosystems: Threats, Opportunities and Solutions." *Philosophical Transactions of the Royal Society B: Biological Sciences* 375 (1794): 20190104. https://doi.org/10.1098/rstb.2019.0104.

regulation of infectious diseases. The loss of biodiversity and disruption of natural ecosystems can increase the risk of disease transmission from animals to humans, known as zoonotic diseases.[15] Deforestation and habitat loss have been linked to outbreaks of infectious diseases such as Ebola and Nipah virus, as these activities bring humans and wildlife into closer contact, increasing the risk of transmission[16]. Additionally, changes in wildlife behavior due to habitat loss or climate change can lead to altered migration patterns and feeding behaviors, increasing the likelihood of disease transmission. Infectious disease risk also limits individual's ability to partake in cultural ecosystem services, as observed during the COVID-19 pandemic, due to threat posed by coming in contact with other beings.

The 2021 presidential inauguration left the United States with an opportunity to claim a higher level of sustainability, though substantial change is necessary in order to reverse the negative effects of four years of environmental apathy. In the chapters that follow, this paper will discuss the approach that Sweden took to achieving such a high sustainability ranking, and consider their methodologies as means for improving the United States ESG levels. The next three chapters will analyze three main environmental disciplines in regard to Sweden's sustainability - history, economics, and politics. These discussions will be accompanied by analyses of other overlapping disciplines, including environmental education and psychology.

Chapter 2. An Environmental Pioneer

19th Century Schools of Thought. Sweden's commitment to placing high value on essential ecosystem services is rooted in their country's environmental history. When discussing

[15] Keesing, Felicia, and Richard S. Ostfeld. 2021. "Impacts of Biodiversity and Biodiversity Loss on Zoonotic Diseases." *Proceedings of the National Academy of Sciences* 118 (17): e2023540118. https://doi.org/10.1073/pnas.2023540118.

[16] Schmeller, Dirk S., Franck Courchamp, and Gerry Killeen. 2020. "Biodiversity Loss, Emerging Pathogens and Human Health Risks." *Biodiversity and Conservation* 29 (11-12). https://doi.org/10.1007/s10531-020-02021-6.

the history of environmentalism in Sweden, it must be recognized that a key turning point was the emergence of two distinct schools of thought regarding conservation during the 19th century. These differing perspectives on human interaction with nature had a significant impact on both environmental policy and sustainability practices within Sweden. The preservationist and utilitarian schools emerged at this time period to represent their unique ideologies surrounding environmental protection and management.

Elias Fries was a botanist who played a key role in the emergence of the preservation movement in Sweden. Fries became known as one of the first documented advocates for conserving nature based on non-economic reasons.[17] He was a strong advocate for the protection of natural areas and viewed wilderness destruction as a threat to both nature and human well-being. Fried firmly believed that avoiding environmental exploitation, coupled with practicing restraint when utilizing natural resources, is morally justifiable. This novel ethical approach towards conserving nature gained popularity among other academics as well as the middle class who appreciated how it added aesthetic value to their lifestyle and environment. Fried played an integral role in establishing Sarek National Park; Europe's first national park- which marked an essential milestone for preservationist movements. He also contributed significantly towards developing Sweden's forest conservation policies aimed at ensuring sustainable use of its forests.

The Utilitarian school surfaced in Sweden during the later part of the century, when rapid industrialization and economic growth were taking place. Influenced by Swedish geologist Otto Nordenskjöld, this approach placed significant importance on conservation with a scientific and rationalistic motive. The increasing demands of Sweden's growing industrial sector for natural

[17] Hillmo, Thomas, and Ulrik Lohm. 1997. "Nature's Ombudsmen: The Evolution of Environmental Representation in Sweden." *Environment and History* 3 (1): 19–43. https://doi.org/10.3197/096734097779555980.

resources like timber, minerals, or water to generate energy production and facilitate manufacturing were mainly responsible for motivating this philosophy. Nordenskjöld believed that these resources could be exploited in a way that was both profitable and sustainable. He was a staunch advocate for the development of hydroelectric power, which he saw as an opportunity to provide power to Sweden's expanding industries while decreasing its dependence on imported fossil fuels. Nordenskjöld also played a vital role in advancing Sweden's mining industry that has greatly contributed to the country's economic growth. This school of thought gained popularity by the beginning of the 20th century and further enthusiasm towards science-based preservation eventually paved the way for establishing Swedish Society for Nature Conservation in 1909.[18]

The tension between the preservationist and utilitarian schools of thought played out in several policy debates and controversies during the 19th century in Sweden. The establishment of Sarek National Park was a significant win for the preservationist movement, but it led to various disputes over natural resource utilization. Some argued that national parks' creation or nature reserves hindered economic development, while others regarded them as necessary measures to safeguard Sweden's natural heritage.

Despite their differing views on the use of natural resources, both Fries and Nordenskjöld were passionate about conservation and environmental protection. They recognized the importance of preserving Sweden's natural beauty and biodiversity, as well as seeing value in wilderness areas beyond just economic potential. Although they may have differed in methods for conservation, both contributed to developing Sweden's policies for environment preservation; this set a foundation which has allowed the country to lead sustainability efforts. Today, Sweden has found ways to balance economic growth with conservation and environmental stewardship.

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[18] Swedish Environmental Protection Agency. 2009. “Swedish Nature Conservation - 100 Years.” Edited by Olle Höjer, Danne Eriksson, Jorid Eriksson, Anna Eriksson, Thomas Pettersson, Henrik Schreiber, and Sandra Wennberg. https://www.diva-portal.org/smash/get/diva2:1610124/FULLTEXT01.pdf.

The legacy left behind by Fries and Nordenskjold is present now through ongoing prioritization toward sustainability concerns.

Post-War Environmentalism. After World War II, Sweden experienced an unprecedented amount of economic growth. The country rapidly industrialized and shifted from relying on agriculture to having a more modern commerce-based society. As the government implemented policies aimed at boosting the economy and improving living standards, rapid industrialization resulted in an increase in demand for natural resources. During this time, the country's forests, water resources and minerals were overexploited and depleted.[19] Forests were harvested at an unsustainable rate to meet the demand for timber, and water resources were overused and contaminated by industrial waste. The mining industry has also played a significant role in Sweden's economic growth but resulted in environmental degradation due to the release of toxic substances into the air, water, and soil. The effects of industrialization and environmental degradation were especially pronounced in urban areas, where rapid industrial growth and urbanization resulted in poor living conditions, including poor air quality, crowded living conditions, and lack of access to green spaces. Furthermore, the heightened amount of automobiles increased traffic congestion leading to high amounts of air pollution.

In response to these issues, the Swedish government began to take action to address air pollution and other environmental problems. In 1967, Sweden became the birthplace of modern day environmental activism. That year, Sweden's social democratic government created Naturvardsverket, the world's first Environmental Protection Agency.[20] At first, the agency's

[19] Susanna Fellman. 2019. "Economic Development in the Nordic Countries." Nordics.info. June 13, 2019. https://nordics.info/show/artikel/economic-development-in-the-nordic-countries.

[20] Lönnroth, Måns. 2010. *The Organisation of Environmental Policy in Sweden*. The Swedish Environmental Protection Agency.

significance was not stressed to the public. It was proposed by environmental scientists and brought straight to the political arena without much discussion about climate as a civilian issue.

Hans Palmstierna's book, "Plundring, Svalt, Forgiftning" (Looting, Starvation, Poisoning), is an essential historical document that sheds light on some of the early environmental concerns raised to Swedish citizens.[21] The book is a collection of articles and essays, initially published in 1967, that Palmstierna wrote for newspapers and magazines during the 1950s and 1960s The title refers to three significant environmental problems: overexploitation of natural resources, and hunger/malnutrition, and pollution, which Palmstierna identified as leading areas of concern. In his work, Palmstierna criticizes the economic and political systems of his time. He blames them for destroying the environment and exploiting natural resources. He highlights environmental problems caused by industrialization and modern agriculture including deforestation, soil erosion, air pollution, and water contamination. Additionally he writes about negative effects mass consumption brings along with it such as waste generation. Palmstierna's book remains a valuable resource for researchers in addition to policymakers helping provide insight into early concerns regarding different aspects of nature conservation.

In the months following the uproar in public concern, prominent Swedish scientists and activists held Swedish United Nations delegation meetings to discuss how climate issues should be addressed at a global level. Many stressed the importance of equipping politicians in the science of environmental issues - as well as how these threats pertained to the economic-social-political sphere. The group drafted a proposal for a major environmental conference to be held at an international level. This proposal stressed the qualifications of the

[21] Heidenblad, David Larsson. 2018. “Mapping a New History of the Ecological Turn: The Circulation of Environmental Knowledge in Sweden 1967.” *Environment and History* 24 (2). https://doi.org/10.3197/096734018x1513794959193.

members of their council, listed important topics of discussion and presented possible origins of funding. Six disciplines were to be discussed in conjunction with the environment- science, technology, medicine, economics, political science, and history.[22] In December 1968, the United Nations National Assembly accepted the group's proposal and agreed to convene in 1972 to address global environmental concerns.[23] Four years later, Sweden held the inaugural United Nations Conference on the Human Environment in their capital city of Stockholm.

The 1972 United Nations Conference on the Environment in Stockholm was the first recorded instance when nations came together to address the state of environmental issues as a major concern. It marked an unprecedented global recognition that the environment posed a serious threat, and its solution cannot be achieved only at local levels. During this 12-day conference, representatives from 113 countries formulated an action plan addressing pressing environmental concerns.[24] One of the most significant discussions at the conference was about the relationship between economic growth and environmental protection. The debate focused on whether it is possible to achieve economic growth without sacrificing nature, or if protecting ecology would lead to a decrease in economic progress. Another crucial subject discussed at this event concerned both developed and developing countries' association with environmental issues. Developing nations argued that wealthier nations had more responsibility when it comes to ecological depletion due to their historical contributions towards pollution and natural resource exhaustion.

It is noted in the conference's official summary that throughout the general debate, global leaders expressed gratitude to the Swedish government for their initiative and desire to make the

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[22] Heidenblad, David Larsson. 2021. *The Environmental Turn in Postwar Sweden*. Manchester University Press.

[23] United Nations. 1972. "United Nations Conference on the Environment, Stockholm 1972." United Nations. 1972. https://www.un.org/en/conferences/environment/stockholm1972.

[24] Brisman, Avi. 2011. "Stockholm Conference, 1972." *Encyclopedia of Global Justice*, 1039–40. https://doi.org/10.1007/978-1-4020-9160-5_655.

environment a key topic in future geopolitical discourse.[25] By the end of their meeting, they had adopted the Declaration of the Human Environment. The declaration consisted of 26 principles and 109 recommendations to combat pollution caused by industrialization and economic growth with an aim to ensure worldwide well-being for people.[26] In late 1972, within the framework of the Declaration, the United Nations Environment Programme (UNEP) was established. The UNEP has since provided global leadership in advocating for effective environmental action.

What followed the initial period of environmental anxiety in the late 1960s can be best described as a period of growth in environmental engagement. Social understanding of the environment completely shifted, and conservation was becoming regarded as a matter of survival, thus rooting its importance in Swedish society. Much of this breakthrough in engagement was due to the increased circulation of knowledge in the public sphere.[27] This time period is often referred to by historians as the 'ecological turn'. Environmental diplomacy during this period was heavily intertwined with scientific diplomacy, and scientists were often leaders of environmental discussion.[28]

As scientific communication relating to environmental threats became more widespread, Swedish society became known to involve the country's youth in order to influence the future knowledge and values of the next generation. The Swedish Youth organization *Fältbiologerna* was established in 1947 as a sector of the Swedish Society for Nature Conservation.[29] At the time it was founded, the goal of the organization was to motivate children to spend time outdoors and

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[25] United Nations. 1973. "Report of the United Nations Conference on the Human Environment." United Nations.

[26] United Nations Audiovisual Library of International Law. 2012. *DECLARATION of the UNITED NATIONS CONFERENCE on the HUMAN ENVIRONMENT*. www.un.org/law/avl.

[27] Heidenblad, David Larsson. 2021. *The Environmental Turn in Postwar Sweden*. Manchester University Press.

[28] Paglia, Eric. 2021. "The Swedish Initiative and the 1972 Stockholm Conference: The Decisive Role of Science Diplomacy in the Emergence of Global Environmental Governance." *Humanities and Social Sciences Communications* 8 (1). https://doi.org/10.1057/s41599-020-00681-x.

[29] Kaijser, Anna, and David Larsson Heidenblad. 2017. "YOUNG ACTIVISTS in MUDDY BOOTS." *Scandinavian Journal of History* 43 (3): 301–23. https://doi.org/10.1080/03468755.2017.1380917.

learn about their environment. However, at the peak of the ecological turn, the group's focus changed and began to incorporate environmental activism for the members. Youth involvement peaked in the late 1960s, as youth-led activism and political culture spread across the country.[30] Many early environmental activists attributed to strengthening the environmental movement were youth and young adults, with many being students. Since the ecological turn, it has been a prominent goal of Swedish society to foster global consciousness in younger generations, particularly pertaining to environmental factors. This notion has influenced the entirety of generations to follow, and is vastly credited as the reason Sweden has such an expansive amount of activist youth taking part in modern day environmental discourse.

United States' Potential. Environmentalism in the United States was first sparked by concerns over rapid industrialization and urbanization that accompanied economic growth from the early to mid-20th century. This initial wave of environmental activism culminated with landmark legislation passage, such as the Clean Air Act and Clean Water Act during the 1960s and 1970s. However, despite this early progress; political, social or economical factors lead to falter U.S.' commitment towards environment protection through the following decades.

One of the main contributors to the decline of environmentalism in the United States was conservative political ideology that emerged during the Reagan Administration in the 1980s. Policies favored by Reagan's conservatives were mostly aimed at downsizing and limiting government control, which ultimately proved antagonistic with previous decades' efforts towards sustainability.[31] The Reagan administration had a preference for deregulation and minimal government intervention in the private sector. This agenda conflicted with the necessity of

[30] Järvikoski, Timo. 1995. "Young People as Actors in the Environmental Movement." *YOUNG* 3 (3): 80–93. https://doi.org/10.1177/110330889500300306.

[31] Kraft, Michael E., and Norman J. Vig. 1984. "Environmental Policy in the Reagan Presidency." *Political Science Quarterly* 99 (3): 415. https://doi.org/10.2307/2149941.

governmental oversight concerning industrial and commercial activities that have adverse effects on the environment. In addition, conservative politicians attempted to diminish environmentalism's consequences by asserting it endangered economic growth while limiting market freedom. Such an approach portrayed environmental protection as being detrimental to economic progress thereby decreasing public backing towards environment conservation efforts.

Another factor that contributed to the decline of environmentalism in the United States was a change in political attitudes and interests among many main players in the Democratic Party. During this time period, there was an increasing influence from conservative voices within the party who argued that environmental regulations were burdensome on businesses and would hinder future economic potential for the country. Conservatives had particular sway over Democrats in Southern states where sympathy towards Reagan administration policies (including those benefiting fossil fuel industries) held greater appeal.[32]

Another reason for the decline of environmentalism within The Democratic Party was a change in priorities towards other issues. These included national security and economic competitiveness. In light of the Cold War's aftermath, Democrats increasingly focused on subjects such as defense spending and international trade that were viewed as more crucial to overall well-being than protecting the environment.[33] This switch was also influenced by growing economic competition from countries like Japan and Germany who were regarded as more efficient and productive compared to The United States. Democrats believed that our

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[32] Hulse, Carl. 2004. "THE 40TH PRESIDENT: THE DEMOCRATS; How Reagan Forced Foes to Reinvent Party." *The New York Times*, June 10, 2004, sec. U.S. https://www.nytimes.com/2004/06/10/us/the-40th-president-the-democrats-how-reagan-forced-foes-to-reinvent-party.html.

[33] Stoll, Steven. 2007. *U.S. Environmentalism since 1945 : A Brief History with Documents*. New York: Palgrave Macmillan.

nation's financial future counted on its capability to compete globally with these nations; thus, they thought environmental regulation hindered their goal.

Furthermore, the Democratic Party neglected to present a definitive blueprint for the future of environmentalism in America. Despite having notable party members who were passionate about ecology like Al Gore, there was no unified agreement on how best to progress with this movement. Some Democrats argued for a more moderate approach, emphasizing collaboration with industries and compromising on environmental regulations. Others advocated for a more confrontational approach, including civil disobedience and mass protests. Without a clear vision for the future of environmentalism in the United States, the movement could not sustain its momentum or achieve its goals. As a result, the United States was unable to establish itself as an influential global leader in environmentalism.

Chapter 3. Policy and Progress

Environmental Governance. Sweden boasts a robust environmental governance system that includes an extensive network of governmental agencies, organizations and policies working collaboratively to support sustainable development while protecting natural resources and curbing greenhouse gas emissions. The Swedish Environmental Protection Agency (EPA) stands out as the most prominent governmental agency charged with coordinating Sweden's environmental policy framework alongside enforcing corresponding regulations.[34] The EPA was established in 1967 and provides scientific and technical advice to the Swedish government regarding numerous environmental concerns, such as air quality, hazardous waste management, chemicals handling, water quality issues. The primary aim of this agency is to enhance Sweden's

[34] Naturvårdsverket. 2023. "About the Swedish Environmental Protection Agency." 2023. https://www.naturvardsverket.se/en/about-us/about-the-swedish-environmental-protection-agency/.

natural resource standards while also ensuring safe living conditions throughout the country. Furthermore, members of the EPA join in on international initiatives that are geared towards addressing noteworthy global environment-related challenges in countries. With their expertise on science, the members of the EPA play a critical role within Sweden's governance system. This agency ensures that Sweden remains among the world leaders when considering environmentally responsible nations.

The Swedish government established the National Environment Protection Board (NEPB) the same year as the EPA. NEPB functions as an administrative body in charge of making decisions pertaining to nature conservancy, water and air protection, outdoor recreation, and the protection of wildlife.[35] The board was founded with the intention of achieving integrative environmental policy. Soon after, a research committee was set up within the NEPB to conduct the research necessary to propose and implement the most feasible policies. Prior to the establishment of the NEPB, the main players involved in Swedish environmental discourse were the Social Democratic Party, scientists, and academics in the energy sector.[36]

The Swedish Energy Agency (SEA) was established in 1998. It is responsible for promoting and facilitating the transition towards sustainable and renewable energy sources within Sweden.[37] TThe SEA offers assistance for the adoption of energy-efficient technologies, including LED lighting and efficient appliances. It collaborates with industries and construction sectors to encourage the use of such materials in building designs. Additionally, it provides financial support for developing renewable energy infrastructure like wind turbines and solar

[35] Lundqvist, Lennart. 1972. "Sweden's Environmental Policy." *Ambio* 1 (3): 90–101. https://www.jstor.org/stable/4311956.

[36] Ekberg, Kristoffer, and Martin Hultman. 2021. "A Question of Utter Importance: The Early History of Climate Change and Energy Policy in Sweden, 1974–1983." *Environment and History*. https://doi.org/10.3197/096734021x16245313030028.

[37] International Energy Agency. 2022. "Swedish Energy Agency – Analysis." IEA. 2022. https://www.iea.org/articles/swedish-energy-agency.

panels. The agency's contribution is vital towards Sweden's ambition to mitigate greenhouse gas emissions through sustainable means. Additionally, The SEA is responsible for administering Sweden's carbon dioxide tax and conducting scientific research and analysis on the environmental impacts of various policies. The agency participates in international initiatives to share knowledge and expertise regarding sustainable energy solutions. As a crucial player, SEA facilitates Sweden's transition towards renewable sources of energy, thus contributing to a more environmentally-friendly future.

The leading environmental agencies of Sweden are accountable for coordinating the execution of numerous environmental initiatives that target the protection of ecosystem services. The Swedish National Strategy for Biodiversity is an all-inclusive policy initiative aimed at putting a stop to the deterioration of biodiversity and endorsing the sustainable use of natural resources.[38] One of the primary objectives of this strategy is to promote restoring degraded ecosystems. Several measures, such as reforestation, wetland restoration and protecting areas with high biodiversity are utilized for achieving this objective. The initiative targets creating awareness about ecosystem services' significance and maintaining biological diversity among decision-makers and the general public. This can be achieved through means like education, outreach programs, and by integrating thoughts on biodiversity into planning & decision-making procedures. The Swedish Environmental Protection Agency leads in implementing and coordinating these activities by collaborating with additional governmental agencies, non-governmental organizations (NGOs), as well as local communities.

[38] Government Offices of Sweden, Ministry of Climate and Enterprise. 2015. "Swedish Strategy for Biodiversity and Ecosystem Services." 2015. https://www.government.se/articles/2015/08/swedish-strategy-for-biodiversity-and-ecosystem-services.

The Swedish Ecological Compensation Program is a policy initiative aimed at mitigating the negative environmental impact of infrastructure development projects. This program requires developers to compensate for any loss of ecological values that may occur.[39] The program applies to a broad spectrum of projects, such as transportation infrastructure, housing development and energy production facilities. Under the initiative, developers must first attempt to avoid or minimize any negative environmental impact of their projects. If unavoidable impacts occur, developers must compensate for the loss of ecological values by creating or restoring similar habitats elsewhere. This program is a vital element of Sweden's environmental policy and has aided in fostering sustainable development practices by promoting the consideration of infrastructure development project's environmental impact. The EPA administers this program to guarantee effective implementation of compensation measures.[40] The EPA collaborates closely with other government agencies, landowners and stakeholders to recognize areas that require compensation. They also devise appropriate measures to address the consequences of human impact on the environment.

Thanks to the dedication of numerous governmental agencies, non-governmental organizations, and initiatives, Sweden remains an environmental pioneer. The aforementioned agencies represent only a fraction of those operating to implement effective environmental policies. Altogether, Sweden's unwavering commitment towards preserving the environment sets an example for other nations around the globe to emulate.

Climate Change and Energy Transition. As the environmental movement gained mainstream recognition, climate issues transitioned from scientific discourse to a relevant

[39] Sjöholm, Lotta. 2022. "The Application of the Swedish Environmental Code's Regulations on Ecological Compensation in Sweden." *Swedish University of Agricultural Sciences*.

[40] Naturvårdsverket. 2020. "Ecological Compensation." 2020. https://www.naturvardsverket.se/en/international/research/the-environmental-research-fund/forskningssatsningar-natur/ecological-compensation/.

segment of Swedish politics. In the early 1970s, there was growing concern about fossil fuels and their role in global climate warming. By the time alternative energy sources became known to the public, Sweden had already established a transition plan. The Swedish government believed that nuclear power could provide a dependable source of electricity without facing risks associated with imported oil. Consequently, Oskarshamn Nuclear Power Plant - Sweden's initial commercial nuclear power plant- commenced operations in 1972.[41]Throughout the subsequent years, Sweden continued its construction of nuclear power plants. At one point in the 1980s, they had twelve reactors actively running. Sweden's nuclear power program was heavily supported by the government, which provided subsidies and incentives for the development of nuclear power. They recognized that nuclear energy was a crucial aspect of their country's overall energy security strategy and could help reduce dependence on nonrenewable resources like fossil fuels.

In 1975, the Swedish Energy Council organized a conference to discuss the energy transition and possible future energy sources. Advocates for a low energy model argued for a future of energy efficiency through the small-scale use of renewables, but this plan was challenged by those who were in favor of a high-energy alternative like nuclear power . One notable supporter of nuclear power was the Chairman of the energy council, Erik Grafström, who argued that small scale renewable energy plans would hinder Sweden’s economic growth and oppose modernity. Ultimately, Grafström’s political argument persuaded Swedish Prime Minister Palme, who implemented a policy that would favor nuclear energy as an alternative to fossil fuels. Figure 3 shows Sweden’s increase in nuclear energy consumption following the implementation of this policy in 1975. This switch to nuclear energy is identified globally as the earliest acknowledgement of climate change by a government in an official policy document.

[41] Matthiessen, Will. 2018. “Nuclear Energy in Sweden.” Large.stanford.edu. 2018. http://large.stanford.edu/courses/2018/ph241/matthiessen2/.

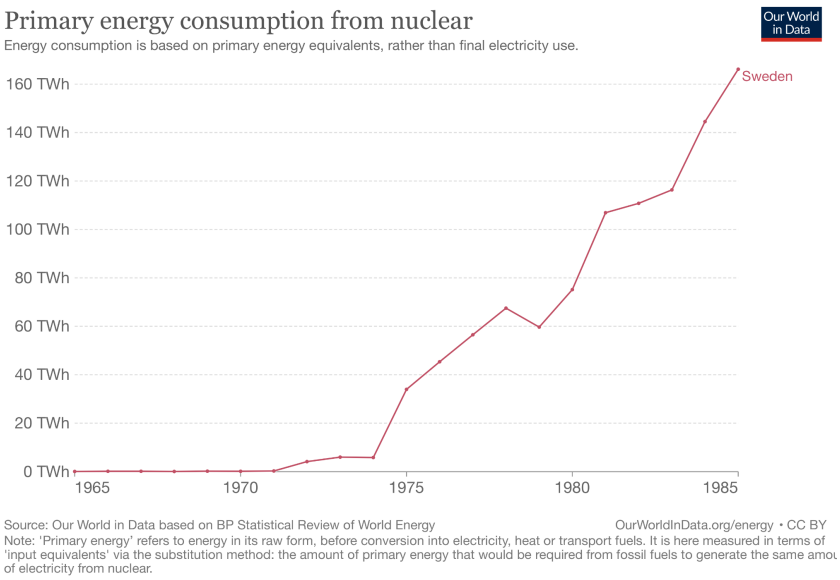

Figure 3, Annual nuclear energy consumptions level in Sweden, 1965-1985, Our World in Data

Although supported by the government, public concern about the reliance on nuclear power began to grow. The utilization of nuclear power as an energy source was controversial among Swedish activists since the first plant was built in 1972, but opposition grew more firm after the implementation of this energy policy. The main critique was focused on the safety issues that can accompany prolonged operations of nuclear power.[42] There was pushback by antinuclear who raised concerns of both routine operating risks and the risk of catastrophic accidents. If improperly managed, an uncontrolled nuclear reaction could lead to contamination of air and waterways. Radioactive waste is created from utilizing nuclear energy sources, which has the potential to pose high level safety concerns if a reliable storage plan is not in effect. Tight regulatory requirements need to be set in place in order to avoid these environmental and public health risks.

[42] Nordhaus, William D. 1995. *The Swedish Dilemma: Nuclear Energy v. the Environment*. Sweden: SNS Foerlag.

The Three Mile Island incident, which occurred in 1979, was a pivotal moment in the public's perspective of nuclear power. The accident at the Three Mile Nuclear Generating Station located in Pennsylvania became the most severe nuclear catastrophe within United States history and consequently influenced global opinions toward nuclear energy.[43] Although there was significant emission of radiation, the incident sparked apprehension regarding nuclear power plant safety and potential for graver catastrophes. Given that Sweden had chosen to rely on nuclear energy as its primary source not too long before this disaster, numerous protests erupted across the nation to try and halt the new plan.

In the wake of these concerns, Sweden began to shift away from nuclear power and towards renewable energy sources. In 1980 the Swedish parliament made the decision to phase nuclear energy out of future environmental strategy, planning to instead utilize long-lasting renewable energy systems that posed lesser risk to the public and the environment.[44] A ban on nuclear power would not be immediately implemented; the parliament instead decided that existing plants could be utilized for the rest of their lifetime, but no new sites would be built going forward. Based on this plan and the expected life span of the youngest nuclear reactor site, Sweden was set to have phased out nuclear energy completely by approximately 2010 - 30 years later.

The plan was generally supported by the public in the years following its passing, and gained further support after the 1986 Chernobyl explosion left the majority in fear of nuclear disaster. However, after fourteen years of the phase out plan for nuclear power, a commissioned energy group appointed by Sweden's government found that this strategy was no longer feasible.

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[43] Union of Concerned Scientists. 2013. “A Brief History of Nuclear Accidents Worldwide.” Union of Concerned Scientists. October 1, 2013. https://www.ucsusa.org/resources/brief-history-nuclear-accidents-worldwide.

[44] Kaijser, A. 1992. “Redirecting Power: Swedish Nuclear Power Policies in Historical Perspective.” *Annual Review of Energy and the Environment* 17 (1). https://doi.org/10.1146/annurev.eg.17.110192.002253.

With an extensive evaluation of other possible sources of energy and research carried out in detail, it became evident that ending nuclear electricity generation would not be viable from financial or environmental perspectives.[45] This raised concern over what the right decision was regarding the future of nuclear energy, as the parliament became concerned that when the last reactor stopped operating they would be faced with an economic downturn and an environmental crisis. When it came to make a decision in June 2010, the Parliament - following the advice of researchers the decade before - officially voted to reverse the 1980 referendum.[46] They had passed a government proposal that would allow old nuclear reactors to be replaced, starting the following year.

In the 13 years since the referendum reversal, the Swedish parliament has taken considerable action to formulate effective environmental policies. Although nuclear energy is still at use, there are clear plans in place to continue the decline in its usage rates. Other initiatives have been set in combination with these plans in order to achieve minimal environmental degradation going forward. The Swedish government has invested a significant amount of resources towards developing hydropower projects in order to accomplish their goal. Additionally, Sweden is actively pursuing ways to improve and update its pre-existing infrastructure for producing hydroelectricity by implementing modernization techniques on both dams and power plants with an ultimate objective geared toward achieving better efficiency, increased capacity potential as well as overall enhanced environmental aptitude. One notable factor that prompted Sweden's shift towards deploying more hydroelectric power can be attributed to the large quantity of water reserves found within its borders; including a multitude

[45] International Energy Agency. 2019. "Energy Policies of IEA Countries - Sweden 2019 Review." IEA Publications.

[46] Bowen, Andrew. 2010. "Power On." Edited by Nigel Tandy. Dw.com. June 18, 2010. https://www.dw.com/en/swedish-parliament-narrowly-reverses-ban-on-new-nuclear-power-plants/a-5697078.

of rivers and lakes. Additionally, Sweden has a long history with hydropower initiatives, with some of its oldest facilities still in use today.

In 2017, parliament introduced a climate policy framework that allows the country to achieve carbon neutrality for 2045, as in accordance with the Paris Agreement.[47] Their emission reduction goals are notably the most ambitious worldwide. This 2017 framework is set to be the most important that the country has ever implemented, as now for the first time over all local governments are obliged to implement policy to meet specific goals. The official government proposition document explains the two municipality obligations: '(1) Municipalities must assess the risk of damage to the built environment as a result of flood, erosion and climate-related risks, as well as how such risks may change in the future, and (2) Municipalities must offer a detailed plan when issuing a land permit for measures that may impair the land's permeability'.[48] This reform is noted as being the key component that emphasized Sweden's Paris Agreement compliance.

Sweden's approach to environmental policy continually shifts to meet the needs of the most pressing climate issues. In 2022, the Sustainable Governance Indicator survey (SGI) ranked Sweden number 1 in the area of environmental policy.[49] The nation's position as a leader in climate action is enormously due to the progressiveness of their climate policy as they transition to 100% renewable energy.

US Politics After the 1970s. There have been many notable environmental policy changes implemented in the United States over. Although some have been able to improve nation-wide sustainability, the majority of recent policy change has been for the worse. The US has certainly

[47] Government Offices of Sweden, Ministry of the Environment. 2021. *Sweden's Climate Policy Framework*. https://www.government.se/articles/2021/03/swedens-climate-policy-framework/.

[48] The Government of Sweden. 2018. *National Strategy for Climate Change Adaptation (Government Proposition 2017/18:163)*.

[49] Sustainable Governance Indicators. 2022. "Environmental Policies." *Bertelsmann Stiftung*. https://www.sgi-network.org/2022/Sweden/Environmental_Policies.

not done enough to address environmental challenges, resulting in continued degradation of the natural environment.

Prior to the turn of the century, numerous political successes were noted. Among them was the establishment of the Environmental Protection Agency (EPA) in 1970 - a remarkable feat aimed at safeguarding human health as well as environmental protection by enforcing existing laws enacted by Congress.[50] In the decade that followed, various groundbreaking policies were put into action. Most notable were the Clean Air and the Clean Water Acts, which served to establish America's unparalleled progressiveness with regards to environment conservation.[51]

In the recent decades, US environmental policy has been quite erratic, leading to adverse environmental outcomes. However, during Obama's administration period, a Clean Power Plan was put in place with an aim of reducing carbon emissions that result from power production and fight against effects associated with climate change. This plan had particular targets for every state concerning cutting down their carbon dioxide discharge levels emanating from energy generation plants. It also set out a 32% reduction target below what existed in 2005 by the year 2030 as its overall objective.[52] Since power plants are the largest source of carbon emissions in the United States, this plan was seen as crucial in combating the climate crisis. In 2019, however, the Trump administration repealed the Clean Power Plan.[53] The President argued that it placed too much pressure on the fossil fuel industry and could lead to job losses. In place of this plan,

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[50] US EPA. 2018. "The Origins of EPA." US EPA. November 19, 2018. https://www.epa.gov/history/origins-epa.

[51] Fowler, Luke. 2014. "ASSESSING the FRAMEWORK of POLICY OUTCOMES: THE CASE of the U.S. CLEAN AIR ACT and CLEAN WATER ACT." *Journal of Environmental Assessment Policy and Management* 16 (04): 1450034. https://doi.org/10.1142/s1464333214500343.

[52] National Resources Defense Council. 2017. "What Is the Clean Power Plan?" Www.nrdc.org. 2017. https://www.nrdc.org/stories/what-clean-power-plan#:~:text=According%20to%20EPA%20projections%2C%20by.

[53] Yale School of the Environment. 2018. "Trump Administration Rolls Back the Clean Power Plan." Yale E360. 2018. https://e360.yale.edu/digest/the-trump-administration-rolls-back-the-clean-power-plan.

his administration introduced a new initiative called Affordable Clean Energy (ACE) Plan which reduced regulations on power plants and gave individual states authority to set their own emission standards. It's apparent that this plan favored interests in favor of those within the fossil fuels industry while disregarding all progress previously made over ten years ago.

As previously discussed, the US withdrawal from the Paris Agreement can be noted as an extremely significant setback in environmental progress. The US had previously made commitments to decrease its emissions as part of the agreement, setting ambitious targets due to the country's extremely large emission levels. However, in 2017, the Trump administration decided that the US would be leaving the Paris Agreement due to concerns of how harsh environmental policy would limit the economy.[54] Environmentalists and scientists harshly criticized this move, but no action could be taken to reverse it at the time.

Since he was inaugurated in early 2021, US President Joe Biden has made a few notable efforts to reverse the harmful environmental policies set by his predecessor. One of his first actions was the rejoining of the Paris Agreement.[55] Since the announcement, President Biden has pledged to set even more ambitious targets for reducing greenhouse gas emissions. This is a clear step in the right direction for the environmental movement. In April 2021, he announced his new goal of cutting U.S. emissions by 50-52% below their levels from 2005 by 2030.[56] Overall, the Biden administration's environmental policy initiatives represent a new era of progress and hope for the reversal of previous setbacks. If the US intends to improve national sustainability, it is necessary to continue down this path, implementing more rigorous policy going forward.

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[54] Pompeo, Michael R. 2019. "On the U.S. Withdrawal from the Paris Agreement." United States Department of State. November 4, 2019. https://2017-2021.state.gov/on-the-u-s-withdrawal-from-the-paris-agreement/index.html.

[55] Blinken, Antony. 2021. "The United States Officially Rejoins the Paris Agreement." United States Department of State. February 19, 2021. https://www.state.gov/the-united-states-officially-rejoins-the-paris-agreement/.

[56] The White House. 2021. "FACT SHEET: President Biden Sets 2030 Greenhouse Gas Pollution Reduction Target Aimed at Creating Good-Paying Union Jobs and Securing U.S. Leadership on Clean Energy Technologies." The White House. April 22, 2021. https://www.whitehouse.gov/briefing-room/statements-releases/2021/04/22/.

Chapter 4. The Future is Circular

Circular vs Linear Economies. The circular economy model strives for sustainability by seeking to reduce waste and pollution through prolonging the lifespan of goods. It strongly advocates closed-loop systems where materials are repurposed or recycled instead of being thrown away, unlike in traditional linear economics which emphasizes extraction from finite resources towards production before culminating with wastage at end-of-life stage. This unsustainable model leads to a depletion of natural capital as well as increased accumulation of environmental degradation attributable to accumulation of pollutants and waste over time.

Several principles and strategies are involved in the circular economy model. The first principle is to eliminate waste and pollution by creating restorative products and processes, utilizing renewable resources, reducing material use, designing long-lasting items that can be repaired or disassembled.[57] Another essential component involves maximizing product lifespan through reuse or recycling methods. To achieve this objective various effective collection systems should be implemented alongside efficient sorting techniques which ideally aligns with collaborative models such as leasing services for shared consumption benefits while promoting sustainable practices on a more accessible scale throughout society.

Incorporating nature as its source of inspiration, the circular economy model follows biomimicry principles.[58] This approach mimics natural cycles in Earth's ecosystems where waste from one organism becomes a valuable resource for another.[59] In contrast to this, traditional

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[57] Oliveira, Mariana, Mécia Miguel, Sven Kevin van Langen, Amos Ncube, Amalia Zucaro, Gabriella Fiorentino, Renato Passaro, et al. 2021. "Circular Economy and the Transition to a Sustainable Society: Integrated Assessment Methods for a New Paradigm." *Circular Economy and Sustainability*, March. https://doi.org/10.1007/s43615-021-00019-y.

[58] Kennedy, Emily, Daphne Fecheyr-Lippens, Bor-Kai Hsiung, Peter H. Niewiarowski, and Matthew Kolodziej. 2015. "Biomimicry: A Path to Sustainable Innovation." *Design Issues* 31 (3): 66–73. https://doi.org/10.1162/desi_a_00339.

[59] Mazur-Wierzbicka, Ewa. 2021. "Towards Circular Economy—a Comparative Analysis of the Countries of the European Union." *Resources* 10 (5): 49. https://doi.org/10.3390/resources10050049.

linear economies adhere to "make-take-waste" practices ignoring our planet's finite resources resulting in depletion of natural reserves and generation of excess wastage. Biomimicry has found favor among numerous domains such as architecture, engineering and agriculture by creating sustainable products which are efficient, adaptable and long-lasting. In the context of the circular economy, biomimicry is applied to the design of products and processes that are inspired by natural systems and their ability to cycle materials and energy. For example, the circular economy model encourages the use of renewable resources and the creation of closed loops where products and materials are reused or recycled, similar to how nutrients and organic matter are cycled in nature. Figure 4 illustrates the continuous circulation of materials through the circular economy, maximizing the regeneration of goods and minimizing externalities.

In light of growing awareness about environmental concerns, the circular economy has gained traction in recent times. This approach to economic modeling has attracted support from governments, businesses and individuals globally as an alternative solution to the conventional linear model that depends on perpetual resource extraction. Several countries in addition to Sweden, including Japan and Finland, have implemented a range of policies and initiatives to promote circularity in their economies.[60] This rise in popularity is highly due to recognition of the limitations of the linear model. The linear model assumes infinite resource availability and disregards our planet's finite resources, resulting in constant waste and pollution that poses an immense threat to both environment and human health. Another factor driving the rise of the circular economy is the growing awareness of the economic benefits it can bring.[61] Companies that design products and procedures to achieve optimal resource efficiency can reduce expenses,

[60] Sitra. 2018. “Japan and Finland to Show off Their Circular Economy at WCEF2018.” Sitra. 2018. https://www.sitra.fi/en/articles/japan-finland-show-off-circular-economy-wcef2018/.

[61] Melati, Kuntum, Jaee Nikan, and Phuong Nguyen. 2021. “Barriers and Drivers for Enterprises to Transition to Circular Economy.” *Stockholm Environment Institute*.

elevate competitiveness levels while simultaneously exploring new revenue streams. Furthermore, this alternative approach to a linear system has potential for job creation in sectors such as recycling management, waste control or remanufacturing techniques.[62]

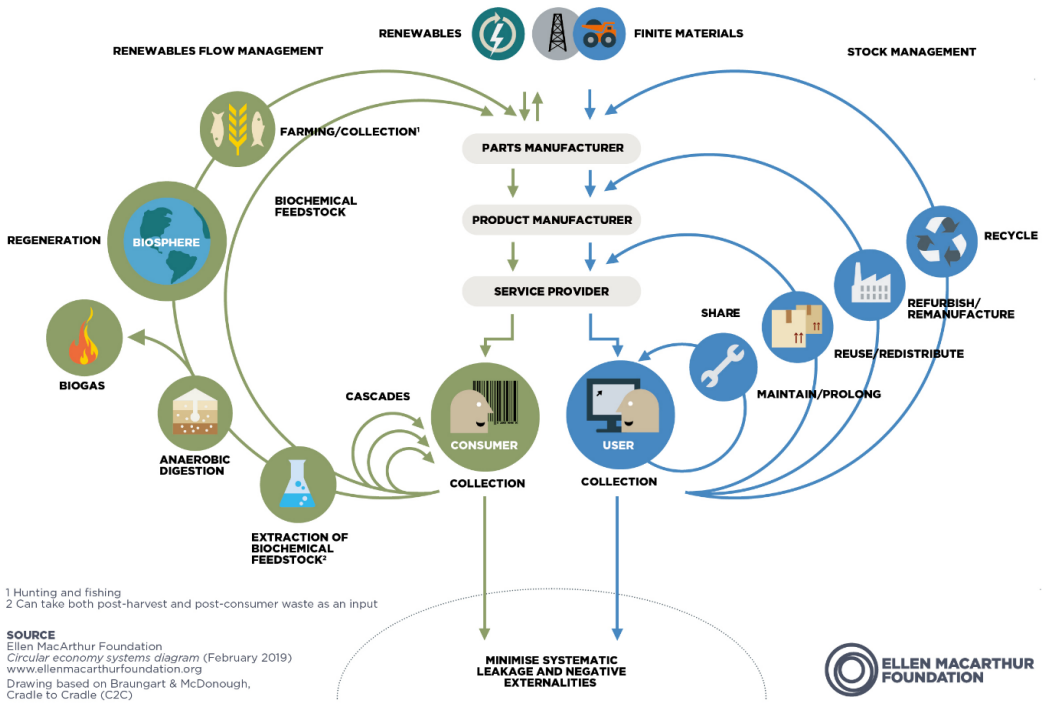

Figure 4, Diagram illustrating the circular economy model, Ellen Macarthur Foundation

The linear model that commands the US economy has been criticized for its negative impacts on the environment and human health, creating air and water pollution and depleting natural resources.[63] A desire to embrace the alternative circular economic model can be seen in a few cities, businesses,and organizations within the country, but little has been done by those in higher positions of political power. There are still significant challenges to overcome in shifting the US economy towards a circular model. These include the stubborn interests of industries that

[62] Sulich, Adam, and Letycja Sołoducho-Pelc. 2021. "The Circular Economy and the Green Jobs Creation." *Environmental Science and Pollution Research* 29 (14231–14247). https://doi.org/10.1007/s11356-021-16562-y.

[63] U.S. Department of Commerce. 2021. "Circular Economy." NIST. November 18, 2021. https://www.nist.gov/circular-economy.

currently profit from linear practices, as well as insufficient policy incentives and regulatory frameworks to encourage more sustainable ones. In addition, there is also an ingrained cultural mindset favoring growth and consumption over principles such as innovation and sustainability that support circularity.[64]

Sweden's Circular Economy Approach. In addressing the most pressing global climate issues, the Swedish government recognizes that transition to renewable energy is not enough. Sweden has implemented an additional approach in order to address the country's large material footprint and consumption levels. Despite being recognized as the most sustainable country in the world, Swedish society has historically had relatively high levels of consumption compared to the global average.[65]

In 2020, in order to combat their consumption levels, the Swedish government adopted a national strategy for a circular economy. Their strategy sets long term goals which will ensure the nation's sustainable transition and reduce its environmental footprint.The Swedish national strategy for implementing the circular economy model has four key areas of focus.[66] These four components are closely linked and will allow for innovation and improvement throughout the entire value chain.

The first focus of this framework emphasizes a transition to sustainable production and product design. The design of products is crucial to achieving a sustainable economy as up to 80% of a product's environmental impact is dependent on its design process.[67] The Swedish parliament has generated numerous proposals that will drive sustainable production, including

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[64] Yarrow, Andrew. 2010. "American Identity through the Lens of Economic Success." *University of Massachusetts Press*.

[65] Circularity Gap Reporting Initiative. 2022. "The Circularity Gap Report - Sweden 2022." PACE.

[66] Government Offices of Sweden, Ministry of the Environment. 2020. "Circular Economy - Strategy for the Transition in Sweden."

[67] THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS. 2020. *A New Circular Economy Action Plan for a Cleaner and More Competitive Europe*.

promoting the use of non-toxic materials through purchasing quota obligations. The main goal will be to extend the lifespan of materials through generating high quality goods, in order to minimize the usage of raw materials. The parliament is also seeking to further develop Sweden's bioeconomy, so that sustainably produced raw materials will immediately replace the fossil-based raw materials that are currently being utilized in developed nations across the globe.

The circular economy framework's second focus relies on establishing sustainable ways of consuming and using materials, products, and services. In order to achieve this, it is necessary for the Swedish parliament to make knowledge of sustainable consumerism widespread and accessible. Changing consumption habits requires public lifestyle change and individuals to make circular choices in their everyday lives. In order to make this accessible to the public, the Swedish government put in place a plan to make it simple and profitable for businesses and individuals to extend the lifespan of their belongings through generating greater supply of and demand for reuse and repair services.[68] Educating the public on the effects of their lifestyle is crucial to alter consumer demand. Sweden already has a reputation for having an environmentally literate population, but further effort from the public will be necessary to achieve their ambitious carbon reduction goals. In a first attempt to increase sustainability awareness, the Swedish National Agency for Education has implemented a sustainable development initiative for schools across the county.[69] The initiative's goal is to incorporate sustainable development across all educational levels in order to foster a population with deep understanding of environmental issues. Schools who meet the necessary standards receive the "green school" accreditation.

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[68] Government Offices of Sweden, Ministry of the Environment. 2020. "Circular Economy - Strategy for the Transition in Sweden."

[69] Gericke, Niklas, Annika Manni, and Ulrica Stagell. 2020. "The Green School Movement in Sweden – Past, Present and Future." *Green Schools Globally*, 309–32. https://doi.org/10.1007/978-3-030-46820-0_17.

The third focus area prioritizes non-toxic and circular material cycles. The parliament notes that landfills will be utilized only as a last resort, and they will prioritize recovering any waste that is suitable for use elsewhere. In order to create a larger market for recycled materials, it is necessary that the secondary material has a high credibility factor. In order to ensure this, as noted previously, the Swedish government is focused on replacing fossil-based raw materials with renewable, bio-based raw materials. Policy implementation to monitor this includes prohibiting the use of materials that present a certain level of hazardous concern. High requirements will be set in regards to the extended use of non-toxic virgin and recycled materials. The country has already implemented a number of measures, including the Swedish Chemicals Agency's Product Register, which requires companies to report an inclusive list of all chemicals used in their products.[70] The parliament is also focused on making it more accessible for businesses and individuals to manage waste and facilitate effective recycling procedures. Again, widespread education is necessary for successful implementation, so it is necessary that Sweden prioritizes public awareness of all the initiatives they are funding.

The final focus area of Sweden's circular economy framework pivots to promoting innovation and circular business models in the business sector. In order to foster a sustainable financial market, the government action plan proposes monetary incentives for businesses who prioritize circular material cycles through producing products with longer intended life spans. As of recent years, the Swedish government has put heavy focus on strengthening the business climate so that circular companies are able to grow and succeed, thus providing consumers with a larger array of sustainable, reusable products. In order to achieve their goals, the government has voiced their commitment to increasing efficiency in their process of examining

[70] The Swedish Chemicals Agency. 2023. "Products Register." 2023. https://www.kemi.se/en/products-register#:~:text=The%20Swedish%20Chemicals%20Agency%20uses.

environmental permit applications. This will allow green companies to speed up their development and establish new and innovative sustainable production methods.

Strategy in Action. Sweden has set a clear strategy to develop a more circular economy, and the country has already implemented a multitude of policies and initiatives to make progress towards their long-term goals. In order to facilitate a successful transition to a circular economy from a traditional linear economy, the cooperation of many actors is pivotal. Actors across many key Swedish industries have exhibited willingness to comply with regulations and pursue innovation.

Established in 2019 by the Swedish Parliament, the Delegation for Circular Economy strives to encourage a sustainable and circular economy across Sweden.[71] This group consists of industry leaders, academics, and members of civil society who collaborate with one another via productive dialogue. The organization's primary aim is guiding businesses towards implementing circular business models by offering guidance and connecting them with potential project funds. Furthermore, the Delegation encourages information exchange and teamwork among diverse participants to advance new ideas for circularity. The members of their team, backed by the parliament, have helped to foster a culture of innovation and sustainability in Swedish industry.

Not only is the Swedish Government taking steps towards a circular economy, but smaller governing bodies like municipalities and local authorities are also contributing to this transition. They play a crucial role in promoting sustainable practices at the community level. The Swedish Environmental Protection Agency serves as a critical partner for these entities in their efforts towards achieving sustainability goals. Providing local leaders with expert advice on environmental issues is one of the many services offered by the EPA. The Swedish EPA has

[71] United Nations Environment Programme. 2023. “The Swedish Delegation for Circular Economy.” One Planet Network. January 24, 2023. https://www.oneplanetnetwork.org/knowledge-centre/policies/swedish-delegation-circular-economy.

participated in the National Waste Management Plan initiative, which aims to establish objectives and approaches for transitioning towards a circular economy.[72]

Another important partner for smaller governing bodies in Sweden is the Swedish Research Council for Environment, Agricultural Sciences and Spatial Planning. Its mission is to provide funding for research initiatives that drive sustainable development and circular economy practices with a primary emphasis on agriculture, land utilization, and urban design challenges. The council has funded research on sustainable food systems in rural areas, and on the use of circular materials in urban construction projects.[73]

In Sweden's shift towards a circular economy, civil society has also been extremely productive in driving progress. Community groups and organizations are working to develop local circular economies through various initiatives. An example of this is the city of Gothenburg, where an independent circular initiative has been established.[74] This community-driven project encourages waste reduction, recycling practices and circular business models to foster sustainability in the city. Civilians are also making valuable contributions through research and advancements in technology. Universities and research institutions are collaborating to create new technologies that promote circularity. For instance, The Swedish University of Agricultural Sciences has conducted research on and made investment in sustainable agriculture and food systems.[75]

Opportunities for Improvement. The Circulatory Gap Reporting initiative (CGRi) , an initiative of the Circle Economy Organization, reports on annual circularity metrics at both

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[72] Swedish Environmental Protection Agency. 2021. *The Swedish EPA's Roadmap for the Sustainable Use of Plastics*. Naturvårdsverket.

[73] Frykman, Jonas. 2019. *The Sustainable Development Goals – Formas' Approach*. FORMAS.

[74] Dong, Liao Er. 2022. "Sustainable Cities: The Example of Gothenburg." Earth.org. November 29, 2022. https://earth.org/sustainable-cities-gothenburg/#:~:text=Gothenburg%2C%20the%20Nordic%20city%20aloof.

[75] The Swedish University of Agricultural Sciences. 2023. "Crossdisciplinary Challenges." SLU.SE. 2023. https://www.slu.se/en/collaboration/international/slu-global/agrifose/about-ny-standard/crossdisciplinary-challenges/.

global and national levels. The report examines the circularity level while also noting discrepancies between current material circularity and potential levels.[76] It provides an all-encompassing view of a country's landscape concerning the circular economy - inclusive of policy measures implemented towards promoting it, as well as challenges that still require attention. The circulatory gap report serves as a valuable resource for policymakers, researchers, and industry stakeholders to evaluate advancements towards achieving a circular economy. It also helps in recognizing opportunities that require additional actions in order to expedite the transformation process.

The 2022 Circulatory Gap report gave multiple recommendations on the most effective ways to reduce material use in Sweden.[77] Due to factors such as its expanding population, geographical position and low population density, Sweden's construction industry uses significant amounts of materials. The report recommended that in order to make the built environment sector more sustainable, Sweden should focus on renovating existing properties rather than building new ones. This can be achieved through utilizing durable lightweight elements while minimizing recyclable waste used for waste-to-energy purposes.

The manufacturing sector in Sweden possesses a sizable carbon and material footprint. To curb these impacts, the report suggests boosting efficiency levels of production processes, reducing raw materials usage, as well as creating durable equipment to minimize impact. Sweden, being abundant in resources, has one of the world's highest resource extraction rates. To manage this sustainably, it is advised that Sweden restrains its resource extraction activities by restraining new mining site openings or expanding protected regions for forests and marine life to control biomass and fish harvesting.

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[76] Circle Economy Organization. 2023. "Circularity Gap Reporting Initiative." Www.circularity-Gap.world. 2023. https://www.circularity-gap.world.

[77] Circularity Gap Reporting Initiative. 2022. "The Circularity Gap Report - Sweden 2022." PACE

Despite having the highest usage of biofuels in the EU and one of the world's largest shares of electric vehicles, Sweden still relies heavily on fossil fuel-powered transportation while also being heavily reliant on private transport. The report urges Sweden to promote sustainable transportation by advocating for carpooling, endorsing flexible work-from-home environments and giving priority to long-lasting and fuel-efficient vehicles. Finally, Sweden must design conscious consumables by limiting plastic and chemical production, turning textiles circular, encouraging circular furniture design, and rethinking appliance production and use.

The closing statement of the report reads "A huge opportunity for Sweden. The country has a ways to go: it's more linear than it appears on paper, with levels of extraction and consumption beyond what the Earth can provide. But it's well-positioned to take on the challenge of going circular: it boasts a low-carbon economy (with the significant presence of renewables in its energy mix), the strongest climate ambitions in the EU, and the technical and behavioral capacity for change. Through systematic change permeating governments and businesses, and shifts in individual behavior, Sweden has the opportunity to become a global leader for circularity." [78]

In 2022, the initiative reported that by successfully transitioning to a fully circular economy, Sweden would reduce nationwide consumption levels by 42.6%. Despite their current circulatory rate being relatively low because of their plan's newness, CGRi identified Sweden as a country with strong potential to achieve full circularity due to its cultural and economic makeup. Compared to other developed nations, Sweden already has particularly low rates of foreign material extraction. Additionally, their history of effective environmental policy shows higher potential for legislative support of the necessary implementations. Finally, decades of

[78] Circularity Gap Reporting Initiative. 2022. "The Circularity Gap Report - Sweden 2022." PACE

Swedish civilian engagement in environmental discourse exhibits their cultural prioritization of environmental matters - an essential aspect to achieving circularity.

Chapter 5. Greening the American Dream: Lessons from the Swedish Model

The 2021 Country Sustainability Ranking listed Sweden as the most sustainable country in the world, while the United States placed 21st, the country's lowest ever recorded ranking.[79] This report immediately followed the end of the Trump administration, a notable period of environmental disregard. The 2021 United States Presidential inauguration offered hope of further prioritization of climate issues in the years to come. In order to position the United States as a nation dedicated to sustainability, changes need to be implemented in the political and economic spheres. Environmentalism in the United States could benefit substantially from implementing strategies similar to those of Sweden that have been discussed in previous chapters.

A Return to Environmental Prioritization. Throughout the 1960s and 1970s, there was a significant spike in awareness concerning environmental matters throughout the United States. As industrial growth within the nation continued to surge forward relentlessly, it became increasingly apparent that pollution and ecological harm were becoming prominent issues. Consequently, due to escalating public anxiety surrounding this situation, Congress approved several essential legislative measures - most notably the Clean Water and Clean Air acts- which imposed legal standards for how the environment was treated. In 1970, the foundation of the EPA officially established America's commitment to protecting the environment. Sweden also achieved significant strides towards environmental preservation during this period. In 1967,

[79] Robeco Investment Management. 2021. "Country Sustainability Ranking." https://www.robeco.com/media/3/2/5/325dd63882d778324dd13ad2122d8ecb_202108-country-sustainability-ranking_tcm17-31263.pdf.

Swedish lawmakers passed an Environmental Protection Act that cemented preservation efforts at a national level and declared environmental protection as a national goal. Additionally, Sweden led waste management innovation by prioritizing recycling initiatives while reducing overall waste production.

During the 1980s, there was a change in American politics and culture that led to decreased emphasis on environmentalism. The Reagan administration questioned government regulation and aimed to reduce environmental protections. Conservative political movements that emerged later in the century played a significant part in separating America from its history of prioritizing environmental issues by emphasizing economic advancement and minimal governmental interference, which often conflicted with protecting nature.

Fast forward to the present day, and Sweden has become a front-runner in sustainable development. Ambitious emission reduction goals have been set and significant environmental investment has been made. The country places great importance on circular economy principles by eliminating waste through thoughtful design choices and maximizing the usefulness of materials for as long as strategically possible. Conversely, the US has seen a roll-back of environmental regulations and a shift towards promoting economic growth at the expense of the environment.

If the US wants to regain its position as a leader in sustainable development, it needs to return to prioritizing the environment the way it did in the 1960s and 1970s. A shift in attitude and cultural values is essential. The first step is to acknowledge the urgency of the situation. Recent studies on climate change display an accelerating path toward a crucial turning point, at which the severe effects of global warming will be immediately present. To combat such threats

effectively, the US must make bold strides towards ensuring nation-wide sustainability efforts before it's too late.

Bipartisan Politics. Environmentalism in the United States has long been rooted in politics, which has only worsened with partisan divides.[80] In comparison to noteworthy efforts made by countries like Sweden to address ecological concerns, America's track record is lackluster. The primary reason for this setback can be traced back to its political infrastructure that fails to prioritize environmental issues above party affiliations.

The environmental political atmosphere in Sweden contrasts greatly with that of the United States. The nation boasts a robust history of collaborative efforts between both major parties to address ecological matters, demonstrated by their implementation of several effective environmental strategies. Furthermore, Sweden's government frequently establishes cross-party committees specifically dedicated to tackling environmental issues. This practice underlines the country's commitment towards prioritizing sustainability regardless of political party.[81] In contrast, environmental issues in the United States have become highly politicized and divided along party lines. Democrats advocate for more rigorous protections to safeguard nature while Republicans argue that such regulations impose adverse impacts on economic growth. These divergent perspectives between the two parties have resulted in a stalemate when it comes to environmental policy-making within America.

The pervasive role of special interest groups in American politics has contributed significantly to the existing polarization. The fossil fuel industry, for instance, has heavily financed Republican politicians leading to an absence of political commitment to address climate

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[80] Jacquet, Jennifer, Monica Dietrich, and John T. Jost. 2014. "The Ideological Divide and Climate Change Opinion." *Frontiers in Psychology* 5. https://doi.org/10.3389/fpsyg.2014.01458.

[81] Government Offices of Sweden. 2016. "Broad Consensus in Riksdag on Proposal for Sweden's Future." Regeringskansliet. 2016. https://www.government.se/press-releases/2016/06/broad-consensus-in-riksdag-on-proposal-for-swedens-future/.

change.[82] Furthermore, environmental concerns have become intertwined with identity-related politics where Republicans and Democrats regard it as an extension of their personal morals and values. Consequently, environmental issues are no longer perceived as unbiased scientific evidence but instead are viewed through an ideological lense, where one believes that all their political views must be interconnected.

The United States must adopt a non-partisan approach similar to Sweden in order to make progress on environmental policy. To bring about this change, politicians should pivot away from short-term gains over long-term sustainability and lessen the power that special interest groups have within American politics. With additional activism and public support, progress can be made towards reducing these influences. A key solution would involve establishing cross-party committees modeled after Sweden's efforts which address necessary issues regardless of which party is in control of the government at the time.

American Values. The US has long been guided by a specific set of core values. These values, ranging from the Founding Fathers' emphasis on individual freedom and agency to contemporary notions surrounding consumerism and financial prosperity, have profoundly influenced American society and culture. However, this strong focus on individualism and consumption comes at a considerable cost to our environment. There exists an unsustainable pattern of consumption deeply ingrained in American culture, requiring significant shifts in value systems or priorities for reversal thereof.

Sweden stands out as a country that has defied this phenomenon. The country's environmental progress can largely be attributed to Sweden's cultural values which prioritize

[82] Kirk, Karin. 2020. “Fossil Fuel Political Giving Outdistances Renewables 13 to One» Yale Climate Connections.” Yale Climate Connections. January 6, 2020. https://yaleclimateconnections.org/2020/01/fossil-fuel-political-giving-outdistances-renewables-13-to-one/.

collective welfare rather than individual consumption-driven ideologies prevalent elsewhere. Upon examining the core values of the United States and Sweden, it is evident that American culture's driving principles pose a significant obstacle to sustainability. It is imperative to adopt more Swedish ideals regarding collective well-being in order to make environmental progress.

One of the key values that drive American culture is the pursuit of individual wealth and success. This emphasis on personal gain has led to a society that places a high value on material possessions. As a result, Americans consume more resources per capita than any other nation on Earth. In contrast, Swedish values the collective; this cultural value reflects Sweden's strong welfare state which provides an exceptional standard of living for all citizens. The emphasis on collective well-being leads to societal appreciation towards sustainability and social responsibility. By prioritizing collective wellbeing over individual gains, Sweden can build a sustainable and just community system successfully.

A final value that drives American culture is the emphasis on personal freedom and individual choice. This value has led to a society that prioritizes individualism desire over the greater good. To address this issue, the US must shift its values towards collective responsibility for the environment. In contrast, Sweden's values prioritize collective accountability for the environment rather than personal decision-making. This can be seen in Sweden's robust environmental regulations and policies designed to protect natural resources as well as reduce carbon emissions. By emphasizing more significant focus on collectiveness regarding their ecological regulations, America too can make considerable progress towards achieving sustainable planet goals while maintaining overall wellbeing.

Going Circular. The United States is one of the most affluent nations in the world. This status has been attained through sustained growth and expansion within its economic system. However, this trajectory towards wealth accumulation has also resulted in an unfortunate byproduct: excessive waste generation and consumptive behaviors that have compounded over time. As such, it comes as no surprise that this nation ranks among those with one of highest levels of carbon emissions globally - acting both individually and collectively to contribute substantially towards climate change's impact on our planet. To make environmental progress, revaluation of consumption levels must be done alongside drafting a clear plan for transitioning towards a circular economy. There is a lot that the US could learn from Sweden's transition strategy.

Although there is still much work to be done, Sweden has made notable advancements in transitioning to a circular economy. To decrease waste production and encourage sustainable consumption practices, the country has established various policies and initiatives. Public awareness regarding sustainability remains high in Sweden, with implemented measures incentivizing environmentally conscious choices such as tax refunds. In Sweden, there is a reduced value-added tax (VAT) on the repairs of items such as bicycles, clothes and shoes.[83] This policy incentivizes consumers to repair and reuse items instead of buying new ones which consequently reduces waste generation while conserving resources. A similar strategy should be implemented in the United States by either reducing sales taxes or offering reparative service credit for customers encouraging them to engage more in repairing their belongings compared with purchasing brand-new products that eventually generate excess waste caused by

[83] World Economic Forum. 2016. "Sweden Is Paying People to Fix Their Belongings instead of Throwing Them Away." World Economic Forum. 2016. https://www.weforum.org/agenda/2016/10/sweden-is-tackling-its-throwaway-culture-with-tax-breaks-on-repairs-will-it-work/.

non-biodegradable substances. Moreover, this practice could potentially create job opportunities in refurbishment industries thus creating economic growth within local communities. Adopting these practices would aid reduced carbon emissions and encourage economic prosperity with environmental consciousness as its core principle.

Improving waste management practices is another crucial element in the transition to a circular economy. Presently, the United States heavily depends on disposing of garbage into landfills which will eventually become unsustainable. Therefore, innovative solutions for managing waste like composting and recycling must be developed as immediate alternatives by investing more resources. Composting effectively addresses reducing trash while additionally producing natural fertilizers. Recycling also provides an integral aspect within this eco-centric economic system because it reduces new material demand rates significantly through reuse cycles.

The global climate would largely benefit from the United States implementing a plan to establish a circular economy, similar to that that was established by the Swedish parliament in 2020.[84] A 2018 report on the status of a circular economy in America highlighted eight factors the United States will need to address in a plan to establish the circular economy framework - waste as a resource, product life extension, material innovation, education, information transparency, products as a service, product design, and financing.[85] Sweden's ability to address these concerns in their 2020 framework shows dedication to the sustainable growth of their economy, and the United States government will need to do the same to factualize their commitment to sustainable development.

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[84] Government Offices of Sweden, Ministry of the Environment. 2020. "Circular Economy - Strategy for the Transition in Sweden."

[85] Lee, Gina. 2018. "THE STATE of the CIRCULAR ECONOMY in AMERICA - Trends, Opportunities, and Challenges." Circular CoLab Organization.

Combating Climate Change. It is incredibly necessary that the United States drastically decreases reliance on fossil fuels as an energy source. Globally, the United States currently has the greatest fossil fuel consumption level per capita, with the average individual contributing to approximately 14.86 tonnes of carbon emissions annually,[86] which contributes to over 5 billion tonnes combined per year. Figure 5 shows the United State's per capita emissions compared to those of the globe's other leading economies. In 2021, the United States relied on fossil fuels for 81.38% of the country's annual energy production. It is essential that the US lowers this reliance through a switch to sustainable and renewable energy sources. Hydropower has long been recognized as one of the most efficient and environmentally friendly forms of renewable energy. It is a particularly attractive option for countries looking to reduce their carbon footprint, combatting the devastating effects of climate change.

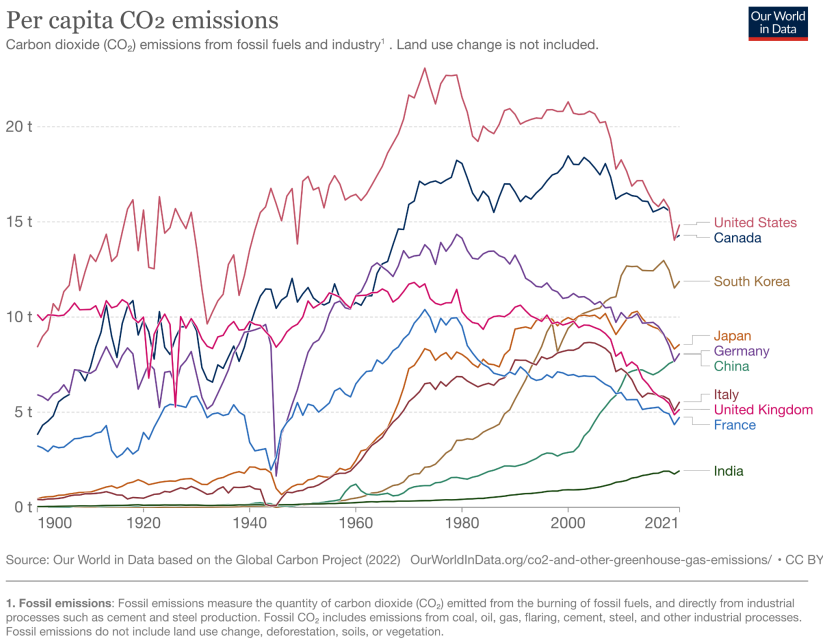

Figure 5, Per capita CO_2 emissions by country 1900-2021, Our World in Data

[86] Ritchie, Hannah, and Max Roser. 2021. "United States CO2 Country Profile." *Our World in Data*.

Sweden has utilized hydroelectric power for decades, and it is now their main source of renewable energy generation. The country's pioneering work in this field has resulted in hydropower accounting for approximitely 30% of its energy production.[87] Contrastingly, a very small percentage of America's electricity comes from hydropower due to slow adoption rates. Now more than ever before it's crucial that countries take responsibility for their impact. The US needs an active campaign committing resources towards expanding capacity within hydropower generation methods with increasing urgency if sustainable futures are expected outcomes.

Hydroelectric is a cost effective alternative to fossil fuels that would allow the United States to achieve carbon neutrality by 2050 as to be in accordance with the Paris agreement. In 2016, the Department of Energy reported that the United States' economic investment in new capacity hydropower in combination with the utilization of existing capacity hydropower could reduce cumulative greenhouse gas emissions by 5.6 billion metric tons in 2050.[88] In addition, this hydropower investment would have positive economic ramifications, generating an estimated 195,000 new jobs across the country.

In conjunction with analyzing the effects of this transition, the Department of Energy proposed an action plan to incentivize stakeholders. Their report outlines the three key objectives that the renewable energy transition would promote - optimization, growth, and sustainability. Their plan includes key points of action necessary for implementation, including enhancing new and existing hydropower technologies to maximize their environmental performance. In the past, there has been pushback against the use of hydroelectric power as a primary renewable energy source primarily due to its potential of degrading aquatic ecosystems.[89] To address this, the DOE

[87] Ritchie, Hannah, and Max Roser. 2021. "Sweden: Energy Country Profile." *Our World in Data*.
[88] U.S. Department of Energy. 2016. "Hydropower Vision." United States.
[89] Sperling, Eduardo von. 2012. "Hydropower in Brazil: Overview of Positive and Negative Environmental Aspects." *Energy Procedia* 18: 110–18. https://doi.org/10.1016/j.egypro.2012.05.023.

has created a plan for ensuring environmental performance is thoroughly addressed within the efforts to modernize hydroelectric fleets. The Board has researched and proposed "damless" water facilities that channel part of a stream through a powerhouse before the water rejoins the main river. This method would ease the negative effects of hydropower on surrounding ecosystems.

Although hydropower has numerous potential benefits, the United States has been slow in embracing this renewable energy source. A major obstacle to investing in hydropower is the large upfront investment needed for constructing extensive projects. While the hydropower can be very cost effective in the long-term, its high start-up expenses can discourage investors especially under an economic and political atmosphere that emphasizes immediate profits instead of long-term ventures. Building considerable facilities for producing hydroelectric power may require billions of dollars, which could prevent prospective financiers from participating. Additionally, hydropower growth in the US has been held back by regulatory barriers that have yet to be addressed. The Federal Energy Regulatory Commission (FERC), which is responsible for issuing licenses for such projects, has come under fire due to an extremely slow permitting process.[90] Because potential investors know they may not receive needed permissions upon request from FERC, many choose to not bother starting the investment process.

In order to promote the growth of hydropower in the United States, the US should reflect on what's been done in Sweden. In order to expedite investment in hydropower, the Swedish government implemented an efficient pathway for obtaining necessary permits and approvals. The permitting process is managed by the Swedish Energy Agency, whose development guidelines for hydropower development uphold a clear and consistent standard in order to

[90] Federal Energy Regulatory Commission. 2023. "Applications for Permits to Site Interstate Electric Transmission Facilities." *Federal Register*.

minimize confusion about the process. In addition to establishing these regulations, Sweden has also instituted financial incentives in order to stimulate more substantial investments . For instance, they provide a feed-in tariff for hydropower production that ensures a fixed price for electricity generated by hydroelectric plants. This guarantees stable revenue streams and makes financing of these projects secure and easier for investors. By updating its current environmental policy and pushing for advancement in the future, the US can work towards environmental leadership as Sweden has.

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