What Public Policies Around The World Are Most Successfully Increasing Global Sustainability In The Fight Against Climate Change?

Ellie M. Goetz

Fordham University

December 2021

Introduction

Environmental public policies are in place in a vast number of countries around the world. Public policy can be generally defined as a system of laws, regulatory measures, courses of action, and funding priorities on a specific topic that are promulgated by a governmental association or its representatives (Kilpatrick, 2000). With sea levels rising and an influx of global temperatures, climate change is more prevalent than ever. The Intergovernmental Panel on Climate Change (IPCC), the United Nations group tasked with assessing climate science for policy makers, states that climate change is "any change in climate over time whether due to natural variability or as a result of human activity" (Pielke, 2005). This brings to light the issue of human induced climate change, which has seen significant growth in recent years following the industrial revolution.

When looking at the urgency for revised policies that combat climate change, it is important to understand why the matter is time sensitive. According to German physicist Hans Schellnhuber in a Cambridge University study on the dangers of climate change, in the past few centuries, atmospheric carbon dioxide has increased by more than 30% (Schellnhuber, 2006). This is an issue for a multitude of reasons. Carbon dioxide alters the heat balance of the earth by fluctuating as a one-way screen. "It is transparent to radiation at visible wavelengths, where most of the energy of sunlight is concentrated, so that the sun can warm the oceans and the land" (Revelle, 1982). As global warming has become more and more drastic over the last decade, countries are locking down on environmental policies as an attempt to slow down the destruction caused by climate change and the rising temperatures that come along with it. One notable global organization is the Paris Climate Agreement. This international treaty has a goal set of

maintaining the global temperature rise to below 2 °C above pre-industrial levels, and striving for no more than 1.5 °C. The Paris Climate Agreement is both legally binding and voluntary, with environmental activist organizations such as Fridays for Future (FFF) working to hold countries accountable around the globe. The agreement obliges all parties "to undertake and communicate ambitious efforts" and to have these efforts represent "a progression over time" (Schreurs, 2016). Throughout this paper, I will be assessing several different countries that have strict environmental laws and systems in place in an attempt to examine how their influence can be spread in other countries. The examination of these policies will provide information on how nations can become more sustainable and eco-friendly. Considering that almost 200 countries have joined the Paris Climate Agreement, the entirety of the countries in focus throughout the duration of this paper are contributors to the accord, under the authority of the UN. These countries include Denmark, Switzerland, Morocco, Sweden, and Costa Rica.

Denmark

The country of Denmark has been a leading country in the fight against climate change. Considering that Denmark is completely surrounded by water, rising sea levels can lead to a variety of difficulties for the nation. Denmark is aiming to heavily reduce carbon levels within the next 10 years, and has made significant strides towards the reduction of air pollution with action plans such as The Climate Act as well as the introduction of the Committee for the Green Transformation. Furthermore, in 2017, Denmark achieved a world record of 43.4% of power produced by wind turbines both on and offshore, making their energy system the top of the World Energy Council's rankings. After this, the government formally stated that at least 50%-70% of Denmark's energy needs must be covered by renewable energy by the year 2030

(Danish Gov. 2018). Next, the widely accepted idea of Green Growth in Denmark strives for economic prosperity through efficiency gains and the use of sustainable resources.

According to the Danish Energy Agency, a branch of the Danish Ministry of Climate, Green Growth helps to "enable the Danish economy to become independent of unstable energy prices and scarce resources" (Agency, 2019). This additionally increases the potential for foreign trade and influence as climate change becomes more prevalent as an economic barrier. Green Growth will further international opportunities that utilize Danish Manufacturing specialists in both the water and energy sectors In recent years, public employment in the green sector has significantly increased, especially in comparison to growth in the private sector. Furthermore, the Danish Council on Climate Change is working towards implementing a Carbon Tax. A new tax of 1,200 kroner ($192) has been expressed to be the easiest way for the country to meet their reduction target goals (OECD, 2014). Although unpopular among large corporations, this tax shows the importance of environmental care and immediate action.

Having addressed the large public policy plans that Denmark currently has in place, what really sets the country of Denmark apart from the vast majority of others in the fight against climate change comes down to what is being done at a local level. With 4.6 million bikes and just 2.5 million cars, the bicycles used in Denmark almost double the amount of privately owned cars. This not only helps promote physical activity among citizens, but reduces carbon emissions that are produced by alternative transportation methods. Also, there are a variety of environmental activist groups based throughout the country of Denmark that include but are not limited to The Danish Society for Nature Conservation, the Danish Ornithological Society, as well as The Outdoor Council.

Sweden

According to the Government of Sweden, by 2045, Sweden is to have zero net emissions of greenhouse gases into the atmosphere. Sweden prioritized environmental research and education throughout their country, which has increased environmental activism and participation on a local level. One particular Swedish-based activist group known as Fridays For Future has been recognized as the UN Environment Programme Champion of the Earth. Next, the formation of the new 'eco-quarter' of Norra Djurgarden is a great model for other sustainable projects happening across the country. This eco-quarter is "using old gasworks to build thousands of eco-friendly homes complete with biogas produced from food waste, as well as providing electric car chargers and planning a new tram line" (Institute, 2021). The expansion of this project has great potential for neighborhoods and 'energy grids' around the country of Sweden and, later, the world.

Considering the vast urbanization of the country, many of the nation's policies have been focused towards the future of transportation through the extended use of cargo bikes. This provides a safer and cleaner alternative to automobile transportation. In the city of Stockholm, around 850,000 people use public transport on a normal day, so the increase in cleaner transportation was a necessity. The underground metro known as the The Stockholm metro runs entirely on green electricity. Also, according to the Climate Technology Center and Network, trains and buses in Stockholm have been using 100% renewable energy since 2017 (CTCN, 2021). If other cities around the world became more dependent on renewable energy-based transportation, carbon GHG emissions produced by cars would be greatly reduced. Many large automobile companies such as Toyota and Volkswagen are beginning mass production of electric vehicles.

Switzerland

Landfills and trash pile-ups negatively impact many species and habitats worldwide. Garbage patches throughout the oceans kill aquatic life and terrain. The country of Switzerland is close to achieving a 50% recycling rate, making it one of the most effective waste management programs in the world. Considering that the more waste produced correlates directly to the amount that citizens pay in taxes, Switzerland residents individually help to tackle waste issues. The country separates and recycles organic waste and recyclable waste while converting the rest of the trash to energy. This is a great alternative to other waste management methods such as burning plastic, which only adds to the release of toxic chemicals and air pollution.

Switzerland has also utilized innovative technology to make recycling easier for citizens. For example, an app called The Recycling Map groups over 10,000 collection points for a variety of recyclable materials throughout Switzerland. The app is useful to "anybody looking for the nearest collection point for used aluminum packaging, tins, glass bottles, recyclable plastic, textiles, batteries, electric devices or any other reusable materials" (Aluminium-Recycling, 2012). Switzerland is one of the most eco-friendly countries in the world, with public education and environmental awareness helping to increase activism among citizens. The country's forward thinking recently led to the opening of the world's first industrial scale carbon-capture plant in the city of Zurich. The plant focuses on the elimination of CO2 from the air by the process of direct air capture. "Conserving both land space and water, the CO2 is captured and delivered to a greenhouse with 250 000 similar sized plants"(Farrell, 2019). If more countries prioritized funds to build industrial scale carbon-capture plants, rising CO2 emission rates could be slowed significantly.

Switzerland's impressive renewable energy rates have largely been due to the consistent use of hydropower. A case study conducted by Thomas Dworak at the Ecological Institute of Berlin found that hydropower in Switzerland accounts for about 59 % of the electricity supply (Dworak, 2011). Some of the advantages of hydropower range from low energy production cost, to greater efficiency, close to no release of greenhouse gas emissions, and freedom from varying fuel prices. Considering the vast amount of lakes and other waterways throughout Switzerland, using hydropower has been a great way to sustainably produce energy for their transportation sector as well as electrical systems.

Morocco

The World Bank recently added Morocco to their list of Climate Risk Countries. With rising sea levels becoming more of an issue, Morocco has established the Integrated Coastal Zone Management Project (ICZM) which "promotes sustainable development in the coastal area as a way of enhancing protection of biodiversity in ecologically sensitive areas, and ensuring that coastal resources are managed both for the benefit of the country and for the overall good of the countries bordering the Mediterranean" (Dove, 2021). The ICZM works to strictly preserve habitats and conserve at-risk areas of the country. Although Morocco does not have a net zero target, their policies aim to reduce its overall energy consumption by 15% by the year 2030 (Kingdom of Moro, 2019). In order to achieve this goal, Morocco has moved towards large renewable energy development through the use of wind and solar power. Having four solar plants and 11 wind power plants fully in production, the expansion of additional plants will greatly benefit the entirety of Morocco.

With that in mind, outside energy specialists from the World Bank Organization have pointed out the potential that Morocco has for the future of the wind turbine economy, considering their geographic position gives them unique access to shallow and deep areas of the Atlantic Ocean that have ideal conditions for turbines. An uncommon approach that Morocco has taken to become more sustainable was the banning of plastic bags. This bill prohibits the import, sale, and production of plastic bags throughout the country to reduce plastic waste. Plastic bags contribute to fossil fuels and waste, creating more problems for the environment. According to the New Climate Institute Climate Action Tracker, "If all countries were to follow Morocco's approach, warming could be held below—but not well below—2°C" (Climate Institute). This demonstrates that the systems in place throughout Morocco are clearly working, and that implementing their policies could greatly benefit the surrounding countries of the world.

Costa Rica

Costa Rica is adding more focus to the electrification of its transport sector, which is the country's largest source of greenhouse gas (GHG) emissions. To achieve their 2050 goal of net-zero Costa Rica is the first country to have developed a National Decarbonisation Plan. The RAND Corporation, a research organization with the focus on developing solutions to public policy challenges, found that "The decarbonisation pathway can lead to emissions' reduction of 87% in the transport and energy sectors by 2050. Energy efficiency, the adoption of electromobility, modal-shift towards public transport and active mobility, as well as reduced demand due to digitalisation and teleworking, are found to be key drivers towards the deep-decarbonisation" (Godínez-Zamora, 2020). Considering that the National Decarbonization Plan results in a lower total discounted cost of about 35% of current Costa Rica's GDP, not only

is decarbonisation practical but also could lead to an array of social and economic benefits. With that being said, along with implementing charging grids for electric cars, President Carlos Alvarado announced the Tren Eléctrico Limonense de Carga (TELCA) in December 2019. The introduction of Limon's Electric Cargo Train is a new project in Costa Rica that has been put in place to reduce carbon emissions. It has the objective to promote and modernize transport rail infrastructure in a way that is clean energy-powered (Canales, 2021). Similarly, Costa Rica recently introduced the Greater Metropolitan Area Electric Passenger Train (GAM), which has a corresponding focus and aim.

Currently, Costa Rica already possesses many other policies worth noting, such as the business-focused National Program for Carbon Neutrality, Nationally Appropriate Mitigation Actions in the agricultural sector, and the National Energy Plan. According to a study done by the University of Costa Rica on the decarbonization of the transport and energy sectors in Costa Rica, these existing policies have resulted in almost 100% renewable electricity and a forest coverage of approximately 60% (Godínez-Zamora, 2020). Costa Rica is the first country seen to have stopped the continuation of deforestation over the years and reversed some of the effects. Costa Rica sets an example to other countries that the preservation of our forests in modern society is both necessary and possible.

Overview

Although the countries of Denmark, Sweden, Switzerland, Morocco, and Costa Rica each possess unique and innovative methods when working towards sustainable living, they do contain many similarities to their approaches. The increased use of renewable energy through solar power and wind turbines is a widespread occurrence throughout these countries. Using the

public employment sector through green job opportunities to most efficiently increase the economy in an eco-friendly way was also seen throughout the five. It is also notable that a focus on the transport sector in particular is also being seen in each of the countries to limit CO2 greenhouse gas emissions. Some of the noteworthy projects in the countries mentioned previously include but are not limited to the world's first industrial scale carbon-capture plant in Switzerland, Costa Rica's Limon's Electric Cargo Train, Sweden's eco-quarter, Denmark's Green Growth plan, and the ban on plastic bags in Morocco.

With government officials increasing public awareness about the pressing issue of global warming, a lot of sustainability changes have been seen on a regional level, throughout numerous communities. Local changes such as green electrical systems in homes as well as using bikes or public transportation methods that are energy-based, have been shown to be common among neighborhoods in each of the five countries analyzed throughout this report. All things considered, if more countries around the world were to implement a handful of the strategies touched on, the global environment would benefit substantially. Some countries that have critically insufficient climate policies include Singapore, Thailand, Turkey, and Vietnam (Climate, 2021). Continuously, the countries that are viewed as "most responsible" for climate change are global superpowers such as China, The United States of America, Canada, and Australia. If the implementation of stricter environmental policies fails to be seen around the world in the future, CO2 levels and GHG emissions will continue to rise, negatively impacting the planet in a multitude of ways. Rising sea levels and temperatures will lead to an increase in natural disasters and the destruction of habitats. Climate change is an issue for the entirety of humanity and life on Earth.

Works Cited

Agency , Danish Energy. “Green Growth in Denmark.” *Energistyrelsen*, 17 July 2019, https://ens.dk/en/our-responsibilities/energy-climate-politics/green-growth-denmark.

Aluminium-Recycling, Igora-Genossenschaft für. “Recycling Map.” *App Store*, 4 Feb. 2012, https://apps.apple.com/ch/app/recycling-map/id498495910?l=en.

Canales, Danny. “Carlos Alvarado Acelerará Tren Eléctrico De Carga Entre Limón y Zona Norte Para Dejarlo Licitado.” *Periódico La República*, La República, 6 May 2021, https://www.larepublica.net/noticia/carlos-alvarado-acelerara-tren-electrico-de-carga-entre-limon-y-zona-norte-para-dejarlo-licitado.

CTCN, UN. “Sustainable Public Transport in Stockholm.” *Sustainable Public Transport in Stockholm | Climate Technology Centre & Network | Wed, 04/14/2021*, https://www.ctc-n.org/products/sustainable-public-transport-stockholm.

Danish Gov. *Denmark Energy and Climate Pioneer PDFA - Kefm.dk*. Danish Ministry of Utilities Energy and Climate , 2018, https://kefm.dk/media/7127/denmark_energy_and_climate_pioneer_pdfa.pdf.

Definitions of Public Policy and the Law, https://mainweb-v.musc.edu/vawprevention/policy/definition.shtml.

Dove, MacKenzie. “Morocco - Climateknowledgeportal.worldbank.org.” *World Bank Group*,

https://climateknowledgeportal.worldbank.org/sites/default/files/2021-09/15725-WB_Morocco%20Country%20Profile-WEB.pdf.

Dworak, Thomas. “Green Hydropower in Switzerland.” *Ecologic Institute*, European Commission, Directorate-General Research, 15 Dec. 2011, https://www.ecologic.eu/4634.

(EERE) Department of Energy Efficiency and Renewable Energy“Benefits of Hydropower.” *Energy.gov*, Water Power Technologies Office , https://www.energy.gov/eere/water/benefits-hydropower.

Farrell , Sarah Robyn. “5 Examples of Sustainability in Switzerland.” *S U M A S*, 26 Apr. 2021, https://sumas.ch/5-examples-of-sustainability-in-switzerland/.

Godínez-Zamora, Guido, et al. “Decarbonising the Transport and Energy Sectors: Technical Feasibility and Socioeconomic Impacts in Costa Rica.” *Energy Strategy Reviews*, Elsevier, 5 Nov. 2020, https://www.sciencedirect.com/science/article/pii/S2211467X20301267.

Climate Institute, Next. “Policies & Action.” *Policies & Action | Climate Action Tracker*, https://climateactiontracker.org/countries/norway/policies-action/.

Institute , Swedish. “Sweden and Sustainability.” *Sweden.se*, 29 Nov. 2021, https://sweden.se/climate/sustainability/sweden-and-sustainability.

Kilpatrick, Dean G. “Definitions of Public Policy and the Law.” *Definitions of Public Policy and the Law*, Medical University of South Carolina , https://mainweb-v.musc.edu/vawprevention/policy/definition.shtml.

OECD, Centre for Tax Policy and Administration. *DNKDNKCountrySheet Environmentally-Related-Taxes-Denmark ...* https://www.oecd.org/tax/tax-policy/environmental-tax-profile-denmark.pdf.

Pielke, Roger A. "Misdefining 'Climate Change': Consequences for Science and Action." *Environmental Science & Policy*, Elsevier, 28 Sept. 2005, https://www.sciencedirect.com/science/article/pii/S1462901105001048#bfn2.

Revelle, Roger. "Carbon Dioxide and World Climate." *Scientific American*, vol. 247, no. 2, Scientific American, a division of Nature America, Inc., 1982, pp. 35–43, http://www.jstor.org/stable/24966657.

Nations, United. "List of Parties That Signed the Paris Agreement on 22 April." *United Nations*, United Nations, https://www.un.org/sustainabledevelopment/blog/2016/04/parisagreementsingatures/.

Schellnhuber, H.J., et al. "Avoiding Dangerous Climate Change." *Welcome to IIASA PURE*, Cambridge University Press, 1 Jan. 1970, https://pure.iiasa.ac.at/id/eprint/7972/.

Schreurs, Miranda A. *The Paris Climate Agreement and the Three ... - Fu-Berlin.de*. https://refubium.fu-berlin.de/bitstream/handle/fub188/16627/666-3205-1-PB.pdf?sequence=1&isAllowed=y.