

The Need for Federal Legislation to Drive the Transition to Renewable Energy

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On my honor as a University Student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments

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Introduction

During Climate Week in 2020, artists Gan Golan and Andrew Boyd replaced New York City's iconic Metronome Clock in Union Square. It normally counts the time to/from midnight, but Golan and Boyd reset the clock to countdown to irreversible damage to the earth's climate (Moynihan, 2020). The clock indicated less than seven years remain to take serious action to avoid the effects of climate change (Moynihan, 2020). Golan and Boyd set the climate clock timer based on a report by the Intergovernmental Panel on Climate Change (IPCC) to bring attention to, as Stephen Ross, chairman of the developer that owns the Metronome building, says “just how perilously close we are to the brink” (Moynihan, 2020). And while this clock is no longer presented in Union Square, the grave danger it was meant to bring attention to remains.

Because of the urgency of this crisis and the reluctance of many energy-producers to quickly change to more sustainable practices, the U.S. Government must begin to force a change to avoid this irreversible damage. The government must create more binding legislation to require sustainable energy practices in the presence of an urgent environmental crisis coupled with an absence of compelling market forces that incentivize a switch.

Why We Have a Compelling Need for Change

The legacy thinking framework explains a phenomenon wherein people become blind to innovations that challenge their view of how their society functions. People refuse to put trust into and subsequently discount new solutions that go against their ideas of how society is meant to work (Burrus, 2019). This phenomenon can be seen when analyzing the current climate crisis. Many people refuse to believe sustainable energy can satisfy our society's needs simply because they have grown accustomed to a world run by fossil fuels. They rationalize these feelings by

claiming that renewable energies are too expensive or unreliable. New innovations, however, make it possible for renewable energy to support our society. Because people are accustomed to fossil fuel technologies that have been dominant for most of their lives, and because the climate clock is ticking, it is essential that the government drive this transition that individuals and corporations would otherwise readily forego.

The United States is second only to China as the biggest producer of CO₂ emissions on the planet (“Each Country’s Share of CO₂ Emissions”, 2019). According to a study performed by the European Centre for Medium-Range Weather Forecasts (ECMWF) “87 percent of all human-produced carbon dioxide emissions come from the burning of fossil fuels like coal, natural gas and oil”, which occurs in the process of generating energy (“Main Sources of Carbon Dioxide Emissions: CO₂ Human Emissions”, 2017). These emissions cause more environmental damage each day, as greenhouse gases – the most abundant of which is CO₂ – are one of the leading causes of climate change caused by humans (Denchak, 2017). Renewable sources of energy, however, such as wind, hydropower, solar, and geothermal, produce essentially zero CO₂ emissions (“Benefits of Renewable Energy Use”, 2020).

While the U.S. ranks third in the world in total energy produced by renewable sources in 2020, behind only China and the European Union, it continues to be a world leader in CO₂ emissions due to its large energy consumption (IEA, 2020). On a percentage basis, the U.S. ranked incredibly low in 2019 at 133rd in the world, with only 18% of its energy coming from renewable sources (Ritchie & Roser, 2020).

A result of the increase of CO₂ emissions over many years is that the temperature of the planet is increasing (MacMillan, 2016). According to a study done by the Mercader Research Institute on Global Commons and Climate Change (MCC), using data from the

Intergovernmental Panel on Climate Change (IPCC), the global mean surface temperature (GMST) will rise in relation to pre-industrial (1850s-1900) levels by 1.5°C in less than 7 years and 2°C in 25 years unless drastic changes are made to prevent further CO₂ emissions (“That's How Fast the Carbon Clock is Ticking”, n.d.). It is estimated that net zero carbon emission over the planet needs to be reached in less than 15 years, a very lofty goal, to stop the current trajectory to a 1.5°C temperature rise (“IPCC, 2018: Summary for Policymakers”, 2018). More widespread and severe heatwaves are expected to accompany a temperature increase of 1.5°C (“IPCC, 2018: Summary for Policymakers”, 2018). A more attainable goal is preventing a temperature rise of 2°C (“IPCC, 2018: Summary for Policymakers”, 2018). Failure will result in even more extreme weather events across the globe, subjecting 420 million more people to extreme (Maximum Heat Wave Magnitude (HMWid) of over 40) heatwaves, 65 million more to exceptional (HMWid of over 80) heatwaves, and heavier flooding along coasts throughout the world (Dosio et al., 2018; “IPCC, 2018: Summary for Policymakers”, 2018).

Why the Government Needs to Drive this Change

Market Forces Cannot Drive the Change

The United States has experienced many transitions in energy systems in its history, from relying on wood and charcoal prior to the industrial revolution, transitioning to coal as societies became more populated and industrial, and then utilizing oil and natural gas as drilling practices became widespread and cars became commonplace (Gross, 2020). In 2010, a transition from oil to natural gas occurred in power plants all over the country (Aramayo, 2020). From 2010 to 2019, 78.8 gigawatts (GW) of 316.8 GW of coal-powered energy were retired and converted to natural gas (Aramayo, 2020). The transition was partially driven by market forces, technological advancements, and aging out of coal plants; however, it was also spurred by stricter emissions

regulations, demonstrating the power of the government to influence a transition in the industry (Aramayo, 2020).

Similar to natural gas, a cleaner technology than coal, needing legislative actions to support its adoption, renewable energy now needs the government to usher in a new transition. Corporations with a legacy-thinking mindset are resistant to making a transition away from using fossil fuels because they are hesitant about changing practices they have grown accustomed to, and, currently, fossil fuels are abundant and inexpensive. Additionally, many companies, especially those generating power in the United States, are heavily invested in infrastructure that relies on fossil fuels (Chrobak, 2021). Companies can respond to increased demand by increasing output from existing plants more cheaply than responding to demand with renewables, despite the costs of renewable energy becoming competitive with fossil fuels (Chrobak, 2021). Mark Paul, an environmental economist at the New College of Florida, explains that in most cases, “producing one more unit of electricity is cheaper from using existing infrastructure than building new infrastructure” (Chrobak, 2021).

Eventually, renewable energy will become the most economical decision for many power companies and states. Currently, renewable energy is competing against already existing, or the expansion of already existing, fossil-fuel infrastructure. This disincentivizes and results in a huge barrier to entry for green energy (Chrobak, 2021). When the infrastructure currently supporting the U.S.’s energy requirements eventually needs replacement, building renewable energy plants may be the most economical decision, but it will take time for that infrastructure to age out, as power plants can operate for 30-50 years (McDonnell, 2020). The U.S. government needs to create policy and legislation to incentivize, or more likely force, a higher percentage of

power to come from renewable sources of energy sooner. The current market forces will not drive the industry fast enough.

Public Pressure Cannot Drive the Change

In the absence of compelling market forces, consumers can attempt to apply pressure on companies to make changes to help protect the environment, but its impact is insignificant. Many of the nation's largest utility companies advertise a strong commitment to utilizing renewable energy systems, using images and buzzwords on their websites and TV ads to boast about their progress towards reducing carbon emissions and maintain a strong public image (Beetz, 2019). However, reviews into these companies' practices show that many, such as Duke Energy, NextEra, and Florida Power, hide their continued reliance on fossil fuel to generate most of their power while actively funding efforts to stop the transition to renewable energies (Beetz, 2019). It appears that absent direct action by the federal government, energy companies engage in greenwashing, "the practice of making an unsubstantiated or misleading claim about the environmental benefits of a product, service, technology or company practice" (Milliken, 2019). Pressure by the public on companies may have marginal benefits, but too often it garners only commitments, not accountability. Pressure on these corporations must come from laws that create change and accountability.

Renewable Energy Decisions Cannot be Determined at the State Level

Some states, such as California, have begun to implement specific requirements, such as SB 350, which requires buildings to increase their efficiency by 50% and the state to satisfy 50% of its energy needs with renewables by 2030; SB 185 attempts to put pressure on the oil industry by requiring the state's two largest pension funds to remove their oil investments (Pyper, 2016).

The problem, though, is too big for a state-by-state solution since not all states are making environmentally conscious decisions such as these independently. Texas, with an abundant fossil fuel supply, decided to run the state on an independent energy grid to avoid federal regulations that comes with moving power across state lines (Lloyd, 2021). However, CO₂ emissions and the effects of climate change cross state lines. Allowing states to make independent decisions means they will likely make choices that are in the best financial interest of their state, thus impeding improvements made by other states attempting to lessen their carbon footprint.

What the Government is Doing to Drive this Change

Use Government Purchasing Power to Influence Change

One direct way the government can legislate better climate policy is through the federal government's budget. The U.S. government is a very large energy consumer with over 350,000 government-operated buildings, and 600,000 government owned vehicles ("Office of Federal Sustainability", n.d.). The President and Congress can directly influence the whole federal government, without a compelling focus on profit or loss in the way that companies must consider when making decisions about energy. The federal government, through its massive purchasing power, has attempted to take some short-term actions to address the climate change. The policies put in place by the president and Congress in the budgeting process can set sustainability goals for agencies, and government contractors and suppliers will respond to meet these needs if they hope to continue winning bids for contracts.

An important agency the administration can consider, as a means of influencing energy practices, is the Department of Defense (DoD). The DoD has both the largest share of the federal discretionary budget and the highest energy consumption of any organization worldwide (Grant,

2021). President Biden has voiced a desire to shift government spending away from older systems reliant on fossil fuels to “smart investments in technologies and innovation” (Grant, 2021). Responding to executive and legislative direction, the DoD has set a goal of satisfying 25% of their energy needs with renewable energy by the year 2025 (Greenley, 2019). The U.S. Army has set additional goals for itself, including achieving net-zero energy usage on five Army installations by 2020 and an additional 25 installations by 2030 (“DoD’s Energy Efficiency and Renewable Energy Initiatives”, n.d.). The U.S. Navy aims to satisfy 25% or more of its energy needs from renewable sources, including its “Great Green Fleet”, which is a carrier strike group using hybrid-electric technologies by 2025 (Grant, 2021). The U.S. Air Force, which consumes more petroleum than any other military branch, has committed itself to researching alternative biofuel blends in its aircraft (Grant, 2021). These changes within the government can have a direct impact, but also indirectly influence the private sector.

Current Administration’s Sustainability Goals

The federal government and its budget is only a small example of how legislation is needed to influence energy policy and practices. With the election of President Joe Biden came an administration that supports taking action to stop climate change more ambitiously and recognizes that the economy and environment are interconnected (Lee, 2020; Ocasio-Cortez, 2019). Since taking office, President Biden has signed three executive orders addressing climate change, including calling for the Department of the Interior to halt the approval of all oil and gas drilling leases on federal land and water, in addition to a review of already existing leases (“2021 Joe Biden Executive Orders”, n.d.; McGrath, 2021). Such orders signal administrative priorities, but unfortunately, executive orders can be very easily undone. The Keystone XL Pipeline may serve as a good case study of the fragile and temporary nature of executive orders.

Keystone XL Pipeline Case Study

The Keystone XL Pipeline has been a topic of political debate since 2008 when TransCanada first announced its plans to extend its Keystone oil pipeline system to the Gulf Coast (“The Keystone XL Pipeline Timeline”, 2014). In 2012, President Obama sided with environmental activists and rejected TransCanada’s cross-border permit, thus stopping plans of extending the pipeline through his executive authority (“The Keystone XL Pipeline Timeline”, 2014). On January 24, 2017, in President Trump’s first days in office, he signed an executive action to accelerate approval of the Keystone XL Pipeline, thus negating President Obama’s attempts to stop the expansion of a pipeline that would support continued use of fossil fuels for many years (DiChristopher, 2017). On March 24, 2017, TransCanada was granted a permit to expand the Keystone XL Pipeline (Labott & Diamond, 2017). On President Biden’s first day in office, he signed an executive order revoking the Keystone XL Pipeline permit, thus putting a stop to planned construction (Arvin, 2021).

This example shows how easily an executive order can be put in place, or removed. Legislation is a more binding and lasting solution that would compel rapid and lasting change.

Biden Administration Legislation Proposals

In an attempt to compel change through legislation, President Biden has proposed a \$2 trillion infrastructure plan that includes funding dedicated to the research, development, and implementation of clean energy and environmental protection (Newburger, 2021). In conjunction with the infrastructure plan, the Biden administration introduced a tax plan that incentivizes clean energy production and penalizes fossil fuel companies with the removal of existing subsidies (Gardner, 2021). This is a step in the right direction toward a more carbon neutral tomorrow, but the legislation’s survival is still uncertain, with some lamenting its cost and large

scope while others complain that it is too limited to tangibly combat climate change (Newburger, 2021).

This type of government-driven approach to supporting and incentivizing industry behavior is the way that Iceland successfully moved toward renewable energy (Logadóttir, n.d.). Though they were more driven by existential economic threats at the time, not existential climate threats, the compelling influence of government was important to influencing change.

Iceland's Energy Transition Case Study

In 1970, Iceland began its transition to using 100% renewable energies, motivated by fluctuations in oil prices that made it difficult for the then-developing country to sustain a stable economy (“5 Places Running on 100% Renewable Energy”, 2020). The island’s geography gives it very advantageous access to extensive renewable energy. The country’s hydropower systems are fueled by seasonal melts from glaciers covering 11% of the island (Logadóttir, n.d.). Their extensive geothermal energy systems are powered by the region’s very active volcanic zone that lies on the Mid-Atlantic Ridge (Logadóttir, n.d.). The island also has access to favorable wind conditions to generate reliable wind energy, a potential that remains largely unused (Logadóttir, n.d.). Their electricity now comes from 75% hydropower and 25% geothermal energies (“5 Places Running on 100% Renewable Energy”, 2020).

Iceland was able to achieve this transition so quickly by using government funding to heavily incentivize research and implementation of sustainable energy infrastructure (Logadóttir, n.d.). Iceland established a fund dedicated to awarding loans for geothermal research and test drilling to remove financial burdens on researchers attempting to aid the country’s energy crisis (Logadóttir, n.d.). Additionally, should tests yield poor results, the geothermal research fund had provisions that allowed loans to be converted to grants for cost recovery of failed attempts,

further removing the risk placed on researchers in the field (Logadóttir, n.d.). Additionally, citizens were given financial incentives from the government to remove their homes from the fossil-fuel-powered grid and connect to the geothermal-powered grid (Logadóttir, n.d.). The government's extensive assistance to researchers and citizens has been credited as a large reason why the country was able to undergo such a rapid transition from being dependent on fossil fuels to being completely operated by renewable energies today (Logadóttir, n.d.).

It is this type of example that shows how government can, and must, influence or, indeed, compel change. Whether the plans proposed by the Biden administration go too far, or not far enough, can be argued. What is clear, though, is that effective change requires legislative action. The policy proposals established by the president expressing desires for renewable energy systems is important, but laws that bind industry, people, and future presidents to that policy is critical.

Power of Legislation to Compel Change

The U.S. does not have the same powerful economic forces present as 1970s Iceland, though we can learn from how they managed to transition from being fossil fuel dependent just 50 years ago to being operated completely by renewable energies today. Iceland's government, recognizing the importance of accelerating the speed of their transition to using renewable energies, allocated extensive amounts of government funds towards research, development, and implementation of renewable energy systems (Logadóttir, n.d.).

Many states do offer incentives for businesses and homes to utilize clean energy. For example, San Francisco, CA offers citizens rebates up to \$500 per kilowatt hour (kWh) of energy generated by a solar system (City of San Francisco, 2017). Georgetown, TX allows citizens with solar panels connected to the city's utilities to be credited for excess solar energy generated (City

of Georgetown, 2020). Many of these incentives, however, are determined on a city-by-city basis, and they are not uniform in all parts of the country. Additionally, many of these policies incentivize individuals to utilize clean energy, but because energy corporations are responsible for most of the carbon emissions in the U.S., federal legislation must target large businesses (Riley, 2017).

In order for renewable energy incentives to be created on a federal level, legislation must be passed in Congress. In the United States, bills regarding revenue must originate in the House of Representatives and then be voted on in the Senate before getting final approval from the president (U.S. Const. art. I, § 7.). It is the legislative approach that can create the type of immediate and widespread incentives, and penalties, needed to drive rapid change in energy practices.

One such action, if passed into law, that could force energy corporations to greatly reduce emissions is to limit the power output of all existing plants using fossil fuels. As mentioned above, it is often cheaper to produce additional units of energy from existing fossil fuel infrastructure than to build renewable infrastructure to meet an increase in demand (Chrobak, 2021). To prevent energy companies from simply increasing their output at existing fossil fuel plants, the federal government can pass legislation prohibiting plants from increasing their output above 2020 levels. Since the energy companies will have to build a new facility to meet any increase in demand, and renewable energies are becoming lower in price than fossil fuels, these companies will then choose to build renewable energy plants.

Legislation needs to directly target reducing emissions as fast as possible. In 2019, President Trump's administration announced new policy to allow states to set their own emissions goals (Tollefson, 2019). The policy, though, focused more on energy-efficiency and

less on emissions reductions (Tollefson, 2019). The passing of this policy eliminated President Obama's policy that aimed to create a federally mandated goal of reducing emissions to 32% below their 2005 levels by 2030 (Tollefson, 2019). Similar to the Keystone XL example, policy changes were easily undone.

The Keystone XL Pipeline demonstrated the power and the weakness of executive orders to influence the country. This often means that many policies will be overruled and completely reversed when there is a change in administration. This event occurred when President Trump overruled President Obama's executive orders prohibiting the extension of the Keystone XL Pipeline, and again when President Biden overruled President Trump's executive orders allowing its extension.

While these executive orders often assist the president in being able to quickly and effectively establish policy direction, they are very easily undone by future presidents who have differing views. Climate change poses too large a risk to allow executive orders to drastically change policies regarding environmental conservation between each administration. Congress must act to pass environmental protection legislation that cannot quickly and easily be undone by future presidents with differing agendas. While this legislation created by Congress can be undone, it would require a much longer review process from both bodies of Congress and the president to take effect – it could not be erased by a president unsympathetic to the cause on their first day in office (U.S. Const. art. I, § 7.).

Conclusion

The U.S. is aware of the threats that climate change presents to the well-being of its citizens and the planet, having taken some measures to limit its carbon footprint. Despite this, the U.S. continues to be a huge contributor to climate change and a relatively slow adopter of clean

energy. In order to drastically decrease its CO₂ emissions, it must pass legislation to accelerate a transition to renewable energy. Reliance on market forces and executive policy or orders cannot create rapid and lasting change. There may be legacy thinking by individual states, corporations, or citizens reluctant to move away from their customary fossil fuel practices; however, major changes must be forced if the U.S. hopes to meaningfully address the ticking climate clock.

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