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Leading by Example: Measuring the Success of Climate Change Policies in the United States and Germany

Introduction

Climate change has become one of the most prominent issues discussed internationally in the past few years. Everyone from scholars, experts, politicians, and even the public is now familiar with the subject as well as the intense debate surrounding how to address it. While individual countries around the world discuss the topic, it is also an international issue that has been negotiated on the global stage.

In order to address substantial greenhouse gas reductions, global environmental leadership from large economies is key, as smaller countries lack the resources or influence to drive action unilaterally. In addition, countries with a history of environmental awareness and extensive policy experience will serve as examples for other countries seeking to follow suit. In the case of climate change, the United States and Germany represent two countries that have the acumen, environmental track record, and global influence to demonstrate to the world that there exist methods for addressing greenhouse gases. Specifically, this research project examines the climate change policies and posturing of Germany, and how it can translate its efforts to becoming an example for the rest of the world.

A Brief History of Global Action

In 1988 the United Nations established the Intergovernmental Panel on Climate Change, a global initiative to research climate change to provide a scientific understanding of the phenomenon.¹ The IPCC reviews all scientific data and produces Assessment Reports that describe the current scientific understanding of climate change, as well as its potential impacts.² These Assessment Reports are published every few years, the first of which was published in 1990. This first report set the tone when it noted that climate change presented a growing challenge and called for international cooperation to address it.³ Its findings also helped push for creation of the United Nations Framework Convention on Climate Change (UNFCCC) in 1992, a treaty with the stated goal of “stabilizing greenhouse gas concentrations to prevent catastrophic

¹ United Nations, Intergovernmental Panel on Climate Change, History, Available at: https://www.ipcc.ch/organization/organization_history.shtml

² Ibid.

³ United Nations, Intergovernmental Panel on Climate Change, First Assessment Report, 1990, Available at: https://www.ipcc.ch/publications_and_data/publications_ipcc_first_assessment_1990_wg1.shtml

climate impacts.”⁴ The convention includes nearly every country in the world and meets annually.⁵

The IPCC’s second Assessment Report was published in 1995.⁶ This iteration was of particular importance because it expanded on the IPCC’s initial findings and was then followed by the first global climate change initiative called the Kyoto Protocol.⁷

Beginning in 1997, countries around the world met in Kyoto, Japan to hash out a rudimentary plan to address greenhouse gases. This marked the first time countries around the world, through the United Nations, sought to limit their carbon emissions. The Kyoto Protocol put much of the responsibility to reduce emissions on developed countries, as it was argued at the time that they are more responsible for the current increase of greenhouse gases.⁸ The first commitment period began in 2008 and ended in 2012. A second commitment period was agreed to in 2012 in Doha, Qatar and will last until 2020.

Due to the plan’s structure, which put much of the pressure on developed countries only, the system was minimally successful.⁹ Some countries, such as the United States, never ratified the Kyoto Protocol, while other countries such as Canada, pulled out of the treaty.¹⁰ Not securing support from all countries limited Kyoto’s success and ergo any impact on global greenhouse gas emissions. While the Kyoto commitment period is still underway, the United Nations realized that a new more inclusive system should be discussed to address greenhouse gases.

Over the years, the UNFCCC has continued to meet and discuss new parameters and plans needed to increase participation and attain more meaningful emissions reductions.¹¹ While at the same time, the UN IPCC continued to issue Assessment Reports every few years.¹² This culminated in the UNFCCC’s twenty-first meeting in Paris, France. In December 2015, countries from all over the world met to negotiate the most comprehensive environmental agreement in history. The goal was to combat climate change internationally through individual member planning and participation. Moving beyond the limited scope of the Kyoto Protocol, the Paris agreement encompasses all countries and takes steps to address climate change through large reductions in emissions.

⁴ United Nations, Framework Convention on Climate Change, About, Available at:

<http://newsroom.unfccc.int/about/>

⁵ Ibid.

⁶ United Nations, Intergovernmental Panel on Climate Change, Second Assessment Report, 1995, Available at: https://www.ipcc.ch/publications_and_data/publications_and_data_reports.shtml

⁷ United Nations, Framework Convention on Climate Change, Kyoto Protocol, Available at: http://unfccc.int/kyoto_protocol/items/2830.php

⁸ Ibid.

⁹ New Scientist, “was Kyoto Climate Deal a Success? Figures Reveal Mixed Results,” 2016, Available at: <https://www.newscientist.com/article/2093579-was-kyoto-climate-deal-a-success-figures-reveal-mixed-results/>

¹⁰ The Guardian, “Canada Pulls Out of Kyoto Protocol,” 2011, Available at:

<https://www.theguardian.com/environment/2011/dec/13/canada-pulls-out-kyoto-protocol>

¹¹ United Nations, Framework Convention on Climate Change, Essential Background, Available at:

http://unfccc.int/essential_background/items/6031.php

¹² United Nations, Intergovernmental Panel on Climate Change, Reports, Available at:

https://www.ipcc.ch/publications_and_data/publications_and_data_reports.shtml

In order to increase participation and overall emissions reductions, each country was asked to submit an Intended Nationally Determined Contribution (INDC), which outlines each country's plan to domestically curb greenhouse gas emissions.¹³ These plans were publicly submitted then negotiated amongst member parties to produce a comprehensive plan that would limit global emissions. The Paris meeting resulted in near unanimous participation globally, something the world had never done before on this issue.

The new climate agreement differs radically from the Kyoto Protocol. In Paris, each country was tasked with submitting an individual plan outlining what measures each country would take to reduce emissions. There were no established limits to what a country could submit. The result was an array of different domestic measures representing different levels of emissions reductions. In contrast, the Kyoto Protocol used one set of guidelines for emission reductions for large groups of countries. The Paris conference allowed countries leeway to make their own determinations, which represented a more inclusive strategy instead of the top down approach of Kyoto.

Life After Paris

While the Paris Conference was a historic milestone when it comes to shared-intentions among nations to collectively address an issue, the real work is in implementation. From 2016 forward, each country must take steps to initiate, implement, and even accelerate their domestic plans. The first few years after the agreement will be crucial in measuring the success of the agreement. Initializing domestic plans will be an important indicator of whether or not this new inclusive approach and agreement will be effective. This research project examines and comments on the policies of two of the world's largest economies for implementing far-reaching emissions reductions.

The implementation plans of the United States and Germany can be used as a blueprint for other countries around the world, especially those that have not previously sought to address climate change through policy. These countries can look to environmentally leading countries for support, and in return, increase the likelihood of success for their commitments to the Paris climate agreement. As the first commitment phase of Paris is fast approaching, countries must act soon. If countries are indeed serious about backing up their commitments from the Paris conference, then efforts must ensue immediately.

¹³ United Nations, Framework Convention on Climate Change, Intended Nationally Determined Contributions, Available at: http://unfccc.int/focus/indc_portal/items/8766.php

Making Sense of Domestic Climate Plans

Programs, plans, policies, initiatives, and strategies; the list goes on. Each country uses different words to describe how they domestically protect the environment. The sheer number and overlapping of these plans can often be confusing as they differ from country to country. Therefore, first it is important to make sense of what is being undertaken in each of the case example countries.

In the United States, the umbrella climate change program is called the Climate Action Plan.¹⁴ This plan encompasses all regulations that would lead to emissions reductions. These regulations will make up the United States' contribution for Paris to achieve an economy-wide target of reducing greenhouse gas emissions by 26-28% below 2005 levels in 2025.¹⁵

The cornerstone of the plan is the Clean Power Plan, which regulates the amount of greenhouse gas emissions from existing and future power plants for the first time.¹⁶ While this plan is the subject of domestic controversy,¹⁷ it represents the lion's share of the United States' pledged reductions included in its INDC. In addition to the Clean Power Plan, the United States will utilize other regulations covering fuel economy standards in the transportation sector, energy efficiency and conservation standards for buildings, and standards to address methane emissions from land use.¹⁸

Likewise, the climate programs of Germany are equally substantive and aim to achieve far-reaching reductions. In the lead up to Paris, the European Union submitted a single INDC to represent all member countries. The EU submitted a collective plan that sets reduction targets at 40% below 1990 levels by 2030.¹⁹ However, individual country plans were not specified, therefore a deeper dive into Germany's climate policies required extensive research.

Germany is one of the European Union's highest profile countries in terms of greenhouse gas emissions, as well as its posturing towards substantial reduction policies. Germany's own goals are much more ambitious, and its reductions much more stringent. Domestically, Germany set lofty goals of achieving greenhouse gas emissions reductions at 40% by 2020, and even higher goals of 95% by 2050.²⁰

¹⁴ Executive Office of the President, The President's Climate Action Plan, June 2013, Available at: <https://www.whitehouse.gov/sites/default/files/image/president27sclimateactionplan.pdf>

¹⁵ United Nations, Framework Convention on Climate Change, United States Submission, Available at: <http://www4.unfccc.int/submissions/INDC/Published%20Documents/United%20States%20of%20America/1/U.S.%20Cover%20Note%20INDC%20and%20Accompanying%20Information.pdf>

¹⁶ U.S. Environmental Protection Agency, Clean Power Plan, Available at: <https://www.epa.gov/cleanpowerplan>

¹⁷ The Washington Post, "Supreme Court Puts the Brakes on the EPA's Clean Power Plan, February 9, 2016, Available at: <https://www.washingtonpost.com/news/volokh-conspiracy/wp/2016/02/09/supreme-court-puts-the-brakes-on-the-epas-clean-power-plan/>

¹⁸ Ibid.

¹⁹ United Nations, Framework Convention on Climate Change, Latvia and European Union Submission, Available at: <http://www4.unfccc.int/submissions/INDC/Published%20Documents/Latvia/1/LV-03-06-EU%20INDC.pdf>

²⁰ Clean Energy wire, "Germany's Greenhouse Gas Emissions and Climate Targets," March 17, 2016, Available at: <https://www.cleanenergywire.org/factsheets/germanys-greenhouse-gas-emissions-and-climate-targets>

Germany, while ambitious in its domestic climate change portfolio, has had a somewhat troubled history with achieving sustainable declines in greenhouse gases. With the fall of the Berlin Wall came instant reductions in emissions as the East German power sector shrank.²¹ However, following the nuclear phase out, emissions crept up as economically competitive coal replaced nuclear power. In 2007, Germany began implementing a plan to reduce emissions primarily through energy efficiency objectives.²² The first short-term goal was to increase both energy efficiency and the share of renewable energies in the consumption mix to 20% by 2020. The plan also focused on reducing emissions from power plants by building modern facilities that are more efficient.²³ In 2011, Germany further solidified its climate action through its Energiewende (Energy Transition) following the Fukushima disaster in Japan, which spurred Germany to finalize a long debated moratorium on nuclear energy and ultimately the nuclear phase out.²⁴ The Energiewende largely built on the previous plans of decreasing greenhouse gas emissions while increasing renewable technologies for energy efficiency.

Even with this plan in place, Germany has not been able to remain on track to meet its targets for greenhouse gas emissions reductions. This is largely due to sustained power sector emissions even in the face of mass renewable deployment, as well as a lack of will to address transport sector emissions due in part to reluctance jeopardize both the global and domestic influence of the its automotive industry.²⁵ In 2014, Germany began a new program called the Climate Action Programme 2020 aimed at further reducing emissions and placing the county on track to meet its initial targets set in 2007.²⁶

Unfortunately, questions and roadblocks remain a reality for Germany in achieving its self-imposed emissions targets for the near term. While further reductions in the power sector are needed, the government has encountered push back industry and workers unions that present major problems for the country's plans.²⁷ Furthermore, the low cost of coal means it is more economically competitive than other fuel sources.

²¹ Ibid.

²² Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety, Germany, Climate Agenda 2020: Restructuring Industrial Society, April 2007, Available at: http://www.bmub.bund.de/fileadmin/bmu-import/files/pdfs/allgemein/application/pdf/climate_agenda2020.pdf

²³ Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety, Germany, Climate Agenda 2020: Restructuring Industrial Society, April 2007, Available at: http://www.bmub.bund.de/fileadmin/bmu-import/files/pdfs/allgemein/application/pdf/climate_agenda2020.pdf

²⁴ Deutsche Welle, What Exactly is Germany's Energiewende, January 1, 2013, Available at: <http://www.dw.com/en/what-exactly-is-germanys-energiewende/a-16540762>

²⁵ Clean Energy wire, "Germany's Greenhouse Gas Emissions and Climate Targets," March 17, 2016, Available at: <https://www.cleanenergywire.org/factsheets/germanys-greenhouse-gas-emissions-and-climate-targets>

²⁶ Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety, Germany, The German Government's Climate Action Programme 2020, December 3, 2014, Available at: http://www.bmub.bund.de/fileadmin/Daten_BMU/Pool/Broschueren/aktionsprogramm_klimaschutz_2020_broschuere_en_bf.pdf

²⁷ Clean Energy wire, "German Government Wants to Tackle Old Coal-Fired Plants to Meet Emission Goals," March 20, 2015, Available at: <https://www.cleanenergywire.org/news/german-government-wants-tackle-old-coal-fired-plants-meet-emission-goals>

Germany has since put forth new plans dealing with power plants aimed at appeasing industry while staying on track to meet their targets. The new power market design establishes a planned reserve system that puts coal-fired power plants on standby for a period of time before being officially phased out.²⁸ Germany's need to readjust their methods for emissions reductions highlights the tensions between different technologies, how to achieve substantial reductions, and the political reality of having to navigate the interests of various stakeholders in a coal-heavy environment.

Research in Germany

In order to more fully understand the domestic climate policies of Germany, as well as to gain insight into how policies are progressing today, an intensive research agenda was conducted in Berlin, Germany in October 2016. Through extensive interviews and meetings with German government staff, think tanks, nongovernmental organizations, industry, and other various stakeholders, a comprehensive assessment of Germany's climate change agenda was developed for this research project.

Federal Perspectives²⁹

First, this research was informed directly from federal employees with intimate knowledge of the country's policies and strategies. Specifically, the Environment Ministry, Energy Ministry, and representatives from the German Congress (Bundestag) were interviewed.

The Environment Ministry has responsibility for a large portion of Germany's climate change initiatives. While federal agencies work together, most climate initiatives come from the Environment Ministry. Initiatives such as the Climate Action Plan 2020 and the Climate Action Programme, are two large examples of the Environment Ministry's work.

Overall, Germany's contributions for emissions reductions will mainly come from three large sectors, including the electricity sector, transport sector, and housing sector.³⁰ For the electricity sector, reductions are being sought from the replacement of coal with renewable sources such as wind and solar energy. It is worth noting that in Germany, cleaning up the electricity sector is made even harder from the decision to stop use of nuclear energy as a source for electricity. Following the disaster in Fukushima Japan, the German government decided to halt all reliance on nuclear energy citing safety concerns.³¹ This leads to a real obstacle for Germany, as nuclear energy is considered a clean source of energy with minimal greenhouse gas emissions, making it an ideal energy source to rely on for fuel switching. Nonetheless, Germany continues to plan for a phase

²⁸ Clean Energy Wire, "Germany's New Power Market Design," November 4, 2015, Available at: <https://www.cleanenergywire.org/factsheets/germanys-new-power-market-design>

²⁹ The information included in this section has been synthesized from in person meetings conducted while in Berlin, Germany. October 2016.

³⁰ Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety, Germany, Climate Action Plan 2050, Available at: http://www.bmub.bund.de/fileadmin/Daten_BMU/Download_PDF/Klimaschutz/klimaschutzplan_2050_im_pulspapier_en_bf.pdf

³¹ Ibid

out coal use in its electricity mix. While many people differ on the exact timeframe for a complete shutdown of coal use, it is estimated that a phase out could be started by 2030 and possibly completed by 2050.³²

Transformations in the transport sector will also contribute emissions reductions to Germany's climate goals. This will be achieved through fuel efficiency standards for traditional engines, which ultimately reduce the amount of greenhouse gases emitted into the atmosphere. The other initiative, which has recently become a larger topic politically, is the introduction of electric vehicles into the transport sector. Also known as E-Cars, or E-Mobility, these cars use electricity to power their engines instead of relying on more traditional fuel mixes such as gasoline. While at the moment the market penetration of electric vehicles has been minute, future increases of electric vehicles sales are likely, with likely government subsidies to incentivize consumers to switch. In fact, some in the German Congress believe that in order to achieve faster emissions reductions, a phase out should be initiated on traditional combustion engines. While this is not currently an official policy, some speculate that this could be achieved after 2030, with no new combustion engines being built beyond this time.

While looking at this particular strategy from a distant perspective, it would appear that this could help provide emissions reductions to meet Germany's climate contributions. Unfortunately, there are also drawbacks. While the introduction of electric vehicles would transform the car industry of today, the electricity it would be powered by, and depend on, would still be generated from an electricity sector that has not been adequately decarbonized. Therefore, meaningful reductions in emissions would not be achieved until the electricity sector changes more drastically. Unfortunately, the transport and electricity sectors are also interconnected that it is difficult to reduce emissions unless both are addressed, or first through changes in the electricity sector. Also worth noting is the large and influential auto industry in Germany. This industry is world-renowned for its products, which expands beyond the borders of Germany. The industry also generates a large portion of revenue for the German economy. In the coming years, if Germany decides to address electric vehicles more thoroughly, great care must be given to help the German auto industry transition away from traditional combustion engines, while not harming the economy. This is an underlying concern for many climate change policies: achieving substantial emissions reductions while preserving economic output.

The third sector that Germany is addressing in its climate change portfolio is the housing sector. This is done through making homes and buildings more energy efficient. In this way, less energy is needed and consumed and therefore less emissions end up in the atmosphere. The German government uses incentive programs to replace components of older buildings, sometimes as simple as using new window technology to reduce wasted energy. Other components such as using smart meters in homes, or even installing solar panels on roofs, aids in emissions reductions overall.

³² Electrek, "6 Major Countries Have Recently Announced Imminent Phase-Out of all Coal-Fired Power Plants," November 25, 2016, Available at: <https://electrek.co/2016/11/25/6-major-countries-phase-out-coal/>

Underpinning many of the climate initiatives, which aims at reducing greenhouse gas emissions, is also the desire to increase the share of renewable energy in the country's energy mix. This is primarily done through the Energiewende, which was passed into law in 2010.³³ The Energiewende places government-mandated goals of renewable energy percentages domestically. While the specifics of the law have slightly changed over time to meet its goals, the first milestone is achieving a renewable energy share of the energy mix of 35% by 2020.³⁴ While this is an attainable goal, Germany has encountered problems in staying on course, and is currently not on track to meet this goal in three years.³⁵ In order to achieve success within their own timeline, Germany must again refocus its efforts to more aggressively increase renewables. However, even if Germany is achieving changes in its energy portfolio at a slower rate, the Energiewende has been seen as a successful policy. Germany's domestic resilience in committing to substantial decreases in greenhouse gas emissions, while increasing renewable energy shares, will prove helpful to achieving its contributions internationally. While the first compliance period of Paris starts in 2020, Germany must stay on track domestically in the coming years prior to this in order to meet its intended contributions. As the largest greenhouse gas emitter in the European Union, success unfairly rests on Germany's shoulders.

Think Tank and NGO Perspectives³⁶

In addition to federal perspectives on Germany's climate change initiatives, this research was informed from a range of prominent think tanks. On the heels of the Paris climate agreement, discussions and opinions are rampant with respect to how Germany will fair. Yet, at the same time, there is optimism within Germany that the Paris agreement will help curb global emissions. Nobody believes this will be easy. More than any other climate initiative, curbing the electricity sectors emissions is where the biggest disagreements will be. There is push back, not only in Germany, but in other countries, such as the United States. Appropriately addressing the electricity sector is a large part of Germany's commitment to the Paris agreement, since this is where substantial reductions in greenhouse gas emissions will occur. Conversely in the transport sector, the introduction of eclectic vehicles is coming alongside traditional combustion engines and could take generations to completely change its landscape. Already, lines have been drawn and there is doubt about how the changing energy landscape will fair under Paris.

³³ German Government (Bundesregierung), the Energiewende is Progressing, 2012, Available at: <https://www.bundesregierung.de/Content/DE/Infodienst/2012/06/Energiewende/energiewende.html>

³⁴ German Government (Bundesregierung), "What are the Key Objectives of the Federal Government's Energy Policy?" Available at: https://www.bundesregierung.de/Webs/Breg/DE/Themen/Energiewende/Fragen-Antworten/1_Allgemeines/1_warum/_node.html

³⁵ Clean Energy Wire, "Germany Set to Miss Climate Goals – Think Tank," October 14, 2015, Available at: <https://www.cleanenergywire.org/news/germany-set-miss-climate-goals-think-tank>

³⁶ The information included in this section has been synthesized from in person meetings conducted while in Berlin, Germany. October 2016.

The method that Germany plans to utilize will not rely on a continuation of the status quo with coal. For instance, in the United States, climate change policies for coal rely on technological advancements, such as carbon capture and storage, in order to continue the production of energy from coal. In contrast, Germany does not plan to rely on technologies such as these for the continuation of coal in the country. Instead, they have opted to ultimately phase out coal.

There is a real possibility that the path to phasing out coal will encounter problems over time. Realistically, phasing out coal over the next twenty years will be done through different iterations of the German parliament. Politics routinely shapes our world, and the issue of climate change is no different. Germany has political parties that align themselves to different issues and causes, including energy uses. Appeasing a disgruntled political base while maintaining international obligations will be an extremely difficult needle to thread. At some point, expectations will either be softened or a section of the German population will be overlooked for success on the international stage.

Germany has currently opted to keep coal producers on an emergency reserve line if it is needed in the coming years. Germany is paying coal plants not to operate at full capacity, while also leaving the door open for their help. During a coal phase out, Germany will essentially be paying for coal to go out of business. With the amount of pushback from challenging an industry, Germany can here be seen as pursuing a softened approach. There is no hard stop to coal use. Instead, Germany is seeking to work with industry to engage in a smooth transition from coal to renewable energies. This is in direct contrast to the approach taken from the United States, which instead of pursuing a coal phase out, is attempting to rely on new technologies to implement a reduction plan and a continued use of clean coal in the future. Yet there are also similarities. In both countries, the coal industry is given little choice and must comply with new policies.

Underpinning Germany's aggressive climate agenda is the real possibility that domestic targets will not be met on time. Historically, emissions reductions were at their greatest when economic downturn occurred. This can be seen in the 1990s after the reunification of Germany.³⁷ Many industrial businesses in East Germany went out of business, and in result, emission decreased. This is also seen globally in the 2000s with the Great Recession.³⁸ During this time, economic output slowed, translating to fewer emissions. There is a fear that Germany, and also the world, will not be able to meet its climate emissions reduction targets unless another recession occurs. While this is a possibility in a tumultuous global environment, it is not openly discussed or relied on to meet emission reductions. Instead, Germany is pushing forward with its climate initiatives with the mindset that tweaks to its plans may be needed in order to achieve meaningful reductions and meet its contributions internationally.

³⁷ Clean Energy Wire, "Germany's Greenhouse Gas Emissions and Climate Targets," March 2016, Available at: <https://www.cleanenergywire.org/factsheets/germanys-greenhouse-gas-emissions-and-climate-targets>

³⁸ Ibid.

Stakeholder Perspectives³⁹

Lastly, this research was informed by multiple stakeholders intimately involved in the climate industry of Germany. From nongovernmental organizations to industry representatives, this research relies on multiple perspectives to better understand Germany's current and prospective future climate landscape.

There exists the notion that the ideology of the Paris agreement is stronger than its substance. Unprecedented global action and collaboration is needed if there is any hope of reaching the goals of the Paris agreement. Not only will governments be involved in meeting the international agreement, but it will also be supported from a wide range of outside actors, such as nongovernmental organizations that monitor emission from industries, as well as environmental organizations that pressure for further action. In Germany, there even seems to be a growing opinion in industry that the phase out of coal is only a matter of time. It is no longer an "if" but "when" it will happen. This again appears to be in contrast to the United States, which is continuing its coal use in the face of new technologies and regulations. In Germany, industry is responding to the domestic climate initiatives and the new international agreement by taking the opportunity to expand its business to other forms of energy, such as renewables.

There is also concern that the European Trading System (ETS) needs to be readjusted in order to operate more efficiently in a post-Paris world. Prices in the trading scheme have fallen and there is now talk about creating a price floor to elevate prices paid by participants and polluters. There is also ongoing discussion about the need for a new or reformed carbon tax to steer industry away from continued use of coal as an energy source. While it doesn't appear that these initiatives will occur anytime soon, they also remain a possibility with a country that struggles to meet its climate change reductions. Therefore, the possibility of further changes shouldn't be dismissed.

A Path Forward for Germany

After conducting a month of intensive research in Germany, it is clear that a path forward for meeting its domestic and international emissions goals remains achievable. This is not to say though, that it will be easy, or that further tweaks to Germany's plans are unwarranted. In fact, without further tweaks, Germany may miss their own internal milestones. This is evident in a recent report from the government that Germany is currently not on track to meet its 2020 goals for renewable energy or its climate plan.⁴⁰ Likewise, addressing Germany's current decision and plan to phase out coal will enable them to stay on track. By focusing heavily on only the reduction of energy sources in the energy mix, Germany may be limiting their own success. There exists a potential problem where Germany seeks to decrease what it deems "dirty" energy sources while simultaneously attempting to make up this lost energy source with renewable energy.

³⁹ The information included in this section has been synthesized from in person meetings conducted while in Berlin, Germany. October 2016.

⁴⁰ Clean Energy Wire, "Environment Minister: Germany 'Won't Quite Reach' 2020 Emissions Goals," November 2016, Available at: <https://www.cleanenergywire.org/news/environment-minister-germany-wont-quite-reach-2020-emissions-goal>

There is legitimate concern that the reduction of one and increase of the other will not offset each other, and there could be an imbalance that Germany must then deal with.

Likewise, one of the greatest risks to Germany's ambitious climate initiatives is the government itself. In democracies, the changeover of government leadership over time can lead to differing opinions about how to address certain issues. Climate change would not be invulnerable to this. In spite of this reality, Germany has continued a persistent agenda of tackling climate change through the years. It is difficult to see this changing in the coming elections in 2017, but it is also a real possibility. Germany relies on various coalitions of government parties to create a majority system, but the exact configuration could result in either increased climate pursuits or diminished efforts. Even in Germany, the methods for reducing greenhouse gases are not without controversy. This was evident in drafting the climate plan 2050, where the coal-phase out was at one point taken out, presumably for political reasons. This illustrates the difficulty for any economy to move away from a domestic resource which has long been a part of the local economy.

In order for Germany to realize its goals, it should focus on establishing a robust energy mix in the electricity sector that includes multiple sources of energy. Germany is not afforded the same luxuries as the United States in terms of energy sources. In the United States, the shale gas revolution has transformed the energy landscape, providing cheap and cleaner energy for the country. Since Germany has placed a moratorium on hydraulic fracturing, they are limiting their options on how to address the electricity sector. Germany should follow a similar path that allows for different energy sources to play a role as countries transition to a less carbon intensive economy. This could include natural gas either from imports or from new technologies to acquire it. Allowing for a more robust energy mix while allowing market forces to play out, especially within the confines of the already established Emissions Trading System, could yield substantial reductions and allow Germany to meet its fast approaching milestones.

Germany is also counting on emissions reductions from the transport sector partially through electric vehicles. This will not result in meaningful reductions if the electricity charging the electric vehicles is continually sourced through carbon intensive energy sources. At the same time, regardless of the current configuration to keep coal available, Germany should endeavor to increase its share of renewable energy sources through the Energiewende. This is a current goal, but since the country is not on track to meet its 2020 milestone, Germany should transition its efforts from other sectors to focus on catching up with renewable energy. To date, Germany has devoted time and resources for renewable energy and thus has real interest in their policies producing desirable outcomes.

Overall, Germany has many climate initiatives currently in play. Their heavy investment throughout various sectors indicates their commitment to staying on track. Since Germany has come this far, it is worth assessing whether their efforts will yield desirable results. From renewable energy standards, electricity sector modifications, to transport and housing sector reductions, Germany is attempting to make small reductions in many places. While this approach makes sense, Germany risks becoming spread too thin in tackling each area. Instead, tackling one or two areas at a time will allow the country to focus real attention and effort on substantial reductions. This research paper advocates for a continued push to increase its renewable energy

resources while addressing the electricity sector through several viable and pursuable options. It would be difficult and straining for Germany to pursue more stringent policies in other sectors, such as a moratorium on combustion engines in the transport sector, until a path forward for the electricity sector becomes clearer.

With the international commitment period for Paris fast approaching, Germany should take great care in monitoring its internal emissions and meeting its domestic climate policies. There is no doubt; Germany has some of the most ambitious climate policies in the European Union and the world. For Germany to be successful, they must make drastic decisions about how to address their current shortcomings to meet their goals, while also steering clear of economic harm. Since many countries around the world agreed to commit themselves to the goals of the Paris agreement, individual country action will likely begin soon. Germany's own success has the potential to act as a guide for other countries that are looking to initiate their own climate change agenda. The path forward for Germany is grounded in its domestic commitments and willingness to address difficult decisions for practical solutions. The climate efforts of Germany are shaping up to be a test case for whether an economically strong economy with strong industry can make progress on emissions reductions. The fact that Germany is both ambitious and economically powerful makes this test case that much more important.