

BIDEN SCHOOL JOURNAL OF PUBLIC POLICY

Note from Editor-in-Chief Pravesh Raghoo

Health Equity Requires Advocacy: Rejecting Silence and Individualism for the Sake of Public Health Corinne N. Bogan

Policy Perspective: Externalities of Developing Floating Offshore Wind Turbines Walker H. Schwartz

Regulatory Framework for the Transmission of Offshore Wind Energy Walker H. Schwartz

Student Resource Officers: Alternative Approaches to Student Safety and School Discipline Rachel Widom

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Achieving Carbon Neutrality: US and India Weigh Policy Options Palaniappa Krishnan, Prahlad Kasturi

The Impact of Historical Residential Discrimination Policies in Richmond, Virginia

N. Kristian Schmidt

Published by Joseph R. Biden, Jr. School of Public Policy & Administration University of Delaware III Academy Street, I84 Graham Hall Newark, DE 19716, USA

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Note from Editor-in-Chief

The 2021–2022 Biden School Journal of Public Policy (Biden School JPP) Editorial Board is pleased to present the 13th Volume of the journal. The Biden School JPP (formerly known as the New Vision for Public Affairs) has been in operation since 2008 and over the course of the last 14 years, the journal has been a medium to showcase the exceptional research and academic work of University of Delaware's students and faculty. The contents of Volume 13 equally reflect the interdisciplinary research of students and faculty on various topics and pressing public policy issues from water policy, climate and energy policy, international politics, school discipline and health policy among others. The Volume has received original research articles, policy briefs and an opinion piece and embody the wonderful work of University of Delaware's students and faculty.

This volume also bears testimony to the countless hours put in by Editors in the Biden School to review articles and make sure they are of high quality. The Editors are the backbone of the journal and have ensured that quality and guidelines are respected. The Editorial Board is also complemented by the Faculty Board who has supported the Editors with valuable experience and advice since the start of the journal.

The journal is active for every academic year of the University of Delaware. Every year the journal provides opportunities for graduate students to submit their work as well as to serve as Editors and gather experience over the academic publishing process. For more information, visit the Biden School JPP website or be on the lookout for invitations to join the Board through your UD official email.

With this, the Editorial Board invites you to read the articles, make contact with authors if you are interested to know more about their work or collaborate on other projects.

Pravesh Raghoo

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BIDEN SCHOOL JOURNAL OF PUBLIC POLICY

Short Communication

Health Equity Requires Advocacy: Rejecting Silence and Individualism for the Sake of Public Health

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Abstract

Article history:

Received: March, 21, 2021 Accepted: May 27, 2022

Suggested Citation:

Bogan CN (2022). Health Equity requires Advocacy: Rejecting Silence and Individualism for the sake of Public Health. *Biden School J. Pub. Pol*, 13, 1-3

© 2022 The Authors. Published by the Joseph R Biden School of Public Policy & Administration, University of Delaware. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (https://creativecommons. org/licenses/by/4.0/) Over time, the field and profession of public health has shied away from political engagement and reform efforts, focusing primarily on behavioral models of public health. In doing so, we have inadvertently reinforced radical individualism and inoculated the larger society against suspicion that the structures of our health, economic, and social systems are largely responsible for most health disparities. This commentary examines why responding to Covid-19 related inequities requires much more than monetary public health investments. Significant advocacy efforts are required to address the political determinants of health, and I argue that the field of public health should reclaim its position as a leader of progressive social and cultural change, in the interest of health.

Keywords: Advocacy, Public Health, Covid-19, Social Justice, Structural Inequity, Individualism

Covid-19 has exposed persisting inequities that have systematically undermined the physical, social, economic, and emotional health of minority populations within the United States. The disproportionate burden of Covid-19 on these vulnerable populations should be of no surprise to public health professionals and those in public service; the economic and health insecurities exasperated by Covid-19 have existed for decades and are long overdue in being properly addressed. Despite clear evidence that death and disability are collective problems (Powers & Faden, 2006), progress in responding to Covid-19 in a comprehensive public health framework has been stunted by the debilitating first language of individualism in American culture, described by Wallack and Lawrence (Wallack & Lawrence, 2005). This language and preoccupation with individual freedoms, personal responsibility, and limited government has led to a fragmented Federal pandemic response, individual non-compliance with Covid-19 safety mandates, and a complete lack of national strategy for equipment or disaster relief. Individualism is not a sufficient public health strategy (Wallack & Lawrence, 2005). The way through this pandemic is with collective action that prioritizes relief efforts and fiscal investments in historically underserved Black and Brown communities.

Fairchild and colleagues describe the shifting definitions of the public health profession and call for a "Back to the Future" realignment of public health that reclaims its place as part of an emerging reform movement (Fairchild et al., 2010). Let us not forget the progress of sanitarians who led reform efforts in the 19th and early 20th centuries (Fairchild et al., 2010). Requiring housing to have indoor plumbing, improving tenement laws, and imposing housing density regulations had positive effects on rates of tuberculosis and other disease (Blackmar, 1995). While American politics may prioritize individualism and limited regulation, the nature of disease humbly reminds us that human life is interconnected. With this in mind, public health professionals must expand and improve practices to protect African American and Latinx communities that do not have the privilege of working from home (Gould & Shierholz, 2019). This includes securing protective equipment for frontline workers, expanding testing, contact tracing, and healthcare services in low-income neighborhoods with overcrowded apartments and high rates of homelessness, advocating for paid sick leave policies, and extending the national moratorium on evictions. Public health professionals must also advocate for the incarcerated population, 40% of which is black, despite the fact that African Americans make up just 13% of the overall population (Federal Bureau of Prisons, 2020). Personal protective equipment should be secured for correctional facilities and inmates as social distancing is not possible. Additionally, states should consider policies to release nonviolent inmates, particularly those that are medically compromised, to mitigate inevitable and uncontrollable outbreaks.

The aforementioned policies are merely immediate band-aids, and do not address the years of lacking upstream investment in the country's social and economic system. No longer can public health retreat from political engagement with special interests that have generated such unhealthy environmental conditions. The central issue remains the injustice of a dominant market ethic described by Beauchamp in Public Health as Social Justice (Beauchamp, 1976). In this landmark 1976 paper, Beauchamp describes how the market model encourages victim blaming and attention to individual behavior rather than the social preconditions of such behavior (Beauchamp, 1976). In doing so, the market model unfairly protects majorities and powerful interests from their fair share of the burdens of prevention, while spreading the costs of public problems among the general public (Beauchamp, 1976). Market ethic is alive and well today, for during the worse economic downturn since the great depression, Jeff Bezos added \$74 billion to his networth (Pitcher, 2020). Meanwhile, 11.5 million are unemployed as of October 2020 (Bureau of Labor Statistics, 2020) and social services are unable to keep up with increasing demand. Despite the millions that are affected by the disproportionate distribution of wealth in America, class analysis and efforts of social welfare have somehow been equated as anti-American since the McCarthy era (Powers & Faden, 2006). If public health professionals want to sustainably address the health inequities that have been magnified from Covid-19 for the long-term, we must prioritize addressing poverty and economic inequality- the strongest predictor of health- while developing America's second language of community (Wallack & Lawrence, 2005).

Some suggested solutions for addressing income inequality, as provided by the American Public Health Association, include increasing the minimum wage, expanded family and medical leave policies, worker's compensation reform, banning the use of forced arbitration agreements, and strengthening the rights of workers to organize and collectively bargain (APHA, 2017). While the field of public health has already expressed support for reducing income inequality to advance health, the current and incoming generation of professionals should push to reclaim public health's power as a leader of

progressive social change. Of equal importance is the need to shift cultural understanding of social welfare and the mutual dependence of human beings- a shift that has started taking place in the context of environmentalism and ecosystems. Now is the opportunity to initiate a shift in conversation and in mindset at the national and global level, and push for community values to be reflected in public policy, without fanning xenophobic fears. Any further complicity in regard to social progress is directly contradictory to public health.

"Without community, there is no liberation...but community must not mean a shedding of our differences, nor the pathetic pretense that these differences do not exist." – Audre Lorde

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BIDEN SCHOOL JOURNAL OF PUBLIC POLICY

Policy Brief

Policy Perspective: Externalities of Developing Floating Offshore Wind Turbines

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Abstract

Article history:

Received: January 15, 2022 Revised: March 28, 2022 Accepted: May 26, 2022

Suggested Citation:

Schwartz WH (2022). Policy Perspective: Externalities of **Developing Floating** Offshore Wind Turbines. Biden School J. Pub. Pol, 13, 4-12

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Offshore wind industry is a growing renewable energy source that has barriers for implementation like many other energy sources. It is key to identify both positive and negative externalities associated to implement well thought out policy. Policymakers must use a future oriented frame of mind to execute lasting successful policies that will impact the future direction of the offshore wind industry. Floating offshore wind technology is a growing tool for the expansion of the industry with its own new and varying effects. As more information and technological advancement comes there will be greater understanding of the externalities that come with the implementation of this new technology. This policy perspective paper will discuss the known externalities associated to direct future policy creation.

Keywords: Offshore wind, Floating Wind Turbines, Energy Transition, Externalities, Renewables

Introduction

The offshore wind industry has the potential to become a leading industry in the United States as a force to combat global greenhouse emissions, rivaling that of solar, nuclear, hydroelectric and geothermal. President Biden's Administration proposes a goal of reaching 30 gigawatts (GW) of offshore wind by the year 2030 and 100 GW by the year 2100 (White House, Office of the Press Secretary, 2021). This objective is a key part of Commons Attribution (CC Biden's ambitious goal of reaching a net zero emissions future in the United States. Offshore wind is a growing industry with one current project operating off the coast of Block Island, Rhode Island, while many more under construction, in the permitting, leasing or planning phases. Many of the current proposed or planned commercial offshore wind turbine developments are along the east coast of the United States. This is due to the currently available commercial wind turbine technology and the specifications needed for these offshore wind turbines to be installed. The offshore wind industry is going to have to hurdle significant challenges and expand its planned development or it will hinder the successful completion of Biden's goal by 2030 and 2100.

There are many barriers to the implementation of offshore wind turbines due to technological specific specifications, but there are also factors that development of wind turbines have faced. These include pushback from environmentalists, fishermen and coastal residents who feel as though the development of offshore wind farms negative externalities out way the overall benefit that they would have to society. Some of these negative externalities include the destruction to species, impact in fishermen's livelihood or the fact that they are an eyesore. While these barriers may not seem insurmountable when implementing offshore wind projects, in fact that they have been in the past. These lead to the demise of the Cape Wind offshore project back in 2015. Throughout this paper the policy perspective on the future construction of floating offshore wind turbines will be constructed through the analysis of the externalities associated with this future technology. This analysis will make use of the topic of externalities found in Ethan Bueno de Mesquita's "Political Economy for Public Policy." This paper will first describe the background behind floating offshore wind turbines, then the negative and positive externalities associated with the new technology and concluding with a recommendation for future policy implementation of floating offshore wind technology.

Background

Offshore wind is a great source of renewable energy for the United States and has seen success in countries around the globe. There is a need for a larger number of commercial offshore wind sites along the United States, but there is a problem. Current offshore wind turbines that are listed in development plans along the United States and throughout the globe are predominantly known as fixed wind turbine structures. Fixed offshore wind turbines have foundations such as gravity base, monopile, tripod and jacket foundations, which need to be installed in water depths of less than 50 meters(m) (Wu et. al., 2019). A water depth that is greater than 50 m results in an economically infeasible model because the cost to construct a turbine of that size is not worth the amount of resource that can be exploited. Wind speed is also a critical factor for the location of fixed turbines. According to the U.S Energy Information Administration (EIA), the optimal wind speed for a small wind turbine is approximately 9 miles per hour (mph) or 4 meters per second (m/s) while utility scale wind turbine's optimal wind speed is 13 mph or 5.8 m/s (EIA, 2021).

Floating offshore wind turbines are a relatively new technology that has not seen large commercial development within the United States. In fact, the first floating offshore wind array consists of five turbines off the coast of Scotland (Hockenos, 2020). There are also projects being constructed in other locations of Europe and Japan at a much greater size. This new and evolving technology has primarily three different setups which include buoyant substructures known as: Spar, Semi-Submersible, and Tension Leg Platform. All these installations use mooring lines that are connected to the substructure and can be attached to the sea floor with a depth of up to 1000m (Jiang, 2021). This increase in depth creates a greater potential for future offshore wind energy that can be harnessed that we will explore below.

Question & Hypothesis

The question being asked is: Will the positive externalities of future implementation of commercially sized offshore floating wind turbine technologies outweigh the negative externalities, thereby demonstrating the importance for this technology in the future growth of the offshore wind industry? I hypothesize that the use of offshore wind turbines will advance the wind industry's future growth through limiting the barriers of "Not in my backyard" arguments (NIMBY), opposition of environmentalists and fishermen, and allowing the United States to harness potential economic development and reduce cost of electricity.

Analysis

Offshore wind potential has not been fully harnessed without the use of floating offshore wind turbines. As stated above, in the EIA there are certain water depths and wind speeds that inhibit the future installation of fixed offshore wind turbines. Currently, the offshore wind industry is missing out on wind power potential in the Pacific and other waters that are deeper than 50 meters. A study on Wind Energy Resource Assessment done by the National Renewable Energy Laboratory (NREL) can give one a good understanding of the potential of offshore wind energy as shown in the figure below.



Figure 1: Gross potential resource area showing excluded water depths of more than 1,000 m in dark blue. NREL used turbine hub heights of 100m, the capacity array was 3 MW/Km², energy production potential of 6MW turbine power curve, excluded areas with a depth greater than 1000m and excluded wind speeds less than 7 m/s (Musial et. al., 2016)

Figure 1 illustrates the potential for offshore wind resources through depicting the depth and distance from shore. NREL states that the gross offshore resource capacity for the United States is 10,800 GW and technically feasible is 2,059 GW according to this study (Musial et. al., 2016). Technically feasible area demonstrates the GW that would be able to be harnessed by current, non-floating wind turbine technology due to a water depth that is acceptable for their installation. The gross offshore resource capacity for the United States uses depths of greater than 60 m, a boundary of up to 200 nautical miles (nm), 3 MW/Km², gross capacity factor from open wind and the losses from that capacity factor through wakes, electrical, availability, etc. Thus, there is a huge renewable energy potential that can be harnessed with the future development of offshore floating wind technology on a commercial scale. Renewable energy production using wind can be signified by the International Renewable Energy Agency (IRENA) calculator which back in 2018 stated that there was, "275,834 GW hours resulting in the avoidance of 213.8 million tonnes of Carbon dioxide emissions from fossil fuels," (IRENA, 2021). As the production and

implementation of renewables become greater, this avoidance of emissions will continue to grow which in turn mitigates the devastating effects of climate change.

There is great potential for future offshore wind development, but what is the economic cost and future forecast of offshore floating turbines that would make this newly evolving technology economically feasible in comparison to fixed offshore wind turbines? I will be identifying how the Levelized cost of energy (LCOE) and Levelized avoided cost of energy (LACE) play a factor in the future forecast of economic feasibility of offshore floating wind turbines. LCOE is the total cost of generating a unit of electricity and is commonly expressed in dollars per megawatt hour (MWh) and factors in variations due to energy production (e.g., average wind speeds, etc.) and capital expenditures (e.g., varying sea states, distance from shore, water depth, soil and substructure sustainability, etc.) (Musial et. al., 2016). The LACE is known as levelized avoided cost of energy and is a metric used to capture the system value of generation electricity. The metric is used to approximate the electric system value of a generational technology over its expected lifetime and commonly expressed in dollars per MWh (Musial et. al., 2016). In short, LCOE refers to estimates of revenue required to build and operate floating offshore wind turbines over a certain period of time where cost can be recovered, while LACE refers to the revenue that can be generated during that period.

Using LCOE and LACE we can determine the net value in dollars per megawatt hours by subtracting LACE from LCOE. This will help determine future forecasts for the economic feasibility of offshore floating wind turbines. If LACE cost is high, the LCOE is bound to decrease due to the expansion of new commercial developments of offshore wind lowering the cost of dollars per megawatt hour. Once the LACE becomes higher value then LCOE a floating offshore wind turbine site is economically feasible. As illustrated in the figure 2 below, one can distinguish (net value >0) the economic feasibility for some wind sites are valued. This trend will continue through the year 2030 and the future creating an advantage for the use of floating offshore wind turbines.

Observers have been recorded to see offshore wind turbine facilities from up to 44 km (27 miles) (Sullivan et. al., 2017). According to the figure below the optimal distance for a suggested sight based off LCOE and LACE is approximately 72 km which is much farther than the observable distance of offshore wind turbines. The site has a water depth of 221 m and 72 km from site to cable landfall. Its LACE of \$103/MWh (green star) compares to an LCOE of \$92/MWh (blue star) by 2027 (Musial et. al., 2016). Since its LACE is above its LCOE this site will be economically feasible by 2027.



^{★ ★} Stars illustrate an economically viable location in Massachusetts where LACE (green) is greater than LCOE (blue) in 2027 (COD)
■ Obts illustrate an economically unviable location in Massachusetts where LACE (green) is less than LCOE (blue) in 2027 (COD)



Floating offshore wind turbines are currently cost prohibitive due to their new technology creating high costs to construct. Looking at the figure below, the future cost reduction scenario for floating and fixed turbines shows the future forecast for their ranges of LCOE through the year 2030. The lower range of LCOE estimates among all U.S. offshore wind sites indicates a decline from \$130/MWh in 2015 to \$95/MWh in 2022, to \$80/MWh in 2027, and \$60/MWh in 2030. The upper range of LCOE estimates among U.S. offshore wind sites shows a decline from \$450/MWh in 2015 to approximately \$300/MWh in 2022, \$220/MWh in 2027, and \$190/MWh in 2030. These reference scenarios represent averages for and not any specific Bureau of Ocean Energy Management (BLM) lease area or site (Musial et. al., 2016). One can identify that the LCOE for floating technology is significantly higher in 2015, but is expected to converge with fixed bottom over time. In fact, it looks to have a lower LCOE by the year 2030 and will continue to become lower throughout time. The reason for these lower LCOE at sites is due to strong wind resources resulting in net capacity factors between 40% and 60%, proximity to onshore grid interconnection, shore-based port facilities, and other relevant locations.

Another large proponent for the opposition of offshore wind developments are fishermen. In a case study done in Scotland and Germany we can analyze the results in the figure below. The main concern for fisherman's opposition of the offshore wind industry is the limited data on the safety risks, data availability regarding effects on marine organisms and ineffective communication creating a large divide. Below is a representation of the surface of an ever-evolving discussion between the fishing industry and offshore wind industry. In figure 4 there have been a list of factors identified by three major stakeholders of the offshore wind industry; the offshore wind developers, the government and the fishing industry, according to the study. In both case studies it was identified that there were several drivers and barriers to implementation of offshore wind turbines developments. The results illustrated that the positive effects outweighed the negative effects by 18 (positive) to 7 (negative). These barriers and drivers illustrated both negative and positive effects. Some included: noise impacts, indirect cost to consumers, artificial reefs, benefits to local economy, etc. It can be identified that the positive effects outweigh the negative effects in this figure due to the number of factors identified in the study, but it is important to understand that this is data at the beginning. The fishing industry does not feel as though there is adequate data that can solidify a decision or discussion for the future coexisting off offshore wind developments.



Figure 3: Levelized cost of electricity for potential offshore wind projects from 2015 to 2030 over technical resource area (Musial et. al., 2016)



Figure 4: Identification of positive and negative effects of offshore wind in fishing industry (Schupp, 2020)

Discussion

There are several positive and negative externalities associated with the policy implementation of floating offshore wind turbine technology as highlighted in the above analysis. These positive externalities consist of reduction of electricity cost for consumers, countering the NIMBY arguments, while some negative externalities include impact of fishing industry and the environmental destruction. The discussion for implementation of floating offshore wind is a complicated issue with evolving developments.

Mesquita (2016) defines situations with externalities as, "situations in which one person's actions directly affect another person's welfare," according to his book; "*Political Economy for Public Policy*," (Mesquita, 2016, p. 100). Mesquita's idea of collective action correlates directly to the future success of the implementation of the offshore wind industry. The probability a goal is achieved is a function of the amount of people that participate as Mesquita states. The incremental benefit needs to be greater or equal to the incremental cost. If everyone participated there would be a social surplus of thousands more GW of renewable energy leading to mitigation of an extraordinary amount of greenhouse gas emissions resulting in a larger utility pie. Therefore, a policy intervention such as implementation of floating offshore wind technology would have everyone participating, which in turn would be a Pareto improvement. A Pareto Improvement can be defined by Mesquita as "a policy change that is unambiguously in the public interest" (Mesquita, 2016, p. 76). This will be supported by further assessments made throughout the paper.

In the past Mesquita has found that many people didn't participate because their expected costs didn't outweigh their expected benefits. An example of this for the offshore wind industry is the demise of the Cape Wind project in 2015. A new development of offshore wind was shut down because citizens believed that the expected cost of having to see the offshore wind turbines outweighed the potential to create GW of renewable energy for consumption. The future policy implementation of floating offshore wind will successfully address this previous argument that was so detrimental to the Cape Wind project of 2015 because optimal location for offshore wind is farther away than the human eye's capability to see.

The policy implementation of the floating offshore wind technology and the creation of renewable energy, a clean source of energy aimed at mitigating the devastating effects of climate change, reduce the greenhouse gas emissions that would otherwise be emitted by an alternative source of energy. This falls under Mesquita's idea of the ubiquity of incentives that lead to the under-provision of public goods. Public goods in this case are both non-excludable and non-rival, both defining characteristics of public goods. Everyone has access to positive externalities of renewable energies effects of the mitigation of carbon emissions without diminishing the supply of leftover goods.

The second-best policy is a way to describe the implementation of floating offshore wind technology. As Mesquita states, "it is policy that maximizes the utilitarian social welfare, taking into consideration all the various effects of the policy." (Mesquita, 2016, p. 126) While some of the negative externalities include ecological destruction and impact to the fishing industry, these policies are dominated by other effects. These effects include future reduction of electricity cost, mitigation of devastating effects of climate change and squandering of NIMBY argument. These policies dominate the second-best policy discussion.

Conclusion

This policy perspective is a preliminary discussion of the full scope of the implementation of commercial floating offshore wind turbines. Further research analysis will need to be conducted as more literature becomes available to comprehend the full scope of the externalities present. This paper was only able to discuss a select few that would help the reader best understand the future direction of the subject matter.

The question I had identified and looked to answer was: Will the positive externalities of future implementation of commercially sized offshore floating wind turbine technologies outweigh the negative externalities, thereby demonstrating the importance for this technology in the future growth of the offshore wind industry? Part of my hypothesis was correct in identifying that the policy implementation of floating offshore wind technology would lead to reduced cost of electricity, reducing arguments of NIMBYs and lead to economic development. There are still issues concerning environmental destruction and pushback from fishermen that will continue to be studied and analyzed as technology continues to advance.

The future implementation of floating offshore wind technology has many positive externalities which have been discussed above. These positive externalities identify that this future policy implementation will be better understood through the second-best policy lens. There will be various effects of this policy that will continue to be created in the future, but the overall development of positive externalities this future policy implements outweighs the negative externalities. Just as the offshore wind industry started with fixed turbines, future policy implementation and policy will continue to mitigate the negative externalities associated with the growing wind industry. Therefore, it is my assessment that the future of the offshore wind industry is heavily reliant on the technological advancement of turbines. Future research should explore the challenges and policy needed to be implemented to successfully and efficiently transmit this growing renewable technology to the national grid to promote greater energy security and independence. This in culmination with future research and data on impact on marine life would help policymakers break significant barriers in the future implementation of floating offshore wind technology.

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BIDEN SCHOOL JOURNAL OF PUBLIC POLICY

Policy Brief

Regulatory Framework for the Transmission of Offshore Wind Energy

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Abstract

Article history:

Received: January 15, 2022 Revised: March 30, 2022 Accepted: May 26, 2022

Suggested Citation:

Schwartz WH (2022). Regulatory Framework for the Transmission of Offshore Wind Energy. *Biden School J. Pub. Pol*, 13, 13-18

© 2022 The Authors. Published by the Joseph R Biden School of Public Policy & Administration, University of Delaware. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (https://creativecommons. org/licenses/by/4.0/) There is no current federal or state plan or framework put in place to ensure the proper transmission and interconnection of offshore wind developments to the regional grid systems through utilities in the United States. Electricity transmission of offshore wind to the local grid is of great importance in order to optimize future offshore wind developments. This policy brief will look to identify the regulatory framework for future offshore wind transmission through the assessment of three policy options that are currently utilized by several European countries. Upon analyzing the Transmission System Operator (TSO), Developer, and Third-Party Model this paper will identify a policy recommendation regarding a certain policy framework. In order to analyze this process this brief will also discuss two transmission processes used which include the Radial connection (alternating current system) and Hub connection (direct current system) for transmission. This policy brief will allow for future policymakers to utilize a future oriented frame of mind in order to implement lasting successful policies that will impact the future direction of the offshore wind industry. Without future federal or state plans or framework regarding offshore wind transmission the current administration's targets will not be met due to the current transmission framework inhibiting development of future offshore wind sites.

Keywords: Offshore Wind Transmission, Grid Transmission, Energy Transition, Transmission Frameworks, Third-Party Model

Introduction

Transmission and interconnection of offshore wind to the grid system will allow for grid system operators to "...capture the economic and environmental benefits of the increasing availability of the wind energy, while enhancing grid operations and assuring overall system reliability, resiliency, and security," (Office of Energy Efficiency & Renewable Energy, 2020). Without further offshore wind transmission and interconnection with the grid, the United States will lose out on \$109 Billion dollars of economic activity by the year 2030 and even larger amounts by the year 2100 according to the Special Initiative

for Offshore Wind (McClellan, 2021). These years are current targets that have been established by the current administration stating a target of 30 gigawatts (GW) of offshore wind by the year 2030 and 100 GW by the year 2050 (White House, 2021). Without proper policies put in place to ensure transmission certainty, the current administration's target will not be plausible in turn leading to missed opportunities of economic activity, environmental benefits and enhanced energy independence and security. It is the objective of this policy brief to give the reader an informed policy recommendation on the future transmission of offshore wind energy by identifying the best process for ensuring a reliable and affordable energy grid transmission.

Background

In order to understand the complexity of the issue it is important to get some insight on how the transmission of offshore wind energy works. Offshore wind turbines are connected to an offshore substation in the area in which these turbines are placed. This offshore wind substation then bundles this produced electricity into alternating current in two ways. Alternating current (AC) systems allow for the transmission directly from the offshore wind substation to an onshore substation. Direct current (DC) systems convert AC current to DC before transmitting from offshore wind substation and then convert it back prior to reaching the onshore substation (Girard et. al., 2021). DC lines are cheaper than AC systems and can be operated at a higher current safely leading to greater transmission, but DC units need power converters at both offshore and onshore substations which are costly (Mueller, 2019). Once connected to the onshore substation, the cables can connect with the existing transmission system. This setup is also displayed in the figure one below. These transmission costs can accumulate to approximately 13 to 25 percent of the total wind farm cost making it a critical cost component and an issue that needs to be addressed (Girard et. al., 2021). Current transmission companies are unlikely to build new transmission until needed by new generation technologies, but wind developers are unlikely to site a project where adequate transmission does not exist leading to a policy issue (Balachander et. al., 2011).

When discussing the transmission of offshore wind energy there are three primary actors which include Transmission System Operator (TSO), developer of an offshore wind farm, or a third company. The Transmission System Operator is local and can oversee the development and operation of the transmission. TSO is subject to national regulatory oversight or under direct public control because it is a state-owned company. A TSO's role in the offshore wind becomes complicated because its responsibility extends from the onshore grid to the transmission from the offshore wind farm; the problems that arise with this will be discussed later in the paper.

The developer of an offshore wind farm can also be responsible for the offshore transmission. This expands the offshore wind developers' responsibilities from developing the wind farm to managing the transmission. When discussing DC systems, this can create a "bottleneck" as displayed in figure one below. Finally, a third-party model can be partially or fully responsible for the transmission of electricity from an offshore wind farm. Partial responsibility would be if the third-party model does not both develop and operate the transmission asset. The transmission assets that will be discussed include Onshore Transmission, Onshore Substation, Export cable, Offshore Substation platform (OSP), Array cables and Wind turbines (Zhao, 2021).

The only currently operating offshore wind farm is in Block Island, Rhode Island. This wind farm uses AC cables to directly connect the offshore wind farm to a Sea2Shore: Renewable Link, formerly known as Block Island Transmission System (BTIS), such as

through a submarine cable. National Grid is an electricity, natural gas and clean energy company delivering to those in New York, Massachusetts, and Rhode Island (Bay, 2021). This is an example of the TSO approach where the local transmission operator has taken upon the development and operation of the transmission of the Block Island wind farm. During further discussion of policy options, we will be reviewing several examples that will help illustrate the pros and cons associated with each of the policy options.



Figure 1: Illustrates the different layouts and technology options of offshore transmission assets (Girard et. al., 2021)

Policy Options

I have now identified the transmission of electricity from the offshore wind farm to the grid is not a simple and straightforward task. There are multiple actors that are included as discussed above, there are technological complications of the implementation of the grid and there are economic concerns. The regulatory framework for the transmission of offshore wind industry is a complicated process that has no concrete answer, as I will identify the best option for the future of offshore wind electricity transmission in the United States.

I briefly described above the three different regulatory frameworks that are associated with the transmission of the offshore wind industry. These include TSO, developers or a third-party framework. In order to discuss real world examples of these policies to best understand the complications with each framework, I will be looking at studies dealing with European countries where the offshore wind industry has been established.

I will firstly start with the TSO, the transmission system operator framework as discussed above. This framework uses a local, state-owned company that can be best compared to a utility such as the ones we use and are regulated for our electricity grid. The

use of the TSO can be categorized as a monopolistic framework, also known as a separate approach, because the TSO is legally assigned to operate the development, operation and maintenance of the transmission. Denmark's TSO approach to the offshore wind industry sees that they implement the Onshore substation, Export cable, and Offshore substation platform (OSP) while the developer's jurisdiction and responsibility is the installation of array cables and wind turbines (Zhao, 2021). Other countries that include this framework include Germany and the Netherlands (Levitan Associates Inc., 2020).

TSO models are known to have long term planning and are in close coordination with the government resulting in taxpayers' inherited cost (Girard et. al., 2021). The TSO model has several advantages. It allowed government policy-makers to pave the way for early OSW developers by pre-approving offshore grids, assured offshore transmission compatibility with the existing onshore grid, facilitated and directed future OSW development by establishing OSW project locations. It also addressed broader grid considerations such as load growth, redundancy, and ancillary services. This allowed the TSOs to participate in the growing OSW industry, and permitted OSW developers to bid lower costs without transmission burdens (Levitan Associates Inc., 2020). The TSO model can lead to significant delays due to the significant time and effort to coordinate the transmission efforts. The compensation needed for these long delays ultimately came from Germany's taxpayers in an example. Therefore, transparency in the planning process is needed as discussed in later models.

The second regulatory framework is the Developer framework. The responsibilities of the developer of the wind farm expand beyond the development of the wind farm itself, but also the development and operation of the transmission asset. The developer shaped model has aligned commercial interests and risks which keep projects on a better timeline and don't result in the added costs to the taxpayers. The interconnection process assures technical compatibility between the radial export cable and the onshore grid, but broader planning considerations are not incorporated (Levitan Associates Inc., 2020). Since offshore wind developers like TSOs are large entities, it is speculated that when the economies of scale play a role into the future of the offshore wind industry, these two entities will have a cost advantage to third parties (Girard et. al., 2021). One of the largest risks associated with the developer framework is lack of solidified commitments from both states or offshore wind developers making it, "financially virtually impossible," for this framework to work (Levitan Associates Inc., 2020).

Thirdly, the final model is known as the third-party model. This is a model in which a third party is a partial or full actor in the development and operation of transmission assets. This regulatory framework looks to be a mixed framework with the potential for combining the two frameworks above. This results in future implications like too many individual developer cables trying to connect to onshore transmission creating an overload instead of creating offshore transmission grids with other wind farms which may be more beneficial towards future development of the offshore wind industry. The United Kingdom's (UK) framework is represented by the third-party framework because there is partial involvement of a third party. The Uk originally has a system in place where a TSO is the executor of all transmission assets, but then it is competitively priced to a third party. The UK uses a partial developer approach but then is regulated to have a third party buy the export cables. This is not transitioned to third parties prior to installation in order to have significant coordination advantages (Zhao, 2021).

In a cost breakdown analysis done by the Board of Public Utilities (BPU) there was a significant reduction in the Levelized Cost of Electricity that this third party produced as shown in figure two below. A monopolistic regulatory approach as the one in Germany

with TSOs will have a higher cost of offshore transmission assets (OTA) associated with this framework. The reason for higher cost were listed as the following in the BPU study; (1) TSOs are assured of full recovery of costs; (2) TSOs do not have efficiency incentives; (3) TSOs may utilize more expensive transmission technology; (4) TSOs have more restrictive planning parameters; (5) separating transmission increases coordination costs; and (6) TSO OTAs have excess and unused capacity when completed in advance of OSW projects (Levitan Associates Inc., 2020).



Figure 2: BPU looking at the Levelized Cost Breakdown of TSO model and Third-Party Model (Levitan Associates Inc., 2020)

Policy Recommendations

All three regulatory frameworks have their advantages and disadvantages. After weighing the pros and cons of each regulatory framework I have concluded that the best overall framework is the Third-Party Model. I would go even further to say that I would implement some details from the TSO model in order to create the best regulatory framework necessary for the United States. The Third-Party Model framework is the best overall framework due to its economic advantages and efficiency in implementing projects as discussed above. Economic affordability paired with efficiency is key to the new and growing offshore wind industry in the United States.

One of the most significant advantages of the TSO model, as discussed above, was the planning phase in order to prepare for future developments. With a great number of new proposed offshore wind sites and limited onshore transmission locations, there is going to be further research in order to understand the best approaches to develop offshore transmission grids. This long-term planning is not focused on by developers and third parties, which will lead to future issues for new development to connect to the grid causing overloads detrimental to the grid. Large disturbances like overloading the grid will create major issues not only now, but in the future when most of our energy comes from renewables. There may not be enough back up sources of power in the event of outages.

TSO models are good at planning for the grid, but these issues cause greater costs to the taxpayers which no citizens want to hear, especially if one is trying to create new offshore wind industry developments in order to mitigate the devastating effects of climate change and reach net zero emissions. There will be great opposition if taxpayers know the future added cost. To mitigate these efficiencies is where the Third-Party Model becomes objectively the best option. As discussed above, the comparison between the levelized cost of electricity between the TSO model in Germany and the Third-Party model shows a significant incentive to use the Third-Party model due to cheaper levelized cost of electricity. These cheaper costs are because a lack of insurance coverage for recovery costs, developers have efficiency incentives, utilize cheaper transmission technology, combination of transmission decreases coordination costs, and lack of unused capacity at the end of the project (Levitan Associates Inc., 2020).

Thus, if the Third-Party Model could optimize planning for the future while having efficiency and reducing costs of the project, it would objectively be an even better framework then just the Third-Party model alone. There will have to be further research as the wind industry grows in the United States to get a better understanding of the best policy for the country. All studies as of right now are learning from our European counterparts in order to predict the best available options for future implementation of the growing offshore wind industry. As time passes, there will be literature that may suggest a framework outside of the discussed three that would be more beneficial.

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BIDEN SCHOOL JOURNAL OF PUBLIC POLICY

Policy brief

Student Resource Officers: Alternative Approaches to Student Safety and School Discipline

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Abstract

Article history:

Received: January 21, 2022 Revised: March 24, 2022 Accepted: May 20, 2022

Suggested Citation:

Widom R (2022). Student Resource Officers: Alternative Approaches to Student Safety and School Discipline. *Biden School J. Pub. Pol*, 13, 19-27

© 2022 The Authors. Published by the Joseph R Biden School of Public Policy & Administration, University of Delaware. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (https://creativecommons. org/licenses/by/4.0/) School Resource Officers (SROs) have become more commonplace in recent years in response to school shootings and violence. SROs are law enforcement officials that are responsible for school safety and have the authority to make arrests. The current literature reports conflicting evidence as to whether SROs are effective at mitigating or preventing school shootings. However, research suggests that students with an SRO stationed on school premises are more likely to be arrested, contributing to the school-to-prison pipeline, which disproportionately affects students with disabilities and students of color. Currently, gaps in the literature exist on providing effective, equitable, and feasible alternative approaches to SROs. This report aims to offer alternative solutions to SROs focused on promoting school safety and equitable school discipline practices. Following the murder of George Floyd in 2020, public and political officials called for social reforms such as the removal of SROs from schools. One policy alternative to SROs includes the implementation of student safety coaches who are trained on mental health, restorative justice, and de-escalation strategies. This initiative has been implemented in school districts in Minnesota and has yielded positive evaluation results. Another alternative includes the reallocation of funds following the removal of SROs to mental health professionals. Mental health professionals have the authority to assess risks and are an effective mechanism at dealing with school safety and school disciplinary policies. Nonetheless, a hybrid model of both policy alternatives is the best mechanism to deal with school safety and student discipline. Student safety coaches should be implemented along with trained mental health professionals in public schools following the removal of SROs.

Keywords: Student resource officers, School safety, School discipline, School-to-prison pipeline

Introduction

The controversy surrounding school resources officers (SROs) and the best methods to ensure school safety has been widely discussed in recent years in part due to the rise of school shootings and gun violence. Recently, there has been an additional focus on police brutality, the school-to-prison pipeline, and the need for mental health services in schools. This policy brief aims to analyze the role of SROs and to examine the most effective, equitable, and feasible methods to deal with school discipline and school safety concerns.

Alternative approaches that will be discussed in this report include the implementation of student safety coaches. This alternative solution has not been widely implemented but has yielded positive evaluation results in dealing with school safety and school discipline in an equitable manner. Likewise, the reallocation of funds to mental health services in schools is a widely discussed approach, that also yields positive evaluation results in the areas of effectiveness and equity.

The role of SROs

Student Resources Officers (SROs) are "sworn law enforcement officers that are responsible for safety and crime prevention in schools (US Department of Justice, n.d., p. 1)." SROs responsibilities are similar to police officers as they have the authority to make arrests, respond to service calls, and document incidents (US Department of Justice, n.d.). According to the US Department of Justice, SROs have four separate roles: law enforcers, informal counselors, educators, and emergency managers. As a law enforcer, SROs are expected to promote and address school safety and to "serve as a liaison between the school and outside agencies (US Department of Justice, n.d., p. 1)." SROs also act as an informal counselor by connecting and building relationships with youth and students. The officer is also expected to fill an educator role by teaching students about careers related to law enforcement (US Department of Justice, n.d.). Lastly, SROs are emergency managers. Working with district and school administrators, SROs craft safety plans and implementation strategies to respond to threats and security issues (US Department of Justice, n.d.).

SROs are deployed throughout the United States at a wide variety of schools and institutions, including high schools, middle schools, and elementary schools. According to the National Center for Education Statistics, 46% of public schools had an SRO on school campus at least once a week (Diliberti et al, 2019). However, according to the National Association of Student Resource Officers (NASRO), the number of SROs in the United States is a mere estimate because SROs are not required to register with any national database. In addition, police departments do not have to disclose how many of their officers work as SROs (National Association of Student Resource Officers, n.d.-a). Additionally, public schools are more likely to have an SRO compared to private schools (National Association of Student Resource Officers, n.d.-a).

SROs undergo training to fulfill their four roles that were outlined earlier by the United States Department of Justice. The basic training course is held over 5 days and is 40 hours long. The training has been developed by the NASRO and includes elements of instruction on de-escalation, classroom management tools, informal counseling techniques, and how to respond quickly to neutralize threats. Additional SRO training is available through the association and includes resources such as an adolescent mental health training and crime prevention through environmental design (National Association of Student Resource Officers, n.d.-b). Furthermore, NASRO notes that officers who are considered for the job also must have at least three years of law enforcement experience and no active records of disciplinary action (National Association of Student Resource Officers, n.d.-b).

Historical Background

The concept of an SRO started in Flint, Michigan in the 1950s as a method to strengthen community relations between police officers and students. Although SROs were

established in the 1950s, it was not until the 1990s, following the Columbine shooting and the implementation of the Office of Community Oriented Policing (COPS¹) that SROs became more common in American public schools. (Weiler & Cray, 2010). The presence of SROs furthered increased in the last several years due to concerns of school safety in response to school shootings in the United States. In 1975 only 1% of schools had a police presence on site compared to 58% of schools in 2018 (Connery, 2020).

A national trend has developed that following a school shooting funding for SROs increase. For instance, following the Marjory Stoneman Douglas High School mass shooting in 2018, Florida's Governor Rick Scott signed a bill denoting \$99.7 million to fund SROs in the state (Fiddiman & Jeffery, 2018). Additionally, following the 2012 shooting at Sandy Hook Elementary School, the Obama Administration renewed funding to increase the number SROs. Since 1998, one year before the Columbine shooting, the federal government invested over 1 billion dollars in SROs (Connery, 2020). The majority of public schools in the United States now have an SRO on campus (Diliberti et al, 2019).

Policy Problem

Recently, controversy has surrounded SROs and their effectiveness regarding mitigating security threats, accelerating the school-to-prison pipeline, and effectively dealing with student discipline. The US Department of Justice (DOJ) asserts that a well-trained officer has a profound impact on preventing mass shootings and other targeted violence. The DOJ noted that SROs are effective and cites two instances where officers successfully intervened in a school shooting (Modan, 2020). The instances that showcased successful intervention by SROs happened in 2018 in Maryland and Illinois. In both instances, the SRO intervened by firing rounds at the shooter's, successfully preventing additional causalities or injuries (Grinberg & Watts, 2018; Levenson, 2018).

However, some studies show that SROs are ineffective at mitigating gun violence and other threats to students and staff. University of Delaware Professor of Sociology and Criminal Justice Policy, Aaron Kupchik explained that there is inconsistent research surrounding SROs effectiveness at mitigating school violence or preventing crime (Manser, 2020, p. 1). Likewise, a Criminal Justice Professor at Hamline University, Jillian Peterson, found that "more people die in school shootings where an armed officer is present than when there isn't (Feshir, 2021, p. 1)." Additionally, an SRO or an armed security guard was on school premises in both the Marjory Stoneman Douglas High School (February 2018) and Columbine High School (April 1999) mass shootings. Ultimately in both case studies, the SRO and armed guard were ineffective in mitigating the crisis resulting in the deaths of students and staff (Fiddiman & Jeffery, 2018).

Not only is there conflicting evidence on SROs ability to prevent school shootings, but they also pose a risk to students by contributing to the school-to-prison pipeline. The school-to-prison pipeline is a national trend, according to the American Civil Liberties Union (ACLU), where youth are being funneled out of public schools and placed into the juvenile justice system (American Civil Liberties Union, n.d.). Students of color and students with disabilities are disproportionately impacted by the school-to-prison pipeline. According to the ACLU, black students in the United States are more than twice

¹ COPS "is the component of the U.S. Department of Justice responsible for advancing the practice of community policing by the nation's state, local, territorial, and tribal law enforcement agencies through information and grant resources (Office of Community Oriented Policing Services, n.d., p. 1)."

as likely to be referred to law enforcement compared to white students. In addition, "Students with disabilities were three times more likely to be arrested or referred than students without disabilities (ACLU News and Commentary, n.d., p. 3)." In the State of Delaware, a 2013 study from the Northwestern Journal of Law and Public Policy found that black students are over three times more likely to be arrested compared to their white classmates (Hughes, 2020). The research and evidence clearly indicate that students of color and students with disabilities are being disproportionately arrested by SROs.

Kupchik also concluded in his research that police officers in schools increase the chance of students being arrested, whereby contributing to the school-to-prison pipeline. Professor Kupchik's research demonstrated that when students were involved in a physical altercation, both students were routinely arrested even in instances of bullying (Manser, 2020). The National Center for Education Statistics also found that school officials are more likely to refer students to police than school administration for petty infractions, such as theft or vandalism. (Fiddiman & Jeffery, 2018). The presence of SROs is an inequitable and likely ineffective policy solution to handle school security concerns and ultimately accelerates the student-to-prison pipeline, disproportionately targeting students with disabilities and minority students.

Policy Alternatives

SROs are inherently harmful to students by accelerating the school-to-prison pipeline (ACLU News and Commentary, n.d; Hughes, 2020). In addition, conflicting evidence remains on SROs effectiveness in preventing and responding to school shootings. Therefore, SROs must be removed from schools and new approaches should be considered on how to handle school safety and student discipline. The next portion of this report will explore two policy options to ensure school safety. Both options will be evaluated on the following criteria: effectiveness, equity, and feasibility. The first option includes the implementation of student safety coaches, a new approach to school safety and discipline, which has been chosen to be included in this report as it has demonstrated positive evaluation results. The second option calls for the replacement of SROs by reallocating funding to mental health and trauma-informed professionals. This option has been widely discussed by school districts throughout the country. Other policy options such as the use of metal detectors, bullet proof glass, and the hiring of additional SROs or armed guards will not be included in this report. Current evidence and literature discussing these alternatives find these solutions to be ineffective, costly, inequitable, and fail to create a sense of community in schools (Fiddiman & Jeffery, 2018).

Student Safety Coaches

One alternative to replace SROs are student safety coaches whose job is to build relationships with students, de-escalate conflict, and provide emergency support services. Coaches are trained to de-escalate conflict with a focus on restorative justice, mental health, and trauma-informed practices. Unlike SROs, student safety coaches do not have the authority to arrest students. Safety coaches also do not carry firearms. Most SROs are armed, but some jurisdictions have policies in place that prohibit officers from carrying a firearm on school grounds (Knott, 2021; Nissman, 2020).

Coaches will undergo a wide variety of training such as mental health crisis management, de-escalation practices, and how to engage in culturally responsive student interactions. The goal of this model is to reform student disciplinary practices and to ensure the security of students and staff. Safety coaches will also maintain a relationship with local law enforcement in the event of a security threat. However, police officers will not be responsible for school discipline practices (Knott, 2021; Nissman 2020).

Student safety coaches have been adopted in several school districts including public schools in Minnesota in 2017. The Student Safety Coach Program was implemented with several recommendations including utilizing school-based restorative justice, discouraging the use of metal detectors, searches, and body scans, and maintaining a school culture surrounding the values of mutual respect and trust (Intermediate School District 287s, 2020). In the District's Student Safety Coach logic model, the framework outlines expected short-term, intermediate-term, and long-term impacts of implementation. Expected short-term outputs of the implementation of student safety coaches include increased knowledge for students on how to process conflict and cope with negative emotions. Intermediate-term impacts include identifying safe ways to cope with negative emotions and practicing behaviors to increase social connections. Long-term outputs include keeping school building safe and promoting a positive learning environment where students and staff feel connected to their school (Intermediate School District 287s, 2020). Next steps for the district include working to ensure buy-in by all stakeholders including staff, students, and families on the use of safety coaches. Moreover, Intermediate School Districts noted the need for additional research and program evaluation. The district plans to continue reviewing incident report data and conducting surveys or interviews with staff, students, and families on programming (Intermediate School District 287s, 2020).

Following three years of program use, the district sent out an evaluation survey to staff members, which yielded positive results. For instance, approximately 80% of staff concluded that student safety coaches built trusting relationships with students and 74% of staff responded saying that coaches were effective at de-escalating situations (Intermediate School District 287s, 2020).

In the wake of the murders of George Floyd and Breonna Taylor, more school districts have opted to replace SROs with safety coaches. For instance, Albemarle County in the Commonwealth of Virginia is in the process of crafting of incorporating eight student safety coaches into buildings next school year (Knott, 2021).

Reallocation of Funds to Mental Health and Trauma-informed Professionals

Another policy alternative that has been widely discussed in the effort to remove SROs from schools is to reallocate funding to social workers, counselors, and other traumainformed and mental health professionals. Students' unmet mental health needs can be a barrier to student enrichment and academics, but also can compromise school safety (American School Counselor Association, n.d.). In this context, school safety not only refers to physical violence but also non-physical violence including psychological, verbal or other aggressive behaviors, according to licensed school counselor, Zachary Pietrantoni (Bray, 2016, p. 1).

School Counselors are trained professionals that help foster and build relationships with students and staff. Carleton Brown, a certified school counselor and counselor educator noted that perpetrators of school violence often act out as a method to feel heard by their peers or society (Bray, 2016). By building relationships and allowing students and staff to feel heard, counselors are helping to ensure school safety and creating a positive school environment.

A phenomenon called leakage is another avenue to help ensure school safety and to eliminate security concerns. A common example of leakage in a school would be when a student cues a classmate on his or her plan for violence. If the classmate is comfortable with counselors or other staff, they may alert a staff member who then can work to mitigate the threat (Bray, 2016, p. 4).

Counselors and mental health professionals are also able to reach out to students who are struggling in school (e.g., socially, behaviorally) and provide students with necessary resources. School counselors also have the necessary skills and training to provide crisis intervention, assess threats and to de-escalate conflict. Executive Director of the National Behavioral Intervention Team Association, Brian Van Brunt explained the term "threat assessment" as to when a practitioner can determine "how likely a person is to repeat a violent incident or follow through on a threat (Bray, 2016, p. 6)."

Reallocation of funds and direct resources to support counselors, social workers, and other individuals who are trained in threat assessment, risk mitigation, and mental health have received wide support following the outcry for reform following police shootings and brutality. The defund the police movement has spearheaded several school districts to consider or implement policies to reallocate funding. According to Brookings Institute, the term defund police refers to the reallocation or redirection of funding "away from police departments to other government agencies funded by the local municipality (Ray, 2021, p. 1)." The Oakland Unified School District (OUSC) voted to eliminate SROs in 2020. The 2.5 million dollars per year used to fund school police was redirected and used to hire mental health professionals, social workers, and restorative justice coordinators (Gomez, n.d.). Red Clay Consolidated School District in the State of Delaware also pondered the prospect of phasing out SROs as part of the George Floyd and Breonna Taylor Resolution (Eichmann, 2020). Red Clay board members Jose Matthews and Adriana Bohm introduced the Resolution that would "direct the superintendent to use the money previously spent of SROs to fund preventative, trauma-informed interventions from social workers, counselors, psychologists, and other mental health professionals (Eichmann, 2020, p. 3)." Ultimately, the Resolution did not pass, and SROs remain in the district (Eichmann, 2020).

Evaluation Criteria

The three evaluation criteria that will be used in this report include effectiveness, equity, and feasibility. Student safety coaches have been shown to be highly effective mechanisms in dealing with student discipline and student safety. Initial survey results out of Intermediate School District demonstrated that student safety coaches were effective at helping student to develop positive behaviors, de-escalate conflict, and respond to student crisis (Intermediate School District 287s, 2020). However, additional studies need to be replicated in other schools and district to fully understand the effectiveness of student safety coaches measure in the evaluation criteria of equity. However, Intermediate School District (2020) notes that the absence of a police presence on campus decreases arrests rates across all demographic groups. Feasibility of program implementation is dependent on a wide variety of local factors including public opinion on SROs, staffing, and funding resources. However, the removal of SROs would provide additional funding for school safety measures that could be used in the implementation of student safety coaches.

As with student safety coaches, additional literature and studies are needed to fully understand the impact of reallocating funds from SROs to mental health professionals. Based on current literature, mental health professionals have been shown to be effective in de-escalating conflict and promoting school safety. Similar to student safety coaches, mental health professional do not have authority to arrest students, whereby decreasing the student-to-prison pipeline (Intermediate School District, 287s, 2020). The policy of eliminating SROs on school premises promotes equity as students with disabilities and minority students are disproportionately being arrested by school police. Like student safety coaches, the feasibility of removing SROs and reallocating funds to hire additional mental health professionals varies based on school district and locality.

Policy Recommendations and Implementation Strategy

Evidence asserts that SROs need to be removed from schools as they have been shown to accelerate the school-to-prison pipeline and arrests minority students at disproportionately high rates (ACLU News and Commentary, n.d.; Hughes, 2020). In addition, conflicting evidence remains on the effectiveness of SROs in preventing school shootings and violence. Depending on the school district, budgetary constraints, and local public opinion, school administrators may choose to implement one or both solutions of hiring student safety coaches or reallocating funding to hire mental health professionals.

In public schools that lack access to the necessary mental and behavioral health services, the reallocation of funds to trauma-informed professionals, social workers, or counselors would likely be a more viable option. School districts looking to implement the policy of reallocating SRO funding to mental health professionals, should also train staff on emergency management preparation. Emergency management preparation is needed so that staff are prepared to deal with a potential security threat. In the case of a security threat, schools and districts should have partnerships with local police and fire departments. Mental health and trauma-informed professionals could be highly needed in schools, but without emergency management training and partnerships with local agencies, the policy alternative would likely get little public support.

Although not widely utilized, student safety coaches are another effective mechanism for school discipline and for ensuring school safety. Nonetheless, a hybrid approach of the use of safety coaches and increased mental health professionals in schools is the most effective, feasible, and equitable alternative to the use of SROs. To fund these new programs, both state and federal funding should be shifted and reallocated to include the hiring of social workers, safety coaches, and additional mental health professionals.

Conclusion

The use of SROs is an insufficient policy for promoting school safety and contributes to the school-to-prison pipeline through ineffective school discipline practices. The consequences associated with the use of SROs are severe, particularly for students of color and students with disabilities who are more likely to be disciplined or arrested for minor offenses. Many school districts are seeking alternative solutions to SROs following a focus on police brutality and racial disparities in both the education and criminal justice systems. Student safety coaches have been used as a replacement for SROs in a small number of schools. These coaches are trained in mental health, de-escalation, conflict resolution and emergency management. The prime distinction between student safety coaches and SROs is that coaches do not have the authority to make arrests and are not armed. This policy option is not widely used. Therefore, additional studies must be replicated in school districts to fully understand the impacts on the evaluation criteria of effectiveness, equity, and feasibility. Another alternative is the reallocation of funding to hire and retain mental health and trauma-informed professionals. This policy alternative, although more common than student safety coaches, has been implemented in several districts including Oakland Unified District. Mental health professionals have been cited to be effective at dealing with school safety through building relationships with students, providing threat assessments, and de-escalating conflict. Likewise, feasibility of implementing both programs varies dependent on local laws, funding formulas, and public opinion. Staff and resources would be needed to assist in the hiring, onboarding, and training of mental health professionals and safety coaches, which can be time consuming and costly. Additionally, research and studies are necessary to further understand the impact of this policy approach on all evaluation criteria. A hybrid model incorporating additional mental health professionals and student safety coaches is likely the best alternative to the use of SROs. Finally, each school must also weigh public opinion, access to available mental health services, and budgetary constraints before implementing any policy solution.

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BIDEN SCHOOL JOURNAL OF PUBLIC POLICY

Policy Brief

The Increasing Concentration of War Powers in the Executive Branch: A Legislative History of Exercised War Powers

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Abstract

Article history:

Received: November 6, 2021 Revised: February 17, 2022 Accepted: May 26, 2022

Suggested Citation:

Wolgast HK (2022). The Increasing Concentration of War Powers in the Executive Branch: A Legislative History of Exercised War Powers. *Biden School J. Pub. Pol,* 13, 28-34

© 2022 The Authors. Published by the Joseph R Biden School of Public Policy & Administration, University of Delaware. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (https://creativecommons.or g/licenses/by/4.0/) Constitutional constraints on a President's ability to lead the nation to war have been unrealized repeatedly since WWII. A legislative trend of granting broad and unchecked authority to the President to use military action has changed the nature of American entry into armed conflicts. The most frequently relied upon legislative method for granting war powers today, Authorizations for Use of Military Force (AUMFs), grant broad-reaching war powers to the executive branch. The 2001 and 2002 AUMFs have granted four consecutive Presidents the ability to act swiftly and divisively to combat enemies of the state across the globe without Congressional deliberation or authorization (United States Senate Committee on Foreign Relations, 2017, p. 2). While civil liberties groups and Constitutional scholars have widely recognized that this authority poses a threat to the balance of power and transparency of a democratic society (Bradley & Goldsmith, 2005, p. 88), constitutional originalists recognize unilateral power of the executive in military action (Ramsey, 2002, p. 21) and defense officials value security and stress the importance of retaining secrecy as to minimize the global recognition of small but dangerous terrorist groups (Cronk, 2017, p. 1). The Biden administration has called for a new AUMF to replace the outdated and unilateral authorizing language of the post-9-11 war powers that have been utilized to wage war across the globe. This call must be swiftly acted upon by Congress, as it would enact a return to Congressional oversight of presidential war powers not seen in contemporary U.S. military history.

Keywords: AUMF, war powers, domestic-law authority, international affairs

Backdrop of Constitutional War Powers in Twenty-First Century Conflicts

The nation's founding documents separated powers in the authorization of wartime military action through legislative checks on executive power. Article 1, Section 8, Clause 11 of the Constitution gives Congress the power to declare war. The Congressional authority to declare war, however, has been repeatedly bypassed in military conflicts for decades.

The attacks of September 11th accelerated the transition of increased war powers to the executive with congressional bipartisan approval. The 2001 Authorization for Use of Military Force (AUMF), passed within the week of attacks on domestic soil, shifted counterterrorism American policy in making use-of-force authorizations a lasting authorizing force granting the President unilateral military intervention powers.

The post 9/11 AUMFs, 2001 and 2002 AUMFs, have not been amended and remain legal justification for military use-of-force across the globe. Despite its explicit unitary aim to empower the Bush administration to intervene in Iraq where Saddam Hussein was alleged to have weapons of mass destruction, the lack of clear guidance and the permanent nature of the 2002 AUMF led the Obama administration to cite the 2002 AUMF as "alternative statutory basis", alongside the 2001 AUMF, for war against ISIS (Savage, 2014, p. 1). Similarly, in January of 2020, the Trump Administration cited the 2002 AUMF as basis for the assassination of Iranian general Qassem Soleimani

The long-gone formalism of declaring war has decreased accountability and increased costs in the exercising of war powers. As precedent for war powers shifts away from the legislative branch, use-of-force legislation today has allowed four consecutive Presidents to deploy troops at his discretion and often without Congressional knowledge.

Historical Use of War Powers Following WWII

The checks on the executive's power to wage war have been largely co-opted since WWII. Congressional war powers have not been traditionally utilized since 1941 when war was declared on Germany, Japan, and Italy. To send U.S. troops into the Korean War, President Truman bypassed Congressional approval, justifying his administration's refusal to recognize Congressional war powers by labeling the American intervention not a war but, "a police action under the United Nations" (Fisher, 1995, p. 34). President Johnson followed precedent, knowingly utilizing faulty Gulf of Tonkin information to encourage a bypass of Congressional war powers for the unilateral guarantee of power that the Gulf of Tonkin Resolution provided throughout the rest of the Vietnam War. These executive actions led to Congressional development of bipartisan policy checking presidential war powers.

In 1973, Congress passed the War Powers Resolution Act over President Nixon's veto (H.J. Res. 542). This legislation sought to reinforce Congressional authority over Presidential war powers by necessitating Congressional approval. Specifically, the joint resolution requires that the president notify Congress within 48 hours of sending armed forces into conflict and requires that without subsequently obtaining a Congressional declaration of war or an AUMF, troops must remain no longer than 60 days, with an additional 30 days granted for withdrawal. The War Powers Resolution, however, has been repeatedly bypassed. President Clinton did not obtain Congressional approval for the bombing campaign of Kosovo in 1999 in the required time frame. Similarly, President Obama's administration did not obtain Congressional authorization for intervention in Libya in 2011. These actions were objected to by both liberal and conservative members of Congress, but legislative action has not been taken against any specific alleged violations of the War Powers Resolution.

War Powers Authorization Post- War Powers Resolution: The AUMF Model

The repeated bypass of Congressional oversight set out in the War Powers Resolution Act set a precedent for common use of AUMFs, the common legislative method for approving military action following Cold War U.S. military policy. AUMFs grant broadreaching emergency war powers to the executive. The most frequently utilized by the executive branch today are the 2001 and 2002 AUMFs.

Congress passed the 2002 AUMF to authorize presidential use of the armed forces as deemed "necessary and appropriate" to "defend U.S. national security against the continuing threat posed by Iraq" and to "enforce all relevant Security Council resolutions regarding Iraq." This AUMF was introduced with the intent of waging war against Saddam Hussein's regime in Iraq on the grounds of violation of the U.N. Security Council resolution for possessing weapons of mass destruction, information later revealed to be untrue. Despite the 2002 AUMF's narrow intended authorization purpose, the Obama and Trump administrations have cited the authorization as authority for broad military force. The Obama administration cited it as "alternative statutory basis", alongside the 2001 AUMF, for war against ISIS (Savage, 2014, p. 1). In January of 2020, the Trump Administration cited the 2002 AUMF as basis for the assassination of Iranian general Qassem Soleimani (House Committee on Foreign Affairs, 2020, p. 8).

While the 2002 AUMF was tailored to specifically justify use of force only against Hussein's Iraqi regime, the 2001 AUMF authorized military action against all groups with any broadly defined connection to the September 11th attacks. Specifically, the 2001 AUMF authorized Presidential use of all necessary and appropriate force against "those nations, organizations, or persons he determines planned, authorized, committed, or aided" the September 11th attacks (S.J. Res. 23) (H.J. Res. 64). Subsequent court cases have interpreted this broad language to include "associated forces" which played no part in the 9/11 attacks, may not haven even existed at the time, but are deemed by the President to be associated with those groups (D.C. Cir. 2010) (Boumediene v. Bush, 553 U.S. 723, 2008).

In a 2004 Supreme Court Decision, *Hamdi v. Rumsfeld*, the Court interpreted the 2001 AUMF as granting the authority to detain enemy combatants, even if enemy combatants were U.S. citizens, until hostilities ended (124 S. Ct. 2633, 2004). The ruling rested on the clause of the AUMF which grants the executive power to use "all necessary and appropriate force".

In 2018, a bipartisan group of senators led by Tim Kaine (D-VA) and Bob Corker (R-TN) introduced legislation to repeal and replace the 2001 and 2002 AUMFs with updated war powers authorizations that fit current military targets (S.J. Res. 59). Their 2018 AUMF would have authorized presidential war intervention specifically against al Qaida, the Taliban, and the Islamic State in Iraq and Syria (ISIS). No further action was taken on the bill after its introduction in the Senate. However, the bill was re-introduced with bipartisan sponsors on March 3, 2021, as Senators expressed frustration with the Biden administration's airstrikes in Syria against Iranian militia groups which were carried out without Congressional authorization (Desiderio & O'Brien, 2021, p. 1). A similar bill to repeal the 2002 AUMF, H.R. 256, passed in the House with bipartisan support. It is important to note that the newly introduced bill call for the repeal of the 1991 and 2002 AUMFs. They would not repeal the broadest contemporary war authorization legislation, the 2001 AUMF.

Two days after the re-introduction of this bill, press secretary Jen Psaki announced the Biden administration's support for repealing active AUMFs and replacing them "with a narrow and specific framework that will ensure we can protect Americans from terrorist threats while ending the forever wars" (Bender & Desiderio, 2021, p. 1). Former President Obama had similarly called for the repeal of the 2001 and 2002 AUMFs and in 2015, his administration issued a formal request for a new AUMF to authorize military action against the Islamic State (Bradley & Goldsmith, 2016). Despite Obama's call, Congress did

not introduce a new AUMF, and instead funded operations against ISIS under the 2001 and 2002 AUMFs despite their intended use for action against a different enemy.

One would expect that Congress would abide by the President's request, as repealing outdated AUMFs and replacing them with new versions would provide Congress with more oversight of the nation's military efforts. Congressional refusal to consider these changes in 2015, however, recognizes that the body's interests are not primarily in providing constitutional oversight of Presidential war powers. Instead, international relations scholars like Stephen M. Walt (2021) have suggested that Congressmembers recognize military interventions as a sensitive matter amongst their constituency and prefer to remain removed from war authorization legislation as to allow themselves to either criticize or take credit for military actions depending on constituents' perceptions (Walt, 2021, p. 2). The Biden administration's support and the newly introduced Senate bill provide Congress once again with the opportunity to rebuild a responsible war powers policy framework. Whether or not this opportunity is taken will define whether the executive branch can continue the near 75-year escalation towards a unilateral and undemocratic process of initiating acts of war.

Value Orientations to Current Status

AUMFs today have granted Presidents the ability to act swiftly and divisively to combat enemies of the state across the globe without domestic or international approval. These enemies are increasingly shadow groups and non-nation states, so the broad executive powers granted by existing AUMFs empower the President with what defense officials label the necessary power to use military force against these groups without public knowledge or debate as to the righteousness of intervention (Cronogue, 2012 p. 393-395). While civil liberties groups and Constitutional scholars have argued that this authority poses a threat to the balance of power and transparency of a democratic society (Bradley & Goldsmith, 2005, p. 88), constitutional originalists recognize unilateral power of the executive in military action (Ramsey, 2002, p. 21) and defense officials in valuing security and stressing the importance of retaining secrecy as to minimize the global recognition of small but dangerous terrorist groups (Cronk, 2017, p. 1).

Stakeholders Amidst Calls to Repeal, Rewrite, Replace Longstanding AUMFS

Rep. Barbara Lee (D-CA13) cast the sole dissenting vote in the House of Representatives approval of the 2001 AUMF. In her statement, she cautioned, "If we rush to launch a counterattack, we run too great a risk that women, children, and other non-combatants will be caught in the crossfire" (C-SPAN, 2015, p. 1). She declared Congress' granting of war powers to President Lyndon Johnson in 1964 to be an "abandoning [of] its own constitutional responsibilities" and broadly expressed caution, "as we act, let us not become the evil that we deplore". Ten years later, in 2011, the Obama administration did not obtain Congressional authorization for intervention in Libya. Instead, the administration's intervention was justified with legal counsel of Caroline D. Krass, Principal Deputy Assistant Attorney General, who wrote that the President had the "constitutional authority to direct the use of military force in Libya because he could reasonably determine that such use of force was in the national interest" (Krass, 2011, p. 1). Krass also found legality of the President's actions due to the "limited operations" of the intervention.

In response to President Obama's unilaterally authorized naval and military intervention in Libya, liberal interest groups including the American Civil Liberties Union (ACLU), Appeal for Justice, The Constitution Project, and others have labeled the 2001

AUMF as too broad and called for, in a letter to the House Foreign Affairs Committee, future AUMFs to be "clear, specific, tailored to the particular situation for which force is being authorized" (American Civil Liberties Union, 2017, p. 1).

Opposition to rewriting or repealing 2001 and 2002 AUMFs comes from the Department of Defense as well as senior administration officials. In October 2017, the Senate Foreign Relations Committee called now-former Defense Secretary Jim Mattis and now-former Secretary of State Rex W. Tillerson to speak to determine as former Republican Committee Chair, the Hon. Bob Corker said, "the appropriate oversight role for Congress" in the continued use of the AUMFs. The ranking member of the Democratic party, Hon. Benjamin J. Cardin said their appearance was needed to obtain an update "on the use of the 2001 AUMF" and to "[hear] the Secretaries' belief as to what authorizations exist today for military operations against North Korea". It is important to note that Democratic members questions expressed explicit support for re-writing or repeal of the 2001 AUMF while Republican members' questions acknowledged its continued importance in the War on Terror. Tillerson and Mattis' statements were both in opposition to rewriting the 2001 AUMF (S. HRG. 115–639, 2017).

The Department of Defense stands to absorb concentrated costs inherent in revisions to broad executive war powers granted by 2001 and 2002 AUMFs. Concentrated costs in this case are important to note as reigning in current AUMFs would extensively drawback the Department of Defense's policymaking capability. In comparison, policy benefits would be diffused or dispersed among a larger population which is less likely to lobby for policy change as they will feel the effects less directly. The pressure of these concentrated costs allows us to expect the Department of Defense to lobby extensively against changes to existing AUMFs (Stone, 1988, p. 238-243).

Policy Scholars on Vagueness

There is consensus among policy scholars and stakeholders alike that the vagueness of the 2001 AUMF allows for broad executive interpretation in the implementation of the legislation. Policy scholars broadly agree that this vagueness must be addressed to revitalize Congressional oversight and approval over military use. Benjamin Wittes argues that updating ambiguities within the AUMF would constrain the nearly endless uses for which it can be applied to today (Wittes, 2012, p. 3). Eliminating these ambiguities would require replacing 'support' and 'aid' for the enemy, as justification for intervention, with more specific, intent-based acts. Wittes recommends maintaining 'harboring' of the enemy as necessary in changes to current AUMFs. Broad languagelike 'supporting' the enemy allows for intervention against groups which have only relative or tenuous connection to enemy groups whereas a shift in the language of AUMFs to 'harboring' requires knowledge of or intent to foster enemy groups.

Another prominent scholar on military authorization policy, Graham Cronogue, proposes a similar expansion of explicit language in a revised AUMF. Specifically, Cronogue stipulates that Congress clearly name the targeted actors in a use-of-force authorization, an action which he argues would provide clearer guidance of executive action (Cronogue, 2012, p. 402).

Conclusion

The 2001 and 2002 AUMFs created the unusual precedent of war powers authorization without an expiration date and as an effect, has retained active war powers in the executive branch for four consecutive presidents. War authorization powers are constitutionally a congressional jurisdiction yet the proliferation of broad-reaching AUMFs, especially after
the fear entrenched policy decisions following 9/11, have given unchecked and unilateral military power to the sitting President. Repealing the 2001 and 2002 AUMFs is vitally important to the transparency of future military action and the democratic functioning of war powers authorization in future conflicts. Redefining targeted groups in specifically tailored language is necessary to prevent the continuation of guileful legal opinions by the Justice Department that utilize the widely encompassing language of the 2001 and 2002 AUMFs to provide grounds for actions of war across the globe.

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BIDEN SCHOOL JOURNAL OF PUBLIC POLICY

Original Research Article

Understanding Water Affordability in the United States

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Abstract

Article history:

Received: December 1, 2021 Accepted: May 6, 2022

Suggested Citation:

Bilal A (2022). Understanding Water Affordability in the United States. *Biden School J. Pub. Pol, 13, 35-45*

© 2022 The Authors. Published by the Joseph R Biden School of Public Policy & Administration, University of Delaware. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (https://creativecommons.o rg/licenses/by/4.0/) Access and affordability to clean water in households are primarily considered third world issues – which is why there seems to be limited research on water affordability focused on the first world. However, rising water prices over time have become a growing concern even in the developed world, especially for the low-income population. Therefore, this paper takes a deep dive into the literature available on water affordability in the United States to explain what water affordability means; the equity and efficiency concerns around it; how it is measured; the critiques to the standard affordability threshold being used; the possible alternative criteria that can be considered instead; and the policy responses to the current water affordability from an equity standpoint, though it does not suggest a decrease in prices across the board or making water services free. This research can serve as a baseline for future studies related to water affordability within different regions in the United States and other developed countries.

Keywords: Water affordability, Water pricing, Water access, Water scarcity, Water equity, EPA affordability threshold

Introduction

Access to clean water is globally recognized as a fundamental human right. The United Nations General Assembly and the Human Rights Council formally recognized human right to safe drinking water as part of the binding international law in 2010 (UN General Assembly, 2010). Though there has been considerable progress in increasing availability of safe drinking water to the world population, affordable access remains a concern. This is because access to water is not just limited to the provision of water supply infrastructure but also about households having sufficient purchasing power to afford the available water services (García-Valiñas, Martínez-Espiñeira, & González-Gómez, 2010). Hence, water affordability is integral to ensuring that people can enjoy their right to clean water.

Water affordability is largely considered a third world issue, which is why there seems to be limited scholarship around the subject in developed countries (Mack & Wrase, 2017). However, in the recent past, concerns have been shared about rising water rates and how

they can impact affordability in the developed world, including the United States (Layne, 2019; Picchi, 2017). Analysis of the literature reveals that many low-income families across the globe are struggling to pay their water bills, which makes a significant proportion of their low incomes (García-Valiñas, Martínez-Espiñeira, & González-Gómez, 2010). According to a study, at least 11.9 percent of people find their water bills unaffordable in the United States when the EPA affordability threshold¹ is used (Mack & Wrase, 2017). As many as 19,500 households (representing more than 100,000 people) in Detroit, Michigan, had their water shut off on March 1, 2014, as they could not pay their bills (Wilder & Ingram, 2018). Hence, water affordability is an important issue for both developing and developed countries (García-Valiñas, Martínez-Espiñeira, & González-Gómez, 2010; Sebri, 2015).

This paper aims to dig deeper into water affordability as a growing problem and review the literature around it. The focus is specifically on potable water used in households for which sewer costs may or may not be combined. The paper is divided into sections that discuss water affordability issues emerging after a close review of the available literature. These include increasing water rates, water equity and efficiency, meaning and measurement of water affordability, assessment of water affordability criteria, and response to affordability challenges. The analysis presented here can serve as a baseline for future studies related to water affordability within different regions in the United States.

Increasing water rates amidst scarcity concerns

One of the significant findings in the literature around water affordability is that water rates (i.e., prices of water supply to households) have been on the rise. Costs of water provision are increasing in the U.S. due to the aging infrastructure, growing demand for water, and need for compliance with federal standards – all of which translate directly into rising water rates over time (Beecher, 1994). This increase has been more than the rise in the Consumer Price Index (CPI), while at the same time, real incomes of the poor households have decreased (Pontius, 2008). An example is Pennsylvania's case where water rates increased faster than incomes, proving to be burdensome for the lower-income households, many of whom were paying more than the affordability threshold of 2 percent (Rubin, 1994). The following graph shows the water rates trend compared to electricity and CPI from 2000 to 2016 (BPC, 2017).

¹ Explained in section 4





Figure 1: Trends in U.S. Consumer Prices (1982 – 84 = 100) (Source: Bipartisan Policy Center, 2017; Original Source: Bureau of Labor Statistics)

The increase in water rates is accompanied by growing concerns over a decrease in the water supply. Though freshwater is a renewable resource, population growth, human intervention, and climate change are causing a steady reduction in the world's clean water supply (Devi, Joseph, Karunakaran, Anurdha, & Devi, 2009). Already a scarce resource, water is expected to get scarcer even in the United States, especially in the arid and semiarid regions, as the water-intensive economic activities have grown substantially (Whiteley, Ingram, & Perry, 2008). Given the current trend and scarcity concerns, water cost is expected to increase even more in the future. If this trend continues for the next five years, the percentage of people that find water unaffordable in the U.S could grow five times the current level of 11.9 percent (Mack & Wrase, 2017). Therefore, pricing policies need to be more sensitive to the principles of equity (García-Valiñas, Martínez-Espiñeira, & González-Gómez, 2010). The next section shares more about equity and what it means for water distribution and affordability.

Water equity and efficiency

Equity has been associated with the *benefit principle* and *ability to pay principle*. The former means different users pay the same for a certain quality and quantity supplied, while the latter implies linking the water payments inversely with incomes (García-Valiñas, Martínez-Espiñeira, & González-Gómez, 2010). The benefit principle seems to be more prevalent and deemed sufficient for determining water rates. However, the latter is more socially just.

The distinction between these two principles can also be understood in terms of equality and equity, two seemingly related concepts with different implications. "Equal water distribution assumes uniform needs and rights to water. By contrast, equitable water distribution is based on fairness in terms of local histories, norms, and beliefs rather than equal allocations alone." (Wutich, Brewis, Sigurdsson, Stotts, & York, 2013, p.221). In addition, water equity is considered aspirational, contextual, and relational. It is aspirational since it aims to accomplish better outcomes and contextual because it can be achieved in specific places and contexts. It is also participatory and inclusive. Moreover, it depends on the relationship between different governance actors and the relationship between humans and the environment, making it relational (Wilder & Ingram, 2018). Hence, the goal of

attaining water equity is not as simple as ensuring equal access to water for all. It is also about having an inclusive process and looking at the community's benefits overall (Whiteley, Ingram, & Perry, 2008).

Sebri (2015) describes that social equity, concerning water, has four primary dimensions. The first is the proportionality principle, according to which consumers must pay the water's cost as per the quantity they consume. The second is equality, which implies each person gets an equal amount of water. The third principle is an allocation based on need, which means that availability is not dependent on the ability to pay. The fourth is intergenerational equity, which implies environmental sustainability, i.e., making sure that today's consumption does not impact the water availability for future generations.

Unfortunately, the focus of current water distribution is not on equity or equality. The emphasis of reforms for the past thirty years has been on efficiency. This approach treats water as a commodity and assumes that markets are more efficient water allocators than public enterprises (Wutich, et al., 2017). A focus on efficiency that has no equity considerations ignores the needs of the many to serve a few (Wilder & Ingram, 2018). There are clear trade-offs between equity and efficiency (García-Valiñas, Martínez-Espiñeira, & González-Gómez, 2010), and this trade-off is politically sensitive (Beecher, 1994). Though economic maximization of water is essential, and efficiency helps achieve that goal, it is just one of the values that can be achieved when considering water distribution. A focus on efficiency alone can miss critical practical considerations, e.g., environmental concerns regarding water provision. (Whiteley, Ingram, & Perry, 2008).

None of the principles or approaches are mutually exclusive and may be interrelated. However, what is important is the kind of principle prioritized when making water policies and designing water prices because that directly impacts affordability, especially for low-income households. The next section describes what we can learn about water affordability from the literature.

Understanding water affordability

Economists often use the contingent valuation (CV) method to capture *willingness to pay* for water. CV surveys capture the maximum amount that a person is (hypothetically) willing to pay for a proposed improvement in water services, assuming that the households are free to allocate their financial resources. (Devi, Joseph, Karunakaran, Anurdha, & Devi, 2009). Though the method is useful and has its merits, especially when we do not have sufficient market data to determine the appropriate cost, it is often inappropriately associated with affordability. *Willingness to pay* implies a choice that cannot capture affordability accurately. On the other hand, the *ability to pay* is about what customers *can* pay – which is why it can be a better indicator of affordability (EPA, 1998).

Several factors come into play when understanding affordability, especially for lowincome households. Five of these factors have been described by Sebri (2015). First, water and sewage bills represent a larger proportion of income for low-income families. Nondiscretionary obligations, e.g., rent, taxes, utilities, take up a larger proportion of income for low-income households (Beecher & Shanaghan, 1998). Second, poor quality housing and inefficient appliances add to the costs of clean water supply (Beecher, 1994). Third, some households have different needs, e.g., larger households or families with younger children may need more water. Fourth, water pricing structure can impact households disproportionately, e.g., if the structure has a higher fixed cost with increasing prices, the smaller families may end up paying disproportionately more than larger families consuming more. This implies a regressive impact of utility bills for low-income families (Beecher & Shanaghan, 1998). Finally, location can be a significant factor as getting water to people in remote areas entails more cost and can mean higher water charges. Therefore, it is vital to consider the *ability to pay* when discussing affordability.

In contrast to efficiency – which only looks at costs – affordability focuses on prices. Affordability is a function of both the price of water and consumers' ability to pay for it. This means looking at the *ability to pay* instead of just the *willingness to pay*. While *willingness to pay* is dependent on the price elasticity of demand, the *ability to pay* is dependent on the income elasticity of demand. Income, in turn, is a function of employment, which is impacted by the socioeconomic conditions of the community (Beecher & Shanaghan, 1998). Hence, affordability is not only dependent on household circumstances but also on the conditions of the community. Figure 2 shows the relationship of water prices to household ability-to-pay. Table 1 shows the framework for affordability analysis that gives all the factors that contribute to affordability at each level, i.e., within the household and the water system and higher up till the service territory.

• •			Water	r Prices
		· · · · · · · · · · · · · · · · · · ·		
	ta ang ang ang ang ang ang ang ang ang an		Selected factors that can raise water prices	Selected factors that can lower water prices
			 Compliance costs Infrastructure improvement costs Demand growth costs Debt costs Correction of historic underpricing 	•Economies of scale •Affordable technologies •Low-cost loans •Grants •Subsidies
Household Ability-to-Pay	Selected factors that lower ability-to-pay	 Low income levels Unemployment Nondiscretionary obligations No income or payment assistance Regressive rate structures 	High prices and low ability- to-pay	Low prices and low ability- to-pay
	Selected factors that raise ability-to-pay	•High income levels •Employment •Discretionary expenditures •Income or payment assistance •Progressive rate structures	High prices and high ability- to-pay	Low prices and high ability- to-pay

Figure 2: Relationship of Water Prices to Household Ability to Pay [Source: (EPA, 1998)]

Given the interdependency of factors shown in Table 1, water system affordability and household affordability are sometimes not so different. For example, the ability to get external finances for the water system may depend on the community's financial health, which helps in household affordability. Water systems in the U.S. may also be eligible for the Drinking Water State Revolving Fund (DWRF) if they cannot comply with the Safe Drinking Water Act's standards due to cost considerations. Affordability concerns can also arise when states have to meet requirements of the Clean Water Act; the Asbestos Hazard Emergency Response Act; the Comprehensive Environmental Response, Compensation, and Liability Act; and the Resource Conservation and Recovery Act (Beecher & Shanaghan, 1998).

An important consideration here is that even though desolate community conditions can impact households' affordability, the opposite may not be true. Not all households living in well off neighborhoods can afford water prices. In fact, it has been found that some families within counties face unaffordability even though the region overall is doing better. This is why some people's inability to pay in the community can impact services for the whole area (Mack & Wrase, 2017).

It is also important to note here that not all low-income renters must pay their water bills directly since these costs may be included in their rents. However, higher water prices owning to location or pricing mechanism, or any other factor may be reflected in higher rents (Beecher & Shanaghan, 1998; BPC, 2017). Given that rents are already a high burden, where renters end up paying more than half of their incomes, increasing water prices can exacerbate the situation (BPC, 2017).

Category	Focus	Level of Analysis	Selected Indicators
Household affordability	Rate impact on the capacity of water users (particularly residential users) to support the full cost of water service (including debt repayment) through user charges.	Households	 Ratio of user charges to income Ratio of user charges to income relative to income levels Percentage rate increase (rate shock)
Financial capacity	The financial structure of the water system including internal sources of capital, key financial ratios, and business planning capability.	Water system	 Ratio of revenues to expenditures Ratio of net income to revenues Ratio of assets to liabilities Debt-service coverage Composite indicators of financial health Market test for goods and services (noncommunity systems)
Access to private capital	Ability of the water system to arrange financing (such as a bank loan) through private sector equity and debt markets.	System (or parent entity) and private capital markets	 Credit and bond ratings Debt and debt capacity Market test
Eligibilíty for public capital	Ability of the water system to secure financing (grants or loans) from local (community) or nonlocal (SRF and other programs) public sources.	System (or parent entity) and public capital markets	 Credit and bond ratings Priority rankings Eligibility test
Fiscal conditions	Fiscal stress on the community in terms of the condition of local government finances and competing demands for capital and operating expenditures.	Relevant local government	 Debt as a percentage of market property value Tax revenues as a percentage of market property values Property tax collection or delinquency rate Local expenditures per resident Opportunity costs associated with water system expenditures
Socio- economic conditions	General socioeconomic conditions related to household affordability, priority for public funding, and fiscal distress.	Service territory	 Median household income Percent below the poverty level Percent unemployment Composite indicators of distressed communities

Table 1: Framework for Affordability Analysis [Source: (EPA, 1998)]

Measuring water affordability

Though there is a general understanding of affordability, measuring affordability is complex and dependent on several factors. Mainly, there are two approaches to quantifying affordability, i.e., an income-based approach or an expenditure-based approach. Both have their pros and cons, e.g., it is easier to measure expenditure than total income since revenue could be from different sources. However, the expenditure approach may give a false impression of being water-poor if a family with an above-average income uses abundant water for non-essential purposes. Similarly, affordability thresholds are also different for different measures (Mack & Wrase, 2017).

The Environmental Protection Agency (EPA) in the U.S. uses the income-based approach to calculate affordability, i.e., the ratio of the annual user charges (AUC) as a percentage of median household income (MHI). MHI may be available in the census data for a state, county, or place – not necessarily corresponding to the boundary of the water system's customer base. The threshold is set to be 2.5 percent (4.5 percent for water and sewage combined), which means that if the annual water charges are more than 2.5 percent of the median household income, the costs are considered unaffordable. However, it should be noted that this is the maximum threshold and does not automatically imply that 2.5 percent of the MHI will be automatically affordable for everyone in the community. If the socioeconomic conditions do not allow for charges as high as 2.5 percent, states can use a lower threshold (EPA, 1998).

Ensuring household affordability is the first step and can be referred to as the Residential Indicator (RI), similar to household affordability in Table 1. The second step is looking at the water system's financial capability in terms of how well it can comply with the standards and still provide water at affordable levels. This is called the Financial Capability Indicator (FCI). Both RI and FCI contribute to the EPA's financial assessment to determine overall affordability (Raucher, Rothstein, & Mastracchio, 2019).

Since EPA requires that water systems ensure compliance with SDWA, it has set an affordability criterion for determining whether affordable compliance technology exists for small systems. The criterion depends on the household affordability threshold (Devi, Joseph, Karunakaran, Anurdha, & Devi, 2009). Decisions to fund these small systems or allowing for variances are based on the criteria established by the EPA (EPA, 1998; Scharfenaker, 2006; Pontius, 2008). Details about the EPA criteria for water systems to allow for variances are not part of this paper's scope.

While the EPA affordability criterion is commonly used as a standard across the U.S., it is not without its flaws. Several studies have criticized the measures used by the EPA and proposed alternatives. The next section dives into these critiques and alternative paradigms.

Criticism on affordability criteria and proposed alternatives

Using any affordability criterion can be problematic because of its binary nature and the fact that some costs will always remain excluded. Wutich et al. (2017) explain this as follows:

"Specifically, the binary nature of these conventional approaches—either 'affordable' or 'unaffordable'—is problematic because affordability is rarely a strictly either/or phenomenon; water is affordable relative to the costs of other things and the household's total economic resources (cash and noncash). Simple income percentagebased metrics are not sensitive to other essential household costs (e.g., food, housing, medicine, home energy, taxes), and so income percentage standards can lead to overestimates or underestimates of affordability. More accurate and comprehensive (but seldom used) affordability metrics account not only for the direct service costs households pay through water bills, but also direct capital costs (e.g., connection fees, water tanks, or on-site purification technology) and the opportunity costs associated with water acquisition, including time spent traveling to and from water sources. But even the broadest cost measures still exclude costs such as the physical impacts of hauling water and missed opportunities for work or school due to water carriage, although these are issues at times taken up in qualitative and critical water security studies." (Wutich et al., 2017, p.3)

Though this critique is important, it does not necessarily invalidate the use of some criterion for determining affordability as a practical need for devising policy. It serves as a good explanation to understand limitations when using any standard metric.

The affordability criterion set by EPA has mostly been criticized due to the use of MHI (Teodoro, 2018; Christian-Smith, Balazs, Heberger, & Longley, 2013). Some of the challenges of using MHI, as explained by Eskaf (2013), are as follows:

- 1. The MHI estimate is for the state, county, or place, and not the customer base of the water or wastewater utility itself.
- 2. MHI estimates are different across the three versions of the ACS (1-year, 3-year, and 5-year), even for the same year.
- 3. The latest MHI estimates are usually more than a year old
- 4. MHI estimates for a community can significantly change from one year to the next.
- 5. The Median Household Income is not a single number (anymore).
- 6. MHI does not provide a complete picture of the income distribution of households.

Though these challenges exist, Eskaf (2013) does not entirely discredit the use of MHI, though he underscores the need for understanding the implications while using it.

On the other hand, Teodoro (2018) gives several reasons why the EPA's overall standard is misleading, especially since it uses MHI. First, applying average utilization instead of essential use can inflate the actual water needed. It can include consumption to water lawns or filling up pools, especially in summers. Second, using MHI means calculating affordability as a function of the whole community, which can be seriously skewed. The use of median income can leave low-income and poor households unrepresented. Third, costs need to be inclusive of other essential items like food and energy as these costs can impact a household's financial flexibility. Moreover, these essential items might be a lesser proportion of the income but are usually a high proportion of the disposable income, hence the need to include other essential costs. Finally, the ratio is arbitrary, and its binary nature can be problematic, as has also been shared by Wutich et al. (2017).

Given these issues, the study proposes using a different method that considers household affordability (instead of financial capability), basic water needs (instead of average consumption), and low-income households (instead of median-income customers). It also accounts for other essential costs apart from water and sewage. The method involves two complementary metrics, i.e., the Affordability Ratio (AR) and basic costs expressed as hours of labor at minimum wage (HM). Using AR and HM for the top 25 cities in the U.S. shows strikingly different results if EPA criterion was used. For example, the conventional metric of water rates for Dallas is only 1.8 percent of MHI – well under the affordability criterion. However, the AR and HM come out as 8.7 and 8.3, respectively, which shows that the water cost burden is higher than perceived. Though the use of AR and HM has limitations, an important take-away is that the kind of methodology used can lead to different results. However, the variables used should be based on some

realistic understanding of household-level affordability, which seems to be lacking in the EPA methodology.

The National Academy of Public Administration (2017) shares the deficiencies about the use of RI and FCI for financial assessment by EPA. It gives recommendations about how these can be improved, e.g., by focusing on low-income users instead of median income households and including all costs related to water provision with an overall focus on 'integrated planning'. Based on these reservations, an alternate measure of affordability has been proposed by Raucher et al. (2019). It entails using the *Household Burden Index (HBI)* and *Poverty Prevalence Indicator (PPI)* instead of RI and continued use of FCI to understand the community's circumstances. The HBI includes the combined water service costs as a percentage of the 20th percentile household income. This means that it measures the economic burden faced by the relatively low-income households in the community when paying their water bills. On the other hand, the PPI is the percentage of community households at or below 200 percent of the federal poverty level, i.e., the degree to which poverty is prevalent in the community. Hence, both the metrics combined give a snapshot of the household level burden and the prevalence of challenges due to the community's water sector costs.

Though these alternative measures provide better reasoning for using the said variables, the practicality of their use is yet to be seen. When any standard is used across the country, the ease with which it can be utilized and implemented at the lowest level is one of the major factors. Hence, while complicated formulae may seem more accurate, they may be almost impossible to implement, e.g., the use of AR proposed by Teodoro (2018).

Response to affordability challenges

In response to the affordability issues, some organizations have identified the problems associated with affordability to propose recommendations for programs that can help. UCLA Luskin Center for Innovation has published a report about affordability concerns in Los Angeles County in light of the law passed in 2012, which recognized water as a human right for all Californians (Pierce & Gmoser-Daskalakis, 2020). The UCLA Luskin Center for Innovation (as partners with California Environmental Protection Agency) also offers an analysis of the "Low-income Water Rate Assistance Program" in California to present recommendations for effective implementation (Pierce, et al., 2020). Moreover, Pacific Institute has published a brief about some programs that can help with water affordability in California (Pacific Institute and the Community Water Center, 2012). These efforts contribute to addressing the issues surrounding water affordability in the U.S.

The Tiered Assistance Program (TAP) by the City of Philadelphia is another example of a program where the government responds to the growing issues of water affordability (City of Philadelphia, 2019). The Water Center at the University of Michigan has analyzed this program and how it helps people struggling to pay their water bills (Water Center, University of Michigan, 2018). Several reports share policy recommendations and strategies that can help with affordability, e.g., using discount programs (BPC, 2017; National Consumer Law Center, 2014). However, it should be noted that these programs are scarce and not being practiced nationwide to help with water affordability.

Conclusion

This paper uses the available literature to provide a general understanding of water affordability, its link to equity, and the kind of variables that need to be considered – especially for low-income households – when an affordability metric is being used. The

paper sheds light on the implications and limitations of using the EPA affordability criterion and shares the critiques and possible alternatives shared by different scholars.

While the analysis indicates the need to understand water affordability from an equity standpoint, it should be noted that it does not suggest a decrease in prices across the board or making water services free. Water needs to be priced, especially because the growing challenges of climate change can threaten future water availability if we remain careless about its use. However, that pricing mechanism and affordability threshold should not be the same for low-income and relatively affluent households.

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BIDEN SCHOOL JOURNAL OF PUBLIC POLICY

Original Research Article

State Capture and the Role of Political Parties in Latin America

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Abstract

Article history:

Received: December 18, 2022 Revised: March 9, 2022 Accepted: May 21, 2022

Suggested Citation:

Korman JG (2022). State Capture and the Role of Political Parties in Latin America. *Biden School J. Pub. Pol*, 13, 46-65

© 2022 The Authors. Published by the Joseph R Biden School of Public Policy & Administration, University of Delaware. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (https://creativecommons.or g/licenses/by/4.0/) This study explores the impact of political parties on state capture in Latin America. A mixed effects model is used with time as the level one unit nested within countries that serve as the level 2 units with a total sample size of 349 observations pooled across 19 different Latin American countries with data ranging between the years 1996-2017. The model is also estimated with an AR(1) term in order to account for the temporal dimension of the analysis and any problems autocorrelation may pose. First, the impact of political party in power [years], a variable that captures how long one political party is able to stay in power in a given country in years – is analyzed for its effects on state capture. Second, the impact of political party in power [years] on state capture at varying levels of economic development as measured by GDPPC is then examined. The analysis provides support for the negative impacts of political party in power [years] on state capture we will see. Overall, the results suggest that a lack of political competition and horizontal accountability that political parties are able to provide in a given country results in enhanced levels of corruption and state capture across the Latin American region.

Keywords: Corruption; Economic Development; Latin America; Political Parties; State Capture

Introduction

Since the early 1980s after the fall of mixed market economies world-wide and the institutionalization of neoliberalism alongside widespread democratization, corruption and state capture along with attention being paid to these phenomena have exploded world-wide. After the fall of the Soviet Union and heading into the early 2000s at the height of the globalization era, this explosion only amplified (Ackerman & Palifka, 1999). Even though corruption is a popular topic in economic and political development literature (Ackerman et al., 1999; Shabbir & Anwar, 2007; Karklins, 2002), the continuing surge in corruption demands new attention. A multitude of statistical and econometric analyses along with qualitative studies have addressed corruption and state capture and their

underlying forces. Modeling state capture is a difficult task because there are so many intervening variables. Among explanatory variables, general corruption and state capture phenomena are quantifiable and are therefore included in studies. Others, such as the role of political parties, the presence of illicit actors and their contribution to economic activity and state capture, and the level of informality, are much less so. The analysis is further complicated as there are so many mechanisms that contribute to state capture (Bonilla, 2018).

One factor that has drawn attention to state capture is the role of political parties. The role of political parties has gained prominence as populism along with the erosion of democracy have surged in the last two decades. The evidence of *political party in power* [years] is mixed when it comes to their role in state capture. For instance, Uruguay has experienced party continuity of the executive branch in power for semi-lengthy periods of time but has not necessarily exhibited an increase in state capture the longer one party is able to stay in power. Meanwhile, the opposite is true for Venezuela where there lies a direct correlation of the current party in power founded by Hugo Chavez and an increase in state capture where the longer the party remains in power, the more capture year after year arises. Addressing such a paradox requires careful analysis. So far, scholars of policymaking and corruption in general have dealt with political parties in various ways (Spiller, Stein, Tommasi, Scartascini, Melo, Mueller, & Penfold, 2008; Blake & Morris, 2009). Meanwhile, scholars of state capture have attempted to address the issue of political parties in fomenting state capture, but often purely examine things from the perspective of political party financing (Durand, 2019). Analogous empirical research regarding the role of political party institutionalization and duration of *political parties in power [years]* on state capture is scant. Therefore, it is the objective of this paper to help uncover the casual effects that *political parties in power* [years] has on state capture.

This paper is organized as follows. A review of the role of political parties and their impact on state capture are presented first. Stemming from this review, hypotheses are developed that aim to test the impact of *political party in power [years]* on *state capture* along with an examination of the role of *GDPPC* (economic development) may have in moderating the magnitude of the effect *of political party in power [years]* on *state* capture. Analysis and results are then presented. Finally, the paper concludes with a discussion on the findings and their implications.

Literature Review

General studies on state capture and how it functions

State capture can generally be defined as a phenomenon where private sector actors systematically shape the rules of the game of the state in their favor through illicit mechanisms and private payments (Hellman, Jones & Kaufmann, 2000). The groundbreaking work on state capture by Hellman et al. (2000) provides guidance for how state capture tends to function. Large incumbent firms have a structural advantage in their respective economies within which they operate, as they tend to enjoy privileged contractual rights and protection of property under the home regime. In order for outsiders to compete against such incumbent firms who often have strong linkages with the state and its respective networks of power, they turn to state capture. This creates a dynamic in society where innovation is placated in favor of a "capture economy," as the authors describe it to compensate for the weaknesses in the existing legal and regulatory apparatuses. In capture economies when the state underprovides for its citizenry, public officials and politicians privately sell underprovided goods which are a must for entry and competition. Ackerman et al. (1999) also wrote extensively about how corruption creates

distortions in the market, as public officials deliberately create "scarcity" in order to provide opportunities to extract rents and bribes from those who need to get things done such as obtaining a new business permit to overcome the deliberate "scarcity" and barriers to entry and competition. Thus, captor firms purchase these benefits "a la carte" from the state to secure property rights and remove any obstacles that may be a hindrance to their business. Therefore, identifying the variables exerting the strongest impact on state capture are crucial for the sake of equitable development and a healthy economy for a given country. The majority of previous studies have relied on qualitative evidence and causal analysis (Durand, 2019; Durand & Crabtree, 2017) which have greatly expanded our knowledge of the issue. In order to advance our understanding of the mechanisms that contribute to *state capture*, however, this study uses aggregate state capture data in a quantitative manner.

Identifying additional variables that contribute to *state capture* can expand our knowledge of the underlying causal mechanisms and their influence on *state capture*. To this end, the length of *political parties in power [years]*, a factor that has received recent attention, is included among the explanatory variables that contribute to *state capture*. The role that political parties and the state of institutionalization of those parties play in explaining corruption/state capture can take many forms. For instance, political parties can be operationalized as an all-inclusive variable comprising their party identity, party longevity (how long a political party remains active), the politico-economic system in which they operate under and the corresponding rules of the game, and their ideology. Political parties in this study, however, are used here to describe specifically the time in years that the party of the executive branch is able to stay in power. Thus, *political party in power [years]* is the appropriate operationalization of the variable.

Literature on the role of political parties on state capture

With respect to Latin America, political parties do matter, even if they had played an insignificant role in the transition to democracy in the region during the 1980s and 1990s. Political parties play a critical role in the consolidation of democracy because they serve as a strong oppositional coalition to authoritarian rule such as rule by the military (Petrova, 2010). But they have contributed much less to political and democratic stability as had been expected. This was a result of the "pacted" nature of many Latin American transitions from authoritarian rule. Transitions that came about due to pacts have a tendency to "lock in" existing privileges of the current social forces in power. Moreover, they tempt elites to extend their initial agreements beyond the period of uncertainty where the rules of the game are still in flux and instead reinforce a pattern of collusion amongst political parties that foments corruption and citizen disengagement (Schmitter, 2010). Gustafsson, Merino, & Scurrah (2020) also speak to the dangers that political parties can play if they are collusive with elites, which makes it more difficult for reform-oriented actors to challenge their power. By and large, the neoliberal reforms that ensued in the democratization era in Latin America in the 1980s and 1990s produced structural reforms that eroded the established linkages that political parties once held with the electorate (Kaltwasser, 2015).

Simultaneously, another stream of thought ponders upon the role of political party financing by private interests and the corresponding contributions to state capture (Durand, 2019; Hellman et al., 1999; Hellman, Jones, & Kaufmann, 2000; Hellman & Kaufmann, 2001). Hellman et al. (2001) argue that weak political parties contribute to state capture, as captor actors are better able to curate and preserve informal one on one relationships with state officials as collective representation remains weak. Beltran et al. (2020) argue that the financing of political parties was a key factor in explaining corruption

in Guatemala. The authors note that it is often the case that elites and power groups finance elections expecting to receive a return on their investment that comes in the form of privileged contracts, benefits, and sway over policy and crucial jobs in key ministries of the government. Nonetheless, variation exists with regards to the impact of political party financing by private interests. For instance, parties may be more susceptible to capture depending on their relative degree of institutionalization (Blake & Morris, 2009). To that end, Beltran et al. (2020) argue that political parties and their associated fragmentation have served as a key source of corruption in Colombia. The authors' state this is so due to the creation of "personal parties" which are conducive to corrupt political exchanges as a result of the paucity of campaign finance regulations. These personal parties are able to raise funds for political campaigns while dolling out patronage and rewards to their supporters/donors with respect to preferential jobs, contracts, and favors. It is even the case that some political parties can simply buy votes outright. In theorizing about political finance and its impact on political parties, Kupferschmidt (2009) posits that illicit political finance can come about via legally grey areas of lobbying. He notes that "lobbying" and its definition and regulation have been exceedingly slow to change in a whole host of countries' along with legal bribery which is characteristic of the assumed quid pro quo for making political donations to political parties and candidates.

Economic inequality also appears to play a role in facilitating state capture (Karl, 2019), especially if one of the parties in power plays a principal role in promoting policies that contribute to state capture and corruption. Winters & Paige (2009) elucidate this concept as they argue political parties ultimately need large sums of cash in order to be and remain viable, which forces them to cozy up to investors who in turn insist on policy allegiance – policy that often times can contribute to further inequality. Fuentes-Nieva & Galasso (2014) note, however, that political parties can play a key role in halting economic inequality through policy interventions, which could lead to less state capture overall while promoting healthy economic development. With that said, this does not appear to be the prevailing trend in Latin America.

In terms of political party institutionalization, countries with institutionalized political parties offer a wide array of benefits as they are predictable, have a structured political process, and a wide sense of legitimacy amongst the population along with a strong tradition of abiding by the rules of the game. Cox & McCubbins (2005) note that political parties once unified are better able to solve collective action problems. On the other hand, countries with disjointed party systems where party identity remains weak among the population, party discipline is low, and where parties remain loosely organized – are apt to make decisions that are unpredictable and not in the best interest of those they represent. Moreover, for party systems that are in disarray, the existing incentives and constraints make it easier for anti-party/anti-system candidates to reach power and undermine political parties' ability to prevent the executive branch from drastically changing the existing rules of the game (Flores Macias, 2012). Furthermore, as party system institutionalization decreases, any pro-market policies that are in place in a given country are likely to radicalize, leading to an upsurge of privatizations, trade liberalizations, and the elimination of subsidies becoming the norm (Flores Macias, 2012). This leads to increased opportunities for private sector actors to engage in capture. Moreover, it is evident that political parties are having declining influence. This contributes to anti-system candidates running for office, or at the very least, causes the executive branch to take more extraordinary measures than it otherwise would if political parties had wielded more influence (Kernell, 2006).

Non-institutionalized parties appear to be on the rise. Kupferschmidt (2009) states that in many countries, established and institutionalized party systems are withering away at worrying speeds. Politicians are now creating a party which they personify, and this appears to be a global phenomenon in which democracy assistance groups seek to resolve by strengthening existing party systems along with increased transparency and so on. Worryingly, he notes that political parties in many countries have now become temporary election vehicles representing one or very few candidates. Tsai (2019) finds similar results where he posits that political parties – the key representative democratic institution – break down because the major traditional parties lose the support of voters which ushers in new personalistic parties that are often populist in nature, such as Fujimori of Peru and Chavez in Venezuela. Flores Macias (2012) discusses how Rafael Correa, Hugo Chavez, and Evo Morales all utilized personal party vehicles that centered around their persona rather than competing for the presidency through established political parties. They were able to do so because these populist leftist governments and the citizens of their respective countries held widespread mistrust of political parties and other institutions as instruments of corruption (Kaltwasser 2015). However, as a result of the weak party systems in these countries, they were forced to abdicate even more power to the executive branch. Consequently, horizontal accountability severely eroded. Since political parties became unable to serve a check on the executive branch, the executive was easily able to rewrite the existing rules of the game. Given that political parties could therefore not translate the demands of the various sectors of society they represent into shaping the executive's policy, plebiscitary rule became the preferred option. This creates a severely unstable dynamic in a respective country when broad based changes take place without broad consensus. This is exactly what happened in Peru during the 1990s (Levitsky & Loxton 2018; Carrion 2021). Gustafsson & Scurrah (2019) note that the authoritarian populist government of Alberto Fujimori imposed reforms on the country that drastically reduced the importance of state regulations and planning institutions, while severely debilitating the power of political parties along with civil society organizations. Cameron (2020) notes this form of neoliberal populism as espoused by Fujimori ushered in a form of oligarchic rule.

In the end, political parties care about gaining office, not about promoting a better or more ideal society (Downs, 1957). However, the degree of political party institutionalization and how long one party stays in office does matter for a country and its citizenry. This is evident because weak political parties are unable to serve as a check on corporate power and economic elites (Gustafsson & Scurrah, 2019), which could otherwise help weak agencies enforce the institutional rules of the game. Moreover, strong political parties and competition as is the case in Chile, Uruguay, and Brazil create a vertical linkage between governor and governed (Kaltwasser, 2015). Without vertical linkage associated with weak party systems, it is easy for state capture to begin to take hold. Durand (2019) states that Latin American political parties suffer from a dependence on capital and extreme amounts of corruption. Moreover, weak political parties lead to the subversion of both horizontal and vertical accountability and can contribute to populism (Schedler, 2003; March, 2017). Thus, given the state of the literature, it is clear there are maladies in current Latin American political parties, especially with the surge in populism occurring throughout the region. The longer one party (often populist) stays in power, the more corruption and state capture can take hold. Carrion (2021) details this explicitly in his argument pertaining to populism in power. He notes that in cases of unconstrained populism, in which there are a lack of oppositional checks and balances including a paucity of judicial oversight, once chief executives can cement their power asymmetries, corrupt

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practices become more widespread. This lack of horizontal accountability has real consequences. I argue that the length of the current party in power diminishes existing political competition the longer one party is able to stay in power. In the end, there must be a healthy balance between political competition and economic competition in order to assure a more egalitarian society. It is time we take a hard look at how elected leaders and political parties lose touch with those who they are supposed to represent and how this contributes to state capture.

Thus, it is clear that political parties are being undermined and this is resulting in increased state capture with the intent to subvert democracy (Kupferschmidt, 2009). The longer a party can stay in power, the greater the abuse can take place whereby such party and its leader begin to cement their rule and erode horizontal and vertical accountability mechanisms. This facilitates clientelism and patrimonialism where there lies a relationship between a patron (who has all of the power) and the client. The patron, once a sufficient set of horizontal and vertical accountability mechanisms have been eroded, is then able to use their power to grant privileges to certain groups and sectors in society. Developing countries such as those in Latin America are in need of resources and funding, and thus business actors tend to operate in privileged positions. Moreover, the level of economic development present in a given country may directly impact the magnitude of the effects of party in power [years] on state capture, as more economically developed countries often have superior institutions and legal frameworks that can inhibit acts of state capture relative to countries that suffer from a paucity of economic development. Given the state of the existing literature along with my theoretical propositions as derived from the literature, I derive two core hypotheses:

- H1: The longer one single party is able to stay in power, the weaker political competition is/gets while opposition parties lose power and become unable to exert a check on the majority. This opens the door for corrupt actors (both public and private) to infiltrate the politico-economic apparatus and promote self-interest via mechanisms of corruption and capture.
- H2: The impact of *party in power [years]* on *state capture* will be lower at higher levels of economic development relative to lower levels of economic development as is measured via Gross Domestic Product Per Capita (GDPPC). Economically developed countries and their citizens would not tolerate acts of corruption and state capture to "get business done" as may be the case in a country which suffers from low levels of economic development. This is because less-developed countries political and private sector actors are more easily capable of skewing the rules of the game in their favor as it is often the case that that less developed countries also lack the necessary institutions and legal/regulatory frameworks for inhibiting corruption.

Methodology

This study includes a sizeable number of countries in the Latin American region offering a broad perspective on *state capture* and the impact of *political party in power [years]* and corresponding institutionalization of said parties. The statistics on aggregate state capture data are analyzed alongside key regressor variables. Most of the data for the sample is derived from the World Bank. The remaining data for other regressors come from the Database on Political Institutions from the Inter-American Development Bank, the Heritage Foundation; and Freedom House. Given the time limitations in the dependent variable *state capture* this study analyzes the time period 1996 through 2017. In total, 19

countries from Latin America are included in a pooled time series cross-sectional dataset. These countries represent the complete spectrum of countries across Latin America, including developed countries that are established democracies with limited corruption, such as Chile, and underdeveloped countries suffering from flourishing corruption, such as El Salvador and Venezuela. Overall, this study incorporates countries with markedly varying levels of the ControlofCorruption index, a measure which is formulated by the World Bank in combination with Daniel Kaufmann, a leading scholar on corruption and state capture. The ControlofCorruption index takes a wide variety of factors into consideration that capture different perceptions in regard to the extent that public power is exercised for private gain to include both petty and grand forms of corruption along with "capture" of the state by private actors and interests to ultimately curate the index (WGI-Home 2022). A total of 418 observations was expected, but missing data for particular years and countries resulted in fewer observations, N= 349.

There is one main model used in this study to analyze the effects of *political party in power* [years] on *state capture* with the intent of capturing the key independent variable's base effect. Within the overall estimation technique, the study produces a set of four different model outputs to properly analyze the variation in state capture. The model employed is a mixed effects model. The mixed effects approach is suitable given the use of continuous variables in the study along with the pooled nature and inherent time component. The mixed effects model also has advantages relative to other type of modeling strategies in numerous domains. For example, it's superior in regards to a pure time series analysis due to the fact that it is better able to account for messiness and or missingness in the data while still producing robust and reliable results while at the same time being able to account for autocorrelation in the model. The dependent variable, as mentioned earlier, is state capture as derived from the ControlofCorruption index. State capture as derived from the index is originally scaled between -2.5 through 2.5, where -2.5 signified the most extreme amounts of state capture whereas 2.5 signified a corruption free country. First, the state capture variable was inverted so higher levels on the index equate to higher levels of state capture and vice versa. Then, the variable was transformed in order to make its values all positive integers for ease of the analysis by adding 2.5 to every single observation to produce the new scaled measure of state capture that ranges between 0 (no state capture/corruption free) up through 5 (extreme state capture).

The key independent variables are *political party in power [years]* as measured by the Database on Political Institutions curated by the Inter-American Development Bank, log GDPPC which is a measure that comes from the World Bank Development Indicators in which the log of GDPPC was took in order to smooth out the variation of the variable to better capture its true effect, and an interaction variable *Party in Power [years]* * log GDPPC. First, measuring the impact of political parties is problematic. There is no consensus among researchers regarding what should be properly measured as is evident by the multitude of studies that measure the phenomenon in different ways (Blake et al., 2009; Beltran et al., 2020; Beck, Clarke, Groff, Keefer & Walsh, 2001). However, objective measures have become available, and one good source is from the Database on Political Institutions which curates a wide variety of factors relating to political parties. The factor I employ from the database is *party in power [years]* which measures the length that the current party in power sitting in the executive branch holds power for. The variable is straight forward and codes country year data for the respective countries within the database for how long the current party is in power in years in a given country and restarts the count measure once there is a change in regimes. I also estimate the squared and cubic versions of *Party in Power [years]* in order to estimate any quadratic effects that may be present. I argue that quadratic effects

may be present as the impact of *party in power [years]* on *state capture* may be relatively slow gaining at first but once a certain party in power in a given country is able to rule for longer than normal periods of time – corruption and patronage networks should be able to begin to cement themselves in the existing politico-economic system and thus – the quadratic terms aim to capture this effect. *Log GDPPC* is a rather straight forward measure which aims to capture overall levels of economic development in a given country. In order to parse out the effects of *party in power [years]* and *log GDPPC* in a more fine-tuned manner – the interaction term between these two regressors seeks to capture the effect as theorized earlier in this study and posited by my hypothesis that the effect of *party in power [years]* on *state capture* will be greater in countries with lower levels of *economic development* relative to higher levels of *economic development*.

The mixed effects model also includes other "control" variables besides the key independent variables present in the study and discussed above which appropriately account for the determinants of *state capture* as suggested by the literature. The mixture of control variables come in a variety of forms ranging between continuous and dummy variables respectively – but all are known to be determinants of *state capture*.

Finally, so as to avoid the problem of autocorrelation – the mixed effects model is developed to account for the problem of autocorrelation or time dependence in our data by including the autocorrelation term employing an AR(1) process. Moreover, in order to serve as a robustness check given that our key independent variable of interest is *party in power* [*years*] – this study also re-estimates the main results but with dropping Cuba from the sample as it is an extreme outlier (one-party rule for over 60 years). In the robustness results shown in Table 2 – this had the effect of lowering the total n from 348 to 330 for all models estimated. Table 1 below presents the descriptive statistics for the main model and its variables. A discussion of the results follows.

	Min	1QR	Median	Mean	3QR	Max	SD
Time	0	5	10.5	10.48	16	21	5.83
Total % Urban Population	43.44	60.13	72.59	70.88	81.46	95.24	13.59
Economic Freedom	26.70	56.23	61.80	60.10	67.00	79.00	10.78
Total % (GDP) Nat Resources	0.02	1.18	2.01	4.16	4.84	32.28	0.76
Party in Power (Yrs)	1	3	5	9.73	10	71	10.77
State Capture	1.1	1.75	2.01	2.22	2.42	4.1	0.69
GDP Per Capita	5	2294	4123	5275	7170	18691	3866.12
POLITY DV	0	1	1	0.83	1	1	0.38
Civil Liberties	0	2	3	2.97	4	7	1.27
Drug Trafficking	0	0	0	0.21	0	1	0.41

Table 1: Descriptive Statistics

Results

The mixed effects regression results for the full sample are presented in Table 2 with the main model and variations of the main model with a total output of 4 different regression models. Table 3 presents results that form a robustness check where "Cuba" was deliberately omitted from the sample in order to ensure the validity of the results as presented in Table 2 as Cuba is an extreme outlier for our key independent variable of interest *party in power [years]*. The models ran in Table 3 were the same as in Table 2 with the exception of Cuba being omitted from the analysis. In Tables 2 and 3 respectively – the

main model presents the pure results in their base form. Model 2 in Tables 2 and 3 present the results of the main model with the inclusion of a squared quadratic term for our key independent variable *party in power [years]*. Model 3 in Tables 2 and 3 presents the main model with the inclusion of both squared and cubic quadratic effects for *party in power [years]*. Finally, model 4 in Tables 2 and 3 estimates the base model (the main model) without the inclusion of quadratic effects for our key independent variable of interest *party in power [years]* but with the inclusion of an interaction term *party in power [years]* X Log *GDPPC* in order to test for any moderating effects that may be present to properly examine H2. The autocorrelation term is also included in all models in Tables 2 and 3 in order to properly account for the presence of autocorrelation employing an AR(1) process. I begin by discussing the main results of Table 2 below.

Main Results

Table 2 below presents the main results. In Table 2, the main model presents our base estimates. Beginning with the fixed effects, our key independent variable of interest *party in power* [*years*] as shown in Table 2 in the main model was statistically significant at the p < .1 level and positive after controlling for all available regressors. This suggests to us that the longer one *party in power* [*years*] is governing a respective country – the more *state capture* there will be. This finding confirms H1 in which I argued that the longer a party in power is able to stay in power gives said party opportunities to erode political competition while at the same time eroding mechanisms of vertical and horizontal accountability. This in turn enables the leaders of the *party in power* to firmly cement their rule and engage in mechanisms of rent extraction and patronage with ease as political competition remains weak due to the systematic attacks on the existing rules of the game such as has been the case in Venezuela with President Nicolas Maduro. In an environment such as the one described above – corrupt networks are easily able to foment themselves and take root. Figure 1 below visualizes the effect of *party in power* [*years*] on *state capture* in order to greater examine the effects impact on *state capture*.

From Figure 1 below: we clearly see that the longer one party is able to remain in power shown on the x-axis – the more *state capture* we correspondingly see as is shown on the y-axis with 95% confidence intervals on the lower and upper bounds respectively shown in grey. Albeit the effect is modest in regards to the impact of *party in power [years]* on *state capture* as we don't necessarily see drastic increases in *state capture* the more one party is able to remain in power – the effect is still highly salient nonetheless and does confirm H1 that the greater *party in power [years]* – the more *state capture* there will be. This also suggests that corruption and state capture do take time to develop as *party in power [years]* increases – these are not just phenomena that happen overnight.

Table 2: Main results

	Main Model	Model 2	Model 3	Model 4
Fixed Effects				
Time	0.016***	0.015***	0.015***	0.016***
	(0.006)	(0.006)	(0.006)	(0.006)
Total % Pop Urban	-0.019**	-0.019**	-0.019**	-0.020**
	(0.008)	(0.008)	(0.008)	(0.008)
Economic Freedom	-0.006**	-0.006**	-0.006**	-0.006*
	(0.003)	(0.003)	(0.003)	(0.003)
Total % Nat Res Rents (GDP)	-0.005**	-0.005*	-0.005**	-0.005**
	(0.003)	(0.003)	(0.003)	(0.003)
Drug Trafficking	0.627**	0.628**	0.633**	0.631**
	(0.279)	(0.279)	(0.280)	(0.278)
Party in Power	0.002*	0.003	0.001	0.028*
	(0.001)	(0.003)	(0.004)	(0.017)
^2 Party in Power		0.000	0.000	
		(0.000)	(0.000)	
^3 Party in Power			0.000	
			(0.000)	
Democracy	-0.079**	-0.077**	-0.076**	-0.072*
	(0.036)	(0.037)	(0.037)	(0.037)
Civil Liberties	-0.046**	-0.046**	-0.045**	-0.045**
	(0.02)	(0.02)	(0.02)	(0.02)
Party in Power X Log GDPPC				-0.007
				(0.004)
Log GDPPC	-0.278***	-0.276***	-0.279***	-0.225**
	(0.101)	(0.102)	(0.102)	(0.107)
Constant	0.477	0.467	0.47	0.30
	(0.61)	(0.61)	(0.612)	(0.618)
Random Effects				
Intercept	9 394	4 323	4 16	912
intercept	(1.83)	(3.38)	(3.62)	(3.46)
Residual	0.523	0.527	0.53	0.523
Residual	(0.07)	(0.08)	(0.08)	(0.08)
	(0.07)	(0.08)	(0.08)	(0.08)
Correlation Structure (AR1)	0.978	0.978	0.978	0.978
	240	240	240	240
Ubservations	349	349	349	349
Log Likelihood	242.883	242.977	243.228	244.134
AIC	-459.767	-457.954	-456.456	-460.267
BIC	-409.651	-403.983	-398.63	-406.296

Note: *p<0.1; **p<0.05; ***p<0.01



Figure 1: Substantive effects Party in Power [Years] on State Capture

Log GDPPC in Table 2 of the main model results represented our control variable for overall economic development and wealth of a country. The results show that while controlling for all other variables – Log GDPPC is highly statistically significant at the p <.01 level and negative which suggests to us the wealthier and more economically developed a given country is – the less amount of *state capture* will be present in a given country. This suggests to us that wealthier and more economically developed countries may be better off at distributing the gains of wealth and leveling the economic playing field. Moreover, once a country becomes wealthy, it could have "lock in" effects where citizens realize how good things are and the minute things begin to turn sour – they will loudly express their "voice". Thus, wealthier and more economically developed countries should generally show elasticity with respect to the relationship between economic development and state capture where the wealthier and better off a country – the less state *capture* while the reverse holds true for less developed countries economies who often suffer from poor institutional quality and rigged rules of the game which are not conducive to healthy economic production and development. The impact of Log GDPPC on state *capture* is shown below in Figure 2 in order to greater parse out its effect on *state capture*.



Figure 2: Substantive effects Log GDPPC on State Capture

Figure 2 above visualizes the effect of *Log GDPPC (economic development)* shown on the x-axis on *state capture* as is shown on the y-axis with 95% confidence intervals in grey. Figure 1 demonstrates that the more economically developed and wealthier a country's citizens become as we move across the range of the x-axis – the less *state capture* there will be overall – thereby confirming part of H2 with respect to the impact of *economic development* on *state capture*. H2 will be fully explored in more detail later below in order to parse out the moderating effect of *party in power [years]* on *state capture* at varying levels of *economic development*. The key takeaway for this finding, however, remains the fact that *economic development* matters for *state capture* and corruption – where the more economically developed a given country is – the less *state capture* overall.

The correlation structure (AR1) process shown in Table 2 in the main model also demonstrated that there was significant autocorrelation or "time dependence" present in the model and that we have properly accounted for it by including the autocorrelation term. Overall, the results for the main model proved highly robust while H1 proved true – the longer a *party in power [years]* – the more *state capture* there will be. Next, I briefly discuss models 2 through 3 in Table 2 below which extend the analysis of the main model but include quadratic effects on our key variable of interest *party in power [years]*.

In model 2 of Table 2 – I examine the same model as the main model but this time include a squared term for *party in power [years]* where by this term enabled the analyzation that perhaps at lower levels of *party in power [years]* – *state capture* may increase but once *party in power [years]* reaches a certain threshold – its effect on *state capture* exponentiates. We see, however, that including the squared term for *party in power [years]* in model 2 while controlling for all other variables did not produce any reliable results and did not garner any statistical significance. Overall, from these results we can derive the fact that *party in power [years]* with respect to quadratic effects on *state capture* does not hold. However, the base result as was shown in the main model of Table 2 remains robust. A brief discussion of model 4 – the model with our interaction term in Table 2 follows below.

Model 4 in Table 2 presents the same estimation as the main model in Table 2 but with the inclusion of an interaction term Log GDPPC * Party in Power [years] but without the examination of any quadratic effects as was done in models 2 through 3 in order to analyze H2. Overall, the results remain consistent with the estimation results from the main model. Meanwhile, our key variable *party in power [years]* also remained statistically significant and positive while controlling for all other factors which once more suggests to us that as *party in power [years]* increases as every year goes by – *state capture* can be expected to increase as well. Log GDPPC also remained negative and statistically significant. However, it lost a level of significance moving from a p < .01 significance level as was the case in the main model to a p < .05 level in model 4 with the interaction term due to the multicollinearity present between the interaction term and the variable itself which has the effect of biasing the estimates downward. The interaction term Log GDPPC * party in power *[years]* is negative which is the correct sign as predicted by my argument in which I argue that the impact of *party in power* [years] on *state capture* will be less at higher levels of *GDPPC* (as this variable serves as a corollary for general levels of economic development in a given country). This is due to the fact that once a certain threshold of wealth in a given country has been reached which doesn't come about via poor institutions and corruption as these factors increase wealth inequality and stifle economic development - but rather overall levels of higher economic development as suggested by the corollary of GDPPC signify that the country as a whole and its citizens are benefitting from a politico-economic system that is more egalitarian in nature. Thus, once citizens of a given country would sense a downturn for the worse in terms of overall economic development and inequality – citizens in a wealthier and more economically developed country as measured via GDPPC will be more apt to raise their "voice" and express discontent for perceived mismanagement of the economy and wrongdoings by public officials and or harmful acts which stifle economic development on behalf of private sector actors. This is because citizens in a country that is more economically developed will not tolerate corruption to the same extent as citizens may in a country that is not as economically developed where the rules of the game are still in flux and the ease of doing business remains difficult. In countries such as those just described that remain at lower levels of overall economic development - "greasing the wheels" of commerce or "greasing the palms" of public sector officials in order to carry on with business remains common practice. On the other hand, in economically developed countries, the citizens in these countries would not be able to fathom corrupt practices as they already were able to see how good things were at high levels of economic development and will not tolerate a reversion backwards. Put shortly, the impact of party in power [years] on state capture will be less at higher levels of GDPPC relative to lower levels of GDPPC as economically developed countries and their citizens are less likely to tolerate corrupt acts and practices as economically developing countries and their citizens would be due to the paucity of strong institutions and legal/regulatory frameworks which are often characteristic of economically developed countries which lubricate economic activity but serve as a hindrance to economic activity in less developed countries as is shown via the proxy of GDPPC. Still, this interaction term was not statistically significant at a p < .12 even though its direction was correct (negative). However, it is important to analyze the impact of the interaction term in detail below with a visualization in order to visualize the effects of party in power [years] on state capture at



varying levels of *log GDPPC* to better parse out the interaction terms true effects as is shown in Figure 3 below:

Figure 3: Party in Power [Years] on State Capture at Varying levels of Log GDPPC

In examining Figure 3 above which visualizes our key interaction term to test H2 in which I argued that the effects of party in power [years] on state capture will be less at higher levels of *economic development* relative to lower levels of economic development in which I went into the argument as to why detailed above – we do see that this appears to be the case. In Figure 3, the red line corresponds to the lower levels of GDPPC (economic development) and we see that in this case, the effect of party in power [years] as shown on the x-axis on *state capture* as shown on the y-axis is higher at these lower levels of economic development suggesting to us that less economically developed countries are not as capable at controlling the corrupting effects of party in power [years] on state capture. Meanwhile, Figure 3 demonstrates as shown via the green line that higher levels of GDPPC (economic development) in which the legend to the right also portrays the various levels of GDPPC – that at these higher levels of economic development – the impact of party in power [years] on state capture is mitigated which suggests to us that higher economically developed countries offer superior institutional quality that are better able to mitigate any corrupting impacts that a party in power [years] may have on state capture. Still, the moderating effect remains without statistical significance.

Robustness Check Results

In Table 3 below I present a robustness check of the results garnered from Table 2 by dropping Cuba from the sample to bring the total number of observations estimated in the model down from 349 to 330 which accounts for the omission of Cuba for the years 1996-2017. The results in Table 3 serve as a robustness check as Cuba is an unusual case – especially with respect to our key independent variable of interest *party in power [years]* as Cuba is an extreme outlier in this case having a single party rule ever since its revolution in 1959. Thus, it is worthwhile to guarantee the robustness of our results as were shown in Table 2 by omitting Cuba from the sample as is done in Table 3 and its estimated models.

From Table 3 in the main model – we see that the results remain highly robust and consistent with the main model estimation as was done in table 2 but with the omission of Cuba from our sample. The same can be said for models 2 through 4 in Table 3 in which once more the results remained consistent with the results from table 2 and highly robust. Overall, *party in power [years]* in both the main model and model 4 of Table 3 remained statistically significant and positive in our robustness check models (the same outcome as was the case in table 2 which presented the main results). Thus, our robustness check demonstrates that even with Cuba omitted from the sample which was a major outlier with respect to our key independent variable of interest *party in power [years]* – the results hold, are consistent with the main estimates in Table 2, and remain highly robust.

Discussion and Conclusion

This study examined the relationship between *political party in power [years]* which is synonymous with political party institutionalization as the longer one party is able to remain in power signifies that political competition is weak and state capture. This is because opposition political parties that can serve as a potential check on the party in power are slim to non-existent. The study used a pooled regression employing a mixed effects model where time served as our level 1 units (the fixed effects) and countries served as our level 2 units (the random effects) for 19 different Latin American countries through the years 1996-2017. The findings are consistent with the various results presented in the literature and suggest that *party in power [years]* where the longer one single party is able to remain in power presents a serious obstacle for controlling corruption and *state capture*. However, as we have shown in this study, the greater a country's level of *economic* development – the effects of party in power [years] are abated relative to countries with low levels of overall *economic development* albeit the moderating variable was without statistical significance. Still, the base effect for economic development on state capture remained statistically significant. The data for this study are derived from various sources, aggregated by countries at the country-level. At the present state, the findings of this study generalize the country level experiences of *state capture* and adds to our understanding of the impact of *political party in power [years]* and resultant institutionalization of political parties and their impacts on *state capture*.

Table 3: Kobustness check	(Cuba omitted fro	Model 2	Model 2	Model 4
Final Effects	Main Model	Widdel 2	Model 5	Model 4
Fixea Effects	0.01/***	0.01 (***	0.01/***	0.01 (***
lime	0.016***	0.016***	0.016***	0.016***
T - 10/ D - 111	(0.006)	(0.006)	(0.006)	(0.006)
Total % Pop Urban	-0.019**	-0.019**	-0.019**	-0.020**
	(0.008)	(0.008)	(0.008)	(0.008)
Economic Freedom	-0.007**	-0.007**	-0.007**	-0.007**
	(0.003)	(0.003)	(0.003)	(0.003)
Total % Nat Res Rents (GDP)	-0.006**	-0.005**	-0.005**	-0.005**
	(0.003)	(0.003)	(0.003)	(0.003)
Drug Trafficking	0.583*	0.584*	0.584**	0.587**
	(0.278)	(0.278)	(0.275)	(0.277)
Party in Power	0.002*	0.003	0.000	0.029*
	(0.001)	(0.003)	(0.004)	(0.018)
^2 Party in Power		0.000	0.000	
		(0.000)	(0.000)	
^3 Party in Power			0.000	
			(0.000)	
Democracy	-0.081**	-0.079**	-0.078**	-0.073*
	(0.037)	(0.037)	(0.037)	(0.037)
Civil Liberties	-0.044**	-0.043**	-0.042**	-0.042**
	(0.021)	(0.021)	(0.021)	(0.021)
Party in Power X Log GDPPC				-0.007
				(0.005)
Log GDPPC	-0.282***	-0.280***	-0.284***	-0.230**
C	(0.104)	(0.104)	(0.104)	(0.109)
Constant	0.553	0.543	0.557	0.361
	(0.611)	(0.612)	(0.609)	(0.622)
			× ,	× ,
Random Effects				
Intercept	4.148	3.691	1.651	3.648
	(1.83)	(3.38)	(3.14)	(3.46)
Residual	0.522	0.522	0.518	0.52
	(0.07)	(0.08)	(0.08)	(0.08)
Correlation Structure (AR1)	0.976	0.976	0.976	0.976
	220	220	220	220
Upservations	33U 224 (44	330	33U 225 174	330
Log Likelihood	224.644	224.724	225.164	225.86
	-423.288	-421.447	-420.328	-423.72
BIC	-373.9	-368.26	-363.342	-370.533

Table 3: Robustness check (Cuba or	mitted from	analysis)
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The theoretical arguments against strong political parties and institutionalization do not hold according to our study. Strong parties do make a difference at controlling corruption in a given country as they serve as a key source of horizontal accountability on the executive branch but also against private sector actors in their attempts to engage in

acts of *state capture*. Both of which are crucial for Latin America which historically has a legacy of a very strong executive branch or what O'donell (1994) would describe as "delegative democracies" along with asymmetrical power wielded by private sector actors (Durand 2019). This study has demonstrated the negative impacts of *political party in power [years]* on *state capture* as the longer one party is able to remain in power – the greater the level of *state capture* will be present within a given country. This further suggests that political parties (especially the party in power) play a pivotal role in either facilitating or inhibiting state capture and corruption. This also suggests that the type of *political party in power* [years] may also either contribute to or inhibit *state capture*. This crucial fine point is worth explicating, as it has not yet been empirically examined in the literature. Thus, a study that not only accounts for political party in power [years] but also a characterization of said party such as its ideology on a scale ranging from autocratic to democratic and its resultant impact on state capture is a worthwhile undertaking to examine for future research. One way to estimate this would be to include a moderator that examines political party in power [years] on state capture at varying levels of regime type. To do so in this study, however, is beyond the scope of the focus of this research.

Including *political party in power [years]* in the *state capture* model may help countries and their respective governments with all of the different horizontal and vertical accountability mechanisms in place to realize the importance of strong political party competition when it comes to controlling corruption. It is well known that autocracies by and large experience more corruption than do democracies (Durand, 2018) as party competition in autocracies is often slim to non-existent. Thus, for autocracies, there may not be a whole lot society can do until reform or revolution take hold which enable healthy political party competition to take place. For weak and or ill-established democracies, however, – the importance of political parties is even more profound – as they can make or break whether or not a country goes down the path of corruption and state capture – or the path towards healthy and equitable politico-economic development. Moreover, in dynamic environments such as what a government governing a country confronts considering the role of political parties will help state officials and politicians implement measures to help protect political party competition along with refine any existing deficiencies in existing political parties and their respective structures and legal frameworks in which they operate in order to mitigate any factors that could cause political parties to play a key role in fomenting *state capture* and corruption. Based on this study, even miniscule changes in *political parties* can make a difference when it comes to *state* capture (or lack thereof). Thus, once governments determine the relative importance of political parties for state capture, their response to the expected digressions/improvements in political party robustness in a given country would have to be taken into account in the existing legal and regulatory frameworks for purposes of helping to limit acts of state *capture* and corruption.

Governments and private sector actors alike should ultimately take an aggressive stance when it comes to corruption and *state capture* for the good of the country and the long-term interests of the citizenry at large. To that end, if *political parties* once in power become unable to be dislodged from such power due to weak political party opposition and resultant lack of competition in a given country and therefore begin to cement corrupt networks and acts of patronage due to the lack of accountability they confront – it is up to the marginalized sectors of society at that point to call out the perceived wrongdoings on behalf of those who wield power. However, this becomes increasingly difficult for the marginalized in such a situation as they often confront at this point once a single party in power is able to cement its rule – inevitable acts of political persecution along with judicial

misgivings. Therefore, it is crucial to fight for civil liberties at all costs and ensure civil society can act as a check on an increasingly autocratic governing party in power once political competition becomes stifled. To that end, the importance of a strong and independent judiciary must not be discounted either (Carrion 2021).

Examples can be found where governments have played a key role in managing corruption and acts of *state capture* with the aid of responsible and robust political parties. For instance, Chile – with its robust political party system has better been able to keep a check on corruption in the country while offering a greater level of horizontal accountability that can provide checks on an executive that wishes to skew the system in its favor. At the other end of the spectrum, a country such as Venezuela has lost all forms of horizontal and vertical accountability. In Venezuela, there is no political opposition while Venezuelan president Nicolas Maduro has managed to turn Hugo Chavez's populist movement into full-fledged authoritarian rule. In Venezuela, the implications of one single *party in power* for a substantial number of years along with a lack of political competition are clear: the country and its people are living in a crisis. A country such as Peru can be argued to be in the mid-level range of Chile and Venezuela. While Peru does not have robust and institutionalized party systems as does Chile - there are, nonetheless, alternations in power and political competition which are notably absent in the case of Venezuela. This could explain partly why Peru has greater levels of *state capture* than Chile but lower levels relative to Venezuela. In the end, political parties' matter – and they play a key role in either the strengthening or weakening of the politico-economic rules of the game.

This study does yield limitations. It relied upon a perception-based measure of corruption/state capture for the dependent variable given the inevitable difficulty of properly measuring a phenomenon that often takes place in either "grey zones" or completely illicit zones. With that said – it is still one of the most robust corruption measures out there in the world today and made for an easy choice for inclusion in this study. Another limitation of this study is that it could not properly account for the specific impact of party in power based upon the classification of said party. This study only took the key independent variable party in power [years] and measured its impact on state capture. While this provides a good estimate for the initial impact of *party in power* on *state capture* - it is not a perfect measure. Future studies aiming to estimate the impact of the length of the party in power on *state capture* should also attempt measures at classifying this key independent variable depending upon whether the *party in power* leans more democratic or autocratic in order to better parse out its effects. Finally, it is worthwhile to examine if the impact of *party in power* on *state capture* varies depending upon the type of economy and not just overall levels of economic development (ie is the economy resource dependent or more diversified; the total % manufacturing relative to other sectors etc.). Addressing these issues is and remains a critical task for helping governments, policymakers, and academics alike to better manage and understand corruption and state capture. To do so here, however, is beyond the scope of this study.

Acknowledgements

I am grateful to Dr. Julio Carrion (my advisor, mentor, and committee chair) for his thoughtful comments and input on this paper along with the knowledge he has passed down to me relating to Latin American Politics and state capture. Julio – I want you to know that it is and always will be a true honor to be able to work with and learn from you, along with have you as my advisor. It is an opportunity I don't take lightly. I also owe a debt of gratitude to my mentor and professor Dr. Ben Bagozzi who helped me finalize the

proper model estimations and make this study as robust as it could be – along with his enduring support and all that he has passed down to me in the realm of quantitative methodologies. Ben, it has been a true pleasure to be able to work with and learn from you as well – and you know how much it means to me to be able to do so. Finally, I would like to thank Dr. Daniel Kinderman – for his thoughtful input on my paper including helping me to flush out argument from theory and for serving as a professor who I look up to and as someone who also places an emphasis on research that stands up against the existing socioeconomic inequalities in the world today in hopes for a better and more equitable future. Daniel – I look forward to learning from you and to strengthening our academic partnership in the years to come. Thank you all – for everything.

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BIDEN SCHOOL JOURNAL OF PUBLIC POLICY

Original Research Article

Achieving Carbon Neutrality: US and India Weigh Policy Options

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Abstract

Article history:

Received: February 21, 2022 Revised: March 9, 2022 Accepted: May 3, 2022

Suggested Citation:

Krishnan, P & Kasturi, P (2022). Achieving Carbon Neutrality: US and India Weigh Policy Options. *Biden School J. Pub. Pol*, 13, 66-97

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The paper takes a critical look at the US and India positions on achieving carbon neutrality as per their commitment to the *Paris Agreement* on Climate Change. These are based on the climate change policies of the leaders of the two countries, President Joe Biden, and Prime Minister Narendra Modi, at the COP 26 summit held in Glasgow, Scotland in November 2021. Policy tools to achieve carbon neutrality such as cap and trade and carbon tax (both market-based approaches), regulations (command and control approach) and other economic incentives such as tax credits and subsidies are examined. Based on various empirical research published in the literature regarding the two countries, an assessment is made regarding the use of these tools to achieve the goals of efficiency, equity, liberty, and sustainability in the two countries. Carbon taxation at the national level is currently missing in both countries and has the potential to be a revenue source of climate finance. The US needs to assert its leadership among the OECD donor countries to provide climate finance to developing countries and direct more of such finance for adaptation to climate change among developing countries. Low Carbon Technology (LCT) transfer through trade is low among both countries and there is a need to accelerate this process. Innovations that are occurring in both countries presently in nuclear power, hydrogen power and other clean energy such as solar, hydroelectric, geothermal and biomass can provide a great fillip to early achievement of net zero emissions. International cooperation and partnership between the US and India are growing in pursuing nuclear and solar as clean fuels. However, stepped up co-innovation in clean energy between the two countries holds great dividends to achieve carbon neutrality in both countries.

Keywords: Carbon neutrality, climate policy tools, climate finance, technology transfer, innovation, international cooperation and partnerships

Introduction

Since 1992 countries of the world are collectively engaged to slow down global warming. Climate change threatens humanity with all kinds of environmental

catastrophes such as sea level rise, droughts and floods, desertification and species loss that reduces biodiversity in nature. But it is not clear from the most recent concluded year 2021 that efforts to thwart consequences of global warming have been working.

The foreign minister of Tuvalu, a Pacific Island nation, gave his speech to the United Nation's Conference on Climate Change held in Glasgow in November 2021 standing knee deep in seawater in order to show how the low lying country was at the front line of climate change (Colin, 2021). Several other island countries are also at high risk for sea level rise. It has been observed that sea level rise has already encroached lands on many of the islands. High tides and frequent storms continue to place local homes and property at risk. Recent research indicates that on average sea levels have been increasing by 3.4 millimeters (0.13 inches) per year. (Albert et al, 2016). The Standardized Precipitation Evapotranspiration Index (SPEI) Global Monitoring, a real time global monitor, reported that the world is facing unprecedented levels of drought and that no continent had been spared except Antarctica. Drought affected large areas in the United States, Brazil and Madagascar in 2021 (Tebor, 2021). At the same time, heavy rains and floods occurred in several countries around the world. These included various countries such as Germany, France, Bosnia, Herzegovina, Turkey, China, India, Afghanistan, Pakistan, Sri Lanka, Guatemala, Mexico, the United States, Nigeria, Somalia, Australia, and New Zealand (Bir, 2021). Desertification affected 45 percent of the African continent in 2021 (UN, 2021). Also, researchers at the Natural History Museum in UK released a report in October 2021 which stated that globally biodiversity intactness index stood at 75 percent. The biodiversity intactness index represents the proportion of the original number of species in an area that remain and their abundance. Scientists have set 90 percent as the safe limit in order to maintain ecological processes such as pollination and nutrient cycling that is vital to the survival of humanity (Ashworth, 2021).

Economic Impact

An IPCC Special Report for policy makers released in 2018 notes that risks to global aggregated economic growth due to climate change impacts are projected to be lower at 1.5°C than at 2°C by the end of this century. Excluded from these costs are the costs of mitigation, adaptation investments and the benefits of adaptation. The largest impacts due to climate change should global warming increase from 1.5°C to 2°C would be for countries in the tropics and Southern Hemisphere subtropics. A great proportion of people both so exposed and susceptible to poverty are in Africa and Asia. Global warming risks across energy, food, and water sectors could overlap spatially and temporally. This would create new and exacerbating current hazards, exposures, and vulnerabilities that could affect increasing numbers of people and regions adversely (IPCC, 2018).

Christian Aid, a charity organization, reported that based on its research, climate emergency cost the world nearly \$200 billion in 2021 (Democracynow, 2021). Swiss Re, an insurance company, has provided a macroeconomic forecast that climate change could potentially cost the world economies \$23 trillion by 2050 in annual global economic output if governments fail to act decisively on the climate (Flavelle, 2021). This amount represents about 18 percent of the world's Gross Domestic Output (GDP).

The first report in 1990 of the Intergovernmental Panel on Climate Change (IPCC) held that emissions resulting from human activities are increasing the atmospheric concentrations of the greenhouse gases (GHG), resulting on average in an additional warming of the Earth's surface. The terms carbon emissions and greenhouse gases are used interchangeably in the literature. In the three decades since the IPCC report was made public, governments have collectively pledged to slow global warming. But despite intense lobbying by activists, political leaders and diplomats, the world still faces the perils of climate change.

By terms of the Kyoto Protocol negotiated in 2005 and the Paris Agreement negotiated in 2015, a large number of countries agreed to reduce greenhouse gas emissions. However, the amount of carbon dioxide in the atmosphere keeps rising, and as a result the Earth is being warmed up at an alarming rate. Scientists have warned of dire consequences if the warming continues unabated. Table 1 shows carbon emissions of the top twelve emitter countries in the world and the progress made or lack thereof in the decade since 2010. Table 2 shows per capita emissions for the same 12 select countries.

Country	Yr-2010 (Million metric tons)	Yr-2020 (Million metric tons)
China	8617	10668
US	5676	4713
India	1678	2442
Russia	1613	1577
Japan	1215	1031
Iran	570	745
Germany	833	644
Saudi Arabia	518	626
South Korea	596	598
Indonesia	452	590
Canada	559	536
Brazil	440	467
South Africa	467	452
Turkey	314	393

Table 1: Carbon Dioxide Emissions by Select Country, 2010 and 2020 (Source: <u>https://www.statista.com/statistics/270499/co2-emissions-in-selected-countries/</u>)

Table 2: Per Capita Carbon Dioxide Emissions by select country, 2010 and 2020 (Estimated per capita emissions based on population figures for 2010 and 2020 for selected countries from the Population Council)

Country	Yr-2010 (metric tons/capita)	Yr-2020 (metric tons/capita)
China	6.44	7.56
US	18.35	14.30
India	1.36	1.77
Russia	11.29	10.94
Japan	9.49	8.19
Iran	7.73	8.87
Germany	10.19	7.74
Saudi Arabia	18.85	17.98
South Korea	24.28	23.20
Indonesia	1.87	2.16
Canada	16.44	14.10
Brazil	2.25	2.20
South Africa	9.12	7.62
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Turkey	4.34	4.66

International Legal Framework

Clearly trying to impact climate change to reduce global warming requires tremendous cooperation from all countries of the world. Over the last 35 years, international negotiations have resulted in four landmark agreements. These include the *Montreal Protocol in 1987, the UN Framework Convention on Climate Change (UNFCCC) in 1992, the Kyoto Protocol in 2005 and the Paris Agreement in 2015* (Maizland, 2021).

The *Montreal Protocol* does not tackle climate change directly. It requires countries to stop producing substances that damage the ozone layer, such as chlorofluorocarbons (CFCs). The protocol which has been ratified by all countries has served to virtually eliminate ozone-depleting substances. The Kigali Amendment to the *Montreal Protocol* agreed to by all parties in 2016 requires further those countries also reduce their production of hydrofluorocarbons (HFCs), powerful greenhouse gases that contribute to climate change.

The UN Framework Convention on Climate Change (UNFCCC) has been ratified by 197 countries and is the first accord to address climate change. The medium chosen to address the issue is an annual forum, known as the Conference of the Parties, or COP for short. The international discussions that followed to stabilize the concentration of greenhouse gases in the atmosphere resulted in the *Kyoto Protocol* and the *Paris Agreement*.

The *Kyoto Protocol* was adopted in 1997 by various countries and entered into force in 2005. This was the first legally binding climate treaty. Developed countries were required to reduce emissions by an average of 5 percent below 1990 levels, and a system to monitor countries' progress was also established. The treaty did not compel developing countries to act. Included among them were China and India which are major carbon emitters The United States became a signatory in 1998. The country never ratified it however, and later withdrew its signature from the agreement.

The *Paris Agreement* is considered the most significant global climate agreement. It requires all countries to set emissions-reduction pledges. Governments set targets, known as nationally determined contributions (NDCs), with the goals of preventing the global average temperature from rising 2°C (3.6°F) above preindustrial levels and pursuing efforts to keep it below 1.5°C (2.7°F). The key idea is to achieve global net-zero emissions, where the amount of greenhouse gases emitted equals, the amount removed from the atmosphere, in the second half of the century. This is also known as being **climate neutral** or **carbon neutral**. The US became a signatory to the agreement in April 2016 under President Obama, withdrew from the Paris Agreement on November 4, 2020 under President Trump and rejoined as a signatory on February 19, 2021 under President Biden(McGrath, 2020; NPR, 2021). This flip flop shows that domestic politics play a significant role in shaping a country's commitment to abide by the terms of the *International Paris Agreement*.

As per the Global Stock Take (GST) process of the Paris Agreement, every five years, countries assess their progress toward implementing the agreement. Countries are allowed to set their own targets, and there are no compelling enforcement mechanisms to ensure that the targets are being met. The first of the GST process started in 2021 and is set to conclude in 2023.

Numerous countries have made new pledges during the recent UN climate conference known as COP26 held in Glasgow, Scotland in November 2021. The US has pledged to decrease carbon emissions by 50 percent by 2030, India by 22 percent and China by 25

percent over the same period. The US plans to achieve full carbon neutrality by 2050, China by 2060 and India by 2070. Still, skeptics remain concerned that these pledges are not ambitious enough.

As mentioned earlier, carbon neutrality means having a balance between emitting carbon and absorbing carbon from the atmosphere in carbon sinks. To achieve net zero emissions, all worldwide greenhouse gas (GHG) emissions will have to be counterbalanced by carbon sequestration. In the following sections, we review the most recent climate change policies of the United States of America and India to achieve carbon neutrality by the latter half of the twenty first century and examine some of the economic tools available to achieve the same. A longitudinal view of climate change policies under various administrations in the two countries since the Kyoto protocol was signed in 1997 can be found in Table 3. What can be inferred from the Table is that climate change policy changed drastically in the US when the country withdrew from the Paris Agreement. It is also clear that in India there has been growing awareness of its global responsibility as it previously regarded climate change primarily as a problem of developed countries. It has also increased its commitment to be part of the solution to the problem of climate change.

Leader of Country Climate Change Policy		Source
USA		
President William Clinton (1992-2000)	The Clinton Administration launched the Climate Change Technology Initiative to spur the development of clean energy technologies to reduce greenhouse gas emissions that lead to global warming while saving money and creating jobs.	https://clintonwhitehouse5.archives.gov/WH/A ccomplishments/eightyears-08.html The Clinton Presidency: Protecting our Environment and Public Health
President George W. Bush (2001-2008)	President Bush stated that his plan would prevent the release of 500 million metric tons of greenhouse gases, which is about the equivalent of 70 million cars from the road. This target would achieve this goal by providing tax credits to businesses that use renewable energy sources.	https://en.wikipedia.org/wiki/Climate_change policy of the George W. Bush administratio <u>n</u> Climate Change Policy of the Bush Administration.
President Barack Obama (2009-2016)	The Climate Action Plan is an environmental plan that proposed a reduction in carbon dioxide emissions. It included preserving forests, encouraging the use of alternate fuels, and increased study of climate change.	<u>https://en.wikipedia.org/wiki/Presidential_Cli</u> <u>mate_Action_Plan</u> Presidential Climate Action Plan
President Donald Trump (2017-2020)	Programs to be eliminated included the radon program, grants to clean up industrial sites ("brownfields"), climate change research, and the Office of Environmental Justice. Trump's objectives include the lifting of regulations from various energy industries to boost domestic energy production. Withdrew the US from the Paris Agreement on June 1, 2017.	https://en.wikipedia.org/wiki/Environmental policy of the Donald Trump administration Environmental Policy of the Donald Trump Administration. https://en.wikipedia.org/wiki/United States w ithdrawal from the Paris Agreement United States withdrawal from the Paris Agreement
India		
PM Atal Bihari Vajpayee (1999- 2004)	Increase the share of wind, solar and hydro power. Promote various energy efficiency measures in the industrial, commercial, governmental and domestic sectors. Increase forest cover and reduce energy intensity of GDP.	https://archivepmo.nic.in/abv/speech- details.php?nodeid=9066 Speech of Prime Minister Shri Atal Bihari Vajpayee At the High Level Segment of the Eighth Session of Conference of the Parties to the UN Framework

Table 3: Longitudinal Climate Change Policy of US and India since the Kyoto Protocol of 1997

Convention on Climate Change

PM	Manmohan	Country is pursuing solar energy, urging energy efficiency, creating a	https://www.nytimes.com/2008/07/01/business/
Singh (20	004-2014)	sustainable habitat, conserving water, preserving the Himalayan ecosystem,	worldbusiness/01rupee.html India Offers 8
		creating a "green" India, creating sustainable agriculture and, finally,	Ideals on a Climate Change Policy, but Few
		establishing what Singh called a "strategic knowledge platform for climate	Details
		change."	

US Current Climate Change Policies

The US plans to be carbon neutral by 2050. On December 8, 2021, President Joe Biden has signed an executive order to make the federal government carbon-neutral by 2050, with a 65% reduction in planet-warming greenhouse gas emissions by 2030 and an all-electric fleet of cars and trucks five years later. The highlights of the plan include the following:

The United States federal government will use its full influence in scale and procurement power to be a prime example in preventing the climate crisis from further escalation. The US seeks to curtail emissions across federal operations, advance American clean energy industries and manufacturing, and create clean, healthy, and resilient communities. It hopes to manage the climate crisis in a manner that creates well-paying jobs, newer industries, and makes the country more economically emulous. It may be noted in context that there have been 13 bills or enabling legislations that have been approved by the US Congress since 1992 which are aimed at combatting various aspects of climate change (C2ES, 2022). They also support various aspects of the Biden plan.

The salient features of the new climate policy of President Biden is directed to achieve five ambitious goals (Whitehouse, 2021):

- 100 percent carbon pollution-free electricity (CFE) by 2030, at least half of which will be locally supplied clean energy to meet 24/7 demand.
- 100 percent zero-emission vehicle (ZEV) acquisitions by 2035, including 100 percent zero-emission light-duty vehicle acquisitions by 2027.
- Net-zero emissions from federal procurement no later than 2050, including a Buy Clean policy to promote use of construction materials with lower embodied emissions.
- A net-zero emissions building portfolio by 2045, including a 50 percent emissions reduction by 2032; and
- Net-zero emissions from overall federal operations by 2050, including a 65 percent emissions reduction by 2030.

The US federal government will also orient its procurement and operations efforts in line with the following principles and goals (Whitehouse, 2021):

- Achieving climate resilient infrastructure and operations.
- Building a climate- and sustainability-focused workforce.
- Advancing environmental justice and equity.
- Prioritizing the purchase of sustainable products, such as products without added perfluoroalkyl or polyfluoroalkyl substances (PFAS); and
- Accelerating progress through domestic and international partnerships.

India's Current Climate Change Policy

The national statement delivered by Prime Minister Modi at COP26 Summit in Glasgow highlighted the fact that India, which is working to uplift millions of people out of poverty accounts for 17 % of the world's population but bears responsibility for only 5 percent of the carbon emissions (MEA, 2021). India has been delivering in letter and spirit on the Paris Commitment. He also noted that India ranks fourth in the world in installed renewable energy capacity. The National Renewable Energy Laboratory (NREL) has shown that a 35 percent penetration of renewable energy car reduce carbon emissions by 25-45 percent (Tierney and Bird, 2020). It has been estimated that India's non-fossil fuel energy had increased by more than 25% in the previous 7 years, and it had reached 40% of India's energy mix. Among other notable achievements, India had more passengers travel by Indian Railways than the entire population of the world which is estimated currently

at 7,9 billion. This ultra large railway system hopes to achieve 'Net Zero' by 2030 which initiative alone could reduce carbon emissions by 60 million tonnes annually. Likewise, the massive LED bulb campaign could reduce carbon emissions by 40 million tonnes annually.

India had also worked to provide institutional solutions to provide a cooperative pathway with the world at the international level. It had initiated the International Solar Alliance to use solar power more effectively. It had also created a coalition for disaster resilient infrastructure for climate adaptation. This was both a sensitive as well as a vital initiative to save millions of lives.

The Government of India (GOI) pledged to do the following in the near future (MEA, 2021):

- take its non-fossil energy capacity to 500 GW by 2030.
- meet 50 percent of its energy requirements from renewable energy by 2030.
- reduce the total projected carbon emissions by one billion tonnes from now till 2030.
- reduce the carbon intensity of its economy by more than 45 percent by 2030.
- achieve the target of Net Zero by 2070.

The Prime Minister observed that the promises made till date regarding climate finance had proven to be hollow. There was a need to revise the world's ambitions on climate finance since the time of the *Paris Agreement* as the world's ambition on climate change had increased substantially. Transfer of climate finance and low-cost climate technologies had become more important than ever before. Developed countries need to provide climate finance of \$1 trillion at the earliest. Alongside tracking the progress made in climate mitigation, it was also important to track climate finance. There were proper justice issues which required applying pressure on those countries that did not live up to their promises made on climate finance. Thus, India has signaled that emission cutting pledges from India and other developing nations would require finance from rich developed nations that have been historically large emitters.

Policy Options to Mitigate Climate Change

The US and India are the second and third largest respectively among the world's three biggest emitters of greenhouse gases in the world. In this section, we study various economic tools that are available to mitigate the problem of climate change. These public policy tools need to be applied in various countries bearing in mind that the world has over 194 countries at various stages of development. These countries could be classified as developed economies or developing economies or least developed economies, or alternately as high income, medium income, or low-income countries. So within each country, depending on the political set up, concerns and emphasis over efficiency, equity, liberty and sustainability in applying these economic tools of public policy to attain climate change goals will vary (Dolan & Goodman, 1995). The choice of economic tools thus could be influenced based on national priorities.

By studying the policy options available to both a developed nation such as the United States and a developing nation such as India, a critical evaluation of the options is also provided in this section and shows how these two democracies can learn from each other while pursuing prosperity for their respective countries and yet interact cooperatively to deal with the grim message of the COP26 climate crisis summit held in Glasgow, Scotland.

In the literature, various economic tools have been identified to deal with the problem of climate change (EPA, 2021-a; Harris et al., 2017; McKibbin & Wilcoxen, 2002; Prahu & Hofman, 2009). These include cap and trade, carbon tax, regulation, and economic policy

tools such as tax credits and subsidies. The first two represent market-based approaches, whereas the third is part of command and control (CAC) and the last one is part of larger economic policies to alter economic behavior. In terms of international cooperation among countries to achieve progress over climate change the *Paris Agreement* also incorporates sections on climate finance and technology transfer. All of these are discussed in this section of the paper.

Cap And Trade

The *Kyoto Protocol* established a carbon credit system. For countries that ratified it, a system was devised that placed national caps on GHG of developed nations. These countries were aligned as Annex B countries. Each developed country ratifying the *Kyoto Protocol* has been given an allotment and corresponding number of emission allowances known as Assigned Amount Units (AAUs). The target set for them is to reduce their emissions to well below 1990 levels and more than 5% by 2012. Emissions could be reduced by trading in emission allowances with countries that had surplus allowances. A country could also meet its target by buying carbon credits.

National and international bids to mitigate the growth in concentrations of GHG in the atmosphere have relied on a system of carbon credits and carbon markets. A carbon credit also referred to as a carbon offset is a credit for GHG emissions reduced or removed from the atmosphere by an emission reduction project. Governments, industry, or private individuals can use carbon credits to offset emissions generated elsewhere. Trading partners use GHG mitigation projects that generate credits to finance carbon reduction schemes (example renewable energy such as wind, solar, geothermal and biomass or reforestation) around the world. One carbon credit is equal to one metric ton of carbon dioxide, or in some markets, carbon dioxide equivalent gases. The transaction involving carbon credits is accomplished through international brokers, online retailers, and trading platforms. Utilizing a carbon credit means that there will be one less metric ton of carbon dioxide in the atmosphere than otherwise.

Recent data shows that the cap and trade for carbons is gaining traction worldwide. There has been swift and rapid growth of voluntary carbon.



Figure 1: National and subnational carbon pricing programs (Source: CRS using data from World Bank, "Carbon Pricing Dashboard" as of November 1, 2020 <u>https://carbonpricingdashboard.worldbank.org</u>)

Voluntary carbon markets had hit an all-time market value of \$6.7 Billion by August 2021. This was based on growing global network of 172 EM Respondents (13% increase from 2020 of 152), with traded credits from projects located in 80 countries. The gain in value of voluntary carbon markets in the first eight months of 2021 represented a near-60% increase in value from the 2020 year. Corporate net-zero ambitions and growing interest in carbon markets to achieve *Paris Agreement* climate goals contributed to this result. Companies and speculators were both purchasing credits and thus becoming a serious source of finance for green projects around the world (EcosystemMarketplace, 2021).

According to the State of the Voluntary Carbon Markets 2021 report by 31 August 2021, voluntary carbon markets had already posted \$748.2M USD in sales for 239.3 million credits, each representing one ton of carbon dioxide equivalent, reflecting a 58% year-to-date jump in value (up from \$472.9M), and growth in credit volume of 27% over 2020 performance (up from 188.2 million credits transacted) (EcosystemMarketplace, 2021).

Energy, consumer goods, and finance and insurance sectors were the most active in the market. The identified sectors face challenges in quickly cutting climate impacts both in direct as well as financed emissions. A large share of their emissions resulted from an infrastructure or technological base they could not quickly upgrade or resulted from parts of their supply chain or portfolio they had less influence over than direct operations. Thus, purchasing carbon offsets by companies provided the means to immediately reduce the net emissions footprint. It provided time for the companies to abate more costly and difficult-to-address emissions in the medium to longer term (EcosystemMarketplace, 2021).

The *Kyoto Protocol* provides for three mechanisms namely, Joint Implementation (JI), Clean Development Mechanism (CDM) and International Emissions Trading (IET) that enable countries, or operators in developed countries, to acquire greenhouse gas reduction credits.

India's has one of the fastest growing carbon markets in the world and has already generated approximately 30 million carbon credits, the second highest transacted volumes in the world. The pace of growth of the carbon trading market has been more rapid than even its information technology, biotechnology, and Business Process Outsourcing (BPO) sectors (Gautam, 2021). Earlier there was a question whether India would lose millions of carbon credits or emission reduction certificates (CERs) that it had earned by investing in low-carbon intensive technologies, such as switching to renewable energy and protecting forests. This had happened under an earlier climate agreement - the *Kyoto Protocol*. The Madrid COP 25 meeting had failed to finalize rules for a new global carbon market as part of the current Paris Agreement over a disagreement on double counting of credit, when both buyers and sellers claim the carbon credit. For instance, if a country or company sells the credit it has earned by building a solar park, the buyer offsets their carbon emissions in the credit they bought. According to critics, since the seller also counts the credit in its favor, the seller is not making meaningful emission reductions (BBC, 2019). However, the more recently concluded Glasgow COP26 meeting had finalized the rules of carbon trading after adopting compromise language to phase down coal instead of phase out coal. India thus will be able to sell more than a million carbon credits from previous years, and can also create a domestic market for carbon trading (The Hindu, 2021). India's gain through carbon trading is estimated at least \$5 billion to \$10 billion over a period of time. It is one of the largest beneficiaries of the total world carbon trade through the Clean Development Mechanism (CDM) claiming about 31 per cent of the total (Gautam, 2021).

Compliance markets are also used to achieve decarbonization in the United States although limitedly. The compliance carbon market is represented by the California Global Solutions Act system and the Regional Greenhouse Gas Initiative in the northeastern states which include eleven states, namely Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey (withdrew in 2012, rejoined in 2020), New York, Rhode Island, Vermont, and Virginia (Estuaries, 2021), Compliance carbon markets are marketplaces through which regulated entities obtain and surrender emissions permits (allowances) or offsets in order to meet predetermined regulatory targets. It is a market for carbon offsets created by the need to comply with a regulatory act (Rainforests, 2014). In a Cap-and-Trade emissions reductions market, actors buy and sell carbon offsets to comply with the cap or limit imposed on their emissions.

Intercontinental Exchange (ICE) witnessed a record number of trades of carbon allowances in 2021, up almost 30% on the previous year (Twidale, 2022). Europe and parts of the United States, including California have set up emission trading systems (ETS), that place a price on carbon dioxide emissions as part of their efforts to cut greenhouse gas emissions to achieve climate targets. A total of 18.3 billion tons of carbon allowances traded in 2021 on the exchange, up from 14.3 billion in 2020. Of the total some 15.2 billion tons, were trades of EU Allowances, traded on Europe's ETS. In 2021, a record 2.4 billion California Carbon Allowances and 346 million tons of Regional Greenhouse Gas Initiative (RGGI) allowances traded on the exchange. These were up from 1.87 billion and 231.5 million allowances in 2020 respectively (Twidale, 2022).

The Global Financial Markets Association (GFMA) and the Boston Consulting Group (BCG) report finds that 80% of GHG emissions are not covered by regulated carbon pricing in compliance carbon markets. But within ETS coverage/compliance markets there is scope to expand not only within and across sectors by including more high-intensity emission sectors. These include energy and power as well as transportation, oil and gas industries (Pablo, 2021). Other large emitters are iron and steel production and processing companies, those who produce commodities such as cement, glass and ceramics and the paper and pulp industry (Gold Standard Help, 2015).

The compliance carbon market size was estimated at \$261 billion in 2020. CCM is considered the more mature and larger of the two carbon offsets markets. CCMs are tools used by countries to meet their climate goals (Gold Standard Help, 2015). The compliance carbon market (CCM) and the voluntary carbon market (VCM) can be complementary to each other and both can play a significant role in decarbonizing the environment (Pablo, 2021).

Cap and Trade is considered an efficient method to deal with carbon emissions (Denny, 2018). However, concerns remain whether it is equitable and fair. In California, there is a view that distributing free allowances overcompensates firms for the cost of compliance, assuming any compensation is warranted. There should be no transfer of ownership to industry of the atmosphere at the expense of the public (Farber, 2011). Cap and Trade has also been considered efficient which minimizes waste and recognizes liberty and at the same time having favorable distributional effects on richer households at the expense of poorer households (Caney & Hepburn, 2011). In the United States, California's climate policies which relies on the Cap and Trade program has brought about a steady decline in the state's carbon dioxide pollution (EDF, 2007). So, there is reason to believe it supports sustainability of the environment.

Carbon Tax

A carbon tax is another market mechanism through which application carbon emissions can be reduced. It is the imposition of a fee directly on using fossil fuels (coal, oil, gas) as an energy source (C2ES, 2021). Potentially, a policy tool such as a carbon tax can help reduce and eventually eliminate the use of fossil fuels which results in carbon emissions and climate change.

A carbon tax causes users (both businesses and consumers) of carbon fuels either to internalize the cost in production or in consumption and to pay for the climate damage caused by the release of carbon dioxide into the atmosphere. A high enough carbon tax would result in a monetary disincentive to use carbon fuels and create the necessary motivation to switch to non-carbon fuels and reduce carbon emissions.

Since the carbon content of every fossil fuel, from anthracite or lignite coal to heating oil and natural gas, is precisely known, the carbon tax thus is structured accordingly which implies higher taxes on coal than petroleum products, and much more than on natural gas (C2ES, 2021).

There is no carbon tax in the United States. There were Washington State Initiatives 732 in 2016 and 1631 in 2018 for a carbon tax on the ballot both of which failed. Such an initiative in the state was defeated because it could impact on infrastructure, growth and employment prospects (Ballotpedia, 2018).

Between 2018 and 2020, several congresspeople and senators have sponsored various bills in Congress to have some form of federal carbon tax in the US. Such a federal tax could have various impacts on the US economy (Energy Policy, 2020). Although carbon taxes would increase revenues, the impact on net revenues would be to lower it, because payments of the carbon tax leave individuals and businesses with less income, and thus lower tax payments on that income. The Joint Committee on Taxation and the Congressional Budget Office refers to it as the "Income and Payroll Tax" Offset. A study by Urban – Brookings Tax Study Center of carbon tax proposals has estimated that the size of the offset could reduce government revenue by about 23 percent of the annual carbon tax revenue (Rosenberg et al., 2018).

A carbon tax also impacts energy prices directly. Since a carbon tax is based on the carbon content of various sources of energy i.e., on carbon-intensity of fuels, price impacts are most significant for energy produced with coal, then petroleum, then natural gas.

Emissions are also impacted by a carbon tax. A financial incentive causes emitters of greenhouse gases to shift to lower-carbon alternatives especially if doing so costs less than the tax. This results in lesser emissions. Via the price mechanism, the carbon tax encourages and accelerates low-carbon technological progress and larger investments in innovation.

Low income and middle-income households can be more adversely affected than wealthier households by what is seen as a regressive carbon tax. This is because these households spend a larger proportion of their total consumption on energy- intensive goods such as electricity, home heating fuels, and gasoline. Thus distributional impacts to lower income households can be more adverse than to wealthier households (Energy Policy, 2018).

A large-scale shift from high-carbon to low-carbon energy sources will have wideranging effects on the U.S. economy. A price on carbon is a necessary part of a low-cost climate change strategy because it encourages emissions reductions wherever and however, they can be achieved at the lowest cost.

A study shows that impacts of a carbon tax on near-term macroeconomic outcomes like gross domestic product (GDP) for the US are small and typically negative compared to a status quo policy (Energy Policy, 2018). GDP impacts are less than 0.5 percent per year and they could be positive or negative, depending on how the revenue is used i.e., whether revenue is used to reduce payroll taxes or income taxes or returned to eligible recipients without corrections to distortions in the economy. It is important to perfect the estimate of macroeconomic impact by capturing the economic benefits of avoided regulations, reduced air pollution, and the technological progress stimulated by the tax.

Finally, there can be also variations in regional impacts of a carbon tax due to differing regional patterns in energy production and consumption (Energy Policy, 2020). Rural communities will experience larger energy cost increases as a proportion of income than urban residents. This is because the low population density in rural areas lends to a higher per capita energy demand for transport, heating, and cooling. Western and Northeastern regions of the country would fare well under a carbon tax than would the more carbon-and energy-intensive southern and Midwest parts of the country. However, carbon tax revenues can be used to mitigate such regional disparities.

It was recently reported that the Biden Administration supports a carbon tax of \$20 per ton of carbon ahead of the COP 26 summit (Bloomberg, 2021).

In India also there is currently no carbon tax at the national level. However, it had a clean energy cess on coal since 2010. The aim was not only to earmark revenues to fund research and innovative projects in clean energy but also to nudge consumers to greater use of cleaner fuels at the expense of coal via the price mechanism (ipleaders, 2021). Criticisms of the cess was that the earmarked revenues were not used to promote research and that it failed to distinguish between users of cheap polluting form of coal or clean coal and was thus not linked to the quantum of carbon emissions. The clean energy cess was eliminated the Government of India in 2017. Some states or city jurisdictions have also imposed taxes on their own to compensate for the negative externalities such as the green cess in Goa or the Eco tax imposed on vehicles entering Mussoorie city in Uttarakhand.

It has been argued that India as a very large emitter of GHG, should re-introduce a comprehensive carbon tax in order to: a) discourage the use of carbon emission intensive inputs and outputs; b) promote research of cleaner alternatives and support renewable energy projects with the carbon tax revenues which would result in sustainable alternatives that would in turn help Indian products meet international standards and also be exempt from cross border tariffs related to carbon emissions; and c) streamline implementation through seeking uniformity between federal and state measures (Sawhney, 2021).

Recent research by the Observer Research Foundation explored four scenarios of climate action for India using a systems dynamics model called the Energy Policy Simulator for India. Research tried to address the dilemma that exists for a developing country like India with its huge population size, low income, and employment levels whether strong climate action could compromise economic development and job creation. Among the four scenarios examined in this macroeconomic study was a net zero emission or a deep decarbonization scenario which included implementation of an economy wide carbon tax as a policy driver, among others. Surprisingly, the policy simulator found that deep decarbonization in the Indian economy could increase jobs and GDP and at the same time prevent millions of premature deaths due to harmful air pollution by 2050 relative to the reference scenario i.e., India's ongoing efforts in renewable energy (RE), energy efficiency, electric mobility, and cost-optimization of technologies in the electricity and transport sectors. The study concluded that massive investments would be needed in the power, industry, transport, and hydrogen sectors. Early policy signals could accelerate technology adoption by industries that benefited from decreasing technology costs (Agarwal et al., 2021).

A couple of studies exist about the distributional impact of carbon pricing in India. A carbon tax in India has been found to be mildly progressive with progressivity being higher in the rural sector as compared to the urban sector. The progressivity also varied

between different fuels. Carbon tax was more regressive for kerosene relative to electricity or liquefied petroleum gas in India (Rathore & Bansal, 2013).

Another distributional policy issue is the regressive nature of the tax that affects lowerincome households more adversely than middle and high-income households, since a larger share of their incomes are spent on energy-intensive goods and services. The distributional and welfare concerns associated with a carbon tax are primarily determined by how the revenues are spent. If the carbon tax revenues are used for financing the fiscal deficit, the impact is likely to be more regressive. Another concern is that higher domestic prices will raise costs for local industries, making them less competitive in global markets. A revenue neutral approach is advocated in light of the political volatility and distributional concerns associated with the carbon tax, Revenue recycling could be a panacea for the distributional issues related to a carbon tax, If adopted, the revenues generated from the carbon tax could be earmarked and returned to society through spending the money on green initiatives or returning money back to firms and household in the form of dividends (Chandra, 2021).

The carbon tax has been proven environmentally efficient. An empirical analysis of the carbon tax in the energy industry in Europe showed that an increased tax rate curbed GHG production, which statistically significantly is affected by the consumption of fossil fuels (Hájek et al., 2019). The study showed that by raising the carbon tax by one euro per tonne can cut annual per capita emissions by 11.58 kg (25.47 pounds).

The investigation of the distributional and equity aspect of a carbon tax has been investigated for Sweden (Andersson & Atkinson, 2020). The Swedish carbon tax on transport fuel was determined to be regressive between 1999-2012 when measured against annual income, but progressive when using lifetime income. An increase in regressivity was found to be highly correlated with a rise in income inequality. So, the distributional impact is also affected by the inequality in the distribution of income. Since a carbon tax should be applied to goods that typically are necessities like transport fuel, food, heating, and electricity for mitigation purpose, the tax is likely be regressive in high-income countries, especially in countries with a more unequal distribution of income. More recently the US Congressional Budget Office has used a method that allocates the carbon tax burden to households on the basis of their income rather than their consumption (Carloni & Dinan, 2021). Its estimates show that the burden on households in the lowest income quintile, measured as a percentage of income before transfers and taxes, would be twice as large as that imposed on households in the highest income quintile. However, the burden on households appears less regressive if measured as a percentage of income after transfers and taxes, largely because of the progressivity of the existing federal transfer and tax system.

From a conservative perspective a carbon tax could be good for liberty and spur innovation (Neeley & Collins, 2017). A carbon tax encourages bearing responsibility for creating a negative externality. Second, prices matter for better resource allocation and environmental mitigation so zero price for carbon emission should be avoided. A carbon tax would be a powerful signal to businesspeople and entrepreneurs to switch to cleaner and cheaper use of energy which could through ripple effect stoke decarbonization and help end energy poverty. Third, carbon tax revenues could be used to substitute for income or capital gains taxes. Such a tax swap would promote economic prosperity. And finally, a carbon tax reduces the risk of climate change without growing government.

Carbon taxes are also a good policy option to promote the goal of sustainability (UN, 2021). By applying a tax on greenhouse gases (GHG) emissions, they encourage businesses to invest in cleaner technology or switch to more efficient practices. Consumers too are

incentivized to invest in energy efficiency, alter lifestyle habits and switch to clean fuels. Further carbon tax revenues could be used to invest in sustainable development.

So overall, carbon taxes support efficiency, liberty, and sustainability although there are distributional and equity issues that need to be addressed.

Regulations

Current US Climate Change policy under President Biden is to squarely face the urgent threat of climate change and to propel the country toward a clean energy future. Towards this end, the US Environmental Protection Agency (EPA) is considering fresh regulations to address some of the nation's largest sources of both climate- and health-harming pollution, such as the transportation, oil and natural gas, and power sectors (EPA, 2017).

- Currently being used in applications such as air conditioning, refrigeration, fire suppression, solvents, foam blowing agents, and aerosols are regarded as highly potent greenhouse gases with global warming potentials that are hundreds to thousands of times greater than carbon dioxide (CO₂). EPA regulation will phase down the U.S. production and consumption of HFCs by 85% over the next 15 years, as mandated by the American Innovation and Manufacturing (AIM) Act of 2020. A global phasedown of HFCs is expected to avoid up to 0.5°C of global warming by 2100.
- 2. New federal greenhouse gas emissions standards have been set for passenger cars and light trucks for Model Years (MY) 2023 through 2026. The new standards aiming to usher in clean car technology will result in \$190 billion in net benefits to Americans and help reduce climate pollution, improve public health, and save drivers money at the pump. The new standards set on vehicle emissions are most stringent to be ever established for the light-duty vehicle sector. These scientific standards have been determined based on a rigorous assessment of current and future technologies. Over three billion tons of GHG emissions will be avoided through 2050 due to the new standards. Over the next three years, new standards will also be adopted for heavy duty trucks in MY 2027 and beyond. The new standards would apply to criteria pollutants and GHG and reduce emissions in highway transportation.
- 3. The EPA is ensuring that airplanes used in commercial transportation and large business jets are compliant with standards set by the United Nations' International Civil Aviation Organization.
- 4. EPA is also implementing the Renewable Fuels Standard Program which requires petroleum-based transportation fuel to be replaced by a certain volume of renewable fuel.
- 5. Among stationary sources, EPA is: i) proposing new standards for the oil and gas industry that would sharply reduce methane and other harmful air pollution from both new and existing sources in the industry; ii) looking to further reduce greenhouse gas pollution under the Clean Air Act from fossil fuel-fired power plants in the power sector which is by far the largest category of stationary sources of greenhouse gases in the United States; iii) developing meaningful reductions in carbon dioxide emissions from existing power plants; iv) establishing emission standards for greenhouse gas emissions from new, modified and reconstructed fossil fuel-fired utility boilers and natural gas-fired stationary combustion turbines; and v) updating New Source Performance Standards (NSPS) for new and modified landfills and guidelines for existing landfills to reduce emissions of methane-rich landfill gas.

- 6. Under the Greenhouse Gas reporting program of the EPA, information is gathered from large emission sources across a range of industry sectors, as well as suppliers of products that would emit greenhouse gases if released or combusted. Facilities that meet reporting thresholds must report greenhouse gas emissions to the program annually. Also, EPA collects detailed CO₂ emissions data and other information from power plants across the country as part of the Acid Rain Program (ARP), Cross State Air Pollution Rule CSAPR and CSAPR update programs.
- 7. Among Greenhouse Gas Endangerment and Cause or Contribute Findings, the EPA has issued final actions under different sections of the Clean Air Act, that motor vehicles and various classes of engines used in aircraft also constitute a threat to public health and welfare and contribute to climate change.

In India, the National Action Plan on Climate Change (NAPCC) has been promulgated to deal with climate change. Legislation has not been the primary avenue in India. It has adopted policies to reduce carbon emissions.

Emission standards have been set for the transportation and the power sector specifically coal thermal power plants.

Current automobile emission standards were set in 2014 by the Expert Committee and were to be implemented nation-wide by 2020. The foundation is laid out in the Expert Committee's Auto Fuel Vision and Policy 2025 report. India had started adopting European emission and fuel regulations for four-wheeled light-duty and for heavy-duty vehicles by around 2000 and it rolled out in various stages. Currently it is in Stage VI of the implementation program. India's own emission regulations apply to two- and three-wheeled vehicles (Dieselnet, n.d.). Emission standards have been adopted for the following categories of new engines and/or vehicles: These apply to emissions and fuel economy of cars and light trucks, 2- and 3- wheel vehicles, heavy duty truck and bus engines, non-road (off roads) diesel engines and generator sets. There have been challenges in implementing the regulations and ensuring compliant vehicles. Some of these challenges have occurred due to jurisdictional issues, court challenges and prior exemption granted to specialty vehicle (taxis) manufacturers.

India's transportation sector accounts for 10 per cent of India's total greenhouse gas (GHG) emissions and road transportation contributes about 87 per cent of the total emissions in the sector (Paladugula et al., 2018).

With respect to the power industry, the Union Ministry of Environment, Forest and Climate Change (MoEF&CC) of the Government of India released the final list of the coal thermal power plants and their categorization in line with the ministry's April 2021 notification which revised the deadline for meeting emission norms (Aggarwal, 2021). The three groupings (drawn up by jointly by the Central and State Pollution Control Boards) of the 596 coal thermal power plants are i) Category A of plants located within a 10 km radius of the capital or any city with +1 million population; ii) Category B includes plants located within 10 km radius of critically polluted areas or non-attainment cities; and iii) Category C consisting of the remaining power plants. Category A and Category B coal thermal power plants (combinedly constituting 11 percent of the total plants) were to meet the emission norms set by the ministry in 2022 and 2023, respectively. However, indications are that about 78 percent of the plants in the country are not likely to be compliant till 2024.

Coal thermal power plants contribute to over half Sulphur dioxide (SO2) concentration, 30 per cent oxides of Nitrogen (NOx), 20 per cent particulate matter (PM) in the ambient air.

It has been estimated that India's coal-based power sector contributes to 2.4 per cent of global greenhouse gas (GHG) emissions, 33 percent of India's GHG emissions, and around 50 per cent of the country's fuel related emissions (CSE india, 2022).

A regulatory approach or command and control approach is less likely to achieve the desired goals given problems of practical implementation and political realities. In a comparative study in the US it was found to achieve only 59 percent of the desired goal and cost twice as much as the carbon tax (Rossetti et al., 2018). So, it is less efficient.

To look at the distribution impacts of the regulatory approaches, it is important to look at the compliance costs, and monitoring, recordkeeping and reporting costs and compare it to monetized social benefits i.e., improved climate and co-health benefits. The cost and benefits could be distributed unequally regionally, occupationally and across various income classes of consumers given existing unequal income distribution (EPA, 2014-b; Super, 2010).

Several international guaranteed human rights are affected by climate change caused by carbon emissions. States (duty-bearers) may therefore be regarded as having affirmative obligation to take effective measures to prevent and redress the climate impacts. To the extent the regulatory approach is aimed at mitigating the adverse impacts of climate change and promoting adaptation to the climate crisis and upholding human rights, it could be regarded as promoting both liberty and sustainability (OHCHR, 2015). It has also been argued that more regulations and more government in order to curb carbon emissions is detrimental to liberty (Neeley, 2018). An alternate way to deal with carbon emissions could be through 1) cutting regulatory red tape for clean energy sources such as nuclear and hydro power which face millions and billions of permitting costs and 2) removing restrictions on energy competition by removing the "monopoly" feature of regulated utilities and protecting them with rate setting rather than allowing for more competition from clean energy sources such as solar and wind which have had falling costs to generate clean energy for the past two decades. These measures would imply less regulation and shrinking government resulting in more liberty.

Taxes and Subsidies

Tax credits or other types of tax incentives can be used to encourage business investment in GHG-reducing technologies, like renewable energy generation or carbon capture and sequestration. This leads to their early adoption. Without public support businesses are reluctant to invest in research of such technologies because they cannot capture all the benefits. Governments also use tax policies to incentivize consumers to buy electric vehicles and solar panels or invest in household energy efficiency improvements. A tax on gasoline is intended, for example, to curb its use in order to reduce greenhouse gas emissions (Ramseur et al., 2021).

Currently, the US federal government provides a 26% tax credit for renewable energy systems installed by homeowners through 2022, and 22% for 2023 (Pickrell, 2021). Biden has also proposed subsidies for farmers to retain carbon in the ground. Farming contributes about ten percent of the greenhouse gas emissions in the US (NPR, 2021).

India too is providing capital subsidies at 40 percent for capacities below 3 kWp and 20 percent for capacities between 3 kWp and 10 kWp for roof top installations of solar panels in the form of central financial assistance. Direct and indirect tax benefits such as sales tax, safeguard or anti-dumping duty inclusions, excise duty exemptions and custom duty exceptions have also been given by the government. Project developers benefit from income tax exemption on all earnings from a project in its first 10 years of operation. Solar energy producers can claim accelerated depreciation (AD) and claim 40% of the costs in

the first year itself. Domestic manufacturers who provide modules for rooftop solar PV systems are being supported through these measures (Energetica, 2021).

Some researchers have found that the energy investment tax credit is efficient, that is, reducing the price of energy-efficiency property would lead to additional investment (Hassett & Metcalf, 1995). Other researchers have found that the tax credits to recipients were instead more likely associated with windfall gains rather than with additional energy-efficiency investment(Dublin & Henson, 1988; Walsh, 1989).

Taxpayers that are homeowners tend to be higher income than taxpayers living in renter-occupied housing. Thus, energy tax investment tax credits targeted at homeowners would tend to benefit higher-income taxpayers. This is borne out in 2012 tax data, as residential energy-efficiency tax credits are claimed by middle- and upper-income taxpayers. So tax credits pose equity and fairness issues (Crandall-Hollick & Sherlock, 2012).

Distributional issues related to loss of common land and right to land use has come up at the large Charanka Solar Park developed by the Solar Park Group in Gujarat in India. The benefits of renewable energy development with less carbon emissions tend to accrue at regional and national level whilst local host communities bear the adverse consequences of land acquisition for the project. Within the host community the economically well-off members of the community were able to take advantage of the development opportunity while vulnerable sections suffered from the loss of use of land for grazing. The uneven distribution of benefits arising from the solar park development reinforced and deepened existing inequalities (Yenneti et al., 2016). Companies involved with producing renewable energy have tax exemptions. The Gujarat state government has also declared more benefits to residential, individual and commercial producers of solar energy in addition to the incentives provided by the central government (Business Line, 2020). The security deposit required to be given to Discoms for the Power Purchase Agreement (PPA) by the developers has been significantly reduced.

The US federal government provides tax credits to taxpayers that do carbon capture and storage (CCS), or use carbon dioxide and carbon oxide in accordance with rules laid out in Section 45Q of the Internal Revenue Code of 1986, as amended, and the Treasury Regulations thereunder (Rodgers & Brandon, 2021). The Bipartisan Budget Act of 2018 made a number of significant changes to Section 45Q that made these credits more attractive to investors. Among the changes, the Act: a) expanded Section 45Q to cover both carbon dioxide and carbon oxide; b) eliminated limits on the overall credits available in the market; c) lowered thresholds for the amount of carbon that would have to be captured in a given year for some types of taxpayers; d) clarified that credits would be available for 12 years from the time carbon capture equipment is placed in service offering greater certainty to investors; and e) enhanced the value of the tax credits.

Investors reacted positively to the changed rules making it likely that significant investment in CCS would occur in the future. Since tax credits directly lower the amount of tax one owes, one could surmise it is conducive to liberty. On the other hand, harmful government subsidies such as allowing people to build homes in coastal areas likely to be adversely impacted due to sea level rise caused by global warming limit liberty and grow the government in the future (Neeley, 2018). So, tax credits and subsidies have a mixed impact on liberty.

Economic incentives such as tax credits and subsidies applied to reduce greenhouse gas emissions to control for climate warming can help improve sustainability of the environment (EPA, 2021-c).

Climate Finance

The Convention, the Kyoto Protocol and the Paris Agreement all called for financial assistance to be provided by developed countries with more financial resources to developing nations that were less endowed and more vulnerable to climate change. This climate finance was expected to be about \$100 billion per year drawn from local, national, or transnational financing and made available from public, private and alternative sources of financing. Such finance could be used by developing nations to support mitigation and adaptation actions they undertook to deal with climate change. However the developed countries did not resolve how this money would be raised among themselves and what share of it would be undertaken by each country (Rodgers & Brandon, 2021).

Speaking at the COP 26 Summit in Glasgow, the Prime Minister of India said (MEA, 2021):

"We all know this truth that the promises made till date regarding climate finance have proved to be hollow. While we all are raising our ambitions on climate action, the world's ambitions on climate finance cannot remain the same as they were at the time of the Paris Agreement.

Today, when India has resolved to move forward with a new commitment and a new energy, the transfer of climate finance and low-cost climate technologies have become more important. India expects developed countries to provide climate finance of \$1 trillion at the earliest. Today, it is necessary that as we track the progress made in climate mitigation, we should also track climate finance. The proper justice would be that the countries which do not live up to their promises made on climate finance, pressure should be put on them."

Numerous countries from Fiji to the Philippines to Uganda and small island nations like Antigua, Barbados, Grenada, Kiribati, Marshall Islands and Tuvalu also referred to the broken promise on climate finance at the COP 26 Summit (Piper & James, 2021; UN, 2021). The Alliance of Small Island States (AOSIS) and the Least Developed Countries Group have also wanted to establish liability and compensation for loss and damage for vulnerable and developing countries.

Developed countries are offering developing countries climate finance more in terms of loans rather than outright grants. This is increasing the burden of developing countries who are already weighed down with past debts. This makes it difficult to grow their economies and eventually get out of debt. This practice is also inequitable as the problem of global climate change was a creation of developed countries primarily which went unabated for a period of 150 years. Climate finance is also offered for mitigation projects that directly reduce carbon emissions with a small trickle going for adaptation to climate change because loans for the latter will not be as easy to recover as for the former. This neglect of providing funds for people to adapt to climate change is impoverishing people in developing countries who suffer the consequences of floods, droughts, hurricanes, and other disasters due to climate change. Some developed countries are adding a climate component requirement to their former aid programs and calling it climate finance (Timperley, 2021). These actions of developed countries together with not meeting the pledged goal of \$100 bn per year are unlikely to meet the 2015 Paris agreement goal of restricting global warming to "well below" 2 °C, if not 1.5 °C, above pre-industrial temperatures.

In 2018, the United States provided only about \$6.6 billion of the world's climate finance funds. The total annual flow of US climate finance funds through all channels (bilateral and multilateral inflows and multilateral development banks outflows) is about \$7.56 bn average between 2016 and 2018. About 70 percent of its funds were directed to

mitigation projects about 23 percent were devoted to adaptation and about 7 percent were cross cutting. The average per capita climate finance provided by the United States was \$16.59 during the 2016-2018 period. The World Resources Institute estimated that based on an analysis of the gross national income, population size, and carbon emissions of OECD countries, as per fair share the United States should have contributed between 40 and 46 percent of the climate finance funds and provided between \$28 bn to \$32 bn. on the low end and between \$40 bn to \$46 bn on the high end instead of the \$6.6 bn it did in 2018 (Thwaites & Bos, 2021). The amount of OECD Climate Finance funds reported on an annual basis from 2013 to 2018 ranges from \$34.1bn to \$54.7 bn which is way below the \$100 bn that were pledged in the Paris Agreement. However, even this size of climate finance funds claimed by OECD as having been provided to developing countries is grossly exaggerated according to Oxfam and India (OECD, 2021). Oxfam says most of the money provided is loans and not grants, the Indian Ministry of Finance says the amount is grossly overstated and Antigua and Barbuda say the figures put out by OECD are highly inflated. President Biden has promised to double the US contribution from \$5.7 bn to \$11.4 bn by 2024 and \$3 bn will be for adaptation to climate change (Dloughy, 2021; Vinopal, 2021). His pledge has been termed both political and inadequate. Without US leadership, it is unlikely that the Paris Agreement pledge of \$100 bn a year will be achieved. Furthermore, the climate finance need is expected to grow to \$ 200 bn a year by 2030 and even more by 2040 (OECD, 2021; Robins & Kyiakipoulou, 2022; Timperley, 2021).

Developing countries are unlikely to get to net zero emissions if the funds pledged to assist them are not forthcoming. If there are cosmetic changes to former aid funds now being provided as loans from the re-termed climate finance funds by developed countries, the world would be perpetually under a delusion of fighting climate change. This vicarious living by people in developed countries at the expense of poor people in developing countries, who are expected to bear the burden of halting climate change, is neither equitable nor sustainable.

Technology Transfer

Under the United Nations Framework Convention on Climate Change (UNFCCC), clean energy technology transfer is an important precondition for climate change mitigation and the transition to a low-carbon global economy (UNFCCC, 2022). This transfer occurs from developed to developing countries. It involves technology information, learning, enabling environments, capacity building and mechanisms for transfer to occur. This is necessary as clean energy technologies are costly and face barriers to adoption in developing countries.

Technology transfer is complicated and involves multiple different stakeholders such as governments, private sector entities, financial institutions, non-governmental organizations, and research/education institutions.

Low and zero carbon technology (LZC) is also the term given to low carbon technologies (also known as LCT) that emit low levels of CO2 emissions, or no net CO2 emissions(Brighton-hove, n.d.). The utilization of low carbon technologies is more effective within buildings with a highly energy efficient fabric after heat demand and loss have been minimized. Solar water heaters, solar photovoltaics, combined heat, and power (CHP), biomass power, air and ground source heat pumps, efficient gas boilers, carbon capture and storage (CCS) and wind turbines could be considered LCTs. There are other LCTs that could be used in aviation and maritime transport, steel industry, cement industry, chemicals industry, and construction as well as fuels like hydrogen and nuclear power (Brighton-Hove, n.d.).

Providers/donors of LCT transfers are from developed countries, for example, the US or any of the OECD countries; recipients are in developing countries like India. A LCT transfer process takes place across borders. The entities in the transfer process can be governments, NGOs, international agencies, or private sector companies. The LCT transfer processes involve both primary flows and dual flows. The primary flow is tangible technologies or intangible "know-how" transferred from developed countries to developing countries; the dual flow is the money that finances the technology transfer. For the primary flow that the source of LCT transfer is developed countries and the destinations are developing countries. However, the directions of the dual flows are less transparent. If developed countries fund the transfer process, money flows from developed to developing countries; if the transfer process is a part of an international trade transaction, money flows from developing countries to developing countries (Yang, 2009).

In 2020, the relative percent share of exports and imports of LCT products of overall exports and imports for the United States was 5.82 and 5.14 percent respectively, while the relative percent share of exports and imports of LCT products of overall exports and imports for India was 2.56 and 3.53 percent, respectively. The comparative advantage index for India for environmental goods stood at 0.56 in 2020 (value < 1 implying relative disadvantage) while for the United States it was 1.14 (value > 1 implying relative comparative advantage) (IMF, 2021).

At the COP 22 Marrakesh Summit in Morocco, Canada, Denmark, the European Union, Germany, Italy, Japan, Korea, Switzerland, and the United States pledged US\$23 million to provide a major scale-up of the United Nations Framework Convention on Climate Change (UNFCCC) Climate Technology Centre and Network. This was to assist the Centre deliver tailored capacity building and technical assistance to developing countries across a broad range of mitigation and adaptation technology and policy sectors (Venkatesh, 2016). Between 2010 and 2015, the United States was a LCT innovator and held 18 percent share of all LCT patents world-wide according to PATSTAT. Also, Patentscope Data reveals that India was only second among developing countries with 0.54 percent of all LCT patents over the same period (Pigato, 2020). Thus, both India and the US have major roles to play in low carbon technologies transfer to combat climate change.

India and the US could increase technology transfer of low carbon and clean energy technologies in a variety of ways. These have been discussed by the bilateral Climate and Clean Energy Agenda 2030 Partnership (Lopes, 2021) and a policy paper of the Brookings Institution (Jones and Saran, 2015) that deals with an 'India exception' and India-US partnership on Climate Change. The salient points are stated below:

- US investment of between \$50 billion and \$100 billion over the next 10 years—in natural gas infrastructure, renewables and clean building technologies that will encourage India to adopt more efficient energy pathways during its industrialization.
- Assisting India with Green Technology in buildings so that new buildings in cities have low carbon emissions.
- Partnership to Advance Clean Energy (PACE), to accelerate low-carbon economic growth and deployment of clean industrial technologies, through sharing of knowledge and technology
- Setting up a US-India Green Transition Finance Initiative to mobilize investment for India to transition to renewable fuel technologies expected to cost \$2.5 trillion.
 PACE mobilized \$ 2.5 billion in private and public investment in clean energy

deployment in India. In 2016, both countries launched S7.9 million PACEsetter Funds to provide grants for innovations in clean energy solutions

 Providing finance and technology applications for decarbonizing end-use sectors thus reducing economy-wide net greenhouse gas emissions.

Innovation

There are opportunities and a need for Federal agencies in the US to provide financial and technical assistance for low-carbon innovation. The federal aid could be targeted for electric-vehicle (EVs)) manufacturing, energy storage innovations that would give the impetus for wider use of the intermittent renewable energy power sector, nuclear energy generation with small modular fission and fusion technologies, manufacture of blue hydrogen from natural gas, focusing on use of hydrogen fuel in the steel and cement industries, use of biofuels in aviation, trucking and shipping, carbon capture and storage (CCS) technologies and the development of better materials such as graphene to make batteries and solar cells (Pinner & Rogers, 2021). Investments in these innovations are likely to accelerate the pace at which the US will achieve net zero emissions. United States committed \$114 billion in low carbon energy transition between 2020 and 2021 (BloombergNEF, 2022). The Biden Administration has proposed a 37 percent increase in Research, Development and Demonstration of clean energy in the 2022 budget (Gallagher & Anadon, 2021). An MIT startup has recently made waves with its electrochemical technology to suck up carbon dioxide from the atmosphere and other industrial sources and attracted investments from major backers of carbon capture and storage (CCS) (Bloomberg, 2022).

India invests a substantial amount in nuclear energy R&D to further its goal of indigenizing its nuclear program. India seeks to indigenize nuclear power plant materials and reactor technology by developing an Advanced Heavy Water Reactor that uses thorium as its main fuel. The government aims to more than triple its current nuclear power capacity to achieve 22.5 GW by 2031. India has also adopted stricter SO₂, NO_x, and PM_{2.5} emission standards for power plants and this has led to an increase in renewable energy capacity away from coal plants. Renewable energy R&D investments have increased but remain tiny in the overall portfolio. Grid-related R&D investments in technologies have also increased substantially since 2009 (Zhang et al., 2021).

Electricity installation capacity and power generation at an aggregate level from various sources have increased over time in India. The share of clean energy (hydropower, nuclear, and renewable) has also increased over the last two decades. India is thus slowly shifting from fuel-based energy sources to non-fuel-based sources to meet peak demand. In India's energy portfolio, renewable energy rose to 3.6% in 2019 from 0.2% in 2000. By 2020, India had installed capacity of 37.5 GW for Wind Energy, 33.7 GW for Solar, 9.9 GW for Biomass and 4.7 GW for small hydropower (Sahoo, 2021).

Of these renewables, the role of biomass has been questioned in promoting carbon neutrality since burning biomass releases carbon emissions (DeCicco, 2016). More recent evidence suggests that as per net life cycle approach (LCA)), the potential of bioenergy is similar to other renewable energy sources in reducing emissions (Bird and Cherubini, 2013). A note on the Climate Portal at MIT shows that biofuels are a promising option that will not contribute to the greenhouse effect and climate change because the carbon dioxide (CO₂) they emit is recycled through the atmosphere (Prather and Krol, 2020). The Biomass Energy for Rural India (BERI project) conducted in Tumakuru (Tumkur) district of Karnataka covered 33 villages and was funded by UNDP and the Global Environment Facility (GEF) and co-financed by the Indo Canadian Environment Facility (ICEF) and both

the Governments of Karnataka State and Government of India. It aimed to develop and implement a bio-energy technology package to reduce GHG emissions to promote a sustainable and participatory approach in meeting rural energy needs. The project used biomass electrical generators, community biogas cooking systems, improved stoves and afforestation and reforestation. The annual target achieved by the BERI project for carbon savings was 26,761 tCO2 annually showing enormous potential for rural India (Ravindranath, 2011). India has 771 districts and 664,369 villages in the country. In more recent news, researchers in the US used microbes to make carbon neutral biofuel (NSF, 2021)

India has also provided financial support for clean energy startups that focus: on transport such as solar powered and electric powered vehicles; on energy efficiency such as micro-LED chips, electro-mechanical switches, smart home energy management and retrofit services; on energy renewables such as biofuels, solar and geothermal; on hydrogen; and, on energy storage like lithium extraction services and metal-hydrogen battery stationary storage (Bennett & Le Marois, 2021).

India is also developing co-innovation strategies for low carbon or green technologies with Japan and Switzerland (Sethi et al., 2021). Also several private and public entities in India have been active in setting up blue hydrogen and green hydrogen plants in 2021 (Business-Standard, 2022; Economic Times, 2021; Pekic, 2021).

Indo-US International Collaboration on Climate Change

There have been several landmark agreements between the United States and India as the two work together actively to achieve carbon neutrality or zero emissions as per their Nationally Determined Contributions (NDCs) which are at the heart of the Paris Agreement and reiterated last at the COP 26 summit in Glasgow. The cooperation agreements are conducive to the achievement of their respective long-term goals. The US NDC endeavors to reduce national carbon emissions by 50-52 percent by 2030 over 2005 levels and achieve carbon neutrality or net zero emissions by 2050 (Arosetegui, 2021). India will cut its carbon emission by one billion tons between 2021 and 2030 as per its NDC. This means that India has set an ambitious goal to cut its emissions by 22 per cent by 2030 and achieve net zero by 2070 (Narain, 2021).

In 2020, India and the USA extended their Memorandum of Understanding for cooperation on the Global Centre for Nuclear Energy Partnership (GCNEP) by another 10 years (world-nuclear-news, 2020). The Centre located in Bahadurgarh in Haryana officially opened in 2017. It supports international cooperation in nuclear energy applications. Under the 2020 MOU, the two countries cooperate on issues related to nuclear safety and security, research and development in nuclear science and technology, nuclear and other radioactive material security and collaborate on advanced future nuclear technology projects. The outcomes are expected to be shared internationally. However, the pursuit of nuclear energy as a clean fuel option to combat climate change has been criticized in the literature due to its excessive capital requirements and the issue of radioactive waste disposal which is currently deemed unsafe (Jordaan et al, 2019).

United States and India also launched the "India-US Climate and Clean Energy Agenda 2030 Partnership." in April 2021 (MEA, 2021). Both countries hope to reach their stated carbon emission reduction goals for 2030 through this partnership. Both mitigation as well as adaptation to climate change are addressed. They will jointly seek to: a) mobilize finance and speed clean energy deployment; b) demonstrate and scale innovative clean technologies needed to decarbonize sectors including industry, transportation, power, and buildings; and c) build capacity to measure, manage, and adapt to the risks of climate-

related impacts. The Partnership is expected to proceed along two main tracks: the Strategic Clean Energy Partnership and the Climate Action and Finance Mobilization Dialogue.

In November 2021, the US joined the inter-governmental treaty based International Solar Alliance (ISA) which India and France had initiated at COP 21 (Roche, 2021). This provides one more area of international cooperation for the rapid deployment of solar globally. This is particularly important for developing countries, The framework agreement of the ISA hopes to catalyze global energy transition through a solar led approach and its vision hopes that the approach will culminate with interconnected global grids. This has been launched as the Green Grids Initiative i.e. One Sun One World One Grid at the COP 26 Summit.

Conclusion

This research has documented the many harmful consequences of global warming and the efforts of various signatory countries to *the Paris Agreement* to halt greenhouse gas emissions. We have examined in depth the commitments of the two large democracies, the United States and India, made at COP 26 in Glasgow in November 2021. These two countries are the second and third largest carbon emitters in the world.

The timelines provided by the two countries to achieve zero carbon emissions or net zero emissions stretch from a period of 30 to 50 years hence. The United States plans to achieve net zero emissions by 2050 and India by 2070. Given that in democracies, there are periodic changes in governments which bring with it changes in policies, our attempt to analyze the situation is based on enunciated policies of the current governments of the United States and India. We note that there are considerable risks and uncertainties pertaining to the science, technologies, and public policies to deal with climate change over the exceptionally long run. Both countries have attempted to reduce the production of greenhouse gases sincerely and have outlined steps that they plan to take with respect to various industrial sectors, transport, power production, the grid system and carbon capture and storage that will help achieve the goal of zero emissions.

We examined the economic tools available to the two countries for achieving carbon neutrality through incentivizing various sectors of the economy. We also evaluated the market approach methods such as cap and trade and carbon taxes, the command-andcontrol approach such as regulations and other economic policy tools such as tax credits and subsidies based on four goals or standards of efficiency, equity (distribution effects), liberty and sustainability. These evaluations were based on the results of empirical studies undertaken in both countries and available in the literature. All the above approaches had a positive impact on sustainability since they positively affect the environment by slowing climate change. Subsidies had the potential to enhance liberty.

The cap-and-trade mechanism controlled for the emission levels whereas the pricing was uncertain. It could be efficient way to price carbon that also recognizes liberty but could have negative distributional impact for lower economic classes. It could also transfer public rights of the environment to private hands. Compliance Carbon Markets (CCMS) and Voluntary Carbon Markets (VCMs) are doing extremely well in the United States. India is also one of the largest beneficiaries of the total world carbon trade through the Clean Development Mechanism (CDM).

Carbon taxes may be efficient and obtain reductions in emissions levels through internalizing the cost of an environmental externality. The pricing is certain but there is uncertainty over emission levels. It could also be regressive on lower income levels. It could also impact fuel prices differently as the tax is based on carbon content or carbon intensity of the fuels. It also has adverse distributional impacts on lower income households and rural communities due to its regressivity. Carbon taxes could hasten low carbon technological progress and spur innovation. However, both the United States and India do not employ carbon taxation at the national level at the present time. Concerns remain over the impact of carbon taxes on unemployment, income, and gross domestic output levels. Recent macroeconomic studies in both countries appear to show that these concerns may be exaggerated. There is *a prima facie* case for exploring a carbon tax to generate revenues that could be used for climate finance in both countries.

Regulations have been resorted to in both countries to limit carbon emissions especially in the power and transportation sectors. A regulatory approach may not be a very efficient method in controlling emissions due to practical implementation problems and the political realities in both countries. The cost and benefits of regulations could be distributed unequally regionally, occupationally and across various income classes of consumers given existing unequal income distributions. From a human rights perspective, the regulatory approach may enhance liberty but for many to whom big government and more regulations is an anathema, this approach to limit carbon emissions restricts liberty. Economic incentives such as tax credits and subsidies are an efficient method to get individuals and businesses to make the necessary investments in technologies that limit carbon emissions. These incentives are being offered in both the United States and India. The distributional impacts are that they are being claimed by middle- and high-income people and the low-income people get a smaller share of these incentives and may end up with fewer resources.

Climate finance is especially important to developing countries like India to achieve carbon neutrality. India is committed to making the necessary sacrifices to achieve zero emissions despite having an extremely low per capita carbon emission rate and a large percent of its population living at low-income levels. United States and other developed countries have not sufficiently contributed to the goal of \$100 billion in climate finance funds annually for developing countries as per their undertaking in the *Paris Agreement*. The U.S. could exercise its leadership not only by contributing more for mitigation efforts but also by making more funds available for adaptation to climate change by developing countries.

Currently, both the United States and India, are not engaged sufficiently in the transfer of low carbon technologies. The trade of low carbon technology (LCT) goods as noted in their exports and imports remain low. There is a need to step up efforts to increase the volume of LCT goods in the trade flow with respect to each other and then other countries of the world.

Both countries are continuing to invest private and public sector funds in research and development to foster innovations in electrical vehicles (EVs), nuclear energy, energy storage cells, carbon capture and storage and alternative clean fuels such as biomass, wind, solar, hydrogen and other renewable fuels.

The two countries are making several collaborative and cooperative partnerships to work together for harnessing clean energy and reducing carbon emissions. Co-innovation partnerships between the United States and India could help hasten zero emissions or carbon neutrality in both countries.

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BIDEN SCHOOL JOURNAL OF PUBLIC POLICY

Original Research Article

The Impact of Historical Residential Discrimination Policies in Richmond, Virginia

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Abstract

Article history:

Received: January 15, 2022 Revised: March 18, 2022 Accepted: June 3, 2022

Suggested Citation:

Schmidt NK (2022). The Impact of Historical Residential Discrimination Policies in Richmond, Virginia. *Biden School J. Pub. Pol, 13, 98-116*

© 2022 The Authors. Published by the Joseph R Biden School of Public Policy & Administration, University of Delaware. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (https://creativecommons.o rg/licenses/by/4.0/) The impact of historical residential segregation polices has affected many cities in the United States, but none more than Richmond Virginia. Richmond has a long history of disenfranchisement which still is prevalent today. Known as the capital of the Confederacy during the American Civil War, Richmond has cultured a path of differences in educational, occupational, and residential opportunities for African Americans. This paper examines how segregation has been able to exist even with policies that were created to improve conditions for minorities. My research will provide a chronological background for housing polices and examine how the implementation of these policies affected African Americans. The academic article will focus on the current impacts of racial covenants and the Home Owner's Loan Corporation redlining policies of the 1930s. The article will compare and contrast these former redlined areas county by county and examine current conditions in 2021. Conditions such as healthcare access, social vulnerability, and educational opportunities are highlighted. The HOLC highly desirable sections will be examined to provide the disparities in economics, health and education. It is clear that as a result of such polices African Americans attend schools with fewer resources then those located in other areas throughout the city. The paper makes the case for health disparities between African Americans and whites by providing statistics which highlight the differences in life expectancy, median age, poverty, and other social vulnerabilities. Lastly, the article concludes with the current state of the city.

Keywords: Redlining, Covenant, Ordinance, Home Owner's Loan Corporation (HOLC), Health, Education

Introduction

Richmond, Virginia has a checkered past pre- dating the American Civil War. Located along the James River, Richmond was a hot bed for the transatlantic slave trade as well as a major shipping port. The city also served as the capital for the Confederacy during the war. As the war ended and the era of Jim Crow began, the city adopted mechanisms to keep discrimination towards African Americans intact. After the end of the reconstruction era in 1877, Jim Crow laws were enforced in the southern states, leading to an almost an entire century of targeted discrimination against the African American people until the 1950s.¹ One of the main mechanisms used to uphold segregation was through residential discrimination tactics.

This essay begins with an overview of the *Plessy v. Ferguson's* decision of "separatebut-equal" and how it would impact future landmark cases and legislation. This will be followed by a timeline discussion of policies adopted which would further discriminate towards African Americans in Richmond. Methods such as the HOLC's redlining security maps would have lasting effect on minorities in Richmond which still exist today. Issues such as healthcare and education are at the forefront of the discussion. The essay will also examine how the Brown v. Board of Education would overturn the separate-but-equal doctrine and the resistance to implement such change in the city of Richmond. The conclusion will focus on the current state of healthcare and education in Richmond and how these residential discriminatory policies, while outlawed, still impact the city in 2021.

The Impact of Plessy v. Ferguson on Public Education

The impact of residential segregation goes far beyond housing polices. When looking at the practice of such policies it is important to also analyze the effect in other areas such as job opportunities, education, and health. As a result of the 1897 supreme court ruling of *Plessy v. Ferguson* the doctrine of "Separate but Equal" would be used to enforce polices in many other areas then railroad cars. This landmark court ruling would only bolster Jim Crow laws in the south. Jim Crow laws went beyond separate railroad cars or designated rear seating on buses, states now instituted openly discriminatory policies that infringed African Americans' civil rights.².

One of the most glaring impacts of the *Plessy v. Ferguson* decision was on public education in America. This ruling gave states the legal jurisdiction to create segregationist polices. This was no more prevalent than in the southern states. The Supreme Court's decision provided the legal foundation for an elaborate system of subordination and exclusion.³ As the number of school boards grew across the south, many minorities lost control of how education would look for them and their children. In many cases African American teachers were paid less than Caucasian educators. While schools were indeed separate, they were not equal. Several of the reasons schools were not equal were the allocation of recourses and conditions of the facilities. In every state in which segregation was practiced, the schools maintained for African American students were usually neglected and deteriorated.⁴

Like today schools were funded by tax dollars by the passing of referendums. Often times white schools were allocated more funding which resulted in a better-quality education for white students. In many cases school boards consisted of white members who would often side with the side of white parents. This was such the case in the *Cumming v. Richmond Board of Education* decision. The school board argued that financial

² The Aftermath of the Plessy v. Ferguson Ruling, The Making of the Modern U.S.,

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http://projects.leadr.msu.edu/makingmodernus/exhibits/show/plessy-v--ferguson-1896/the-aftermath-of-the-plessy-v- (last visited Nov. 20, 2021)
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¹ Aaqil Zakarya, Richmond - A Modern Day Analysis of a City with a History of Racial Segregation, Statsmath, https://statsmaths.github.io/stat209-s18/assets/project-b/aerrapothu.html (last visited Dec. 4, 2021)

³ Leland Ware, *Plessy's Legacy: The Government's Role in the Development and Perpetuation of Segregated Neighborhoods*, 7 No. 1 JSTOR 1 (2021)

⁴ Ibid

limitations made it difficult to build a new school. Due to financial concerns, the community closed a school for African Americans in order to convert into two elementary schools. The result was African American students had to attend another school with a tax fee the same amount. This resulted in Caucasian students receiving a higher quality of an education. This decision set a precedent for other bordering states to set forth educational polices which limited opportunities for African American students. This was true in the ideology of J.L.M. Curry of Virginia. While Curry was a strong advocate for the education of African Americans, he viewed the white race as superior. Curry believed that African Americans had the right to an education, however it was the responsibility of the whites to manage such.

"I shall not stultify myself by any fresh argument in favor of Negro education, but I must be pardoned for emphasizing the fact that there is a greater need for education of other races. The white people are to be leaders, to take the initiative, to have the direct control in all matters pertaining to civilization and the highest interest of our beloved land. History demonstrates that the Caucasian will rule."⁵

As the 1930s approached, the NAACP challenged that while schools were separate, they simply were not equal. This was known as the "equalization strategy." The equalization strategy was based on the violation of the 14th amendment. As a result, southern states scrambled to implement higher educational curriculums and the offering of more courses for African American schools. This was done to ensure the separate but equal doctrine while implementing more segregationist polices.

In 1951, a US District Court ruled against the NAACP in the *Briggs v. Elliot* decision. Harry Briggs was one of twenty parents that brought suit to the president of the school board in Charleston County, South Carolina. There was dissatisfaction from parents in regards to school transportation for African American students. Thurgood Marshall argued that as long as separation existed schools would be unequal. Two of the judges believed that the state needed time to implement new equalization programs. One judge however had a differing opinion, stating that segregation is in fact unequal. This was the first time a judge in the south ruled against segregation polices. While the court ruled against the parents, this was a victory as it would set up the landmark *Brown V. Board* decision.

The History of Residential Discrimination

Years after the passing of the 13th Amendment abolishing slavery various other tactics were used to segregate African Americans. One of these methods was exclusionary zoning practices and city zoning ordinances. These polices prohibited the sale of property to Black people. Exclusionary zoning laws place restrictions on the types of homes that can be built in a particular neighborhood. Common examples include minimum lot size requirements, minimum square footage requirements, prohibitions on multi-family homes, and limits on the height of buildings.⁶ The Supreme Court ruling of *Buchanan v. Warley* outlawed these racially zoning practices stating Louisville's racial zoning ordinance violated the 14th

⁵ A'Lelia Robinson Henry, Perpetuating Inequality: Plessy v. Ferguson and the Dilemma of Black Access to Public and Higher Education, 27 J.L. & EDUC. 47 (1998)

⁶ Chair Cecilia Rouse, Jared Bernstein, Helen Knudsen & Jeffery Zhang, Exclusionary Zoning: Its Effect on Racial Discrimination in the Housing Market, The White House,

https://www.whitehouse.gov/cea/blog/2021/06/17/exclusionary-zoning-its-effect-on-racial-discrimination-in-the-housing-market/ (last visited Nov. 20, 2021)

Amendment's due protection clause and marked an infringement of contractual freedom because it interfered with private property sales between Caucasians and African Americans.⁷

Once the outlawing of the exclusionary zoning laws was passed, property owners used other techniques to manipulate the system. An example of this was the usage of racial covenants. These restrictive covenants served as mutual agreements between property owners to ban the sale of specific properties to certain racial groups such as African Americans. By the time the Supreme Court found racially restrictive covenants themselves unconstitutional in 1947, the practice was so widespread that these agreements were difficult to invalidate and almost impossible to reverse.⁸

As efforts to combat such segregation tactics resumed, we must start with the National Housing Act of 1934. As a result of The Great Depression, public housing legislation was at the forefront of efforts to discriminate. Signed into legislation on June 27, 1934 President Franklin D. Roosevelt aimed to improve public housing as part of his New Deal programs. The aim of such legislation was to improve housing conditions, make housing lending more accessible, and to reduce foreclosures. While on the surface this legislation sounds like a step in the right direction it would not be offered to all citizens in America. The government's efforts were primarily designed to provide housing to white middle-class Americans. The method of doing such involves the practice called redlining. In 1934 the Home Owner's Loan Coalition (HOLC) introduces "residential security maps".

The premise of redlining was for the government to use a color-coded system to classify areas across the urban United States in over 200 cities. There were four colors used to classify each area. Green represented the best areas that were in-demand and consisted of professional men. Blue classified the still desirable areas in which neighborhoods had reached their top status, however had a low risk of non-white infiltration. Yellow had a classification of definitely declining and was considered risky due to the potential infiltration of non-white groups. Last, red was deemed hazardous where infiltration had already taken place.

These maps served as a tool for the government to decide as to which areas were eligible for federal funding. For the white population it was quite easy to secure a loan in a highly desirable area with high property values. On the contrary, those "risky" areas where African American residents resided were ineligible for federal loans. This continues to have a long-term effect on African Americans in which it was difficult for families to accrue long-term wealth. The federal government's discriminatory policies excluded African Americans from the largest wealth-producing programs in the nation's history: single-family homes in suburban communities purchased with VA and FHA insured mortgages.⁹

As time moved on President Roosevelt signed the G.I. Bills into law which fostered programs to assist returning World War II veterans. Some of these programs included college tuition assistance and low-cost mortgages with low-interest loans. While millions of loans were provided to the retuning solders, many of the benefits were denied to African American Veterans. The G.I. Bill was written to give enormous power to local officials. In which the words of Historian Ira Katznelson: "the law was deliberately designed to

^{7 1917:} Buchanan v. Warley, The Fair Housing Center of Greater Boston,

https://www.bostonfairhousing.org/timeline/index.html (last visited Nov. 20, 2021)

⁸ Beatrix Lockwood, *The History of Redlining*, ThoughtCo., https://www.thoughtco.com/redliningdefinition-4157858 (last visited Nov. 20, 2021)

⁹ OLIVER & SHAPIRO, supra note 34 at 97

accommodate Jim Crow."¹⁰ The premise was to deny African Americans the ability to have access to homes and education. The only educational funding African Americans were granted was for Historically Black Colleges. Without access to homes and education job placement was bleak to say the least. These are all examples of how such polices were designed to create institutional racism.

The black veteran who fought for the right to a college degree at the institution of his or her choice found few allies in the VA. A 1947 survey conducted by scholar Howard Johnson found that "of 1700 veterans employed in the Veteran's Administration in one southern state, only seven are Negroes", despite the fact that African Americans compromised a third of all southern veterans at the time.¹¹

The passing of the Federal Highway Act in 1965 sparked a period of innovation in the United States. Prior to this time period the nation had a population boom and the generation was coined the baby boomers. Post-World War II America saw a steep incline in the economy. The economic uptick in economy had a direct effect on the increased home ownership and employment rate. Suburbs were expanding at a rapid rate and more people were moving out of the cities and into residential neighborhoods. This new trend led to more commuter traffic, which required new roads. The Federal Bureau of Public Road was tasked with the goal of determining the most inexpensive methods of building new roads. This process had an extremely negative impact on African American neighborhoods.

While Interstates were regularly used to destroy black neighborhoods, they were also used to keep black and white neighborhoods apart.¹² This was true by the placement of these new interstates as they secluded African American neighborhoods from the main center cities. Today the highways still serve as political dividing lines and practices such as gerrymandering are. This not only affects the national political spectrum, but also affects school boards and local governments. This legislation also propelled the white middle class to leave the urban areas resulting in low white populations in urban areas and prevalent demolishing of blighted areas.

As the Civil Rights movement gained full steam, the Fair Housing Act was passed in 1968. The main goal for the Fair Housing Act was to protect African Americans from future residential discrimination. It was the first time that Congress declared it illegal for private individuals to discriminate on the basis of race in the sale or rental of housing.¹³ The same year the Housing Act was passed, the practice of redlining areas was abolished. Many methods were used to deter African Americans from purchasing homes. Such methods used all legal and illegal means, including cross burnings, arson, and physical attacks, to keep African Americans out of their neighborhoods. They formed thousands of homeowner organizations, complete with block captains, with the express purpose of keeping African Americans out of white neighborhoods. And when these methods failed,

¹⁰ Kevin Leacock, *A Brief History of Housing Policy in the U.S.*, National Nurse Led Care Consortium (Oct. 29, 2019), https://nurseledcare.phmc.org/advocacy/policy-blog/item/641-a-brief-history-of-housing-policy-in-the-u-s.html

¹¹ Hilary Herbold, Never a Level Playing Field: Blacks and the GI Bill, 6 JSTOR 104-08 (1995)

¹² Kevin M. Kruse, *What Does Have to Do with segregation? Quite A Lot.*, The New York Times (Aug. 14, 2009), https://www.nytimes.com/interactive/2019/08/14/magazine/traffic-atlanta-segregation.html

¹³ Michelle Adams, The Unfulfilled Promise of the Fair Housing Act, The New Yorker (Apr. 11, 2018), https://www.newyorker.com/news/news-desk/the-unfulfilled-promise-of-the-fair-housing-act

they simply moved to suburbs.¹⁴ These scare tactics were the same during the Jim Crow era and one hundred years from the 14th Amendment being signed into legislation.

In 1974, the Section 8 Amendment was passed which highlighted the Housing Choice Voucher Program. The goal was for the federal and state governments to provide vouchers to low-income families for home rentals. The residents would pay a small percentage of the rent and the federal government would pay the remining cost. The problem was and continues to be that vouchers are very scarce and applicants can wait years for approval. Many scholars have stated amending this act would create more opportunities for vouchers. In many cases applicants are vetted based on their source of income. Proponents of such an amendment say it would help fulfill the voucher program's goal of providing low-income families with a wider choice of housing and eliminate a form of discrimination that has frustrated the FHA's goals of ending racial discrimination and segregation.¹⁵

A note about the difference between "income" and "source-of- income" discrimination: the former deals with "how much," while the latter deals with "where from." Income-based discrimination has consistently been viewed as compatible with the FHA, as confirmed by the statute's legislative history, Thus, landlords and other housing providers in FHA cases have always been perceived as having a legitimate interest in their tenants' ability to pay the rent or to meet other financial obligations (e.g., to secure protection against default, property damage, etc.). Where this income comes from, however, is a different matter (e.g., wages, investments, trusts, government assistance, etc.). In theory, a tenant's source of income should not matter to a landlord, so long as that income is reasonably likely to continue and does not impose on the landlord other risks or hardships.¹⁶

Some of the more contemporary legislation which creates hurdles for minorities are the Faircloth Act and the Rental Assistance Demonstration or (RAD). The Faircloth Amendment of 1999 puts a ceiling on the number of new public housing units that can be built. A unit can be built only as an older structure needs to be replaced. Many professionals see this as adding another problem to a much larger wicked problem. Others state that repealing the Faircloth amendment does not help matters, that government does not have the means or the time to perform the task as real estate brokers. The sentiment is government will not allocate resources going forward to maintain such properties only cultivating future blighted areas. The 2012 Rental Assistance Demonstration creates a hybrid funding between public and private sectors. Critics state that private investors only use these opportunities to gain revenue from the government. Another criticism is that this policy can cause displacement and failure of adaptation to new landlords and dwellings. A recent complaint from resident advocates in Baltimore, Maryland, alleges that RAD residents have been routinely evicted without access to a grievance procedure and without proper notification.¹⁷

Historic Residential Policies in Richmond, Virginia

Richmond has a long history of using residential segregations tactics to deprive African Americans from equal opportunities. From the transatlantic slave trade along the James River, to the horrific treatment of African Americans pre-and post- reconstruction.

¹⁴ Ibid

¹⁵ Robert G. Schwemm, *Source-Of-Income Discrimination and the Fair Housing Act*, 70 Case W. Res. L. Rev. 577 (2020)

¹⁶ Ibid

¹⁷ Shamus Roller & Jessica Casella, *The Promise and Peril of HUD's RAD Program*, Shelterforce (July 30, 2018), https://shelterforce.org/2018/07/30/the-promise-and-peril-of-huds-rad-program/

Richmond's leading role in U.S. domestic trafficking in human labor can no longer be sloughed off: how long it went on, how profitable it was, the creation of the construct of race and false hierarchies to justify enslaving African people, the economic capital made possible only by the industry of the enslaved, the "peculiar institution" that led to the Civil War and its aftermath, virulent segregation policies, Jim Crow laws, eugenics, lynching, economic deprivations, and the divisions between black and white that are at the heart of some of today's most damaging social problems.¹⁸

The research suggests that in the 1850s, class defined Richmond neighborhoods more than race. In 1871 while African American males had the right to cast their ballot, the ward known as the "shoe string ward" due to boundaries was gerrymandered. This manifested little or no representation of African Americans on city council. First developed in Richmond, Va., in 1887, the electric streetcar quickly became a popular form of public transportation throughout American cities, replacing the earlier horse-drawn trolleys (or horsecars).¹⁹ The streetcars allowed the development of "streetcar suburbs" and greatly expanded the boundaries of the city. Restrictions on home ownership by deed or restrictive covenants makes most of these suburbs' whites-only, and inaugurates the first "white flight" leaving poorer whites and African Americans in the center city.²⁰ The city of Richmond expanded into surrounding counties resulting in "white flight". Poor whites and African Americans stayed in the city around industrialized areas. Home ownership was very restricted in these new "streetcar suburbs" as a result of covenants.

In 1911 and 1912 Richmond City Council the Virginia General Assembly created a new residential segregation ordinance which allowed all cities and towns to use residential segregation polices. *Buchanan v. Warley* (1917) overturned racial zoning ordinances in Louisville which prohibited whites selling and blacks buying homes in white-majority neighborhoods.²¹ As a result of *Buchannan v. Warley* the ordinances became unconstitutional. Restrictive covenants played a role shortly after until the ruling of *Shelly V. Kramer* made them unconstitutional. The result of these court rulings would employ real estate practices such as block busting, steering, and redlining until the passage of the 1968 Fair Housing Act. Such methods of black busting allowed businesses in the area to profit from these discriminatory policies.

As a result of these new suburbs the surrounding counties would all be graded by the HOLC's residential security maps. The categories of security map had a direct correlation with the racial makeup of the area. Those areas outlined in red or graded type D by the HOLC, were predominantly African American and found in the inner city. Areas labeled type C were classified as 'working class' and contained a larger number of whites. The vast majority of areas graded type A and B, were populated solely by whites. The

¹⁸ Ana Edwards, Shockoe Bottom Changing the Landscape of Public History in Richmond, Virginia, 2021 JSTOR 79

¹⁹ Emma Newcombe, The Fascinating Rise, Fall and Rebirth of Streetcar Suburbs, Governing (Jan. 27, 2022), https://www.governing.com/context/the-fascinating-rise-and-fall-of-streetcar-suburbs

²⁰ Timeline of Housing Events, Virginia Memory, https://www.virginiamemory.com/onlineexhibitions/exhibits/show/mapping-inequality/mapping-inequality-timeline (last visited June 10, 2022)

²¹ D. Eric Schansberg, On 100th Anniversary of Louisville Case, Beware of Racism Under Cloak of Zoning | Opinion, Courier Journal, https://www.courier-

journal.com/story/opinion/contributors/2017/12/15/louisville-housing-racism-key-supreme-court-ruling/955121001/ (last updated Dec. 15, 2017)
underlying racism of the HOLC grading system and the resulting lack of investment in predominantly African American neighborhoods is still prevalent today.²²

The inner city of Richmond is located in Henrico County. Henrico County is surrounded by six other counties consisting of Charles City, New Kent, King William, Hanover, Goochland, and Powhattan counties. When analyzing the 1937 HOLC map of Richmond most of the "D" hazardous labeled areas were located in the inner city of Richmond Henrico County, Chesterfield County, and New Kent County. On the contrary most of best, and still desirable areas (A and B) were located outside of the city were the majority of white flight occurred in the late 1800s and early 1900s. When comparing the 1937 HOLC maps, early 20th century poverty maps, and 2010 poverty maps one could make the argument the impact of historical residential discrimination polices still exist today. A wealth gap between Black and white households exists to this day, and homeownership remains the primary reason. In Richmond, 26 homes were bought by white households per day on average in 2017. That same year, an average of six homes per day were purchased by Black buyers, according to the Partnership for Housing Affordability.²³ When looking at the HOLC descriptions of such areas, the language used sets the stage. For example, C7 is described as "respectable people but homes are too near negro area". This language was just to steer white people out of the area. "D8 states negroes are crowded out of D-1 are crowding white men out of the aged and obsolete structures." The result of such descriptions was used to justify the lack of financial lending and low African American home ownership. The areas were categorized into A, B, C, and D areas with A being the best and D being the worst.

Mid 20th Century & Contemporary Residential Polices in Richmond, Virginia

During the 1940s and 1950s Richmond saw a high concentration of federal public housing in the inner city and east Richmond. Many of the areas that saw construction where those deemed hazardous by the HOLC residential security maps. The housing came about through the New Deal public works program, aimed to replace slums and catered to the potential workforce post World War II. Many opposed such federal housing projects influenced by the Jim Crow Era and powerful real estate companies. Public housing did not come easily to Richmond, a city leery both of federal meddling and the potential incursion of socialism.²⁴

While the projects on the outside seemed as though they would benefit impoverished African Americans, there are those who suggested this was just a tool to reinforce segregation. You cannot separate the history of public housing in Richmond from race," says the Rev. Ben Campbell, who writes about this history in his book, "Richmond's Unhealed History." "It is the white establishment deciding what they want to do with predominantly black neighborhoods and using language that suggests they are trying to

²³ Mark Robinson, *Report: Virginia's Land Use Policies Promoted Racial Segregation, Contributed to Wealth Gap*, Richmond Times- Dispatch (Feb. 14, 2021),

https://richmond.com/news/report-virginias-land-use-policies-promoted-racial-segregation-contributed-to-wealth-gap/article_0a82f062-c6e5-56fe-bdab-9875330c51a2.html

²⁴ Tina Griego, How Did We End Up Here? Richmond Mag (Jan. 28, 2016),

²² Timeline of Housing Events, Virginia Memory, https://www.virginiamemory.com/onlineexhibitions/exhibits/show/mapping-inequality/mapping-inequality-timeline (last visited May 22, 2021)

https://richmondmagazine.com/news/features/creighton-history/

help improve them, while the actual fact is much darker than that. And that set the stage for what we are dealing with now."²⁵

The signing of the Federal-Aid Highway Act in 1956 had a lasting impact on the city of Richmond. Over 1000 miles of roadway known as I-95 would result in over 4700 homes being demolished. Jackson Ward, the largest residential area for African Americans, would fall victim to what is now known as the Richmond-Petersburg Turnpike. This would not only result in massive displacement, but it caused a massive decline on employment amongst African Americans. The employment situation for African Americans in Richmond mirrored the one nationally. In 1950, for example, the jobless rate for whites was 3.8 percent and 10.5 percent for African Americans.²⁶ Another casualty to the construction of highways was the Navy Hill community. Interstates 64 and 95 would result in the destruction of this once thriving neighborhood. It was noted that 1000 families would be displaced by the construction of the interstate. The neighborhood was eaten up by highway construction and various projects, including the now shuttered Richmond Coliseum. The former streets and backyard gardens were supplanted by the Virginia Biotechnology Research Park in the early '90s.²⁷

Richmond residents had suffered from the practices of the subprime mortgage lending companies and a large foreclosure crisis. The subprime mortgage lending crisis was a result of risky lending practices. Many of the applicants for these mortgages had poor credit history. Most of these loans were lent to African Americans. In Richmond from 2004 to 2011, subprime loans accounted for 31 percent of all loans in predominantly minority neighborhoods compared to just 5 percent in predominantly white neighborhoods.²⁸ The number of home purchases in the early 2000s peaked at an all-time high. Unfortunately, when new financial tools were created many lenders wanted their money reinvested in hedge funds and interest rates climbed high. This resulted in massive foreclosures and eventually evictions.

"In many ways, this analysis carries on a story that has been told many times – geographic disparities are omnipresent in the city. Housing instability has plagued areas in the south, east, and northeast in Richmond from slum clearance and redlining, while those in the western parts of the city live away from threats of displacement. Apart from the spatial similarities between foreclosure and eviction, previous literature has indicated that the rise of investor-owned properties, many of which were previously foreclosed, in urban areas has resulted in higher eviction rates. In the case of Richmond, large-scale property owners of previously foreclosed buildings have bought up significant amounts of housing and appear to evict at very high rates, 7% higher than the citywide average eviction rate. From exclusion of access to credit through redlining and sales of speculative land contracts during the 20th century, to the recent targeting of non-white households receiving high-risk mortgages, current eviction processes continue the denial of stable housing opportunities for minority families. The connection between eviction and

https://richmondmagazine.com/news/sunday-story/the-original-navy-hill/

²⁸ Timeline of Housing Events, Virginia Memory, https://www.virginiamemory.com/online-

²⁵ Ibid

²⁶ Michael Eric Taylor, *The African-American Community of Richmond, Virginia: 1950-1956*, University of Richmond UR Scholarship Repository, https://core.ac.uk/download/pdf/232773245.pdf (last visited May 23, 2021)

²⁷ Harry Kolltaz Jr., The Original Navy Hill, Richmond Mag (Dec. 29, 2019),

exhibitions/exhibits/show/mapping-inequality/mapping-inequality-timeline (last visited May 22, 2021)

foreclosure through large-scale property ownership reframes and continues the legacy of wealth extraction from communities of color."²⁹

Current Residential Status in Richmond

The use of federally backed Section 8 vouchers for low-income renters is another issue for minorities. Often times landlords will not rent to applicants whom qualify for such vouchers. A 2020 study conducted by Richmond-based fair housing watchdog Housing Opportunities Made Equal found that only 25 of the 139 apartment complexes contacted in the Richmond area accepted vouchers.³⁰ Virginia Attorney General Mark R. Herring has taken a strong stance on housing discrimination based on voucher applicants. He recently filed 13 lawsuits against companies in Richmond, Henrico, and Chesterfield counties. According to the lawsuits, each company's property manager, staff member or leasing agent responded that a voucher was not an acceptable form of payment.³¹

Housing prices in Richmond are at an all-time high as of 2021. Highland Springs is a suburb of Richmond, just east of the state capital. Home prices in Highland Springs were particularly low for two years, when the median sale price was approximately \$150,000 in September 2021. However, two years later, the median sale price in Highland Springs has grown by 50.7%, reaching \$226,000 in September 2021.³² The result in such a surge in home prices continues to have an effect on lower income residents. First, lower income residents are priced out of gentrified areas. Having to move as a result of displacement can cause future health concerns based upon living environments. In the process of relocating some residents will not have access to important resources such as healthcare and quality food access. Access to a good education can also be at stake. Typically, schools are funded by the community. If residents are forced to leave to high rent, they may have to enroll in public schools that do not have the resources that provide a quality education. This leads to an ever-increasing racial wealth gap.

"According to the Federal Reserve Bank of Richmond, only 25.2% of Virginia's Black population has a bachelor's degree or higher, compared to 42.9% of the state's white population—something local colleges and universities should be compelled to address. Still, a bachelor's degree is not enough to fully mitigate the effects of systemic racism. The UVA report found that Black Virginians with a bachelor's degree have a median wage that is still 10% lower than white Virginians with a bachelor's degree."³³

The Impact of Social Inequities in Health in Richmond, Virginia

To see the impact of historical residential segregation polices health most be examined. Often times social determinants are the main factor in poor health conditions. Variables

http://richmondfreepress.com/news/2021/oct/21/crackdown/

³¹ Ibid

²⁹ Woody Rogers, *The Connections Between Evictions and Foreclosures in Richmond*, Virginia Commonwealth University (May 2019), https://cura.vcu.edu/media/cura/pdfs/cura-

documents/TheConnectionsbetweenEvictionsandForeclosuresinRichmond.pdf

³⁰ Jeremy M. Lazarus, *Crackdown*, Richmond Free Press (Oct. 21, 2021),

³² Andrew DePietro, *Virginia Housing Markets That Have Seen the Biggest Jumps in Home Prices of 2021*, Forbes (Nov. 3, 2021),

https://www.forbes.com/sites/andrewdepietro/2021/11/03/virginia-housing-markets-that-have-seen-the-biggest-jumps-in-home-prices-of-2021/?sh=7faa17ed6549

³³ Andre M. Perry, Carl Romer & Anthony Barr, *A University-Led Remedy to Place-Based Discrimination in Richmond, Va.*, Brookings (Aug. 6, 2021),

https://www.brookings.edu/research/a-university-led-remedy-to-place-based-discrimination-in-richmond-va/

such as safe housing, education levels, job opportunities, and healthcare access create these inequities in health. The Center on Society and Health at Virginia Commonwealth University found that residents of low-income Black communities in the East End of Richmond have a life expectancy that is 20 years shorter on average than white residents in wealthy West End neighborhoods.³⁴ Crime is a key factor in health conditions amongst inner city Richmond residents. Violent crimes consist of homicide, rape, robbery and assault. According to the U. S. Department of Justice, the violent crime rate in Richmond City was 648 .7 crimes per 100,000 persons in 2012, the highest reported rate among large Virginia cities.³⁵ Non-Violent crimes such as burglary and theft are also contributing factors in health amongst Richmond City residents.

In 2021 it is clear the COVID-19 pandemic has had a devastating impact on Latino and African American communities in Richmond. According to the Virginia Department of Health, hospitalizations of African Americans due to the virus occur at 1.8 times greater than that of white residents. Deaths related to the virus occur 1.7 times greater than white residents. Latinos are affected at 1.8 times greater for hospitalizations and 1.6 greater in deaths than those of white residents. ³⁶ This was analyzed by using a tool known as the Health Equity Dashboard. The dashboard does a case-by-case comparison in four categories: cases, hospitalizations, death, and vaccinations. Healthcare itself is very scarce in Richmond and the surrounding counties. For example, in Richmond there is one mental health provider for every 278 people, one dentist for every 750 people, and one primary care provider for every 966 people.³⁷ Similar numbers exist in Henrico, Charles City, and Dinwiddie counties.

Former redlined areas in Richmond average five degrees hotter than non-redlined areas and can have as much as a twelve-degree difference in some cities.³⁸ The lack of green space is a factor in causing urban heat islands. This trend in Richmond is known as Thermal Inequity. In the former redline areas there are few trees making these areas very hot. Areas that were not redlined, which were home to the white population, tend to be much cooler. An article in the New York Times stated more than 2000 residents, mostly black, reside in low-income public housing that lacks central air conditioning. In many cases the front yards are concrete or pavement which absorbs heat. Hotter areas are causing a health issue for residents killing 12,000 people per year nationally.³⁹ It is clear that the former redlining practices are a major cause of poor healthcare conditions.

³⁴ Richmond Declares Racism A Public Health Crisis, Richmond City Health District,

https://www.vdh.virginia.gov/richmond-city/2021/07/28/richmond-declares-racism-a-public-health-crisis/ (last visited Nov. 24, 2021)

³⁵ Population, Community Characteristics, and Health in Virginia, Metropolitan Richmond, and Richmond City, Health Equity in Richmond Virginia, https://societyhealth.vcu.edu/media/society-health/pdf/RVAHealthEquityFINAL.pdf (last visited Nov. 24, 2021)

³⁶ Michael Landen & Helen Tazelaar, COVID-19 Disparities by Race and Ethnicity in Virginia, Virginia Department of Health (Mar. 8, 2021),

https://www.vdh.virginia.gov/coronavirus/2021/03/08/covid-19-disparities-by-race-and-ethnicity-in-virginia/

³⁷ Brendan King, *Data Show Large Disparities in Access to Healthcare Across Central Virginia*, 6 News Richmond (Apr. 16, 2021), https://www.wtvr.com/news/local-news/disparities-healthcare-access-central-virginia

³⁸ Brad Plumer & Nadja Popovich, *How Decades of Racist Housing Policy Left Neighborhoods Sweltering*, New York Times (Aug. 24, 2020), https://www.nytimes.com/interactive/2020/08/24/climate/racism-redlining-cities-global-warming.html

³⁹ Kelly C. Saverino et al., *Thermal Inequity in Richmond, VA: The Effect of an Unjust Evolution of the Urban Landscape on Urban Heat Islands*, 13 Sustainability 16 (2021)

"Based on our research it is evident that heat is unequally distributed throughout the City of Richmond. This is the result of racist historical zoning practices that sought to keep white neighborhoods separate from Black and minority communities and protected from the harm of industrialization. The extremely detrimental effects of these practices are still evident in the segregation of Richmond today, as the more affluent suburban western end of the city is dominated by white neighborhoods and the urban eastern side of the city is dominated by Black neighborhoods. Since areas occupied by Black communities were essentially sacrificed as industrialization grew, these regions have the most impervious surfaces and least green space and are in turn the warmest parts of the city. In comparison, the western end of the city has a great deal of green space and minimal impervious surfaces. At local scales, differences in temperature were expected between adjacent gentrified and non-gentrified regions. The temperature data comparing North Church Hill and gentrified South Church Hill were not significant, yet the two areas did have large differences in percent below the poverty level, per capita income, median household income, and property value, revealing the tangible effects of gentrification. While the extent of the disparity that the findings revealed is disturbing, the data can be used to implement initiatives to reduce the thermal imbalance."40

When analyzing the social inequities in health this paper will analyze two areas in Richmond. The areas will consist of two sections of the HOLC redlining maps in the 1930s. They consist of one former highly desirable "A" graded, and one former hazardous "D" graded. Criteria will consist of Social Vulnerability, Percent Minority, Life Expectancy, Median Age, Over 65, Asthma, Poverty, Cancer, Diabetes, High Blood Pressure, Kidney Disease, Mental Health Problems, Obesity, and Pulmonary Disease. Below are the current statistics in 2021.

0	2 0 2 2	0,
1930s HOLC Areas	A5	D5
Social Vulnerability	15%	79.6%
Percent Minority	5.2%	87.2%
Life Expectancy	84.3 Years Old	71.3 Years Old
Median Age	50 Years Old	43 Years Old
Over 65	25.6%	20.8%
Poverty	0.8%	28.4%
Asthma	7.8%	12.7%
Cancer	9.6%	6.6%
Diabetes,	8.7%	22.5%
High Blood Pressure	30.9%	50.8%
Kidney Disease	2.7%	5.4%
Mental Health Problems	7.5%	16.8%
Obesity	23.3%	45%
Pulmonary Disease	4.8%	11.3%

Table 1: Richmond HOLC Graded Area Comparison (Note: Statistics were generated through *Not Even Past: Social Vulnerability and the Legacy of Redlining*)

The Impact of Brown v. Board on Public Schools in the South

On May 17, 1954 the U.S. Supreme Court took away constitutional powers for states to segregate by race in public education. Brown v. Board would overturn Plessy v.

⁴⁰ Ibid

Ferguson stating that such legislation is a violation of the 14th Amendment. On the very day the decision was made, southern leaders declared defiance. James Eastland, the powerful Senator from Mississippi, declared that "the South will not abide by nor obey this legislative decision by a political body."⁴¹ The movement of "Massive Resistance" was called on by Senator Harry Byrd of Virginia. Several laws were passed in Virginia as a result in effort to stall the process of integration in public schools.⁴² Such laws were used to punish any public school district that integrated by withholding funding as well as threats to close such schools. There was only the tiniest token of progress during the first ten years following Brown, where 98 percent of southern Black students remained in all Black schools a decade later.⁴³

Tools such as withholding funds for schools that integrated students were used. The largest strategy by opposers to Brown was simply delaying integration. School districts were authorized to assign students to specific schools according to specific criteria. This effort was known as pupil placement.⁴⁴ The Brown v. Board of Education ruled that states integrate "with all deliberate speed" it did not establish deadlines. Virtually no desegregation occurred in any states of the former Confederacy until 1957, leading one Black congressman to concede that the South had won "the first round in the battle for compliance" with Brown.⁴⁵

White moderates opposed such resistance to integration of schools. Most moderates believed that massive resistance was too harsh and had no rights in opposing the federal government. The governor of Virginia, Lindsay Almond, began closing schools leaving hundreds of white students without education. In 1948 President Truman had ordered Chesterfield, King George, and Gloucester counties to equalize schools.⁴⁶ While Brown was an important ruling for American society it did not come without future issues as a result. The ruling allowed for other methods of segregation to occur and by in large tension still exists as a result in 2021.

Current Status Public Education in Richmond, VA

Today in Richmond when analyzing the current counties and their demographics the existing impact of HOLC redlining maps can clearly be seen. Comparing and contrasting the 1930s HOLC maps to current demographic maps, it is clear many of the impoverished communities lie within formerly the original redlined areas. Many of these communities are located in the former redlined regions. Schools in these areas are largely attended by African American students and have little representation of white students. For example, in Richmond City Fairfield Elementary has an African American Population of 98 percent. In the same district, Martin Luther King Jr. has consisted of 97 percent African Americans.

brown/ (last visited Nov. 27, 2021)

⁴¹ The Southern Manifesto and "Massive Resistance" to Brown, LDF, https://www.naacpldf.org/ldfcelebrates-60th-anniversary-brown-v-board-education/southern-manifesto-massive-resistance-

⁴² Massive Resistance, Virginia Museum of History & Culture,

https://virginiahistory.org/learn/historical-book/chapter/massive-resistance (last visited June 10, 2022)

⁴³ Gary Orfield & Chungmei Lee, Brown at 50: King's Dream or Plessy's Nightmare? 2004 C.R. Project Harv. U. 17

⁴⁴ Massive Resistance, Virginia Museum of History & Culture,

https://virginiahistory.org/learn/historical-book/chapter/massive-resistance (last visited June 10, 2022)

⁴⁵ Massive Resistance, Segregation in America, https://segregationinamerica.eji.org/report/massive-resistance.html (last visited Nov. 24, 2021)

⁴⁶ Ibid

The student body at Armstrong High School high school in Richmond City African Americans make up 95 percent. Issues that have plagued these schools for decades are funding gaps and achievement gaps.⁴⁷

On the contrary, schools that exist in former highly desirable areas tell a much different story. White students make up most of the student bodies. The student to teacher ratio is much smaller lending to better test scores and college placement. The resources that are available to students and teachers tend to be substantially better quality than those schools in former redlined areas. Segregationist policies, like school funding based on property values, are impeding the progress of those most marginalized.⁴⁸

Conclusion

When analyzing the Richmond area redline maps and other historical discriminatory housing polices it is clear they have had a lasting impact on the existing demographics. The tactic of using redlining has produced a segregated population which still exists in 2021. These polices have had a negative impact on the health, wealth, and educational opportunities of minority Richmond residents.

A research study performed by researchers from the National Community Reinvestment Coalition, University of Richmond and the University of Wisconsin-Milwaukee They compared the maps to the current economic status and health outcomes in those neighborhoods today and found higher rates of poverty, shorter life spans and higher rates of chronic diseases including asthma, diabetes, hypertension, obesity and kidney disease.⁴⁹ A recommended policy to obtain more community investment to curtail increasing health issues. Another policy of community investment would be the addition of more greenspaces and opportunities for employment would be a small solution to help the Richmond health crisis in the inner city.

There is a clear correlation between housing policies and the current status of public education in Richmond. Recently, Richmond only had one school make the top public-school ranking in the state of Virginia. At the Maggie L. Walker Governor's School, an elite public magnet school in Richmond named for a Black civil rights pioneer, most students are not classified as economically disadvantaged.⁵⁰ Eliminating district boundaries for school funding would create higher quality education for Richmond residents. Black residents in Richmond make up 46.9 percent of Richmond's population, and 23.2 percent of this group lived below the poverty line in 2019, according to the United States Census Bureau.⁵¹ Introducing more diverse hiring practices would foster a comfortable learning

⁴⁷ Find the Best K-12 Schools for You, U.S. News, https://www.usnews.com/education/k12 (last visited June 10, 2022)

⁴⁸ Lynette Guastaferro, *Why Racial Inequities in America's Schools Are Rooted in Housing Policies of the Past*, USA Today (Nov. 2, 2020), https://www.usatoday.com/story/opinion/2020/11/02/howredlining-still-hurts-black-latino-students-public-schools-column/6083342002/

⁴⁹ Maria Goody, In U.S. Cities, the Health Effects of Past Housing Discrimination Are Plain to See, NPR (Nov. 19, 2020), https://www.npr.org/sections/health-shots/2020/11/19/911909187/in-u-s-cities-the-health-effects-of-past-housing-discrimination-are-plain-to-see

⁵⁰ Kenya Hunter, New VCU Studies Show Increase in School Poverty, Deeper Segregation by Race and Class, Richmond Times-Dispatch (May 1, 2021), https://richmond.com/news/local/new-vcu-studies-show-increase-in-school-poverty-deeper-segregation-by-race-and-class/article_2f06849f-f1a7-5d13-9e8d-2ee8117b25d0.html

⁵¹ Jamaija Rhoades, *Virginia's History of Racism Lives on in Richmond Public Schools*, Pulitzer Center (July 21, 2021), https://pulitzercenter.org/stories/virginias-history-racism-lives-richmond-public-schools

environment where all students feel represented on a daily basis. It is clear these polices are still affecting Richmond in 2022.

Acknowledgements

I would like to thank my wife Lanie, for your belief in my abilities. My advisor Dr. Danilo Yanich, for the opportunity for growth in the master's program at the Biden School. I would also like to give a special thanks to Dr. Leland Ware, thank you for allowing me the opportunity to serve as your research and teaching assistant as well as helping take my writing to the next level. My experience at University of Delaware will serve me well as I embark on doctoral work.

Appendix

When taking a deeper look at three public high schools research was gathered to compare and contrast each school. This data was recorded from *U.S. News*.

Charles City County High School

Total minority enrollment is 70% 55% are economically disadvantaged. 57% African American 30% White National Ranking 13,394 out of 17,857 State Ranking 269 out of 319 Only 26 full time teachers

Highland Springs High School

* Former redlined area Charles City County

* Former redlined area Henrico County

At Highland Springs High Total minority enrollment is 90% 65% of the students are economically disadvantaged. National Ranking 13,394 out of 17,857 State Ranking 269 out of 319 80% African American 10% White 85% graduation rate well below the state median.

Powhatan High School

* Former High Desirable Area

Total Minority 13% 17% economically disadvantaged 87% White 5% African American National Ranked 6,516 out of 17,857 State Ranking 151 out of 319 102 full time teachers



Figure A1: Virginia Department of Public Works, "Map Showing Territorial Growth of Richmond, Department of Public Works, 1923.," *Online Exhibitions*, accessed November 30, 2021, https://www.virginiamemory.com/online-exhibitions/items/show/14.



Figure A2: Home Owners' Loan Corporation, "Home Owners' Loan Corporation (HOLC) Map of Richmond, 1937.," *Online Exhibitions*, accessed November 30, 2021, https://www.virginiamemory.com/online-exhibitions/items/show/32.



Figure A3: Courtesy John Moeser, "Current Poverty Areas Compared to 1937 HOLC Map of Red Lined Neighborhoods, 2010.," *Online Exhibitions*, accessed November 30, 2021, https://www.virginiamemory.com/online-exhibitions/items/show/28.



2021, https://www.virginiamemory.com/online-exhibitions/items/show/36



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Biden School Journal of Public Policy

(Formerly New visions for public Affairs-Print) ISSN 2575-842x (Formerly New visions for public Affairs-Online) ISSN 2575-8535

Biden School of Journal Public Policy (Biden School - JPP) Joseph R. Biden, Jr. School of Public Policy & Administration, 111 Academy Street 184 Graham Hall, Newark, DE 19716 Website: <u>https://sites.udel.edu/biden-school-journal/</u>