# The Role of Governance in Advancing Climate Change Adaptation Policies: A Comparative Study of U.S. and Global Best Practices

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## ABSTRACT

Climate Change globally represents the most disturbing challenges necessitating urgent action from the state and NGOs, the private sector and civil societies. Exploring the best global practices in climate change adaptation policies, this study employed Multilevel governance (MLG) Theory and systematic literature review to compare efforts of different countries such as the United States, Canada, France, New Zealand and Germany that have mobilized efforts towards achieving zero-carbon emission. Notably, the Paris Agreement and Greening Government Initiative have encouraged collaboration and innovation among countries to achieve zero-carbon emission in the power, manufacturing and transport sectors. In the United States, the Biden-Harris administration's comprehensive climate change agenda mobilized efforts aimed at achieving significant greenhouse gas reductions by 2030. France's Low Carbon National Strategy, Canada's Net-Zero Emissions Accountability Act, and Germany's sectoral emissions further demonstrate the efforts of long-term strategies among countries that are vulnerable to extreme weather conditions such as wildfires, hurricanes and heatwaves. Comparing the United States climate change adaptation policies, it was discovered that while the U.S. federal system empowers states to develop climate change policies it also presents challenges in achieving a unified national strategy. Therefore, this paper emphasizes the importance of synchronizing the federal and state climate change adaptation policies within the U.S. federal system. Likewise, there is a need for citizenship and cross-sectoral inclusivity in climate change governance.

**Keywords:** Governance, Climate Change Adaptation policies, United States, Global Best Practices

## INTRODUCTION

Adaptation is increasingly becoming an integral part of urban agendas as cities worldwide are bent on addressing the adverse effects of climate change to reduce susceptibility to current and unforeseen risks (Hughes, 2015; Long and Rice, 2019; Reckien et al., 2018). Adaptation assumes prominence as a vital urban policy concerning climate change governance. It is a political process and policy formulation to make the urban environment more resilient to the threat of climate change (Chu & Cannon, 2021; Meerow & Mitchell, 2017; Reckien et al., 2018). Many governments have committed to incorporating adaptation deliberation into development plans and sectoral strategies within the national climate change plans linked to the Paris Agreement (UNFCCC 2016)

Since the early 1990s, the problem of climate change has become challenging for countries to address effectively. There have been agreements on the amount of carbon emission into the atmosphere. The Paris Agreement, United Nations Framework Convention on Climate Change(UNFCCC), and Kyoto Protocol are noteworthy. For instance, the Paris Agreement aims at keeping global temperature rise well below 2°C above pre-industrial levels, and to pursue efforts to limit temperature rise to 1.5°C. UNFCCC effort is geared towards stabilizing greenhouse gas concentrations in the atmosphere to prevent dangerous human interference with the climate system. Despite the progress recorded at international and local levels in implementing climate change policies by countries, there are still risks of unprecedented floods, droughts and unpredictable weather conditions demonstrating the ineffectiveness of the international treaties of climate change governance (Grynspan *et al.*, 2021).

Governments worldwide primarily address building a low carbon economy through the implementation of long-term mitigation strategies such as carbon taxes, emissions trading systems and carbon neutrality targets (Birchall, 2014a, Birchall, 2014b; Birchall, Murphy, & Milne, 2015; Bulkeley & Tuts, 2013). The persistent effects of global warming highlight the pressing need for governance systems to address climate change effectively (IPCC, 2018; Hoegh-Guldberg et al., 2019). Numerous studies demonstrate how government institutions are embarking on climate resilience actions (Flatt and Huang, 2012; Vogel et al., 2016).

In the United States, cities and municipalities are notable for adaptation efforts (NASA, 2021). New York City has implemented PlaNYC (now OneNYC) to increase climate resilience. Also erect a flood protection system called The Big U around Lower Manhattan. The Big U now provides a serene green space for Manhattan residents and visitors to enjoy, and improves their health and well-being. The city has also embarked on extensive tree planting and green infrastructure projects. In Miami, Florida, the government launched the Miami Forever Bond to fund flood mitigation and stormwater management. This is embarked upon to construct a stronger, more resilient future for Miami, relieving existing and future dangers to citizens, economy, tourism and the city's legacy. The Bond will fund a series of projects that will transform the future of Miami by investing a total of $400 million in five key categories, which align with the City's most pressing needs: Sea-Level Rise and Flood Prevention, Roadways, Parks and Cultural Facilities, Public Safety and Affordable Housing.

However, the United States has an inconsistent policy adoption in addressing climate change developed by various states (Bromley-Trujillo and Holman, 2020; Hultman et al., 2019). For instance, the Biden-Harris administration prioritises combating climate change by mobilising government efforts to reduce climate pollution across all sectors of the economy and enhance resilience to climate impacts (The White House, 2021). This encompassing commitment is reinforced by the United States' Long-Term strategy which highlights the nation's roadmap to achieving its climate objectives (The United States, 2021). Also, the structure of the American federal system has empowered individual states to pursue ambitious climate change mitigation policies since the 1990s, fostering ongoing policy innovation (Karapin, 2016).

The state of California has implemented comprehensive policies across multiple sectors supported by robust regulatory bodies ensuring enforcement. The state is notable for energising the federal government to take stronger action through litigation or other unique control mechanisms (Vogel, 2018). There is the California Climate Adaptation Strategy developed in 2021, which is a statewide framework outlining priority actions across different sectors to address climate risks. This has created the California Wildfire and Forest Resilience Task Force, 2which focuses on increasing controlled burns and forest thinning. The state has invested in fire-resistant infrastructure in high-risk zones by expanding firebreaks and emergency response capacity.

Numerous states have resisted adopting climate change policies and frequently rival federal climate change initiatives, sometimes through active non-compliance or multistate litigation coalitions led by state attorney generals (Nolette, 2015). California is notable for climate adaptation polices that often go beyond federal policies because the state has some of the most polluted cities in the U.S. and needs stricter vehicle standards to improve air quality. This has made it possible to pursue stronger, science-based adaptation strategies due to its unique vulnerabilities to climate change (wildfires, droughts, and sea-level rise) and commitment to environmental leadership. Under the Trump administration, California challenged the administration revoking the waiver under the Clean Air Act, which was later reinstated by the Biden administration. These challenges at the state level have often acted as a counterbalance to the federal governance system's climate change efforts as Congress remains largely passive on the issue of climate change and environmental issues. Consequently, this study investigates how governance in the U.S. has influenced climate change adaptation policies compared to global best practices.

## Climate Change Adaptation

Climate change adaptation was initially conceived by the Intergovernmental Panel on Climate Change (IPCC) in 2001 as "[a]adjustments in natural or human systems to an unexplored or changing environment…in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities" (McCarthy, 2001). Additionally, adaptation is described as actions that adjust to current or unforeseen effects of climate change in the Fifth Assessment Report of the IPCC (IPCC AR5). According to the IPCC, adaptation can

take many shapes and is categorised alongside timing, scope, purposefulness, and the adaptation agent (IPCC AR3, nd). These variables determine whether adaptation is autonomous or planned, local or regional, short- or long-term, proactive or reactive, and anticipatory.

Adaptation to climate change transcends beyond adjusting to changing climatic conditions, rather it addresses the global impacts of climate change effects that are extreme and transboundary. (Adger, 2009). The process of adjusting to the effects of climate change is known as climate change adaptation. Infrastructural, institutional, behavioural and nature-based options are the four types of climate change adaptation actions (O'Neill, 2024). These actions are carried out to prevent the unexpected harm of climate change to people and the environment. These adaptation plans are carried out by humans to adjust to the natural systems (IPCC, 2022) through different adaptation strategies or options. For instance, there are hospitals built to manage the impact of natural disasters or roads that can withstand torrents of rain and floods (World Bank, 2024).

Reducing vulnerabilities, resilience building, responding to risk and managing the adverse effects of climate change are the most important components of adaptation. These are actions directed at preventing damage and recovery from harm done to people and the environment by climate change. To lessen or recover from harm, climate change adaptation entails changing the physical, environmental, and socioeconomic conditions. These entail categorising the geographical locations that are resilient or can adapt to climate change (Ruhl, 2010). and recognising and lessening their sensitivities to climate change by achieving a degree of preparedness through improving socioeconomic conditions (Kaswan, 2013) to reduce social vulnerabilities that result in natural hazards, death, injury, loss, and disruption of livelihood.

IPCC emphasizes in AR5 humans engage in planned adjustment or response to climate change which may be transformational or incremental (Bulkeley & Tuts, 2013). The latter is the process of preserving the institutional, economic, technological, and social systems coping with the effects of climate change (Brooks et al., 2011). In light of the effects of climate change, which may force migration and destroy livelihoods and other forms of human activity, transformational adaptation seeks to alter basic elements of human systems (Bulkeley & Tuts, 2013). While transformational adaptation is more drastic, necessitating long-term changes in the governance structure, incremental adaptation gradually integrates climate change adaptation into governance (Bulkeley & Tuts, 2013).

Furthermore, according to AR5, autonomous adaptation is an additional type of adaptation. This type of adaptation implies a reactive approach, and the actions taken are not the result of deliberate or planned attempts to address climate change and its consequences (Field & Barros, 2014). Additionally, there is a passive semi-deliberate adaptation, which increases the ability of the environment's bio-components, including people, to adapt to changing conditions without addressing climate change or its effects on society (Field & Barros, 2014).

However, the environment plays a role in the need for adaptation. Environments vary in how they adjust to the particular climate risks they face (O'Neill et al., 2022). For example, coastal plains may give mangrove restoration and sea-level rise defences priority. In arid areas, solutions for heat management, land restoration, and water scarcity may take precedence. The degree to which the climate changes or is predicted to change—which varies by location—will also determine the adaptation requirements. Since developing nations are most at risk from climate change, adaptation is crucial (United Nations, nd). Sarkodie et al. (2022) state that there is a high need for adaptation in food, water, and other sectors that are crucial to economic output, employment, and incomes. Prioritizing the needs of communities, especially the poorest, is one of the challenges to prevent the disproportionate impact of climate change on the communities (Birkmann et al., 2022).

Planning for adaptation is essential to assisting nations in managing climate risks. More than 70% of nations have plans, policies, or strategies in place (UNEP, 2021). Countries are encouraged to create adaptation plans that align with international treaties such as the Paris Agreement. This is considered crucial to implementing adaptation policies that will achieve climate change resilience globally. However, adaptation efforts alone are insufficient to mitigate the adverse risks of climate change that are currently experienced but must also foresee future risks (IPCC, 2022).

The two approaches to combating climate change are adaptation and mitigation. The goal of mitigation is to improve greenhouse gas sinks or decrease the sources of emissions. According to the IPCC (2001), adaptation is defined as "an modification in natural or human systems in response to present or expected climatic stimuli or their effects, which moderates harm or exploits good opportunities." The spatial scales of adaptation and mitigation are different; although climate change is a worldwide issue, the benefits of adaptation are local, while those of mitigation are global. Additionally, the temporal dimensions and economic sectors involved in adaptation and mitigation are different (Tol 2005). There are several significant distinctions between adaptation and mitigation, especially with regard to their goals. While adaptation deals with the effects of climate change, mitigation deals with its causes, which are the buildup of greenhouse gases in the atmosphere. Both strategies are required. On the one hand, adaptation to these changes is required because the climate will continue to change over the coming decades despite significant mitigating measures. However, mitigation is essential to limiting changes in the climate system, as adaptation cannot completely eliminate all adverse effects.

**Climate Change in the United States**

As the second-largest emitter of greenhouse gases in the world (CIAT, 2019), the United States is expected to contribute 5,057 million metric tons of carbon dioxide emissions in 2022 (Friedlingstein et al., 2022) and 6,558.3 million metric tons of CO2 equivalent in 2019 (Lu et al., 2023). Beginning in the early 1990s, the overall amount of greenhouse gas emissions gradually rose and peaked at 15.6% in 2007 during the first half of the 2000s compared to the increase in 1990. However, after 2007 there was a recorded decline in emission levels of carbon footprints but they fluctuated between the years. In 2019, it was 1.8 per cent higher compared to 1990 estimates but declined in 2020 due to the global pandemic (EPA, 2021) that closed down transportation systems and industrial activities.

These emissions are from transportation, electric power, and industry (Lu et al., 2023). Although tremendous efforts are being made to lessen carbon emissions, the U.S. economy heavily relies on the transportation sector burning fossil fuels, such as gasoline and diesel. The chemical industry's production of raw materials also contributes to the emission of $CO_2$. (Cresko et al., 2022). Carbon dioxide, among other greenhouses emitted continues to be the most significant, contributing roughly 80% of all emissions over the past decades. The transportation sector has continued to rely on petroleum-based fuels and has heavily surpassed the electric sector annually, emitting greenhouse gases in recent years. The transportation and the electric sector remain the primary carbon dioxide emitters. Methane is a main source of energy production, agriculture, and livestock activities, contributing to greenhouse gas emissions (Lu et al., 2023). However, the power sector recorded a reduction in $CO_2$ emissions, experiencing a transition from coal-fired power plants to natural gas systems. Methane, the primary source of energy production, agriculture and livestock activities, accounted for 10% of the accumulated greenhouse gas emissions.

The emissions are without consequences in the U.S., affecting the country in numerous ways. As the increase in temperatures threatens the nation, there are particular occurrences of climate change notable in different parts of the country (US Global Change Research Program, 2018). Coastal regions are vulnerable to rising sea levels, and severe weather and precipitation are major threats in the Midwest and the Southwest, where drought is severe (NASA, 2020). Additionally, the frequency and intensity of natural disasters and extreme weather events have increased, leading to hurricanes in the southern states, flooding in the midwestern states, and wildfires in the western states. The nation's food production systems struggle with changing seasons and conditions. Low-income communities are now more susceptible to the long-term effects of climate change from extreme weather events like heat waves, cold snaps, droughts, and heavy precipitation.

**United States Adaptation Policy to Climate Change**

The federalism that underpins the U.S. system of government involves the division of powers between the federal and state structures. This helps state and local governments in the US adapt to climate change while restricting the federal government's capacity to carry out environmental protection laws. Five states are still working on their adaptation plans, while 19 states and the District of Columbia have completed theirs by 2022 (Georgetown CLC, 2022). Even in states lacking comprehensive state-level strategies, adaptation plans are ongoing at the local and regional levels (Georgetown CLC, 2022). Other states without any kind of adaptation plans are

Arkansas, Kansas, Missouri, Nebraska, North Dakota, South Dakota, West Virginia, and Wyoming (Georgetown CLC, 2022).

With the publication of its most recent strategy in 2021, the state has been effectively tackling climate change through its adaptation laws and policies since 2015, despite challenges such as the COVID-19 pandemic and the Trump Administration (CNRA, 2021). CNRA 2021 characterizes the updated approach as "Elevated six key priorities that must drive all resilience actions in California": (1) strengthening protections for communities at risk from climate change; (2) enhancing public health and safety; (3) creating a climate-resilient economy; (4) accelerating nature-based climate solutions and enhancing the climate resilience of natural systems; (5) making decisions based on the best available climate science; and (6) making use of resources through partnerships and collaborations. Furthermore, California is forming alliances for climate adaptation with the many tribes that border the state. The government is also determined to incorporate and support tribal expertise and traditional ecological knowledge into climate change to reflect the priorities of California Native American tribes in adapting to climate change" (Cal.gov, 2022).

In addition, there are U.S. tribes' policies regarding climate adaptation. 574 Native American tribes in the 48 contiguous states and Alaska are formally recognized by the government (BIA, 2021) but many others have no legal status at all or simply state recognition (USGCRP, 2021). Tribes with federal recognition have significant sovereign autonomy within their reservations and are reliant on sovereign nations. About 60 tribes have plans in place for adaptation (University of Oregon n.d.; NCAI, 2022) and tribes that have prepared for climate change are more than 800 (USGCRP, 2021: 576). Tribal adaptation planning is most prevalent in the Pacific Northwest, Alaska, and the Great Lakes region, while there are tribes from Arizona, California, Colorado, and Utah.

**Multilevel governance (MLG) Theory**

MLG theory has broadened the scope of levels that are linked through governance in natural resource scholarship, frequently analyzing the connections between local, regional, national, and global policies. The MGL framework explores how the interaction between levels of governance—local, regional, national and international—influences complex issues such as climate change adaptation. MLG highlights that governance occurs at several levels, acknowledging that states frequently supervise natural resources. It recognizes that climate change governance interaction exists among state actors and non-state actors such as government and non-governmental organizations, private sectors and civil societies.

Much of the research using MLG has concentrated on how higher-level policies trickle down to be implemented locally because formal natural resource management policies are frequently developed at the regional or national level. With this premise, top-down-driven governance about climate change adaptation policies can function effectively when it is successfully integrated across all levels of governance. MLG postulates that the more vertical integration between the various levels of governance, the more effective climate change adaptation policy.

Examining how different level of governance globally coordinates efforts to accelerate climate change adaptation and the role of global agreements such as the Paris Agreement and the Greening Government Initiative, which have shaped U.S. national and sub-national climate change adaptation policies, is explored in the theory

Climate change adaptation policies are decentralized among the U.S. federal agencies (i.e. FEMA, EPA), state governments, and local authorities. States are granted autonomy to develop their climate change adaptation policies to effectively address their peculiar climate change challenges. These policies are deliberated and implemented at respective jurisdictional levels, which challenge the effectiveness of the limited change adaptation policy of the U.S. federal government. Although the MLG theory facilitates governance to be organized across jurisdictions, it also creates mismatches of policies that could hamper effective decision-making about climate change policies. There are discrepancies or lack of cohesiveness between the federal and state approaches to climate change adaptation due to the peculiar climate change vulnerabilities different states, such as California, Florida and Texas, are confronted with. For example, wildfires are notable in California. Such

situations thereforerequire federal government climate change policies to be implemented effectively across these sub-nationals in the U.S.

MLG framework therefore underscores the need for cross-border cooperation, collaboration and partnership between government agencies, NGOs, the private sector and civil societies to share and address climate change challenges, technology transfer and capacity building to achieve climate resilience. The theory also highlights the inclusiveness of local communities, urban planners and other stakeholders in the development and implementation of climate change adaptation policies.

## METHODOLOGY

This study deployed systematic literature reviews to select and summarize studies to draw broader conclusions on how governance has shaped U.S. climate change adaptation policies compared to other countries and best global practices. The review's sample of peer-reviewed papers was gathered by using keywords associated with climate change adaptation and governance. For a more thorough qualitative analysis, grey literature was also taken into consideration as a significant source of information about climate change and adaptation. The studies were selected through the widely used standard for systematic literature reviews in the planning disciplines, "Preferred Reporting Items for Systematic Reviews and Meta-Analyses" (PRISMA) (Page et al., 2021) (Abusaada and Elshater, 2022). In recent years, researchers have advocated for greater precision and transparency of methods and suggested that systematic reviews be used to thoroughly assess adaptation progress (Berrang-Ford et al., 2015). This approach has gained popularity in the field of adaptation policy research.

This research paper therefore uses the PRISMA guidelines to analyze how governance advances climate change adaptation policies in comparison to best global practices to move forward in a methodical and replicable manner. The PRISMA protocol outlines a set of procedures for selecting the sample of sources that will be examined: the establishment of search parameters to build a preliminary database, a sequence of screening stages, and an evaluation of each study to be considered for the systematic review as determined by predefined eligibility criteria.

In the process of selecting studies to be reviewed for this study, peer-reviewed publications were retrieved by searching three databases, Google Scholar, Scopus and ResearchGate. This was accomplished by using keywords such as "climate change AND adaptation AND governance" to search the database. As a result, the literature used for this study came from both scholarly publications and policy documents about climate change policy. Each of the publications used for the study underwent a series of screenings following the PRISMA protocol to guarantee their applicability to the investigation. Thematic analysis, a technique for qualitative investigation with textual data (Braun and Clarke, 2006), was selected to direct the examination of the selected literatures during the analytical phase. The themes analysed in the discussion of findings include global climate change prioritization, u.s. climate adaptation policies, international cooperation and agreements, sectoral approaches to climate mitigation, monitoring and evaluation (m&e) systems , national coordination and governance, oecd's role in climate policy alignment, institutional structures in climate policy and stakeholder and citizen engagement in policy development.

## DISCUSSION OF FINDINGS

The selected studies reviewed for this paper revealed that climate change actions have become priorities for countries globally. However, it was found that one of the top priorities of governance in the United States is addressing the effects of climate change. To improve resilience to the effects of climate change, the government has mobilised efforts to reduce climate pollution across all sectors of the economy (The White House, 2021). The long-term strategy of climate change adaptation plans reflects the high level of commitment of the government (The United States, 2021). This plan acts as a blueprint for current and future administrations and aims at discovering potential trade-offs and milestones that could achieve climate policy goals and countries to adopt new technologies and influence other countries (Cox, 2019).

One of the global strategies with a long-term blueprint is the Paris Agreement which is an awakening for countries to design and disseminate their long-term low-greenhouse gas emission (LT-LEDS) development

strategies by 2020 (OECD/IEA, 2020) and 58 countries have submitted their strategies to lessen greenhouse gas emission to the United Nations Framework Convention on Climate Change (UNFCCC, 2023).

In the United States, President Biden aimed to reduce U.S. greenhouse gas emissions by 50–52% by 2030 and limit global warming to 1.5 degrees Celsius, as required by the OECD emissions reduction pathway to lower the use of electricity, using fleets of zero-emission cars, reducing emissions from government buildings, procurement, public services operations, and hiring employees who are climate-focused. To achieve these goals, the United States and Canada in April 2021 launched the Greening Government Initiative as a novel global initiative to encourage and assist governments worldwide in greening national government operations. Through this unique international community of practice, nations will be able to exchange insights and best practices, foster innovation, and fulfil their obligations under the Paris Agreement. To speed up national efforts to green national government operations and create a climate-resilient public administration, the Greening Government Initiative provides a forum for country representatives to exchange knowledge and best practices, highlight innovation and accomplishments, and form cooperative partnerships (Office of the Federal Chief Sustainability Officer, 2021 and Government of Canada, 2022).

Similarly, France's national effort to combat climate change is also governed by the "French Strategy for Energy and Climate," which is a set of four strategies reviewed regularly. The country's Low Carbon National Strategy (SNBC) outlines the sectoral measures that must be implemented to meet the 2030 and 2050 emissions targets; the third SNBC (2024–2028) and the Pluriannual Energy Program (PPE) describes the development of the country's energy system. The National Climate Change Adaptation Plan (PNACC) and the third PPE (2024–2033) also outline the steps meant to help nations adjust to the effects of climate change. Furthermore, there are dashboard systems used by France's Delivery Unit, which is housed within a central institution, to track important government priorities, such as climate change.

Exploring approaches for Canada's Transition to Net-Zero Emissions describes the country's long-term strategy which offers the use of alternative and renewable fuels, and the application of CO2 capture technologies. The Canadian Net-Zero Emissions Accountability Act codifies it into law and establishes an advisory body (European Commission, 2023; Environment and Climate Change Canada, 2022; Government of the United Kingdom, 2021; SEMARNAT-INECC, 2016). As part of its transition to climate-resilient and net-zero carbon operations, the Canadian government is focused on lessening its impact on waste, water, and biodiversity, among other environmental factors.

As governments globally continue to accord a high priority to long-term climate policy strategies, nations that have acknowledged this, and in fact, 75% of those who have submitted their LT-LEDS have stated that they have interacted with stakeholders throughout the process (UNFCCC, 2022). To create their long-term plans, the central government of nations like Estonia conducted a protracted period of stakeholder and citizen consultation. Switzerland's national risk assessment took into account how climate change is changing their risk exposures across several domains, while the UK's national governance resilience framework supports long-term strategy setting by utilizing national security risk assessments and climate change information.

Acknowledging that climate change is complicated to measure, monitoring strategies are especially important when implementing policy. According to research, it can be helpful to create standard monitoring and evaluation (M&E) arrangements to align with climate change adaptation strategic documents or objectives across governmental levels.

Governmental institutions at various levels now have the chance to keep track of climate change policies thanks to digital monitoring platforms and quantifiable indicators. In the UK, the centre-facilitated non-ministerial Climate Change Committee (CCC) has created a Monitoring Framework to monitor government efforts to cut greenhouse gas emissions. Sector monitoring maps, annual progress reports, risk assessments, and departmental recommendations are just a few of the many outputs generated by the Framework (Climate Change Committee, 2022). To monitor progress in the long-term implementation of the National Adaptation Plan and Emissions Reduction Plan, for example, an Interdepartmental Executive Board was established in New Zealand, where implementation responsibilities are frequently delegated to government agencies. The Board is made up of chief executives from various government ministries (Ministry for the Environment, 2022).

The division of national goals into sectoral plans, targets, or emission ceilings is another tool used to help align climate change adaptation objectives. In certain instances, emissions are formally distributed across sectors in a top-down manner. For example, Germany's first climate law, which was passed by the Federal Government in 2019 and revised in 2021, establishes annual sectoral emission targets for six distinct sectors through 2030 (OECD, 2023). In a similar vein, Ireland's carbon budgets for 2035 have been converted into Sectoral Emissions Ceilings, with national Climate Action Plans outlining how these will be met (OECD, 2023).

Another illustration is how the OECD International Programme for Action on Climate (IPAC) aims to help countries work toward achieving net-zero greenhouse gas emissions and a more resilient economy by 2050. IPAC assists OECD members, G20 nations, and a few other nations in coordinating and strengthening their climate action through consistent monitoring, policy evaluation, and feedback on outcomes and best practices. It supports and enhances the monitoring frameworks of the Paris Agreement and the UNFCCC. A climate action dashboard, an annual climate action monitor, country notes, and examples of policies in action are the four pillars that support IPAC. Numerous nations have used and cited these tools to support their monitoring tools, acknowledging their value.

Overall, coordinating the implementation of domestic climate policies across government agencies and ensuring policy coherence are direct responsibilities of the US central government. The White House Office of Domestic Climate Policy was established by Executive Order in January 2021 to oversee the President's climate policy agenda's implementation and guarantee that domestic climate policy initiatives align with the President's declared objectives (The White House, 2021). Nonetheless, the White House's decision to establish a monitoring organization separate from the government's current departments starkly contrasts with strategies prioritising interministerial coordination.

The above findings therefore emphasise that climate change adaptation has become a global priority, with countries developing long-term strategies to mitigate its impacts. The United States, under President Biden’s administration, has intensified efforts to reduce greenhouse gas emissions through policies targeting electricity use, transportation, and public sector operations. The Greening Government Initiative, launched in collaboration with Canada, highlights the role of international cooperation in promoting sustainable governance. At a global level, the Paris Agreement serves as a foundational framework for nations to design and implement low-emission development strategies (LT-LEDS). France, Canada, the UK, and Germany have adopted sectoral approaches, including national climate laws, carbon budgets, and emissions reduction targets, to ensure measurable progress.

Governments are increasingly utilizing monitoring and evaluation (M&E) systems to track climate policy implementation. Digital platforms, national risk assessments, and interdepartmental coordination mechanisms—such as New Zealand’s Interdepartmental Executive Board and the UK’s Climate Change Committee (CCC)—demonstrate how countries are institutionalizing climate adaptation governance. Furthermore, OECD’s International Programme for Action on Climate (IPAC) has become a critical tool for aligning national policies with global climate resilience goals, providing consistent monitoring and policy evaluation frameworks. In the U.S., the White House Office of Domestic Climate Policy plays a central role in ensuring policy coherence, though its independent structure contrasts with other nations that prioritize interministerial collaboration. Ultimately, the findings underscores that while climate change governance varies across countries, stakeholder engagement, sectoral policy alignment, and digital monitoring tools are essential components of effective adaptation strategies.

## CONCLUSION AND RECOMMENDATIONS

There is an increasing prioritization of climate change adaptation across nations globally, emphasizing the role of governance frameworks and international commitments to climate change resilience actions. Globally, the Paris Agreement has inspired 58 countries to be committed to long-term low-emission strategies. Nations such as the U.S., France and Canada are notable for fostering global collaboration through climate change initiatives like the Greening Government Initiatives that promote global best practices to achieve net-zero emissions and resilience. Notable examples include the Biden-Harris administration focusing on carbon emissions and improving climate resilience as well as France’s Low Carbon National Strategy and Canada's Net-Zero Emissions Accountability Act.

Significantly, the findings call attention to the importance of integrating communities and stakeholders directly affected in the U.S climate change adaptation and mitigation policies. This paper critically illustrates the need for an overarching structured policy of climate change adaptation in the United States. Demonstrating how France's Low Carbon National Strategy and Canada's transition to net-zero emissions and how in Estonia and Switzerland citizen consultations and risk assessment shape adaptation frameworks likewise, in Germany and Ireland's sectoral emissions ceiling, climate change adaptation policies in the United States federal should prioritize citizenship inclusivity, cross-sectoral arrangement and transparency to achieve resilience and sustainability that can protect the evolving climate landscape. To achieve policy coherence and accountability for climate change action, there is a need to also have comprehensive legislative frameworks and monitoring and evaluation systems to ensure that domestic policy aligns with international climate commitments such as the Paris Agreement, Greening Government Initiative and the OECD International Programme for Action on Climate (IPAC).

## REFERENCES

1. Abusaada, H., & Elshater, A. (2022). Notes on developing research review in urban planning and urban design based on PRISMA statement. Social Sciences, 11(9), 391.
2. Adger, W. N., Lorenzoni, I., & O'Brien, K. L. (Eds.). (2009). Adapting to climate change: Thresholds, values, governance. Cambridge University Press.
3. Anguelovski, I., Chu, E., & Carmin, J. (2014). Variations in approaches to urban climate adaptation: Experiences and experimentation from the global South. Global Environmental Change, 27, 156-167.
4. Berrang-Ford, L., Pearce, T., & Ford, J. D. (2015). Systematic review approaches for climate change adaptation research. Regional Environmental Change, 15, 755-769.
5. Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. Qualitative research in psychology, 3(2), 77-101.
6. Bromley-Trujillo, R., & Holman, M. R. (2020). Climate change policymaking in the states: A view at 2020. Publius: The Journal of Federalism, 50(3), 446-472.
7. Brooks, N., Anderson, S., Ayers, J., Burton, I., & Tellam, I. (2011). Tracking adaptation and measuring development.
8. Bureau of Indian Affairs (BIA) (2021). Indian Entities recognized by and eligible to receive services from the United States Bureau of Indian Affairs. Federal Register 85, 7554–7558.
9. Bulkeley, H., & Betsill, M. (2013). Revisiting the urban politics of climate change. Environmental Politics, 22(1), 136–154. https://doi.org/ 10.1063/1.2756072
10. Bulkeley, H., & Tuts, R. (2013). Understanding urban vulnerability, adaptation and resilience in the context of climate change. Local environment, 18(6), 646-662.
11. Birkmann, J., Liwenga, E., Pandey, R., Boyd, E., Djalante, R., Gemenne, F., ... & Wrathall, D. (2022). Poverty, Livelihoods and Sustainable Development In: Climate Change 2022: Impacts, Adaptation, and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change, edited by H. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change.
12. Carmin, J., Nadkarni, N., & Rhie, C. (2012). Progress and challenges in urban climate adaptation planning: results of a global. Progress and Challenges in Urban Climate Adaptation Planning: Results of a Global, 30-30.
13. CAIT Climate Data Explorer. (2019). Country Greenhouse Gas Emissions. Washington, DC: World Resources Institute. Retrieved from http://cait.wri.org.
14. Chu, E. K., & Cannon, C. E. (2021). Equity, inclusion, and justice as criteria for decision-making on climate adaptation in cities. Current Opinion in Environmental Sustainability, 51, 85-94.
15. California Natural Resources Agency (CNRA) (2021) California Climate adaptation strategy. Available at: https://resources.ca.gov/Initiatives/Building-Climate-Resilience/2021-State-Adaptation-Strategy-Update.
16. Climate Change Committee (2022), CCC Monitoring Framework, Climate Change Committee, https://www.theccc.org.uk/publication/ccc-monitoring-framework/ (

17. Cresko, J., Rightor, E., Carpenter, A., Peretti, K., Elliott, N., Nimbalkar, S., ... & Liddell, H. (2022). US Department of Energy's Industrial Decarbonization Roadmap (No. DOE/EE-2635). USDOE Office of Energy Efficiency and Renewable Energy (EERE).
18. Cox, S. (2019), LONG-TERM CLIMATE STRATEGIES CASE STUDY: LESSONS FROM LOWEMISSION DEVELOPMENT STRATEGIES TO SUPPORT LONG-TERM STRATEGY DEVELOPMENT AND IMPLEMENTATION, http://www.longtermstrategies.org/lessons-lowemission-development-strategies.
19. European Commission (2023), National long-term strategies, https://commission.europa.eu/energy-climate-change-environment/implementation-eucountries/energy-and-climate-governance-and-reporting/national-long-term-strategies_en.
20. Environment and Climate Change Canada (2022), Exploring Approaches for Canada's Transition to Net-Zero Emissions, https://unfccc.int/sites/default/files/resource/LTS%20Full%20Draft_Final%20_version oct31.pdf.
21. Falduto, C. and M. Rocha (2020), "Aligning short-term climate action with long-term climate goals Opportunities and options for enhancing alignment between NDCs and long-term strategies", http://www.oecd.org/environment/cc/ccxg.htm
22. Friedlingstein, P., O'sullivan, M., Jones, M. W., Andrew, R. M., Gregor, L., Hauck, J., ... & Zheng, B. (2022). Global carbon budget 2022. Earth System Science Data, 14(11), 4811-4900.
23. Flatt, V., and Huang, L. (2012). Climate Change Adaptation: The Impact of Law in the Private Sector. Centre for Progressive Reform Briefing Paper. Available online at: https://ssrn.com/abstract=2120083.
24. Field, C. B., & Barros, V. R. (Eds.). (2014). Climate change 2014–Impacts, adaptation and vulnerability: Regional aspects. Cambridge University Press.
25. Georgetown Climate Center (2022) State adaptation progress checker. Available at: https://www.georgetownclimate.org/adaptation/plans.html.
26. Government of Canada (2022), Greening Government Strategy: A Government of Canada Directive https://www.canada.ca/en/treasury-board-secretariat/services/ innovation/ greeninggovernment/strategy.html.
27. Government of the United Kingdom (2021), Net Zero Strategy: Build Back Greener, https://unfccc.int/sites/default/files/resource/UK%20Net%20Zero%20Strategy%20- %20Build %20 Back%20Greener.pdf.
28. Grynspan, R., Mene, W. and Amoako, K.Y. (2021), Reaping the Potential Benefits of the African Continental Free Trade Area for Inclusive Growth, UNCTAD, New York, NY.
29. IPCC 2001 Climate change (2001). Synthesis report. Cambridge University Press.Hughes, S. (2015). A meta-analysis of urban climate change adaptation planning in the US. Urban Climate, 14, 17-29.
30. Hultman, N., Frisch, C., Clarke, L., Kennedy, K., Bodnar, P., Hansel, P., & Cyrs, T. (2019). Accelerating America's Pledge: Going All-in to Build a Prosperous, Low-carbon Economy for the United States'. New York: Bloomberg Philanthropies.
31. Hoegh-Guldberg, O., Jacob, D., Taylor, M., Guillen Bolanos, T., Bindi, M., Brown, S., et al. (2019). The human imperative of stabilizing global climate change at 1.5°C. Science, 365, 6459. https://doi.org/10.1126/science.aaw6974.
32. IPCC. (2022). Annex II: Glossary [Möller, V., R. van Diemen, J.B.R. Matthews, C. Méndez, S. Semenov, J.S. Fuglestvedt, A. Reisinger (eds.)]. In: Climate Change 2022: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [H.-O. Pörtner, D.C. Roberts, M. Tignor, E.S. Poloczanska, K. Mintenbeck, A. Alegría, M. Craig, S. Langsdorf, S. Löschke, V. Möller, A. Okem, B. Rama (eds.)]. Cambridge University Press, Cambridge, UK and New York, NY, USA, pp. 2897–2930, doi:10.1017/9781009325844.029
33. Karapin, R. (2016). Political opportunities for climate policy: California, New York, and the federal government. Cambridge University Press.
34. Kaswan, A. (2013). Climate change adaptation and land use: exploring the federal role. J. Marshall L. Rev., 47, 509.
35. Long, J., & Rice, J. L. (2019). From sustainable urbanism to climate urbanism. Urban Studies, 56(5), 992-1008.

36. Lu, H., Xu, Z. D., Cheng, Y. F., Peng, H., Xi, D., Jiang, X., ... & Shan, Y. (2023). An inventory of greenhouse gas emissions due to natural gas pipeline incidents in the United States and Canada from 1980s to 2021. Scientific Data, 10(1), 282.
37. McCarthy, J. J. (Ed.). (2001). Climate change 2001: impacts, adaptation, and vulnerability: contribution of Working Group II to the third assessment report of the Intergovernmental Panel on Climate Change (Vol. 2). Cambridge University Press.
38. Ministry for the Environment (2022), Climate Change Chief Executives Board, Ministry for the Environment,https://environment.govt.nz/what-government-is-doing/areas-of-work/climatechange/ about-new-zealands-climate-change-programme/climate-change-chief-executivesboard/ (
39. Meerow, S., & Mitchell, C. L. (2017). Weathering the storm: The politics of urban climate change adaptation planning. Environment and Planning A: Economy and Space, 49(11), 2619-2627.
40. National Congress of American Indians (NCAI) (2022) Climate action: Tribal approaches. Available at: https://www.ncai.org/ptg/climate-action-tribal-approaches
41. NASA. (2020). The Effects of Climate Change. Retrieved from https:// climate.nasa.gov/ effects/# :~: text=Increased%20heat%2C%20drought%20and% 20insect, coastal%20areas%20 are%20 additional %20concerns.
42. New Zealand Parliament (2020), Public Service Act 2020, https://www.legislation.govt.nz/act/public/2020/0040/latest/LMS106159.html
43. Nolette, P. (2015). Federalism on trial: State attorneys general and national policymaking in contemporary America. Univers.ity Press of Kansas.
44. OECD (2023), OECD Environmental Performance Reviews: United States 2023, OECD Environmental Performance Reviews, OECD Publishing, Paris, https://doi.org/10.1787/47675117-en.
45. OECD (2023), OECD Environmental Performance Reviews: Germany 2023, OECD Environmental Performance Reviews, OECD Publishing, Paris, https://doi.org/10.1787/f26da7da-en.
46. OECD/IEA (2020), Aligning short-term climate action with long-term climate goals: Opportunities and options for enhancing alignment between NDCs and long-term strategies, Climate Change Expert Group, https://www.oecd.org/environment/cc/LEDS-NDC-linkages.pdf.
47. Office of the Federal Chief Sustainability Officer (2021), Federal Sustainability Plan, https://www.sustainability.gov/federalsustainabilityplan/index.html (accessed on 23 June 2023).
48. O'Neill, B. C., van Aalst, M., Zaiton Ibrahim, Z., Berrang-Ford, L., Bhadwal, S., Buhaug, H., ... & Oppenheimer, M. (2022). Key risks across sectors and regions.
49. Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., ... & Moher, D. (2021). The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. bmj, 372.
50. Word Bank. (2024). Climate Change. Trending Data.
51. Reckien, D., Flacke, J., Olazabal, M., & Heidrich, O. (2015). The influence of drivers and barriers on urban adaptation and mitigation plans—an empirical analysis of European cities. PloS one, 10(8), e0135597.
52. Ruhl, J. B. (2010). Climate change adaptation and the structural transformation of environmental law. Envtl. L., 40, 363.
53. Sarkodie, S. A., Ahmed, M. Y., & Owusu, P. A. (2022). Global adaptation readiness and income mitigate sectoral climate change vulnerabilities. Humanities and Social Sciences Communications, 9(1).
54. SEMARNAT-INECC (2016), Mexico's Climate Change Mid-Century Strategy, http://www.semarnat.gob.mx.
55. The Intergovernmental Panel on Climate Change (2018). Special report on global warming of 1.5°C: Strengthening and implementing the global response. Geneva: IPCC.
56. The United States (2021), The Long-Term Strategy of the United States: Pathways to Net-Zero Greenhouse Gas Emissions by 2050, United States Department of State and the United States Executive Office of the President, https://www.whitehouse.gov/wpcontent/uploads/2021/10/US-Long-Term-Strategy.pdf.
57. The White House (2023), National Climate Task Force, https://www.whitehouse.gov/climate/
58. The White House (2021), The Biden-Harris Administration Immediate Priorities, https://www.whitehouse.gov/priorities/

59. Tol, R.S.J. (2005). Adaptation and mitigation: trade-offs in substance and methods. Environmental Science and Policy 8(6): 572-578.
60. US Global Change Research Programme. (2018). Fourth National Climate Assessment. globalchange.gov/nca4.
61. University of Oregon Tribal climate change guide: Adaptation plans. Available at: https://tribalclimateguide.uoregon.edu/adaptation-plans
62. UNEP. ( 2021). "Adaptation Gap Report 2020". UNEP – UN Environment Programme.
63. UNFCCC (2023), Long-term strategies portal, https://unfccc.int/process/the-parisagreement/long-term-strategies.
64. UNFCCC (2022), Long-term low-emissions development strategies. Synthesis report by the secretariat, https://unfccc.int/documents/619179.
65. U.S. Global Change Research Program (USGCRP) (2021). Fourth national climate assessment volume II: Impacts, risks, and adaptation in the United States. As revised March 2021 (Washington, D.C: U.S. Government).
66. Vogel, C., Scott, D., Culwick, C. E., & Sutherland, C. (2016). Environmental problem-solving in South Africa: Harnessing creative imaginaries to address 'wicked' challenges and opportunities. South African Geographical Journal, 98(3), 515–530. https://doi.org/10.1080/ 03736245.2016.1217256.
67. Vogel, D. (2018). California Greenin' How the Golden State Became an Environmental Leader. Princeton University Press.