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*“Climate change governance: the defiant policy of the U.S. state”*

**Tesis que, para completar los requisitos del Programa de Honores  
presenta la estudiante**

**Ivana Del Río Benítez Landa**

**156267**

**Ciencia Política**

**Relaciones Internacionales**

**Dr. Juan Antonio Le Clercq Ortega**

**San Andrés Cholula, Pue.**

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## **Hoja de firmas**

Tesis que, para completar los requisitos del Programa de Honores presenta la  
estudiante **Ivana Del Río Benítez Landa**

### **Director de Tesis**

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**Dr. Juan Antonio Le Clercq Ortega**

### **Presidente de Tesis**

---

**Dra. Celeste Gabriela Cedillo  
González**

### **Secretario de Tesis**

---

**Dr. Carlos E. Juárez**

*The climate is changing.*

*Are you?*

– Someone

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## Introduction

Climate change is undoubtedly the crisis of our times. From shifting weather patterns that threaten food production, to rising sea levels that increase the risk of catastrophic flooding. The impacts of climate change are global in scope and unprecedented in scale. Scientific consensus confirms, the phenomenon is real and human activities are the main cause. Therefore efforts from all around the world for tackling global warming have been agreed and today it is one of the most important priorities on any political agenda.

There has been a constant debate regarding the management of climate change – on which political level is more appropriate to operate: top down policy vs bottom up policy. Today the debate is over due to a phenomenon known as, the multilevel governance of climate change. There is no longer a level distinction, instead a public issue is decentralized in order to be administrated by the three political levels, where together they will cooperate with each other in the formulation of more comprehensive policies. This research intends to take a look at the three climate policy models of the United States (top down, bottom up, and multilevel).

The United States is one of the most powerful countries of the international community and one of the countries most affected by climate change. Even so, its position on the issue has been highly variable in the last twenty years: they either are supportive or disruptive. First, the U.S. failed to ratify the Kyoto Protocol, then societies witnessed President Obama's efforts to reengage in climate negotiations with the United Nations, to end up attesting a political leader that denied climate change and called it "mythical," "nonexistent" or "an expensive hoax."

Under these different approaches to climate change by the federal government, there has been a constant, local climate action. In formal federations such as the United States that foster some degree of multilevel governance, climate change is no longer addressed at the Nation-state level, it has been incorporated into a subnational system. In the last years, states and cities in the United States have been leading the way to combat climate change and have created a parallel and stronger climate policy.

Based on this, the research question is: due to a multilevel governance process or by the decentralization of climate change policy in the United States, has local governance overcome the State measures? The hypothesis of this paper is to prove [with a categorization] that: U.S. states have a *defiant* climate policy towards the federal government. Among the main objectives of this paper can be mention: analyze the different models for governing the environment; provide a context of climate change in the U.S. and its agenda; divulge American local climate action; create a metric to compare U.S. state climate policy; and make inquiries regarding the results and the future of multilevel governance in the United States.

The paper will start with a theoretical framework which aims to share main concepts, theories such as the climate regime, multilevel governance, and previous relevant investigations. Then, the conceptual framework will give a broad explanation of climate change and its impact in the United States to highlight the problematic of global warming, it will also explain the relationship between greenhouse gas (GHG) emissions, and give an overview of the federal climate policy. Afterwards, the methodology for making a comparative study and the indicators for measuring and creating a typology of state climate policy will be presented.

The first chapter will focus on divulging the tendency of local climate policy in the United States, highlighting key trends, figures, policies and networks. The second chapter is going to file the results of every state (according to the categorization), giving a brief description of the effects of global warming and the measures to address it. The third chapter will address the main findings, and make an analysis on (i) the atypical cases (ii) the future of the multilevel governance of climate change in the United States, considering the current political panorama. Finally a brief summary will take place mentioning the opportunities and challenges of this and future research.

### **Theoretical framework**

*Governing the environment: global environmental governance and the climate change regime*

Governing the environment is not an easy task, it was until the 80's that environmental issues entered the political agenda under a command-and-control model. Backstrand and Löfbrand (2006) described it as “a detached and powerful view from above, where nature is approached as a terrestrial infrastructure subject to state protection, management and domination” (p. 55). Under this model the environment was not perceived as a major concern for the government and environmental policy tended to be devolved to national authorities (Lowe and Ward, 1998).

Today is different, the idea that environmental issues are global is taken to be self-evident. This is thanks to what Donald Worster (1977) has identified as the “ecological age,” diverse situations such as the detonation of the atomic bomb in 1945 or the publication of

Rachel Carson's book *Silent Spring* in 1962 symbolized the fact that humans were capable of inflicting major long-lasting damage upon the planet. Afterwards, the emergence of environmental science was critical in establishing environmental problems as global issues, this involved "not only the international coordination of assessment and policies but also the difficult task of defining, conceptualizing, and measuring general consensus among scientists and policymakers" (Jasanoff and Wynne, 1998, p. 47).

Nowadays there are enough arguments for having a green political agenda, however the perception of "environmental problems are everyone's fault but nobody's problem" still dominates. The fact is that this type of issue offers no simplicity because everyone is implicated in both the problem and the solution. This is because environmental issues require collective action solutions. Collective actions are those "taken by two or more people in pursuit of the same collective good" (Marwell & Oliver, 1993, p. 4), these are typically framed as resulting in some shared outcome, or "public good," in this case, the environment.

There are 5 challenges to collective action:

First, scientific uncertainty can make policy-makers hesitant to act. Second, the subjective nature of environmental problems means that solutions can never be right, but merely more or less acceptable to different groups. Third, many environmental problems are transboundary in character, which means that they require international cooperation. Fourth, and closely related to this, the current system of nation states tends to breed competition rather than cooperation. Finally, environmental issues tend to have complex causes that spill across many different areas of human activity, making it hard to coordinate action (Evans, 2012).

Theories of collective action suggest that rational actors will work together if it makes sense to, but with environmental problems there is little common agreement as to what outcome is desirable, let alone how to achieve it. In the absence of scientific certainties, the definition of environmental problems and their solutions will vary according to whose

perspective it is seen from, posing what policy analysts call a “wicked problem” (Rittel and Webber 1973). Climate change certainly seems to belong to this category of problems.

Besides collective action problems, environmental issues face the problem of scale. As Lemos and Agrawal (2006) argued “the multiscale character of environmental problems—spatially, socio-politically, and temporally— adds significant complexity to their governance” (p. 308). Decoupling across scales of the causes and consequences of environmental problems introduces major concerns about the unequal distribution of costs and benefits of environmental issues. For example, a problem such as climate change may have been caused primarily by the major producers of GHG in the developed world, but many of their more dramatic effects will negatively affect low-emitting countries in the global south. Environmental problems transcend national borders and this makes it a challenge to design and implement solutions.

In the efforts to solve environmental problems and deal with the mentioned challenges, a political approach was born “environmental governance.” The term has been in the ascendant since the mid-90s and has gained rapid acceptance from a vast number of actors including scientists and decision makers. It can be understood as “interventions aiming at changes in environment-related incentives, knowledge, institutions, decision making, and behaviors” (Lemos and Agrawal, 2006, p. 298). Specifically, it refers to the “set of regulatory processes, mechanisms and organizations through which political actors influence environmental actions, and outcomes” (Loc. cit.).

One of the main aspects of environmental governance is that it includes the actions of the State and in addition, encompasses actors such as communities, businesses, and NGOs. The vast majority of theorists agree that “the role of government in the process of governance

is much more contingent” now than before (Pierre and Stoker, 2002, p. 29), shifting from one of rowing to one of steering (Rhodes, 1997). Regardless, this paper focuses specifically on governance that involves the State as the primary actor.

Given the nature and scale of environmental issues, environmental governance has taken a global character known as “global environmental governance” (GEG). Much of the term’s definition comes from studies of international environmental cooperation around the 1972 United Nations Conference on the Human Environment in Stockholm (Johnson, 1972). Even though a clear definition on GEG has not yet been agreed upon, GEG is founded on a few basic rules:

First, the fundamental premises outlined in the 1648 Westphalia Settlement concerning the absolute sovereignty and legal equality of nation states are at its center. Without these concepts, relationships between states in international forums would appear as little more than political parlor games and weight-lifting contests. Second, GEG follows international law – the compendium of binding agreements reached over years of interaction at various levels by which governments adjudicate differences and work toward positions of common interest and which subsequently become national law. In addition, GEG is guided by a growing number of principles and other non-binding instruments with the important caveat that, although agreed upon by consensus, these principles are not always accepted by all cultures in the same way (Saunier and Meganck, 2009, p.4).

Likewise Biermann and Pattberg (2008) comment on three broad developments of the current phenomenon of GEG.

First, the emergence of new types of agency and of actors in addition to national governments, the traditional core actors in international environmental politics; second, the emergence of new mechanisms and institutions of GEG that go beyond traditional forms of state led, treaty-based regimes; and third, increasing segmentation and fragmentation of the overall governance system across levels and functional spheres (p. 280).

Also, GEG has a 3-step procedure: *process*, *architecture*, and *implementation*.

*Process* relates to the global meetings, which are organized to coordinate multilateral

responses to environmental issues. The institutions that are created to enact the agreements reached at these meetings are known as *architecture*. Finally, *implementation* is the most important element of GEG and it refers to making sure that what gets agreed is put into practice (Evans, 2012).

All the dynamics of GEG are often closely associated with the formation and development of *regimes* defined as “sets of both formal and informal rules, institutions and procedures aimed at governing action in a particular issue area usually based on a founding treaty” (Depledge, 2013, p. 13). Regimes help the international community realize the benefits from cooperation and help states achieve their objectives through reducing contracting costs, providing focal points, enhancing information and therefore credibility, monitoring compliance, and assisting in sanctioning deviant behavior (Keohane and Victor, 2011, p. 8).

Regime formation has become a popular response to emerging global environmental problems over the past two decades with the establishment to address, for example, stratospheric ozone depletion, biodiversity loss, desertification, organic pollutants, and of course climate change. As Mike Hulm (2009) a lead author on the Intergovernmental Panel on Climate Change (IPCC) claimed “climate change is a crisis of governance not a crisis of the environment or a failure of the market” (p.310).

The emergence of the climate change regime (CCR) traces back to 1988, that is when the United Nations General Assembly (UNGA) (acting on a proposal from Malta) made the resolution 43/53 declaring climate change to be a “common concern of mankind” before that, the issue had been dominated essentially by nongovernmental actors –primarily environmentally oriented scientists– (Bodansky, 2001). The debate in the UNGA came in

the wake of the establishment of the Intergovernmental Panel on Climate Change (IPCC) which made its first Assessment Report in 1990 on the state of climate change science warning that human activity was increasing temperatures. The same year, the UN established the Intergovernmental Negotiating Committee (INC) (Bodansky, 2001).

Afterwards, the arrival of climate change to the international agenda, commonly presumed to entail a dominant role for major national powers that would cobble together a multinational pact to be implemented by an international regime (Rabe, 2011). This materialized in 1992, countries joined the United Nations Framework Convention on Climate Change, for international cooperation to combat climate change by limiting average global temperature increases and coping with impacts that were, by then, inevitable.

Two years later, the climate change regime experienced its first international treaty with the Kyoto Protocol (1997). In the treaty industrialized countries and economies in transition committed to limit and reduce GHG emissions in accordance with agreed individual targets. The Convention itself only asks those countries to adopt policies and measures on mitigation and to report periodically. Overall, the targets add up to an average 5% emission reduction compared to 1990 levels over the five year period 2008–2012 (the first commitment period). Later with the Doha Amendment the Kyoto Protocol was adopted for a second commitment period, starting in 2013 and lasting until 2020 (UNFCCC, 2020).

Regardless, there were several critics to the Kyoto Protocol. For starters it came on force until 2005 and failed to drive down global GHG emissions. Hunt (2012) argues that the Protocol was doomed from its birth, because it did not encompass the world's largest and fastest growing economies from binding targets and the United States failed to sign up. Keohane and Victor (2011) note that a comprehensive institution covering all of the issue

areas in the current climate regime would have been unlikely to gain traction in 1997—but there could have been the intentional creation of a flexible regime that recognized the potential for the diversity of problems and issue areas that climate change posed. Nevertheless, this does not mean that the Kyoto Protocol is entirely without merit, it initiated the inclusion of climate change on the agendas of governments around the globe, and its design features too are not objectively bad (Rosen, 2015).

After the difficulties around the Kyoto Protocol, the CCR needed to be strengthened. The 15th Conference of the Parties (COP- 15) of the UNFCCC met December 7–19 2009, in Copenhagen aimed to arrive at an international agreement for mitigating climate change. The decision by more than one hundred heads of state or government to attend “*Hopenhagen*” (as the Danes called it) heightened expectations that the conference would result in a major breakthrough, and more than forty thousand people registered, which made it one of the largest environmental meetings in history (Bodansky, 2010). Unfortunately, an agreement could not be reached; instead, the COP-15 arrived at the so-called Copenhagen Accord.

The Copenhagen Accord (a political rather than a legal document) is very brief, only about two-and-a-half pages long, and leaves many details to be filled in later. Its key elements include the long-term goal of limiting climate change to no more than 2°C, systems of “pledge and review” for mitigation commitments or actions by both developed and developing countries, and significant new financial resources. It has been highly criticized as inadequate, but it represents a potentially significant breakthrough. The Accord articulates a quantified long-term goal for the first time and puts significant new funds on the table, for both the short and medium terms; it also reflects the principle of common but differentiated responsibilities and respective capabilities (Loc. cit.).

The milestone of the climate change regime comes six years later with the Paris Agreement. The outcome of the 21<sup>st</sup> Conference of the Parties (COP- 21) of the UNFCCC, has been hailed as “historic,” a “landmark,” the “world’s greatest diplomatic success,” a “big, big deal.” It proves to be historic because it institutionalizes a new paradigm that, over time, catalyzes ever stronger global action to combat climate change. According to Bodansky (2016) there are eight features that stand out: it is a legally binding instrument (albeit with many non-binding elements), it is global (it applies not only to developed countries), it specifies the same core obligations for all countries, it establishes a long-term durable architecture, it has an iterative process every five years, it sets an expectation of progressively stronger action over time, it establishes an enhanced transparency and accountability framework, and it appears to command universal, or near universal, acceptance.

The Paris Agreement entered into force less than a year later and 189 countries are part of it. The deal aims to substantially reduce global GHG emissions and to limit the global temperature increase in this century to 2° Celsius while pursuing means to limit the increase even further to 1.5°. In order to achieve long-term emissions reductions the Agreement obliges Parties to submit pledges so called “National Determined Contributions” (NDC’s). It is this reliance on countries voluntary climate policy ambition that marks the most significant departure from other treaties, as of March 15, 2016, 188 countries had put forward intended nationally determined contributions, representing roughly 95 percent of global emissions (Falkner, 2016).

Figure 1: Climate change regime history

## Climate change regime history



Source: Own elaboration based on: Bodansky, D. (2001). The history of the global climate change regime. *International Relations and Global Climate Change*, 23(23), 23-40

Now, it is true that the climate change regime may encompass many different negotiations, but it can be summarized in 3 important phases which are the ones described: the Kyoto Protocol, the Copenhagen Accord and the Paris Agreement. On purpose, Bodansky and Rajamani (2018) remark the issues of legal form, prescriptiveness, and differentiation of the three documents.

On the issue of legal form, the 1997 Kyoto Protocol imposed legally binding targets and timetables on Annex I Parties to limit their greenhouse gas emissions, together with procedural obligations regarding accounting, reporting, and review. The 2009 Copenhagen Accord was its antithesis: a political agreement without any legal force, providing for Parties to submit self-selected national actions and commitments. The 2015 Paris Agreement represents a synthesis: it is a legal instrument establishing a number of procedural obligations; but some of its core elements, including Parties' nationally determined contributions (NDCs), do not create legally binding obligations of result (p. 184).

On the issue of prescriptiveness, most of the key elements of the Kyoto Protocol were internationally negotiated rather than nationally determined, including, in particular, its emissions limitation targets. The Copenhagen Accord was its antithesis, with virtually no internationally negotiated rules. The Paris Agreement represents a hybrid approach, combining nationally determined mitigation contributions with internationally negotiated rules on ambition, progression, and transparency (p. 185).

Finally, on the issue of differentiation, the 1995 Berlin Mandate, which initiated the Kyoto Protocol negotiations, explicitly ruled out any new commitments for non-Annex I Parties, and led to the Kyoto Protocol's so-called 'firewall' between Annex I and non-Annex I countries. The 2009 Copenhagen Agreement, in contrast, contained no explicit reference to differentiation. The Paris Agreement represents a middle ground, not employing the categorical, annex-based approach of the UN Framework Convention on Climate Change and the Kyoto Protocol, but incorporating tailored differentiation with respect to mitigation expectations, financial commitments, and transparency (p.185).

Conceptually, the issues of legal form, prescriptiveness, and differentiation are independent. But, politically Parties tend to view them together in the context of an overall package and may determine the success or failure of the treaty. For example, the Paris Agreement abandons the static, annex-based approach and involves both –developed and developing countries– which makes a reciprocal and inclusive treaty; also, the NDC's approach of Common but Differentiated Responsibilities and Respective Capabilities (CBDR–RC) makes it self-differentiated, just and encouraging.

Before the Paris Agreement the climate change regime so far proved to have a failed design which is a true liability, because it has cost the global community something that cannot be replaced: time. By adopting a flawed institution that lends itself to *path dependence*, experts have missed out on promoting alternative methods that could potentially have performed better. But the Paris Agreement gives hope to the new climate change regime– the cycle of NDCs, reporting, review, stocktaking, and updating.

Albeit, reducing the climate change regime in a 5 step process or in three main international treaties is complicated and limiting. Regimes can either be *hierarchical*, with fully institutions that impose regulation or *non-hierarchical*, a loosely coupled system of institutions. The climate change regime does not seem to fit in any of the categories, that is why Keohane and Victor (2011) use the terminology of *regime complexes* which are located somewhere in the middle of this continuum. Three forces can explain why a regime is situated in this position: distribution of interest weighted by power, uncertainty, and linkages.

Climate change is not hierarchical, nor non-hierarchical. So, Keohane and Victor (2011) present us the “regime complex for climate change.” The distribution of interest weighted by power explains the lack of agreement in the Kyoto system and why the United States failed to ratify. Uncertainty has made most governments wary about making costly commitments to global institutions when they are unsure of the benefits and whether other countries will make and honor promises to implement comparable efforts. And across most of the cooperation problems in climate change, governments are still struggling to find productive linkages, although in a few areas those linkages are tight and deep, such as the links between emission trading systems and compensation (p. 12-13).

The regime [complex] of climate change encompasses several layers of more or less formal sets of institutional arrangements, procedural rules and informal practices; and it faces severe challenges. The truth is that the infeasibility of a strong comprehensive regime makes climate change a very difficult international problem to manage. In consequence, new trends have emerged and it is recommendable that domestic political systems generate a strong demand for local action in ways that are consistent with one another and also with GEG and the CCR.

*Decentralizing GEG and the CCR: the MLG of climate change*

As Hutchcroft (2001) suggests, “the decentralization of government functions is the latest fashion or at least a fashion of our time” (p. 23). Indeed, for many interested in environmental governance, the term is synonymous with what happens on the international or the global stage. However, it is at least equally correct that some of the most important contemporary changes in environmental governance are occurring at the subnational level and relate to efforts to incorporate lower-level administrative units and social groups better into formal processes of environmental governance.

For almost two decades the international community has struggled to craft a strong, integrated and comprehensive regulatory system for managing the environment. The reality was that environmental problems –including climate change– proved to be more complex than originally anticipated. Now, national governments across the world have advanced strong claims about the imperative to establish and strengthen partnerships in which local administrative and organizational arrangements complement or substitute for more central efforts to govern environmental resources.

According to Pattberg and Widerberg (2015) there are two observations that might illustrate this trend.

First, the increasing institutionalization of GEG does not occur without continuing policy making at national and subnational levels. Second, a system of governance that is no longer organized along the principle of territoriality tends to create functional overlaps (with both positive and negative consequences) among the different levels (p. 688).

Moreover there are other reasons for the decentralization of GEG and the CCR among this Lemos and Agrawal (2006) mention three justifications:

One it can produce greater efficiencies because of competition among subnational units; it can bring decision making closer to those affected by governance, thereby promoting higher participation and accountability; and finally, it can help decision makers take advantage of more precise time and place specific knowledge about natural resources (p. 303).

So, GEG is not limited to the governance that is global, it can include governance at all levels of the political system. As Biermann and Pattberg (2008) argued the emerging GEG system is characterized by an increasing segmentation of different layers and clusters of rulemaking and rule implementing, fragmented both vertically between supranational, international, national, and subnational layers of authority (*multilevel governance*) and horizontally between different parallel rule-making systems maintained by different groups of actors (*multipolar governance*) (p. 284). For the purposes of this paper, an emphasis on *multilevel governance* will be made.

The term multilevel governance (MLG) was developed by the political scientist Gary Marks in 1993, the concept of MLG comprises numerous state and non-state actions located at different levels, such as the local (subnational), the national and the global (supranational). According to Saito-Jensen (2015) referring to a MLG process means that a public concern has been decentralized (e.g. bottom up policy) and is no longer addressed only at the Nation-State level, which allows subnational and other actors involvement. Yet, the term also refers to the implementation of public policies and joint efforts of different governance levels into one policy aspect (e.g. climate policy).

There are two types of MLG policy models. The first (Type I) conceives a dispersion of authority to a limited number of non-overlapping jurisdictions at a limited number of levels. Federalism, with its focus on the relationship between central and subnational governments, is the intellectual foundation for this form of multilevel governance. Type II

captures both the multiple levels at which governance is taking place and the myriad actors and institutions which act simultaneously across these levels. (Hooghe and Marks, 2001). Type I is considered in relation to federal states such as the United States, whether Type II is considered relevant in other contexts, where horizontal networks of governance take shape.

According to MLG theory, states are no longer the monopolizing or even necessarily central actors of policymaking. Instead, the power of government is increasingly shaped by and shared between actors operating at multiple levels. Therefore, we are witness to a series of reconfigurations of the relationships and modes of interactions between states and other levels of government. The result is a system of MLG which is characterized by “interdependencies among the different levels and overlaps in terms of regulatory content, normative commitments, and actors involved” (Pattberg and Widerberg, 2015, p. 302).

In the approach of MLG the role of the state is diminishing, or certainly changing, as various levels of governance interfere with its powers, while state agents retain certain amounts of control, the power to make decisions is transferred in multiple directions, upwards, downwards and sideways, with somewhat unpredictable consequences. This situation creates problems and opportunities. On the one hand, problems relate to the aforementioned diminished capacity of States to actually control governance. On the other hand, it means that States have better possibilities for delegating responsibilities to other levels of governance, which may enable them to effectively target their resources on the particular issues and projects (Saito-Jensen, 2015, p. 4).

In the context of a highly fragmented CCR, with protracted and polarized developments in forging an internationally binding solution, subnational initiatives have been gaining in number and legitimacy. The development of a governance perspective involves

recognizing the roles of supranational and subnational state and non-state actors, and the complex interactions between them in the process of governing. Such an approach is particularly relevant in the context of global environmental issues where modes of governing are multiple and include processes and institutions that transverse scales.

In the last 20 years, scholarship in the role of subnational states in the realm of global climate governance has grown significantly, which has in turn fostered a new kind of thinking about climate governance (Jørgensen, Jogesh and Mishra, 2015). In the timeline by Betsill and Rabe (2009) we are living in an epoch where a greater degree of attention is brought to climate action at lower levels of government with a different interplay between private and public actors, where climate policy has reflected homegrown responses.

Various commentators have suggested that subnational entities rather than nation-states may be the most appropriate arena in which to pursue policies to address specific global environmental problems. Studies pointed that subnational institutions could be pioneers in climate policy initiation and implementation. First, by independently developing new problem-solutions in different policy domains, and two, by experimenting with the implementation of these new problem-solutions. These policies then, could serve as a model for other states or the nation as a whole (Volden, 1997, p. 79).

In addition, Betsill and Bulkeley (2006) argued that states and cities seem to be significant for four related reasons:

First, in a highly urbanized world, cities are sites of high energy consumption and waste production. The influence of local governments over these processes varies but can include energy supply and management, transport, land use planning, building regulations, and waste management. Second, local governments have been engaging with issues of sustainable development through LA21 in ways that have implications for the mitigation of climate change. Third, local governments can facilitate action by others in response to climate change by fostering partnerships with relevant

stakeholders, encouraging public participation and lobbying national governments. Fourth, some local governments have considerable experience in addressing environmental impacts within the fields of energy management, transport and planning. (p. 143).

Over these practices local governments can exercise a degree of influence over GHG emissions and implement policies that combat global warming, in ways that directly impact national targets. This proves the value of MLG, local governments have assumed leadership roles on climate policy development, offering a distinct contrast to continuing federal government inertia. The next stage of GEG and the CCR is the architecture or system of the *multilevel governance of climate change*.

*Prior studies of intergovernmental climate policy in the U.S.*

Analysis that focused on intergovernmental relations were initially dismissed by scholars as irrelevant to climate change, given the predominant thinking that theories of International Relations/Political Science and regime formation were far more applicable. But the American case over recent decades, as well as emerging lessons from other federal systems, suggest that an intergovernmental perspective can be applied with considerable rigor to climate policy. Now there is a need to use an intergovernmental lens for understanding the factors that foster and deter policy formation at multiple governmental levels as well as the interactive dynamics across them.

There are several studies of climate change and multilevel governance. Many have defined and examined patterns whereby states (either a single state or a subset of them) tend to take the lead in policy innovation, sometimes fostering considerable subnational diffusion of policy that may (or may not) trigger some form of federal response (Volden, Ting, and

Carpenter 2008). Others focus on the attempts of climate action related to economic development (Oates and Schwab 1988) or concerned with strategic political advantage (Aulisi, Larsen, Pershing and Posner, 2007). There are also comparative case studies on local action across states (Burke and Ferguson 2010).

Recently, studies looked at how bottom-up initiatives could impact the global climate governance system incentivizing MLG (Schreurs, 2008). Literature has also pointed that subnational governments are no longer mere observers in international climate policies but also influential actors (Nelson et al., 2014). As for the national context, the role of subnational actors in framing domestic climate policy in federal and multi-tiered systems has become an important area of research, Gupta (2007) has examined challenges of multilevel climate governance in the domestic context, comparing case studies that focus on the division of responsibility for climate policy between central and lower levels. And, there has been growing interest in the coordination challenges that arise out of the functioning of domestic multilevel climate arrangements (Engel, 2009).

However there are few studies in which american state climate policy is categorized. One of the academics that studies this phenomenon is Rabe (2011) in *Contested federalism and American climate policy*. In this research the author uses different time frames to consider climate policy engagement at both, federal and U.S. state level, involvement can run along a high-to-low continuum, with possibilities of significant changes, where each combination represents a different intergovernmental dynamic.

Figure 2: Intergovernmental involvement in american climate change policy (1975-2011)

## Intergovernmental involvement in American climate change policy, 1975–2011

Contested federalism, 2008–2011 High federal, high state 1	State domination, 1998–2007 Low federal, high state 2
Federal domination (none) High federal, low state 3	Symbolic policy, 1975–1997 Low federal, low state 4

Source: Rabe, B. (2011). Contested federalism and American climate policy. *The Journal of Federalism*, 41(3), p. 497.

In which contested federalism (cell one) means that both levels are actively involved and may either collide, compete or cooperate with one another. Then, (cell two) indicates low federal and high state involvement, states will likely be exploring just how far they can go given the confines of a federal system and possible backlash from either federal or rival state authorities. In the case of federal domination (cell three) the federal government has established a dominant relationship where there is intergovernmental tension over how those federal policies are implemented in various states but limited jockeying between respective levels for control of the area. And, there is symbolic policy (cell four) low federal and state involvement, there is scant intergovernmental engagement because little or no policy is being enacted at either level (Rabe, 2011).

Another study is made by the same author, Rabe (2008) in *States on Steroids: The Intergovernmental Odyssey of American Climate Policy*, where he analyzes state policy adoption trends and correlates it with the state's GHG emission course. As shown in the following table, Rabe dichotomizes the states by their rate of emissions growth since 1990

and also divides them according to low (zero to one) versus high (two or more) policy adoption rates from this census of eight possibilities, which are: renewable portfolio standard, carbon tax, renewable fuel standard, carbon cap and trade, statewide emissions target, mandatory emissions reporting, litigation (formal support of Massachusetts in *Massachusetts v. EPA*), and California vehicle emission standards.

Figure 3: State climate policy adoption and greenhouse gas emission trends

State Climate Policy Adoption and Greenhouse Gas Emission Trends			
		Emission Growth Trends (1990–2003) <sup>a</sup>	
		High (>15%)	Low (<15%)
Levels of State Climate Policy Adoption <sup>b</sup>	High (2 or more policies)	10 States Arizona Minnesota Oregon	12 States California New Mexico Pennsylvania
	Low (0–1 policies)	22 States Alabama Florida Texas	7 States Louisiana Michigan West Virginia

<sup>a</sup>See Table 1.

<sup>b</sup>Measures the adoption of the following policies within a state: Renewable Portfolio Standard, Carbon Tax, Renewable Fuel Standard, Carbon Cap-and-Trade, Statewide Emissions Target, Mandatory Emissions Reporting, Litigation (formal support of Massachusetts in *Massachusetts v. EPA*), and California vehicle emission standards.

Source: Rabe, B. (2008) States on steroids: the intergovernmental odyssey of American climate policy. Review of Policy Research, 25(2), 105-128.

The results are as followed:

This demarcation essentially divides the nation into two blocs. Twenty-two states representing about one-half of the American population have enacted two or more of these eight climate policies, indicating a considerable degree of political support for policy and formal engagement in climate policy adoption. A few of these states, such as California, Massachusetts, Connecticut, and New York, have adopted as many as six or seven of them. In some cases, states have revisited early policies and decided to “raise the bar,” elevating initial emission reduction targets or earlier commitments to renewable energy. The remaining 28 states represent the other half of the American population and have either zero or one such policy in operation, indicating less political support for policy or formal engagement in climate policy adoption. Over the past three years, at least eight states have moved from the “low” policy cell to the

“high” policy cell. That trend appears likely to continue given the volume of activity on various climate policies in many state legislatures (Rabe, 2008, p. 110).

This study is similar to the work that will be done, some of the indicators are even replicated. But the aim of this work is to update and upgrade the data, and most importantly to categorize the state climate policy, not compare policy trends to GHG, which is what Rabe did.

### **Conceptual framework**

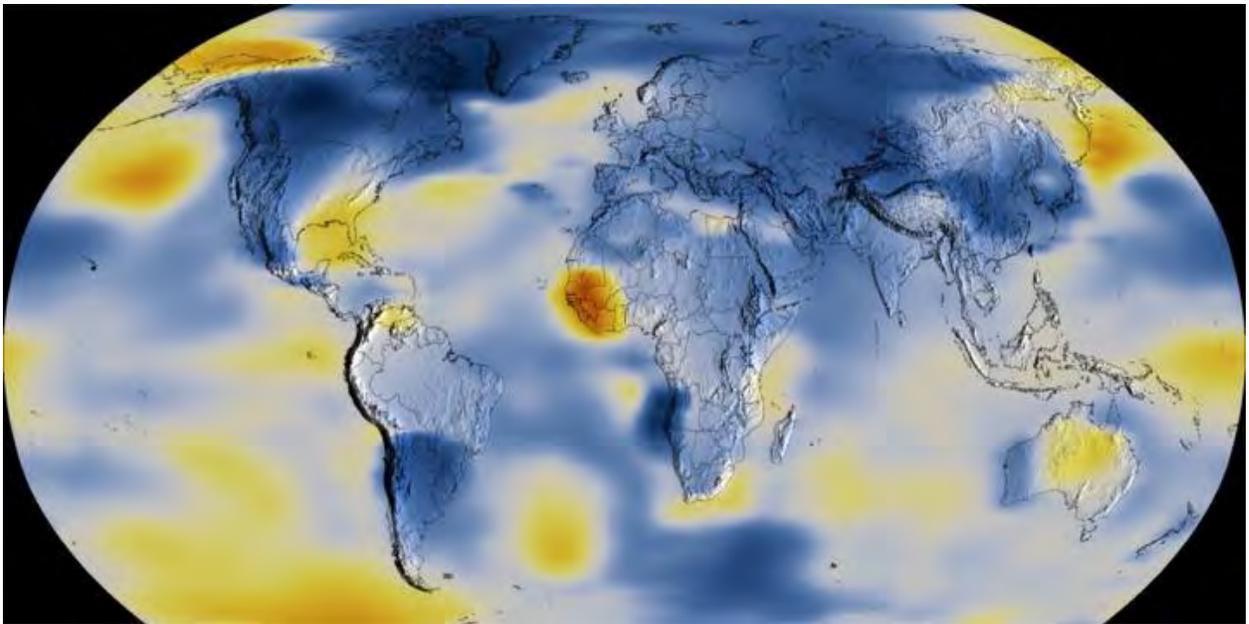
#### *Climate change and its effects in the U.S.*

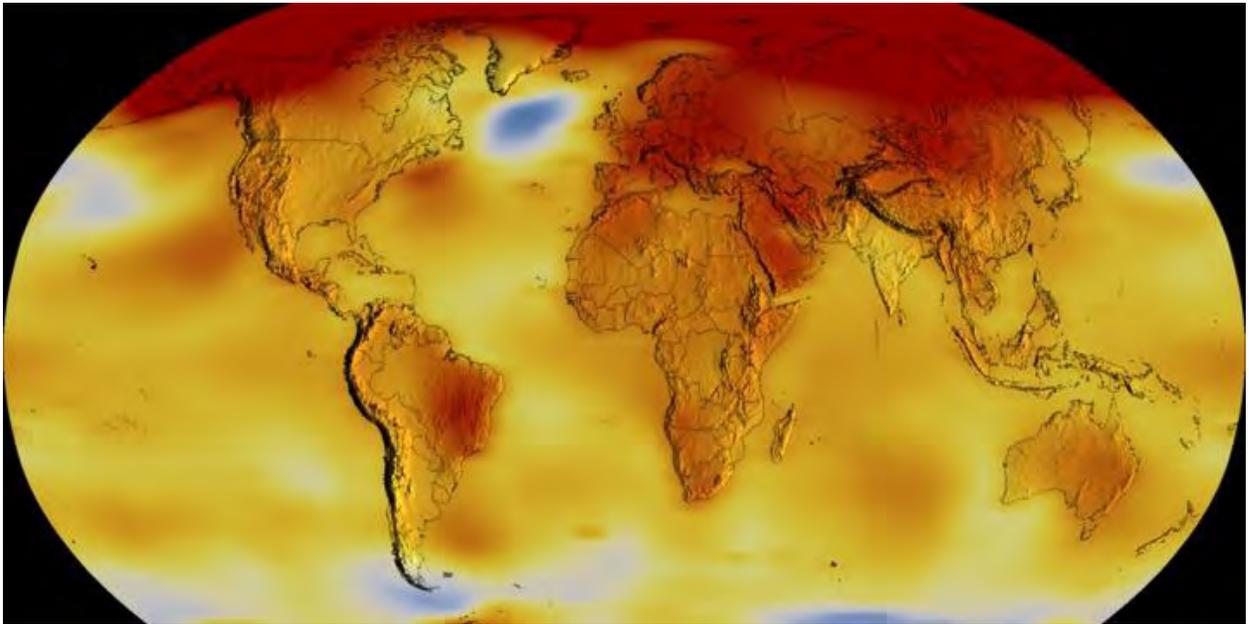
Climate change has been described as the crisis of our times. And it is. Life on planet Earth relies on the global temperature increment and its speed. Unfortunately since the industrial revolution, warmth in the atmosphere has escalated at a record-breaking rate. Why? Scientists say that there is a 95% chance that human activity is the cause. Global population has tripled in the last 70 years and human beings have been burning more fossil fuels like oil and coal which release CO<sub>2</sub>.

Earth’s climate depends on the functioning of a natural “greenhouse effect.” This effect is the result of heat-trapping gases (also known as GHG) like water vapor, carbon dioxide, ozone, methane, and nitrous oxide, which absorb heat radiated from the Earth’s surface and lower atmosphere and then radiate much of the energy back toward the surface. Without this natural greenhouse effect, the average surface temperature of the Earth would be about 60°F colder. However, human activities have been releasing additional heat-trapping gases (Forster et al.).

The augmentation of gases in the atmosphere creates variations in temperature and therefore climate. This is popularly known as climate change. The United Nations Framework Convention on Climate Change (1992) defined it as: “A change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods” (p. 7). Since 1880 global temperature has increased 2° Fahrenheit, the following images illustrate the average variation of global temperature from 1884 until 2019, dark blue indicates areas cooler than average, and dark red indicates areas warmer than average.

Figure 4: Change in global surface temperature (1884-2019)





Source: NASA/GISS. (2020). <https://climate.nasa.gov/vital-signs/global-temperature/>

The main activity that causes climate change is humanity's increased use of fossil fuels (coal, oil and gas) to generate electricity, run cars and other forms of transport, power manufacturing and industry. The Intergovernmental Panel on Climate Change (IPCC) has found that emissions from fossil fuels are the dominant cause of global warming, in 2018 89% of global CO<sub>2</sub> emissions came from fossil fuels and industry. Other activities include deforestation because living trees absorb and store carbon dioxide, and increasingly intensive agriculture and cattle raising which emits greenhouse gases like methane and nitrous oxide.

According to the World Meteorological Organization, planet earth is now nearly one degree warmer than it was before the widespread industrialization. These are not just numbers, every fraction of a degree makes a difference to human health, access to food and fresh water, extinction of animals and plants, survival of coral reefs and marine life, economic productivity and to the resilience and infrastructure of cities. The United Nations has warned that the world needs to limit climate change to below 1.5° Celsius above pre-industrial levels.

But scientists say that keeping to the 1.5° Celsius target will require rapid, far-reaching and unprecedented changes in all aspects of society.

Climate change is real and unequivocal human-induced, notwithstanding many citizens are not yet familiar with it and most governments do not address it seriously, even when every country is susceptible to global warming consequences: changes in the ecosystems, desertification, melting of the poles, rising sea levels, extreme weather events, acidification of the oceans, extinction of species, and massive migrations. Recently, we have presence massive fires in Australia and in the Amazonia, droughts in the Horn of Africa, and floods in Japan. The United States is no exception. According to the Global Climate Risk Index, the U.S. is one of the countries more vulnerable to climate change, ranked in 12th place.

Climate-related changes are already observed in the United States. These include increases in heavy downpours, rising temperature and sea level, rapidly retreating glaciers, thawing permafrost, lengthening growing seasons, lengthening ice-free seasons in the ocean, on lakes and rivers, earlier snowmelt, and alterations in river flows. In the past 50 years U.S. has experienced: an average rise in temperature of more than 2° Fahrenheit, increase in precipitation of about 5%, augmentation of rain falling in the heaviest downpours by 20%, extreme weather events more frequently, stronger hurricanes in the Pacific and Atlantic coasts, and all these phenomena are expected to rise (Karl, Melillo, and Peterson, 2009).

Besides this, climate change is harming the human health of American citizens. Temperature-related illnesses include dehydration and heatstroke; air quality impacts can cause lung and cardiovascular diseases, precipitation events can transport pathogens that entail gastrointestinal infections, and overall mental health is at risk too, it can produce

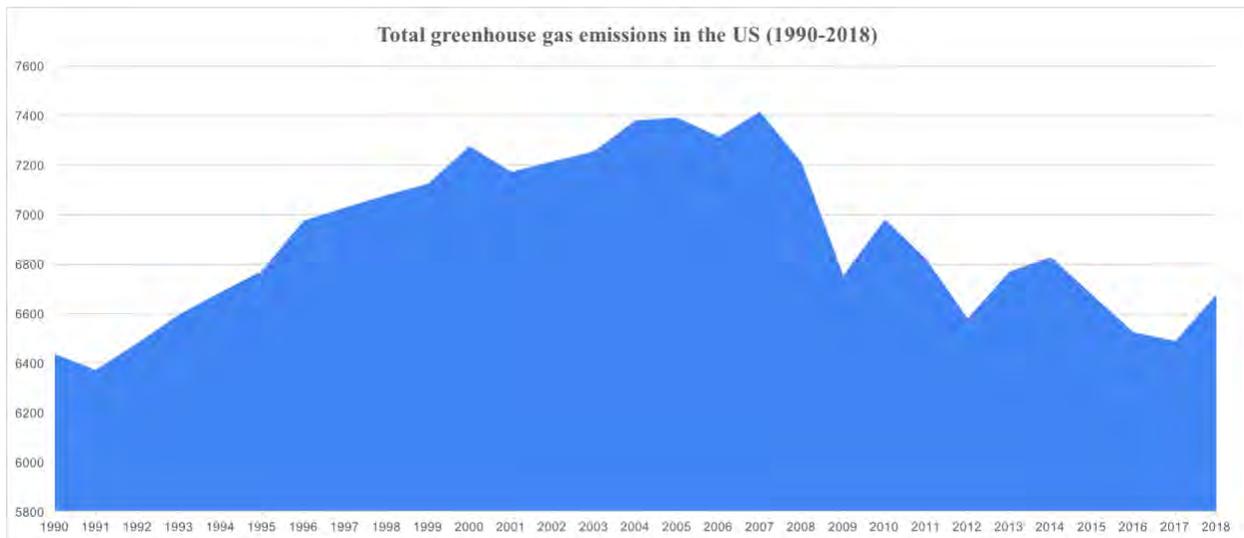
sleeplessness, anxiety, depression, and post-traumatic stress disorder (Center for Disease and Control Prevention, 2020). Scientists assure that some existing health threats will intensify and new health threats will emerge, but the impacts are associated with the different regions in the United States.

Also, the United States economy is endangered. Martinich and Crimmins (2019) examined how climate change could affect 22 different sectors, if the higher-temperature scenario prevails, climate change impacts could cost the United States up to \$520 billion each year. Another study proved that in any case, the United States stands to suffer large economic losses due to climate change, second only to India (Ricke, Drouet, Caldeira, and Tavoni, 2018). All the impacts mentioned demonstrate that there is a clear need to increase understanding of how the United States will be impacted by climate change, and most importantly, take them into consideration for decision-making.

#### *U.S. vis a vis climate change*

The United States is the world's second largest emitter of heat-trapping gases. But it is the country that has contributed most to CO<sub>2</sub> emissions, over the period from 1750-2017 the United States emitted 399 billion tones, which is equivalent to 25% of global cumulative emissions (Our World in Data, 2019) In the last 28 years, gross United States GHG emissions have increased by 3.7%, CO<sub>2</sub> emissions grew 5.8% and there was an increment on CO<sub>2</sub> emissions from fossil fuel combustion of 6.2% (EPA, 2020).

Figure 6: Total greenhouse gas emissions in the U.S. (1990-2018)

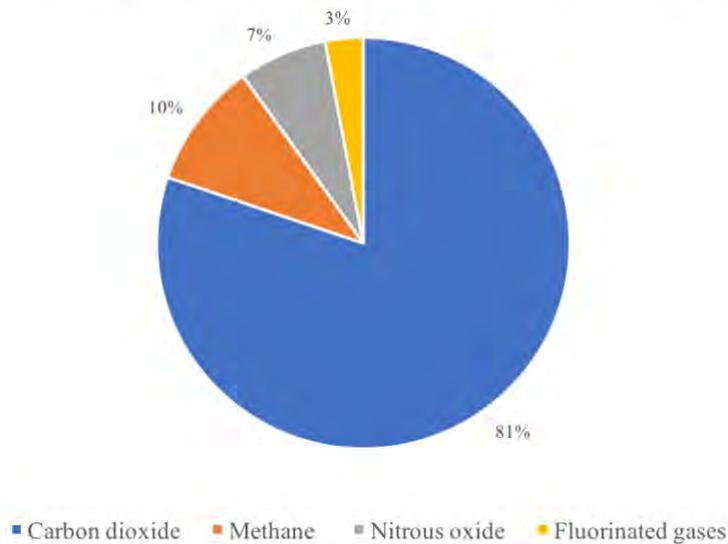


Source: Own elaboration based on: United States Environmental Protection Agency. (2020). Inventory of US greenhouse gas emissions and sinks 1990-2018.

The latest data from the United States Environmental Protection Agency, informed that in 2018 the GHG emissions totaled 6,677 million metric tons. Carbon dioxide accounted for the largest percentage of GHG (81%), followed by methane (10%), nitrous oxide (7%), and fluorinated gases (3%). The main sources of these gases are transport (28%) and electricity (27%), the sector that contributes the least is agriculture (10%).

Figure 7: Overview of greenhouse gas emissions in the U.S. (2018)

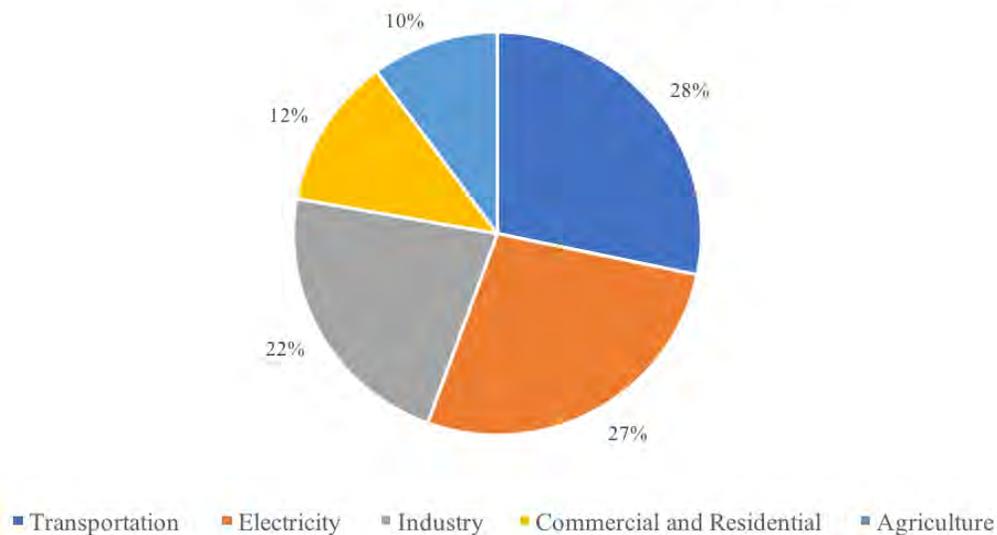
### Overview of greenhouse gas emissions in the U.S. (2018)



Source: Own elaboration based on: United States Environmental Protection Agency. (2020). Inventory of US greenhouse gas emissions and sinks 1990-2018.

Figure 8: Sources of greenhouse gas emissions in the U.S. (2018)

### Sources of greenhouse gas emissions in the U.S. (2018)

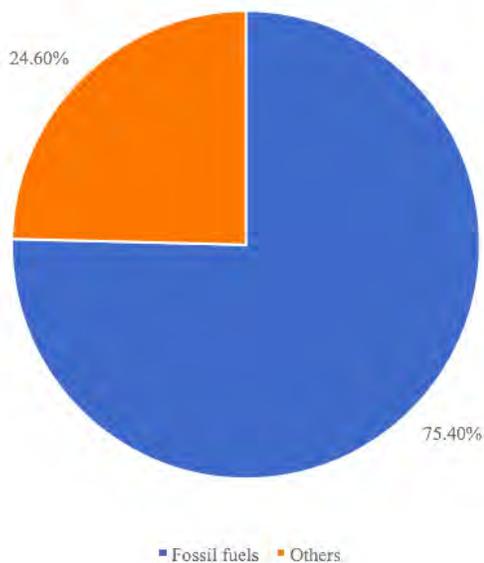


Source: Own elaboration based on: United States Environmental Protection Agency. (2020). Inventory of US greenhouse gas emissions and sinks 1990-2018.

The United States has a high dependency on fossil fuels. Most of the energy used comes from coal, oil and natural gas. In 2018, those “fossil fuels” fed about 80% of the nation’s energy demand, down slightly from 84% a decade earlier. Solar and wind power use has grown at a rapid rate over the past decade or so, but as of 2018 those sources accounted for less than 4% of all the energy used in the United States (Desilver, 2020). This means that renewable energy is growing fast but fossil fuels still dominate.

Figure 9: GHG emissions by fossil fuels in the U.S (2018)

**GHG emissions by fossil fuels in the U.S. (2018)**



Source: Own elaboration based on: United States Environmental Protection Agency. (2020). Inventory of US greenhouse gas emissions and sinks 1990-2018.

There are two main reasons that explain the reliance of the United States in fossil fuels. The first one is the American Conservative movement. They oppose climate change policy because the pursuit of environmental protection often involves government action that is seen as threatening to economic libertarianism, a core element of conservatism (McCright

and Dunlap 2003). Actually Boehmer (1994) in his investigation, concluded that the conservative movement and especially the conservative think tanks appear to have successfully affected the nation's policy making.

The second reason is the economic and political interests. Fossil fuel money has played a substantial role in climate policy, and some researchers say it's the single most important reason climate action has been stalled for decades in the United States. A report by InsideClimate News showed that Exxon and other oil companies have spent more than \$5 billion undermining climate science and fighting clean energy policies (Hasemyer, 2017). And, currently there are 17 Senators with over \$1 million in campaign contributions from the fossil fuel industry (Kirk, 2020).

In as much, public opinion about climate change has evolved in the last decades and American citizens are more informed and preoccupied about it. Surveys made in 1994 about whether or not the greenhouse effect or global warming was real, 57% answered in the affirmative (Nisbet and Myers 2007); today the number has raised up to 72% (Marlon, Howe, Mildenerger, Leiserowitz and Wang, 2020). The former study by Yale also suggests that in 2020 60% of the population think the President should do more to address global warming and that 64% consider citizens should do the same.

#### *Top down climate policy (2000-2020)*

Given the far-reaching relationship between United States and GHG emissions, effective measures are needed to achieve deep long-term reductions. Nevertheless, in the last 20 years the United States has been identified as a global laggard on climate change policymaking and implementation. The three branches of government all have a role to play in reducing United

States GHG emissions, which so far has been characterized as inefficient and in the absence of a federal comprehensive approach.

It all started with President George W. Bush's hostility towards the Kyoto Protocol, which he and the Congress denied ratification due to the exclusion of China and India, as well as concerns about negative economic impact (Sanger, 2001). He repudiated the Kyoto Protocol because the treaty "exempts 80% of the world from compliance," and it "would cause serious harm to the United States economy, especially given the current scientific and technical uncertainties" (Bush, 2001). However in June 1997 six months ahead of the UN conference in Kyoto, the Senate adopted a nonbinding resolution stating that the United States should not enter into any international climate agreement that did not include comparable emissions commitments by developing countries or that "would result in serious harm to the economy of the United States."

In his first term he opposed the introduction of mandatory GHG regulations, and often expressed skepticism about climate change science (Selin & VanDeveer, 2011, p. 122). Yet the 108th Congress (2003–2004) made significant bipartisan efforts to reduce the United States GHG emissions. Among many bills, in 2003 Sen. John McCain (R-Ariz.) and Sen. Joe Lieberman (D-Conn.) offered the Climate Stewardship Act of 2003 to institute a cap and trade program to reduce emissions from electricity, manufacturing, commercial, and transportation sectors of the economy (representing 85% emissions). The bill had a House companion and was reintroduced in the 109th and 110th Congresses (Center for Climate and Energy Solutions, 2020).

But during his second term, the primary vehicle at the federal level for addressing climate change was decided on the court. *Massachusetts v. The Environmental Protection*

*Agency* a 2007 Supreme Court case which determined that carbon dioxide and GHG are air pollutants under the Clean Air Act and should be regulated by EPA. Massachusetts and another 11 states won the case 5-4 (United States Department of Justice, 2015). Besides this, during the same year Congress mandated emissions reporting. EPA was ordered to publish a rule requiring public reporting of GHG emissions from large sources, since then over 40 source categories are covered (Center for Climate and Energy Solutions, 2020).

President Bush terms relied on the “Clear Skies and Global Climate Change Initiatives” which has been described as a voluntary and flexible course of action. As Blanchard and Perkaus (2004) argued the Bush administration assigns heaviest weighting to avoiding near-term economic costs linked to immediate emissions reductions. Therefore the Bush Administration climate policy does not guaranteed any meaningful contribution to climate protection. Critics affirm that under President Bush, the United States went from a prospective climate leader to a straggler and the United States did not take a leading role in the United Nations climate negotiations while he was in office (Kelemen and Vogel 2010, p. 441).

Opposite to his predecessor, President Obama pledged that his administration would mark a “new chapter in American leadership on climate change” (Obama, 2008). A year before winning the election President Obama proposed that the United States reduce carbon dioxide emissions by 80% by 2050, invest \$150 billion over a decade in “clean, affordable energy,” require that 25% of electricity be generated from renewable sources, make the United States 50% more energy efficient by 2030, and “rejoin the community of nations” in negotiations toward an international agreement on climate change (Obama 2007).

The main instrument of his presidency for fighting climate change was the Climate Action Plan. The plan announced on June 25<sup>th</sup>, 2013 outlines 75 goals in three areas: cutting carbon pollution, preparing the country for the impacts of climate change, and leading international efforts to address climate change. According to Tubman (2015) areas of progress in the program include steps to limit carbon pollution from power plants, new energy efficiency standards, actions to reduce methane and hydrofluorocarbon (HFC) emissions, the release of climate adaptation plans for 38 federal agencies, a Climate Resilience Toolkit for the public; and a joint announcement with China of new GHG targets.

An important remark is that he reengaged in the multilateral climate negotiations with the UN. During the Climate Change Conference of December 2009 in Copenhagen the United States compromised to a climate target of reducing GHG 17% below 2005 levels by 2020 and aimed for a low-carbon technology research on clean technologies (Dimitrov, 2010, p. 803). In November 2015 the United States became part of the Paris Agreement, where it added a climate target to its agenda: reduce emissions by 26–28% below 2005 levels by 2025. Actually, Parker and Karlsson (2018) argued that in both accords the United States performed the most leadership from all the parties and had a big influence in shaping the institutional design of the agreements (p. 535).

But, Obama's policy implementation was quite mixed. Some remember him for an alleged climate legacy, nevertheless Lehmann and Chemnick (2017) argued that he prioritized health care reform and saving the American industry due to the economic recession over climate legislation early in his first term and then, after being stung by an abandoned cap and trade bill, he went almost silent on the issue for two years. Still, the acceleration of his agenda from the Clean Power Plan to rejection of Keystone XL on climate change

grounds, a climate deal with China, the successful Paris accord, and his decision to ban Arctic drilling ban, were dizzying (Lavelle, 2016). It is regrettable that President Obama did not push this issue harder during his first term, which could have accelerated domestic and global action to curb GHG emissions.

The Trump Administration has clearly opposed the climate policies of Obama, and there is no reason to expect legislative action of any kind during the 116th Congress. This is primarily because climate change is an ideological issue for Republicans. Their opposition to climate policy is rooted in populism, economic nationalism, a conviction that the U.S. has a right to exploit nature, isolationism, and a rejection to multilateral institutions (Jotzo, Depledge and Winkler, 2018). President Trump has followed President Bush by rejecting the scientific consensus about anthropogenic climate change, but has taken it way too far by calling climate change "mythical", "nonexistent", or "an expensive hoax" in social media.

Figure 10: Trump's position on climate change via Twitter

“ We must reject the **perennial prophets of doom** and their predictions of the apocalypse

“ I don't believe it.

The concept of global warming was **created by and for the Chinese** in order to make U.S. manufacturing non-competitive.

“ I don't think it's a **hoax**, I think there's probably a difference. But I don't know that it's manmade.

It's freezing in New York — **where the hell is global warming?**

“ The United States will join **one trillion trees** initiative

The weather has been so cold for so long that the **global warming HOAXSTERS** were forced to change the name to climate change to keep \$ flow!

“ The environment is very important to me. Someone wrote a book that **I'm an environmentalist**

The badly flawed Paris Climate Agreement protects the polluters, hurts Americans, and **cost a fortune. NOT ON MY WATCH!**

“ I want the cleanest water on the planet. **I want the cleanest air anywhere** — crystal-clean water

**Donald J. Trump**

Source: BBC News (2020). <https://www.bbc.com/news/world-us-canada-51213003>

Disregarding scientific data about the risk of climate change is just one of the many actions President Trump has taken. He dismantled the Clean Power Plan that could result in 1,400 additional premature deaths from air pollution and \$30 billion in health damages per year compared to the original Clean Power Plan; rolled back a commonsense policy that requires new light bulbs to meet stringent energy-efficiency standards; refuses to support bipartisan legislation to curb super pollutants from air conditioners and refrigerators; eliminated existing standards requiring oil and gas companies to monitor and repair leaks of methane from both new and existing equipment; and loosened emissions standards for cars and trucks (Clevenger and Herbert, 2020).

So, the legacy of President Trump possibly might be climate damage. Popovich, Albeck and Pierre (2020) investigation revealed that his administration dismantled major climate policies and rolled back many more rules governing clean air, water, wildlife, and toxic chemicals, in total 84 regulations were cancelled and 20 are still in progress. Despite that, the most shocking actions President Trump took was (i) the United States withdrawal from the Paris Agreement, which has several consequences like reduction of federal incentives for low-carbon projects and demotivation for the international community; and (ii) the immediately cease implementation of United States nationally determined contribution, announced in July, 2017 at the G20 Summit (Fransen and Levin, 2017).

Now, across these years the United States has made several climate pledges and targets. The United States is not a Party to the Kyoto Protocol. While a target of a 7% reduction below 1990 levels from 2008–2012 was originally negotiated and agreed, the United States never ratified the Protocol and therefore, the target never came into force.

Regarding the Copenhagen Accord in 2009 the United States GHG emissions were roughly 12% below 2005 level, that puts the United States at risk of missing its agreed target (17% below 2005 levels by 2020). In addition, United States emissions last year were still “a long way off” from the 26-28% reduction that it pledged to carry out by 2025 under the 2015 Paris climate agreement (Mufson, 2020).

Table 1: U.S. Climate compromises

U.S. Climate compromises		
<i>Accord</i>	<i>Date</i>	<i>Pledge</i>
Kyoto Protocol	December 1997 Not ratified	7% below 1990 levels by 2012
Copenhagen Accord	Ratified in December 2009	17% below 2005 levels by 2020
Obama Administration	November 2016	80% below 2005 levels by 2050
Paris Agreement	Ratified in September 2019 Withdrawal in November 2020 Reentering in February 2021	26-28% below 2005 levels by 2025

Source: Own elaboration based on: Climate Action Tracker (2020). <https://climateactiontracker.org/countries/usa/pledges-and-targets/>

The polarized nature of climate change has led to gridlock at the national level in the United States, with federal branches unable or unwilling to engage in substantive actions to address the problem and with climate policy not ambitious enough to meet pledges and targets. Notwithstanding, in the last 20 years the low action from at the national level has been defiant by local climate action, states and governments have created networks, integrated solutions and public policies to construct a parallel and stronger climate policy.

## Methodology

One of the main objectives of this research is to create a metric to compare U.S. state climate policy and contrasting it to the federal measures, to analyze the MLG process developed at the bottom up governance. And, therefore realize if local governance overcome the State measures. The aim is to prove that U.S. states have a *defiant* climate policy towards the federal government – Which means that local governments have incurred on multilevel climate governance to create policy at their own political level.

The categorization will consist on three different climate policy labels: *evenness*, *complemental* or *defiant*. These categories make allusion to the existence of public policy instruments on climate change at the local level, these are: a GHG emission target, a carbon pricing policy, a climate action plan, an electricity portfolio standard, an energy efficiency decoupling policy, and a low carbon and alternative fuel standard. The instruments will be used as indicators, each one with a 1 point value; which means that the minimum score a state can get is 0 (no policy instruments) compared to a maximum score of 6 (all policy instruments).

So, if the state has an overall score of 0, it has an *evenness* climate policy, this means the state does not have any climate policy instrument and it only follows the federal legal framework. If the state has 1-3 points, it has a *complemental* climate policy which means that it also follows the federal policy but counts with at least one extra instrument. And if the state has from 4 up to 6 of the policies it is categorized as a *defiant* state towards the federal climate policy, this suggests the state considers the Nation-State commitments and the federal legal frameworks insufficient and has opted to implement climate policy by itself.

Table 2: Measurement of state climate policy

### Measurement of climate state policy

<i>Indicator</i>	<i>Value</i>
The state has a greenhouse gas emission target	1
The state has a carbon pricing policy	1
The state has a climate action plan	1
The state has an electricity sector policy	1
The state has an energy efficiency policy	1
The state has a low carbon and alternative fuel standard	1

Source: Own elaboration

Table 3: Categorization of state climate policy

<b>Categorization of state climate policy</b>	
<i>Score</i>	<i>Category</i>
0 points	Evenness
1-3 points	Complemental
4-6 points	Defiant

Source: Own elaboration

## **Chapter I: Climate change action from the bottom up**

Given the global nature of the problem, answers to tackle climate change have been sought through processes of international negotiation between Nation-States. However, awareness has been brought on the premise that the scale of environmental problems need not dictate the scale of governance mechanisms. It is clear that countries were unable to meet their commitments for addressing climate change without more explicit engagement with subnational action. There was a need to incorporate subnational governmental roles such as state and cities in a multilevel system that tackled climate change. The United States is one of the countries that performs the mentioned approach, a climate policy from the bottom up.

For a proper beginning, this chapter intends to explore the odyssey of local climate policy in the United States in the last decades. It will describe the unexpected prominent role states and cities have taken to tackle the issue of climate change, highlighting key trends and examples. It will also mention key figures which have been labelled as climate leaders and their contributions. It will offer an overview of various initiatives at both levels (state and city) ranging from public policies to networks memberships. Overall the main objective of the chapter is divulge what local governments have been doing to tackle climate change.

#### *The odyssey of local climate change action*

The federal government retains substantial authority in many spheres of American public policy, nevertheless as some areas have moved to more centralization like security, education and medical care; environmental protection and climate change have moved toward decentralization (Conlan and Dinan, 2007). Today all fifty states have their own constitutions and they retain a number of areas directly relevant to GHG emissions such as electricity sector regulation and have received authority from Washington D.C. for playing a the lead role in implementation of many federal environmental and energy programs. Local governments retain a considerable authority through “*home rule*” for implementing environmental policies.

The odyssey of climate change action traces way back, actually Mazmanian and Kraft (2009) argued the prominence of three epochs of [sub]national climate change policy. Epoch one is characterized by a closed attention on the matter by international and national authorities. Epoch two acquires a decentralized approach focused on the state, local, and

community levels. Epoch three is a combination of the former models, it involves a collaborative and intersectorial approach that creates a nexus between State-local/MLG.

The first epoch (1990-2000) can be tied with the beginnings of the climate change regime, where most of the climate actions occurred at the sphere of environmental multilateralism. The policy framework of the United States during this epoch was a command-and-control model. Among the most important limitations of this model are its high costs and inefficiencies, a focus on remedial rather than preventive actions, and adversarial rule making processes (Mazmanian and Kraft, 2009). Climate policy proved to be far messier than prevailing depictions had anticipated for the national government and across levels.

In this period, the politics often leaved both states and local governments without incentives for achieving their environmental objectives. Notwithstanding the mid-90's consist on a decade of climate strategies as well. That is when the Northeast states as New York, Massachusetts and New Hampshire started to develop policies focused on energy efficiencies; yet the first renewable portfolio standard was adopted in 1983 by Iowa. That decade also involved a big role on cities, Portland (OR) became the first city to develop a climate action plan in 1993 (Betsill and Rabe , 2009).

In the following years –epoch two (2000-2015)– American disengagement continue to strengthen subnational action, which created a local-centric climate policy approach. Local governments chose to be “first movers,” often taking bold steps with the explicit intent of trying to take national leadership roles on climate policy. Rabe (2009) explains this involvement due to the augmentation of state capacity, that now accounts for a fairly autonomous in interpretation, implementation, and innovation in climate policy. There was

a dramatic increase on agencies with considerable oversight in areas relevant to climate change, e.g. these institutions were responsible of more than 90% of all environmental permits and conducting more than 75% of all enforcement actions.

Continuing proliferation in state policy engagement on climate change pursue. In 2010 more than half of the states had enacted at least one piece of climate legislation or passed at least one executive order which set formal requirements for reducing GHG emissions; approximately one third of states have passed multiple laws designed to achieve such reductions (Rabe, 2009). If anything, all this actions point to a rapid pace in local engagement on climate change. Long-active states were expanding their efforts and elevating their reduction commitments and long-dormant states were (in some instances) showing signs of compromising.

The most important remark of this period is the emergence and establishment of a bottom up system for addressing climate policy, with an expanding and permanent role for states and cities to play in continued policy development and implementation. This feature is thanks to (i) local governments capacity to function as idea labs for federal lawmakers as they consider changes to national climate and energy reform (Fischer, 2010); (ii) due to the national rejection of the Kyoto Protocol, local response was challenging, just two years after the negative response, states have passed more than three dozen climate laws (Rabe, 2012); and (iii) Obama's approach to involve local actors in the climate change policies in his Clean Power Plan (Gaby, 2017).

On the opposite to these one-approach models, today –under epoch three (2015-to date)– there is a degree of vertical interaction, what is known as MLG; not only because of the decentralization of the CCR, also due to the interdependence across levels. One salient

example is New York city, The Big Apple has already a very low rate of GHG emissions and a history of involvement on climate action. Yet mayor Michael Bloomberg decided to expand this role through a 127-point plan, many of these provisions can be taken unilaterally but others require active support from the state government in Albany. The support includes approvals from specific roles as the governor, legislature and state commissions to financial aid (Betsill and Rabe , 2009).

Another example is Florida, a case over electricity development and generation where the state constrain the use of fossil fuels restrict local preferences. In Florida legislation authorized the state's Public Service Commission to prioritize approvals for renewable energy and energy conservation activities, placing construction of any new coal-fired facilities at the bottom of cost-effectiveness approval hierarchy. This decision had an effect on four cities to support the development of an 800 megawatt coal plant, leading them to suspend planning (Loc. cit.).

Although some vertical interaction across different levels was perceived during epoch three, it is important to note that the tendency of a bottom up system prevailed and still does. In the recent years, the best climate practices emerge at the state and city level –as it will be demonstrated through the chapter.– This can be attributed to the low response of the Donald Trump administration gave to climate change. In consequence, there is a possibility of a stronger climate MLG approach under Joe Biden leadership –discussed on chapter three “The United [green] States.”–.

Perhaps the biggest surprise as climate policy continues to evolve, –since the odyssey is far from being over– is that in the American case it is becoming increasingly evident that climate policy constitutes an issue of federalism or MLG. Epoch one indicates the emergence

of climate change as a political problem and United States response. Epoch two reflected the capacity of local governments to be laboratories for innovation and important actors in the climate change regime. Epoch three showed the desire to find a middle ground for developing new forms of collaboration for participatory policymaking and rulemaking.

### *Green pioneers*

States and cities wield real power over the emissions released within their borders, including from cars, power plants, factories, and buildings. States and cities in the United States are green pioneers and are setting an example for the world in combating climate change, instead of waiting for a top down approach, they are taking the lead. Rosner (2019), Green (2019) and Ricketts, Clifton and Oduyeru (2020) in their different researches they comment on different initiatives and local governments setting an example;

1. 100% renewable energy. With 28% of the country's GHG emissions coming from electricity production, switching to renewables is key. Solar and wind power costs have reduced dramatically in the recent years, renewables now account for more than 17% of the nation's electricity generation. In this, who's a pioneer? New York passed the most ambitious policy of the country. The law requires carbon-free electricity by 2040 and zero emissions statewide by 2050. It also requires at least 35% of clean-energy investments be made in marginalized communities, which are often burdened with pollution from power plants. Other leaders include: California, Washington, Maine, Colorado, South Carolina, Pennsylvania, Illinois, Wisconsin, Puerto Rico and Washington D.C.

2. Low carbon buildings. American buildings are responsible for a staggering amount of CO<sub>2</sub> emissions, they surpass those of any single country except China. Reducing these

emissions, which account for roughly 40% of the national output, involves moving from fossil-fuel energy to renewable electricity. In this, who's a pioneer? California's building code (the first of its kind in the country) offers a roadmap for radical changes in the built environment. It requires all new residential construction from 2020 to be net-zero energy, meaning a building makes as much electricity as it consumes. Other leaders include: Washington, New York city and Boulder (CO).

3. Innovative transportation. Vehicle miles having increased 11 % from 2000 to 2016. There is a need for cleaner vehicles, electric vehicles are part of the answer. In this, who's a pioneer? California has an approved budget 2020-2021 for \$30 million to support pilot projects for low-carbon transportation. It has also developed a program called Clean Mobility Options, which aims to reduce local air pollution and put more low-income people in electric vehicles, while lowering emissions and generally enhancing transportation choices. Other leaders include: Washington, Colorado, Oregon, New Jersey, Kansas (MO), Seattle (WA), and New York city.

4. Wildlife corridors. Climate change is altering landscapes and damaging animals homes. Today one in five species in the United States is in danger of extinction, due in large part to habitat loss. Local governments must immerse themselves in a model of living that includes nature. In this, who's a pioneer? New Mexico is protecting its deer, elk, pronghorns and other animals. The Wildlife Corridors Act requires the state's fish-and-game and transportation departments to identify, prioritize, and maintain corridors for animal movement and to construct highway crossings and other secure means of passage. Other leaders include: California, Colorado, Oregon, Maine, Vermont, and New Hampshire.

5. Carbon farming. Growing food accounts for nearly 10% of GHG emissions. But smarter agricultural practices could turn cropland into a carbon sponge, a solution for this is carbon farming, which employs methods that capture and hold carbon, may sequester as much as 1.5 tons of CO<sub>2</sub> per acre per year. In this, who's a pioneer? Hawaii launched a Greenhouse Gas Sequestration Task Force to identify ways to store carbon in its farms and natural areas, such as forests. The state is offering grants, technical support, tax credits, and other incentives to help produce and distribute more compost and to generally build healthier soils. Other leaders include: New Mexico.

6. Coastal resiliency. Coastal counties are home to 42% of the United States population and contribute nearly half of the national GDP. However, they are at risk from sea-level rise, storm surges, erosion, flooding, and saltwater intrusion into aquifers. Therefore, local governments are looking up for solutions for adaptation measures. In this, who's a pioneer? Louisiana decided to generate solutions such as buyouts of houses outside the levee system, wetland restoration, creation of a public harbor where boats can shelter during storms, and services for people experiencing mental health impacts from the stress of living in disaster-prone areas. Other leaders include: South Carolina, and New Jersey.

7. Cut harmful air pollutants. Although pollution from carbon dioxide receives the most attention, short-lived climate pollutants, such as black carbon, methane, and hydrofluorocarbons (HFCs), also pose key challenges to climate and health. States and cities must address this pollutants in the same measure as CO<sub>2</sub>. In this, who's a pioneer? Virginia made a legislation to limit methane leaks from natural gas infrastructure and landfills. Other leaders include: Connecticut, Maryland, Washington, Vermont, and New York.

8. Industrial emissions. Industrial activities contribute more than one-fifth of United States GHG emissions. Fortunately, efforts to reduce industrial emissions are a critical opportunity to build a robust clean energy manufacturing sector, with enormous potential to support American manufacturing jobs and increase international competitiveness. In this, who's a pioneer? California became the first state to institute a so-called Buy Clean Standard, requiring government agencies to take into account suppliers GHG emissions when purchasing materials, such as steel and glass, for infrastructure projects. Other leaders include: Washington, Oregon and Minnesota.

#### *Climate leaders*

This dramatic evolution would be best illustrated with political figures who claim leadership on the climate change issue. Under conventional thinking, it would be best assumed that recent presidents, congressional leaders and heads of federal agencies such as the Department of State and the Environmental Protection Agency would be the dominant forces, engaged in international negotiations while implementing such bargains through federal laws and institutions. Instead, the elected officials in the American life that best claim climate leadership operate at the subnational level, including governors such as California's Arnold Schwarzenegger or Massachusetts's Deval Patrick, and mayors such as New York City's Michael Bloomberg, Chicago's Richard Daley, and Seattle's Greg Nickels.

Arnold Schwarzenegger was California's governor from 2003-2011 with the Republican party, the perfect example for arguing that there is no partisanship regarding climate change. He is known as a climate leader for the Assembly Bill 32, or the Global Warming Solutions Act of 2006, the first program in the country to take a comprehensive,

long-term approach to addressing climate change while maintaining a robust economy. During his terms he made California the global leader in combating climate change, promoting renewable energy and finding innovative environmental solutions. More importantly, California reached all of its environmental goals –emissions were reduced to 1990 standards two years early–. Today he is in charge of R20 Regions of Climate Action, a non-profit coalition of various private and public institutions which assists subnational governments in implementing climate resilient projects (KQED Science, 2018).

Deval Patrick was Massachusetts governor from 2003-2011 with the Democratic party. For him, solving the climate crisis is a matter of human survival, as well as a moral imperative. As Schwarzenegger, Patrick confronted the climate challenge a decade before most political leaders were paying attention to this issue. During his terms he worked with neighboring states on the Regional Greenhouse Gas Initiative, closed coal-fired power plants, build a solar, wind and energy efficiency sector that generated ample alternatives and created tens of thousands of jobs and set the goal of a carbon neutral economy by 2040. He run in the Democratic primary race for presidency and today he joined Boston-based investment firm Bain Capital to launch a so-called impact investing fund (Patrick, 2020).

Michael Bloomberg was New York City mayor from 2002-2013 with the Democratic party. He is known for presiding over a reduction in the city’s carbon footprint (at twice the rate of the rest of the country), even as New York’s economy grew. He also started the campaign “We are still in” after trump announced the United States withdrawal from the Paris Agreement. He is popular for his international climate advocacy, for example, he pledged \$50 million for international effort to close down coal power plants in other

countries. In 2018, UN Secretary General Antonio Guterres appointed Bloomberg as special envoy for climate action (Irfan, 2020).

Richard Daley was Chicago mayor in 1989 and reelected in 1991, 1995, 1999, 2003 and 2007 with the Democratic party. In 2008 Daley announced a plan to make Chicago “the greenest city in America.” Daley launched the Chicago Climate Action Plan, which set 2020 targets for emissions reduction, tree planting, biking mobility, energy efficient buildings, green roofs, electric vehicles, recycling and more. During his terms Chicago require all building renovations to meet green standards, increase efficient power generated on-site using distributed generation and combined heat and power, augmented the number of walking and bicycle trips to one million a year, and promote use of alternative refrigerants in air conditioners and appliances. Today he is retired from politics. (Eng, Pupovac, and Crosson, 2019).

Greg Nickels was Seattle mayor from 2002-2010 with the Democratic party. In 2005 frustrated with the Bush Administration's inaction on global warming, Nickels decided to work the problem himself, "If the federal government is not going to sign on to the Kyoto Protocol," he said in his State of the City speech, "why can't we just do it at the local level? So, on February 16<sup>th</sup> 2005 (the launching date of the Kyoto Protocol) Nickels and other 141 cities signed an initiative to advance the goals of the Kyoto Protocol. Besides this, among his initiatives is the Seattle Climate Partnership a voluntary agreement among Seattle-area employers to assess and reduce their carbon footprint, and to work together to help meet community-wide goals for reducing climate pollution. Today he continues to work closely with the U.S. Conference of Mayors Climate Protection (Barcott, 2008).

### *Climate networks*

As different initiatives across individual states have expanded, there is also an increasing evidence of the development of intrastate networks and interstate interaction. In particular, more states are beginning to work collaboratively with other, usually neighboring states attempting to coordinate their policies and literally regionalize their efforts to maximize their objectives. This is best illustrated with the several multistate networks;

The Western Climate Initiative (WCI) was initially formed as a collaboration of jurisdictions working together to identify, evaluate, and implement emissions-trading programs at a sub-national level. In November 2011, WCI transitioned into WCI Inc. a nonprofit corporation that provides administrative and technical assistance to support the implementation of state and provincial GHG emission trading programs. Each participating jurisdiction sets its own individual program rules and maintains enforcement authority. Currently California is the only United States jurisdiction participating.

The United States Climate Alliance was formed by the governors of California, New York, and Washington in 2017, shortly after President Trump announced his intention to withdraw the United States from the Paris Agreement. Membership now includes 25 states and Puerto Rico. Member states have committed to reducing GHG consistent with the goals of the Paris Agreement and accelerate new and existing policies to reduce carbon pollution and promote clean energy deployment at the state and federal level.

The Governors Accord for a New Energy Future, is an accord signed in February 2016 by a group of 17 governors representing all regions of the country. Signatories are California, Connecticut, Delaware, Hawaii, Iowa, Massachusetts, Michigan, Minnesota, Nevada, New Hampshire, New York, Oregon, Pennsylvania, Rhode Island, Vermont,

Virginia, and Washington. The group is committed to promoting and deploying clean energy, including energy efficiency, renewable energy and alternative-fuel vehicles.

Established in 2008, the Pacific Coast Collaborative (PCC) is a cooperative agreement among the leaders of Alaska, British Columbia, California, Oregon, and Washington to leverage clean energy innovation and low-carbon development to reduce the effects of climate change on the regional economy. Participating jurisdictions coordinate, propose, and adopt policy aimed at generating investments in renewable energy, climate resilience, low-carbon transportation infrastructure, and environmental conservation. The PCC promotes coordination of state-level climate policies to achieve the broader goals reflected in PCC agreements.

The Transportation and Climate Initiative was created with the aim of promoting investment in solutions to reduce transportation emissions, 12 jurisdictions came together in 2010 to launch the organization. The TCI aims to expand safe and reliable transportation options, attract federal investment, lower transportation costs, improve overall air quality and public health, and mitigate the transportation sector's impact on climate change. The TCI consists of Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, and the District of Columbia.

Inasmuch, the flurry of climate change activity at the municipal level in recent years has been equally staggering, in the presence of networks through which local authorities become engaged in the issue of climate change. The first network to become active in the United States was the Cities for Climate Protection Campaign (CCPC) which was initiated in 1993, the CCPC has more than 650 members from all around the world, including 160 american cities. The CCP is characterized as a milestone approach in which members agree

to conduct an emissions inventory, set a target for controlling emissions, create a local action plan for achieving the target, and monitor and report their progress (Betsill and Bulkeley, 2003).

From 1993 to 2005 climate compromise increase, that is when Seattle Mayor, Greg Nickels launched an effort to encourage mayors in the U.S. to commit to reducing local emissions 7% below 1990 levels by 2012 (The U.S. Kyoto Protocol target) and lobbying state and federal officials to take stronger action on climate change. In consequence the largest municipal climate network in the United States came to be, organized around the U.S. Mayors Climate Protection Agreement (USMCPA). To date, 1,066 mayors have signed the agreement.

Today there are other municipal climate networks. ICLEI an international organization created three decades ago impassioned mayors asserted their role in fighting environmental pollution at the United Nations, the USA Office has 286 members dedicated to sustainability. C40 Cities is a network that connects 97 cities (14 american) of the world's greatest cities to take bold climate action, leading the way towards a healthier and more sustainable future. And the Global Covenant of Mayors for Climate & Energy (GCoM) the largest global alliance for city climate leadership, where 175 cities have committed to the network's principles.

### *Climate policies*

For years, states and cities have been addressing climate change in the absence of stronger federal action. A wide range of policies have been adopted at the regional, state and municipal levels to reduce GHG emissions, develop clean energy resources, promote alternative fuel

vehicles, and advance more energy-efficient buildings and appliances, among other things. Although climate change ultimately requires an effective national and international response, the actions taken by states and regions play a vital role by developing and testing innovative solutions, delivering near-term emission reductions, and laying the groundwork for broader action.

One of these policies is the adoption of specific GHG emissions targets. A GHG emissions target is a state-level goal to reduce emissions by a specific amount by a predetermined date. The targets can cover all greenhouse gas emissions or specific gases (e.g. carbon dioxide only). The targets can be economy-wide or sector-specific, and they can also differ based on the baseline year that the state aims to reduce emissions below and the timeline for emissions reductions, including short-term, medium-term, and long-term targets.

Local governments have been taking responsibility for setting a GHG emission target, usually nation-states are the ones making commitments under their NDC in the Paris Agreement. But the United States local governments have acquired this policy and responsibility. In total 27 states plus the District of Columbia (Center for Climate and Energy Solutions, 2020) and 132 cities (ICLEI and WWF, 2015) have adopted objectives. Among these we can find democratic states like California, Oregon and New York and Republican states such as Louisiana or Montana; and the most populated cities: San Diego, Los Angeles and Chicago.

A policy that complements a GHG emission target is a climate action plan (CAP). This includes the detailed actions a local government can take to help meet those goals, it may also include additional components such as resilience strategies, clean energy targets, and economic and social goals. In total 29 states have a climate action plan (Center for

Climate and Energy Solutions, 2020). In what cities corresponds, of the top 100 most populous cities in the United States as of 2017, less than half (45) had climate action plans. Nevertheless, it is important to remark that since 1991, over 600 local governments in the United States have developed CAPs that include GHG inventories and reduction targets (Markolf, Azevedo, Muro and Victor, 2020).

Another policy that local governments use to address emissions is carbon pricing. It is a mechanism that reduces carbon emissions by using market mechanisms to pass the cost of emitting on to emitters. Its broad goal is to discourage the use of carbon dioxide-emitting fossil fuels in order to protect the environment, address the causes of climate change, and meet national and international climate agreements (Rose and Mann, 2016). The instrument may take form as a carbon tax, emission trading system (ETS) or a cap and trade program, a crediting mechanism, under a results-based climate finance (RBCF) or by international accords.

In the United States, with Congress largely gridlocked on climate policy the main carbon pricing efforts have unfolded at the state level via cap and trade programs (though carbon taxes are being considered in a few states as well). An ETS sets a limit (“cap”) on total direct GHG emissions from specific sectors and sets up a market where the rights to emit (in the form of carbon permits or allowances) are traded. This approach allows polluters to meet emissions reductions targets flexibly and at the lowest cost. It provides certainty about emissions reductions, but not the price for emitting, which fluctuates with the market (Rose and Mann, 2016).

The Regional Greenhouse Gas Initiative (RGGI) is the first mandatory market-based program, is a cooperative effort among the states of Connecticut, Delaware, Maine,

Maryland, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island, Vermont, and Virginia to cap and reduce CO<sub>2</sub> emissions from the power sector. The system auctions power plants a steadily dwindling supply of carbon pollution permits. One important feature is that states have used the money raised by the auctions to invest in efficiency and clean energy programs.

California has a cap and trade program too, it is one of the largest multi-sectoral emissions trading systems in the world and it covers nearly its entire economy and is linked with the Canadian province of Quebec. The program launched in 2013 is the fourth largest in the world, following the cap and trade programs of China, the European Union, and the Republic of Korea. Its main objective is to help meet California's ambitious goals to reduce GHG emissions and achieve an economy wide carbon neutrality by 2045 (Center for Climate and Energy Solutions, 2020).

The program's covered entities include large electric power plants, large industrial plants, and fuel distributors (e.g. natural gas and petroleum). In total, about 450 businesses that are responsible for around 85% of California's total GHG emissions must comply. The revenues that California receives from the program are deposited into the state's Greenhouse Gas Reduction Fund and then appropriated to state agencies to implement programs that further reduce GHG emissions. So far the program has proven successful since California reduced its emissions 5.3% from the start of the program to 2017 (Center for Climate and Energy Solutions, 2020).

Another state that has a cap and trade program is Massachusetts. The state has two separate cap and trade programs to reduce GHG emissions in the power sector, since they are also part of the RGGI. The program named Reducing CO<sub>2</sub> Emissions from the Electricity

Generating Facilities covers 21 large fossil fuel-fired power plants and is expected to reduce aggregate CO<sub>2</sub> emissions from these facilities 80% below 2018 levels by 2050. This program is a part of a suite of regulations issued in response to a Supreme Judicial Court ruling and executive order directing the Massachusetts Department of Environmental Protection to take actions to reduce GHG emissions (Center for Climate and Energy Solutions, 2020).

Now, municipalities play a key role on pricing carbon as well. In the first place, because cities tend to be more progressive than states, and the political opportunity to pass strong climate action tends to be higher. Take Texas for example, the state is generally conservative and Governor Greg Abbott is a climate change denier; but Texas is also home of several liberal cities, such as Austin and Dallas, passing carbon pricing in one of these municipalities is a lot more feasible than doing so statewide. Second, cities are laboratories where innovative policies can be experimented before spreading across the nation. Like banning plastic bags, San Francisco became the first city to do it in 2007 and since then hundreds of other cities have followed suit (ClimateXChange, 2018).

Even though cities do not have a cap and trade program, they have priced carbon before. Aspen (CO) was the first city in the world to introduce a carbon fee in 1999, called the Renewable Energy Mitigation Program (REMP). Bay Area (CA) passed a 4.4% per carbon ton fee that applies to 500 businesses. Athens (OH) in 2018 passed a carbon fee through a referendum, through which 76% of the population voted in favor of the measure (Clarq, 2020). These municipalities, and others like them, are taking steps to reduce their own carbon footprints and advance climate solutions locally.

Likewise, a wide range of state policies help to reduce GHG emissions from the power sector. One of the most common state policies is a portfolio standard that requires

electric utilities to deliver a certain amount of electricity from renewable or clean energy sources. Most of these policies take the form of: a renewable portfolio standard (RPS), adopted in 29 states and the District of Columbia, which require a certain percentage of a utility's electricity to come from renewable energy sources; or in a clean energy standard (CES), adopted by seven states, which requires electric utilities to deliver a certain amount of electricity from renewable or clean energy sources (Center for Climate and Energy Solutions, 2020).

Many cities as well are employing innovative strategies to procure low-carbon energy, including participating in power purchase agreements, green tariffs, and community choice aggregation. Cities also promote the deployment of renewables by piloting demonstration projects, leasing government-owned land for privately-owned installations, and updating regulations to facilitate private investments. When cities are not able to cover their energy needs directly from low-carbon sources, they often purchase renewable energy credits (RECs) from projects elsewhere (Center for Climate and Energy Solutions, 2020).

One example is the Climate Action Plan (CAP) tax in Boulder (CO) America's first voter-approved climate mitigation tax in 2006. Under CAP, the city's only electric utility, Xcel Energy, charges residents and businesses a fee via their monthly utility bills and exempts renewable energy consumers. Tax revenue is used to fund weatherization efforts, sustainability projects, and solar rebates (ClimateXChange, 2018). Hyattsville City (MD) is another municipality that has taken strong measures to address climate change. The city recently passed Community Choice Aggregation (CCA), a program that gives municipalities the power to provide electricity for their residents from an alternative supplier, allowing the city to choose greener, cleaner sources to power the grid (Clarcq, 2020).

On the other hand, states can promote energy efficiency projects and practices through mandates or incentives (many states take both approaches). Mandatory energy efficiency policies include building codes that require low-energy features or appliance standards, while incentives for energy efficiency are provided chiefly through tax credits and/or rebates for energy efficiency products. Another way to promote energy sector efficiency is decoupling— changes in power regulation that base utility revenue on factors other than volume of electricity sold. In total, 27 states have these types of policies (Center for Climate and Energy Solutions, 2020).

Because cities use so much energy too, they have great potential for reducing carbon emissions by cutting building energy use. Cities are enacting tougher standards for new buildings, such as requiring LEED and EnergyStar certification; or helping residents and businesses overcome the persistent hurdle of up-front costs by offering Property Assessed Clean Energy (PACE), low-interest loans, grants, and rebates. Regarding this, as an example, California's cities required LEED certification for its buildings since 2004 (Burgoyne, 2021) and Dallas (TX) had the PACE program since 2013 (Lepeska and Spath, 2021).

States are opting for transportation policies that reduce GHG emissions. The best policy is a low carbon fuel standard (LCFS) aim for reducing GHG emissions by requiring a shift to lower-carbon transportation fuels, such as biofuels, without prescribing a particular fuel type. Currently only California and Oregon have LCFS policies in place, but other 5 states have clean fuels measures (Center for Climate and Energy Solutions, 2020).

Clean transportation is different in cities. With large fleets of government vehicles, taxis, public transportation systems, and dense walkable neighborhoods, the options for getting around are far greater in a city than in a state. Carpooling has become a trend, it is

popular in cities like Visalia-Porterville (CA), Moultrie (GA), and Liberal (KS). Biking is also a common and sustainable practice in cities such as Eugene (OR), Laramie (WY) and Vermillion (SD). Lastly the most common activity– walking can be perceived in Ithaca (NY), Pullman (WA) and Ketchikan (AK) (Taylor, 2018).

## Chapter II: Defiant states?

Every U.S. state is particularly affected by climate change, but also each one of them has decided (or not) to implement local policies to reduce GHG emissions, develop clean energy resources, promote alternative fuel vehicles, foster more energy-efficient buildings, among other things. This chapter will give a brief description on each U.S. state climate impact and the state’s response – which is directly linked to the number of policy instruments they have. Overall the main objective of the chapter is to categorize every state into one of the three categories of state climate policy of either of *evenness*, *complemental* or *defiant*, when compared to the federal measures.

### Overview

Table 4: Results

State	Overall score	Category of state climate policy	State	Overall score	Category of state climate policy
<i>Alabama</i>	0	Complemental	<i>Montana</i>	2	Complemental
<i>Alaska</i>	0	Evenness	<i>Nebraska</i>	0	Evenness
<i>Arizona</i>	2	Complemental	<i>Nevada</i>	4	Defiant
<i>Arkansas</i>	1	Complemental	<i>New Hampshire</i>	4	Defiant
<i>California</i>	6	Defiant	<i>New Jersey</i>	5	Defiant

<i>Colorado</i>	4	Defiant	<i>New Mexico</i>	3	Complemental
<i>Connecticut</i>	5	Defiant	<i>New York</i>	5	Defiant
<i>Delaware</i>	4	Defiant	<i>North Carolina</i>	4	Defiant
<i>District of Columbia*</i>	4	Defiant	<i>North Dakota</i>	1	Complemental
<i>Florida</i>	1	Complemental	<i>Ohio</i>	2	Complemental
<i>Georgia</i>	1	Evenness	<i>Oklahoma</i>	1	Complemental
<i>Hawaii</i>	5	Defiant	<i>Oregon</i>	5	Defiant
<i>Idaho</i>	1	Complemental	<i>Pennsylvania</i>	5	Defiant
<i>Illinois</i>	4	Defiant	<i>Puerto Rico*</i>	1	Complemental
<i>Indiana</i>	1	Complemental	<i>Rhode Island</i>	5	Defiant
<i>Iowa</i>	2	Complemental	<i>South Carolina</i>	2	Complemental
<i>Kansas</i>	0	Complemental	<i>South Dakota</i>	1	Complemental
<i>Kentucky</i>	1	Complemental	<i>Tennessee</i>	0	Evenness
<i>Louisiana</i>	2	Complemental	<i>Texas</i>	1	Complemental
<i>Maine</i>	5	Defiant	<i>Utah</i>	1	Complemental
<i>Maryland</i>	4	Defiant	<i>Vermont</i>	5	Defiant
<i>Massachusetts</i>	5	Defiant	<i>Virginia</i>	5	Defiant
<i>Michigan</i>	4	Defiant	<i>Washington</i>	5	Defiant
<i>Minnesota</i>	5	Defiant	<i>West Virginia</i>	0	Evenness
<i>Mississippi</i>	0	Evenness	<i>Wisconsin</i>	4	Defiant
<i>Missouri</i>	2	Complemental	<i>Wyoming</i>	1	Complemental

Source: Own elaboration

### *Alabama*

Alabama's most treasured places are flooding and eroding away due in part to sea level rise from climate change. Extreme weather events include severe storms, heat waves, cold snaps, and more intense hurricanes. Other consequences include heritage of food and damages to agriculture and crops (EPA, 2017). Considering this effects, Alabama should be taking action on climate, however it has an *evenness* climate state policy – it does not have any local climate instrument.

### *Alaska*

Over the past 60 years, Alaska has warmed more than twice as rapidly as the rest of the U.S., with average annual air temperature increasing by 3°F and average winter temperature by 6°F, with substantial year-to-year and regional variability. Because of its cold-adapted features and rapid warming, climate change impacts on Alaska are already pronounced, including earlier spring snowmelt, reduced sea ice, widespread glacier retreat, warmer permafrost, drier landscapes, and more extensive insect outbreaks and wildfire (EPA, 2017). Unfortunately Alaska has not implemented any state climate policy, and therefore has an *evenness* climate state policy.

### *Arizona*

In Arizona severe and sustained drought will stress water sources, already over-utilized in many areas, forcing increasing competition among farmers, energy producers, urban dwellers, and ecosystems for the region's most precious resource (EPA, 2017). Arizona has two climate state policies to make front to these challenges. It has a renewable portfolio standard adopted in 2006, it requires 15% of the electricity load in the state to come from renewable sources by 2025. It also has a climate action plan released in 2006, key aspects include reducing energy demand and increasing energy efficiency, expanding carbon sinks, and imposing a cap and trade program (Center for Climate and Energy Solution, 2020). Considering Arizona's two climate policies, the state has a *complemental* policy.

### *Arkansas*

Arkansas is exceptionally vulnerable to sea level rise, extreme heat events, hurricanes, and decreased water availability (EPA, 2017). Arkansas has a *complemental* climate state policy since it has one policy instrument. Arkansas has a climate action plan released in 2008, key aspects include improving building codes, developing and expanding biofuels, and managing forests sustainably (Center for Climate and Energy Solution, 2020).

### *California*

California is already experiencing drought and extreme weather that will affect the valuable market of fruits and vegetables, increased temperatures and longer warm seasons lead to the spread of respiratory and heart disease, extreme coastal flooding as a result of sea level rise, and widespread of fires that damages ecosystems and wildlife (EPA, 2017).

California has several climate policies to tackle climate change. (i) A GHG emission updated in 2016 to reduce emissions 40% below 1990 levels by 2030 and reach net-zero emissions by 2045. (ii) A clean energy standard updated in 2018 requiring 100% of electricity sales in the state to come from renewable energy and zero carbon resources by 2045. (iii) A carbon pricing policy, which takes form on a cap and trade program launched in 2013. (iv) A decoupling policy set in 2010, (a revenue program for gas and electric). (v) A low carbon and alternative fuel standard policy updated in 2018 that requires fuel suppliers in the state to reduce the carbon intensity of fuels by 10% by 2020 and 20% by 2030. (vi) A climate action plan updated it in 2017, key aspects include attaining a 50% renewable portfolio standard by 2030, doubling energy efficiency by 2030, and continuing the cap and trade program through 2030 (Center for Climate and Energy Solution, 2020).

California is a unique case, from the 52 local governments evaluated in the model, it is the only one that has six climate state policies, all the instruments considered as indicators. So, according to the categorization, California has a *defiant* climate state policy. The particularities of California are evaluated in chapter III “The United [green] States.”

### *Colorado*

Colorado’s climate is changing, most of the state has warmed one or 2° F in the last century. In the state, heat waves are becoming more common, snow is melting earlier in spring, and less water flows through the Colorado River (EPA, 2017). Colorado has taken seriously the consequences of global warming, it has developed several climate policies.

Colorado has a GHG emission target set in 2019 it aims to reduce GHG emissions 26% by 2025, 50% by 2030, and 90% by 2050, all compared to 2005 levels. It has a renewable portfolio standard adopted in 2004. It requires a certain percentage of electricity produced in the state 30% from investor owned utilities, 25% from large electric cooperatives, and 10% from electricity cooperatives to come from renewable energy and recycled sources by 2020. A decoupling policy (a revenue program for electricity) set in 2017. And a climate action plan released in 2018, key aspects include modernizing the Public Utilities Commission, incentivizing zero emissions vehicles and other low-carbon commuting options, and ensuring a just and equitable transition (Center for Climate and Energy Solution, 2020). In total Colorado has 4 climate polices, therefore it has a *defiant* climate state policy.

### *Connecticut*

In Connecticut rising temperatures and shifting rainfall patterns are likely to increase the intensity of both floods and droughts. Likewise, rising sea level erodes wetlands and beaches and increases damage from coastal storms (EPA, 2017). In order to address these challenges, Connecticut has developed five climate state policies, which makes it a state with a *defiant* climate state policy.

Its first policy is a GHG emission target updated in 2018 which aims to reduce GHG emissions 45% below 2001 levels by 2030. It has a carbon pricing policy due to its participation in the Regional Greenhouse Gas Initiative (RGGI) established in 2005. Also, a renewable portfolio standard adopted in 2018 that requires 48% of the electricity retail load in the state to come from renewable energy sources by 2030. Its fourth policy is a decoupling policy (a revenue program for gas and electric) set in 2007. Finally, it has a climate action plan updated in 2018, key aspects include economy-wide carbon pricing, price incentives for electric vehicle adoption, and updating building codes (Center for Climate and Energy Solution, 2020).

### *Delaware*

In the last century Delaware has experienced heavy rainstorms more frequent and the sea is rising about one inch every seven years. In addition, rising temperatures are likely to increase the intensity of droughts. In the coming decades, changing in the climate is expected to increase coastal flooding, harm ecosystems, disrupt farming and risk human health (EPA, 2017).

The northeastern state is aware of the troubles mention and in response has developed a number of climate policies. In 2014 set a GHG emission target to reduce emissions 30%

below 2008 levels by 2030. It has a carbon pricing policy due to its participation in the Regional Greenhouse Gas Initiative (RGGI) established in 2005. In 2018 Delaware adopted a renewable portfolio standard that requires 25% of electricity sales in the state to come from renewable energy sources by 2025, with at least 3.5% from solar photovoltaics. It has a climate action plan updated in 2020, key aspects include purchasing and deploying lower-emitting vehicles and advocating for low-carbon building design practices (Center for Climate and Energy Solution, 2020). In total the state has four climate policies and in consequence it has a *defiant* climate state policy.

#### *District of Columbia\**

As a result of climate change, DC will experience: much warmer average temperatures, up to 2-3 times as many dangerously hot days, longer, hotter and more frequent heat waves, intense heavy rain events and higher tides as a result of rising sea level (EPA, 2017). DC has responded to these threats by developing four climate policies, this means it has a *defiant* climate state policy.

Among these policies, can be mentioned: (i) DC's GHG emission targets were set in 2017 to reach emissions 50% below 2006 levels by 2032 and 80% below 2006 levels by 2050, (the targets also aim for net-zero GHG emissions by 2050); (ii) a renewable portfolio standard updated in 2018 that requires 100% of electricity sales to come from renewable energy sources by 2032 with a 10% solar carve out by 2041; a decoupling policy set in 2009 (a revenue program for electricity); and (iv) a climate action plan updated in 2018, key aspects include a net-zero-energy building code, electrifying buses, and supporting a

substantial increase in the quantity of electricity generated in the city (Center for Climate and Energy Solution, 2020).

### *Florida*

In the Florida peninsula, the sea is rising about one inch every decade, heavy rainstorms are becoming more severe, and rising temperatures are increasing (EPA, 2017). Nonetheless, Florida only has one climate policy: a climate action plan released in 2008, key aspects include restoring forests, improving power plant efficiency, and developing a cap and trade program (Center for Climate and Energy Solution, 2020). Therefore, this state has a *complemental* climate state policy.

### *Georgia*

In Georgia the changing climate is likely to harm livestock, increase the number of unpleasantly hot days, and increase the risk of heat stroke and other heat-related illnesses. Likewise Georgia may experience sea level rising, heavy downpours, floods and droughts (EPA, 2017). However the state only has one climate policy, a decoupling policy set in 2007 (a revenue program for gas and electric) (Center for Climate and Energy Solution, 2020). This categorize Georgia as a state with a *complemental* climate state policy.

### *Hawaii*

In Hawaii warming in the oceans has damaged coral reefs, and in recent decades, increased ocean acidity has threatened reefs and other marine ecosystems. Average precipitation decreased in the last century, reducing freshwater availability on some islands and affecting

delicate land-based ecosystems, often harming native species. (EPA, 2017). Fortunately Hawaii has developed a series of climate policies to make ensure the island's future.

Some of these policies are: the declaration for a net-zero GHG emissions by 2045; a renewable portfolio standard updated in 2015 that requires 100% of net electricity sales in the state to come from renewable energy sources by 2050; a decoupling policy set in 2010 (a revenue program for electricity); a low carbon and alternative fuel standard policy adopted in 2010 which requires the use of alternative fuels on 20% by 2020 and 30% by 2030; and an climate action plan released in 2009, key aspects include supporting the Hawaii Clean Energy Initiative, upgrading building and land use codes, and considering opportunities for carbon sequestration and offsets from reforestation (Center for Climate and Energy Solution, 2020). In total Hawaii has five climate policies, which makes it a state with a *defiant* climate state policy.

### *Idaho*

In Idaho snowpack is melting earlier in the year, and the flow of meltwater into streams during summer is declining. Other impacts include decline in species, augmentation of wild fires, expansion of deserts, scarcity of water for irrigation (EPA, 2017). Yet, Idaho only has one climate instrument, a decoupling policy (a revenue program for electricity) set in 2013 (Center for Climate and Energy Solution, 2020). With one climate instrument, this state has a *complemental* climate state policy.

### *Illinois*

Illinois is suffering from more frequent floods, and ice covering the Great Lakes is forming later or melting sooner. In the coming decades, the state will have more extremely hot days, which may harm public health in urban areas and corn harvests in rural areas (EPA, 2017). In response, the state is currently implementing four climate policies, this categorize Illinois with a *defiant* climate state policy.

Among these policies, can be mentioned: (i) a GHG emission target set in 2019 to reduce GHG emissions by at least 26-28% below 2005 levels by 2025; (ii) a clean energy standard updated in 2016 that requires 25% of electricity sales in the state to come from renewable energy sources by 2025; (iii) a decoupling policy (a revenue program for gas) set in 2008; and (iv) a climate action plan released in 2007, key aspects include setting a low-carbon fuel standard, developing a cap and trade program for power plants and large industrial sources, and encouraging methane capture from coal mines, landfills, livestock and wastewater treatment plants (Center for Climate and Energy Solution, 2020).

### *Indiana*

The climate in Indiana has change dramatically, in the last century the state has warmed about one degree (F). Heavy precipitation and flooding may be more common, spring rainfall and average precipitation are likely to increase, and severe rainstorms are likely to intensify. Increasing temperatures are near, 70 years from now much of Indiana is likely to have 5 to 15 more days per year with temperatures above 95°F than it has today (EPA, 2017). Inasmuch Indiana has only one climate policy: a clean energy standard established in 2012, it requires electricity utilities to voluntarily produce 10% of the electricity from renewable energy

sources by 2025 (Center for Climate and Energy Solution, 2020). In consequence, the state has a *complemental* climate state policy.

### *Iowa*

In Iowa floods and extremely hot days are becoming more frequent, these events may harm public health in urban areas and corn harvests in rural areas (EPA, 2017). The state has a *complemental* climate state policy, since it developed two instruments to manage global warming. It has a clean energy standard adopted in 1983 that requires the two investor-owned utilities to own or to contract 105 MWs from renewable energy sources. Also a climate action plan released in 2008, key aspects include developing energy efficiency incentives offered through utilities, implementing fuel economy and tailpipe emissions standards established in federal law, and participating in a cap and trade program (Center for Climate and Energy Solution, 2020).

### *Kansas*

In Kansas the soil is becoming drier, rainstorms are becoming more intense, and floods are becoming more severe. Warming winters and changes in the timing and size of rainfall events have altered crop yields. In the coming decades, summers are likely to become increasingly hot and dry, creating problems for agriculture and possibly human health (EPA, 2017). Considering this effects, Kansas should be taking action on climate, however it has an *evenness* climate state policy – it does not have any local climate instrument.

### *Kentucky*

As a result of climate change, Kentucky is facing a big challenge related to precipitation and water resources. Annual precipitation in Kentucky has increased approximately 5% since the first half of the 20th century, but rising temperatures increase evaporation, which dries the soil and decreases the amount of rain that runs off into rivers. This may produce more common droughts that endanger aquatic ecosystems, human health and forest resources (EPA, 2017). Even so, the state has only developed one climate policy, a climate action plan released in 2011, key aspects include increasing the productivity of abandoned, underused, and reclaimed lands, implementing biomass co-firing at power plants, and financing programs and incentives for building energy efficiency upgrades (Center for Climate and Energy Solution, 2020). In consequence, Kentucky has a *complemental* climate state policy.

### *Louisiana*

Unlike most of the nation, Louisiana did not become warmer during the last century. But in the coming decades, Louisiana will become warmer, and both floods and droughts may become more severe. Until now, soils have become drier, annual rainfall has increased, more rain arrives in heavy downpours, and sea level is rising (EPA, 2017). In response, the state is currently implementing two climate policies, this categorize Louisiana with a *complemental* climate state policy.

Louisiana has GHG emission targets set in 2020, they aim to reduce emissions 26-28% by 2025 and 40-50% by 2030 compared to 2005 levels, the targets also aim for net-zero GHG emissions by 2050. The state also has a low carbon and alternative fuel standard policy adopted in 2006, it requires that 2% of total gasoline sold in the state include denatured

ethanol made from domestic agricultural products or other biomass and that biodiesel make up 2% of total diesel sold in the state (Center for Climate and Energy Solution, 2020).

### *Maine*

Maine has been severely affected by climate change, the state has warmed about 3 F° since the year 1900. Rising temperatures and shifting rainfall patterns are likely to increase the intensity of both floods and droughts. The state is also experiencing sea level rise, wetland loss, and coastal flooding. Other consequences relate to ecosystems by disrupting relationships between species, and warmer temperatures that could increase the incidence of some diseases carried by insects and some respiratory conditions (EPA, 2017). Fortunately Maine has developed five climate policies to make ensure the state's future; therefore, Maine has a *defiant* climate state policy.

Some of these policies are: GHG emission targets set in 2019 to reduce emissions 45% below 1990 levels by 2030 and 80% below 1990 levels by 2050, the targets also aim for net-zero GHG emissions by 2050; a carbon pricing policy due to its participation in the Regional Greenhouse Gas Initiative (RGGI) established in 2005; a renewable portfolio standard updated in 2019 that requires 80% of the electricity sales in the state to come from renewable sources by 2030 and a goal of 100% by 2050; a decoupling policy (a revenue program for electricity) set 2014; and a climate action plan updated in 2020, key aspects include active forest management, tailpipe emissions standards, and landfill gas management (Center for Climate and Energy Solution, 2020).

### *Maryland*

Maryland's climate is changing. In the last century, heavy rainstorms are more frequent, and the sea is rising about one inch every seven to eight years. Higher water levels are eroding beaches, submerging low lands, exacerbating coastal flooding, and increasing the salinity of estuaries and aquifers. In the coming decades, changing the climate is likely to increase coastal and inland flooding; harm marine, wetland, and inland ecosystems; disrupt fishing and farming; and increase some risks to human health (EPA, 2017). Maryland has responded to these threats by developing four climate policies, this means it has a *defiant* climate state policy.

The state has a GHG emission target set in 2016, it aims to reduce emissions 40% below 2006 levels by 2030. It also has a carbon pricing policy due to its participation in the Regional Greenhouse Gas Initiative (RGGI) established in 2005. Since 2005 Maryland has a decoupling policy (a revenue program for gas and electric). In 2020 Maryland updated its climate action plan, key aspects include renewable energy development, increasing the state's emphasis on adaptation, and promoting energy efficiency measures (Center for Climate and Energy Solution, 2020).

### *Massachusetts*

In the northeastern state average annual precipitation increased 10% from 1895 to 2011, sea level is rising making coastal cities more vulnerable to storms. In the coming decades, the changing climate is likely to increase flooding, harm ecosystems, disrupt fishing and farming, and increase some risks to human health (EPA, 2017). In response, the state is currently

implementing five climate policies, this categorize Massachusetts with a *defiant* climate state policy.

Among these policies, can be mentioned: (i) Massachusetts's GHG emission targets set in 2008 and 2020 to reduce emissions 25% below 1990 levels by 2020 and 80% below 1990 levels by 2050 and 85% below 1990 levels, the targets also aim for net-zero GHG emissions by 2050. (ii) Two carbon pricing policies: an independent cap and trade program and another program due to its participation in the Regional Greenhouse Gas Initiative (RGGI) established in 2005. (iii) Three electricity portfolio standards: a renewable portfolio standard, a clean energy standard and an alternative portfolio standard. (iv) A decoupling policy set in 2008 (a revenue program for gas and electric). And (v) a climate action plan updated in 2015, key aspects include increasing imported hydroelectric and wind power from northern New England, implementing more advanced green building codes, and retiring coal-fired power plants (Center for Climate and Energy Solution, 2020).

### *Michigan*

Michigan has warmed 2-3 F° in the last century. Heavy rainstorms are becoming more frequent, and ice cover on the Great Lakes is forming later or melting sooner. In the coming decades, the state will have more extremely hot days, which may harm public health in urban areas and corn harvests in rural areas (EPA, 2017). In response, the state is currently implementing four climate policies, this categorize the state with a *defiant* climate state policy.

Michigan has a GHG emission target set in 2019 to reduce emissions 26-28% below 2005 levels by 2025, the target also aim for net-zero GHG emissions by 2050. It has a renewable

portfolio standard updated in 2016 that requires 15% of electricity produced in the state to come from renewable sources by 2021. Michigan's decoupling policy was set in 2016, (a revenue program for gas and electric). The state also has a climate action plan released in 2009, key aspects include increasing the use of nuclear energy, establishing a cap and trade program, and protecting agricultural land and forests (Center for Climate and Energy Solution, 2020).

### *Minnesota*

Minnesota has warmed 1-3 F° in the last century. Floods are becoming more frequent, and ice cover on lakes is forming later and melting sooner. In the coming decades, these trends are likely to continue. Rising temperatures may interfere with winter recreation, extend the growing season, change the composition of trees in the North Woods, and increase water pollution problems in lakes and rivers (EPA, 2017). Minnesota is one of the selected states that developed five policies to tackle climate change, this means it has a *defiant* climate state policy.

The state has GHG emission targets set in 2007 to reduce emissions 30% below 2005 levels by 2025 and 80% below 2005 levels by 2050. It has a renewable portfolio standard adopted in 2007, that requires 30% of electricity sales from utilities with nuclear plants to come from renewable sources by 2020 and 25% of electricity sales from other utilities to come from renewable sources by 2025. Likewise, it has a decoupling policy (a revenue program for gas and electric) set in 2007. Minnesota is one of the few states with a low carbon and alternative fuel standard adopted in 2013, it requires that biofuels, including both corn-based ethanol and other biofuels, make up 10% of gasoline sold in the state, and that diesel

contain biodiesel from 5% in the winter months to 10% in the spring to 20% in the summer. And finally it has a climate action plan updated in 2020, key aspects include expanding mass transit, increasing the renewable electricity standard, and retiring coal plants (Center for Climate and Energy Solution, 2020).

### *Mississippi*

Unlike most of the nation, Mississippi did not become warmer during the last 50 to 100 years. But, soils have become drier, annual rainfall has increased, more rain arrives in heavy downpours, and sea level is rising about one inch every seven years. The changing climate is likely to increase damages from tropical storms, reduce crop yields, harm livestock, increase the number of unpleasantly hot days, and increase the risk of heat stroke and other heat-related illnesses (EPA, 2017). Unfortunately Mississippi has not implemented any state climate policy, and therefore has an *evenness* climate state policy.

### *Missouri*

In Missouri changing climate is likely to increase the frequency of floods, navigation in rivers will be severely affected and the riverfront communities are in big trouble. A particular threat for the state will be the augmentation of tornados (more than 50 tornados a year), since concentrations of GHG tend to increase humidity, and thus, atmospheric instability (EPA, 2017). Under this risks, Missouri has a *complemental* climate state policy, due to its two measures. First, a renewable portfolio standard adopted in 2008, that requires 15% of electricity sales in the state to come from renewable energy sources by 2021. Second, a low

carbon and alternative fuel standard adopted in 2008, it requires that gasoline sold in the state contains at least 10% ethanol (Center for Climate and Energy Solution, 2020).

### *Montana*

In Montana heat waves are becoming more common, and snow is melting earlier in spring. Rising temperatures and recent droughts have killed many trees by drying out soils, increasing the risk of forest fires, or enabling outbreaks of forest insects. In the coming decades, the changing climate is likely to decrease the availability of water in Montana, affect agricultural yields, and further increase the risk of wildfires (EPA, 2017). Under this risks, Missouri has a *complemental* climate state policy, due to its two measures. First, a GHG emission target set in 2019 to reduce GHG emissions 26-28% below 2005 levels by 2025. Second, a renewable portfolio standard adopted in 2005, that requires 15% of electricity sales in the state to come from renewable sources by 2015 (Center for Climate and Energy Solution, 2020).

### *Nebraska*

Nebraska's soil is becoming drier, and rainstorms are becoming more intense. Flooding is likely to increase, yet summers are likely to become increasingly hot and dry. Rainstorms and tornados are expected to rise. All these risks would reduce yields of some crops, require farmers to use more water, and amplify some risks to human health (EPA, 2017). Unfortunately Nebraska has not implemented any state climate policy, and therefore has an *evenness* climate state policy.

### *Nevada*

Nevada is suffering from snowpack (the amount of snow that accumulates over the winter), as the climate warms, less precipitation falls as snow, and more snow melts during the winter. Another threat for the state is water availability, the changing climate is likely to increase the need for water but reduce the supply; this will cause droughts that directly affect (i) Nevada's farms and cattle ranches; and (ii) Nevada's forests since warmer and drier conditions make forests more susceptible to pests (EPA, 2017). In response, the state is currently implementing four climate policies, this categorize the state with a *defiant* climate state policy.

Nevada has GHG emission targets set in 2019 to reduce emissions 28% by 2025 and 45% by 2030 compared to 2005 levels, the targets also aim for net-zero GHG emissions by 2050. It has a renewable portfolio standard updated in 2019, that requires 50% of the electricity sales in the state to come from renewable sources by 2030. Nevada has a decoupling policy (a revenue program for gas and electric) set in 2008. And, a climate action plan released in 2020, key aspects include recommendations for reducing emissions from electricity, transportation, buildings, and other state operations (Center for Climate and Energy Solution, 2020).

### *New Hampshire*

Most of New Hampshire state has warmed 2-3° F in the last century. Spring is arriving earlier and bringing more precipitation, heavy rainstorms are more frequent, and summers are hotter and drier. Sea level is rising, and severe storms cause floods that damage property and infrastructure (EPA, 2017). Fortunately New Hampshire has developed a series of climate

policies to ensure the state's future. In total, the state has four climate policies, this categorize the state with a *defiant* climate state policy.

New Hampshire has GHG emission targets set in 2009 to reduce emissions 20% below 1990 levels by 2025 and 80% below 1990 levels by 2050. It has a carbon pricing policy due to its participation in the Regional Greenhouse Gas Initiative (RGGI) established in 2005. A renewable portfolio standard adopted in 2007, it requires 25.2% of the electricity produced in the state to come from renewable sources by 2025. And a climate action plan released in 2009, key aspects include maximizing energy efficiency in buildings, reducing vehicle emissions through state actions, and protecting natural resources to maintain carbon fixing and sequestration (Center for Climate and Energy Solution, 2020).

### *New Jersey*

In New Jersey, the climate is changing. The state will be severely affected by rising seas and retreating shores, in New Jersey sea level is rising more rapidly than in most coastal areas because the land is sinking, the sea is likely to rise 18 inches along the shore in the next century. A direct consequence will be saltwater intrusion, as sea level rises, salt water can mix farther inland or upstream in bays, rivers, and wetlands, this means that soils may become too salty for the crops and trees. Finally, as sea level rises, coastal homes and infrastructure flood are at risk because storm surges become higher as well (EPA, 2017).

New Jersey has several climate policies to tackle climate change. (i) A GHG emission targets to reduce emissions to 1990 levels by 2020 and 80% below 2006 levels by 2050. (ii) A carbon pricing policy due to its participation in the Regional Greenhouse Gas Initiative (RGGI) established in 2005. (iii) A renewable portfolio standard updated in 2018, that

requires 50% of electricity sales in the state to come from renewable sources by 2030. (iv) A decoupling policy (a revenue program for gas) set in 2006. (v) And a climate action plan updated in 2020, key aspects include establishing standards for fossil-fuel electric generating units, developing and facilitating the use of state green building guidelines, and determining needs for implementing infrastructure alternatives to conventional motor vehicle fuels (Center for Climate and Energy Solution, 2020). Considering New Jersey's five policies, the state has a *defiant* climate state policy.

### *New Mexico*

New Mexico belongs to the southwestern United States, where heat waves are becoming more common, and snow is melting earlier in spring. Other effects of climate change include: reduction on water availability, increasing droughts that interfere with the state's farms and cattle ranches, augmentation of wildfires and heat strokes and dehydration due to extreme heat (EPA, 2017). In response New Mexico has developed three climate policies: a GHG emission target set in 2019 to reduce emissions 45% below 2005 levels by 2030; a clean energy standard adopted in 2009, that requires 100% of electricity sales to come from carbon free sources by 2045; and a climate action plan updated in 2019, key aspects include prioritizing climate-focused forest and grassland management, boosting electric vehicles and expanding energy-efficient housing and appliances (Center for Climate and Energy Solution, 2020). This policies categorize New Mexico with a *complemental* climate state policy.

### *New York*

Most of New York state has warmed 1-3° F in the last century, heavy rainstorms are more frequent, and the sea is rising about one inch every decade. Higher water levels are eroding beaches, submerging low lands, and exacerbating coastal flooding. In the coming decades, changing the climate is likely to increase coastal and inland flooding, disrupt farming and winter recreation, and increase some risks to human health (EPA, 2017). New York has responded to these threats by developing five climate policies, this means it has a *defiant* climate state policy.

In the first place, it has GHG emission targets set in 2019 to reduce emissions 40% below 1990 levels by 2030 and no less than 85% below 1990 levels by 2050, the targets also aim for net-zero GHG emissions by 2050. It has a carbon pricing policy due to its participation in the Regional Greenhouse Gas Initiative (RGGI) established in 2005. Its third policy is a renewable portfolio standard adopted in 2016, that requires 50% of the electricity consumed in the state to come from renewable energy sources by 2030. It has a decoupling policy set in 2006 (a revenue program for gas and electric). And a climate action plan updated in 2020, key aspects include setting higher performance standards in new buildings, investing in public transit and high-speed rail, and adopting a more aggressive renewable portfolio standard (Center for Climate and Energy Solution, 2020).

### *North Carolina*

In North Carolina, oceans warm, seawater expands and raises sea level. As sea level rises, salt water can mix farther upstream and farther inland in aquifers and wetlands, damaging ecosystems. Warm oceans cause tropical storms and hurricanes to be more common and intense. Other sectors to be affected include: agriculture, energy and health (EPA, 2017). In

consequence North Carolina developed some climate policies. It has a GHG emission target set in 2018, to reduce emissions 40% below 2005 levels by 2025. It also has a renewable portfolio standard adopted in 2007, that requires investor-owned utilities to supply 12.5% of electricity sales from eligible energy sources by 2021 and requiring municipal utilities and electrical cooperatives to supply 10% of electricity sales from eligible energy sources by 2018. A decoupling policy (a revenue program for gas and electric) set in 2015. And, a climate action plan updated in 2019, key aspects include policies for decarbonizing the electric power sector, modernizing the electricity grid, ensuring access to clean energy, and increasing energy efficiency (Center for Climate and Energy Solution, 2020). In total, the state has 4 climate state policies, which means it has a *defiant* climate state policy.

#### *North Dakota*

In North Dakota temperature has increased 2° F in the last century. Rainstorms are becoming more intense, and annual rainfall is increasing. In the coming decades, longer growing seasons are likely to create opportunities for farmers, and increasing rainfall may benefit some farms but increase the risk of flooding (EPA, 2017). Inasmuch, the state has only developed one climate policy, a renewable portfolio standard adopted in 2007, that requires 10% of electricity sales in the state to come from renewable and recycle energy sources by 2015 (Center for Climate and Energy Solution, 2020). Therefore, North Dakota has a *complemental* climate state policy.

#### *Ohio*

In the future, Ohio will suffer from an increment in spring rainfall and average precipitation, and severe rainstorms are likely to intensify, these factors will tend to further increase the risk of flooding. Likewise, 70 years from now Ohio is likely to have 5 to 15 more days per year with temperatures above 95°F than it has today, causing droughts that hurt crop yields (EPA, 2017). To address these challenges, the state has created two climate policies: an alternative portfolio standard adopted in 2007, that requires 8.5% of the state's electricity supply to come from renewable and alternative energy sources by 2026, and a decoupling policy (a revenue program for electricity) set in 2008 (Center for Climate and Energy Solution, 2020). In consequence, Ohio has a *complemental* climate state policy.

### *Oklahoma*

Most of Oklahoma did not become warmer during the last 50 to 100 years. But soils have become drier, annual rainfall has increased, and more rain arrives in heavy downpours. In the coming decades, summers are likely to be increasingly hot and dry, which would reduce the productivity of farms and ranches, change parts of the landscape, and possibly harm human health (EPA, 2017). Oklahoma should have a series of climate measures, however it only has one climate policy. It has a renewable portfolio standard adopted in 2010 that require 15% of electricity generation capacity come from renewable sources by 2015 (Center for Climate and Energy Solution, 2020). This means, that Oklahoma has a *complemental* climate state policy.

### *Oregon*

Over the past century, most of Oregon has warmed about 2° F. A big consequence from climate change is that snowpack is melting earlier in the year, and the flow of meltwater into streams during summer is declining. In the coming decades, coastal waters will become more acidic, streams will be warmer, wildfires may be more common, and some rangelands may convert to desert (EPA, 2017). In response, the state is currently implementing five climate policies, this categorize Oregon with a *defiant* climate state policy.

Oregon's first policy is a GHG emissions targets updated in 2020 to reduce emissions 45% below 1990 levels by 2035 and 80% below 1990 levels by 2050. The second policy is a renewable portfolio standard updated in 2016, it requires 50% of electricity sales to come from renewable sources by 2040 and calls for the total phase-out of coal-fired electricity by 2035. Oregon has a decoupling policy (a revenue program for gas and electric) set in 2003. Oregon's fourth policy is an alternative fuel standard adopted in 2007 and a low carbon and alternative fuel standard adopted in 2016. Finally it has a climate action plan updated in 2020, key aspects include strengthening the state's clean fuels standard, setting new energy efficiency standards for buildings and appliances, and reducing industrial pollution (Center for Climate and Energy Solution, 2020).

### *Pennsylvania*

In Pennsylvania rising temperatures and shifting rainfall patterns are likely to increase the intensity of both floods (during winter and spring) and droughts (during summer and fall). Sea level is also a threat for the state, which would alter river flows and cause problems for commercial navigation. It is important to mention that ecosystems, agriculture and human

health are at risk too (EPA, 2017). Pennsylvania has taken seriously the consequences of global warming, it has developed several climate policies.

Among these policies, Pennsylvania has GHG emission targets set in 2019 to reduce emissions 26% below 2005 levels by 2025 and 80% below 2005 levels by 2050. It has a renewable portfolio standard adopted in 2004, that requires 18% of electricity to come from alternative energy sources by 2021. Also, a decoupling policy (a revenue program for gas and electric) set in 2018. Pennsylvania is one of the few states with an alternative fuel standard adopted in 2008, it requires that gasoline sold in the state contain 10% cellulosic ethanol and all diesel sold in the state contain at least 2% biodiesel. It has a climate action plan updated in 2019, key aspects include increasing clean public transportation, updating building codes, and increasing the adoption rate of and providing training for no-till farming practices (Center for Climate and Energy Solution, 2020). With 5 policies in total, Pennsylvania has a *defiant* climate state policy.

#### *Puerto Rico\**

In Puerto Rico, the sea level has risen by about four inches relative to the state's shoreline since 1960. Tropical storms, hurricanes and inland flooding will become more intense in the future, affecting cities, roads and ports. A climate change trend in Puerto Rico is warming waters that affect coral reefs and ocean acidification. On the other hand, with hotter temperatures, agriculture will be affected with reduction on plantain, banana, and coffee yields, but also ecosystems and Puerto Rico's wildlife (EPA, 2017). Even so, the state has only one climate policy a GHG emission target set in 2017 to reduce emissions 26-28% below

2005 levels by 2025 (Center for Climate and Energy Solution, 2020). This means Puerto Rico has a *complemental* climate state policy.

### *Rhode Island*

Rhode Island has been severely affected by climate change, the state has warmed about 3° F since the year 1900. These rising temperatures are likely to change precipitation patterns and produce both floods and droughts. Sea level is rising and eroding wetlands and beaches, increasing damage from coastal storms. Fishing and agriculture may suffer too as climate changes, rising water temperatures can lower oxygen levels and otherwise alter freshwater and marine ecosystems. Diseases carried by insects or by air conditions are likely to intensify (EPA, 2017). Fortunately Rhode Island has developed a series of climate policies to make ensure the island's future.

Some of these policies are: GHG emission targets set in 2014, to reduce emissions 10% by 2020, 45% by 2035, and 80% by 2050, all compared to 1990 levels; a carbon pricing policy due to its participation in the Regional Greenhouse Gas Initiative (RGGI) established in 2005; a renewable portfolio standard adopted in 2006, that requires 38.8% of electricity sales in the state to come from renewable sources by 2035; a decoupling policy (a revenue program for gas and electric) set in 2010; and a climate action plan updated in 2016, key aspects include developing utility-scale renewable energy, relicensing nuclear power facilities, and developing transport biofuels (Center for Climate and Energy Solution, 2020). In total the state has 5 climate policies, which makes Rhode Island a state with a *defiant* climate state policy.

### *South Carolina*

South Carolina has warmed less than most of the nation, yet nowadays it is experiencing: land surface sinking and retreating shores (due to sea level rising), infrastructure damage (as a consequence of tropical storms and hurricanes). In the coming decades, the state's changing climate is likely to reduce crop yields, harm livestock, increase the number of unpleasantly hot days, and increase the risk of heat stroke and other heat-related illnesses (EPA, 2017).

South Carolina has a *complemental* climate state policy, since it has developed two policies. A renewable portfolio standard adopted in 2014, that requires participating utilities to recover costs connected to meeting a 2021 target of 2% aggregate generation capacity from renewable energy sources. And, a climate action plan was released in 2008, key aspects include developing renewable portfolio standards, increasing use of local agricultural products, and increasing advanced recycling and composting (Center for Climate and Energy Solution, 2020).

### *South Dakota*

South Dakota is experiencing several consequences due to climate change. These include more intense rainstorms, and increment in annual rainfall. In the coming decades, summers are likely to become increasingly hot, which may amplify some risks to human health and decrease yields of some crops while lengthening the growing season for others (EPA, 2017). Under this scenario, the state has only developed one climate policy, a renewable portfolio standard adopted in 2008, that requires 10% of electricity sales to come from qualifying energy sources by 2015 (Center for Climate and Energy Solution, 2020). This means that South Dakota has a *complemental* climate state policy.

### *Tennessee*

Although the average temperature did not change much during the 20th century, the state has warmed in the last 20 years. Climate effects include: augmentation of average annual rainfall of 5% since the first half of the 20<sup>th</sup> century, and increment of flooding by 27%. In the coming decades, the changing climate is likely to reduce crop yields, threaten some aquatic ecosystems, and increase some risks to human health (EPA, 2017). Unfortunately Tennessee has not implemented any state climate policy, and therefore has an *evenness* climate state policy.

### *Texas*

Most of the state has warmed between one-half and one degree (F) in the past century. In the eastern two-thirds of the state, average annual rainfall is increasing, yet the soil is becoming drier. Rainstorms are becoming more intense, and floods are becoming more severe. Along much of the coast, the sea is rising almost two inches per decade (EPA, 2017). Texas has not taken climate change as a priority in its agenda and has only developed one climate policy, a renewable portfolio standard adopted in 1999, which requires 5,000 MW of new renewable energy capacity by 2015 and 10,000 MW by 2025 (Center for Climate and Energy Solution, 2020). This means, that Texas has a *complemental* climate state policy.

### *Utah*

In Utah, as the climate warms, less precipitation falls as snow, and more snow melts during the winter. The changing climate is likely to decrease the flow of water in Utah's rivers,

increase the frequency and intensity of wild fires, and decrease the productivity of ranches and farms (EPA, 2017). Utah has a *complemental* climate state policy, since it has developed one policy, a renewable portfolio standard adopted in 2008, that requires 20% of electricity sales to come from renewable energy sources by 2025 (Center for Climate and Energy Solution, 2020).

### *Vermont*

Vermont's climate is changing. The state has warmed by more than 2° F in the last century. Throughout the state, spring is arriving earlier and bringing more precipitation, heavy rainstorms are more frequent, and summers are hotter and drier. Severe storms increasingly cause floods that damage property and infrastructure. In the coming decades, changing climate in Vermont is likely to harm ecosystems, disrupt agriculture and winter recreation, and increase some risks to human health (EPA, 2017). To tackle climate change, the state developed five climate policies, which categorize Vermont with a *defiant* climate state policy.

Among the measures Vermont has taken, it would be important to highlight (i) Vermont's GHG emission targets set in 2020 to reduce emissions 26% below 2005 emissions by 2025, 40% below 1990 levels by 2030, and 80% below 1990 levels by 2050; (ii) a carbon pricing policy due to its participation in the Regional Greenhouse Gas Initiative (RGGI) established in 2005; (iii) a renewable portfolio standard adopted in 2015, that requires 75% of electricity sales in the state to come from renewable energy sources by 2032; (iv) Vermont's decoupling policy (a revenue program for electricity) set in 2006; (v) a climate action plan updated in 2018, key aspects include accelerating the adoption of advanced wood

heat to replace high-emitting systems, providing purchasing incentives for electric vehicles, and increasing investment in land conservation (Center for Climate and Energy Solution, 2020).

### *Virginia*

In Virginia sea level is rising more rapidly along the state's shores than in most coastal areas because the land is sinking. If the oceans and atmosphere continue to warm, sea level along the Virginia coast is likely to rise 16 inches to 4 feet in the next century. Beaches also erode as sea level rises, the United States Geological Survey estimates that Virginia's barrier islands could be broken up by new inlets or lost to erosion if sea level rises two feet by the year 2100. In consequence, the loss of tidal marshes could harm fish and birds that depend on a marsh for food or shelter. Other sectors that may be harmed by climate change are health, energy, agriculture and infrastructure (EPA, 2017). Virginia has taken seriously the consequences of global warming, it has developed several climate policies.

One of these policies is Virginia's GHG emission target set in 2020 to achieve net-zero GHG emissions by 2045. The second policy is a carbon pricing policy due to its participation in the Regional Greenhouse Gas Initiative (RGGI) established in 2005. The state has a renewable portfolio standard adopted in 2007, which requires 15% of electricity sales to come from qualifying energy sources by 2025. Virginia has decoupling policy set in 2008 (a revenue program for gas). Virginia's fifth policy is a climate action plan was released in 2008, key aspects include establishing a capital fund for energy efficiency investments, enacting state incentives for the purchase of fuel-efficient vehicles, and educating the public

about climate change and action needed to address it. (Center for Climate and Energy Solution, 2020). With five climate policies, Virginia has a *defiant* climate state policy.

### *Washington*

Washington's climate is changing. Over the past century, most of the state has warmed 1-2° F. Glaciers are retreating, the snowpack is melting earlier in the year, and the flow of meltwater into streams during summer is declining. In the coming decades, coastal waters will become more acidic, streams will be warmer, populations of several fish species will decline, and wildfires may be more common (EPA, 2017). Fortunately Washington has developed a series of climate policies to make ensure the state's future. In total the state has five climate policies, which categorize Washington with a *defiant* climate state policy.

Washington has GHG emission targets set in 2020, to reduce emissions 45% by 2030, 70% by 2040, and 95% by 2050, all compared to 1990 levels, the targets also aim for net-zero GHG emissions by 2050. It has a clean energy standard adopted in 2019, that requires 100% clean energy by 2045, coal to be phased out by 2025, and electricity sales to be carbon neutral by 2030. It has a decoupling policy (a revenue program for gas and electric) set in 2015. Is one of the few states with an alternative fuel standard adopted in 2006, which requires that denatured ethanol make up at least 2% of total gasoline sold in the state and that biodiesel compose at least 2% of total diesel sold in the state. And it has a climate action plan updated in 2014, key aspects include a cap and trade program, developing an energy smart building program, and providing purchasing incentives for clean cars (Center for Climate and Energy Solution, 2020).

### *West Virginia*

In West Virginia rising temperatures and shifting rainfall patterns are likely to increase the intensity of both floods and droughts. Yet, especially droughts are a severe risk for the state, in recent decades, the state has had flood-related disaster declarations nearly every year and these are only expected to increase. Since the rivers flow attract several tourists every year (e.g. more than 60,000 on the Gauley River alone) the state may suffer economic consequences related to the weather. Other areas that may experience damage are forests and farms, ecosystems and health (EPA, 2017). Inasmuch, West Virginia has opted not to develop any climate state policy; therefore, West Virginia has a *evenness* climate state policy.

### *Wisconsin*

Changing the climate is likely to increase the frequency of floods in Wisconsin, over the half past century annual precipitation has increased by 5-10%. It is also possible that warmer winters shorten the season for recreational activities like ice fishing, snowmobiling, skiing, and snowboarding, which could harm the local economies that depend on them. Other sectors such as ecosystems, health and agriculture are at risk too (EPA, 2017). In consequence, the state has developed four climate policies, these categorize Wisconsin with a *defiant* climate state policy.

Wisconsin has a GHG emission target set in 2017 to reduce emissions 26-28% below 2005 levels by 2025. It has a renewable portfolio standard updated in 2006, that requires 10% of the electricity consumed in the state to come from renewable energy sources by 2015. Wisconsin has a decoupling policy (a revenue program for gas and electric) set in 2009.

Finally it has a climate action plan updated in 2020, key aspects include developing a statewide initiative to change consumer and business behavior, developing Great Lakes wind resources, and increasing mass transit funding (Center for Climate and Energy Solution, 2020).

### *Wyoming*

Wyoming's climate is changing. In the past century, most of the state has warmed by 1-3° F. Heat waves are becoming more common, and snow is melting earlier in spring. Rising temperatures and recent droughts have killed many trees by drying out soils, increasing the risk of forest fires, or enabling outbreaks of forest insects. In the coming decades, the changing climate is likely to decrease the availability of water, affect agricultural yields, and further increase the risk of wild fires (EPA, 2017). Considering this effects, Wyoming has a *complemental* climate state policy, due to its decoupling policy (a revenue program for gas) set in 2009 (Center for Climate and Energy Solution, 2020).

## **Chapter III: The United [green] States**

At this point it has been remarked the multilevel governance process and practices in the United [green] States. This has allowed local governments to incorporate climate change into their political agenda even when the subject has been left aside in the federal level, on the opposite states and cities have implemented a range of policies and joined different climate networks. The analysis made also proved that most states have a *defiant* climate policy as a response to the federal measures, this demonstrates and strengthens the argument that is

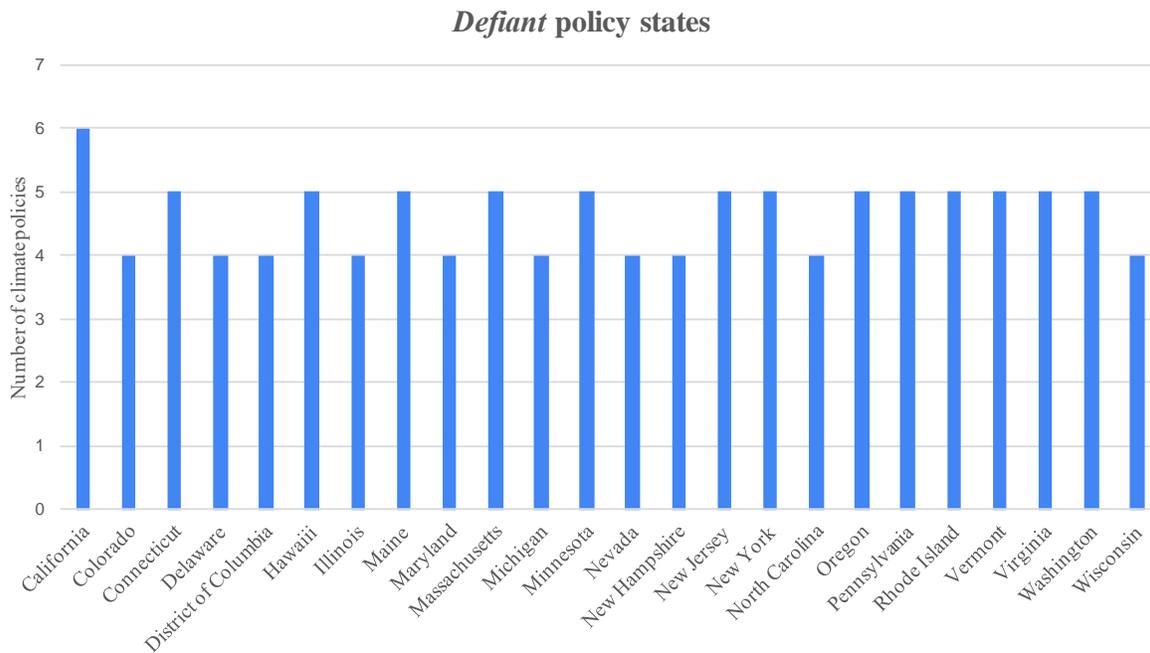
possible for local governments to construct a parallel and stronger climate policy, thanks to the decentralization of the CCR.

For a proper ending, the main objective of the chapter is to make argumentative cases based on the results. First, the chapter intends to make an analysis and comment on the main findings of the model. It will discuss the exemplary case of California, the only state with six climate policies and also the atypical cases, the seven states with no climate policies, and their possibility to bandwagon to the tendency of climate action. Lastly it will dissect on the future of U.S. climate policy taking into consideration the Biden triumph and the new possibilities for local governments under its leadership.

#### *Analysis and main findings*

Results prove that most states in the United States have a *defiant* climate policy towards the one implemented by the federal government – This confirms the hypothesis. These states opted to develop four to six policy instruments to tackle global warming, beyond the top down policy of the United States. In total 24 states have this type of policy which are: California, Colorado, Connecticut, Delaware, District of Columbia,\* Hawaii, Illinois, Maine, Maryland, Massachusetts, Michigan, Minnesota, Nevada, New Hampshire, New Jersey, New York, North Carolina, Oregon, Pennsylvania, Rhode Island, Vermont, Virginia, Washington and Wisconsin.

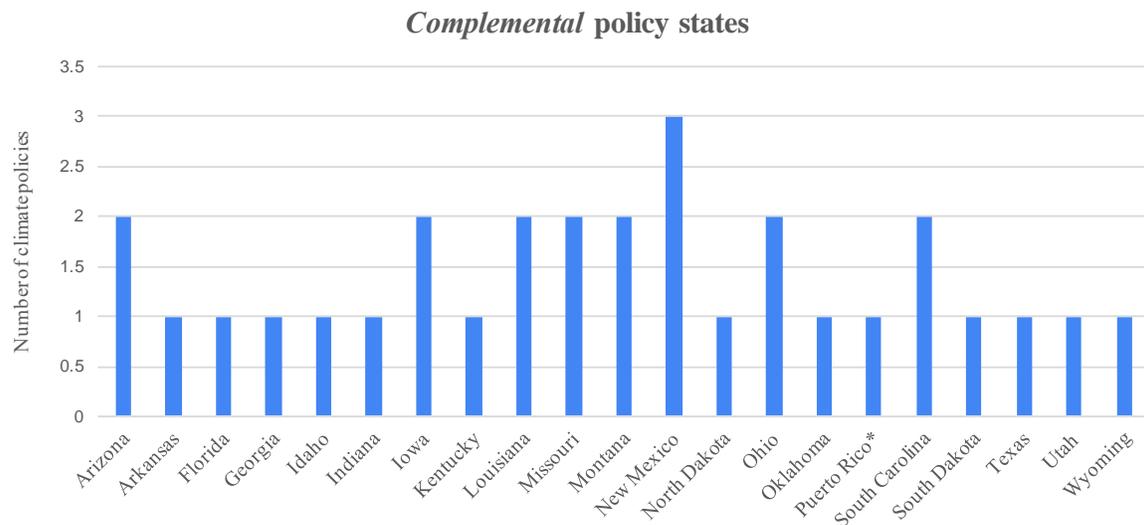
Figure 11: *Defiant* policy states



Source: Own elaboration

Followed by the *defiant* category –in number of instruments– comes the *complemental* one. Where the states have at least one and up to three climate policy instruments, aside from the federal policy. In total there are 21 states under this category: Arizona, Arkansas, Florida, Georgia, Idaho, Indiana, Iowa, Kentucky, Louisiana, Missouri, Montana, New Mexico, North Dakota, Ohio, Oklahoma, Puerto Rico,\* South Carolina, South Dakota, Texas, Utah and Wyoming.

Figure 12: *Complemental* policy states



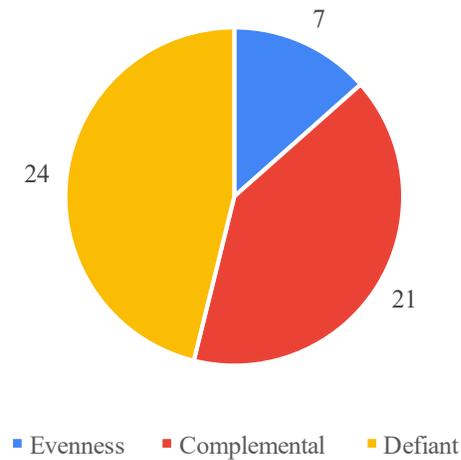
Source: Own elaboration

Finally, there are seven states that do not have any climate policy instrument: Alabama, Alaska, Kansas, Mississippi, Nebraska, Tennessee and West Virginia. This means they have an *evenness* policy with the federal government, they only dictate the measures already established and do not procure climate change on their jurisdiction. But most importantly, this indicates that only a minority of states fail to incorporate climate change into their agenda.

In total there are 24 states – a majority– with a *defiant* climate policy, 21 states with a *complemental* policy, and just seven states with no climate policy at all. This evidences state [successful] disposal to manage climate change at their own jurisdictional level. This is coherent with multilevel governance premises, which allow local governments to play a more active role on decision-making process and to be involved in international regimes.

Figure 13: Categories of climate state policy by number of states

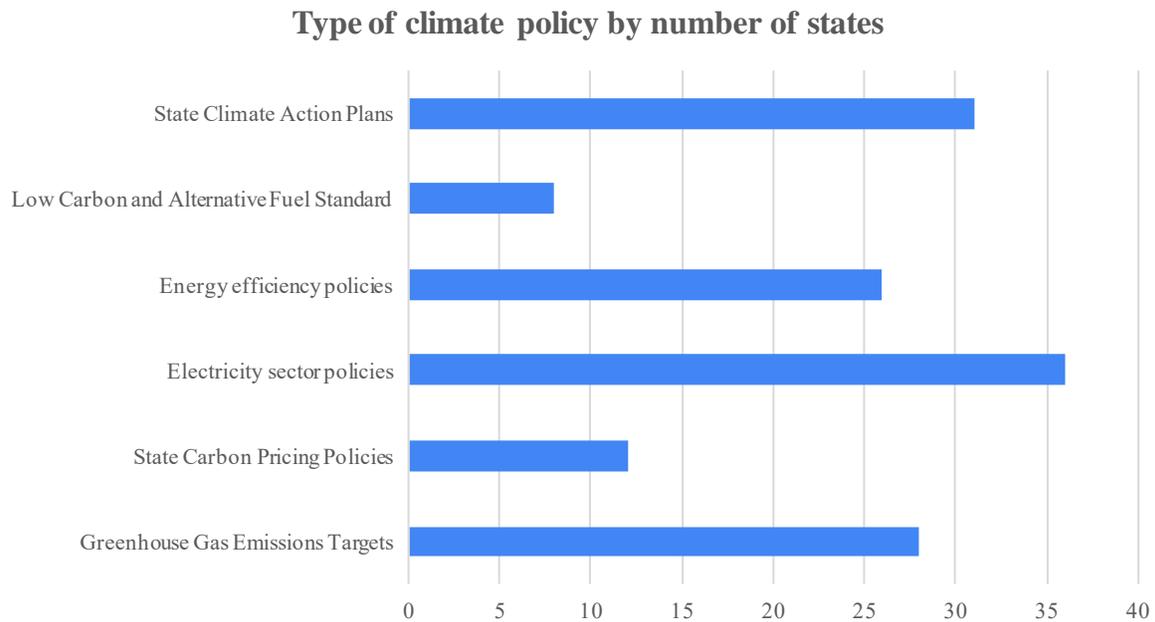
### Categories of climate state policy by number of states



Source: Own elaboration

Regarding the discoveries of the model, the most popular policy is the one related to the electricity sector, in total 35 states and the District of Columbia have a portfolio standard that requires electric utilities to deliver a certain amount of electricity from renewable or clean energy sources. In the contrary, the least common policy is found in the transportation sector, only 8 states have requirements for a shift to lower-carbon transportation fuels.

Figure 14: Type of climate policy by number of states

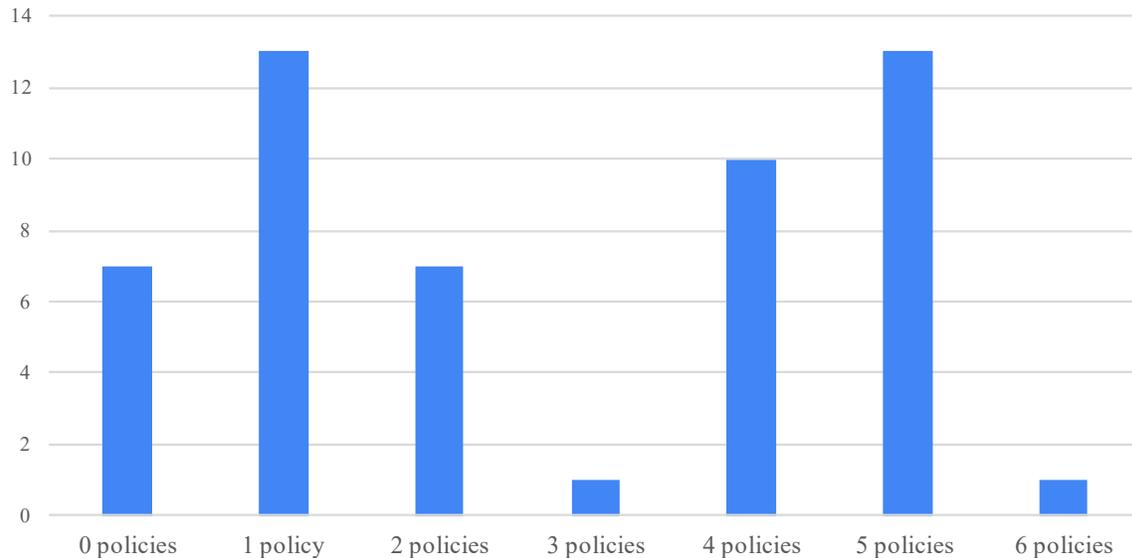


Source: Own elaboration

A tendency was detected regarding the number of climate policies among states. They tend to have the minimum of policies or vice versa a high number of policies. There are 13 states that have just one policy: Arkansas, Florida, Georgia, Idaho, Indiana, Kentucky, North Dakota, Oklahoma, Puerto Rico, South Dakota, Texas, Utah and Wyoming; and also 13 states that have a considerable amount of policies (5 instruments) these are: Connecticut, Hawaii, Maine, Massachusetts, Minnesota, New Jersey, New York, Oregon, Pennsylvania, Rhode Island, Vermont, Virginia and Washington. These sums up 26 states, half of the local governments studied.

Figure 15: Number of climate policies among U.S. states

## Number of climate policies among states



Source: Own elaboration

Moreover, the feature that stands out the most is that 45 states, (including the District of Columbia and Puerto Rico) have at least one climate policy in their own political level. This demonstrates the importance of MLG. There are several opinions that categorize the United States as a straggler on climate change policy, for its dependence on fossil fuels and its low commitment on environmental multilateralism; when the truth is that most local governments in the country are pioneers in the subject. Clearly 47 subnational entities –and a number of cities– have compromised to having a green agenda which permits them to construct a parallel climate policy.

### *The exemplary case*

California has recognized the serious threat of global warming and responded quickly with a comprehensive set of actions to cut emissions. It all started with the state legislator Byron

Sher's 1988 legislation to create an emissions inventory and a report on global warming impacts on California. Throughout the 1990s, California undertook a number of efforts to analyze both the sources and impacts of climate change and began the development of policy recommendations to respond. In 2000, Senator Sher authored Senate Bill 1771, which established the California Climate Action Registry to record and register voluntary GHG emission reductions made by California entities.

These early leadership efforts were expanded through a series of legislative, administrative and executive actions. Yet it was on 2006 with the California Global Warming Solutions Act, that California's legislature recognized the list the serious threats of global warming "to the economic well-being, public health, natural resources, and the environment of California" as well as "the detrimental effects on some of California's largest industries." California realized the threats are real and significant, and implemented a series of measures to tackle climate change (Nichols, 2010).

California's response to this crisis has been to propose, adopt and implement a comprehensive set of actions designed to reduce overall GHG emissions, improve its environment, reduce their dependence on oil, diversify their energy sources, save energy, create new jobs and enhance public health. This response invokes the state's long-established police powers to respond to the new types of threats triggered by global warming. Besides the six instruments mentioned on this report, some of the programs, regulations and policies that stand out are: the California Climate Registry, the Green Building Standard, Advanced Clean Cars Program and the Greenhouse Gas Reduction Fund.

California's climate policies are a lesson for the nation and the world. The state is a leader in clean energy transition and has some of the world's most ambitious decarbonization

policies, which allowed them to reach its climate targets four years in advance. In the words of Nichols (2010) California success relies on leadership, cross-agency engagement and stakeholder involvement. The secret was to involve Californians at all levels to respond to a shared challenge. This means that a systematic, cross effort using a variety of strategies is the most effective approach. California's actions of encompassing its various statutes, executive orders, administrative actions and local initiatives, and embraced by a host of private and governmental entities, is the blueprint.

In California 77% residents recognize that global warming is happening (5 points above from the national average). The project finds that 76% of residents support regulating carbon dioxide as a pollutant and 86% support funding research into renewable energy sources (Marlon, Howe, Mildenerger, Leiserowitz and Wang, 2020). California ranked 1st in installed solar capacity in 2016, with 19,000 MW installed and over 4.8 million homes being powered by solar. Currently the state ranks 4th in the nation for wind generation, with 5,656 MW of capacity installed. Also California is a leader in clean tech, electric vehicles, energy efficiency and other measures (Climate Nexus, 2021).

Based on this, California's next plans consist on making a leverage its cap and trade program to protect rainforests around the world via its proposed California Tropical Forest Standard, fast-tracking emissions reductions to benefit public health through policies that work in a multidisciplinary approach, establishing complementary policies, incentives, and market rules that help the state transition to a low-carbon, clean energy economy through promoting renewables and modernizing and automating energy options in the state, and partnering with other regions and stakeholders, including indigenous peoples, to share

California's lessons and experiences from the state's early adoption of comprehensive climate and energy policies (Green, 2019).

*The atypical cases: can they bandwagon?*

Currently neither Alabama, Alaska, Kansas, Mississippi, Nebraska, Tennessee or West Virginia have any climate policy. Even so, a brief profile of each state will be provided according to Climate Nexus and to the Yale Map Project on Climate Change Communication; in order to discuss if a bandwagon tendency may be possible.

In Alabama 63% residents recognize that global warming is happening. The project finds that 70% of residents support regulating carbon dioxide as a pollutant. And, 79% support funding research into renewable energy sources. Alabama does not have any renewable energy policy or portfolio standards; however, in 2016 Alabama ranked 14th in net electricity generation from renewable energy resources, with conventional hydroelectric power supplying 70% of the state's renewable generation and Alabama's Browns Ferry Nuclear Plant, has a total generating capacity of 3,310 megawatts, second only to Arizona's Palo Verde nuclear plant.

In Alaska 70% of residents recognize that global warming is happening. The project finds that 72% of residents support regulating carbon dioxide as a pollutant. And, 86% support funding research into renewable energy sources. Alaska's economy is largely based on oil and gas production, despite this local climate action persists in Alaska. Kodiak, the second largest island in the United States has been running on 100% renewable energy — wind and hydro— since 2014. It saves the city from burning 2 million gallons of diesel

annually, the cost of electricity in Kodiak is cheaper now than it was 15 years ago, and Kodiak residents pay less for their power bills than other cities on mainland Alaska.

In Kansas 67% of residents recognize that global warming is happening. The project finds that 71% of residents support regulating carbon dioxide as a pollutant. And, 85% support funding research into renewable energy sources. Kansas does not have any renewable energy policy or portfolio standards; yet, Kansas is one of the top states in the country for potential wind generation. Currently Kansas ranks 5th in the nation for wind generation, with 4,930 MW of capacity installed, wind energy has grown from less than 1% of net electricity generation in 2005 to 24% in 2015, making wind the state's second largest power provider, after coal.

In Mississippi 66% of residents recognize that global warming is happening. The project finds that 72% of residents support regulating carbon dioxide as a pollutant. And, 83% support funding research into renewable energy sources. Mississippi since 2015 has been generating electricity from renewable sources almost all of which was biofuels from wood waste. Nuclear energy in Mississippi is at the highest, the Grand Gulf Nuclear Station is the largest single-unit nuclear power plant in the nation, it generated 18% of Mississippi's electricity in 2015.

In Nebraska 66% of residents recognize that global warming is happening. The project finds that 71% of residents support regulating carbon dioxide as a pollutant. And, 85% support funding research into renewable energy sources. Nebraska is one of the top states in the country for potential wind generation the National Renewable Energy Laboratory estimates that more than 90% of Nebraska has suitable conditions for

commercial-scale wind-powered electricity generation. Currently Nebraska ranks 18th in the nation for wind generation, with 1,328 MW of capacity installed.

In Tennessee 64% of residents recognize that global warming is happening. The project finds that 71% of residents support regulating carbon dioxide as a pollutant. And, 83% support funding research into renewable energy sources. Tennessee is a hydropower leader, wind manufacturer. At almost 9.8 million megawatt hours in 2015, TN's net electricity generation from hydroelectric power was the third-highest among states east of the Mississippi River, and sixth-highest in the nation. And ten wind manufacturing facilities are located in Tennessee producing components for the wind industry and employing 100-500 people.

In West Virginia 59% of residents recognize that global warming is happening. The project finds that 67% of residents support regulating carbon dioxide as a pollutant. And, 83% support funding research into renewable energy sources. West Virginia is taking efforts to implement renewable sources of energy. Since 2012 the number of operational coal mines in the state has fallen from 216 to 136 in 2015, so far it has installed 583 MW of wind capacity ranking 24th in the United States.

All these data suggests that a tendency to bandwagon may happen in a near future. All seven states recognize global warming is happening above 50% of their population, this may incentive governors, mayors and legislators to act. Also, above 50% of the population in every state think CO<sub>2</sub> should be regulated as a pollutant. And, that funding research for renewable energy sources should be supported by 80% of the population rates (except Alabama), this could open new paths for climate policy. Be that as it may, research indicates that neither of the states have plans of developing a climate action plan, setting a GHG target

or creating a renewable portfolio standard. Therefore it is assumed that any bandwagon tendency may depend on national pressure and MLG interactions.

*What's next? A new federal administration, the same local governments*

Nowadays there is an encouraging panorama regarding climate change in the United States thanks to Joseph Biden electoral win. Biden touted an ambitious set of climate policies during his campaign, many developed via consultation with the Biden–Sanders task force on climate, and he has named climate change as one of his top four priorities on the website for his transition team. Environmentalist groups in the U.S. are arguing that Biden's victory represents a mandate to act on climate.

He could be “the climate president.” Why?

He can use executive action to set standards for things like carbon emissions in the power sector and methane emissions resulting from oil and gas drilling. He can empower the Securities and Exchange Commission to mandate disclosure around climate risk. He can direct the federal bureaucracy to actively mitigate the disparate effects of environmental harms. He can rejoin the Paris Agreement and attempt a new wave of climate diplomacy (Battistoni, 2020, ¶4).

So far this assertion seems possible. On his entrance to the Oval Office, President Biden recommitted the United States to the Paris climate agreement, the international accord designed to avert catastrophic global warming, and ordered federal agencies to start reviewing and reinstating more than 100 environmental regulations that were weakened or rolled back by former President Donald Trump. He also rescinded the construction permit for the Keystone XL oil pipeline, which would have transported carbon-heavy oil from the Canadian oil sands to the Gulf Coast (Davenport and Friedman, 2021).

President Biden has elevated tackling the climate crisis among his highest priorities. He even set an ambitious target for the U.S. to eliminate carbon dioxide emissions from the electric power sector by 2035 and from the entire economy by 2050 (Loc. cit.). All these actions are crucial as Le Clercq (2021) argues “Biden’s actions have a political and symbolic value; for the international community it is impossible to advance in more effective GHG mitigation and in containing the inevitable effects of the increase in temperature without the participation of the United States.”

An important thing to take into consideration is that Biden brings with him the largest team of climate change experts ever assembled in the White House. He selected Gina McCarthy, who led the EPA in the Obama administration, to start up a new White House office on climate policy. David Hayes, who served as the deputy interior secretary in both the Obama and Clinton administrations, will be a special assistant to the president for climate policy. And former Secretary of State John Kerry will serve as Biden’s international climate envoy (Friedman, 2021).

The team as well includes Jonathan Pershing, who served as the State Department special envoy for climate change under President Obama, Sue Biniaz, a former top climate lawyer for the State Department across multiple administrations who played a key role in drafting the Paris Agreement, and Leonardo Martinez-Diaz, who served as the deputy assistant secretary of the Treasury Department for Energy and Environment under Obama. But more importantly President Biden also has reached into the world of civil society, the youth climate movement and environmental justice activist group were seek for key deputy-level positions (Friedman, 2021).

The Cabinet has produced a glimmer of hope too. From Brenda Mallory, Chair of the Council of Environmental Quality (CEQ), who will be the first African American to lead the institution and brings with her several years of experience in the Environmental Protection Agency and has served as the General Counsel for the CEQ under President Obama; to Ali Zaidi, White House Deputy National Climate Advisor, who will be the highest-ranking Pakistani-American despite his young age (Gallo, 2021). The announcement of Biden's climate cabinet over the past few weeks has buoyed the hopes of many skeptical of the President's commitment to the transformational change needed to truly address climate change.

Not only is climate change back on the presidential agenda, it is back on the congressional agenda too. In a recent op-ed, for instance, House Republicans Greg Walden (OR), Fred Upton (MI), and John Shimkus (IL) stressed the need to seriously address climate change and to find innovative solutions that can create economic co-benefits. The House Transportation and Infrastructure Committee also held two hearings on the urgency of investing in infrastructure, including to mitigate and adapt to climate change (Townsend, 2019).

Leading climate voices from both parties are working on bipartisan agreements to help strengthen the legislative action to deliver comprehensive climate policies. For example, Rep. Francis Rooney (R-Florida), noted the growing demands among his constituents for stronger federal action, announced that he will be reintroducing the carbon tax bill he worked on with former Rep. Carlos Curbelo (R-Florida) during the last congress. And, Sen. Tom Carper (D-Delaware) stressed the economic opportunity that accompanies the transition to a

low-carbon economy, highlighting the example of the Kigali agreement, which would reduce potent greenhouse gases known as HFCs by 80% in the next 30 years (Loc. cit.).

Nevertheless, the Democrats are pushing harder for climate change. Sen. Bernie Sanders (I-Vt.) and Reps. Alexandria Ocasio-Cortez (D-N.Y.) and Earl Blumenauer (D-Ore.) introduced legislation that would require the president to declare a national emergency on climate change. Senate Majority Leader Charles Schumer (D-N.Y.) says that in response to the national emergency, Biden should invest in major resiliency projects that will help prepare the country's infrastructure for climate change's impacts and make investments in clean energy that are socially and racially just (Frazin, 2021).

Under these legislative initiatives and under President Biden leadership the United States is currently on a path to reincorporate climate change into its agenda as a priority, this brings hope within the country's borders and for the globe. But after four years with relatively none top down climate policy, the United States needs determination and humility to reengage in climate action. According to Waskow, Dagnet, Thwaites and Fransen (2020) there are three key steps that the Biden administration must take: submit a robust national climate commitment (NDC) ahead of the COP-26, deliver financial support and align financial flows with the Paris Climate Agreement, and forge relationships with other countries to tackle climate change.

On the first point, the next United Nations Climate Change Conference (COP-26) is scheduled to take place in Glasgow, in November 2021. Well before then, it will be critical for the Biden administration to demonstrate to the world that the United States is serious about taking climate action at home. This means setting a bold 2030 emissions-reduction target as part of a new commitment under the Paris Agreement. On the second point, the

Biden administration needs to increase its financial support for climate solutions in developing countries, if it is to regain its place as a leader on the international stage by boosting demand for clean tech exports. On the third point, given the menaces climate change poses to the global economy and security, the Biden administration should treat it as a core foreign policy issue.

Nonetheless the most important remark is the benefits subnational entities can acquire under this new administration. Finally American climate policy will rest on a strategy of combining an ambitious set of State and local policies and actions with a set of strong and complementary federal policies. Another important consequence is that, federal leadership can expand bottom up efforts and strengthen multilevel governance. United States has reach a point where bottom up actions from states, cities, businesses, and other entities will mutually reinforce top down federal action and vice versa.

State and local governments have a unique opportunity to move forward with a bold vision to catalyze and transform mitigation and adaptation policies through partnerships with the federal government. “We look forward to seeing President-elect Biden rejoin the Paris Agreement,” said Philadelphia Mayor Jim Kenney, “and we look forward to collaborating with his administration in scaling up local action to ensure our city and our residents can thrive today and into the future”. Moreover, states and cities public officials have already met with Biden’s climate advisers, Christine Knapp had recently a reunion and informed that White House officials were eager to learn how local governments are addressing climate change (Phillips, 2021).

While much of the climate and environmental regulatory analysis looks at federal law and policy, the Biden administration is poised to advance local climate action as well. Turner

(2020) comments on three ways the new government can strengthen bottom up policy. It can set greenhouse gas emissions and energy standards that act as floors, but that allow states and cities to set more ambitious standards if they choose, take the lead on policy levers that are largely the subject of federal authority and share them with the local level, and provide funding for local climate action.

Another way they the Biden administration could show leadership is to prioritize local government action within the multilateral agreement process on the upcoming Paris Agreement negotiations. According to Fyffe and Arikan (2021) these actions may increase multilevel governance in the climate regime: coordinating the national coalition to mobilize states and cities to UNFCCC led Race To Zero and Race to Resilience Campaign, presenting a Multilevel Action Task Force in its second NDC, and enacting a congressional city and subnational diplomacy act.

## **Conclusions**

Governing the environment is a difficult task, countries around the world are making their best efforts to control a critical phenomenon, climate change. The United States position on the issue has been supportive or disruptive, even when the country is suffering the effects of climate change as heavy downpours, rising temperature and sea level; and when it is the country that has contributed most to CO<sub>2</sub> emissions. Yet in the country is perceived a phenomenon of known as MLG of climate change –discuss on the Theoretical Framework– where climate policy is decentralized and manage by the local governments or in coordination by the three political levels.

Under MLG it is able to compare the different policy actions across levels. Therefore, this investigation argue that the American local climate action is *defiant* vis-à-vis the federal measures. In the Conceptual Framework and in Chapter I “Climate change action from the bottom up” a discussion between top down and bottom up policy took place. The research found out that the United States can be identified as a climate change laggard (considering its non-participation in the Kyoto Protocol and its withdrawal from the Paris Agreement), but actually local governments have operated a successful parallel climate policy.

In the panorama of comparing the different approaches of U.S. climate policy, it was decided to inspect the climate policy at the U.S. state level. The paper made an inquiry – considering MLG process and the decentralization of climate change policy– to analyze if local governance overcome the State measures, with different categories of U.S. state climate policy that represent a behavior towards the federal government. In consequence the hypothesis of this paper was to prove that: U.S. states have a *defiant* climate policy towards the federal government, the statement was confirmed –argued through chapter II “Results” and chapter II “The United [green] States”–.

For this, a categorization of state climate policy was created whether local governments can have a climate policy of either *evenness*, *complemental* or *defiant* to the federal government measures; regarding six bottom up policy instruments states have develop (to make front to the tenuous federal measures): a GHG emission target, a carbon pricing policy, a climate action plan, an electricity portfolio standard, an energy efficiency decoupling policy and a low carbon and alternative fuel standard.

Results prove that most states have a *defiant* climate policy (24 states). Which remarks the fact that 45 states, the District of Columbia and Puerto Rico have at least one

climate policy instrument in their own political level. Among other findings, the results proved that California is an exemplary case of climate governance (the only state with 6/6 policy instruments); and that the seven states which do not have jurisdictional climate instruments, have great potential to bandwagon climate action. But, most importantly it is demonstrated the advantages of climate decentralization, that so far have allowed local governments to develop their own policy instruments in the lack of federal compromise.

Finally, –as a part of chapter III “The United [green] States”– the investigation also aimed to make an long-projection analysis (taking into consideration the newly elected administration) of the future of multilevel climate governance in the United States. It was determined that with Biden as head of government, U.S. states, cities and the federal government have a unique opportunity to joint efforts to position the United States as a climate leader.

Now, it is important to mention the study key strengths and limitations. Regarding the strengths, it is considered that the paper makes big contributions to MLG, comparisons between top down and bottom up policy, and to a count on public policy instruments by U.S. states – In the approach of environmental governance and climate change policy. On the other hand, there are some limitations such as: the missing information for a cross-variable analysis, in order to discuss “what makes a state have a *defiant* climate policy?” (e.g. high budget or differentiation of political parties).

On the other hand, there are opportunities beyond this research such as expansion or replicability. It will be interesting to include most populated U.S. cities in a further study. And use the metric to categorize climate policy in other countries like Mexico, the INECC (National Institute of Ecology and Climate Change) has publications regarding public policy

instruments on climate change by state, indicators can be modified, but comparisons between local and federal policy can be generated.

Overall, the paper aimed to make a contribution on the field of Environmental Governance and study a recent popular phenomenon: multilevel governance of climate change, on a country where the topic is highly polarized. Hopefully after this, the reader will be able to have a more comprehensive view on climate governance in the United States, where it is easy to recognize both federal mistakes and local triumphs, and above all the process of how climate change decentralized and is now managed across levels (specially by the U.S. state).

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