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The Emergence, Role, and Potential of U.S. Quasi-Governmental Organizations for Climate Change Governance

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THE EMERGENCE, ROLE, AND POTENTIAL OF U.S. QUASI-GOVERNMENTAL ORGANIZATIONS FOR CLIMATE CHANGE GOVERNANCE

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Abstract

Numerous governance barriers interfere with achieving effective outcomes in climate change adaptation and mitigation. These barriers include the politicization of climate change and insufficient decision-making coordination between public and private stakeholders. U.S. quasi-governmental organizations (QGOs) were traditionally created to address several of these barriers in non-climate change domains. This thesis investigates QGOs' structure, role, and potential for climate change governance.

Firstly, we examine how the design characteristics of subnational U.S. QGOs may be useful for overcoming the politicization and insufficient stakeholder coordination barriers in climate adaptation. We analyze six cases, selected to illustrate the major characteristics of climate-focused and non climate-focused U.S. subnational QGOs. Among those QGOs' designs, we conclude that some are particularly well suited to overcoming either the politicization or insufficient stakeholder coordination barriers; while some reduce both, albeit to a lesser extent.

Secondly, we investigate whether federal U.S. QGOs function in the climate or environmental domains, or whether they can be oriented towards those domains (ce-QGOs). To understand their potential role, we examine their corporate structure, and how emerged historically and fit in to the U.S. governance landscape. We conclude ce-QGOs represent a sizeable proportion (~20%) of federal QGOs; emerged at different periods in time, and more continuously, than government agencies for climate change or environmental governance; were mostly created for environmental purposes, and later added on climate change policies to their work. We suggest ce-QGOs with high

public and private stakeholder variation on their boards have unique potential to overcome the insufficient stakeholder coordination barrier, while those with low variation offer little advantage over government agencies.

Thirdly, we investigate a case study of a QGO green bank, the Connecticut Green Bank (CGB). We aim to understand how the CGB's quasi-governmental status may have played a role in its ability to adapt to a budget shock instigated by Connecticut state. To study this adaptation, we use organizational ambidexterity theory. We conclude the CGB adapted financially to the shock, as a result of mission and financial drift away from Connecticut state control. The CGB's adaptation hinged on its quasi-governmental status, which allowed it to create a spin-off nonprofit.

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1 Introduction

Climate change is a significant multi-level (federal through municipal) and private sector stakeholder collective action problem. Global decarbonization and adaptation efforts to solve it will likely have to occur over long periods into the future. Limiting global warming to 1.5° or 2°C and reaching a net-zero greenhouse gas (GHG) emissions target is projected to take several decades at least – even under the most optimistic decarbonization scenarios (IPCC 2023). Limits on nations' ability to reduce GHG emissions rapidly makes achieving a particular mitigation target difficult. Unrealized and inevitable climatic warming will also require a significant ramp-up of adaptation efforts.

As expressions of structured collective action, state and non-state organizations are crucial building blocks in formulating policies to address climate change and administering them (Stewart et al. 2017; Berkhout 2012). To address the long-term challenges posed by climate change, adaptive and effective organizations are required. However, organizing in this way faces institutional barriers that are common within and outside of the climate change domain (Pörtner et al. 2022; Dubash et al. 2022). Examples of these barriers include the politicization of decision-making and lack of coordination between intra-governmental and private sector stakeholders.

Although these barriers are important across the world, in the United States the stakes they raise are particularly important. The U.S. is currently the world's largest economy and second largest contributor of global greenhouse gas emissions. Its climate change policies therefore have an important bearing on global and domestic climate change goals.

In addition, the U.S. embodies a federal political system where the federal level exercises broad policymaker authority and controls the majority of financial resources, while substate entities are the primary entities charged with climate change and non-climate change policy implementation (Mueller and Fenna 2022). Coordinating these governmental levels politically and financially – in collaboration with private sector actors – is needed to leverage the U.S.' economic resources, curtail GHG emissions, and adapt to climate change impacts.

An important example of these barriers is the fragmented regulatory control of the U.S.' electric grid (Li 2022). The U.S. grid is controlled by numerous governing entities, e.g. the Federal Energy Regulatory Commission, regional transmission operators, state public utility commissions, and balancing authorities. Currently, these entities insufficiently coordinate with each other to effectively build up and upgrade interregional transmission facilities across the nation (NAP 2021). This is a significant impediment to decarbonization efforts, including connecting and sharing renewable energy from sites around the U.S. where certain energy sources (e.g. wind, solar) are produced more efficiently and reliably (NAP 2021).

Since the U.S.' founding, policymakers have had a long history of experimenting with public administrative organizations (Mead and Warren 2016; Koppell 2001). Quasi-governmental organizations[1] (QGOs) represent particularly important and unusual products of this experimentation. QGOs were created for a variety of reasons. One reason is managing critical events and transitions in the U.S.' history. For example, many government corporations were

[1] We define quasi-governmental organizations as organizations that have some formal legal relation to government, and blend public and private sector characteristics and for-profit and not-for-profit modes of operation. Other conceptualizations of these organizations exist. See chapter 2 for more on this.

created to manage the war effort in WWI, were critical elements in President F.D. Roosevelt's New Deal in the aftermath of the Great Depression, and enabled sprawling domestic and international construction efforts that occurred after WWII (e.g. the St. Lawrence Seaway, developed jointly with Canada) (Mitchell 1999). Maintaining the U.S.' innovative capacity over the long term in domains such as the environment, economic competitiveness, national intelligence, and healthcare has also been an important reason for founding some QGOs, e.g. agency-related nonprofits research foundations, public venture capital funds (Roberts and Schmid 2022; Gallo et al. 2019). Finally, climate change has started to motivate the creation of a particular form of organization: subnational QGO and non-QGO green banks (Whitney et al. 2020).

One other U.S. subnational QGO form in particular is worth noting – not so much as an instrument to address particular transitions, but rather to provide a wide variety of continuously-needed functions – special districts. Special districts have come to be so popular that they dominate a significant part of the US public administrative landscape, i.e. constituting just under 50% of all U.S. federal and subnational "government" entities (Goodman 2019). These entities provide for flood control, soil and water conservation, fire protection, industrial development, parks and recreation, housing development, and education, to name a few.

Another important reason why QGOs were created is to overcome barriers that include i) lack of coordination among the different components of the federal political system and private sector, and ii) the politicization of decision-making. For example, the Port Authority of New York and New Jersey, modelled on the Port of London Authority in particular, was designed to solve both problems in the context of port activity (Mitchell 1999). Because they are created, to some extent,

to bridge the public and private sectors, QGOs are structured in ways that depart, sometimes significantly from traditional government agencies. These designs afford QGOs measures of independence from political control, i.e. agencies where technical, "neutral" competence could be exercised to a greater extent. They also allow QGOs to connect the distinct governmental levels (i.e. municipal, county, state, federal), as well as private sector actors, within a single decision-making organization.

A priori, anecdotal work on QGOs, predominantly from non climate change domains, suggests they may be valuable models for the future organizing of climate change efforts over the long term. However, despite their important presence in the U.S. public administrative landscape, the extant literature on these organizations is limited and scholars know little about their structure, role, and potential for climate change governance. In this thesis, we begin to elucidate and answer important questions in this research gap in the context of climate change and related environmental activities. Specifically, we focus on the political and financial structure of subnational and federal QGOs, the emergence of federal QGOs, and the adaptation of a state QGO to a financial shock.

1.1 Overview of the dissertation

From an academic perspective, climate change governance is inherently an interdisciplinary domain. We present three research projects that draw on insights from public administration, governance studies, political science, and organization studies – and apply them to answer questions on subnational (municipal to state) and federal U.S. quasi-governmental organizations. We focus predominantly on QGOs operating in the climate change and environmental domains; supplemented by some utilities, transportation infrastructure, and education QGOs. The first two

projects look at the structure of these organizations, while the third focuses on an example of their adaptation to shocks that threaten to undermine their long-term survival. The flowchart below summarizes the brief following project descriptions.

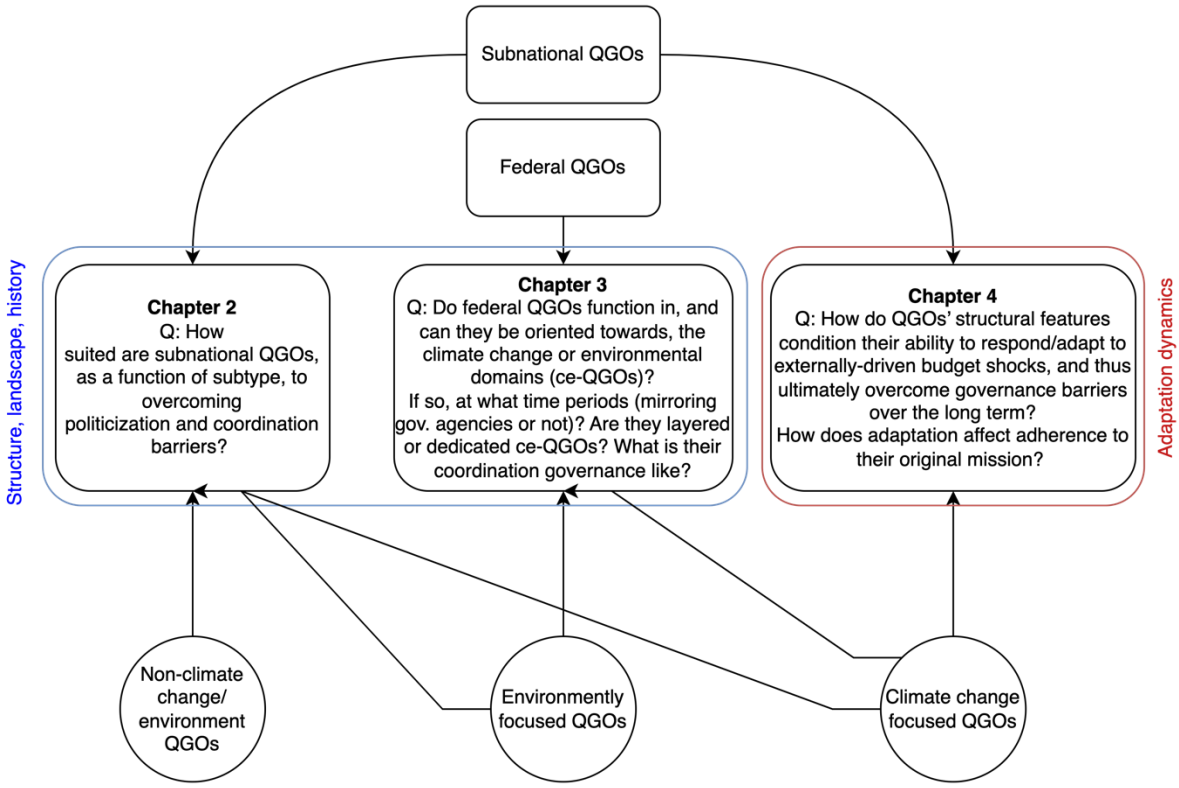


Figure 1: Outline of the thesis projects.

1.2 Landscape, structure, and history

In this rubric, we present two projects that inform an overview of QGOs and facilitate assessment of their structural characteristics in relation to their potential to overcome governance barriers.

Firstly, using a sample of subtypes of subnational QGOs in climate change, environmental, and utility/transportation/education domains, we analyze eight design characteristics of these organizations to estimate their potential to overcome the politicization and stakeholder

coordination barriers. We find that some QGOs may be particularly useful in addressing the former or latter barrier, and some may reduce both simultaneously.

Secondly, we build a novel dataset of federal U.S. QGOs and explore the landscape of the subset operating in climate change and environmentally related domains. We outline their historical emergence and potential to overcome the stakeholder coordination barrier. We find that they represent a significant proportion of federal QGOs, evolved differently than governmental agencies operating in the same domains, were created primarily for environmental purposes onto which climate change policies were often layered, and exhibit substantial variation in the stakeholders involved in decision-making and in their potential to address the coordination barrier.

1.3 Adaptation dynamics in emerging climate change QGOs

As a third project, we present the case study of the quasi-governmental Connecticut Green Bank, an example of an emerging form of climate change-focused U.S. organization. We evaluate its strategy and adaptation to a significant budget shock from Connecticut state. Ultimately, U.S. QGOs' potential to overcome climate change governance barriers and deliver effective climate change outcomes depends on their ability to adapt to external shocks. However, virtually nothing is known about quasi-governmental green banks in general, including whether their QGO status enables them to adapt and whether this comes at the cost of organizational mission drift.

We find that the CGB adapted to the shock by putting in place measures to become financially independent from the state – which included creating a spin-off nonprofit organization and

leveraging its self-financing capabilities – and comes at the cost of drift away from state control and its original state-given mission.

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2 Models of Sub-national U.S. Quasi-Governmental Organizations: Implications for Climate Adaptation Governance

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Abstract

The politicization of climate change and the difficulty of achieving multi-level or sectoral stakeholder coordination are common institutional barriers to effective climate change adaptation governance outcomes. In the U.S., quasi-government organizations (QGOs) were designed to overcome such barriers, albeit traditionally for non-climatic purposes. This study's objective is to illustrate how the design characteristics of QGOs may be useful for overcoming the above climate adaptation barriers. Methodologically, this paper analyzes six case studies, selected to illustrate the major characteristics of QGOs, of climate-focused and non climate-focused QGOs at the sub-national level in the U.S. Non climate-focused examples are included for comparison with, and to supplement, the limited number of QGOs currently working on climate efforts. For each case, this study focuses on eight design characteristics: seven that represent measures of political and financial independence, and one focused on board composition, to illustrate the extent to which QGOs enable multi-level and multi-sectoral stakeholder coordination. This study finds that among the assortment of existing QGO designs some are particularly well suited to overcoming either the

politicization of climate adaptation policy or obstacles to enhancing policy coordination, while some reduce both, albeit to a lesser extent. Broadly, this paper concludes that QGOs can strengthen effective action by depoliticizing informational sources and fostering cross scale coordination of planning and implementation.

2.1 Introduction

Quasi-governmental organizations (QGOs) represent an important, yet often underappreciated, subset of what is traditionally conceived of as "government". QGOs are characterized by some combination of attributes commonly associated with the public (which this study treats here as equivalent to government) and private sectors, and for-profit and not-for-profit modes of operation (a diagram of this is in Supplementary Information). Because this mix of characteristics blurs conventional views of what constitutes government, QGOs "hide in plain sight" in the governance landscape. Even among experts, the specific nature, function, and capabilities of these entities is often poorly or vaguely understood (Roberts and Schmid 2022). As this article will highlight, QGOs constitute solutions in overcoming the politicization and difficulty of achieving multi-level and sectoral stakeholder coordination barriers to effective climate adaptation governance.

Understanding the possibilities and limitations of QGOs is relevant for climate adaptation governance for two key reasons. First, the climate adaptation governance field is already becoming populated by growing numbers of quasi- and non-governmental organizations. Climate change induced risk affects both public and private stakeholders, at local, regional, national, and international levels. A significant literature has developed discussing how these groups may efficiently and effectively meet this multi-sectoral and level challenge. With the 2015 Paris

Agreement under the United Nations Framework Convention on Climate Change (UNFCCC), nations committed to a system of governance that emphasizes bottom-up, multi-level climatic efforts to a greater extent than the top-down approach advocated in the earlier Kyoto Agreement (Castro 2020; Keohane and Oppenheimer 2016). Consistent with this polycentric perspective, greater attention has been given to and has emerged from the role played by sub-national public and private actors (Stokes and Breetz 2020).

Indeed, decentralized and experimental forms of organization for climate adaptation have taken hold, mixing modes of governance (hierarchies, markets, networks) in different permutations, e.g. public-private partnerships (between hierarchies and markets), co-management (hierarchies-networks), private-private (markets-networks). These forms have emerged not only within nations, but also between them, for instance as transnational municipal networks and international public-private partnerships (Schoenefeld et al. 2022). This has lent credence to theoretical predictions that countries' climate adaptation governance would grow increasingly towards one composed of many formally independent groups making decisions (Ostrom 2010).

The Ostrom framework has been often used in environmental and climatic studies, but this study chooses to focus here on a different literature, the MLG framework, because it is more central to understanding the interaction between stakeholders in climate adaptation governance (Heinen et al. 2022; Partelow et al. 2020). In the context of climate adaptation, multi-level and multi-sectoral institutional actors have been the focus of attention in multilevel governance (MLG) framework analyses (Heinen et al. 2022; Corfee-Morlot et al. 2011; Gupta 2007; Hooghe and Marks 2003). The MLG concept can be defined as a "pluralistic and highly dispersed policymaking milieu where

multiple actors participate at various political levels . . . [and] are mutually dependent through intertwined cross-level decision-making activities." (Ishtiaque 2021: 173; Stephenson 2013). MLG has been used to understand how these interactions have advanced recent adaptation efforts in and across different nations (Barichella 2023; Adriazola et al. 2018).

The second rationale for focusing on QGOs is that they have the potential to help overcome coordination and politicization challenges that are known to bedevil climate adaptation governance efforts. The difficulty of coordinating numerous multilevel actors can inhibit effective adaptation outcomes. Barriers include the degree of fragmentation and complexity of the system, differing stakeholder interests, diverging climatic and non-climatic stakeholders' goals, reactivity (as opposed to proactivity) to climatic change, lack of access to information and funding, and the inability to maintain stable and long-term commitments to planning and implementation (Funfgeld et al. 2023; Biermann et al. 2020; Clar and Steurer 2019; Shi 2019).

The latter barrier has reflected the politicization of climate adaptation in the U.S., which has been characterized by conflict between interest groups from the local to national level, as well as the (albeit temporary) withdrawal of the U.S. from the Paris Agreement at the international level (Rasmussen et al. 2021; Koslov 2019). Domestically, the consequences of politicization have included the reversal of climate mandates, termination of programs and organizations, and a general instability in U.S. governance efforts over time (Mildenberger 2021; Konisky 2020).

To counter the effects of politicization and difficulty of achieving multi-level or sectoral stakeholder coordination barriers, scholars have recommended e.g. improving access to accurate

forward and backward-looking scientific information (such as risk projections); developing broad public support regarding the need for efficient and equitable action; improving interactions between multilevel actors and policy entrepreneurs that are strongly engaged, informed, and trusted; and tying climatic goals to non-climatic goals – recommendations that reflect those posited by the multilevel literature on barriers (Funfgeld et al. 2023; Bergquist et al. 2020). These recommendations have been generally discussed within the context of conventional governmental and private sector organizations, or new combinations thereof, such as partnerships or networks. Virtually no work however has discussed the role that QGOs already play in dealing with non-climatic governance challenges, and how they might be used in the future for climatic purposes. By extension, the variation that exists in QGO design across different QGO categories has not been investigated as a means to overcome climatic adaptation barriers.

This paper therefore suggests that quasi-governmental organizations (QGOs) are a potential solution in overcoming two important MLG climate adaptation governance barriers, namely politicization and multi-level and multi-stakeholder coordination. An ongoing, but limited, literature focuses on U.S. QGOs operating outside of the climate or environmental domains. This article's research objectives are to understand i) what role U.S. QGOs have played already, and ii) how they might help to reduce barriers to climate change adaptation policies in the United States. These objectives are important for two reasons. Firstly, increasing numbers of quasi- and non-governmental organizations are populating the climate adaptation sector, where governance barriers to effective planning and implementation include politicization and difficulty of achieving multi-level or sectoral stakeholder coordination. Secondly, U.S. QGOs were traditionally created to overcome these barriers in non-climate change or environmental fields.

To accomplish these objectives, this study examines six QGO case studies, operating in a variety of fields (not limited to the environment and climate change), at the sub-national U.S. level. This paper's analysis does not aim to show what climate adaptation work current QGOs are doing or have done. Instead, it serves to show examples of governance design that could be useful for future QGOs to overcome the above climate adaptation barriers. This paper conceptualizes QGOs as organizations that have some formal legal relation to government, and blend public and private sectors characteristics and for-profit and not-for-profit modes of operation. This hybridity gives QGOs measures of administrative and financial independence from political influence and enables multi-level and multi-sectoral stakeholder interactions to potentially take place within a single organization. This may occur for instance through the use of unconventional monetary resources (e.g. gifts, donations and operational fees), structural characteristics (e.g. multimember, appointed, boards of directors, with staggered and extended term lengths), and sometimes large and rare combinations of members (from both the public and private sectors).

This article's analysis involves evaluating a selection of these characteristics across six case studies. No authoritative listing is available in the literature of all the characteristics that define independence from politicization and allow stakeholder interactions. Therefore, this study selects seven commonly noted ones related to politicization, which are detailed below at the start of the case study analysis, plus board composition as a marker of multi-level and sectoral stakeholder coordination within the QGO leadership. In addition to these eight characteristics, this paper draws more broadly on insights from the QGOs' history and context to highlight how well-designed QGOs can strengthen effective action by overcoming these two barriers.

This study's analysis serves to identify key QGO design elements that scholars in climate adaptation may find useful to situate in future studies and discussions of governance. By illuminating the possibilities of QGOs for overcoming politicization and difficulty of achieving multi-level or sectoral stakeholder coordination barriers in non-climatic domains, this paper opens new avenues for considering their application to such challenges in the climate adaptation sphere. This study is based on a limited number of cases, so it avoids broad claims. However, the bridge this study provides here between the QGO and climate adaptation literatures will, hopefully, allow future, large-sample, studies to further map out the governance characteristics of QGOs and their applicability to the climate adaptation domain.

2.2 Quasi-governmental organizations

2.2.1 Conceptualization

Defining quasi-governmental organizations has proven to be an elusive task. Kosar (2011: 2) described quasi-government organizations as "entities that have some legal relation or association, however tenuous, to . . . government; or to the terrain that putatively exists between the governmental and private sectors". Koppell (2006: 12) defines (in the context of federal government) a hybrid as "an entity created by the federal government (either by act of Congress or executive action) to address a specific public policy purpose. It is owned in whole or part by private individuals or corporations and/or generates revenue to cover its operating costs". Mead and Warren (2016) propose a gamut of characteristics that are typically associated with the public and private sectors, e.g. in terms of legislation (the private sector follows laws while the public sector creates them), ownership (private organizations are privately owned, while the public ones

are "owned by the people"), mission accountability (the public sector reflects majoritarian values, while private institutions can reflect advocacy, individual expression, civic engagement), etc. These and other similar definitions make light of the continual difficulty scholars have had in unequivocally defining these organizations. For this study's purposes, this paper proposes the following one: QGOs are organizations that have some formal legal relation to government and exhibit some combination of attributes commonly associated with the public and private sectors, and for-profit and not-for-profit modes of operation.

While the above definitions appear relatively broad, further precision has been hard to achieve. Part of the problem rests on how to define each underlying term (e.g. "public") without blurring it in the process (e.g. private sector non-profits, as defined by the IRS, provide public goods like education, safety, and charity). Another is that of the confusion associated with inconsistent nomenclature for quasi-governmental organizations. The 2021 U.S. Governmental Manual lists the Smithsonian Institution and the Legal Services Corporation as Quasi-Official Agencies for instance. And the latest 2017 Census of Government details that subnational QGOs called special districts may also be termed authorities, boards, corporations, commissions, or even (if particularly closely associated with county or municipal government) subordinate agencies – alternative names that can be applied to non-QGO, temporary, or private forms of organization (USCB 2019). Special districts can be defined as "independent, special-purpose governmental units that exist as separate entities with substantial administrative and fiscal independence from […] local governments." (USCB 2019: 5). Examples include school, fire protection, or water supply districts. More information about these QGOs is available in Supplementary Information.

2.2.2 Elements of independence

Beyond the confusing terminology, recognizing which organizations are QGOs can be, on the one hand, facilitated by government classification, e.g. the quasi-official agencies at the federal level, or special districts at the subnational (Selin and Lewis 2018). For other cases where the government doesn't explicitly provide this classification, they can be identified based on whether they have characteristics that give them a greater degree of independence from the executive branches of government than traditional governmental entities possess. A complete listing of these characteristics has also proved elusive, though authors have suggested some pertinent ones: for-cause provisions that prevent the removal of organizational leadership except under cases of criminal infraction or neglect of duty, a board of directors structure instead of a single agency head, tenures that are specified (i.e. members don't "serve at the pleasure" of elected officials) and that exceed those of elected officials, staggered terms (to prevent political shakeups of the agency directors), requirements that boards have a balanced proportion of members from different political groups, quorum requirements that enforce majoritarian decision-taking, authority to litigate without going through the executive branch's Department of Justice, exemption from mandatory executive branch reviews of budget proposals, legislative materials, administrative rules, and congressional testimony, and funding sourced outside of government appropriations (e.g. through fees, donations, bond issuance), etc. (Selin and Lewis 2018; Selin 2015; Datla and Revesz 2013).

QGOs may have some, but not necessarily all, of the above indices of independence at a given time. To consider a few characteristics, the Tennessee Valley Authority (TVA) for instance is a federal energy provider QGO founded by Congress that has a nine member board of directors with specified five-year terms, can litigate matters independently, and virtual funds almost all its

operations from bond issuance and electricity sales (as opposed to government appropriations). However, TVA has no removal protection for its board members, no board membership partisan balance requirements, and no authority to bypass congressional review of its legislative proposals, budget submissions, and congressional testimony. Independence indices may combine in different ways for different forms of QGOs, although it is unclear whether there is a pattern (Richardson 2019; Datla and Revesz 2013).

Scholars have suggested a variety of rationales to explain why elected officials would endow a QGO with elements of political or financial independence. Some suggest that they are used as instruments to overcome limitations that the executive may place on monetary borrowing by pure governmental organizations (often invoked in the case of New York state quasi-government), institutionalize coordination and agreements between separate governmental entities (like bi-state agencies), establish an organization with characteristics associated with businesses (which may be perceived, as compared to bureaucracies, to be more lean and efficient), or reduce the politicization of a policy function (Roberts and Schmid 2022; Mead and Warren 2016; Kosar 2011; Koppell 2006: 6).

Reducing political and financial control over these institutions however is synonymous with saying that their democratic accountability to elected officials, and by extension voters, is lessened. Explaining why QGOs may be endowed with varying permutations of political and financial independence characteristics presumably depends on the specific socio-political context and evolution of the organization in question (Peters 2014; Doig 1993). Perceptions of excessive independence of certain QGOs at points in time have led to efforts to reduce it by increasing

oversight and accountability mechanisms (Mitchell 1992). Nevertheless, despite some perceptions to the contrary, quasi-governmental organizations are not immune to being terminated, merged into another organization, or having their freedoms curtailed through legislation (Kosar, 2011).

Despite the uncertainty about which organizations exactly qualify as QGOs, and about how numerous they are, scholarly work has tried to create taxonomies of QGOs by situating them along a kind of "linear" spectrum between pure governmental and pure private sector organizations; while acknowledging that the blurring between public, private, for-profit, and non-profit makes this approach complex at best (Mead and Warren 2016; Kosar 2011; Koppell 2003; Greve et al. 1999). In perhaps the most developed effort to date (which happens to apply to federal QGOs), Kosar (2011) proposes the following listing, ranging from closest to the government to most private-like: quasi-official agencies, government-sponsored enterprises, federally-funded research and development centers, agency-related nonprofits, venture capital funds, congressionally chartered nonprofits, and instrumentalities of indeterminate character. Another similar categorization procedure seeks to place QGOs into four discrete spectrum categories: governmental, quasi governmental, quasi nongovernmental, and private; although this is more frequently used for discussions of QGOs in other nations, where the meaning of quasi-government may be different depending on each nation's administrative structure (Kosar, 2011).

2.2.3 QGOs in multi-level governance

It is worth noting that QGOs are part of a generally fragmented U.S. governance. Substate governmental entities (counties, townships, cities) represent ninety-nine percent of all government in the nation, though this fragmentation varies across different states as a function of legislative

laws in place, administrative traditions, and local-level experimentation (Goodman 2019; OECD 2019; Peters 2018). And in the shadow of government, at the federal level alone, there are potentially more than two hundred QGOs; while at the sub-national level, the number of special districts alone are estimated at more than thirty-eight thousand, or roughly 43% of all local government (USCB 2019). Estimates of other quasi-governmental entities are difficult to come by, though likely are overshadowed by the number of special districts.

The absence of a comprehensive database of all QGOs, and particularly of those that undertake climate change efforts, impedes a clear understanding of the work that these types of organizations have completed to date. Generally, it appears the use of U.S. quasi-governmental organizations for climate adaptation efforts has been limited to date. At the local level, various quasi-governmental special districts (e.g. in charge of water management, land conservation, energy provision) have begun to engage in climate adaptation discussions, planning, and funding – notably in collaboration with other municipal and regional actors (Bennett and Grannis 2017). These efforts have remained sparse however, with funding being a particularly limiting factor (CSDA 2022). Interestingly, these efforts have emerged in states like California or Washington, with populations and policies that are already supportive of climate change work; as well as in Florida where this support has been more uneven or absent.

QGOs specifically dedicated to climate adaptation or mitigation have been an even rarer occurrence, though not entirely absent. Within the last decade or so, states within the Northeast U.S. in particular, and among some municipalities (NYC, Washington DC), have created a number of "green banks", i.e. entities that look to finance, and help catalyze private investment in, both

mitigation and adaptation measures (CGC 2023). Examples include the Connecticut Green Bank, or Hawaii Green Infrastructure Authority. On the whole, investment by U.S. green banks since 2011 has reached roughly $2 billion (or $7 billion, including private sector co-investment) – though this appears to have mostly been applied to mitigation measures. On the heels of this quasi-governmental climate investment, proposals for the creation of a federal green bank have also arisen, yet without success to date (Rives 2021).

2.3 Methods

This study is based on a set of six cases — six because each one illustrates one of the six broad categories of QGOs that have been identified in the literature, i.e. subordinate agencies and areas, special districts, public utilities, public corporations, not-for-profit corporations, and non-profits (USCB 2019; Mead and Warren 2016; Kosar 2011). Within each category, this study chose the particular cases to study by optimizing for three criteria: i) variation in QGO independence characteristics across the whole set (e.g. if a nonprofit and a public corporation showed few differences, another example of one or the other was searched for), ii) prominence of the organization (more information is typically available for well-known cases, e.g. the PANYNJ), and iii) whether they operate in a climatic or environmental field. For the first criterion, variation was a goal of this paper, to illustrate what possible designs exist in the QGO sphere. The QGO literature also sometimes makes mention of "typical" governance characteristics associated with a category (USCB 2019; McNabb 2016). When that was the case, this paper picked a QGO typical of its category. When it wasn't the case, this study used the second and third criteria of the optimization search to pick a QGO. This latter process is subjective, but sidesteps the current impediments to other approaches that would require systematic and comprehensive classifications

of QGOs nation-wide. Unfortunately, this large-scale classification has not yet been attempted in the literature, would involve choices that are still debated among QGO scholars, and consists in a difficult process of data and historical information gathering. Due to these difficulties, this study restricted the dataset to one case study per commonly-noted QGO category.

For each of the six cases, this paper chooses to review eight characteristics: seven common characteristics that are believed to increase QGOs' administrative and financial independence; plus an eighth characteristic that may enhance QGOs' multi-level and sectoral stakeholder coordination (Selin 2015). These characteristics are i) the number of board of directors members governing the organization, ii) whether the members are elected or appointed to the board, iii) the members' appointment or election term lengths, vi) whether the members' terms are staggered, v) what conditions exist for the members' removal from the board, vi) the number of members needed to constitute a quorum and vote to push through an action, vii) what financial resources are available to the organization for its survival, and viii) the composition of the board of directors, in terms of public and private sector members. This study used original case study material (QGO founding legislations, bylaws) as well as secondary sources (prior research, external reports, QGO website information) to collect the data on these eight characteristics.

This paper also collected data on the historical context of the six QGOs' formation that pertain directly to the above eight characteristics; and obtained information about what climate adaptation or mitigation activity the climate and environmental QGOs have conducted, when available. For both the historical context and climate change activity, this study manually collected available information from primary and secondary sources: the QGOs' own websites, academic research,

and external reports. Using the above data, this study assessed the eight characteristics and the cases' history and climate change activity. This approach follows the example of other survey literature on governance institutions (e.g. Mildenberger 2021)

2.4 Results – six sub-national QGO designs

In Supplementary Information this paper provides general information on the categories of QGOs discussed in this article. In the following, this study presents a synopsis of six QGO case studies (in table 1), focusing on eight governance characteristics indicative of independence from politicization and capacity to coordinate stakeholders (an expanded description is also available in SI). As mentioned earlier, the cases were chosen on the basis of multiple criteria and more broadly illustrate each of the six categories of QGOs highlighted in the literature. To illustrate more fully the evolution of these QGOs – which might serve as a guide for future climate organizations – this section also highlights some of the historical context of their formation that bears most directly on the eight governance elements. In addition, this section provides some information about what climate adaptation or mitigation activity the climate and environmental QGOs have conducted, if available. The following results aim to highlight examples of governance design (i.e. combinations of the eight characteristics) that could be useful for future QGOs in overcoming the i) politicization and ii) difficulty of achieving multi-level or sectoral stakeholder policy coordination climate adaptation barriers.

This study avoids broad claims – these characteristics enable, but do not guarantee, QGOs' ability to overcome these barriers. In some ways, QGOs are linked to or controlled by politicians, e.g. the latter can terminate the former. Below, this section notes instances in which some of the cases

became politicized, or in which politicians and QGO members have interacted in ways that cast a doubt on QGOs' impartiality and independence. More broadly, QGOs are not perfect. As mentioned in section 2.2, QGOs have on occasion committed improprieties, i.e. illegal or morally questionable behavior, that likely emerged as a result of their independence. Describing these instances is beyond the purview of this article.

Table 2.1: Summary table of eight independence criteria for the six QGO cases.

	Number of board members	**Elected or appointed board members**	**Board member term length. Re-election or appointment of members**	**Board member term staggering**	**Board members removal conditions**	**Number of board members required for quorum**	**QGO financial resources**	**Board composition (and number of members)**
NYC Energy Efficiency Corporation	Variable (5-20 members)	Appointed and Elected	Ex-officio members: unspecified. Public members: 3 years. Unlimited reelection possible.	Yes	For cause, after majority board vote	Majority of board	Revenue from project loans, grants, partnerships with private firms	Mayor's office ex-officio members: variable number of members. General public: variable.
San Francisco Bay Conservation and Development Commission	27	Appointed	Ex-officio: unspecified. Public: unlimited. Reelection possible	Unclear	At pleasure	Majority (14 members)	Trust fund, grants, contracts, gifts	Municipal to federal agency representatives: 20 members. General public: 7 members.
Palm Beach Soil and Water Conservation District	5	Elected	All: 4 years. Unspecified	Yes	For cause	Majority (3 members)	Lease/sale of property, partnerships, gifts and donations	General public: 5 members
Knoxville Utilities Board	7	Appointed	All: 7 years. Two elections maximum	Yes	4/5th vote of the board; or, for cause	Majority (4 members)	Utility services revenue, bonds/notes, contracts and leases, investments	General public: 7 members
Port Authority New York and New Jersey	12	Appointed	All: 6 years. No, but appointment occurs once a successor is chosen	Yes	For cause.	Majority (6 members), 3 from each state. Caveat: commissioners' votes can be vetoed by the governors.	Operational revenue, bonds, borrowing monies	General public: 6 members from each state.
U.C. Regents	26 (plus 2 non voting U.C. faculty members)	Appointed	Ex-officio state: 4 years. University ex-officio: 12. years. Student: 1 year. No	Yes	Majority board vote	Majority (9 members)	Endowment, operational fees, goods and services sales, gifts, contracts, grants	Ex-officio: 4 members from the state, 3 from the university. Student: 1 member. General public: 18 members.

2.4.1 Climate QGO

2.4.1.1 New York City Energy Efficiency Corporation

The New York City Energy Efficiency Corporation (NYCEEC) is an example of a not-for-profit corporation, or "local authority". Its aim is that of "lessening the burdens of government and protecting the public interest by implementing the greenhouse gas reduction plans of The City of New York, including … the provision of funding and financing to property owners … the installation of renewable energy systems…, the development and aggregation of demand for such funding and financing through education, marketing, and outreach efforts, the coordination and development of related workforce development activities, and the promotion of innovative energy initiatives" (NYSOAG, 2017). Because of these activities, the NYCEEC is also frequently referred to as a green bank.

More specifically, the NYCEEC focuses on helping NYC reduce its greenhouse-gas emissions by 80% by 2050. Both with its own funds and in partnership with other groups, the NYCEEC provides a variety of instruments to do this, e.g. mortgage and equipment loans, energy service agreements, and credit enhancements. From its energy efficiency and clean energy financing activities, it estimates it has (NYCEEC 2022): reduced CO2 emissions by 1 million metric ton, increased the energy efficiency of 356 buildings by 25.5 million MMBtus, and invested 433$ million for clean energy projects (counting co-funders' capital). The NYCEEC's projects have also looked to achieve non-climatic goals in conducting this work. Increasingly, it has focused on providing financing for low and moderate-income households (approximately 85% of projects concern this demography). And it has also helped create an estimated 4,709 jobs in the process.

It is important to note that the NYCEEC was founded in 2010 as part of a broader set of actions facilitated by Mayor Bloomberg's widely trusted climate policy entrepreneurship to reduce NYC's climate change risk – e.g. the creation of the NYC Panel on Climate Change, an independent scientific and decision-support advisory body (Hölscher et al. 2020). The NYCEEC is one of the first examples of a green bank; that is, a public organization that provides investment capital to facilitate adaptation and mitigation initiatives. It is, in addition, particularly rare as it operates at a municipal level (EPA 2018). Other foundational green banks were created around that time as well, including e.g. the Connecticut, New York, Hawaii, Vermont Green Banks; though these are all, as the names imply, state-level banks. The NYCEEC is notable in that it was created to support New York City's Sustainable Energy Program – but was set up so as to have a high degree of latitude in its operations. The Corporation was initially founded as an element of city government; capitalized with federal grant money from the Department of Energy's Energy Efficiency and Conservation Block Grant (EECBG) program. However, in 2012, NYCEEC was filed with the IRS as a non-profit public charity; and in 2013, the board members (including Mayor Bloomberg, serving in ex-officio capacity) amended the corporation's bylaws to make it fully independent of New York City.

From a political perspective, it's worthwhile noting as well that Bloomberg and the other NYCEEC's board members decision to separate the NYCEEC from NYC's government in 2012, both administratively as well as financially, was reportedly based on the idea that this would help it to sustain its work indefinitely (Muir and Bose 2020). Indeed, turbulence in other local "green banks" in the U.S. is not unheard of, and may have been a motivating factor, particularly for organizations operating in the politically controversial space of climate change. The Connecticut

Green Bank for instance, considered to be among the most independent of these types of institutions, was itself the target of the state government's diversion of part of its operating funds as the state looked to reduce its budget deficits (Ahn 2017).

2.4.2 Environmental QGOs

2.4.2.1 San Francisco Bay Conservation and Development Commission

In the western U.S., the San Francisco Bay Conservation and Development Commission (SFBCDC) represents an example of a quasi-governmental subordinate agency of the California Natural Resources Agency. The SFBCDC's mission is to protect and improve natural waterways and lands around the Bay Area, and promote the public's enjoyment of them; essentially through permitting powers related to individuals or agencies wanting to fill, extract or make substantial changes to water and land structures within its jurisdiction. To do so, it relies on an unusual governance arrangement which essentially approximates the structure of a multi-level compact comprised of members of the federal, state, and local government (Scott 1963, 104); modeled after the Delaware River Basin Commission (created only two years before the SFBCDC, in 1961). The study commission that proposed this governance arrangement also recommended that the commission should "have authority superior to that of private interests, city and county governments, and must be subject only to extraordinary veto by the state and federal governments", i.e. a high degree of independence granted legally and fiscally (e.g. through taxation and eminent domain).

The SFBCDC has taken steps to integrate climate change adaptation into its broader environmental project planning and implementation. It has worked on developing climate adaptation planning

through workshops with Bay Area stakeholders concerning their proposed modifications to the BCDC's Bay Plan (the BCDC's guiding policy document), partnerships with academia and research institutes to map out potential sea level rise impacts, and forming an initiative (Bay Adapt) to establish a regional agreement on sea level rise resilience principles and actions. The BCDC also developed an internal Climate Change Program, which consists in a variety of initiatives. Perhaps the most impactful has been carrying out amendments to the Bay Plan. These have included: requirements for carrying out sea-level rise risk assessments, regulations designed to make new projects resilient to mid-century sea-level rise projections, suggestions to give vulnerable species and habitats special consideration for preservation efforts, developing a regional sea-level rise adaptation strategy in conjunction with other multi-level governmental entities in the Bay Area to help protect sensitive ecosystems and shoreline resilience, and encouraging a case-by-case evaluation of each reviewed project's benefits, resilience, and adaptation capacity while the strategy above is being developed, etc. Recently, the BCDC co-authored a report estimating the cost of a project to protect the Bay Area from sea-level rise at more than $110 billion by 2050 – an undertaking the city of San Francisco is currently consulting on and starting to address (Rogers 2023).

More broadly, it is important to point out that the SFBCDC has benefitted from including a representative of the U.S. Army Corps of Engineers (USACE) as a permanent member of its board of directors. This link with the USACE has provided the SFBCDC with federal-level planning and evaluation resources that are perhaps best equipped to provide planning in response to climate change exacerbated sea level rise (Rasmussen et al. 2023). These resources have access to localized ranges of the detailed impacts within alternative coastal risk futures across the U.S.

Finally, this study notes an instance in which the SFBCDC likely became politicized. In the 1990s, the California senator and governor attempted to terminate the BCDC. Although the attempt failed, the BCDC subsequently adopted many changes in response to these politicians' criticisms, i.e. speeding up the permit application review process, and reforming some of its regulations (Smith and Pendleton 1998).

2.4.2.2 The Palm Beach Soil & Water Conservation District

The Palm Beach Soil & Water Conservation District is an example of a broader category of organization (Soil and Water Conservation Districts) whose mission involves informing U.S. residents about methods of natural resource protection and land management practices. Perhaps contrary to expectations, the organization has not included climate change concerns in this informational campaign (like other conservation districts in Florida). The Palm Beach case is an example of a quasi-governmental non-profit organization.

Soil and Water Conservation Districts are a rare type of QGO aiming to implement a form of federal-state-municipal governance; directed originally from the federal level. Helms (1990) suggests that the original idea for the Soil and Water Conservation Districts (SWCD) came from M.L. Wilson, the under-secretary of the USDA in 1935. Wilson viewed the newly-created Soil Conservation Service (of 1935) – which, in the aftermath of considerable soil mismanagement in previous decades, aimed to educate farmers on better soil use techniques through demonstration projects – to be insufficient to deal with the practical financial and technical limitations that farmers would face in applying the SCS's lessons (Helms 1990: 13). As such, Wilson imagined

that something more than education was needed to truly address the problem, and was reportedly inspired by the example of water conservancy districts as a governance and organizational solution (pp. 14). In essence, the envisioned system was one that would be able to deal with soil, as well as water, conservancy through i) local-level units of government, and ii) delegation of resources and decision-making to those units – a model he drafted as the Soil Conservation Districts Law. This legislation was passed by Congress in 1937, and it encouraged the creation of these SWCDs at the local state level. Indeed, Florida, as well as forty-seven other U.S. states, also amended their legislations to promote the development of these organizations at sub-state levels. The Palm Beach Soil and Water Conservation District is thus one of many SWCDs existing across the US.

2.4.3 Other QGOs

2.4.3.1 Knoxville Utilities Board

The Knoxville Utilities Board (KUB) is a public utility aiming to supply a variety of utility services (e.g. electricity, water, gas, wastewater treatment) to the population of Knoxville, Tennessee. Its governance exemplifies a particular model of governmental public utility, i.e. an independent city agency – as opposed to other U.S. public utilities, which often operate as city departments, city-owned corporations, municipal utility districts, or joint powers agencies (Homsy 2020). The KUB aims to provide apolitical management in utility service provision; and also, importantly, emerged from within the engaged and scientifically informed culture diffused by the Tennessee Valley Authority (Hamilton 2020; Neuse 1983).

This paper hasn't found an example of politicization of the KUB. However, by their own admission, some KUB board members have previously kept close contact with the Knoxville city

mayor and council — despite the organization's original mission to be apolitical. The board members justify this saying "that's just good politics and good business" (Baer et al. 2001: 25).

2.4.3.2 Port Authority of New York and New Jersey

The Port Authority of New York and New Jersey's (PANYNJ) is a public authority, in the category of special districts. Its mission is primarily one of overseeing regional transportation infrastructure in the New York and New Jersey port areas; and more specifically, of helping to meet the transportation needs of the two states in terms of accessibility, efficiency, and regional economic development. PANYNJ was thus founded through an interstate compact between the two states.

Members of the PANYNJ have been on occasion politicized. The most recent example is perhaps the so-called 2014 Bridgegate scandal – PANYNJ employees, acting under the political influence of then-NJ governor Christie's influence, temporary closed highway lanes as political retribution (Zernike 2015). In the 1970s, inappropriate behavior occurred between a port authority commissioner and then-NJ governor, Brendan Byrne — e.g. the governor would fly on PANYNJ transportation for private and public business (Blumenthal 2008). Doig (1993) provides more information about instances of politicization at the PANYNJ.

2.4.3.3 The Regents of the University of California

The Regents of the University of California (i.e. the university system's official organizational and directorship name) is an example of a public corporation endowed with a public trust. Its mission is that of administering the system of schools' endowment, managing land properties owned by the organization, and governing university educational policy in all its facets. Although it was

reportedly inspired by the model of the University of Michigan at the time of the UC's founding (through the California Organic Act of 1868), its governance is relatively unique. The University of Michigan had a board of directors (whose members are also referred to as "Regents"), and a degree of political independence similar to that proposed for the California system (Douglass 2000). Beyond its governance, over time, the UC system and its resources have been an important element in informing the Californian public and enabling persistent support for state and substate conservation and climate change measures (Mazmanian et al. 2020).

This paper notes that the U.C. Regents have not always been immune to politicization. In 1970, the board succumbed to a political pressure campaign waged by then-California governor Reagan to start charging tuition to students. Reagan leveraged student unrest and the state's financial support for the U.C. system to push this policy change through, as a way to gain favor with conservative voters (Nations 2021).

2.5 Discussion

This study proposes that understanding quasi-governmental organization design characteristics is important in potentially overcoming MLG climate adaptation barriers related to politicization and difficulty of achieving multi-level and sectoral stakeholder coordination. This paper highlighted QGO examples from climate-focused, environmental, and "other" domains. For all these QGOs, it is beyond the scope of this article to suggest here that the QGOs' founders set these organizations up in order to overcome the climate adaptation barriers mentioned above. The climate work conducted by climate-focused and environmental QGOs is described here to illustrate as much as possible some of the overlap existing between QGOs and climatic concerns (and their application

to other environmental goals). Put together, this study proposes that all the cases serve as examples of governance design (i.e. combinations of the eight politicization and coordination characteristics) that could be useful for future QGOs. This paper builds up this argument by comparing the different QGO designs in the following discussion.

Comparing the specifics of the six cases, this study begins by noting that changes in the characteristics of QGO independence do not appear to vary in a systematic way as a function of the legal status or type of QGO – a conclusion other scholars have reached as well, as previously mentioned (Mead and Warren 2016; Kosar 2011; Koppell 2006; Greve et al. 1999). Quasi-governmental organizations, such as subordinate agencies, whose nomenclature would at first suggest a close link with government (i.e. government maintains significant control of the agency) can in reality exhibit measures of independence that even fairly independent organizations (e.g. nonprofits) might not have. Comparing the SFBCDC (a subordinate agency) to the Palm Beach SWCD (a non-profit) for instance, this paper notes that the former has a greater number of appointed individuals on its board of directors (as opposed to elected), these directors have potentially unlimited term lengths (as compared to fixed four-year terms, similar to most elected officials'), and access to a variety of potential funding sources extending from grants, donations, rents, royalties, and public monies (versus only gifts and donations). Likewise, there may also be blurring of characteristics in the other direction – the SWCD is formally organized in a relatively independent non-profit structure yet has board members who are entirely elected by the district members it serves.

There is also flexibility within the QGO governance structure with respect to the coordination of directors. The NYCEEC for instance has a number of board members that is variable, between five and twenty. In addition, the term length for its members may also differ – for ex-officio individuals this is dependent on their office's specific appointment duration, while for the "elected directors" this is three years (though unlimited reelection is possible). The University of California is also an example of a QGO with some flexibility in terms of the length of its Regents' tenure. Among its twenty-six members, there are i) seven ex-officio, like the governor, who have terms determined by usual political cycles (i.e. four years), ii) eighteen members with long twelve-year appointments (which suggests a much greater degree of freedom from political influence than the ex-officio individuals may have), and iii) one student regent with a short one-year term.

In terms of stakeholder coordination, the QGO case studies illustrate a variety of different structures to link multilevel and sectoral actors. This ranges from relatively simple organizations like the KUB or the SWCD, that are governed by a few elected or appointed members drawn from a particular district or county (noting that the KUB even excludes public sector officials from appointment); to those like the NYCEEC that have some proportion of elected directors from NYC, in combination with members of city government (the director of the Mayor's Office of Sustainability, plus a City employee designated by the mayor); to models that institutionalize intergovernmental governance like the bi-state PANYNJ's leadership constituted of even distributed groups of appointed commissioners (six from each state); to large and moderately complex groups like the U.C. Regents, which is constituted of ex-officio officials from state government, appointed individuals from any part of the general public, and a stakeholder from the university itself.; to highly multi-sectoral and level QGOs like the SFBCDC led by members of

the general public, municipal representatives, an inter-municipal water quality control board, county representatives, various state bodies, and federal agencies.

Explaining why these different QGOs have the specific governance characteristics that they have – for instance, why some particular public or private groups are given one or more seats at the board of directors' table – would require an in-depth historical analysis that exceeds this paper's purpose. Nevertheless, it appears that the particular context quasi-government emerges from bears a mark on organizational design. The Palm Beach SWCD emerged from a federal-led initiative to create a localized system (as opposed to the previous top-down approach, which was seen as being ineffectual) to diffuse best practices in agricultural management, with supervisors drawn from the very same district they would seek to help inform. In NYC, concerns that the NYCEEC's administrative position within City government could hamper its climate work – as a result of changes in mayoral attention towards climate change – led its board to reorganize it as a nonprofit. And the SFBCDC for instance was the product of strong bottom-up entrepreneurialism to get a wide variety of different stakeholders involved in what is inherently a highly multi-jurisdictional problem of better protecting and improving the San Francisco Bay waterways and lands.

Put together, these results suggest that among the examined QGOs, some could be most useful to overcome either the politicization or difficulty of achieving multi-level or sectoral stakeholder coordination climate adaptation barriers, but none are an optimal solution to both at the same time. It may be the case that a QGO that this study has not reviewed here constitutes such a solution, but it is beyond the scope of this article to speculate about what that QGO design would look like.

Some QGOs in this study's set would be best suited for multi-level and sectoral stakeholder coordination in particular. The SFBCDC is perhaps the best example of this with its board composition consisting of a wide range of actors from the public (from federal to municipal) and private sectors (members of the public). While other QGOs in the set approach the number of board members present in the SFBCDC – twenty-six in the U.C. Regents, or up to 20 in the NYCEEC – no other organization in the set incorporates that kind of variety of decision-makers. On the other hand, other QGO designs have little to no impact in overcoming coordination challenges. A provision dictates that no public officials can be appointed to the KUB's board for instance – thus strongly limiting coordination with members of public agencies. A similar situation is present for the Palm Beach SWCD, although no provision is explicitly mentioned.

A more complex problem is understanding which of this study's QGOs designs best overcomes the politicization barrier. As mentioned, political influence is manifested along the various independence characteristics this paper discussed, though it's not necessarily clear what "net" independence would be incurred from varying combinations of them, for instance if a QGO has unlimited board member terms lengths but member removal conditions are lax ("serving at the pleasure" of a given politician), or if it has access to a wide variety of financing sources but is situated within an organization structure (subordinate agency, for instance) considered less independent. This is an expression of the earlier observation this paper made that QGO independence characteristics do not vary "linearly" with legal status – which the comparison between the SFBCDC and the Palm Beach SWCD exemplified. Nevertheless, some QGOs have a better "net" independence than others. The most obvious example is the U.C. Regents, who have term lengths that are significantly longer than the political cycle, can be removed only under

circumstances requiring the vote of the rest of the board, are numerous (twenty-six members) which makes decision-making less contingent on the steering of one individual (especially any of the seven ex-officio officials on the board), and have access to a range of public and private financing for the university. These characteristics afford the Regents independence that is generous on the whole – albeit not as significant as if e.g. there were no ex-officio public officials present on the board, board member terms were unlimited, removal could only occur "for cause", etc.

More broadly, in terms of the cases' history and context, this study suggests QGOs can strengthen effective action – either within or outside of the climate change adaptation domain – by depoliticizing informational sources and fostering multi-level and sectoral stakeholder coordination in planning and implementation. The NYCEEC, SFBCDC, KUB, and UC Regents have all in some way contributed to or emerged from a broader effort to promote apolitical, accurate, scientific, and coordinated decision-making, within and outside of the climate adaptation sector. These examples speak to the possibilities of QGOs to address necessities for effective governance.

2.6 Conclusion

The multi-level governance (MLG) framework has been used to understand how stakeholder interactions affect climate adaptation outcomes. Effectiveness of these outcomes is limited, among other factors, by politicization as well as by the difficulty of achieving multi-level and sectoral stakeholder coordination. Scholars have discussed how to overcome these barriers in the context of the private sector, governmental organizations, and new institutional arrangements linking them together. With the signing of the Paris Agreement emphasizing the importance of the bottom-up

component of adaptation MLG, finding sub-national organizational solutions to adaptation barriers has been deemed particularly critical.

Despite these concerns, there has been virtually no consideration of the role that quasi-governmental organizations (QGOs) may play in future U.S. climate adaptation MLG at the federal and sub-national levels. The quasi-governmental form of organization has been traditionally employed as a solution to obstacles of achieving multi-level and sectoral stakeholder policy coordination and politicization in non-climatic domains. Quasi-governmentality emerges from an organization's ability to embody for-profit and not-for-profit modes of operation and public and private sector characteristics. QGOs thus incorporate varying blends of these elements and, depending on the combination, possess certain measures of political and financial independence absent in traditional governmental agencies.

Through an analysis of six QGO case studies, operating in climatic and non-climatic fields, this study highlights different modalities of administrative and financial independence expressed in U.S. sub-national governance. Some of these QGOs exemplify relatively unique governance models, while others are indicative of much more predominant functional forms present throughout the U.S. Most importantly, this paper suggests that QGOs constitute an overlooked means to overcome the difficulty of achieving multi-level or sectoral stakeholder coordination and politicization barriers in climate adaptation MLG. Specifically, some QGOs are particularly well adapted to clearing one or the other hurdle; while some reduce both simultaneously, but to a lesser extent. Using a QGO to deal with adaptation barriers therefore requires considering which of these situations is more desirable in addressing a locality's particular needs and governance context.

More generally, this paper's cases illustrate that well designed QGOs can overcome these governance barriers, by filling a need for e.g. effective policy entrepreneurship, providing apolitical and trusted scientific information, enabling public support on issues requiring efficient and equitable action. Some of the cases exemplify this with regard to climate adaptation, while others do so in the context of environmental or other domains.

This paper's results constitute the first guide to U.S. quasi-governmental organization design and its importance for overcoming climate adaptation institutional obstacles – thus bridging the divide between the literatures on these topics. In addition, this article responds to calls from the global governance literature to place more attention on the critical role that sub-national organizations play in nations' efforts to carry out their Paris Agreement goals. This paper is based on and constrained by a limited number of cases – for this reason, this study avoids broad claims on the potential of QGOs in climate adaptation governance. This limitation emerges from a lack of systematic and comprehensive data on these organizations; and of research on their context, history, and decision-making. For that reason, it is beyond this article's scope to i) suggest that for any of the six QGO cases, founders set up these organizations in order to overcome climate adaptation barriers, and ii) speculate about what an "optimal" QGO design to overcome them would look like. Instead, this paper therefore provides a foundation for scholars to build on to assess the U.S.' projected institutional capacity to address climate adaptation planning and implementation, and explore the potential role for QGOs to add to this capacity in particular situations.

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2.8 Supplementary Information

2.8.1 A visual definition of QGOs

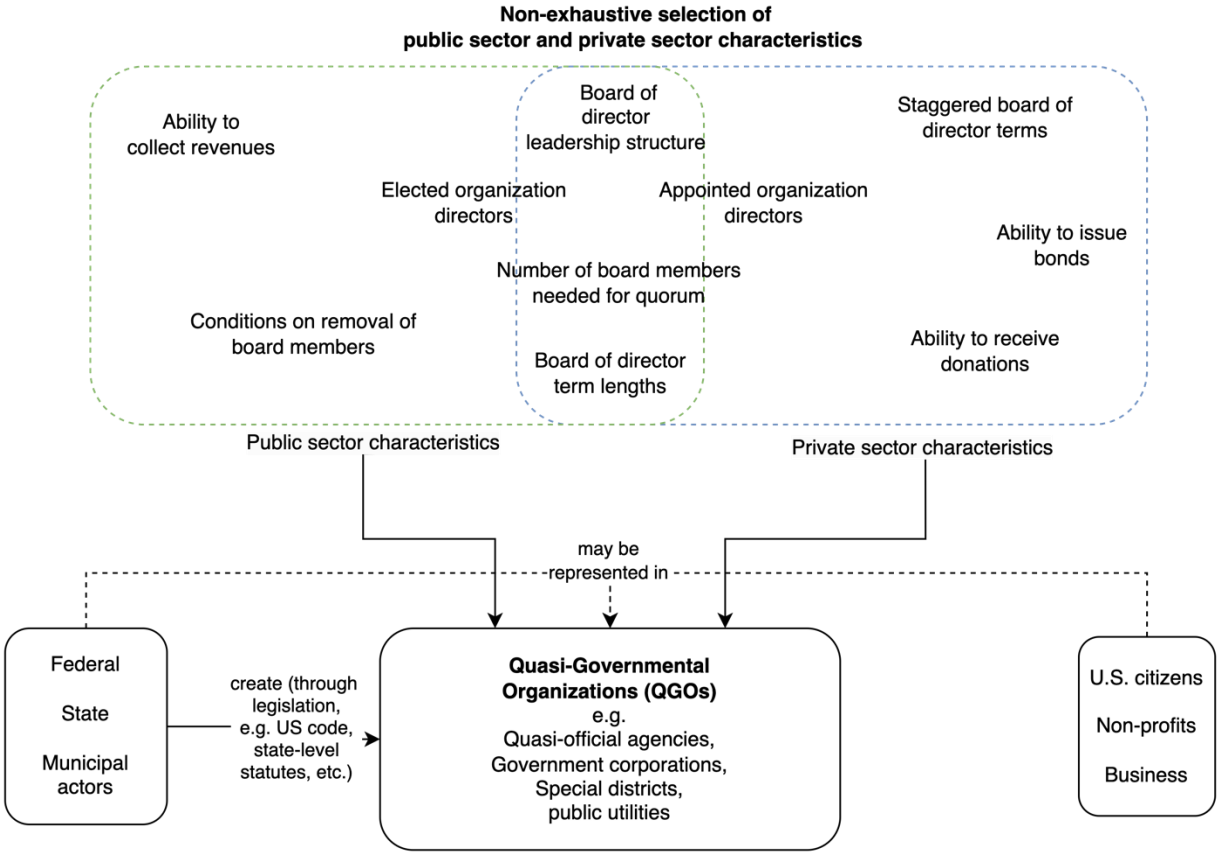


Figure 2.1: The figure gives a non-exhaustive selection of public sector and private sector characteristics, as represented by the two top boxes (in dotted lines). These boxes contain our eight governance characteristics, which are discussed in the Methods section. Some characteristics are placed at the intersection/overlap between the public and private sector boxes – to indicate that some characteristics may be present in both of those sectors. As indicated in the manuscript, the distinction between public and private sector characteristics is not always clear. At the bottom of the figure, the box on the left contains examples of public sector actors (i.e. government), while the box on the right contains private sector actors. The arrow between government organizations on the left and QGOs in the center indicates the process by which QGOs are created (i.e. the legal relation between government and QGOs). The arrow between i) the government organizations box, and U.S. citizens/non-profits/business box, and ii) the QGOs box in the center illustrates that government and citizens/non-profits/business actors may be represented in the organizational structure of QGOs (e.g. in the board of directors). Figure created with draw.io.

2.8.2 General categories of QGOS

In the following, we briefly summarize some properties of major categories of sub-national U.S. QGOs. Because of a lack of systematic and comprehensive data on existing QGOs, this is intended to be a broad overview instead of an exhaustive list of possible quasi-governmental organizations.

2.8.2.1 Subordinate agencies and areas

A number of organizations may be considered closely linked, i.e. in terms of administrative or fiscal dependence, to general-purpose government. Administrative and financial closeness is indicated by legislative provisions that suggest the QGO is a "subordinate" unit or organization to a broader (traditional) government agency; as well as through accountability activities that governmental agencies require the QGO conduct, e.g. reporting on organizational activities, providing personnel performance and budgetary data for external review, defense of QGO's activities in court by a governmental entity or lawyer (e.g. the Department of Justice), etc. Thus, among these QGOs is included agencies subordinate to a governmental organization, as well as special districts. The former may be described as units "subject by law to administrative or fiscal control by the state or by independent local governments . . . [and] may be any number of authorities, commissions, corporations, and other forms of organization that have certain governmental characteristics but, nevertheless, do not fully meet the Census Bureau's criteria for being classified as an independent government." (USCB 2019: 6). Although these organizations have some measure of control by traditional government, they represent a hybrid type of institution that separates them from traditional organizations (e.g. authorities, commissions, and corporations).

2.8.2.2 Special districts

Special districts can be described as "independent, special-purpose governmental units that exist as separate entities with substantial administrative and fiscal independence from general-purpose local governments." (USCB 2019: 5). Although the Census Bureau definition is relatively broad, some authors (Coyle McCabe 2004; 2000) also suggest that a spectrum of special districts exist – some for instance aim to address more than one issue at a time (classified as multi-purpose districts, as opposed to single-purpose), and some might establish their fiscal independence through a revenue-returning, "business" activity (enterprise districts, as opposed to non-enterprise). The latter factor in particular, being enterprise/"self-funding" or not, can affect how much a special district can stand alone from general-purpose government. These organizations have been formed for different purposes including for, e.g. education, the management of parks and recreation, water supply, fire protection, etc. And it's also worth mentioning that some of these functions can overlap with "many that are performed by general-purpose governments" (USCB 2019: 5).

2.8.2.3 Public utilities

Public utilities represent a type of organization operating in a range of industries for the production of essential public services. These utilities may be for-profit, not-for-profit, or a mix of the two – the chain of production of electrical energy for instance may include contractors from the private sector working for a government-owned and controlled electrical infrastructure (McNabb 2016; Geddes 2000). McNabb also points out that public utilities are different from businesses in the sense that their funding can include taxes, rates charged from utility customers, and financial instruments (stocks, bonds). In addition, because governmental utilities' services ultimately aim to provide a public good, their price typically don't reflect actual supply and demand.

2.8.2.4 Public corporations

In addition to the previous categories, there are a number of more singular, "one-off" types of organizations – created e.g. as part of a unique program run by a branch of general-purpose government, or perhaps as a reflection of a particular policy problem the government looked to address. These organizations may take on other names besides public corporations, including municipal corporations, public benefit corporations, and bodies corporate and politic. For the Census Bureau, these are all viewed generically as "organized entities" (USCB 2019: 1), but may, depending on the state in which they are established and on their characteristics vis-à-vis governance and independence, be categorized more specifically.

2.8.2.5 Not-for-profit corporations

Generally speaking, these are entities that are incorporated to address a particular policy or administrative function that does not include making profit. This category may encompass a variety of different sub-organizations, depending on the particular enabling state legislation. Not-for-profit corporations may not necessarily qualify for federal tax-exempt status under the Internal Revenue Service's 501(c)(3) code.

2.8.2.6 Non-profit QGOs

While the distinction with the previous category is not always clear, non-profit QGOs are typically described in the literature as qualifying and adopting tax-exempt status under the Internal Revenue Service's 501(c)(3) code. Because the private sector also creates non-profits, the "non-profit" label is also interpreted as indicating QGOs that are — at least from a nomenclature and legal status perspective — markedly distinct and legally separate from the government.

2.8.3 Expanded description of the six sub-national QGO designs

2.8.3.1 Climate QGOs

2.8.3.1.1 New York City Energy Efficiency Corporation

The New York City Energy Efficiency Corporation (NYCEEC) is an example of a not-for-profit corporation, or "local authority". Its aim is that of "lessening the burdens of government and protecting the public interest by implementing the greenhouse gas reduction plans of The City of New York, including … the provision of funding and financing to property owners … the installation of renewable energy systems…, the development and aggregation of demand for such funding and financing through education, marketing, and outreach efforts, the coordination and development of related workforce development activities, and the promotion of innovative energy initiatives" (NYSOAG, 2017). Because of these activities, the NYCEEC is also frequently referred to as a green bank.

More specifically, the NYCEEC focuses on helping NYC reduce its greenhouse-gas emissions by 80% by 2050. Both with its own funds and in partnership with other groups, the NYCEEC provides a variety of instruments to do this, e.g. mortgage and equipment loans, energy service agreements, and credit enhancements. From its energy efficiency and clean energy financing activities, it estimates it has (NYCEEC 2022): reduced CO2 emissions by 1 million metric ton, increased the energy efficiency of 356 buildings by 25.5 million MMBtus, and invested 433$ million for clean energy projects (counting co-funders' capital). The NYCEEC's projects have also looked to achieve non-climatic goals in conducting this work. Increasingly, it has focused on providing

financing for low and moderate-income households (approximately 85% of projects concern this demography). And it has also helped create an estimated 4,709 jobs in the process.

It is important to note that the NYCEEC was founded in 2010 as part of a broader set of actions taken by Mayor Bloomberg's trusted policy entrepreneurship to reduce NYC's climate change risk – e.g. the creation of the NYC Panel on Climate Change, an independent scientific and decision-support advisory body. The NYCEEC is one of the first examples of a green bank; that is, a public organization that provides investment capital to facilitate adaptation and mitigation initiatives. It is in addition particularly rare as it operates at a municipal level (EPA 2018). Other foundational green banks were created around that time as well, including e.g. the Connecticut, New York, Hawaii, Vermont Green Banks; though these are all, as the names imply, state-level banks. The NYCEEC is particular in that it was created to support New York City's Sustainable Energy Program – but was set up so as to have a high degree of latitude in its operations. The Corporation was initially founded as a subdivision of the city; capitalized with federal grant money from the Department of Energy's Energy Efficiency and Conservation Block Grant (EECBG) program. However, in 2012, NYCEEC was filed with the IRS as a non-profit public charity; and in 2013, the board members (including Mayor Bloomberg, serving in ex-officio capacity) amended the corporation's bylaws to make it fully independent of New York City.

The bank's board is composed of a variable number of members – ranging from no fewer than five, to no more than twenty. At minimum, these members include so-called "ex-officio directors": the Director of the NYC Mayor's Office of Sustainability, as well as a City employee appointed by the Mayor; appointed for as long as they remain in office in City government. In addition, a

variable number of "elected directors", consisting of people who must be external to the Bank, are voted in annually for staggered terms of three years by the bank's current elected directors. All members can be reelected for an unlimited number of terms; but may be removed for cause after an affirmative majority vote of the entire board. Decisions taken by the NYCEEC require a majority vote of the quorum (which is constituted by the presence of one-third of the entire board).

From an economic perspective, the NYCEEC was set up as a 501 c(3) non-profit in order to benefit from the lack of taxation that that legal form implies with regards to the entity's investment and loan activities (Muir and Bose 2020). As a non-profit, it is thus able to retain, after payment of certain basic organizational obligations, all of the profits from its operations to finance new loans and expand itself and its "business". Also, the NYCEEC's non-profit status presents the economic advantage of allowing it to seek and receive public as well as private sources of funding. Allowing the bank to receive grant funding or to form partnerships with private sector firms notably is also an important element of its mission to not only fulfill a government imperative to promote green projects, but also, to a certain extent, to incentivize the private sector to initiate and increase its own investments in them as well.

From a political perspective, it's worthwhile noting as well that Bloomberg and the other NYCEEC's board members decision to separate the NYCEEC from NYC's government in 2012, both administratively as well as financially, was reportedly based on the idea that this would help it to sustain its work indefinitely (Muir and Bose 2020). Indeed, turbulence in other local "green banks" in the U.S. is not unheard of, and may have been a motivating factor, particularly for organizations operating in the politically controversial space of climate change. The Connecticut

Green Bank for instance, considered to be among the most independent of these types of institutions, was itself the target of the state government's diversion of part of its operating funds as the state looked to reduce its budget deficits (Ahn 2017).

2.8.3.2 Environmental QGOs

2.8.3.2.1 San Francisco Bay Conservation and Development Commission

In the western U.S., the San Francisco Bay Conservation and Development Commission (SFBCDC) represents an example of a quasi-governmental subordinate agency of the California Natural Resources Agency. The SFBCDC's mission is to protect and improve natural waterways and lands around the Bay Area, and promote the public's enjoyment of them; essentially through permitting powers related to individuals or agencies wanting to fill, extract or make substantial changes to water and land structures within its jurisdiction. To do so, it relies on an unusual governance arrangement which essentially approximates the structure of a multi-level compact comprised of members of the federal, state, and local government (Scott 1963: 104); modeled after the Delaware River Basin Commission (created only two years before the SFBCDC, in 1961). The study commission that proposed this governance arrangement also recommended that the commission should "have authority superior to that of private interests, city and county governments, and must be subject only to extraordinary veto by the state and federal governments", i.e. a high degree of independence granted legally and fiscally (e.g. through taxation and eminent domain).

The SFBCDC has taken steps to integrate climate change adaptation into its broader environmental project planning and implementation. It has worked on developing climate adaptation planning through workshops with Bay Area stakeholders concerning their proposed modifications to the BCDC's Bay Plan (the BCDC's guiding policy document), partnerships with academia and research institutes to map out potential sea level rise impacts, and forming an initiative (Bay Adapt) to establish a regional agreement on sea level rise resilience principles and actions. The BCDC also developed an internal Climate Change Program, which consists in a variety of initiatives. Perhaps the most impactful has been carrying out amendments to the Bay Plan. These have included: requirements for carrying out sea-level rise risk assessments, regulations designed to make new projects resilient to mid-century sea-level rise projections, suggestions to give vulnerable species and habitats special consideration for preservation efforts, developing a regional sea-level rise adaptation strategy in conjunction with other multi-level governmental entities in the Bay Area to help protect sensitive ecosystems and shoreline resilience, and encouraging a case-by-case evaluation of each reviewed project's benefits, resilience, and adaptation capacity while the strategy above is being developed, etc. Recently, the BCDC co-authored a report estimating the cost of a project to protect the Bay Area from sea-level rise at more than $110 billion by 2050 – an undertaking the city of San Francisco is currently consulting on and starting to address (Rogers 2023).

More broadly, it is important to point out that the SFBCDC has benefitted from including a representative of the U.S. Army Corps of Engineers (USACE) as a permanent member of its board of directors. This link with the USACE has provided the SFBCDC with federal-level planning and evaluation resources that are perhaps best equipped to provide planning in response to climate

change exacerbated sea level rise (Rasmussen et al. 2023). These resources have access to localized ranges of the detailed impacts within alternative coastal risk futures across the U.S.

The SFBCDC is governed by a highly multi-level and sectoral board of twenty-seven members. All members are appointed and come from i) federal agencies (EPA, USACE), ii) California State bodies (Secretary of Transportation staff, Natural Resources Agency staff, Director of Finance staff, member of the State Lands Commission), iii) County representatives (representing a supervisorial district from each of the nine San Francisco Bay counties), iv) the inter-municipal San Francisco Bay Regional Water Quality Control Board, v) municipal representatives from North/South/East/West bayside cities, and vi) members of the public. All members have theoretically unlimited terms, as they "serve at the pleasure of their respective appointing powers" (Cal. Gov. Code, § 66622). The presence of fourteen members constitutes a quorum (of whom, thirteen must be non-federal representatives) as well as the minimum number of votes needed to take a decision.

In terms of financial resources, the SFBCDC has a variety of tools at its disposal. In 1976, the California State Coastal Conservancy was founded – a conservation trust of sorts not endowed with regulatory powers – to assist the Conservation and Development Commission in its work in the protection, management, and even acquisition, of bay property. This organization was funded through a set of obligation bonds passed by California voters, which have amounted to more than $1.5 billion, as well as monies from other public and private sources (Lester 2013). And while the SFBCDC may also receive gifts, in recent budget filings of its budgets, it appears to mostly make use of three sources of funding: California state's General fund, monies from the National Oceanic

and Atmospheric Administration (NOAA), and a variety of short-term grants and contracts from other public agencies (SFBCDC 2021) – thus seeming not to be receiving or making use of philanthropic revenues. Finally, the organization doesn't have the ability to sustain itself financially through revenue-generating activities.

2.8.3.2.2 The Palm Beach Soil & Water Conservation District

The Palm Beach Soil & Water Conservation District is an example of a broader category of organization (Soil and Water Conservation Districts) whose mission involves informing U.S. residents about methods of natural resource protection and land management practices. Perhaps contrary to expectations, the organization has not included climate change concerns in this informational campaign (like other conservation districts in Florida). The Palm Beach case is an example of a quasi-governmental non-profit organization.

Soil and Water Conservation Districts are a rare type of QGO aiming to implement a form of federal-state-municipal governance; directed originally from the federal level. Helms (1990) suggests that the original idea for the Soil and Water Conservation Districts (SWCD) came from M.L. Wilson, the under-secretary of the USDA in 1935. Wilson viewed the newly-created Soil Conservation Service (of 1935) – which, in the aftermath of considerable soil mismanagement in previous decades, aimed to educate farmers on better soil use techniques through demonstration projects – to be insufficient to deal with the practical financial and technical limitations that farmers would face in applying the SCS's lessons (Helms 1990: 13). As such, Wilson imagined that something more than education was needed to truly address the problem, and was reportedly inspired by the example of water conservancy districts as a governance and organizational solution

(pp. 14). In essence, the envisioned system was one that would be able to deal with soil, as well as water, conservancy through i) local-level units of government, and ii) delegation of resources and decision-making to those units – a model he drafted as the Soil Conservation Districts Law. This legislation was passed by Congress in 1937, and it encouraged the creation of these SWCDs at the local state level. Indeed, Florida, as well as forty-seven other U.S. states, also amended their legislations to promote the development of these organizations at sub-state levels.

The Palm Beach Soil and Water Conservation District is thus one of many SWCDs existing across the US. It is governed by five supervisors elected by members of the public (within district boundaries), with term lengths spanning four years. Elections are staggered in time, with seats picked every two years. A simple majority of the supervisors constitutes a quorum, and decisions can be taken with a vote of the majority as well. Members of the board can be removed from the SWCD board by the governor of Florida – although only for malfeasance in office or neglect of duty.

The SWCD has the power to regulate (and enforce) – subject to district land-owning inhabitants' majority vote approval of the proposed measures – the district's land-use with the aim of conserving soil resources and controlling soil erosion, including provisions for: engineering projects, certain methods of cultivation (e.g. planting of erosion-preventing plants), and any other measures that could assist in the districts' land-use aims. Notably, the district also has the power to conduct informational measures (e.g. research, investigations, demonstrational projects), enter into agreements and cooperate with other agencies and specific land-owners in the aim of fulfilling its mission, and purchase/lease/grant any property for the purpose of maintaining itself financially

and for soil-conservation and erosion measures. From a financial perspective, as one might expect from the governance of a non-profit, the Palm Beach SWCD may also source its monies through the receipt of gifts and donations, and does not have the ability to levy taxes or issue bonds to further its activities.

2.8.3.3 Other QGOs

2.8.3.3.1 Knoxville Utilities Board

The Knoxville Utilities Board (KUB) is a public utility aiming to supply a variety of utility services (e.g. electricity, water, gas, wastewater treatment) to the population of Knoxville, Tennessee. Its governance exemplifies a particular model of governmental public utility, i.e. an independent city agency – as opposed to other U.S. public utilities, which often operate as city departments, city-owned corporations, municipal utility districts, or joint powers agencies (Homsy 2020). The KUB aims to provide apolitical management in utility service provision; and also, importantly, emerged from within the engaged and scientifically informed culture diffused by the Tennessee Valley Authority (Hamilton 2020; Neuse 1983).

In terms of governance, the KUB is governed by a board composed of seven commissioners appointed to it by the city's mayor (conditional on approval from the city council). The appointments are staggered in time, and the commissioners' term of office is seven years. Each member may serve up to a maximum of two times. Members of the board can be removed only under two circumstances – a four-fifths affirmative vote of the rest of the board, or for the causes detailed in the general ouster law of the state of Tennessee – thus making the removal of commissioners rather difficult.

Any action proposed with respect to governing the utility requires affirmative votes from a minimum of four commissioners (which also constitutes a quorum of the board). The KUB's enabling legislation also specifies the board is given "all the powers and duties possessed by the City of Knoxville to construct, acquire, expand or operate the system [utility] … [and] the system shall be free from the jurisdiction, direction or control of other city officers, employees, and of the city council" (Knox. Ord. part 1, XI §1106).

From a financial perspective, the KUB obtains some of its revenues from the rates it charges users for the provision of the variety of utility services it provides. It may also issue bonds and notes on the authority of the state of Tennessee and the city of Knoxville (with approval of the city council, but not that of electors), as well as enter into leases and contracts with other entities, or receive monetary advances from them to expand the utility's infrastructure. Interestingly, KUB is also allowed to invest its surplus funds into "securities and investments as are authorized by state law and the investment policies of the board" (Knox. Ord. part 1, XI §1106). In terms of financial obligations, the utility has to make annual payments (instead of taxes) to the city.

2.8.3.3.2 Port Authority of New York and New Jersey

The Port Authority of New York and New Jersey's (PANYNJ) is a public authority, in the category of special districts. Its mission is primarily one of overseeing regional transportation infrastructure in the New York and New Jersey port areas; and more specifically, of helping to meet the transportation needs of the two states in terms of accessibility, efficiency, and regional economic development.

PANYNJ was thus founded through an interstate compact between the two states. The design of the PANYNJ is relatively unique, and largely attributed to Julius Cohen. In 1919, acting as counsel to a bistate (NY-NJ) commission evaluating possible resolutions to port development issues between the two states, Cohen developed the framework of governance for the PANYNJ; based reportedly in part on his earlier Protocol of Peace treaty, as well as on British port "authorities" – notably, the Port of London Authority and especially the Mersey Docks and Harbour Board of Liverpool (Fetner 1977; Tobin 1953). The latter model was particularly important because of the parallels Cohen could draw between the region around Liverpool and the New York-New Jersey area – in terms of the similar levels of contentiousness between local governments (e.g. on matters of transportation, port use), and of the ownership by municipalities of desirable pier facilities (Smith 1974: 48).

The PANYNJ is governed by a board of twelve commissioners, with six appointed by each governor of the states of New York and New Jersey for overlapping term lengths of six years. This term length gives the commissioners some independence from politicians (governors' terms are four years long), though this is limited by the governors' right to veto the actions of the commissioners from their state. Commissioners may also be removed or suspended from office in accordance with the laws of New York and New Jersey respectively. The presence of six commissioners (three from each state) constitutes a quorum, and decisions are taken with a majority of votes in the affirmative.

From a financial perspective, the organization is given the power to sustain its operations through a variety of enterprises. Within the PANYNJ's jurisdiction, it may purchase, hold, construct upon, and lease property for any reason (including for transportation facilities); from which it receives money for instance from tolls, or other fares collected from public usage. It can also borrow money (e.g. as mortgages) or issue debt in the form of bonds against its properties. It however does not have the power to tax or receive tax money from governments in New York State.

2.8.3.3.3 The Regents of the University of California

The Regents of the University of California (i.e. the university system's official organizational and directorship name) is an example of a public corporation endowed with a public trust. Its mission is that of administering the system of schools' endowment, managing land properties owned by the organization, and governing university educational policy in all its facets. Although it was reportedly inspired by the model of the University of Michigan at the time of the UC's founding (through the California Organic Act of 1868), its governance is relatively unique. Specifically, the legislation for the California Organic Act of 1868 was developed by the future president of the university, John Durant, in conjunction with an Alameda County assemblyman. In their recommendations for the legislation, Durant reportedly insisted that the University be given a high level of autonomy in its governance – pointing to the example of the University of Michigan, which was widely viewed as particularly successful model of university among the colleges founded in the new states of the union. The University of Michigan had a board of directors (whose members are also referred to as "Regents"), and a degree of political independence similar to that proposed for the California system (Douglass 2000). Beyond its governance, over time, the UC system and its resources have been an important element in informing the Californian public and

enabling persistent support for state and substate conservation and climate change measures (Mazmanian et al. 2020).

The Regents' board consists of twenty-six voting members (each referred to as a "Regent"), plus two non-voting U.C. faculty members. Among the twenty-six voting members are seven ex-officio officials (with four being part of California state government): the Governor, Lieutenant Governor, Speaker of the Assembly, and Superintendent of Public Instruction, the acting president of the university, and the president and vice president of the alumni association of the university. One member is a student of the university appointed by the Regents. And the remaining eighteen come from the general public and are appointed to their positions by the Governor, with approval of the Senate. The term length for the appointees is twelve years (and one year for the student member); and there is a complex multi-step process for removal of appointee members that requires a majority vote from the rest of the board. A quorum, for a regular meeting, is constituted by the presence of nine (or majority of) Regents, and decisions that are approved for action by the board require a majority of votes as well.

The university is endowed with many powers "of organization and government, subject only to such legislative control as may be necessary to insure the security of its funds and compliance with the terms of the endowments of the university and such competitive bidding procedures as may be made applicable to the university by statute for the letting of construction contracts, sales of real property, and purchasing of materials, goods, and services" (Cal. Const. art. IX § 9 (a)). Furthermore, the university is prescribed to be "entirely independent of all political and sectarian influence and kept free therefrom in the appointment of its Regents and in the administration of its

affairs" (subsection f). Within this broad framework of the organization's goals and responsibilities, the Regents themselves are tasked with a variety of matters, including the steering of its: governance, academics, finance, capital projects, appointments and compensations, etc.

From a financial perspective, the Regents of the University of California manage a significant, but not unique, source of funding – the endowment (or UC General Funds) – for the public trust (the UC system). The UC system also obtains resources from: its tuition and fees, private support (i.e. gifts), government contracts and grants, and enterprises it is engaged in (sales of goods and services, including in its medical centers). Originally, the U.C. General Funds were established in part thanks to the sale of lands granted to the UC system (and other universities) as part of the Morrill Act, or Agricultural College Land Act of 1862 (Croft 2019). The Morrill Act legislated the creation of financial resources for universities; and, in California, the provision of financial support for the 1868 Organic Act's mandate creating the University of California.

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3 Multi-stakeholder Coordination in U.S. Federal Quasi-Governmental Organizations for Climate Change and Environmental Policy

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Abstract

Lack of policymaking coordination between public and private sector actors is a climate change governance barrier. In the U.S., we suggest quasi-governmental organizations (QGOs) provide an overlooked organizational model to potentially overcome this barrier. We know federal QGOs exist. However, little is known about whether they function in the climate or environmental domain or whether they can be oriented towards climate or environmental problems (ce-QGOs). In order to understand their potential role, it's important to understand how they emerged historically, fit in to the U.S. governance landscape, and what their corporate structure is. Using a novel dataset of federal U.S. QGOs, we investigate these questions. We conclude that ce-QGOs (n=9) represent a fairly high proportion of federal QGOs in general (n=45); have emerged at different periods in time, and more continuously, than traditional government agencies for climate change or environmental governance; were mostly, but not exclusively, created for environmental purposes, and later added (or "layered") on climate change policies and programs to their work. Furthermore

they are characterized by substantial variation in the multi-level and multi-sectoral stakeholders represented on their boards and in the board member nomination process. We suggest that ce-QGOs with high multi-stakeholder variation on their boards have unique potential to overcome the stakeholder coordination governance barrier, while those with low variation offer little advantage over traditional government agencies.

3.1 Introduction

Lack of decision-making coordination between actors from different levels of government and sectors of society, is a governance barrier to effective climate mitigation and adaptation efforts (Pörtner et al. 2022; Dubash et al. 2022; Biesbroek 2021; Hsu et al. 2020; Shi 2019; Amundsen et al. 2018; Scott 2017). We define the former set of actors as "multi-level"; and the latter as "multi-sectorial" (i.e. government represents the public sector, and entities such as businesses, nonprofits, and the general public represent the private sector). Recent IPCC reports on climate mitigation and adaptation highlight the coordination barrier (Pörtner et al. 2022; Dubash et al. 2022), drawing on case studies from the US (Shi 2019; Hunt and Watkiss 2011), Latin America (Di Gregorio et al. 2019; Adriázola et al. 2018), Europe (Lehmann et al. 2015; Hunt and Watkiss 2011), and across the world (Boyd et al. 2022). The 2015 Paris Agreement under the United Nations Framework Convention on Climate Change (UNFCCC) crystallized the need, which nations committed to, for greater multi-level and multi-sectoral stakeholder coordination in climate change governance (Keohane and Oppenheimer 2016; Castro 2020).

Increased multi-level and sectoral stakeholder involvement in climate change-focused organizations may help to e.g. allow stakeholders to pursue objectives in an integrated and

coordinated way, establish and maintain support to conduct mitigation and adaptation efforts, and prevent the decision-making process from being unduly influenced by certain actors (Lee et al. 2022; Fastiggi et al. 2021; Malloy and Ashcraft 2020; Fuso Nerini et al. 2019). Multi-stakeholder decision-making in organizations thus provides an opportunity, but not a guarantee, for stakeholders to interact and lead to more effective and coordinated policies. These outcomes are also conditional on other variables, including: sufficient decision-making power, creditworthiness and access to funding, a supportive political and legal context, stakeholder interests, power relations and trust, and policy entrepreneurship (Kronvall et al. 2023, van der Heijden 2019; Ravikumar et al. 2015).

Research has examined novel organizational forms created between public and private organizations as a means to increase stakeholder coordination, among other goals (Leal Filho et al 2022; Hsu et al. 2020; Lee and Jung 2018; Stewart et al. 2013). These organizations represent permutations of governance modes (hierarchies, markets, networks), e.g. public-private partnerships (between hierarchies and markets), co-management (hierarchies-networks), private-private (markets-networks). These forms have emerged not only within nations, but also between them, for instance as transnational municipal networks and international public-private partnerships (Ejsing et al. 2023; Schoenefeld et al. 2022). The effectiveness and purpose of these organizations is debated, e.g. local climate assemblies may serve stakeholders better as forums for information sharing than as loci of policy creation and implementation, due to limitations in independence from political actors, financial resources, and tangible agenda-setting or decision-making power (Ejsing et al. 2023).

Consequently, the search for organizational models that overcome the multi-stakeholder coordination barrier is ongoing. This search is all the more important in the United States – the world's largest economy and second largest emitter of global greenhouse gases (GHG). The U.S. embodies a federalist political system where the federal level exercises broad policymaking and revenue-raising authority while substate entities are the primary entities charged with policy implementation (Mueller and Fenna 2022). Coordinating these governmental levels politically and financially – with private sector actors – would be important to leverage the U.S.' economic resources in curtailing GHG emissions and adapting to climate change impacts.

In the United States, we suggest that quasi-governmental organizations (QGOs) constitute an overlooked organizational model that may be useful to overcome the multi-stakeholder coordination barrier in climate change and environmental governance (ce-governance). Outside of QGOs, formal governmental organizations that effect multi-stakeholder decision-making is limited in the U.S. With the exception of a small set of organizations which connect the different levels in the federal system, i.e. Metropolitan Planning Organizations (MPOs) which connect all government levels, Presidential intergovernmental offices, and the now defunct Advisory Commission on Intergovernmental Relations, informal institutions are the primary form different levels of government use to interact with one another, e.g. professional associations between governors, state lawyers, state legislatures, mayors, or voluntary regional associations (the Councils of Governments, notably) (Smith 2015). Moreover, QGOs represent a significant proportion of what is typically considered to be "government" (USCB 2019), addressing a variety of policy issues across the U.S. We define them as entities having some formal legal relation to government, and blending public and private sectors characteristics and for-profit and not-for-

profit modes of operation. In general, anecdotal work has showed that these characteristics and modes allow a QGO's decision-making to be conducted by multi-level and multi-sectoral stakeholders. However, the extent to which this occurs in U.S. QGOs, and therefore how useful these organizations would be to overcome insufficient multi-stakeholder coordination, is unknown. Moreover, it is also unclear whether a subset of these QGOs exist at the federal level to address climate change and often closely related environmental issues; and if they do exist, how they emerged historically and fit in to the U.S. governance landscape.

In this article, we look to fill these research gaps and focus on examining QGOs at the federal level. Specifically, we investigate whether U.S. federal-level QGOs function exclusively in (i.e. dedicated to) climate change or environmental domains or were oriented towards these domains after their creation (i.e. climate policies were layered on subsequently). In either case we name these organizations ce-QGOs. To understand their potential role in U.S. climate change or environmental governance, we also ask how ce-QGOs emerged historically, and the extent to which public and private stakeholders are involved in ce-QGOs' decision-making, i.e. their board of directors and directors' nomination process. We use the latter point as a proxy for policymaking stakeholder coordination. We frame these questions in the context of three hypotheses, posited below. Our conclusions are that federal-level U.S. ce-QGOs represent a fairly high proportion of federal QGOs in general; have emerged at different periods, and more continuously, than traditional government agencies in ce-governance; were mostly, but not exclusively, created for environmental purposes, and later added (or "layered") on climate change policies and programs; and are characterized by substantial variation in the multi-level and multi-sectoral stakeholders represented on their boards and in the board member nomination process. We suggest some ce-

QGOs have potential to overcome coordination issues, although further research is needed to identify the extent to which their formal structure translates into policy coordination outcomes.

3.2 U.S. governance and QGOs

The stakeholder coordination barrier discussed above is particularly salient in the context of the U.S. federal system of government. U.S. federalism divides constitutional power along federal, state, and substate entities. Federal (and state) governmental entities represent less than 1% of all governmental entities in the nation – counties, townships, and cities account for the rest, and the degree to which these are fragmented across various states varies as a function of legislation, administrative traditions, and local-level experimentation (Goodman 2019; OECD 2019; Peters 2018). Because of the fragmentation of power, policies develop competitively and experimentally. Issues of intergovernmental policy require voluntary cooperation between governmental entities, and disputes are frequently settled through the court system (Bakvis and Brown 2010).

Although climate change policy in the U.S. has developed and progressed at all levels of government – notably at the (sub)state level, at times when federal administrations became less entrepreneurial in this field – scholars have devoted particular attention to the federal level (Basseches et al. 2022; Shouse 2021; Urpelainen and Van de Graaf 2018). Federal climate change policy has largely materialized in governmental agencies through institutional layering, i.e. climate change responsibilities given to pre-existing agencies; as opposed to through the creation of novel, dedicated organizations that centralize and coordinate policy (Mildenberger 2021; Dubash 2021). A number of U.S. presidents have created bodies in the executive branch to coordinate climate change policies in the executive branch, e.g. the President's Coordinator for Climate Change, State

Department's Special Envoy on Climate Change, or White House Office of Climate Policy. Many of these discretionary coordinating entities were terminated or altered as new administrations came into power. Consistent progress on multi-stakeholder climate change policy coordination has consequently been difficult to achieve (Mildenberger 2021; Konisky 2020; Carlson and McCormick 2015).

Besides politicized executive efforts on climate change coordination, legislative action has tasked existing federal agencies with administering climate change and environmentally related programs and funds (Cunningham and Jordan 2023; Humphreys and Ramseur 2022; Shouse 2021). Although some of these programs look to coordinate efforts across departments and stakeholders at the federal level, these efforts have been limited (Cunningham and Jordan 2023). In addition, because departments are headed by political appointees, presidential administrations unfriendly to climate change and environmental work have been able to stall progress and reduce policy coordination capacity in these domains – sometimes leading to drawn-out legal battles, e.g. Massachusetts v. EPA (Mildenberger 2021).

3.2.1 QGOs in climatic and environmental U.S. governance

Quasi-governmental organizations are virtually absent in discussions of U.S. climate change and environmental governance. As mentioned, we define them as entities having some formal legal relation to government, and blending public and private sectors characteristics and for-profit and not-for-profit modes of operation. In the literature, there is no current consensus on all the subtypes of organizations included in the quasi-governmental organization nomenclature. At the U.S. federal level, according to our definition and methodology (given below), examples of QGO

subtypes include: government corporations (e.g. the Tennessee Valley Authority, or TVA), quasi-official agencies (e.g. the Smithsonian Institute), and agency-related nonprofits corporations (e.g. the National Fish and Wildlife Foundation). More background and definitional information on QGOs is given in Supplementary Information.

One way to view quasi-governmental organizations is as a set of organizations over which elected officials have relaxed their administrative and financial control, relative to traditional governmental agencies (Koppell 2001). The degree of relaxation, or independence, is viewed as being some function of a particular QGO's governance characteristics. These independence characteristics include: a board of directors structure instead of a single agency head; requirements that boards have a balanced proportion of members from different political, demographic, expertise groups; quorum requirements that enforce majoritarian decision-taking; exemption from mandatory executive branch reviews of budget proposals, legislative materials, administrative rules, and congressional testimony; and funding sourced outside of government appropriations (e.g. through fees, donations, bond issuance), etc. (Selin and Lewis 2018; Selin 2015; Datla and Revesz 2013).

For the purposes of this article, i.e. addressing the problem of stakeholder coordination, we select and focus on the following elements: i) a board of directors decision-making structure that explicitly requires stakeholders from different levels of government and/or private sector stakeholders to be included, ii) requirements concerning who can be appointed to the board of directors (e.g. political, demographic, expertise conditions), and iii) a director nomination process that requires input from different governmental entities, public officials, or private sector actors

(Selin and Lewis 2018; Selin 2015). The way these characteristics interact to form a certain degree of independence is as of yet unclear, although legislators that design and create QGOs appear to have some informal, practice-based conceptualization of this (Knapp 2020; Datla and Revesz 2013). We note that perceptions of excessive independence of certain QGOs, exhibited by morally questionable or illegal activities, at points in time have led to efforts to reduce it by increasing oversight and accountability mechanisms (Mitchell 1992). Nevertheless, despite some perceptions to the contrary, quasi-governmental organizations are not immune to being terminated, merged into another organization, or having their freedoms curtailed through legislation (Kosar, 2011).

The TVA for instance is governmental in a number of ways: it was created by an act of Congress, is wholly owned by the U.S. government, and has a mandate to serve the general public in southeastern states through the provision of electricity, land management, and economic development. It deviates from government agencies in other ways however: it operates as an independent nonprofit tax-exempt corporation that is entirely self-funded (through operating revenues, power program financing, and issuance of corporate debt), and has governance characteristics that distinguish from more typical federal government agencies, notably: a board of directors, who are appointed, hold 5-year term lengths, and have specific geographic and expertise requirements.

Scholars have advanced a variety of rationales to explain why elected officials would create a quasi-governmental organization. Some suggest that they are used as instruments to institutionalize coordination and agreements between separate governmental entities (like bi-state agencies), overcome limitations that the executive may place on monetary borrowing by pure

governmental organizations (often invoked in the case of New York state quasi-government), establish an organization with characteristics associated with businesses (which may be perceived, as compared to bureaucracies, as more efficient), or reduce the politicization of a policy function (Mead and Warren 2016; Kosar 2011; Koppell 2006: 6; Moe 2001; Mitchell 1999).

Evaluations of the extent to which QGOs' structural characteristics – such as a board of decision-makers populated by individuals from the public and private sectors, and different levels of government – lead to outcomes such as decision-making coordination, have been sparse. Anecdotal evidence suggests that QGOs that regroup multi-sectoral and multi-level stakeholders have been broadly successful in increasing decision-making coordination, e.g. the Appalachian Regional Commission (Bradshaw 1992; Hansen et al. 1990: 145; Widner 1990), the San Francisco Bay Conservation and Development Commission (Pinto et al. 2018; Smith and Pendelton 1990), Delaware River Basin Commission (Moore 2021; Kauffman 2015). However, a micro-level analysis of how board members, representing different stakeholders, actually interact and lead (or not) to coordination is lacking in the QGO literature.

Efforts to estimate the number of QGOs in the U.S., federal and otherwise, have been challenged by inconsistent and ambiguous nomenclature surrounding these organizations, both from scholars as well as the government itself. Likely as a result, no comprehensive dataset on these entities exists, even according to a given classification scheme or another. Nevertheless, some sources' classification of these entities suggests there may be up to 200 of them at the federal level; while at the subnational level, a particularly prolific form of QGO, the special district, constitutes an estimated 43% of all sub-state government (USCB 2019).

Another by-product of the above issues is that virtually no work has investigated whether QGOs, federal or subnational, exist to address climate change and environmental work; and if so, what their performance has been so far. Anecdotal evidence points to decision-makers' interest in using this form of organization for ce-governance. The National Fish and Wildlife Foundation for instance was created in 1984 to encourage and administer private gifts to assist the US Fish and Wildlife Service and National Oceanic and Atmospheric Administration, and undertake conservation and management activities, among other goals. Last year it invested more than $734 million in 814 conservation programs, which also contributed to climate mitigation and adaptation goals (NFWF 2022). More recently, the Foundation for Energy Security and Innovation was created in 2022 to support the Department of Energy's mission and accelerate the commercialization of existing and new energy technologies (including clean energy) through fundraising from the private sector (Duggan and Hart 2022).

3.3 Theoretical Framework

As an underlying premise, we assume that QGOs constitute a potentially useful model of organization to overcome stakeholder coordination issues in ce-governance. In what follows, we posit three hypotheses on U.S. federal QGOs in ce-governance to guide our investigation of these organizations. Namely, we look to understand when and how they were created, and the degree to which their formal governance structure is arrayed in a manner that, based on theory, aims to overcome stakeholder coordination challenges. Due to the virtual absence of any prior research on QGOs and their intersection with ce-governance, we build the following hypotheses on research from traditional U.S. governmental agencies and climate change and environmental history.

1. Scholars describe the 1970s as the beginning of a significant era of U.S. environmental law and policy (Konisky 2020; Lazarus 2001). Major government agencies and organizational units were re-organized from disparate organizational units during this period to deal with environmental issues, e.g. the Environmental Protection Agency (EPA), the National Oceanic and Atmospheric Administration (NOAA), or the Bureau of Oceans and International Environmental and Scientific Affairs (OES). The EPA for instance emerged as a reorganization of previous programs and authorities which were limited in scope and distributed throughout the federal apparatus (Konisky 2020).

These were not the first agencies or offices tasked with environmental policymaking and regulation in the U.S., but were arguably expressions of a new environmental consciousness (Konisky 2020). For instance, prior to 1970, states were the primary actors in charge of controlling air and water pollution, with the federal government's role largely confined to providing research, guidelines, and assistance. As state's inability or unwillingness to deal with pollutions issues grew, federal policymakers eventually filled the gap through the creation of the EPA and supporting environmental legislation (Fiorino 2013).

In terms of legislation, the landmark National Environmental Policy Act (NEPA) was signed into law in 1970. NEPA made it mandatory for every entity and office in federal government to gather, evaluate, and share environmental impacts data on potential large-scale federal agency decisions (Lindstrom and West 2022). Also particularly noteworthy is the 1970 Clean Air Act which gave the EPA the ability to regulate air emissions from stationary and mobile sources. In the rest of the

decade, a number of other important environmental legislations followed, notably the: Clean Water Act (1972), Endangered Species Act (1973), Safe Drinking Water Act (1974), Resource Conservation and Recovery Act (1976), the National Forest Management Act (1976), and the Comprehensive Environmental Response, Compensation, and Liability Act (1980).

Hypothesis 1: we expect to find that the first U.S. federal QGOs created to address environmental issues were founded predominantly, but not exclusively, in the 1970s.

2. U.S. climate change policy has arguably developed predominantly since the late 2000s (Shouse 2021; Konisky 2020). Research on U.S. governmental organizations suggests that climate change policies have largely been layered onto previously existing, non climate-dedicated, governmental organizations, e.g. carbon emission regulations at the EPA (Dubash 2021; Mildenberger 2021). In other words, new climatic policies or features have been added on to the responsibilities of existing institutions. Broad political agreement within countries is considered necessary to create and sustain new climate-dedicated organizations, e.g. in the UK, Australia, or New Zealand. The lack of development of these dedicated organizations in the U.S. is attributed to the politicization and policy conflict surrounding climate change within the country (Dubash 2021).

Hypothesis 2: we expect that U.S. federal QGOs dedicated to climatic issues have not been created. Rather we expect to find that climatic policies have been layered onto already existing environmental or non-environmental federal QGOs, and that this process largely started since the late 2000s.

3. Following the previous hypotheses, we infer that U.S. federal ce-QGOs were predominantly created at different time periods, and with different levels of dedication/layering with respect to environmental or climatic issues (Mildenberger 2021). In other words, because these organizations were presumably not created within a specific administrative era and framework during which certain QGO subtypes might have been in vogue (e.g. government corporations in the 1930s New Deal), it is likely that different subtypes of QGOs exist (with differences in the governance elements mentioned above) (Mitchell 1999).

> *Hypothesis 3: we expect variation in the aforementioned critical decision-making elements of ce-QGOs' governance. In the context of stakeholder coordination, in terms of their: board of directors, its composition, and stakeholder input into directors' nomination to the board. In other words, we expect there to be different subtypes of QGOs represented within the ce-QGO dataset (e.g. government corporations, nonprofit foundations).*

3.4 Methods

We compile a list of currently-existing federally created QGOs using various documentation: listings from the US Government Manual (for quasi-official agencies), Congressional Research Service reports explicitly discussing quasi-governmental entities, the Administrative Conference of the United States' (ACUS) Sourcebook of United States Executive Agencies, and academic literature that mentions QGOs that may not have already been identified using the prior sources (USGM 2023; Gallo 2022; Lawhorn 2022; Kosar 2011; Kosar 2008). From the compilation process, we obtain a set of 201 federal QGOs. We filter this set according to 5 criteria, described

below — which removes 156 organizations. We then retain for analysis the remaining subset (n=45) for the purposes of this article. To our knowledge, no previous research has attempted to compile a full list of U.S. federal QGOs. Consequently, there are no precedents or pre-existing guidelines in the literature on this topic.

The five QGO criteria we use are i) founding at the federal level in the US Code, ii) not explicitly described in legislation as being "private" entities, iii) led by a board of directors (or other equivalent directorship structure), iv) not under government conservatorship, and v) currently existing or active. We use the first criterion to make sure that a potential candidate for inclusion in our dataset is indeed governmental to some extent and recorded as such in the official codification of federal-level statutes, i.e. the U.S. Code — this relates our definition of QGOs as "having some formal legal relation to government". The second criteria guards against the opposite problem — where there might be no basis for calling an organization quasi-*governmental* if policymakers have explicitly called it "private". We adopt the third criterion because it speaks to the purpose of this article, i.e. we want to focus on QGOs that have a primary decision-making structure that is composed of more than 1 individual (i.e. a board of directors, since this allows potential stakeholder coordination). The fourth criterion eliminates QGOs whose current governance has substantially departed from their founding governance structure, i.e. government conservatorship post financial crisis of the Federal National Mortgage Association (Fannie Mae); which has placed significant restrictions and controls on the organization. Finally, we adopt the fifth criterion to ensure we only analyze QGOs that are viable models of potential multi-stakeholder coordination. In other words, QGOs that policymakers have not made active (for example by indefinitely withholding funding from them), or have been terminated and no longer currently exist, are

implicitly considered as not being useful examples of multi-stakeholder coordination structures. Specifically, according to the first two criterion, we exclude (n=149) organizations from our compilation: congressionally-chartered nonprofit organizations, venture capital funds, so-called "instrumentalities of indeterminate character", and federally-funded research and development centers (Kosar 2011). According to the third criterion, we remove three QGOs: Saint Lawrence Seaway Development Corporation, Community Development Financial Institutions Fund, and the Administrative Conference of the United States. As per our fourth criterion, we remove the Government National Mortgage Association, and the Federal National Mortgage Association. Finally, we remove the Northern Great Plains Regional Authority, and the Southwest Border Regional Commission (fifth criterion). The remaining QGOs listed (n = 45) include quasi-official agencies, government corporations, federal regional commissions and authorities, and agency-related nonprofit research foundations and corporations.

For this list of QGOs, we collect data on 7 variables that we use as proxies for QGOs' multi-level and multi-sectoral decision-making coordination. These variables represent characteristics of the board of directors of the QGOs, i.e. the number of sectors and levels on the board, board member nomination input from the U.S. congress, a composite index we created to represent variation in stakeholder representation (aggregated from the following binary variables: US citizenship, geographic characteristics, demographic characteristics, expertise requirements, and political party balancing). We call the variables in this index "board conditions". For these elements, and especially for the first two, we count sectors or levels only if they are explicitly mentioned in the legislation.

We select these particular variables as they speak directly to the driving motivation behind the project, i.e. organizational structures that may overcome the climate governance barrier of stakeholder coordination in decision-making. No complete guide of variables exists to describe QGOs' governance. However, some research has attempted to do this for independent agencies – and has lumped some federal QGOs in this category (Selin and Lewis 2018; Selin 2015). This work uses a variety of variables to describe these independent agencies' governance. We reprise the categorization for "leadership structure" (Selin and Lewis 2018) and extract the variables within that category that are directly relevant to multi-level and multi-sectoral coordination in the board of directors, exhibit some variation, and are not limited to specific types of organizations. Along these criteria, we exclude e.g. data about employees, specific provisions on directors' terms, or factors relevant only to certain subsets of organizations (e.g. presence of civilian board member on military agencies' board).

Although evaluating QGOs' actual coordination may be preferable to using the variables above as proxy for potential stakeholder coordination, it is unclear how this could be assessed. In terms of documentation, QGO meeting minutes may arguably be the best fine-grained record of organizational decision-making and the process by which "coordination" is achieved through the interaction and presence of different stakeholders. However no meeting minutes currently exist for many of the ce-QGOs in our subset: FFAR, NPF, CCC, FESI (because it is a new organization), ICEF, or NFF. For the Presidio Trust and TVA, meeting minutes do exist but are not precise enough to evaluate whether and how coordination plays out among their directors.

Data on the above variables (unindexed), with the exception of the number of sectors or government levels present on the board of directors, was obtained from the ACUS' Sourcebook of United States Executive Agencies (2nd edition) dataset. The ACUS dataset provided information on a subset of government corporations, as well as a few quasi-official agencies and federal regional commissions and authorities listed among our 45 QGOs. For the missing QGOs, we manually collected data from US code legislations and supporting material if necessary (QGOs' websites, bylaw documents, CRS reports).

In addition, we manually collected data on the 45 QGOs' creation date, their legal status, mission or purpose statements, and (potential) climate or environmental work. The latter two elements were used to assess whether, and to what extent, some of the QGOs in the dataset work on climate or environmental issues – as stated in either the US code, the QGOs' bylaws or website, or the Federal Register. Multiple sources were used in case descriptions of the mission/purpose were insufficiently precise in one or the other. Summaries of the ce-QGOs' work were gathered using the organizations' own annual reports (typically the latest ones) as well as any other pertinent sources (displayed on their websites, other reports, CRS reports, etc.).

3.5 Results

In Supplementary Information we provide general information on QGOs. In the following, we present our analysis' results for this study's nine U.S. federal ce-QGO cases. We structure our results to address the three hypotheses we posited in section 3. For hypotheses 1 and 2, we present key elements of the ce-QGOs' history, and climate change or environmental activity. In Supplementary Information (table 3), we provide the data used to describe the results below, i.e.

the areas of focus, names, creation dates, purpose/missions, and climate or environmental work carried out by this study's ce-QGOs. For hypothesis 3, we describe three aspects of the ce-QGOs' governance structure (also shown synthetically in tables 1 and 2), i.e. variation in the multi-level and multi-sectoral stakeholders represented on their boards of directors and in the board member nomination process. The following results aim to establish whether U.S. federal QGOs function or can be oriented towards the climate change or environmental issues, how ce-QGOs emerged historically and within the U.S. governance landscape, and the extent to which their decision-making is led by multi-level and multi-sectoral stakeholders. Answering these questions provides a foundation for scholars to build on to assess the U.S.' projected institutional capacity to address climate change and environmental planning and implementation, and explore the potential role for QGOs to add to this capacity by overcoming the difficulty of achieving multi-level or sectoral stakeholder policy coordination.

This study avoids broad claims. Assessing the effectiveness, or performance, of the ce-QGOs' climate change or environmental work is beyond this article's purview. Also, some ce-QGOs' multi-level and multi-sectoral decision-making structure may enable, but does not guarantee, their ability to overcome the stakeholder policy coordination barrier. We do not claim that guarantee because of limited data availability on these organizations' decision-making over time. Moreover, QGOs are not perfect. As mentioned in section 2.2, QGOs have on occasion committed improprieties, i.e. illegal or morally questionable behavior, that may curb legislators' future desire to use these organizations for climate change of environmental purposes. Reviewing these improprieties is also beyond this study's scope. Our results however suggest that QGOs have been increasingly created to work on climate change or environmental issues.

3.5.1 Hypotheses 1-2

Among the forty-five federally created QGOs identified in our dataset, we find that nine were primarily or partially created for, and are currently involved in, climate or environmental work (i.e. ce-QGOs).

Regarding hypothesis 1, we find that no environmental QGOs in our dataset were created in the 1970s. Instead, environmental or environmentally related QGOs were created only before, and after, that time. Some were founded as early as the 1930s (the Tennessee Valley Authority and Commodity Credit Corporation), while the latest is the Foundation for Energy Security and Innovation (in 2014). The National Park Foundation (1967) and National Fish and Wildlife Foundation (1984) are the only two QGOs created in some proximity to the 1970s.

Regarding hypothesis 2, as discussed above, we use the QGOs' mission statements to understand what they were created for, and documents such as their annual reports and performance assessments as proxies for their policies since their founding. We find that one QGO, the International Clean Energy Foundation, was exclusively created to work on climate change mitigation. Another, the Foundation for Energy Security and Innovation (FESI), was created with a mission that suggests a primary focus on climate change energy technology – i.e. commercializing past and new energy technologies, that include renewables – but doesn't exclude environmental work, given its aim of supporting the Department of Energy's work. We can't verify what work FESI has conducted so far, given its recent creation (in 2022). The only other QGO created in the 2000s, the Foundation for Food and Agricultural Research (FFAR), was founded

ostensibly to address environmental issues. It started to address (layer on) climate change work at a later date, notably with its Agriculture Climate Partnership in 2020. Prior to that, all the other ce-QGOs, with the exception of the Commodity Credit Corporation, were created for environmental or environmentally related reasons; and subsequently layered on climate change work.

3.5.2 Hypothesis 3

Regarding hypothesis 3, we find that ce-QGOs' governance varies substantially in terms of the three elements we focus on: public and private stakeholders explicitly required to be present on the board of directors, board conditions placed on those stakeholders, and the actors having explicit input into the nomination of directors. Table 2 summarizes the first two elements, and table 3 the third.

The FESI for instance has a high degree of multi-stakeholder representation on the board of directors, including individuals from different levels of government (federal, state, county, and municipal), as well as from the private sector (business, non-profit, and academia); with two board conditions, expertise and geography. Yet, it only has board nomination input from nonprofit and federal actors (including the U.S. Congress). On the other hand, the TVA, which has the highest number of external actors providing nomination input, i.e. from the general public, non-profit, business, state, and Congress, has no similar explicit variation in its board (the TVA's legislation does not specify whether directors must come from government or the private sector); even though the TVA has the highest number of board conditions placed on the members. Finally, both the ICEF and the CCC require only a member of a federal entity to be on the board, and have few to

no board conditions and stakeholder input nomination (only expertise and congressional input from Congress, respectively, for the ICEF).

Among the board conditions, political balancing of the board of directors is never required among the nine ce-QGOs, i.e. there are no requirements that the proportion of directors adhering to particular political party be capped.

Table 3.1: This table shows the stakeholders present on the board of directors (B), or having input into their nomination (I), in all this study's ce-QGOs. The final column "US Congressional bodies" represents whether 1 or more individuals from either the Senate or House of Representatives have some kind of input into the nomination of QGO directors, e.g. "advice", "consent", "recommendation of possible directors".

Organization	Academia	GP	Non-profit	Business	Municipal	County	State	Federal	Quasi-governmental	U.S. Congressional bodies
Foundation for Energy Security and Innovation	B		B, I	B	B	B	B	B, I		I
Commodity Credit Corporation								B		
Foundation for Food and Agriculture Research			I	I				B, I		
International Clean Energy Foundation								B		I
National Forest Foundation		1							I (itself)	
National Fish and Wildlife Foundation								B, I	I (itself)	
National Park Foundation		B						I		
Presidio Trust (of San Francisco)								B		
Tennessee Valley Authority		I	I	I			I			I

Table 3.2: This table shows the five board conditions for the board of directors of the ce-QGOs, i.e. U.S. citizen, geographic, demographic, expertise, party balancing.. Y indicates a condition is present in legislation, 0 indicates none.

Organization	U.S. citizen	Geographic	Demographic	Expertise	Party Balancing
Foundation for Energy Security and Innovation	0	Y	0	Y	0
Commodity Credit Corporation	0	0	0	0	0
Foundation for Food and Agriculture Research	0	0	0	Y	0
International Clean Energy Foundation	0	0	0	Y	0
National Forest Foundation	0	0	0	Y	0
National Fish and Wildlife Foundation	Y	0	0	Y	0
National Park Foundation	Y	0	0	0	0
Presidio Trust (of San Francisco)	0	Y	0	Y	0
Tennessee Valley Authority	Y	Y	Y	Y	0

3.6 Discussion and outlook

This study proposes that understanding U.S. federal QGOs' function, emergence, and governance in the climate change or environmental domains is important in potentially overcoming the difficulty of achieving multi-level or sectoral coordination in climate change governance.

We first observe that ce-QGOs represent a fairly substantial proportion (n=9) of the total federal QGO dataset (n=45). This is all the more surprising given the lack of attention in the scholarly literature on these entities and their place in U.S. climate change and environmental governance.

With regards to our hypotheses, we reject the first, finding that federal environmental(ly related) QGOs emerged in a historically different way than traditional government agencies. While the latter emerged predominantly in the 1970s in the environmental sphere, environmental QGOs were not created during that time; and instead were founded in a more continuous fashion starting in the 1930s. This suggests there is a substantial difference in decision-makers' creation and usage of QGOs as organizational tools for environmental purposes, as compared to government agencies. For all practical purposes, climate change as a policy issue didn't exist in the 1970s but –as we highlight below regarding our second hypothesis – may subsequently have been layered onto previous-existing environmental QGOs.

We also partially accept our second hypothesis, i.e. that climatic policies have been layered onto already existing environmental or non-environmental federal QGOs. While most of the QGOs we examine have environmentally-focused missions onto which climate change concerns have been "layered" on, two QGOs were created with a dedicated focus on climate change work, i.e. the International Clean Energy Foundation (ICEF), and the Foundation for Energy Security and Innovation (FESI). One caveat, the International Clean Energy Foundation, although existent in legislation, appears not to have been created yet as a working organization. On the whole, the layering of climate change onto previous non-climate change focused organizations, observed in traditional U.S. government agencies, appears to also hold true for QGOs. This may be changing however, given that ICEF and FESI are two of the newest QGOs to have been created.

Finally, we accept our third hypothesis. There is substantial variation in governance across all ce-QGOs, in terms of the multi-level government and multi-sectoral stakeholders involved in the

organizations' board of directors, the actors having input into the nomination of directors, and the board conditions placed on them. It is unclear if there is a trend among these three factors. However, our results highlight the potential for multi-stakeholder coordination in some of these organizations, as compared to governmental agencies typically directed by a single political appointee. The FESI for instance is required to include a wide variety of stakeholders from almost all levels of government, as well as actors from the private sector, in its board. This kind of structure has potential to allow greater coordination in decision-making. On the other hand, the Commodity Credit Corporation (CCC) for instance may have similar potential for stakeholder coordination than a typical government agency – which is to say fairly little – although this ultimately depends on the individuals nominated to the board. For the CCC as for some other QGOs, founding legislations or bylaws often do not specify the affiliation of members of the board. It is up to nominators whether they want to nominate a variety of different stakeholders, or not, to QGOs' boards. Consequently, ce-QGOs' boards with few explicit requirements for multi-sector or government level representation on the board may nevertheless exhibit high variation in it.

In our results, high variation in stakeholder representation on a QGO's board is not accompanied by a proportionally high number of required stakeholders having input in board member nomination, nor presence of board conditions. Generally, it is not clear why this is so. However, there may be a relationship between the actors having input into board member nominations and their level of funding of ce-QGOs. For instance, the bulk of FESI' funding is expected to come from the nonprofit or private organizations, and a minority from the federal government – coincidentally the same two groups with nomination input in FESI's board of directors (Duggan and Hart 2022).Further research however would be welcomed to investigate and establish this and

other potential relationships between stakeholder representation on QGO's boards, stakeholder nomination power, and board conditions.

Corresponding to the latter part of hypothesis 3, we also find that a variety of QGO subtypes exist in the ce-QGO subset, i.e. foundations, charitable and nonprofit corporations, and government corporations (or body corporates). It is not clear whether there is a decisive historical trend in the emergence of particular QGOs subtypes. It appears that foundations represent a greater share of the ce-QGOs created in the last few decades, and likewise for government corporations in the 1930s. The latter likely reflects a trend during that era, around the New Deal, of creating corporations (Mitchell 1999). Little research however exists to shed light on why foundations may be becoming more popular recently, if indeed this is the case.

Ultimately, determining the extent to which some ce-QGOs' higher stakeholder representation and input into decision-making has translated into greater coordination in decision-making is outside the scope, and is a limitation, of this article. We propose instead that greater stakeholder representation serves as a proxy and may provide, at least, an opportunity for increased coordination. Virtually no research exists that assesses these QGOs' decision-making and coordination within them over time – arguably with the exception of the TVA. QGOs themselves produce little to no detailed documentation that may provide a window into their decision-making over time. What information these organizations publish about their activities is typically restricted to annual reports, which exhibit different formats and levels of precision, and do not lend themselves well to effective comparisons of organizational performance over time, let alone internal coordination in decision-making.

3.7 Conclusion

The difficulty of achieving multi-level or sectoral stakeholder coordination is a common institutional barrier to effective climate change governance outcomes. In the U.S., quasi-government organizations (QGOs) were designed to overcome such barriers, albeit traditionally for non-climatic purposes. Research on QGOs has not yet explored the existence, emergence, and potential for stakeholder coordination of U.S. federal QGOs in the climate change and environmental domains. In this paper, we address this research gap and ask whether U.S. federal-level QGOs function in the climate or environmental domain or whether they can be oriented towards climate or environmental problems (ce-QGOs). We also ask how these ce-QGOs emerged historically, fit in to the governance landscape, and what their corporate structure is.

We find that federal-level U.S. ce-QGOs represent a fairly high proportion of federal QGOs in general; have emerged at different periods, and more continuously, than traditional government agencies in ce-governance; were mostly, but not exclusively, created for environmental purposes, and later added (or "layered") on climate change policies and programs. We also find substantial variation in multi-level and multi-sectoral stakeholders represented on U.S. ce-QGOs' boards and in the board member nomination process.

We suggest some ce-QGOs have potential to overcome the difficulty of achieving multi-level or sectoral stakeholder coordination. We avoid broad claims – determining the extent to which QGOs' formal structure translates into policy coordination outcomes is a limitation of this paper. Our work contributes to the literatures on i) multi-stakeholder governance and ii) barriers to

climate change governance. Overcoming governance barriers such as the difficulty of achieving multi-level or sectoral stakeholder coordination is particularly important in the U.S. The United States' federalist political system which allocates primary environmental policymaking authority to the federal level, and policy implementation mostly to subnational government impedes policy coordination between governmental levels. Coordinating these levels together, in conjunction with private sector actors, would leverage the U.S.' economic resources more effectively in mitigating the country's GHG emissions and adapting to climate change impacts. Lowering the U.S.' GHG emissions, the second highest in the world, is also important to mitigate global climate change.

3.8 References

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3.9 Supplementary Information

Table 3.3 The table displays the areas of focus, names, creation dates, purpose/missions, and climate or environmental work carried out by this study's ce-QGOs, i.e. QGOs created to deal with climate change or environmental issues. We categorize the ce-QGOs in the following domains: i) climate change (as either mitigation or adaptation), ii) environmental, or iii) climate change or environmental related. This categorization is subjective and based on our assessment of the ce-QGOs' purpose and mission statements. The ce-QGOs' climate or environmental work we list in the table is extracted, not verbatim (except where in quotes), from the organizations' website or relevant documentation.

Area of focus	QGO name	Created	Purpose/mission	Climate or environmental work
Climate mitigation	***International Clean Energy Foundation*** (foundation)	2007	["Intent of Congress":] It is the intent of Congress . . . to create an entity that serves the long-term foreign policy and energy security goals of reducing global greenhouse gas emissions.[2]	None - no trace of the organization exists beyond enabling legislation
Climate mitigation related	***Foundation for Energy Security and Innovation*** (nonprofit corporation)	2022	The mission of FESI is two-fold: (1) to support the mission of the Department of Energy generally; and more specifically, (2) to increase private and philanthropic sector investments to accelerate the commercialization of energy technologies.[3]	Recently created – no work performed yet by the organization
Climate and Environment related	***Foundation for Food and Agricultural Research*** (R&D nonprofit corporation)	2014	The purposes of the Foundation shall be— (1) to advance the research mission of the Department by supporting agricultural research activities focused on addressing key problems of national and international significance including— (A) plant health, production, and plant products; (B) animal health, production, and products; (C) food safety, nutrition, and health; (D) renewable energy, natural resources, and the environment; (E) agricultural and food security; (F) agriculture systems and technology; and (G) agriculture economics and rural communities; and (2) to foster collaboration with agricultural researchers from the Federal Government, State (as defined in section 3103 of this title) governments, institutions of higher education (as defined in section 1001 of title 20), industry, and nonprofit organizations.[4]	Key areas of research grants supported by FFAR include: soil health, sustainable water management, next generation crops, advanced animal systems, health-agriculture nexus, and urban food systems. (FFAR 2022) FFAR is also involved in partnerships, including the: *Agriculture Climate Partnership*, created in 2020 by FFAR and US Farmers & Ranchers in Action. Since rebranded as *AgMission*, the partnership is a "global partnership with the goal of helping agriculture achieve net negative greenhouse gas (GHG) emissions. AgMission mobilizes farmers, ranchers, scientists, data providers, stakeholders and funders to develop, implement

[2] https://www.law.cornell.edu/uscode/text/42/chapter-152/subchapter-VIII/part-B
[3] https://www.federalregister.gov/documents/2023/02/15/2023-03199/request-for-information-foundation-for-energy-security-and-innovation-fesi
[4] https://www.law.cornell.edu/uscode/text/7/5939

				and accelerate climate-smart farming practices at scales previously unimagined." (FFAR 2020: 11). AgMission has invested $50 million in greenhouse gas mitigation agricultural projects since 2020. In addition, FFAR created the Greener Cattle Initiative aiming at reducing methane emissions. FFAR also recently provided grants to support the dairy industry's adoption of environmental health improving tech. (FFAR 2021). From 2016 to 2022, FFAR awarded 307 grants, totaling $605 million, in partnership with 550+ partners. The ratio of FFAR funding to partner funds is 1:1.40. 40% of projects were climate-related. In 2022, it raised and awarded $82 million in non-federal funds (FFAR 2022).
Climate and Environment related	***Presidio Trust of San Francisco*** (government corporation)	1996	The Presidio Trust's mission is to preserve and enhance the Presidio as an enduring resource for the American public. The Trust's work encompasses the natural areas, wildlife, and native habitats of the park, as well as the historic structures, and designed landscapes that make the park a National Historic Landmark District.[5]	Planet Strategic Goal(s): restoration of wetlands, enhancing biodiversity, reintroduction of species (e.g. coyotes), forest maintenance and rejuvenation (replacing old trees with young ones), water conservation vis-à-vis development projects, waste reduction and electric energy usage, LEED building restoration/preservation (PT 2023).
Climate and environment related	***National Forest Foundation*** (charitable and nonprofit corporation)	1992	The purposes of the Foundation are to — (1) encourage, accept, and administer private gifts of money, and of real and personal property for the benefit of, or in connection with, the activities and services of the Forest Service of the Department of Agriculture; (2) undertake and conduct activities that further the purposes for which units of the National Forest System are established and are administered and that are consistent with approved forest plans; and (3) undertake, conduct and encourage educational, technical and other assistance, and other activities that support the multiple use, research, cooperative forestry and other programs administered by the Forest Service.[6]	Funding and external stakeholder partnering/mobilization for restoration and recreation projects in National Forests and Grassland, e.g.: planting trees, improving trails, reducing fire risk, protecting watershed and forest health, carbon sequestration. The NFF issued 290 grants or contracts in FY 2022. Not including tree planting they invested $17,688,929 in federal and private funds, which were leveraged with $20,867,012 in partner-raised funds for a total conservation value of $28,535,940 (NFF 2022).
Climate and environment related	***National Fish and Wildlife Foundation*** (charitable and nonprofit corporation)	1984	The purposes of the Foundation are — (1) to encourage, accept, and administer private gifts of property for the benefit of, or in connection with, the activities and services of the United States Fish and Wildlife Service and the National Oceanic and Atmospheric Administration, to further the conservation and management of fish, wildlife, plants, and other natural resources; (2) to undertake and conduct such other activities as will further the conservation and management of the fish, wildlife, and plant resources of the United States, and its territories and possessions, for present and future generations of Americans; and (3) to participate with, and otherwise assist, foreign governments, entities, and individuals in undertaking and conducting activities that will further the conservation and management of the fish, wildlife, and plant resources of other countries.[7]	Over the past 39 years, NFWF has funded more than 21,680 projects and supported more than 6,000 grantee organizations. The Foundation's investments since its founding have leveraged matching contributions from grantees and other partners to generate a total conservation impact of $8.1 billion. In 2021, investments of more than $734 million (total, $414.4 million invested by NFWF, plus $319.8 million in matching contributions by grantess) in 814 conservation programs, incl. coastal resilience (Emergency Coastal Resilience Fund and National Coastal Resilience Fund awarding a combined ~$75 million), watershed conservation (e.g. Chesapeake Bay, Great Lakes, Long Island Sound), forest conservation programs (e.g. Great Plains, Southwest deserts), climate mitigation and adaptation goals and wildlife biodiversity projects (124 projects due to 2022 Bezos Earth funding), watershed/forest/grassland restoration and resilience, funding other conservation nonprofits (e.g. Nature Conservancy). (NFWF 2022).
Climate and environment related	***National Park Foundation*** (charitable and nonprofit corporation)	1967	[Purpose:] To encourage private gifts of real and personal property, or any income from, or other interest in, the property, for the benefit of, or in connection with, the Service, its activities, or its services, and thereby to further the conservation of natural, scenic, historic, scientific, educational, inspirational, or recreational resources for future generations of Americans, there is established a charitable and nonprofit corporation to be known as the	In 2022, NPF granted $59.1 million to parks and partners, and received $350,000 in donations from individuals. Work in climate mitigation, resilience, and sustainability (e.g. waste reduction, recycling, phasing out fossil fuel vehicles in parks), landscape and wildlife conservation (e.g. expanding park boundaries, preserve animal species/habitats, restoration

[5] https://www.federalregister.gov/agencies/presidio-trust
[6] https://www.law.cornell.edu/uscode/text/16/583j
[7] https://www.law.cornell.edu/uscode/text/16/3701

			National Park Foundation to accept and administer those gifts.[8]	projects), maintain and improve National parks (e.g. maintaining trails, planting trees and other vegetation), build engagement and collaboration (e.g. expanding service corps crews and training for fire management and response). (NPF 2022).
Climate and environment related	***Tennessee Valley Authority*** (body corporate)	1933	[Created:] For the purpose of maintaining and operating the properties now owned by the United States in the vicinity of Muscle Shoals, Alabama, in the interest of the National defense and for agricultural and industrial development, and to improve navigation in the Tennessee River and to control the destructive flood waters in the Tennessee River and Mississippi River Basins . . .[9]	Climate mitigation and sustainability work (e.g. EnergyRight® Community Centered Growth partners with lower power companies to provide energy efficiency upgrades to small businesses, the Home Uplift program, which provides free energy upgrades in qualifying residents' homes, incentivizing silicon metal production industry development (for solar cells, batteries, etc.) in TVA's region, issuing proposals for 5k MW of carbon-free energy by 2029, partnering with other entities on information sharing regarding environmental priorities in the community). Renewable energy production (in 2022, >50% of electricity supplied by TVA was from nuclear, hydroelectric and purchased power renewables, hydropower Boone Dam facility reopening, nuclear energy program for advanced reactor technology development). Environmental stewardship (e.g. biodiversity policy which integrates species/habitat conservation in project planning (120 projects carried out in 2022). EV development (charger installation, attracting automakers/suppliers to region) (TVA 2022).
Environment related	***Commodity Credit Corporation*** (body corporate)	1933	[Created:] For the purpose of stabilizing, supporting, and protecting farm income and prices, of assisting in the maintenance of balanced and adequate supplies of agricultural commodities, products thereof, foods, feeds, and fibers (hereinafter collectively referred to as "agricultural commodities"), and of facilitating the orderly distribution of agricultural commodities . . .[10]	Programs in: commodity, conservation (agricultural land conservation easements incl. protecting and enhancing wetlands, assisting farmers to conserve and improve soil/water/air/wildlife resources and address drought mitigation, flood control, water quality control), dairy, livestock and disaster (assistance to producers for losses due to adverse weather/wildfires, etc.), export/foreign assistance, farmer assistance, misc. domestic assistance. CCC has an authorized capital stock of $100 million held by the United States with the authority to have outstanding borrowing of up to $30 billion at any one time. Its capital structure is replenished each year by appropriations to restore net realized losses on support operations and to reimburse costs of other programs (CCC 2023).

Quasi-governmental organizations

Conceptualization

Defining quasi-governmental organizations has proved to be elusive task. Kosar (2011: 2) described quasi-government organizations as "entities that have some legal relation or association, however tenuous, to . . . government; or to the terrain that putatively exists between the

[8] https://www.law.cornell.edu/uscode/text/54/101111
[9] https://www.law.cornell.edu/uscode/text/16/831
[10] https://www.law.cornell.edu/uscode/text/15/714

governmental and private sectors". Koppell (2006: 12) defines (in the context of federal government) a hybrid as "an entity created by the federal government (either by act of Congress or executive action) to address a specific public policy purpose. It is owned in whole or part by private individuals or corporations and/or generates revenue to cover its operating costs". Mead and Warren (2016) propose a gamut of characteristics that are typically associated with the public and private sectors, e.g. in terms of legislation (the private sector follows laws while the public sector creates them), ownership (private organizations are privately owned, while the public ones are "owned by the people"), mission accountability (the public sector reflects majoritarian values, while private institutions can reflect advocacy, individual expression, civic engagement), etc. These and other similar definitions make light of the continual difficulty scholars have had in unequivocally defining these organizations. For our purposes, we propose the following one: QGOs are organizations that have some formal legal relation to government and exhibit some combination of attributes commonly associated with the public and private sectors, and for-profit and not-for-profit modes of operation.

While the above definitions appear relatively broad, further precision has been hard to achieve. Part of the problem rests on how to define each underlying term (e.g. "public") without blurring it in the process (e.g. private sector non-profits, as defined by the IRS, provide public goods like education, safety, and charity). Another is that of the confusion associated with inconsistent nomenclature for quasi-governmental organizations. The 2021 U.S. Governmental Manual lists the Smithsonian Institution and the Legal Services Corporation as Quasi-Official Agencies for instance. And the latest 2017 Census of Government details that subnational QGOs called special districts may also be termed authorities, boards, corporations, commissions, or even (if particularly

closely associated with county or municipal government) subordinate agencies – alternative names that can be applied to non-QGO, temporary, or private forms of organization (USCB 2019). Special districts can be defined as "independent, special-purpose governmental units that exist as separate entities with substantial administrative and fiscal independence from […] local governments." (USCB 2019: 5). Examples include school, fire protection, or water supply districts.

Beyond the confusing terminology, recognizing which organizations are QGOs can be, on the one hand, facilitated by government classification, e.g. the quasi-official agencies at the federal level, or special districts at the subnational (Selin and Lewis 2018). For other cases where the government doesn't explicitly provide this classification, they can be identified based on whether they have characteristics that give them a greater degree of independence from the executive branches of government than traditional governmental entities possess. A complete listing of these characteristics has also proved elusive, though authors have suggested some pertinent ones: for-cause provisions that prevent the removal of organizational leadership except under cases of criminal infraction or neglect of duty, a board of directors structure instead of a single agency head, tenures that are specified (i.e. members don't "serve at the pleasure" of elected officials) and that exceed those of elected officials, staggered terms (to prevent political shakeups of the agency directors), requirements that boards have a balanced proportion of members from different political groups, quorum requirements that enforce majoritarian decision-taking, authority to litigate without going through the executive branch's Department of Justice, exemption from mandatory executive branch reviews of budget proposals, legislative materials, administrative rules, and congressional testimony, and funding sourced outside of government appropriations (e.g. through fees, donations, bond issuance), etc. (Selin and Lewis 2018; Selin 2015; Datla and Revesz 2013).

QGOs may have some, but not necessarily all, of the above indices of independence at a given time. To consider a few characteristics, the Tennessee Valley Authority (TVA) for instance is a federal energy provider QGO founded by Congress that has a nine member board of directors with specified five-year terms, can litigate matters independently, and virtual funds almost all its operations from bond issuance and electricity sales (as opposed to government appropriations). However, TVA has no removal protection for its board members, no board membership partisan balance requirements, and no authority to bypass congressional review of its legislative proposals, budget submissions, and congressional testimony. Independence indices may combine in different ways for different forms of QGOs, although it is unclear whether there is a pattern (Datla and Revesz 2013).

Supplementary Information References

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4 Quasi-governmental organization under pressure: the Connecticut Green Bank's response to a budget shock

In preparation for submission to *Environmental Policy and Governance*, co-authored with Adam Goldstein and Michael Oppenheimer.

Abstract

Numerous barriers interfere with achieving effective outcomes of climate adaptation and mitigation governance. In the U.S., the politicization of climate change and the long-standing susceptibility of long-term projects to politicians' short-term budgetary incentives both heighten the difficulties for effective climate change governance. U.S. quasi-governmental organizations (QGOs) were traditionally created to address several of these barriers in non-climate change domains. The properties of QGOs that allow these organizations to address governance barriers may also allow them to cope with shocks more easily than traditional government agencies. Green banks are an emerging and growing form of dedicated climate change governance in the U.S. We use the organizational ambidexterity (OA) framework to evaluate the case of the quasi-governmental Connecticut Green Bank (CGB)'s adaptation to a 2017 state-instigated budget shock. The OA framework is useful for this case study given its emphasis on managerial response to organizational survival threats. We find that the CGB adapted financially to the shock, as a result of mission and financial drift away from Connecticut state control and policy. The CGB's adaptation to the shock hinged on its quasi-governmental status — which allowed it to create a nonprofit organization, Inclusive Prosperity Capital (IPC), and pursue activities to render both

entities financially and operationally self-sufficient. We characterize the CGB's adaptive response as *hybrid, structural-cyclical, ambidexterity*. Our study provides the first empirical description of ambidexterity in the quasi-governmental space, and builds evidence for the utility of applying hybrid ambidexterity theory in the climate change domain.

4.1 Introduction

Scholars have documented numerous barriers to effective climate adaptation and mitigation governance (Pörtner et al. 2022; Dubash et al. 2022; Mildenberger 2021; Konisky 2020; Hsu et al. 2020; Shwom and Kopp 2019; Shi 2019). Examples include the politicization of climate change, or insufficient decision-making coordination between public and private stakeholders.

Organizations, and the strategies they employ to overcome these barriers, are the subject of significant interest in the climate governance literature (Leal Filho et al. 2022; Shwom and Bruce 2018; Hsu et al. 2017; Lee and Jung 2018). To that end, research has examined novel organizational forms created between public and private organizations (Leal Filho et al. 2022; Lee and Jung 2018; Hsu et al. 2017; Stewart et al. 2017). These organizations represent permutations of governance modes (hierarchies, markets, networks), e.g. public-private partnerships (between hierarchies and markets), co-management (hierarchies-networks), private-private (markets-networks). These forms have emerged not only within nations, such as local climate assemblies or climate adaptation and mitigation collaboratives; but also between them, for instance the ICLEI transnational municipal network, or CP3 international public-private partnerships (Ejsing et al. 2023; Bennett and Grannis 2017).

U.S. quasi-governmental organizations (QGOs) are a form of organization that may help to overcome climate change governance barriers. U.S. QGOs represent a significant (~43%), yet understudied, proportion of what is typically considered to be "government" (USCB 2019). We define them as entities having some formal legal relation to government, and blending public and private sectors characteristics and for-profit and not-for-profit modes of operation. Compared to traditional government agencies, this blending of characteristics affords QGOs variable measures of political and financial independence (Lawhorn 2023; Kosar 2011; Koppell 2006; Mitchell 1999). These independence characteristics include a board of directors structure instead of a single agency leader, and funding sourced outside of government appropriations (e.g. through fees, donations, bond issuance, or combinations thereof), etc. (Selin and Lewis 2018; Selin 2015; Datla and Revesz 2013). More information on conceptualizing QGOs is given in Supplementary Information (SI).

Scholars have advanced a variety of rationales to explain why government creates quasi-governmental organizations. For instance, QGOs may be used to establish a governmental organization with characteristics associated with businesses (which may be perceived as more efficient than bureaucracies), reduce the politicization of a policy function, or improve coordination between separate governmental entities (like bi-state agencies), and overcome limitations that the executive may place on monetary borrowing by pure governmental organizations (often invoked in the case of New York state quasi-government) (Mead and Warren 2016; Kosar 2011; Koppell 2006: 6; Moe 2001; Mitchell 1999).

Yet the structural features that lend QGOs a degree of insulation from political pressures does not make them entirely immune to external shocks. Like all organizations, U.S. QGOs' effectiveness in helping overcome climate change governance barriers ultimately depends on their ability to adapt to pressures from within and outside the organization[11]. For instance, the political polarization of climate policy has, and may continue to, generate political efforts to undermine and defund organizations (Mildenberger 2021). Organizational science scholars have long noted that both resource shocks from the external environment – and the adaptive strategies with which organizations respond to those shocks – can each destabilize organizations' effectiveness and threaten survival (Askim et al. 2020; Kuipers et al. 2018).

In responding to those shocks, organizations are faced with a dilemma. Organizational adaptation (or survival) may come at the expense of remaining faithful to organizational mission, i.e. mission drift – a phenomenon that policymakers may be concerned about in the context of quasi-governmental organizations (Huizinga 2023; Grimes et al. 2019; Ebrahim et al. 2014; Minkoff and Powell 2006). In this paper, we examine QGOs' ability to respond to this dilemma through a case study of the Connecticut Green Bank (CGB), a U.S. quasi-governmental green bank. Founded in 2011, the CGB is the oldest of the US green banks. To our knowledge, it is also the only green bank to have experienced a budget shock: from 2017-2019, the Connecticut legislature halved its operating income (Kehoe et al. 2021). A notable part of the CGB's response to the shock includes the creation of a nonprofit organization – Inclusive Prosperity Capital (IPC). In addition, the organization's decision-making is well documented through internal memos, meeting minutes,

[11] We caution the reader to keep the distinction between organizational adaptation and climate adaptation (mentioned further above) in mind throughout this paper.

annual financial reports, and various other corporate documents. Thus, we begin to fill an organizational adaptation research gap.

We use the organizational ambidexterity (OA) theoretical framework to evaluate the CGB's response to the shock of a sudden budget reduction. The framework gives us conceptual purchase on understanding how an organization may effect an adaptation response and what that implies for its alignment or drift from prior mission goals. OA theory is particularly useful for our case study, given it emphasizes an organization's managerial response to threats to its survival. In SI, we compile instances of the CGB's ambidextrous activities, and a short glossary of potentially unfamiliar financial terms. In the results and discussion sections of the paper, we highlight six key themes of the CGB's adaptation and explicitly contextualize them within this paper's guiding hypotheses and OA framework. We conclude that the CGB adapted successfully to the budget shock, at the cost of drifting to some extent from its original mission of supporting state climate change policy. Its survival hinged on a "sustainability plan" it developed to become financially independent from Connecticut state. Ultimately, the CGB's quasi-governmental status was critical in allowing it to explore, form, and implement this plan. The plan involved the CGB unilaterally creating and designing a mission-aligned nonprofit organization, Inclusive Prosperity Capital (IPC) — to which the CGB divested itself of some of its less profitable programs (i.e. low-middle income projects). The IPC was also designed to become financially independent, based on a strategy of conducting part of its work, and obtaining funding from, outside of Connecticut. Part of the strategy's success hinged on the IPC being organized as a more independent entity than the CGB. On the whole, this paper highlights the CGB's ambidextrous balancing of activities conducted by the CGB and IPC that helped the CGB overcome the budget shock. More broadly,

it illustrates the critical role that quasi-governmentality played in the CGB's adaptation response, and how this may give other U.S. QGOs an advantage in surviving and continuing to address climate change work over the long term.

4.2 Green Banks

4.2.1 Generalities

In this section, we provide an outline of green banks, and the CGB. More information on green banks is provided in SI. Green banks (GBs) are a rapidly growing type of institution created to finance climate mitigation (especially clean energy technology) and, more recently, climate adaptation projects (Leonard 2014). In addition to financing, they can also provide social equity, knowledge spillover, and energy security benefits (Lyons and White 2023).

Across the world, GBs exist as quasi-governmental, as well as government and nonprofit organizations (EPA 2023; OECD 2015). The U.S. accounts for about two-thirds of all the more than 30 GBs existent in the world (CGC 2022; NRDC 2020). Green banks are a relatively new and rare form of organization – new because the first was created in 2004 and their emergence accelerated around 2010 (NRDC 2020), and rare because they are exclusively dedicated to addressing climate change, as opposed to working on it as a secondary goal (Dubash 2021). So far, they have invested, and attracted private co-investment, of over $70 billion (NRDC 2020).

In the U.S., over the 2011-2022 period, green banks have invested $4.2 billion in U.S. clean energy projects, and leveraged $10.66 billion in co-investment with private partners (CGC 2022). The amount of direct and co-investment has rapidly grown during that time period. In 2021, green

banks invested $1.25 billion, out of a total $ 4.64 billion, in low income and disadvantaged communities. Encouraged by these results, U.S. legislators have been building proposals for a national green bank modeled after the CGB and other green banks.

Research on green banks in general has not ventured beyond overviews of their emergence and evolution, nor has it contextualized these organizations within the broader QGO literature (Kehoe et al. 2021; Weiss and Konschnik 2018). We therefore know little about their governance and response to political and financial pressures. In terms of quasi-governmental green banks, this is a notable research gap.

Similarly, in the non-green bank QGO literature, there is limited evidence of QGOs' response to these pressures. This is likely due to definitional issues and a lack of systematic data on U.S. QGOs. Generally, quasi-governmental organizations are considered more politically and financially independent than governmental agencies, though this is dependent on the particular QGO subtype (Lawhorn 2023; Selin and Lewis 2018). A priori, without knowing more about a particular QGO subtype and its governance, assessing a specific green bank's independence, and how it could use that independence to its advantage (or not) in its reaction to pressures, is difficult.

4.3 Theoretical Framework

In what follows, we posit three hypotheses on the CGB and its response to the budget shock. These focus on i) whether the CGB adapted to the shock, and if so through which of the pathways theorized in the ambidexterity framework, ii) whether the adaptation process involved changes in all aspects of the CGB (e.g. mission, purpose) not explicitly limited by legislative requirements,

and iii) whether the CGB's quasi-governmental status enabled it to pursue its adaptive response to the shock. The three hypotheses and their theoretical underpinnings are presented in the following three numbered sections.

1. Organizational adaptation is an important research area of organizational studies (Sarta et al. 2021). Scholars use numerous theoretical approaches to study this phenomenon, e.g. organizational sociology, strategic change, behavioral theory. In this paper, we adopt the organizational ambidexterity (OA) framework to evaluate the Connecticut Green Bank's adaptation to the budget shock. The critical elements of OA theory put a special emphasis on an organization's managerial response to potential threats to its survival, making it particularly appropriate for our case study.

OA suggests that organizations that manage to adapt and survive over time are those that balance exploitative (to ensure their current/short-term survival) and explorative (for future/long-term viability) activities (Tushman and O'Reilly 1996; March 1991). Numerous empirical studies have documented that in the face of an uncertain environment, OA is associated with higher organizational innovation, financial performance, greater chances of survival (O'Reilly and Tushman 2013). Exploitation has been described as e.g. "refinement, choice, production, efficiency, selection, implementation, execution"; while exploration has been defined as "search, variation, risk taking, experimentation, play, flexibility, discovery, innovation" (March 1991: 71). For a public sector organization, some authors conceptualize exploitation as e.g. the refinement (in terms of ameliorating efficiency and execution, given a set amount of available resources, notably) and expansion of already-existing routines, processes, and methods; while exploration

has been conceptualized as innovation writ large (e.g. co-creating and developing new processes through strategic meetings, "products", and organizational governance structures) (Cannaerts et al. 2020; Cannaerts et al. 2016; Laegreid et al. 2011; O'Reilly et al. 2009; Damanpour and Evan 1984).

Finding the right balance between exploitation and exploration is contingent on a number of factors internal and external to the organization (Lavie et al. 2010; Teece 2007). Among the internal factors are the organization's senior management team (including its level of risk aversion and experience), slack resources, culture, age, and size. Outside of the organization, those factors include the extent of unpredictability in the organization's context, exogenous shocks (i.e. unexpected events beyond the organization's control), competitive intensity with other organizations, and how easily the organization's context allows it to benefit from its explorative activity.

Generally, OA research conceptualizes four archetypical pathways to achieve ambidexterity, i.e. structural, reciprocal, cyclical, and contextual. The first two take place within the same organizational unit, and the last two across separate (sub)units. In structural ambidexterity, different subunits – characterized as having their own strategies, structures, incentive systems, and cultures – carry out explorative and exploitative activities (Geerts et al. 2018; Tushman et al. 2010). These activities are coordinated and integrated by managers under a shared organizational mission (e.g. Jansen et al. 2008; Lubatkin et al. 2006). Reciprocal ambidexterity involves separate subunits each simultaneously undertaking exploration and exploitation activities, using the outputs generated by the other (Simsek et al. 2009). Underpinning this process is a flow of information

and resources between units. In cyclical ambidexterity, an organizational unit focuses predominantly on exploitation, periodically punctuated by moments of exploration (O'Reilly and Tushman 2008). And in contextual ambidexterity, exploitation and exploration are simultaneously pursued. This results from managerial know-how in building processes and systems that allow individuals within the organization to judge when to focus on one or the other (Ossenbrink et al. 2019; Gibson and Birkinshaw 2004; Tushman and O'Reilly 1996). Some research suggests these distinctions are not entirely exclusive, and that organizations use some hybrid combinations of them (Ossenbrink et al. 2019).

While these ambidexterity archetypes usually suggest exploration and exploitation take place at the sub-organization level (i.e. within units of the group), this is not necessarily the case. A rare illustrative case involving infrastructure development in Australia, Nowacki and Monk (2020) detail how federal and state governments in the country created new subordinate agencies (representing the role of "exploratory units" in the broader "exploitative" government landscape) to develop innovative development plans.

So far, there is no conclusive empirical evidence for one or more ambidexterity pathways (or modes) being better predictors of successful adaptation outcomes than others. Depending on the domains organizations operate in, Fourné et al. (2019) suggest either structural and contextual ambidexterity may be more effective. Boumgarden et al. (2012) suggest cyclical (or temporal) ambidexterity offers greater performance than the structural pathway. Raisch (2008) conclude that different modes may be complementary, rather than exclusive. Finally, some research provides

evidence for the effectiveness of blended (or hybrid) ambidexterity modes (Foss and Kirkegaard 2020; Ossenbrink et al. 2019; Kauppila 2010).

H1: We expect that the 2017 budget shock led the CGB to implement changes that could be construed as ambidextrous in character.

2. We define QGOs as entities characterized as having some formal legal relation to government, and blending public and private sectors characteristics and for-profit and not-for-profit modes of operation. According to this definition, QGOs like the CGB are founded in governmental legislation (in this case Connecticut law) which defines some of the essential features and characteristics of the organization – including mission, programs to be run, governance structure, financing mechanisms (Selin and Lewis 2018). The CGB may not alter (or innovate) these elements unless the legislature passes an amendment to the bank's founding legislation. However, founding legislations contain legislative largess and ambiguity which the CGB might choose to innovate on as part of its exploration process, e.g. a QGO may have chosen, up to a certain point, to use only a subset of the sources of financing it is legislatively allowed to use, or may have a broadly-stated mission mandate that leaves room for interpretation (Mitchell 1999).

Broadly-stated missions may give space to the phenomenon of mission drift (or creep). Mission drift may be defined as a "process through which organizational goals can be deflected or sacrificed in the interests of organizational survival" (Minkoff and Powell 2006: 592). Although this process is perhaps more frequently noted in the private sector, it has also been highlighted in cases of governmental and U.S. quasi-governmental organizations (Hyman and Silver 2021; Gallo

et al. 2019; Dobbins et al. 2014; Kosar 2011). Some cases of mission drift in U.S. QGOs have in some cases led to arguably significant policy failures (Oesterle 2010).

H2: We expect the CGB's exploration (or innovation) to have potentially affected all parts of the organization not explicitly maintained fixed by legislative requirements (e.g. specific mission purposes, programs, governance structure of the organization, types of financing).

3. QGO is a term denoting a collection of different organizations, e.g. quasi-public green banks – with varying degrees of attributes that grant them political and financial independence. Variation in QGOs' independence attributes across the U.S. has not been systematically mapped out. Also, QGOs' responses to a range of financial or political pressures have not been investigated.

In the U.S., government agencies are not immortal (Kuipers et al. 2018). They face termination, or threats of termination, for budgetary reasons (i.e. legislators seeking to reduce government deficits or cut costs), among others (Carpenter and Lewis 2004). Younger governmental organizations are more vulnerable to this than older ones (Kuipers et al. 2018). The literature on QGOs is limited but anecdotal evidence suggests QGOs operating outside the climate sphere may be rendered inactive (i.e. effectively terminated), or may never become operational in the first place as a result of lack of funding or of budget cuts (Lawhorn 2023). Also, QGOs strongly dependent on governmental support are unable to survive political or financial shocks (Lawhorn 2023; Anadon and Nemet 2014; Priddy 2013). Other QGOs appear better able to weather shocks, e.g. through user charges, fees, bonds, or administrative transfers of power and responsibilities to other organizations (Bhattacharya 2023; Pritchett 1943).

Weathering shocks is potentially valuable for any organization, but is particularly important for QGOs operating in the climate space. In the U.S., climate change mitigation and adaptation are politicized issues, e.g. the nation's adoption, withdrawal, and rejoining of the Paris Agreement (Rasmussen et al. 2021). The consequences of politicization have included the termination of programs and organizations, reversal of climate mandates, and a general instability in U.S. governance efforts over time (Mildenberger 2021; Konisky 2020).

Green banks are initially capitalized through a variety of sources, i.e. government, business, and philanthropic. Subsequently, the banks are typically funded through the provision of loans for clean energy projects, as well as through other sources of financing (e.g. issuance of debt). The CGB therefore is likely to have access to various self-funding instruments (e.g. loans, user charges, bonds), if not through other financial sources of governance independence.

H3: We expect the CGB to have certain quasi-governmental properties that allowed it to conduct its post-shock ambidextrous response (e.g. self-financing instruments, administrative freedom), despite the financial control exerted by the Connecticut legislature.

4.4 Methodology

We use theoretical sampling to select the CGB as this article's research case study (Eisenhardt and Graebner 2007). So far, the CGB is unique among green banks in terms of having experienced a budget shock – and in the level of information available on how the institution responded to it through exploitation and exploration. Most green banks were created recently however (i.e. after

2011), and may experience budget shocks as they age in the U.S.' politicized climate change policy landscape. The CGB's response to its budget shock may be instructive to them in overcoming the shocks they might experience. The objective of our analysis is to understand the CGB board's strategy in responding to the 2017 budget shock.

For this case study, we collect meeting minutes from all the CGB's different committees (i.e. the CGB board of directors, the joint committee CT Energy Efficiency and CGB directors, the budget and operations committee, audit compliance and governance committee, and deployment committee), as well as all other available supplementary data from the CGB's website. For these committees and boards, the availability of meeting minutes stretches back to 2011 – with the exception of the joint committee and deployment committee, both of which start in 2012.

We then manually process the collected data twice. In a primary document, we extract all text relevant and connected to the following keywords: "Inclusive Prosperity Capital" or its abbreviation "IPC", and "non-profit" (when the text indicates it refers to the IPC). Then, in a second document, we extract text from the primary document relevant to our objective of understanding the CGB's strategy. We analyze this second document, inductively noting all changes the CGB undergoes as a result of the budget shock. We give particular attention to changes in:

i) CGB structure (in the board or other parts of the organization, creation of new units)
ii) Mission (e.g. in the CGB's broad purpose, or in sub-units in the organization)

iii) Programs – the distribution and weight of the CGB's different activities (e.g. change over time of low-interest loans, whether loans are promoted preferentially to disadvantaged communities, total size of financial activity over time, whether certain sub-programs are offloaded to IPC).

All three of the previous points address the first two hypotheses (H1 and H2) in particular. Broader administrative discussions from the board meetings – i.e. how board members came up with innovation(s) and on the basis of what administrative/financial freedom(s) – help answer the third hypothesis (H3).

Finally, we operationalize the CGB's adaptation to the budget shock using the bank's net position (equal to total assets – total liabilities). The CGB uses this metric in its annual financial reports as a proxy for its financial health. Decreases in the net position after 2017 (until 2023) are, a priori, interpreted as an absence of ambidexterity. Other metrics on the CGB's performance are given in SI.

4.5 Findings

4.5.1 Brief outline of the CGB

The CGB is a quasi-governmental green bank, technically a quasi-official agency, founded in Connecticut state legislation (Public Act 16-245n). In the broadest terms, the CGB aims to "accelerate the green economy" using its funds, as well as those of private co-funders.

More specifically, the CGB published mission and purpose statements (see table 4.6 in SI). The mission statements changed to some extent before and after the budget shock. In the FY 15-16 and 17-19 plans, two key elements are present in the CGB's mission, i) supporting the Connecticut governor and legislature's energy strategy, and ii) promoting local Connecticut economic development. In the FY 2020 plan, both those elements are removed. The focus becomes more generic and shifts towards providing greater investment into the green economy for "all of society". Then, in the FY 23-24 plan, only the first element is removed – the focus is on providing investment into Connecticut's green economy. Over the same period, the CGB's purpose statements have remained virtually identical. We note that the CGB's purpose statement is inscribed in its founding legislation (written by Connecticut legislators), while its mission statement is not.

In its existence, the CGB has operated two types of programs: "incentive" and "financing". Incentive programs provide monies "not intended to be repaid by recipient, used to reduce cost of a specific product or technology", e.g. grants to support increased solar panel use in residential buildings. Financing programs support activities that bring a financial return to the CGB, e.g. loans or leases offered by the CGB without the involvement of third parties, or credit enhancements such as loan loss reserves where the CGB segregates capital to ensure third party lenders against losses from defaulting borrowers. More detailed information on these programs is available in SI.

At its founding, the CGB was capitalized with Connecticut state funds, Connecticut utility customer assessments, and proceeds from a U.S. Northeast greenhouse gas cap-and-trade program (CGB 2012).

Since the CGB's inception, its revenues have come from utility customer assessments, Northeast regional energy auction proceeds, renewable energy credit (or certificate) sales, and various clean energy program investment returns (CGB 2023). However, the majority of the CGB's revenues from 2015 onwards have come from the utility customer assessments. After 2018, renewable energy credit sales have accounted for an increasing proportion of revenues.

Prior to the 2018 budget shock, the majority of the CGB's expenditures (i.e. expenses) went towards incentive programs (also called "subsidies"), as well as towards CGB administration. Post 2018, most of the program expenses went towards financing programs (also called "credit enhancements", and loans and leases). Details and figures of the CGB's revenues and expenses over time are available in SI.

4.5.2 Brief outline of the IPC

The IPC is a Connecticut-incorporated nonprofit, created by the CGB. At its founding, it described its mission or purpose as "focused on aligning investment capital with organizations, projects, and community initiatives that successfully scale traditionally underserved markets." (memo to CGB).

The nonprofit does not publish annual reports, meeting minutes, or other documents that might show any change in the IPC's mission or purpose over the years. However, its website currently describes the organization as a fund "scaling energy financing solutions that channels investment capital to program partners in communities that need it most.", with a mission of providing "a gateway to inclusive prosperity by engaging with communities impacted most by climate

change . . . and invest in clean energy and resilience in partnership with local initiatives and organizations to provide energy security, climate justice, and economic growth." (IPC 2023).

Most of the IPC's initial funding came from 2018 government grants, i.e. about $6.5 million in total from the Connecticut Department of Energy and Environmental Protection (DEEP). The CGB also established a services agreement worth $10 million with the IPC; providing the IPC a revenue stream in exchange for its administration of incentive and financing programs. Other significant sources of income since 2018 have included gifts, contributions, and grants from private sector actors; as well as its advisory and consulting services.

The IPC's expenses are concentrated around its financing programs' development, technical requirements, and support. Other notable expenses are in its advisory and consulting services, and its organizational administration. As with the CGB, more details on these revenues and expenses are available in SI.

4.5.3 Historical outline of the CGB circa the budget shock

On October 31, 2017, the Connecticut legislature effects a budget shock that halves the CGB's operating budget by $32.6 million per year, over the following two years.

In December 2017, the CGB responds by developing a financial Sustainability Plan (detailed below). As part of the plan, they look into creating a "private entity" to help the CGB with its mission in Connecticut, and particularly its work with low-moderate income communities. The CGB board initially conceived of the idea of creating a private mission-aligned organization at a

CGB strategic retreat in January 2017. Picking up again on this idea, the board engaged consultants to advise on how the private entity could be structured, and provide a potential business plan for it. In July 2018, this advice leads to the CGB creating a "mission-aligned independent nonprofit organization" called Inclusive Prosperity Capital (IPC).

The CGB tasks the IPC with managing and administering a subset of its programs, from both the incentive and financing categories – the Smart-E Loan (a loan loss reserve program), Multifamily programs (loans), and leases for low-income households (see figure 4.1). The CGB continues operating the remaining programs, i.e. the RSIP (incentive program) and a number of financing programs (i.e. Commercial Property Assessed Clean Energy (C-PACE), Low Income Solar Lease and Energy-Efficiency Energy Savings Agreement). Similarly to the CGB, the IPC's core business operations are focused on financing programs. Starting in 2019, the CGB begins operating a new financing program, the Small Business Energy Advantage (SBEA). The CGB's logic in dividing up these programs between itself and the IPC appears to be primarily financial, i.e. low to no interest rate return programs that private sector and other QGO actors might be interested in supporting were handed off to the IPC. More information is available in SI.

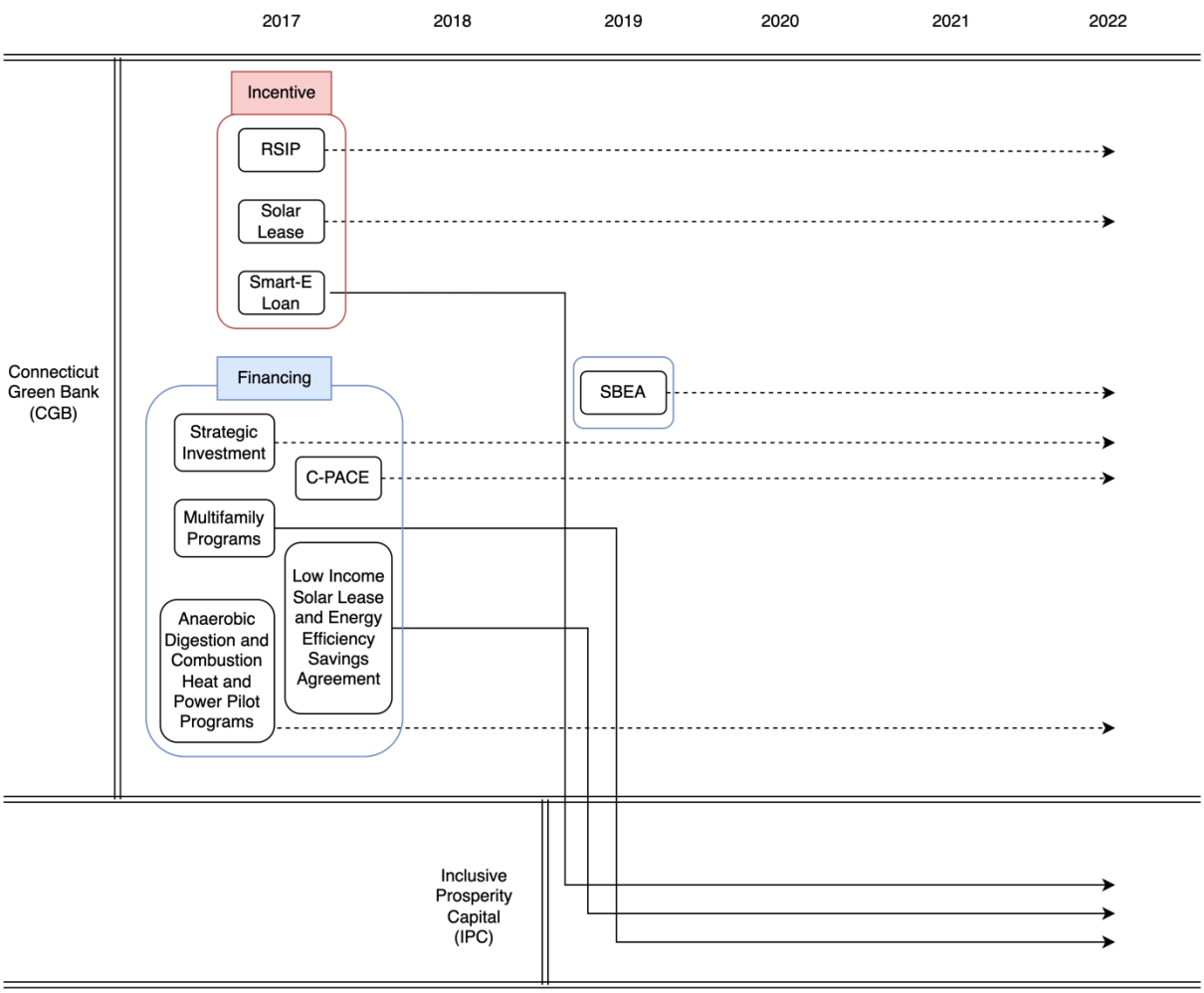


Figure 4.1: Flowchart of the incentive and financing programs operating within the CGB and IPC over time. The SBEA is a financing program, initiated in 2019. The dotted arrows indicate CGB programs that did not get transferred to the IPC after the budget shock. The solid arrows indicate programs transferred to the IPC in 2019. Note: the CGB was founded prior in 2012. We display the programs from 2017 onwards for simplicity. The IPC and CGB programs continue to exist past 2022. The data for this graph were obtained from the CGB's comprehensive annual financial reports. See those reports, e.g. the FY2023 report, for more details on the programs displayed in the graph. Graph drawn with draw.io.

After 2019 to date, the Connecticut legislature ceases to pursue any further budget reductions.

From a financial perspective, the CGB appears to have adapted to the budget shock successfully.

The bank uses a metric, net position (i.e. total assets minus total liabilities), to quantify its overall

financial health. Total assets indicates the sum of all of an organization's assets, e.g. cash available for lending operations, marketable securities, intangible goods, etc.; and total liabilities refers to the sum of its debts of obligations, e.g. (short or long-term) bonds, payroll expenses, taxes, etc. Using that metric over time, table 4.1 shows that the CGB decreased its position during the two budget shock years (2018 and 2019). From 2019 to 2022 however, it registers an increase, and in 2022 its net position is above its 2017 level. Potential business disruptions from Covid-19, which we do not focus on in this paper, may be at the root of the modest net position increase from 2019 to 2020.

After its founding, the IPC's net position (see table 4.1) has varied more unevenly than the CGB's. Until 2021, the net position has fluctuated around the $7.1 million mark, followed by a drop-off in 2022. This latest 2022 value is the result of an increase in employee salaries.

Table 4.1: CGB and IPC net position over time (from Comprehensive Annual Financial Reports and IRS form 990). IRS values for the IPC are end-of-year, and rounded to nearest decimal value. The IPC was created in 2018, so NA values are displayed prior to that year.

	2015	2016	2017	2018	2019	2020	2021	2022
CGB net Position (in $000)	109,167	127,362	128,663* *adj. to 106,716 for accounting reasons	91,325	76,282	76,742	89,494	111,138
IPC net position (in $000)	NA	NA	NA	7,173	7,125	6,851	7,150	3,548

4.5.4 Strategy post budget shock

In this section, we briefly present six themes in the CGB's adaptation to the budget shock, from late 2017 until 2019. We argue these themes highlight notable examples of exploitation and

exploration activities in the CGB and IPC, and of the consequences of those activities, taken from the entire documentation this study analyzed.

4.5.4.1 Financial sustainability plan

After Connecticut state's budget shock, the CGB board decide to "adjust [the bank's] strategy and implement a plan to manage within more limited resources to make investments, while modestly maintaining its statutory mission and purpose. It must also consider a pivot away from a strategy since inception geared towards maximizing leverage of private capital towards one focused on earning a return on its investments to become sustainable". The board suggest reframing their cash flows into two categories i) incentives and ii) investments (or financing); and putting the latter "on a pathway of self-sustainability (i.e. breakeven operations that deliver lower impact should budget sweeps [i.e. shocks] persist)". The CGB staff then modeled three sets of financial breakeven scenarios, with different levels of state funding support, to determine how many years it would take before the CGB could be financially autonomous from Connecticut state.

The board decided to implement one of the scenarios, or Sustainability Pathway (SP). The SP would allow the CGB to "continue advancing its mission and purpose, while responsibly shifting its focus from leverage to self-sufficiency and sustainability".

The SP made a number of assumptions: a 27% reduction in the CGB's operating expenses from 2018 to 2019, no further Connecticut state budget shocks to the CGB in 2020, the CGB's project portfolio returning a weighted average interest rate return of 5% over 10 years, the creation of an "independent non-profit Affiliate" to obtain "operating leverage and attract mission-oriented

investors for a set of products serving underserved market segments (e.g., low-to-moderate income and credit-challenged customers and unconventional credits) that need additional investment and more scale to be able to achieve sustainability". The SP projected a 4-year period until the CGB's main clean energy financing business would be "sustainable".

4.5.4.2 QGO structure and independence

After the shock, the CGB's QGO status was viewed as a detriment to its operations and survival. Consulting with external advisors, the CGB concluded that "the quasi-governmental status of the Green Bank causes its structure, products, and investments to be influenced by state public policy and budget considerations that reduce flexibility and market responsiveness".

However, in keeping with the SP, CGB board members decided that the bank had enough flexibility to create a nonprofit. After CGB board members investigated the bank's founding legislation, they determined that it granted the bank sufficient leeway to create an "outside legal entity", i.e. a nonprofit. The board members noted that this kind of leeway "is consistent with the status of quasi-public agencies as bodies both "politic and corporate" and is often described as the authority to pursue public purposes with the flexibility of private sector means".

We note that while the CGB's creation of the IPC is unorthodox – a more traditional pathway would involve the legislature creating that entity, or some other agency – the Connecticut legislature did not seek to prevent the CGB from doing so. For instance, the legislature might have tried to pre-emptively amend parts of the CGB's founding legislation to clarify the meaning of "subsidiary", or terminate the CGB itself.

4.5.4.3 Periodic "strategic retreats"

The CGB periodically organized strategic retreats, i.e. multi-day events at which the CGB's senior staff discussed the organization's successes and failures in past years and its future strategy. Retreats occurred prior to the budget shock (November 2015 and January 2017), as well as after (February 2019).

Prior to the shock, the retreats set the stage for the creation of the nonprofit organization. In 2015, CGB staff discussed the potential creation of a Community Development Financial Institution (CDFI), a type of private sector financial organization, to increase clean energy deployment outside of Connecticut. The CDFI idea was not discussed within the context of potential budget raids, despite the board's awareness that they could occur.

In 2017, prior to its strategic retreat and cognizant that Connecticut would be facing a large budget deficit in the following years, the CGB board once again discussed the potential of a private entity (CDFI or otherwise) to support the CGB's mission. Separately, they also discuss strategies to mitigate "threats" to the CGB's financial position.

After the budget shock and the IPC's creation, the 2019 retreat concluded that the CGB needed to, among other things: attract more private sector investment to increase impact in Connecticut and beyond, use its "full suite of public policy tools" (including starting to issue bonds), and develop an appropriate investment strategy to finance climate mitigation and adaptation goals while remaining "financially sustainable". They reviewed the CGB's funding sources; and explored how

to potentially safeguard them, and develop new sources. Ultimately, the CGB acted on many of the retreat's conclusions, including issuing green bonds.

4.5.4.4 Reliance on external organizations

In March 2018, the CGB engaged a consultant (Forsyth Street Advisors, or FSA) to create a business plan for the IPC. In the process of creating the plan, FSA reviewed the CGB and its operations and found several limitations impeding its development, including: operational inefficiencies (high personnel overhead), quasi-governmental structure (arguing its structure, products, and investments are subject to "state public policy and budget considerations that reduce flexibility and market responsiveness"), and limited scale (i.e. underserving of segments of the clean energy market). The plan suggested the CGB had the expertise and capability to expand its model to underserved markets in Connecticut. The IPC on the other hand could help the CGB's goal of becoming financially "self-sustainable" by taking on the lower-return CGB programs that require "greater scale" to become sustainable and serve underinvested communities within and outside of Connecticut.

4.5.4.5 IPC governance design

As mentioned, in April 2018, CGB directors held a long discussion on how to structure the IPC – and particularly, its board of directors.

Using the FSA's business plan for the IPC, one of the CGB board members proposed the following outline for the IPC – a nonprofit organization, employing ex-CGB staff, and governed by a self-perpetuating board (i.e. board members nominate their successors). A nonprofit 501(c)(3) status

would give the IPC independence critical to achieve "investor confidence in the accountability of the organization to its mission and to investors, separate from the Green Bank mission and obligation". The board would be constituted of 5 members (of which 2 would be named by the CGB, i.e. the CGB would have a minority representation on the board) and 3 members from third party groups (likely representatives of external organizations providing funding to the IPC). This CGB presence on the IPC's board would ensure that the IPC would operate to "help fulfill the Green Bank's mission in Connecticut". A third-party individual, or "incorporator", would be charged with nominating the initial directors. Once that board was constituted, the members themselves would be tasked with appointing the next members, without any input from the CGB. Also, the IPC would have the power to draw up its own bylaws and operating procedures (as opposed to the CGB doing so).

The CGB board members considered the idea of creating a subsidiary, instead of a nonprofit. They decided against this idea because, among other reasons, a subsidiary would be controlled by the CGB and therefore Connecticut state; as compared to a nonprofit, that would be independent. State control implied that subsidiary could also be subject to future budget shocks – an unappealing proposition to NGOs and donors wishing to support the CGB's mission but anxious about their funds being diverted by the state.

Ultimately the CGB board members' discussion on how to create the IPC revolved around the problem of balancing two critical factors: the need for the IPC to be formally independent from the CGB and Connecticut state, and the need to keep the IPC close enough to the CGB so that its mission would be aligned with the CGB's. The former requirement stemmed from the need to

establish the nonprofit away from a potential budget shock by the state legislature; while the latter factor was necessary to ensure the CGB could rely on the IPC to manage the programs it would transfer to it.

4.5.4.6 IPC business strategy design

The CGB decided that the IPC would adopt the CGB's business approach and best practices as a guide in developing its own new business opportunities.

Subsequently, from 2019 to 2022, as recorded in quarterly memos the IPC sent to the CGB directors detailing its "progress to targets", the IPC conducted a number of activities in line with the above objectives. It applied for grants and financial opportunities, e.g. an awarded $200,000 grant from McKnight Foundation to support the IPC's expansion to the Midwest, or the Community Investment Guarantee Program, led by the Kresge Foundation; worked with green banks and local governments to develop IPC products and financing strategies, e.g. with the Montgomery County Green Bank, Rhode Island Infrastructure Bank, Philadelphia Energy Authority; joined advisory councils and initiatives related to the U.S. Department of Energy's solar financing grants and programs; and continuously conducted talks with public and private organizations to discuss potential partnerships outside of Connecticut.

4.6 Discussion

4.6.1 Hypotheses

1. We accept our first hypothesis, and argue below that the CGB engaged in an ambidextrous response to the Connecticut legislature's budget shock. We suggest that the CGB's response is

best characterized as a hybrid of structural and cyclical ambidexterity pathways. In other words, the response does not fit only within one of the four OA archetypes. We thus provide novel evidence for hybrid ambidexterity in the quasi-governmental domain.

We do not consider the CGB's adaptation as primarily cyclical because OA theory describes the cyclical pathway as taking place within a single organizational unit. While the CGB developed its post-shock strategy, the IPC played an important role in helping the CGB adapt to the budget shock. We therefore suggest the ambidextrous response ultimately took place through both the CGB's and IPC's implementation of the CGB's strategy. Below, we provide support for our argument that the adaptation was hybrid — by describing the structural and cyclical elements of the response.

Immediately following the budget shock, the CGB's board of directors came up with the idea of a shared mission between the CGB and IPC, with the IPC's complementing the CGB's. The CGB's design of the IPC governance structure was calibrated to render the IPC independent enough to be immune from budget interference from Connecticut state, yet close enough to the CGB to ensure mission alignment. The IPC's board of directors was the focal point in achieving this balance, i.e. a minority of the initial board were nominated initially by the CGB, and successive board members would be nominated by the previous IPC members themselves (with no outside input from the CGB). The CGB considered that this would make the IPC's board, and especially future board members relatively independent from the CGB's influence — while preserving a common mission between the two organizations. While it is not necessarily clear what the CGB board would consider to be mission misalignment between the two organizations, no documentation from 2018

to 2022 suggests the board was dissatisfied with the implementation of their mission alignment strategy.

Prior to the budget shock, the CGB operated sets of incentive and financing programs. Due to the shock, the bank created the IPC and gave it a portion of each of these program types to run. As a result, the CGB effectively separated itself structurally into two "subunits" — itself and the IPC — with each conducting exploratory and exploitative activities simultaneously, guided by complementary missions. In this context, we interpret the IPC as being a part of, and helping, the CGB's ambidextrous response.

Both organizations carried out exploitation activities after the budget shock — the CGB continued operating a subset of the programs it managed prior to the shock, and the IPC adopted programs that the CGB transferred to it at its founding, facilitated by the CGB's assistance and "best practices" in administering them. In terms of business strategy, the IPC was designed to broadly mimic the CGB's operations. Post-budget shock, the CGB focused on being financially sustainable by developing its financing business. Similarly, the CGB's board members conceived of the IPC's strategy in the same way, with the added challenge that the IPC would need to bring lower interest rate financing programs to scale, thanks to partnerships and funding it would have to explore for and obtain both inside and outside of Connecticut.

We assess that the CGB's structural ambidextrous response led to a successful financial outcome. As measured by its net position from the budget shock to date, the CGB initially had decreases in this position during the two years of the shock, then recovered with year-over-year increases. The

IPC's net position has remained broadly stable, except for a drop as reported in its last financial report. We avoid interpreting this last net position value as predicting future IPC performance declines.

Finally, we suggest elements of the CGB's adaptation response are characteristic of cyclical ambidexterity. The periodic strategic meetings, that occurred both in the immediate aftermath of the budget shock as well as in 2019, played a critical role in the CGB's innovations and strategy in general, including key elements of its ambidextrous response to the budget shock. The idea of creating some kind of mission-affiliated organization, the process of analyzing CGB programs by interest rate return and assessing their vulnerability to political disruptions (relevant for the organization's future financial independence), and financing program innovations and the rediscovery of the CGB's ability to issue series of green bonds are indicators of important periods of exploration. Between the strategic meetings, the CGB arguably exploited the initial ideas for its strategy, in conjunction with consultants/external advisers.

2. We accept our second hypothesis and note that both the CGB and IPC carried out innovative activities after the budget shock. In the CGB these innovations occurred in many, but not all, parts of the organization not explicitly maintained fixed by legislative requirements. The CGB's mission statement — which, as mentioned, is not inscribed into the CGB's founding legislation — changed, or "drifted", significantly post-shock. It reflects the bank's strategy, implemented in conjunction with IPC, to start serving markets outside of Connecticut (particularly in the aftermath of the shock), and to focus on promoting a broad green economy (as opposed to the Connecticut governor and legislature's energy strategy exclusively). More broadly, the CGB begins as an effort to

support Connecticut state's political strategy (pre-shock), but ends up distancing itself in 2020, through its mission statement, from the political structure that created it and cut its funding. The 2023-2024 mission statement appears to walk this mission drift back slightly, but not to the extent of returning back to the pre-shock formulation.

As a kind of subsidiary with a mission complementary to the CGB's, the creation of the IPC also represents a governance change for the CGB. Previous members of the CGB staff are sent to work at the IPC, some members of the CGB sit on the IPC's board of directors, and a regular flow of information about the IPC's operations is sent to the CGB (i.e. the quarterly memos on progress to targets).

After the budget shock, the CGB's strategic direction changed, notably through a revised distribution of its programs, short-term operations, and self-financing. The CGB's sustainability plan encapsulated the CGB's new strategy to become financially independent from Connecticut state through i) a 27% reduction in its operating expenses, ii) the retention of a subset of its programs (not transferred to the IPC) yielding a 5% interest rate over 10 years, and iii) the creation of a nonprofit. The sustainability plan ultimately aimed to render the CGB financially independent over the following 4-year period, a fundamental shift in strategy from its previous operations.

Finally, as expected, we do not note changes in the CGB's organization or activities that are statutorily-mandated, e.g. its purpose statement, and its administration of incentive programs.

Overall, the CGB's board was by and large the most important group in initiating and executing the organization's budget shock response. As mentioned, consultants and other external actors played critical roles in helping develop or shape the CGB board's actions, but their input would not have occurred without the board's impetus.

3. We accept our third hypothesis, although we note that quasi-governmental status may appear paradoxical in enabling the long-term survival of quasi-governmental green banks. Connecticut state created the CGB as a QGO in order for it to achieve public aims with a degree of flexibility associated with business or private sector.

Although the CGB's quasi-governmental status was partly intended to incentivize private sector investors to help the CGB close the funding gap for climate change projects, the CGB wasn't sufficiently insulated enough from Connecticut state's control to enable it to attract some investors (rightly) concerned about the bank's exposure to budget shock. In this sense, elected officials' control of the CGB was an impediment to its survival.

And yet, the CGB's quasi-governmental status also allowed it to conduct activities usually inaccessible to traditional government agencies. Firstly, the bank's founding legislation was broad enough that the CGB directors were able to create the IPC and transfer part of the bank's programs to it. Secondly, the CGB's ability to conduct "for-profit" (financing) business operations allowed it to implement its sustainability plan – which aimed to place the CGB on a path of greater (financial) independence from Connecticut state.

Therefore, the net effect of Connecticut state's shock was to incentivize the CGB to adapt by separating itself further from the grasp of the state, and create a private sector nonprofit with even less exposure to elected officials' control.

4.6.2 Study limitations

Beyond our three hypotheses, our study has limitations. Our use of the content analysis methodology implies that i) we may have left out important pieces of data/documentation in the data collection and extraction processes, and ii) we may have misinterpreted parts of our data. It's also possible that the CGB's own documentation provides an incomplete picture of the CGB's adaptation, and IPC's emergence, following the budget shock.

We also highlight that the CGB's mission statements and the financial net position metric are key elements of our conclusion that i) the CGB drifted away from Connecticut state policy and control after the shock, and ii) the bank adapted, and the IPC emerged, successfully in the wake of the budget shock. We have not found CGB documentation that explicitly discusses the thought-process behind the (re-)writing of these mission statements over the years. We believe they reflect the CGB's post-shock strategy of expanding their independence from Connecticut state, but this link is equivocal to some extent. Also, we suggested that the net position metric is likely a good proxy for organizational financial health. Other metrics may perhaps measure the CGB's or IPC's adaptation and emergence better than net position. However, it is beyond this article's scope to explore and assess other financial metrics' accuracy in characterizing the CGB and IPC's financial health.

Finally, we note that the budget shock took place recently. Consequently, it is possible that the shock catalyzed long-term financial or other damage to the CGB and IPC that has not yet been assessed, e.g. reputational damage. If so, we believe such a factor would have already been described in the CGB or IPC's documentation. On the contrary, in 2019, the CGB inspired a proposal for a national green bank, in the Green Bank Act of 2019 (Murphy 2019) – which suggests other observers of the CGB's situation are not preoccupied by it.

4.7 Conclusion

Numerous barriers hinder effective outcomes in climate change mitigation and adaptation governance. U.S. quasi-governmental organizations (QGOs) have traditionally been used to overcome these barriers in non-climate change domains, and may also be useful in the climate change space. Quasi-governmentality emerges from an organization's ability to embody for-profit and not-for-profit modes of operation and public and private sector characteristics. In the U.S., almost half, and counting, of all "governmental" organizations are QGOs. Green banks, which comprise QGOs, have steadily increased in number across U.S. states and municipalities since the CGB was created. In addition, U.S. legislators have been building proposals for a national green bank modeled after the CGB and other green banks. However, we expect climate change-focused U.S. governmental and quasi-governmental organizations to continue to be politicized, as a result of partisan politics and the lack of institutional means to mediate climate change policy conflict (Mildenberger 2021). Politicization may materialize as shocks that threaten the stability of U.S. governance efforts, reverse climate change policies, or terminate organizations altogether. As entities with measures of administrative and financial independence, QGOs may be better suited to weather these shocks than traditional government agencies. Little scholarly work exists on

quasi-governmental green banks and how their quasi-governmentality may play a role in their ability to adapt to these shocks.

To address these research gaps, we conduct a case study of the quasi-governmental Connecticut green bank (CGB) and its response to a 2017 Connecticut state-driven budget shock. We suggest the CGB engaged in a successful adaptive response best characterized as hybrid structural-cyclical organizational ambidexterity (OA). The CGB's quasi-governmental status was critical in enabling it to adapt to the shock. From a structural perspective, this status allowed it to create a nonprofit organization, Inclusive Prosperity Capital (IPC). Both the CGB and IPC implemented exploitation and exploration activities aimed at rendering both entities financially and operationally self-sufficient. Cyclical strategic meetings at the CGB represent important moments of exploration and strategy development. Importantly, we suggest that the CGB's adaptation to the budget shock – aided by the IPC – came at the expense of mission and financial drift away from the state's control and policy. This study is limited by the constraints of content analysis methodology. Our choice of descriptions and metrics of organizational mission and performance are also potential limiting factors.

We contribute to the ambidexterity literature by developing the literature's limited empirical basis on hybrid OA. Through this case study, we also provide the first application of the OA framework to U.S. quasi-governmental organizations.

Understanding how U.S. QGOs respond to shocks ultimately allows scholars and legislators to assess the U.S.' projected institutional capacity to address climate adaptation planning and

implementation. It also affords legislators a better understanding of the potential consequences of these shocks on organizational drift. QGOs that are unable to survive a shock, budgetary or otherwise, are unlikely to contribute to post-shock climate change efforts. We do not claim that quasi-governmentality necessarily grants QGOs the ability to survive shocks. Ultimately, legislators can terminate these organizations. Instead, we suggest that the CGB, and QGOs whose governance is structured in a similar way, have measures of organizational independence that may help them weather shocks, and may therefore play an important role in overcoming future climate change governance barriers.

4.8 References

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4.9 Supplementary Information

4.9.1 CGB definition of "clean energy" (from Annual Comprehensive Financial Report FY 2023, pg. 139):

- solar photovoltaic energy
- solar thermal
- geothermal energy
- wind
- ocean thermal energy
- wave or tidal energy, fuel cells
- landfill gas
- hydropower that meets the low-impact standards of the Low-Impact Hydropower Institute
- hydrogen production and hydrogen conversion technologies
- low emission advanced biomass conversion technologies
- alternative fuels used for electricity generation including:
    - ethanol
    - biodiesel or other fuel produced in Connecticut and derived from agricultural produce

    - food waste or waste vegetable oil, provided the Commissioner of Energy and Environmental Protection determines that such fuels provide net reductions in greenhouse gas emissions and fossil fuel consumption
    - usable electricity from combined heat and power systems with waste heat recovery systems
- thermal storage systems
- other energy resources and emerging technologies which have significant potential for commercialization, and which do not involve the combustion of coal, petroleum or petroleum products, municipal solid waste, or nuclear fission
- financing of energy efficiency projects, projects that seek to deploy electric, electric hybrid, natural gas or alternative fuel vehicles and associated infrastructure, any related storage, distribution, manufacturing technologies or facilities and any Class I renewable energy source, as defined in section 16-1 [of Chapter 277 of Connecticut State legislation].

4.9.2 CGB activities (from the Appendix of the Annual Comprehensive Financial Report FY 2023)

The text in this section below is reprised verbatim from the appendix (with the exception of the author's note).

CGB Investment - Green Bank investment activity is broken down into two categories, presented below as separate metrics.

- CGB Investment = CGB Incentives + CGB Financing
- CGB Incentives - CGB incentives are funds that are not intended to be repaid by the recipient and are used to reduce the cost of a specific product or technology. At present, RSIP is the only active incentive program administered by CGB.
- CGB Financing - CGB financing includes the total funds deployed by the Green Bank during the specified time period with the intention either that the funds will be repaid or to bolster the creditworthiness of borrowers. CGB Financing is the sum of the types of financing below, each of which is its own metric.
- CGB Financing = CGB Loans and Leases + CGB Credit Enhancements
- CGB Loans and Leases - Loans and leases are the types of CGB financing in which capital is directly lent to fund projects. It does not include third party lending.
- CGB Credit Enhancements - Credit enhancements involve the deployment of CGB capital to bolster the credit of borrowers. This financing category comprises the three categories of funds below, each as its own metric.
- CGB Credit Enhancements = Loan Loss Reserves + Guarantees + Interest Rate Buy-Downs
- Loan Loss Reserves - Loan Loss Reserves are capital that the CGB has segregated as part of a program to ensure against losses incurred by participating lenders due to the failure of borrowers to repay loans.
- Guarantees - Guarantees reflect a specified dollar commitment that CGB has made to external lenders for repayment of specific transactions in the event one or more borrowers fail to repay the lenders.

- Interest Rate Buy-Downs - Interest rate buy-downs involve the deployment of CGB capital by paying a portion of the interest on borrowers' loans to decrease their cost of capital.

Author's note: at an aggregate level, the bank provides an overview of its incentive vs financing activities (see graph below). Subsidies represent the incentive business – e.g. in the above definitions, the Residential Solar Investment Program (RSIP) is mentioned as the only current incentive program, and is later described in the Annual Financial Report of FY 2023 as a subsidy program (pg. 315). Credit enhancements and loans/leases are descriptors of the financing business.

4.9.3 CGB Capital Deployed (i.e. expenses) by fiscal year

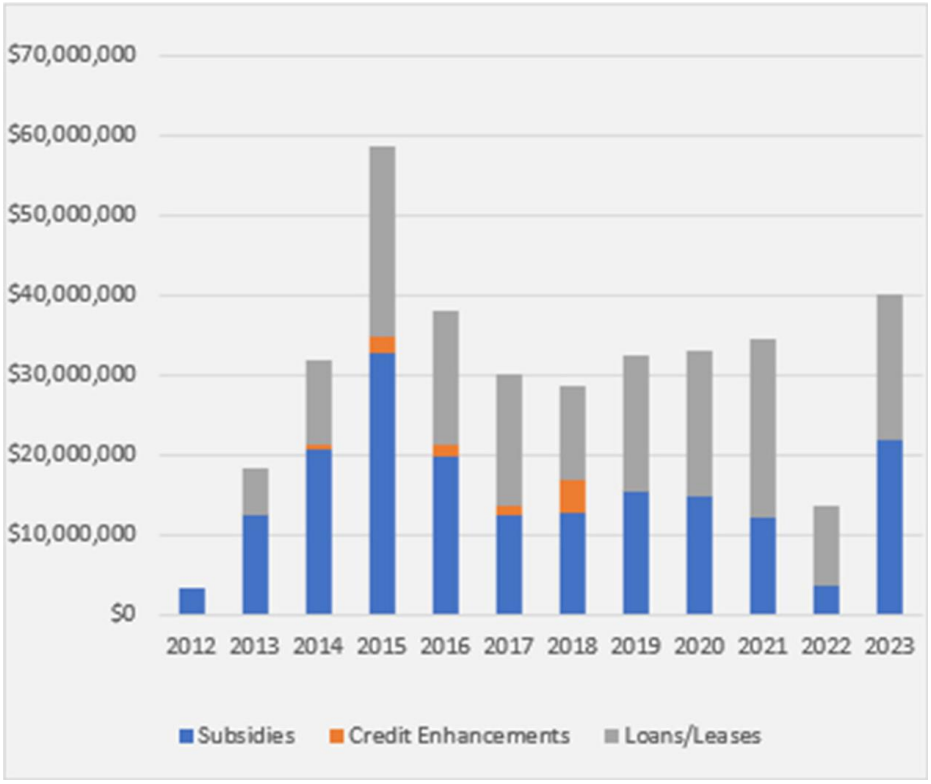


Figure 3.2: Subsidies refer to the deployment of "incentive" program monies. Credit enhancements and loans/leases refer to "financing" program monies. Figure taken from the CGB's annual financial report of FY 2023 (page 146).

4.9.4 CGB and IPC: Revenues and Expenses

NB: for clarification on the different revenue and expense components of the following graphs, please refer to the program descriptions section of this SI document.

4.9.4.1 CGB Operating revenues

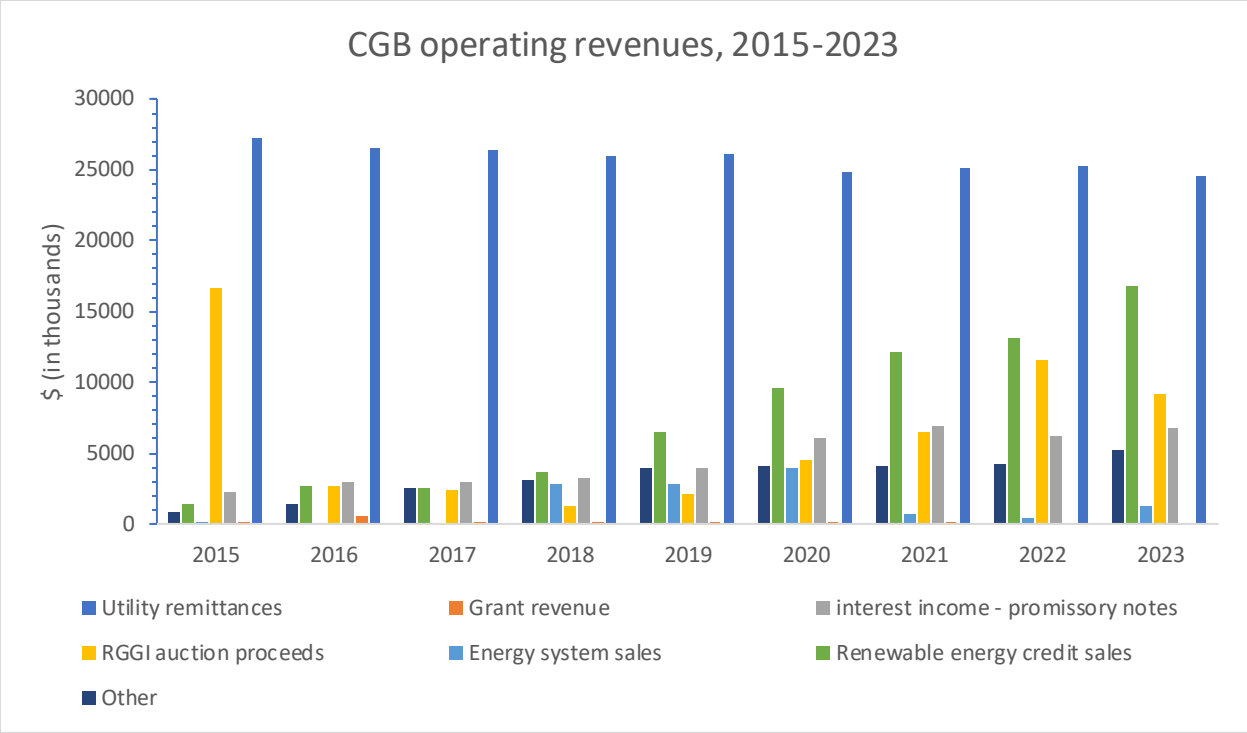


Figure 4.3: Utility remittances indicates customer charges (1 mil/kWh) for electric services collected by utility companies and transferred to Connecticut state, Renewable energy credit sales (RECs). Data pulled from the CGB annual financial reports from 2015 to 2023.

The following figure provides a more precise breakdown of "significant sources" of revenue by CGB program:

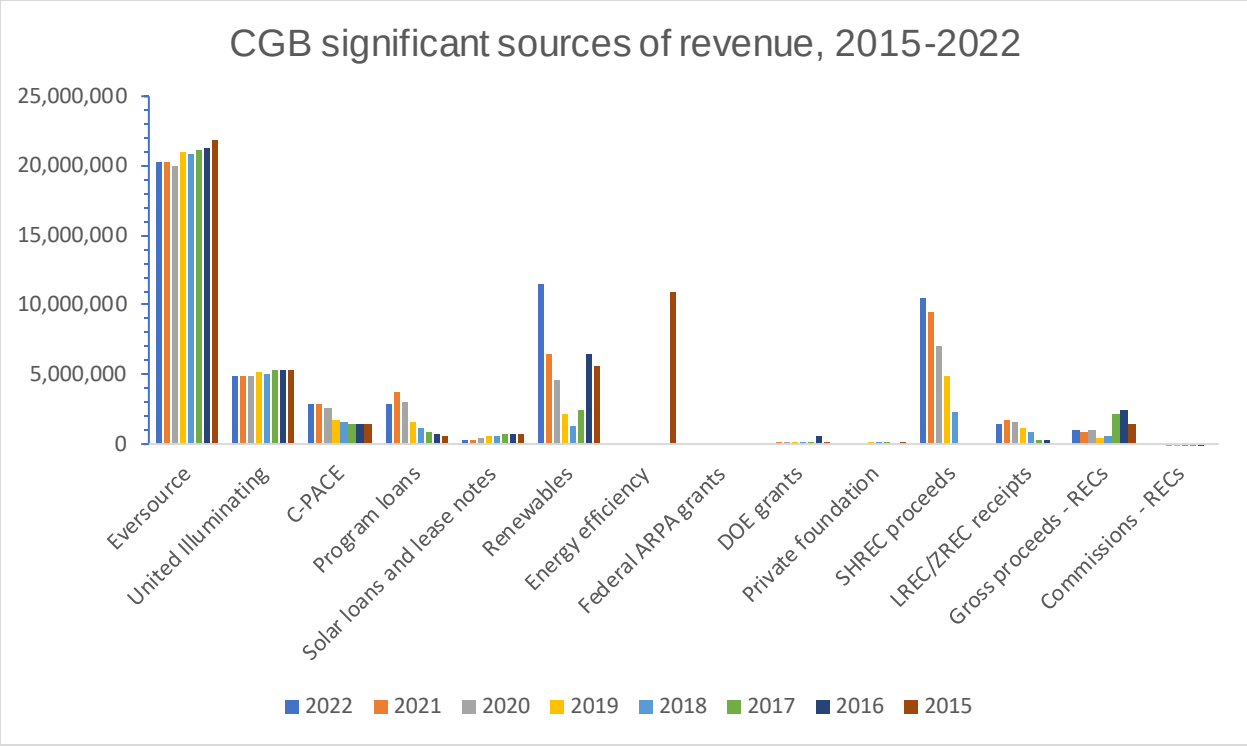


Figure 4.4: Significant sources of revenue (in $) for the CGB, from 2015 to 2022. Data collected from the CGB's annual reports across that same time period.

4.9.4.2 CGB operating expenses

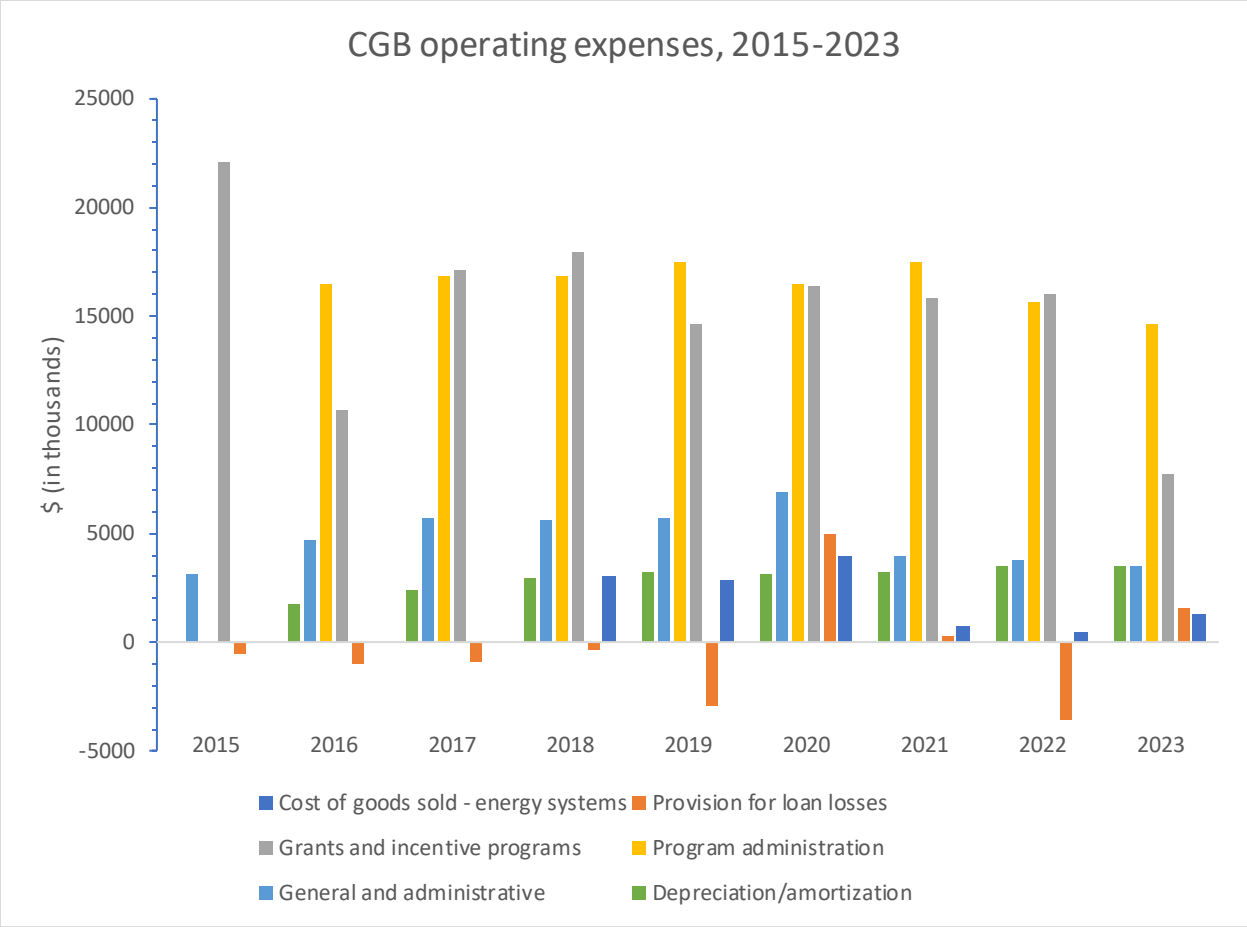


Figure 4.5: The CGB's operating expenses (in thousands of $), from 2015 to 2023. Data collected from the CGB's annual reports across that same time period.

4.9.4.3 IPC revenues

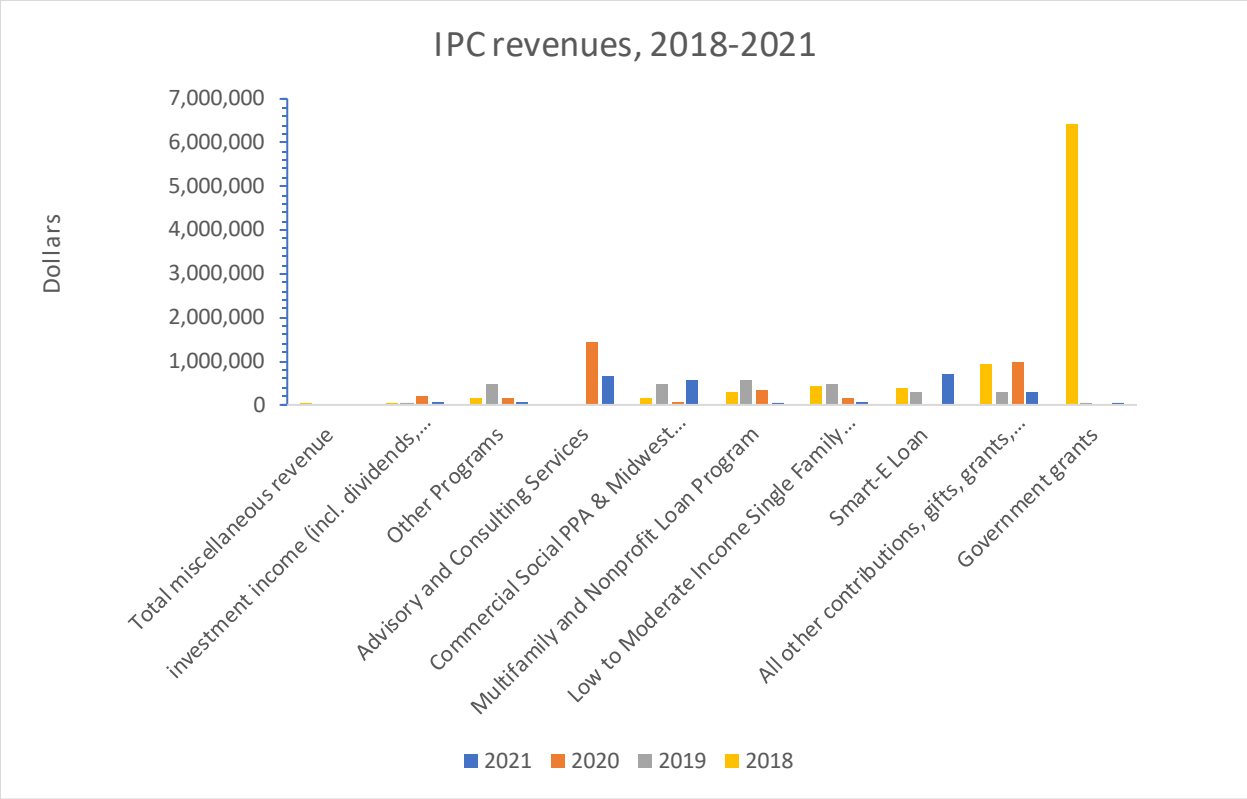


Figure 4.6: The IPC's operating revenues (in $), from 2018 to 2021. Data collected from the IPC's IRS form 990s across that same time period.

4.9.4.4 IPC expenses

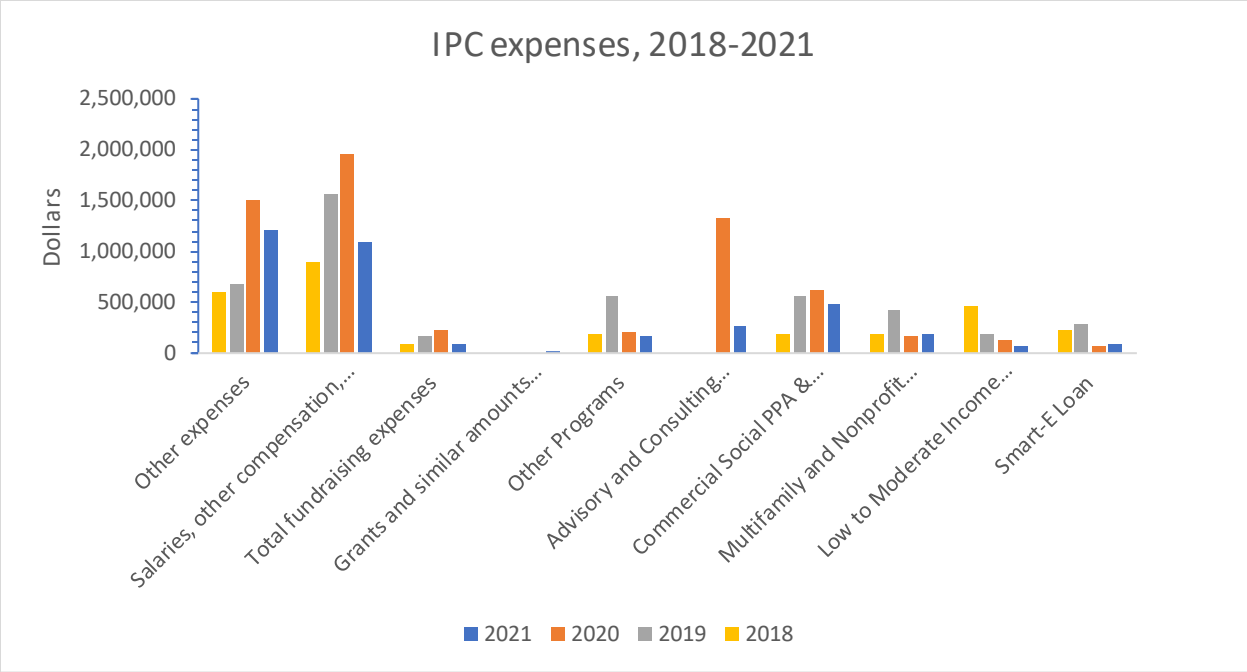


Figure 4.7: The IPC's operating expenses (in $), from 2018 to 2021. Data collected from the IPC's IRS form 990s across that same time period. Other expenses includes costs related to the IPC's loan portfolio, program development, technical support, and project inspections. See Form 990 for more details.

4.9.5 Background on quasi-governmental organizations

4.9.5.1 Conceptualization

Defining quasi-governmental organizations has proven to be an elusive task. Kosar (2011: 2) described quasi-government organizations as "entities that have some legal relation or association, however tenuous, to . . . government; or to the terrain that putatively exists between the governmental and private sectors". Koppell (2006: 12), using a typological approach modified from Perry and Rainey (1998), defines a hybrid as "an entity created by the federal government (either by act of Congress or executive action) to address a specific public policy purpose. It is owned in whole or part by private individuals or corporations and/or generates revenue to cover its operating costs". Mead and Warren (2016) propose a gamut of characteristics that are typically

associated with the public and private sectors, e.g. in terms of legislation (the private sector follows laws while the public sector creates them), ownership (private organizations are privately owned, while the public ones are "owned by the people"), mission accountability (the public sector reflects majoritarian values, while private institutions can reflect advocacy, individual expression, civic engagement), etc. These and other similar definitions make light of the continual difficulty scholars have had in unequivocally defining these organizations. For our purposes, we propose the following one: QGOs are organizations that have some formal legal relation to government and exhibit some combination of attributes commonly associated with the public and private sectors, and for-profit and not-for-profit modes of operation.

While the above definitions appear relatively broad, further precision has been hard to achieve. Part of the problem rests on how to define each underlying term (e.g. "public") without blurring it in the process (e.g. private sector non-profits, as defined by the IRS, provide public goods like education, safety, and charity). Another is that of the confusion associated with inconsistent nomenclature for quasi-governmental organizations. The 2021 U.S. Governmental Manual lists the Smithsonian Institution and the Legal Services Corporation as Quasi-Official Agencies for instance. And the latest 2017 Census of Government details that subnational QGOs called special districts may also be termed authorities, boards, corporations, commissions, or even (if particularly closely associated with county or municipal government) subordinate agencies – alternative names that can be applied to non-QGO, temporary, or private forms of organization (USCB 2019). Special districts can be defined as "independent, special-purpose governmental units that exist as separate entities with substantial administrative and fiscal independence from […] local governments." (USCB 2019: 5). Examples include school, fire protection, or water supply districts.

Beyond the confusing terminology, recognizing which organizations are QGOs can be, on the one hand, facilitated by government classification, e.g. the quasi-official agencies at the federal level, or special districts at the subnational (Selin and Lewis 2018). For other cases where the government doesn't explicitly provide this classification, they can be identified based on whether they have characteristics that give them a greater degree of independence from the executive branches of government than traditional governmental entities possess. A complete listing of these characteristics has also proved elusive, though authors have suggested some pertinent ones: for-cause provisions that prevent the removal of organizational leadership except under cases of criminal infraction or neglect of duty, a board of directors structure instead of a single agency head, tenures that are specified (i.e. members don't "serve at the pleasure" of elected officials) and that exceed those of elected officials, staggered terms (to prevent political shakeups of the agency directors), requirements that boards have a balanced proportion of members from different political groups, quorum requirements that enforce majoritarian decision-taking, authority to litigate without going through the executive branch's Department of Justice, exemption from mandatory executive branch reviews of budget proposals, legislative materials, administrative rules, and congressional testimony, and funding sourced outside of government appropriations (e.g. through fees, donations, bond issuance), etc. (Selin and Lewis 2018; Selin 2015; Datla and Revesz 2013).

QGOs may have some, but not necessarily all, of the above indices of independence at a given time. To consider a few characteristics, the Tennessee Valley Authority (TVA) for instance is a federal energy provider QGO founded by Congress that has a nine member board of directors with specified five-year terms, can litigate matters independently, and virtual funds almost all its

operations from bond issuance and electricity sales (as opposed to government appropriations). However, TVA has no removal protection for its board members, no board membership partisan balance requirements, and no authority to bypass congressional review of its legislative proposals, budget submissions, and congressional testimony. Independence indices may combine in different ways for different forms of QGOs, although it is unclear whether there is a pattern (Datla and Revesz 2013).

4.9.5.2 QGO and non-QGO green banks

GBs have been founded for a variety of reasons, e.g. incentivizing private sector crowd-in, reducing energy costs, meeting emissions target goals, lowering the cost of capital, and developing local economic conditions (GBN 2023). GBs use a range of financial products and tools to achieve these aims, e.g. grants, (co-)loans, loans loss reserves (guarantees to cover losses that private lenders may incur after a default), green bonds (Leonard 2014). Globally, green banks have invested, and attracted private co-investment, of over $70 billion (NRDC 2020).

In U.S. governance, public and quasi-public green banks are all the more unusual in light of the way national climate change policy has developed, i.e. predominantly layered onto previously existing, non climate change-dedicated, governmental organizations (Dubash 2021; Mildenberger 2021). U.S. GBs have been created at the state, county, and municipal levels. Proposals for a federal green bank have repeatedly emerged in recent years, but have not been acted on so far (Berlin 2022).

4.9.6 Measures of success (from the CGB's Annual Comprehensive Financial Report FY 2023)

The text in this section is reprised here verbatim from the report, with the exception of the author's notes.

4.9.6.1 CGB Project activity

The Connecticut Green Bank tracks projects through three phases as they move through the pipeline from application through implementation – Approved, Closed, and Completed. "Approved" signifies that the appropriate authority within the Connecticut Green Bank, whether President & CEO, Deployment Committee, or Board of Directors, has approved the agency's investment in the project per the Comprehensive Plan and Budget. "Closed" indicates all financial and legal documents have been executed and any additional funding has been secured. "Completed" indicates the project has closed, all construction and installation are completed, and the project is operational.

Table 4.2: The CGB's project activity from 2012 to 2023. See note above for more details on the "approved", "closed", and "completed" columns. Data pulled from the CGB's 2023 annual financial report. Year-over-year computations completed by the author.

Fiscal Year	Approved	Closed	Completed	% Approved change (year over year)	% Closed change (year over year)	% Completed change (year over year)
2012	739	288	18			
2013	1,236	1,114	759	67.25304465	286.8055556	4116.666667
2014	2,469	2,448	1,208	99.75728155	119.7486535	59.15678524
2015	6,389	6,457	3,938	158.7687323	163.7663399	225.9933775
2016	7,353	7,229	9,520	15.08843324	11.95601673	141.7470797
2017	4,993	4,871	5,424	-32.09574323	-32.61861945	-43.02521008
2018	6,598	6,639	5,925	32.145003	36.29644837	9.236725664
2019	11,701	11,686	7,256	77.34161867	76.02048501	22.46413502
2020	8,329	8,315	7,888	-28.81804974	-28.84648297	8.710033076

2021	7,139	6,933	6,277	-14.28742946	-16.62056524	-20.42342799
2022	3,300	3,309	4,385	-53.77503852	-52.27174383	-30.14178748
2023	2,688	2,450	1,380	-18.54545455	-25.95950438	-68.5290764
Total	62,934	61,739	53,978			

4.9.6.2 CGB Investment by source

The Connecticut Green Bank's intent, stated in the Comprehensive Plan, is to use public funds to attract multiples of private investment into Connecticut's green energy economy, to decrease reliance on public funds over time, and expand the scale of clean energy investments in the state.

Table 4.3: CGB and private sector investments in green projects, from 2012 to 2023. Data pulled from the CGB's 2023 annual financial report. Year-over-year (yoy) computations completed by the author.

Fiscal Year	CGB Investment	Private Investment	Total Investment	Average Investment Per Project	% Change in CGB Investment (yoy)	% Change in Private Investment (yoy)	% Change in Total Investment (yoy)	% Change in Average Investment per project (yoy)
2012	3,401,642	6,499,869	9,901,511	$34,380				
2013	18,460,095	92,681,121	111,141,216	$99,768	442.6818872	1325.892137	1022.467227	190.1919721
2014	31,847,052	75,263,463	107,110,514	$43,754	72.51835378	-18.79310243	-3.626649181	-56.14425467
2015	58,698,748	261,609,129	320,307,877	$49,606	84.31454189	247.5911399	199.0442908	13.37477716
2016	37,996,026	282,172,997	320,169,023	$44,290	-35.26944391	7.860531503	-0.043350167	-10.71644559
2017	30,074,679	150,340,014	180,414,693	$37,039	-20.84783024	-46.72062331	-43.65017224	-16.37164145
2018	28,467,983	193,260,347	221,728,330	$33,398	-5.34235461	28.54884196	22.89926409	-9.830179001
2019	32,515,637	287,031,404	319,547,041	$27,344	14.21826759	48.52058814	44.11646947	-18.12683394
2020	32,886,758	253,030,100	285,916,858	$34,386	1.141361616	-11.84584806	-10.52432934	25.75336454
2021	34,522,434	234,634,071	269,156,506	$38,823	4.973661435	-7.270292744	-5.861967048	12.90350724
2022	13,683,381	102,965,986	116,649,367	$35,252	-60.36379996	-56.11635362	-56.66113789	-9.198155732
2023	$40,218,369	$129,337,968	$169,556,337	$69,207	193.9212831	25.61232405	45.35555688	96.32077613
Total	$362,772,804	$2,068,826,469	$2,431,599,273	$39,385				

4.9.6.3 CGB Program Leverage Ratios by Year

The table below shows in ratio form the extent to which public monies are driving private investment into the Green Bank's programs and the clean energy economy. The Green Bank's "leverage ratio," as it is commonly referenced, is calculated by dividing the total monies available in each period – here the Green Bank's fiscal year periods – by the amount of public investment.

Table 4.4: CGB financing and incentive program leverage ratios, from 2012 to 2023. Data pulled from the CGB's 2023 annual financial report. Year-over-year (yoy) computations completed by the author.

Fiscal Year	Financing	Incentive	Total	% change Financing (yoy)	% change Incentive (yoy)	% change total (yoy)
2012	0	2.9	2.9			
2013	11.5	3	6	NA	3.448275862	106.896552
2014	2.7	3.7	3.4	-76.52173913	23.33333333	-43.333333
2015	4.8	5.8	5.5	77.77777778	56.75675676	61.7647059
2016	6.9	9.1	8.4	43.75	56.89655172	52.7272727
2017	3.7	8.1	6	-46.37681159	-10.98901099	-28.571429
2018	5.9	8.6	7.8	59.45945946	6.172839506	30
2019	8.6	10.7	9.8	45.76271186	24.41860465	25.6410256
2020	4.7	11.8	8.7	-45.34883721	10.28037383	-11.22449
2021	4.5	11.3	7.8	-4.255319149	-4.237288136	-10.344828
2022	4.6	15.1	8.5	2.222222222	33.62831858	8.97435897
2023	3.4	4.9	4.2	-26.08695652	-67.54966887	-50.588235
Total	5.2	7.7	6.7			

4.9.6.4 CGB Installed Capacity, estimated generation and energy saved and/or produced by FY

The data below present the clean energy outputs of the projects supported by the Green Bank. Data are presented as electric capacity (MW), electricity production (MWh), and Energy Saved or Produced (MMBtu).

Table 4.5: Clean energy metrics for CGB projects, from 2012 to 2023. Figure reproduced from the CGB's 2023 annual financial report (page 136).

		Estimated Generation (MWh)			Energy Saved/Produced (MMBtu)[29]		
Fiscal Year	MW	Annual	Lifetime[30]	Lifetime Clean Energy Produced (kWh) / Green Bank Investment ($)	Annual	Lifetime	Lifetime Combined Energy Generated & Saved (MMBtu) / Green Bank Investment ($)
2012	1.9	2,210	55,238	16.2	7,539	188,473	55,407
2013	23.5	131,562	1,479,603	80.2	463,525	5,273,193	285,654
2014	23.4	51,592	995,539	31.3	247,824	4,549,412	142,852
2015	62.2	209,524	3,423,946	58.3	697,481	11,208,147	190,944
2016	65.8	91,601	2,105,738	55.4	332,473	7,350,420	193,452
2017	50.0	71,701	1,672,396	55.6	528,172	9,741,563	323,912
2018	56.4	77,730	1,866,414	65.6	259,946	5,990,635	210,434
2019	64.3	209,308	3,580,208	110.1	274,087	6,397,701	196,758
2020	73.9	163,270	2,876,041	87.5	313,222	6,980,042	212,245
2021	64.8	94,870	2,178,325	63.1	283,093	6,600,563	191,196
2022	21.3	49,732	988,899	72.3	112,285	2,601,311	190,107
2023	64.3	42,432	742,019	18.4	80,092	1,752,134	43,566
Total	**571.8**	**1,195,532**	**21,964,366**	**60.5**	**3,599,739**	**68,633,594**	**189,192**

4.9.6.5 Other measures of success that the CGB highlights include:

- Tax revenue generated
- Avoided GHG emissions
- Economic health care savings due to GHG emissions reductions

4.9.7 CGB and IPC program descriptions

The following program descriptions are extracted verbatim from the CGB's annual financial report FY 2023. For more details on these programs, please see the annual financial report, available on the CGB's website.

4.9.7.1 Anaerobic Digestion and Combined Heat and Power Pilot Programs

These pilot programs were initiated in 2011 per Public Act 11-80 Section 103, the Green Bank is to develop a three-year pilot program for AD and CHP by setting aside $2 million a year for each

pilot for three years – for a total of $12 million. Funds to support the pilot programs could be used as grants, power purchase agreements or loans. There were to be no more than five (5) AD projects, each no more than 3 MW in size, and no more than 50 MW of CHP projects each not to exceed 5 MW in size. Both pilot programs supported projects at no more than $450 per kW on a grant basis; Seven projects were supported over the duration of these pilots (see Table 192 below). Due to the Connecticut General Assembly's reallocation of monies from the Clean Energy Fund to the General Fund in 2017, the Green Bank cancelled existing commitments for these pilots the following year.

4.9.7.2 C-PACE

Commercial Property Assessed Clean Energy (C-PACE) creates an opportunity for building owners to pay for clean energy improvements or clean energy production projects over time through a voluntary benefit assessment on their property. This process makes it easier for building owners to secure low- interest, long-term capital to fund energy improvements and is structured so that energy savings more than offset the benefit assessment.

For a municipality to participate in the C-PACE program, its legislative body must pass a resolution enabling it to enter into an agreement with the Connecticut Green Bank to assess and assign benefit assessments against C-PACE borrowers' liabilities. As of June 30, 2023, there are 139 cities and towns signed up for C-PACE (82% of municipalities) representing 79% of commercial and industrial building parcels in Connecticut.

4.9.7.3 Low Income Solar Lease and Energy-Efficiency Energy Savings Agreement (ESA)

Through the solar developer PosiGen, a respondent to the Connecticut Green Bank's 2015 RFP soliciting solar financing solutions to address underserved markets, the Green Bank supports solar and energy efficiency deployment targeted at the state's low to moderate income (LMI) population. In Connecticut, PosiGen develops and originates these solar projects as project sponsor, utilizing tax equity from multiple investors, senior debt capital from private lenders, and subordinated debt from the Green Bank. Initially the Green Bank supplied a debt advance of $5,000,000 (followed by another $3.5 million), which was subordinated to an additional $8,500,000 advanced by private lenders Enhanced Capital and Stonehenge Capital to leverage over $46 million in value for solar projects targeting LMI homeowners. The RSIP program's tiered LMI performance-based incentive (PBI) provides PosiGen a higher incentive for customers demonstrating these income requirements. In FY2019, the Green Bank partnered with Inclusive Prosperity Capital to help manage the Green Bank's investment and engagement with PosiGen.

To continue to expand the program, in FY'22 the Green Bank and Forbright Bank closed on a $140 million credit facility designed to allow PosiGen to continue to provide affordable solar system and energy efficiency leases to residential customers nationally, including low to moderate income homeowners in Connecticut. The Green Bank allocated up to $20 million for its own funding, 40% of which was participated out to other lenders.

Through the partnership with PosiGen, the Connecticut Green Bank lowers the financial barriers to Connecticut LMI residential customers seeking to install solar PV with no up-front investment and energy efficiency measures. PosiGen's model also includes an alternative underwriting approach that does not rely on credit scores and a community-based marketing approach – two key

ingredients for targeting this underserved market segment. Capital provided to PosiGen to be able to offer consumers a solar PV lease and energy efficiency upgrades is repaid to the Connecticut Green Bank, the tax equity investor, and the lenders through consumer lease repayments. This contrasts with traditional energy program subsidies targeted to LMI homeowners, which are typically in the form of grants only.

The financial structure of the Low Income Solar Lease product includes origination, servicing, and financing features in combination with the support of the Connecticut Green Bank.

4.9.7.4 Multifamily Programs

The Green Bank focused on lending to multifamily properties to support their energy efficiency overhauls and the development of their on-site clean energy generation. Due to changes in the regulatory environment in Connecticut, the Green Bank has pivoted our focus for relieving energy burden in multifamily housing to the Green Bank Solar Power Purchase Agreement. This section is focused on our lending efforts.

The Green Bank provides a suite of financing options that support property owners in assessing, designing, funding, and monitoring high impact energy efficiency and renewable energy upgrades for multifamily properties, defined as buildings with 5 or more units. The Green Bank contracted with Inclusive Prosperity Capital (IPC), to manage and administer these programs on behalf of CGB.

The Green Bank encourages owners to take a holistic approach to their buildings by implementing energy upgrades that will deliver a high return on investment over the long term through energy and operating cost savings, increased property values, and improvement of resident health, safety

and living environment. The organization partners with building owners to finance a project design approach that is both technology and fuel agnostic – whereby owners identify the combination of renewable energy and energy efficiency measures/technology approaches that will deliver the most benefits and highest impact. This holistic approach and focus on deeper efficiency measures is particularly important in Connecticut due to the need of the state's old and aging housing stock need for significant capital improvements and health and safety remediation. We are catalyzing holistic projects that reap the benefits of significant energy and operating cost savings, which can also be used to finance other capital improvements like full roof replacements and remediation of mold, asbestos, lead, etc. which have additional health and safety benefits.

The Green Bank Multifamily programs primarily target the low to moderate income market in Connecticut, for all ownership types, including private and non-profit owned apartments, condominiums, cooperatives, and state and federally funded affordable housing developments, including senior and assisted living facilities.

4.9.7.4.1 Pre-development resources

In a sector that is traditionally difficult to address, multifamily projects present a significant need for pre- development financing, trusted technical support, and streamlined access to funding programs. In 2015, the Green Bank established pre-development energy loan programs to support property owners in identifying high-quality technical assistance providers, and fund the work needed to scope and secure financing for deeper, cost-effective energy upgrades. Eligible assessment and design services funded under the pre-development Navigator loan include those for energy and water efficiency, efficient fuel conversion, renewable energy systems, energy

storage and EV charging stations, qualified health and safety measures, and performance benchmarking.

The Green Bank is working to change the model of pre-development and technical assistance from one that is primarily grant-funded in the low to moderate income housing space to one that is loan driven and financially sustainable.

This program is supported by a revolving loan fund which provides loans of 1.99% to 3.99% for up to two-year terms. The affordable multifamily version of this program is administered in partnership with the Housing Development Fund (HDF), a local CDFI, and funded by a portion of a $5 million program- related investment from the MacArthur Foundation.

- **Navigator Pre-Development Energy Loan*:*** funds pre-development costs for building owners to assess, scope and design their project.

4.9.7.4.2 Term Financing Solutions

The Green Bank offers the following term financing options for project implementation.

- **Loans Improving Multifamily Energy (LIME) Loan:** typically funds energy improvement projects for low to moderate income properties (where at least 60% of units serve renters at 80% or lower of Area Median Income) and is geared towards mid-cycle energy improvements. LIME has recently been expanded to serve market rate properties in addition to properties that house low to moderate income residents. The LIME Loan program is delivered through a partnership with Capital for Change, a local CDFI. LIME typically provides alternatively secured loans (not secured by mortgages although

mortgage security is also possible) that cover 100% of project costs, require no money down, and are repaid from energy cost savings for terms up to 20 years. Projected energy savings are used to cover the debt service of the loan. The Green Bank supports LIME with a $625,000 loan loss reserve and provided $3.5 million to capitalize the initial $5 million loan fund. When it is necessary to lower the overall cost of capital to close a loan, funds from the $5 million program-related investment from the MacArthur Foundation, housed at HDF, may be used to support the program.

- **CT Green Bank Power Purchase Agreements:** offer solar-only financing that allows owners to go solar and lock in lower long-term electricity rates with no upfront cost and without the risk or hassle of purchasing and maintaining a system. Solar financing is available for multifamily properties through the Green Bank's solar power purchase agreement facilities. See the Case 2 – CT Green Bank PPA & Solar Lease for more information**.**
- **Commercial Property Assessed Clean Energy** (C-PACE): funds 100% of project costs with no money down. C-PACE loans are for a term of up to 20 years and are secured by using a benefit assessment on the borrower's property tax bill. The program serves market rate as well as affordable multifamily properties; however, to-date, given difficulties acquiring lender consent, multifamily C-PACE financing continues to be limited. See Case 1 – C-PACE for more information.
- **EnergizeCT Health & Safety Revolving Loan Fund*:*** funds health and safety improvements necessary to allow subsequent energy improvements in existing properties. The program is funded by $1.5 million from DEEP and provides low-interest, 2.99% fixed rate loans made available on a rolling application basis.

4.9.7.5 Residential Solar Investment Program (RSIP)

The RSIP was a subsidy program that provided incentives to reduce the cost for homeowners to own solar photovoltaic (PV) systems or for third party owners (TPOs) to provide clean electricity from solar PV systems through leases or power purchase agreements (PPAs) with homeowners. Incentives were provided either upfront (i.e., through an expected performance-based buy-down or EPBB) for homeowner-owned systems or were paid out over time290 based on system production (i.e., through a performance-based incentive or PBI and a low-and-moderate income performance-based incentive or LMI-PBI) for third-party owned projects. With either incentive type, the Connecticut Green Bank retained ownership of the Renewable Energy Credits (RECs) and other environmental attributes.

The subsidy under the RSIP decreased over time – see Table 237, supporting the goal of reducing market reliance on incentives while moving towards innovative low-cost financing and sustained orderly development.

In September 23, 2020, as RSIP was reaching its statutory target of 350 MW, the Board of Directors approved the RSIP Extension (RSIP-E), consisting of additional 32 MW of capacity over the RSIP statutory target, including up to 10 MW in Step 16 to ensure RSIP could achieve the 350 MW deployment goal of the public policy, and an additional 22 MW in Step 17 to support the residential solar PV industry toward achieving the sustained, orderly development in the context of COVID-19 impacts.

December 31, 2021 marked the official end of RSIP, and the transition to a tariff-based compensation for residential solar PV systems in the state.

4.9.7.5.1 SHREC Program

Legislation enacted by the General Assembly enables the Connecticut Green Bank to recover the costs of the RSIP by aggregating and monetizing the Solar Home Renewable Energy Credits (SHRECs) earned for solar energy generated by systems whose owners received RSIP incentives. The SHRECs are sold through long-term contracts to the state's two investor-owned utilities, as mandated by the law. Through the SHREC Master Purchase Agreement, the Green Bank has thus far sold its Tranche 1 through Tranche 6 SHRECs to the utilities – for a total of just over 301 MW of residential solar PV projects supported through the RSIP. Tranches 1 and 2, totaling 109 MW, were included in the Green Bank's first securitization of SHREC revenues, closing in March 2019, for $38.6 million. Tranche 3, which was just over 39 MW, was included in the Green Bank's second securitization of SHREC revenues, in the form of Green Liberty Bonds, which sold out on July 15, 2020 for over $16 million. Tranche 4, which was over 59 MW, was the Green Bank's May 2021 Green Liberty Bond offering and sold for over $24.8 million.

Tranches 5 and 6, totaling over 93 MW of generation capacity have not been securitized yet.

4.9.7.6 Small Business Energy Advantage (SBEA)

The Small Business Energy Advantage program was created in partnership by United Illuminating and Eversource under the guidance of the Energy Efficiency Board. The program enables small businesses to reduce their energy costs through energy efficiency improvements in their office, shops, restaurants, and factories. Businesses can borrow up to $100,000 to address these measures, at zero interest and repay their financing on their electric bills. Municipalities can borrow up to $1,000,000 or up to $5,000,000, depending on their credit rating. Connecticut State Agencies have no limit on their borrowing.

4.9.7.7 Smart-e Loan

The Smart-E residential loan program is a financing program developed in partnership with Energize CT and local lenders that uses a credit enhancement (i.e., $1,923,522 loan loss reserve).189 to stimulate the market for residential energy efficiency, solar, storage, and health and safety loans in Connecticut. Through the product, the Connecticut Green Bank lowers the cost of capital for Connecticut residential customers seeking to install solar PV, high efficiency heating and cooling equipment, insulation or other home energy upgrades and reduces the loan performance risks to lenders. The $1.7 million loan loss reserve is used to encourage lenders to offer below market interest rates and longer terms for unsecured loans, mitigates their losses, and encourages customers to undertake measures that would prove uneconomical at higher interest rates. In Fiscal year 2019, Inclusive Prosperity Capital (IPC) began managing the day-to-day operations of the Smart-E Loan program. With support from the Hewlett Foundation, and in partnership with Michigan Saves, IPC developed a new online platform for contractors and

lenders. In doing so, IPC is soliciting other Green Banks and similar organizations around the country, to use the new platform to bring overall costs down for all programs.

The Smart-E Loan was designed to make it easy and affordable for homeowners to make energy efficiency and clean energy improvements to their homes with no out-of-pocket cash and at interest rates low enough and repayment terms long enough to make the improvements "cash flow positive." At the same time, the Green Bank was intentional in opening conversations with local lenders to demonstrate the value of loans that would help their existing customers with burdensome energy costs and serve as an effective marketing tool to attract new relationships. In return for a "second loss" reserve which would be available beyond an agreed "normal" level of loan losses, lenders agreed to lengthen their terms and lower their rates. The end result is a successful loan product that has enabled thousands of homeowners throughout the state to lower energy costs and make their homes more comfortable in the summer heat or the depths of winter.

The financial structure of the Smart-E Loan product includes origination, servicing, and financing features in combination with the support of the Connecticut Green Bank.

4.9.7.8 Solar Lease

The Green Bank has used third-party ownership structures to deploy distributed solar generation in Connecticut in both the Residential and Commercial sectors. These funds are a unique combination of a tax equity investor and a syndicate of debt providers and the Green Bank to support solar PV installations (i.e., rooftop residential lease financing for solar PV and commercial leases and PPAs for rooftop, carport, and ground mount solar PV).

Residential leases were one of the first products to graduate from Green Bank funding, but the organization still actively pursues new projects in the Commercial, Industrial, and Institutional sector for its funds. The Green Bank also performs asset management functions for the entire portfolio including the now closed Residential portion of the program.

The CT Solar Lease 2 fund was the second "solar PV fund" established using a combination of ratepayer funds and private capital. In developing this fund, which was fully utilized in 2017, the Green Bank sought to innovate both in the types of credits that would be underwritten and via broadening the sources of capital in the fund. Before these innovations by the Green Bank, a fund had not been established that would underwrite residential solar PV installations as well as installations on a "commercial scale" such as for municipal and school buildings, community oriented not-for-profit structures (all of which can't take advantage of Federal tax incentives due to their tax-exempt status) as well as a vast array of for-profit enterprises. These commercial-scale projects are discussed above in the Solar PPA and Commercial Lease section.

4.9.7.9 Strategic Investments

The Green Bank's financial resources may be considered for part of the capital stack for projects that are outside any of the organization's existing programs and are aligned with its mission. Opportunities are evaluated as they arise, and projects are selected based on the opportunity to expand the Green Bank's experience with specific technologies, advance economic development in a specific locale, or drive adoption of clean energy that might not otherwise occur.

4.9.8 The CGB: mission, purpose, funding, and post-shock strategy

4.9.8.1 CGB Mission and Purpose

Table 4.6 CGB Purpose and Mission statements (reproduced verbatim)

CGB	*Comprehensive Plan FY15-16 (last update Oct 2015)*	*F17-19 (last update July 2018)*	*FY20 (last update Jan. 2022)*	*FY23-24 (last update Jul 2023)*
Purpose	1. Developing programs to finance and otherwise support clean energy investment in residential, municipal, small business and larger commercial projects and such other programs as the Green Bank may determine; 2. Supporting financing or other expenditures that promote investment in clean energy sources to foster the growth, development and commercialization of clean energy sources and related enterprises; and 3. Stimulating demand for clean energy and the deployment of clean energy sources within the state that serves end-use customers in the state.	Same as FY 15-16 (slightly reworded)	1. To develop programs to finance and otherwise support clean energy and environmental Infrastructure investment in residential, municipal, small business and larger commercial projects and such other programs as the Green Bank may determine; 2. To support financing or other expenditures that promote investment in clean energy sources and environmental infrastructure to foster the growth, development and commercialization of clean energy sources, environmental infrastructure, and related enterprises; and 3. To stimulate demand for clean energy and the deployment of clean energy sources and investment in environmental infrastructure within the state that serves end-use customers in the state.	Same as FY20
Mission	To support the Governor's and Legislature's energy strategy to achieve cleaner, cheaper and more reliable sources of energy while creating jobs and supporting local economic development.	Same as FY 15-16	Confront climate change and provide all of society a healthier and more prosperous future by increasing and accelerating the flow of private capital into markets that energize the green economy.	Confront climate change by increasing and accelerating investment into Connecticut's green economy to create more resilient, healthier, and equitable communities.

4.9.8.2 CGB funding

The CGB funds swept by Connecticut state come from two sources: the Connecticut state's Clean Energy Fund (CEF) and the Regional Greenhouse Gas Initiative (RGGI). The former is constituted of electricity surcharges from Connecticut utilities customers (generating about $30 million per

annum), and the latter of greenhouse gas emission allowance proceeds from a cap-and-trade program in the Northeast.

4.9.1 Strategy post-shock

4.9.1.1 Financial sustainability plan

The SP proposed a plan for the CGB to adjust "its model from using limited public funds to attract and leverage private investments, towards seeking investment opportunities in its core business that maximizes financial returns in its pursuit of its own profitability at the expense of markets that aren't yet profitable (e.g., low income single family and multifamily affordable housing)".

After adopting the SP, the board then reviewed the CGB's various programs and estimated each one's financial return and term length – and included those that met the 5% over 10 years target into the CGB's newly created Sustainability Plan. Also, referencing the 2017 strategic retreat, the CGB board directs staff to "look into how a private entity could help advance its mission in Connecticut, with a particular focus on low-to-moderate income communities".

4.9.1.2 QGO structure and independence

The IPC business plan, created in March of 2018 by the CGB with the assistance of Forsyth Street Advisors, states: "the quasi-governmental status of the Green Bank causes its structure, products, and investments to be influenced by state public policy and budget considerations that reduce flexibility and market responsiveness".

In June 2018, a group of CGB board members formally investigate the bank's founding legislation to determine whether the bank would indeed be able to create a nonprofit. In a memo to the other CGB board members, they point out that the Connecticut state legislation founding the CGB (16-245n(d)(1)(E) included a provision authorizing the CGB to establish "subsidiaries", but that "nothing in Section 16- 245n suggests that is the exclusive way for the Green Bank to carry out its purposes through some kind of outside legal entity". The group of CGB board members also interpret other specific sections of the legislation related to the CGB's powers and authority and similarly conclude that the language is permissive and broad enough to allow for the creation of a nonprofit.

We note that some debate occurred between CGB board members regarding the board's proposed resolution to create the nonprofit. In July, one member, writing as a representative of the Connecticut state treasurer, opposes the resolution on the grounds that "our office's general counsel and outside bond counsel are not persuaded that the proposal is crafted to meet Green Bank's statutory authority to form either a subsidiary or participate in a joint venture. Green Bank would lack the control over the new private entity, as required by statute for a subsidiary, and the proposal lacks a third party participating in the operation, as required for a joint venture. We also have concerns that funds now earmarked by the state for the Green Bank will be used to partially support the new entity during a transition period without state oversight." Then, the CGB sought external legal counsel for further advice, and concluded from it that the CGB would have the necessary authority. It subsequently acted on this conclusion and created the IPC.

4.9.1.3 Periodic Strategic Retreats

In 2015, CGB staff discussed the potential creation of a Community Development Financial Institution (CDFI) to take "the Connecticut Green Bank model to the rest of the country…[and] help lead to the deployment of more clean energy in upwind high-polluting states of Connecticut". The CDFI idea was not discussed within the context of potential budget raids. However, other discussions during the retreat make clear that the board was conscious that such raids could occur.

In 2017, cognizant that Connecticut state would be "facing a billion-dollar budget deficit in FY 2018 and beyond", the CGB board planned to discuss "strategies for how we can more accurately present and communicate our financial position as well as reduce the budget threats from the legislature". At the retreat, the board again suggests investigating "how the creation of a private entity (e.g. CDFI, 501(c)3 non-profit, foundation, etc.) may help the organization achieve greater results". Separately, the directors discussed "ways the organization might mitigate threats to its strong financial position [and] . . . transfer to the [Connecticut state's] general fund", but do not discuss this in the context of creating a nonprofit organization.

In 2019, the strategic retreat's aim was to move the CGB "from Green Bank 1.0 to 2.0". Retreat participants, which included external stakeholders, discussed "several ideas for new products and programs, as well as suggestions for criteria to evaluate investment opportunities, [and]. . . funding future Green Bank activities."

In particular, retreat participants evaluated how "reliable the [CGB's] current funding sources are and if there are ways to protect them". They qualitatively mapped out the reliability, risks, and "actions to protect" they might take for the CGB's various funds, e.g. state-derived funds, grants, program investment income. In addition to issuing bonds, the participants also suggested applying for federal funding, pursuing other programs with private sector partners, developing income from investment banking-like transactions, and pursuing strategies and funds targeted towards obtain sector-specific funds. Subsequently, the CGB acts on many of these conclusions, notably by starting to issue mini-green bonds (the Green Liberty Bonds, and Green Liberty Notes) that net the bank $105.4 million from 2019 to 2022.

4.9.1.4 Reliance on external organizations

The CGB was strongly reliant on external organizations to shape its post budget shock strategy. Following news of the shock, the CGB obtained a $50,000 grant from the Hampshire Foundation, an environmentally and climate change focused nonprofit, to help it assess how an affiliate organization could help increase the bank's impact in Connecticut. Based on the assessment, the CGB put out a request for proposals, and hired a financial advisory firm, Forsyth Street Advisors (FSA), to "conduct a market scan and overview of entity structure options [for the affiliate]; with [CGB] staff recommend an approach moving forward; and, if moving forward, develop a business plan".

FSA recommended creating a "mission-aligned affiliated entity, an independent non-profit, to efficiently deliver capital to underserved segments of the clean energy market in Connecticut and beyond. The Affiliate would house a collection of products incubated by the Green Bank and ready

for the next level of scale . . . and would run these products in Connecticut on behalf of the Green Bank . . . Certain staff would become employees of the Affiliate, allowing the Green Bank to reap immediate operating savings on staff expenses involved in these programs, due to a significantly lower overhead rate in the Affiliate. The Affiliate would be seeded by a Connecticut-dedicated loan fund that would likely include a grant from the Department of Energy and Environmental Protection and a mix of mission-oriented investors, private capital providers, and, as available, other state and municipal funds.". The overhead rate refers to administrative costs. The CGB board approved of this strategy and planned to develop a detailed business plan for the IPC.

In March 2018, using the rest of the Hampshire Foundation grant, the bank then engaged FSA to produce a business plan that explored "opportunities that exist outside of Connecticut to further their goal of replicating successful Green Bank/low-to-moderate financing models more broadly".

The FSA's business plan suggested the IPC would be able to help the CGB become self-sustainable through operating leverage (lower overhead costs), leveraging the prior success of the CGB model, and having access to new capital providers and projects outside of Connecticut.

The FSA's business plan for the IPC conceptualized the nonprofit's mission as being to "(1) further the purposes of the Green Bank . . . (2) promote the environment through clean energy and sustainability measures, and (3) focus on underserved market segments including LMI communities and unconventional credits.".

By April 2018, a CGB board member discussed how the bank had been in contact with several other advisors, including Shipman and Goodwin (a law firm, to help with nonprofit structuring and governance), Blum Shapiro (a business and accounting advisory firm, for questions of IPC independence from the CGB and its programs). The advice these firms offered was not explicitly shared in the CGB meeting minutes. Subsequently however, the board's discussions on the IPC's potential structure and independence are identical to the above recommendations from FSA's business plan.

A board of directors memo from June 2018 also points out that Lamont Financial (an advisory firm specialized in public finance) was engaged to evaluate the "assumptions of the IPC financial business plan", the "reasonableness of the [plan's] assumptions", and "whether the financial impacts to the CGB [from the creation of the IPC] . . . would cause any material or adverse financial outcome for the CGB".

4.9.1.5 IPC governance design

One of the CGB board members proposed the following outline for the IPC – a nonprofit organization, with a self-perpetuating board (i.e. board members nominate their successors), constituted of 5 members, of which 2 would be named by the CGB (i.e. the CGB would have a minority representation on the board), and the rest from third party groups (likely representatives of external organizations providing funding to the IPC). A third-party individual, or "incorporator", would be charged with nominating the initial directors. Once that board was constituted, the members themselves would be tasked with appointing the next members, without

any input from the CGB. Also, the IPC would have the power to draw up its own bylaws and operating procedures (as opposed to the CGB doing so).

Other CGB board members discussed many of these features at length during the April board meeting.

Various CGB board members asked about the extent to which Connecticut state might be able to control, if at all, the nonprofit or approve of nominations to its board, how the nonprofit's board would be appointed, whether having CGB representatives on the board would make it independent enough, whether there should be more than 3 third party board members and whether that might lead to the IPC losing mission alignment with the CGB. They also suggest that a primary mechanism to maintain this mission alignment between the CGB and IPC would be through the professional service agreements, i.e. formalized delegation of program management from the CGB to IPC, in exchange for fees given to the IPC. The discussion was kept open after this discussion, although the outline proposed for the IPC above was not fundamentally challenged.

The, in June 2018, a number of CGB board members put together a Q&A document answering some of the broader questions members had regarding the IPC's design. One question focused on whether the CGB should create a "subsidiary" as opposed to a nonprofit – since the CGB's founding legislation only explicitly allowed for the former type of organization. The response to the question was that the subsidiary form would be incompatible with the CGB's strategic objectives. Firstly, a subsidiary would be controlled by the bank and therefore Connecticut state. This would make it significantly less appealing to NGOs and donors wishing to support the

organization's mission but anxious about the possibility of a budget shock to the subsidiary. Secondly, a subsidiary wouldn't be allowed to have its own employees. This would mean the CGB couldn't take advantage of cost savings achieved by transferring employees to the nonprofit, where the overhead rate per employee is lower – a critical advantage the CGB planned on utilizing to help reach its "financial sustainability". Finally, not being able to transfer employees would likely mean that the subsidiary's activities would be carried out by CGB employees, which would limit the scope of the subsidiary's activities to within Connecticut – another limitation in the CGB strategic objective to benefit from public and private support outside of the state, and the economies of scale the nonprofit could achieve as a result.

Another element that went into the CGB's choice to create the IPC as a nonprofit was the supposed example set by other organizations. In an April 2018 board of directors discussion on whether the CGB could and should create a nonprofit organization, a member argued creating it would be justified, in part, by the precedent set by other Connecticut organizations. Pressed for details, he suggested two other quasi-public state agencies had done this, named one of them (Connecticut Innovations Foundation, created by CT Innovations), and proposed to dig up "the exact quasi-public state agencies" and report back. Another board member added an example: SmartPower, co-created by Connecticut Innovations and philanthropic foundations. No other specifics about these preceding organizations were noted in subsequent board meeting minutes; and no information is available on the internet, or elsewhere, about the Connecticut Innovations Foundation. SmartPower is a nonprofit entity created in 2002 by "some of the nation's largest private foundations" and headquartered in Virginia state. It is unclear whether a quasi-public entity was involved in its creation, and whether it may have originally been incorporated in Connecticut

(SmartPower 2023). In any case, no further discussion in the CGB took place to review in greater detail these or other precedents in affiliate organization creation by quasi-public entities.

4.9.1.6 IPC business strategy design

In April 2018, the CGB board outlined the IPC's business operations. Similarly to the CGB, they conceived of the nonprofit's core business as consisting of financing (as opposed to incentives) programs; and, less importantly, the management of a Connecticut state mandated incentive program. In terms of financial strategy, the board discussed their goal for the IPC to become financially "sustainable" (i.e. independent), by focusing on developing recurrent revenue streams – a perspective they based on the CGB's experience.

To enable the IPC to reach this goal, the CGB planned on leveraging its relationships with external contractors, program partners, municipalities, etc. to facilitate IPC's development within Connecticut. Other states' green banks signaled they would be ready to do the same for the IPC outside of Connecticut.

4.9.2 Short glossary of financial terms

Definitions retrieved verbatim from Investopedia.com (consulted December 2023):

- Cost of goods sold: the direct costs of producing the goods sold by a company. This amount includes the cost of the materials and labor directly used to create the good. It excludes indirect expenses, such as distribution costs and sales force costs.
- Depreciation: how much of [an] asset's value has been used up in any given time period.

- Loan loss provision: expense set aside as an allowance for uncollected loans and loan payments. This provision is used to cover different kinds of loan losses such as non-performing loans, customer bankruptcy, and renegotiated loans that incur lower-than-previously-estimated payments.
- Promissory note: written and signed promise to repay a sum of money in exchange for a loan or other financing. A promissory note typically contains all the terms involved, such as the principal debt amount, interest rate, maturity date, payment schedule, the date and place of issuance, and the issuer's signature.

4.9.3 Exploration and exploitation quotes

Table 4.7: Representative quotes of exploration and exploitation activities taken from the study's CGB text corpus.

	Conceptualization, with focus on public organizations (Cannaerts et al. 2020; Cannaerts et al. 2016; Laegreid et al. 2011; March 1991; Damanpour and Evan 1984)	**Representative quotes**
Exploitation	refinement and extension of existing competencies, technologies, and paradigms	CGB President: The CGB needs to "adjust its strategy and implement a plan to manage within more limited resources to make investments, while modestly maintaining its statutory mission and purpose." (Dec 15 2017 board of directors (BOD) Memo)
	choice	Not found
	production	Not found
	Efficiency/execution	"Going forward, by putting the Green Bank on a pathway to self-sufficiency and sustainability, the organization will have to adjust its model from using limited public funds to attract and leverage private investments, towards seeking investment opportunities in its core business that maximizes financial returns in its pursuit of its own profitability at the expense of markets that aren't yet profitable (e.g., low income single family and multifamily affordable housing)." (Dec 15 2017 BOD Memo)
	selection	Not found
	implementation	"The Nonprofit will help the Green Bank implement its Sustainability Plan by lowering its operating expenses, providing investment opportunities, attracting private investment in Connecticut that have been crippled as a result of the sweeps [i.e. the budget shock], and enabling the Green Bank to continue to serve its mission for the underserved." (June 28 2018 BOD Memo, Q&A)
Exploration	Search	CGB President: The CGB must "…consider a pivot away from a strategy since inception geared towards maximizing leverage of private capital towards one

		focused on earning a return on its investments to become sustainable." (Dec 15 2017 BOD Memo) "Bert Hunter noted that the Green Bank has used several outside advisors, including Scott Murphy of Shipman and Goodwin and Ray Casella, also from Shipman and Goodwin. Brian Farnen introduced Mr. Casella to the Board and offered a bit about his background as an expert in nonprofit structuring and governance. Bert Hunter also noted that staff consulted with our auditors, Blum Shapiro, who assisted with matters related to independence of the Non-Profit from the Green Bank as well as "component unit" issues under GASB. Finally, Bert Hunter mentioned the Green Bank had connected with Forsyth Street to assist with overall strategy and focus on the investments." (April 3 2018 BOD Memo) "Mr. Harrity voiced a concern about how CGB can "crack that nut" better to help companies sign up for green initiatives." (Dec 6 2018 BaO Minutes)
	variation	"…the nonprofit needs to get to sustainability and should be focused on the future on how cash flows would come in. The key is to focus on recurrent revenue streams. Initially providing 50% revenues and then growing to 66% into the third and fourth year of the forecast. He explained the decision behind the numbers came from current experience in the Green Bank." (April 3 2018, BOD Memo)
	risk taking	Not found
	experimentation	Not found
	play	"Mr. Garcia reviewed that small investors would be able to invest in future endeavors of CGB [through bonds]. Mr. Harrity recalled receiving US Savings Bonds as kids and feels that these small bond investments in green initiatives will be "snapped up" but pointed out that the $300 may be harder to reach than amounts of $200-$250." (Dec 6 2018 BaO Minutes)
	flexibility	". . . A Nonprofit would afford [CGB] programs (and future initiatives) the freedom and flexibility to continue to grow, without limiting their access to sufficient capital and resources, in doing so, allows the Green Bank to keep these key products in the Connecticut market." (March 2018, IPC Business plan, produced with Forsyth Street Advisors)
	discovery	CGB President recalls that, at Jan 5 2017 strategic retreat, the participants were "investigating how a private entity created by [the CGB] (e.g., Community Development Financial Institution permitted in statute) could help achieve more impact. The Board of Directors directed the staff to look into how a private entity could help advance its mission in Connecticut, with a particular focus on low-to-moderate income communities." (Dec 15 2017 BOD Memo) "[Bert Hunter] explained that the team has discovered that mission-oriented investors are quite open to partnering with the Green Bank through a separate nonprofit entity than they were before when subject to sweeps [i.e. the budget shock]." (April 3 2018 BOD Memo)
	innovation	Not found

5 Conclusion

The above chapters each contain conclusions. In what follows, I reprise these conclusions, and tie them together within the broader context of the thesis.

The focus of this dissertation is on a set of questions pertaining to quasi-governmental organizations' structure and how it allows them to potentially overcome stakeholder coordination and politicization governance barriers; as well as how this structure may allow some QGOs to overcome threats to their survival. To answer these questions, we study U.S. quasi-governmental organizations operating at the federal and subnational level, dedicated to or partly focused on climatic, environmental, and other issues. We also adopt a range of study samples from a single case study of a dataset that covers federal QGOs.

We reach the following set of conclusions:

1. *Quasi-governmental organizations are an important part of the U.S. institutional landscape. We find examples of QGOs operating in climate change, environmental, and other domains. A substantial proportion of federal QGOs have environmental missions, and a limited but growing proportion of subnational and federal QGOs operate in the climate change space. (Chapter 2, 3, 4)*

In number, subnational entities represent nearly all (99%) of U.S. government (i.e. federal, state, regional, and local). Special districts alone, a type of subnational QGO, constitute roughly 43% of all subnational government. Estimates of other quasi-governmental entities are difficult to come

by, though likely are overshadowed by the number of special districts. At the federal level, we compile a list of 201 federal QGOs, which we then filter into a study dataset of 45 QGOs. The filter is composed of five criteria: i) founding at the federal level in the US Code, ii) not explicitly described in legislation as being "private" entities, iii) led by a board of directors (or other equivalent directorship structure), iv) not under government conservatorship[12], and v) currently existing or active. This filter aims to i) make sure that a potential candidate for inclusion in our dataset is indeed governmental to some extent and recorded as such in the U.S. Code, ii) guard against the opposite problem, i.e. organizations policymakers have explicitly called "private", iii) focus on QGOs with a primary decision-making structure that is composed of more than one individual (i.e. a board of directors, since this allows potential stakeholder coordination), iv) eliminate QGOs whose current governance has substantially departed from their founding governance structure (which we use as a basis for analysis), and v) ensure we only analyze QGOs that are viable models of potential multi-stakeholder coordination, i.e. policymakers have made some QGOs inactive (for example by indefinitely withholding funding from them), or have terminated others.

At the subnational level, we highlight 6 examples of subnational QGOs operating in climate change, environmental, and other sectors. At the federal level, out of our n=45 dataset, we find that 9 were created to deal with climate change and environmentally work (ce-QGOs).

[12] Government conservatorship may be defined as a situation when the "assets and management of a distressed financial firm are placed under the protection of a conservator (guardian) until financial health is restored." (Weiss and Getter 2019: 6). Fannie Mae and Freddie Mac are examples of QGOs placed under the federal government's conservatorship.

2. *The historical emergence of US federal QGOs created to deal with environmental issues does not mirror that of traditional government agencies. However, QGOs and government agencies are analogous in terms of how climate change policies have been layered onto their work over time. (chapter 3)*

In the environmental sphere, government agencies emerged predominantly in the 1970s. In contrast, environmental QGOs were not created during that time; but were founded in a more continuous fashion starting in the 1930s.

Most of the QGOs originally created with environmentally-focused missions subsequently "layered on" climate change policies. Similarly, for government agencies, scholars suggest that climate change policies have largely been layered onto previously existing, non climate-dedicated, government organizations (Dubash 2021; Mildenberger 2021). However, two of the newest QGOs to have been created were established with a dedicated (i.e. not layered) focus on climate change work, i.e. the International Clean Energy Foundation (ICEF), and the Foundation for Energy Security and Innovation (FESI).

These points suggest that the historical development of climate change policies in U.S. QGOs and government agencies is broadly similar, but that the emergence of environmentally-focused QGOs and agencies is different.

It is not clear whether there is a decisive historical trend in the emergence of particular QGOs subtypes in the environmental or climate change focused space (ce-QGOs). A variety of ce-QGOs

subtypes exist, i.e. foundations, charitable and nonprofit corporations, and government corporations (or body corporates). Foundations appear to represent a greater share of the ce-QGOs created in the last few decades, and likewise for government corporations in the 1930s.

3. *U.S. quasi-governmental organizations' governance characteristics influence the organizations' potential to overcome climate change governance barriers, namely the politicization of decision-making, and limited multi-level and sectoral stakeholder coordination. There is substantial variation in subnational and federal QGOs' governance characteristics. (chapter 3; 4)*

At the subnational level, through a structural analysis of 6 QGO case studies, operating in the climate change and other domains, we highlight modalities of their administrative and financial independence. We suggest that some QGOs are particularly well adapted to clearing one or the other above governance barriers; while some reduce both simultaneously, but to a lesser extent.

Among our case studies, we highlight the San Francisco Bay Conservation and Development Commission as an example of a QGO with the greatest potential for extensive multi-level and multi-sectoral stakeholder coordination in decision-making, i.e. its board composition consists of a wide range of actors from the public (from federal to municipal) and private sectors (members of the public). In terms of reducing the decision-making politicization, we highlight the University of California Regents as an example of a QGO outside the climate change or environmental domains with a high number of structural elements to address this barrier. The regents have term lengths that are significantly longer than the political cycle, can be removed only under

circumstances requiring the vote of the rest of the board, are numerous (26 members) which makes decision-making less contingent on the steering of one individual (especially any of the seven ex-officio officials on the board), and have access to a range of public and private financing for the university.

At the federal level, we focus on the stakeholder coordination barrier. We find that there does not appear to be a pattern across three indicators of potential stakeholder coordination in ce-GQOs' decision-making, i.e. the multi-level government and multi-sectoral stakeholders involved in the organizations' board of directors, the actors having input into the nomination of directors, and the board conditions placed on them. There is substantial variation in these factors across our ce-QGO dataset. Analogously to the subnational level, we find models of QGOs that offer significant potential for multi-stakeholder coordination, e.g. the Foundation for Energy Security and Innovation (FESI), which includes a wide variety of stakeholders from almost all levels of levels of government, as well as actors from the private sector in its board of directors. On the other hand, QGOs such as the Commodity Credit Corporation (CCC) may have no greater potential for stakeholder coordination than typical government agencies.

On the whole, QGOs' potential usefulness in overcoming climate change governance barriers is contingent on which particular governance barrier(s) the organizations are aimed at addressing.

4. *Quasi-governmental status, and its associated independence, may play a critical role in ameliorating a QGO's chance of adapting to a budget shock. This adaptation may come at the cost of mission and financial drift away from legislative control and policy. (chapter 4)*

At a micro level, the way in which QGOs leverage their governance characteristics to withstand external shocks – particularly in the climate change domain – is a significant research gap. Using the case study of the Connecticut green bank (CGB) and ambidexterity theory, we analyze the CGB's response to a 2017 budget shock and conclude it adapted to it successfully. The adaptation involved a "sustainability plan" the CGB developed to become financially independent from Connecticut state. Ultimately, the bank's quasi-governmental status was critical in allowing it to explore, form, and implement this plan. The plan involved the CGB unilaterally creating and designing a mission-aligned nonprofit organization, Inclusive Prosperity Capital (IPC). The bank then divested itself of some of its less profitable programs (i.e. low-middle income projects) and put the IPC in charge of running them. Yet, the IPC was designed to become financially independent as well, based on a strategy of conducting part of its work outside of Connecticut (the CGB's statutorily-mandated area of influence).

Part of the strategy's success hinged on the IPC being even more independent from Connecticut state than the CGB. Prior to 2017, investors/donors who originally wanted to support the CGB's mission were (rightly) worried about the CGB's exposure to potential state-initiated budget shocks. The CGB's rationale in creating the IPC was that the nonprofit wouldn't be exposed to this kind of shock, and thus would be able to obtain more donations than the CGB could. This would in tum help counterbalance the IPC's modest program-based revenues.

5.1 **Strengths and limitations of QGOs**

In the following, we highlight the strengths and limitations of quasi-governmental organizations for policymaking and implementation, and argue that those strengths and limitations are fundamentally two sides of the same coin – i.e. organizational independence and accountability (or control).

5.1.1 Strengths

Quasi-governmental organizations' strength revolves around their ability to embody the blending of governance characteristics, i.e. for-profit and not-for-profit modes of operation and public and private sector characteristics. This blending of characteristics allows QGOs to be politically or financially independent to some extent from elected officials' control. How these elements interact precisely is as of yet unclear, although legislators that design and create QGOs appear to have some informal, practice-based conceptualization of this (Knapp 2020; Datla and Revesz 2013).

Case studies illustrate why elected officials would create these entities situated some length away from their control. The blending of governance characteristics allow QGOs to overcome limitations that the legislators may place on monetary borrowing by pure governmental organizations (often invoked in the case of New York state quasi-government), institutionalize coordination and agreements between separate governmental entities (e.g. bi-state QGOs like the Port Authority of New York and New Jersey), establish an organization with characteristics associated with businesses (which may be perceived, as compared to bureaucracies, to be more

lean and efficient), or reduce the politicization of a policy function, e.g. delegation of key monetary controls to the broadly independent Federal Reserve (Mead and Warren 2016; Kosar 2011; Koppell 2006: 6; Moe 2001).

Relative to traditional government agencies, even relatively minutes changes in these characteristics can have a significant effect on QGOs' independence. In chapter 4 for instance, we illustrated how ambiguity in legislative language gave the CGB the ability to implement its sustainability plan to, among other things, create a nonprofit and ramp up its revenue-producing activities – paving the way for the organization to be financially independent from Connecticut state, and ameliorate its chances of surviving over time.

More broadly, some QGOs were created to conduct activities that private organizations no longer chose to pursue, or were reticent to do in the first place — notably, for cost-effectiveness reasons or because of higher perceived risk. Legislators established QGOs for these activities to serve what they viewed as important policy purposes. For instance, Amtrak, a government corporation, was established to take the place of private sector passenger railroads that gradually went out of business by the 1970s. A notable reason for this, as described in the Rail Passenger Service Act, was "to preserve and promote intercity passenger rail service". Likewise, the CGB, and other U.S. green banks, were created to incentivize banks and other private sector investors to engage in climate mitigation and adaptation lending. These private institutions have been reticent to engage in this funding due to perceptions of higher project risks than in more traditional (fossil fuel) energies (Kehoe et al. 2021).

5.1.2 Limitations

Elected officials generally have lower political and financial influence over QGOs than they do over traditional government agencies. This implies that QGOs are to some extent less accountable to those officials, and by extension to the general public that elects them (Mead and Warren 2016; Koppell 2006; Moe 2001). Although beyond the scope of this dissertation, QGOs may nevertheless be influenced in ways other than through elected officials' political and financial influence; or may choose to accommodate those influences voluntarily to reduce the turbulence of their operational environment. For instance, in a survey of thousands of U.S. state and local public authorities, Mitchell (1993) finds that authority managers can be influenced by their employees, professional codes of conduct, financial entities, or the general public.

Concerns over QGOs accountability – some more strongly voiced than others – are a frequent topic of discussion on quasi-governmental organizations (Axelrod 1992). Different forms of QGOs have periodically been involving in morally questionable, or illegal, behavior (Mitchell 1999). As an example of the former, in 1983 New York state' Urban Development Corporation (UDC) issued tax-exempt bonds to fund prison construction projects ultimately financially backed, but not politically approved, by NY taxpayers. (Fein 2010). The NY governor and legislature turned to the UDC to do these projects given its ability, as a government corporation, to circumvent voter-mandated debt limits placed on state agencies (Mitchell 1999). As mentioned above, this financial feature of government corporations is one reason legislators are incentivized to create these organizations. Other questionable and even criminal activities among QGOs include nepotism, conflicts of interest, improper contracting for services, fraud, etc. Research on this aspect of QGOs is limited. Mitchell (1999) presents anecdotal examples of these activities among a range of U.S.

government corporations, but does not assess how prevalent these instances are as compared to analogous government organizations. Meier and Holbrook (1992) find no statistically significant association between the presence of special districts, another subset of QGOs, and incidences of corruption (defined as illegal activities for private gain).

Despite perceptions that unaccountable QGOs, like other government agencies in government, may be "immutable" or "immortal", this is not the case. Elected officials have taken action to reduce the independence (i.e. increase accountability) of particular QGOs after instances of questionable behavior or outright illegal activity emerged (Mitchell 1999). Similarly, politicians have terminated some organizations they no longer deemed necessary or insufficiently competent to continue operating, e.g. the Synthetic Fuels Corporation, or the Washington Public Power Supply System (Yang and Oppenheimer 2007; Salsbury 1991).

5.2 Chapters review

This thesis provides the first explicit bridge between literatures on climate change governance and its barriers, U.S. climate change and environmental policy, and quasi-governmental organizations. More specifically, we contribute studies of federal and subnational QGOs' governance design – in the climate change, environmental, and other domains – within the context of overcoming different climate change governance barriers. We also provide the first case study of a climate dedicated quasi-governmental green bank, so far largely unknown inside or outside the climate change literature.

The thesis is limited by challenges inherent to the domain of quasi-governmental organizations research – e.g. inconsistent conceptualizations of many of the features of QGOs, and importantly a lack of systematic QGO nomenclature, as well as the paucity of available data. Addressing these challenges would require significant data collection and research in the public administration domain, which was not this thesis' primary goal. Instead, we aimed to draw on insights from the literatures mentioned above. In doing so, we aim to provide a foundation for scholars to build on to assess the U.S.' projected institutional capacity to address climate change planning and implementation. As a result, data collection and filtering were notable challenges in chapters 2 and 3 of this thesis.

Also, in chapters 2 and 3, we used QGOs' structural governance features as proxies for their potential to overcome two climate change governance barriers: limited multi-level and multi-sectoral stakeholder coordination, and decision-making politicization. Two forms of inference support this approach: case studies of QGO founders' (typically legislators) views on organizational design, and QGOs' post-hoc outcomes. The QGO literature provides accounts of some QGO founders' motivations and thinking for designing these organizations; and the designs' intended influence on overcoming particular governance barriers (e.g. Muir and Bose 2020; Douglass 2000; Scott 1963). We highlighted examples of this in chapter 2, e.g. the U.C. Regents, or the Port Authority of New York and New Jersey. Founders frequently appear to design QGOs by copying other QGOs – that are perceived as being successful – as well as based on their perspective of how governance features will influence the organizations' ability to overcome governance barriers. Other research points to certain outcomes as indicators of the QGOs' design features success in overcoming governance barriers. For example, a number of U.S. regional

commissions, designed to overcome a lack of multi-stakeholder coordination, have enabled certain outcomes to be achieved, e.g. stakeholder meetings, policy plans, regional environmental regulations, highway constructions (Moore 2021; Pinto et al. 2018, Bradshaw 1992). We also note that chapter 4 provides an example, applied to a nonprofit instead of a QGO, of the first type of inference we note above. The CGB's board members spent considerable time considering the design of the nonprofit they created (Inclusive Prosperity Capital), seeking to balance the need for the IPC to be formally independent from the CGB and Connecticut state, and the need to keep the IPC affiliated close enough to the CGB so that its mission would be aligned with the CGB's. The board members did not explicitly discuss their reasoning for how each of the IPC's final governance features would lead this desired balance, but appeared instead to be led by their personal prior experience with the CGB and Connecticut state.

Chapter 4 addresses the limitation of the previous two chapters' structural approach by studying the evolution of the CGB's decision-making over time. The CGB case study provides rich data on how a quasi-governmental green bank adapts financially to a budget shock, and its associated mission and financial drift away from state control and policy. Through the case study, we contribute to the organizational ambidexterity literature's investigation of organizational performance or adaptation as a result of balancing exploitation and exploration activities. Specifically, we provide the first empirical description of ambidexterity in the quasi-governmental space, and build evidence for theoretical hybrid ambidexterity. As with the previous two chapters, chapter 4 sets the stage for future research on QGOs and their role and potential for climate change governance.

5.3 Outlook

The following section aims to speculate about which climate change domains QGOs will expand into in the future. I use the emergence and activities of U.S. QGOs in recent years as a guide.

The extent to which QGOs will expand in climate change subfields likely depends on i) how US legislators structure the future development and implementation of climate change policy in the public administrative system, and ii) how important it becomes to them to overcome governance barriers. I address the former point below, in two scenarios, followed by a discussion on the latter point.

1. So far, legislators have mostly layered climate change policy onto existing governmental and quasi-governmental organizations operating in different policy fields (Mildenberger 2021, chapter 3). If legislators continue doing so, few new QGOs are likely to emerge to exclusively address climate change policy.

Existing U.S. QGOs may begin, or continue, expanding into climate change subfields. At the federal level, a substantial number of QGOs (n=36) are not carrying out climate change work or integrating it into their formal mission (see chapter 3). For example, the National Institute for Building Sciences (NIBS)'s aim is to support "advances in building science and technology" (NIBS 2024). The NIBS recently published a strategic plan for climate adaptation and mitigation actions relevant to the built environment, but hasn't yet integrated them into its activities and mission/purpose statement.

In chapter 3, we also examined ce-QGOs which have already begun to deal with climate change. From that chapter, we note there often appears to be a close association between QGOs' original mission and the climate change work or policy they later implemented— e.g. the Foundation for Food and Agricultural Research developed a partnership focused on reducing GHG emissions from agriculture, or the National Park Foundation's grants to phase out the use of fossil fuel vehicles in parks.

Existing QGOs might also expand into the climate change space for geopolitical reasons – for example if tensions flare between the U.S. and countries that control or produce technologies important for climate mitigation or adaptation. For example, the federal Export-Import Bank of the United States (EXIM), a federal QGO, aims to support "American jobs by facilitating the export of U.S. goods and services". It does this for instance through loans for projects that struggle to obtain private sector financing (EXIM 2024). In March 2024, EXIM provided an Australian miner $600 million in loans to develop a rare earths project, which aims to secure the U.S. government's access to critical minerals not produced by China. These minerals are used for climate mitigation technologies, e.g. electric vehicles, wind turbines, as well as for other applications (Hunt 2024).

2. A small, but important set of QGOs have emerged over the last decade to address climate change in a dedicated manner – quasi-governmental green banks. As we highlighted in chapter 4, green banks (GBs) are increasing rapidly both in number and in the monies they raise and co-invest with private sector organizations. GBs predominantly finance clean energy projects, but have increasingly started targeting resilience/adaptation projects (CGC 2023). A 2019 survey reported

these organizations saying they saw future areas of green bank investment in "energy storage, green hydrogen, resilience and adaptation, grid decarbonization, microgrid development, electric vehicles, and air quality improvements" (Whitney et al. 2020: 29). It is not yet clear whether existing GBs have broad enough organizational missions to start addressing all these potential investments in the future, or whether new GBs might emerge to do so. If the latter, we might see the GB domain expand significantly and divide up into more distinct investment areas.

Also, it is worth noting that for many GBs, climate change financing also aims to tackle particular social objectives, e.g. greater social equity, environmental justice, knowledge education and diffusion about climate change, and energy security benefits (Lyons and White 2023). Legislators may decide to create new green banks, or expand GB's missions, to increasingly address these purposes, though it is likely too early to tell.

Currently, green banks exist mostly at the state level. New GBs are likely to be created at the municipal, regional, and federal levels. An example of a municipal quasi-governmental GB we reviewed in chapter 2 is the New York City Energy Efficiency Corporation. Legislators have also repeatedly introduced bills to create a federal green bank over the last decade. The 2022 Inflation Reduction Act allocated funds to potentially create one, or allocate the monies to existing subnational nonprofit clean energy lending organizations.

5.3.1 Governance barriers

Throughout this thesis we highlighted that legislators create QGOs for various reasons that include overcoming governance barriers, e.g. reducing the politicization of a policy function, or increasing multi-level and multi-sectoral stakeholder coordination.

Politicization has slowed down, curtailed, and reversed climate change progress among U.S. government agencies (Mildenberger 2021). Legislators may decide to increasingly layer climate change policies onto existing QGOs or newly-created QGOs, as opposed to government agencies, if they feel politicization might hold back progress on those policies. As discussed, government agencies are typically more tightly controlled by legislators than QGOs. The New York City Energy Efficiency Corporation for instance was reportedly separated from NYC's government and incorporated as a QGO to insulate it from political interference by future mayors.

QGO nonprofits are perhaps the most similar form of QGO to private sector organizations (i.e. private sector-created nonprofits), and their status may give them substantial independence from political interference – although their independence depends on which governance characteristics they have. An increasing number of QGOs working in the environmental domain at the federal level appear to be nonprofits, e.g. the National Fish and Wildlife Foundation (see chapter 3). This recent increase in these environmentally-focused organizations might foreshadow a similar expansion of their use for climate change policy. Many of the nonprofit ce-QGO we reviewed in chapter 3 were tasked to aid a federal government agency. More research is needed to identify the extent to which these kinds of QGOs have substantial decision-making independence and authority

beyond the agencies they help support; and whether they might expand into the climate change domain absent a simultaneous expansion of the agencies.

Regardless of the prior existence of QGOs, legislators may also decide to create new QGOs to improve stakeholder coordination for climate change policy. In the environmental sector, chapter 2 noted that the San Francisco Bay Conservation and Development Commission (SFBCDC) was created to coordinate a significant number of existing municipal, regional, state, federal, and private sector stakeholders. For example, a QGO analogous to the SFBCDC in other regions of the U.S. may be useful to organize climate change efforts (Jay et al. 2023).

Because the U.S.' political system fragments decision-making authority and financial resources between federal and substate authorities, legislators may see a significant opportunity to create new climate change focused QGOs to bring together governmental and private sector stakeholders. There are numerous challenges across the U.S. that would benefit from greater coordination, e.g. reducing wildfire risk, developing urban heat plans, expanding managed retreat programs (Jay et al. 2023). In the climate mitigation space, an important challenge involves bringing together the fragmented regulatory entities in control of the national electric grid to build up and upgrade interregional transmission facilities (Li 2022). In the adaptation domain, QGOs may help overcome stakeholder coordination barriers in NYC's climate change adaptation planning and implementation for sea-level rise (Magnan et al. 2022; Gornitz et al. 2020).

In sum, this section and evidence from the thesis' chapters, suggest there are significant possibilities for QGOs' expansion into the climate change domain – either as dedicated or layered

organizations. My outlook on this expansion is based on, and constrained by, the history of QGO development in the U.S. As a nation with a history of policy innovation, particularly at the subnational level, the U.S. may well bring about entirely new forms of QGOs, or government agencies, to tackle those innovations in the climate change domain (Basseches 2022; Rabe 2011; Mitchell 1999).

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