

# How a Green Bank Can Drive the North Carolina Clean Energy Economy

## A Market Opportunity Overview

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## Executive Summary

This report provides an analysis of clean energy finance opportunities that will accelerate the transition to a clean energy economy in North Carolina. Green Banks have been proven as an effective engine for job creation by leveraging public resources to catalyze private investment, which is particularly relevant in this time of high unemployment. These institutions have helped states make progress on renewable portfolio standards and other greenhouse gas emission goals. Green bank financing can also assist municipal, industrial, commercial, and agricultural facilities transition to cleaner energy resources and lower operational costs. A North Carolina Green Bank (or Clean Energy Fund) was one of the top recommendations coming out of three parallel stakeholder processes in 2019: the NC Clean Energy Plan, the NC Energy Efficiency Roadmap, and the Department of Transportation's Zero Emission Vehicle (ZEV) Plan.

Green Banks are mission-driven finance entities designed to drive greater capital into clean energy projects by addressing and alleviating financing barriers in their markets. They are not deposit holding institutions, but rather they are specialized investment funds and go by many names such as a Clean Energy Fund or a Clean Energy Jobs Fund. While the public model has been successfully implemented in states where public capital is available and legislatures are supportive of green initiatives, the conditions ideal for a public or quasi-public Green Bank are not found in every state. Other Green Bank models have been tried and tested to overcome these difficulties. In these cases, the Green Bank is often established as a nonprofit 501(c)(3) entity. Given the budgetary and political landscape in North Carolina, the nonprofit approach seems the most viable, near-term approach.

The purpose of this report will be to assess the feasibility of such an institution in North Carolina through the evaluation of the current financing landscape, possible gaps in the market that could be immediately addressed, and the possible institutional structures for a Green Bank. In November 2019, the Coalition for Green Capital (CGC) and the Nicholas Institute (NI) met with a diverse set of North Carolina stakeholder groups to discuss the perceived financing gaps that might be preventing the state from realizing their full clean energy and energy efficiency potential. From these conversations, it became clear that the most pressing mandate for a North Carolina Green Bank would be to build a range of clean energy projects throughout the state, including renewable power, building efficiency, grid infrastructure, industrial decarbonization, clean transportation, reforestation, and climate-resilient infrastructure. While a Green Bank in North Carolina would seek to address projects across these seven sectors, this report will lay out specific near-term opportunities for the state, as identified through our discussions with the aforementioned stakeholders. The report focuses on achievable, near-term wins, with an eye towards identifying additional financing opportunities as the bank matures.

There are four key roles a Green Bank could play in the North Carolina energy market to increase access to clean and efficient energy solutions: a connector in the market to provide technical assistance, a risk mitigator by partnering with commercial lenders to expand access through credit enhancements, a direct lender in order to expand the market to projects that otherwise could not be financed, and a bundler for smaller projects.

**Table 1. Roles and Opportunities**

Role	North Carolina Opportunities
<b>Connector</b>	<ul style="list-style-type: none"><li>Provide technical assistance to support electrification and energy efficiency on-bill tariff programs for electric cooperatives and municipal utilities</li><li>Support cities in developing energy efficiency and clean energy projects</li></ul>
<b>Risk Mitigator</b>	<ul style="list-style-type: none"><li>Encourage traditional lenders to grow their energy efficiency offerings</li><li>Expand the affordable housing programs offered by the NC Housing Finance Agency</li></ul>
<b>Direct Lender</b>	<ul style="list-style-type: none"><li>Offer dedicated energy efficiency lending in industrial, commercial, and agriculture sectors</li><li>Electrify transit and school bus fleets</li></ul>
<b>Bundler</b>	<ul style="list-style-type: none"><li>Establish a heat pump water heater program</li><li>Offer standardized energy efficient residential equipment loans</li></ul>

Given the sizing of other dedicated financial institutions, it is estimated that a Green Bank in North Carolina should aim for an amount of seed capital ranging from \$100–150 million. However, not all of this capital need arrive on the first day of Green Bank operations. For a lean start-up organization, a typical commitment for operating capital would be around \$1–3 million, spread out over three years, as the Bank gets off the ground.

**Table 2. Green Bank Pathways and Strategies for Creation**

Pathway	Level of Capitalization	Method
<b>Bootstrap Model</b>	<ul style="list-style-type: none"><li>\$1–3 million</li></ul>	Seed funding used to design and implement at most one financial product which the Green Bank can use as proof of concept to then start raising additional capitalization funds in future years.
<b>Lean and Mean Model</b>	<ul style="list-style-type: none"><li>\$10–50 million</li></ul>	Capital used to stand up a Green Bank and roll out one or two programs. As the Green Bank grows, additional capital can be added through foundations, government action, or balance sheet borrowing.
<b>Transformation Model</b>	<ul style="list-style-type: none"><li>\$100 million and more</li></ul>	This level of capitalization would allow the Green Bank to launch multiple financial products in order to transition the state's energy economy to clean energy and recover from COVID-19 through job creation, and safer, more reliable, more resilient, and more equitable energy sources.

Green Banks lower the barriers not just for clean energy investment, but also for equitable access to the benefits of clean energy. This market assessment provides a framework for North Carolina to design a statewide Green Bank that will help build its clean energy economy and support emission reduction efforts in an equitable and affordable way.

## WHY NOW: THE NEED FOR A GREEN ECONOMIC RECOVERY

In a time of national crisis, we are fighting battles on more than one front: states are forced to simultaneously address the COVID-19 health crisis, the ensuing economic recession, the climate emergency, and issues of inequality and inequity pervasive across society and sectors. Citizens are looking to the government for economic stimulus, job creation, climate mitigation and resilience, and equity for marginalized communities. In North Carolina over one million individuals filed for unemployment between March and July 2020 and continued unemployment filings has been recorded at more than 600,000 claims.<sup>1</sup> While the federal government has spent \$3.3 trillion through stimulus spending, most of this has gone toward stopping job loss and not toward job creation. In planning its economic recovery, North Carolina will need to create new jobs in a way that faces not just one of these crises, but all of them.

A strong clean energy economy can keep existing jobs and create much needed new workforce opportunities in North Carolina. As of October 2019, more than 300,000 North Carolinians were employed in clean economy industries, including clean energy generation, energy efficiency, and clean transportation jobs. A 2019 report from the state Department of Commerce outlined opportunities for continued growth in the state's clean economy workforce.<sup>2</sup> These include five-year estimates of 27.9 percent growth in clean energy generation (solar, wind, etc.) jobs, an increase of 25.6 percent in energy efficiency jobs and 19.9 percent job growth in clean transportation industries. New sources of jobs are needed across the country and North Carolina is no exception: in April 2020, the unemployment rate in the state topped 12 percent as the state reeled from job losses associated with the COVID-19 epidemic, including the loss of 21,200 clean energy jobs or nearly 19 percent of the clean energy workforce.<sup>3</sup> As the state looks to recover, the clean energy economy

### Definition of a Green Bank

Green Banks are not deposit holding institutions. Green Banks are mission-driven finance entities designed to drive greater capital into clean energy projects by addressing and alleviating financing barriers in their markets. The term "Green Bank" is merely a description of the kind of role an entity plays in the market. Green Banks apply their specialized expertise in energy to undertake transactions that private sector capital providers are unlikely or unable to do on their own due to perceived credit risk or project economics that are below a targeted rate of return. They focus on scalable solutions, dedicating capital and staff time to demonstrate innovative financing structures that can be replicated across multiple projects.

1. Federal Reserve Bank of St. Louis, 2020. <https://fred.stlouisfed.org/series/NCCCLAIMS>.

2. North Carolina Department of Commerce, "Clean Energy and Clean Transportation in NC: A Workforce Assessment," October 1, 2019. [https://files.nc.gov/ncccommerce/documents/Policymaker-Reports/Clean-Energy-Clean-Transportation-in-NC-A-Workforce-Assessment-2019\\_asPublished\\_100119.pdf](https://files.nc.gov/ncccommerce/documents/Policymaker-Reports/Clean-Energy-Clean-Transportation-in-NC-A-Workforce-Assessment-2019_asPublished_100119.pdf).

3. Clean Jobs North Carolina, E2 and NCSEA, August 2020. <https://e2.org/reports/clean-jobs-north-carolina-2020/>.

is a viable pathway to putting people safely back to work while also addressing climate and equity concerns.

Although there are many ways to fund a Green Bank, many of which are described in a 2018 Nicholas Institute brief,<sup>4</sup> the discussion of a Green Bank in North Carolina is particularly timely in that a national Clean Energy and Sustainability Accelerator was recently added as an amendment to a House Infrastructure package coming out of the House Committee on Energy and Commerce. This amendment would create a national level Green Bank (or Accelerator) that would funnel money into regional projects and support new and existing state Green Banks.<sup>5</sup> According to new polling data, seven out of 10 voters nationally support a nonpartisan nonprofit fund that supports clean energy economic investment.<sup>6</sup> If a national fund or accelerator were to be created, one of its mandates would be “supporting the creation of green banks within the United States where green banks do not exist.”<sup>7</sup> Given the opportunities outlined in this report, North Carolina would be a likely recipient of that federal capital.

## NORTH CAROLINA OVERVIEW

Clean energy is a major driver of North Carolina’s economy. From 2007–2018, investment in clean energy development in North Carolina increased from \$49.5 million to \$14.8 billion.<sup>8</sup> The vast majority (88 percent) of this investment went to renewable energy (RE) projects—solar in particular. North Carolina is now second only to California in installed solar capacity.<sup>9</sup> The clean energy economy has also been a boon to the tax base. State incentives alone enabled state and local governments to realize additional tax revenue of \$1.4 billion.<sup>10</sup>

Despite the growth of clean energy in North Carolina, there is still significant work to be done to fully capitalize on the clean and efficient energy opportunities and ensure that growth is shared equitably across the state. While solar investment has grown rapidly, energy efficiency (EE) comprises the largest percentage of clean energy jobs, employing over 88,000 workers in the state.<sup>11</sup> EE is a particularly effective engine of long-term job creation, and new investment structures can help unlock this potential while lowering customer bills and reducing energy burdens.

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4. Weiss, J., and K. Konschnik. 2018. “Beyond Financing: A Guide to Green Bank Design in the Southeast.” Nicholas Institute. Durham, NC: Duke University. <https://nicholasinstitute.duke.edu/publications/beyond-financing-guide-green-bank-design-southeast>.

5. National Climate Bank Act in the House: <https://www.congress.gov/bill/116th-congress/house-bill/5416?s=1&r=4>; in the Senate: <https://www.congress.gov/bill/116th-congress/senate-bill/2057>; and Amendment dated June 29, 2020: [https://amendments-rules.house.gov/amendments/DINGMI\\_087\\_xml%20REVISED%20V2629200938513851.pdf](https://amendments-rules.house.gov/amendments/DINGMI_087_xml%20REVISED%20V2629200938513851.pdf).

6. Clean Energy Polling Survey Results, 2020. <https://coalitionforgreencapital.com/wp-content/uploads/2020/05/Coalition-for-Green-Capital-Poll-Competititve-Swing-May-2020.pdf>.

7. Amendment to Rules Committee Print 116–54 Offered by Mrs. Dingell of Michigan, Chapter 10 - Clean Energy and Sustainability Accelerator, page 8. [https://amendments-rules.house.gov/amendments/DINGMI\\_087\\_xml%20REVISED%20V2629200938513851.pdf](https://amendments-rules.house.gov/amendments/DINGMI_087_xml%20REVISED%20V2629200938513851.pdf).

8. RTI May 2019 update on NCSEA’s website: [https://energync.org/wp-content/uploads/2019/05/NCSEA\\_Economic\\_Impact\\_Analysis\\_of\\_Clean\\_Energy\\_Development\\_in\\_North\\_Carolina\\_2019.pdf](https://energync.org/wp-content/uploads/2019/05/NCSEA_Economic_Impact_Analysis_of_Clean_Energy_Development_in_North_Carolina_2019.pdf).

9. Solar Energy Industries Association, Solar State by State, accessed July 8, 2020. <https://www.seia.org/states-map>.

10. RTI International. “Economic Impact Analysis of Clean Energy Development in North Carolina—2019 Update.” May 2019.

11. Clean Jobs North Carolina, E2 and NCSEA, August 2020. <https://e2.org/reports/clean-jobs-north-carolina-2020/>.

Energy affordability is a primary concern for all North Carolina ratepayers. According to the U.S. Census Bureau, approximately 1.4 million North Carolinians (14 percent of total population) lived in poverty in 2018.<sup>12</sup> Despite relatively low electricity rates, energy bills in North Carolina are higher than the national average, resulting in unmanageable burdens for the state's most vulnerable households.<sup>13</sup> Over 288,000 households in North Carolina spend 35 percent or more of their income on energy.<sup>14</sup> EE investments can help to reduce energy use, but EE alone might not be enough to reduce the energy burden for these households. A full and targeted suite of solutions that address both sides of the cost equation (energy price and energy usage) is needed to meet the needs of energy burdened households. Increases in electricity rates also limit the ability of commercial and industrial customers to expand their operations within the state, reducing the prospect of additional jobs and economic growth.

Recognizing both the need and opportunity for new growth in these markets, state leaders have set out ambitious plans for transforming the state's clean energy economy. In October 2018, North Carolina Governor Roy Cooper signed Executive Order 80 (EO80), setting the state on a course to address climate change while expanding clean energy businesses and creating jobs. The order commits North Carolina to achieve, by 2025:<sup>15</sup>

- Reductions in greenhouse gases (GHG) to 40 percent below 2005 levels;
- Growth in the number of registered zero-emission vehicles (ZEV) to at least 80,000; and
- Reductions in energy consumption in state-owned buildings by at least 40 percent from fiscal year 2002–2003 levels.

One year later, through extensive research, analysis and stakeholder engagement, North Carolina's Department of Environmental Quality (NC DEQ) released the state's Clean Energy Plan (CEP), further detailing the state's clean energy goals:<sup>16</sup>

- Reduce electric power sector greenhouse gas emissions by 70 percent below 2005 levels by 2030 and attain carbon neutrality by 2050;
- Foster long-term energy affordability and price stability for North Carolina's residents and businesses by modernizing regulatory and planning processes; and
- Accelerate clean energy innovation, development, and deployment to create economic opportunities for both rural and urban areas of the state.

Through continued CEP stakeholder engagement, the Governor's Office and NC DEQ are now working to implement the CEP and achieve North Carolina's clean energy potential. However,

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12. U.S. Census Bureau, American Community Survey, 2018. <https://www.census.gov/quickfacts/fact/table/NC>.

13. According to the Energy Information Administration 2018 Average Monthly Bill analysis, North Carolina residential electricity customers average 1,129 kWh per month with an average monthly bill of \$125.17. The US average is 941 kWh per month with an average monthly bill of \$117.65.

14. Covergence. "Energy Poverty." <https://convergence.unc.edu/vulnerabilities/energy-poverty/>.

15. North Carolina Executive Order 80, October 29, 2018. [https://files.nc.gov/nccommerce/documents/Policymaker-Reports/Clean-Energy-Clean-Transportation-in-NC-A-Workforce-Assessment-2019\\_asPublished\\_100119.pdf](https://files.nc.gov/nccommerce/documents/Policymaker-Reports/Clean-Energy-Clean-Transportation-in-NC-A-Workforce-Assessment-2019_asPublished_100119.pdf).

16. North Carolina Department of Environmental Quality, "North Carolina Clean Energy Plan: Transitioning to a 21st Century Electricity System." [https://files.nc.gov/governor/documents/files/NC\\_Clean\\_Energy\\_Plan\\_OCT\\_2019\\_.pdf](https://files.nc.gov/governor/documents/files/NC_Clean_Energy_Plan_OCT_2019_.pdf).

business as usual will not get the state to where it needs or wants to be in terms of clean energy deployment, equity, and economic development—new tools are needed. One increasingly popular tool used to address stubborn barriers and catalyze growth in other markets is the Green Bank model. States from Rhode Island to Hawaii have seen success at targeting and overcoming market barriers through the use of a Green Bank.

A North Carolina Green Bank (or Clean Energy Fund) was one of the top recommendations coming out of three parallel stakeholder processes in 2019: the NC Clean Energy Plan, the NC Energy Efficiency Roadmap and the Department of Transportation’s Zero Emission Vehicle (ZEV) Plan. Each process identified that a Green Bank that could catalyze investment in clean energy, energy efficiency and clean transportation:

- NC Clean Energy Plan (Recommendation F-3): Develop a green energy bank or statewide clean energy fund to catalyze the development and expansion of clean energy markets by connecting private capital with clean energy projects.<sup>17</sup>

Funding gaps identified during the CEP stakeholder process included project funding in clean energy, energy efficiency, electric vehicle infrastructure, and other measures that reduce emissions, specifically in rural and poorer communities of the state that otherwise lack access to necessary capital. The need for a statewide fund was also identified by the CEP stakeholder breakout group focused on Equitable Access and Just Transition.

- NC Energy Efficiency Roadmap (Recommendation 18): Create a North Carolina-based Clean Energy Fund.<sup>18</sup>

The stakeholders identified a need to establish a clean energy fund to issue loans, provide credit enhancements, and invest in projects to promote energy efficiency, energy conservation, and a reduction in energy consumption to the benefit of North Carolina businesses, congregations, nonprofits, and consumers. The fund could be used to fill gaps in residential and commercial EE and clean energy lending in NC.

- NC ZEV Plan (Affordability Recommendations): Credit unions and commercial banks provide low-interest financing for customers who purchase electric vehicles.

The emergence of a North Carolina Green Bank as a consistent theme in these processes reflects the broad recognition that with the right financing mechanisms in place, the state has an enormous opportunity for energy efficiency and renewable energy deployment. Using the tools pioneered in other states, a mission-driven Green Bank would be well positioned to identify and address stubborn market gaps that are left unaddressed by private sector actors alone. A Green Bank could play a key role in driving the North Carolina energy economy by connecting stakeholders to financing options and technical assistance, mitigating risk for private lenders

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17. North Carolina Department of Environmental Quality, “North Carolina Clean Energy Plan: Transitioning to a 21st Century Electricity System,” page 97. [https://files.nc.gov/governor/documents/files/NC\\_Clean\\_Energy\\_Plan\\_OCT\\_2019\\_.pdf](https://files.nc.gov/governor/documents/files/NC_Clean_Energy_Plan_OCT_2019_.pdf).

18. Nicholas Institute for Environmental Policy Solutions, Duke University, “North Carolina Energy Efficiency Roadmap,” page 46. August 2019. <https://nicholasinstitute.duke.edu/sites/default/files/publications/North-Carolina-Energy-Efficiency-Roadmap-Final.pdf>.

through the use of credit enhancements, and offering direct loans in order to expand the market to projects that otherwise could not be financed.

The economic crisis sparked by the COVID-19 epidemic gives additional urgency to finding new ways to create good jobs for North Carolinians and meeting the climate change mitigation goals set in the state. This market assessment aims to lay the structural groundwork for a Green Bank in North Carolina that will leverage the state's strengths and target the most promising opportunities.

## THE GREEN BANK MODEL FOR CLEAN ENERGY & ECONOMIC GROWTH

### ***Designing the Green Bank***

Given the highly localized nature of energy markets, Green Banks are often created as local institutions. They are market-oriented, seeking to achieve returns on their investments, in part to demonstrate to private investors that attractive returns are possible. While they are not technically banks, they use various techniques to offer favorable terms to clean energy projects, including loan guarantees, technical assistance, and lower-cost or longer-term loans.

Across the country, Green Banks have helped drive over \$5 billion of investment into clean energy projects (as shown in Figure 1, *Investment Caused by US Green Banks*<sup>19</sup>). Green Banks have served as powerful tools to help states and cities achieve their sustainability goals and drive greater investment into clean energy markets. For example, The Connecticut Green Bank has used \$250 million in public funding to drive over \$1.6 billion in overall investment in the state's clean energy market.<sup>20</sup> Michigan Saves, Michigan's independent, nonprofit Green Bank, has used \$19 million in public and philanthropic funding to drive over \$190 million of investment into the state's clean energy market.<sup>21</sup>

Out of the publicly profiled Green Bank Investment Projects, 34 percent have been community solar projects, of which a majority is for low- to moderate-income communities. Green Banks have served as a market expander across the nation to provide financial services to communities and projects that otherwise would not have access, as illustrated in Figure 2.

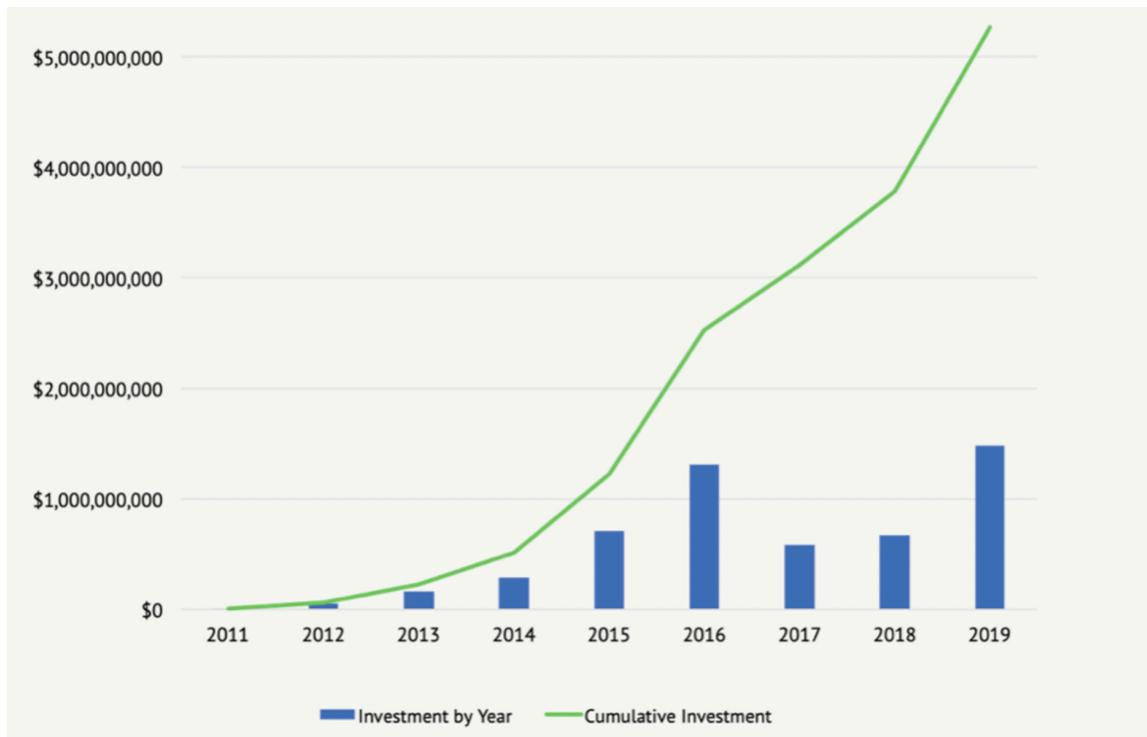
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19. American Green Bank Consortium Annual Report. <https://static1.squarespace.com/static/59bc05f0c534a543a9f96b0d/t/5edf9fb8285f063f6c13bbe/1591713732941/2020+Annual+Industry+Report+Final.pdf>.

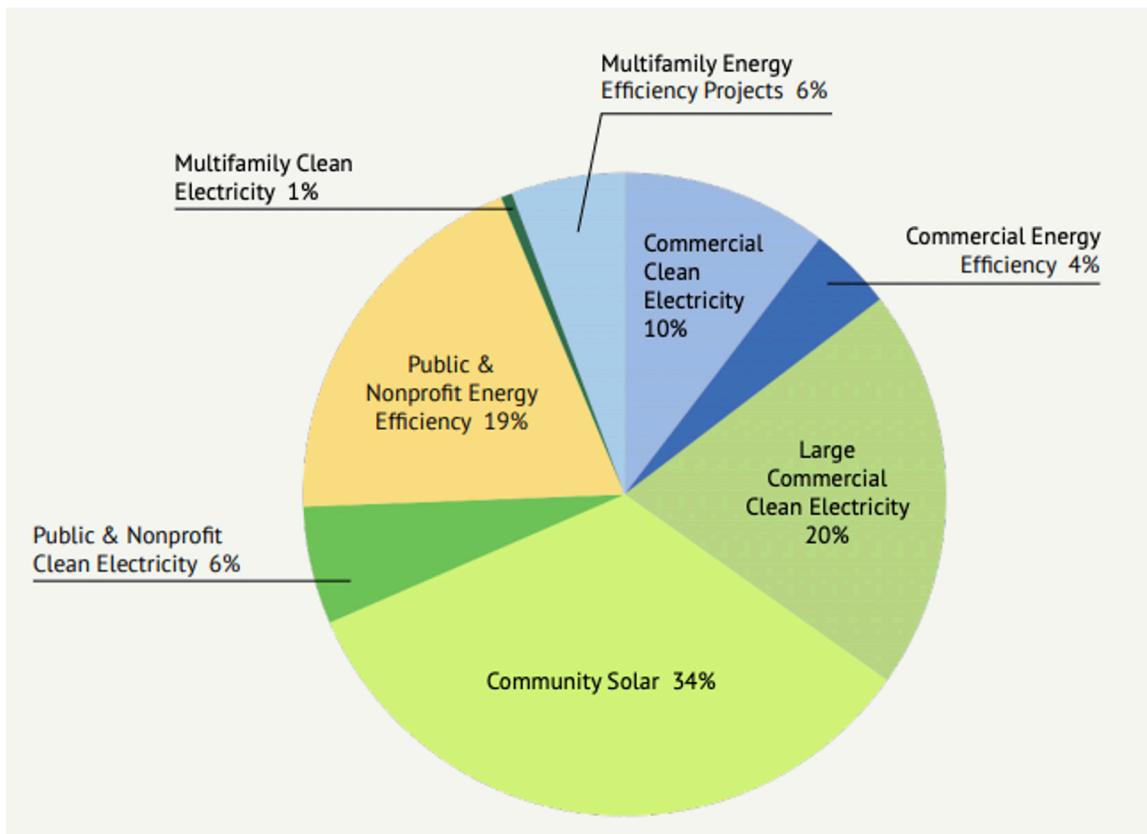
20. Connecticut Green Bank. Comprehensive Plan, 2019. [https://ctgreenbank.com/wp-content/uploads/2019/07/Comprehensive-Plan\\_FY-2020-and-Beyond\\_Final\\_\\_071819.pdf](https://ctgreenbank.com/wp-content/uploads/2019/07/Comprehensive-Plan_FY-2020-and-Beyond_Final__071819.pdf).

21. Michigan Saves. 2018 Annual Report. <https://michigansaves.org/michigan-saves-2018-annual-report-your-journey-is-our-story/>.

**Figure 1. Investment Caused by U.S. Green Banks**



**Figure 2. Green Bank Investments in Low Income Communities**



Given their dedicated expertise in clean energy finance, Green Banks have served as thought leaders for clean energy development in their geographies. For example, the Connecticut Green Bank hosts quarterly webinars highlighting key market insights that may be relevant to developers, financiers, and customers interested in developing clean energy projects in the state.<sup>22</sup> Green Banks could also help spot job trends that our technical schools and community colleges could rely on to build new training and certification programs.

### ***Roles of a Green Bank***

To characterize the types of solutions a Green Bank could offer in North Carolina, it is helpful to consider the roles Green Banks play in their markets. Typically, Green Bank activities can be organized around four broad roles:<sup>23</sup>

- **Connector:** Work with market participants to overcome gaps in information, expertise, or process. The Green Bank may facilitate introductions, develop and share document templates, or aggregate information. While the Green Bank may not invest its own capital in this role, taking on these crucial (but often uncompensated) market development activities allow more transactions to happen.
- **Risk Mitigator:** Encourage other actors to begin or increase their clean energy investment by removing some risk. This could include providing a loan loss reserve.
- **Direct Lender:** Provide financing (typically in the form of debt) to clean energy projects. This role is a particularly good fit for markets where there is limited private sector activity, or where project economics are below the target rate of return for private sector investors.
- **Bundler:** Finance smaller projects with an eye towards selling them off as part of a larger portfolio. Many private sector financiers do not have the capacity or inclination to originate small (e.g., less than \$1 million) projects. The Green Bank can take on the work of doing this and sell them off once they achieve sufficient scale.

Depending on the needs of the market they are trying to serve, Green Banks have achieved impact in a variety of ways. Green Bank financing solutions can take the form of techniques like credit enhancement, co-investment or warehousing, dedicated debt to support structures like Property Assessed Clean Energy (PACE) finance or on-bill financing programs, or market development like information sharing, developer training, or program coordination. Earlier-stage Green Banks have traditionally focused on one or two solutions as they seek to establish themselves. Over time, as these Banks mature, they have often expanded their offerings to maximize their impact and reach new markets.

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22. Connecticut Green Bank. Webinars. <https://ctgreenbank.com/news-events/webinars/>.

23. Not included in the roles described above is the administration of direct subsidies to lenders (e.g., interest rate buy-downs) or end-users (e.g., rebates). While some Green Banks are responsible for administering incentive programs, these types of programs are often best served by existing actors. Among other reasons, incentive programs are designed to lose money over time, and thus conflict with the goal of achieving financial self-sufficiency over time. In designing its interventions, however, the Green Bank should carefully consider the incentive landscape, and design its offerings to compliment existing programs.

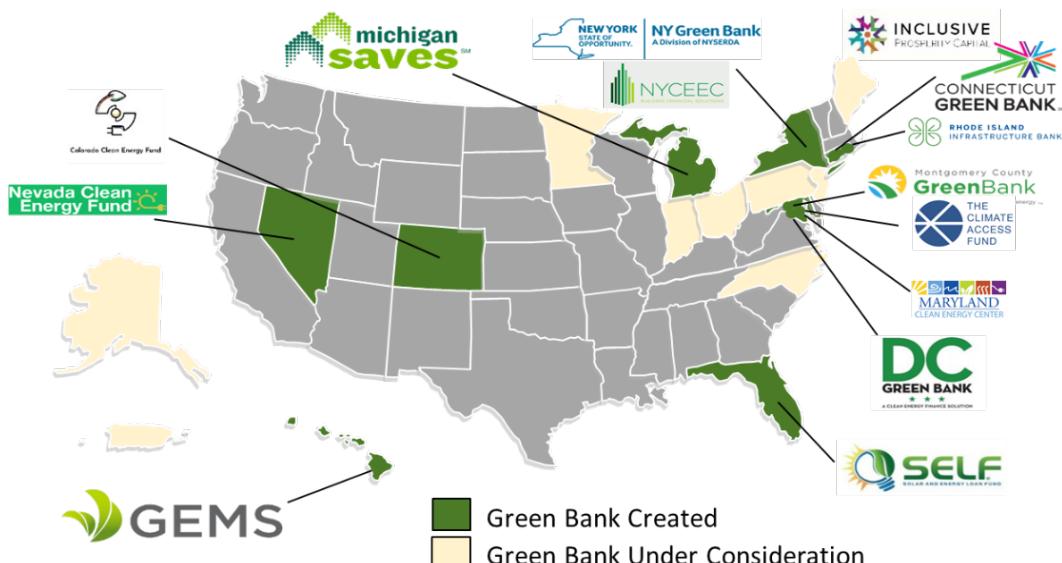
**Table 3. Sample Green Bank Financing Solutions and Roles**

Role	Barrier to Investment	Solution	Examples
Connector	First-of-kind-transaction	Technical assistance	Put in technical legwork that comes with closing more labor-intensive, innovative transactions
Risk Mitigator	Perceived project risk	Credit enhancement	Provide a loan loss reserve that can mitigate risk and allow investment to flow at longer term of lower rate
Direct Lender	Marginal economics	Co-investment	Lend to a project, in senior or junior position, to improve overall economics for investors and customers
Bundler	Inefficiencies of scale	Aggregation & Warehousing	Aggregate small projects to meet scale to attract private capital

The roles a Green Bank chooses to play are largely driven by the conditions present in the target market. Not all solutions work in all markets. For this reason, the role of Green Banks has differed widely across the country.

As of 2020, there are 14 Green Banks in the U.S.,<sup>24</sup> with several others under development (Figure 3).

**Figure 3. US Green Bank Landscape**



24. The American Green Bank Consortium.

## ***Establishing a Green Bank***

As Figure 3 suggests, the flexibility and efficiency of the Green Bank model has made it a popular choice in a wide variety of states. Each of these geographies has its own energy market gaps, policy priorities, and budgetary landscape. As a result, the creation pathway for a Green Bank varies across geographies.

Many of the first Green Banks, like those in Connecticut and New York, were created as public institutions and capitalized with large amounts of public funding. Armed with a large source of public capital and a clear mandate from the government, public Green Banks have been successful in catalyzing market development in their states. However, even when the public pathway is possible, there are potential drawbacks to consider. First is the amount of public resources (focus, money, and political capital) needed to create a new institution or re-purpose an existing one. Second, it takes a significant amount of time to launch a public Green Bank. Due to the large number of stakeholders and legal processes involved with a public Green Bank, the time between when a Green Bank is proposed and when a Green Bank begins to finalize their first deal can be significant. In DC, over two years passed between the completion of the initial Green Bank study and the passage of legislation.

Finally, and perhaps most significantly, these entities are necessarily exposed to political and budgetary whims outside of the Green Bank's control. Facing a state budget deficit in 2017, the Connecticut legislature opted to divert the Green Bank's dedicated stream of funding. The result was that the Green Bank needed to significantly alter some programs and curtail others.<sup>25</sup> This potential for "boom and bust" financing cycles is particularly detrimental to developing nascent clean energy markets, which often require a steady hand over the course of several years.

While the public model has been successfully implemented in states where public capital is available and legislatures are supportive of green initiatives, the ideal conditions for a public or quasi-public Green Bank are not found in every state. Other Green Bank models have been tested to overcome these difficulties and to expedite their establishment. In these cases, the Green Bank is often established as a nonprofit entity. Given the political landscape in North Carolina and the immediate need for job-creating solutions, the nonprofit approach alongside companion public policy seems most likely to yield results supportive of a clean and efficient energy economy.

## ***The Nonprofit Model***

There is a great deal of diversity in nonprofit approaches. Relevant examples for North Carolina include:

### ***The Colorado Clean Energy Fund (CCEF)***

Colorado began its exploration of the Green Bank with a study funded by a competitive grant from the U.S. Department of Energy's State Energy Program. The Colorado Energy Office (CEO), CGC, and other partners explored the viability of various creation pathways and determined that a nonprofit model for Green Bank operations was the most promising. CGC incorporated

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25. Hartford Business. Financially wounded, pioneering CT Green Bank has a path forward. <http://www.hartfordbusiness.com/article/20180108/PRINTEDITION/301039919/financially-wounded-pioneering-ct-green-bank-has-a-path-forward>. January 2018. Accessed July 2018.

a nonprofit called the Colorado Clean Energy Fund (CCEF) to act as the state's Green Bank. Colorado Governor John Hickenlooper then announced CCEF as the state Green Bank in December 2018.<sup>26</sup> CGC worked with national philanthropy to identify operating capital for the Green Bank and hired the first staff in late 2019. Since then, CCEF staff have been working to raise investment capital and further develop its line of products. CCEF expects to announce its first transaction, support for a municipal on-bill finance program, in the first half of 2020 and is currently raising a fund for small-scale C-PACE projects.

### The Nevada Clean Energy Fund (NCEF)

Similar to Colorado, Nevada's first step towards Green Bank creation began with a study. Senate Bill 360 tasked Nevada's Governor's Office of Energy (GOE) to complete the study, and CGC worked closely with the GOE to complete this work.<sup>27</sup> In 2017, Governor Brian Sandoval signed Senate Bill 407, which established a Nevada Green Bank into law. The bill directed the GOE to create an independent, nonprofit corporation named the Nevada Clean Energy Fund (NCEF). The bill also established the board of directors for the nonprofit. While it is an independent institution, NCEF's board will have several public officials serving as ex officio board members. By early 2020, the state had identified public funds to serve as the initial operating capital for the Green Bank. The first task of the staff will be to identify public, private, and philanthropic sources of investment capital. As in Colorado, a limited but critical amount of public commitment (in the form of the study and operating capital) has enabled the Green Bank to take its first steps forward.

### Green Bank in Cuyahoga County, Ohio (name TBD)

Cuyahoga County included the creation of a Green Bank in its 2019 climate action plan. In support of this goal, CGC has been working to establish a fund to catalyze clean energy development in the county. During 2019, CGC completed a market opportunity analysis of Cuyahoga County to explore the most promising markets for increased clean energy lending and develop products to support growth in those markets. Later in 2019, CGC and its partners selected one product from the potential Green Bank products identified through the report and began the work to raise capital and establish a fund in support of that product.

Working with a local nonprofit lender, CGC has begun incubating a clean energy fund within the existing business that will provide debt for the development of small-scale solar power purchase agreements in Cuyahoga County. CGC estimates that, for this Green Bank, start-up operations will cost approximately \$250,000 per year for the first three years until the Green Bank can pay for itself through its loan portfolio.

The Green Bank in Cuyahoga County is structured to support capitalization from foundation program-related investments and low-interest loans from local government. The first tranche of investment capital was secured in February 2020 from a philanthropy, and the fund is actively

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26. Judith Kohler, "Colorado Energy Office helps launch 'green bank' to spur clean energy investments." Denver Post. December 11, 2018. <https://www.denverpost.com/2018/12/11/colorado-launching-green-bank/>.

27. Coalition for Green Capital, "Nevada Governor Signs Green Bank Bill." June 6, 2017. <http://coalitionforgreencapital.com/2017/06/06/nevada-governor-signs-green-bank-bill-clean-energy-fund/>.

raising more capital. Based on modeling to support a self-sustaining institution, CGC is targeting the creation of a \$12–15 million fund.

The pathway of these nonprofit Green Banks demonstrates that public sector priorities and stakeholders can play key roles in the development and ongoing operations of a Green Bank, without the public sector running the process or the institution itself. Like Cuyahoga County, North Carolina has already proclaimed its interest in the Green Bank model through processes like the Clean Energy Plan.

## THE GREEN BANK OPPORTUNITY IN NORTH CAROLINA

In each of the nonprofit Green Banks profiled above, an upfront analysis helped ground the Green Bank creation effort in the market realities of the geography. Most importantly, this allowed for an early identification of the roles and product(s) of the Green Bank, which is critical for capital raising. The key question of early nonprofit Green Bank operations is the source of its capital, both for investments and operations. More recently, the National Climate Bank Act, introduced in Congress in 2019, has opened the door to the potential federal funding for Green Banks. The Act proposes a \$35 billion nonprofit institution that would have the ability to provide capital both to projects and local Green Banks. A National Climate Bank or Clean Energy Jobs Fund has also been explored as part of the discussion around the federal stimulus to COVID-19. In the meantime, other sources of capital must be explored early on as part of the Green Bank creation process. This includes philanthropy as well as state and local government.

The amount of capital needed by the Green Bank will necessarily vary depending on its market role. In order to achieve a meaningful impact in the market, a minimum investment capitalization of approximately \$50–100 million is typically recommended to establish a state green bank. However, not all of this capital need arrive on the first day of Green Bank operations. As the examples of Colorado and Nevada demonstrate, it is possible for a Green Bank to piece together its capital from a variety of sources while it is ramping up. In terms of operating capital, a rule of thumb is for the Green Bank to achieve financial self-sustainability by the end of its third year of operations. This provides line of sight to funders about the length of commitment required and creates an early emphasis on financial sustainability.

### *Sizing the North Carolina Opportunity*

Using the relative energy produced and energy consumed by New York, home to an established Green Bank, a selection of different multiples was used to estimate the capitalization required for North Carolina. The New York Green Bank started with seed capital from the New York State Energy Research and Development Authority (NYSERDA) amounting to \$210 million, with an overall plan to reach \$1 billion.<sup>28</sup> Given the relative size of the markets, for the most significant impact a North Carolina Green Bank should aim for an amount of seed capital ranging from \$100–150 million. However, not all of this capital need arrive on the first day of Green Bank operations. For a lean start-up organization, a typical commitment for operating capital would be around \$1 million, spread out over three years, as the Bank gets off the ground.

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28. NYGB was started with \$165M from NYSERDA, along with \$44.7M OF RGGI funding).

## **North Carolina Market Assessment**

As a first step in identifying capital needs, this report focuses on an assessment of the market gaps and associated Green Bank roles in North Carolina. In November 2019, the CGC and NI teams met with a diverse set of stakeholder groups to discuss the perceived financing gaps that might be preventing the state from realizing their full clean energy and energy efficiency potential. These groups included state agencies, local governments, financial institutions, environmental organizations, clean energy business associations, utilities, and representatives from the residential, agricultural and industrial customer segments. See the Acknowledgements for a complete list of stakeholders. In our discussions, we asked what types of financial barriers different constituencies are facing and gathered thoughts on the types of projects that could be advanced given the potential Green Bank roles.

Preliminary discussions with North Carolina stakeholders revealed finance gaps and opportunities that included technical assistance for decision makers, accessibility to clean energy financing for low-income and vulnerable populations, and a need for credit enhancements to reduce the financial risk and uncertainty associated with financing energy efficiency. Our market assessment found that there are significant opportunities to grow the clean energy ecosystem in North Carolina by having a Green Bank play the role of Connector, Risk Mitigator, Direct Lender, and Bundler. The following sections, summarized in Table 4, provide examples of how the Green Bank could spur progress in each role. This represents an initial set of opportunities based on early stakeholder interest. Green Banks can and should play a diverse set of roles that evolve over time.

**Table 4. North Carolina's Green Bank Opportunities**

<b>Role</b>	<b>North Carolina Opportunities</b>
<b>Connector</b>	<ul style="list-style-type: none"><li>Provide technical assistance to support electrification and energy efficiency on-bill tariff programs for electric cooperatives and municipal utilities</li><li>Support cities in developing energy efficiency and clean energy projects</li></ul>
<b>Risk Mitigator</b>	<ul style="list-style-type: none"><li>Encourage traditional lenders to grow their energy efficiency offerings</li></ul>
<b>Direct Lender</b>	<ul style="list-style-type: none"><li>Expand the affordable housing programs offered by the NC Housing Finance Agency</li></ul>
<b>Bundler</b>	<ul style="list-style-type: none"><li>Offer dedicated energy efficiency lending in agriculture</li><li>Electrify transit and school bus fleets</li></ul>
	<ul style="list-style-type: none"><li>Establish a Heat Pump Water Heater Program</li><li>Offer standardized energy efficient residential equipment loans</li></ul>

## **Role: Connector**

**Provide technical assistance to support electrification and energy efficiency on-bill tariff programs for electric cooperatives and municipal utilities:** On-bill finance (OBF) is an innovative program that allows property owners to finance energy improvement projects at attractive rates and repay that financial obligation via a monthly charge on their utility bill. In this regard, OBF is essentially a financial repayment mechanism that is offered by a utility provider to its customers, often in partnership with a third-party capital provider. By tying the repayment to the utility bill, OBF allows for more flexible and inclusive underwriting criteria (e.g. utility bill payment history) that allows a larger segment of the population to access capital for energy improvements. Alternative finance products often exclude large segments of the population based on FICO/credit restrictions. This is one of the primary benefits offered by OBF, but OBF offers several benefits to each of the stakeholders involved in the program, including the fact that building owners aren't required to place any money down, thereby addressing one of the most often cited barriers facing building owners who would like to pursue these types of projects. OBF also typically offers more affordable interest rates than most alternative financing products available to residences. Lastly, OBF can be structured in a manner that is tied to the electric meter, making it accessible to renters and owners alike, reducing energy use without increasing the debt-load of the consumer.

In North Carolina, the potential for the success of on-bill financing is already apparent. Roanoke EMC, in eastern North Carolina, is one of the electric cooperative leaders in providing customer-focused tarifed on-bill programs for its members. Launched in 2015, the "Upgrade to \$ave" program has assisted 553 households with energy efficiency improvements as of June 2020.<sup>29</sup> On average, each project invested \$7,122 in energy efficiency improvements, and the program has seen a less than 0.1 percent default rate. According to an interview<sup>30</sup> with Curtis Wynn, president and CEO of Roanoke, part of the success of the program resulted from the implementation of the Pay As You Save® model developed by the Energy Efficiency Institute (EEI).

While the Roanoke program has been successful in advancing energy efficiency for low- to moderate-income households in rural areas, it represents only a fraction of the potential market. North Carolina's 31 electric membership cooperatives (EMCs) and 75 municipal electric utilities provide service to over 1.6 million customers, approximately one third of the state's population.<sup>31</sup> These utilities provide electricity to primarily rural markets in almost all of the state's 100 counties. An expansion of the on-bill model into other co-ops and other sectors (agriculture, for example) presents a great opportunity for additional energy efficiency, clean energy generation and beneficial electrification in rural communities.

*Green Bank Solution:* To unlock the benefits of OBF, effective and informed program planning, design, and implementation can help maximize the uptake and impact of the program. Key factors to be considered when designing an OBF program include determining the project eligibility requirements, consumer eligibility and underwriting criteria, contractor management

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29. Email communication with Laura Laugham, North Carolina Sustainable Energy Association, July 9, 2020.

30. <https://www.utilitydive.com/news/pay-as-you-save-co-ops-are-reaching-new-customers-with-a-novel-way-to-pay/424234/>.

31. North Carolina Utilities Commission, "Annual Report Regarding Long Range Needs for Expansion of Electric Generation Facilities for Service in North Carolina," December 31, 2019.

process, and pinpointing a financial structure and source of capital for the program. The program design process can be long and complex, often resulting in the need for the utility to work with a third party to design, launch, and sometimes even administer the program. This is often a more efficient use of utility staff time (i.e. it is time consuming to reassign and train existing staff on the nuances of OBF) and a less costly approach than hiring new staff that may or may not be required once the program is eventually launched.

While EEI played an integral role in the successful launch of Roanoke's Upgrade to \$ave program, the scaling up of on-bill programs could be a role filled by, or in partnership with, a North Carolina Green Bank. Green Banks are well positioned to provide these administrative third-party services to utilities interested in launching OBF programs. Green Banks are well connected to the local network of clean energy lenders, contractors, auditors, and others whose feedback should be incorporated in the program design process. Plus, Green Banks are well positioned to either provide the third-party capital to support the OBF offering, line up capital from an alternative third-party source (e.g., USDA Rural Utility Service RESP funding), or utilize a credit enhancement to improve the terms offered by a third-party capital provider.

*Example:* The Colorado Clean Energy Fund (CCEF)—Colorado's recently launched nonprofit Green Bank—serves this exact role in Colorado's market. CCEF recently helped facilitate a financial transaction between Fort Collins Utilities (FCU) and a third-party capital provider to support FCU's OBF program, called Epic Homes. FCU is a very sophisticated utility that had managed an OBF program in the past, so it didn't require CCEF's services in terms of designing and launching the program, but it had a difficult time lining up capital to support the Epic Homes' 15-year loan terms. CCEF was able to serve this function on behalf of FCU, but it will expand its services to future utilities. Looking ahead, CCEF will replicate Epic Homes in utility territories across Colorado. Similar to North Carolina, Colorado has a fragmented utility network comprised of more than 50 utilities. This presents a sizable, scalable opportunity for the CCEF to partner with utilities to deploy OBF programs. The CCEF will conduct outreach to utilities, thereby originating OBF opportunities, and will offer a mix of services to replicate and expand Epic Homes across Colorado.

**Supporting cities in developing energy efficiency and clean energy projects:** Multiple cities and counties in North Carolina are currently participating in a Cities Initiative program facilitated by EDF. As part of their assessment of policies that are needed to advance clean energy investment within their jurisdictions, the group of 18 local governments identified Green Banks, or more specifically the connection to funding sources, as a high priority need. The local governments expressed a desire to gain additional expertise and knowledge around financing municipal solar plus storage, affordable housing, electrification and resiliency projects.

*Green Bank Solution:* Today, some local governments lack the technical knowledge and experience to educate their city/county councils and economic development staff on the financing options available to move these clean energy projects forward. A Green Bank could provide technical expertise and education for decision makers and/or connections to utility programs and financing partners.

## **Role: Risk Mitigator**

**Encourage traditional lenders to grow their energy efficiency offerings:** North Carolina has a significant energy efficiency opportunity and multiple utility programs providing incentives and rebates to qualifying customers. Yet despite these incentives, many low- to moderate-income households, renters and small businesses lack consistent options for financing the up-front capital cost for energy efficiency improvements. Poor credit, high interest rates and non-ownership create barriers to accessing capital and the efficiency improvements go unrealized. Credit enhancements can play a role in encouraging traditional lenders to make more capital available to energy efficiency projects, even to nontraditional borrowers, particularly small businesses and businesses owned by women and minorities.

*Green Bank Solution:* In North Carolina, small commercial customers have great potential for energy-saving investment, but many have limited capital to fund the retrofits. Duke Energy is considering a new nonresidential program designed specifically for small business and small commercial customers. This potential new program would provide energy audits and incentives to the customer based on the performance of the EE upgrades. The financing for the work would be provided by qualified trade allies (contractors). It is unlikely these contractors will all have the financial expertise or access to low-cost financing options, creating a barrier to implementation of the program. A Green Bank could bridge the financing gap by providing credit enhancements—including interest rate buydowns—to facilitate easy access to low-interest financing for the contractors.

*Example:* The Connecticut Green Bank's Smart-E residential loan program is a credit enhancement program developed in 2012 to stimulate residential energy efficiency and solar loans. Through this 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 to lenders. Using a loan loss reserve, the bank encourages local lenders to offer below market interest rates and longer terms for unsecured loans, mitigating their losses, and encourages customers to undertake measures that would prove uneconomical at higher interest rates.

The Connecticut Green Bank has worked with a network of 10 local banks and credit unions. Before the implementation of this program, these banks were either offering capital at high rates and short terms, or not making loans into the space at any terms. And those that were willing to lend into this market were not actively building deal flow with contractor partnerships or other methods. In exchange for receiving the benefit of the CGB's loan loss reserve, the banks agreed to offer capital at specific terms and rates<sup>32</sup> that don't exceed a certain cap.

Connecticut designed Smart-E 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

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<sup>32</sup>. Terms are set between 5–20 years and rates are capped at 4.49–6.99% depending on term.

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, the 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. To date, the Smart-E program has encouraged over \$74 million of investment into over 3,800 residential energy efficiency and renewable energy projects,<sup>33</sup> sparking economic growth in the form of job creation and small business development.

**Expand the affordable housing programs offered by the NC Housing Finance Agency:** In North Carolina, a tremendous lack of affordable, safe, energy efficient housing has resulted in thousands of people living in sub-standard housing conditions. The NC Housing Finance Agency (NCHFA), a self-supporting public agency, has assisted with the financing of more than 269,000 homes and apartments for low- to moderate-income North Carolinians since its creation by the General Assembly in 1973.<sup>34</sup> Financing programs range from down payment assistance for single family homebuyers to the administration of federal tax credit programs for large multi-family developments. Two NCHFA programs, the federal Low-Income Housing Tax Credit (LIHTC) and Supportive Housing programs, offer favorable financing options for the development of affordable housing, but the agency is generally unable to offer additional financing support for energy efficiency or clean energy investment, especially to smaller developers.

Under the LIHTC program, property owners are eligible to take a tax credit (equal to approximately nine percent of the “Qualified Cost” of building or rehabilitating the property) for the development of housing that meets certain eligibility criteria, primarily that the owners agree to keep rents affordable for families and individuals with incomes at or below 80 percent of the local median income.<sup>35</sup> The tax credit is available each year for 10 years, as long as the property continues to operate in compliance with program regulations. This tax credit enables property owners to lower the amount of the property’s debt financing by exchanging the tax credits for equity investments from major financial institutions.<sup>36</sup>

Supportive Housing programs are designed to help nonprofit organizations develop housing for the state’s most vulnerable populations—including development projects that benefit homeless persons, persons with disabilities, persons with substance use disorders, children in foster care, youth aging out of foster care, and adults released from correctional facilities.<sup>37</sup> The housing

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33. Connecticut Green Bank. 2019 CAFR. <https://ctgreenbank.com/wp-content/uploads/2019/11/2019-Green-Bank-CAFR-FINAL-10-31-19.pdf>.

34. NC Housing Finance Agency. Press Room. <https://www.nchfa.com/press-investors/press>.

35. In North Carolina, there are two types of low-income housing tax credits: a 4% tax credit (low-income housing tax credits available pursuant to Section 42(h)(4) of the Code) and a 9% tax credit (low-income housing tax credits available for allocation under the state’s volume cap pursuant to Section 42(h)(3) of the Code). The 80% AMI is the top cap, but 60% is the income average for the project cap. Applicants electing to use income averaging must comply with the following: (a) The income average for the property cannot exceed 60% of area median income, (b) The income average for any bedroom type cannot exceed 60% of area median income.

36. NC Housing Finance Agency, Low Income Housing Tax Credits. <https://www.nchfa.com/rental-housing-partners/rental-developers/rental-development-financing-options/low-income-housing-tax-credits>.

37. NC Housing Finance Agency, Supportive Housing Developers. <https://www.nchfa.com/rental-housing-partners/supportive-housing-developers>.

must serve individuals and families who earn below 50 percent of area median income with a requirement that rent and utilities cannot exceed 30 percent of targeted household income for residents. The program offers interest free financing for up to \$700,000 per building but does not include requirements for efficiency.

*Green Bank Solution:* The NCHFA has successfully managed these programs for many years, but they are unable to meet the entire need for energy efficient, affordable housing in the state. In order to scale up these programs and include specific energy efficiency and renewable energy requirements, a Green Bank could leverage private investment to expand the reach of the NCHFA programs and offer low-interest financing for energy efficient rehabs either at the start of the project (LIHTC) or when they are up for renewal (after 30 years in NC). The Green Bank would enable the developers to access low-interest financing for the additional investment into EE or RE as well as provide educational opportunities for owners and tenants. Furthermore, a Green Bank could support smaller developers who cannot currently access LIHTC funds become more competitive by layering-in clean energy subsidy into their capital stack.

### ***Role: Direct Lender***

**Offer dedicated energy efficiency lending in agriculture:** The need for new energy efficiency lending options is particularly acute in agriculture. North Carolina is home to some of most diverse agriculture in the country. With over 46,000 farms and cash receipts exceeding \$11 billion, agriculture plays an essential role in North Carolina's overall economy. EnSave, a firm specializing in sustainable energy solutions for agricultural and rural communities, implements the North Carolina Energy Audit Program for NC Electric Cooperatives through a USDA Rural Development grant. The program offers discounted energy audits to help North Carolina farms prioritize energy efficiency projects and access funding for equipment upgrades.

EnSave estimates that as many as 2,000 North Carolina farms could directly benefit from a comprehensive farm energy audit. Data was shared with the Nicholas Institute from 75 farms that had received energy audits in North Carolina. The analysis of the data from these farms, and application of the results, demonstrates that the total opportunity for the 2,000 farms likely represents approximately 983,340 MMBtu in potential energy savings. The average estimated equipment cost on the sample farms was \$72,000, which represents \$144 million in equipment upgrades across the state. Another technical assistance program, Waste Reduction Partners (WRP), administered by NC DEQ, has provided 99 farm energy assessments since 2012 with USDA Rural Energy for America Program (REAP) support. These USDA REAP supported assessments, some with modest REAP grants awards, have resulted in an estimated 202,516 MMBtu cumulative energy savings in 2020 with average annual energy reductions of 386 MMBtu and \$5,900 in utility cost savings per farm. The on-site energy assessment work of EnSave, WRP, and other providers demonstrate the potential for energy efficiency projects and investment need within the agricultural community.

In our conversations with EnSave, WRP, and others in the agricultural community, we know that farms need access to financial assistance with minimal barriers to entry. To finance these projects, farms and other small businesses will typically need to borrow at the corporate level. In other words, the lender will look at the overall business in determining whether to extend

financing. For some small businesses, lenders will require personal guarantees to reduce risks. This type of underwriting is costly, time intensive for the borrower, and often yields expensive rates. It is much more attractive if the lender can simplify the underwriting based on an understanding of the underlying energy efficiency proposition.

**Green Bank Solution:** Green Banks have provided enabling financing for energy audits in other markets. Through its equipment loan program, NYCEEC provided a small (<\$60,000) loan to enable a multifamily building to complete a lighting and fuel conversion project recommended by its free energy audit with no upfront cost.<sup>38</sup> A dedicated, energy-focused lender can also develop a more nuanced understanding of risks in a particular market, and potentially simplify the lending process for clean energy projects. In 2019, NY Green Bank provided a \$6 million loan to finance the construction of a high-tech greenhouse that had a number of energy efficiency features, including LED lights and heat sinks.<sup>39</sup> A goal of this transaction was to help establish the precedent of asset-based financing in the agricultural sector. A similar approach could be used in North Carolina to capitalize on the work already done by the audits.

**Electrify transit and school bus fleets:** North Carolina has 13,000 school buses currently in service across the state, each on a 13-year replacement cycle. These buses are primarily diesel today and the NC Department of Public Instruction (NC DPI) funds the replacement of the buses (but not additions to the fleet which must be funded by other grants). The cost differential between a diesel replacement bus and an electric alternative is between \$100,000 to \$150,000. In addition to the reduced lifetime operating and maintenance costs, electric buses offer health benefits in the surrounding communities. For example, the California Energy Commission has approved funding for 200 new electric bus replacements which are estimated to save the schools nearly \$120,000 in fuel and maintenance costs per bus over 20 years. In addition, the Energy Commission estimates that the buses will eliminate nearly 57,000 pounds of nitrogen oxides and nearly 550 pounds of fine particulate matter (PM2.5) emissions annually.<sup>40</sup>

Similarly, there are more than 3,500 transit vehicles in operation across the state, most of which are operated by urban systems that receive funding directly from the Federal Transportation Administration (FTA). Approximately 2,000 of these are transit buses. The FTA estimates that the replacement cost for large transit buses range from \$325,000 to \$600,000 with a minimum useful life of 12 years or 500,000 miles.<sup>41</sup>

**Green Bank Solution:** While the operational costs over the life of an electric bus will likely offset the incremental cost over a diesel replacement, the NC DPI and NC DOT lack the additional capital funds to purchase an all-electric fleet (plus the associated charging infrastructure). The first phase of North Carolina VW Settlement funding allocated a little over \$7.3 million for electric bus replacement, enabling the purchase of six school and 11 transit electric buses.<sup>42</sup> To

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38. NYCEEC. Deal Spotlight Spencer Place. <https://www.nyceec.com/deal-spotlight/spencer-place/>.

39. NY Green Bank. Supporting Deployment of Controlled Environment Agricultural Assets in New York State Agbotic, Inc. June 2019.

40. California Energy Commission, <https://www.energy.ca.gov/news/2019-07/energy-commission-awards-nearly-70-million-replace-polluting-diesel-school-buses>.

41. Federal Transit Administration, “Useful Life of Transit Buses and Vans,” Report No. FTA VA-26-7229-07.1, April 2007, Table ES-1, page iv. [https://www.transitwiki.org/TransitWiki/images/6/64/Useful\\_Life\\_of\\_Buses.pdf](https://www.transitwiki.org/TransitWiki/images/6/64/Useful_Life_of_Buses.pdf).

42. North Carolina Department of Environmental Quality, Volkswagen Settlement website accessed 8/27/2020. <https://deq.nc.gov/about/>

help offset the upfront cost of purchasing additional electric buses, a Green Bank could leverage future VW Settlement or other funding to provide favorable financing for the cost differential, paid back over time by the reduced operational, maintenance and fuel expenses. Although EV infrastructure and fleets have yet to be financed through Green Banks in the U.S., programs are currently in development. The Connecticut Green Bank is evaluating a plan to create a revenue stream for owners of EV infrastructure and NC would prove a ripe environment for investment in EV infrastructure.

### **Role: Bundler**

**Establish a Heat Pump Water Heater Program:** Heat pump water heaters (HPWH) offer energy reduction benefits by using electricity to move heat from one place to another instead of generating heat directly, saving a family of four approximately \$350 per year on its electric bills compared to a standard electric water heater and up to \$3,750 over the HPWH's lifetime.<sup>43</sup> This reduction in energy use can be beneficial to residential households, especially those with high energy burdens. However, even with utility incentives, the upfront cost of the HPWH can be more than a household is able to pay, despite the long-term energy savings. Some utilities have developed rental programs, purchasing efficient appliances in bulk and passing along the savings to their customers, repaid through a low monthly rental fee.

*Green Bank Solution:* In the absence of a utility program, a third-party nonprofit could be established to provide the upfront financing for a HPWH rental program. By developing a standardized, easy to access, financing program for HPWH, a Green Bank could act as the administer of such a program with the additional benefit of bulk purchasing of the appliances to further reduce the cost. These loans can then be bundled together and sold to private investors to further diversify risk and achieve scale.

*Example:* This kind of product could fit into a program such as the aforementioned Smart-E Loan executed by the Connecticut Green Bank. The Connecticut Green Bank lowers the cost of capital for residential customers seeking to Heat Pump Water Heaters by using a loan loss reserve, which encourages local lenders to offer below market interest rates and longer terms for unsecured loans.

**Offer standardized energy efficient residential equipment loans:** A proven way to reduce emissions is to upgrade aging equipment in residential households and often, this purchase is made in an emergency situation. Without an available alternative, these purchases are often made with a credit card or, in emergency situations, a high interest rate loan.

*Green Bank Solution:* Whether it is upgrading to a more efficient HVAC unit, transitioning from a natural gas hot water heater to electric heat pump, or investing in an Energy Star refrigerator, a Green Bank could provide a standardized, low-interest financing option for new equipment purchases, including affordable credit options for households with no equity or credit restrictions.

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[divisions/air-quality/motor-vehicles-and-air-quality/volkswagen-settlement.](#)

43. Energy Star, [https://www.energystar.gov/products/water\\_heaters/high\\_efficiency\\_electric\\_storage\\_water\\_heaters/benefits\\_savings](https://www.energystar.gov/products/water_heaters/high_efficiency_electric_storage_water_heaters/benefits_savings).

## POSSIBLE BENEFITS OF A NORTH CAROLINA GREEN BANK

### **Economic Recovery**

While North Carolina has made progress on renewable energy and energy efficiency deployment, Coronavirus has struck a significant blow to the overall economy, including the clean energy workforce. Within North Carolina alone 1,086,000 people have filed for unemployment since March.<sup>44</sup> According to a study conducted by E2, more than 21,000 NC clean energy workers remain unemployed in July 2020, or approximately 19 percent of the state's clean energy workforce.<sup>45</sup> Since 2007, NC clean energy jobs have grown at a rate of 690 percent, but the hit from coronavirus has near wiped out the growth from 2019.<sup>46</sup> In order to recover economically, stimulus is needed. Alongside concurrent crises of unprecedented unemployment rates, global health concerns and the impending climate crisis, budgets are tight and must be leveraged to increase the necessary impact; Green Banks are a proven way to do that.

### **Job Growth**

According to a June Vivid Economics report, with \$35 billion a National Clean Energy Jobs Fund could create 5.4 million jobs in its first five years of operation.<sup>47</sup> Given that sizing, it is estimated that, with \$100 million in seed capital, a Green Bank in North Carolina could create 15,000 jobs within its first five years with no other state or federal policy changes. Not only that, but as initial investments are repaid and then reinvested by the Green Bank, job creation would continue at approximately the same rate. These jobs are based on the assumption of investment across seven priority sectors of (i) renewable energy, (ii) clean transport, (iii) grid technology, (iv) building efficiency, (v) industrial decarbonization, (vi) agriculture, and (vii) climate-resilient infrastructure. The jobs outlined by the report estimate that almost two-fifths of the new jobs created by Green Bank investments are expected in production and manufacturing jobs, with a sixth of all jobs in installation or repair, while also supporting a wide range of associated white-collar sales, administrative, and management jobs. Clean investments generate more jobs than fossil fuel investments, for the same level of spending.<sup>48</sup> In 2020, North Carolina has lost over a million jobs. Based on the projections that 42 percent of those jobs will not come back but that 30 percent of those laid off workers will be hired in growing industries, almost 300,000 new jobs will need to be created.<sup>49</sup> Given the Vivid Economics forecasts, a Green Bank in North Carolina

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44. Unemployment By State, NBC News, June 2020. <https://www.nbcnews.com/business/economy/unemployment-claims-state-see-how-covid-19-has-destroyed-job-n1183686>.

45. Clean Energy Unemployment Claims, March 2020, E2. <https://e2.org/reports/clean-jobs-covid-economic-crisis-march-2020/>.

46. Clean Jobs North Carolina, E2 and NCSEA, August 2020. <https://e2.org/reports/clean-jobs-north-carolina-2020/>.

47. Bounce Back Greener, Vivid Economics. <https://www.vivideconomics.com/wp-content/uploads/2020/06/Bounce-Back-Greener-The-Economic-Impact-Potential-of-a-Clean-Energy-Jobs-Fund-v3.pdf>.

48. The Economic Benefits of Investing in Clean Energy, 2009 [https://www.peri.umass.edu/fileadmin/pdf/other\\_publication\\_types/green\\_economics/economic\\_benefits/economic\\_benefits.PDF](https://www.peri.umass.edu/fileadmin/pdf/other_publication_types/green_economics/economic_benefits/economic_benefits.PDF).

49. NBC Unemployment Data, 2020: <https://www.wcnc.com/article/news/investigations/investigators/nc-ranks-worst-in-the-country-for-timely-unemployment-payments/275-d6096f8a-7445-45d3-ab6d-f72c596b0b1d> | 42% of losses expected to be permanent, with 58% returning to prior jobs. See Barrero et al, "Covid-19 is Also a Reallocation Shock," Becker Friedman Institute for Economics at UChicago, Working Paper No. 2020-59, May 2020. Expected that for every 10 permanent jobs lost, 3 new hires are made. See Federal Reserve Bank of Atlanta, "Covid-19 Caused 3 New Hires for Every 10 Layoffs," May 1, 2020.

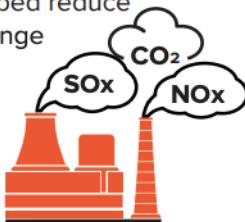
could support the creation of at least five percent of those new jobs needed for recovery if it were to capitalize at \$100 million.

### ***Meeting Emissions Reduction Goals***

Given the state's goals to reduce electric power sector greenhouse gas emissions by 70 percent below 2005 levels by 2030 and attain carbon neutrality by 2050, significant investments are needed to build the necessary infrastructure and ecosystem support. According to the Connecticut Green Bank, based on their investments from 2019, they were able to reduce GHG emissions by 1,183,050 tons and have offset 120.7 million barrels of oil from being consumed.<sup>50</sup> In addition, their investments in clean infrastructure have also saved an estimated \$42–96 million in public health spending.

**Figure 4. Connecticut Green Bank Emissions Reductions, 2019<sup>51</sup>**

**Pollution** The Green Bank has helped reduce air emissions that cause climate change and worsen public health. In FY19, this equaled 662,949 pounds of SOx, 1,013,419 pounds of NOx, and



**1,183,050 tons of CO<sub>2</sub>**



**17.7 million**  
tree seedlings  
grown for 10 years

over the  
life of the projects,  
which equals



**120.7 million**  
barrels of oil not  
consumed

or

**Public health** The Green Bank has improved the lives of families, helping them avoid sick days, hospital visits, and even death.



**\$42.6 - \$96.1 million of  
lifetime public health value  
created in FY19**

### ***Health Benefits, Equity, and Environmental Justice***

Through mission-driven capital, Green Banks lower the barriers not just for clean energy, but also for equitable access to the benefits of clean energy. Across our concurrent crises: climate change, COVID-19, and economic downturns, one thing remains the same—they all disproportionately affect low income communities and communities of color.

According to the 2017 U.S. Census Bureau Data, 22 percent of African Americans in North Carolina live below the official poverty line (\$25,100 for a family of four) compared with 10.6

50. CT. Green Bank Annual Report, 2019. <https://ctgreenbank.com/wp-content/uploads/2019/12/AR-FY19-layout-single-pages-1.pdf>.

51. CT Green Bank Impact Report, 2019 <https://ctgreenbank.com/wp-content/uploads/2019/10/FY12-FY19-CGB-Impact-website.pdf>.

percent of Whites.<sup>52</sup> The coronavirus is disproportionately impacting communities of color and most specifically Black and Hispanic individuals. Black North Carolinians make up 34 percent of the state's deaths while making up only 22 percent of the population. North Carolina's Hispanic population currently makes up 41 percent of all positive COVID-19 cases, despite the fact that they are just 9.6 percent of the population. Meanwhile, during a pandemic that is attacking the lungs, soot pollution causes an estimated 200,000 asthma attacks annually, an additional 200,000 caused by smog, and air pollution causes about 3,000 premature deaths in North Carolina annually.<sup>53</sup> The links between clean energy, health, racial equity, and prosperity are not opaque, and Green Banks have a mission to address them all through access to financing for improved health outcomes, improved financial savings, and improved access to clean and efficient energy solutions.

## REALIZING THE OPPORTUNITY

There is real opportunity as well as support for the creation of a North Carolina Green Bank. Based on needs in the market and experience of other states, we estimate that at least \$100 million in seed capital would be needed. In order to move forward with the creation of a Green Bank, the next steps are for stakeholders to come together to determine the structure, and most importantly the source of capital, for such an institution. Sources of capital include Federal funding through the creation of a National Climate Bank, state public dollars, and capital from private foundations and social impact investors.

**Table 5. Green Bank Sources and Methods of Capitalization**

Source	Method
<b>National Climate Bank</b>	<ul style="list-style-type: none"><li>• Federal Legislation creating a National Climate Bank</li><li>• Resilience Funds</li><li>• Decarbonization Funds</li><li>• If the state joins the Regional Greenhouse Gas Initiative (RGGI) and uses auction proceeds to capitalize the Green Bank</li></ul>
<b>State Funding</b>	<ul style="list-style-type: none"><li>• If the state mandates a carbon tax and some portion is used for the Green Bank</li><li>• General Funds</li><li>• Budget appropriations</li><li>• Issuance of a state Green Bond</li></ul>
<b>Foundations</b>	<ul style="list-style-type: none"><li>• Grants</li><li>• Program-related investments</li></ul>

52. U.S. Census Bureau Fast Facts. <https://www.census.gov/quickfacts/fact/table/NC/IPE120218>.

53. Air Pollution and Public Health in North Carolina, 2006. <https://frontiergroup.org/sites/default/files/reports/NC-Air-Pollution--Public-Health-text--cover.pdf>.

To better assist these steps forward, the Nicholas Institute in partnership with the Coalition for Green Capital will organize informational panels on possible paths forward in the coming months, to work with a diverse group of stakeholders to determine the Green Bank's formation strategy. Stakeholders who will need to be engaged in this process include state and local government agencies, the environmental advocacy community, clean energy organizations, commercial capital providers, community development finance institutions, community groups, as well as private foundations. These discussions will include an analysis of these potential pathways:

**Table 6. Green Bank Pathways and Strategies for Creation:**

Pathway	Level of Capitalization	Method
<b>Bootstrap Model</b>	\$1–3 million	Seed funding used to design and implement at most one financial product which the Green Bank can use as proof of concept to then start raising additional capitalization funds in future years.
<b>Lean and Mean Model</b>	\$10–50 million	Capital used to stand up a Green Bank and roll out one or two programs. As the Green Bank grows, additional capital can be added through foundations, government action, or balance sheet borrowing
<b>Transformation Model</b>	\$100 million and more	This level of capitalization would allow the Green Bank to launch multiple financial products in order to transform the state's energy economy to transition to clean energy and recover from COVID-19 through job creation, and safer, more reliable, more resilient, and more equitable energy sources.

## THE CONTINUING ROLE OF THE GREEN BANK

As the NC Green Bank is developed and the programs outlined in this paper are launched to address current market opportunities, the bank should continue to incubate innovative solutions to some of North Carolina's most difficult problems and play a catalytic role supporting future innovation especially with relation to access to opportunities in energy efficiency, electrification and renewable energy generation as well as reducing energy burdens for low- and moderate-income households and enhancing economic opportunities for commercial and industrial energy users. As the Bank grows and matures, additional opportunities will be identified and might include:

## **PACE Support**

NC Green Bank could support Property Assessed Clean Energy (PACE) related initiatives in the role of Connector (supporting cities in developing energy efficiency and clean energy projects) and/or Risk Mitigator (encouraging traditional lenders to grow their energy efficiency offerings).

The NC Green Bank could support cities who want to develop PACE projects by serving as an administrator (as Connecticut's green bank does), or as a financer of the projects that would be paid back by the assessment payments and other fees associated with the PACE process.

NC Green Bank could help mitigate risk with tools such as interest rate buy-downs and loan loss reserves to leverage private capital. The NC Green Bank could help market the program to encourage more lending and attract capital providers to participate in PACE projects.

## **Low-Moderate Income (LMI) Initiatives**

The NC Green Bank may consider earmarking a portion of spending for LMI communities, or otherwise incentivizing or prioritizing LMI communities for investment through spending carve-outs for income qualified households or other mechanisms that would target LMI households through programs, income screening, community need, etc.

## **Other Potential Applications**

“Money follows vision” is an adage that may apply here. A NC Green Bank could inspire and attract new capital providers and catalyze new industries in NC including transportation, agriculture or energy. A few possibilities may include:

- **Biogas** – a nascent industry in NC could possibly drive job growth in rural NC, increase energy independence in our state, reduce GHG emissions and solve an environmental nuisance to improve property values and quality of life.
- **Clean transportation** – In addition to electrifying bus fleets, there is opportunity to drive adoption of EVs with incentives in consumer lending or infrastructure financing for fast charging stations, mass transit or commuter rail.
- **Emerging technologies** – NC is striving to compete for emerging cleantech startups through programs such as Joules Accelerator, Wells Fargo Innovation Incubator and The Collider. As more cities launch similar incubator programs, NC must compete to attract “green technology” startup talent to our region. NC Green Bank could offer convertible loans to qualified startup companies or evaluate other ways to gain more visibility with private capital providers for emerging technologies.
- **Renewable energy** – Financing for renewable energy (wind, solar, geothermal, and select hydropower) projects.
- **Energy Resilience** – The impacts of climate change in recent years have affected many homeowners, communities, businesses, and government operations beyond a scale unseen in previous years. According to the leading experts as stated in the 2020 NC Climate Science Report, projections of future climate change will continue to put strains on

the state's people, economy, and the natural and built infrastructure. Reducing climate related risks through energy resilience offers significant advantage to reducing power outages, reducing demand for energy, protecting critical infrastructure, and investing in distributed energy resources such as microgrids in strategic locations vulnerable to climate hazards.

- **Circular economy** – Circular economy related products, production technologies, processes and/or resources are an emerging area for jobs and waste reduction. For example, [Envision Charlotte](#) recently launched a project to convert waste plastic to filament for PPE manufacturers in NC.

By leveraging public resources to catalyze private investment, a North Carolina Green Bank can accelerate the transition to a clean energy economy, putting people back to work safely and reducing greenhouse gas emissions. With this adaptive framework in place, North Carolina will be poised to more nimbly take advantage of future opportunities, filling market gaps and catalyzing future clean and efficient energy solutions.

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