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2023

## The Financial and Environmental Returns in Green Banking

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*The Financial and Environmental Returns in Green Banking*

An Honors Thesis submitted in partial fulfillment of the requirements for Honors in  
*Parker College of Business.*

By  
*Julia White*

Under the mentorship of *Dr. Katie Pham*

*ABSTRACT*

With dire climate circumstances looming, simply recycling aluminum cans and driving EV cars is not enough to offset the past consequences our planet has withstood. Large initiatives have to be set in motion to combat and ward off future problems, which takes the amount of money that is afforded by dedicated investments. Private and public sectors are putting their money into green banking, which is proving to provide impressive returns. This paper examines the progress that has been made due to green investments and how the planet can be the recipient of groundbreaking and impactful initiatives. I will focus mostly on the United States but will briefly examine what other countries are doing to help with this worldwide issue. Without changes and progress, climate change can have devastating effects, which are currently being noted. I also mention what will happen if green banks do not have funding or are not funneling money to the proper areas of research, funding, and loans.

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November 2023  
*Parker College of Business*  
Honors College  
**Georgia Southern University**

**Acknowledgements**

I extend my deepest gratitude to the Honors College for giving me this opportunity. Dr.

Engel, Dr. Pham and Dr. Mangee were willing to answer my questions and encourage me.

I would also like to thank all of my professors for pushing me and helping me become successful throughout my time at Georgia Southern.

I am thankful that my parents cheered me on when I applied to the Honors College and celebrated when I was accepted. I also want to thank my brother who now attends Georgia Southern and is also a source of encouragement.

## **Introduction**

Most investors pay close attention to their portfolios. They want to make sure that over time, their original investment has a positive rate of return, which leads to their future value being higher than its previous and present value. This applies to everyone: shareholders who own a portion of a company, a person investing in their retirement, and green banks that invest in clean energy for the environment.

A green bank is generally a public financial establishment that organizes private investments into financing to create clean energy and fight climate change. Green banking supports sustainability by financing projects that are for the benefit of the planet and its inhabitants while receiving a potential return on investments (ROI). Simply put, green banking has a goal to invest money that will grow in order to pay for sustainable projects; in turn, the projects will help the earth and its inhabitants (Gopalakrishnan, 2022). Their goal is to ensure a habitable Earth for many centuries to come. Banks like New York Green Bank and Connecticut Green Bank have invested in renewable energy and continue to do so. Since green banking is a somewhat new concept, many people wonder if green banking helps companies with their return on investments in the long run. Their efforts and intentions are positive, but there is still a chance their returns do not reflect that.

Can the topic of green initiatives be discussed without mentioning the financial aspect? Individuals and companies can recycle paper, soda cans, and printer cartridges. Employees and concertgoers can hop on public transportation to get them to their destinations. Anyone can create a compost pile. Those are all great ideas to implement to help the environment and seemingly do not require much of a financial investment to

make them happen. But to really respond to and reverse some major climate problems, the dollars have to add up to huge sums. The damage has amassed a need to fix and prevent decades of poor choices and prevent further effects. It is a situation that will touch every person on the planet. The threat of rising ocean waters and rising temperatures cannot be solved with compost piles and recycling bins. “Financial markets are a primary vehicle for mitigating and hedging climate risk. They mitigate climate risk by facilitating the flow of investment capital toward ‘green’ projects, and away from ‘brown’ industries” (Giglio et al., 2020). The money needed is in the trillions and requires considerable agreement among governments and their citizens. Can that level of investment (politically and financially) be realistic?

### **Hypothesis**

With the environment being such a multifaceted topic, multiple hypotheses are presented to explore under the framework of green banking.

Because environmental concerns are often a topic of debate in political circles, there is a certain amount of exposure that the public experiences by following news sources and elections. This makes green banking an interesting thesis topic to find out how deep this knowledge runs.

### **Hypothesis 1**

Green banking has thus far been limited to corporations and government because of the sheer expense of climate-improving projects.

Small improvements that families tackle to help the environment include planting trees and taking public transportation. These are not big-ticket items that require the level of investment that is needed for wind turbines or entire building renovations.

**Hypothesis 2**

Individuals want options for investing in green companies beyond what they purchase in the grocery store each week.

While it is a good choice to buy eco-friendly detergents, shampoo, and products in minimal packaging, those who are wanting to do more for the climate will pursue further steps to contribute to the improvement of the planet.

**Hypothesis 3**

The United States and other countries, even if they are not collaborating in green banking, have similar products and investments in place.

It is not just the United States that is aware of the dangers of global warming; other countries have programs in place to improve the health of this planet and its atmosphere.

**Background**

So far, green banks' investments have had a positive rate of return in the long run, in more ways than one. In 2020, green banking had a record year, even though the world was suddenly faced with the worldwide pandemic, COVID-19. The first green bank, The Connecticut Green Bank, was established in 2011. Its original goal was to help fight climate change. Over the years, they have promoted renewable energy sources and have provided more opportunities for affordable and efficient homes. They offer attractive financing opportunities and other incentives to complete approved projects. Roofs, solar panels, and building materials are all rated by their energy efficiency and are promoted through the Connecticut Green Bank teams. Proposals are required to obtain financing and to get a seal of approval, but the institution even provides services to help people

submit their proposals (“Connecticut’s green economy”, n.d.). The Connecticut Green Bank is not only the first green bank, but it also maintains a high standard and a user-friendly model that keeps it running successfully. Since then, billions of dollars have been invested in green banks for the improvement of the environment, and there are now twenty-one green banks in the United States that are more developed since 2011. Their cumulative investment has reached over \$7 billion since 2011. In 2021, there were even more improvements and an even more expanded organization of green banks. In President Biden’s American Jobs Plan infrastructure proposal, he created the Clean Energy and Sustainability Accelerator. Through this, underprivileged communities would receive a 40% investment from the billions of dollars invested. This gave more communities access to clean energy. The momentum of providing and replenishing a clean environment can continue with the right tools in place, and green banks can provide those tools in the form of money. Billions of dollars have been raised and since this is an investment format, like an index fund, for example, the rate of return is promising year after year (Brown, 2023).

Right now it is important that green banking is taken seriously. In order for green banks to succeed, people need to be investing in them. There are issues with climate change all over the world. Between floods, droughts, and temperatures that become more concerning each year, the change in all of these issues has become more and more common. This is not an issue that is happening for no reason: human activities have been harming the environment causing a change in the levels of greenhouse gases.

According to the NOAA annual climate change report (Dahlman et al., 2021), the temperature in the land and ocean have had an average increase rate of 0.14 degrees

Fahrenheit per decade for the past 140 years, but since 1981, the rate has been 0.32 degrees Fahrenheit per decade. Climate change is irreversible, so now is the time for people to be making environmentally friendly decisions. The longer the wait, the smaller the possibility of correcting past environmental mistakes. Not only is it a problem, but climate change takes a toll on the economy because of its costs. Not everyone has access to clean energy since it is expensive, which means that it is harder to access for low-income households. Since climate change is a major issue today, green banks are making an effort to slow this process by making economically friendly changes, and their efforts are what the world needs in order to make a change in the environment.

The projects that green banks fund include renewable energy sources so the dependency on fossil fuels goes down. The types of projects that have been conducted in the past include water infrastructures, clean energy, forms of transportation, and innovative remediation. With deforestation causing a multitude of environmental crises, the funds also go toward replenishing the areas that were once lush forests. Green banking can help mitigate deforestation, raise environmental awareness, and economically friendly corporate activities. Deforestation leads to climate change, so it affects the environment greatly over time. Due to this, green banking can benefit different areas of the environment.

As word spreads about green banking, there is so much research to be found. Green banking is now the popular topic of podcasts, magazine articles, legislation, financial advising, and scholarly publications. For an everyday consumer, information is becoming more widely available to decide if green bank investing is a wise choice; those with a concern for the environment have a way to invest in funds that can benefit the



environment. Consumers also like to know that their investments are not only providing them with a positive return but also doing some sort of good deed. Plenty of research is available to find out about these funds. While volunteering for river clean-up days once seemed to be enough to help, it is now clear that even buying EVs and water-saving faucets does not even begin to make a dent in the issues. Even though these small changes will help a little over time, there still needs to be bigger changes to curve climate change. Investing, in addition to the other measures, will help close the financial gap to fund the environmental efforts.

With climate change causing widespread trauma and devastating outcomes, people realize they are the problem but can also be the solution. Changing their habits can be one way to change, but a bigger way is through funding large projects. Renewable energy, for example, is a helpful way to improve the environment. Green banking can raise large sums of money to fund these projects and fund loans to support environmental plans. Green banking companies are often not well known so some run awareness programs to get the word out (Cerami & Fanizza, 2023). Significant contributions come from proceeds earned in green banking funds and consequently make greater strides in the fight against climate change.

For corporations and governments, green banks are being created to close the funding gap that benefits the environment. They are looking at states that have already taken those steps, such as Connecticut, Florida, Michigan, and several others. But where did the states get their information? Connecticut, for example, had bipartisan support and projects in place that needed to be funded. The green bank model has been improved upon since 2011 and is somewhat becoming a turnkey basis for how to proceed with

green bank investing. Bipartisan support is common in many states, often because environmental funding is coming from green banking rather than taxes. Research is ongoing on the ways to improve green banks, how best to use the money, and the ROI.

Information about green banks is becoming more available as the concept proves its worth. Many credible sources are available about the topic, including expert-cited studies, governmental agencies, and scientific and financial experts. Dahlman states that environmental issues affect every living creature on the planet and lists the dangerous problems that are occurring. “Green banks in the United States” provides a wealth of charts, tables, and lists with descriptions of green banks and funds and the successes gained from the initiatives. The authors point out weak areas of this relatively new concept, such as addressing problems in low-income areas and low consumer awareness. Akbar Mir (Akbar Mir et al., 2006) provides a study of India and Malaysia and how green banking can and will benefit those countries. They stated that green banking has been shown to reduce credit risk, legal risk, and reputation risk. The expectations of what these banks should fund is also explored. Climate Finance (Giglio et al., 2020) is a publication from Yale University that shows a direct correlation between various financial models and environmental improvement. The text points out that as more is understood about climate change, the more focused the investments and allocations can become.

A dive into research shows that there is a relationship between green banking and a high rate of return for green banks and their stocks. Green bank awareness is becoming more widespread and provides awareness among communities and an increase in clean energy usage in the environment (“Using green banks to solve America’s affordable

housing crisis”, n.d.). It is possible that people started to make more economically friendly decisions once they gained awareness of the efforts green banks have been making. If banks are making green choices and publishing their efforts, the public will catch on and start dabbling in environmental-conscious investing. It may not be surprising to learn that green banks do indeed have a positive rate of return. The amount of clean energy used today is higher than it was before green banks came around, and people have started to invest their efforts in making environmentally friendly choices to slow the effects of climate change.

Green banking has made an impact, which is positive for climate change, investment returns, and the environment long term. These entities are held accountable to follow through with what they plan to do with the returns. The following chart lists several American banks and how they use funds. For example, Massachusetts plans “to manage two crises at once: lack of affordable housing and climate change” (“Using green banks to solve America’s affordable housing crisis”, n.d.):

<b>Green Bank</b>	<b>Areas of Focus</b>
Massachusetts Green Bank	Provides affordable, sustainable housing powered with clean energy; the bank will use federal funding provided by the Inflation Reduction Act
Connecticut Green Bank	The first state green bank in the U.S. Provide loans for flood protection modifications; affordable housing that reduces emissions. Also provides recycling for water and waste.
New York Green Bank	Invest \$100 million in green housing by 2025; examples include solar panels and geothermal energy
Hawaii	Promotes solar energy
Michigan Saves	Finances efficient energy technology
Maryland	Finances requests for rooftop solar power and electric vehicle charging stations

The general public is becoming more knowledgeable of this concept, but how would anyone find a green bank and/or green investment fund? In other words, is there a specific designation that one could search to find an environmentally motivated establishment? Most green banking supports large-scale projects, such as wind turbines, but there is also support for small-scale initiatives such as going paperless; what investment, if any, is too big or too small? Does it support electric vehicle production and purchase? It is important to know if investments are secured in any way or if it's a potentially risky endeavor like putting money into a brokerage account and investing in only small-cap stock funds.

Green banking is traded publicly. The Montgomery County Green Bank states that "it has attracted approximately \$20 million in private capital with a green bank funding investment of only \$1 million for a loan loss reserve" ("Clean energy finance", 2018). The Connecticut Green Bank has brought in an additional \$6 in private capital for every dollar of public funds brought in. They have proven to be successful so far with the money green banks have been able to bring in with public funding.

While green banking often refers to the investment funds that create large-scale projects around the world, other measures have already been in place among most institutions. By reducing anything that releases pollution into the air, the water, or the ground, these measures are setting forth a positive impact. Financial institutions that send digital statements instead of paper statements were among the first positive impacts toward less pollution from pulp mills and fewer items ending up in landfills. The opportunities for digital correspondence increase and over time will exponentially save nonrenewable resources. With more people doing their banking and investing online,

fewer physical buildings need to be built, which also saves an incredible amount of resources, such as energy, water, materials, and various fuels. Gone are the days of endless filing cabinets overflowing with papers: archived folders of monthly statements, investor documents, mail, stock prospects, and yes, printed emails are fortunately not the processes in most offices anymore.

This push for a paperless office has been very successful as well as impactful. State and federal regulations also impact how businesses need to conduct their operations. Companies have had to shift their business model; these shifts have inspired bigger ideas on how to not just be reactive to a climate and pollution crisis but how to get ahead of the problem to avoid further problems. These “big ideas” have to continue to expand in the forms of actions and also funding.

Green banking funds initiatives to help reverse environmental damage and to help develop more environmentally friendly projects. As the debate between renewable and nonrenewable energy sources continues, green banking practices need to carry on in order to expand, gain acceptance, and continue to come up with new technologies.

In July 2023, Yahoo! Finance published a story about a new initiative from the federal government. President Joe Biden allocated \$20 billion that will fund climate-friendly projects. Where will the money come from? A federal green bank. In 2022, Congress started building up funds to offset climate problems by creating this green bank which invests money in order to finance projects. Even though green banks have been around for almost two decades, this one backed by the government is especially wide-reaching with a vast list of plans to lower the use of nonrenewable resources. Among the various initiatives, Biden announced several, including charging

stations for electric vehicles, heat pumps for homes, and cooling centers in communities with homeless populations. The funds will be in the form of grants and will be awarded to low-income communities. Business owners can also apply for no-cost loans to purchase energy-saving vehicles (Daly, 2023). So far in the United States, roughly \$9 billion has been spent on green projects, and most of that money has come from investments that were dedicated to improving the climate such as solar panels and emissions-reducing technologies (Turrentine, 2022).

Image: Solar panels provide energy in this low-income apartment building in New York (Using green banks to solve America's affordable housing, 2023)



Before this fund was created, other green banking institutions already existed. “Green banks are ... specifically designed to speed up the transition to a clean energy, net-zero-emissions future” (Turrentine, 2022). Hence, having multiple green banks at the private and public levels is not a conflict of interest. The one formed last year by the

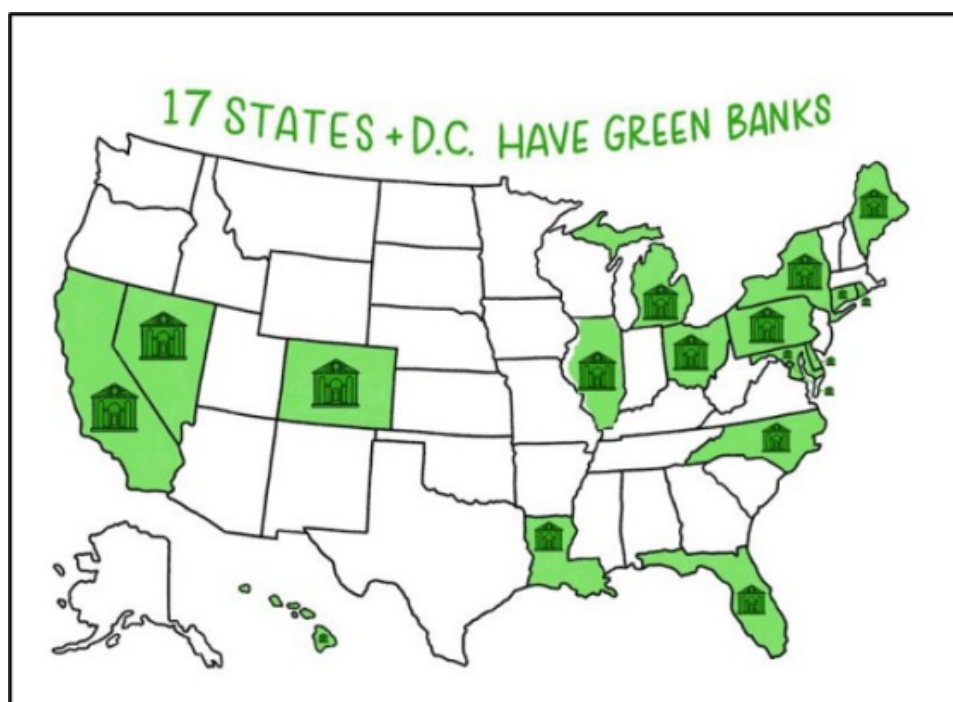
government will bring visibility to the concept and prompt individuals and businesses to consider investing in green banks. Legislation was proposed 14 years ago, but most people were not ready to put resources toward that type of project. That being said, 2011-2020 saw a cumulative investment of \$7 billion into green projects. Each of those years had an increase in buy-in as the public saw results and returns. Additionally, green banks have proven themselves as self-sustaining businesses because non-government banks do not rely on any kind of government funding or investor fees to pay their expenses. Their model has been to pay for expenses out of earned revenue and keep expenses low (“Green banks in the United States”, 2021). Early adopters include Maryland, Hawaii, California, and Florida. California has focused on pollution control and alternative energy sources; loans and grants have provided products and education about efficient energy models in low-income areas and even have a Spanish version. Maryland, meanwhile, has been exploring solar solutions and investigating the cost and return of moving more toward that technology. They discovered that a 20-25% energy savings in bills is a worthwhile cause and have moved deeper into that area of green energy (“Green banks in the United States”, 2021). Connecticut Green Bank was able to gain \$2 billion in private funds to help with solar projects, while only needing to put up \$322 million initially. Their contribution proved credible, which prompted the investors to put in an amount that was six times the initial offering.

A trend toward upfront costs but minimal residual costs seems to sit better with people who are on the fence or not yet on board with green initiatives, especially when those initiatives can cost a lot of money. Starting anything from scratch can be pricey, because salaries have to be paid, factories cost money, and implementations are a huge

expense. Wind turbines are a great example. These monoliths take over a horizon and large blocks of land. While some people think they are a nice addition, others say they are an eyesore. People claim the wind turbines are unreliable and harmful to wildlife, such as migrating birds. They are said to be difficult to work on if broken, and the materials are not environmentally friendly. And these objections do not even address the cost of building, installing, repairing, and maintaining even one of them. These skepticisms are valid, but that is where the green banks can help. “Such projects have struggled to obtain capital from traditional financing institutions” (“Green banks in the United States”, 2021). Loans from green banks provide low- or no-interest opportunities to implement needed advancements in climate-positive incentives which likely would not happen without a large amount of money to get them developed and implemented. The federal government has brought a lot of visibility to the process, which helps with acceptance and more investment dollars. “The most crucial thing we can be doing environmentally is figuring out how we can finance this transition” (“Green banks in the United States”, 2021). Colorado state Representative Alex Valdez echoes a common theme that many have grappled with for a long time. With a dire need to improve the environment and improve the way the earth is mistreated, the longstanding question has been how to fund everything. From the beginning, even on a small scale, green banks have proven successful, so the scale of the money needed has to grow, and seemingly, it has. Colorado, for instance, started with \$30 million to help residents upgrade energy modules. The program has been a success and has brought in investors and more legislation to increase the availability of funds (“Green banks in the United States”, 2021).



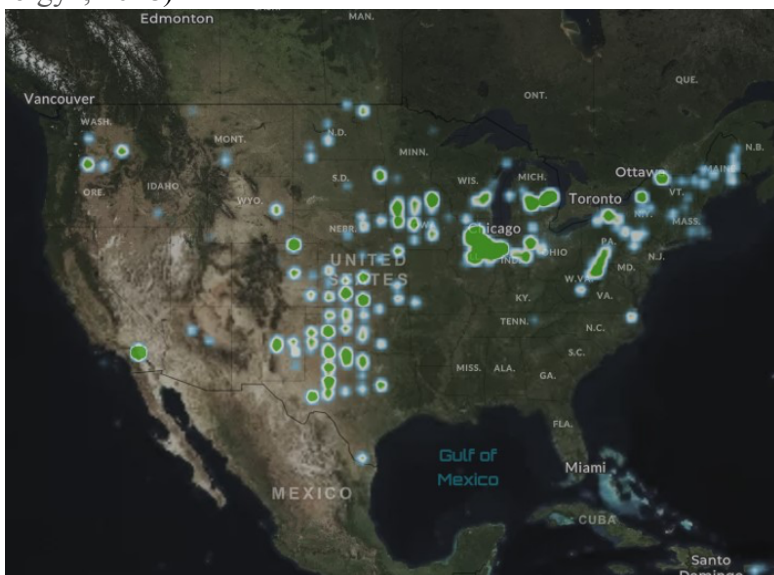
Not all states have green banks. The need for them is greater now than ever. Not only do citizens and businesses want to lessen their own carbon footprint, but not having an in-state green bank can hinder the opportunities to receive federal funding for the initiatives.



As climate policies become more popular and numerous, the ability to receive funding to enact the ideas is realistic. However, to receive the green funding, the state needs to have a green bank to house those funds. Some states are having to take retroactive measures instead of proactive steps. Fortunately, that was not the case for Nevada, where “lawmakers established a green bank in 2017, but didn’t fund it until 2021 when the prospect of federal money emerged” (“Green banks in the United States”, 2021). Green banks are indeed trending and are found at not only the state level but also city and county. One estimate predicts the federal fund could be worth \$235 billion by 2035 (“Green banks in the United States”, 2021).

Once states have a green bank and receive funds, they can use that money to pay for projects that make sense for their geographic location. For example, wind turbines are already implemented in many parts of the United States, but this is not something that is practical for all areas. They tend to be concentrated in certain areas, as noted by the U.S. Wind Turbine Database, which is monitored by the United States Geological Survey (USGS) governmental agency. The figure below shows where turbines are placed in the United States, which illustrates the concentration of this type of technology in the places best served.

Image: United States of map of wind turbine locations, updated May 2023 (“Wind Energy”, 2018)



What are the best projects for a certain geographic area? Research also has to be funded so these projects are as efficient as possible. Lack of research in some areas has been a detriment and has hindered progress with climate initiatives. The need for green buildings is something that could be tackled no matter the part of the country. However, research has lagged lately because more focus has been on electric vehicles and alternative fuels. Energy-efficient structures can have a very positive impact on the

climate and should be researched. “Buildings [account] for 35% and 38% of global energy use and carbon emissions, respectively, highlighted the need for green buildings” (Debrah 2022). Comparatively, the money that has gone toward this has been low. In 2019, out of \$5.6 trillion that was spent on buildings worldwide, only \$148 billion was invested in green construction (Debrah 2022). This means that only 2% of global construction projects were developed with the planet in mind. Much improvement could go into this sector that holds so much influence on climate: green banking returns on investment (ROI) could go toward research and implementation, but also loans so more families, businesses, and governments could build energy-efficient structures; older buildings and homes could be renovated to retrofit with better materials.

Green banks and green financing are worthwhile concepts and are growing each year. However, depending on political affiliation, not everyone agrees with climate change projects. Some groups try to thwart these efforts and say that climate change is not proven; they also say that funds are created just to benefit personal gains rather than help a worldwide cause. The USGS tracks climate change and records both the positive and the negative. Unfortunately, the planet is suffering from negative outcomes: a chain reaction of climate events is causing devastation for humans, animals, and the landscape. Excess greenhouse gases trap heat in the planet’s atmosphere and cause extreme droughts that get worse over time. The rising temperatures also result in more violent storms, on land and over the oceans. For example, tropical storms are stronger and cause billions of dollars in damage each year. Climate change is not a new concept, but the change is happening at a quicker rate due to the heat that is trapped (“How can climate change affect natural disasters”). Minor changes are not enough “to limit global warming to 1.5

degrees Celsius above preindustrial levels” (“Growing Green Bank movement playing key role”, 2021). Another effect is melting snow in areas that have always been covered in glaciers. These glaciers are melting quickly with little chance of recovery (“How can climate change affect natural disasters”). Among all of the atmospheric and weather shifts, humans, animals, and the landscape need to adjust quickly as well, but that is not always possible. Even with a high level of facts published by the USGS, some doubt what needs to be done and how it is being handled.

With so many projects to tackle, fortunately, many people are willing to put time and money into them. Events such as Earth Day help get the word out and prompt grassroots action of planting trees, cleaning water sources, and so on. Earth Day and other similar events generate money into green initiatives as well because even if someone cannot participate in a project, they can donate toward it. As green banks become more known, people will start investing at that level too.

According to the Environmental Protection Agency (EPA), green banks have typical characteristics, as shown in the following table.

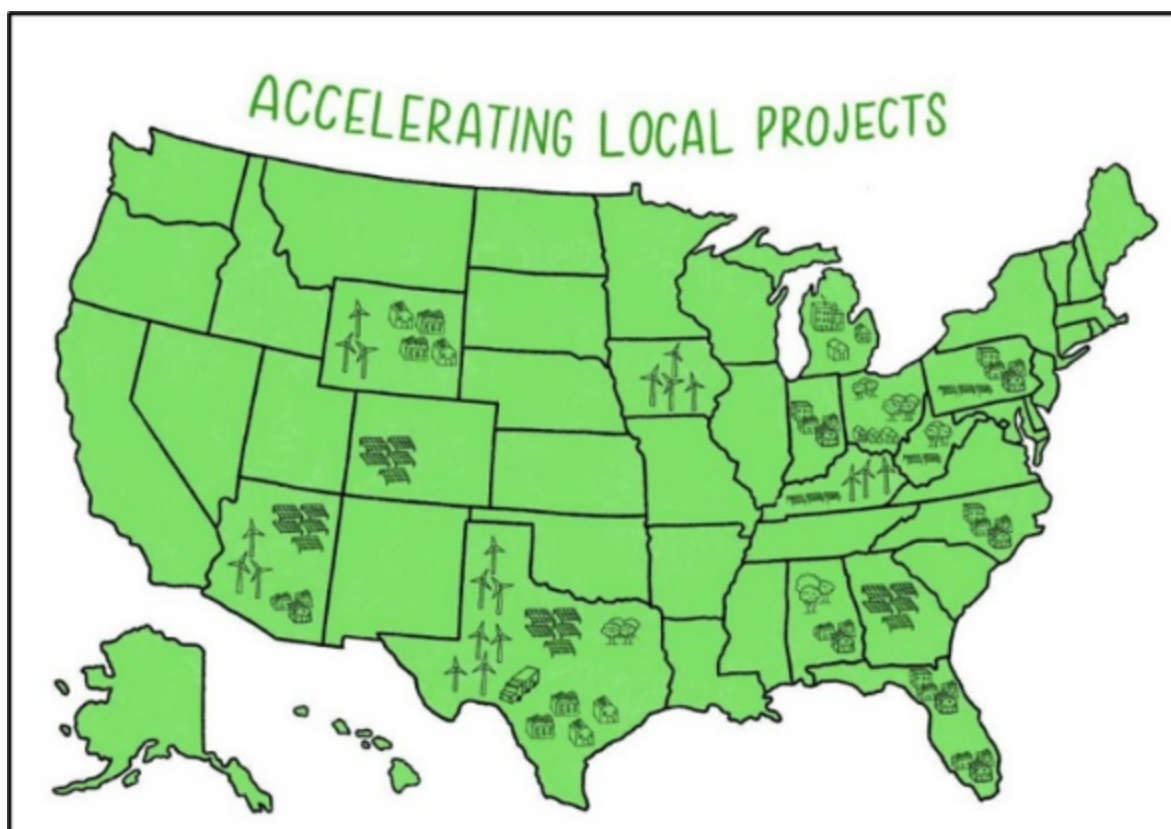
Program types	Local or state agencies, or nonprofit entities
Target sectors	Commercial; Residential; Homeowners, Multifamily, and Renters; Public; Transportation
Potential funding sources	Bonds, public funds, ratepayer funds, philanthropy
Security required of borrower	Determined by lender and program
Repayment mechanism	Monthly or quarterly loan payment
Funding needs	Typically, sponsors must provide a high level of upfront funding to make the program successful for many participants
Enabling legislation requirement	May be required

Some funds are in the form of fully-funded grants, but most are loans with a payback agreement (EPA, n.d.). This setup ensures that the fund will continue to grow with an interest rate tied into the loan. Even though these green funding initiatives work to help the recipient, there has to be a plan to grow the reserves.

### **Has Change Happened?**

Because green banks have one mission, results are measurable. The Natural Resources Defense Council (NRDC) is an advocacy group that reports a reduction of 48 million metric tons of carbon dioxide emissions around the world by improving or removing 22 million cars (“Growing green bank movement playing key role”, 2021).

In the United States, depending on the locale, various projects have been implemented. Wind turbines, solar panels, sustainable housing, and emissions-reduction measures have been put into place. Forestry has become a focus by replacing botanicals that have been clear-cut due to industry and the need for housing. The following chart shows the initiatives that have been implemented by geographic locale.

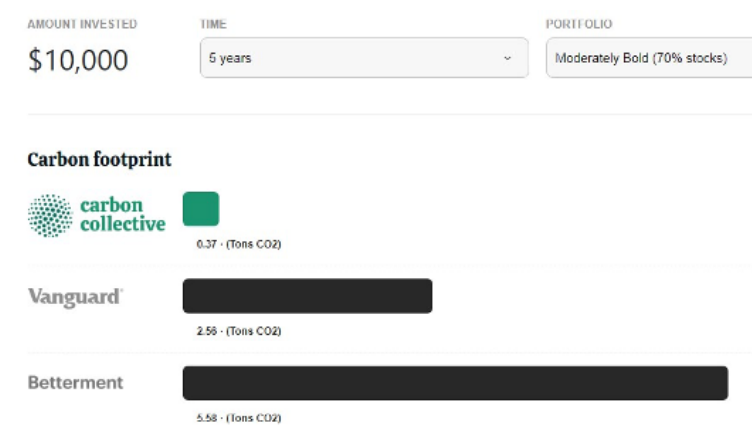


### **Accessibility To Everyone**

How can individuals feel like they are doing more to support big environmental projects? So many headlines say most Americans do not have sufficient retirement accounts, why would it be likely that individuals would seek out a green portfolio? With the advice of “invest in what you believe in”, this could be the incentive to get people’s attention to finance their retirement. In 2020, a company called Carbon Collective was formed to include stocks that are fighting climate change. Companies that contribute to climate change are excluded; if companies produce carbon dioxide emissions, then those companies will not be a part of this retirement fund! Chevron and Exxon are two companies that will not be found on the “Climate Index”. Carbon Collective uses “an inclusionary ethical filter, finding every publicly traded company that is building a

climate change solution” (“Invest in solving climate change”). This company publishes reports on how much of a carbon footprint the companies in certain funds are responsible for. For example, if someone has \$10,000 invested in a moderate bold portfolio, a chart will show comparisons of various brokerage houses.

Image: Carbon Collective helps users set up accounts (“Invest in solving climate change”)



The company can accommodate companies with their employee 401(k) accounts, but it can also work with individuals who want to open a brokerage account to fund an IRA. Carbon Collective offers various portfolio styles to fit a customer’s goals for investing but also supporting climate-conscious businesses.

Image: Carbon Collective offers green options (“Invest in solving climate change”)

The screenshot shows a page titled 'How do you want your money invested in this account?'. Below the title, it says 'We have three portfolio styles for you to choose from. Learn more about the different portfolio options [here](#).' There are three options presented in cards:

- Core**: Climate solutions, low-carbon economy, green bonds, + government bonds.
- Climate Only**: Just climate solutions + green bonds.
- Safety Net**: Climate solutions, low-carbon economy + low-risk bonds.

The web page is extremely user-friendly and is not at all intimidating to someone who is just getting started in investments. Carbon Collective has created an opportunity that

checks so many boxes: their model is promoting and supporting companies who are publicly traded and environmentally conscious, plus they are providing a product/service for a full range of businesses and individuals to invest responsibly. While green banking has been working large scale, this takes it down to a process that anyone starting at age 18 can get involved with. Someone can feel good about saving for retirement and saving the planet!

The United States is not the only country with green banks and pro-climate improvements. And with no regulation on how green banks should operate, each financial organization and each country likely have varying processes. One fact remains, and that is the need to move forward aggressively with climate-changing solutions. India, China, Bangladesh, Pakistan, Ukraine, and Finland are some of the countries who also have established green banking opportunities. China is known for its heavy pollution and high number of factories. Anyone who watched the 2013 Beijing Olympics probably remembers the urgent issues of bringing in thousands of guests and athletes to their polluted air.

Though improving, China ranks low in air quality and high in pollution (Xiang, 2022). Manufacturing centers in China are the primary problem, but they are also searching for ways to reduce pollutants. “The contamination management and innovation-based development that focus on manufacturing enterprises will contribute significantly to the environmental improvement and green transformation of the Chinese economy” (Xiang, 2022). Government subsidizing in the form of green investment practices is a main source of funding for the companies. Research of Chinese green banking found that “corporate green innovations... in quantity and quality... improved



year by year” (Xiang, 2022). Having a dedicated source of money to promote projects is helping China conquer their dangerous pollution problem.

## **Conclusion**

Green banking is the fundamental and absolutely necessary component of making significant strides toward a healthier planet and atmosphere. Renewable energies and other sustainable practices require deep pockets and huge budgets to research, build, and implement. Investing in funds that support those projects has been limited to corporations and the government because of their expense. Like Biden’s recent announcement of a \$20 billion green investment, funds like this are matching the enormity of the projects.

However, individuals want to help too beyond planting trees and dropping off their weekly recyclables. In the past couple of years, there have been more options for individual investors to choose eco-friendly options within their portfolios. Brokerage houses, such as Carbon Collective, provide companies and personal investors options of responsible accounts that exclude companies who are contributing to greenhouse gases, pollution, and general wastefulness. This full-service company can help any level of investor, which is so encouraging for people who are not well-versed in any type of investment activity.

Other countries are on a similar track of investing into green banks. One advantage of green banks is having money that is dedicated to environmental projects! There is not a conflict on where the money should go. Projects have to be prioritized, of course, but when those decisions are made, everyone knows it is to move toward a common solution. The number of green banks is growing worldwide, and more

importantly, the amount of money grows exponentially and will continue to grow on a positive trajectory.

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## **Appendix A**

### Wind Turbine Database

Whereas the United States Geological Society published information in 2018, the Wind Turbine Database is updated frequently and has satellite images of current wind turbines in existence in the United States, Puerto Rico, and Guam. The earliest turbines were installed the late 1980s and continue to be installed in 2023. At present, there are over 72,000 turbines that benefit the U.S. Those are shown on the image on page 17 which was updated in May 2023.