

Some Legal Thoughts About Carbon and Climate

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One of the most contentious issues of the late 20th and early 21st century has been climate change and what to do about it. This paper is an attempt to put this issue into perspective from a legal standpoint and to offer some thoughts on where we – as a country, as an economy – may be heading.

I have been involved in climate research and implementation for several decades. I began teaching climate change as part of an international law and sustainable design course I started teaching in the mid-1990s at the request of our students at Rice University.

In 2010, I became the co-director of the Severe Storm (SSPEED) Center at Rice University¹ which received a major grant to study lessons learned from Hurricane Ike. Among those lessons learned was that we have a lot of low-lying coastal land that should never be developed. However, in Texas, we are generally unwilling to restrict land development through regulation and if we are to stop undesirable development patterns, we need to find financial ways to do this. This led to research on paying landowners for ecological services of their land and the primary ecological service of most coastal lands is to take carbon dioxide out of the atmosphere.

This area of research led me to form a stakeholder group at the Baker Institute at Rice University that started off with about 50 members and now numbers over 800. Through this stakeholder group, in 2021 we formed BCarbon, a carbon credit registry that issues carbon credits which are certificates representing one ton of carbon dioxide removed from or prevented from release to the atmosphere.² I became the CEO of BCarbon upon formation

¹ Severe Storm Prediction, Education, and Evacuation from Disasters (SSPEED) Center, Rice University, <https://sspeed.rice.edu>.

² BCarbon Carbon Credit Registry, <https://www.bcarbon.org>.

and remained in that position when I stepped down in mid-2025 although I remain chairman of the board.

Particularly through my experience with BCarbon, I have come to see the climate issue and carbon policy from a very interesting perspective. For the last several years, I have worked with landowners who are interested in sequestering carbon as a crop. I have worked with corporations who are evolving their policies related to addressing climate change and carbon dioxide emissions. And I have worked with academics who are trying to better understand the science associated with carbon dioxide emission reductions.

In the following paragraphs, I will describe the legal system as I see it unfolding, both generally and more specifically how the legal aspects might reach Texas practitioners.

There Are No Rules

From a legal perspective, the most important point is that there is no single climate-related act in the United States. California has developed its own set of rules as have Oregon and Washington.³ Europe has an extensive set of rules and regulations as do Japan and Singapore and many other countries.⁴ But here in the United States, there is no overall set of rules regarding climate.

This is not to say that there is not a lot of legal action around climate. As can be seen from Figure 1 which is current through 2024, there has been an extensive amount of litigation within the United States regarding climate. There are efforts to hold companies financially accountable. There are efforts to force the government to take certain actions. And there have been peripheral attempts at regulation undertaken by one administration and taken down by the next with resulting lawsuits.

³ Global Warming Solutions Act of 2006, Cal. Health & Safety Code §§ 38500 et seq.; Or. Admin. R. 340-264 (2021); Wash. Rev. Code §§ 70A.65.010 et seq. (2021).

⁴ Council Directive 2003/87/EC, as amended by Directive 2023/959/EU; Regulation (EU) 2021/1119.

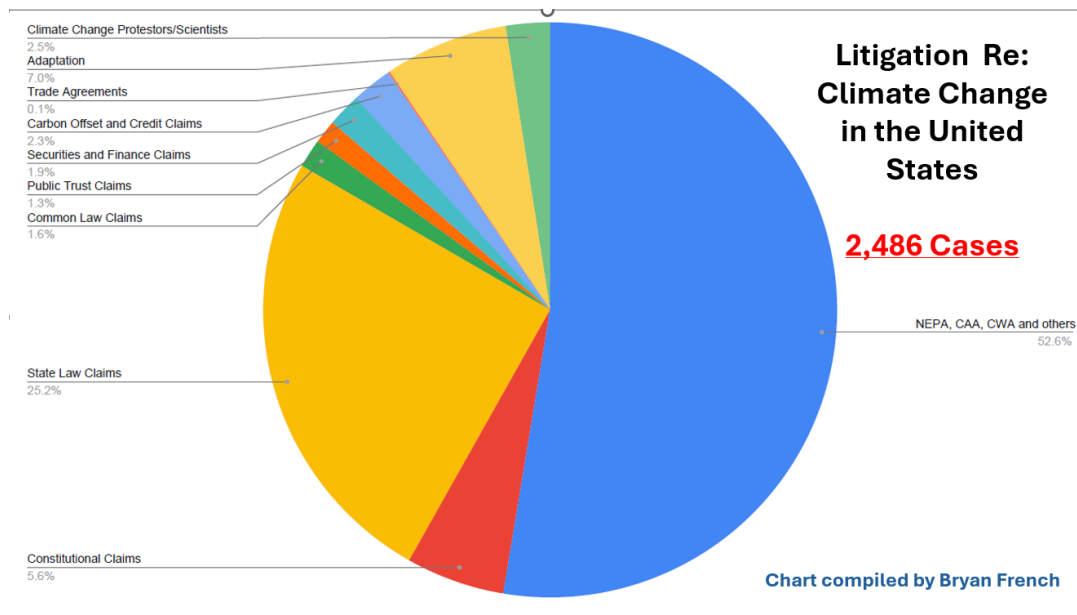


Figure 1. Distribution of over 2400 filed and/or active cases as of mid 2024. Chart compiled by Bryan French.

To date, there have been no “break through” wins for plaintiffs against major carbon dioxide emitters for damage caused by climate change. As a general proposition, the courts are hesitant to rule on an issue with such huge financial consequences. Similarly, there has been a back and forth on regulatory policies, with the current Trump Administration removing many of the initiatives set in place by the Biden Administration. For the best web site on climate cases and recent developments, go to the Sabin Center at Columbia Law School.⁵ <https://climate.law.columbia.edu/>.

Perhaps even more interesting is the international situation with regard to litigation. Although perhaps not a major factor in the 20th Century, the 21st Century is seeing a rise in litigation in courts around the world relative to climate as can be seen in Figure 2 compiled by the Rose Fulbright firm with data from about five years ago.⁶ Due to multi-national corporations doing business around the world, litigation in other countries as well as their

⁵ Sabin Center for Climate Change Law, Columbia Law School, <https://climate.law.columbia.edu/>.

⁶ Norton Rose Fulbright, Climate Change Litigation Update (2020), <https://www.nortonrosefulbright.com/en/knowledge/publications/7d58ae66/climate-change-litigation-update>.

statutory and regulatory requirements cannot be overlooked and are becoming increasingly important in the absence of United States statutes.



Figure 2. Climate litigation around the world. Chart compiled by Rose, Fulbright.

Within the United States, the most interesting development is the change that is occurring in corporate policy without there being any statutory requirement for such change. Remember, there are no rules. There is no regulatory standard, yet almost every corporation has begun to evolve a carbon policy, with some making amazing commitments for future action such as Microsoft vowing not only to reduce current emissions to net zero but to also remove all of its historic emissions from the atmosphere – emissions that can stay in atmosphere for decades if not a century.⁷

I believe that this change is a shift in the basic structure of the global economy, a change expedited by the faster and faster development and exchange of information. And as said before, all of this is happening without a formal rule structure, unlike any previous concept of environmental law.

Climate Is Different

⁷ Brad Smith & Amy Hood, Microsoft Will Be Carbon Negative by 2030, Microsoft Blog (Jan. 16, 2020), <https://blogs.microsoft.com/blog/2020/01/16/microsoft-will-be-carbon-negative-by-2030/>.

From an environmental law perspective, it is worth noting that climate is different from traditional environmental issues. Carbon dioxide emissions and climate issues are imbedded in our economic structure. We are no longer talking about the “end-of-pipe” controls of the Clean Water Act⁸ and traditional Clean Air Act.⁹ Instead, we are talking about carbon dioxide emissions that pervade the supply chain as well as the emitting industry.

Consider the traditional view of carbon dioxide emissions. Here, there are scopes of emissions. Scope 1 emissions are those from the facility itself – stack emissions, co-gen emissions, facility transportation emissions, etc. Scope 2 emissions are those from purchased electricity, generally computed as a composite of the emissions from the production of the power grid. And then there are Scope 3 emissions – the emissions from both downstream and upstream supply chains as well as from investments, travel and other similar actions. In short, the computation of emissions includes sources beyond the facility gates, and the computations are pervasive.¹⁰ A chart showing these various scopes of emissions is set out in Figure 3.¹¹

⁸ Federal Water Pollution Control Act (Clean Water Act), 33 U.S.C. §§ 1251 et seq.

⁹ Clean Air Act, 42 U.S.C. §§ 7401 et seq.

¹⁰ Greenhouse Gas Protocol, A Corporate Accounting and Reporting Standard (rev. ed. 2015), <https://ghgprotocol.org/corporate-standard>.

¹¹ U.S. EPA, Scope 1 and Scope 2 Inventory Guidance, <https://www.epa.gov/climateleadership/scope-1-and-scope-2-inventory-guidance>.

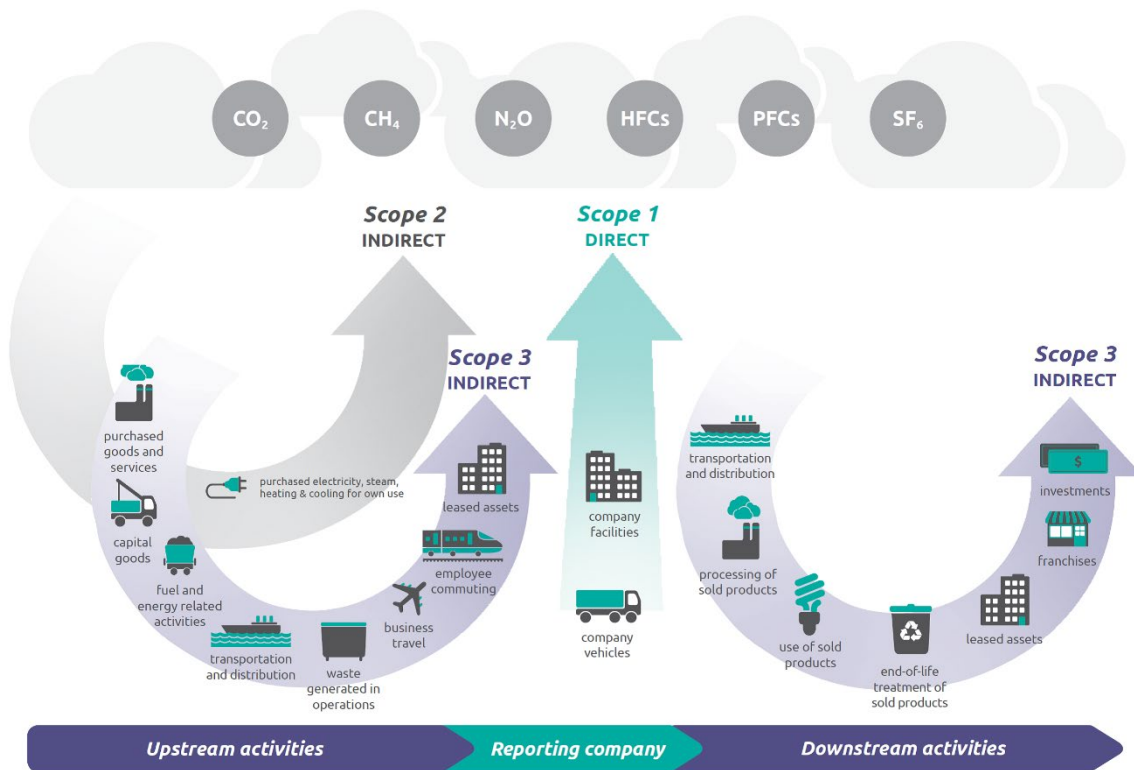


Figure 3. Scopes of emissions. Chart from EPA.

<https://www.epa.gov/climateleadership/scope-1-and-scope-2-inventory-guidance>

And then there are the reduction strategies which also cross all types of lines and raise many varying issues. As can be seen from Figure 4, the global community has been tasked with reducing our carbon dioxide emissions to net zero by 2050 if we are to meet our global goal of limiting the increase in the global temperature less than 2 degrees Celsius.¹²

¹² Paris Agreement to the United Nations Framework Convention on Climate Change, art. 2(1)(a), Dec. 12, 2015, T.I.A.S. No. 16-1104.

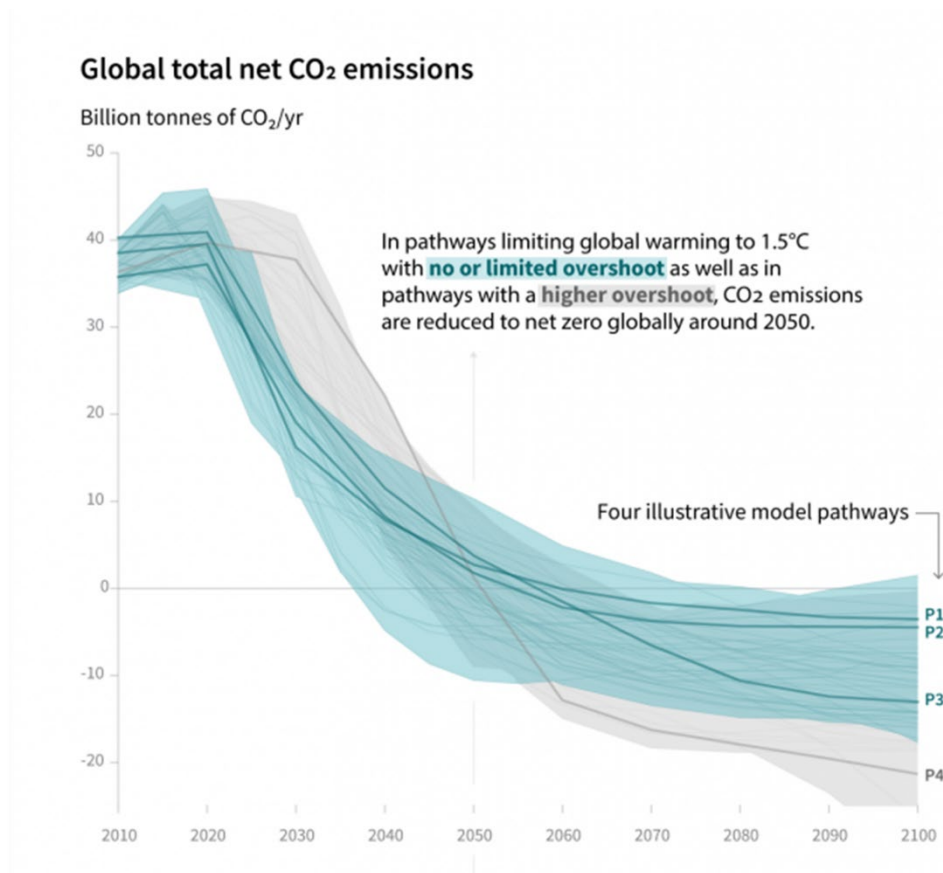


Figure 4. Pathway from 40 billion tons of carbon dioxide equivalent emissions to net zero by 2050. IPCC 2050 Net Zero Pathway, 2023.

<https://www.ipcc.ch/sr15/>.

In order to reach net zero, over 40 billion tons of carbon dioxide emissions will need to be eliminated or withdrawn from the atmosphere.¹³ That will be quite an accomplishment if it in fact occurs. It represents nothing less than the reshaping of the human economy in essentially a 25-year time frame. And although the numbers may not demonstrate these reductions occurring yet, massive change is in fact occurring.

Also fascinating is the “how” of this occurrence. No single strategy is being pursued by the emitting community. Indeed, there are many different approaches and many different scenarios being pursued by different

¹³ IPCC, Climate Change 2022: Mitigation of Climate Change, Sixth Assessment Report, Working Group III (2022), <https://www.ipcc.ch/report/ar6/wg3/>; IPCC, AR6 Synthesis Report: Climate Change 2023 (2023), <https://www.ipcc.ch/report/ar6/syr/>.

individual emitters. However, it is reasonable to classify the reduction strategies into six categories. These are use of renewables, making operations more carbon efficient, using nuclear power, switching from coal to natural gas, utilizing carbon capture technology and using nature to remove carbon dioxide. These strategies and the relative potential contribution of each is set out in figure 4.

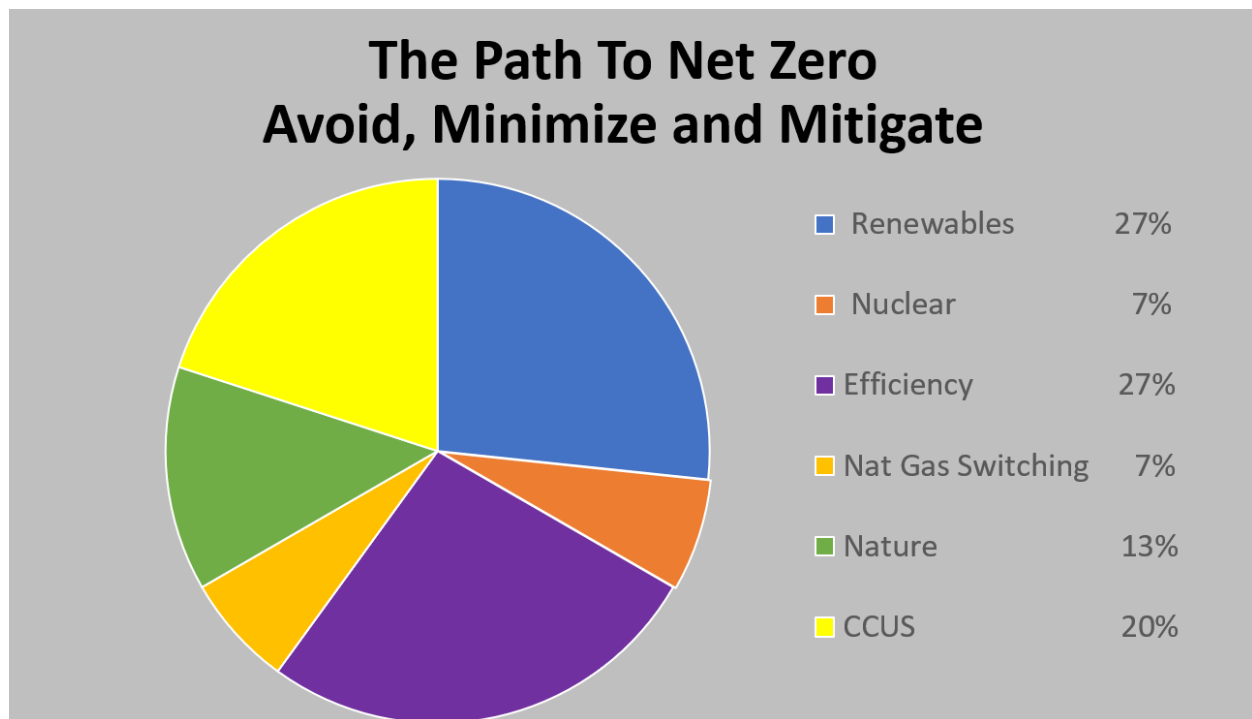


Figure 5. The pathway to net zero using avoidance, minimization and mitigation strategies. Image by Jim Blackburn compiled from multiple sources.

Carbon Capture

There is much that could be written about renewables, nukes, natural gas switching and efficiency. Most of these discussions will involve engineers and fiscal policy planners. When avoidance of emissions by alternative energy sources and minimization of emissions by efficiency are fully utilized, a gap will exist to address residual carbon dioxide emissions. And that gap

will need to be made up by removal of carbon emissions from either the emission point such as the stack or by removal from the atmosphere.

Both humans and nature have excellent carbon capture and removal technologies. Human technology relies on methods that will physically or chemically trap the carbon dioxide molecules and concentrate them and dispose of them, often by underground injection. On the other hand, nature relies on photosynthesis, perhaps the most efficient carbon dioxide removal technology ever evolved. Photosynthesis can operate efficiently at lower concentrations than can human technology. These alternative approaches are shown in figure 6.

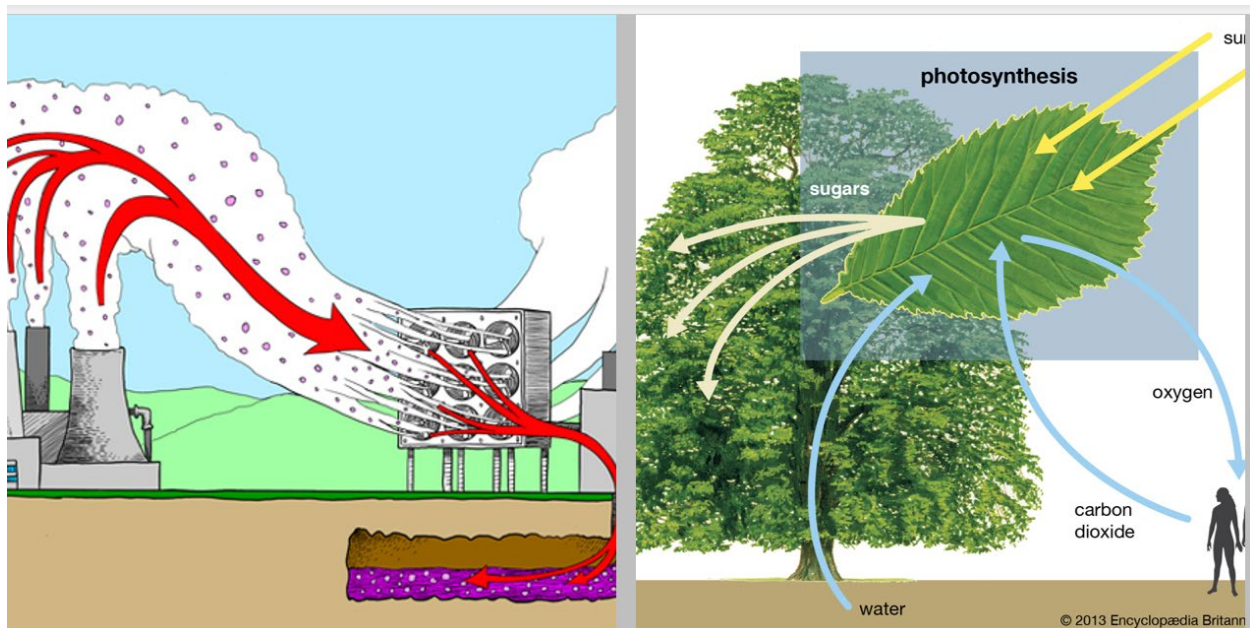


Figure 6. Human carbon dioxide removal technology and nature's carbon removal technology. Image from Encyclopedia Britannica

There is a great future for carbon capture by human technology and by nature's technology if we are to achieve net zero. And there are major hurdles that must be negotiated. For the most part, technological carbon capture, utilization and storage is about the development of technology and obtaining a Type 6 permit for underground injection of the removed carbon dioxide or perhaps a Type 2 permit for underground injection of carbon dioxide, with

Type 2 being for enhanced oil and gas production.¹⁴ Capture of stack emissions is easier than removal of carbon dioxide from the atmosphere itself due to the low concentration of CO₂ in the atmosphere in parts per million which really strains human technology and increases cost substantially.

On the other hand, nature has developed the perfect technology for removing carbon dioxide from the atmosphere. It is photosynthesis, the process by which organic carbon is formed in plants. This natural removal of carbon dioxide is accompanied by storage of carbon in the leaves and wood and roots of the forest, in the leaves and roots and soil of the prairie and in the leaves, roots and soil of the coastal marshes. All of these ecosystems are extremely efficient at removing carbon dioxide from the atmosphere and storing it in wood or soil.

The problem with natural solutions is that nature is subject to human ownership and management. Natural processes have been altered, disrupted and otherwise removed from productivity over the last several centuries. To fully utilize nature as a resource in the transitional economy to the future, we must incentivize landowners to adopt certain management practices and pay them for doing so. Nothing else is likely to work. And this is the part of the climate legal system that most practitioners will encounter as they work with landowners or corporations to achieve these carbon credits.

To this end, a voluntary carbon market has emerged to aid in this transition. An overview of this carbon market is shown in figure 7. The system pivots around a project developer that works with the landowners to develop a project and with the buyers to sell the credits. Credits are issued by the registry which creates protocols which are a set of rules for credit issuance. Verification and validation of the project developers proposal is usually accomplished by third parties reporting to the registry. And ultimately, the buyer must report to its shareholders and stakeholders which is the primary

¹⁴ Safe Drinking Water Act, 42 U.S.C. § 300h et seq.; 75 Fed. Reg. 77230 (Dec. 10, 2010); 40 C.F.R. §§ 146.81 et seq.

“regulators” of the corporation along with its board of directors given the absence of other legal rules controlling credit issuance.

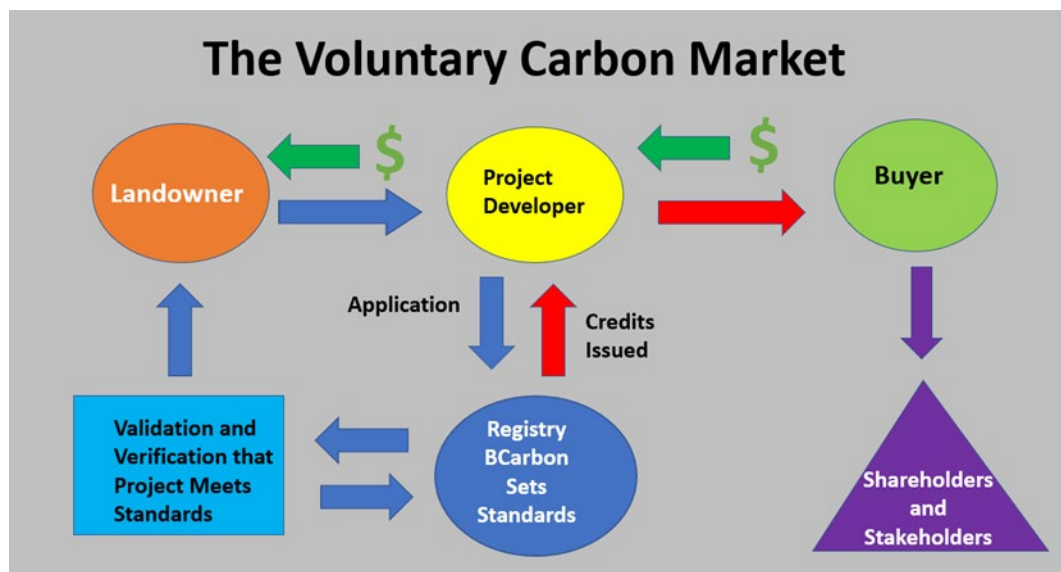


Figure 7. The voluntary carbon market is comprised of project developers that develop credit concepts in association with landowners in accord with protocols set by carbon credit registries that issue credits that are sold to buyers. Image by Jim Blackburn.

The voluntary carbon credit market is real. Although it has been in existence since the Kyoto Protocol of 1997,¹⁵ it has really grown considerably since the adoption of the Paris Accord in 2016.¹⁶ In 2022, several problems within the market became international headlines. As a result of these problems, buyers became more involved in both understanding nature-based carbon credits and in requiring high quality credits.¹⁷ Although this development slowed the growth of the voluntary market, there is no doubt that this market is both viable and growing. It is worth noting that James Clement, a rancher with ranches in both South Texas and West Texas, reported that in 2025, he made

¹⁵ Kyoto Protocol to the United Nations Framework Convention on Climate Change, Dec. 11, 1997, 2303 U.N.T.S. 162, 37 I.L.M. 22 (1998).

¹⁶ Paris Agreement to the United Nations Framework Convention on Climate Change, Dec. 12, 2015, T.I.A.S. No. 16-1104.

¹⁷ Patrick Greenfield, Damian Carrington & Matthew Taylor, Revealed: More Than 90% of Rainforest Carbon Offsets by Biggest Certifier Are Worthless, *The Guardian* (Jan. 18, 2023).

more income per acre on carbon than from cattle in both of his ranches as shown in Figure 8. Only hunting revenue exceeded this carbon income on a per acre basis and that is expected to change as the price for carbon credits rise as 2030, an internal deadline for many corporations, gets closer.

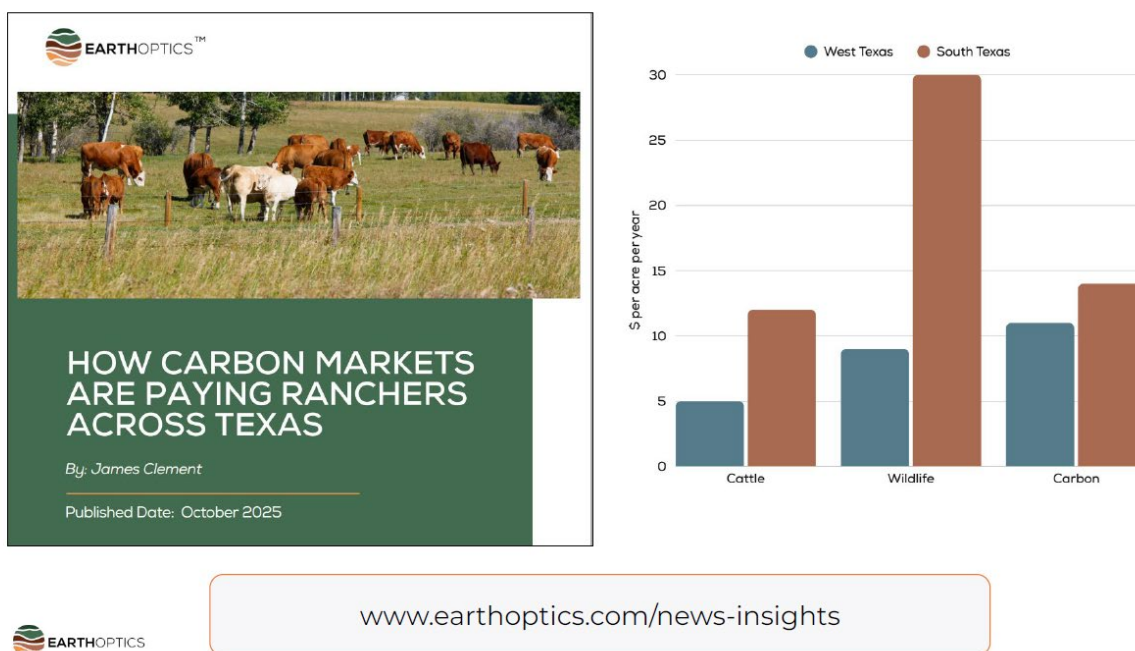


Figure 8. Chart showing per acre income for James Clement’s ranches in West and South Texas from cattle, wildlife hunting and carbon.

From a legal perspective, most lawyers will encounter this voluntary carbon market through the transactions associated with these voluntary credits. Here, there are many contracts required for this system to function. There are contracts between the landowner and the developer and between the buyer and developer. There are contracts between the project developer and the registry and between the registry and the verifier and validator. And within the buyer corporation, there are many interactions with shareholders and stakeholders that keep the General Counsel’s office busy.

Types of Carbon Credits in the Voluntary Market

There are two general categories of carbon credits that are created within the voluntary carbon market. These are credits for the drawdown of carbon dioxide out of the atmosphere and credits for the prevention of emissions that would otherwise occur. With regard to drawdown credits, there are three distinct types. There are soil carbon credits for prairie grasslands and croplands managed in certain ways, there are credits for the growth of trees in forests and there are credits for the drawdown of carbon in wetlands that are protected from sea level rise and coastal erosion by living shorelines.

In addition to drawdown credits, there are credits associated with the prevention of carbon dioxide emissions. These can come from protecting forests that are in danger of being cut and burned, for example, and from protecting wetlands with carbon-rich soil from being eroded with the resulting carbon dioxide release. There are also credits associated with changed agricultural practices that reduce the use of nitrogen fertilizer and the resulting emissions of nitrous oxide, a powerful greenhouse gas. And there are also credits associated with plugging oil and gas wells that are orphaned or abandoned and leaking methane gas, another greenhouse gas.

In all of these cases, there are protocols developed by carbon credit registries such as BCarbon, Verra, Gold Standard and others that set out the rules developed by these private carbon credit registries.¹⁸ In turn, due to concern about the quality of carbon credits, these registries often are certified by international bodies that have minimum quality standards.¹⁹

Conclusion

The law of climate change will be with us for a long time. However, it is and will continue to be, at least for the foreseeable future, unlike other areas of traditional environmental law. It will be changing every year as we get more sophisticated about transactions and about the needs of corporate buyers

¹⁸ Verra, <https://verra.org/programs/verified-carbon-standard/>; Gold Standard, <https://www.goldstandard.org/>; BCarbon, <https://www.bcarbon.org>.

¹⁹ Integrity Council for the Voluntary Carbon Market (ICVCM), Core Carbon Principles (2023), <https://icvcm.org/core-carbon-principles/>.

and landowners that will be converting to methods to bring down more carbon from the atmosphere. It promises to be an interesting upcoming few years.