# Analysis of Legislation Regarding Environmental, Social, and Governance (ESG) Framework's Intersection with Blockchain Technology

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The power of blockchain technology is currently not even close to being leveraged to its fullest potential. A new framework of governance, ESG, has been proposed to forever change the way companies do business. Instead of focusing simply on profits, ESG promotes a focus on other measures, like social or environmental impact. GDP hardly even measures production and consumption to begin with, since stock buybacks, a lack of reporting standards/transparency, and corporate greed/corruption plague businesses across the world. Just updating Wall Street with blockchain technology is a step in the right direction, but why stop there? The problem with ESG is that it innately requires business-to-business (B2B) communication and data exchange. Until now, B2B data interoperability for decision making has been cost prohibitive. Security concerns, while valid, have led to data siloes even within a single organization. Contextualizing these data silos has been expensive enough within a single organization, so B2B data contextualization is going to be an even greater challenge, especially with technology relying on the current client-server model. The cost can be too great for many organizations to deal with, many of whom are not IT companies at heart. Companies that perform social work, non-profit, or other ESG endeavors just can't afford to do the product research or innovations that could lead to technology that enables efficient data exchange and communicability. Who can help them get the technical tools they need? This is where the legislative branch can try and bring stimulus to the right companies or universities and try to make a difference.

This paper attempts to analyze the latest policies that have passed between the years of 2019-2022 in the United States relating to blockchain technology and ESG. Policies that promote innovation or stimulate research into blockchain technology for ESG endeavors are necessary now more than ever. From the National Conference of State Legislators, there were many environmental and social legislation efforts proposed. This papers attempts to give a review of some of them. The "E" and "S", environmental and social problems, need to be solved through firms or universities. The "G", governance, will be solved by blockchain technology itself. This paper breaks down some of the policies passed and proposed to help stimulate ESG endeavors.

**Environmental Blockchain Legislation:**

Between the years 2019-2022, environmental policies were proposed or passed in greater numbers than social policies. This could be because environmental efforts require greater capital expenditures, while social endeavors will have more of a cost from operational expenditures. Also, social endeavors are usually taken on by non-profits working in underprivileged areas, which adds a number of challenges such as profitability being lower, greater risks for operating in the area due to higher crime rates, as well the the privacy concerns that come with working with personally identifiable information (PII) of vulnerable individuals - after all, everyone deserves privacy. The challenges for environmental issues are certainly high, but the risks involved in mitigating social issues are likely even higher.

In 2019, Colorado was the only state to provide legislation for pushing blockchain technology to better handle ESG efforts. A house bill was signed by the governor to stimulate research into how blockchain technology can improve agriculture operations (CO 2019 HB 1247). In this bill, the goal was to fund research that looked into how blockchain technology

could improve a number of factors in agricultural operations including traceability from farm to shelf, providing inventory control, monitor in-field conditions, manage transportation equipment, organic product verification, tracking fertilizer and other input resources, and asset exchange. Another piece of legislation was proposed that year to provide funds to the Colorado State University to research the uses of blockchain databases to manage water rights (CO 2019 SB 184). While the bill has been paused indefinitely, both of these pieces of legislation were definitely ahead of their time. Treating water resources as a bank, with bill SB 184, is quite a new concept and would not be possible if not for features such as tokenization and incentives that come with blockchain technology. The state of Colorado was quite ahead of its time to try and push forward a technology

In 2021, Colorado continued to be the only state to push forward specifically environmental blockchain endeavors, with the bill focusing specifically on water and irrigation (CO 2021 SB 1268). While SB 184 was postponed indefinitely, SB 1268 was signed by the governor and promoted a research initiative to look into a number of benefits blockchain technology could provide for managing the state's water supply. These initiatives include improving the monitoring/management/conservation/allocation of surface water and groundwater, reducing inefficiency and waste in recycling/disposing of wastewater, and exploring the concept of water rights. The University of Colorado as well as Colorado State are to work with the the Colorado water institute to research ways to improve the state's water management abilities. Many environmental efforts are going to require wireless sensor networks (WSNs), since the data and transactions do not contain PII, but rather require real-time monitoring of large bodies of land, air, or water. This bill describes the additional technologies that would be required, such as in-situ sensors for monitoring water sources, direct or remote sensors to monitor water quality, satellite/cellular technology for remote access, and UAVs. The reporting obligations listed in the bill are also interesting to note, as the universities will be required to push forward policy analysis and keep problems like climate change in mind while researching blockchain's efficacy in managing the state's water.

In 2022, there were finally more states involved in promoting environmental management with blockchain technology. The states that were involved include New York, Nebraska, and Colorado again. Continuing on with Colorado, this time there was an effort to try and educate people and businesses in the agricultural industry about how blockchain would change the agricultural industry (CO 2022 HB 1053). This bill is all about educating business owners on what is available, which is incredibly important. Such a complex technology is going to require education and training. Also in the same year, Nebraska began to explore how blockchain technology could aid with efforts in precision agriculture (NE 2022 LB 761). The bill details the Precision Agriculture Infrastructure Grant Program as a means to empower Nebraska agricultural producers to lead the nation in precision agriculture, connectivity, sustainability, traceability, and autonomy. The potential for blockchain technology to propel rural areas is not to be overlooked. Finally, New York was one of the first states to actually prevent activities related to blockchain technology, particularly by forcing a halt to crypto mining operations that implement Proof of Work (NY 2022 SB 6486). While it can be argued that this regulation could hurt innovation, I actually don't think this regulation is particularly problematic. Mining operations are known to leave a rather high carbon footprint and the simple fact of the matter is that crypto miners are not

innovators - they are in it to fill their pockets (most of the time, at least). Placing a halt on mining operations isn't likely to hurt innovation, as Bitcoin and other PoW cryptocurrencies as of now are likely not even going to stand the test of time.

**Social Blockchain Legislation:**

While there were not as many social bills proposed regarding blockchain technology, social policy is something that is very dear to my own heart. At Forgotten Harvest, my job was the use data to try and eradicate hunger from the metro Detroit area. The problem is that it was on the people at the company to do PII management, which simply requires too much implicit trust in order to be a scalable practice. All the social blockchain system legislations were proposed in 2021. Starting off with a bill proposed in Florida, the goal of the bill was to try and mitigate food equity and racial disparities in food supply chains (FL 2021 HB 4119). The bill died in committee, so the proposed 1 million dollars never ended up going towards funding anything. Trying to work on reducing food insecurity myself, I know blockchain technology can help scale these kinds of operations. It was a miracle that Forgotten Harvest was even able to operate their ERP or CRM systems, considering no experienced software professionals ever worked on their systems before. I was the first experienced software professional to work there and bills like this could potentially get more talented people to work for non-profits working on these very issues. Next, a bill was proposed to empower employees by preventing employers from being able to access details on any personal internet accounts (CA 2021 SB 638). This California bill initially included blockchain technology, but eventually amended the legislation to exclude those sections. Labor rights are important and employers shouldn't have access to personal data, but I am not sure why the blockchain segments were amended and crossed out. Finally, there was a bill proposed in New Mexico to construct a blockchain center at Central New Mexico Community College in Albuquerque (NM 2021 HB 296). Education is necessary for creating a society of free and prosperous adults and making learning about blockchain technology accessible at the community college level should become standard practice around the world. This technology is too valuable to be taught just at the graduate level!

**Governance and Conclusions:**

Governance in ESG (the "G") involves risk management, compliance, ethical business practices, avoiding conflicts of interest, and accounting integrity/transparency. While relying on the client-server model would theoretically work, the implicit trust required from businesses is just not going to cut it. Some people and businesses will always act in their own best, short-term interest, so why not leverage a technology that can innately help regulate potential conflicts of interest? The blockchain's focus on integrity and immutability of transactions through a consensus protocol is a major affordance. Security through cryptographic schemes is also provided along with proof of ownership through digital certificates. Additionally, concepts like triple-entry accounting could change the world of accounting, where a B2B audit trail could be easily viewable. Finally, incentive mechanisms, such as those defined in Proof of Work, could play a major role in getting people to contribute their compute resources to things like validating or ordering transactions through consensus. People or businesses who contribute to consensus could get tax credits or actual payouts for the contributions to the network.

Of all the ESG related legislation proposed or passed, only one of them actually tried to limit blockchain technology in any way. All of the other bills were attempts at trying to provide

stimulus or education towards researching or learning about the technology. The only policy that tried to limit the technology wasn't even stifling innovation, as blockchain miners in PoW are not exactly innovators to begin with, but rather people trying to make money within the network. The carbon footprint from PoW is concerning to begin with and in my opinion, PoW isn't even going to stand the test of time. It was surprising to see Colorado so focused on the environmental applications back in 2019 and consistently trying to be involved with environmental blockchain initiatives. The only other state involved with environmental blockchain innovation was Nebraska. Social blockchain legislations were rather scant in quantity, but there were three proposals at least that were trying to take a stab at the problem. Not all of them passed, and one of the bills ended up removing the sections that contained blockchain technology in 2022, but having some proposals is surely better than having none at all.

**Reference List of Bills**

California (2021). *Senate Bill 638*.
Colorado (2019). *House Bill 1247.*
Colorado (2019). *Senate Bill 184.*
Colorado (2021). *Senate Bill 1268.*
Colorado (2022). *House Bill 1053.*
Florida (2021). *House Bill 4119*.
Nebraska (2022). *Legislative Bill 761.*
New Mexico (2021). *House Bill 296*.
New York (2022). *Senate Bill 6486.*