

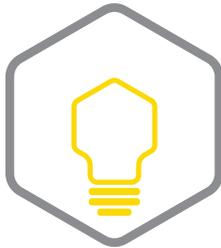
# BLOCKCHAIN FOR PLANETARY STEWARDSHIP

**Landscape of Initiatives in Climate and Sustainability**

Tom Baumann  
ClimateCHECK

January 2018





## Realizing the new promise of the digital economy

In 1994, Don Tapscott coined the phrase, “the digital economy,” with his book of that title. It discussed how the Web and the Internet of information would bring important changes in business and society. Today the Internet of value creates profound new possibilities.

In 2017, Don and Alex Tapscott launched the Blockchain Research Institute to help realize the new promise of the digital economy. We research the strategic implications of blockchain technology and produce practical insights to contribute global blockchain knowledge and help our members navigate this revolution.

Our findings, conclusions, and recommendations are initially proprietary to our members and ultimately released to the public in support of our mission. To find out more, please visit [www.blockchainresearchinstitute.org](http://www.blockchainresearchinstitute.org).



**Blockchain Research Institute, 2018**

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## Foreword

Blockchain technology increases trust and accountability. There is arguably no more important application of this trust than to sustain our environment—our lives depend on it, as do those of our children, our grandchildren, and some 8.7 million other species on this planet, some of which may adapt much better than ours (Figure 1, next page).<sup>1</sup>

Ninety-seven percent of climate scientists agree that human activity is responsible for a number of climate warming trends.<sup>2</sup> It cannot be that practitioners of science, technology, engineering, and medicine—people who have built their careers on applications of scientific fact—are selectively ignoring the overwhelming evidence of the impact of their innovations on the planet. It must be—and this is more likely the case—that we have lacked practical tools and direct incentives to act now. Otherwise, we would be doing far more and with a greater sense of urgency to arrest, let alone reverse, these trends.

For some time now, I have been studying how mass collaboration could mitigate the effects of technology on our ecological systems. In *Macrowikinomics: Rebooting Business and the World*, Anthony Williams and I dedicated an entire chapter, “Reindustrializing the Planet,” to the topic. In my research on blockchain, I began to see distributed ledgers as a potential means of mass coordination of sustainability efforts and accountability for results, combined with tokens as both immediate and long-term inducements for participation.

Blockchain Research Institute faculty member Michael J. Casey has framed blockchain as a solution to ecologist Garrett Hardin’s “tragedy of the commons”: “Once again, it comes down to the capacity to align incentives around a common goal.”<sup>3</sup> Michael goes on to explain how blockchain start-ups, Climatecoin and LO3 Energy, are doing just that in the environmental commons.

This research surveys the landscape of such blockchain start-ups, applications, and networks related to climate and sustainability. It covers not only Climatecoin and LO3 Energy but thirty other endeavors including think tanks, trading platforms, and environment-related cybercurrencies.



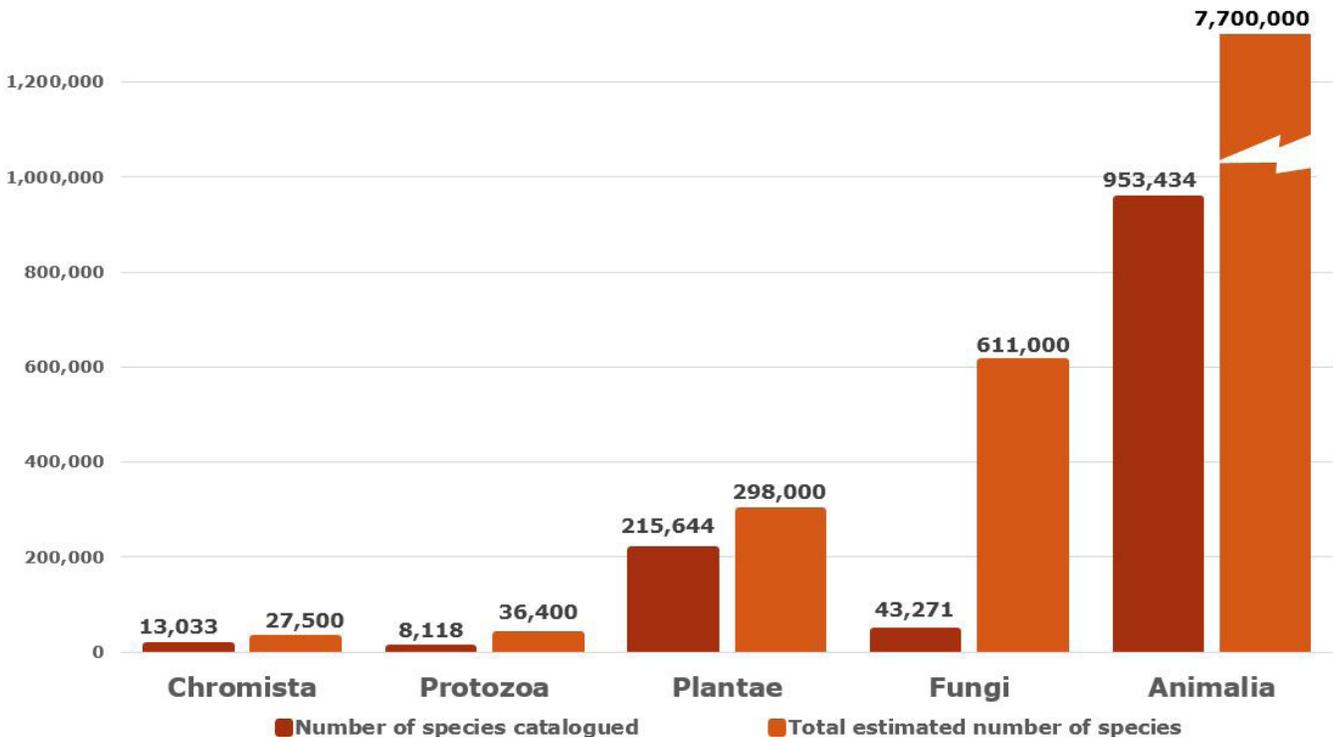
Our research head, Tom Baumann, has evaluated each initiative based on its scope, its relationship to governance networks, and its state of maturity. Tom has incorporated expert interviews, extensive web research, a survey questionnaire, and in-person meetings at international conferences and events.

A final note: by *governance*, we mean *stewardship*, which involves collaborating, identifying common interests, and creating and aligning incentives to act on them. We do not mean government, regulation, or top-down control. My hope is that this research will increase the number of planetary stewards and that BRI members will discover or be inspired by a blockchain initiative here that aligns with their own livelihoods and stakeholder interests.

 **DON TAPSCOTT**  
*Co-Founder and Executive Chairman*  
*Blockchain Research Institute*

**Figure 1: The latest census of species on our planet**

In the most precise computation yet of life on Earth, scientists estimate that our planet hosts some 8.7 million different species, plus or minus 1.3 million, with 2.2 million living in oceans and 6.5 million on land.



Source: *Census of Marine Life, "How Many Species on Earth? About 8.7 Million, New Estimate Says," ScienceDaily.com, 24 Aug. 2011.*

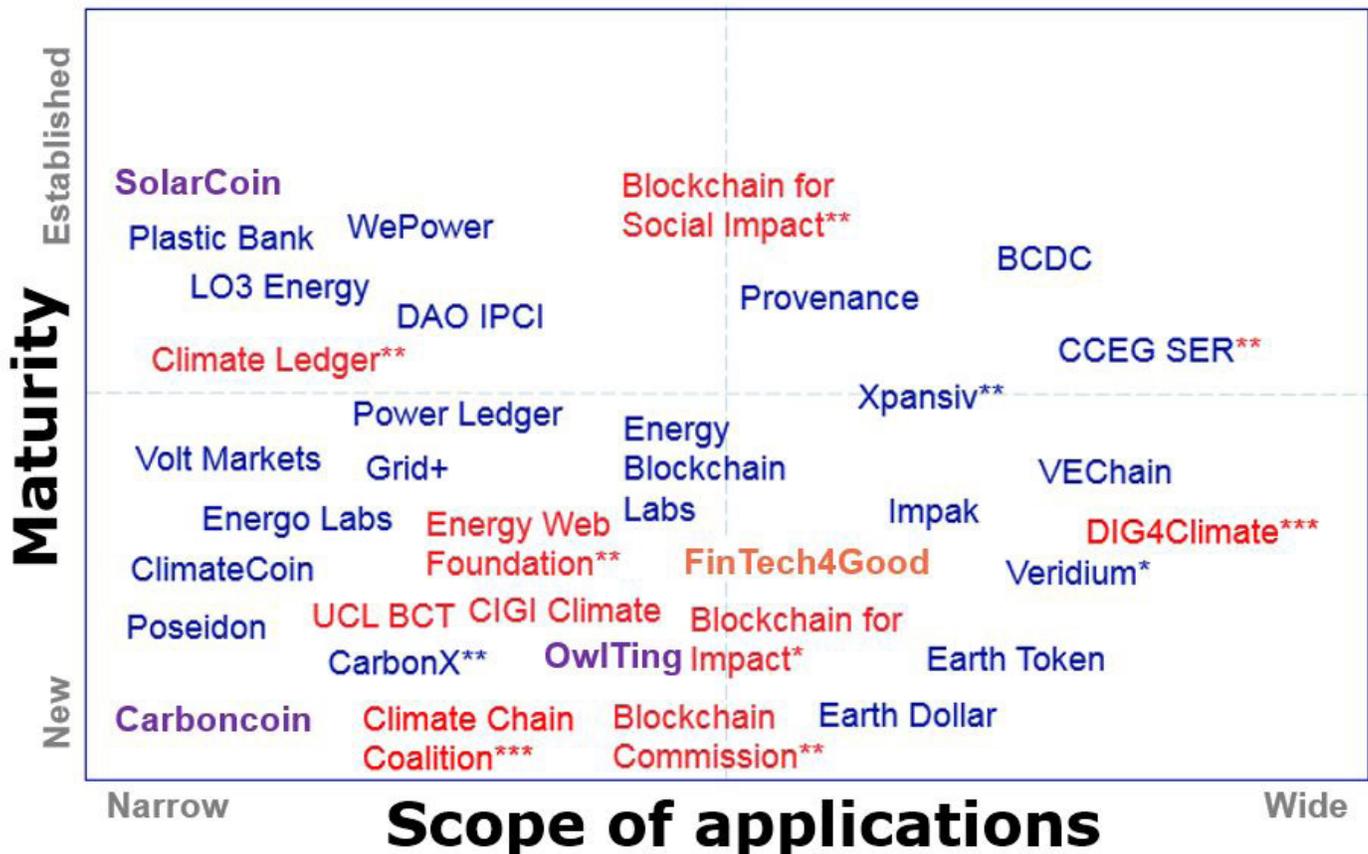


## Idea in brief

- » Since 2014, a variety of blockchain initiatives has emerged within the climate and sustainability space. Renewable electricity, waste management, sustainable supply chains, and carbon credits generated from carefully managed forestry projects that sequester carbon dioxide from the atmosphere are but a few.
- » During 2017, the number of these initiatives more than doubled to over 100—and the rate of growth is accelerating. The initiatives vary not only in their focus but also in their choice of partner ecosystem and use of digital technologies.
- » In our research, we surveyed the landscape of blockchain applications and networks on climate and sustainability, as of December 2017 (Figure 2). It is changing rapidly; interested parties should consult the web links provided for current information.

**Figure 2: Landscape of blockchain initiatives for climate and sustainability**

Networks in red, applications in blue, asterisk (\*) indicates relation with a global solution network.



## Framework for analysis

Within the focus of the Blockchain Research Institute on planetary stewardship, this report increases the focus on climate and sustainability. The descriptions of blockchain initiatives in this report are based on a three-part framework:

- » Scope for climate and sustainability (market focus)
- » Relation to global solution networks
- » State of maturity

### Defining the scope of the blockchain initiatives

Inherent in the crosscutting nature of climate and sustainability, the scope(s) of blockchain initiatives can cover many issues. Based on the preponderance of current initiatives, the following primary categories are used.

- » Carbon registries and markets relate to any carbon units created by emission sources or climate actions and associated with bottom-up entities such as companies, projects, products, and cities that can be aggregated into national or subnational (e.g., provincial or state) accounts or international programs (e.g., aviation).
- » Supply chains, including value chains, can include full life cycle tracking of carbon or sustainability metrics from the raw materials to end-of-life materials, or may be a portion thereof.
- » Commodities include tracking the carbon or sustainability metrics of primary inputs to economic processes, such as oil and gas, metals, and agricultural products such as wheat, corn, rice, etc.
- » Energy includes primarily renewable (green) power that has zero or low carbon energy, as well as related energy management activities to support energy efficiency at a local or market level (e.g., utilizing distributed generation). In addition, new energy systems such as electric vehicles (also used for storage) are included.
- » Landscapes including agriculture, forestry, and other land use are a major focus for climate and sustainability.
- » Sustainability includes environmental, social, and economic dimensions. This category encompasses the remaining issues not incorporated in the categories above. Examples include natural capital and ecosystem management, waste management, international development and communities.



## Defining global solution networks

Don Tapscott launched the Global Solution Networks (GSN) initiative in 2013 and created a GSN taxonomy to support the applied research for and engagement with GSNs. GSNs are multistakeholder, self-governing networks enabled with digital technologies, such as the blockchain governance GSN. The following GSNs are most relevant to this research.

**Standards networks.** Standards networks consist of nonstate stakeholders developing standards and rules in virtually every area of technical specification. Given the growing domains requiring standards, the complexity of standards, the need for truly global standards, and the requirements for vast numbers of stakeholders to be involved, the new networked models of standards setting increasingly make sense. Examples of standards networks are the Greenhouse Gas (GHG) Protocol, International Organization for Standardization (ISO), International Social and Environmental Accreditation and Labeling Alliance (ISEAL), Gold Standard, American Carbon Registry (ACR), and Verified Carbon Standard (VCS).

**Knowledge networks.** The primary function of knowledge networks is to develop new thinking, research, ideas, and policies. Knowledge networks also include applied research and education/capacity building. Examples of knowledge networks addressing education and research are the World Bank Partnership for Market Readiness, NDC (nationally determined contributions) Partnership, Transparency Partnership, LEDS Global Partnership, GHG Management Institute, World Resources Institute, and Climate Ledger Initiative.

**Policy and advocacy networks.** Policy networks are nonstate webs that include nongovernmental players in the creation of government policy. Their activities cover the range of steps in the policy process—beyond just policy proposals or lobbying—including agenda setting, policy formulation, rulemaking, coordination, implementation, and evaluation. Examples of policy networks are We Mean Business, The Climate Group, and 350.org. Advocacy networks seek to change the agenda or policies of governments, corporations, or other institutions. The Climate Reality Project's examples of advocacy networks are the International Emissions Trading Association, the World Business Council for Sustainable Development, and the Environmental Defense Fund.

**Delivery networks.** Operational and delivery networks actually deliver the change they seek, supplementing or even bypassing the efforts of traditional institutions to make sure that applications, platforms, and ecosystems have what they need to operate effectively and efficiently.

**Governance networks.** Multistakeholder networks rather than state based institutions can now govern important global resources. Governance networks are beginning to address the coordination and even management of critical resources like forests and water. These networks have the right and responsibility of non-institutional global governance.

*The primary function of knowledge networks is to develop new thinking, research, ideas, and policies. Knowledge networks also include applied research and education/capacity building.*



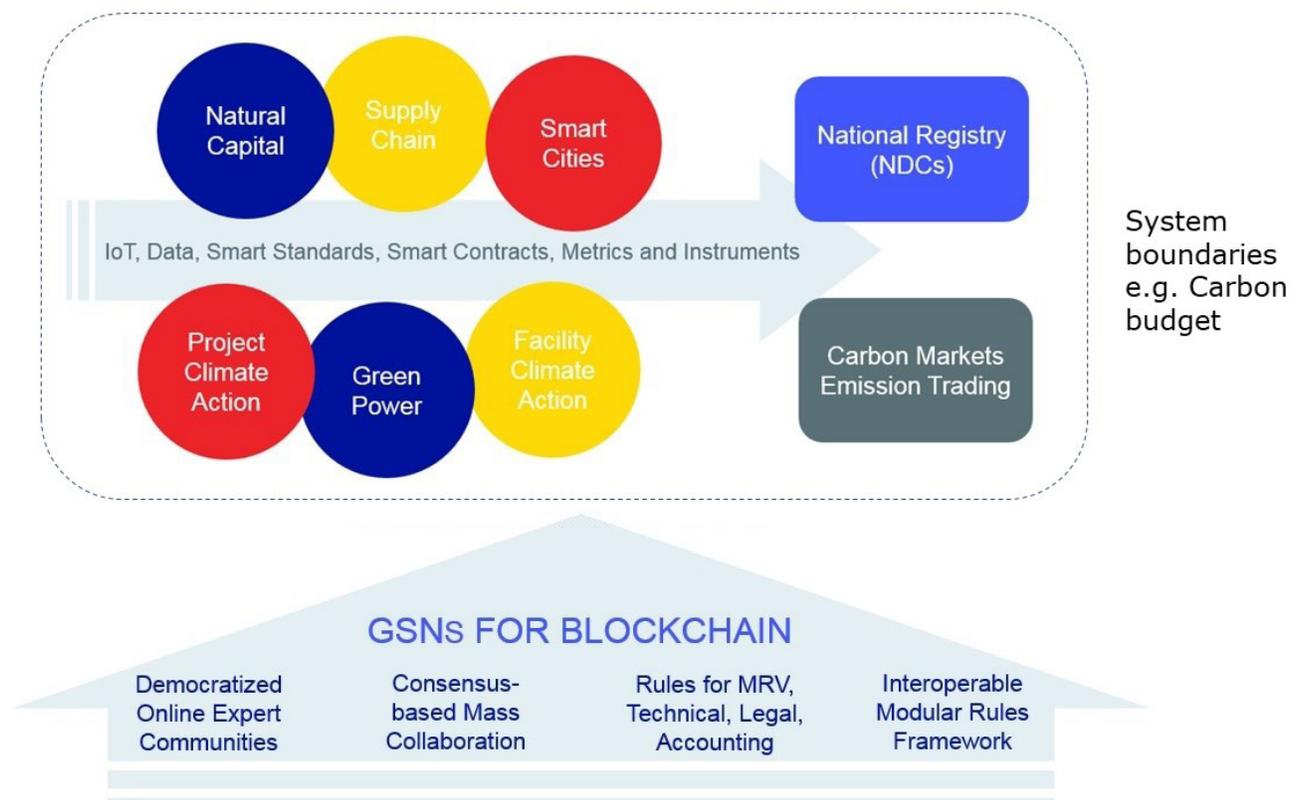
Some networks seek to provide platforms for other networks to organize collaboration with stakeholders and other networks. Platforms provide some kind of technology but also organizational capability that facilitates collective action. Figure 3 illustrates the combination of GSNs supporting a system of blockchain applications for climate.

## Defining the stage of maturity

The blockchain sector is at an early stage akin to the Internet circa the 1980s. In the following pages, we use these five categories to indicate and compare each initiative's stage of maturity:

- » Intent to start announced (i.e. conceptual, the organization is not yet established)
- » Organization established, including partner ecosystem, (e.g., technology partner, implementation partner)
- » Proof of concept completed
- » *Initial coin offering* (ICO) completed or in progress
- » Commercially deployed or in progress

**Figure 3: Global solutions networks supporting blockchain applications in climate and sustainability**



## Networks, alliances, and think tanks

Several networks and alliances have emerged to support common interests and coordination among blockchain initiatives, as well as research on issues of fundamental importance to the evolution of blockchain to address climate and sustainability.

### FinTech4Good and the Blockchain4SDGs Alliance

[www.fintech4good.co](http://www.fintech4good.co)

Launched in January 2017, the Blockchain4SDGs Alliance brings together institutions and global leaders to develop *proof of concepts* (POCs) and pilots, and mobilize capital to scale up blockchain-based *sustainable development goals* (SDGs) solutions. The Alliance has more than 100 members who have developed more than 50 blockchain-based SDGs related solutions. Since its inception, the Alliance has developed a number of programs and initiatives such as Global Council on Digital Economy, Blockchain Bonds Initiative, Blockchain4SDGs Lab, and Blockchain4SDGs Investors Consortium. These programs aim to unite a diverse group of stakeholders to produce blockchain solutions to frontier markets.

*Blockchain for Social Impact Coalition aims to incubate, develop, and implement confederated and customized blockchain solutions that can address social and environmental challenges.*

### CCEG Blockchain UN Lab on SDGs and Seratio Coins

[www.cceg.org.uk](http://www.cceg.org.uk), [www.seratio-coins.world](http://www.seratio-coins.world), and [www.bisgit.org/lab](http://www.bisgit.org/lab)

The Centre for Citizenship Enterprise and Governance (CCEG) is a leading think tank on the Movement of Value with over 90,000 members worldwide including 7,000 heads of *corporate social responsibility* (CSR) of the world's leading companies. CCEG has developed metrics for capturing and measuring intangible and non-financial value for legislative frameworks like the Social Value Act 2012 and Modern Slavery Act 2015, and they are the leading providers of non-financial measurement.

In 2016, the CCEG Blockchain UN Lab was created to focus on the transaction of intangible and non-financial values using a unique combination of blockchain technology and the social earnings ratio. The lab is a new and effective way to deliver, capture, measure, and translate value across all data sets. The lab has also launched the SDG family of digital coins, which carry the attributes of blockchain and have a unique property to make SDG investment contingent on the social impact to be achieved, or that a set of values determines the economic rewards—all within a single transaction instrument.

### Blockchain for Social Impact Coalition

[www.blockchainforsocialimpact.com](http://www.blockchainforsocialimpact.com)

Blockchain for Social Impact Coalition (BSIC), a ConsenSys initiative, was formed to leverage the power of the Ethereum blockchain for those in need. BSIC aims to incubate, develop, and implement confederated and customized blockchain solutions that can address



social and environmental challenges across the UN SDGs. It also aims to inspire, federate, and create bridges between nongovernmental organizations, government agencies, foundations, impact investors, philanthropists, and technologists by targeting: financial inclusion, supply chain, identity and vulnerable peoples, energy, and the environment.

Members of the coalition will collaborate in one of these areas meeting once a month to identify key initiatives, give feedback on existing projects, and craft strategy to accelerate blockchain adoption. In addition to working groups, BSIC is creating a network of decentralized meetups, open to the public, and has already launched events in New York, London, and Washington, DC, while looking to expand globally.

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*Climate March 21/09/14 - 11 by Garry Knight, 2014, used under CC0 1.0.*

## Blockchain Commission for Sustainable Development

[www.blockchaincommission.org](http://www.blockchaincommission.org)

The Blockchain Commission was launched in October 2017 by the Global Partnerships Forum, the PVBLC Foundation, and the Fund for Philanthropy, in response to the need to develop a framework by which the United Nations, its specialized agencies, its member states, intergovernmental organizations, nongovernmental organizations, financial institutions, and private sector-led organizations can come together to develop global solutions.

The aim of the initiative is to establish a network of global leaders in the blockchain community to focus on blockchain for impact, transparency in the evolving marketplace, and trust among multistakeholders. It also seeks to develop an international policy



agenda with a focus on accelerating progress in least-developed countries and implementing best practice toward the sustainable development targets.

Every year, the Blockchain Commission hosts a “Blockchain for Impact” summit, developing a collaborative, convening advocacy platform for conscious leadership from all sectors to explore, co-create, and promote the application of blockchain technology to initiatives with profound and positive social impact. “Blockchain for Impact” invites visionary industry stakeholders into a robust, future-based, multi-track global conversation about social innovation, fair and consistent public policy, and responsible guidelines for industry governance.

## Climate Ledger Initiative

[www.climateledger.org](http://www.climateledger.org)

Climate Ledger Initiative (CLI)—created by Cleantech21, the LIFE Climate Foundation, Climate-KIC, and numerous other partners—started the #ClimateBC program, a network focused on research and supporting early-stage activities. CLI’s mission is to accelerate the momentum for climate action under the Paris Agreement by systematically strengthening the intersection between the field of climate change and blockchain, also known as *distributed ledger technology* (DLT).

CLI has three parallel tracks of focus:

- » Research to fill the knowledge gaps in key areas regarding climate and relevant DLT
- » Innovation use cases to show DLT’s potential and allow learnings from the field
- » Innovation call-outs to raise awareness, build capacity, and convene and mobilize climate and DLT talents

Priorities of CLI research include emissions data capturing and GHG inventories, corporate carbon pricing and *environmental, social, and governance issues* (ESG), and reporting and research related to climate-specific aspects of DLT. CLI’s innovation call-out activities include capacity building on climate action for the implementation of the Paris Agreement and the role of DLT, as well as ideation workshops, prized contests, selection challenges, targeting coaching, and demo days.

## Digital Currency Initiative

[dci.mit.edu](http://dci.mit.edu)

The Digital Currency Initiative (DCI) is a group at the Massachusetts Institute of Technology’s Media Lab, focusing on cryptocurrency and its underlying technologies. DCI seeks to push the envelope on the development of this technology with fundamental research, while shedding light on the associated benefits, risks, and ethical

*Climate Ledger Initiative’s mission is to accelerate the momentum for climate action under the Paris Agreement by systematically strengthening the intersection between the field of climate change and blockchain/DLT.*



*The goal is to create a secure form of reliable, executable collateral to lower risks for lenders and reduce the cost of financing decentralized renewable energy infrastructure, especially in developing countries.*

quandaries. Beyond research centered at MIT, they also help support open-source cryptocurrency communities and diversity, and hope to foster a broader academic community in this space.

One of its current research projects—securitized financing for solar microgrids—will explore using digital currency and DLT to securitize transactions among users and owners of blockchain-managed solar microgrids. The goal is to create a secure form of reliable, executable collateral to lower risks for lenders and reduce the cost of financing decentralized renewable energy infrastructure, especially in developing countries. The team is developing an Ethereum-based smart contract that triggers timed access to a solar electricity resource while payments by the user are up to date. The idea is to create a form of “smart property,” the usage right of which can be managed remotely.

The team is exploring different investment structures to manage these resources, including a cooperatively owned microgrid in which power generation, sharing and usage, as well as payments and administrative protocols are governed via decentralized, blockchain-based mechanisms. Pilot sites are being explored in India and other parts of the developing world. The long-term objective is to create a platform upon which financial engineers can create structured securities backed by solar generation revenues, allowing higher-level capital to flow down to local projects and finance the ongoing rollout of this decentralized renewable infrastructure.



*Offshore Wind Park by Silke (the3cats), 2018, used under CC0 1.0.*

## The Climate Chain Coalition

[www.theclimatechain.org](http://www.theclimatechain.org)

Following the UN climate conference COP23 in November 2017, at which many days of blockchain events for climate were conducted (e.g., Hack4Climate), several blockchain and climate initiatives agreed



to gather again in Paris at the second anniversary of COP21 and the Paris Agreement (12 Dec. 2017). These blockchain initiatives from over 12 countries gathered (and connected online) to cooperate in the launch of a new global collaboration, the Climate Chain Coalition.

The coalition established shared principles and values to guide members and to support the adoption of blockchain for climate and sustainability. The goals of the coalition are to support the sharing of know-how and building capacity, coordinating efforts and resources, as well as facilitating good governance to maximize the environmental integrity and results of blockchain for climate.

The coalition adopted its name from the public research initiative of the Institut Louis Bachelier (ILB) in Paris, France, called The Climate Chain. The purpose of the original ILB Climate Chain was to examine how blockchain and DLT could facilitate the implementation of the Paris Climate Agreement. The initiative focused on offering accessible and reliable technological infrastructure for the implementation of GHG emissions *measurement, reporting, and verification* (MRV) tools. The objective of the Climate Chain was to build capital market confidence and help reach the Paris Accord target at both local and global level through consensus methods and technical interoperability.

The Climate Chain pilot focused on the application of blockchain for the French Carbon Registry in cooperation with the Caisse des Dépôts to study the pros and cons of building a DLT infrastructure for managing MRV processes at sovereign levels and valuing avoided emissions. This pilot is to be completed with further research and technical applications that can meet the expectations of countries looking to create a low cost and robust framework to support their commitment toward a low carbon economy.

## Digital Innovation and Governance for Climate (DIG4Climate)

[www.collaborase.com/dig4climate](http://www.collaborase.com/dig4climate)

The Government of Canada working in collaboration with the Pacific Alliance—Chile, Colombia, Mexico, and Peru—at the UN climate conference COP23 launched a multi-year (2017–2021) project on the use of blockchain and digital innovations to strengthen MRV and attract finance to climate actions. The goal of the project is to enhance current MRV standards and the supporting MRV standards governance system in order to leverage digital solutions and enable “smart standards.” As such, the next generation of governance will structure the application of blockchain and digital technologies for MRV activities such as data input and processing, quality assurance and quality control, audits and verifications, and standards collaboration. The project will support the development of a next generation MRV governance system.

*The Government of Canada working in collaboration with the Pacific Alliance at the UN climate conference COP23 launched a multi-year (2017-2021) project on the use of blockchain and digital innovations.*



Project activities include workshops and an online collaboration that will support capacity building and a multistakeholder dialogue to design and pilot smart standards for MRV with climate actions. The discussion will generate recommendations and a roadmap to guide future governance innovation in support of blockchain and digital innovations for MRV.



*Solar Panels Installation Workers 1794467 by skeeze, 2016, used under CC0 1.0.*

*The Centre for International Governance and Innovation is an independent, non-partisan think tank, with a goal of bringing clarity and innovative thinking to global policy making.*

## Centre for International Governance and Innovation

[www.cigionline.org](http://www.cigionline.org)

*Oonagh Fitzgerald, Director*

The Centre for International Governance and Innovation (CIGI) is an independent, non-partisan think tank, with a goal of bringing clarity and innovative thinking to global policy making. CIGI works across disciplines and in partnership with peers and experts in three areas of research: governance of the global economy, global security and politics, and international law.

As part of CIGI's work on connecting international law and technology to overcome challenges in global governance, CIGI hosted a Blockchain Climate Cup Round Table in June 2017. The round table brought together experts in international climate change law and policy, blockchain, and DTF to explore practical, DLT-powered solutions for tackling climate change under the Paris Agreement.



## Climate change

### CarbonX Personal Carbon Trading, Inc.

[www.carbonx.ca](http://www.carbonx.ca)

*Bill Tapscott, CEO*

*CarbonX tokens are designed to create demand for and certify the production of carbon-friendly and carbon-neutral products and services.*

CarbonX Personal Carbon Trading Inc. is a blockchain economy designed to engage people and enterprises in the Climate Crisis. CarbonX achieves this by re-casting carbon credits/offsets as ERC20 tokens on a private Ethereum blockchain and establishing a marketplace where they can be traded peer to peer. The smart contracts attached to the CarbonX tokens define two use cases:

- » As the cryptocurrency of a loyalty and open-loop rewards program for enterprises to feature and incent carbon-friendly purchases and choices
- » As an offset against excess emissions during the manufacturing 4.0 life cycle thereby creating carbon-neutral products and services

CarbonX tokens are designed to create demand for and certify the production of carbon-friendly and carbon-neutral products and services.

Through the relationship with Don Tapscott, CarbonX is affiliated with the Blockchain Research Institute and Global Solution Networks. CarbonX has established its organization and is establishing its partner ecosystem, including a strategic relationship with Zerofootprint Software Inc. Its *minimum viable product* (MVP) is in development and it plans to announce its first partner companies in early 2018.

### DAO IPCI

[www.ipci.io](http://www.ipci.io)

*Alexey Shadrin, Co-Founder DAO IPCI*

The Decentralized Autonomous Organization Integral Platform for Climate Initiatives (DAO IPCI) is creating a decentralized blockchain-based ecosystem for users to work with environmental assets, liabilities, and carbon market institutions. DAO IPCI creates common space fabric, financial instruments, and ecosystem, which are universal, easy to use, transparent, and reliable. The ecosystem allows diverse stakeholders, governments, civil society, businesses, and individuals to participate in mitigation activities, to register quantified commitments, invest environmental damage mitigation projects, to offset carbon footprints, and acquire and trade mitigation outcomes.



The goal of DAO IPCI is to minimize transaction costs by providing a reliable, transparent blockchain and a smart contracts-based alternative to traditional registries, trading platforms, exchanges, and brokerage services. In March 2017, the organization completed its first international carbon credit transaction on the blockchain. DAO IPCI is designed to be a decentralized public blockchain-ecosystem and aims to create common business space to attract financing from investors not limited by financial capacity, location, or legal status with minimized transaction costs, increased reliability, and transparency.

The current scope of application for DAO IPCI includes carbon registries and markets, with future scope including renewable energy, waste, forestry, and financial services. DAO IPCI published its white paper—and has established its partner ecosystem and its proof of concept—following its Dapp (decentralized application) launch and the first ever blockchain carbon credit transaction—with global players at the World Bank’s Innovate4Climate that took place in May 2017.<sup>4</sup> In October 2017, it completed its ICO—MITO—which is becoming commercially available. DAO IPCI has partnered with the DAO Carbon Registry.<sup>5</sup>

*The goal of DAO IPCI is to minimize transaction costs by providing a reliable, transparent blockchain and a smart contracts-based alternative to traditional registries, trading platforms, exchanges, and brokerage services.*



*Dustbin, Paper Wheelie Bin 95178 by Hans Braxmeier (Hans), 2014, used under CC0 1.0.*

## Energy Blockchain Labs

[www.energy-blockchain.com](http://www.energy-blockchain.com)

*Cao Yin, Chief Strategy Officer*

Based in China, Energy Blockchain Labs seeks to develop a range of enterprise-class blockchain applications, including green certification and financial services, for the energy and environmental protection



industry. Its goal is to remove the data gap between the green economy and finance by working with market players to standardize green asset-backed securities. It expects that its products will allow enterprises to generate carbon assets more efficiently, helping to build a green, low-carbon and environmentally friendly future in China.

Energy Blockchain Labs will provide platforms for various participants in the whole process of green financial asset development and these product platforms will help underwriters and investors to identify green attributes of various assets, and deliver seamless cross-enterprise digital cooperation among necessary third parties—including certification companies, rating firms, exchanges, and financial asset management companies, as well as authorities.

Working with IBM, Energy Blockchain Labs is also creating a carbon asset development platform based on IBM Blockchain Technology. The platform will allow enterprises to generate carbon assets consistently and efficiently. The solution uses the carbon emission reduction quota standard to encourage enterprises and individuals to decrease carbon emissions and use low carbon emission technology. The scope of application for Energy Blockchain Labs includes registries and markets, green finance and energy. It has established its organization and partner ecosystem and completed its proof of concept in late 2016. Energy Blockchain Labs is now in the process of deploying its IBM application commercially.

## Poseidon Foundation

[www.poseidon.eco](http://www.poseidon.eco)

*Laszlo Giricz, Founder*

Poseidon aims to simplify the carbon credit market with the creation of an ecosystem built on Stellar.org's blockchain technology. The goal of the initiative is to bring carbon pricing to the mainstream by giving both consumers and corporations an economically viable, incorruptible, and transparent way of making sustainable transactions and lowering their carbon footprint in real terms. The technology intends to prevent double-counting of carbon and will be consistent across jurisdictions, making it easier for companies to deliver and measure progress toward their climate targets. A main component of the technology is the combination of on-chain and off-chain smart contracts that will provide the carbon markets with reliable evidence and efficiency. Poseidon's on-chain smart contracts will deliver both traceability and transparency of public carbon transaction data, and its off-chain smart contracts will keep confidential information securely stored outside of the public blockchain.

Poseidon tokens, which use a unique valuation model, will be pegged to their carbon credit sales revenue and therefore represent an asset-linked offering. The public price of its tokens will be established through trading on exchanges.

*Working with IBM, Energy Blockchain Labs is also creating a carbon asset development platform based on IBM Blockchain Technology.*



Poseidon's scope of application is for registries and markets. It is in the process of establishing its partner ecosystem and expects to release its white paper soon.

## Climatecoin

[www.climatecoin.io](http://www.climatecoin.io)

*James Haft, CEO*

Climatecoin is a cryptocurrency based on the Ethereum blockchain and created for Climate Change Action. Its goal is to use the funds developed from the ICO to invest in companies and projects that create real solutions to mitigate climate change. A Climatecoin portal will also be developed to tokenize carbon credits.

Climatecoin is a new company. Its white paper on democratizing carbon markets through blockchain technology was released in July 2017, and its token presales took place with the ICO launched December 2017.<sup>6</sup> It is still in the process of developing its partner ecosystem and its proof of concept.

*Climatecoin's goal is to use the funds developed from their ICO to invest in companies and projects that create real solutions to mitigate climate change.*



*Recycled Glass 1558544 by Quinn Kampschroer (quinntheislander), 2016, used under CC0 1.0.*

## Veridium

[www.veridium.io](http://www.veridium.io)

*Todd Lemons, Co-Founder*

Veridium, a collaboration among EnVision Corporation, Lykke, and BK Capital Management, is an environmental fintech company offering blockchain technology that uses the cryptographic environmental mitigation offsets issued through the Veridium network to create



*Veridium is currently working on climate change risk mitigation products for institutional portfolio management companies, pension funds and endowments.*

commodities with net positive environmental impacts. The Veridium market will create a transparent pricing mechanism for peer-to-peer trading of tokenized credits for *Fortune 500* companies to organize and exchange carbon-neutral commodities, contracts, and risk management hedging instruments.

Veridium is responsible for creating enterprise solutions for corporations that will drive demand for the tokenized natural capital assets issued on the blockchain through the Veridium network. The company is currently working on climate change risk mitigation products for institutional portfolio management companies, pension funds and endowments, as well as creating sustainable supply chain solutions for *Fortune 100* and *500* companies—all incorporating the natural asset tokens issued through the Veridium network.

The Veridium network is based on the Ethereum protocol and is a digital asset issuance network or marketplace for natural capital assets and eco-smart commodities. The platform will include multiple types of environmental asset tokens that may be tokenized on the blockchain through the Veridium network. The first natural capital asset tokens to be issued are TGRs (Triple Gold REDD+, where REDD stands for “reducing emissions from deforestation and degradation”), which are supported by the highest quality of forest conservation carbon credit available.

Veridium’s scope of application is supply chains, commodities, carbon credits, landscapes—REDD forestry and sustainability—and natural capital. It has established its organization and formed its partner ecosystem. Veridium published its white paper in November 2017 and is in the process of developing its proof of concept.<sup>7</sup>

## Carboncoin

[www.carboncoin.cc](http://www.carboncoin.cc)

Carboncoin is a cryptocurrency that has been providing value storage and transfer services since February 2014. Users can participate in the Carboncoin economy by shopping directly on CarbonShopper.com, where any purchase made via CarbonShopper is automatically converted into Carboncoin and transferred to the recipient. It moderates products that are sold through the website to ensure that no one within the community is trading illegal products. In addition, 90 percent of the protocol transaction fees are mandated to an environmental charity, which is dedicated to tackling climate change and restoring the planet’s natural ecosystems.

Its current scope of application includes energy efficiency, landscapes, and sustainability. Carboncoin released its coin in 2014; it is currently in the process of switching its customers to Carboncoin Ethereum tokens. Carboncoin is launching its pre-ICO in early 2018. Carboncoin is a delivery network.



## Clean energy

### Power Ledger

[www.powerledger.io](http://www.powerledger.io)

*Jemma Green, Co-Founder and Chair*

Power Ledger, based in Australia, is an energy-trading platform that supports an expanding suite of energy applications with an exchangeable frictionless energy-trading token, Sparkz. Power Ledger allows renewable energy asset owners to decide whom they want to sell their surplus energy to and for what price. The Power Ledger token (POWR) is the fuel of the Power Ledger ecosystem with bespoke private trading applications creating Sparkz in exchange for POWRs. Sparkz tokens are currently purchased and redeemed using fiat currencies with individual trading platforms hosting closed-loop exchanges for energy and Sparkz.

Power Ledger's scope of application categories include energy and carbon trading. To date it has established its organization and partner ecosystem. It also published a white paper on the development of a future power system that is robust, low cost, and zero carbon.<sup>8</sup> Power Ledger completed a 15-home trial in Western Australia in early 2016 and moved to a 500-site project with New Zealand Utility Vector in late 2015. Its ICO was completed in Q3 2017, and it is currently working on application development and its green energy loyalty rewards program. We were unable, however, to identify a link with any GSNs.

*Power Ledger allows renewable energy asset owners to decide whom they want to sell their surplus energy to and for what price.*



*Solar Panel Array 1591359 by skeeze, 2016, used under CC0 1.0.*

## SolarCoin/Solcrypto/ElectricChain

[www.solarcoin.org](http://www.solarcoin.org)

*Francois Sonnet, Solar Consultant, Advisor with SolarChange and Solcrypto, Co-founder ElectricChain*

*Nick Gogerty, Co-founder of SolarCoin Foundation and Chief Strategist at Lykke Corporation*

Created in January 2014, SolarCoin is a blockchain-based digital asset created to incentivize the global solar electricity generation. Its mission is to accelerate solar energy uptake. The technology behind SolarCoin is similar to Bitcoin. By participating as a verified solar energy producer or node on the SolarCoin network--a worldwide group of computer participants who process SolarCoin transactions--network members receive SolarCoin, which they can then redeem through participating affiliates or exchange for other currencies through a number of online exchanges. SolarCoin can be redeemed through participating affiliates and exchanged for other currencies at a number of online exchanges. SolarCoin Foundation affiliates include SolarChange, Solcrypto, and ElectricChain.

SolarCoin's scope of application categories includes energy and carbon trading. To date it has established its organization and partner ecosystem. The SolarCoin Foundation manages the distribution of SolarCoins to solar electricity generators using verified solar facilities as the "proof of work." The SolarCoin Foundation maintains a public ledger detailing each SolarCoin given out to solar electricity generators. It completed its ICO in March 2014, and it is commercially deployed.

## Energy Web Foundation

[www.energyweb.org](http://www.energyweb.org)

*Claire Henly, Team Member and Senior Associate, Rocky Mountain Institute*

The Energy Web Foundation (EWF) is a global non-profit organization focused on accelerating blockchain technology across the energy sector. The EWF was co-founded by Rocky Mountain Institute (a clean-energy-focused non-profit based in the United States) and Grid Singularity (an energy- and blockchain-focused corporation based in Berlin). EWF's objectives are to

- » Develop an ecosystem of users, application developers, and infrastructure providers
- » Work jointly to identify and assess blockchain use cases in energy
- » Build an open source IT infrastructure upon which these use cases can be implemented
- » Educate regulators and other stakeholders and provide input to standards bodies

*SolarCoin is a blockchain-based digital asset created to incentivize the global solar electricity generation. Its mission is to accelerate solar energy uptake.*



The intent of EWF, through its Energy Web Platform, is to develop a market standard that ensures interoperability, reduces costs and complexity, aligns currently dispersed blockchain initiatives, and facilitates technology deployment through easy-to-implement applications. It is engaged in standards networks.

*LO3 Energy builds tools and develops projects to support and accelerate the proliferation of the distributed energy, utilities, and computation-sharing economy of the future.*

## LO3 Energy

[www.lo3energy.com](http://www.lo3energy.com) and [exergy.energy](http://exergy.energy)

*Lawrence Orsini, Founder and CEO*

LO3 Energy is a New-York-based energy technology company building a platform to enable decentralized business models and innovative technologies related to energy, cleantech, and utility systems. The company builds tools and develops projects to support and accelerate the proliferation of the distributed energy, utilities, and computation-sharing economy of the future.

LO3 has developed a proprietary blockchain platform, which utilizes as part of its key offerings, including the TransActive Grid, a platform that enables peer-to-peer energy transactions. It is also engaged in a proposal to develop a community microgrid in Brooklyn, New York, that would enable its members to function separately from the larger electrical grid during extreme weather events or other emergencies.

LO3 has recently launched Exergy—a blockchain and token system that creates a digital mechanism to access and synthesize the critical attributes from the transactive energy value domains, while establishing and maintaining a network participation authorization.

Its scope of application is energy efficiency. It has established its organization and partner ecosystem, and completed its proof of



*Wind Farm 1747331 by Free-Photos, 2016, used under CC0 1.0.*



concept with its Brooklyn Microgrid project.<sup>9</sup> LO3 has also recently released an Exergy white paper.<sup>10</sup> Its engagement networks include knowledge networks.

## Volt Markets

[www.voltmarkets.com](http://www.voltmarkets.com)

*Adam Richard, Co-Founder and CEO*

Volt Markets is an energy origination, tracking, and trading platform. It is driven by smart contracts on the Ethereum blockchain, and its mission is to disintermediate traditional energy markets with a public, decentralized, blockchain-based platform that promotes open innovation for monitoring, managing, and trading energy and energy attributes. Self-upgrading smart contracts ensure jurisdictional regulatory compliance, open markets to new asset classes, incentivize renewable energy, and give households and businesses the ability to trade the energy they produce and consume in real time and at any scale. Volt Markets is using blockchain technology to streamline the distribution, tracking, and trading of energy.

*Self-upgrading smart contracts ensure jurisdictional regulatory compliance, open markets to new asset classes, incentivize renewable energy, and give households and businesses the ability to trade the energy they produce and consume in real time and at any scale.*

Its scope of application is energy efficiency, registries, and markets. Volt Markets has established its organization and partner ecosystem.

## Grid+

[www.gridplus.io](http://www.gridplus.io)

*Mark DAgostino, Co-Founder and Strategy Lead*

Grid+ leverages the Ethereum blockchain to give consumers direct access to wholesale energy markets. It is developing a hardware and software stack to create an Ethereum-enabled gateway and connect Internet of Things devices. Grid+ is a utility provider that exposes its customers to wholesale electricity prices. By opening economic markets, which are historically locked, Grid+ incentivizes customers to purchase solar panels and batteries. This moves electricity generation from upstream generators to distributed generation sources.

Grid+ functions as a commercial utility in select deregulated markets in the United States. Its agent devices pay for all electricity bills automatically and in real time; all payments are done over state channels using BOLT tokens. Each BOLT token is equal to one dollar and is 100 percent backed by US dollar deposits. For transparency, all fees from these payments are held by a fee vault smart-contract called Karabraxos.

Its current scope of application is energy efficiency, registries, and markets. Grid+ has established its organization and partner ecosystem. It has published a white paper about developing a "Smart Agent" to buy and sell electricity on behalf of the user and to help manage smart loads.<sup>11</sup> Grid+ has completed its public ICO with a GRID token sale in Q3 2017.<sup>12</sup>



## Energo Labs

[www.energolabs.com](http://www.energolabs.com)

*Jose Miguel Duque Vehils, Co-Founder and CTO*

Shanghai-based start-up Energo Labs has built a series of *decentralized autonomous energy* (DAE) applications based on blockchain technology and smart contracts. It is focused on social impact for non-grid-connected areas to create a DAE ecosystem. The application utilizes blockchain and smart meters to connect energy producers with consumers inside the microgrid, thus accomplishing P2P energy transactions and making supply meet demand.

Energo's P2P electric-vehicle charging platform gives electric vehicles a unique and human-like digital ID and wallet on blockchain, which can finalize electricity trading and charging services automatically between charging stations within the microgrid.

Energo also provides EME 1.0, a smart meter, to energy producers and consumers. This hardware supports a two-way measurement of electricity generation and consumption; a dual power switch that changes electricity supply between energy generated within the community and the public grid and will be the main control panel for future smart electric products. The Energo app binds the hardware to give the home, company, factory, or even a car a personal identity on the blockchain network.

*Energo provides a smart meter to energy producers and consumers which supports two-way measurement of electricity generation and consumption.*

Its scope of application is energy efficiency, registries, and markets. Energo has established its organization and its first DAE community in the Philippines. It published a white paper entailing development of a P2P DAE community and completed its ICO in August 2017. Energo's governance engagement includes delivery networks.

## WePower

[wepower.network](http://wepower.network)

*Nikolaj Martyniuk, Co-Founder and CEO*

WePower enables renewable energy producers to raise capital by issuing their own energy tokens. These tokens represent energy they commit to produce and deliver. Energy tokenization standardizes, simplifies, and opens a globally existing energy investment ecosystem. As a result, energy producers can trade directly with the green energy buyers (consumers and investors) and raise capital by selling energy upfront, at below market rates. Energy tokenization ensures liquidity and extends access to capital.

To optimize the financing cycle and open access to capital, WePower enables energy tokenization (WPR tokens). Tokenized energy represents a contracting mechanism between an energy producer and energy buyer. WePower token holders will have priority access to participate in auctions for purchasing tokenized energy once the renewable energy plant is connected to the platform. Energy



allocation will depend on the number of WPR tokens held by the participant. Moreover, WPR token holders will be rewarded by no less than 0.9 percent of tokenized energy donated directly by the renewable energy providers, and these holders may use or sell this energy.

Its scope of application is energy efficiency, registries, and markets. WePower has established its organization and partner ecosystem. It also published a white paper about its energy-trading platform powered by blockchain technology.<sup>13</sup> The WePower demo platform is ready, and it is working on its proof of concept—a pilot project with a transmission system operator, Elering. WePower plans to launch its ICO in January 2018.

*WePower token holders will be rewarded by no less than 0.9 percent of tokenized energy donated directly by the renewable energy providers, and these holders may use or sell this energy.*



*World 2081907 by rawpixel, 2017, used under CC0 1.0.*

## Sustainability: Natural capital, conservation, and social impact

### impak

[www.impactfinance.com/home](http://www.impactfinance.com/home) and [mpk.impact.eco/en](http://mpk.impact.eco/en)

*Paul Allard, President and Chief Ecosystem Officer*

Impak Finance launched impak coin (MPK), a new cryptocurrency with a social purpose. The ICO was completed in September 2017 and helped to fund the development of [impact.eco](http://impact.eco), an online social network dedicated to the impact economy. The platform is designed



*Impak's idea to create a new digital bank plans to radically change how people experience their relationship with money. They propose a unique place where investors, companies, and individuals exchange with each other, with the understanding that each dollar has the purpose to do good.*

to simplify the participation, buying, and investing processes that could occur in the impact economy. The aim is for citizens to have the opportunity to invest their time and their own funds in organizations sharing their values, for impact businesses to have a direct contact with customers and the opportunity to have access to capital in order to finance their projects, and for Impact Investors to have access to pre-qualified impact investment opportunities.

By 2019, impak also plans to create a new digital Canadian bank dedicated to the impact economy that would be placed at the center of the ecosystem and act as an agent of economic growth within this space. At its core, this project proposes to radically change how people experience their relationship with money by proposing a unique place where investors, companies, and individuals exchange with each other, with the understanding that each dollar has the purpose to do good. With the focus on the growth of the impact economy, every money transaction, whether it is banking, investing, selling or buying value-aligned responsible products and services, is done with the transparency one would expect in a changing world where the power of capital resides not only in the hands of the few, but also in the hands of the many.

Its scope of application includes finance and sustainability. Impak has established its organization and partner ecosystem. It published a white paper in August 2017 detailing its plan to transform the economic growth space and completed its ICO.<sup>14</sup> Its governance engagement includes delivery networks.

## Blockchain Development Company

[www.bcdc.online](http://www.bcdc.online)

*Donny Macdonald, Co-Founder*

The Blockchain Development Company (BCDC) is a global, decentralized blockchain company based in the United Kingdom that builds applications and platforms using blockchain technology to have a positive global environmental impact. Its core focus is to provide blockchain development services to a variety of companies while concurrently developing its own range of Dapps over the Ethereum blockchain. It is also incentivizing global plastic recycling and providing a global platform to increase crowdfunding of renewable projects to enhance uptake.

BCDC plans to launch several blockchain apps such as RecycleToCoin, EcoChain, and FoodTrax. RecycleToCoin is an incentivized recycling system using a digital token as the incentive. This incentive can then be exchanged for other cryptocurrencies, eGift cards, or donated straight to other charitable organizations.

EcoChain is a blockchain-based investment hub that directly connects investors to renewable energy projects around the world, allowing them to gain long-term return on investment. This platform allows the everyday person to crowdfund renewable projects via a digital



token alongside institutional investors. FoodTrax will allow for transparent food tracking from producer to shelf.

Its scope of application is mainly sustainability—recycling and renewable energy. It has established its organization and partner ecosystem. BCDC has published its white paper outlining its mission to solve trust, inefficiency, and fraud issues across key industries.<sup>15</sup> The company is in phase two of its ICO. Its governance engagement includes knowledge networks and a delivery network.



*Compost 419261 by Manfred Antranias Zinmmer (Antranias), 2014, used under CC0 1.0.*

## Earth Token

[www.earth-token.com](http://www.earth-token.com)

*Leonard Harley, Co-Founder and Managing Director*

*The use of EARTH tokens as the settlement currency reduces complexity related to fiat currency exchange rates, along with significantly reduced transaction fees.*

The natural asset exchange blockchain platform will enable certified natural capital asset project developers to list their products (e.g., carbon credits, metered output), on a unique blockchain and smart contract platform, specifically designed for the Natural asset trading market, at no cost. Since the natural assets will reside directly on a blockchain, there will be no need for sellers to incur the costs related to third-party registries to record sales and retirement of assets.

The use of EARTH tokens (EARTH) as the settlement currency reduces complexity related to fiat currency exchange rates, along with significantly reduced transaction fees. EARTH will be based on Ethereum, which enables advanced smart contracts. Its scope of application includes energy, supply chains, registries, and markets. Earth Token has established its organization and partner ecosystem, and it is currently running an internal proof of concept with crypto integration to build the natural asset exchange.<sup>16</sup>



It published a white paper detailing its mission to merge environment and business sustainability.<sup>17</sup> Earth Token's ICO is now open. Its governance includes delivery networks.

## Earth Dollar

[www.earthdollar.org](http://www.earthdollar.org) and [www.motherearth.network](http://www.motherearth.network)

*Ami Rajpal, Co-Founder and CTO*

Earth Dollar is the world's first asset-backed currency with its sovereignty protected by treaties with nations. The Earth Dollar is decentralized, non-inflationary, and uses blockchain technology. The assets backing the Earth Dollar are tradable smart asset tokens, representing physical natural resources and pledged valuables. While the Earth Dollar is independent of any political affiliations, borders, or nation-states, the Earth Dollar is also the national currency of several indigenous nations and the legal complementary currency of several local governments.

For example, indigenous nations have already pledged approximately 18 million hectares of land, which will be protected as World Heritage Sanctuaries, to back the value of the Earth Dollar. Early partners include the Anishanbe (Algonquin) Nation of the Ottawa River Watershed, Aiken Lake Nation, Tsek'ehne Nation, and the Kingdom of Polynesia.

*Earth Dollar is the world's first asset-backed currency with its sovereignty protected by treaties with nations.*

The Earth Dollar and the smart asset tokens will operate on the Mother Earth Network, an inter-linked blockchain network, using Bitcoin and Ethereum. The Earth Dollar is the world's first digital currency using natural capital to support its value. The accounting system for Natural Capital is being steered by The Economics of Ecosystems and Biodiversity (TEEB) and is expected to replace *generally accepted accounting principles* (GAAP) by the year 2030.

Earth Dollar's main scope is sustainability, specifically natural capital and humanitarian. The organization and partner ecosystem have been established. Its white paper was published, and its ICO is upcoming.<sup>18</sup> Its governance engagement includes policy and advocacy networks and a delivery network.

## Plastic Bank

[www.plasticbank.org](http://www.plasticbank.org)

*David Katz, Founder and CEO*

Plastic Bank is a non-profit broker for recycling companies that receive discarded plastic bottles collected in underprivileged communities. Its mission is to stop ocean plastic by gathering people together to monetize waste while improving lives. To do this, the Plastic Bank provides an above-market rate (social plastic) for plastic waste—thus incentivizing its collection. Individuals who gather plastic can trade it for money, items, or services. The Plastic Bank also



provides the ability for local entrepreneurs to set up and operate a convenience store, in which plastic waste is the currency. The value of social plastic goes beyond the commodity price of plastic: by providing access to income, goods, and services, it creates a ladder of opportunity for the world's poor and keeps plastic from the ocean.

Plastic Bank was piloted in 2013 in Lima, Peru, and is now rolling out on a larger scale in Haiti in collaboration with 26 collection centers. Collectors turn in bottles that are crushed into pellets, or social plastic. These premiums are distributed and authenticated through the Plastic Bank app, which uses blockchain technology to provide the safest and most trusted means to deliver a globally scalable social impact.

Its scope of application is mainly sustainability—recycling and humanitarian efforts. The organization and partner ecosystem have been established, and the proof of concept has been completed (see above). Plastic Bank is now fully commercial and its governance engagement includes a knowledge and delivery network.

*By providing access to income, goods, and services, Plastic Bank creates a ladder of opportunity for the world's poor and keeps plastic from the ocean.*



*Basil Greenhouse 2053350 by thetravelnook, 2016, used under CC0 1.0.*



## Sustainable supply chains and commodities

### Provenance

[www.provenance.org](http://www.provenance.org)

*Jessi Baker, CEO*

Provenance sustainable supply chains are built on blockchain and partnered with Sourcemap on supply chain mapping.<sup>19</sup> Its vision is that one day, every great product, whether a bottle of wine or a pair of jeans, will come with Provenance: accessible, trustworthy information about origin, journey, and impact.

Provenance has set out to build a network of honest businesses and equip them with the tools they need to prove what matters most about their goods: from the source of their ingredients to their impact on the environment and society. It is building a traceability system for materials and products using blockchain, and it is also working toward an open traceability protocol—so consumers can track the provenance of various products. The Provenance platform allows businesses to make themselves, their products, and supply chains more transparent and traceable. Its transparency tools assemble image, identity, and location to create profile, product, and story pages; its traceability system confirms identities and product attributes in tracking items through supply chains.

Provenance's scope of application is mainly supply chains. It has established its organization and formed its partner ecosystem. Provenance published its white paper in November 2017 on a prototype to use blockchain technology for secure traceability of certifications and other information in the supply chain.<sup>20</sup> It has also completed its proof of concept, which is a pilot project using blockchain technology to trace tuna in Indonesia from catch to consumer.<sup>21</sup> Its governance engagement includes standard, knowledge, and delivery networks.

*Provenance is building a traceability system for materials and products using blockchain, and it is also working toward an open traceability protocol—so consumers can track the provenance of various products.*

### VeChain

[www.vechain.com](http://www.vechain.com)

*Shuai Chu, Co-Founder and CTO*

PwC China has formed a strategic alliance with BitSE Group—a Shanghai-based blockchain start-up to boost blockchain adoption in the Asian Pacific markets, with the goal to help clients design and implement innovative blockchain solutions.

The duo created VeChain, an enterprise software designed to create, manage, maintain, and update shared data about products in the supply chain. The platform aims to make the supply chain more transparent and focuses on four areas: anti-counterfeiting, supply



chain management, asset management, and client experiences. By putting unique IDs on the blockchain and embedding each product with a *near field communication* (NFC) chip, *radio frequency identification* (RFID) tag, or QR code, all of which can verify whether an item is genuine, VeChain provides an opportunity for different enterprises to easily create, manage, maintain, and update shared data. So far, several established companies have adopted the platform as part of their production system in industries such as luxury, fashion, logistics, pharmaceuticals, automotive, food safety, and wine and spirits.

VeChain's current scope of application is supply chains and commodities. It has established its organization and partner ecosystem and completed a number of proofs of concept, including one with D.I.G.—which stands for Shanghai Waigaoqiao Direct Imported Goods Ltd., China's largest importer of wines—and one with Renault, a French carmaker. In May 2017, it initiated VeChain 3.0 with the expectation to go live in the second quarter of 2018. VeChain has completed its crowdsourced ICO (the VEN token) and expects to do a full-release in the second quarter of 2018 as well. VeChain is engaged with policy and advocacy networks.

*OwlTing believes that only the best food manufacturers with integrity are willing to show all of their production processes to the public. The always transparent, unalterable records are the best warranty to the consumers.*



*Feeding Time at Brubaker Farms by US Department of Agriculture, 2011, in the public domain.*

## OwlTing

[www.owlting.com/owlchain](http://www.owlting.com/owlchain)

*Darren Wang, Co-Founder and CEO*

OwlChain is a software solution with a transparent, safe, unalterable, and inerasable tracing system for pork using AMIS Blockchain structure. OwlTing believes that only the best food manufacturers with integrity are willing to show all of their production processes to the public. The always transparent, unalterable records are the best warranty to the consumers, and the best commitment that a manufacturer can offer. Based on the information of thousands of suppliers from OwlTing Market, its first blockchain service will be the Food Blockchain Provenance System.



OwlTing's partner, AMIS, provides a complete and private blockchain structure service and application programming interface, so that enterprises need not construct their own blockchain network. OwlTing plans to expand and implement blockchain technology in other operations of its company, including hotel booking, travel insurance, and virtual currency.

OwlTing's scope of application is supply chains. It has established its organization, formed its partner ecosystem, and has completed its proof of concept by partnering with vendors such as Nice Garden and Upwelling Ocean. Together, they expect to create better benchmarks for food safety through blockchain technology integration in the supply chain infrastructure.<sup>22</sup> Its governance category is a knowledge network.

## Xpansiv Data Systems

[www.xpansivdata.com](http://www.xpansivdata.com)

*Joe Madden, Co-Founder and CEO*

Xpansiv Data Systems (Xpansiv) is a North American based company that designs, builds, and applies technology to create data-driven solutions through emerging technologies such as blockchain. It deploys technology to address inefficiencies in global commodity markets and provide cost-effective, sustainable solutions.

The Xpansiv platform converts raw commodity production data into Digital Feedstock. Digital Feedstock is a digital asset class for global commodities that provides a complete, immutable digital representation and title for each unit of commodity production DLT. It helps commodity market participants unlock the value in existing production data for new applications via enhanced data analytics, business process automation, faster settlement, new products, and innovative market structures. Digital Feedstock provides the foundation for digitizing commodity markets.

Xpansiv is commercially active in the oil, gas, and renewable fuels sectors. It addresses two major challenges in commodity markets

*Xpansiv Data Systems deploys technology to address inefficiencies in global commodity markets and provide cost-effective, sustainable solutions.*

- » Antiquated business processes due to reliance on outdated, manual processes
- » Lack of seamless inclusion (pricing/trading) of externalities (climate, water, land use, social impact, etc.) within existing market structures.

Its scope of application is supply chains, commodities, registries, and markets. Xpansiv has established its organization, formed its partner ecosystem, and has completed its proof of concept by capturing data from approximately 5,000 natural gas production wells, each instrumented with dozens of meters, and structuring the data for both operational optimization and tokenization into its DLT platform. The super clean natural gas tokens were subsequently transacted to commercial consumers.<sup>23</sup> It is engaging in standards, knowledge, policy and advocacy, delivery, and governance networks.





## About the author

Tom Baumann is an innovator at the convergence of digital innovation and governance for climate and sustainability. Tom is co-founder of ClimateCHECK, the GHG Management Institute (the world's leading GHG training organization with over 7,000 alumni and members in over 160 countries), and Collaborase (an online collaboration platform for Standards 2.0 with over 5,000 experts supporting leading programs such as Gold Standard and the Natural Capital Coalition).

Tom was the climate hub leader for the Global Solution Networks initiative—a resource for sharing, scaling, and connecting to global solution networks addressing climate change and stewardship of our planet for future generations.

Tom is the international chair of the ISO Climate Change Standards Committee and leads the activities of over 80 national standards bodies in the development of standards for MRV, climate finance, and adaptation.

Tom started in the environmental sector in the early 1990s and previously worked at a climate technology investment fund and at the world's leading GHG certification company. Tom is a registered professional engineer and certified knowledge manager. He holds a BA in Environmental Economics and a BEng/MEng in Environmental Engineering.

## Disclosures

Tom Baumann has links with several activities contained in this report. Together with the International Emission Trading Association, Tom is leading a multi-year international project, "Digital Innovation and Governance for Climate," to develop next generation governance systems and smart standards for blockchain and climate in support of climate actions, nationally determined contributions, carbon markets, and climate finance. He is co-founder of Xpansiv Data Systems, the blockchain and digital technology company focused on sustainability and featured as a case study; and advisor to CarbonX, a partner of Veridium, one of the case studies. Together with the UNFCCC Secretariat, Tom is co-convenor of the Climate Chain Coalition, a global network of blockchain initiatives and companies, and co-author of forthcoming World Bank report, *Digital Innovations for Post-2020 Carbon Markets*.

## Acknowledgments

Tom thanks his colleague Lisa Marroquin for assisting with the research of this landscape survey.





## About the Blockchain Research Institute

Co-founded in 2017 by Don and Alex Tapscott, the Blockchain Research Institute is a knowledge network organized to help realize the new promise of the digital economy. It builds on their yearlong investigation of distributed ledger technology, which culminated in the publication of their critically acclaimed book, *Blockchain Revolution* (Portfolio|Penguin).

Our syndicated research program, which is funded by major corporations and government agencies, aims to fill a large gap in the global understanding of blockchain technology and its strategic implications for business, government, and society.

Our global team of blockchain experts is dedicated to exploring, understanding, documenting, and informing leaders of the market opportunities and implementation challenges of this nascent technology.

Research areas include financial services, manufacturing, retail, energy and resources, technology, media, telecommunications, healthcare, and government as well as the management of organizations, the transformation of the corporation, and the regulation of innovation. We also explore blockchain's potential role in the Internet of Things, robotics and autonomous machines, artificial intelligence, and other emerging technologies.

Our findings are initially proprietary to our members and are ultimately released under a Creative Commons license to help achieve our mission. To find out more, please visit [www.blockchainresearchinstitute.org](http://www.blockchainresearchinstitute.org).

### Leadership team

Don Tapscott – Co-Founder and Executive Chairman  
Alex Tapscott – Co-Founder  
Joan Bigham – Managing Director, International  
Hilary Carter – Managing Director, Canada  
Kirsten Sandberg – Editor-in-Chief  
Jane Ricciardelli – Director of Marketing  
Maryantonett Flumian – Director of Client Experience  
Luke Bradley – Director of Communications



## Notes

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