Blockchain & Digital Technologies for Global Climate Action Tracking and Accounting - Takeaways and Next Steps

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Opening Presentations

Angel Hsu and Martin Wainstein kick off discussions at the New York Climate Week roundtable event.

Introductions

- Dr. Angel Hsu, Yale-NUS, UNC-Chapel Hill
- Dr. Martin Wainstein, Yale Open Innovation Lab via Tsai CITY

Tracking and Assessing Climate Action (Dr. Angel Hsu)

- Why are we here? Blockchain seemed “buzzword-y” a few years ago, but now it’s value to climate action tracking is clear.
- Who’s involved? Climate action is based on an ecosystem of actors, not just national governments any more.
- What’s happened recently? Dr. Hsu and her group, Data-Driven Lab, released a report summarizing the contributions of city and state actors. Current national policies are not on track to reach global goals, and even ambitious plans don’t get close to 1.5C.
- There are are many platforms where actors register their emissions reduction at multiple scales (CDP, We Are Still In, Carbonn, etc.).
- Existing measures of data collection are time-consuming, inefficient, and laborious.

    - There are many standards, and It's very difficult to amass these standards together.
    - Reporting is complex, requiring a lot of time and human capital.
    - Organizations tend to be protective of their data, claiming the information is too sensitive.
- UN reporting
    - Many emissions are generated in places where there's no robust data collection.
    - There are thousands of actors in the database, but only about half have usable data.
    - We talk about goals (emissions need to peak by 2020), but we don't have an accurate picture of what's going on!
    - Very little information exists about implementation.
- Questions going forward for the field of climate data science:
    - What are the gaps?
    - What's not working?
    - What could be improved?
- Where does blockchain come in?
    - Tech isn't a silver bullet but it can help!
    - Blockchain can provide incentives for more secure and efficient data collection.
- Key questions:
    - How would a blockchain system address existing challenges?
    - Who are the primary actors that would need to be part of the ecosystem?
    - What are the potential impacts, challenges, and barriers?

Blockchain for Climate Action Tracking (Dr. Martin Wainstein)

- A global climate accounting system needs to be transparent, decentralized, and open source.
- Key insights from analysis:
    - **Earth data consensus**: We need to agree about what's happening at the planetary level.
    - **Nested accounting**: We need to understand what happens at the non-state level and at the national policy level, and make them complement without duplication.
    - **Climate value and finance dynamics**: We need to connect certified climate value at the earth system level with the financial capital.
- What's needed: Climate-related ledgers integrated over multiple domains
    - This leads to a one-stop climate portal (but this doesn't mean a centralized accounting system).
    - A 'platform of platforms' based on DLT allows for integration of existing record-keeping systems.
    - Transparency should not compromise privacy. Data can be masked to be shared in a broad climate data economy

    - There needs to be interoperability. A ledger of ledgers enables a platform of platforms.
    - Climate action → Digital transformation of Measurement, Reporting, and Verification (MRV) processes → Climate assets
    - How can assets be fungible? At the end of the day, a ton is a ton.
- Global climate accounting system architecture
    - Yale OpenLab has drafted a diagram of the proposed system.
    - This functions as a map where different actors can locate their roles.
    - The system is an integrated digital MRV system with accounting and eventually trading as well.
    - There's no way we can do this alone. The system will only function with radically open collaboration.

Roundtable Discussions

Breakout: Designing governance systems for accountability

Key questions: A global climate accounting system needs a democratic governance mechanism to manage stakeholders, resolve disputes, and maintain functionality of the various platform layers.

- *How can we design a governance system to ensure participants are fairly represented and for the system to remain accountable?*
- *How do we get climate actors, people, and existing platforms onboard?*

Key takeaways:

- Incentives
    - Some actors may need more incentives than others - e.g., large companies may need to incentivize supply chain participants who may have less resources or public pressure to make climate commitments.
    - How do you start the flow of capital to get the system running?
- Inclusion/engagement
    - It is important to consider inclusion and engagement of participants who might not interact with the blockchain framework directly. For instance, how can a system include and engage local communities, who often make offset programs possible? How can it reflect academic/expert insight?
    - How could individuals interact with this system (e.g., as verifiers of national or local initiatives? As an audience for a blockchain's results or dashboard?)?
- Process
    - Suggestion to start by mapping the "Minimum Viable Actors" in a particular ecosystem, create test cases that make it possible to map interactions, identify

incentives, spot potential problems, and develop typologies that make it possible to grow or scale the system.
    - There are limits to how much the system can do and process - what's realistic? If we try to map out and connect the whole system all at once, we will never more forward.
- Scope
    - Perhaps different system elements could be developed in parallel, rather than employing a top-down, centralized approach. A convening organization could help to loosely coordinate or align interested systems; over time, different kinds of connections between these actors might develop.
    - Considering a ton of carbon as the mitigation token could be a good starting point, but it also illustrates the complexity of the system (e.g., how to determine if/how a product's emissions should be attributed to where a product is produced vs. where it is consumed).
- Data
    - How will data be ground-truthed? What governance procedures will guide responses to the discovery of incorrect data?
    - Many existing markets use different tokens or measures that are not necessarily interoperable; should there be a move towards, say, the use of a single ton of avoided GHG emissions as the basis for a token, which different markets and systems can then use in various ways?

Breakout: Digital transformation of MRV, shared protocols and methodologies

Key questions: Different platforms are starting to leverage IoT and blockchain for minting carbon or climate assets, and either use a legacy database or a blockchain based system.

- *How do we define common protocols so that these assets can be interoperable, or fungible within different jurisdictions (eg. markets) and even other ledger systems?*
- *In the long run, how do we verify them to an extent that can be compatible with the international transfer of mitigation outcomes?*

Key takeaways:

- Privacy, confidentiality and accuracy are major issues for data providers.
- Existing different methodologies and protocols may be challenging to reconcile. Approach should be to "let many flowers bloom," but a knowledge hub should be established to facilitate peer-to-peer learning, and iteratively improve and harmonize reporting standards and methodology
- There needs to be a data ombudsperson to be a neutral party to convene different actors together to establish trust and encourage harmonization and standardization of methodology.

- Data quality is also of concern—what eventually gets stored on a blockchain system needs to be of the highest quality and verified by third parties. A rating system, with baselines determined and managed by the ombudsperson, similar to a credit rating system, could be implemented to assist in this verification process.

Breakout: Blockchain pros & cons and interoperability with legacy databases

Key questions: Blockchain is useful for some aspects of climate accounting but not all. Legacy systems, platforms, and conventional databases are well equipped to continue to operate as they are (i.e. if its not broken, don't fix it). For those that use blockchain, the application can be very relevant, but how do we ensure that these can also work with existing legacy systems?

- *What are key principles we need to consider to marry new technology and systems with existing ones?*
- *Is the 'platform of platforms' concept on the right path?*
- *How do we work on protocols and agreements to ensure interoperability?*
- *What are simple guidelines for when to keep a legacy system or database, and when to replace or extend with DLT functionality?*

Key takeaways:

- Renewable energy credits and carbon accounting will fundamentally change with blockchain tracking systems, not only in terms of the process of recording information but also in terms of the information that gets recorded. A common system sets a standard that can raise the level of ambition across the board.
- Don't reinvent the wheel. Think carefully about interoperability with legacy systems. There's plenty of elements that are working well, and these need to be integrated, not replaced.
- Laying out an end-to-end system is a great start for developing solutions. The meta-diagram presented at this roundtable is a first step that can lay the groundwork for further progress.
- Data commons led by a large player can be helpful in catalyzing change. This has been the case with the use of blockchain in energy transactions, as large financial players have begun to get onboard.
- Don't minimize the power of climate action momentum to unify actors. The activism around Climate Week has had a huge impact in conveying the urgency of the climate situation, and many actors are taking note, particularly in the private sector.

Breakout: Decentralised and ownerless open source projects: adoption and collaboration

Key Questions: A global decentralised open source project is not owned by anyone, or it is owned by everyone simultaneously. But getting adoption for a system like this can be hard if current projects find it to overlap or compete with their existing scope. This is often because attachment to institutional or brand egos prevents collaboration.

- *How can we help kickstart projects that are truly global and participatory? Is a truly ownerless and autonomous system even feasible?*
- *Alternatively, if a system was hosted by a more central figure, acting as global steward, who should this institution be? What are the pros and cons of having a central accounting warehouse manager? What about a group rather than a single entity?*

Key takeaways:

- Leverage 'efficiency' and 'cost effectiveness'—such a system could reduce overheads and make people's jobs easier. Show that the technology is cutting edge, not bleeding edge.
- Can we leverage something already existing?
- Embrace open-source culture—organizations need to lead the way in this and move away from proprietary thinking.
- Map stakeholders—who is taking what role?
- Increased transparency of legal permits, carbon credits, and supply chains from a global accounting system can empower consumers and inform their day-to-day decision-making.
- Identify beneficiaries of the open source data—who will be using this?
- Reporting must be painless—the system's UI/UX needs to be intuitive and appealing.

Breakout: Finance technology and smart contracts

Key Questions: Some articles in the Paris Agreement can be turned into smart contracts. MRV processes and financial mechanisms (e.g. climate bonds) can also make use of this innovation.

- *How can the financial technology aspects of blockchain (eg. digital currency and trading contracts) be leveraged and implemented in a global climate accounting space?*
- *What are other ideas for smart contracts to be used in agreements between a group of parties (eg. carbon or climate clubs)?*

Key takeaways:

- How do we assign ratings in blockchain? What role will rating agencies play in assigning risk to potential climate investments on the blockchain?
- Millennials are interested in investing in specific projects or outcomes within a company, so they can precisely allocate their funds towards quantifiable outcomes. Blockchain can be used to provide some confidence in the specific outcome tied to each investment.

- Blockchain can be used to record financial and impact metrics as well as distribute dividends. Smart contracts, driven by construction milestones, can easily integrate into existing frameworks of project finance funding.
- Blockchain can offer the potential for large companies to extend debt to companies within their supply chain (trade finance), offering different tiers of access to debt for production.
- Each class of investor has different risk tiers based on what information is available. Blockchain can be used to quantify risk for different classes of investors (e.g. traditional investors vs NGOs vs governments).
- Rating agencies, or entities of a similar impartial stature, need to create a standard for investment memorandums as well as smart contract outcome verification so that all parties can trust computer code they are unfamiliar with.

Breakout groups at the roundtable honed in on topics including blockchain governance, interoperability with legacy systems, finance technology and smart contracts, and the creation of shared protocols.

Conclusion and Next Steps

- No single university can build this, the aim is to get ideas out there. A university is a good place to build multi-stakeholder collaboration and establish common ground among many other actors.
- Legacy systems don't need to be replaced. Many organizations already have projects that could fit in the system.
- Blockchain has encryption features that can allay privacy concerns
- For governments, it's important to translate climate science and blockchain technology into understandable and actionable language.
- Join the collabathon!