DAO IPCI

Decentralized Autonomous Organization “The Integral Platform for Climate Initiatives” – blockchain ecosystem for carbon markets, environmental assets and liabilities

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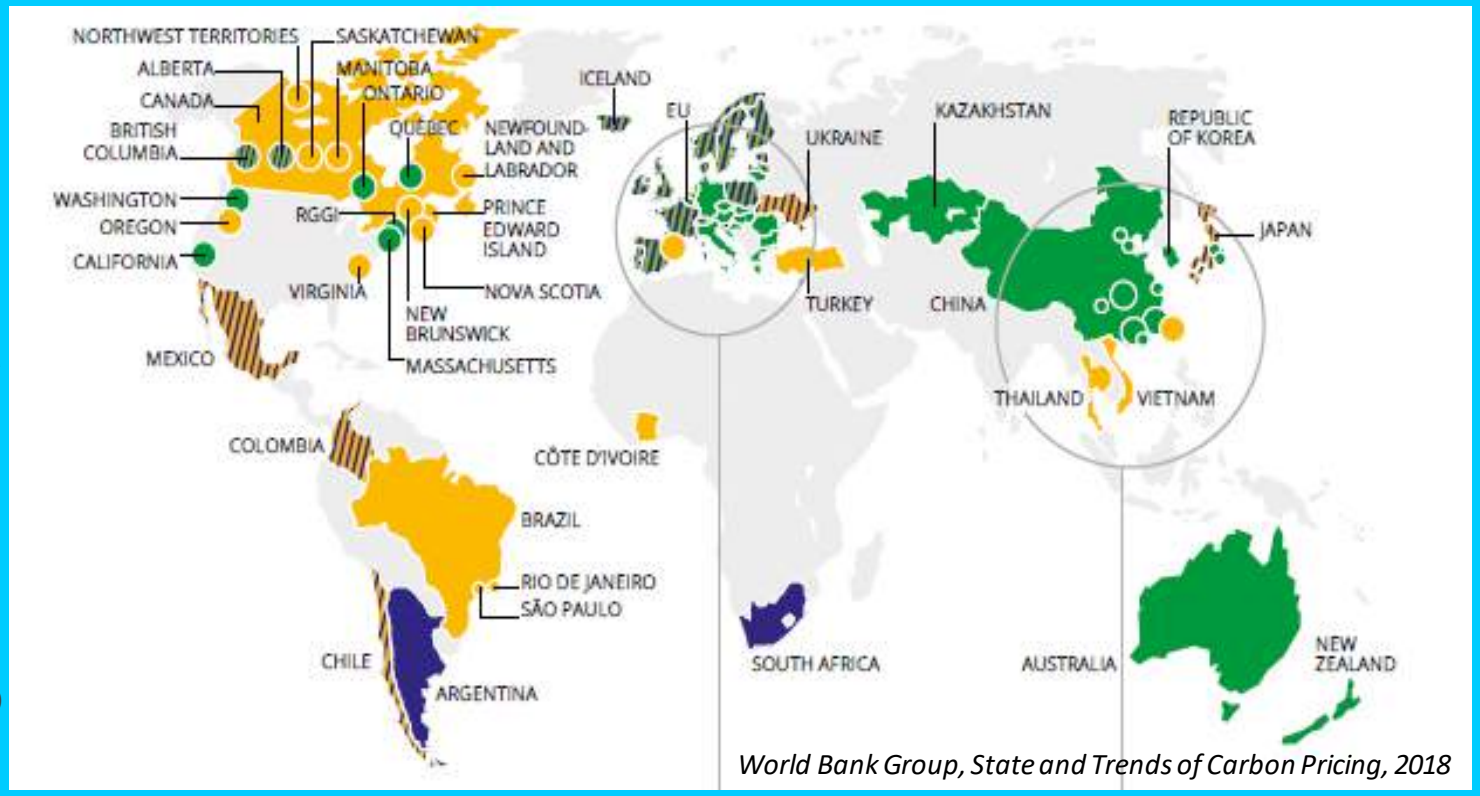
Chain'm!

Carbon Pricing Initiatives

- To date 51 fragmented mandatory carbon pricing initiatives have been implemented or are scheduled for Implementation, including 25 ETSs (mostly at subnational level), 26 carbon taxes primarily on a national level NOT INCLUDING sectoral, voluntary, private, corporate and climate change related (ex. Green energy) market initiatives
- Carbon pricing initiatives cover 11 GtCO2e or about 20 percent of global greenhouse gas (GHG) emissions
- In 2018, the total value of ETSs and carbon taxes was US$82 billion (+around 800 $MtCO_2e$ for CORSIA et al,)
- Probably the largest global commodity market in the mid-term perspective
- Dozens of theoretically fungible carbon compliance units (carbon credits or quotas, allowances) representing one and the same type of intangible asset and value – 1 ton of CO2e – at the price range from almost zero to $139



World Bank Group, State and Trends of Carbon Pricing, 2018

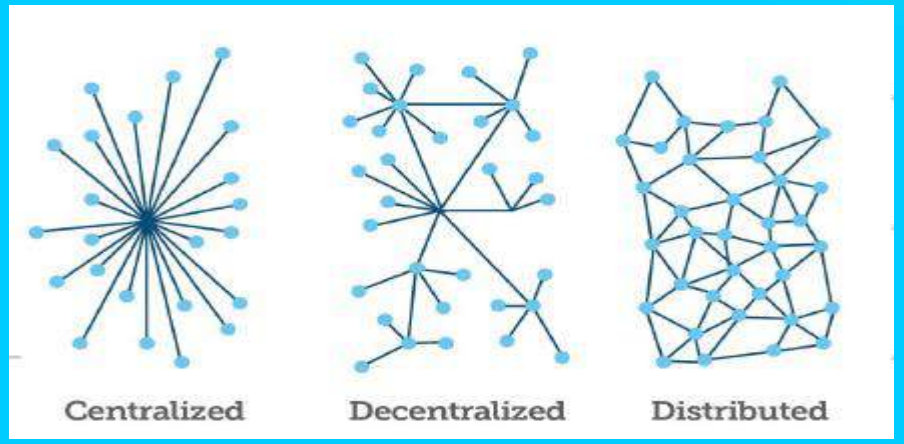
Blockchain by its inherent properties is most suitable technology for independent carbon pricing initiatives and for their interaction, linkage and integration

WHAT IS BLOCKCHAIN?

DISTRIBUTED PEER-TO-PEER DATABASE FORGED BY CONSENSUS

Database randomly distributed (copied) over many nodes (servers, computers) not under control of any single entity

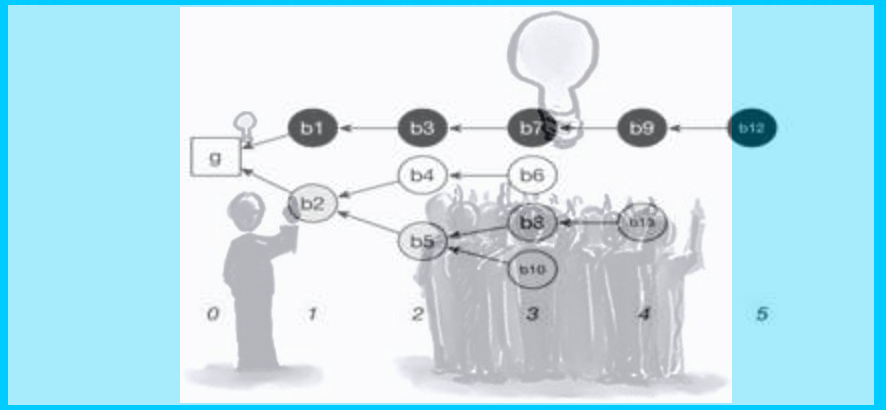
In peer-to-peer systems, all nodes have the same functions, their communication based on common protocols, none of the nodes has governing functions



Distributed database recorded in blocks with timestamps linked in a chain by cryptographic methods

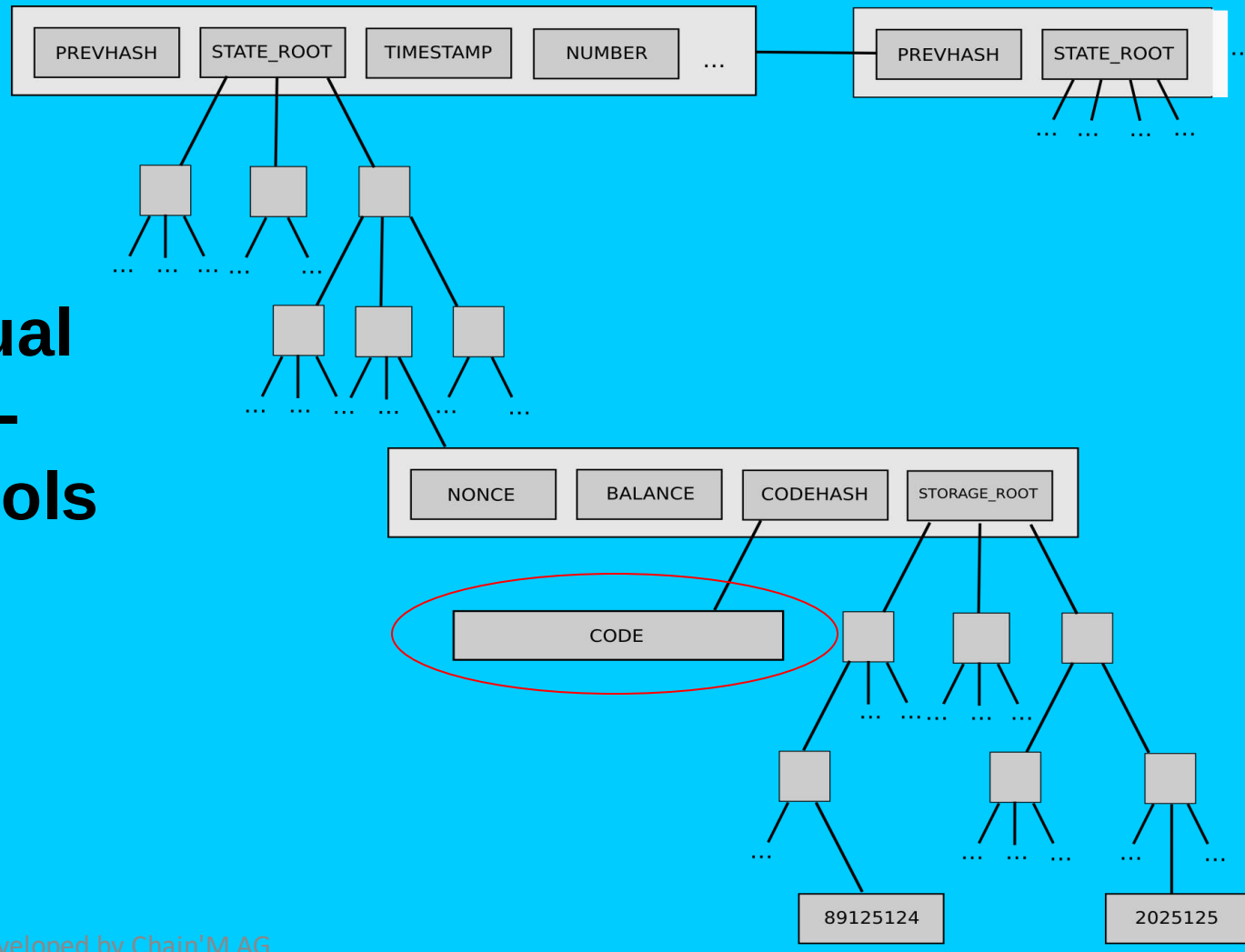
Anyone can record the data embedded into the block, which is verified by the network consensus, i.e. an agreement on a single data value among distributed processes or systems

To alter the data in the block one would have first to alter all of the consecutive blocks, which for public blockchains would require enormous computing capacity



WHAT IS BLOCKCHAIN?

VIRTUAL GLOBAL COMPUTER DISTRIBUTED OVER THOUSANDS OF RANDOM NODES



With Ethereum blockchain now is not just database but public and programmable blockchain, that gives

an opportunity to operate virtual planetary computer with open-sourced self-executing protocols (smart contracts)

embedded into blockchain
to process data and transactions

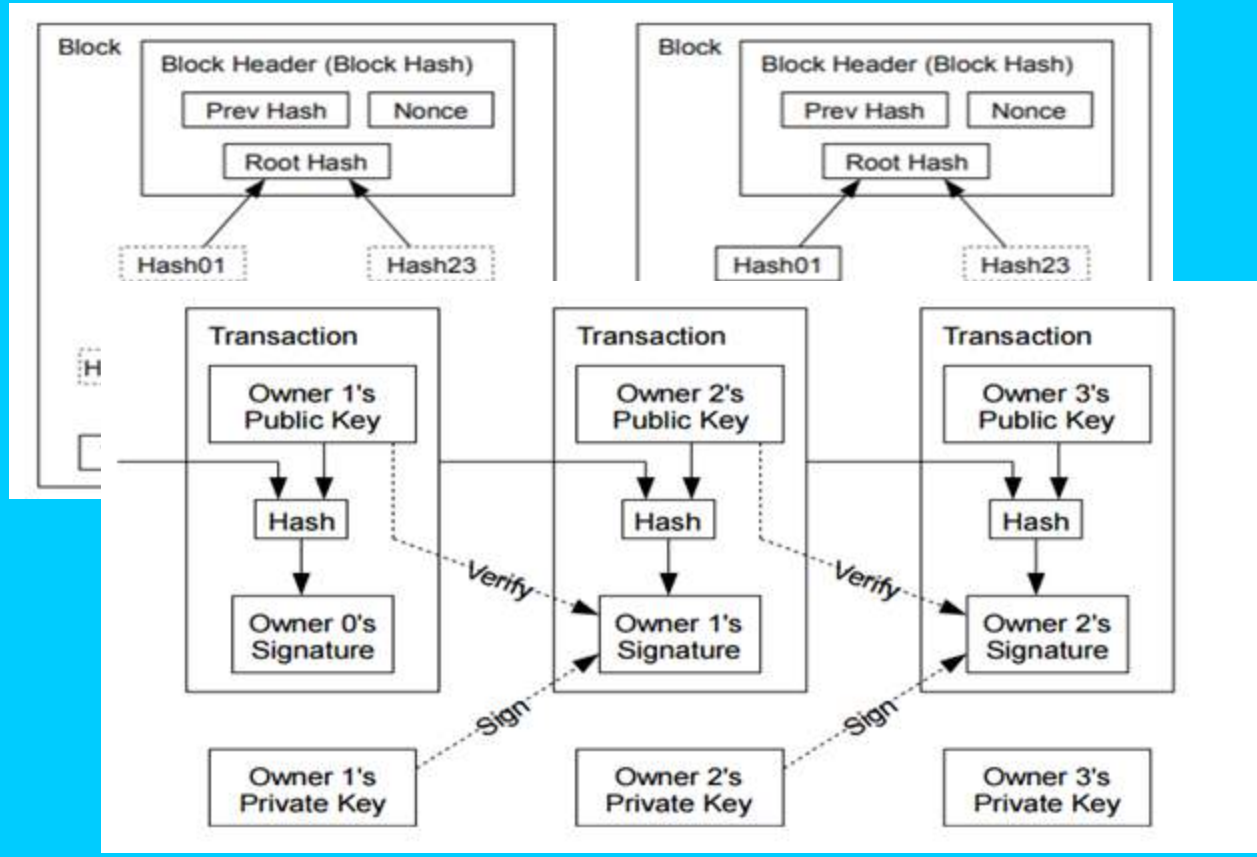
WHAT IS BLOCKCHAIN?

SOME INHERENT PROPERTIES OF PUBLIC BLOCKCHAINS

- Peer-to-peer interaction eliminates middleman and centralized governance.
- Momentum accounting

- **Broadcasts true market price signal instantly**

- Transparency and inalterability. No single point of failure
- Programable blockchain (smart contracts) with open-sourced code



For many cases blockchain is not needed at all, for some it is indispensable and should be public, programable and “trustless”

THE BENEFITS AND COMPATIBILITY OF BLOCKCHAIN PROPERTIES AND CLIMATE CHANGE POLICY REQUIREMENTS

UNFCCC Paris Agreement – essentially a protocol of **decentralized** interaction of *many climate change policy* stakeholders including PA Parties and non-Party actors *with no possibility* or necessity for centralized governance over sovereigns

Public programable blockchain inherent properties provide for

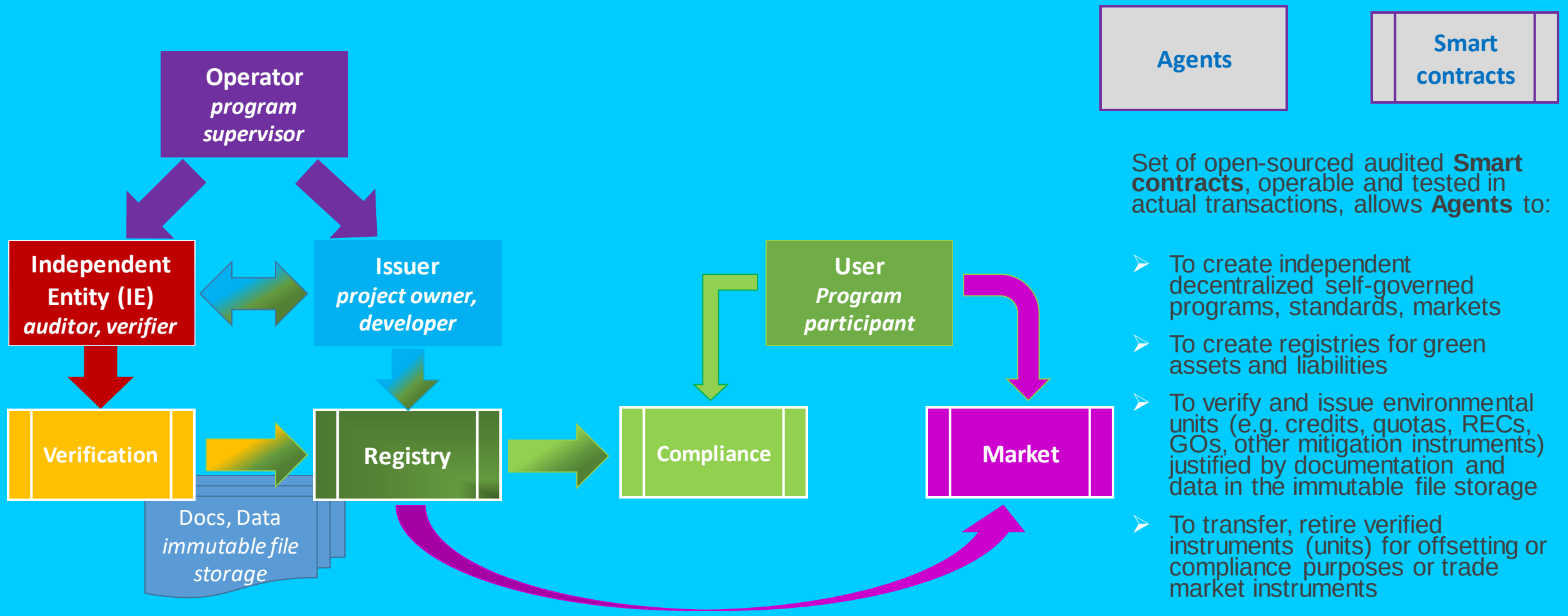
Blockchain benefits for climate policy

- *Cost-efficiency*
- *Information* integrity via pricing signal
- Transparency, preclusion of falsifications, double-counting
- Fungibility of mitigation instruments
- **Decentralized or distributed governance and inclusion**

Disintegration of market space, of the pricing signal would not allow for *global ambitions sufficient to achieve* the Paris Agreement target.

Public and programable blockchain for PA implementation *is to provide for drastic* enhancement of achievable ambitious targets.

DAO IPCI Peer-to-Peer Environmental Impact Programs' (EIP) Standard Structure

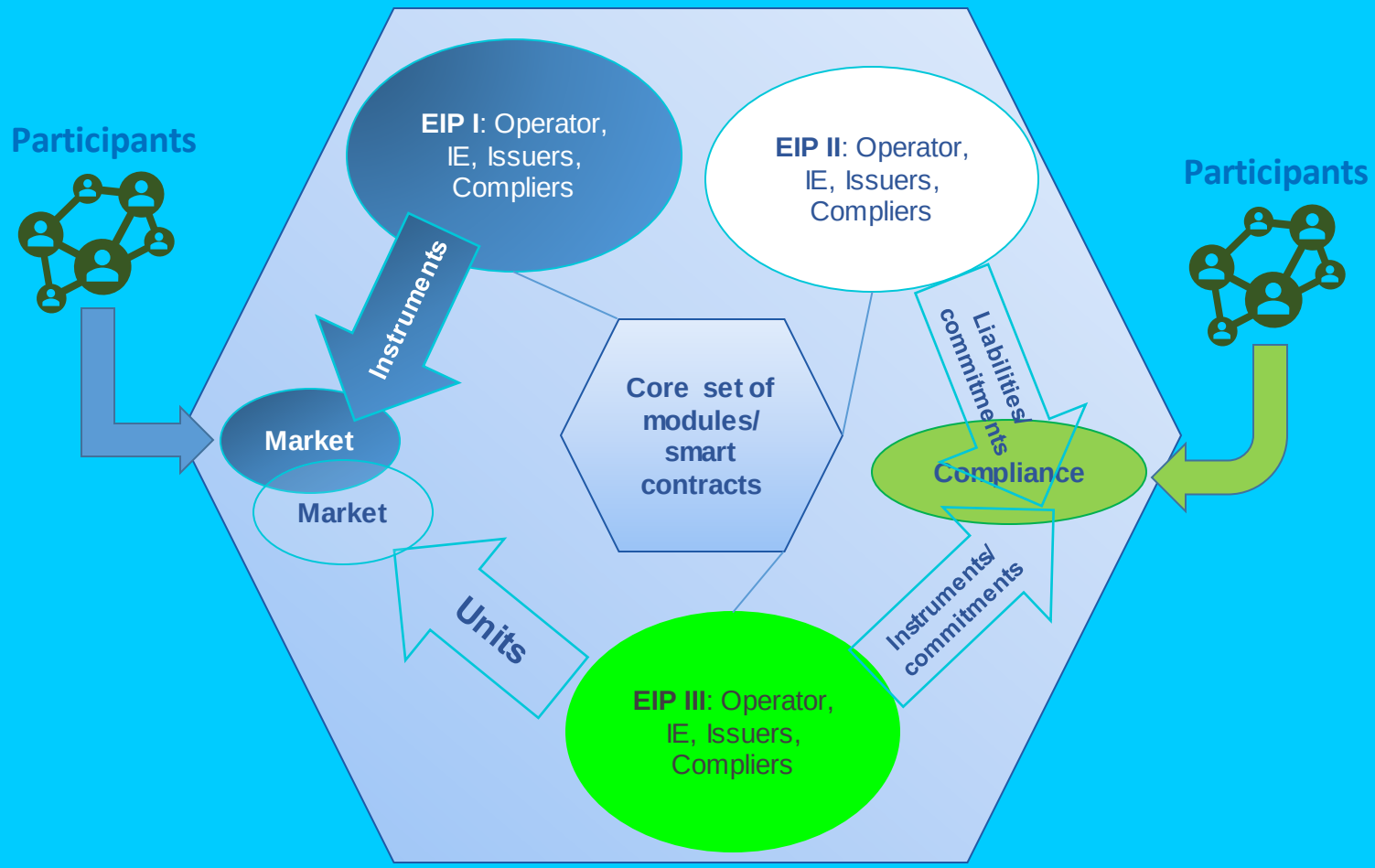


Set of open-sourced audited **Smart contracts**, operable and tested in actual transactions, allows **Agents** to:

- To create independent decentralized self-governed programs, standards, markets
- To create registries for green assets and liabilities
- To verify and issue environmental units (e.g. credits, quotas, RECs, GOs, other mitigation instruments) justified by documentation and data in the immutable file storage
- To transfer, retire verified instruments (units) for offsetting or compliance purposes or trade market instruments

DAO IPCI ARCHITECTONICS

- Independent, self-governed Environmental Impact Programs (EIPs), standards, markets form a “web” of decentralized autonomous organizations (DAOs), use common set of adjustable and ready-to-use modules and smart contracts and can:
- Link,
- Merge,
- Share registries and markets, assets and liabilities



Amalgamation of Public Blockchain with Customary Business Interfaces and IoT-based MRV

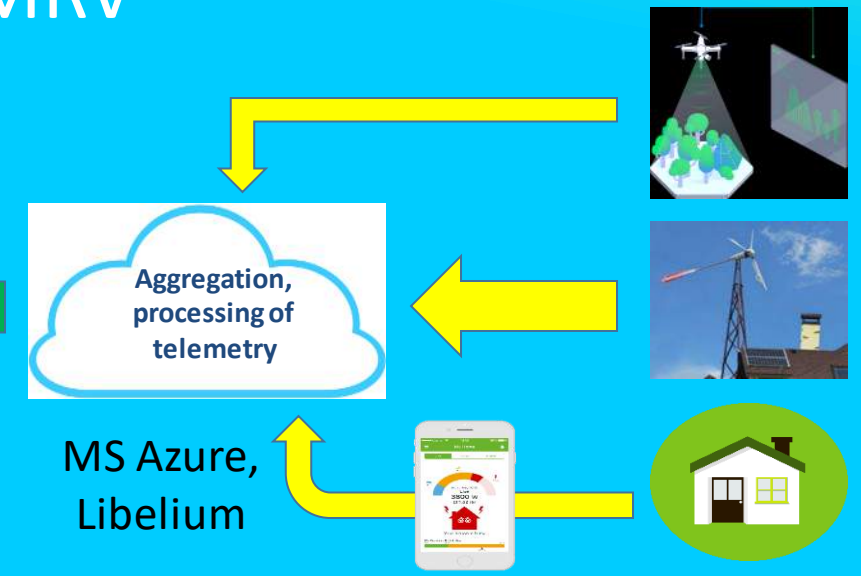
DAO IPCI Blockchain Ecosystem

IoT-based MRV

Positive Impacts Registries (ex. carbon credits. REDD+, RECs, GOs, RMUs, ITMO, etc.)

Market

Compliance / Offsetting



Data, telemetry input, aggregation, processing via customary business interfaces

Data from trusted hard- and software (sensors, meters, drones and/or satellite telemetry)

P2P Common Resource-based Solution to Consequential Environmental Damages Problem

Immutable Data

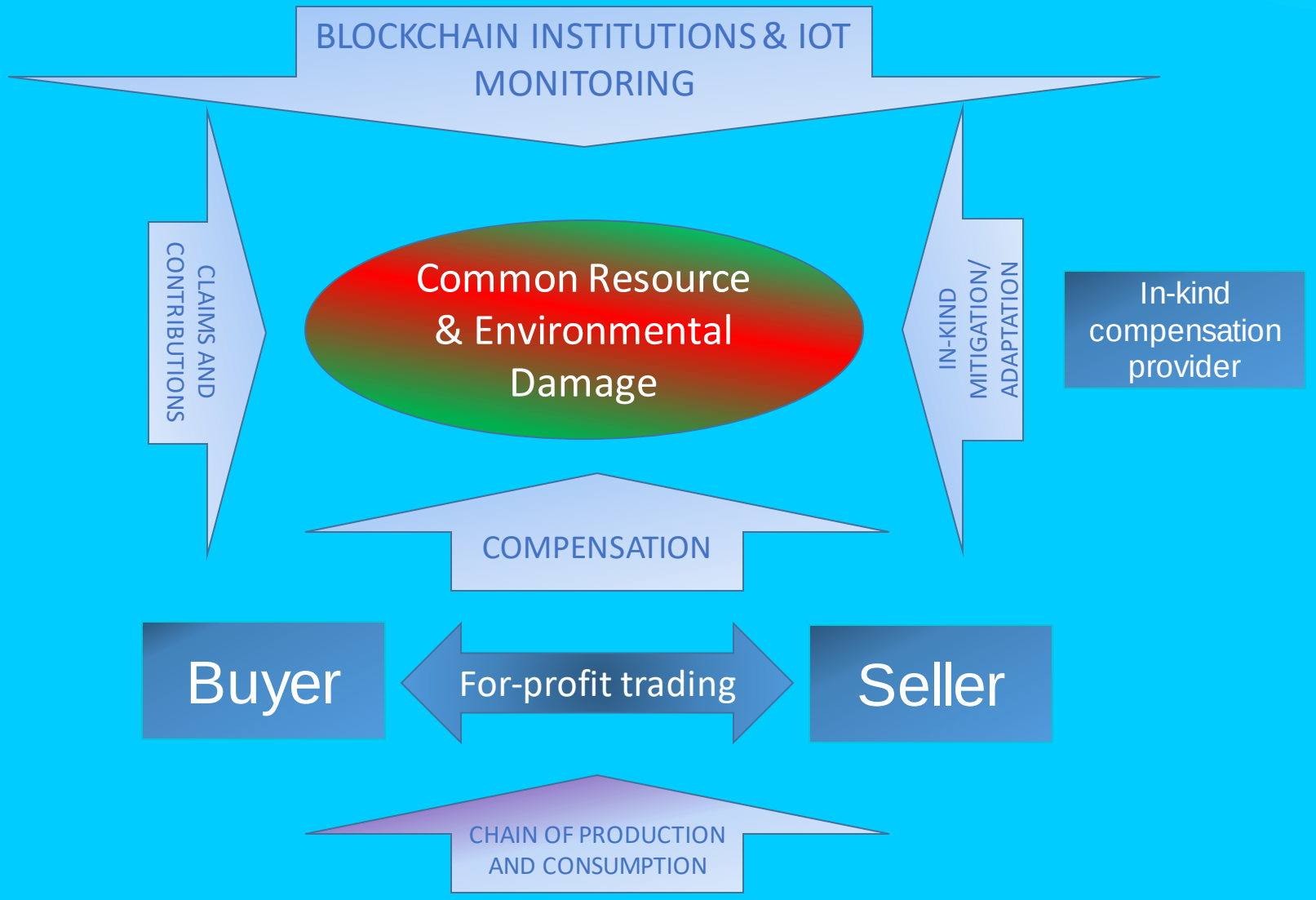
Common Pool of Resources

Contributions

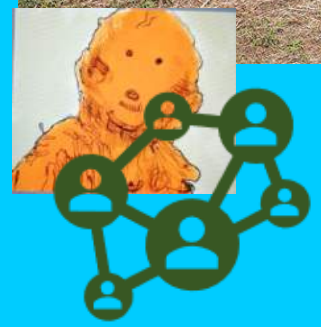
Environmental damage

OFFSETTING

Transaction-based Model



Peer-to-peer Solution to Settle Claims for Environmental Mitigation and Damages



Initial Statement

Law firms /EIA providers' offer

Voting

Contingency fee

Settlement / Award

Contributions Public escrow accounts

Voting / Retainer

Mitigation instruments

Damages

DAO IPCI
Mitigation/ adaptation instruments
IoT verification

Compliance

Top 10 Oil & Gas Deals by Enterprise Value

Buyer	Seller	US$B	Year
Exxon	Mobil	$81	1999
Shell	BG	$82	2015
Rosneft	TNK-BP	$62	2012
BP	Amoco	$55	1998
Total Fina	Elf	$54	1999
Chevron	**Anadarko**	**$50**	**2019**
Chevron	**Texaco**	**$45**	**2000**
ExxonMobil	XTO	$41	2009
ConocoPhillips	Burlington	$36	2005
Statoil	Norsk Hydro	$29	2006

Source: Drillinginfo Market Research

Respondents

Decentralized Positive Impact Fund Model

The Project

Contributions

Project outcomes

Mitigation instruments

DAO IPCI

Mitigation/ adaptation instruments IoT verification

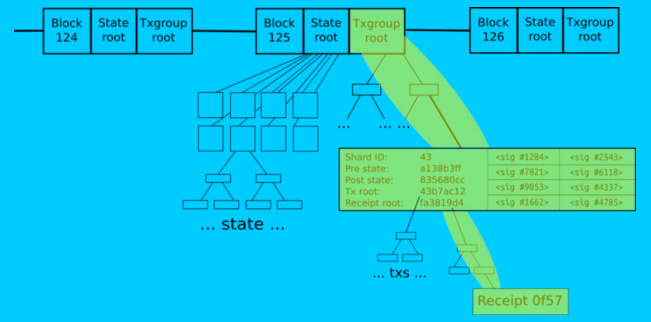
Compliance

Contingency proceeds

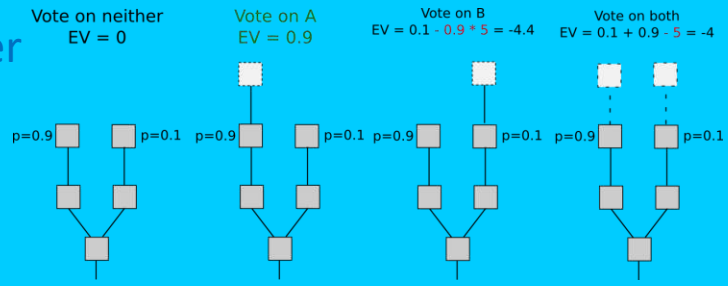
BLOCKCHAIN ISSUES, SOLUTIONS AND PROSPECTS

Solutions for such blockchain issues as **scalability, energy consumption, interoperability** are developed and under implementation, including cryptocurrencies' carbon footprint offsetting

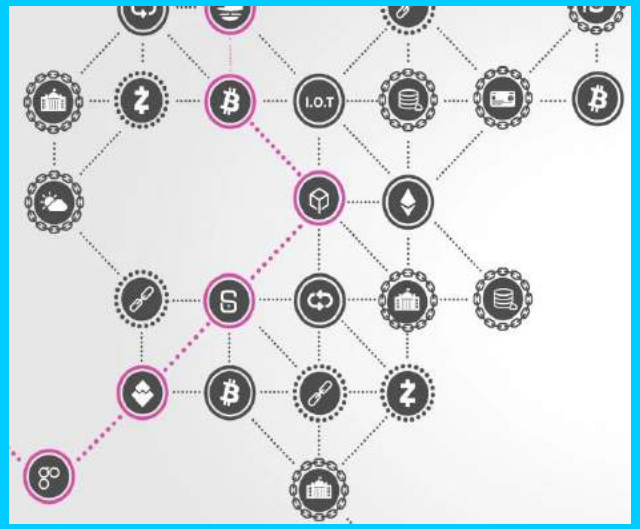
PLASMA SHARDING



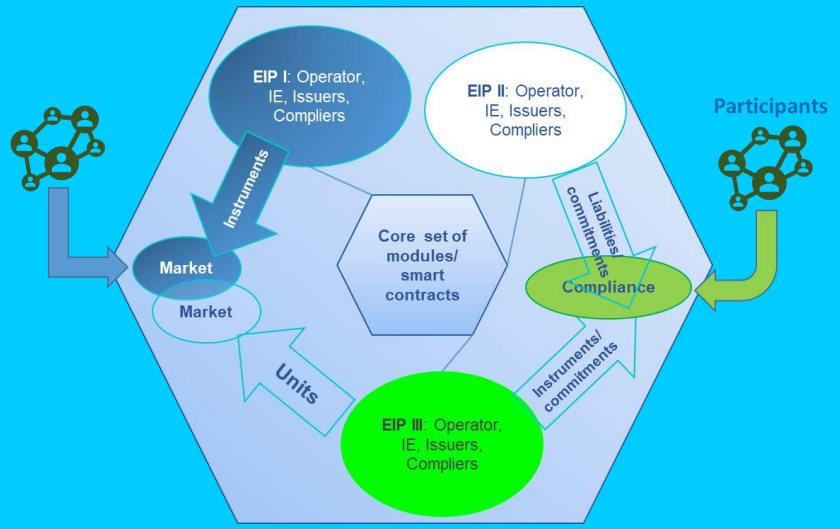
Casper PoS



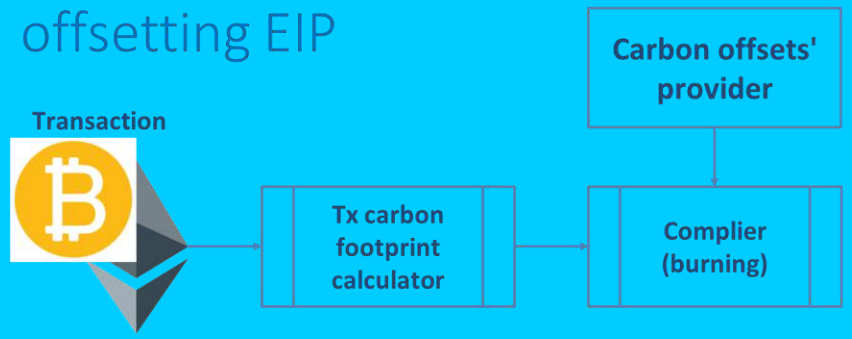
POLKADOT MULTICHAIN INTEROPERABILITY



DAO IPCI PROGRAMS' AND MARKETS' INTEROPERABILITY

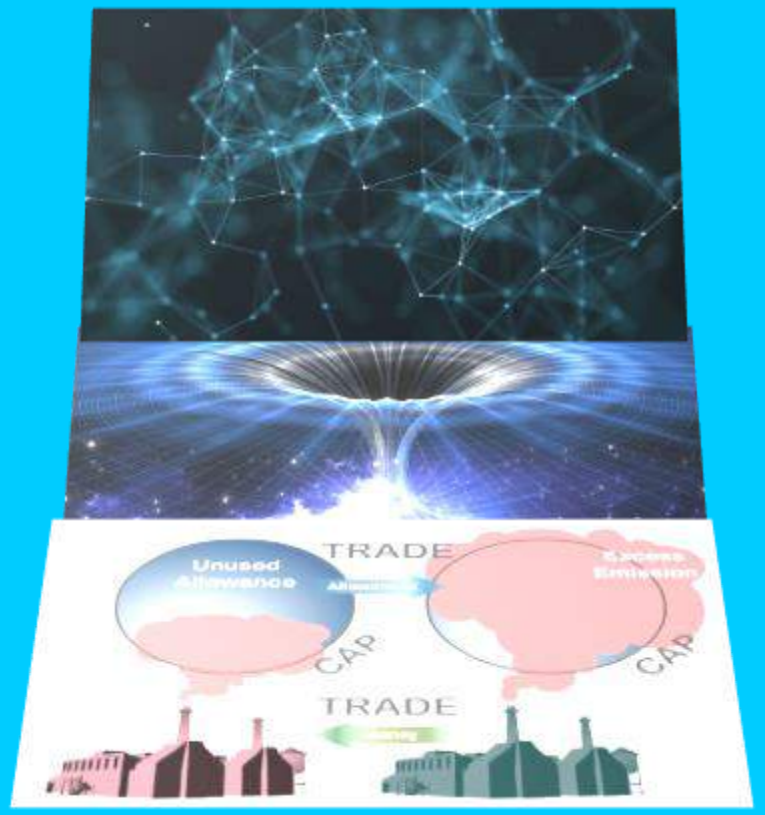


Cryptocurrency carbon footprint offsetting EIP



PORTAL TO YET ANOTHER UNIVERSE

Transfer of such regulated or even overregulated markets *and programs as* carbon markets, other climate change *pricing initiatives* and environmental markets to *the new* public blockchain paradigm cannot occur *overnight. Nevertheless,* it is high-time to start building *portals from existing* systems, disintegrated, often *overcentralized,* non-transparent, in some cases *susceptible to* pressure, corruption and falsifications, to *new universes,* to leap to radically new *climate policy ambitions*



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Annex

DAO IPCI USE CASES

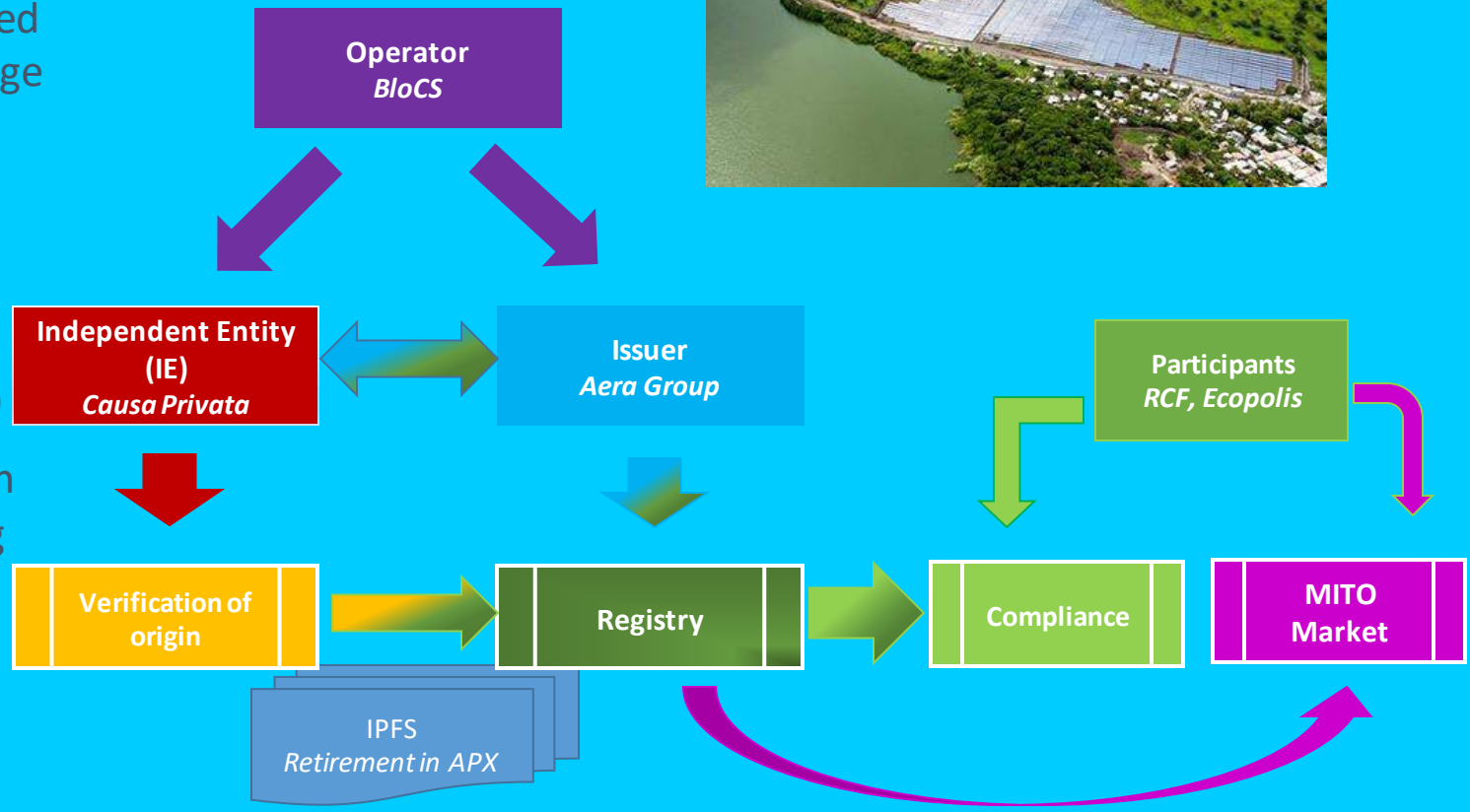
First ever blockchain carbon credit origin verification and transaction (performed)

DESCRIPTION:

- First ever blockchain-based carbon credit verification of origin, purchase for offsetting on March 14, 2017
- Origin and retirement of VCUs from APX conventional registry to transfer to DAO IPCI Blockchain confirmed by the document uploaded to immutable file storage
- VCUs originated from Mauritius solar power plant purchased at MITO Market and used for offsetting

PARTICIPANTS:

- EIP Operator - Blockchain Climate Standard (BloCS)
- IE - Causa Privata Law Firm to confirm retirement in the convectional Registry to avoid double spending
- Issuer, Seller - Aera Group (France)
- Buyers, Compliers - Russian Carbon Fund, Ecopolis



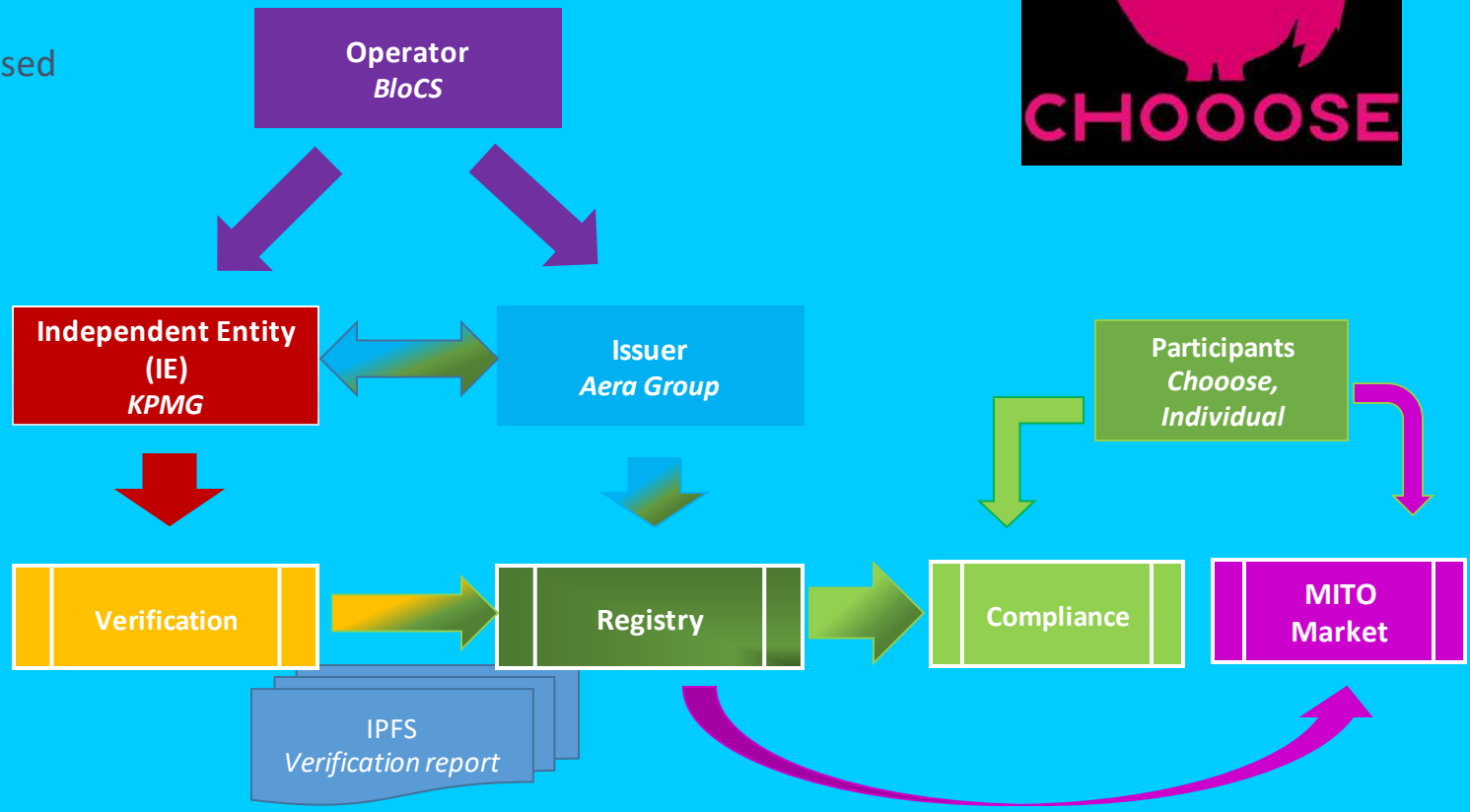
First ever retirement of carbon credits for compliance (performed)

DESCRIPTION:

- First ever blockchain-based carbon credit retirement for compliance (carbon footprint offsetting) on June 22, 2017
- Transfer of VCUs from BloCS individual participant to the Complier in DAO IPCI VCU Mauritius registry
- VCUs originated from Mauritius solar power plant purchased at transferred for offsetting by Chooose (Norway)

PARTICIPANTS:

- EIP Operator - Blockchain Climate Standard (BloCS)
- IE - KPMG
- Issuer - Aera Group (France)
- Seller - Individual participant
- Complier – Chooose (Norway)



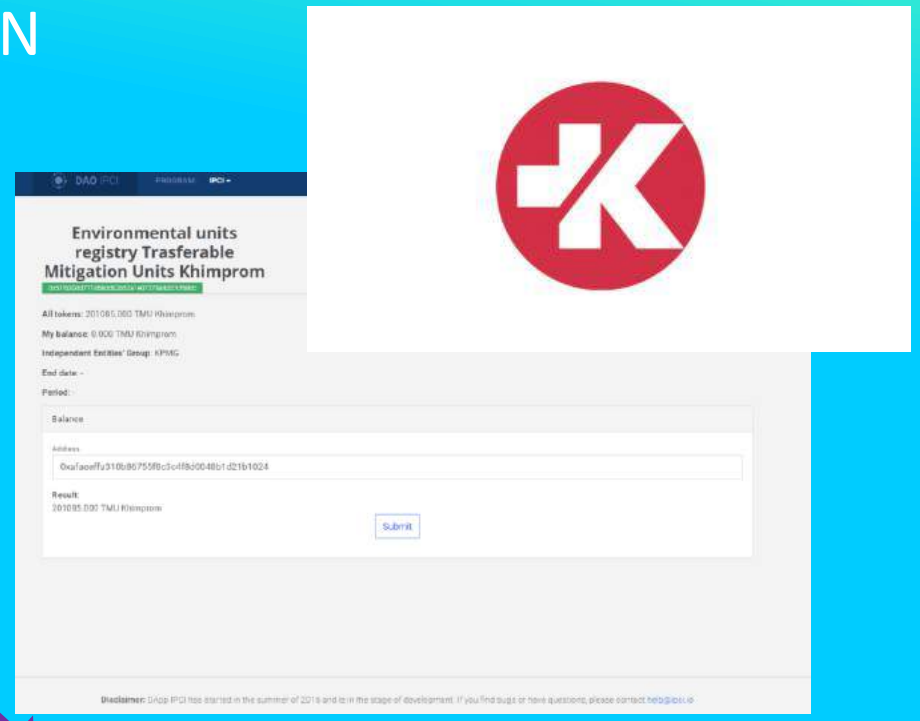
First ever blockchain carbon credit origination (performed)

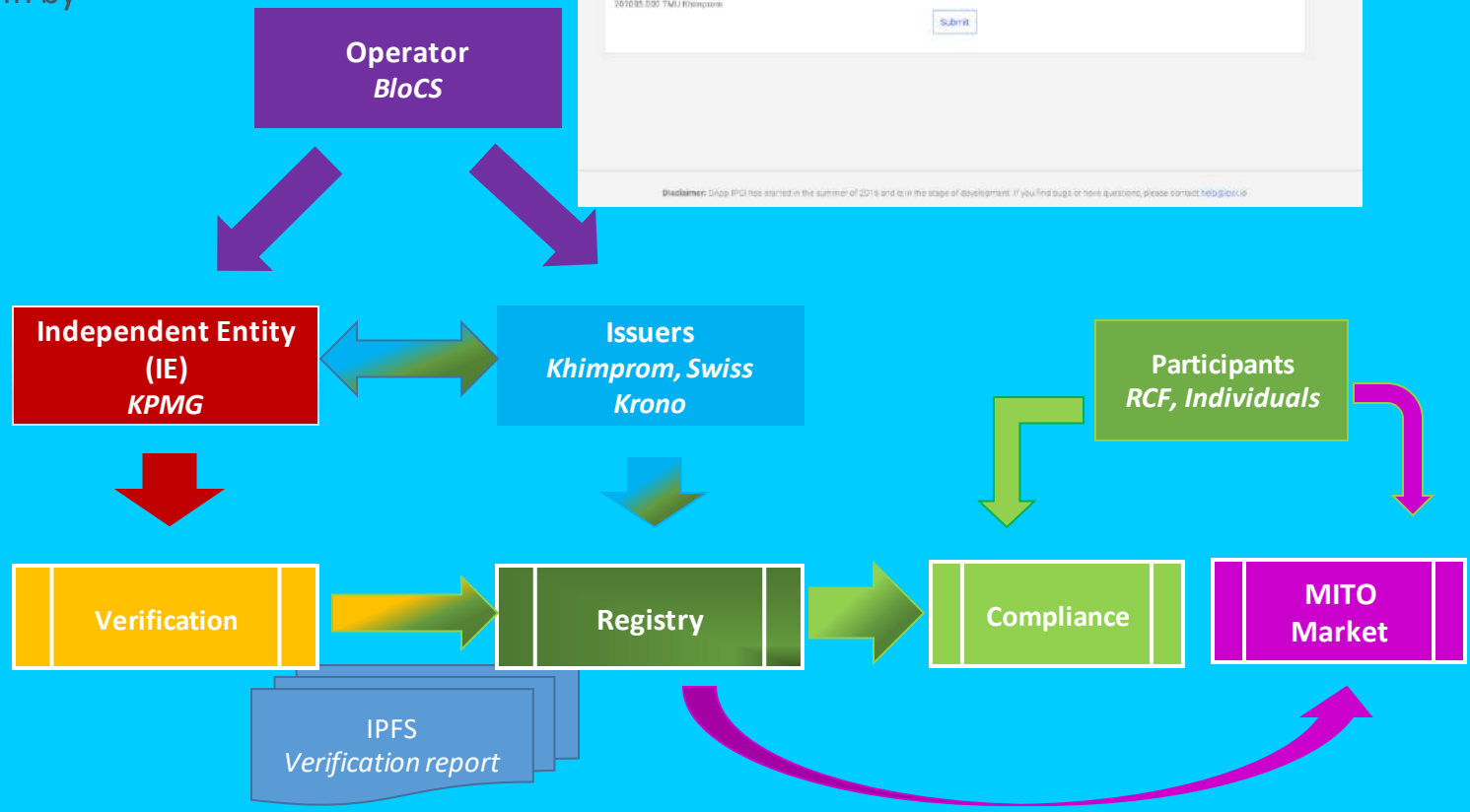
DESCRIPTION:

- First blockchain-based carbon credit origination, verification and issuance transactions performed on October 20, 2017, and April 5, 2018 initiated by Khimprom and Swiss Krono
- Transferable Mitigation Units (TMUs) verified on blockchain by KPMG confirmed by the verification report uploaded to immutable file storage
- MITO Market and compliance (offsetting) transactions performed

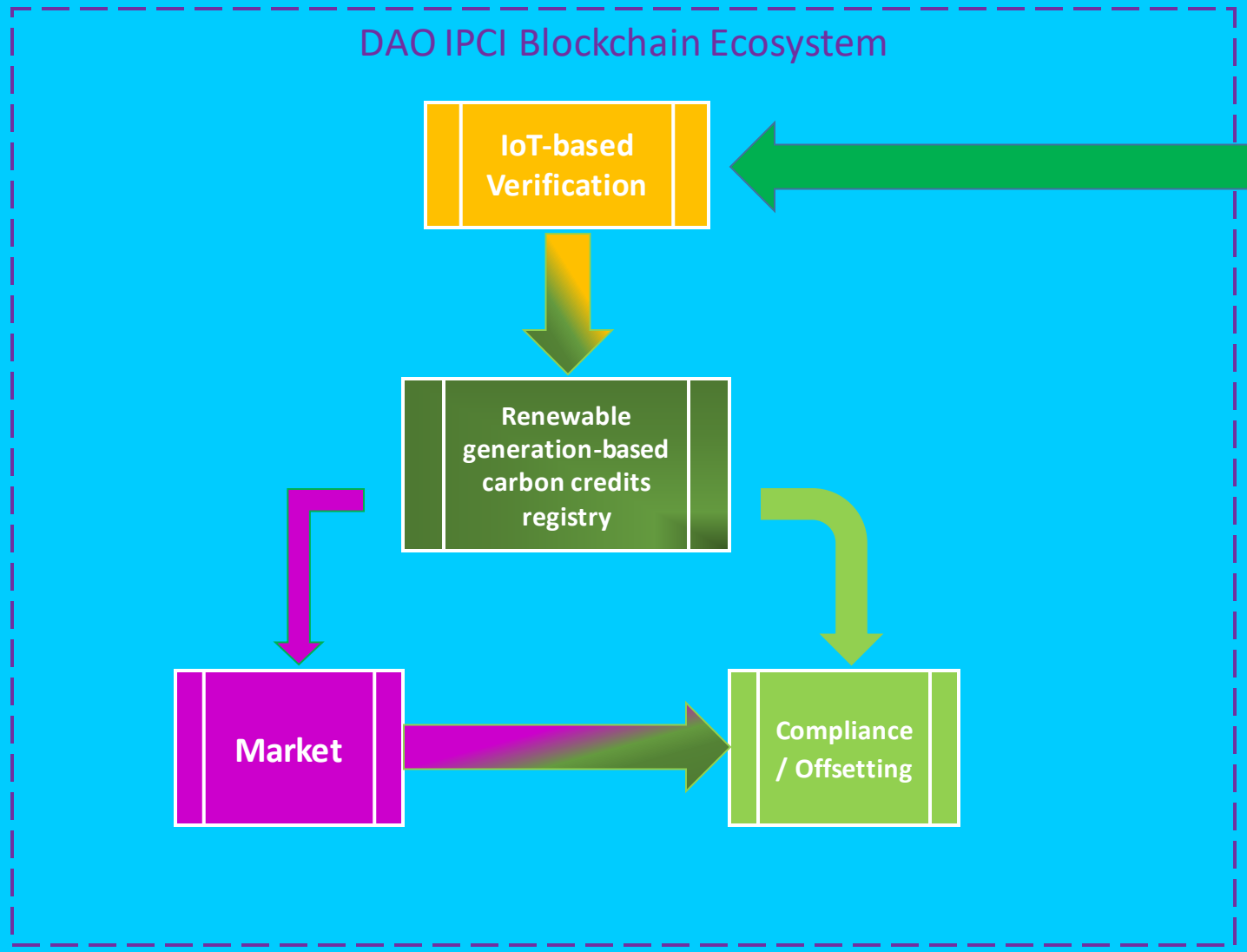
PARTICIPANTS:

- EIP Operator - Blockchain Climate Standard (BloCS)
- IE - KPMG
- Issuers – Khimprom, Swiss Krono (France)
- Buyers, Compliers - Russian Carbon Fund, individual participants





IoT Module for Renewables Carbon Credits (beta test performed)



Data from trusted hardware (converters)

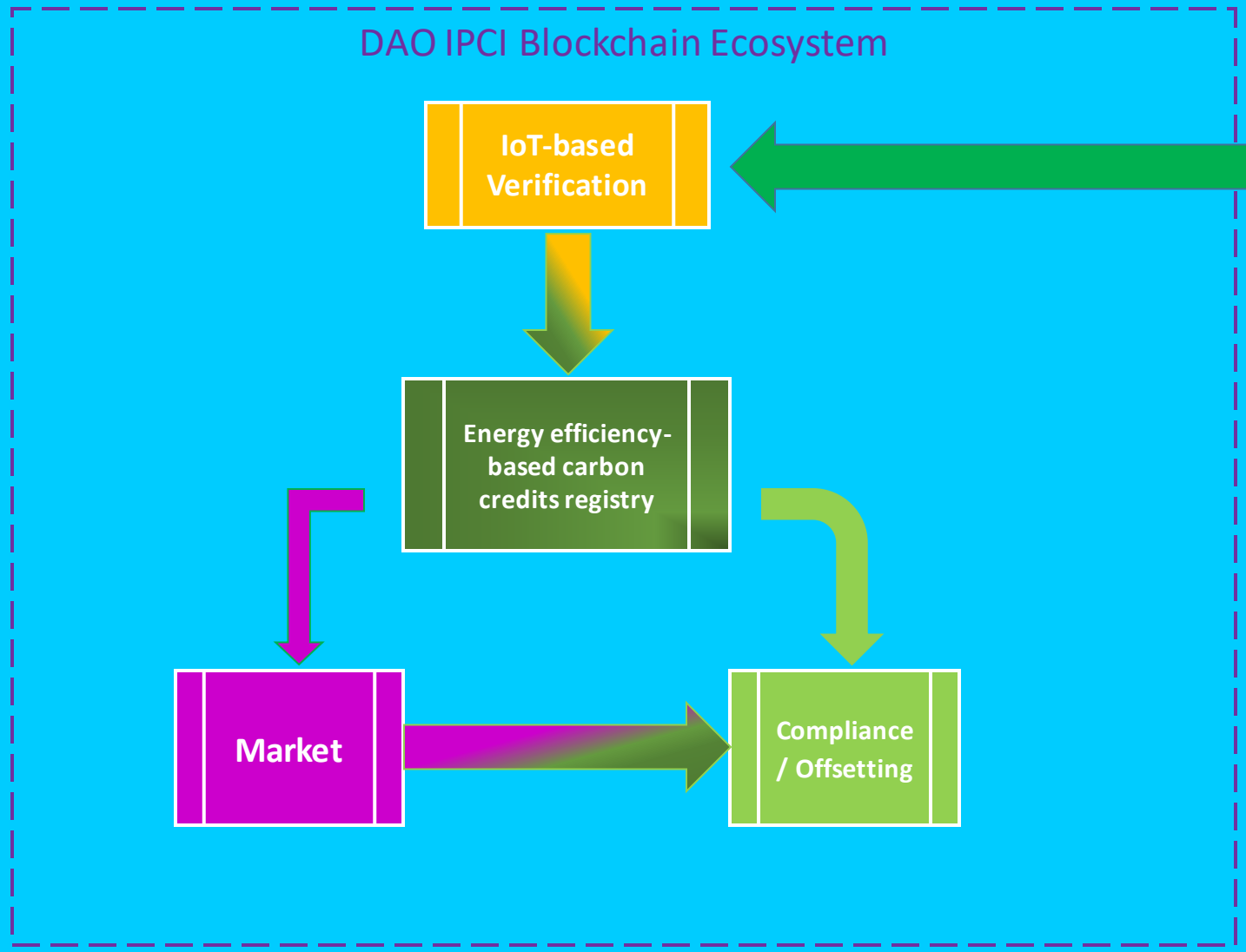
DESCRIPTION:

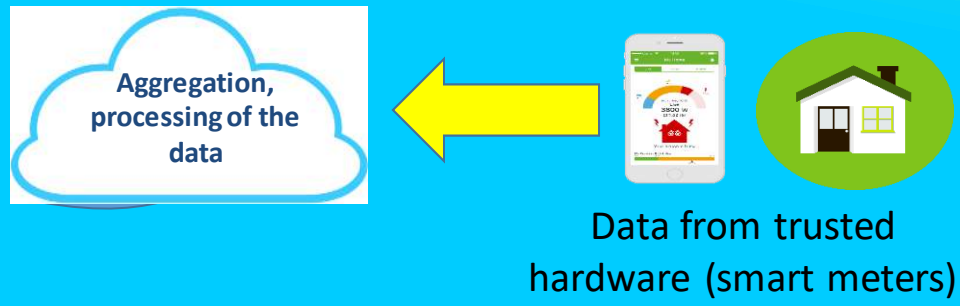
- Successful beta-test of IoT Module for renewable energy-based carbon credit verification and issuance on August 15, 2018
- Renewable Test Credits (RET) acquired at the Market and used for trial offsetting transaction

PARTICIPANTS:

- EIP Operator - Blockchain Climate Standard (BloCS)
- IE – DAO IPCI IoT Module
- Issuer – Energylab (Chile)
- Complier - Individual participant

CARBON CREDITS BASED ON ENERGY EFFICIENCY OF THE BUILDINGS (UNDER DEVELOPMENT)





Data from trusted hardware (smart meters)

DESCRIPTION:

- Data from trusted IoT hardware (smart meters) to be aggregated and processed by DLT /cloud technology and broadcasted to DAO IPCI IoT module to issue verified carbon credits

PARTICIPANTS:

- EIP Operator – Solutions Will (Canada)
- IE – DAO IPCI IoT Module
- Issuers – EIP Participants)owners of the consumption sources
- Compliers - Individuals and businesses

Papua New Guinea sustainable forestry by Travel4Green EIP (under development)

Offsetting Certificate to the Participant

User Interface

CALCULATOR → TO OFFSET → Payment Terminal

Calculate/offset carbon footprint at the arrival/departure

DAO IPCI

Compliance

DAO IPCI

T4G Token/Stake Registry

ILG Ledger

IE and IoT verification

Verified REDD+ Credits Registry

West Africa reforestation by TreeChain EIP (under development)

Contributors

TreeChain Positive Impact Registry

Immutable file storage for MRV data

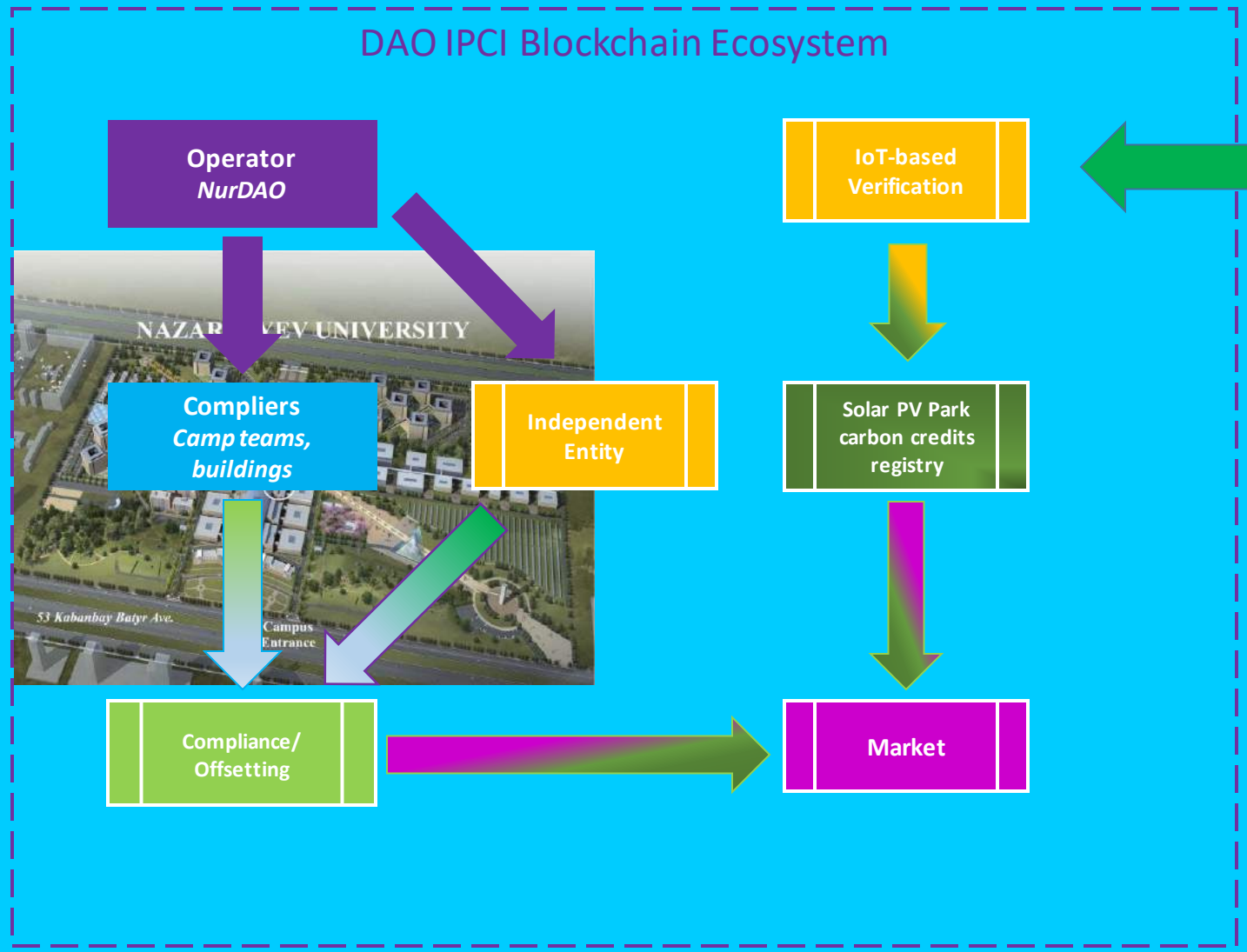
IE and IoT verification

Verified Carbon Removals Registry

Compliance

MITO Market

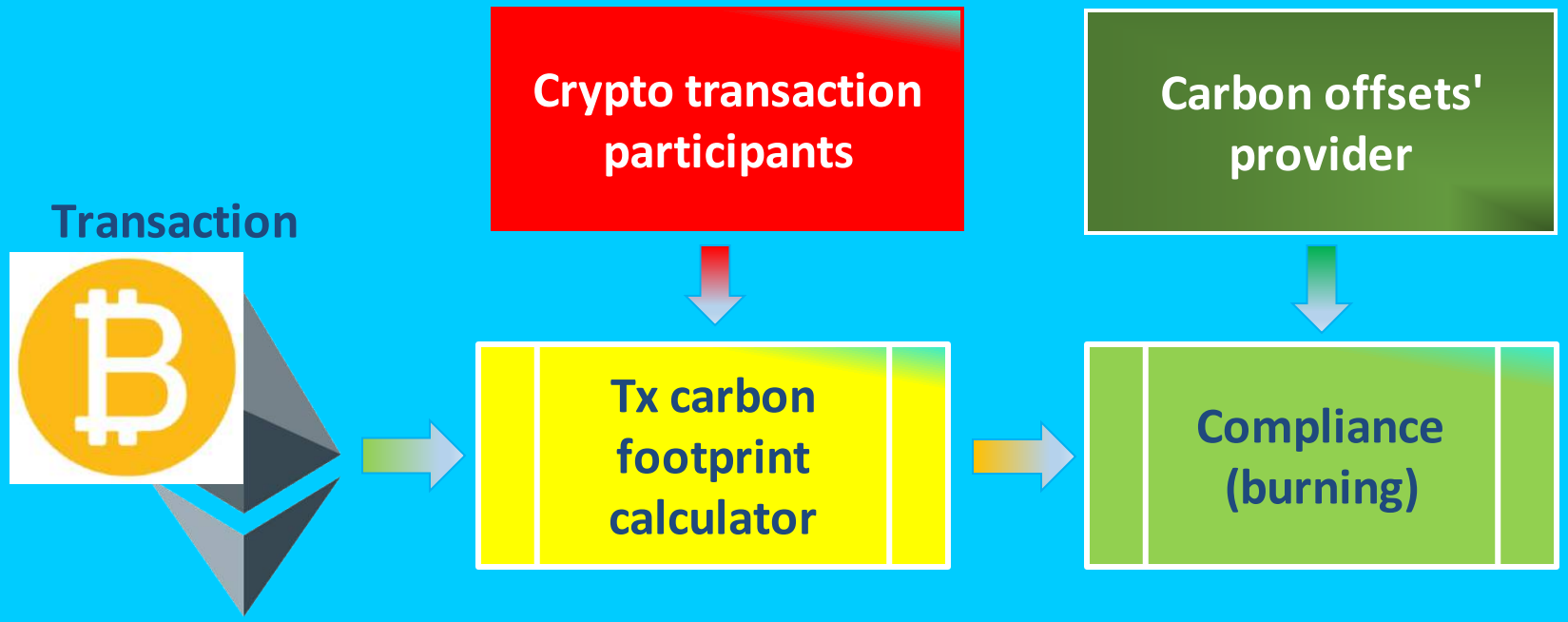
NAZARBAEV UNIVERSITY CARBON MARKET SIMULATION (UNDER IMPLEMENTATION)



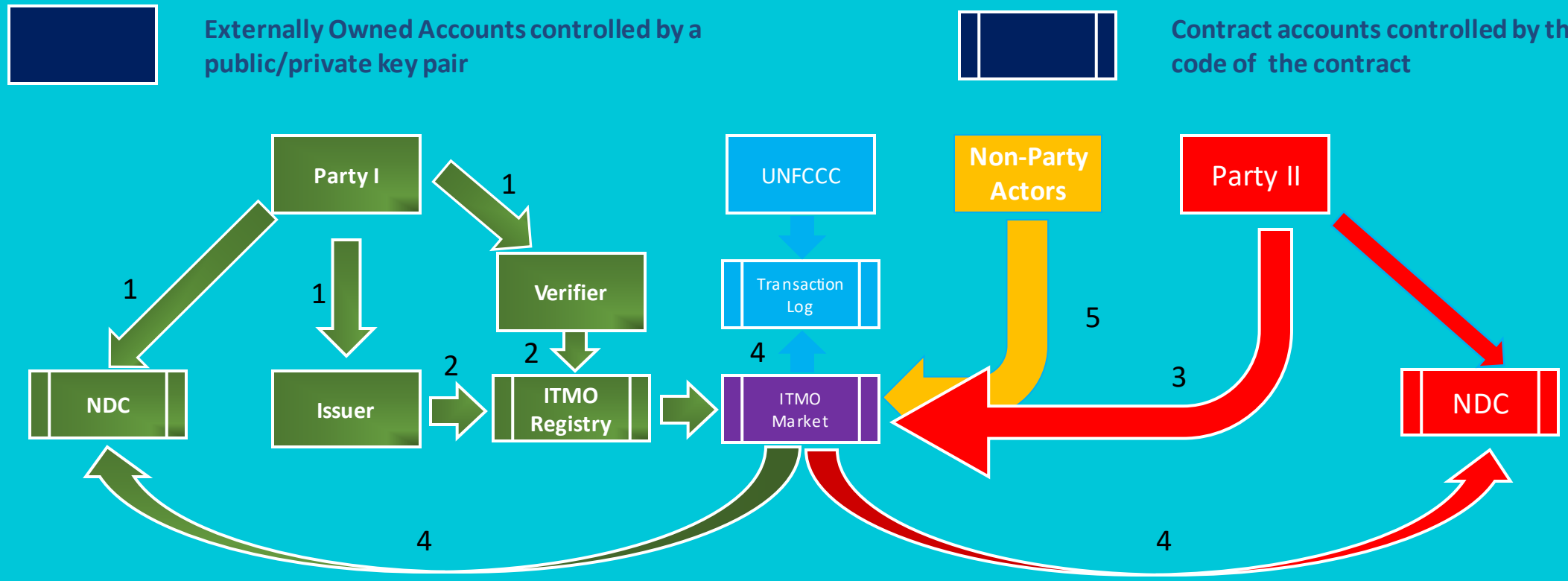
Data from trusted hardware (converters)

- NurDAO Operator allocates quota registered at the Compliance contract to the Teams (Compliers)
- The Teams perform activities to reduce GHG emissions
- Independent entity verifies compliance at the end of the Game
- Renewable Credits from Solar PV Park are verified by IoT Module and may be acquired at the Market and used for compliance

Cryptocurrency carbon footprint offsetting (proposed and developed for implementation)



Blockchain Protocol for the Paris Agreement art 6.2 - 6.3, Internationally Transferred Mitigation Outcomes, ITMO (designed and proposed for implementation)



1. Party I approves and registers NDC quantified commitments, Issuer, Verifier (Independent Entity) and Registry for Internationally Transferred Mitigation Outcomes (ITMO)
2. The Issuer applies for verification and the Verifier verifies issuance of ITMOs
3. The Issuer and Party II perform transaction via ITMO Market
4. Transactions are registered in the UFCCC Transaction Log and accounted for in the Parties respective NDCs
5. Private users and compliers may acquire ITMOs for private compliance and offsetting without accounting them as contributions for NDC commitments performance until transferred to the Party