Role of Blockchain in Carbon Credit Markets

What Are Carbon Credits?

- Kyoto Protocol of 1997 enabled carbon emissions as a **commodity**.

- A unit of measurement that corresponds to the reduction or removal of **one metric ton** of carbon dioxide.

- In addition to allowances, carbon credits can be generated.

- These credits can be bought and sold in the market and can **offset** a company's emissions.

- Specific emission reduction projects such as renewable energy projects, afforestation, or energy efficiency initiatives.

Carbon Credit Markets

- Carbon credit markets play a crucial role in mitigating climate change.

- Basically a financial system designed to help control and reduce GHG emissions.

- Key Concepts

  - Emission Reduction Targets

  - Allocation of Allowances

  - Emission Trading

  - Price Determination

Carbon Footprint Calculation

► [carbonfootprint.com - Carbon Footprint Calculator](carbonfootprint.com)

Offsetting

Already calculated your carbon footprint and ready to offset?

Amount: 5 tCO_2 **Get Prices**

Contact Us if you need to offset over 100 tonnes of CO_2 to choose your specific project and get the best prices

Reforestation in Kenya

Personalised Downloadable Certificate Available

₹ 8281.09 to offset 5 tonnes
(₹ 1656.22 per tonne)

Add To Basket **Monthly Subscription**

Your funding supports the planting of native broad leaved trees in the Great Rift Valley, and supports its developing community. For each tCO₂e one tree is planted and an additional tCO₂e is offset through a VCS Tree Buddying project to guarantee the emission reductions.

The Need for Blockchain

Research Paper

Application of Blockchain in Carbon Trading

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Abstract

This paper introduces the similarity between the mechanism of carbon trading and blockchain, then it elaborates on the application of blockchain in carbon trading. In corporate carbon trading, blockchain technology can record and transfer information flow reliably, realize point-to-point transactions between suppliers and demanders to achieve "decentralization", help to reduce the entry threshold for the carbon trading market. At the same time, an analysis of social environment for blockchain-based carbon trading on person is made. Finally, the paper confirms the value of "blockchain + carbon trading" and looks forward to the future.

Benefits of Blockchain in Carbon Credit Markets

Aspect	Traditional System	Blockchain Based
Centralization	Typically centralized with legal authorities	Decentralized and based on DLT
Transparency	Limited Real Time visibility	High transparency due to public & immutable ledger
Verification	Involves manual process and audits	Automated through smart contracts.
Tokenization	Credits exist in centralized databases.	Credits are tokenized making them trading assets
Double Counting	Risk of double counting credits	Reduced risk due to immutability.

UPES Hackathon

Title of Problem Statement: Blockchain and AI-enabled Carbon Credit Management

Description of Problem:

Develop a scalable solution using Blockchain and AI to count, audit, and trade carbon credits for individuals and small businesses. Also targeting individuals and small businesses become more sustainable by tracking their carbon footprint using AI. Enabling trading of carbon credits on the Blockchain to provide economic incentives for reducing emissions and also building a scalable solution that can be expanded to larger Name of Organizations and even countries using Blockchain. Developing Innovative Technological Solutions to Contribute to the Achievement of UN Sustainable Development Goals in Climate Action.

Why is it Needed: There is an increasing focus on sustainability and reducing our carbon footprint. A solution is needed to help individuals and small businesses calculate their carbon footprint, get credits for reducing emissions, and trade excess credits. This can drive more sustainable practices and also open up a new market for carbon trading. Emerging technologies like Blockchain and AI can enable an innovative, secure, and scalable solution.

Examples of Blockchain based Platforms & Carbon Tokens

- ► KlimaDAO
- ► UPCO2
- ► MossCO2
- ► CUT(Carbon Utility Token)
- ► Klima DAO
- ► Poseidon Foundation
- ► AirCarbon
- ► Nori

Exp 6

```solidity
//SPDX-License-Identifier: MIT
pragma solidity >=0.5.0 <0.9.0;
contract carbonexc{
        struct Record{
        string name;
        string message;
        uint timestamp;
        address from;
        }
        Record[] records;
        address payable owner;

        constructor(){
        owner = payable(msg.sender);
        }

        function buyCarbonCredit(string memory name, string memory message)public payable
{
        require(msg.value>0,"Pay something!");
        owner.transfer(msg.value);
        records.push(Record(name,message,block.timestamp,msg.sender));
        }

        function getRecords() public view returns(Record[] memory){
        return records;
        }
}
```

Deployed Contracts

▼ CARBONEXC AT 0XD91...39138 (MEMORY)

Balance: 0 ETH

buyCarbonCredit

name: Bhargav
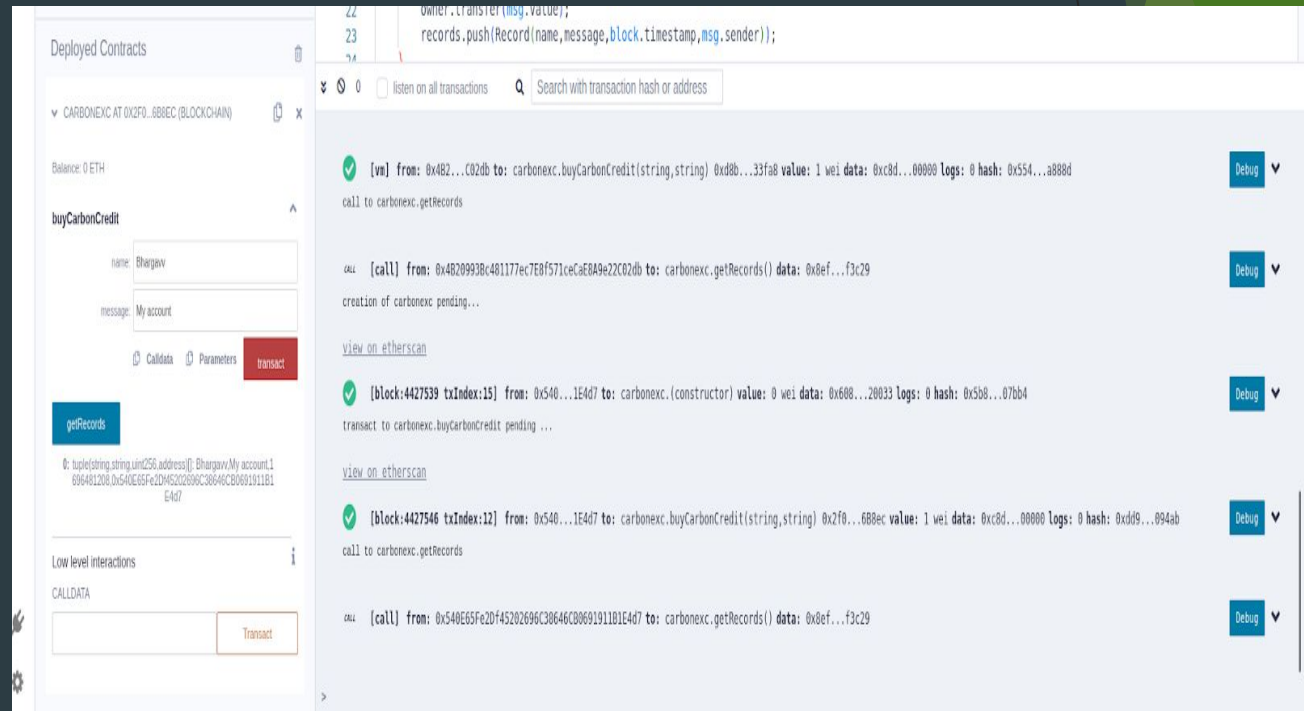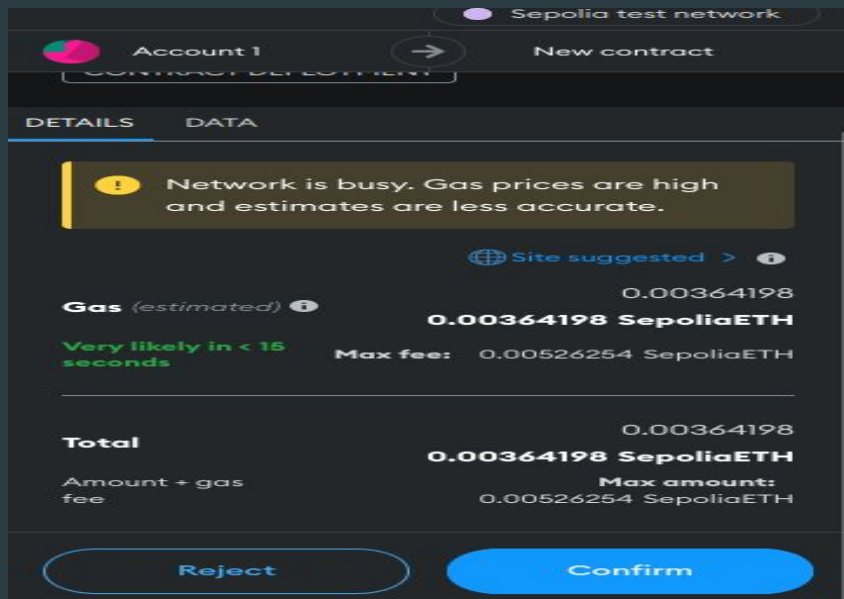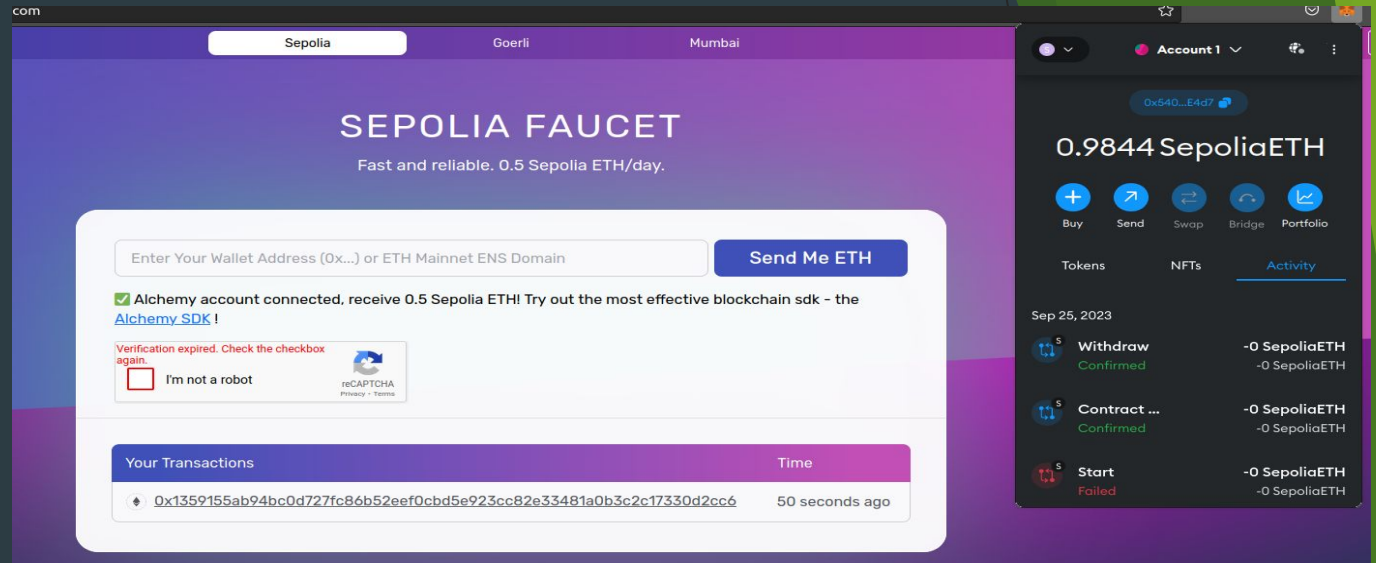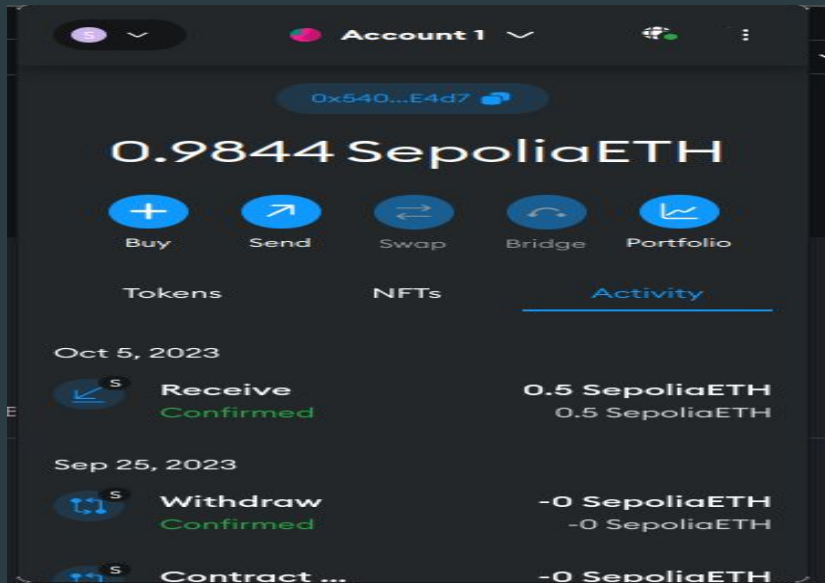
message: Give me the credit

Calldata   Parameters   transact

getRecords

0: tuple(string,string,uint256,address)[]: Bhargav,Give me the credit,1696480132,0xAb8483F64d9C6d1EcF9b849Ae677dD3315835cb2

Ganache

ACCOUNTS   BLOCKS   TRANSACTIONS   CONTRACTS   EVENTS   LOGS

SEARCH FOR BLOCK NUMBERS OR TX HASHES

| CURRENT BLOCK | GAS PRICE | GAS LIMIT | HARDFORK | NETWORK ID | RPC SERVER | MINING STATUS | WORKSPACE |
| 2 | 20000000000 | 6721975 | MERGE | 5777 | HTTP://127.0.0.1:7545 | AUTOMINING | QUICKSTART |

SAVE   SWITCH

TX HASH
0×c709fe20578325703c46c01fc90f7b518cdca361d489b7016e73fa0398300a18
CONTRACT CALL

FROM ADDRESS
0×A196f96DE2d007736eCE6252f3E2846842F643d8

TO CONTRACT ADDRESS
0×15DbCAB611C9e2C3a7Ea2686A1F85a78676eda53

GAS USED
43724

VALUE
0

TX HASH
0×7e89a954d71b8b7fa63cc8261cfa8008da73dd790720e73ccdcf26ced50551d4
CONTRACT CREATION

FROM ADDRESS
0×A196f96DE2d007736eCE6252f3E2846842F643d8

CREATED CONTRACT ADDRESS
0×15DbCAB611C9e2C3a7Ea2686A1F85a78676eda53

GAS USED
125677

VALUE
0

Ganache (Blocks view)

ACCOUNTS   BLOCKS   TRANSACTIONS   CONTRACTS   EVENTS   LOGS

BLOCK 2	MINED ON 2023-09-25 11:06:51	GAS USED 43724	1 TRANSACTION
BLOCK 1	MINED ON 2023-09-25 11:05:10	GAS USED 125677	1 TRANSACTION
BLOCK 0	MINED ON 2023-09-25 10:56:25	GAS USED 0	NO TRANSACTIONS

Firefox Web Browser — Sep 25 11:08

https://remix.ethereum.org/#lang=en&optimize=false&runs=200&evmVersion=null&version=soljson-v0.8

DEPLOY & RUN TRANSACTIONS

CONTRACT
Storage - contracts/1_Storage.sol

evm version: paris

Deploy

Publish to IPFS

At Address   Load contract from Address

Transactions recorded 2

Deployed Contracts

STORAGE AT 0X15D...EDA53 (BLO

Balance: 0 ETH

store   uint256 num

retrieve

0: uint256: 67

Low level interactions

CALLDATA

Transact

```
12    uint256 number;
13
14    /**
15     * @dev Store value in variable
16     * @param num value to store
17     */
18    function store(uint256 num) public {
19        number = num;
20    }
21
22    /**
23     * @dev Return value
24     * @return value of 'number'
25     */
26    function retrieve() public view returns (uint256
27        return number;
28    }
29 }
```

listen on all transactions

[block:2 txIndex:0] from: 0xA19...643d8 to: Storage.store(uint
data: 0x605...00043 logs: 0 hash: 0xcf8...e8c60
call to Storage.retrieve

[call] from: 0xA196f96DE2d007736eCE6252f3E2846842F643d8 to: S

MetaMask

G   Account 2

0xA19...43d8

99.9994 ETH

Buy   Send   Swap   Bridge   Portfolio

Tokens   NFTs   Activity

Sep 25, 2023

Store   -0 ETH
Confirmed   -0 ETH

Contract ... -0 ETH
Confirmed   -0 ETH

MetaMask support

Thank You