Reimbursement For Electricity Supply Using Blockchain

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Abstract:

India today is racing towards the goal of Net Zero emissions by 2070. To achieve this goal, we need to reduce the use of air-polluting fossil fuels like coal. India today has increased its infrastructure of solar panels substantially. However, the efforts of the public can be a huge factor in this sector. Solar Panels have to be adopted by the people to reduce dependence on energy distributors providing fossil energy.

The people who use solar panels for energy need to either connect their supply to a local power grid or maintain huge battery rooms to ensure a stable supply. Battery rooms are not a feasible option hence people choose to connect to the local grid. Solar Energy generated by people sometimes is in excess of their usage. These extra units can be carried forward to the next bill but people are never rewarded for their contribution.

With this new system, we would be able to promote the use of solar panels by rewarding users for their contribution to the local energy supply. Energy distributors would reward users with in-app currency for the number of units they generate, these credits then can be used by users to pay their electricity bills or sell the in-app currency to other users for Fiat money. Using the latest blockchain Ethereum Smart contracts technology we can ensure the safety and security of our in-app currency and transactions made between users. A whole new source of passive income can be generated using this system.

Keywords: Blockchain, Mining, Solar Power, Renewable Energy, Crypto Wallet, Electricity, Clean Energy

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I. Introduction:

Prime Minister has been pushing the world to adopt Solar Electricity and is pushing India's plan globally. Looking at the efforts public are installing Solar Panels on their houses as a way to reduce the reliability on the Energy distribution Companies. However the energy they generate cannot used directly in their house and excess energy needs to be stored. Storage will require huge batteries and space inside the house which is costly and not a viable option for a regular household. Energy generation using renewable resources is future of India's electricity supply. One of the prominent methods is Solar energy. Prime Minister has been pushing the world to adopt Solar Electricity and is pushing India's plan globally. Our application provides a way to do that without leaving any taxable revenue made in the transaction. Every month the Energy Companies will declare its units received as a total in block chain, generating a digital currency. Energy coin these energy coins will be claimed by users using our app to redeem those energy coins using our app. Energy coin then can be used to pay electricity bills and can be traded with other users as a digital currency.

II. Objective:

- To develop a system that generates a revenue for public providing electricity to local grid.
- Creating a decentralized digital currency or crypto currency.
- Promoting use of solar energy for electricity.
- Reduce dependencies on non-renewable energy like coal.
- Allowing users to generate a passive income.
- Ability to pay electricity bills using this currency.

III. Literature Review:

SR. NO	TITLE/ PUBLICATION YEAR	AUTHOR NAME	DESCRIPTION	ADVANTAGE
1.	Block chain technology in the energy sector. February 2019	Merlinda Andoni , David Jenkins	The projects and research initiatives reviewed in this work show that block chains are a promising technology for a wide area of services and use cases in the energy sector.	To conclude, block chain or distributed ledger technologies can clearly benefit energy system operations, markets and consumers.
2.	Secure, Decentralized Energy Resource Management Using the Ethereum Block chain. September 2018	Casimer DeCusatis Kulvinder Lotay, USA.	The work is simulated a micro grid with ten buildings in the northeast U.S., and results of the transaction distribution and electricity utilization are presented.	To conclude in this it Manages Energy Resource and Secure it in Decentralized manner using block chain.
3.	Crypto-Trading: Block chain-oriented energy market. December 2017	Katiuscia Mannaro, Michele Marchesi	It works on integration and development of Smart Contracts for the Energy Market development of the prototype of Crypto-Trading system.	This paper presents the Crypto-Trading project and its characteristics. In particular, we have highlighted the key role of the block chain technology and Energy Market.
4.	Block chain: Elements of Physical Architecture, Empowering Features and Applications in the Indian Power Sector. January 2021	Nilesh Hadiya, Rohit Bhakar, Alekhya Datta,Ghan Vashishtha	The paper's primary focus is given the features that empower a block chain to facilitate various tasks securely, efficiently, and smoothly in a power sector.	This paper described the significant features that empower various applications in several industries across the world, including a glimpse of the uses across India.
5.	Distributed power trading system based on blockchain technology. May 21	Shuguo Chen, Weibin Ding, Zhongzheng Xiang	This paper expands the relevant research on the application of blockchain technology in the field of energy system. The algorithm is innovatively improved to adapt to the data evolution characteristics of	In this paper, the improved Adaboost algorithm is used to predict the supply and demand gap of power trading nodes, and then the prediction ability of the algorithm is tested by the time-sharing data of 9 randomly selected regions of the PJM market

			the distributed power system.	in the United States.

IV. Methodology:

In this research topic, we implemented an automated system that is used to achieve the process of electricity supply, like uploading meter I'd, user details, claiming coins, sending coins, sending user meter I'd details to the administrator and communication with the administrator for authentication purposes. The administrator will check the amount of energy generated by the users through their meter IDs and modulate it with the ledger originated by the grid. Accordingly, the administrator will send coins to the respective user. We use some fundamental key modules to cover our project, which gives you a clear idea of the flow of our project.

- Admin Authentication: This module is mainly based on admin. System will check the admin user name and   password for authentication. After the verification for authorization the admin can be able to precede the process. All works are done under his control.
- User Registration: This module covers the details about the registration of users which they can be register by itself by adding data like name, password, meter id and further details. After registration they can be sign in by their username and password.
- Account Balance: The module allows the user to check on the total coins accumulated and view the in the app which includes the earned amount and the ones bought or received from other users.
- Send Coins: This will allow the app users to Send Urja Coins to other users in exchange of Rupees in order to make profits.
- Claim Coins: This tab will redirect a user to claim the coin they receive once the meter reading is approved by the Urja App Approver. This will have a notification once the form is approved.
- Notification of Monthly Release of Coins: This will be a notification for user to remind the user about the release of current month's release of electricity coins and will suggest them to fill the form with required details and send it.
- Sending of User Meter Details: This tab will be available after the notification to user is sent for the monthly claim it will have an option to upload a picture in app with the meter reading as a proof of user's claim of Urja coins.

V. Application:

Reimbursement for electricity supply app helps users for it actually earning a income using Solar Energy and using it as currency for the earned amount. This helps Energy Companies create a way without actually a need to reimburse the user with taxable currency and a need to maintain account books for it. Our application helps user to provides a way to do that without leaving any taxable revenue made in the transaction.

Since most studies related to energy trading based on block chain are still in the initial stage, according to different research focuses, this paper divides relevant studies into the following four aspects: (1) construction of trading platform; (2) study on the economy, privacy, and security of transaction mechanism; (3) the latency and scalability of trading platform; (4) implementation of the specific technology of trading platform.

Every month the Energy Companies will declare its units received as a total in block chain, generating a digital currency Energy coin these energy coins will be claimed by users using our app to redeem those energy coins using our app. This application helps user is to generate crypto currency.

VI. Existing System:

Solar Energy needs to be stored in large batteries to be used as required alternatively it can be connected to the local power grid to be distributed as its generated.
Energy contributed is deducted from the used amount of energy by the user.
The rates of the contributed units are decided by the Energy suppliers which are usually very low compared to the rate they sell.
Any balance between the contributor and supplier is usually only settled once a year at a very low rate.
An employee from Energy providing companies visit the premises to record the meter details every month.

Not a sufficient or a viable source of income the efforts to install panels are not always fruitful depending on factors like maintenance and weather.

VII. Proposed System:

The proposed system is designed to be more efficient than the manual system. It invokes all base tasks that are now carried out manually, such as the forms transactions and reports which is added advantage. The proposed System is completely computer based application. Thousands of records can searched and displayed without taking any significant time.

Gives accurate information. It minimizes the documentation and tax related work. It helps user to generate an income for electricity supply. It records the details of user's meter by uploading image for Authentication of units generated. Uses a decentralized system and create its own currency using block chain.

VIII. System Architecture:

SYSTEM ARCHITECTURE
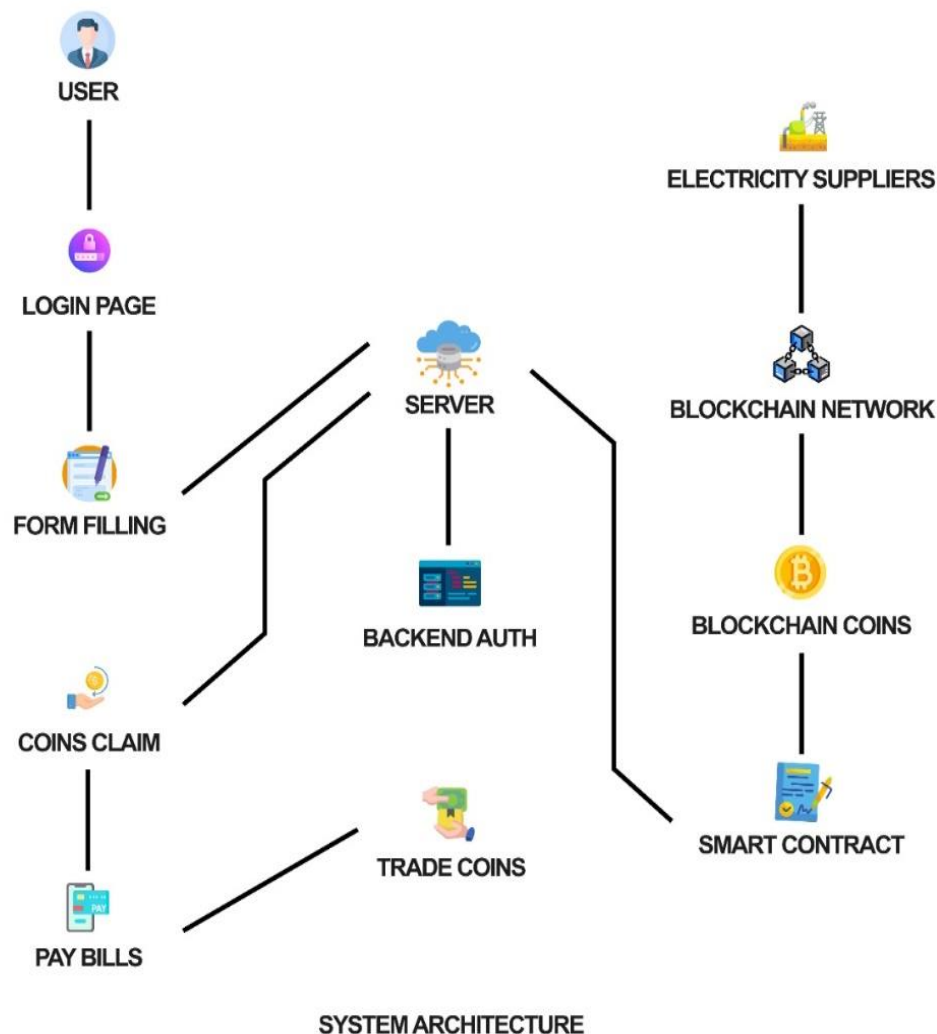
Flow Diagram:
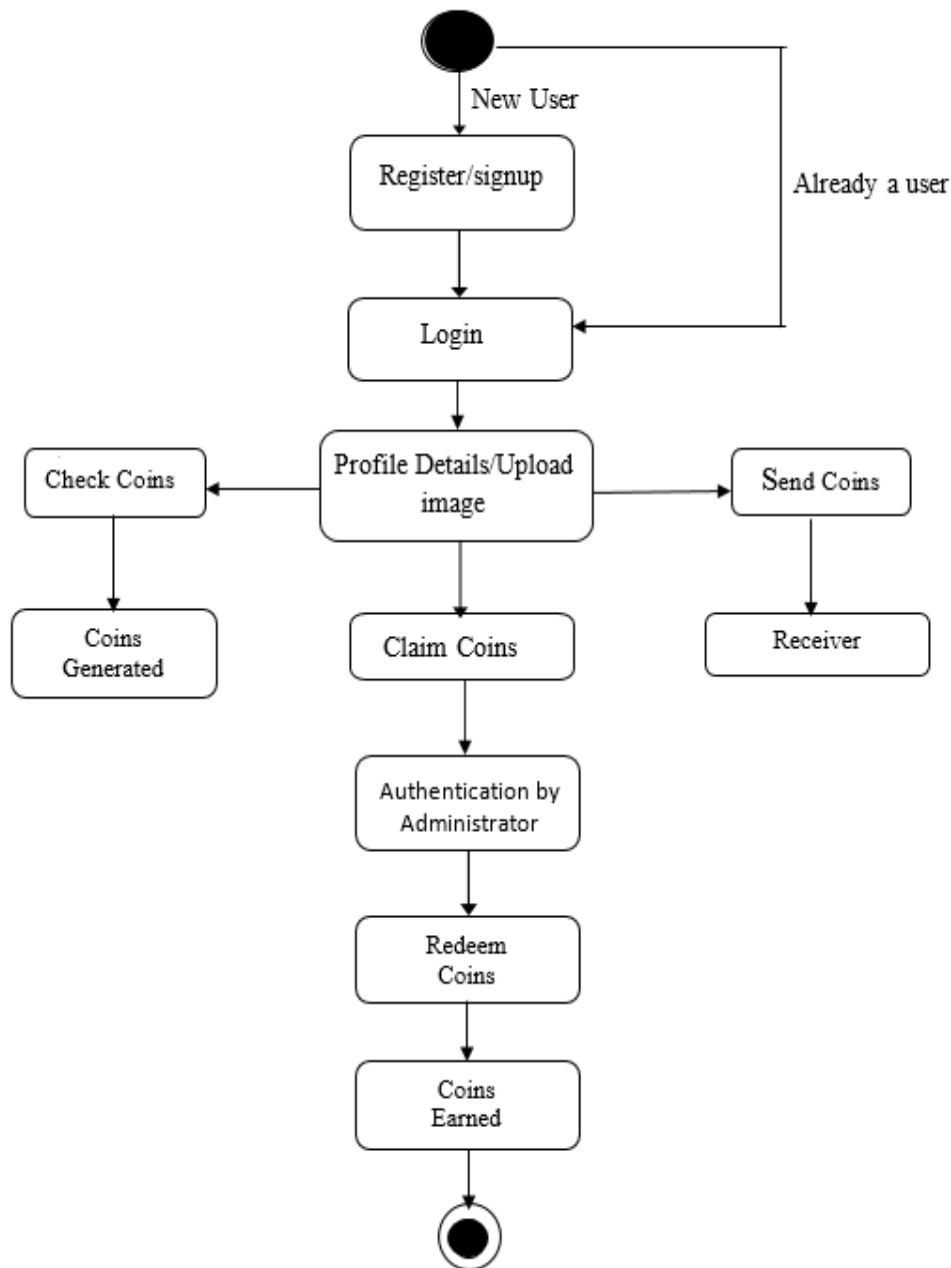
Fig: System Flow Diagram

IX. Snapshots:

Signup Page   **Login Page**
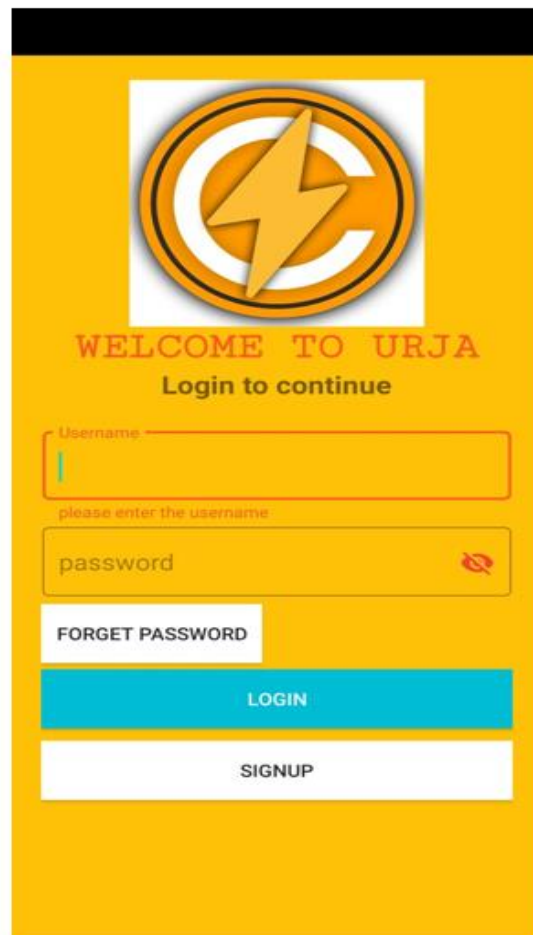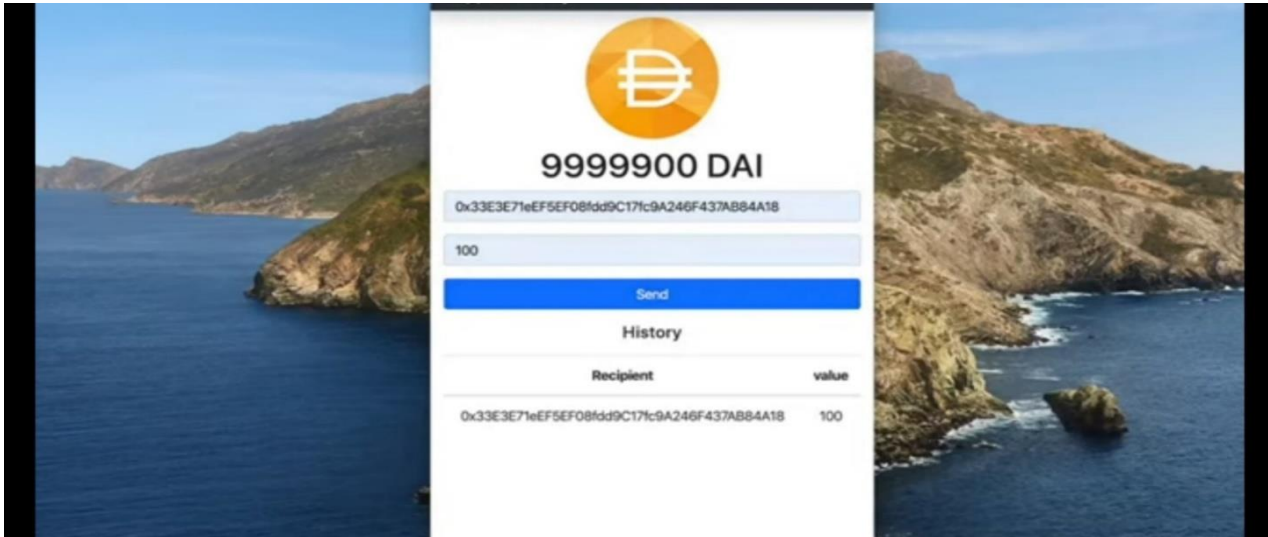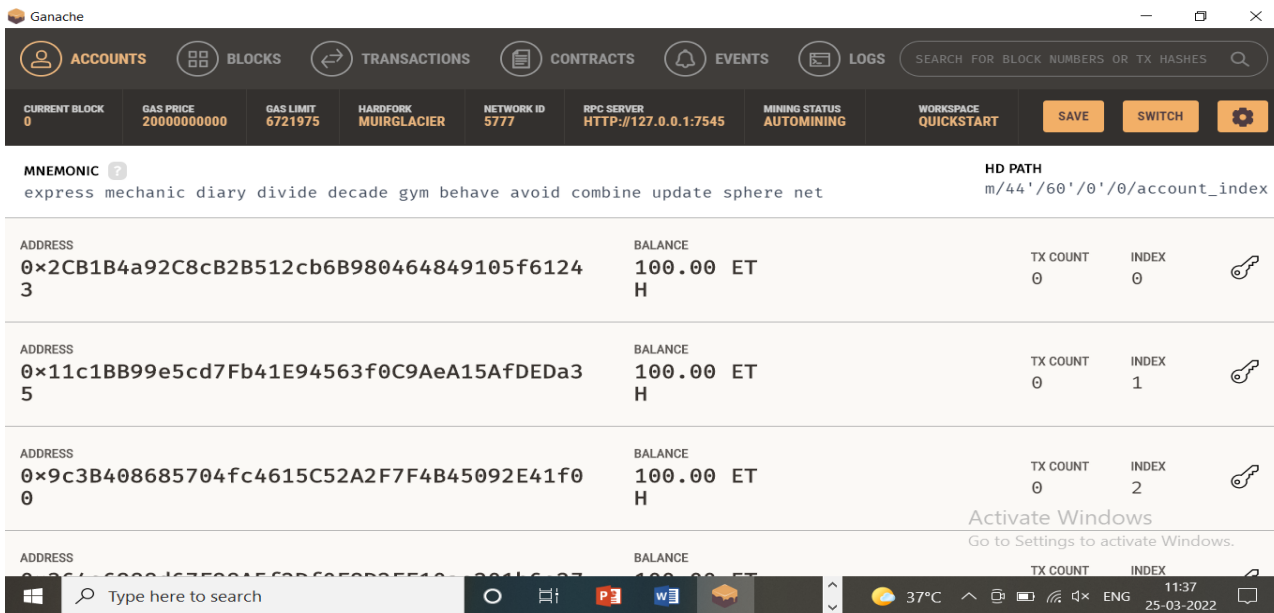

Token Transaction:

This is the page of token transaction in which we can transact or send tokens to the second user by adding their wallet address and the amount of coins and tokens we have to send.

Ganache Blockchain System:

This is a Ganache system which provides us with a Fake Ethereum accounts to carry out different test transactions in our system.

X. Future & Scope:

Plans to implement an AI system which can read the numbers on the user electric meter in order to reduce user's workload trying to fill the required form for reimbursement. Ability to track the users earning on monthly basis and keep a track of profits made using this system. Setting up Urja Coins daily rate convert in rupees.

Ability to pay bills of all the electricity boards in our app.

XI. Conclusion:

To conclude, block chain or distributed ledger technologies can clearly benefit energy system operations, markets and consumers. Our application provides a way to do that without leaving any taxable revenue made in the transaction. Every month the Energy

Companies will declare its units received as a total in block chain, generating a digital currency Energy coin these energy coins will be claimed by users using our app to redeem those energy coins using our app. Energy coin then can be used to pay electricity bills and can be traded with other users as a digital currency. This helps Energy Companies create a way without actually a need to reimburse the user with taxable currency and a need to maintain account books for it. For users it helps in actually earning a income using Solar Energy and using it as currency for the earned amount.

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