Gridgularity

Blockchain for the energy market Impact to Market Model

Erwin Smole gridsingularity.com



Company

Grid Singularity GSy GmbH Berlin/Germany and Vienna/Austria Date: Feb. 2016

Co-founders:



Ewald

Hesse

CEO



Erwin

Smole

SALES



Dr. Ana S. Trbovich STRATEGY

Dr. Gavin Wood BLOCKCHAIN

Buchanan BLOCKCHAIN















The Energy Web Foundation

Enabling and accelerating the transition to a democratized, decentralized, decarbonized, and digitized electricity grid



Once trust is built in, only one shared ledger is needed



The value should be shifting to the customer

And, generation should be shifting to renewables more quickly!



A number of issues need to be addressed

Barriers to scaling the emerging system architecture



EWF = developing *the* global, open source blockchain

EWF Leadership



Advisory Board

Foundation Council





Ph. D. Jon Creyts Member, EWF Managing Director, RMI



Ph. D. Herve Touati President, EWF Senior Fellow, RMI



Christoph Frei Member, EWF Secretary General, World Energy Council



Ewald Hesse Vice-President, EWF CEO, Gsy



Dr. Ana S. Trbovich Member, EWF Strategy, GSy

EWF = developing *the* global, open source blockchain

EWF Team



EWF is primarily focused on the blockchain itself



Four distinguishing features compared to other projects



Token

Public Network = 🖉 Participants



light client reference implementation for IoT use cases

Client Type	Hardware	Software	Example
Full client (conservative footprint)	2 GHz CPU, 20 GB storage, 1 GB RAM, networking capabilities	Linux, MacOS, Windows	
Light client (Compute, storage-light footprint)	1 GHz CPU, 100 MB storage, 50 MB RAM, networking capabilities	Linux, MacOS, Windows	Primary EWF focus to date
Thin client (Minimal footprint)	Minimal	Web browser with WASM support	Example of the state of the sta



first-of-its-kind governance structure based on Proof-of-Authority consensus

Off-chain governance

- **EWF Foundation Council** sets initial authority certification requirements for consideration
- The greater **energy and blockchain ecosystem** generates ideas and protocol improvement proposals
- A "Protocol Implementation Team" recruited by EWF facilitates the ecosystem, identifies / develops the most popular innovations, and submits to authorities for consideration





Ecosystem > Implementation Team > Authorities

On-chain governance

- **EWF blockchain is a public network** (any party / device can participate and submit transactions)
- Unlike other public networks, anonymous validators (e.g., miners, stakers) do not maintain state or run virtual machine
- Instead, permissioned, publicly known and validated authorities validate transactions, run virtual machine, and consider protocol upgrades



EWF is actively experimenting with variations of this structure on our test network in advance of genesis block

private transaction capability, enabling "compliant secrecy"

Private transactions and secret contracts

- Secret contracts can be encrypted
- Transaction data can be encrypted •
- State transitions of contracts only exposed to selected parties (e.g., regulators)
- Enables "compliant secrecy"



Q

Need for Regulator

Library of Certified Smart Contracts

- Secure inter-operability
- Secure system stability
- Parameter already defined in grid codes and/or market rules
- EWF will prepare a library for free

- Check out Chilenean Energy Regulator CNE
- Already all data on public blockchain online

Join our inital workshop for the regulatory library!

Ecosystem Development

EWF affiliate ecosystem as of April 20, 2018



* 18 VCs and vetted individual investors not shown. Total number of EWF Affiliates = 51

Learn how blockchains can be used in energy



We are working with Affiliates across five application domains

1 Utility billing	Utilities/third parties use cryptographic identities to manage customers
2 Certificates of origin	Renewable generators create certificates; certificates are issued, traded, retired and tracked on a blockchain
3 Demand response	Demand response aggregators (utilities, third parties) use secure smart contracts to conduct instant M&V, settlement
4 Electric Vehicles	Utilities/third parties use cryptographic identities to manage customers, vehicles, and charging infrastructure
5 Transactive / Peer to Peer Energy	Market design to balance and control the grid using temporal and locational price signals while maintaining grid reliability

Learn how blockchains can be used in energy



Use EW Connect—a platform for corporates, startups, and everything in between

Energy Web Connect facilitates connects the global EWF ecosystem by

Facilitating connections between and amongst corporate Affiliates (e.g., utilities) and ecosystem Affiliates (e.g., blockchain & energy startups)

Giving corporate Affiliates **a platform to issue RFPs for development support** to developers and startups

Creating a way for **venture-minded EWF** Affiliates to review startups for potential investment



Learn how blockchains can be used in energy



Build the blockchain with us

Affiliates become authorities on test network and provide feedback on tech development

- EWF chain = proof-of-authority consensus mechanism
- Interoperable with other public & private chains
- Purpose built for energy sector

Affiliates also help the EWF team set the standard for blockchain governance in energy

- Known, trusted authority nodes act as validators
- Semi-centralized decision-making enables quicker updates and better alignment
- Governance experiments ongoing



EWF PoA Blockchain Netstats page

Key achievements and milestones

We have maintained a strong focus on timely delivery



Thanks!

Contact:

Erwin Smole

erwin.smole@energyweb.org +43 664 4167905



