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ESIG – DER Blockchain for Services and Markets

June 5, 2019

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Who is EWF?

About Energy Web

Unleashing blockchain's potential in the energy sector

Mission

- An entrepreneurial organization dedicated to unleashing blockchain's potential in order to accelerate the transition to a decentralized, democratized, decarbonized, and digitized energy system.

Who we are

- Switzerland, Germany, USA, global...
- Co-founded by RMI and GSy
- Utilities, grid operators, TSOs/DSOs, oil majors
- IPPs, RE developers
- Blockchain developers, tech vendors
- Investors

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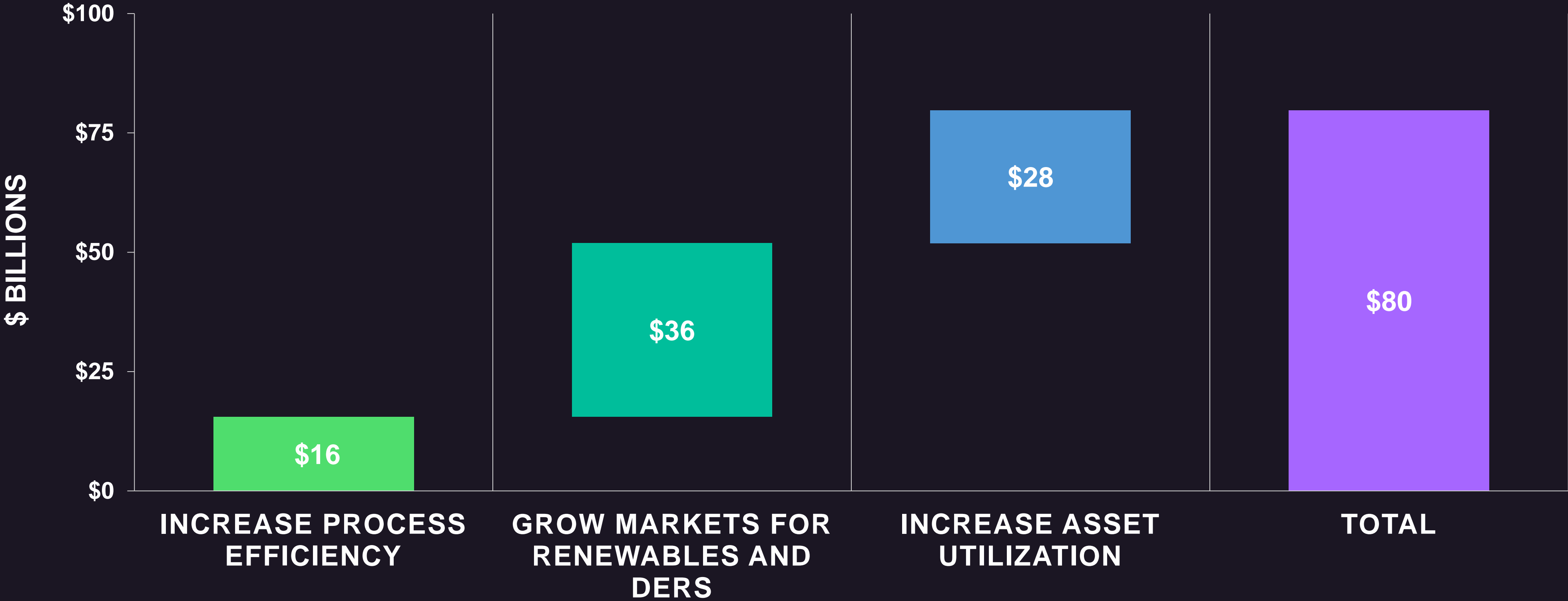# The world's largest energy blockchain community:
100+ Affiliate organizations

Energy Web's market

We believe blockchain enabled solutions can unlock $80 B / year in value globally

ANNUAL ENERGY SECTOR VALUE UNLOCKED BY BLOCKCHAIN

$ BILLIONS

$100			
$75		$28	
$50	$36		$80
$25			
$0			

INCREASE PROCESS EFFICIENCY — $16
GROW MARKETS FOR RENEWABLES AND DERS — $36
INCREASE ASSET UTILIZATION — $28
TOTAL — $80

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Media mentions & accolades

One of the most respected names in energy blockchain

300+

Media mentions since
1 January 2018

193%

Media mentions YOY
growth Q1 2018 vs. 2019

AS COVERED BY >>

261%

LinkedIn follower YOY
growth March 2018 vs. 2019

244%

Mailchimp subscriber growth
since October 2018

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Bloomberg · The Economist · WIRED · WORLD ECONOMIC FORUM

EURACTIV · MIT Technology Review · TNW · Forbes

gtm. A Wood Mackenzie Business · YAHOO! FINANCE · BREAKER · MIT Sloan Management Review

AMERICAN PUBLIC POWER ASSOCIATION · EUROMONEY · GreenBiz · ETH News

ELECTRIC LIGHT & POWER · UtilityWeek · RENEWABLE ENERGY WORLD · SOLAR MAGAZINE

COIN RIVET · pv magazine group · POWER · E&E NEWS

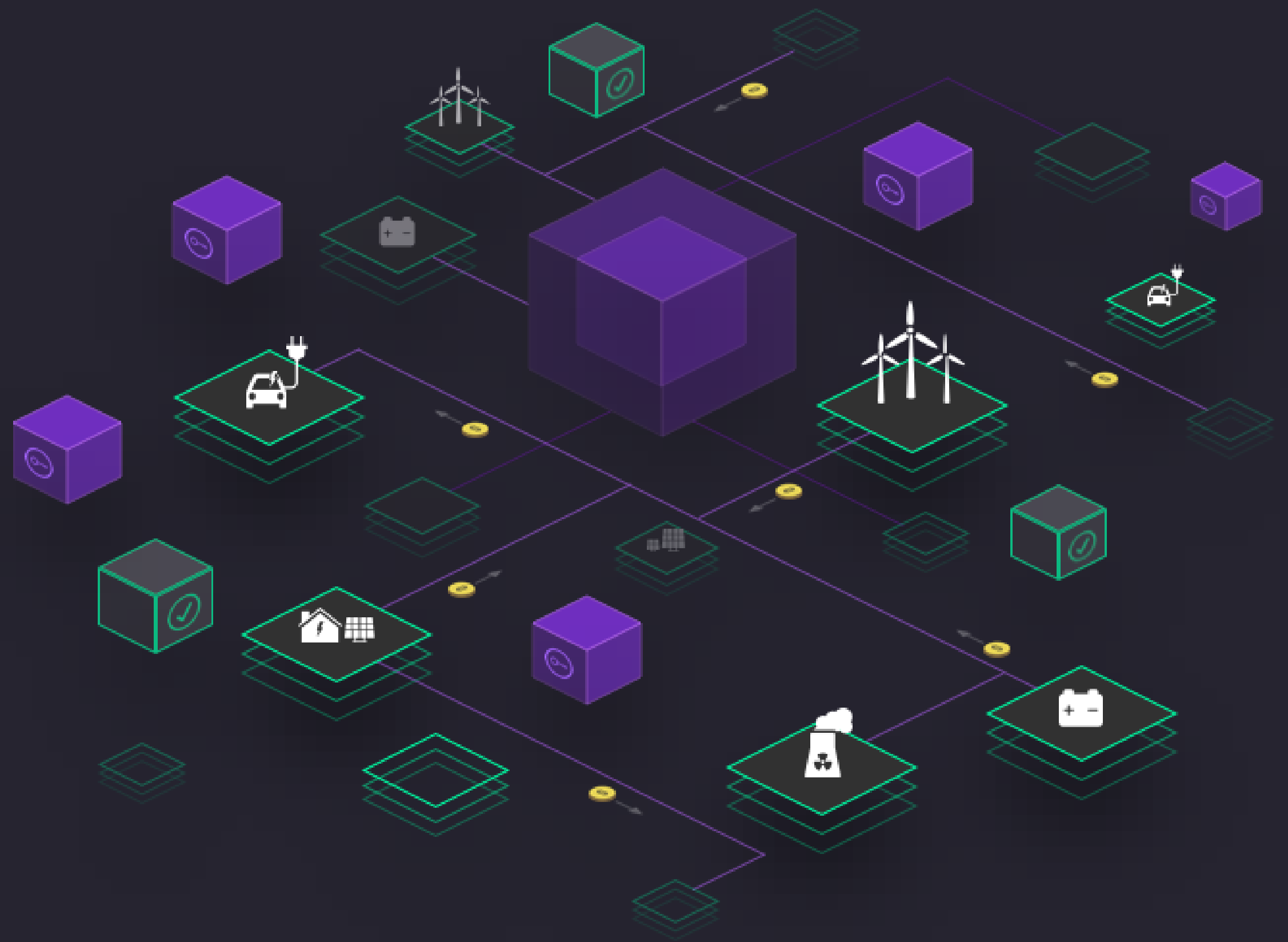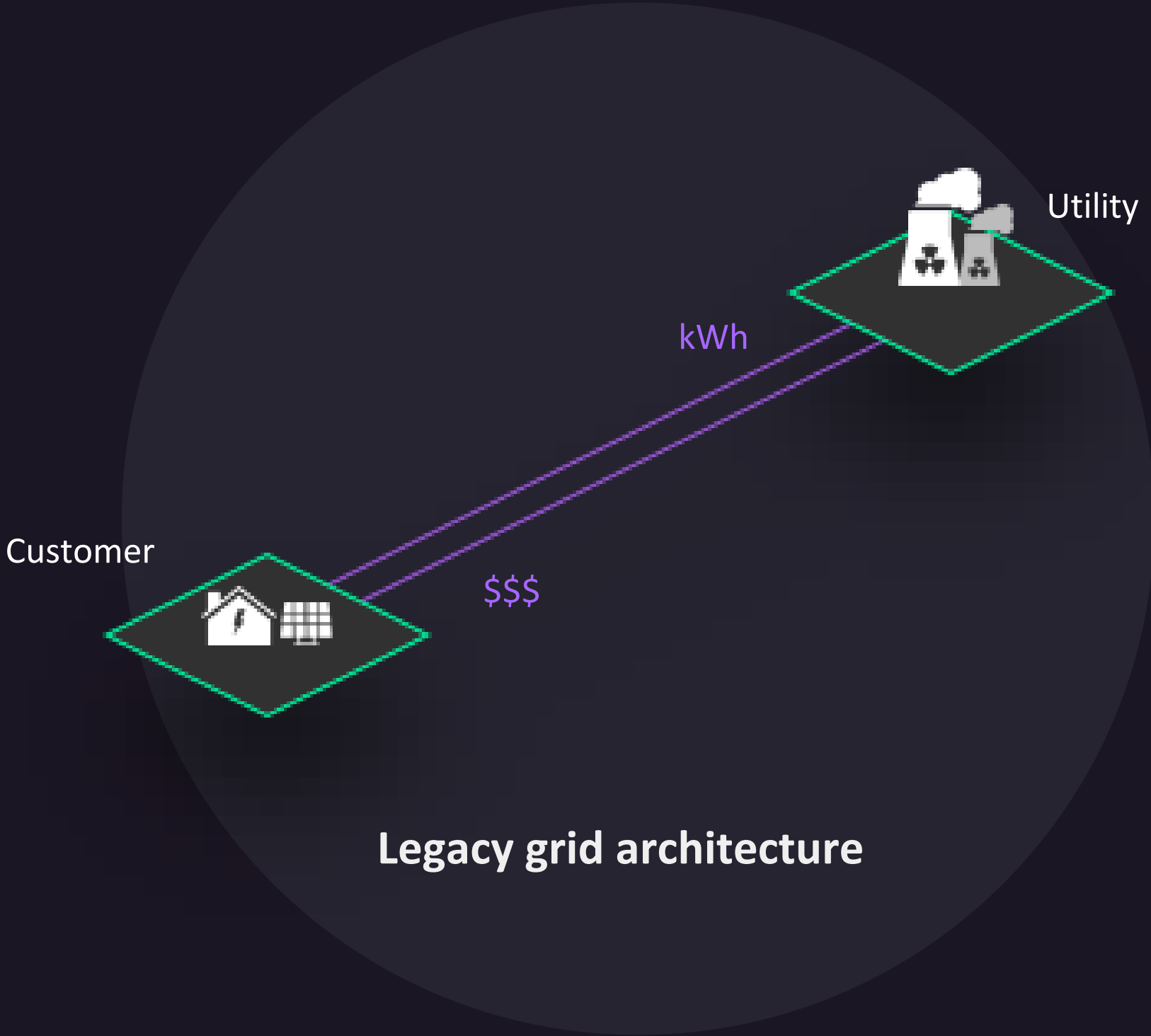PEi POWER ENGINEERING INTERNATIONAL · North American Clean Energy · Clean Technica · COINTELEGRAPH The Future of Money

Myths vs. Reality

The energy sector is transforming

Increasingly decentralized, decarbonized, digitized, and disrupted by electric mobility

Utility

Customer

kWh

$$$

Legacy grid architecture

Emerging grid architecture

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The transformation is driven by a number of trends

Market trends

Governments and corporates are creating **demand for more renewables**

In developed economies: **electricity sales are flat or declining**, and peak demand is increasing

In emerging economies**: over one billion need access to electricity** (and may leapfrog the 20th century grid model**)**

Technology trends

Renewables and distributed energy resources (DERs) are cost competitive with thermal generation

Electric mobility is coming fast, blurring the line between transportation and the grid

New digital technologies, such as blockchain and AI, are coming to market

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Myth #1: blockchain ≠ Bitcoin.

Myth #2: public blockchain ≠ data privacy.

Myth #3: blockchain tech is too nascent.
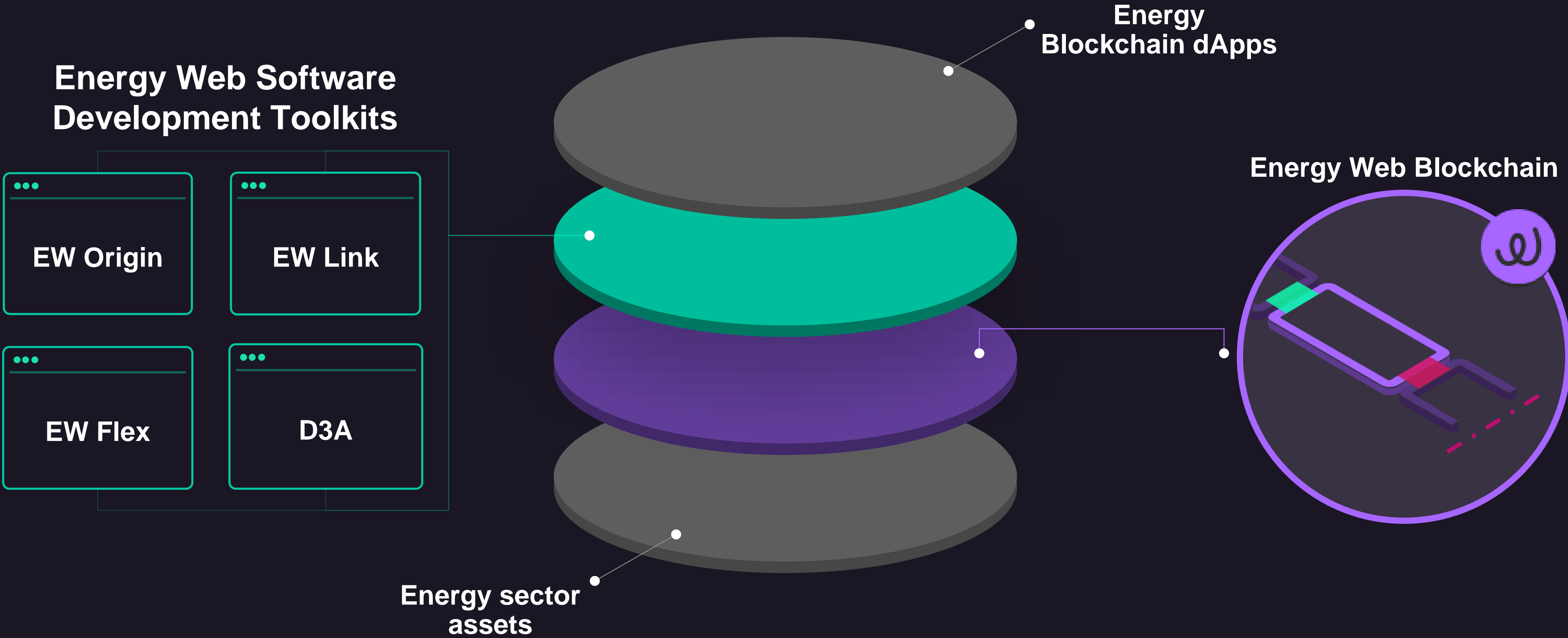
Myth #4: blockchain is a disruptor.

**Myth #5:** blockchain = silver bullet.

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EW Technology

Energy Web Technology

We leverage the Energy Web technology stack to support customer solutions

Energy Web Software Development Toolkits

EW Origin	EW Link

EW Flex	D3A

Energy Blockchain dApps

Energy Web Blockchain

Energy sector assets

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Energy Web Technology: EW Chain

The EW chain was developed specifically for the needs of the energy sector

EW Chain
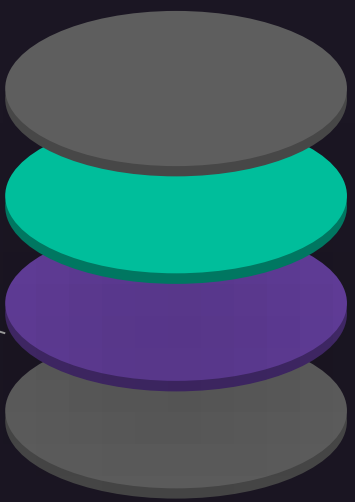
EW Chain Benefits

Interoperable by design and universally accessible

Developer friendly

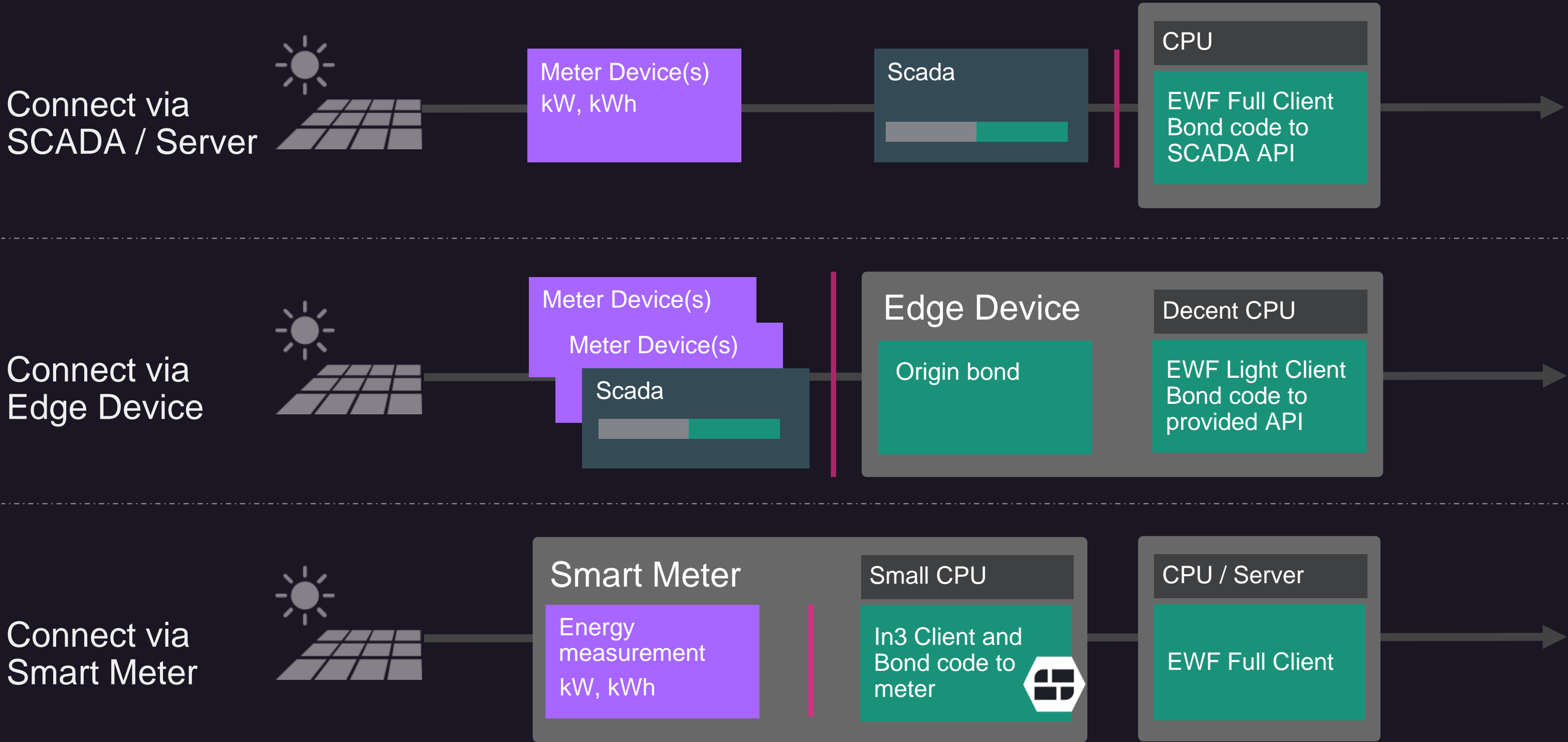**Powered and supported by the global energy community**

High scalability, low transaction costs, low energy consumption

How we create benefits

- Public network open to all utilities, users, and devices

- Virtual machine identical to public ETH

- Validator- and developer-based on-chain governance

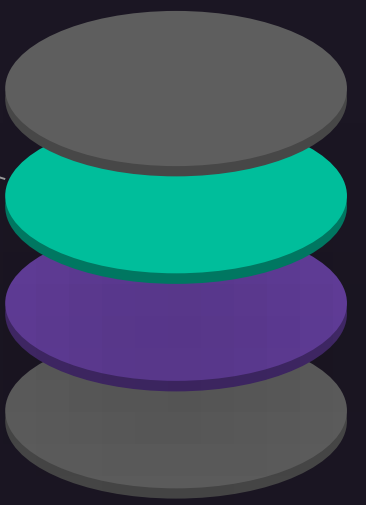- Proof-of-authority consensus

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Energy Web Technology: EW Link

Energy Web Link enables market participants to connect assets to the Energy Web chain with different software and hardware architectures

energy web LINK

Connect via SCADA / Server

Meter Device(s) kW, kWh

Scada

CPU
EWF Full Client Bond code to SCADA API

Connect via Edge Device

Meter Device(s)
Meter Device(s)
Scada

Edge Device | Decent CPU
Origin bond | EWF Light Client Bond code to provided API

Connect via Smart Meter

Smart Meter | Small CPU
Energy measurement kW, kWh
In3 Client and Bond code to meter

CPU / Server
EWF Full Client

🟪 Metering device   ⬛ Hardware with CPU   🟩 Client software

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Use Cases & Vignettes

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Energy Web Technology: EW Origin

Energy Web Origin helps market participants grow markets for renewable energy and increase the efficiency of carbon trading

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ORIGIN**

- **For established renewables and carbon markets**, EW Origin creates value by increasing data transparency and granularity, enabling small customer participation, and trustlessly matching buyers and sellers
- **For emerging renewables and carbon markets**, EW Origin presents a digital leapfrog opportunity to establish and grow markets for renewables

Current Owner: Microsoft Corporation

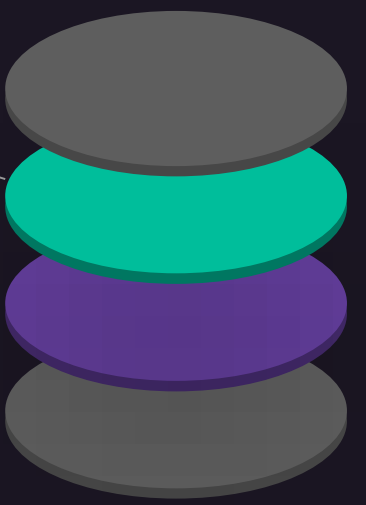**Creation Date:** 12 April 2019

Asset Owner: Engie AS

Asset Type: Wind

Nameplate Capacity: 6,000 kW

Certified Energy: 10.000 kWh

CO_2 Saved: 0.001 kg

Marginal CO_2 offset: 0.001 kg

**Location:** 50.654188, 3.65156

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Energy Web Technology: EW Flex

Energy Web Flex is a new toolkit enabling market participants to share data, manage access rights, and settle payments efficiently and trustlessly
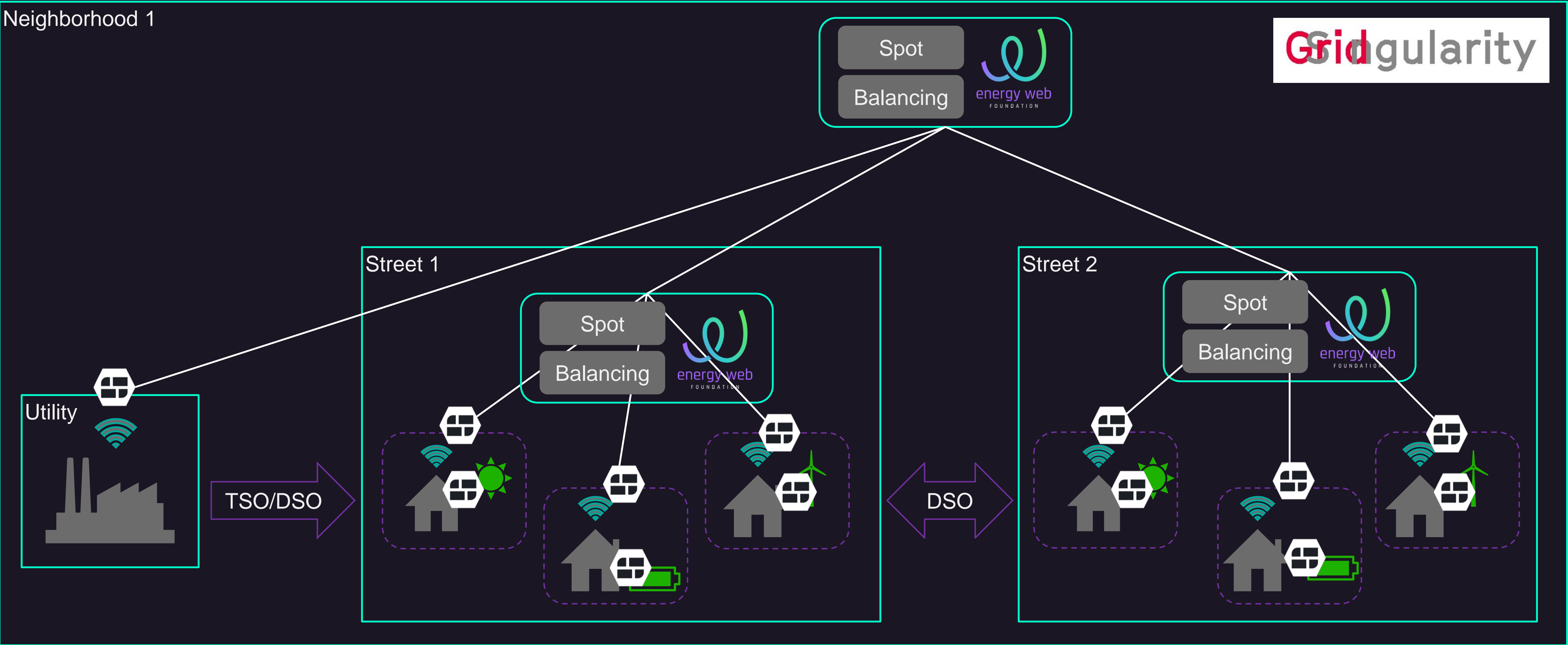

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FLEX

- Onboarding DERs to electricity markets is an expensive, complicated process where asset and user information is siloed across individually managed registries and databases

- **This decreases interoperability and increases cost at a time where coordination is more important than ever**

- EW Flex enables trustless data sharing, DER onboarding, and settlement using any number of market models or incentives
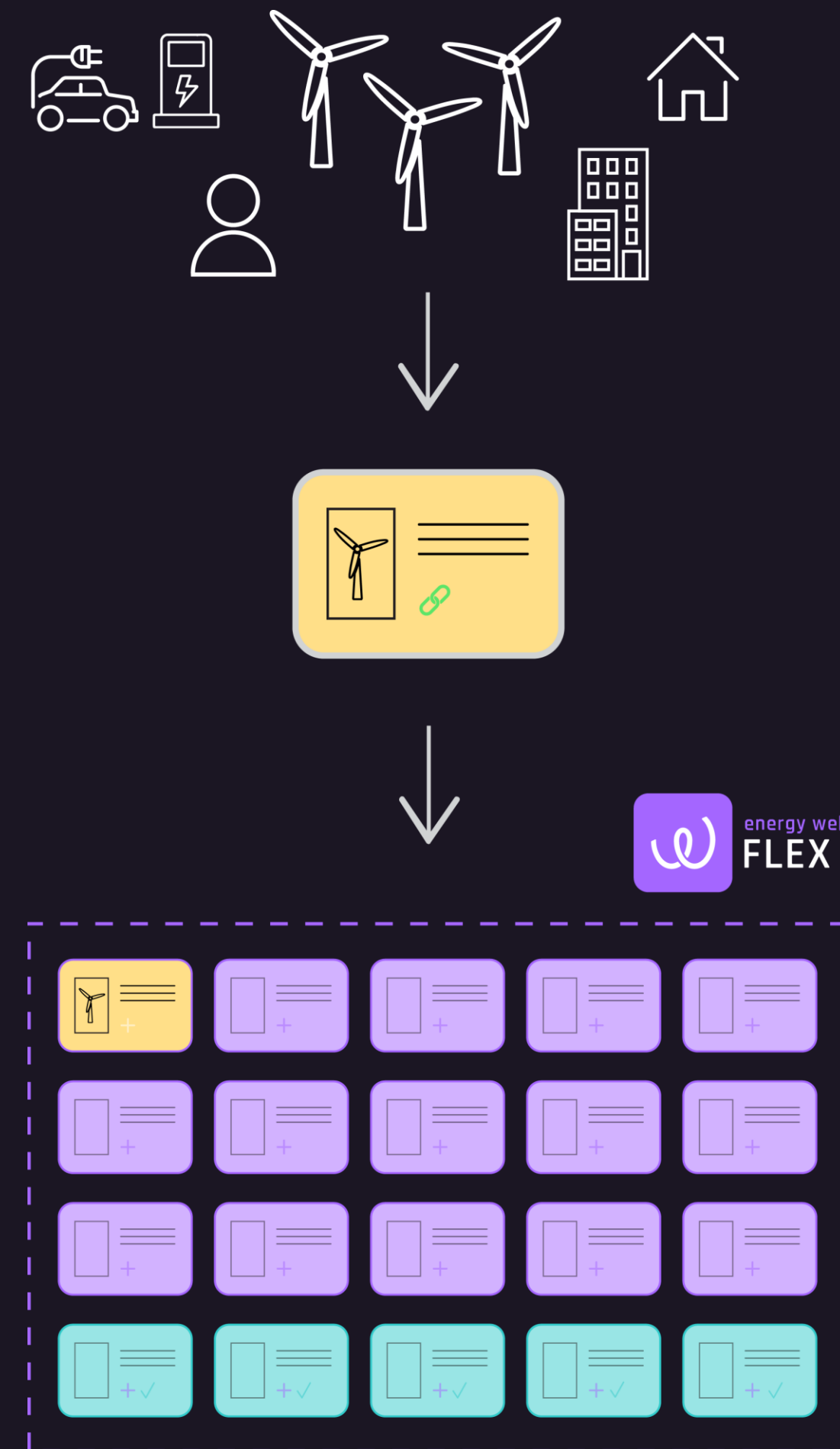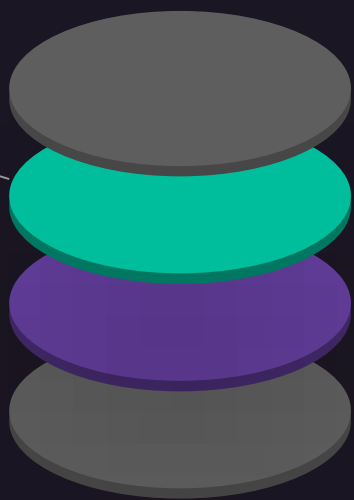
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Energy Web Technology: D3A

The Decentralized Autonomous Area Agent (D3A) is a simulation tool co-developed by EWF and Grid Singularity that enables market participants to understand the value unlocked by transactive and peer-to-peer market models

EventHorizon 2019, Berlin, DEU
June 18, 2019
Energy Web Chain goes live…

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