



**energy web**

**Jon Creyts, PhD**  
**Chair, Energy Web Foundation Council**

***IEA TCP Universal Meeting***  
***Paris, France***  
***18 June 2019***





## **Today's discussion**

**01 EWF mission**

**02 What we do**

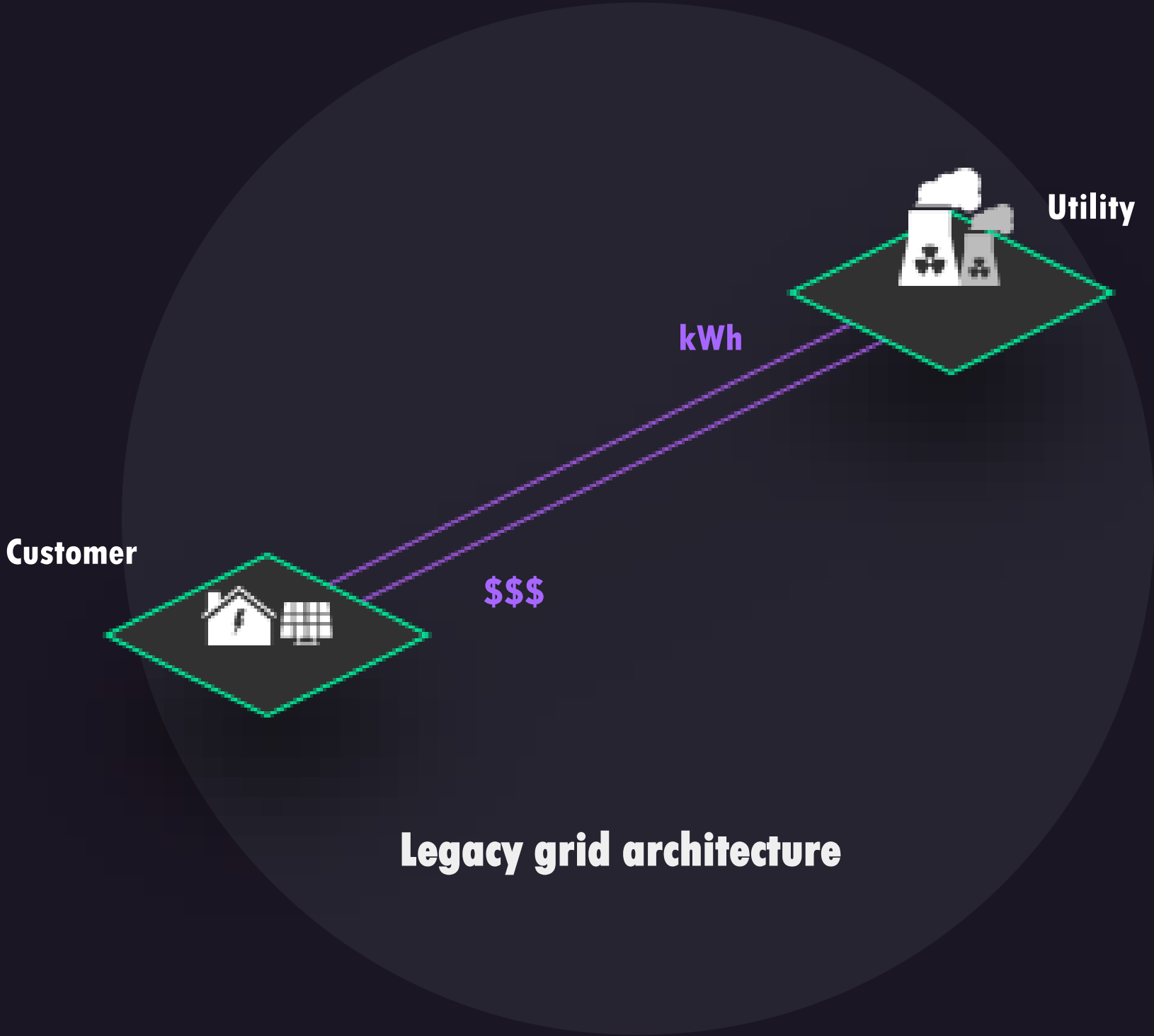
**03 Accelerating innovation**



# ● EWF mission

# The energy sector is transforming

A century-old business model and architecture is in rapid transition



# The transition 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 20<sup>th</sup> century grid model)

## Technology trends

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

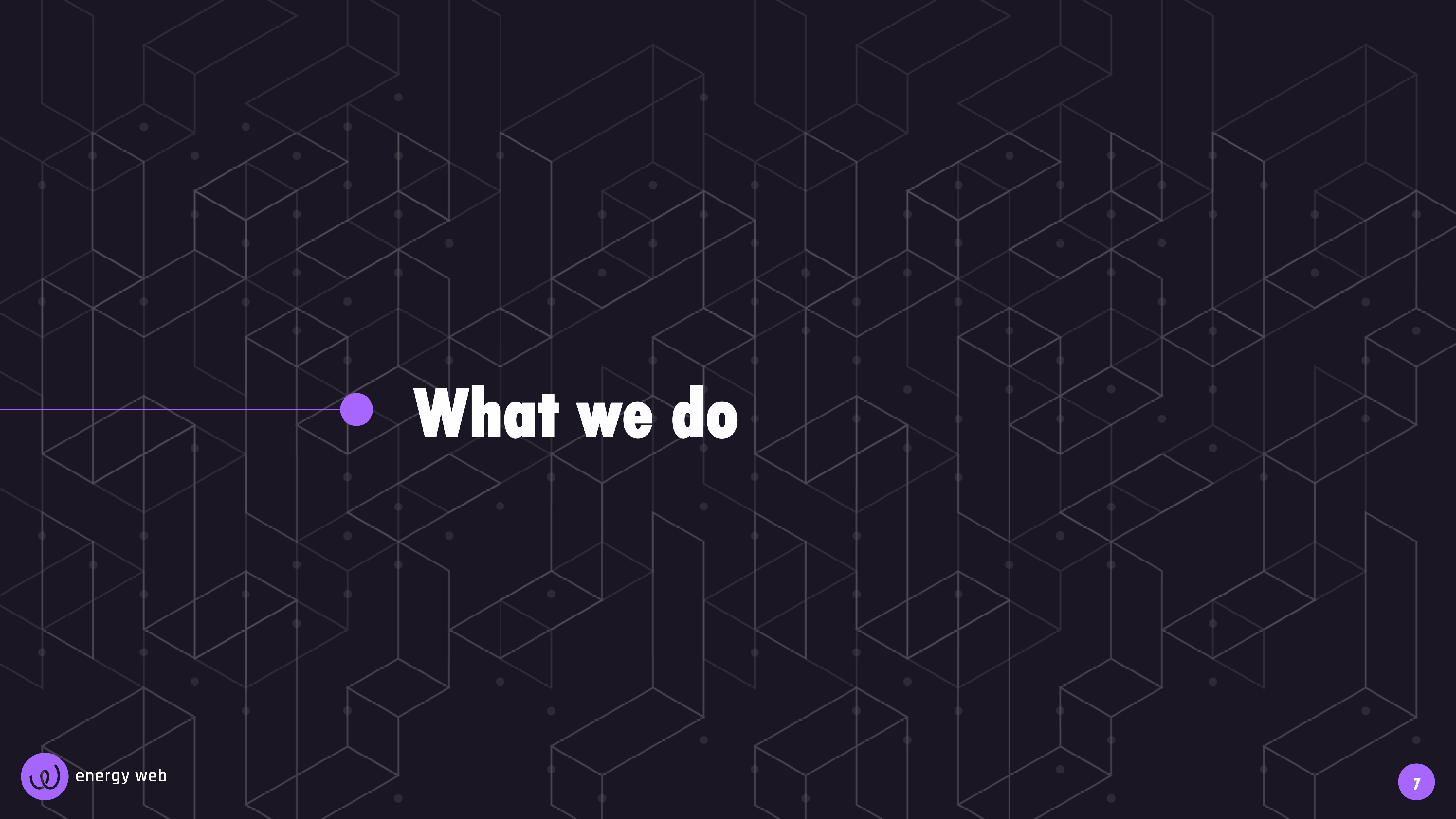
**Electric mobility** is coming fast, blurring the line between transportation and the grid

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



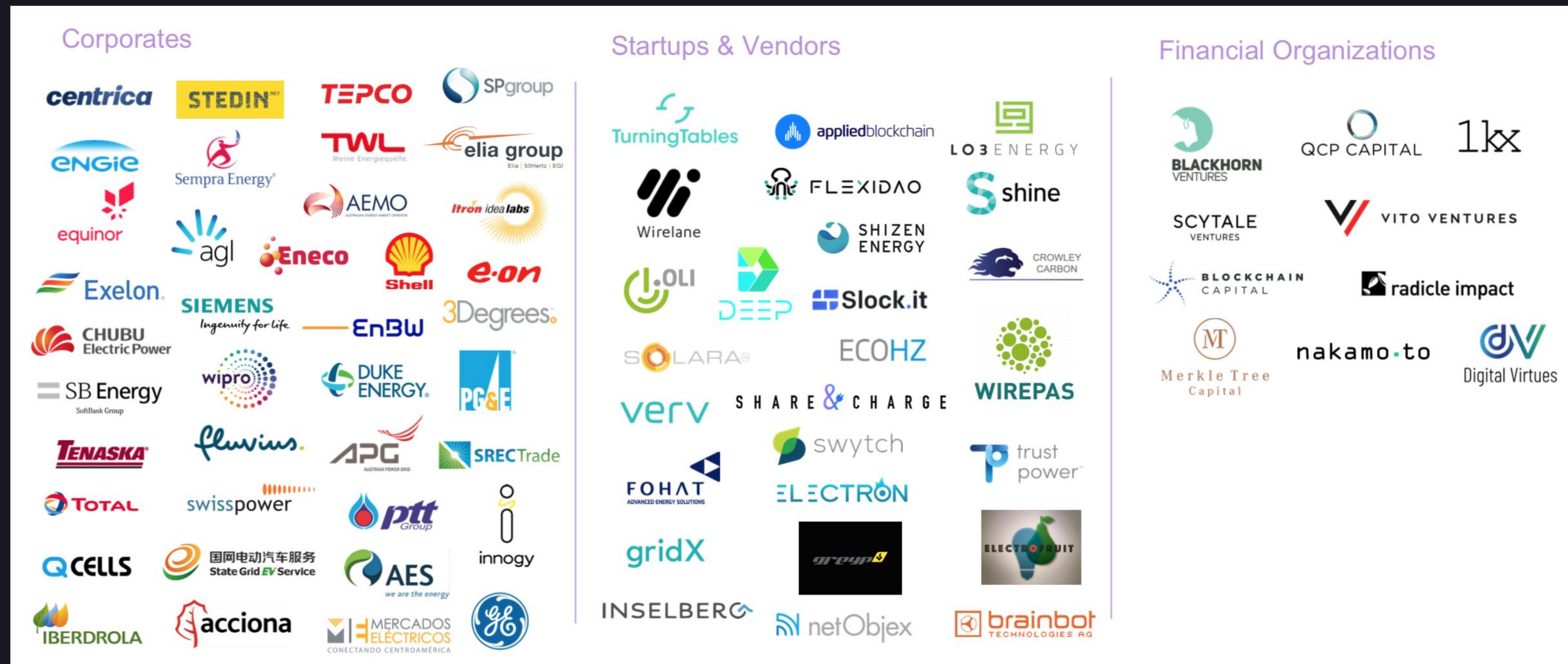
**EWF's mission is to accelerate this transition using blockchain and decentralized technologies**





# ● What we do

# We have assembled the largest energy blockchain community to date with over 100 Affiliate organizations



# With this community we focus on three key activities to achieve our mission

**Support, convene, and advise market participants on how to create business value with blockchain and decentralized tech**



**Develop, test, and integrate technologies in support of decentralized solutions in the energy sector**



**Co-create standards and certifications via interdisciplinary working groups to transform the sector**

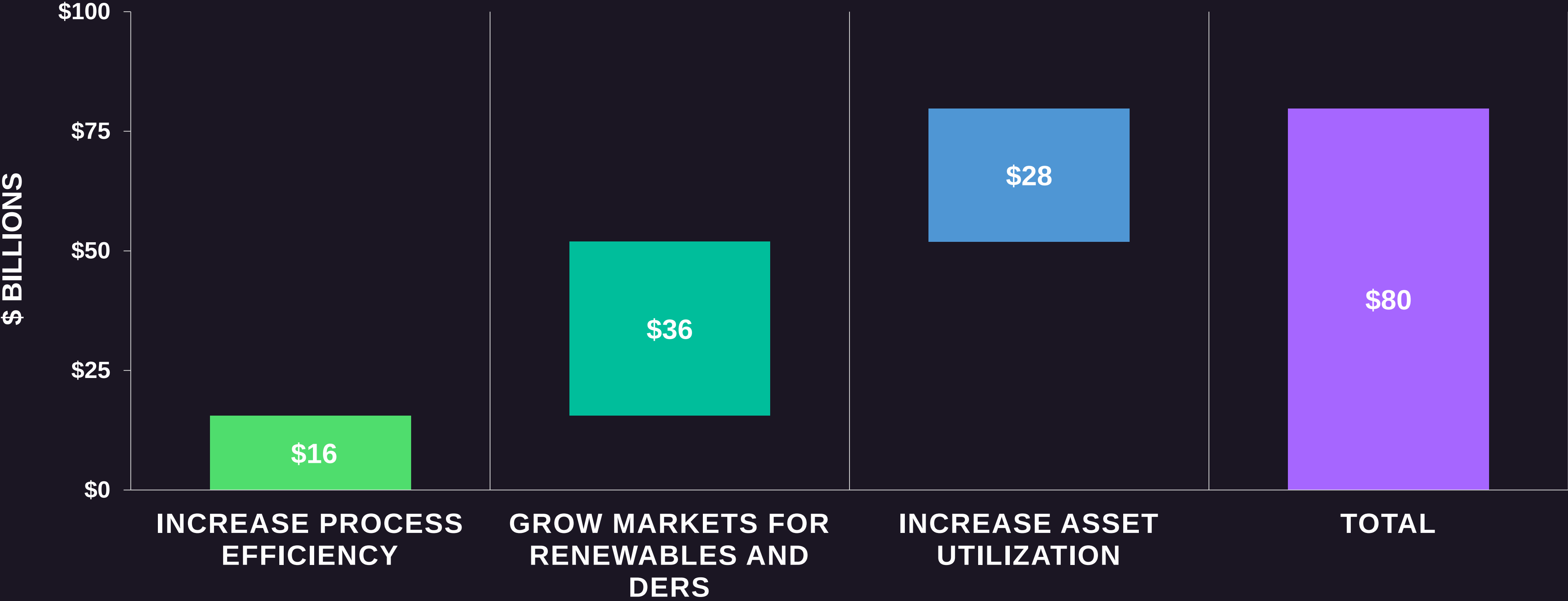




# Focus 1: educate and train market participants on how to unlock value with blockchain

We believe blockchain-enabled solutions can unlock \$80 B / year globally

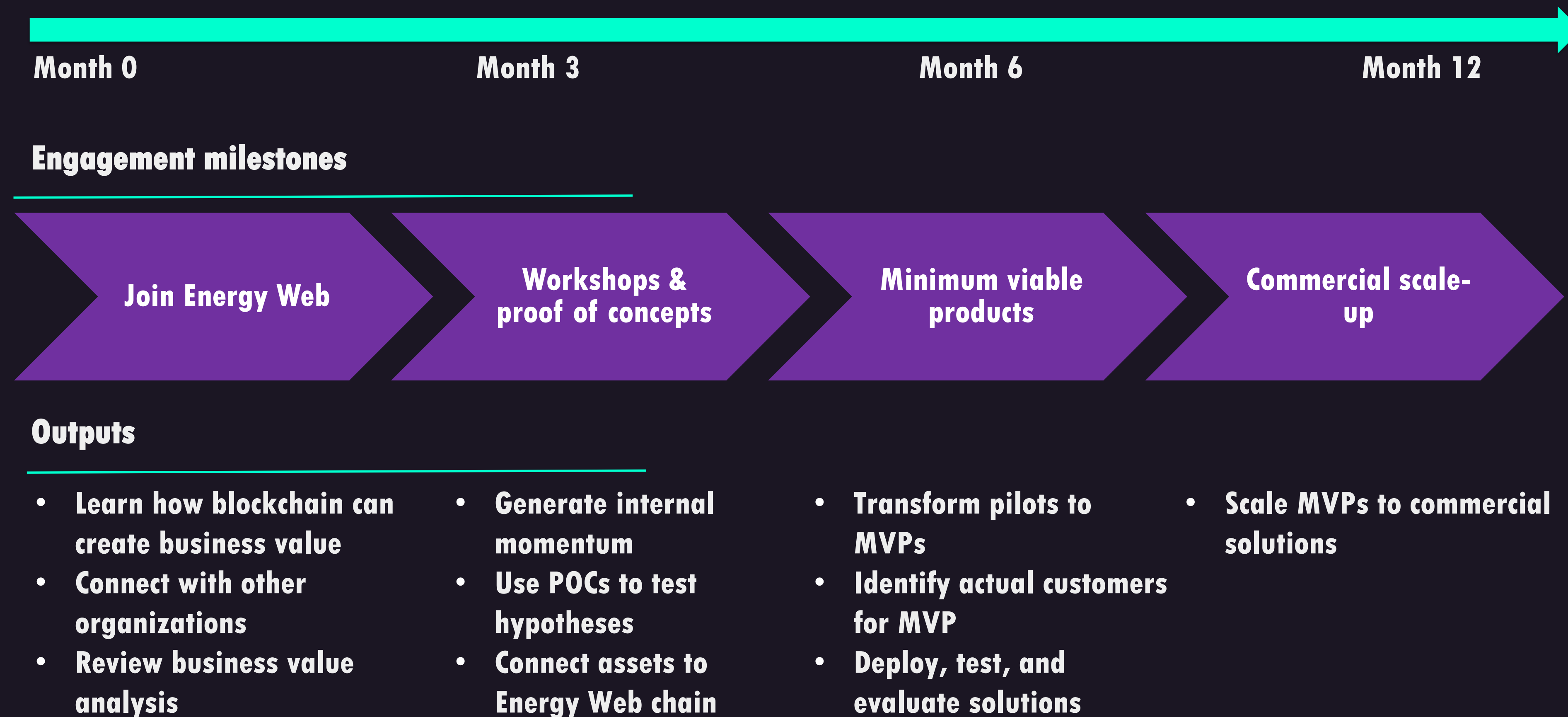
ANNUAL ENERGY SECTOR VALUE UNLOCKED BY BLOCKCHAIN





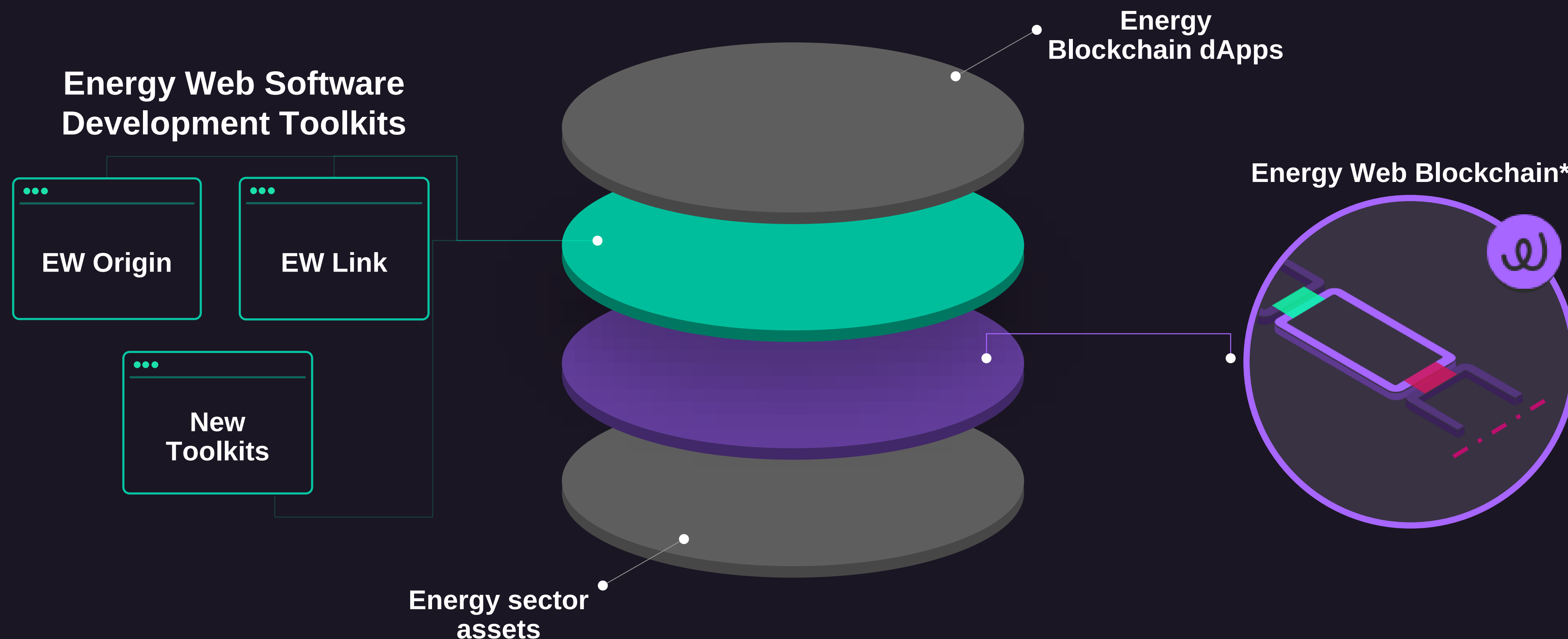
# Focus 1: educate and train market participants on how to unlock value with blockchain

To do so, we typically help EW Affiliates move along a common customer journey





## Focus 2: support energy sector dApps by integrating, testing, and developing open source technologies





# Focus 3: co-create standards and certifications

EWF also works with our community to solve regulatory and policy challenges that stretch across Affiliate boundaries

| Working Group                                    | Intended outcomes                                                                                                                       | Supporting activities                                                                                                                                                                                                                                                                             |
|--------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Registry interoperability                        | Create integrated, regional registries for certificates / guarantees / carbon; integrate and digitize scope 1 and 2 emissions reporting | <ul style="list-style-type: none"><li>Co-developing reference architectures, standards, and/or certification programs</li><li>Convening interdisciplinary groups including key stakeholders from outside EWF ecosystem (e.g., regulators)</li><li>Demonstrating value via POCs / pilots</li></ul> |
| Data sharing for a 21 <sup>st</sup> century grid | Enable secure, trustless data sharing between energy market participants; unlock data marketplaces in energy                            |                                                                                                                                                                                                                                                                                                   |
| Market designs for 100% renewables               | Develop market designs that integrate grid requirements, customers, and regulatory objectives / requirements                            |                                                                                                                                                                                                                                                                                                   |

Other working groups: digital asset certification, regulatory sandboxes



- **Accelerating innovation**

# Rapidly emerging applications of blockchain

## Financial assets

- Payments (e.g., Facebook GlobalCoin)
- Tokenization of assets (e.g., wind / solar farms)
- Digitized financial services (e.g., Komgo – energy trade finance)

## Physical assets

- Supply chain for products (e.g., LVMH's AURA – authenticity of luxury goods)
- Supply chain for commodities (e.g., Singapore Power REC trading)
- Supply chain for services (e.g., the BeSure network)

# Revolutionary assets: Transactive machines

Financial  
assets

Physical  
assets



Transactive  
machines

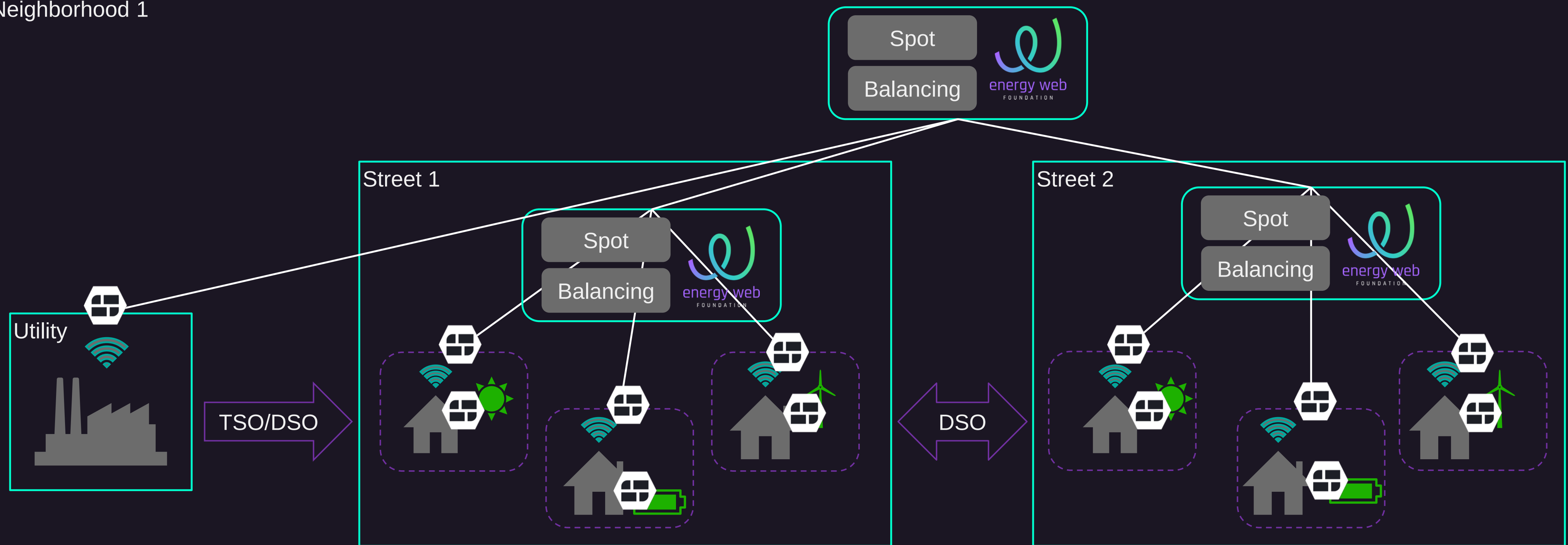


- Have their own *wallet*
- Can *buy* electricity and *sell* services to the grid
- Integrated payments – no invoice, no owner, no bank, ...

# Revolutionary operations: Fractal, recursive markets that dispatch from both ends

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

Neighborhood 1



# Digitalization implications for this Network

1. Be clear on what sets the pace of change
2. Get ahead of asset stranding
3. Leapfrog in undercapitalized markets wherever possible
4. Integrate distributed assets as solutions
5. Engage regulators early

# THANK YOU!

**Jon Creyts**

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# ● **Appendix A: About Energy Web Foundation**

# 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



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

ETHNews

ELECTRIC  
LIGHT & POWER

UtilityWeek

RENEWABLE  
ENERGY  
WORLD

SOLAR  
MAGAZINE

COIN RIVET

pv magazine  
group

POWER  
BUSINESS & TECHNOLOGY FOR THE GLOBAL GENERATION INDUSTRY SINCE 1992

E&E NEWS

PEI  
POWER ENGINEERING  
INTERNATIONAL

North American  
Clean Energy  
www.nacleanenergy.com

Clean  
Technica

COINTELEGRAPH  
The Future of Money

# Media mentions & accolades

One of the most respected names in energy blockchain

*Finalist, Emerging Technology of the Year*  
—2018 Global Energy Awards (S&P Global Platts)

*EWF appears to be positioning itself wisely and carefully in the emerging blockchain-for-energy space... It's one to watch.*

—CleanTechnica

*Named one of “4 energy blockchain companies you should watch in 2019”, one of “the most revered names in the business”, and one of “15 firms leading the way on energy blockchain”*

—Greentech Media

*“EWF has created one of the largest energy blockchain ecosystems in the world, connecting a diverse range of organizations such as energy companies, utilities, grid operators, startups and software developers.”*

—Ledger Insights

*Named a ‘Blockchain Pioneer’ as one of the “companies who are leading the charge”*

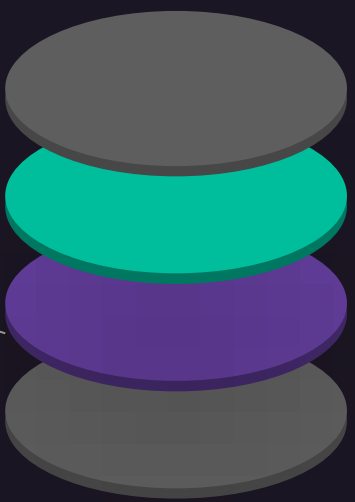
—UtilityWeek

# ● **Appendix B: EW Technology Detail**

# 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**

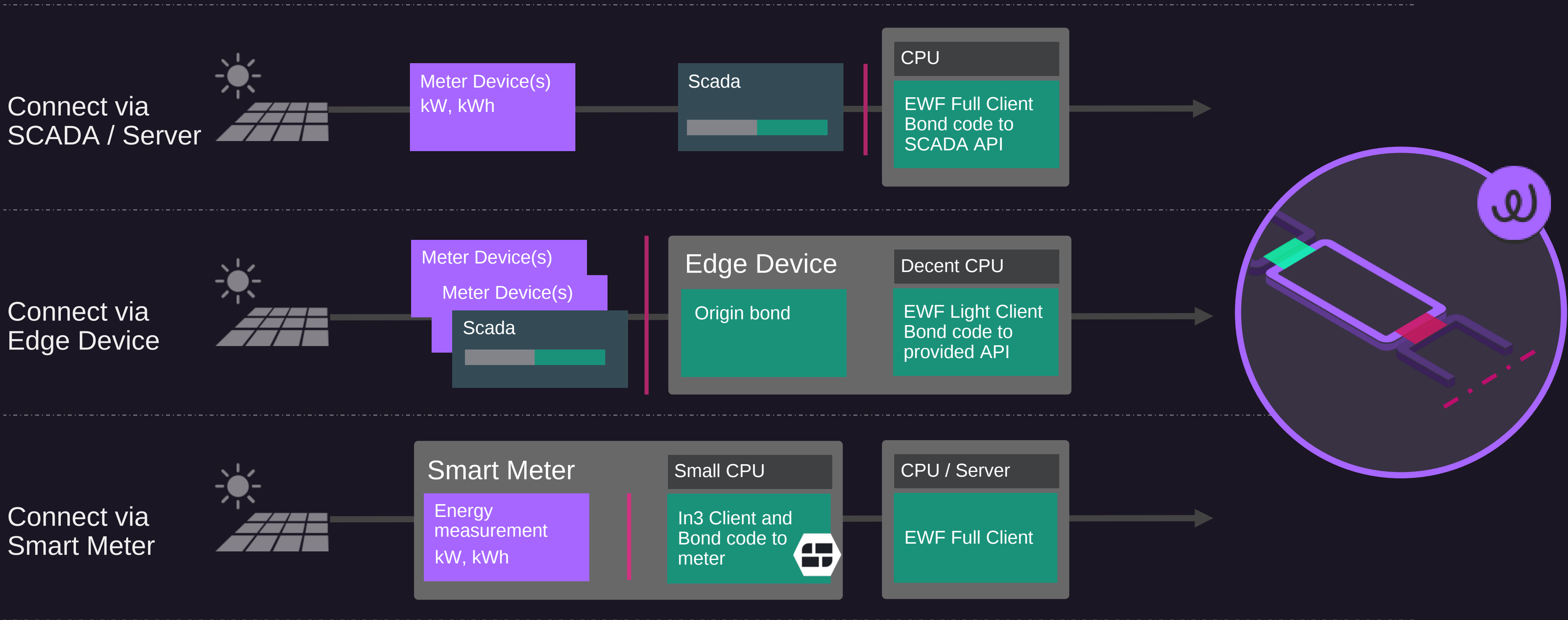
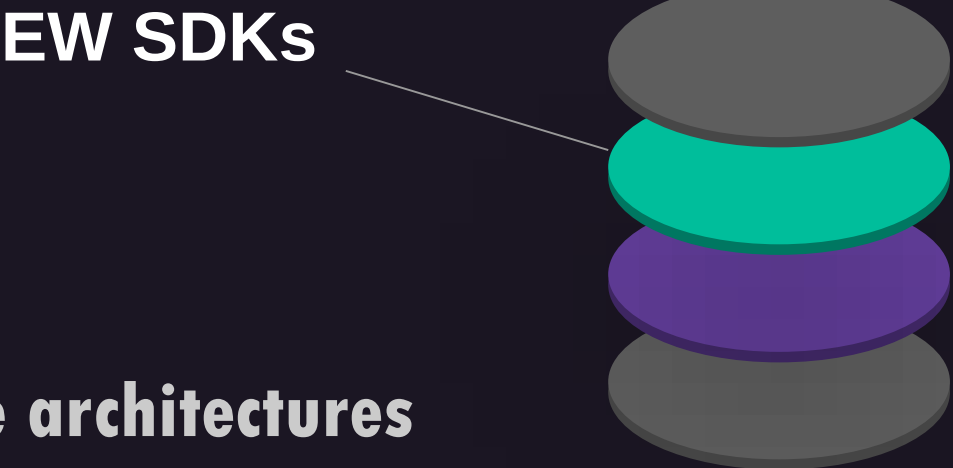
**High scalability, low transaction costs, low energy consumption**

## How we create benefits

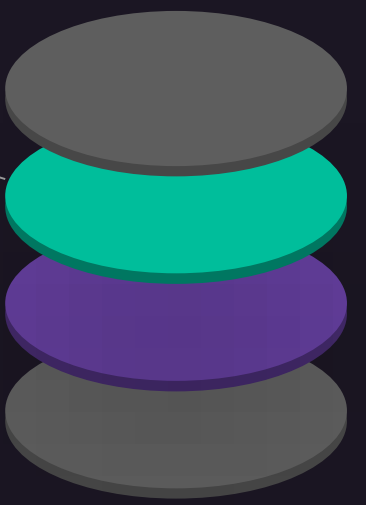
- **Public network open to all utilities, users, and devices**
- **Virtual machine identical to public ETH**
- **Validator- and developer-based on-chain governance**
- **Proof-of-authority consensus**

# 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



■ Metering device   ■ Hardware with CPU   ■ Client software



# Energy Web Technology: EW Origin

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



- **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

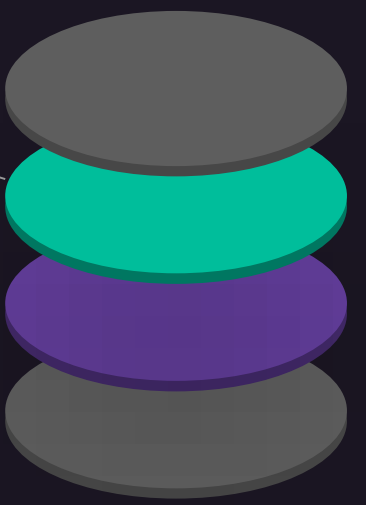
**Nameplate Capacity:** 6,000 kW

**Certified Energy:** 10.000 kWh

**CO<sub>2</sub> Saved:** 0.001 kg

**Marginal CO<sub>2</sub> offset:** 0.001 kg

**Location:** 50.654188, 3.65156

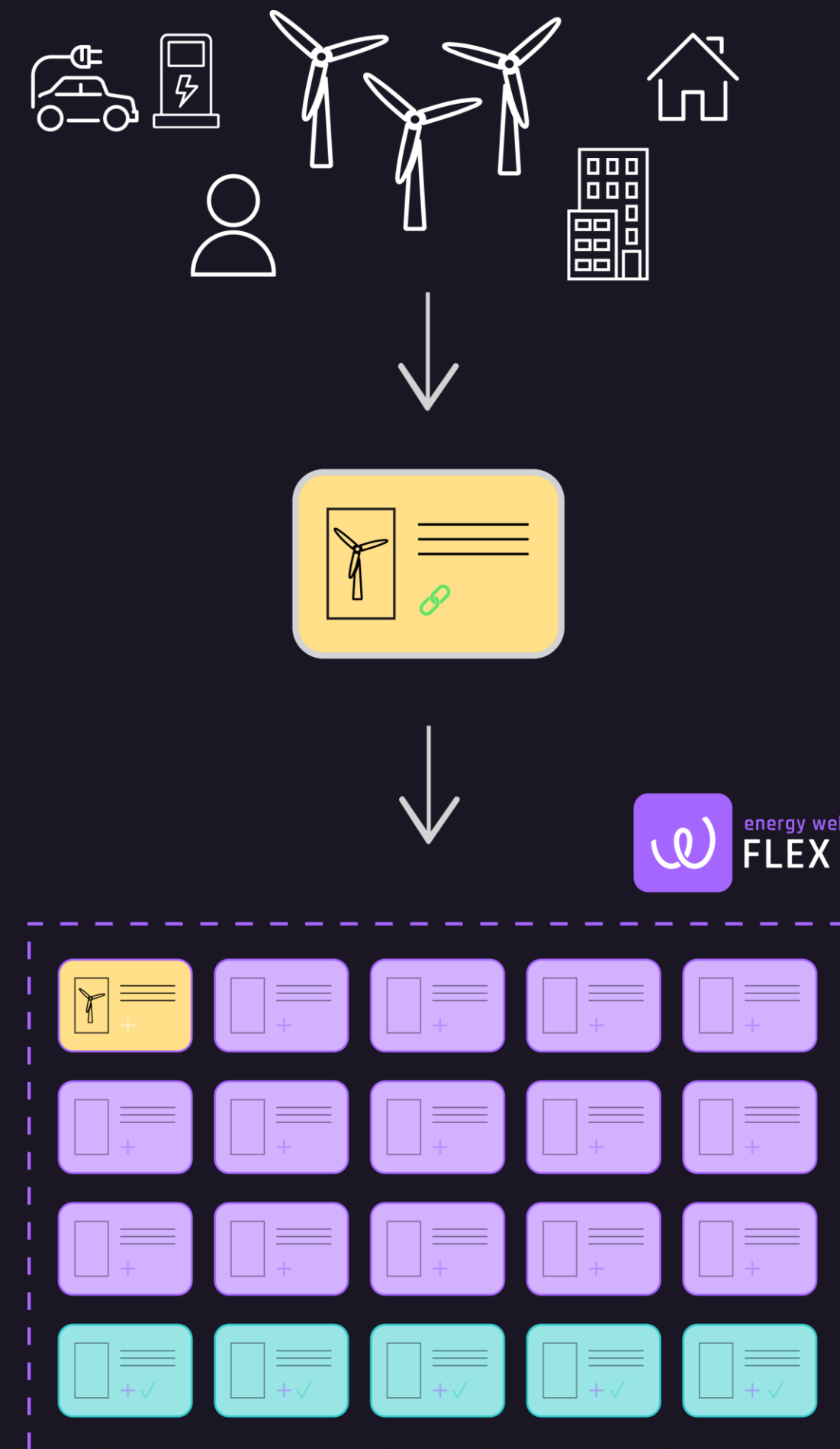


# Energy Web Technology: EW Flex

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



- 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





# Jon Creyts

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