energy web

2025

# Build Connect Transform

ENERGY WEB INTRODUCTION

# Energy Web at a glance

**Energy Web** is a technology company that builds **open source** digital technology to accelerate decarbonization

TECH COMPANY FOCUSED ON

**decarbonizing the global economy**

TECHNOLOGY DEPLOYED AND IN USE BY

**100+** energy companies

ACROSS 17 TIMEZONES

**~45** team members

WITH HUBS IN THE UNITED STATES, WESTERN EUROPE AND AUSTRALIA

**Business model =**

SOFTWARE SERVICES, LICENSES, GOVERNMENT CONTRACTS, AND PHILANTHROPY

# Energy Web Ecosystem

## VISION

Our name is our vision - an interconnected Energy Web empowering a sustainable, decentralized, and resilient global energy future.

## MISSION

Energy Web unites policymakers, leading enterprises, and innovators to collaboratively accelerate and transform global energy markets through Web3 technologies. We pioneer market standards, drive regulatory innovation, and unlock unparalleled liquidity, efficiency, and compliance-shaping a trusted digital infrastructure for the energy transition.

All logos represent current or previous collaborations and partnerships.

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# Solutions

Active Solutions

Digital Spine

Green Proofs

AEMO

Carbon Aware

GP4BTC

Katalist

SAFc

Worker Node Network and SmartFlow

# Introducing Green Proofs

GREEN PROOFS

# Introducing Green Proofs

**Green Proofs** is a comprehensive software solution for corporate sustainability challenges.

PROVE YOUR COMPANY AND PRODUCTS ARE GREEN

Showcase sustainability efforts with verifiable data

SOURCE AND SELL GREEN PRODUCTS

Buy and sell low-carbon services and commodities

GREEN PROOFS

# Green Proofs Solution

## Bitcoin Mining

**IMPACT**
Blockchain-backed proof of clean energy use

**BENEFIT**
Boosts brand trust and streamlines sustainability compliance

www.gp4btc.org

## Aviation

**IMPACT**
Accelerate aviation decarbonization with seamless access to sustainable aviation fuel!

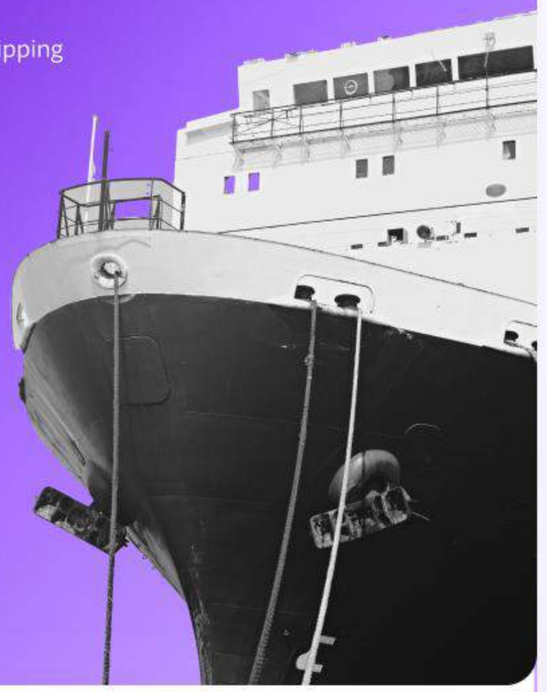
**BENEFIT**
Elevates brand with emissions compliance and sustainability leadership

www.safcregistry.org

## Katalist

**IMPACT**
Enhances sustainability, transparency, and efficiency throughout the shipping industry

**BENEFIT**
Certifies clean fuel use for greener shipping



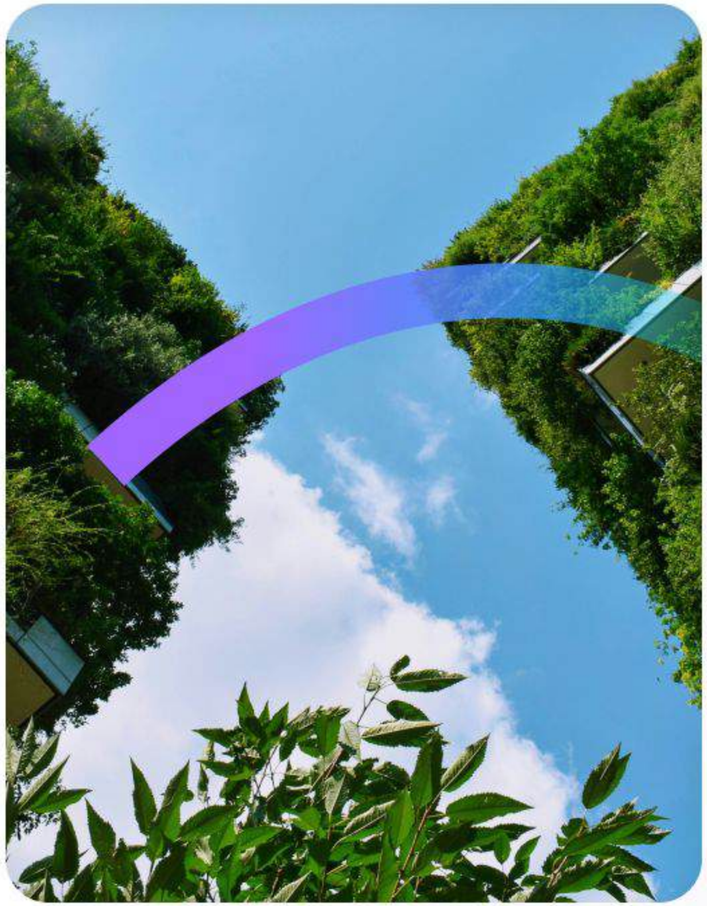
www.katalist.org

WHAT IS GREEN PROOFS?

# Who it's for and focus areas

BUSINESS APPLICATIONS

# Launch Green Product Registries



## Design and launch your own product registry

- Deploy registries to scale markets for emerging green commodity types.
- Enable transparent, scalable, and credible tracking and book-and-claim schemes.
- Help participants securely book, exchange, and retire digital certificates for commodities and their attributes.
- Spearhead your own registry or partner with industry consortia

BUSINESS APPLICATIONS

# Source and sell green products

## Buy and sell low-carbon services and commodities

**Use Green Proofs platforms for sustainable aviation fuel, sustainable shipping services, low-carbon compute, and climate-aligned bitcoin mining services to:**

- Reduce their corporate emissions (scope 1, 2, 3)
- Prove emissions metrics using pioneering Worker Node Network technology
- Streamline market access for green commodities
- Source verifiably sustainable materials for producing and marketing finished green products

# SAFc

Boost eco-friendly aviation fuel demand

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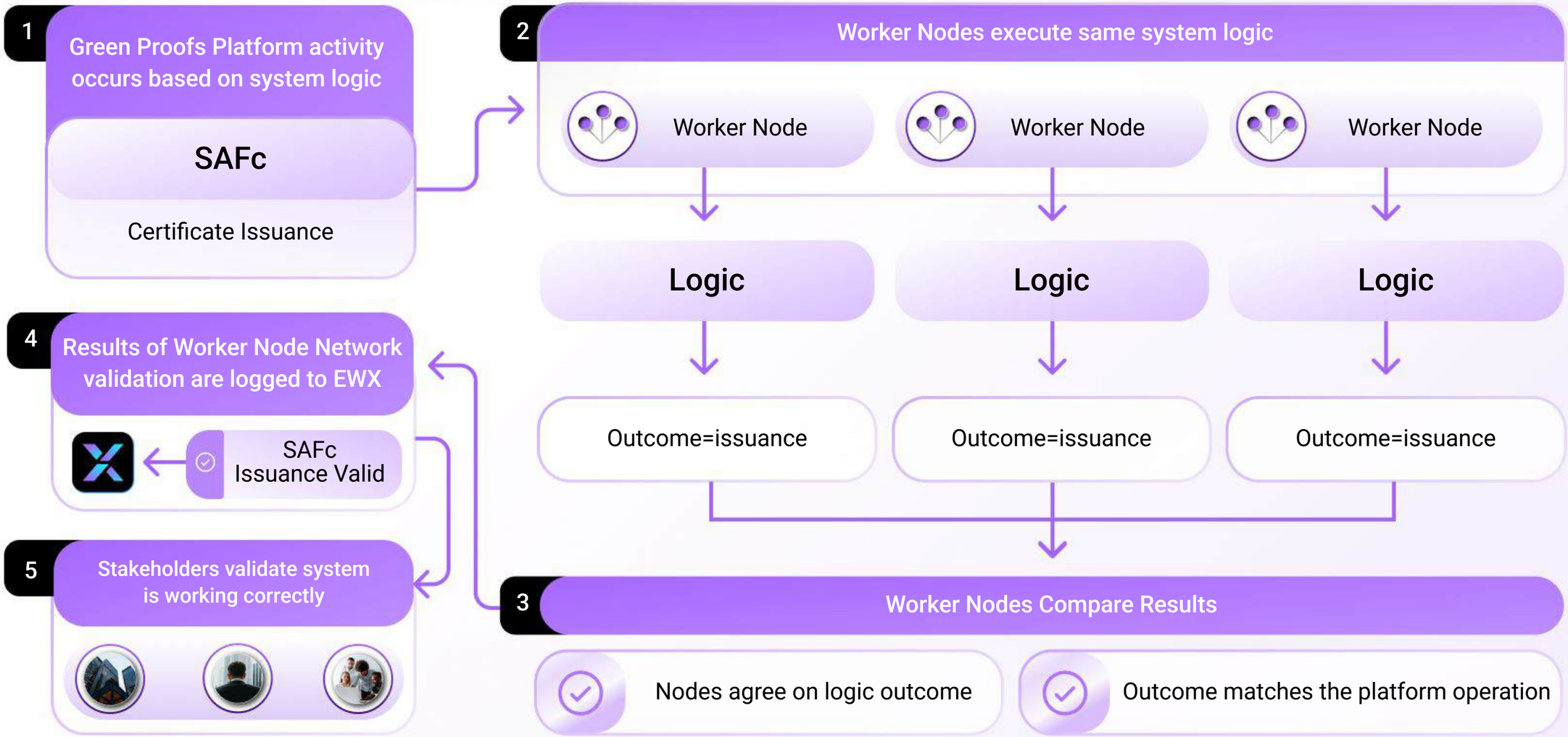
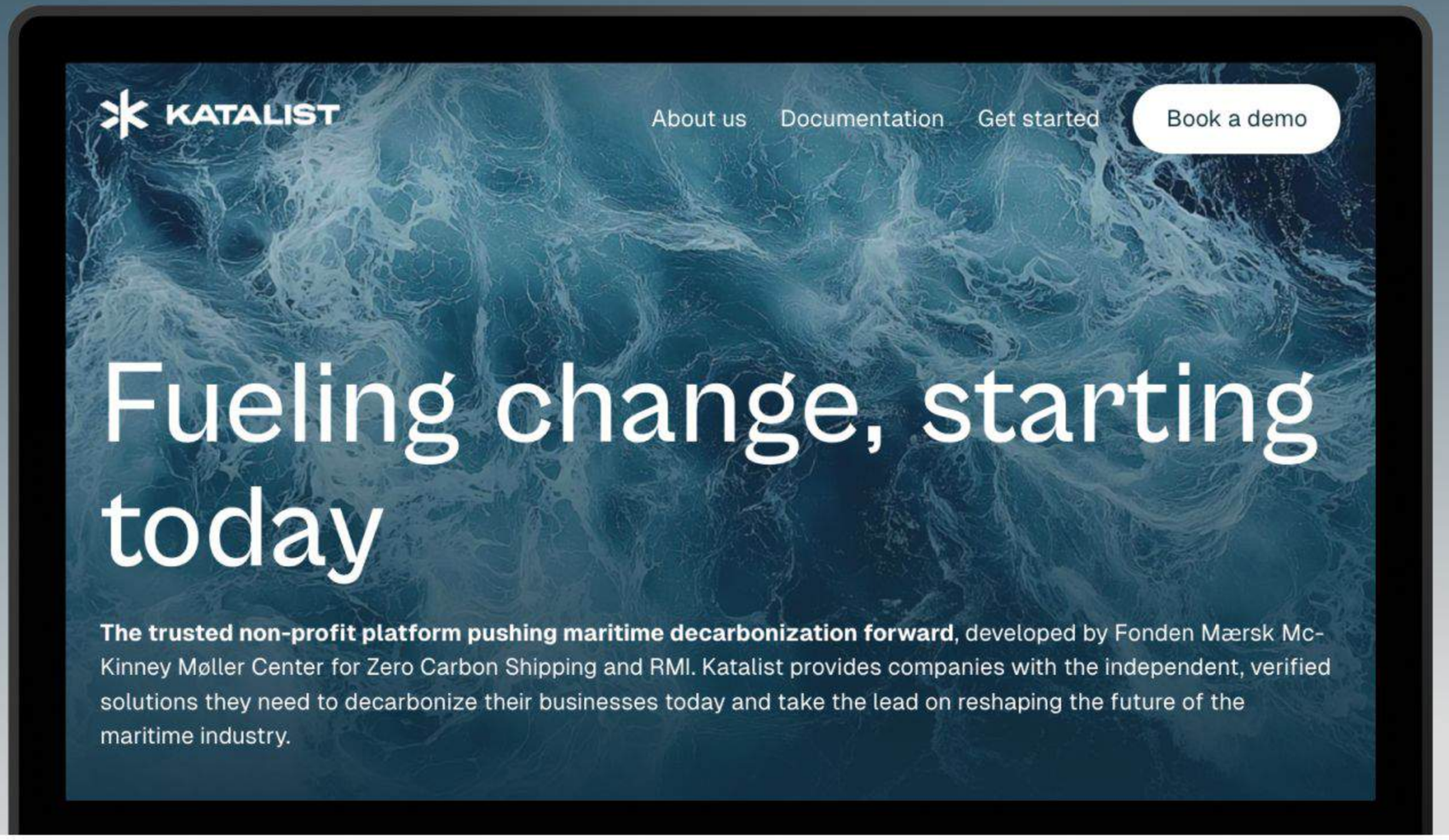
WORKER NODE NETWORKS IN GREEN PROOFS

# SAFc Registry Use Case



# Katalist

Promote Sustainable
Fuels for Shipping

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MARITIME

# Challenge

As a **shoe company** it's much easier to create a sustainable shoe, but have little control over your transportation.

As a **shoe buyer** it's hard to figure out if a shoe transportation is sustainable or not, especially when it travels by sea.

**35 years**
For a ship to be replaced with a sustainable one

**100.000**
Number of commercial vessels in operation

**300M tons**
Amount of fuel burned per year

**3%**
Shipping's share of global emissions

# Maritime Book and Claim (MBC)

Simplify the process of registering the usage and ownership of sustainable fuel for all the actors involved in the shipping part of the supply chain.

**Ship operator**

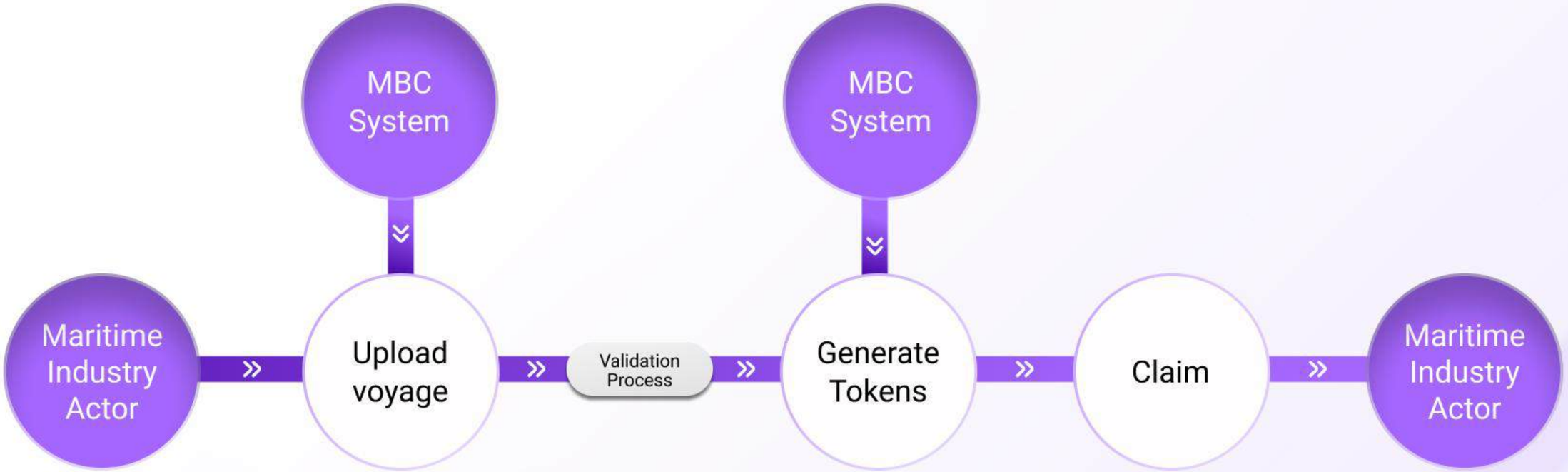
**Ship owner**

**Freight forwarder**

**Cargo owner**

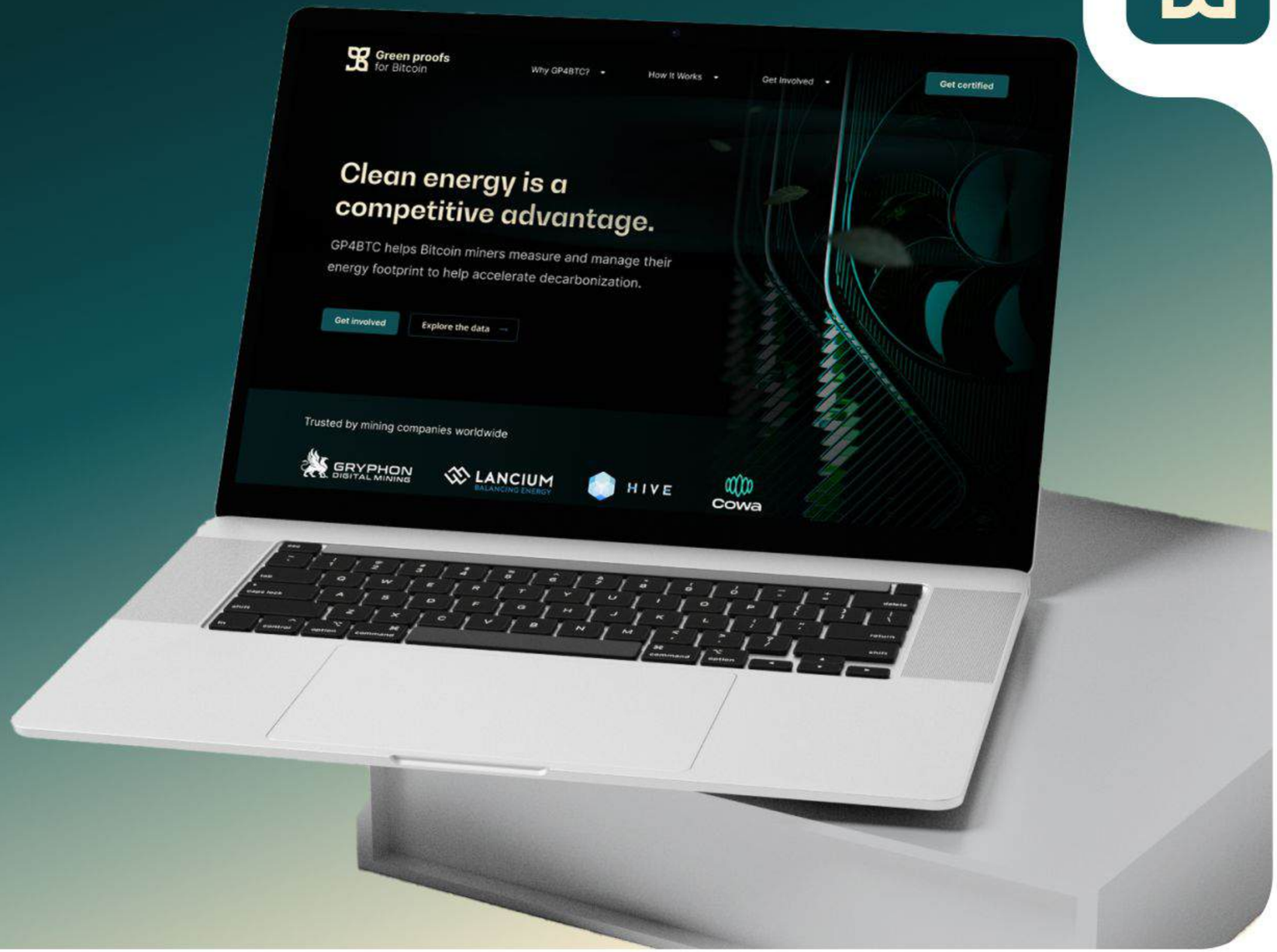
# MBC Registry Mechanism

The road from the country of assemble to your home is rather a complex one.



# GP4BTC

Reducing Bitcoin-adjacent emissions

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SOURCE AND SELL GREEN PRODUCTS

# Green Proofs for Bitcoin (GP4BTC)

**Green Proofs for Bitcoin** helps companies reduce emissions associated with their crypto activities

- Helps companies direct their business towards climate-aligned Bitcoin mining operations
- Spotlights contributions of climate-conscious miners to grid decarbonization
- Developed with 35+ crypto & energy market participants
- Launched May 2023

SOURCE AND SELL GREEN PRODUCTS

# Green Proofs for Bitcoin (GP4BTC)

## What we need

- Industry agreement on what constitutes climate-aligned mining
- Method to measure alignment of mining companies with this definition
- Ways to meet/drive investor demand for climate-aligned mining
- Ways to reward climate-aligned mining

## Green Proofs for Bitcoin

Shared framework for assessing climate impact of mining operations

Independent miner evaluation services

One-stop shop for market participants to discover and do business with climate-aligned miners

ROI for climate-aligned mining

CASE STUDY

# Paypal

## SCOPE

Collaborate with PayPal and DMG to develop a scalable platform for certified miners to participate in a new green mining initiative incentivizing climate-aligned Bitcoin miners

## GOALS

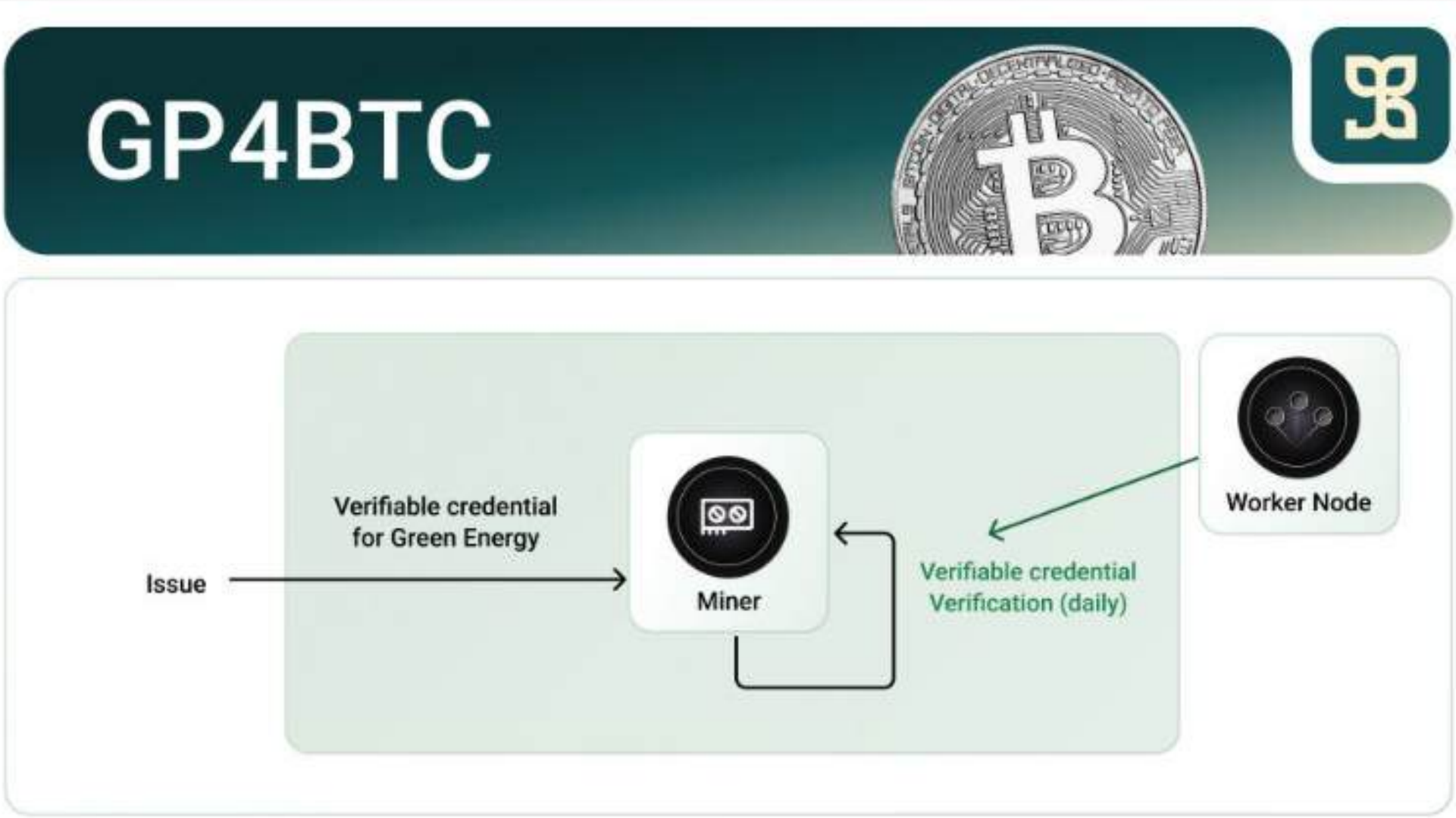
- Reward climate-aligned miners with bitcoins in a trust-independent manner
- Increase the likelihood of routing on-chain transactions to climate-aligned miners

PayPal DMG BLOCKCHAIN SOLUTIONS

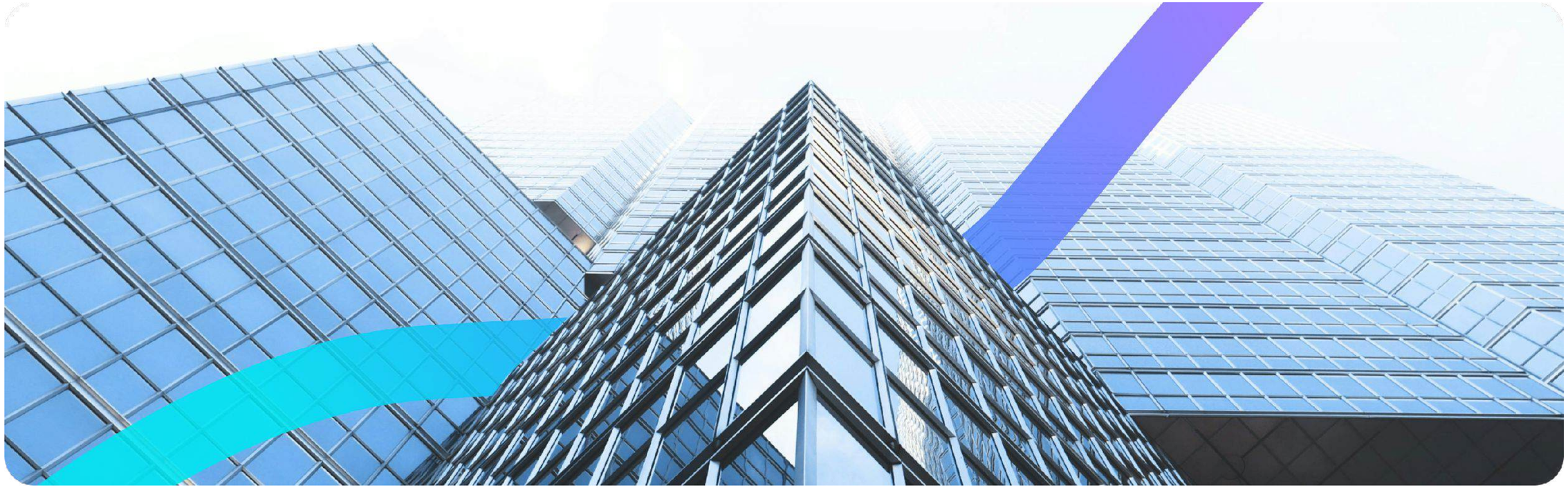
## GREEN MINING INITIATIVE SOLUTION:

- **Identifies** miners using low-emissions energy sources
- **Preferentially routes** on-chain transactions to these miners
- **Rewards these miners** using a 1-of-n multisig script

# GP4BTC Use Case



# Digital Spine Solution:
## Transforming Data Management



DIGITAL SPINE

# More DERs, more renewables = increased complexity

Multiple wholesale markets

Many local services & tariffs

Dozens to hundreds of customer agents

Thousands to millions of customers & assets

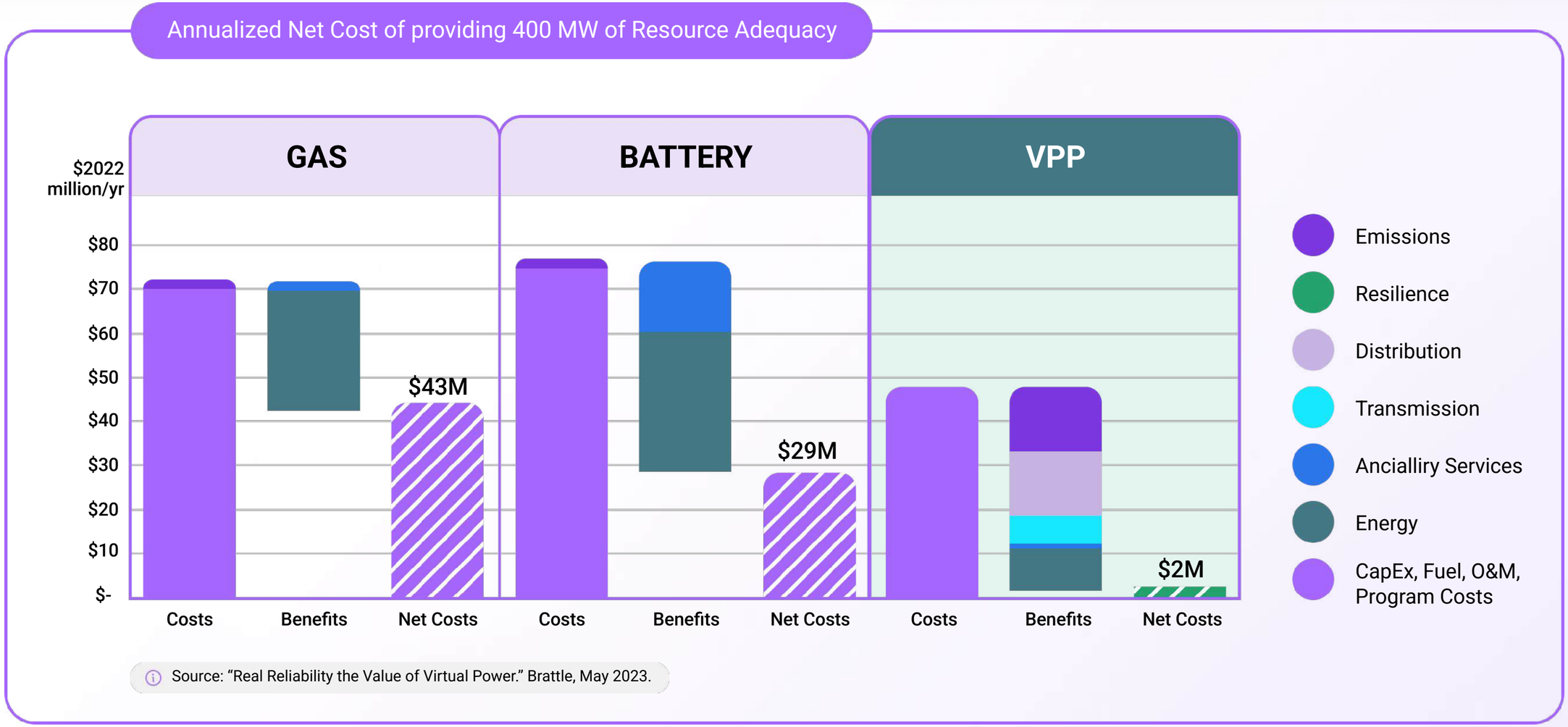
Distribution utilities

Retailers

Aggregators and OEMs

DIGITAL SPINE

# DERs can become powerful tools



DIGITAL SPINE

# Electric utilities and regulators today

**Energy market participants do not have the tools needed to unlock the potential of distributed energy resources**

Have little to no visibility where **DERs are on their system,** let alone understand what they are capable of

**Cannot communicate or interact with DERs** at the speed necessary to increase grid flexibility

Do not have a framework for **coordinating DER behavior** across the transmission and distribution interface

Do not have the tools necessary to **plan for the future** considering the fundamental role DERs will play

DIGITAL SPINE

# Unlocking Flexibility with Digital Grid Solutions

A **Digital Spine** is a solution to sharing Data Exchange for all Distributed Energy Assets in a country/region

## Grid Management

**IMPACT**

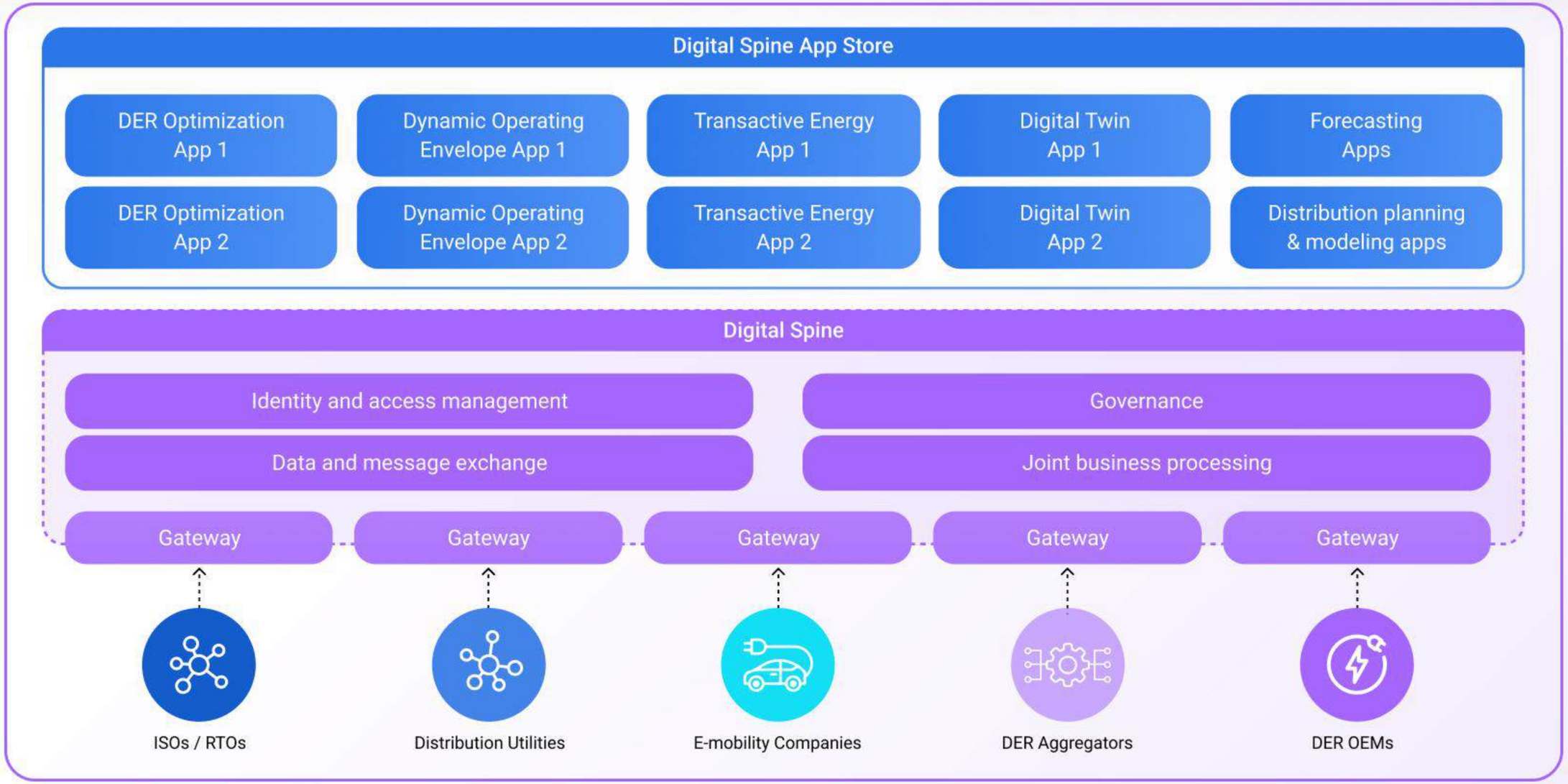
Revolutionizes grid management by fully unlocking the potential of distributed energy resources (DERs)

**BENEFIT**

Enabling greater grid flexibility, efficiency, and fostering a sustainable, resilient energy future for all stakeholders.

DIGITAL SPINE

# Conceptual Diagram



DIGITAL SPINE AND AEMO

# Australia moves to full Production Environment

**Project EDGE is moving to a nation-wide demonstration phase**

EDGE
Energy Demand & Generation Exchange

PLATFORM

**~25** Aggregators, Distribution utilities targeted for enrollment to platform

USE CASES

**~12** different use cases will be supported

TIMELINE

**Q4** 2023 launch, second phase runs throughout 2024

DIGITAL SPINE

# EW Digital Spine's Architecture

**BAU: Point to point data exchange**

All participants responsible for bilateral integrations with counterparties

Highly flexible, but increases cost and complexity

Limits data visibility

Heterogeneous cybersecurity patterns

https://aemo.com.au/initiatives/major-programs/nem-distributed-energy-resources-der-program/der-demonstrations/project-edge/project-edge-reports/der-data-exchange

DIGITAL SPINE

# EW Digital Spine's Architecture

## Centralised Data Hub

Standardizes integration and security

Adds significant IT and security burden to central administrator

More rigid and difficult for participants to organically develop independent applications.

https://aemo.com.au/initiatives/major-programs/nem-distributed-energy-resources-der-program/der-demonstrations/project-edge/project-edge-reports/der-data-exchange

DIGITAL SPINE

# EW Digital Spine's Architecture

## Decentralised Data Storage Hub

Gateway model standardizes integration without requiring one single entity to hold large amounts of data

Highly flexible options for gateway hosting and integration for internal participant systems.

https://aemo.com.au/initiatives/major-programs/nem-distributed-energy-resources-der-program/der-demonstrations/project-edge/project-edge-reports/der-data-exchange

DIGITAL SPINE

# EW Digital Spine's Architecture

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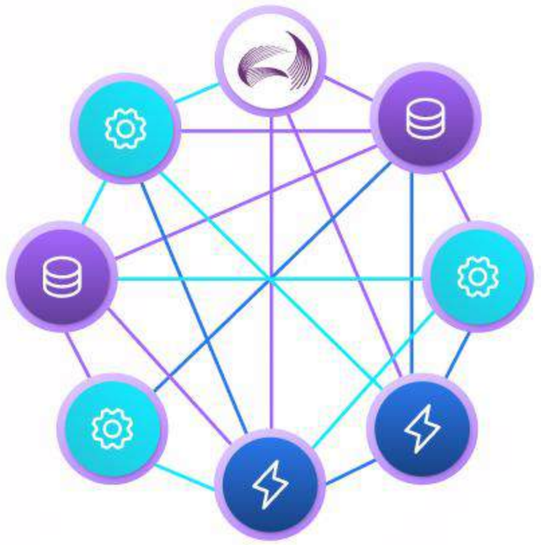
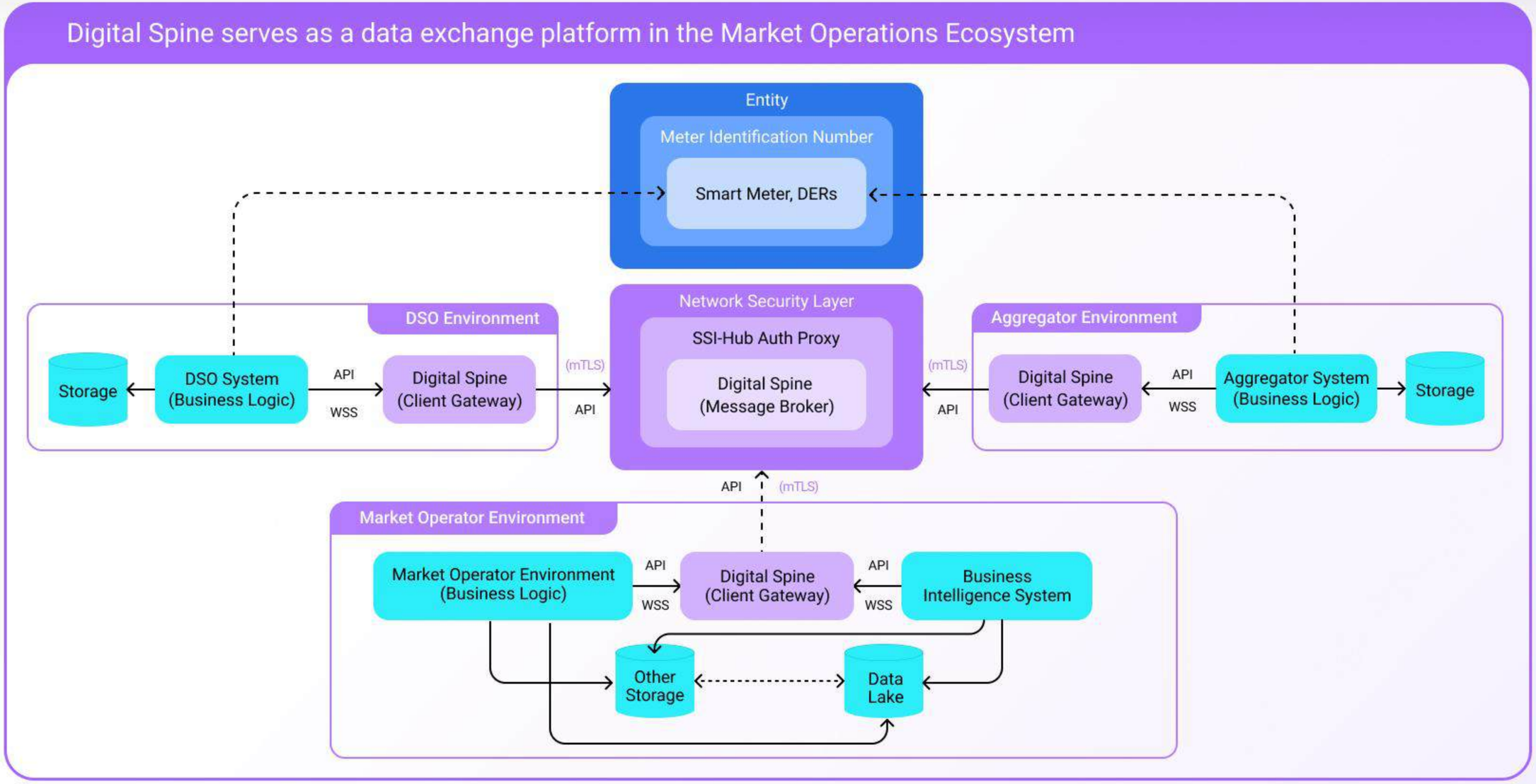


Centralised Data Storage Hub

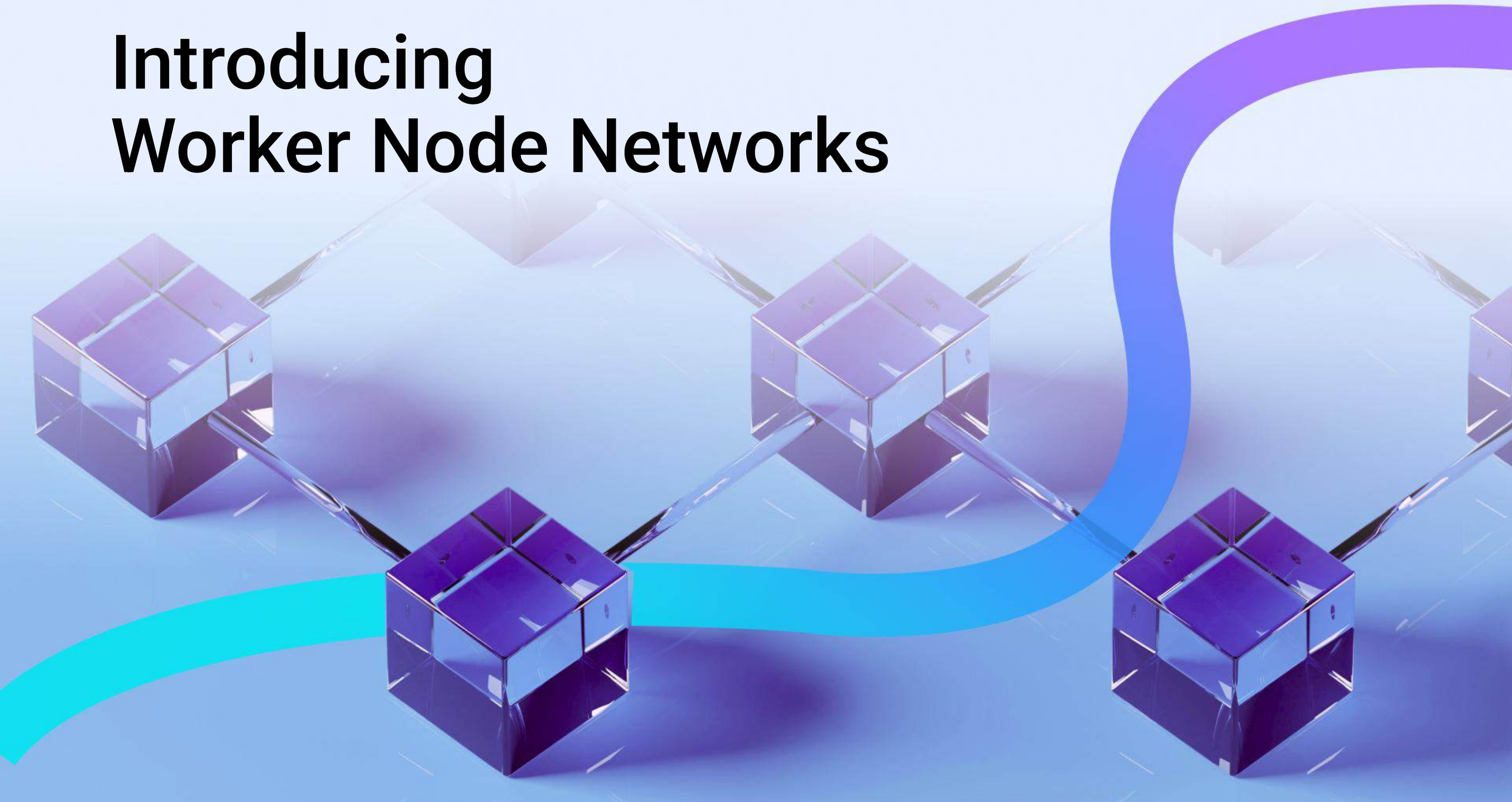
Decentralised Data Storage Hub

https://aemo.com.au/initiatives/major-programs/nem-distributed-energy-resources-der-program/der-demonstrations/project-edge/project-edge-reports/der-data-exchange

# High-Level Diagram (Ecosystem)

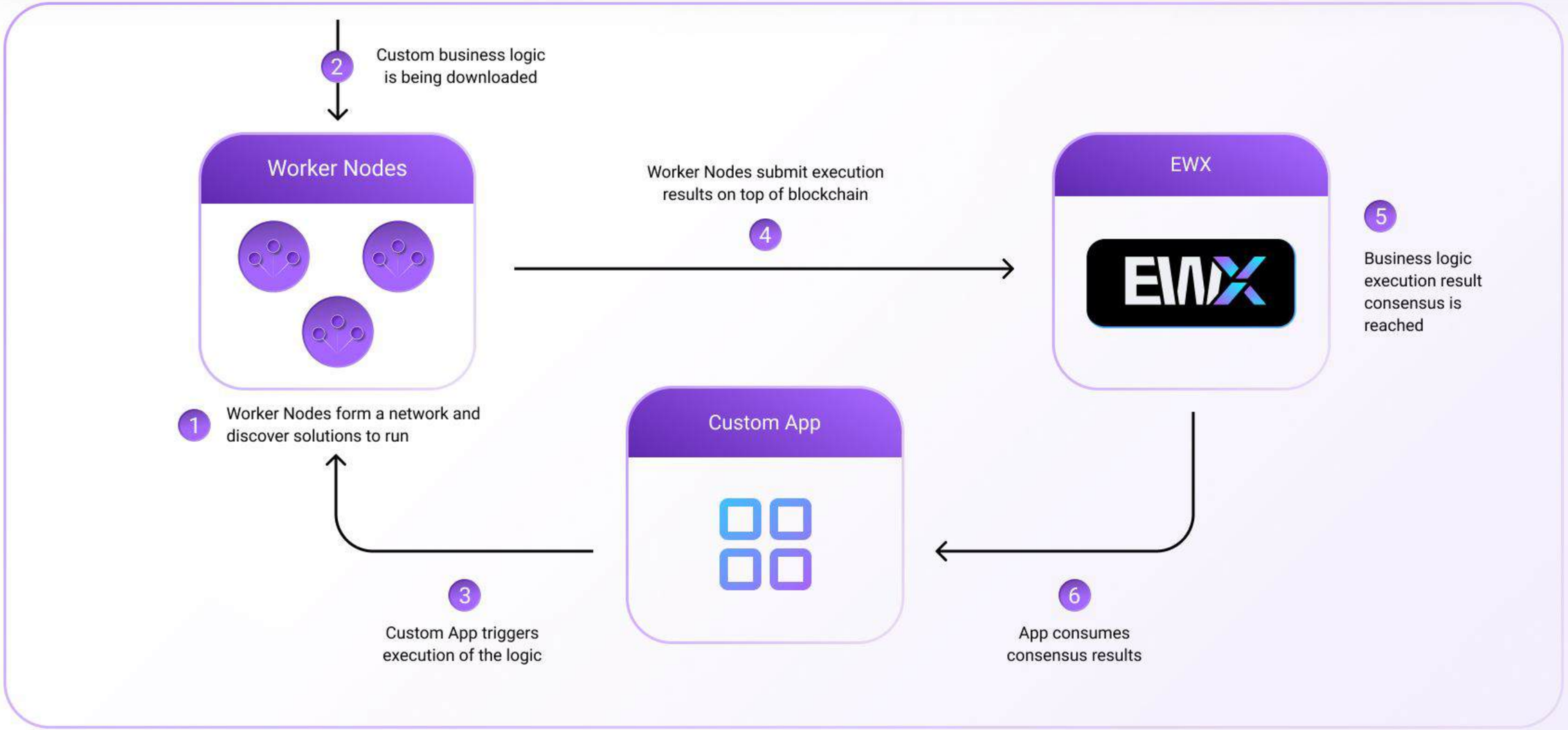


# Introducing
# Worker Node Networks



WORKER NODES

# How Does a Worker Node Work?



# Business Perspective

## When Are Worker Nodes and SmartFlow Needed — and What Problems Do They Solve?

- Trustless execution (decentralized manner)
- Need to incentivize participants
- (Public) Verifiability (auditing e.g)
- Need for blockchain implementation with strong security, advanced governance, and robust data privacy

WORKER NODES

# Worker Node Networks (Other industry use-cases)

WN & S Worker Nodes & SmartFlow | GP Green Proofs | DS Digital Spine

| Use Case & Status | High Level Description | Category | Worker Nodes & Smartflow Use | EW Technologies used |
|---|---|---|---|---|
| **SAFC**<br>**Sustainable Aviation Fuel Certificates**<br>Status: Live on Prod | Ensuring trust and transparency in Sustainable Aviation Fuel Certificates to drive sustainable aviation demand and scale adoption. | Verifiability; Trustless Execution (Decentralizaton) | Verification of certificates Issuance/Transfer/Retirement | WN & S; GP |
| **GP4BTC**<br>**Green Proofs for BTC**<br>Status: Live on Prod<br>*with further development* | Empowering Bitcoin miners with tools to showcase sustainable energy use with a goal to make sustainable Bitcoin mining ubiquitous and accelerate the clean energy transition. | Verifiability; Trustless Execution (Decentralizaton) | Verification of certificates Issuance/Transfer/Retirement | WN & S; GP |
| **Omega-X**<br>**European-commision research project**<br>Status: In-development | Trust-less verification of settlement for consumption and production for EV owners and Solar prosumers (Green EV charging), with cross-country OCN | Verifiability; Trustless Execution (Decentralizaton) | Verification of certificates Issuance/Transfer/Retirement | WN & S; GP; DS |
| **InEEXs**<br>**European-commision research project**<br>Status: In-development | Tokenisation of Energy Performance Contracts and digitalisation of MRV (Monitoring, Reporting & Verification) process using blockchain technology in 4 different pilot-countries | Verifiability; Need for Blockchain Use with maintained privacy | Verification & Execution of MRV algorithm | WN & S |

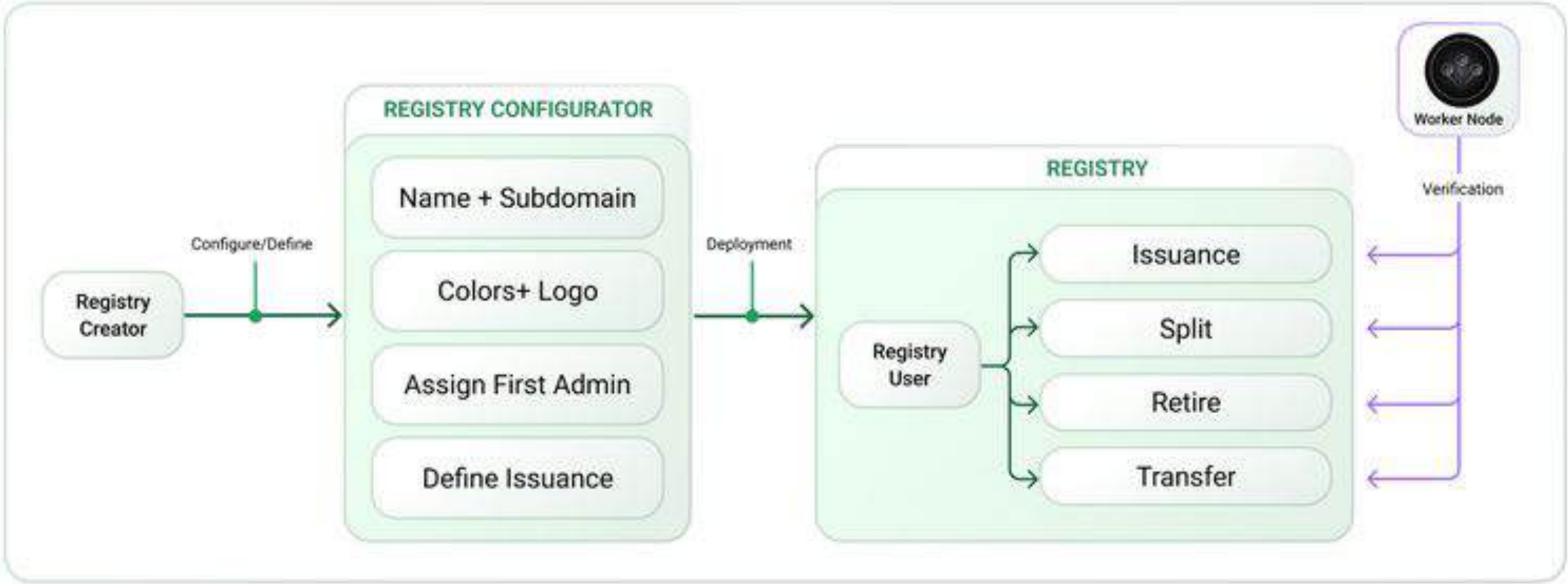
WORKER NODES

# Worker Node Networks (Other industry use-cases)

WN & S Worker Nodes & SmartFlow | GP Green Proofs | DS Digital Spine

| Use Case & Status | High Level Description | Category | Worker Nodes & Smartflow Use | EW Technologies used |
|---|---|---|---|---|
| INTELLIGENT & U2DEMO<br>**European-commision research project**<br>Status: In-development | Open source P2P reference architecture and platform for energy trading | Verifiability ✓<br>Trustless Execution (Decentralizaton) ✓ | Verification & Execution of bids and offers matching algorithm | WN & S, GP, DS |
| ECS4DRES<br>**European-commision research project**<br>Status: In-development | Decentralised solution for generating green certificates to trace the origin of the energy, specifically green hydrogen. | Verifiability ✓<br>Trustless Execution (Decentralizaton) ✓ | Verification of certificates Issuance/Transfer/Retirement | WN & S, GP |
| 24/7 Matching<br>**Renewable electricity matching**<br>Status: POC | Building a traceability platform for 24/7 renewable electricity tracking and matching for Enterprise energy consumers that are interested in accurately measuring (and mitigating) their carbon footprint through the procurement of renewable electricity. | Verifiability ✓<br>Trustless Execution (Decentralizaton) ✓ | Verification & Execution of matching algorithm | WN & S, GP |
| OEP/ZEL<br>**Operating Envelope / Zero Export partioning**<br>Status: POC | An "operating envelope passthrough" refers to a mechanism that allows for adjustments in the operational limits or envelopes of generating units or electrical systems.<br><br>A ZEL Request refers to a "Zero Export Limit" request. This request is made by generators or dispatchable assets to set their output to zero, often indicating that they are not able to inject power into the grid for a specific reason. | Verifiability ✓<br>Trustless Execution (Decentralizaton) ✓ | Verification & Execution of fetching and partitioning of OEP / ZEL | WN & S, DS |

# Green Proof as a Service



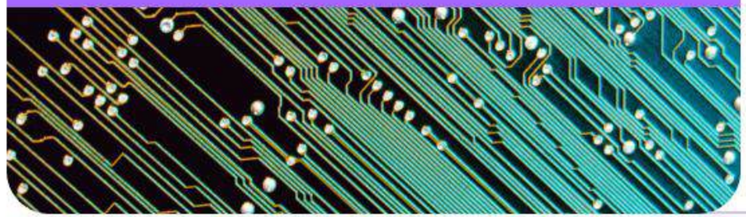
THE GREEN PROOFS DIFFERENCE

# Our Special Sauce

## PROVE YOUR CLAIMS

Using innovative Worker Node Network technology, prove to stakeholders that your environmental claims are correct and credible - without revealing underlying data.

## PROTECT YOUR DATA



Leverage Green Proofs’s robust privacy features to manage access to data and comply with regulation.

## CHOOSE YOUR OWN ADVENTURE

Customize front- and back-end features, integrations, and more to support your business needs.

THE GREEN PROOFS DIFFERENCE

# Worker Node Networks - Overview

- Worker Node Networks are distributed computing networks that securely execute sensitive business operations.
- In Green Proofs, Worker Node Networks (WNN) create cryptographic proof that environmental claims obey relevant rules and standards.
- Worker Nodes ingest data, execute business logic, & compare the outcomes with the network.
- When the WNN agrees on an outcome, the consensus is logged on the EWX blockchain.
- Green Proofs WNN execute the same logic for business operations (certificate issuance, transfer, retirement, etc) as the platform, then compare their results to platform operations.
- Outcomes are logged to EWX as an audit trail for stakeholders, making environmental claims credible.

# SmartFlow

Deploy Solutions in Minutes

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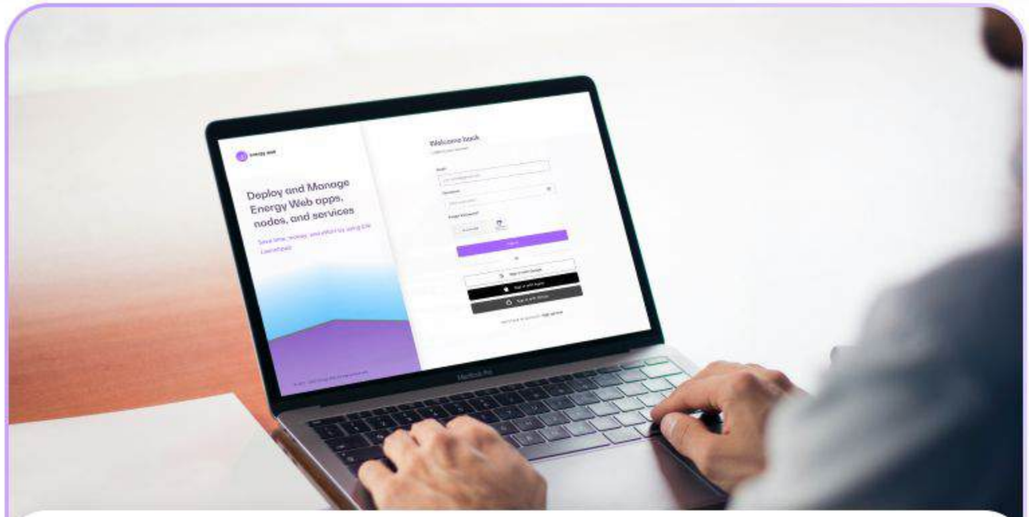
ENERGY WEB LAUNCHPAD

# Introduction




## LAUNCHPAD

Platform offering various EnergyWeb ecosystem products in full enterprise-grade SaaS manner

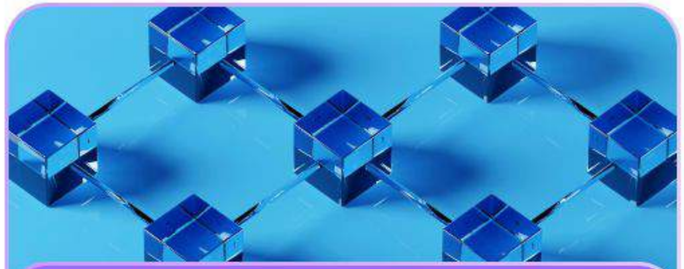
## SMARTFLOW

EW Product allowing for creation of Worker Node Networks and Worker Node Solutions along with underlying business logic reflecting various business use cases and allowing their execution in decentralised manner

ENERGY WEB LAUNCHPAD

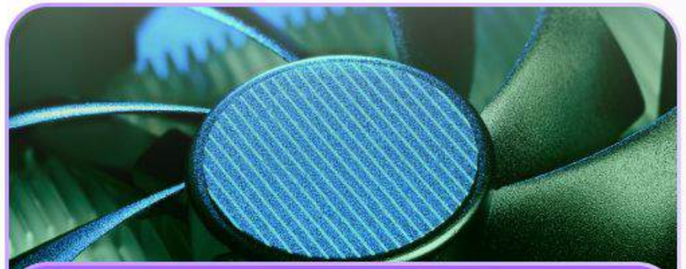
# Introduction

**Launchpad** is a platform offering various EnergyWeb ecosystem products in full enterprise-grade SaaS manner



## Blockchain services

- Blockchain RPC API
- Full RPC nodes
- Validators
- Collators



## General Services

- Green Proofs
- Digital Spine

## EWX Ecosystem

- SmartFlow
- Enterprise Worker Nodes (Worker Nodes as a Service)

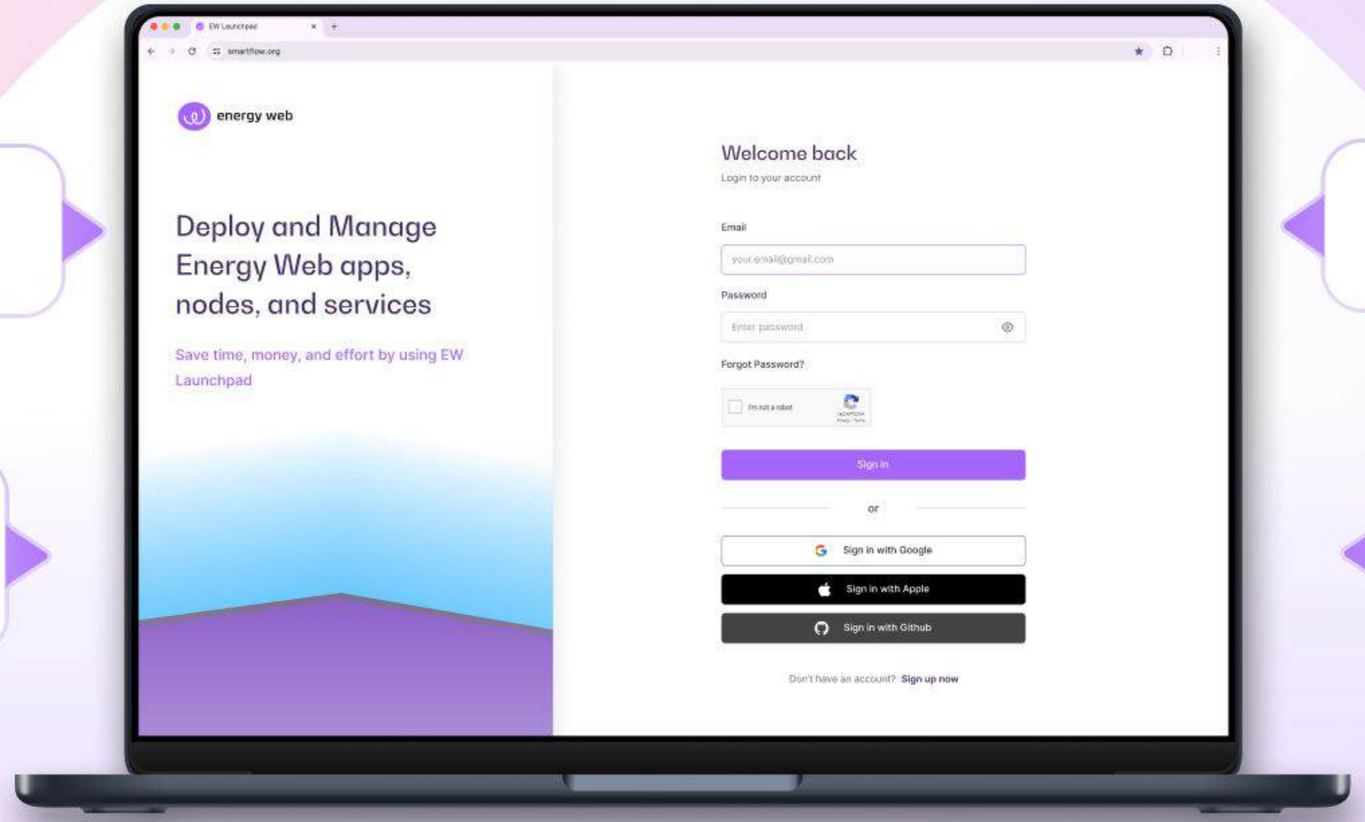
ENERGY WEB LAUNCHPAD

# How EW Launchpad addresses and supports our approach

Offering EW Generic products with easy UI based wizards configuration

Interconnection of both Crypto and Enterprise ecosystems via SmartFlow

Full SaaS Experience with FIAT payments



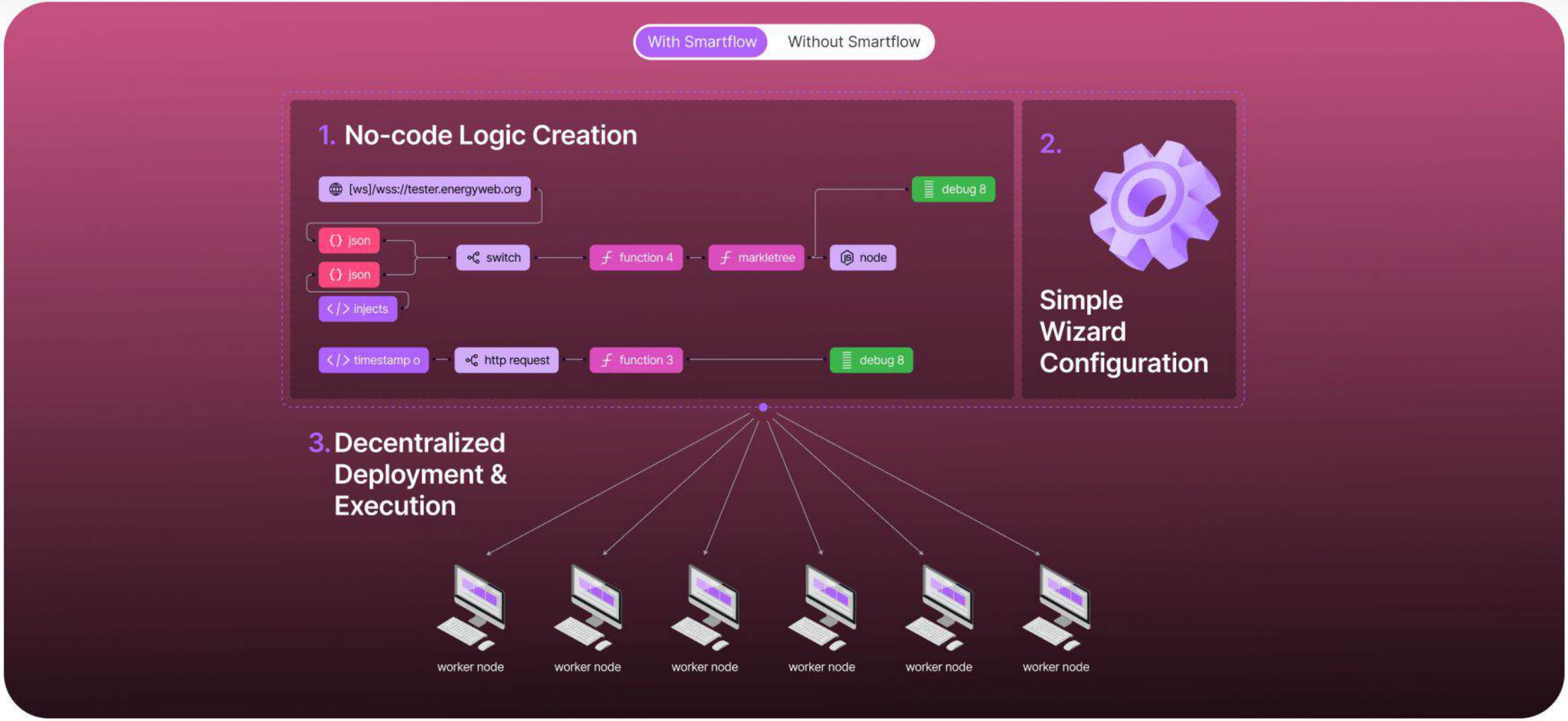

Increased adoption & agnosticity in mind

Enterprise Grade-level offering with overhead reduction

Support Embedded & Decrease entry level complexity

ENERGY WEB LAUNCHPAD

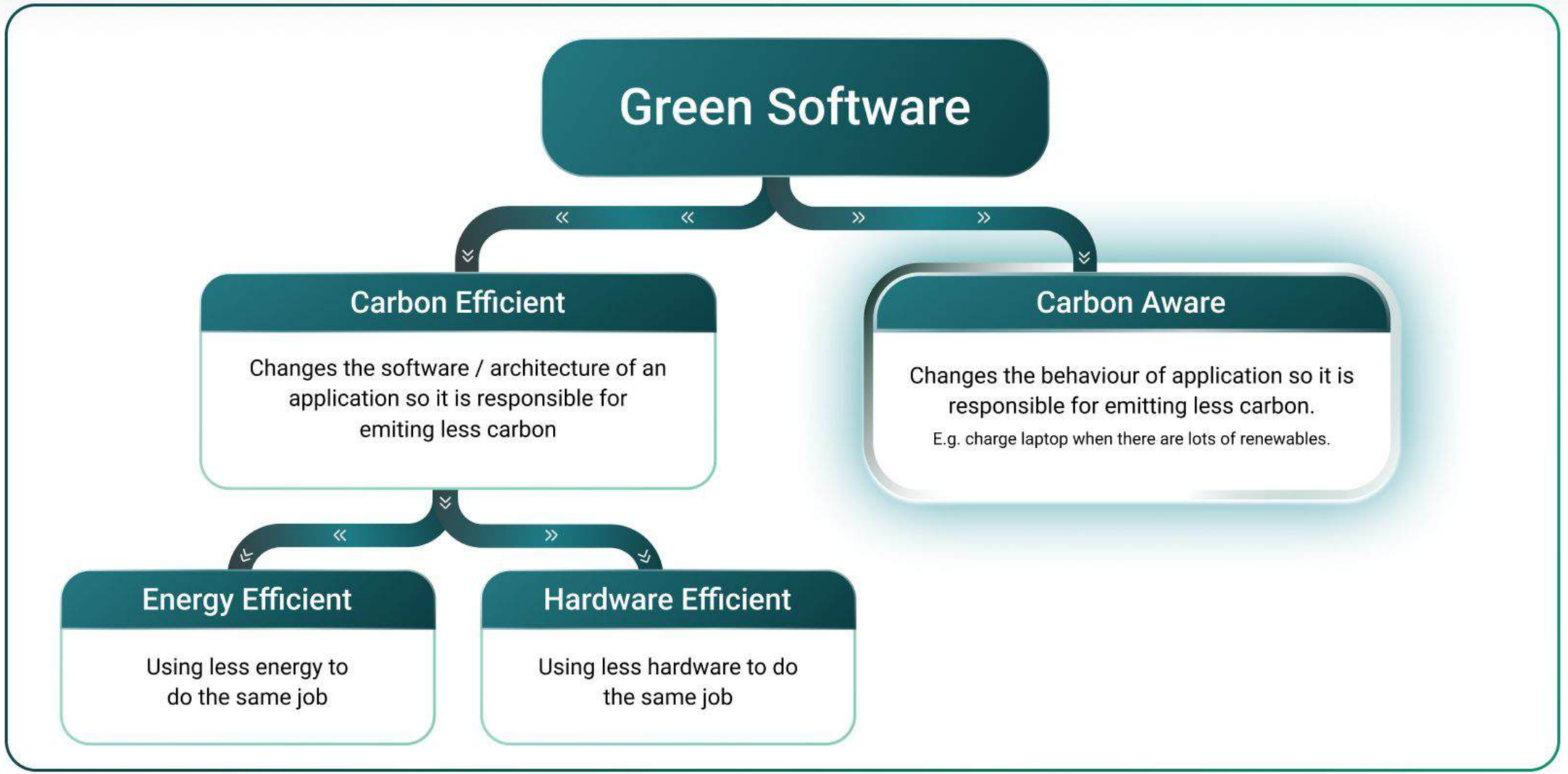
# Benefits & Why would you use SmartFlow?



# Carbon Aware - Decentralized Computation

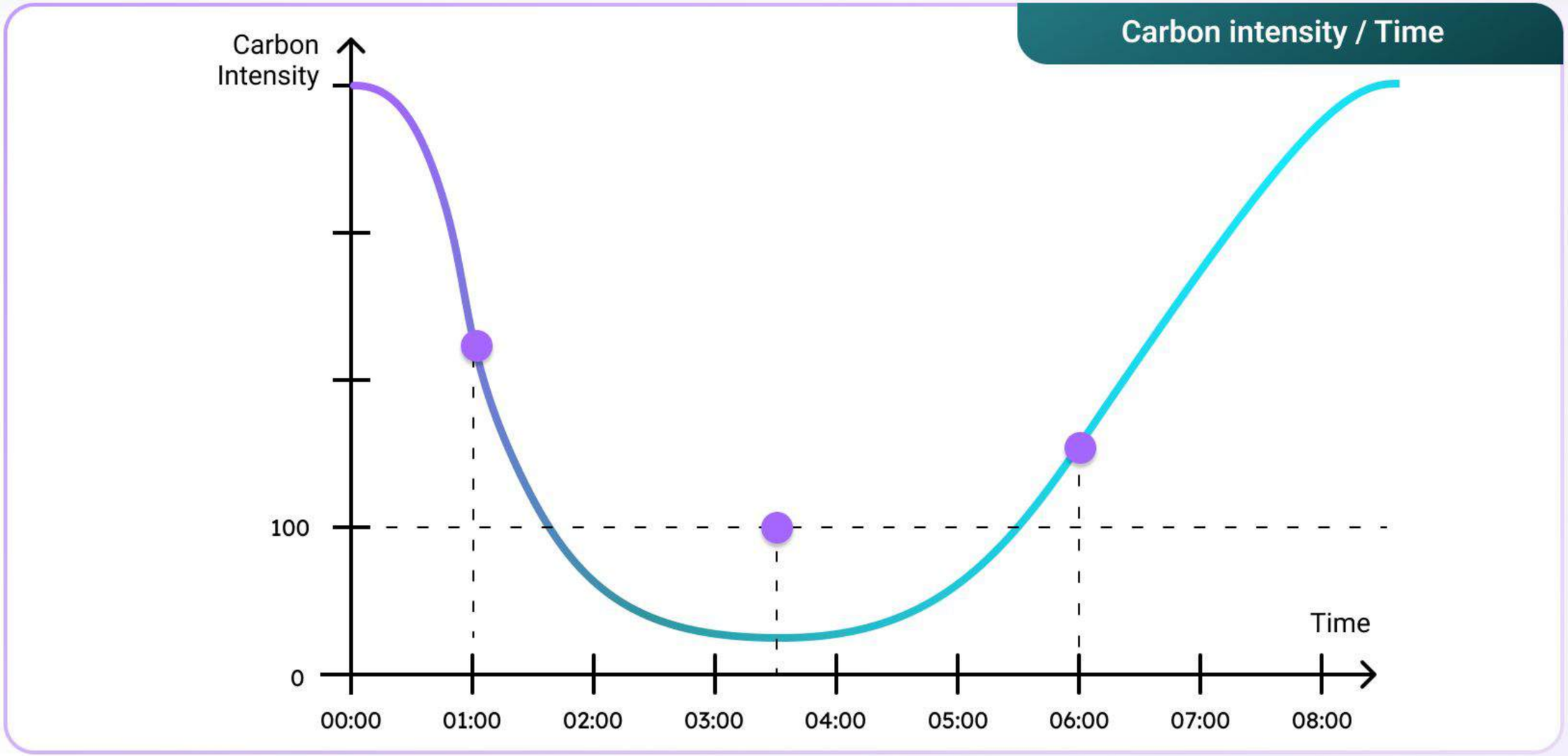
CARBON AWARE - DECENTRALIZED COMPUTATION

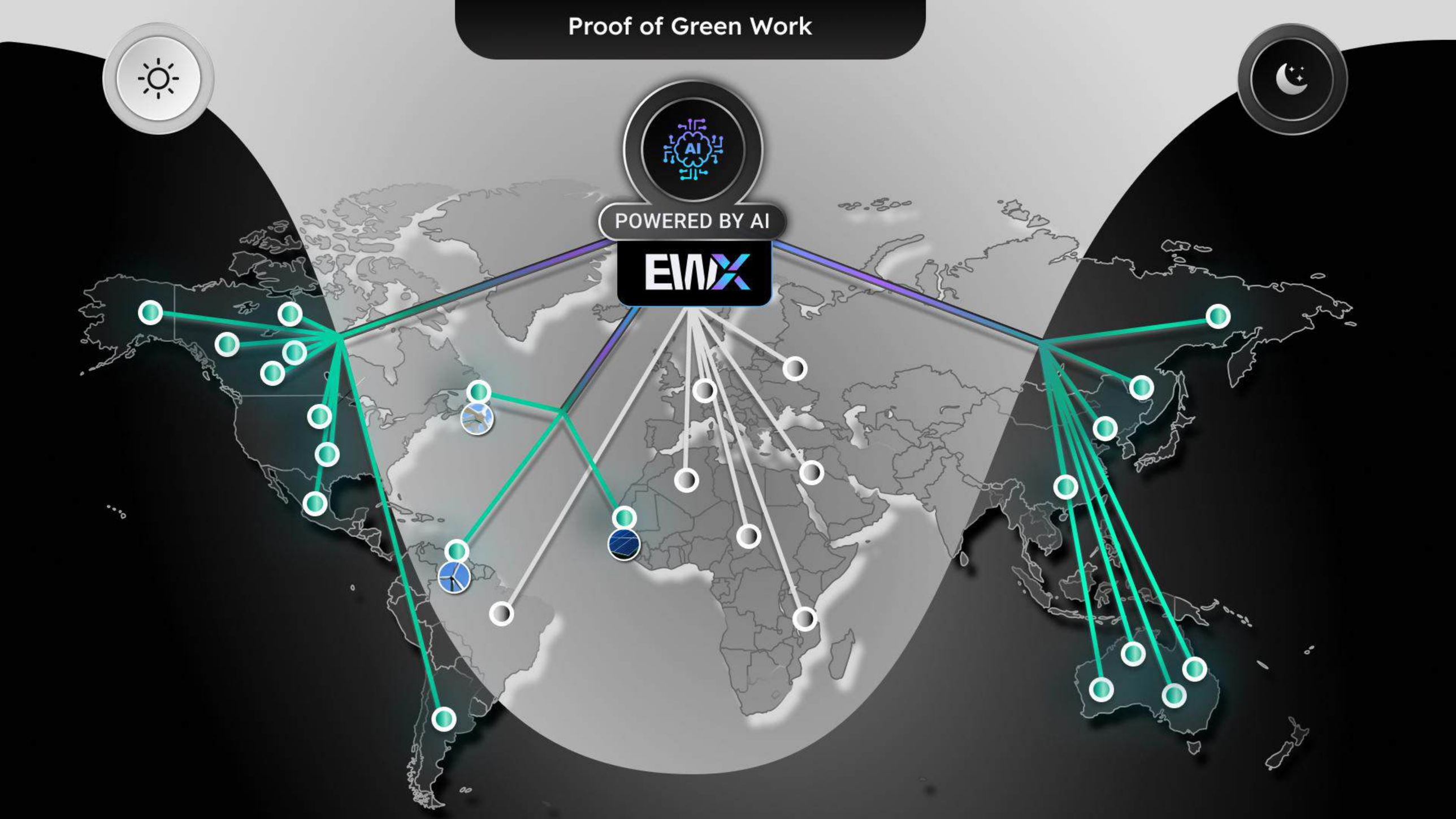
# Typical carbon aware software approaches



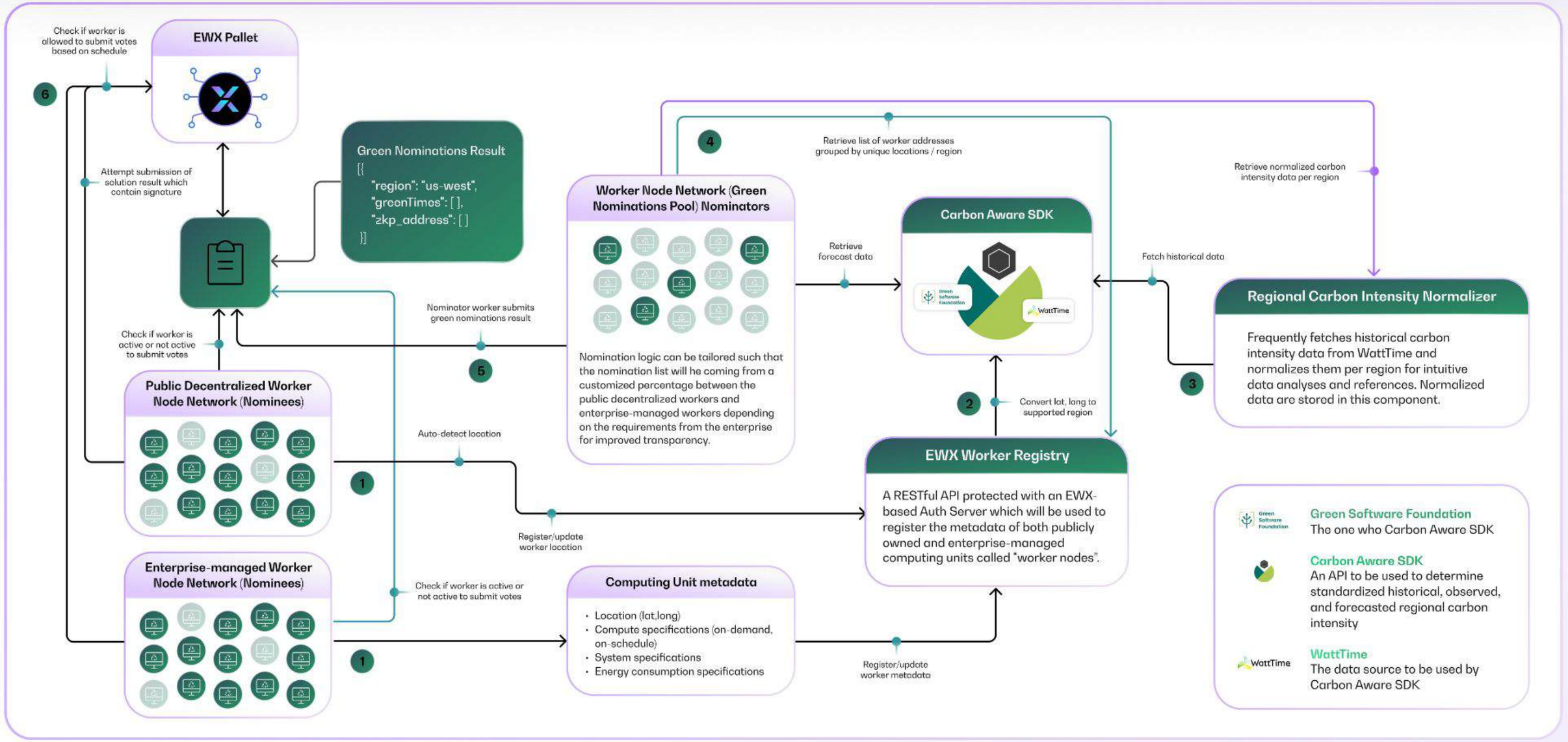
CARBON AWARE - DECENTRALIZED COMPUTATION

# Typical carbon aware software approaches

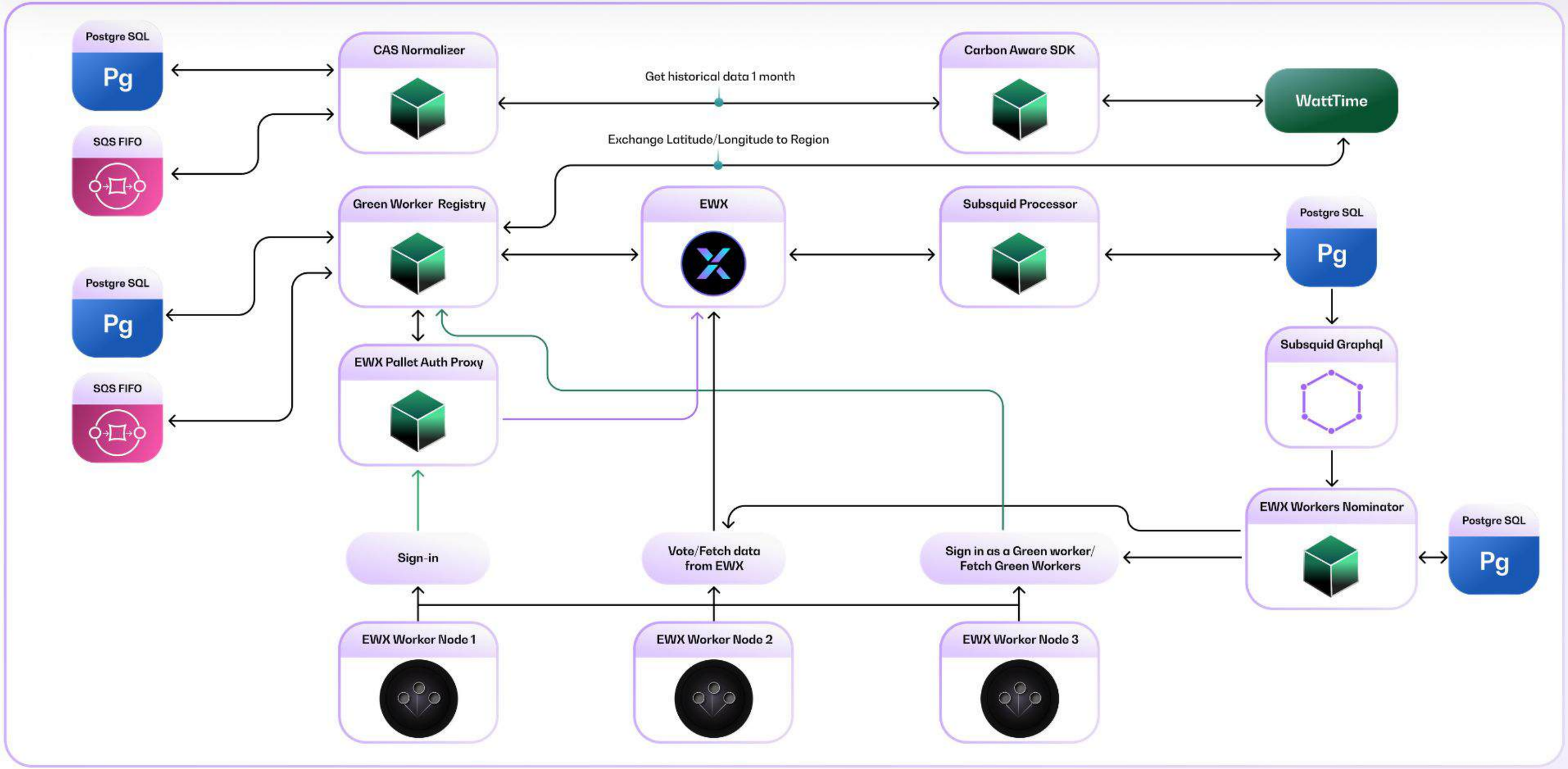



Proof of Green Work
AI
POWERED BY AI
EMX

# How EnergyWeb's open-source, decentralised, Carbon-Aware nomination works



# Detailed system components architecture



ENERGY WEB

# Partnering with Energy Web

## Why This is a Game-Changing Collaboration Opportunity?

### SUSTAINABLE CLOUD COMPUTING

Actively reduces emissions in real time rather than relying on offsets.

- Dynamically optimizes workloads based on real-time carbon intensity.
- Adapts to existing cloud and IT environments with minimal effort, avoiding major reconfiguration.

### OPEN-SOURCE & COLLABORATIVE

Drives transparency, trust, and innovation across industries.

## Key Benefits of Partnering with Energy Web

### Market Leadership & Competitive Edge

- Lead in real-time carbon-aware computing innovations.
- Strengthen sustainability positioning in cloud services.
- Differentiate with proactive emissions reduction & ESG alignment.

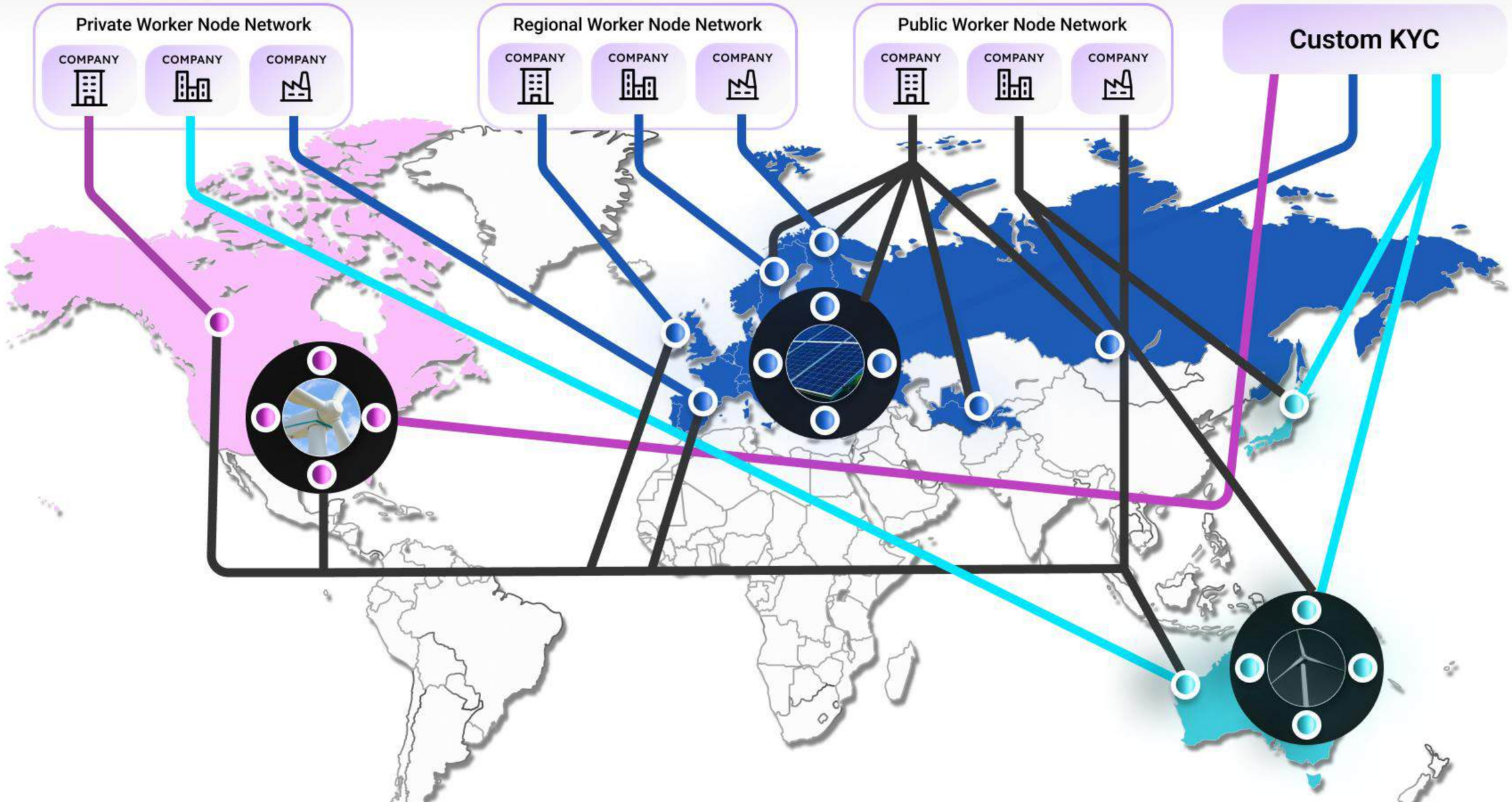
### Enterprise Adoption & Customer Reach

- Access Energy Web's enterprise clients via Launchpad BYOC.
- Enable businesses to reduce their cloud carbon footprint dynamically.
- Expand market reach with trusted sustainability credentials.

### Infrastructure & Technology Integration

- Host decentralized worker nodes on any cloud platform.
- Ensure compliance with sustainability & carbon reduction mandates.
- Collaborate with industry leaders on sustainable computing.

# Zero trust testing and roll-out across fully custom compute networks



# EW Circles - Approach

energy web

EW Circles

# Purpose and Objectives

Established to address specific challenges and requirements in the areas of energy, sustainability, and grid management.

Demands driven by regulation, technological changes, or the transition to sustainable and digital models.

Understand the challenges and problem statements on customer side

Serve as a platform for both members and non-members to connect, exchange ideas, build applications, and collaboratively discuss and create use cases.

Developing practical solutions to meet market demands

Facilitate networking, knowledge-sharing, and innovation, helping to shape and implement solutions that will benefit the broader industry and energy ecosystem.

EW Circles

# Focus Areas

### UNIVERSAL ENERGYID

Decentralized identity and verifiable credentials for energy sector

### CSRD READINESS

Corporate Sustainability Reporting Directive

### SUSTAINABLE ELECTRIC VEHICLE CHARGING

Electric mobility decarbonisation via verifiable proofs

### CARBONAWARE COMPUTE

Sustainable nomination and load balancing of distributed compute resources

### ADVANCED GRID MANAGEMENT

Control and optimize DERs in real-time, paving the way for a more resilient and decarbonised energy grid

### GLOBAL RESPONSIBLE COMMODITIES MARKETPLACE

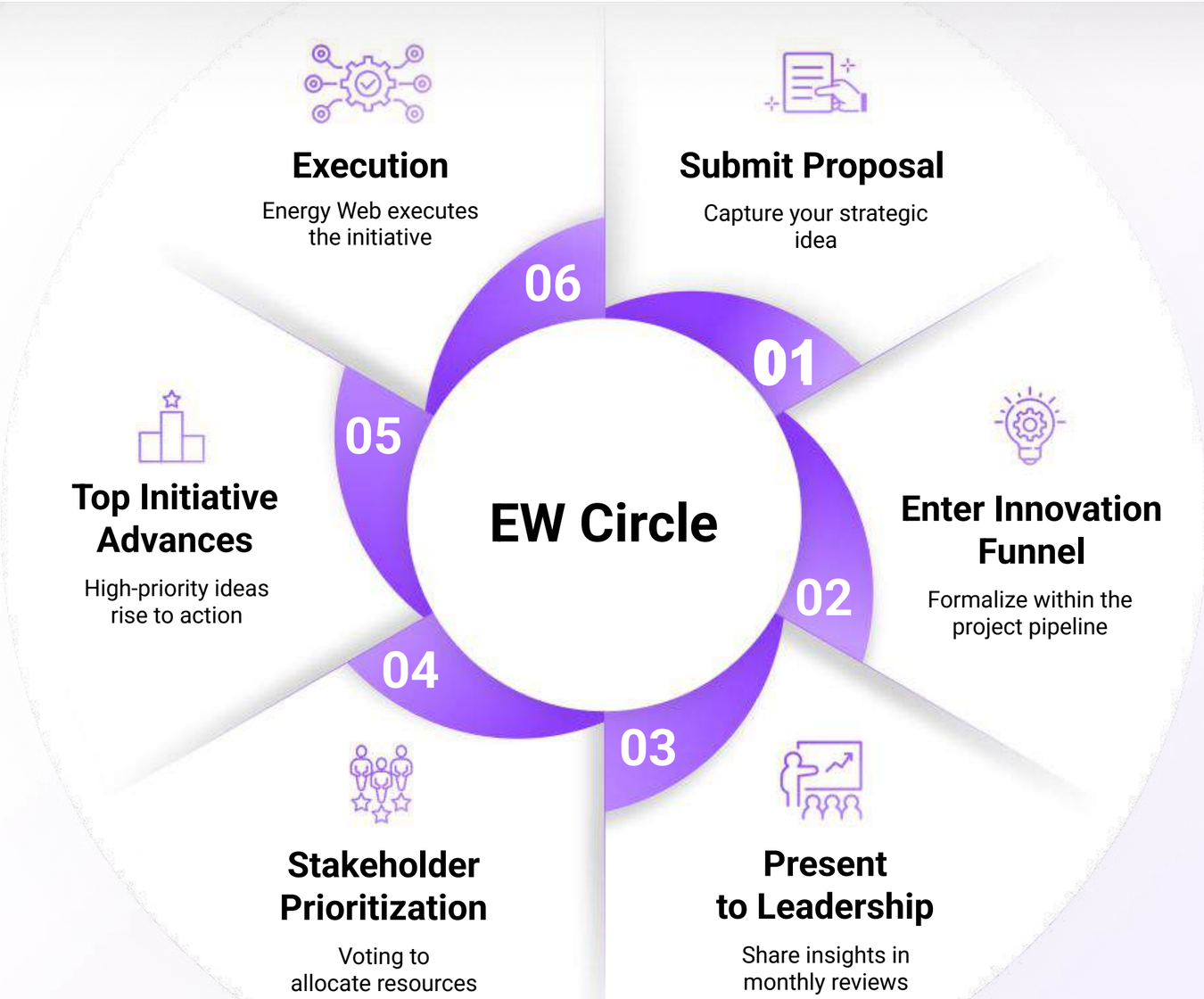
Unified marketplace of responsible commodities connected to individual registries

### GLOBAL ENERGY DIGITALSTORE

Availability of different Apps or Data for Energy Market Services, apps like matching, forecasting, etc. and Data such as various public or private data streams

EW Circles

# Empowering Future Growth Through R&D Investment



# Energy ID

## Universal EnergyID & Credential Ecosystem

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# Introduction to the Initiative

| | |
|---|---|
| **Objective** | Establish a standardised, ecosystem recognized decentralized Identities and verifiable credentials infrastructure for next generation energy use cases and platforms. |
| **Vision** | Drive seamless interoperability across diverse energy systems, promoting identity and data sovereignty to enhance operational efficiencies, reduce entry barriers, ensure regulatory compliance, and support new business models. |
| **Outcome** | A robust governance framework overseeing standardized schemes, data models, and processes, along with the development and delivery of the technology infrastructure necessary to support a secure, interoperable credentialing ecosystem for the energy sector. |

# Background & Motivation

Distributed Energy Resources (**DERs**) **Expansion**

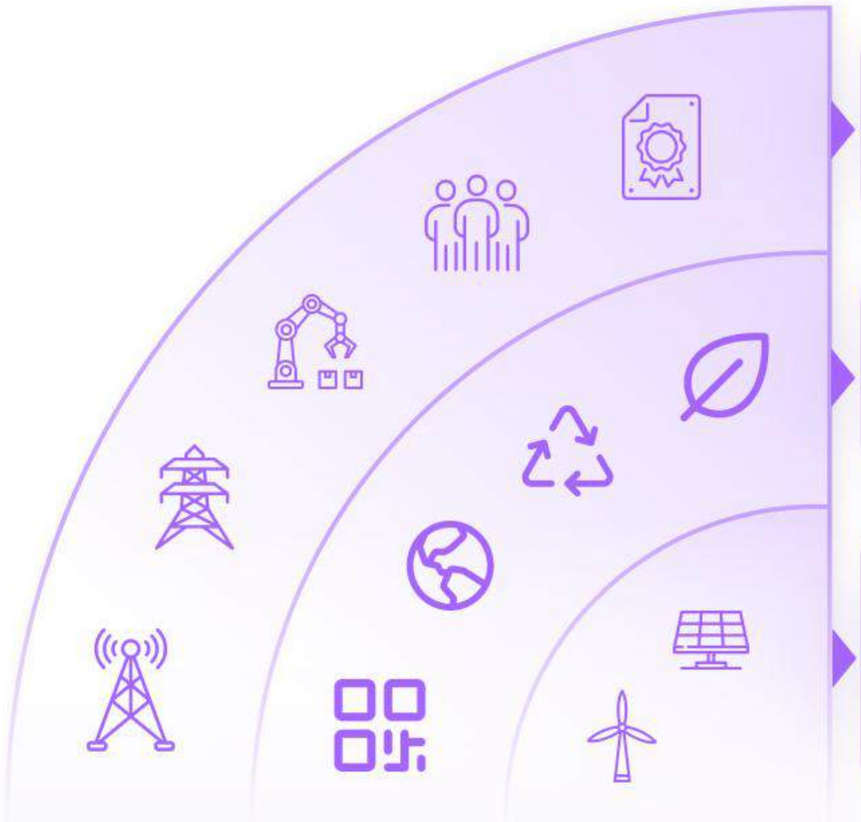
Rising **Demand** for Consumer **Flexibility**

**Data** as a **Valuable** Asset

New **Business Models** in Energy

UNIVERSAL ENERGYID & CREDENTIALS ECOSYSTEM

# Use Case - 1, Unique Identification of Assets & Verifiable Attributes



**Ecosystem**

- Has Unique EnergyID
- Can Prove its Identity
- Can Present Verifiable Credentials
- Assets Owned by Customers

**Verifiable Credentials**

**Assets with EnergyID**

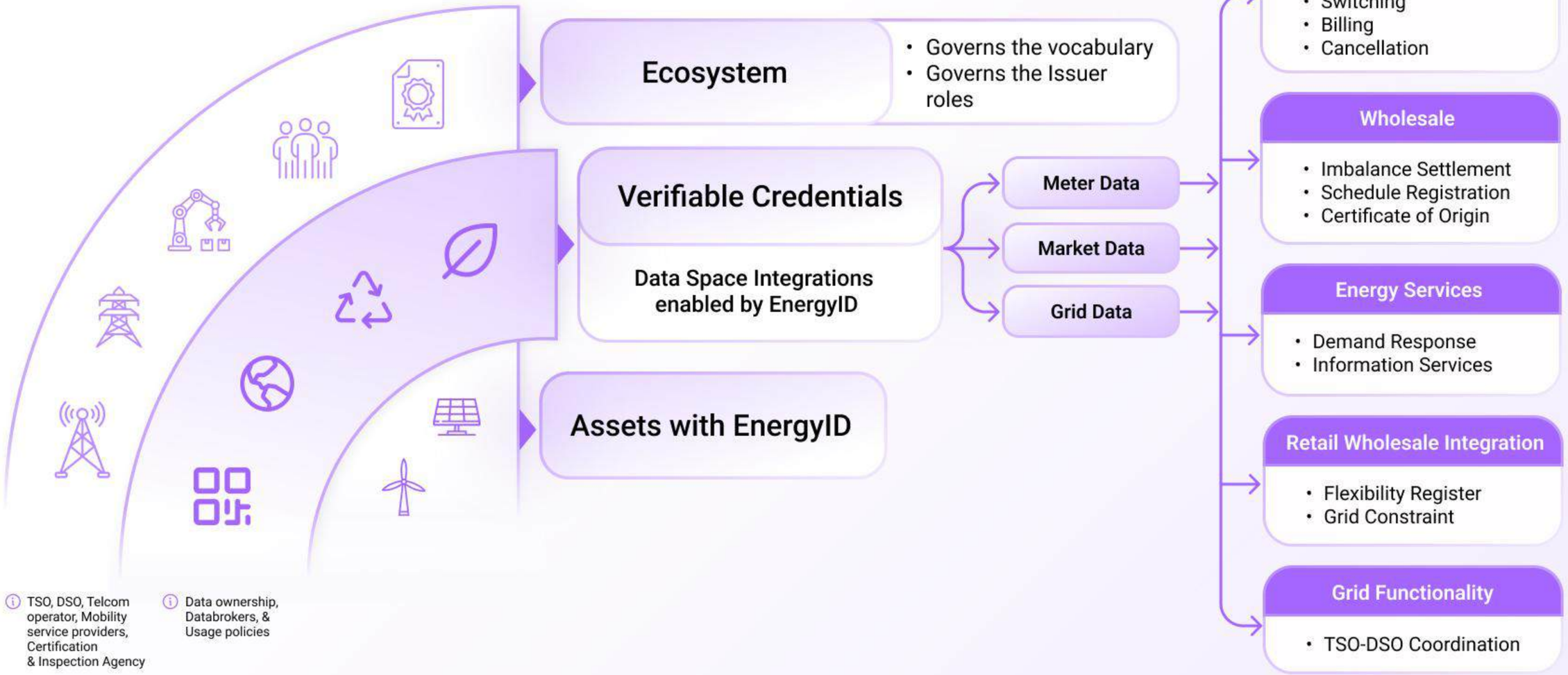
- Governs the Identification Schemes
- Governs the Credentials Schema Standardisation
- Governs the issuer roles
- Issuers of the Verifiable Credentials

ⓘ TSO, DSO, Telcom operator, Mobility service providers, Certification & Inspection Agency

ⓘ Specification, Inspection reports, Control, & Digital Product Passport

UNIVERSAL ENERGYID & CREDENTIALS ECOSYSTEM

# Use Case - 2, Data Spaces for Sovereign Data Exchange



UNIVERSAL ENERGYID & CREDENTIALS ECOSYSTEM

# Use Case - 3, Streaming Payments for Energy Transactions

**Payments**

**EnergyID** is inherently equipped with a **Wallet.**

With **EnergyID** and **VCs, Assets** can be uniquely Identified and **Verified in Real-time.**

Energy being consumed or produced is authentic and trustworthy enabling **accurate billing.**

**Automated** and scalable payment processing.

# European Projects

EU-FUNDED PROJECTS

# About

## Horizon Europe

BUDGET

**€95.5 billion**

The EU's key funding programme for research and innovation

- It tackles climate change
- Helps to achieve the UN's Sustainable Development Goals
- Boosts the EU's competitiveness and growth

## Digital Europe

BUDGET

**€7.5 billion**

Digital Europe aims to deploy digital technologies in a scalable and sustainable way

- Strengthening Europe's competitiveness and strategic autonomy
- Building the strategic digital capacities of EU Member States

# Energy Web Projects in Europe

OMEGA-X

ECS4DRES

INTELLIGENT

U2DEMO

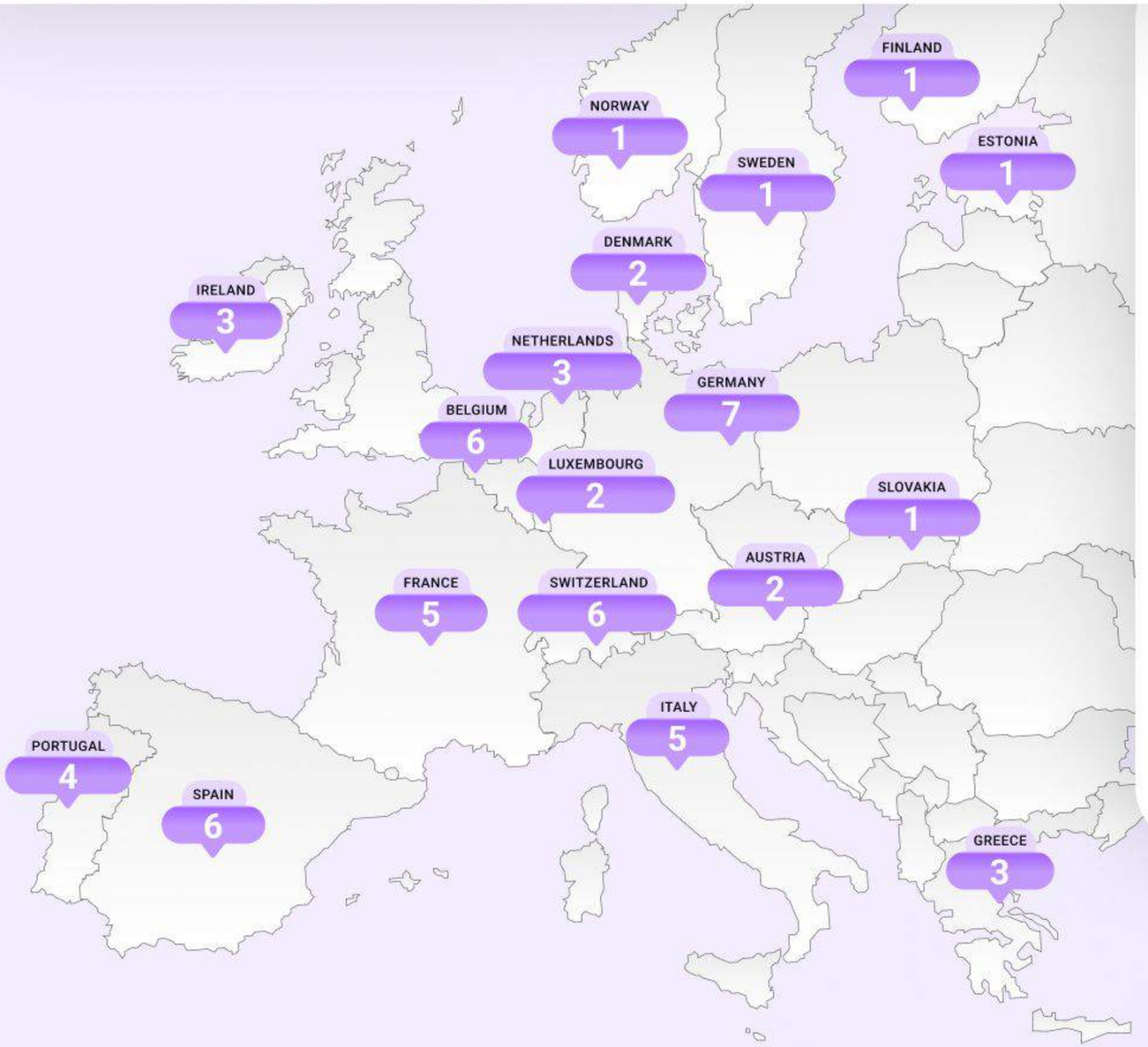
SINOGENNES

InEExS

CIRPASS

CIRPASS-2

# Energy Web Projects in Europe




**GERMANY**
OMEGA-X
ECS4DRES
INTELLIGENT
U2DEMO
SINOGENNES
InEExS
CIRPASS

**FRANCE**
OMEGA-X
INTELLIGENT
U2DEMO
SINOGENNES
CIRPASS

**GREECE**
OMEGA-X
SINOGENNES
InEExS

**DENMARK**
OMEGA-X
CIRPASS

**BELGIUM**
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INTELLIGENT
CIRPASS

**ESTONIA**
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**CYPRUS**
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**SLOVAKIA**
U2DEMO

**FINLAND**
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# Contact us

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## Thank you!

If you are interested in learning more about Energy Web, reach out to us:

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- hello@energyweb.org
- www.energyweb.org