



PYLON NETWORK. The energy blockchain platform.

WhitePaper v.2.0 - December 2018



TABLE OF CONTENTS

1. EXECUTIVE SUMMARY

2. INTRODUCTION

2.1. What is Blockchain and why is it suitable for the energy sector?.

2.2. A global energy problem.

2.3. Our vision.

2.4. Where is the energy market moving towards?.

2.5. The reality.

2.6. The common problem.

3. PYLON NETWORK

3.1. Introduction to Pylon Network.

3.2. Creation of a consumer centered energy ecosystem.

3.3. The innovation. The Open-Source Blockchain of Pylon Network.

3.3.1. Technical specifications.

4. BUILDING THE ECO-SYSTEM AS OUR MVP

4.1. Demonstrated technology (Pilot & Demo)

4.2. Partners.

5. CALL FOR (GLOBAL) ACTION

REFERENCES



PREFACE

The release of an updated White Paper comes, approximately, one year after the official start of the implementation of our project.

This past year, has been the most interesting, challenging and rewarding period, during which, we have learnt a lot.

The purpose of this WhitePaper v2.0. is to offer an updated version of how we see the energy sector landscape - taking into account all the lessons we have gathered during the past year.

We see cooperation among all energy stakeholders as a fundamental ingredient of the energy transition and Pylon Network has been born to be exactly this: a common, open and transparent framework of cooperation in the energy sector.

The time to act is now.

Respectfully,

Pylon Network Team

1. EXECUTIVE SUMMARY

Pylon Network is a neutral energy database, supported by our open-source blockchain technology - specially designed to serve the needs of the energy sector. We develop a blockchain code that is fast, scalable and with minimal energy requirements - designed to play the role of the digital communication infrastructure for the increased participation of distributed assets and stakeholders in the energy markets, as well as the provision of digital energy services focused on the increased engagement of the most important player with our democratized future energy systems; the end-user.

2. INTRODUCTION

2.1. What is Blockchain and how can it benefit the energy sector?

In the last years, the term Blockchain has been seen and heard everywhere - television, newspapers, internet or the annoying guy at work that keeps talking about it (!)... At the same time, the great volatility (and hence gains or losses) associated with Bitcoin - the benchmark cryptocurrency, has created a great speculative interest among "the masses".

However, this spread awareness of Blockchain as a hype word connected to cryptocurrency markets, is not necessarily combined with a clear and wholistic understanding of the potential (and limitations) of the technology, which in turn, has contributed to a commonly wrong conception of the term.

“Blockchain is the technology behind Bitcoin (not Bitcoin itself).”

“Bitcoin is the first use case of the Blockchain technology.”

Therefore, in addition to the widely recognized application for the financial sector, we have many other sectors and hundreds of cases within each sector (Fig.1), where blockchain can deliver a large economic, social and/or environmental impact.

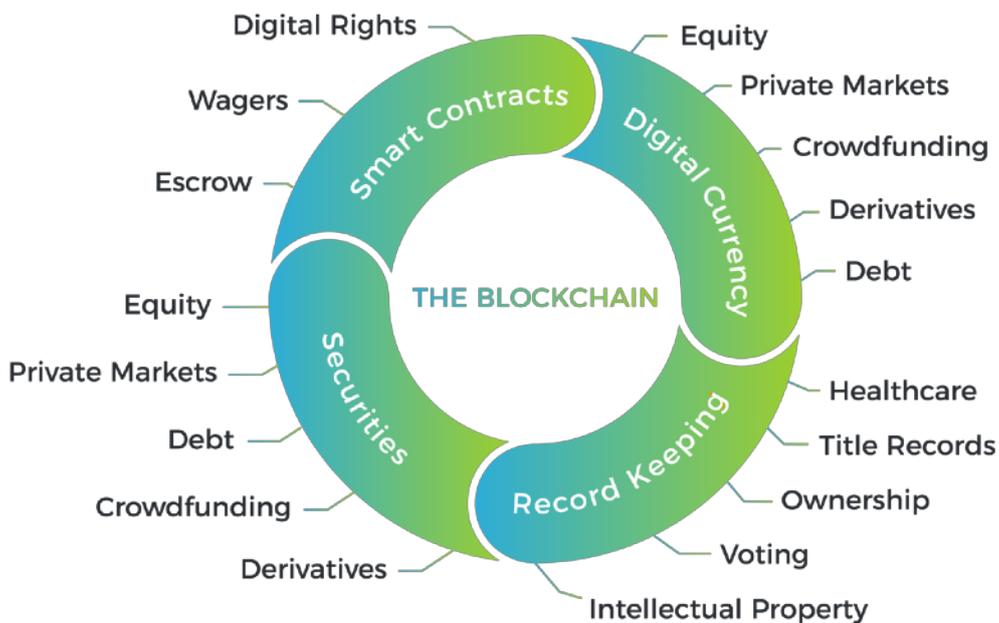


Fig.1; Different Blockchain use cases.

Therefore, we can define Blockchain as **a distributed and decentralized database that allows multiple actors to cooperate and interact in a transparent and secure way**. This implies that the more actors and stockholders are involved in this network of transactions (assuming that their interests are not aligned), the more value Blockchain technology can deliver.

Each transaction is registered and certified in the chain of blocks, which keeps a historic track of all transactions. This means that, once a block is validated and a transaction is "on the chain", it can no longer be modified or deleted. Due to the distributed/decentralized nature of Blockchain, its operation depends on participating nodes, which are the ones that maintain and validate the chain of transactions, through a consensus of cooperation. They are responsible for certifying all registered information and they receive a reward (e.g. a utility token) for supporting and accommodating the operation of the platform.

The energy sector is a clear example of application with very promising potential benefits from the implementation of blockchain technology; many actors involved, intermediaries, and transactions - both physical and digital. Blockchain technology offers incomparable advantages in terms of security, traceability and confidence/transparency among the network participants. It is a disruptive tool that offers a path to complete liberalization and decentralization of energy markets.

2.2. Global problem.

A very common problem faced in the transition process of the global energy markets is that any attempts focused on engaging with the end-customers are failing to do so. A dominant reason for that is that these kind of attempts are designed by - wrongly - assuming that the final user is an energy expert, without thinking of what their real needs - and desired experiences - are. The communication works only unidirectionally (market -> consumer) and in most case s, it is limited to the interactions around the electricity bill (in paper), without the capacity to offer any added value services to the end consumer.

Furthermore, the retailers believe that with a one-fit-for-all service they can satisfy and engage more actively with their consumers, without understanding that the necessity for consumer-personalized services is continuously growing.

For Pylon network the target of a successful energy transition, passes through consumer-

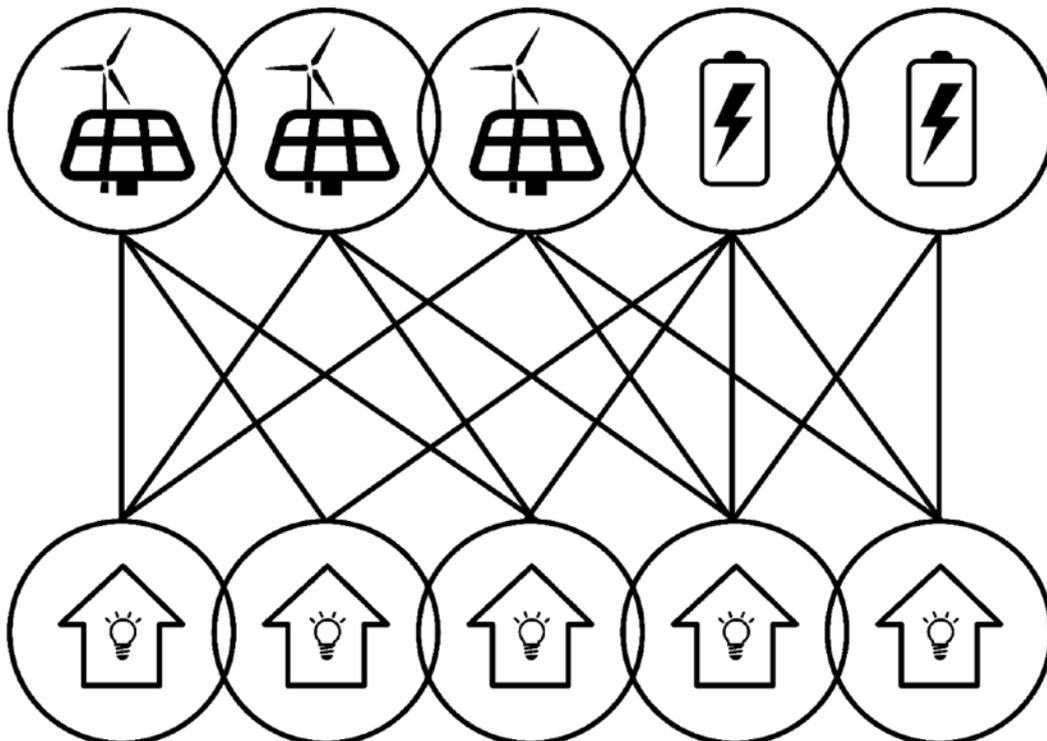
centered approaches for market design, building in that way the necessary confidence and loyalty for the consumer to seek for experiences rather than services, focused on their interests, developed with them and not for them.

2.3. The Vision

We anticipate an energy future in which, you as a consumer, can change your electricity contract through Alexa, or any other voice recognition tool; one, where investing in renewable energy projects is as easy as buying a product on an online retail shop.

This future is possible and is closer than ever.

However, in this future, there is a common, critical element, which will be the catalyst for a successful energy decentralization process and the development of consumer-focused, user-friendly, innovative energy experiences: **access to energy data**.



Our vision is an energy market where **it is possible to consult and interconnect all the energy data/assets distributed in an open and neutral way**. This will open the market to new energy players such as *Aggregators*, thus creating a market where the price of

electricity is completely transparent and the true value of local production and consumption of renewable energy, is fairly and transparently reflected/recognized.

2.4. What is the market telling us?

Currently, most electricity suppliers (who consist the single interaction point between the end consumers and the energy market), fail to show their commitment in engaging with their customers and, as a consequence, are also failing to offer any added value or innovative services, built around the needs of the consumer.

This situation leads more and more consumers to lose their confidence with the traditional retailers, whose models neglect their personal needs and cause a lack of satisfaction, loyalty and trust in this relationship.

The market trends indicate that consumers are getting more demanding and are searching for retailers that can offer them more transparent tariffs and other forms of added value such as the supply of certified renewable energy - being among the most popular/mature ones.

In many parts of our modern, digitized life, we see that disjunctive models focused on the final customer are penetrating most markets, but unfortunately, this is not yet the case of the energy markets. However, there are already some niches in Europe where small retailers with a business model focused on designing customer-centered services, are increasing their share of market - examples are "OVO" and "Opus" in the UK, "Stromio" in Germany and energy cooperatives all around Europe.

2.5. The reality.

We see daily how European policies encourage the increase of active energy citizens (e.g. "prosumers") predicting that by 2030, 19 per cent of Europe's electricity will come from self-production facilities (rising from 4 per cent, at the moment).

But how can we claim that we are moving towards this target, within the next 12 years, when we see clear signs that the European consumers remain largely unengaged with even the most basic market operations that can help them save money - already available now(!) ?

The reality is that each year **95% of European consumers lose altogether an estimated €25Bn by not being in an electricity tariff which best fits their needs** (i.e. consumption profile). In addition to the continuous increase in the price of electricity (e.g. in Spain retail electricity prices have soared by **81% in the last 3 years**, according to **OMIE**) this problem is only expected to worsen.



€ 25 Bn
EVERY YEAR

The retailers are trying to address this problem of customer engagement by developing solutions that in most cases are designed and promoted only for/to their customers without engaging first in a dialogue with them, to truly understand how users (re)act.

So, the question arises: what are the (sometimes underlying) bottlenecks that make these attempts, for improving customer engagement and interaction, fail?

2.6. Common problem.

In most energy markets there is a very little predisposition by the users to improve their habits and understand how they consume and how they can improve their efficiency. In addition, the vast majority do not understand basic elements of their interaction with the energy value chain and even the simplest actions, such as switching to a cheaper available tariff/supplier, are being neglected and underused.

On the other hand, **the incumbent retailers (that own the largest slice of the market pie) are not really looking at improving the situation for the final consumer.** This happens because in reality, retailers are not incentivized to help their consumers reduce their consumption (lower bills for the consumers = less revenues/profits for the retailer). At the same time, retailers are in a special group of energy stakeholders that can access the energy data of their users, while third-parties - like new market entrants, or Energy Service Companies (ESCO) - do not commonly acquire this access. This creates **a barrier for competition, innovation and provision of consumer-focused services in the energy markets** - affecting directly (and negatively) the end users.

In the vast majority of the EU electricity markets, the managers of energy data of consumers are **the Distribution System Operators** - DSO. They have a web portal where the users can access their personal energy data, but **they do not offer the possibility to share the data with third parties.**

And exactly this, is **the root of the problem: there is no adequate market solution for the facilitation of an easy and transparent exchange of energy data between the stakeholders of the energy sector** - consumers, retailers, producers, aggregators, ESCOs etc.

Open data has been characterized as the oil of the 21st century. We believe the same applies for the energy sector. **Open, neutral energy databases consist the key for a more transparent and competitive energy market** that will benefit the operation of our systems and the end consumer.

3. PYLON NETWORK

3.1. Introduction to Pylon Network.

In Pylon Network we have developed a neutral database based on blockchain technology where consumption and production data of energy market users are stored. Pylon Network database allows the user (data owner) to be in control and decide who they share their energy data with, hence actively participating in the market.

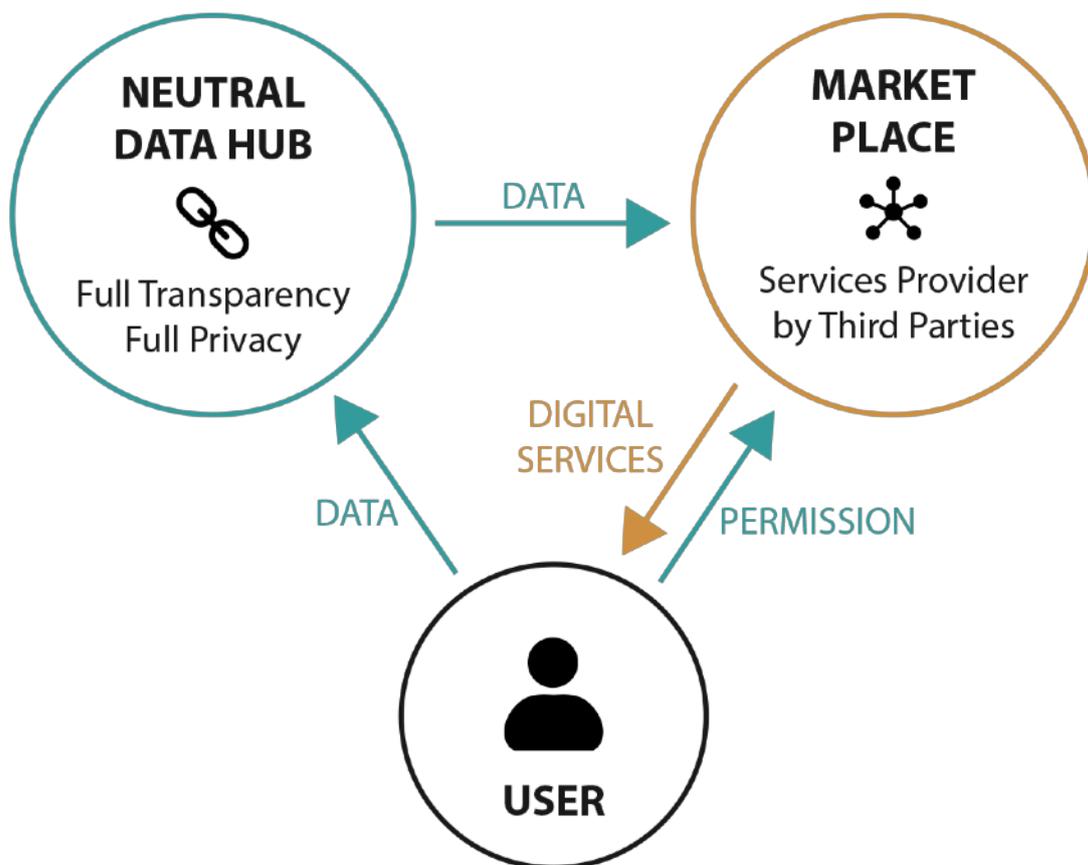


Fig.2. Pylon Network: a neutral energy data facilitator for the provision of added-value services to every-day consumers or other stakeholders.

With Pylon Network a level of data neutrality is achieved, which enables a new level of innovation and competition capacity in the energy markets. Now is the consumer/producer/prosumer himself/herself who, with an easy tool, decides what to do with their private information, being able to choose which third-party - retailer or Energy Service Company (ESCO) - can access it and offer back digital services to them - helping in that way consumers (Fig.2.) save on their bill.

3.2. Creation of a service-oriented ecosystem around the end user.

The data sharing architecture in Pylon Network, not only empowers the end user (consumers/prosumers) by helping them save money & energy, but also empowers the retailers companies and ESCOs, who can offer more targeted, informed and personalized services (e.g. electricity contract) based on high quality, granular consumer data.

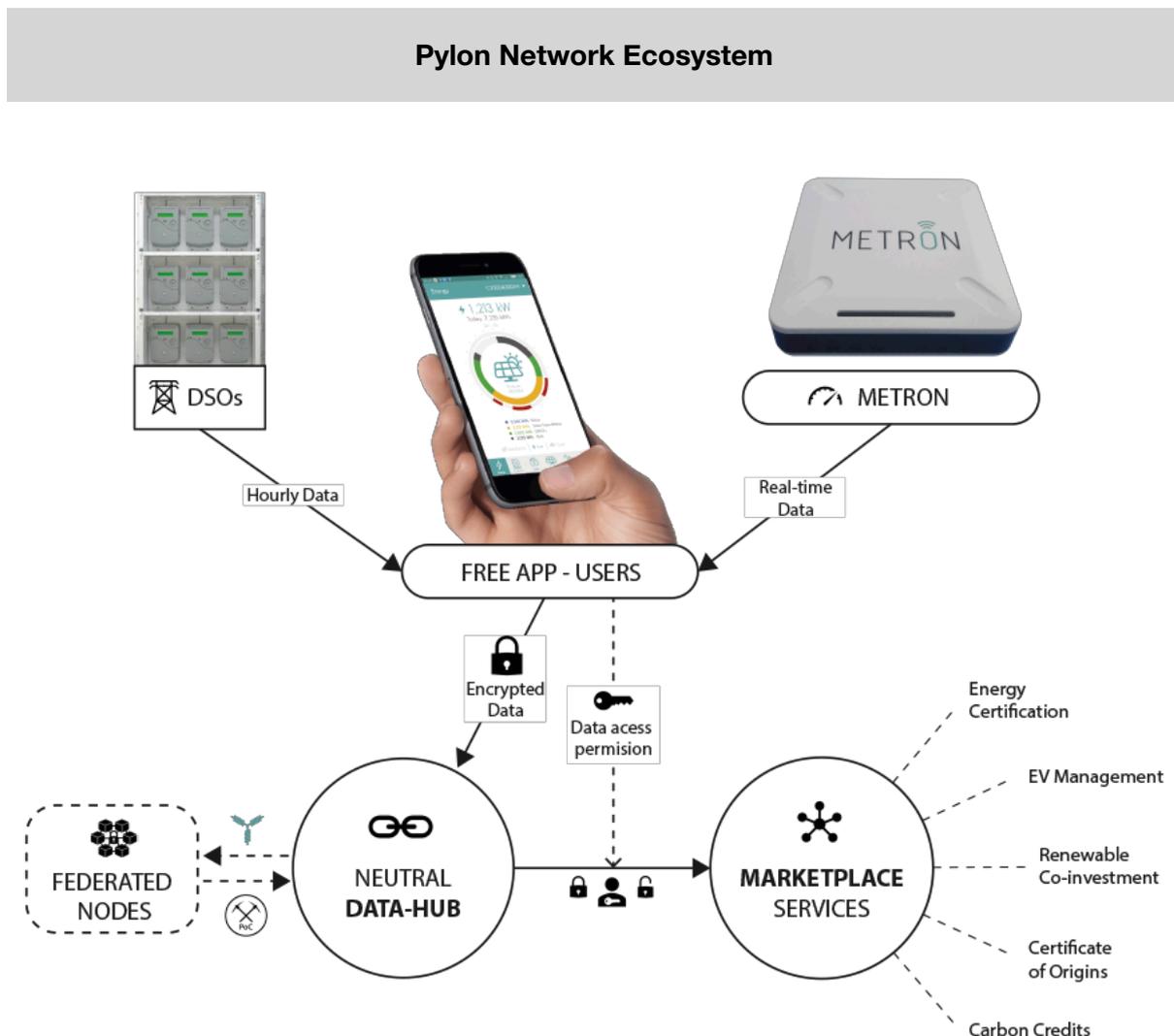


Fig.3. Pylon Network ecosystem.

3.3. The innovation. The Open-Source Blockchain code of Pylon Network.

Pylon Network is the first blockchain code, designed specifically for the needs of the energy sector.

We offer Pylon Network's blockchain technology with an Open Source (OS) license to play the role of an inclusive communication protocol accessible to all stakeholders of the energy market.

We developed our technology with the main objective of accelerating the energy transition and not leave anyone behind in the fast-evolving era of **decentralization**, **digitalization**, **customer engagement** and **transparent cooperation** in the energy sector.

The following sections go through some of the innovative characteristics of Pylon Network, which make it more than a common platform for digital energy services - and more like an ecosystem of value creation for the energy sector.

3.3.1. Technical specifications.

Specification	Description
1000 tx/s	High rate of transactions per second, designed for the energy sector and all its actors.
Non-competitive Mining	With federated nodes, we promote PoC cooperation against the PoW competition to improve energy efficiency and minimize hardware costs.
Low energy consumption	Consumption of 500 tx/Wh (i.e. 0.002 Wh/tx).
GDPR Aligned	Designed to comply with data privacy regulations.
Open Source	Anyone can use it and its users are encouraged to voluntarily improve its design. This is a strategy to create a scalable, effective common framework for cooperation in the energy sector. At the same time, open-source software takes out the risk of technology "lock-in" - a high risk factor on new, untested technologies, like blockchain. A copy of the code can be found on Github, here .
Permission management	It allows the interaction between the actors of the energy market while maintaining privacy.
Scalable	Multiple nodes can be added, increasing the number of users supported by the system. (currently supports 30M users).

4. BUILDING THE ECO-SYSTEM AS OUR MVP

The adaptation of blockchain technology in the energy sector requires demonstration of real use cases - which can prove to be a challenging task for many reasons: one of them is the nuance of the technology and the lack of concrete evidence in terms, both of technical feasibility, as well as of the potential benefits (not to mention any regulatory challenges). Another reason is the conservative mindset of the energy sector, unwilling to take any risks that might jeopardize the security of supply of the cost and access to energy for the consumers.

This is why we have always been focusing on demonstrating the technology - as a necessary requirement for proving its feasibility and as the first step leading to its widespread implementation.

We achieve that by creating an ecosystem with energy stakeholders that are already offering added-value services to consumers and that are willing to cooperate for the integration of innovative services under a common, transparent marketplace of digital services.

The following sections, explain in more detail, what we have achieved until today, in terms of building the ecosystem of Pylon Network; an ecosystem of innovation, cooperation and trust.

4.1. Demonstrated Technology (Pilot & Demo)

Demonstrating our technology within the real market and with real energy stakeholders. Goiener is our pilot partner, a retailer cooperative from the Basque country. The pilot project includes 100 users from their consumers, prosumers and large generators and the development of a number of tools that focus on the interaction with their consumers and the provision of digital services to help them become more competitive as market players and add more value to their customer propositions (e.g. green energy certification, transparent and insightful billing).

Design thinking for end-user engagement: Through our close interaction with the cooperative ecosystem and their active, engaged end-customers we have integrated their invaluable perspective and preferences into our design process for the development of Pylon Network, ensuring favorable conditions for end-user engagement with the technology (rather than the current system that demands the consumer to become energy experts for using such tools – or even interested in energy).

Engagement with customers and their active participation in the market: has been identified by numerous analyses as the key for energy retailers and other energy stakeholders to offer added value services to their customers.

Demonstrated Services:

- **Blockchain code for the energy sector.** Demonstrated code in a real environment with the integration of 10,000 users on our demo platform.
- **Energy certification:** offering the tool to energy retailers, who wish to provide their customers with valuable insight, knowing, at any point, where their electricity comes from.
- **Access to data - as the first step to energy efficiency:** in order for consumers to reduce their consumption, they first need to understand it. Focusing on that we have developed tools to make this process as user-friendly as possible.
- **Consumer-driven open data - full transparency & full privacy:** the end customers are in control of their data and are able to share it with third-parties.
- **Consumer mobile application (Metron App):** METRON mobile app [iOS](#) & [Google Play](#).
- **Consumer overview ("control panel"):** Available on [Website version](#).
- **Pyloncoin Blockchain explorer:** available [here](#).

4.2. Partners

Since the beginning of the project, we have closed agreements with different hardware manufacturers and software developers, as well as companies that fund, develop and manage renewable generation assets. In that way we are building an ecosystem of energy stakeholders, all aligned with our vision and our development/deployment strategy.

More information about the collaborations with such stakeholders can be found on our [website](#) (see links provided at the bottom).

5. A CALL FOR GLOBAL ACTION

Pylon Network is set to offer a consumer-focused, consumer-friendly and open/transparent marketplace. The strategic digitalization pillar of Pylon Network is its unique neutral, shared database, which combines full transparency with full privacy of sensitive (consumer) data.

Open, shared data is considered the oil of 21st century; in the energy sector, shared, open data can be a game-changer in the rate of energy transition, by helping unleash the potential of new innovative technologies and business models/services/markets.

In an era of digitalization, Pylon Network offers an open ecosystem, with the sole objective of accelerating the evolution of our energy systems. This is achieved by leveraging all the advantages of our unique Blockchain technology, able to offer a valuable data management system that can reflect the positive (economic, social and environmental) externalities from the mass adoption of distributed energy generation and allow them to actively engage with more and more segments/stakeholders of the electricity value chain.

We have begun our journey by demonstrating a number of services in that direction, together with energy cooperatives with which we share the same vision for the future of our energy systems.

We are offering a new disruptive model for the energy transition, incorporated within a financial/accounting ecosystem: Pylon-Network is governed by a set of mechanisms that promote/reward the expansion of sustainable and decentralized generation, management and consumption of energy.

At the same time, Pylon-Network will be the link between energy services and the global digital economy; an open platform based on the first sustainable and decentralized utility-based, neutral database, designed to feed (and be fed by) the decentralization of global energy markets.

In a time that the future of our natural ecosystems, resources and diversity are facing an unparalleled threat from the externalities of our economic and social activities...

In a time that the scientific community has raised an unprecedented warning regarding the future of our planet and the sooner-than-predicted irreversible changes, caused to our habitat by human-related activities...

In a time that this clear, alarming scientific evidence is being neglected and facts are a matter of opinion rather than scientific evidence...

In a time that the technology is out there - feasible and 100% proven - but our political/governance systems pose barriers and/or delays in its implementation...

At this time:

Our ultimate goal should be cooperation; cooperation as the only way to express our common vote for change; change for creating a common and fairer energy future for everyone. Because this is the only future.

This is the moment:

We invite all energy stakeholders to join an ecosystem of cooperation, based on transparency, for the benefit of our energy systems and the future well-being of our global societies.

JOIN THE MOVEMENT.

JOIN PYLON NETWORK.

REFERENCES

INTERNAL REFERENCES (PYLON NETWORK)

Website: <https://pylon-network.org/>

Github: <https://github.com/klenergy/pyloncoin>

Demo access: <https://demo.pylon-network.org/angular/>

Pylon Blockchain Explorer: <https://chain.pylon-network.org/>

Blog: <https://pylon-network.org/blog>

APP:

- **(IOS)** <https://itunes.apple.com/es/app/metron-pylon-network/id1374459163?mt=8>

- **(Android)** <https://play.google.com/store/apps/details?id=io.ionic.metronDapp>

EXTERNAL REFERENCES

<https://utilityweek.co.uk/customer-engagement-is-the-key-to-success-for-utilities/https://utilityweek.co.uk/the-future-of-customer-engagement/>

<http://fsr.eui.eu/wp-content/uploads/The-EU-Winter-Package.pdf>

<https://www.siriusenergy.co/post/the-problem-with-energy>

<https://www.independent.co.uk/news/business/news/energy-firms-customer-satisfaction-survey-which-households-british-gas-npower-a8162336.html>

https://www.accenture.com/t20171113T063921Z_w_us-en/acnmedia/Accenture/next-gen-5/insight-new-energy-consumer-2017/Accenture-NEC2017-Main-Insights-POV.pdf

<https://www.bcg.com/en-nor/publications/2018/digital-energy-retailer.aspx>

PYLON NETWORK CHANNELS:

Twitter: https://twitter.com/pylon_network

LinkedIn: <https://www.linkedin.com/company/pylonnetwork>

Facebook: <https://www.facebook.com/pylonnetworkofficial/>

Medium: <https://medium.com/@pylonnetwork>

Telegram:

- **(ENG)** <https://t.me/pylonnetworkofficialtelegram>

- **(SPA)** <https://t.me/pylonnetworkspanishchannel>