ØNDER: Commonwealth environment for digital energy business

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Abstract

We develop a commonwealth environment for the digital energy business. The environment intended to serve as open tools and common building blocks for driving interoperability among decentralized applications (dApps) that incorporate energy services functionality. In the first version, accounting and micropayments are executed by a system of Ethereum smart contracts, and state channels that are publicly accessible are free to use and any dApp can hook into. In the future, when appropriate technologies are developed, there will be a cross-blockchain transfer. DApps built on top of the based infrastructure can use common services and have an architecture with local regulatory requirements. The use of regulatory features at the application level does not harm the rest of the participants and the Token Model. The platform remains neutral. Decentralized governance is used to continuously and securely integrate updates into the base infrastructure without disrupting dApps or end users.

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1.1 Power industry in transition

There are drivers leading to the unprecedented redistribution of value in energy sector toward connected customers and so creating the market for digital ecosystems as a mean to make it happen.

Trend #1: Unprecedented growth of "New Stranded" assets
Power industry becomes increasingly fragmented. Millions of flexible assets getting connected to the grid on the consumer side are distributed generation, storages, IoT equipment, smart homes and electric vehicles, etc. These assets are as small as 0.1–100kW, but their collective capacity is higher than any largest single power plant. The falling cost of technologies incentivizes further growth of this assets base.

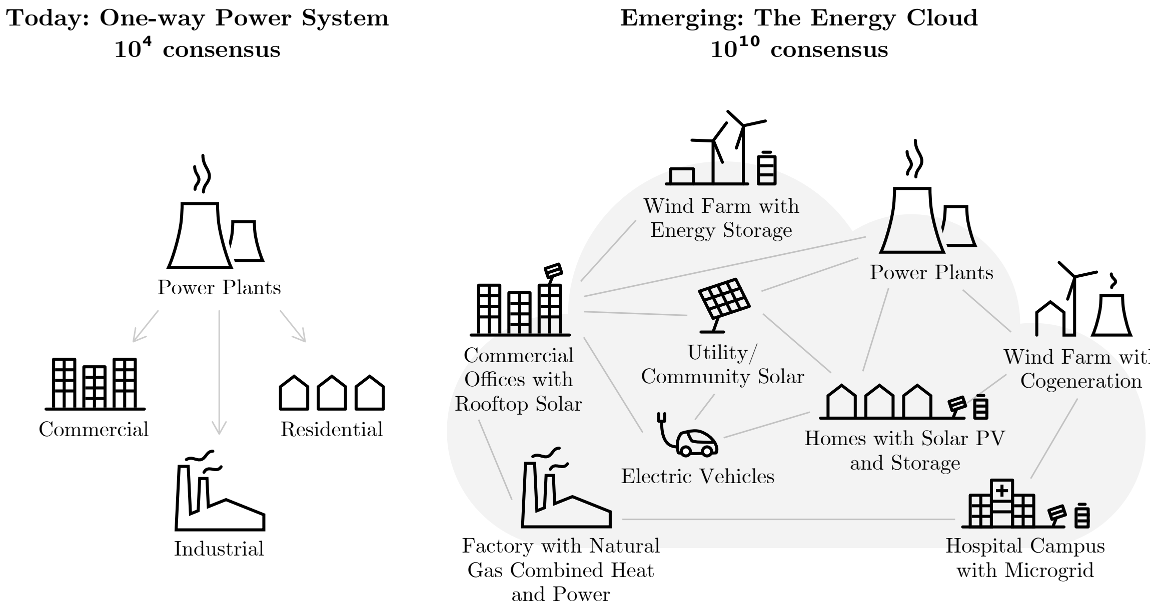

Figure 1: Growing power system fragmentation creates the case for Grid Edge Economics — the inclusion of consumer's Distributed Energy Resources into industry value chain (source: Navigant, 2016).

These consumer's site distributed energy resources (DER) are flexible in power consumption and generation patterns and so could provide services either back to the grid (so-called grid-centric services) to improve the reliability of supply or peer-to-peer between customers (so-called edge-centric services) focusing on maximizing the value of distributed assets.

However, these assets are currently limited to do so. Instead, asset owners are often penalized by utilities for their peaky and flexible demand in the form of various "standby" grid charges for consumers with own generation, like rooftop solar or small-scale CHP, for example in the US, or increased capacity payments to maintain "expected grow" in regional power demand for 10–15Y in advance, e.g., in Russia and UK.

We call this phenomenon "New Stranded" assets. This creates double economic inefficiency in power systems as beside locking potential on consumers side investments, which are already done. Consumers are forced to pay utilities twice for construction and operations of new centralized assets to maintain grid reliability, what would otherwise be available for free if dispersed assets are integrated.

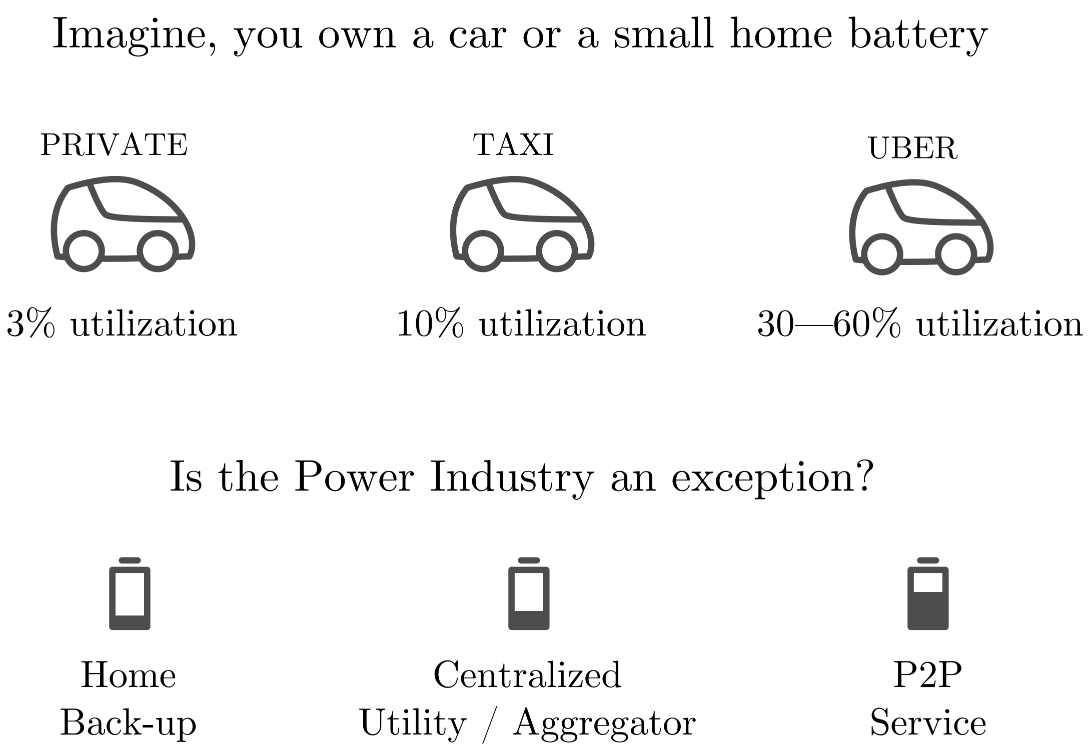

Figure 2: Unlocking value of "New Stranded" assets is the main business case for Digital Energy

Trend #2: Need for flexibility just matures: large-scale, cheap and dynamic
The need for large-scale flexibility integration just matures as power de-carbonization progress, consumers change consumptions patterns and become self-sufficient. We may not need more power in the future, but just as much where and when it is needed.

In fact, net annual power demand in developed countries such as US, UK, including Russia plateaus start to decline over the last decade, driven by energy efficiency, national economies transition away from energy-intensive industries and cheap behind-the-meter generation. At the same time, net peak demand remains steady or grows. Also, simultaneously, penetration of intermittent renewables drives the need for increasingly more flexibility to balance supply and demand. Further progress of secondary electrification of heat (e-heating and heat pumps) and transportation (electric vehicles charging) only supports this trend. For example, installed capacity of a theoretic full e-car fleet electrification in a country may reach 10-time installed capacity of the power system, but their total power consumption will be only 1/10 of today annual generation[1].

This need for large-scale flexibility could hardly be met conventionally by the increase of installed capacities of centralized large-scale power generation and grid infrastructure only.

The conventional energy planning approach used for decades and based boosting installed capacity of centralized generation and transmission assets faces its limits to maintain supply security by:

physical impossibility to install sufficient centralized reserves to cover potentially doubling and tripling peak load at distribution level;

the increased economic inefficiency of the power industry as boosting conventional reserves at flat demand results in lower assets utilization rate and worsen the financial performance of utilities;

blocking emerging and disrupting technologies to dynamically respond to changing consumption

[1] Russian case: 42 mio cars × 80 kW = 3.300 GW, 35 Mio tone fuel per annum = 90 TWh/a electric equivalent. Installed capacity and generation of Russian power system 244 GW and 1050 TWh/a.

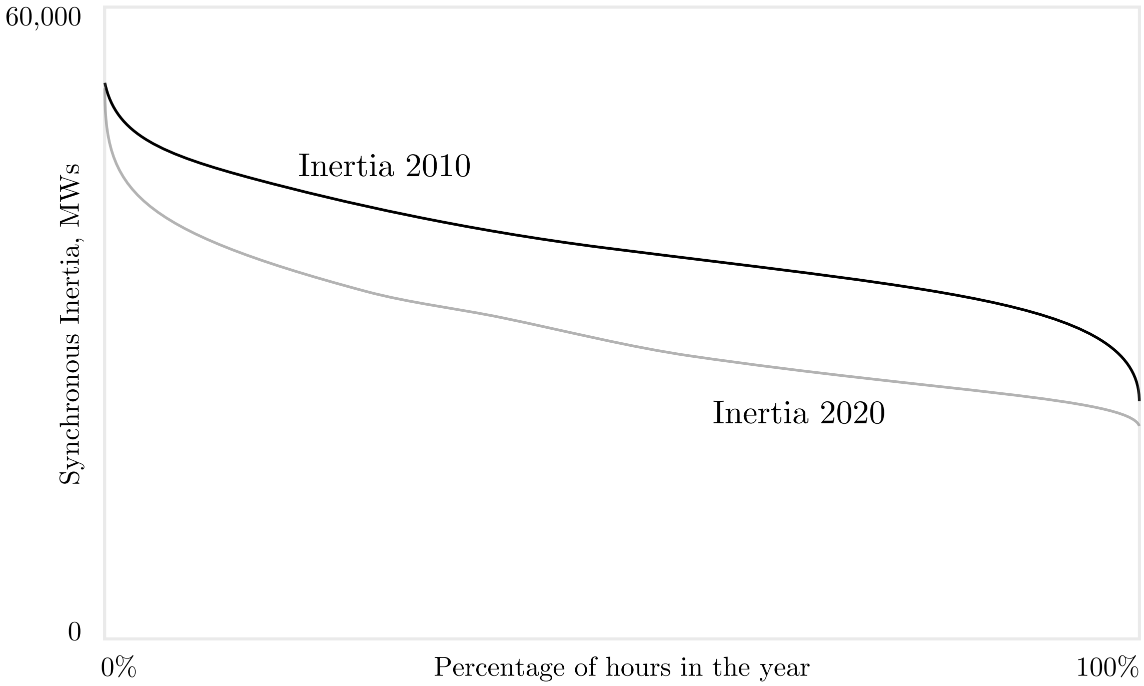

Figure 3: Reducing net load duration of Ireland's Power System 2010 to 2020 (source: EnerNOC)

patterns as costs of new large centralized reserves usually included "tax burden" into utility bill through long-term; 10–25 years agreements to provide a payback on it, disregarding if this capacity is ever required or not.

So, there is a growing awareness in every governmental authority globally that centralized market is missing to provide an acceptable solution[2] to provide secure, affordable and environmentally sustainable power supply. This results in the rollout of demand site management programs as an alternative to large-scale expensive network upgrades across various national markets. Exactly where the inbuilt flexibility of "new stranded" assets on consumer site allows much more economic grid planning and operations through geographically targeted, scalable and timely responsive ways of distributed balancing of supply and demand, not possible within the centralized model with large unit capacities, limited functionality and very long lead times.

Trend #3 Transactive Energy as the new marketplace
The "new stranded" have significant in build economic value, but also bring huge fragmentation and granularity of economic interactions between parties not known before. Modern wholesale markets — both Power and Capacity segments — are used to operate $1 \cdot 10^4$ nodes matrix focusing primarily on high voltage network optimization. Going 3 levels down through distribution grids, low voltage connections to behind-the-meter IoT device networks will expand this task by order of magnitudes to $1 \cdot 10^{10}$ requiring much more granular interactions. Fragmentation, which exists market infrastructure cannot cope with.

We believe that the next wave of efficiency increase in power industry will be driven by Grid Edge Economics, thus unlocking the value of very granular Distributed Energy Resources. To make this happen, a new stakeholder called Transactive Energy (TE) will emerge (TE)[3]: energy systems in which economic — or market-based platforms are used to make decisions involving the generation, distribution, and

[2] On the new EU electricity market design: "we see that Member States (EU) have a declining confidence in the ability of markets to deliver security of supply"
http://energypost.eu/the-new-eu-electricity-market-design-more-market-or-more-state/

[3] TE is a power/energy system in which economic- or market-based platforms are used to make decisions involving the generation, distribution, and consumption of power. It allows value to be created and exchanged throughout the Energy Cloud. TE appears in grid-centric and edge-centric forms, but hybrid and combination forms are possible. Grid-centric

consumption of power to bring this fragmented supply and demand world to a new consensus. The progress and falling costs of connectivity and digital technology create the technologic basis for Transactive Energy implementation.

The trends above represent the fundamental change in the way, and how power industries function across the globe as they lead to an unprecedented redistribution of value in energy sector toward connected customers and so opening up the market for completely new business models and market actors.

1.2 Market for platform and ecosystem

Availability of a critical mass of small and distributed "new stranded" assets need for reliable and economic integration of large-scale flexibility and willingness of regulators to accept new stakeholder interaction create space for new players in power industry — digital energy platforms and ecosystems of users, developers and secondary services around it.

Platform evolution	Value
Ecosystem Network orchestration Blurring of industry boundaries Growth = orchestrating multiple platforms	$ $ $ $
Platform, Orchestration Energy + value-added products and services Focus on optimizing assets across network Networked assets, multiple value streams Growth = managing, deepening connections	$ $
Siloed, Aggregation Asset ownership and management Focus on efficiency optimization Linear value chain, one-way power flow Growth = scale, customer base	$

Figure 4: Evolution for digital energy platforms and ecosystems (source: Navigant, 2018)

The key function of a platform lays in creating an environment, which helps to overcome three key barriers for implementation on "business-to-business-to-customer" business models in TE:

Challenge #1. Business models and markets for Transactive Energy applications include "new stranded"

platforms tend to focus on enabling distributed energy resources (DER) and improving reliability; edge-centric platforms focus on maximizing the value of distributed assets. Navigant Research, Blockchain for Transactive Energy Platforms, 4Q 2017.

assets into the industry value chain and are just emerging. Simple, standardized and easy to use offerings have to be established to make participation attractive for mass market end-users, and on the other hand, allow equipment manufacturers, EV and home appliances producers to offer standardized and cheap compatible hardware. Single investments of technology startups and market incumbents in establishing bespoke services on national markets could be used more efficiently based on standardized use cases and protocols.

Challenge #2. Suitable transacting and billing infrastructures capable to manage hugely fragmented systems are still missing. The current payment systems are too expensive and slow to manage very small peer-to-peer and machine-to-machine transactions. The same applies to the high cost of maintaining trust between transacting parties by using soloed registry and execution of paper signed contracts. The concentration of technical and financial resources is needed for its development and testing. This is usually concentrated in the hands of incumbent utilities as a source of conflict of interest.

Challenge #3. Regulators are cautious to allow large-scale rollout of unproven solutions for the mission-critical power industry. Despite many national regulators are looking for new ways to provide socially acceptable solutions to “keep the lights on” — sustainably and on costs, allowing user to participate in the co-creation of shared power infrastructure of the future still requires a lot of new models and technologies to be tested and proved its ratability as part of trials and pilot-projects before going into mass market.

The ØNDER Blockchain environment aims to help to overcome these issues. The platform provides core open source protocol for quick and low-cost transactions as well as common blocks to build flexible digital energy services easily so that value can be generated and instantly split between transacting parties. The testbed layer of the ecosystem serves to agile and safe sandbox for service testing, allowing service providers and regulators to make data-supported decisions at national markets. So ØNDER creates the ecosystem suitable to launch digital energy services and monetize the value of already available and future distributed energy resources.

1.3 Energy applications & functionalities we focus on

We develop a global commonwealth environment to allow others to build, test and operate digital energy services to final users within national markets. The environment serves as open tools and common building blocks, driving interoperability among decentralized applications (dApps).
To provide this, we develop building blocks for three key application’s functionalities in the areas, where we expect the breakthrough increase of economic efficiency:

Functionality #1: Chain Metering is the first key product of the platform, which we define as a fusion of Blockchain and Smart Metering, thus a set of common protocols and services allowing very granular (up to 3 sec. increment) and fully distributed non-intrusive power data collection & validation, user’s identity verification and peer-to-peer transaction functionality within one block. The case for this functionality is driven high costs and limited functionality of existing Smart Metering and separate payment processing systems close to 100–500 USD per point of connection[4] — equivalent to a sum a household is paying for electricity within 1–5 years (!). Chain metering aims to drive smart metering costs down times up to order of magnitude. Target functionality is suitable for the integration of low-cost non-intrusive load monitoring devices (NILM). However, to account to large-scale fleets of already enrolled intrusive (fix mounted) smart meters, we work with conventional meter’s manufacturers to establish data exchange interfaces. Chain metering services as the key functionality to connect physical devices and digital space as so creates “basic infrastructure” for any further service.

Functionality #2: Shared Infrastructure Applications. The second product is a set of common building blocks and functionalities allowing shared ownership, peer-to-peer payment routing and the instant split of value once a single transaction between multiple parties, who contributed to value creation is made. This functionality allows operation of a bunch of business models starting

[4]Source:
https://ec.europa.eu/energy/sites/ener/files/documents/AF%20Mercados%20NTUA%20CBA%20Final%20Report%20June%2015.pdf

from a simple automation of retail power supply, so that payment could be split into wholesale, transmission, tax and retail change components to the very sophisticated "device as a service" applications and crowd-funding and -owning of distributed energy sources and infrastructures as EV changing network, home power storage, and community scale generation. The latest we believe is the most important prerequisite for scaling up the mass market for Grid Edge Energy application as it allows distributed financial resources of end customers to be invested in a very dynamic and targeted way to cope with local needs opposite to current inflexible utility programs.

Functionality #3: Autonomous Flexibility Pools. This product unites a set of common building blocks allowing to build and operate the functionality of a fully Distributed Demand Response within so-called Autonomous (Self-Balancing) Flexibility Pools — virtual community of controllable loads, local generators, and storage systems integrated horizontally at logical level, but dispersed physically across the grid, which can support a desired energy balance with the main grid[5]. The fundamental innovation of Distributed Demand Response lays in direct integration of a significant amount of flexibility peer-to-peer, allowing scalability not possible by agent-based flexibility integration, known as Demand Response Aggregators. The DDR approach allows any flexible energy resources on the consumer side to be integrated with a manual or automatic control mode, such as IoT equipment, household appliances, storage systems and distributed generation agnostics to hardware and regulatory models of national markets using one basic technical functionality. Integration of flexibility on the consumer side is one of the widest undisclosed markets for today, as it allows to monetize a new function of assets or investments that have already been made.

Over the last decades, it has been believed that high-tech infrastructures are subjected to wealthy developed markets only. Penetration of cheap and reliable digital technology makes emerging markets to lead the transformation. This is why we create a global independent commonwealth ecosystem to allow others to build trusted open source digital energy systems and services easily around the globe. This is our contribution to the clean, reliable and affordable energy future.

2 ØNDER Platform

A decisive condition for the development of the new electric power industry is the change in the model of interaction between retail market subjects, the deregulation of economic relations, the creation of simplified interfaces for technological and information interaction, the creation of mechanisms for recording and distributing the economic effect.

ØNDER's mission is to bring key capabilities of decentralized technology — security, self-management, self-sovereign identity, economic efficiency — to the power industry. We expect that the greatest value will be obtained in greenfield deployments, where there is a free field for market experiments. However, we realize the value of legal regulation in such sensitive for the human wellbeing area and expect to be maximally compliant with existing legal codes.

To fulfill the mission, we will develop a set of tools for energy applications — for creating and operating in self-regulating markets for electricity, power and ancillary services, and will also offer a number of services to expand the functionality of such applications.

2.1 ØNDER Architecture

ØNDER ecosystem will be composed of the following layers: Services, Commons, Core.

[5]We rely on various developments under general concept of DDR including concept developed by "Overgrid: A Fully Distributed Demand Response Architecture Based on Overlay Networks, University of Palermo, 2016" and others.

	Launch Phase MVP Blocks Developed as Minimal Viable Product as part of the Launch Phase in 2018–2019 before separation into non-profit and commercial operations				
	Blocks temporary owned by Platform for Launch Phase only (commercial operation)	External Party Blocks (commercial operation)			
Service Markets	MIPT Testbed	University	Neighborhood	Testbed	Other
Applications	Distributed Demand Response	Renewables financing	Vehicle2Grid	P2P Energy Exchange	Other
Ønder Platform	**Core** Obligatory use, non-profit operation Identity Kit DAO Kit State Channels		**Commons** Optional use General Market Wallet Other		

Figure 5: Functional Structure of the ØNDER ecosystem.

2.2 Functionality development Plant

Platform functionality is developed in two sequential steps:

1. **Launch Phase "Common Non-Profit & Commercial":** to create, test and launch the platform, we'll develop bottom-up distributed demand response service as the minimal viable product. In this phase, commercial and non-profit Blocks are developed and owned by the platform before separation into non-profit and commercial operations.
2. **Operating Phase "Separate Non-Profit & Commercial":** once the platform is launched and fully operational, all Level 2 and 3 blocks will be separated and sold to independent commercial operators with platform controlling only non-profit commonwealth core and commons functionality to avoid conflict of interest.

2.3 Level 3 Users Testbed

Unique proposition of the platform is the availability of a test bed with integrated real-life test users, participating either as non-profit and partly as commercial arrangements

- Region #1 1000 localized test users — this is a geographically limited pool of users in one location
- Global 100000 dispersed volunteers (Residential and Commercial & Industrial consumers) to test application across different regulatory, geographic, cultural and economic environment
- Other regions and pool types will be included in a later phase. Testbed pool will be accessible for 3rd party developers to test new applications and services

2.4 Level 2 Commercial Application Store

- Distributed Demand Response
- Renewables Financing
- Vehicle To Grid
- Building to Grid
- Appliance to Grid
- Fiat Exchange
- AI for self-organizing, grid mapping and metering

- AI dynamic diversity for grid planning
- Other applications

At this layer, there are commercial services that all market participants can develop.

Commercial services use the features of Level 1:

Commons: it is applied if necessary, own decisions can be used.
Core: basic unchanged platform infrastructure.

Tools and application development capabilities have sufficient flexibility for accounting various requirements and restrictions according to the territorial and regulatory features in the service distribution area. For regulated markets, it is possible to run an application that could check and issue the special certificate for services run on the territory of regulation (data storage rules, for example).

However, accounting for regulatory features at the service level does not harm other participants and Token Model. The platform remains neutral.

2.5 Level 1 Blocks: Core & Commons

Core: Platform infrastructure could be changed by platform developers only. Shared for all applications.

- State Channels
- Plazmoid
- Metering Kit
- Service Kit
- Governance Kit

Commons: Third-party developed components could be used.

- Service Hubs
- Generic Market Maker App
- DApp Store
- Wallet

Other Commons could be added as defined by platform operating management.

2.5.1 Core

The layer provides foundational technology for the ecosystem. These will be open source and free to use.

State Channels
The technology allows secure exchange of blockchain assets, and execution of smart contracts off-chain, thus consuming no gas. The state channels smart contracts manage opening, closing, and settlement of peer-to-peer exchange. One can transfer custom assets and apply exquisite dispute resolution mechanisms while using the same set of abstractions. We plan to use the generalized state channels framework developed by Machinomy and enrich it with industry-specific subchannel contracts.

Plazmoid
The open core of a service. Provides SDK for making transactions between a limited yet open set of participants cheaper and faster through the combination of Plasma sidechains and state channels. Through

this approach, we significantly reduce transaction fees and make the transactions lightning fast, even compared with State Channels, which makes it suitable for the energy sector.

Metering Kit
User's actual interaction with the energy markets is mediated by an electricity meter. We do not force our users to install a specific meter. Instead, we maintain the protocol of communication between the user, the meter, the DAO, and the applications. Metering Kit facilitates the protocol on meter level. It is a set of libraries to integrate a 3rd party hardware device into the platform easily. It combines Identity Kit with State Channels and user interfaces.

Service Kit
Service as a decentralized autonomous organization is a way of structuring a particular energy market. It is collectively governed and collectively owned. The Kit provides a user with means to create a DAO and set the governing rules and monetary policy for its token. It provides Ethereum smart contracts, as well as user interface necessary to facilitate participation in the DAO.

Governance Kit
Governance Kit is a suite of plugins for Service Kit with different voting mechanisms. For that, we are going to integrate with Aragon or alternative DAO governance framework. The ultimate goal of the platform is to make it self-sustainable. That makes a governance mechanism a necessity. We are going to experiment with different governance models on service level before applying the most suitable mechanism on top of the platform.

Identity Kit
Identity Kit is a basis for virtual mapping entities onto the real world. Meter producers will use it to attest genuineness of a meter. A user will attest ownership rights for the meter, which serves a basis for meter-to-meter payments, as it allows to elevate a metering dispute on a human level. Identity Kit will use a set of contracts on Ethereum to build a registry of the system actors which links their Ethereum addresses to off-chain data they have on IPFS. There are different types of identity attestations, so we plan to add a TCR-like structure on top. It will make the participants of the system responsible for their actions regarding identity.

App Kit
App Kit provides interfaces for creating applications that are attached to the market and to add value to it. App Kit provides with interfaces to build such an application. It contains a set of contracts to attach the app to DAO, provides a UI framework for interacting with the application, and real-time asset exchange component based on state channels. We are contingent on what other components we should provide based on ecosystem participants feedback.

2.5.2 Commons

ØNDER Commons layer will offer end products, not SDK. Its goal is to facilitate usage of the applications on the platform, and complement the applications created. Some of the components provide paid services. Others, like Wallet, are free.
The sole purpose of the Commons is to bootstrap the ecosystem. We embrace competing services on the platform. It is highly likely sometime the alternatives will render the Commons obsolete. Until that happens, we will provide the Commons as a service of last resort.

Service Hubs
Service Hubs provide a medium for asset exchange between the participants, allowing them to process payments through state channels for a fraction of the cost of traditional payment processors. State channels allow one to group a series of asset exchanges into a single blockchain transaction, thus avoiding fees and mining times on each exchange. It allows one to overcome inherent blockchain limitations regarding time, and scale it to be useable for the real-time energy markets.

Generic Market App
The App serves as a real-time market maker for energy trading. We do not think energy trading per se makes any sense, yet it is a necessary basis for more advanced services. We envision more market maker apps available from 3rd parties. Recognizing that, we will provide a generic market maker app to be a market maker of last resort.

Low-Volatile Tokens App
The platform operates multiple tokens; one token per market. It could be problematic for an ordinary user to keep track of the changing value of his/her assets. We will provide a low-volatile token linked to USD for the user to link assets in the energy system to the outer world monetary equivalent. This lifts a burden of thinking in a multitude of tokens from the user's shoulders while leaving the market mechanisms intact. Maintaining a low-volatile or stable token is a tough task. We expect to partner with existing stable coin providers like Dai or Fragments.

DApp Store
We think a famous slogan "There is an app for that" could be applied to an advanced energy market ecosystem. App Store will provide a user with the selection of energy apps based on his/her location, market participation, energy resources, preferences, etc. At first, the list will be completely centralized and will be curated by the platform management. At that stage, we retain the right to apply fees for app promotion. As the platform moves closer to a self-sustaining stage, we will rebuild the App Store as a curation market.

Wallet
The Vynos wallet is historically the first Ethereum wallet with support for payment channels. It is web-browser-based and lives in an iframe. It does not need any extension or any separate application to download. Developed as a collaboration between Machinomy and SpankChain, it fundamentally changed interaction with adult websites. It replaces passwords, usernames and credit cards all at once.

We are going to embrace the approach and move further with Vynos wallet accompanying it with a compatible mobile wallet. The mobile wallet would allow us to lessen restrictions on the UX of the apps. That makes the wallet a center of a user's digital ecosystem on all the devices, and effectively adopting the wallet for the purpose of Self-Sovereign Identity.

3 ØNDER game like go-to-market strategy

Energy markets are a very tightly regulated space with very specific requirements. That is true, but it is also true that players on these markets (business and regulators) want to create new opportunities to change the current situation because it is not optimal now with new technologies that appeared in last 20 years (private generation, storage, platforms in IT, blockchain, etc.).

Many trials are launching around the world to prove a new approach to energy market architecture. We are not going to introduce "silver bullet" market description for all cases, but we are going to offer the stack of technologies so that business or regulator could construct a model of energy system easily and

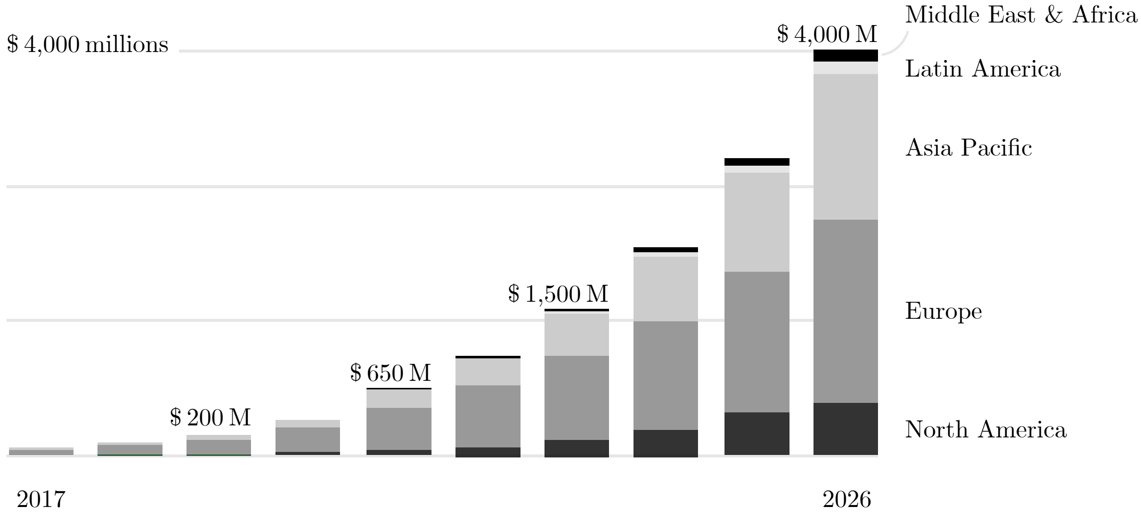

Figure 6: Conventional forecast of "flexibility" integration growth globally for 2016–2025 (source: Navigant, 2016)

cheaply. Try it to see if the model proves its viability and sustainability on practice scale for district, country or around the world with low operational costs.

Our strategy is structured in three steps:

- provide ØNDER protocol benefits to energy market players. Each case launch as a separate project with specific interest for the partner. We create cases with service providers, devices producers, regulators, utilities, and consumers;
- cooperate with different players on the same test site territories. We expect to increase the value that each participant gets from using ØNDER platform through cooperation;
- unite all cases on one platform to provide opportunity scale with each solution on other territories and countries; we also expect new services to appear in several services puzzle.

First markets where we are going to find partners are Russia, Europe, and Asia.

To succeed, we are creating the separate project inside ØNDER ecosystem; we call it "The Game."

It has several layers of technology and purposes:

- User Interfaces for all our users (consumers, service providers, utility, regulation operator);
- Simple constructor, translator, the search engine for smart contracts inside ecosystem;
- Special sandbox regime of work serves to agile and safe sandbox for service testing, allowing service providers and regulators to make data-supported decisions at national markets.

"ØNDER game" is the bridge between the traditional energy and the future. The development of new services in the energy sector is limited by the established market model and the thinking model of their participants. An environment is needed where it is possible to work out a new model of interaction between participants in the energy market, with a maximum approximation to reality.

The essence of the ØNDER game is that on the local market, people concerned (enthusiasts) are equipped with devices with our platform, and we build relations between them for different services. A unique combination is going to be achieved; we can on real physical data arranged in the game by creating an implementation of real services from these devices with real people, which according to current rules or beliefs cannot be applied. For example, to organize a service "Demand Management" when the business model and the regulatory requirements in this region have not been worked out yet. After check viability of services or regulation in the virtual environment, we *get a proof-of-practice that can be fixed in real* *regulatory acts*. Further, from the game, energy services will appear on the local market, which seamlessly integrates into reality.

For first users, we are going to bootstrap participation to test our platform with tokens.

4 Token model

4.1 Common platform

After the release of the platform in 2018, we are negotiating the implementation of pilot projects and the integration of the platform with the business services of energy companies. Some agreements have already been reached with energy companies and service developers. However, we see significant limitations in the classical b2b model.

Business aspires to create separate energy services using the properties of a distributed registry — load management, peer-to-peer energy trading, etc. The business also seeks to monopolize technology, data and the local market, limiting the ability of the consumer to use similar services.

Actually, the massive economic effect is achievable in the presence of a common platform for energy services.

The unique use-case of blockchains is that blockchains can be used to incentivize the creation of unowned platforms, i.e., commons. Thus, the creator of a blockchain can commit to never taking actions to maximize profit at the expense of social value, and it can commit to never taking actions to redistribute more of the social value to itself. The blockchain creator, however, can be rewarded through token issuance. Moreover, since the token and social value of the blockchain are positively correlated, the blockchain-platform creator has strong incentives to create a common that maximize social value.

ØNDER is a common platform for the energy sector. We will present a model in which the value of the tokens will be tied to the value of the platform for the services and users of the platform.

4.2 Platform Øn DER tokens

ØNDER is a network protocol used to facilitate services between participants in the energy market, and it is a framework used to create energy services and connect with energy devices. It is intended to serve as an open standard:

- ØNDER provides the layer of interoperability. Users have the opportunity to choose a service. Service companies are reducing the barriers to entry into the energy market. The platform provides transparent and fair relations for all participants.
- ØNDER open to the use of various meter devices that meet the technical requirements for connection to the system.
- ØNDER open to the use of various services with the original economy model with original tokens.
- ØNDER allows ensuring the integration of services with each other. For example, when financial transactions from renewable energy production are simultaneously split into investment services, towards energy exchange services that provide energy sales and other services that support the operation of renewable energy sources.

We are working on details in cooperation with our partners and first contributors to build the right token model that suits well for every participant of the ecosystem.

5 Organizational Model

We believe that blockchain technology provides the powerful, unique and unprecedented instrument to allow this new fragmented world to come to the new balance. However, blockchain in energy is in its infancy; no one has so far developed mass-market applicable solution providing:

Knowledge Synergy: common development environment leverages from the collaboration of technical talents and avoids duplication of work and resource invested by the creation of basic elements, needed by every digital application and create standards

Resolving the incumbent's conflict of interest: concentration of technical and financial resources is needed for development and testing. This is usually concentrated in the hands of incumbents' utilities as a source of conflict of interest. Non-for-profit body for system development is key to overcome this.

Creating trust and transparency: Blockchain energy once reaching market maturity will control globally the most critical infrastructure — electricity supply. So, this becomes "nuclear weapon of modern" — too powerful to become concentrated in the hands of one nation or corporate body. Thus, an independent overseeing body from independent and trusted persons and the organization has to be engaged from start to guaranty that operating management act compliant to the open, transparent and inclusive governance of the system.

This is why we create a global independent commonwealth ecosystem to allow others to build trusted open source digital energy systems and services easily around the globe.

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