WHITE PAPER

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1. What is SIM?

1.1 Introduction

SIM is the energy economy built for the future. Born within an elite solar company now known as Simmitri (simmitri.com), with the mission to restore a "balance of power" and continue building on their strong community relationships as we move forward into the 21st century. SIM is the economic bridge that will fast track such relationship, providing a self-sufficient and decentralized network powered by artificial intelligence (AI), communicated through Internet of Things (IoT) and audited by blockchain technology.

SIM is the cryptocurrency token generated from within our "SimBox", built to balance power between the consumer, prosumer, innovators and utilities. Each device acts as a node in our network - which we call the ***Energy of Things*** - whereas SIM provides the currency that will compensate users based on enhancing building performance.

The energy conservation efforts inside the building generates negative kilowatt hours "Negawatts" that convert to an automatic output of SIM tokens that can be used for your economic benefit. You can program the SimBox to alert for manual control, or the built-in AI software can automatically address your energy conservation needs while you focus on the finer things in life.

Either way, SIM provides the consumer and prosumer with the incentive to reduce individual energy consumption, distribute to those who are in need and lighten the footprint we all stamp on Mother Nature.

1.2 Background

What started as a family-owned company founded in 1995, Simmitri began by serving their local community with quality roofing, construction and electrical services. As a Master Elite roofer with GAF Material Corporation, it was a natural progression to segway into solar. Simmitri's solar business grew even further into energy efficiency services with a focus on corporate clients. By servicing over 4000 clients in central California we have installed, repaired and facilitated energy throughout thousands of electrical load panels.

Customer Service and data collection has always been a trademark of the company and part of the business growth process. As we survey our customers, we learn about essential concerns in regards to all daily aspects of energy efficiency. Collecting data points from our users has been paramount in the direction of moving into artificial intelligence as a new service of Simmitri. When analyzing user behavior data with other energy forecasting data points such as; timing, weather, location, providers and multiple others, the data begins to show us the best practices for either conserving or producing energy. This provides a comprehensive energy analysis, enabling clients (participants) to systematically yield the greatest rewards.

As of 3Q 2017, Simmitri has been recruiting a core team of blockchain experts who are researching and developing revolutionary strategies to incorporate our energy management systems approach, while integrating AI and smart contracts. Our extensive background in the renewable energy market has positioned us well ahead of the competition in this new and exciting world of energy tokenization. We believe it is better to a have a foundation based on energy before incorporating blockchain technology, rather than to be a blockchain startup incorporating energy.

2. Market Analysis

The market for our smart grid product can be considered either a home energy management system (HEMS)[1] or a building energy management system (BEMS). This technology could be applied to both HEMS and BEMS which are considered as two entirely different market segments; 1) HEMS for residential homes and 2) BEMS for commercial buildings. Although the market segments may be considered separate, we as a company see them as one market, just two types of clients. Furthermore, we serve more than just the homeowner or the commercial property owner and do invite additional clean energy participants to join as listed in our Economy. However, if we were to make a final claim as to where the physical location of our devices would most-likely be, they would be located on site of the home or business.

Overall, whether it's called a HEMS or BEMS product/service, they both have the same goal, ultimately having a better system for managing and controlling their energy consumption. HEMS originally came onto the scene as a system set up by utilities, but has now merged into a connected smart home land grab. Vendors who offer HEMS products and services have definitely seized market momentum, and the leaders are the ones who already had a footing in the home and adding an energy modality was a simple addition to the already pre-existing list of home services. At the Consumer Electronics Show (CES)[2] in January 2018 showed, much of the show had a sense of "smart home-esque" to it. Companies have caught on that the one who wins the smart home race wins the industry, which is just getting started, especially with artificial intelligence.

AI market leaders (Google AI, Amazon's Alexa, Apple' Siri, etc.) are considered more of an entertainment or instructional service than energy management automation at the moment, but the artificial intelligence that operate these tech giants' devices can easily add programmable skill sets into them which connect to the network that runs the home thermostat, lights and so

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[1] http://www.neep.org/initiatives/high-efficiency-products/home-energy-management-systems
[2] https://www.ces.tech/

on. Time will tell how involved these tech giants become in the HEMS or even BEMS space in the coming years, however, there are still several fundamental differences between what an Alexa device and a Simmitri device can do, which is explained later in this document.

According to Navigant Research, global revenue attributed to HEMS devices is expected to grow to $7.8 billion in 2025[3]. Currently, the BEMS industry is harder to calculate with all the different oncoming vendors and software solutions that facilitate a barrage of different energy management solutions in facilities, warehouses, parks and so on. What is known, however, is the BEMS market leaders with large and diversified energy portfolios are the companies who have the current market hold.

In competitive markets such as HEMS and BEMS, innovators must seek adoption through disruption, alliances or complimentary services. Simmitri technologies do solve the primary challenges that face smart grid issues today and we look to become adopted into the smart grid economy through our unique value proposition (UVP) as an AI-powered blockchain solution to IoT energy devices, which commonly distinguishes Simmitri apart from competitors in this space.

2.1 Investment in Grid Modernization

Utilities, innovators and consumers are aware of the dated infrastructure that is our grid. Momentum from US public programs have become mainstream for not only incentives and tax credits, but also stimulus grants issued to solve the burden of modernizing the grid as well as implementing unique, new innovations that prove to help with reliability and sustainability. $3.4 billion was managed by the Office of Electricity Delivery and Energy Reliability (OE) in recent years to help the overall grid industry in reliability and efficiency efforts to help accelerate the deployment of advanced technologies similar to that of which Simmitri develops. Additionally, the Department of Energy (DOE) has joined the movement in 2016 with the Grid

[3]https://www.navigantresearch.com/newsroom/annual-global-revenue-attributed-to-home-energy-management-devices-is-expected-to-reach-7-8-billion-in-2025

Modernization Initiative (GMI), an effort to create strategic alliances to help solve reliability issues through a consortium of industry experts and leaders.[4]

2.2 Investment in Blockchain + Energy

Over the past year: $324MM has been invested in blockchain projects in the energy sector.[5] There are currently 122+ companies working on combining blockchain into an energy market in the United States, and an additional 40 projects internationally. Simmitri is unique in this group of innovators as we are creating the ***only*** AI-powered blockchain in our energy solution. In saying that, there are currently only a handful of energy coins that have paved the way for investing into these platforms on exchanges. SIM Token will be among one of these.

2.3 Key Market Drivers

The smart grid market is on pace to grow 15% within the next two years. The investments that are flowing into the technology that manages energy consumption and improves building performance is the key driver for this market[6]. The other primary driver is customer engagement. Never before in the history of electric management have consumers become so engaged in this sector.

Traditionally, it has always been a "behind the curtain" model where consumers simply trusted that the lights would stay on and had little to no awareness as to how they were affecting the overall grid, let alone interact within it. Now, consumers are being proactive and purchasing HEMS products that they can communicate with as to what their energy wants and needs are to help serve themselves, their neighbors and the overall grid more effectively.

Another large factor to be considered in driving the smart grid market is the need for distributed energy resources (DERs). DERs were introduced in recent years as the adoption of solar and

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[4] https://www.energy.gov/under-secretary-science-and-energy/grid-modernization-initiative
[5] https://www.greentechmedia.com/articles/read/energy-blockchain-startups-raised-324-million-since-2017#gs.8s0Dpio
[6] http://www.strategyr.com/MarketResearch/Smart_Grid_Market_Trends.asp

storage became more prevalent in residential markets. Now, the smart grid can depend on a small percentage (roughly 10%) of consumers to generate their own energy from their own investments and act as an active participant in not only creating enough power for their own building, but can now sell back energy to the grid. Using homeowners and property owners to create their own power has been a monumental shift in the conversation around how smart grids will function.

Alongside the ability to generate power on the residential or local level came into question of who is eligible for producing renewable energy certificates (RECs) and how that interworks with the economy of the grid as a homeowner or company. Albeit difficult to identify figures for drivers of the market regarding RECs, we see this as a gap in a market that would definitely drive innovation in this direction.

2.3.1 Technology

While sources of demand for efficiency and renewable energy continue to expand and diversify, technological advances are paving the way for increased deployment by easing renewable integration into the grid. Two areas of rapid progress are energy storage and digitalization. First, storage; solar and wind have become more viable as replacements for traditional fuel sources when paired with storage capacity. And the cost of lithium ion battery modules has declined more than 70 percent since 2012, driving sharply increasing energy storage deployment in many countries. According to IHS Markit, residential solar and electric battery storage could become cost competitive with grid electricity by 2020.

Blockchain is another digital innovation that is already helping integrate renewable and energy accountability on the grid[7]. The first pilot project in Europe using a networked fleet of home energy storage systems and blockchain technology recently began operating. The regional transmission system operator and storage provider are using an intelligent blockchain-enabled platform to absorb excess output from wind plants in northern Germany into a networked pool

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[7] https://ihsmarkit.com/pdf/Blockchain-Distributed-Ledgers-revolution-for-power-market_309886110913044932.pdf

of home battery storage systems, and then discharge this energy when and where required. This solution reduces transmission bottlenecks, limits the need to curtail wind output, and helps decrease fossil fuel-fired generation, while also compensating home storage system participants with free electricity. Through technologies like analytics, AI, and blockchain, digitalization could not only make it easier to integrate renewables into the grid, but can also help markets derive value from distributed renewables and begin compensating owners for providing services to the grid. So instead of being viewed as intermittent resources that can disrupt the grid, wind and solar may soon be seen as potential solutions in the Simmitri market.

2.3.2 Utility Companies are Bullish on Smart Grids

Utility leaders overwhelmingly anticipate substantial solar and wind power growth in the next 10 years, according to Utility Dive's 2017 survey[8] of the sector. Among utility executives, 71 percent say utility-scale wind will increase moderately or significantly over the next 10 years, and 82 percent predict the same for utility-scale solar.

Utility executives were most confident -- more than two-thirds of respondents in each region -- there would be moderate or significant growth in utility-scale solar, followed by distributed generation, such as rooftop solar, and then by distributed energy storage. A majority of respondents in each region also expect grid-scale energy storage, wind and natural gas to play a greater role in their power mix going forward. They were least optimistic about oil and nuclear (especially on the coasts), with coal coming in last.

The results are based on an online survey of more than 600 electric utility employees in the U.S. and Canada, conducted by Utility Dive in January 2017. Just over half of the respondents work at an investor-owned utility, 32 percent work at a municipal or public utility and 14 percent work at an electric cooperative.

[8] https://s3.amazonaws.com/dive_assets/rlpsys/SEU_2017.pdf

Utilities were most confident about the growth of utility-scale solar, with at least two-thirds of respondents in each region expecting either moderate or significant growth of the resource. Solar sentiment was strongest in the West Coast, Rocky Mountain and Southwest regions, with more than 80% expecting moderate-to-significant growth, reflecting the abundant solar resource in those areas as well as the declining costs of photovoltaic technology.

2.3.3 The Cost for Energy Infrastructure

Large U.S. businesses — including Fortune 500 companies — are increasingly acting on their publicly announced renewable energy goals as new utility-scale wind and solar energy projects are now often the lowest cost power available. According to the WEF report[9], a coalition of more than 100 corporate entities set a goal of purchasing 60 GW of renewable energy by 2025. The report estimates that the coalition still has some 51 GW left to purchase in order to meet that goal, and questions whether current transmission plans can accommodate the increase in demand.

2.3.4 Generational Perspectives Regarding Smart Energy Grids

Sixty-three percent of residential consumers are very concerned about climate change and their personal carbon footprints. But this rises to 75 percent among millennial respondents and 69 percent among Gen X. Similarly, millennials (80 percent) are much more likely to believe that climate change is caused by human actions, followed by Gen X (74 percent)[10]. What's the reason for this age-related difference of opinion? Perhaps millennials and Gen Xers have studied the link between carbon emissions and climate change in school, or they've been exposed to media reports about it for their entire lives. Older generations, on the other hand, may not be as familiar with the scientific data, thus making them more skeptical of a connection between climate change and human activity.

[9] http://www3.weforum.org/docs/WEF_Fostering_Effective_Energy_Transition_report_2018.pdf
[10] https://ecoamerica.org/climate-change-a-rising-policy-priority-for-millennials/

3. Smart Grid Energy Problems

Consumers are not electricians. For the majority, consumers do not understand how electrical power is transmitted and distributed throughout the home. Therefore, when problems arise, the energy consumer is left to make their best guess on how to troubleshoot and solve spontaneous issues. Additionally, the consumer is left to understand their electric bill and to make efforts on managing it.

As population and electronic devices grow exponentially so does the need for energy. The infrastructure of Utility grids are stressed and outdated, they are becoming less reliable as demand continues to rise. Furthermore there is an energy demand time of use imbalance that further complicates the problem (i.e. the duck curve)[11]. This leads to higher grid stress and volatile energy prices.

Utilities and governments have put forth an effort by creating programs to incentivize people to reduce overall energy usage through energy efficiency measures and to shift real time demand by shifting energy usage to different parts of the day. The problem is all of these programs require a considerable amount of resources to administer. These programs require people to be engaged at a high level, which require site visits to people's homes for energy audits, calculations, recommendations on more efficient appliances, verification of energy efficient measures taken, rebate forms and processing. In addition, these programs are only ensuring that appliances are being upgraded but not the usage behavior of the person occupying the building, which is key to solving the demand issue. Unfortunately, human behavior is one of the hardest things to change and this is one major reason why these programs will never be the complete solution.

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[11] https://www.caiso.com/documents/flexibleresourceshelprenewables_fastfacts.pdf

3.1 Market Segment Challenges

One final headwind has been the challenge of attracting the next tranche of buyers beyond the early adopters that fed growth until now, which has led to a solar deployment slowdown in 2017. While US wind power capacity added from January-September 2017 was up 78.6 percent from 2016, solar additions fell by 21.4 percent. Residential and utility-scale solar deployment has slowed, while nonresidential solar, which includes corporate, government, and community installations, is expected to grow 9 percent in 2017. Despite expansion into new states as prices continue to fall, new residential solar system sales do not seem to be enough to offset relative weakness in top markets such as California. In the utility industry, sluggish solar growth is expected to continue in 2017 and 2018 before potentially rebounding in 2019, as utilities focus on projects to come online in 2019 or later. Some projects have been delayed, as potential customers have hesitated to sign power purchase agreements until the trade case is resolved. The commercial sector appears to show long-term potential as energy managers across a variety of industries become more educated about solar opportunities and as more efficient financing structures emerge.[12]

3.2 Consumer Specific Issues

Consumers are restricted from conducting their own real-time energy audit. Furthermore, they are unable to review custom energy efficient options per device from the audit and are bound by the rules and costs of the utility company. Finally, consumers are not incentivized appropriately to become energy efficient. However, consumers are interested in controlling their energy costs.

About eight in 10 households continued to take steps to reduce their electric bills over the past year. What’s more, these actions appear to be working: two thirds expect to use the same amount of electricity over the next year while just under one-quarter expect to use less.

[12] https://www.communitysolarvalueproject.com/uploads/2/7/0/3/27034867/2016_01_08_market_research.pdf

Although consumers are continuing to take steps to reduce household electricity consumption, more than two-thirds (67 percent) believe they are doing all they can to reduce their bills even further. This proportion has remained about the same since 2014. Yet, they do not yet have a workable solution for controlling their energy consumption costs.

3.2.1 Overloaded Circuits

The number 1 most frequent reason for tripped breakers is that the circuit is overloaded, which is a safety feature. This is usually from consumers plugging in too many appliances because they are not familiar with which circuits can handle which energy-demanding devices. This then puts strain on the physical properties themselves, causing damage and a potential fire hazard. Many homes have electrical load panels that are very outdated and should not be relied upon as a single source of safety if this should occur.

According to statistics gathered by the Department of Energy, major blackouts are on the upswing. Incredibly, over the past two decades, blackouts impacting at least 50,000 customers have increased 124 percent, according to DOE data. This is mostly the result of our aging grid; with equipment staying online longer than its programmed life, chances of problems increase.

But we're not just talking about power plants here. Much of the thousands of miles of wiring that makes up the grid is old, too. The weather takes its toll. Pretty much every major storm leaves people without power, and work crews rushing to make repairs. However, in recent years, those repairs have been larger and have taken longer to accomplish.[13]

[13] https://www.eia.gov/electricity/monthly/epm_table_grapher.php?t=epmt_b_1

3.2.2 Manual Conservation

Energy usage is a 24/7 operation. Managing appliances and energy-demanding devices on and off peak hours is very difficult for the average consumer. Most consumers are not aware of how they can conserve energy more efficiently, and for the most part it's not automated which passes the responsibility onto the consumer.[14]

3.2.3 Lack of Information

The modern consumer in regards to their "powerful" lifestyle often leaves them powerless. For example, the typical procedure for when the power goes out is to call the electrical company and to ask what is happening - even when you know a storm is crossing over. But what if you had no idea why there is a power outage? What if you had no idea that the deep freezer you purchased raised your electric bill $15/mo? What if you were spending $41.77 per year per lightbulb, when you could be spending only $32.40? And what if any faulty wiring or device inefficiencies could be covered from an insurance or warranty claim? Again, powerless because you just didn't know.[15]

3.2.4 Lack of Integration

Using the potential use case for a warranty claim is just one scenario. In the prolific world of applications and API integrations, the missed opportunity for a connected EoT experience is very significant. Simmitri believes that multiple online entities should be in constant communication, to include; power, weather, health, insurance and cellular network providers.[16]

[14] http://blogs.worldbank.org/energy/why-saving-energy-is-so-hard
[15] http://www.wrecc.com/what-uses-watts-in-your-home/
[16] https://www.energy.gov/eere/wind/renewable-systems-integration

3.3 Utility Company Adoption Issues

As previously stated, the electrical grid is old. Originally designed to last 50 years, many parts have already surpassed that. There are even parts that are about 100 years old. Yet little is being done to replace the aged parts. This has resulted in the American Society of Civil Engineers giving the power grid a D+ for reliability.[17]

Part of the problem is financial. Currently, the grid needs an estimated trillion dollars worth of repairs and upgrades. Power companies, many of which run on a narrow margin, say they can't afford to replace aged equipment, so they keep patching it up and using it. This is especially true of the companies who own the oldest equipment.

The other part is governmental. Everything from installing a new power pole to building a nuclear power plant requires an enormous amount of red tape. A wide number of government agencies have their finger in the pie, making the job all that much more complex. Utilities need to reduce demand so they can deliver a stable grid. If they do deliver a stable grid they get a bonus check from the State. If they do not, then they get huge fines. This is why they are throwing money at energy efficiency rebate programs to incentivize people to conserve.

As utilities face disruptive change on a number of fronts, they are seeking to transform their business models in order to adapt to shifting market trends. But while utilities know their current models need to change, it's easier said than done. Utility executives' attitudes about business model reform have remained relatively constant over the last year. For the second year running, state regulatory models and integration of emerging technologies top the list of obstacles to the evolution of utility business models. Consumer costs and internal resistance to change again rounded out the top four, though respondents were more concerned about the cost of change this year than last. Utility business model reforms are overseen and facilitated by state regulatory

[17] https://www.infrastructurereportcard.org/cat-item/energy/

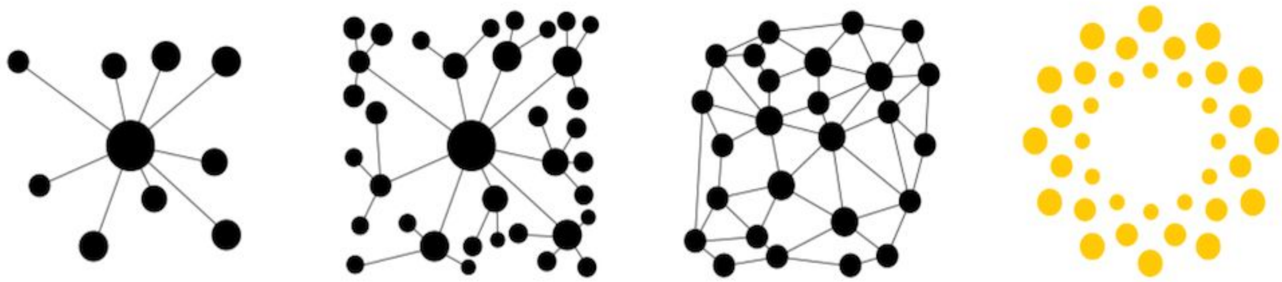
commissions, making it unsurprising that respondents have consistently identified them as an obstacle to change. But sentiment may be shifting somewhat. In 2016, utility regulators were named the biggest impediment to change by a wide margin, beating out emerging technology integration 35% to 21%. This year, regulators and cost concerns tied for the top spot, each receiving 18% of the vote. This suggests that utilities are becoming less dissatisfied with state regulators as more states take up reform dockets similar to the REV[18] in New York or California's DER proceedings. It also indicates some of the frustration expressed at regulators in past surveys may be related to new choices offered to respondents in the survey, such as wholesale market constructs or federal environmental regulations, each of which received 6% of the total vote this year.

4. Simmitri Network Solution

ñEnergy-saving technologies keep improving faster than theyâre applied, so efficiency is an ever larger and cheaper resource.ò **- Emory Lovins**

When we introduce Simmitri, we are actually introducing a new energy network paradigm. As of now, the energy market is in transition from a centralized network to a decentralized and even partially a distributed network. We would like to take an even more progressive approach which could be considered as a ***self-sufficient network***.

[18] https://rev.ny.gov/



A centralized network. *A decentralized network.* *A distributed network.* *A self-sufficient network.*

When the Simmitri team tackled the idea of how to make a self-sufficient network, we were inspired by Mother Nature. All living beings are self-sufficient life forms, living within an interdependent system. It is this balance between interdependence and self-sufficiency that allows the natural world to thrive in its diversity. Simmitri is integrating this principle of balance into its network by creating a hybridized version of the distributed network which is both self-sufficient and capable of participating in the decentralized network, thereby possessing the strengths of both.

4.1 Distributed Energy Resources (DER)

Distributed energy resources (DERs) are electricity-producing resources or controllable loads that are directly connected to a local distribution system or connected to a host facility within the local distribution system.[19] During high energy demand times and when the grid is stressed, the utility company sends the Simmitri Cloud a request for its aggregate of customers to cut consumption as a demand response initiative. Shown in ***Figure 4-1***, Simmitri Cloud then pings every customers' SimBox (A) to initiate the preset energy savings mode. Prosumers (B) produce electrons by feeding power back into the utility grid if the customer has a "SimStation" that integrates with solar and generates energy. This entire process is automated by Simi - the AI

[19] http://www.ieso.ca/en/learn/ontario-power-system/a-smarter-grid/distributed-energy-resources

interface - thereby making it effortless for the customer to participate in this smart grid economy..

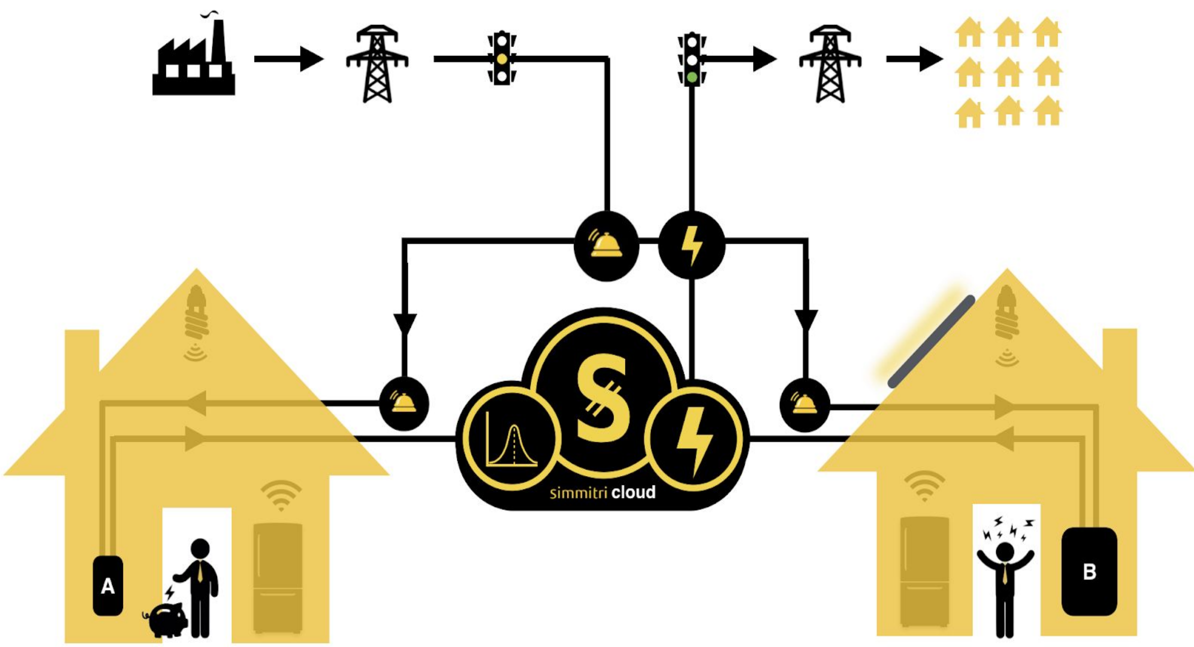


Figure 4-1: Simmitri DER Program with Local Utility

Simmitri provides the tools for current utility and government energy savings to programs to be more efficient and effective by significantly affecting the timing imbalance between peak demand and renewable energy production, also referred to as the “duck curve”.[20]

By acting as the gateway between the utility providers and the home's devices, users receive requests from utility providers to cut consumption and will automatically conserve energy based on unneeded usage at that time. The memory is then logged into ***Simiôs*** database on where, how and when the nodes in the network became more energy efficient. This will begin programming 'scenes' which learns through human behavior and is triggered by utility network demands.

[20] https://en.wikipedia.org/wiki/Duck_curve

4.2 Home Energy Management Systems (HEMS)

The home energy management systems (HEMS) market innovators have developed a fairly large amount of utility-facing products as well as customer-facing systems. However, there are some issues that are repeating themselves in what has happened in the traditional grid over the decades considered to be patchwork on top of patchwork. Creating HEMS solutions for a smart grid just appears to be digital patchwork now. There are over 600 companies with multiple HEMS products flooding to help conserve energy, improve building performance and to do various tracking and management services, all offering their unique hardware/software solution of creating or managing energy efficiency.[21] Furthermore, all putting their own spin on the data collected.

Albeit that we agree that there are truly some incredible devices that do exceptional performances, we still felt that there was a lack of standard in the new and improved smart home. As most companies create energy management products that are entirely utility-facing ***or*** entirely customer-facing, we believed the product needed to face both to help with creating a standard.

In our research, we found that the only true way for customer/utility/innovator synergy and to efficiently distribute energy throughout the entire building from one standard (no matter what brand(s) the user chooses) was to update the electrical load panel and usher it into the 21st century. In this effort, Simmitri essentially began to create its own HEMS (or BEMS) product, calling it the "SimBox". This smart box is what was needed in order to allow consumers to still enjoy the HEMS services they prefer, meanwhile using the 3rd party data to integrate via an application programming interface (API) to analyze and prepare for more smart home energy scenes.

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[21] http://www.neep.org/initiatives/high-efficiency-products/home-energy-management-systems

As the user's data collected per device is used to establish parameters on the blockchain to execute smart contracts, the smart contract issues SIM tokens based on how many Negawatts were produced. As shown in ***Figure 4-2***, the SimBox connects to the smart plug or any HEMS device determining the parameters needed to be energy efficient. The data is absorbed from the devices backend database and is used to determine power supply. If parameters are met and smart contract is executed, the user receives SIM as well as gamifying their profile.

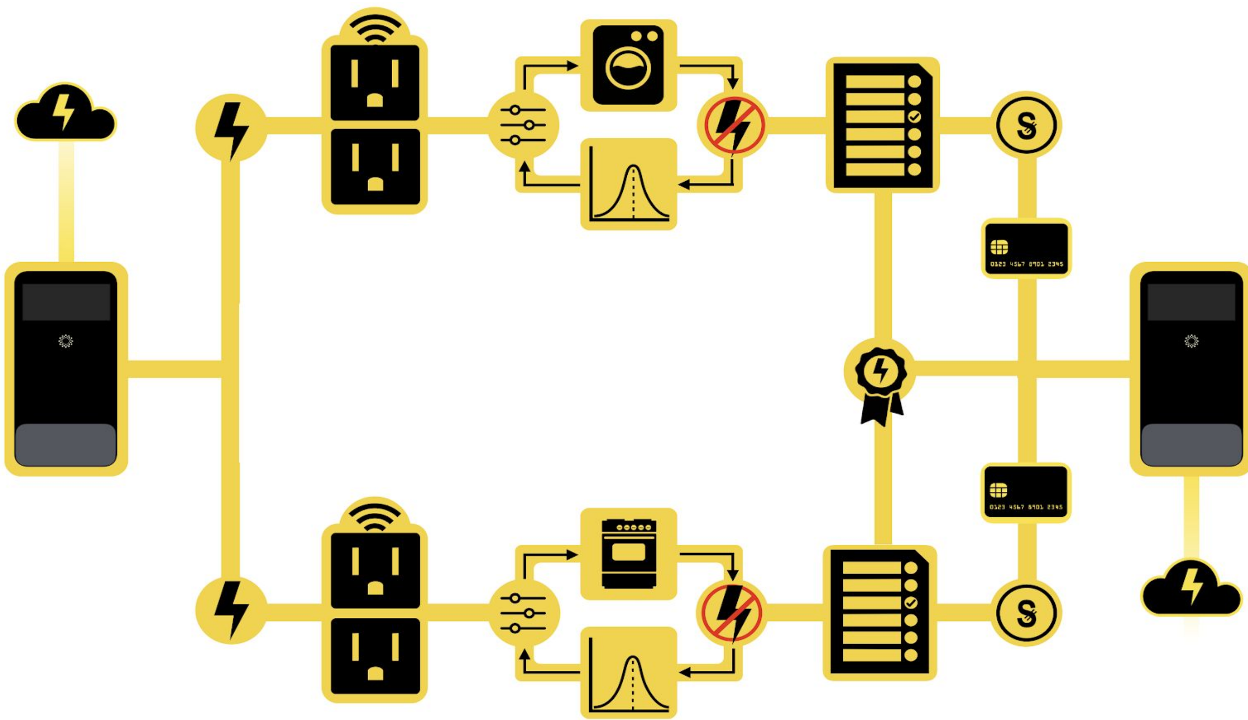


Figure 4-2: HEMS data flow through blockchain device relationship

4.3 Simmitri Cloud Exchange

When Simmitri discovered how the technology could not only communicate with utility needs, customer needs and HEMS services, we also learned that the advanced data collected could be incredibly useful to solve a multitude of other ancillary services. We learned that we could use this data to daisy chain a few services together to include; public incentives, carbon offsets and renewable energy certificates (RECs), all of which can be traded.

Simmitri is now in a position to facilitate an economy in which conservation, generation and demands interact efficiently. The growing energy market trend is in a peer-to-peer, decentralized model whereas consumers can participate in a trade economy to satisfy their energy needs. As we identify projects who create exchanges for consumers to buy and sell RECs and carbon offsets, the advantage of Simmitri would be in the solution of a more automated trustless system which the blockchain solves.

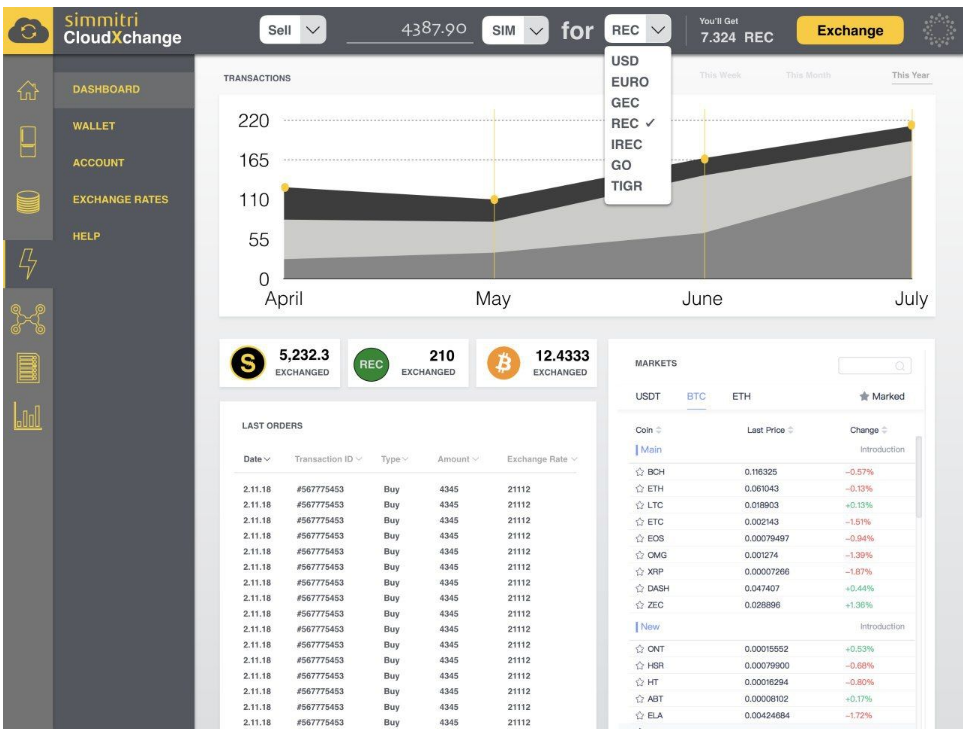


Figure 4-3: Design Mockup of Simmitri Cloud Exchange

4.3.1 SIM Earnings, Nagawatts and Usage

SIM is an ERC20 compliant token that serves as the utility of the blockchain. Using the Ethereum blockchain, SIM leverages the commonly used public ledger to have no central point of failure and to create security through cryptography. The SIM token is a base currency in the exchange and allowed to provide the electric load reductions as a 'bid' in a wholesale energy market..

The tokenized reward system pays users a ratio of SIM to Negawatts in order to reward consumers for becoming energy efficient as well as additional tokens for Prosumers who generate power. In having a platform for users to trade their SIM tokens for other options such as; USD, Renewable Energy Certificates (RECs), carbon credits, other energy tokens and various Home Energy Management Systems (HEMS) products and services, we create an economy with a culture that balances profits with common goals.

Negawatt power is a theoretical unit of power representing an amount of electrical power (measured in watts) saved. The energy saved is a direct result of energy conservation or increased energy efficiency. A Negawatt market can be thought of as a secondary market, in which electricity is allocated from one consumer to another consumer within the energy market. In this market, Negawatts could be treated as a commodity. Commodities have the ability to be traded, which would allow Negawatts to be incorporated in the international trading system. Roughly 10% of all U.S. electrical generating capacity is in place to meet the last 1% of demand and there is where the immediate efficiency opportunity exists.[22]

On March 15, 2011, the Federal Energy Regulatory Commission (FERC), the agency that regulates the U.S. electrical grid, approved a rule establishing the approach to compensation for demand response resources (DER) intended to benefit customers and help improve the operation and competitiveness of organized wholesale energy markets. This means that Negawatts produced by reducing electrical use can demand the same market prices as real megawatts of generated electricity.

The incentives for a Simmitri Negawatt market include receiving fiat money, SIM tokens, reduction of national energy dependency and the local electricity deregulation within certain

[22] https://en.wikipedia.org/wiki/negawatt_power

nations or states. As for the cost incentive, those who produce Negawatts or simply conserve energy can earn tokens by selling the saved energy in the Simmitri market.

Cost for Negawatt power can be calculated using cost-effectiveness analysis or CEA. For energy efficiency investments a CEA calculation produces the value of saved energy or Negawatts in $/kWh. Such a valuation allows comparing the price of Negawatts with price of energy such as electricity from the grid or the cheapest renewable alternative.

Through partnerships, SIM tokens can be issued based on Negawatt earnings and used as a currency for various options;

1. Bill payment to utility provider for power usage
2. Upgrades from HEMS products and services
3. Trading SIMs for RECs, carbon credits and other energy products
4. Zero-fee transactions on cloud exchange

4.3.2 Gamification

Gamification is the new way to empower the community and increase the utility of the token within the ecosystem. As energy conservation is one of the main goals for competition between buildings, this would increase the motivation even more. A dashboard, connected with a social media app, is presented with ratings of homes/buildings that saved the most electricity on a weekly/monthly basis, or even in real-time. A certain pool of tokens will be distributed by airdropping each day/week/month among the top energy-saving participants.

Competitions could happen between neighbours, between cities and later on, even between states and nations. Official awards and badges would be presented to the winners with bonuses in the exchange.

Users will also be allowed to create their own betting pools to incentivize their neighbourhoods and rivalling groups for electricity conservation prizes. Users would stake their own tokens as collateral and they would expect to get a profit if their neighborhood or group wins. Also, the Simmitri platform would set certain targets to be reached for a certain neighborhood that would result in extra tokens.

As the ecosystem of users seek energy-saving strategies, this could become very attractive for energy-saving device manufacturers or HEMS. Token holders would be eligible for special discounts on devices offered from manufacturers and become increasingly more engaged in their own data results.

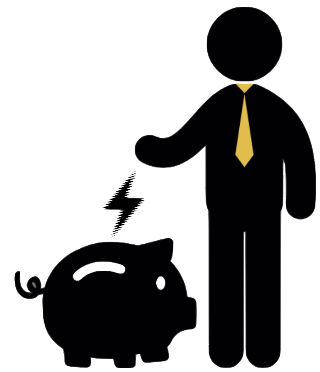
As a token holder, the longer users hold tokens, the bigger the discount received or bonuses earned. Such benefits would motivate users to hold their tokens for a longer term and also shall result in the value of tokens to increase.

4.3.3 Participants

Currently, households have limited ability to select certain producers (e.g. solar plant few miles away, or wind power plant ten miles away) for their clean energy needs. This exchange could enable households or property owners to select the type of origin of electricity supply they desire to power their home. Alternately, this platform enables innovators and utility providers to expand their services and conduct business with various participants.

Throughout this economy, the customer (e.g. homeowner) is usually referenced as Consumer A or Prosumer B. ***A*** is a participant in the network that is primarily focused on conserving energy while ***B*** is focused on generating energy. For example, ***A*** could be represented as a warehouse full of energy-demanding devices that installs an automated efficiency system and ***B*** could be a solar field nearby. The general idea is to keep them segmented as energy conservationists (A) and energy generators (B).

4.3.3.1 Conservationists Consumer (A)



Consumers (homeowners, business owners, property managers, etc) have the ability to interface with the Simmitri exchange and have complete control over their energy profile. In conserving energy, the data metrics have demonstrated to generate Negawatts and to produce validation parameters on the blockchain to execute smart contracts, which in turn earns tokens, producing revenue for this user based on how much energy was saved. The user is then empowered to decide what they wish to do with the earned SIM tokens.

A large focus in the Simmitri economy has been put on this participant because there is a long list of incentives that comes with conserving energy. Most homeowners and business owners who are looking to take advantages of public incentives like tax credits, cost savings or energy sellbacks are looking to adopt alternative technologies to earn such incentives. The ***SimBox*** acts as a digital meter to constantly audit energy usage and automatically references incentives they may be eligible for.

Tax credits (a.k.a. write-offs) are secured when these users provide proof that they have installed an energy-conserving device (e.g. solar, fuel cells, etc). For example, in the United States, the Residential Energy Tax Credit program incentivizes the homeowner to install an energy-conserving or producing device.[23] The ***Simibox*** understands and validates which source is powering the home and assigns a (%) to the source. For example, an outfitted home could be reported to be; 33.3% utility, 33.3% solar, 33.3% hydrogen fuel cells that are powering the home grid. The platform would place this data on the blockchain which then is validated across the ledger and made public.

[23] https://www.irs.gov/newsroom/energy-incentives-for-individuals-residential-property

4.3.3.2 Prosumers (B)

A Prosumer is anyone who produces energy resources as well as consumes it. This company, or individual will be able to take advantage of the system as their own utility grid, producing tokenized energy for sale to their local community as well as be incentivized to conserve energy, earning SIM for their own behavior modifications.[24]

Every participant who is generating energy must be validated on the ledger and pass the standards to earn renewable energy certificates (RECs). The common standard for 1 REC equals 1 megawatt. However, we are introducing an 8-decimal value of RECs so users can earn certificates based on percentages of a megawatt. To date, homeowners have never been able to create RECs and sell them to other participants in an economy. Traditionally, RECs have only been created from solar, wind and other renewable energy facilities.

4.3.3.3 Utility Providers

Traditional electric companies and utility providers will be an large part of this economy.[25] In Simmitri's history, working with utility companies have been a positive experience and offer a significant amount of innovation to be explored with existing infrastructure.

4.3.3.4 Commercial Innovators

Company innovators who offer smart home (HEMS) solutions will be approached to become a part of the Simmitri network. Solutions include; appliances, materials, storage, data, production and all digital assets that can offer efficient upgrades.

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[24] http://www.amdocsoptima.com/the-rise-of-the-prosumer-in-the-energy-market/
[25] https://en.wikipedia.org/wiki/List_of_United_States_electric_companies

5. Proposed Technological Solution

5.1 Simmitri Hardware

Simmitri leverages three primary hardware solutions in this economy. Starting with the electrical load panel, the “SimBox”, runs an ongoing energy audit of every circuit and possible distribution point sending a signal through the circuit wires and reads a unique electrical signature of each circuit, similar to a fingerprint. The smart socket “SimSocket” then sends feedback to the SimBox. This is to establish a grid to be monitored and subject to advanced automation. The Simmitri Power Station, or “SimStation” is an added microgrid power station that allows you to produce electrons and send it back to the grid. These products will learn and automate the most efficient and effective ways to produce Negawatts by managing electrical consumption in real time, which is beneficial for demand reduction and grid stabilization.

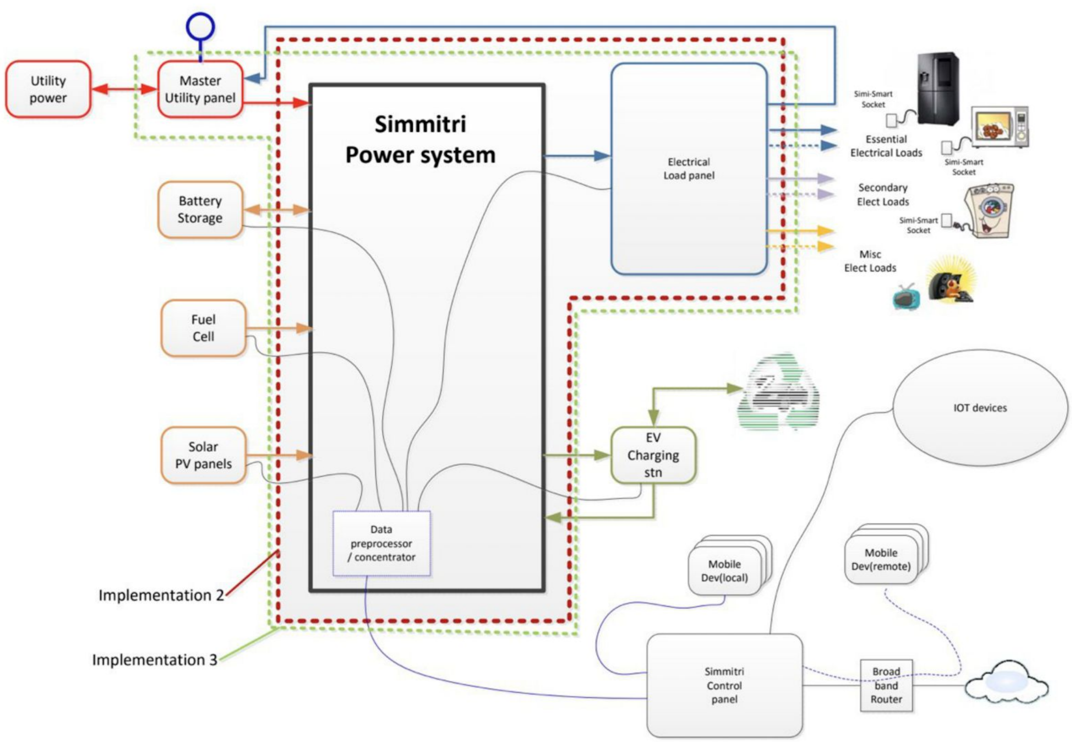

Figure 5-1: Simmitri hardware solutions

5.1.1 SimBox

As the goal of the MVP is to showcase the product at a minimal cost and have actually working product which could showcase the token usage and utility, this is the initial high-level architecture we propose for the platform. The ***SimBox*** proposed technical functions will be:

1. Acts as a mirrored electrical panel that audits all energy-demanding devices in the building.
2. Receives communication from smart HEMS and IoT devices as to the identity of the device to further analyze the importance of what is a need or a want.
3. Responds with electrical feedback to the devices with needed power supply.
4. Collects and stores data from each device in the smart meter.
5. Runs the AI and blockchain protocols to ensure energy efficiency standards.
6. Stores private keys safely in the hardware storage of the device.
7. Act as the gateway to the Ethereum Network, reading the data from the Blockchain and tracking wallet balances.
8. Enable users to transfers their SIM tokens from wallet to the cloud exchange.
9. Exchange their earned SIM tokens to other cryptocurrency or fiat currency and transfer it to his account.

5.1.2 SimSocket

When we decided to approach bringing the fuse box into the modern era, although excited of the possibilities, we still identified serious limitations. One of the primary challenges is that the traditional distribution circuits themselves leading into each socket didn't provide enough information. Basically, all the information provided were two metrics; 1) how much energy is used and 2) when was it used. This left us in the dark for identifying which appliances were in need to handle basic functions of operating, not knowing if the plugged in device was a refrigerator, baby monitor, modem or security cameras - all things considered a needed constant. So, additional hardware solutions needed to be addressed, to include the use of smart plugs to help identify unique devices and ultimately to control the energy flow based on the parameters. The ***SimSocket*** proposed technical functions will be:

1. Separate individual plug in sockets as multiple portals for energy flow.
2. For light sockets, allow for bulbs to be harnessed.
3. Consume data by "pairing" to a smart plug or IoT device.
4. Relay data back to Simbox.
5. Consume sensory data (video, audio, location, temperature, etc.) if desired.

5.1.2 SimStation

For Prosumers, a storage device could be implemented to store and transfer renewable energy from a solar panel or other means to effectively participate in the economy as an energy generator. This high-performance power station comes equipped with connections for multiple energy sources, pairs with multiple microinverters and processes storage at a fraction of the cost.

5.2 Artificial Intelligence | ***Simi***

The smart box powered by our artificial intelligence ***Simi*** makes the SimBox a synchrophaser[26] on steroids. The AI measures the flow of electricity through the building's grid in real time, allowing users to actively manage and avoid disruptions and detect inefficiencies. The sensors across the network would communicate with the grid and modify electricity use during peak times, thereby relaxing the workload of the grid and lowering prices for our consumers.

For the network, we're delivering more than just machine learning, but advanced, human-like AI protocol. Simi will begin her life with behavioral modification through machine learning, proven to be great for regression (prediction) and classifiers - similar to that of a child who is born and

[26] https://www.energy.gov/articles/how-synchrophasors-are-bringing-grid-21st-century

raised in a certain environment. The ML algorithms are the building blocks for the AI, which includes multiple machine learning components such as speech recognition (Recurrent Neural Network)[27], image recognition (Convolutional Neural Network)[28], knowledge representation and then the really interesting part of it having curiosity and human context allowing "it" to be a "her."

Simi uses Recurrent Neural Network (RNN) to process text and to find out the intention (e.g. an action to take, information, etc.) That RNN categorizes the intention as well as fills in the necessary concepts to complete the request of the energy demand. If the request is ambiguous, contradictory, or more information is needed, it will simply ask for the information it requires to complete its task. Supporting images for more context will be useful and can be done by training a Convolutional Neural Network (CNN) to map the images to the same concepts as the RNN.

Concepts can be trained to match word embeddings (have them both reside in the same dimensional space). This would make the knowledge concepts map directly to words. That way it will be more fluent for Simi to map words to concepts, and images could also be translated to concepts. Simi also uses k-means clustering[29] to find the clusters (categories) of the knowledge concepts, and that is the way she has a human-readable way of "understanding" the AI's memory.

As Simi consumes data points from HEMS devices and the network, she unpacks what she believes (references) will be the most energy efficient processing protocol to the user.

5.3 Blockchain Technology

There is a need to understand the distinction between public and private blockchain. Public blockchain enables everyone to use the network, initiate transactions, read data and join the network as miners. The bigger the network, the more secure it is. Private blockchain is

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[27] https://en.wikipedia.org/wiki/Recurrent_neural_network
[28] https://en.wikipedia.org/wiki/Convolutional_neural_network
[29] https://en.wikipedia.org/wiki/K-means_clustering

maintained by a closed network of nodes, or even a single entity. Therefore, for transparency and token economics features, public blockchain is preferred for this case.

Market trend, programming possibilities and community with the Ethereum Blockchain and the functionality of smart contracts brings this solution as the main option. Ethereum blockchain introduced new opportunities, which Bitcoin and similar to Bitcoin protocol blockchains do not have. Using SIM as an Ethereum-enabled code executes the smart contracts in a decentralized fashion. This means that on the blockchain we can move not only value, but also implement rules, according to which that value can be moved.

SIM users do not need to trust any central server and can trust the blockchain consensus algorithm and output of the system. The smart contracts are pieces of code which are stored on the blockchain network (in each node's database on the Simmitri network). This defines the conditions on which all parties using the contract agree and certain actions described in the contract can be executed if required conditions are met.

As we know, each transaction within the Ethereum network cost gas (fees). Therefore, to interact with the Ethereum network, wallets within the SimBox will have to own some amount of ETH currency to be able to initiate transactions of SIM tokens and pay the gas cost for each transaction within the network. To kickstart the platform, Simmitri will subsidize the first transactions and each new SimBox launched will have a small amount of ETH currency. Essentially, the SimBox will be a node running within the network. This will be an application running within the device (e.g. Node.JS application) that would:

1. Communicate with Ethereum Network via API;
2. Track the balance of wallet communicate;
3. Initiate transactions;
4. Communicate with crypto exchanges for instant crypto/fiat exchange.

Allowing SimBox owners to instantly exchange their cryptocurrency (e.g. SIM or ETH) to fiat currency and transfer instantly to credit card can be done through ShapeShift or Changelly by integrating with their public API.

The platform will utilize smart contracts and the Ethereum blockchain to increase the transparency, network effect and automation. The smart contracts described below will be used within the platform. As the SimBox's backend is used for storing information about the user and household electricity usage, it will also analyze the data given and initiate various actions based on that (e.g. initiate promotions back to user.)

There will be a need for a smart contract that would collect all the tokens to be distributed among SimBox households (e.g. for saved energy) and could work as follows:

1. Contract stores the registry of all wallets used by SimBox owners. It could be added or removed by the platform administrator;
2. Collected tokens would be transferred to the smart contract for distribution;
3. Each wallet could track in real-time how many tokens are eligible to receive at the end of each token distribution period;
4. At certain frequency, the platform owner could initiate tokens to be distributed among all the participants within the ecosystem, based on some certain rules (e.g. saved energy percentage from total).
5. Rules (e.g. kWh of electricity saved, devices turned off during peak times, etc.) shall be defined within the smart contract and SimBox wallets participating in the competition defined;
6. Reward tokens or stakes are preloaded to the smart contract;
7. Every day metrics on data usage relevant to competition is submitted to the smart contract;
8. All the participants can track results;

9. Once a competition is over, tokens would be distributed based on previously defined rules.

6. Roadmap

Q1 2018

- Design, technical and production line strategy specs for ***Simibox***
- Primary and secondary rules roster for SIMI AI functions
- Simmitri Token (SIM) applied to be listed on crytpocurrency exchange(s)

Q2 2018

- Customer wallet (dashboard) finalized for earnings and transfers
- Integration testing of blockchain and data collection in open API networks
- Established market maturity for implementation and partners (analysis)

Q3 2018

- Manufactured ***Simibox*** prototype v.01
- Launch smart home incubator program
- Beta testing of local market sample group

Q4 2018

- Integration of ***Simibox*** into current client list and pipeline
- Analysis of deep metrics from beta testers
- Applications filed for state incentives for renewable energy providers

7. Core Team

For brief bios of the team members, please visit http://token.simmitri.com