ERTHOS

HYDROGEN TECHNOLOGY BUSINESS PRIMER

ACCELERATING THE TRANSITION TO GREEN HYDROGEN ECONOMIES

HIGHLIGHTS

LOW-COST SOLAR
Earth Mount Solar™ PV, by Erthos, offers the lowest cost green energy input for powering the green hydrogen transition with a 20% cost advantage to other forms of solar production.

HYDROX™ GENERATOR
The Erthos Hydrox™ generator produces a hydrogen/oxygen mix (Hydrox™ fuel) that will replace natural gas as feedstock for process steam applications.

GREEN STEAM AS A SERVICE
Erthos has developed a business model to provide green-steam-as-a-service (GSaaS) to expedite adoption of Hydrox™ fuel in process steam factories.

HYDROGEN ENERGY CAMPUSES
Erthos will build large-scale green hydrogen energy campuses to provide pure hydrogen as a chemical feedstock to a variety of industries, at parity with brown hydrogen.

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1. INTRODUCTION TO ERTHOS TECHNOLOGIES

Erthos is an innovative utility-scale solar products company based in Tempe, AZ that is committed to accelerating the world's transition to carbon-free energy. Our revolutionary solar architecture has enabled the world's lowest-cost form of electrical energy, which we can now use to produce carbon-neutral Hydrox™ fuel, a clean, waste-free gas consisting entirely of hydrogen and oxygen. Hydrox fuel is a breakthrough solar-to-hydrogen product that we will use to produce clean industrial process heat, thereby replacing natural gas and helping to decarbonize industrial heat markets. We are on track to commercially demonstrate this technology in early 2024, at a project co-located at a food processing facility in California. This primer provides an overview of how this technology works, a description of the proven business model we will use to support it, and a glimpse at the transformative future of our solar-to-hydrogen technologies. We will also introduce the reader to our future plans to use purified Hydrox fuel as a replacement for brown hydrogen.

Solar

Erthos has radically simplified the design of utility-scale solar projects with our patented approach of placing solar modules directly on the ground. Utilizing this technology, Erthos has eliminated the steel structures typically required in solar plants and now offers the world's lowest-cost form of electrical energy. To deploy an Erthos solar plant, we design the plant, provide procurement support for all equipment, and oversee the installation of the project by a selected builder. We also provide the data collection equipment and provide ongoing operations & maintenance services for the life of the plant. By removing expensive balance-of-plant materials and utilizing a high-density, earth-mounted format, our Earth Mount Solar™ PV system offers the lowest CAPEX and OPEX of any utility-scale solar technology on the market today. Compared to conventional single-axis tracker plants, Earth Mount Solar PV provides a roughly 20% LCOE advantage, more than doubles the energy produced per acre of land, and reduces build times by approximately 50%.

Figure 1 — Operating Erthos Plant in California

Hydrox™ Fuel and Green Steam

Erthos is now using this lowest-cost electricity to create carbon-neutral industrial process heat. We have created a DC-solar-ready alkaline atmospheric electrolyzer that we call the "Hydrox™ generator". When coupled with our Earth Mount Solar PV system, the Hydrox generator can electrolyze water into a mixture of hydrogen and oxygen gas that we call "Hydrox™ fuel". Our Hydrox generator has been designed to do this electrolysis without the need for AC power conversion or grid interconnection, thereby eliminating power electronics that comprise nearly half of a typical electrolyzer cost. Hydrox fuel can then be combusted in our proprietary Hydrox™ boiler, as shown in the process diagram below. Through combustion of Hydrox fuel, our Hydrox boiler can produce carbon-neutral industrial process heat that we refer to as "green steam."

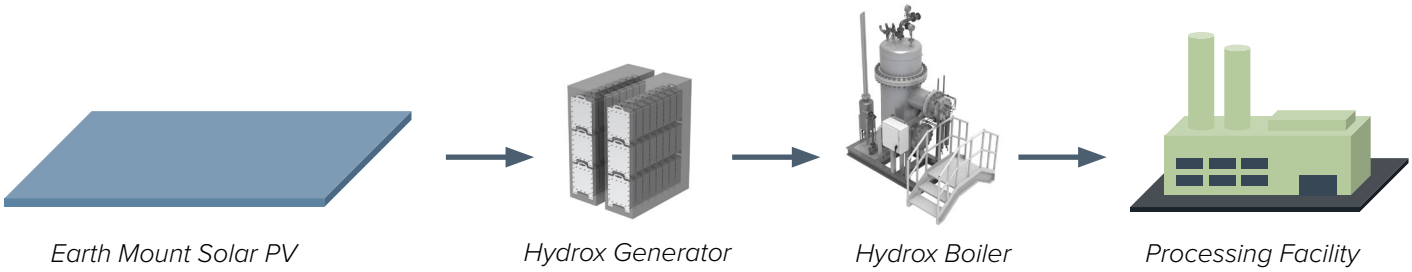

Figure 2 — Solar-to-Green-Steam Process

Green Steam Commercial Demonstration

Erthos is now preparing to commercially demonstrate its green steam system. At a large food processing facility in central California, a 1.3 MW Earth Mount Solar PV system will energize three of our Hydrox generator units to create Hydrox fuel for combustion in our Hydrox boiler, which will then generate 3,300 lb/hr (at 150 psig) of green steam. This will directly reduce the amount of natural gas used to produce the steam required by the facility for its food processing operations. This project, which is anticipated to start in Q1 2024, will commercially demonstrate the performance and cost effectiveness of these technologies, with independent validation to be performed by third-party engineers. To enable the rapid deployment of these technologies to all industrial heat users following their successful demonstration and validation early next year, Erthos has designed its green steam components to be modular and manufacturable at scale. Both the Hydrox generator and the Hydrox boiler will be manufactured in-house, with inexpensive and easy-to-source parts. Erthos's green steam units can be drop-in additions or replacements for existing natural-gas-fired boilers, making them a scalable and flexible solution for decarbonizing US manufacturing facilities.

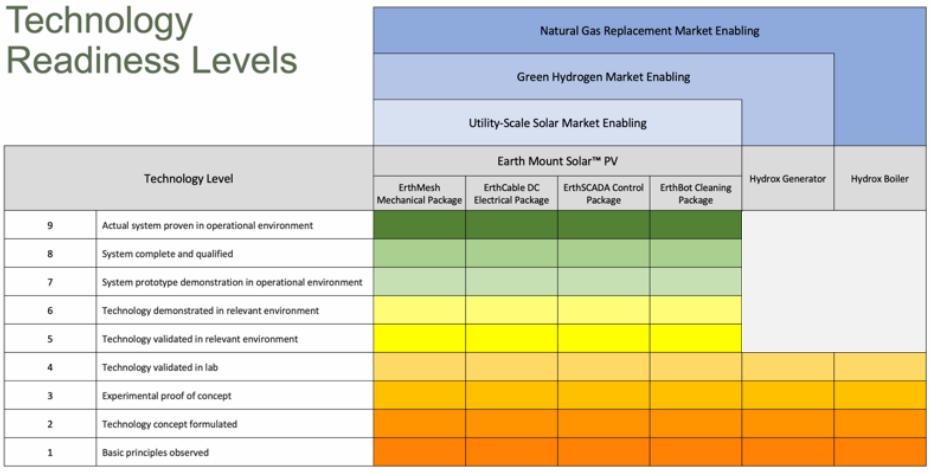

Figure 3 — Technology Readiness Levels

Technology Readiness Level

Our Earth Mount Solar PV system is commercially deployed, with nearly 200MWdc of commercial projects already in operation or under contract. Our Hydrox generator and boiler technologies are currently at TRL 4. Following their successful deployment into the commercial operating environment described above, which we expect to happen early next year, they will join our Earth Mount Solar PV technology as a TRL 9, thus opening massive new markets related to the production of green hydrogen and the replacement of natural gas.

2. THE GREEN STEAM BUSINESS MODEL

Speeding up Decarbonization

America's factories require significant amounts of industrial process heat, which today comes almost exclusively from fossil fuels. According to the US EIA, US industrial facilities consumed approximately 10 quadrillion BTUs of natural gas in 2018, which is almost a billion metric tons of C02 per year — approximately 23% of our carbon output. A large portion of this natural gas is for industrial process heat. Quickly transitioning industrial process heat from natural gas to carbon-free sources can play a critical role in reducing our carbon footprint. As noted by the Intergovernmental Panel on Climate Change, the speed of decarbonization is extremely important when we consider the impacts of long-term global warming, as it directly affects the amount of greenhouse gases that are released into the atmosphere. Unfortunately, industrial facility operators cannot be solely focused on the climate impacts of the fuel sources used to create process heat at their facilities. They must also consider the cost and complexities associated with their current fuel sources, as well as the costs and complexities from switching to newer and cleaner fuel sources. Therefore, the decision to switch fuel sources must be made as simple and compelling as possible. It needs to be a "no-brainer."

This Has Been Done Before: "Solar as a Service" and "Steam as a Service"

There have been other successful and rapid transitions from fossil fuels to renewables. Over the last 15 years, the US electric power sector has rapidly transitioned from fossil fuel-based electricity to renewable-based electricity, with more than 150 GW of installed solar capacity now online. A major driver of this adoption was the "solar as a service" business model, through which electricity customers were offered contracts to purchase clean (solar-derived) electricity at a price below their current (dirtier) power contract, with no upfront payment required. This business model was made possible (and highly appealing) by aligning the incentives between three parties:

- To the host customer, it resulted in a cheaper and cleaner power bill
- To the capital provider, it resulted in a good risk-adjusted return on their investment
- To the solar company, it resulted in a profitable construction contract

This "win-win-win" scenario led to rapid transformation of the retail electricity landscape. From 2010 to 2017, the solar-as-a-service market grew at 60% per year, rising from 268 MW of installations to 1,867 MW of installations, according to NREL. (Note that Erthos's executive team includes many SolarCity veterans who were instrumental in this rise.) In the industrial process heat market, there is also a successful "steam-as-a-service" market through which industrial facility owners contract with third-party providers of industrial process heat in order to reduce capital expenditures, improve operating costs, and focus management attention. This offering is popular in the food and beverage, pulp and paper, and chemical industries, and is today operating at approximately $1B/year with an annual growth rate of 6.5%. Steam-as-a-service market offerings have not yet been made available with carbon-neutral options.

Green Steam as a Service

These two service models (steam and solar) can now be combined to help US industrial process heat users reduce their carbon footprint. Thanks to these models, the rapid reduction in the cost of renewable energy, and new energy technologies, it's now possible to consider a "green-steam-as-a-service" (or GSaaS) business model. Under such a model, a GSaaS provider could develop, own, and operate solar-to-steam projects that sell industrial process heat under long-term contracts to host customers at prices below their current (dirtier) natural gas contract, with no upfront payment required. Like the service business models before it, the GSaaS model can align incentives across three parties:

- To industrial process heat users, it will result in cheaper and cleaner industrial process heat
- To the GSaaS provider's capital providers, it will result in a good risk-adjusted return on investment
- To the GSaaS provider, it will result in a scalable and profitable market for its solutions

This "win-win-win" opportunity for industrial process heat should be even greater than it was for solar adoption, given the massive scale of the US industrial process heat market and the growing political and market pressures on US industrial facility owners to reduce their carbon footprint.

3. THE COMMERCIAL ROLLOUT OF GSAAS

We are now preparing to launch and scale a GSaaS business. Coupling our low-cost of renewable energy with our green steam systems, and armed with our team's previous experience scaling solar-as-a-service and other first-of-kind technology introductions, we will soon originate GSaaS contracts with industrial facility owners. Under this model, we will develop, own, and operate solar-to-steam projects that sell industrial process heat under long-term contracts to host customers at prices at or below their current (dirtier) natural gas contract price, with no upfront payment required.

Hydrogen Purchase Agreements

To scale the GSaaS business, we must first be able to originate long-term hydrogen purchase agreements ("HPAs") with creditworthy industrial process heat users, and do so at scale. Second, we will need to bundle and securitize these HPA contracts at levels that provide sufficient upfront capital to finance project installations. Third, we must be able to execute on these construction and long-term operating contracts at the volumes originated and financed.

We have begun to build out our contract origination team and have entered channel partnership discussions with leading natural gas marketers, through whom we will cross-sell our GSaaS model alongside their traditional natural gas contracts. Erthos is also an active member of the Renewable Thermal Collaborative, whose members are actively seeking industrial decarbonization opportunities, and with whom we have begun HPA discussions. From these discussions, it is clear that a GSaaS offering at or below current pricing for natural gas will be compelling to industrial process heat users seeking to lower their carbon footprint. For example, process heat users in California are currently under pressure to comply with AB 32, the Global Warming Solutions Act of 2006, to reduce their emissions. They are eager for solutions on how to accomplish that goal both simply and cost effectively.

As shown in Figure 4, we conservatively forecast initial HPA origination volumes of 6 MW starting in Q2 2024, with initial projected growth of 10% per year. Once we hit a threshold of 250,000 hours of operating performance data, we project the annual origination growth rate to accelerate to 25%.

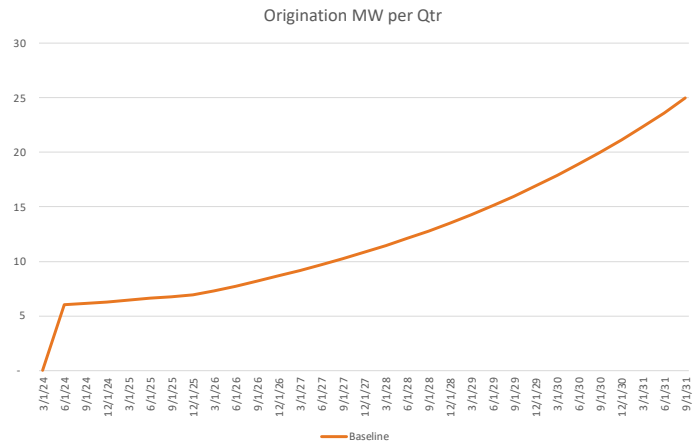

Figure 4 — Baseline Origination Growth

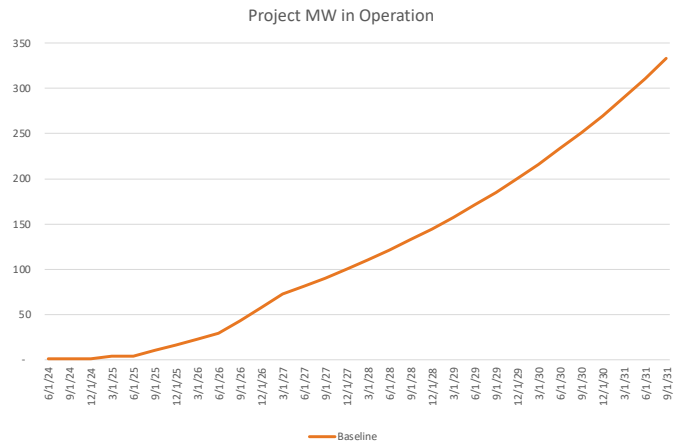

Figure 5 — Baseline Operation Growth

Capital Formation

We are now in early discussions with select infrastructure funds to create a jointly owned holding company to finance GSaaS-project-related capital expenses and to manage them on a portfolio basis. Through such partnerships, the infrastructure fund partner members will provide the necessary sponsor equity capital needed to support this baseline origination volume. We will act as each partnership's managing member and take primary responsibility for structuring and closing the necessary construction and permanent debt vehicles, as well as securing the tax credits for solar, hydrogen, and industrial process heat. We fully appreciate that structuring the necessary lender and tax-equity financing at the leverage levels required during the market introduction phase will be a key challenge in growing our GSaaS business.

Manufacturing and Construction

The Hydrox generator has been elegantly designed to be simple, small, and stackable, making it an easy product to manufacture, store, and ship to anywhere in the world at very low cost. As mentioned previously, the Hydrox generator will be manufactured in-house; the design of this manufacturing facility is already underway. In addition to manufacturing, building out our GSaaS model will require capabilities in construction management and and operations. As shown in our origination forecast, we intend to ramp up our installation management capacity to 30MW/quarter, which amounts to 270 MWdc of operating GSaaS projects by 2030 — enough to offset 555,176 MT of CO2 emissions. Creating regional EPC partnerships to scale construction and meet our origination goals will be critical. Master Service Agreements with top-tier EPCs will help to reduce risks associated with quality, schedule, and cost. Internal hires of project managers, project engineers, and construction managers will oversee EPC responsibilities and help ensure that quality and contractual obligations are met. The executive team at Erthos has experience introducing new technologies to permitting agencies and has already begun introducing the Hydrox generator design to local permitting agencies for our initial project.

4. HYDROGEN ENERGY CAMPUS MODEL

In its second phase of hydrogen market development, Erthos will deploy the same Hydrox generator units into hydrogen energy campuses (HECs) to produce pure hydrogen as a chemical feedstock for industries such as ammonia production, steel production, oil refinement, and transportation fuel. HEC attributes include:

- **Unconstrained Size:** No end-use space constraints
- **Economies of Scale:** centralization and scale drive costs
- **Output Optionality:** Can make 5.0N H2 or 2.0N H2+02
- **High Minimum Efficient Scale:** (100MW+)

The standard methods of producing hydrogen from solar are not able to meet parity with natural-gas-derived hydrogen, and thus green hydrogen is not a viable replacement for brown hydrogen. As seen here, there are many expensive steps in getting from solar energy to pure hydrogen, including expensive AC conversion and transmission equipment.

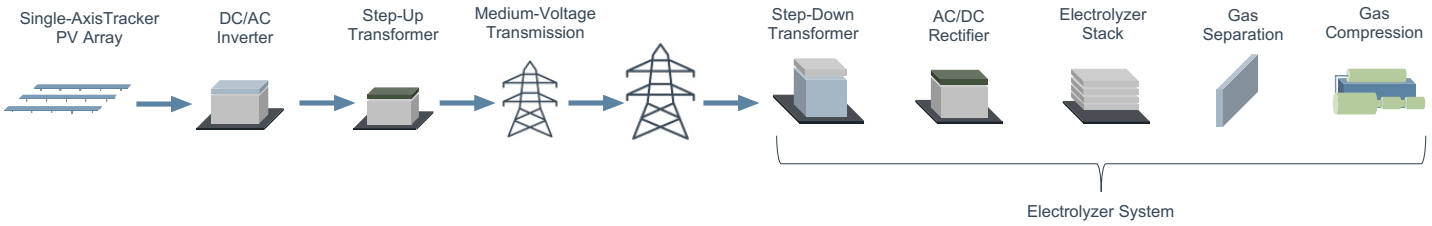

Figure 6 — State-of-the-Art Solar-to-Hydrogen Plant

Because an Erthos solar-to-hydrogen plant will eliminate the need for AC grid interconnect, the system is greatly simplified and parity with natural-gas-derived hydrogen is achievable.

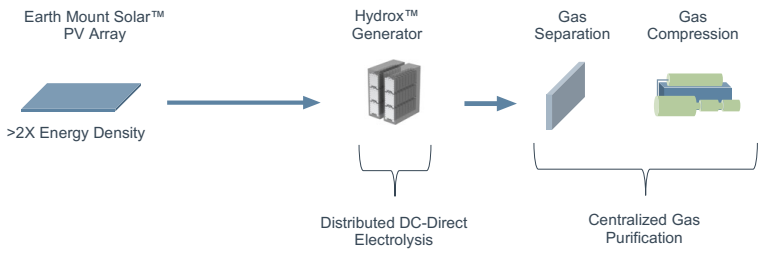

Figure 7 — Erthos Solar-to-Hydrogen Plant Components

Erthos HECs will be built around a 100 MWdc architecture with distributed Hydrox generators and centralized gas purification equipment.

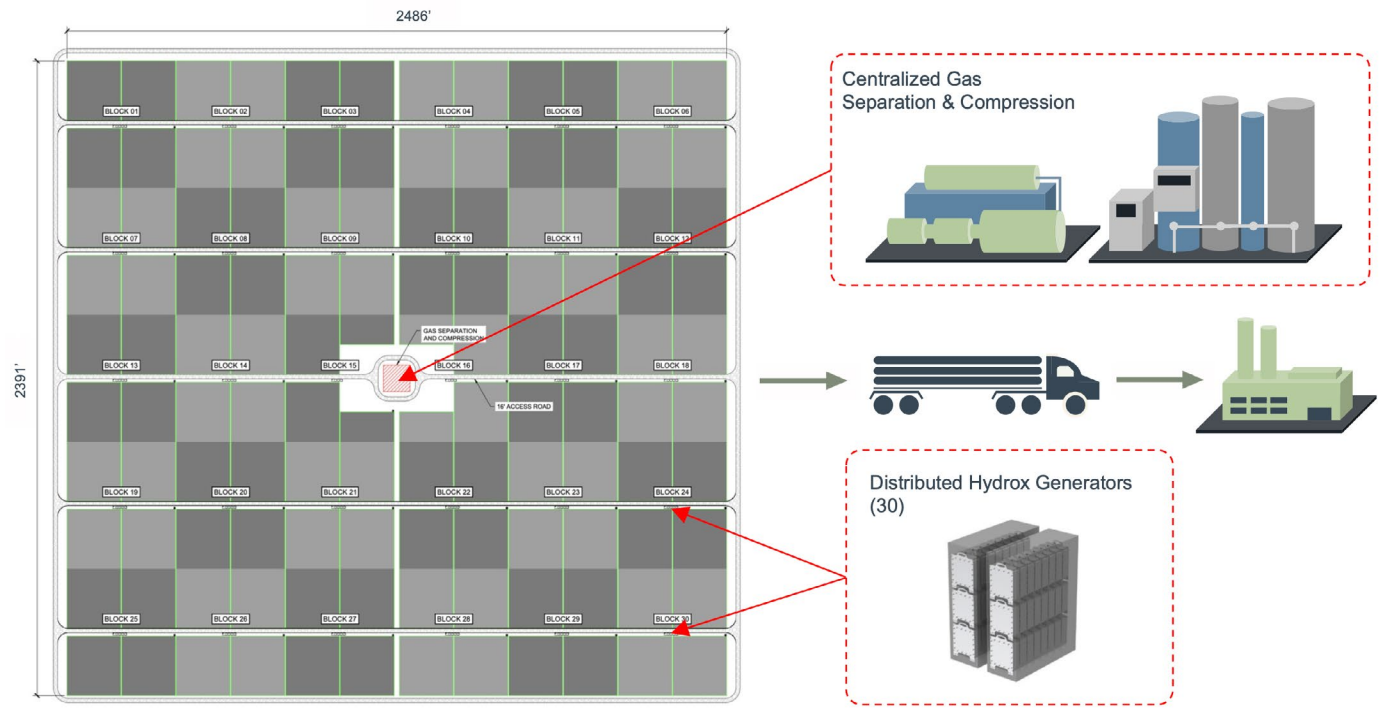

Figure 8 — 100 MWdc Solar-to-Hydrogen Plant

HECs will be sited to service hydrogen consumption within 100 miles of each campus and service a wide variety of offtake.

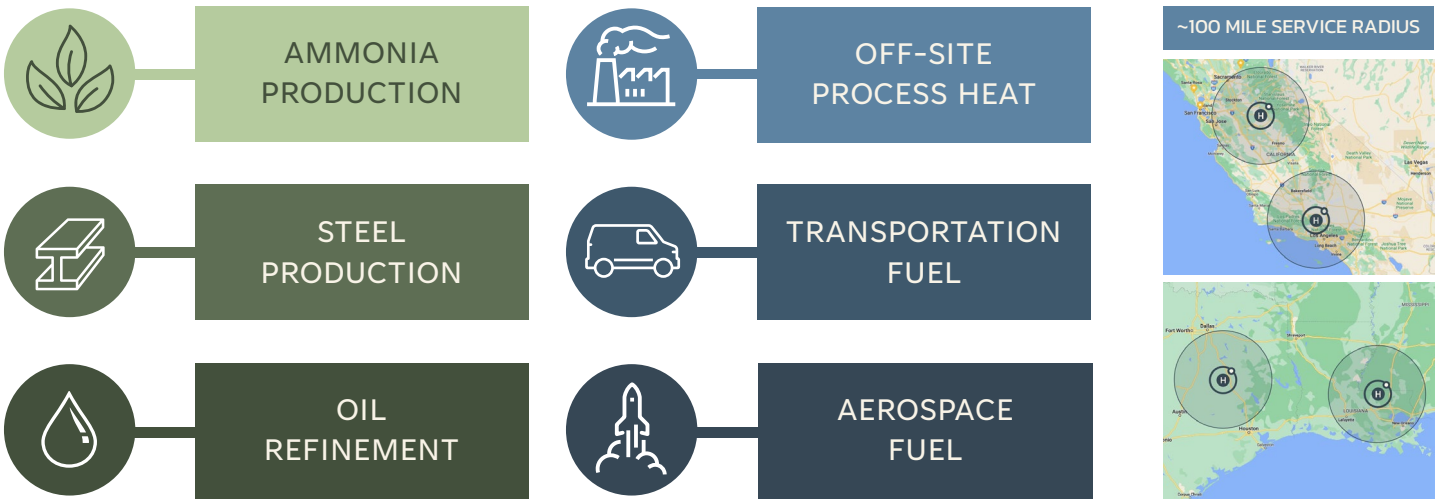

Figure 9 —HEC Offtake and Service Radius

5. MANAGEMENT & ORGANIZATION

The senior executive team at Erthos has over 200 years of combined industry experience building new energy technology ventures, including successfully launching and scaling new businesses with challenges similar to those described in this paper. They have worked at some of the world's most innovative energy companies, including DEPCOM Power, Tesla, First Solar, Solar Frontier, Plug Power, GE, and Bechtel, among others.

Erthos's founder, Jim Tyler, previously built First Solar's EPC business, which employed over 10,000 field personnel and was responsible for installing approximately 40% of US solar in 2012. Benjamin Cook, who overseas the company's hydrogen efforts internally, was an executive at SolarCity during their peak solar-as-a-service scaling periods, during which time he raised the necessary capital to support growth from 15 MW to 900 MW of solar-as-a-service installations per year. He also completed the first investment-grade securitization of solar-as-a-service contracts on Wall Street in 2014. Indeed, many members of that SolarCity team have reunited at Erthos to undertake this launch.

Our broader employee base is similarly qualified, with deep knowledge and experience across the solar, hydrogen, and industrial sectors. For our solar-to-hydrogen business, Erthos has formed an internal team of our most capable and skilled people, all of whom have SaaS experience and who are now intimately involved in bringing our GSaaS innovation to market. In service of this vision, they will leverage their knowledge and connections across multiple disciplines — including engineering, finance, origination, project management, construction, and execution — and will have full access to the entire Erthos talent pool.

We understand the scope of complexities inherent in launching this GSaaS business and believe we have assembled the technologies, business model, and team to make it happen.