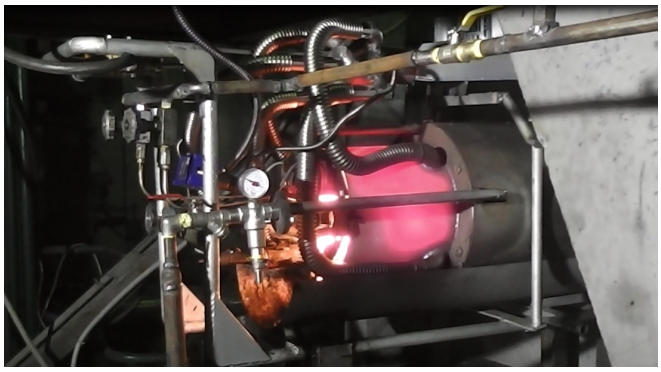
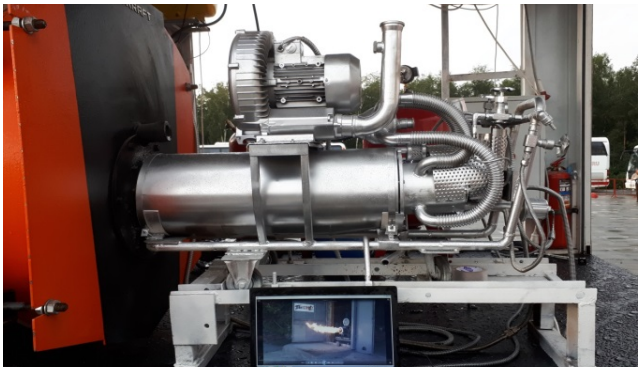
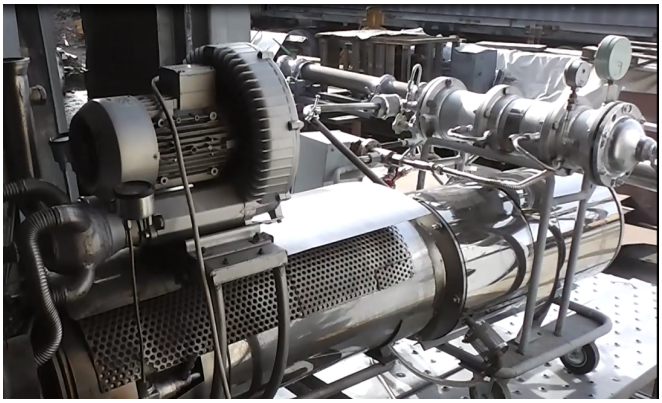
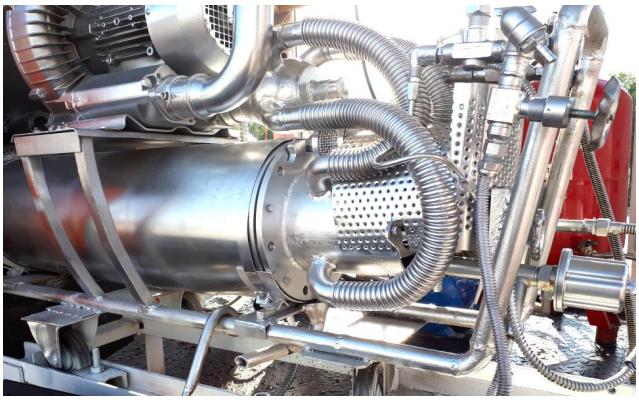
BUSINESS PLAN

PRODUCTION
OF HIGHLY EFFICIENT, MULTY-FUEL
AG-BURNERS FOR INDUSTRIAL APPLICATIONS

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CONTENTS

MEMORANDUM OF CONFIDENTIALITY AND WAIVER… ……..…3

SUMMARY……..…4

OWNER'S PROFILE…….… ……..…….…….…7

INDUSTRY OVERVIEW…….…….…….8

PRODUCT DESCRIPTION……...……..12

MARKETING STRATEGY……...…….…...……...17

PRODUCTION PLAN…….....20

MANAGEMENT AND ORGANIZATIONAL STRUCTURE....……...22

FINANCIAL PLAN……...…24

ECONOMIC EFFICIENCY OF THE PROJECT……..29

RISKS MITIGATION…….……...…….…….…33

MEMORANDUM OF CONFIDENTIALITY AND WAIVER

For the purpose of disclosure of this memorandum and that of a business plan set out hereinafter, the following terms are used. The project, launching the production of highly-efficient AG-Burners for industrial applications; the owner (of the business plan and the project), the company AG Therm, LLC incorporated in New York State, the US; the recipient, any human or organization that gets the authorized by the owner access to the business plan; the technology – AG-Cycle and its embodiments, including AG-Burners.

All information provided in the business plan is confidential to any party except the recipient. The business plan is to be submitted to the recipient for consideration solely to decide whether to provide a loan or investment capital to the owner or provide services related to making the decision. The business plan cannot be copied or distributed to any third party without the owner's express permission.

Should the recipient choose not to supply the owner with a loan or capital investment, the recipient assumes a crucial role in keeping the information disclosed confidential and for returning all copies of the business plan to the owner. This responsibility underscores the trust placed in the recipient. Should the recipient violate any of the two above clauses deliberately or due to negligence or any other reason, and such violation causes damage to the owner, the percipient commits to compensate the owner for the caused damage in full.

The owner assures the recipient that the core and related subject matter set forth in the business plan, including the description of the technology, assumptions, estimates, plans, proposals, or conclusions, as well as estimated sales, expenses, and profit figures, were carried out in good faith by the owner, members of his team, independent consultants, experts, and other contributors. This assurance is meant to instill confidence in the recipient about the integrity of the business plan.

While making a decision on a loan or investment capital to the owner, the recipient assumes the responsibility for supplementary reviewing the business plan for accuracy and consistency of any technical, business, or financial data therein. This right to review empowers the recipient and ensures their involvement in the decision-making process.

Should the recipient use any portion of the business plan without the express permission of the owner for any purpose except for deciding on providing a loan or investment capital to the owner and sustain damage as a result of such use, the recipient waives its right to sue the owner or any party contributed to the drafting of the business plan for any inaccuracy or inconsistency that caused the damage.

SUMMARY

The business plan comprehensively discloses the project owner's vision, strategy, and implementation for launching the production and after-sale maintenance of highly efficient AG-Burners for industrial applications.

AG Therm, LLC is marketing a breakthrough technology with one unparalleled feature: the ability to generate thermal energy (heat) by using at least 60% less liquid, gaseous, or solid liquified hydrocarbon fuels consumption compared with conventional combustion technologies. The technology rests on a reaction of anoxic oxidation of hydrocarbons with water and a phenomenon of excessive heat emission during an interaction between gases and metals at temperatures exceeding 1,700 C^{o}.

Using the technology as a cornerstone, the owner built and successfully tested a line of AG-Burners within the 100 kW to 5 MW power range, having at least 2.5 times lower specific fuel consumption and virtually nonexistent NOx and CO emissions. The owner experimentally established that the technology is scalable, safe, and affordable and reduces specific carbon dioxide emissions by at least 60%. Some technology elements are protected by patents in major world economies, including the USA, Canada, Germany, France, Great Britain, Italy, Spain, Russia, India, Korea. According to the International Monetary Fund (IMF)[1], in 2024, the GDP of these countries accounts for around 49% of the world's nominal GDP.

The expected success of the project rests on the fact that while there are hundreds of research teams working in the field, the owner alone succeeded in overcoming the most notorious obstacles in the art: degradation and stability problems, achieving output plasma temperatures of up to 2,300 CO, and power-to-weight ratio exceeding 10 kW/kg. AG-Burner prototypes with a coefficient of performance (COP) of 2.5 successfully passed rigorous durability tests and are ready to be put on an assembly line. The validity of the claimed COP was corroborated by the world's #1 testing and certification company, SGS.

Another success-contributing factor is that the technology is compatible with virtually all devices and processes utilizing thermal energy (heat) in power production, energy-intensive industries, transportation, and power storage for renewable power, i.e., AG-Burners may reduce hydrocarbon fuel consumption in energy-intensive industries, such as cement, metal, fertilizers, glass, hydrogen production, and water desalination, and increase the electrical efficiency of steam power production by at least 2.5 times. AG-Cycle may also be paired with gas turbines for stationary, aerial, marine, and highway transportation applications, with minor modifications.

[1] https://en.wikipedia.org/wiki/List_of_countries_by_GDP_(nominal)

Although this business plan only covers the production of 50 MW AG-Burners for steam power, cement, and metal production, as well as hydrogen production through steam reforming or partial oxidation of natural gas and water desalination, the very same production facility will be suitable for manufacturing AG-Burners compatible with gas turbines, both, heavy-duty, and aero-derivative, and well as with turbofans and turboprops for aerial, applications, and gas turbine range extenders for trucks and SUVs.

To our best knowledge, AG-Cycle is the only combustion technology that reduces specific hydrocarbon fuel combustion by at least 60% and is ready for mass production. Accordingly, the target market volume is virtually unlimited. Accordingly, it makes sense to start by selling AG-Burners for applications that do not require modification of already installed equipment, i.e., applications that will only require substituting conventional burners with AG-Burners.

The utilization of AG-Cycle in steam and coal power plants should be prioritized at the first stage of launching the technology because their owners will be motivated by economic and ecological considerations to substitute conventional natural gas, fuel oil, and coal burners with AG-Burners. Moreover, increasing pressure on coal power in nearly all major world economies will force the utilities to either re-fire the coal power stations to natural gas or modernize them by retrofitting natural gas combine cycle generating equipment (heavy frame gas turbine generators and steam power, as a bottom cycle).

Since substituting conventional burners in steam power plants and energy-intensive industries won't require any modifications to existing equipment, catering to the needs of this consumer segment will allow for a great deal of unification in the AG-Burner product line. In other words, two or three standard AG-Burners will cover at least half the potential demand in the abovementioned industries. Catering for the market of gas turbines for power production and other applications is scheduled for the project's second stage, which is not subject to this business plan.

Forecasting which countries will be the first to adopt AG-Cycle is challenging. These could only be countries with a well-developed legal system that is a must for enforcing owners' intellectual rights. Also, countries have different natural gas prices. For example, the energy-specific cost of industrial natural gas in Germany is nearly twice that of the US. In order to stick to conservative estimates of the financial parameters of the business plan, the specific industrial natural gas prices in the USA were taken as the benchmark.

Due to the project's innovative character, the best implementation strategy will be creating a flexible distributed manufacturing facility, where during the second and third years, 24 and 98 50 MW AG-Burners will be produced and then installed, accordingly for the needs of energy-intensive industries and power production. The facility may be located virtually in any location as soon as it is well guarded because many different contractors may manufacture different

constituent components, and other components may be bought from OEMs; assembly of the final product may occur on customers' sites.

The project may be funded by a loan or capital investment, has an impressive return on capital investment (ROI), and is resilient to variations of cash inflow and outflow. The project's major financial parameters are summarized in the table below.

Parameter	**Phase 1**	**Phase 2**	**Phase 3**
Duration (months)	12	12	12
Product	50 MW AG-Burner		
Industries	Energy Intensive Industries (cement, hydrogen, etc. production)		
Capital Investment ($m)	$6m	$14.5m	0
Average Annual Number of Employees	6	25	47
Number of Installations (units/GW)	0	24/1.2	48/2.4
Number of Installations Total (units/GW)	72/3.6		
Yearly Sales/Fees ($m)	0	21.3	81.9
Variable Cost per One Installation	$0.8m		
37th Month Net Profit	$6.376m		
Long-Term Capacity factor	50%		
P/E	15		
37th Month Fair Market Value	$574m		
Project's Profitability Index	2,800%		
Investor's Assumed Share (%)	44%		
Investor's Profitability Index (%)	1,230%		

OWNER'S PROFILE

AG Therm, LLC was incorporated in NY in 2020 by a team of engineers and entrepreneurs cheered by a professional construction engineer, Armenian national Gamlet Arakelyan, the inventor of the AG-Cycle. For over 30 years, Mr. Arakelyan was the CEO of a reputable construction company with six regional offices and several business units, which assumed the role of a general contractor in several complex infrastructure construction projects. AG-Cycle was born to solve the company's long-term effort to reduce concrete heating costs.

The success of Mr. Arakelyn's business is a testament to his ability to embrace industry innovations and his exceptional managerial skills. His entrepreneurial journey is marked by a series of pioneering innovations, such as the invention of a concreting technology that processes concrete mixes at an unprecedented high pressure of up to 40 bar and speed of up to 200 m/s.

This technology, patented in the USA (US 8,696,190), has revolutionized the construction industry and was successfully implemented in prestigious projects like the reconstruction of the State Academy Bolshoi Theater and the construction of the iconic high-rise "Federation" in Moscow.

Pavel Zabelin, a US naturalized national and the Managing Partner of AG Therm, LLC, joined the project in 2017. Mr. Zabelin has a Master's degree in electronics, a PhD in economics (with conse, and an MBA from the Business School of the Open Brinish University. He is registered before the USPTO and accrued a competence in IP protection. By running an engineering company with 200 employees for over nine years, he also gained solid managerial skills.

The journey from the initial promising experiments to the creation of a fully automated prototype of 2 MW AG-Burners, ready for mass production, was a testament to Mr. Arakelyan's entrepreneurial vision, engineering prowess, and meticulous management. His ability to identify and engage the right talent, motivate them, and forge sustainable alliances with supporting groups from various technological and business fields was instrumental in this journey. The project was successfully managed within stringent budget constraints, showcasing the company's financial acumen.

The first AG-Burner prototype, which Mr. Arakelyan's team built, was manually operated and had a thermal output power of around 100 kW. Then, a semi-automatic multi-fuel 1 MW AG-Burner was built, tested, and received an Eurasian conformity certificate. The latest, fully automated multi-fuel 2 MW AG-Burner was put on a test bench and tested for reliability and durability tests, which lasted for around 2,000 operating hours and included about 700 on-off cycles.

AG Therm, LLC team can implement this project within a reasonable budget, with predictable results, and meet the schedule because they have proper technology knowledge and the required managerial skills.

INDUSTSRY OVERVIEW

Stand-alone AG-Burner, per se, is an instrument for power production and energy-intensive industries. In this context, the notion of “power production” implies any equipment where gaseous, liquid, or solid hydrocarbon fuels are used to generate thermal energy, except for power production by internally-fired gas turbine generators. In other words, it is any power production where the external combustion of hydrocarbon fuels occurs. When solid hydrocarbon fuels, such as coal or oil shale, are used as a fuel for AG-Burner, they are first processed into a coal-water mixture (CWM) or oil shale water mixture and then fed to AG-Burner.

Whereas most power production technologies are common knowledge and require no elaboration, we'd like to single out an up-and-coming emerging technology compatible with stand-alone AG-Burners: supercritical carbon dioxide power (S-CO2). Supercritical carbon dioxide is CO2 at very high pressure and temperature. S-CO2 turbines are very compact, at least one order of magnitude, and are the size of a steam turbine with a similar output. They are substantially cheaper than a steam turbine. S-CO2 simple cycle has the potential to attain 50% efficiency. AG-Burner will be able to increase this efficiency by around 2.5 times.

For example, a mini-power plant from the American company Peregrin Turbine Technologies can operate on almost any fuel. It's 1 MW unit has an operating temperature of 750 C^{o}, an efficiency of 44%, is approximately 30 times smaller than traditional systems, and is cheaper per unit of installed capacity[2].

A mini-power plant with a capacity of 8.6 MW, operating from the heat of exhaust gases (heat recovery system) with a temperature of 532 C, from the American company Echogen Power Systems, has an efficiency of about 26%[3].

NET Power, an American company, has made significant strides in the field of power plant technologies. They have successfully tested a 50 MW power plant in Texas and are currently in the process of building a 300 MW power plant. The key innovation of NET Power technology is the use of pure oxygen during combustion, a process known as oxy-combustion. This unique approach makes the output almost pure carbon monoxide, which can be sold to oil-producing companies. As a result, NET Power technology is classified as "zero emission," offering a promising solution for reducing carbon footprints in the energy industry[4].

In a significant development, the American Sandia National Laboratories announced in the fall of 2022 the successful testing of a 10 kW installation. This marks a crucial step forward in the advancement of power plant technologies. Looking ahead, the testing of a 1 MW installation is planned for spring 2024, promising further exciting developments in the near future[5].

In January 2024, it was announced that the American Southwest Research Institute had begun testing a 10 MW installation[6].

Many S-CO2 were initially designed to operate on a relatively low-temperature waste heat. Combining them with AG-Burner producing much higher temperature will further increase their already impressive electrical efficiency and reduce their cost due to reduced heat exchanger

[2] https://www.peregrineturbine.com/technology/
[3] https://www.echogen.com/our-solution/product-series/eps100/
[4] https://netpower.com/technology/
[5] https://newsreleases.sandia.gov/brayton_power/
[6] https://www.swri.org/supercritical-carbon-dioxide-power-systems https://newatlas.com/energy/supercritical-co2-turbines/

dimensions and weight. For example, estimates show that AG-Cycle may increase 1 MW Peregrin Turbine Technologies power generator's electrical efficiency up to 120%. Such a combination could potentially be the most efficient source of power for stand-alone/autonomous EV chargers because they would be around four times more fuel efficient than similar EV charges based on gas turbine generators with a typical electrical efficiency of around 30%.

"Energy-intensive industries" in the contest of this business plan include industries and technological processes where the cost of hydrocarbon fuels accounts for a substantial portion of products' overall worth. Energy-intensive industries include cement, steel, glass, fertilizers, hydrogen, hot water, water steam production, water desalination, and water extraction from ambient air. For example, thermal energy accounts for around 30% of the price of cement and about 50% of that of desalinated water produced by Multi-stage Flash (MSF) and Multi-effect Distillation (MED) methods. Accordingly, utilizing AG-Cycle in these two industries will reduce the product cost by 18% and 30%, respectively. These percentages translate into very substantial numbers. For example, by 2025, the global water desalination market is expected to exceed $32 bn.

Undoubtedly, the spectrum of potential uses for our product is vast and often surprising. Consider a potential customer who, upon realizing that our AG-Burner could slash greenhouse heating costs by 60%, saw the opportunity to expand his operations into colder territories. Furthermore, he recognized that coupling the AG-Burner with a conventional steam power generator, fueled by pyrolysis fuel produced on-site, could liberate his pig breeding complex from reliance on the external power grid.

Among the major industry driving forces, it is worth mentioning the tendency of the US federal government to tighten carbon dioxide regulation and taxation. Restoring US membership in the Paris Climate Agreement was the first step in this direction. Higher taxes on carbon emissions will boost the demand for AG-Burners. Renewable power falling prices will prompt the fossil fuels power industry, especially coal power, to investigate ways of reducing costs. AG-Burner is available today and will remain the best option in the foreseeable future.

On the one hand, industry analysis for stand-alone AG-Burners is straightforward because they are applicable virtually everywhere where conventional burners are routinely used. On the other hand, the amount of potential uses is so overwhelming that we assume we cannot even name them all. When asked about any potential technologically barred applications of AG-Burners, we cannot categorically claim that there are no such applications. Still, in good faith, we are unaware of such applications. We believe that AG-Burners do not apply in applications where the presence of reducing agents like hydrogen and carbon monoxide in flame is unacceptable. Again, we cannot provide any specific example.

The key factor that renders a detailed analysis of the industry almost insignificant is the product's extraordinary fuel-saving feature, a trait that sets it apart from all other burners in the market. The routine process of industrial analysis involves mapping and classifying clusters of potential customers and determining which clusters the product in question serves better than the competition. However, since AG-Burners have no competition in this regard, identifying the clusters that the product cannot cater to becomes a somewhat challenging task.

The most complex part of analyzing the target industries is assessing the impact of technology on these industries. Such influence will come from at least two sources. The first one is purely economic. For example, reducing the cost of water desalination will likely result in rising volumes of desalinated water production rather than a mere reduction of its cost because, in most places, desalinated water production is limited by cost considerations alone.

The second is technological. For example, there are plenty of chemical manufacturing processes that, despite their superiority in multiple aspects, are not widely adopted because they require more thermal energy or higher temperatures, which is difficult or expensive to obtain using conventional combustion technologies. For example, noncatalytic natural gas steam reforming at around 1,500 C, although well-known and requires no expansive catalysts, is not utilized in the industry because generating such high temperatures is too costly. The technology fixes the high-temperature problem and reduces the amount of natural gas for heat production by around 60%. Another example is the direct reduction of iron, which requires a temperature of about 1,000 C plus hydrogen gas.

That said, since the production of 50 AG-Burners a year will satisfy only a tiny fraction of potential demand in the most conventional applications, such as steam power, cement, and hydrogen production, there is no need to make a thorough analysis of how the product will impact the entire energy-intensive industries. Also, as soon as the technology hits the market, the potential customers will tell us more about less apparent applications.

Among many possible uses of the technology, we'd like to single out one for which the technology is not just a matter of reduced fuel costs but much more: utilities owing coal power plants. According to US DOE, between 2010 and the first quarter of 2019, US power companies announced the retirement of more than 546 coal-fired power units, totaling about 102 gigawatts (GW) of generating capacity. Around 17 GW of coal-fired power is scheduled for decommissioning in the following five years. Coal power plant decommissioning is a costly and lengthy endeavor. It is, in fact, so Capex-intensive that sometimes operators of coal power plants choose to switch to natural gas-fired mode, i.e., start burning natural gas instead of coal in already existing coal power plants even though the thermal efficiency of boilers in such re-fired thermal power plants reduces by around 4%, and cost of fuel increases.

In 2019, the US's average efficiency of coal power was 32.5%. If all coal power plants were re-powered by natural gas, their average efficiency would have fallen to [32.5%*0.96], i.e., 31.2%. Despite the reduction in efficiency and higher fuel costs, re-firing of coal power plants makes sense in some instances due to low overnight switching costs. That said, coal-fired power plants scheduled for decommissioning are typically converted to natural gas by retrofitting gas turbine generators and retaining the existing boilers and steam turbines, comprising a combined natural gas cycle. This option may provide up to 62% efficiency but requires far more significant Capex.

AG-Burners offer the operators of coal-fired power plants scheduled for decommissioning the best of both worlds' solution: around [2.5*0.96], i.e., 2.4 times higher efficiency compared to that of an authentic coal power plant, [32.5*2.4], i.e., 78%; overnight Capex comparable with that for switching to natural gas-fired mode. Once the AG-Burner option becomes known in the industry, the value of all coal-fired plants scheduled for decommissioning will skyrocket, and that of the remaining coal power plants will go up, too.

One more strategic advantage of AG-conversion of coal-fired power plants is that it will dramatically reduce the cost of creating additional nameplate power capacity needed to generate electricity for EVs. In 2019, 23.5% of 4,118 bn kWh of electricity produced in the US was generated by coal power plants. The estimates indicate that step-by-step conversion of coal power plants to AG-natural gas-fired technology will provide enough power to support the proliferation of EVs for at least a decade.

Gray or blue hydrogen production is another target industry. Most industrial hydrogen is produced by natural gas steam reforming, or “steam methane reforming” (SMR). The efficiency of the process, referred to as “net energy ratio,” i.e., the ratio of the energy of hydrogen produced to that of fossil fuel consumed in the process calculated on an LHV basis, varies between 65% and 75%. For instance, substituting conventional natural gas burners with AG-Burners in the SRM process with the original 70% efficiency would allow increasing the efficiency of the process to [100 - (30/2.5)], i.e., 88%, which is equivalent to [100 - 100/(88/70)], i.e., 20% lower specific natural gas consumption.

According to the US Department of Energy (DoE), of around 10 m. tons of hydrogen annually produced in the US, 95% of which are made by SMR. If the technology were implemented in all hydrogen-producing facilities in the US having an average 70% net energy ratio, and natural gas price was at its lowest of $3.8 per thousand cubic feet, it would reduce yearly natural gas costs for hydrogen production by [0.2*(10 000 000 000*33.3 /0.7/293)*3.8], i.e., $1.23 bn. Additionally, utilization of the technology in SMR hydrogen production will make the produced hydrogen 20% greener than conventional SMR hydrogen in terms of CO2 footprint.

The key driving force in the industry gaining momentum is substituting fossil power with renewable power. Whereas photovoltaic (PV) and wind power will soon displace fossil power in

consumer segments such as households and EV transportation (as soon as batteries with higher gravimetric energy are developed), displacing fossil fuels in energy-intensive industries is expected to be slow. Although, for example, it is theoretically possible to fire clinker in a cement manufacturing process with hydrogen produced by electrolysis from renewable electricity, it will be a prohibitively expensive solution even when PV electricity becomes much cheaper.

Recent developments in the art have proved that the efficiency of carbon dioxide and green hydrogen to methane conversion of 77% (in LHV) is possible. Hydrocarbon fuels synthesized with 77% efficiency from green hydrogen as a fuel for AG-Burners in energy-intensive industries will let to nearly half, [0.77*.2.5=1.92], specific green electricity consumption compared with hydrogen as the primary thermal energy source.

PRODUCT DESCRIPTION

Although all AG-Burners operate on the same physical principle, particularly on a reaction of oxidation of hydrocarbons with water and a phenomenon of excessive heat emission during the interaction between the dissociated hydrogen gas and metals at temperatures exceeding 1,700 CO, they fall into two major categories: stand-alone and retrofitted (built-in). Stand-alone AG-Burners may be used instead of conventional burners without modification of the remaining equipment. In other words, in the nick of time, conventional burners may be substituted by AG-Burners with the same power output, temperature, and flame geometry. For example, a traditional natural gas burner paired with a steam boiler to produce steam for a steam turbine can be substituted with an AG-Burner quickly and without modifications to the boiler or the steam turbine. An AG-Burner may be installed quickly and without significant modifications in place of a conventional natural gas burner used in a natural steam catalytic reformer for synthesis gas production.

Retrofitted AG-Burners are custom-built AG-Burners that are specifically designed to be coupled with a particular device or mechanism, for example, with a conventional natural gas turbine, where it may be either placed inside the compressed air tract in place of an authentic combustion chamber or be designed as a component of an external custom-made combustion chamber of a conventional natural gas turbine, that was modified for external firing. The geometrical parameters of such retrofitted AG-Burner have to match the authentic interior design of a gas turbine. Or, a retrofitted AG-Burner may be specifically designed to be coupled with an external heat exchanger of a Stirling engine for a residential co-generation power system, with its electronics specially tuned to run smoothly with an existing power system. Retrofitted AG-Burners are not the subject of this project. They were mentioned to outline a broader picture of the technology's expansive spectrum of potential applications.

The decision to launch the technology into the market starting with stand-alone AG-Burners was based on a straightforward business consideration: AG-Burners of this type are universal; a handful of standard models will cover around 80% of potential applications. The universalism of stand-alone AG-Burners will dramatically reduce R&D, production, and maintenance costs, increase profitability, and reduce capital expenditures.

This business plan assumes that customers will be able to get access to the technology through an energy supply contract. They won't own AG-Burners installed on their sites and will pay for the thermal energy received. Such a business model will let the project owner constantly monitor AG-Burners' operation on customers' sites for performance control and structural integrity preservation.

From the point of view of an outside user with general skills in the art, AG-Burner operates as a conventional burner, except that it additionally requires a water supply. The water is used inside AG-Burner's reactor to generate hydrogen, which then participates in a heat generation reaction. In AG-Burners with a coefficient of performance around 2.5, the water consumption is around 2.5 times greater than that of hydrocarbon fuel. To avoid using water from an external source, condensing water vapors from exhaust gases makes sense. The recycled water is sufficient to keep AG-Burner running on recycled water. The condenser is a standard OEM equipment with a modest 50% condensation rate.

AG-Burner is designed to be as reliable and durable as any other industrial burner. Its reliability is primarily derived from the fact that it contains no moving parts, except for a forced draft fan necessary to overcome a backpressure of a combustion tract of an equipment AG-Burner is coupled with, such as a steam boiler or a rotary kiln for clinker firing. The most powerful multi-fuel burner built is a 5 MW AG-Burner equipped with an autonomous reactor air cooling system. The cooling air is drawn by the same fan used to overcome back pressure, ensuring a robust and dependable performance.

The 60% lower specific fuel consumption of AG-Burner is its most prominent feature, but it is not the only distinctive one. Whereas the flame of AG-Burners contains some carbon monoxide, the resulting emission of carbon monoxide is lower than that of conventional burners with similar performance due to unconventionally high temperatures. Synthesis gas in AG-Burner’s flame can be utilized for highly efficient direct iron reduction and other chemical processes.

AG-Burners are environmentally friendly not only because they have at least 60% lower specific (per unit of thermal energy generated) carbon dioxide emission but also because they have intrinsically lower NOx emission compared with conventional burners despite higher than usual temperatures. First of all, AG-Burner does not emit so-called prompt NOx, originating from a reaction of nitrogen of the air with radicals such as C, CH, and CH2 fragments, derived from fuel oxidation by oxygen of the air, because none of these are present in the flame.

Secondly, AG-Burner does not generate significant NOx from nitrogen-containing chemicals in liquid and solid fuels converted into a solid-water mixture. During the combustion of hydrocarbon fuel in the air, the nitrogen in nitrogen-containing substances in the fuel is released as a free radical and, after that, forms free nitrogen, or NO. NOx from this source, commonly referred to as "fuel nitrogen," accounts for up to 50% of total NOx emissions through oil combustion, 80% through oil combustion, and around 0% through the combustion of natural gas because it is virtually free of nitrogen-containing chemicals. This conclusion rests on the measurement of NOx emission from AG-Burner consuming natural gas and oil, which are almost the same.

Although the cause of this phenomenon is yet to be established, the working hypothesis we rely on is that in AG-Burner, most nitric oxide (NO) is converted into molecular nitrogen (N2) and water following the reaction: 2NO+2H2=N2+2H2O. Another argument favoring this hypothesis is that AG-Burner's measures NO2 concentration are several times lower than expected at temperatures of around 1,850 C^o from natural gas combustion in a conventional burner.

For NOx emission reduction in conventional industrial burners, gas recirculation of exhaust gases is implemented. Diluting input air with exhaust gases alleviates NOx emission due to reduced molecular oxygen partial pressure. If circumstances warrant, the same method may be applied more efficiently to the AG-Burner because at least two times higher dilution of input air is possible in the AG-Burner compared with conventional burners.

The question regarding AG-Burner that we often face relates to the source of excessive thermal energy in AG-Burner. Everyone analyzing the feasibility of investing in the project will likely raise this question, too. Although we know the ins and outs of technology's engineering part, we, and seemingly everybody else, are in the dark about the exact physical processes that underlie the phenomenon. All we know for sure is that the origin of anomalous heat emission is beyond chemical reactions.

An anomalous (excessive) heat emission occurring when hydrogen and condensed matter are in contact under certain conditions has been known in the art and researched for decades. As of May 2024, more than 5,358 patents and patent applications are available at Google Patent (sub-class G21B3/00), where multiple methods and devices related to this subject matter, sometimes referred to as LENR, are disclosed. Even though plenty of theories have been suggested to provide the phenomena with a scientific explanation, their true nature is yet to be determined.

The lack of a unanimously accepted scientific explanation has not deterred companies and countries from launching multiple research projects in this field. The countries with scarce deposits of fossil natural resources became the pioneers. For example, before 2016, Japan's federal agency, NEDO, established a cooperation with Toyota, Nissan, Mitsubishi Heavy Industries, and four Japanese universities to develop a potent energy source based on the

interaction between hydrogen and metals that fall in a group of so-called “low energy nuclear reactions”, LENR. In the US, several governmental agencies are also known to be involved in pertinent research in the field, including NASA, DOE, and the US Navy. The participants reluctantly shared their achievements and milestones with the general public for obvious reasons. Nonetheless, the latest white papers indicate that a stable thermal energy production of several hundred watts has already been achieved.

Whereas most researchers are diligently working on creating several kilowatts prototypes that usually would work at temperatures below 1,000º C, we decided to investigate the different paths, much higher temperatures, and use of hydrocarbons as a primary hydrogen source. Our approach worked out well. Today, we have an AG-Burner with COP of 2.5, which is ready to be put on a production line, and we already achieved promising results while working on a prototype with COP of 9. We believe that no matter what happens in the mainstream field of LENR research, our technology will remain unchallenged for at least a decade. Here is why.

One day, LENR generators are believed to become capable of producing abundant thermal energy. However, this thermal energy, per se, will only constitute half of the solution to the problem because the thermal energy will need to be converted to electric power. There is no guarantee that the powerful LENR generators will be compatible with conventional energy-generating equipment, such as gas turbine and steam turbine generators, which currently generate at least 80% of power worldwide. Moreover, publications on the subject indicate that such LERN heat generators most likely won’t be compatible with existing power-generating equipment because they won’t be able to produce high enough temperatures.

Accordingly, in large-scale power production, such LERN-based heat generators will be compatible only with organic Rankine cycle (ORC) systems originally developed to convert low-temperature thermal energy to electricity. The second reason is that LERN generators will likely have a low power density and be incompatible with gas turbine generators. Although LERN generators will sooner rather than later become a great option for residential co-generation and will become compatible with thermoelectric generators, specific models of Stirling engines, and compact ORC generators, they, in our opinion, will be suitable neither for industrial nor aerial applications.

In addition to solely technical arguments, obvious economic considerations favor our technology because it alone can provide a peaceful transition from fossil fuel to purely carbon-free power. Most radical innovations are usually beneficial for all in the long run. Still, if not timely and adequately delivered to target markets, they may also cause many short-term problems. For example, in the blink of an eye, they may turn valuable industrial assets into stranded ones, causing financial disaster for companies and investors. In this respect, our technology is superior because it will allow for the gradual reduction of global fossil fuel demand. Also, although it will

cause a decrease in fossil fuel consumption, it won't hurt manufacturers of conventional power-generating equipment, such as gas and steam turbines, boilers, etc.

For example, for environmental reasons, many conventional coal plants must be re-fired to natural gas or shut down. Re-firing, in most cases, implies installing natural gas combined cycle generating equipment with around 62% electrical efficiency, which is a costly solution. An alternative solution, installing AG-Burners in place of coal burners, is a much cheaper, faster alternative, which makes up for a higher electrical efficiency of around 80%. This example illustrates that there are uses of industrial AG-Burners that have no adverse economic side effects for other players and deliver pure "win-win" options for all.

It is reasonable to assume that sooner or later, a powerful LERN generator will be coupled with conventional steam boilers for steam power production or supercritical dioxide heat exchangers for S-CO2 power production. The process of such deep modernization of the power production industry will require hundreds of billions of dollars, if not trillions, and will last for several decades. It is still to be determined, though, when such powerful LENR generators will be created and when the modernization of industrial power plants will start. Meanwhile, AG-Burners could become a sustainable interim solution that will bring vast profits to utilities, reduce electricity prices for consumers, and ensure that the goals of the Paris Agreement are met way ahead of schedule.

The most promising thing about AG-Burners is that their COP seemingly may be further increased. We are currently testing AG-Burner with COP of 5, i.e., the one with five times lower specific fuel consumption than conventional burners. It has yet to be ready to be put on an assembly line, and even if it were, we would not have initiated its mass production. Otherwise, it would harm many power equipment manufacturers, not to mention fossil fuel producers. Our master plan is to provide potential customers with industrial AG-Burners with COP of 2.5, then periodically modernize the "fleet" of all installed AG-Burners and increase their COP. Such a strategy will allow all industries and players enough time to adjust to each next increment in COP.

Some of the experts we are communicating with on various aspects of the technology and its smooth delivery to the market express concern that the technology may constrain the expansion of renewable power because it will make power from fossil fuels around 30% cheaper and thermal power 60% cheaper than they are today. Such worries are exaggerated regarding power production and wrong regarding thermal power generation. A 30% margin of safety might extend fossil fuel power production's life-cycle but will not much curb the growth of renewable power. The technology can mitigate the constraining factor of rapidly evolving renewable electricity - power storing. Moreover, the technology may give renewable energy a competitive edge over fossil power production.

The Industry Overview section of the business plan mentioned that a conversion efficiency of as high as 77% (in LHV) of carbon dioxide and green hydrogen to methane was recently obtained. The idea of using synthetic hydrocarbon fuels as a means of storing green power has always been tempting due to its relatively low cost compared with Li-Ion batteries, resilience to degradation, and unprecedented fuel flexibility (may keep, convert to electricity, or supply hydrocarbon fuels to external users). Its practical realization, though, was constrained for the most part by the low efficiency of hydrocarbon synthesis, of 55 – 57%, low reverse cycle efficiency of around 42% for the simple natural gas cycle, and about 62% for combined natural gas, i.e., low round-trip efficiency of 23% to 35%. Including AG-Burner in this system could increase its round-trip efficiency by up to 80% for the simple natural gas cycle.

MARKETING STRATEGY

In the target industries, durability and reliability are the essential qualities of industrial equipment because it is expected to withstand at least a decade of virtually non-stop operations, and failure of just one element may put the entire technological process at risk. Accordingly, introducing a completely new product by a new company into the industrial equipment market is always challenging. One conventional solution to this problem is launching such a product under a well-recognized trademark in the industry. Although such an option remains open to us, there are better strategies in our case.

We will not just try to persuade our potential customers that our product is as reliable as the competition. On the contrary, we will offer our first potential customers a "prompt and unconditional cancellation option." This option will be part of an "energy supply contract" between the owner and the customers. Such a contract will allow the customers to pay a fee correlated with the actual amount of thermal energy delivered to them monthly and let them unconditionally terminate the contract with only several days' notice.

Customers will keep their original burners on site and will always have an opportunity to substitute AG-Burners with them. We will also keep a spare AG-Burner on the client's site for customers' peace of mind. We will provide such an opportunity only for customers in Phases Two and Three because we anticipate that demand for the service will eventually exceed supply, and competition between potential customers will prompt them to accept a long-term contract without a "prompt and unconditional cancellation option."

The possibility of paying a monthly fee instead of purchasing AG-Burners and a spare AG-Burner will help us launch the project. Also, in such a marketing strategy, the customers would not own the product and would not have the right to resell it to others, modify it, or disassemble it to figure out AG-Burner's internal design. In other words, such a strategy would provide supplementary protection to technology's know-how.

Industry marketing typically relies on informal and formal exchange of information between industry professionals. Traditional information exchange occurs through professional industrial associations, magazines, exhibitions, conferences, etc. Positive references from several early adopters, supplemented with a strong financial motivation to reduce fuel costs, will provide sufficient or excessive demand for the technology.

The first step of our inter-industrial promotion campaign will include installation and a months-long demonstration of AG-Burner operation on one of our potential customers' sites. In addition to demonstration purposes, this undertaking will help us detect and fix potential technical and manufacturing flaws. Usually, a company in an industry owns several manufacturing sites with multiple burners. Since the scheduled yearly production in Phases Two and Three is limited to 9 and 35 AG-Burners, the first customer will likely use AG-Burners on all of its sites if satisfied with the results of a 6-month demonstration.

Possibly, we won't have to launch a traditional marketing campaign because the demand will likely exceed the supply. Since the project implies manufacturing a limited number of AG-Burners (24 units in the second and 98 units in the third year) with an average power output of 50 MW, the overall production in power units will be around 6 GW, a drop in the bucket compared with potential demand.

Competition is the key driving force that will favor the proliferation of the technology. Companies in pertinent industries, i.e., thermal power production and energy-intensive industries that are late to contract our services, will find themselves at a considerable disadvantage because the cost of their products will be higher than that of their competitors, the early adopters. Such a driving force will make a full-fledged marketing campaign unnecessary until a technology like ours enters the market.

That being said, we have a backup marketing campaign plan that includes publishing articles and videos in several industry-specific print and electronic media, participating in industrial exhibitions and conferences, and, first of all, collaboration with the major national and international industrial associations, such as those in the US: The Fertilizer Institute, Gas turbine association, American Iron and Steel Institute, Portland Cement Association, etc. Our financial plan accounts for such marketing campaign costs.

In addition to delivering the information about the technology to potential customers, we are going to reach out to manufacturers of related industrial equipment, i.e., equipment that is technologically compatible with AG-Burners, such as water steam and hot water boilers manufacturers; produces of equipment for hydrogen production by conventional catalytic natural gas steam reforming; produces of rotating kilns for clinker or gypsum firing, etc. Collaborating with manufacturers of related equipment could benefit both sides: the manufacturers may dramatically enhance the competitive status of their original products by supplementing them

with AG-Burners, providing us access to their customers, many of whom are our potential customers.

Usually, marketing strategy is expected to outline the target geographical territories. For two reasons, our project does not limit or artificially expand the geographical scope of potential customers' locations. The first one is that we will offer the option of becoming the first adopter to most potential customers, irrespective of their geographical location. The only prerequisite is a well-developed, effective national legal system, which, if needed, will provide better legal protection to the technology's know-how. Countries, where reverse engineering is a common practice and intellectual property rights protection, is not among the government's priorities won't be on our target geographical territories, at least during the first several years. The second reason is that we have yet to determine which countries will become most receptive to our business propositions.

Like many others, this project has an emergency marketing plan that answers the most difficult questions creditors and investors routinely ask. What happens in the worst-case scenario? The one in our case is to have the technology reverse-engineered sooner rather than anticipated despite all our preventive measures, followed by delivering a substantially duplicate technology to the target market. Whereas we are a conscientious team of businessmen and researchers willing to coordinate the proliferation of the technology with market players, thereby minimizing technology's negative impact on the global markets, there is no guarantee that any other organization that might come in possession of our know-how without our consent will be as cooperative with the industry players as we are going to be.

So, there are two possible scenarios. If such an organization decides to act responsibly to others, it will have to coordinate its marketing strategy with us. Should this development unfold, it won't damage our project. If, on the other hand, such an organization opts to uncontrollably and uncooperatively promote the duplicate technology to the markets, causing financial havoc, we'll start collaborating with all interested parties concerning our patent rights enforcement. If efficiently implemented, such intellectual property enforcement could curb the uncontrollable proliferation of duplicate technology in many countries with a total gross domestic product of half of the world's GDP. Should this scenario occur, the project might either suffer damage or benefit in the long run, depending on the circumstances, because the second scenario may accelerate the penetration of the technology to the markets, which could be financially beneficial for the project.

Routinely, the marketing plan includes an analysis of the competition strategies. This business plan does not have such analysis because there is no competition, at least for the foreseeable future. The established manufacturers of industrial burners are not our competitors. As was mentioned earlier, the second stage of our strategy, scheduled to start right after the completion of Phase Tree of this project, is licensing. All major manufacturers of conventional industrial

burners will be interested in obtaining a production license for our technology because the market for traditional burners will soon cease to exist. We'll license the technology to most of them at some point.

PRODUCTION PLAN

The project comprise three one-year phases outlined below.

Phase	Description	Funding
Preparatory (Phase One)	Test bench construction. Creation and two - three months of 50 MW natural gas AG-Burner testing on a potential customer's manufacturing site. Negotiating installations of AG-Burners with potential customers from the energy-intensive industries. Negotiating technical and business aspects of cooperation with supplies of constituent components for AG-Burners production. Creating a set of legal documents for sustainable communication with customers and suppliers.	$6.0m
Entry (Phase Two)	Creating a manufacturing facility. Manufacturing and installing 24 AG-Burners, preferably for one or two early adopting customers. On-site performance monitoring of the installed AG-Burners for early detection of potential design, manufacturing flaws, and structural integrity. Providing all major potential customers in target industries with information about the product and accepting the pre-orders. Obtaining national conformity certificates for AG-Burners in chosen target countries. Creating internal manufacturing quality control rules, protocols and procedures, and mechanisms for enforcing them. Launching a marketing campaign targeting groups of selected potential customers. Hiring and training technical personnel (technicians). Developing an online automated performance and structural integrity monitoring system for installation on units in Phase Three.	$14.5m
Growth (Phase Three)	Manufacturing and installing 48 AG-Burners with the online automated monitoring system. Performing a full-fledged marketing campaign targeting all potential licensees.	

	If circumstances warrant, modernizing and/or substituting earlier installed units with the latest models, free of design flaws and manufacturing defects. Launching full-fledged R&D for creating a non-destructive quality control system for AG-Burners, constituent components from suppliers, and developing AG-Burners with higher COP.	

Since the primary strategic objective of this project is creating a system for making the technology available to all potential customers, the business model adopted for the implementation of the project is "flexible distributed manufacturing." The manufacturing is "distributed" because most AG-Burners' constituent components will be outsourced. Only the most critical components will be manufactured in-house; final assembling will occur in-house or on customer sites. Being "distributed" also means that, if necessary, AG-Burners production may be launched at virtually any geographic territory in a short time.

The advantages of such an approach are multiple and straightforward, including low capital investments, high-quality components produced by reputable suppliers, the possibility of quickly scaling up production, etc. The scheduled transition to a licensing phase starting from the fourth year, which is beyond the scope of this business plan, requires ensuring that no unresolved technical flaws remain.

The manufacturing method's "flexibility" manifests in its ability to keep steady specific variable costs ($/per unit) when production volumes vary. Within the Base scenario, 24 and 48 units are scheduled for production and installation in Phases Two and Three. The estimated specific variable cost of one installation is $0.8m. The requirement to be flexible was set at the project's outset to make it resilient to variations in the number of annual installations.

The project's yearly fixed costs in Phase One are $6m. Phases two and three are $8.4m and $6m, respectively. Fixed costs in Phase Two are high compared with Phase One because $6m are to be spend on creating a manufacturing facility. Although the project does not assume the production of AB-Burners with COP higher than 2.5, R&D operations are essential to the project's future fair market value. Making AG-Burners with COP of 3 to 3.5 ready by the end of Phase Three would increase the project's value.

MANAGEMENT AND THE ORGANIZATIONAL STRUCTURE

In Phase One, the project will hire financial, strategy, and purchasing/supply managers. The strategist will be responsible for optimizing the project's operations, including preparing quarterly plans, monitoring their implementation, and collecting and processing feedback from all functional divisions. The purchasing/supply manager will create a network of ready-made equipment supplies and custom-made constituent components.

On the inception of Phase One, to timely develop a 50 MW AG-Burner fully compatible with the industrial equipment of a first customer, personnel with the required competencies and experience will be hired, including electrical, software, and mechanical/material engineers. Professionals with pertinent backgrounds and experience will also be recruited to implement a marketing campaign.

In the third quarter of Phase One, skilled technicians will be recruited to perform nine installations. During three months, they will be trained by already hired engineering staff to be ready to perform AG-Burners installations and monitor their performance on customers' sites in Phase Two. According to the Production Plan, the first nine units will be subject to round-the-clock on-site monitoring by technicians for performance and structural integrity control. Since Phase Three implies a four-fold increase in production and installations, in the third quarter of Phase Two, more technicians will be hired and properly trained.

Although the number of installations during Phase Three is expected to increase from one installation per two months to around three installations per month, the amount of additionally hired technicians is only expected to double. The reason is that by the commencement of Phase Three, the development and testing of a full-fledged online monitoring system will be completed. All AG-Burners installed during Phase Three are expected to be equipped with this system, which will allow us to avoid keeping the technicians on customers' sites for monitoring.

At the beginning of Phase Two, the Research team will be created to carry out R&D on the technology. This group's prime objective will be developing the system for monitoring AG-Burners' structural integrity during their operation on customers' sites. The Research team will also work on materials and methods critical for AG-Burners' durability and further increase their coefficient of performance.

Starting from the middle of Phase Three, a group responsible for licensing the technology to major players in the target industries will be formed. The Licensing team's primary task will be negotiating licensing contracts with major players in the target industries. The table below summarizes all significant jobs/functions for each project phase.

Summary of jobs/functions.

Position	First Year				Second Year				Third Year			
	1	**2**	**3**	**4**	**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
CEO	1	1	1	1	1	1	1	1	1	1	1	1
CFO	1	1	1	1	1	1	1	1	1	1	1	1
Strategy	0	0	0	0	1	1	1	1	1	1	1	1
Marketing	0	0	0	0	0	0	1	1	1	1	1	1
Purchases/supplies	1	1	1	1	1	1	1	1	2	2	2	2
Human Resources	0	0	0	0	1	1	1	1	1	1	1	1

IT	0	0	0	0	1	1	1	1	2	2	2	2
Transportation	0	0	0	0	1	1	1	1	2	2	2	2
Legal and IP	0	0	0	0	0	0	1	1	1	1	1	1
Electrical	1	1	1	1	1	1	1	1	2	2	2	2
Software	1	1	1	1	1	1	1	1	2	2	2	2
Mechanical	1	1	1	1	1	1	1	1	2	2	2	2
Quality Control	0	0	0	0	1	1	1	1	2	2	2	2
Technicians	0	0	0	0	12	12	12	12	24	24	24	24
Research	0	0	0	0	1	1	1	1	2	2	2	2
Licensing									1	1	1	1
Totally	6	6	6	6	24	24	26	26	47	47	47	47

The project's organizational structure will be a matrix one. This choice is based on virtually merging development, production, installation, and on-site monitoring operations (functions) into a streamlined cycle with multiple feedback loops.

For example, electrical, software, and mechanical engineers will first participate in developing a 50 MW-AG-Burner. Then, they will test the first prototype on the test bench and then on the customer's site. In Phase Two, they will handle production and on-site installation of AG-Burners. During production and installation, these engineers will also start training technicians, who will assist them in further work, including on-site monitoring of the performance of installed AG-Burners. Some engineers may opt to join the research team in Phase Two

FINANCIAL PLAN

Estimated sales.

Following the Production Plan, in Phases One and Two, 24 and 48 AG-Burners are scheduled for production and installation. The installed AG-Burners will have a 50 MW output power. Suppose all these 72 AG-Burners are installed on thermal natural gas and residual fuel-fired power plants. If used for clinker firing, this amount will allow to modernize approximately 36 firing kilns.

According to the project's business model, the project's owner and a customer will split the fuel economy at a ratio of 1 to 1. In other words, the owner will receive 30% of the original customers' fuel costs as a fee for using the technology under an energy supply agreement. The business model benefits customers because they will start receiving fuel cost savings immediately and won't have to wait until the AG-Burner payback period ends. For the owner, the business model will provide sufficient cash flow, a good profitability index, and a solid guarantee of a high project's future fair market value.

As was outlined in the Marketing Plan section of the business plan, the project has no geographical limitations, except for countries where the government does not diligently enforce intellectual property rights. Since assessing the project's financial parameters for tens of potential countries is neither possible nor reasonable, the universal assessment methodology is set forth below.

The method of forecasting sales is simple and straightforward and rests on the following facts and assumptions: the energy content (LHV) of one thousand cubic feet of natural gas is 293 kWh, and that of one thousand cubic meters is 9,300 kWh; the average AG-Burners' output is 50 MW; each AG-Burner in average operates 700 hours a month; the fee the owner receives constitutes 1/2 of fuel savings which is equivalent to 30% of customer's original fuel cost; the cash flow is not discounted due to several reasons outlined below.

The sales forecast algorithm's first step implies determining the 1 kWh (LHV basis) cost of natural gas when burned in a conventional burner. For example, according to the US Energy Information Administration, the average monthly price of industrial natural gas from November 2018 to November 2020 was $3.8 per thousand cubic feet. Since the lower calorific value, LHV, of one thousand cubic feet is around 293 kWh, the cost of 1 kWh of heat energy is 3.8/293, i.e., $0.013. During the same period, the cost of 1 kWh industrial natural gas in Germany was around $0.026. The second step is the calculation of a monthly fee per one AG-Burner by multiplying the number of AG-Burners in operation (N) by the average power of one AG-Burner (50 000 kW) by the average monthly number of operating hours (700 hours) by fuel cost of 1 kWh of LHV by a factor of 0.3. For AG-Burners installed in the US and Germany, the monthly fees per one AB-Burner are estimated as follows:

fee_{US}=N*50 000*700*0.013*0.3=$136 500*N

fee_{Ger}=N*50 000*700*0.026*0.3=$273 000*N

For further financial analysis, the US market was chosen as a benchmark.

In order to account for the federal and state corporate taxes, an effective monthly fee (EfeeUS) is used in calculations, which is a monthly fee multiplied by a corporate rate factor of 0.7 (for a 30% corporate tax rate):

$Efee_{US}$=$136,500*0.7=$95,500

Estimated costs.

The fixed costs in Phase One (the first year) are estimated at $6m. They include developing and constructing a 50 MW AG-Burner unit, a test bench, and a three-month demonstration of AG-

Burner operation on the customer's site. The fixed costs in Phase Two (the second year) are estimated at $8.4m; in Phase Three (the third year) at $6m. Variable costs associated with the production and installation of AG-Burner both in the second and third years are estimated at $0.8m/unit.

Estimated investments.

The cash flow table below assumes that the project will receive an investment of $6m at its commencement. This money covers the estimated costs of Phase One. For the implementation of Phases Two and Three, the project requires an additional $14.5m investment to cover the project's fixed and variable costs. Accordingly, in the cash flow tables presented below, NPV at any month never substantially went down below ($6m) during the first year and -$20.5m during years two and three. The cash flow table covers 72 installations.

Cash flows modelling.

Cash flow for the second and third years is based on the project's business model, which is a cyclic reinvestment of fees into the production and installation of AG-Burners. Cash flow for such a "snowball" business is commonly created based on the minimum possible net present value (NPV). The absolute value of NPV cannot exceed the capital available to the project. Multiple cash flows may be created under a snowball business model, depending on the owner's priority. It could be the maximization of the project's future fair market value, NPV, or a combination of the two. Also, cash flow is defined by actual demand for AG-Burners and the maximum amount that can be produced and installed within a particular time frame.

Two major financial indicators helpful in analyzing a snowball project are cycle duration and net present value (NPV). The first is a payback period of one AG-Burner, which is [0.8/0.0955], i.e., around eight and a half months. In a snowball project where its future value is prioritized, NPV is an auxiliary indicator that helps optimize the production schedule so that the absolute value of NPV at any month never substantially exceeds the project's capital investment. If, at some point, the absolute value of NPV surpasses the capital investment, it could become necessary to bring in extra financing in the form of additional capital investment of a loan.

Although monthly present values in this project were not discounted, they were nonetheless referred to as the present values for consistency of terminology utilized. Cutting the word "present" might cause confusion between "present value," which is a discounted difference between the inflow and outflow case and the cost of the project, and the project's future "value," which is an estimate of the project's cost at any future moment. Discounting monthly present values by a discounting factor different from 0 would make it impossible to use NPV to optimize the production cycle in Microsoft Excel software.

Since AG-Burner production-installation cycle takes approximately three months, then the sort-term loan of around $1.4m will be needed in 7th to 12th months of Phase Two, and that of around $6.4m in Phase Three.

Cash Flow

	A	B	C	D	E	F	G	H	I	J	K	L	M
2							First Year Cash Flow						
3	**Month**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
4	**Monthly Installations**	0	0	0	0	0	0	0	0	0	0	0	0
5	**Installations Cumulative**	0	0	0	0	0	0	0	0	0	0	0	0
6	**Fees (m)**	0	0	0	0	0	0	0	0	0	0	0	0
7	**Fixed Costs (m)**	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
8	**Variable Costs (m)**	0	0	0	0	0	0	0	0	0	0	0	0
9	**Present Value* (m)**	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5
10	**NPV* (m)**	-0.5	-1	-1.5	-2	-2.5	-3	-3.5	-4	-4.5	-5	-5.5	-6
11													
12							Second Year Cash Flow						
13	**Month**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**
14	**Monthly Installations**	2	2	2	2	2	2	2	2	2	2	2	2
15	**Installations Total**	2	4	6	8	10	12	14	16	18	20	22	**24**
16	**Fees (m)**	0.191	0.382	0.573	0.764	0.955	1.146	1.337	1.528	1.719	1.910	2.101	2.292
17	**Fixed Costs (m)**	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
18	**Variable Costs (m)**	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
19	**Present Value* (m)**	-2.109	-1.918	-1.727	-1.536	-1.345	-1.154	-0.963	-0.772	-0.581	-0.390	-0.199	-0.008
20	**NPV* (m)**	-8.109	-10.027	-11.754	-13.29	-14.635	-15.789	-16.752	-17.524	-18.105	-18.495	-18.694	-18.702
21													
22							Third Year Cash Flow						
23	**Month**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
24	**Monthly Installations**	4	4	4	4	4	4	4	4	4	4	4	4
25	**Installations Total**	28	32	36	40	44	48	52	56	60	64	68	**72**
26	**Fees (m)**	2.674	3.056	3.438	3.820	4.202	4.584	4.966	5.348	5.730	6.112	6.494	6.876
27	**Fixed Costs (m)**	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
28	**Variable Costs (m)**	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2
29	**Present Value* (m)**	-1.026	-0.644	-0.262	0.120	0.502	0.884	1.266	1.648	2.030	2.412	2.794	3.176
30	**NPV* (m)**	-19.728	-20.372	-20.634	-20.514	-20.012	-19.128	-17.862	-16.214	-14.184	-11.772	-8.978	-5.802
31													
32	**Monthly Fee per Unit (m)**	0.0955											
33	**Cost of One Installation (m)**	0.8											

ECONOMIC EFFICIENCY OF THE PROJECT

Assuming that starting from the 37th-month production and installations of AG-Burners halts, reducing variable costs to zero, and that fixed costs remain intact ($0.5m/month), then the fair market value of the project may be estimated as [monthly fees – monthly fixed costs] *12 months * P/E, where P/E is the price to earnings ratio. For a typical P/E of 15 and the assumed capacity factor of 0.5 (percentage of an annual time during which an AG-Burner operates in the long term):

Fair Market Value (FMV)=[72*$0.0955m-$0.5m]*12 months*0.5*15=$574m

Although the assumption was made that during the second and third years, the capacity factor would be close to 100%, this may not be the case. In order to account for this development, it will be possible to increase the project's share of fuel economy from 50% to 100%.

The profitability index may be estimated as FMV/Capital Investment, i.e.

PI=$574m/$20.5m=2,800%

If, for example, an investor has 44% share of the project's, investor's profitability index would be:

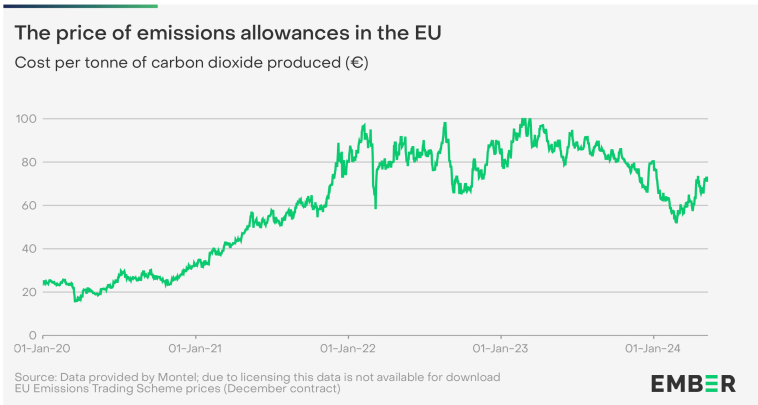
PI_{inv}=2,800%*0.44=1,230%

Analysis of the cash flows shows that the project is resilient to fluctuations of all constituent variables, including the number of installations. Suppose unexpected circumstances arise and cause a rise in costs or a reduction in sales. In that case, it is possible to postpone installations to keep the absolute value of NPV below the capital investment.

Our cash flow assessments were conducted with a conservative approach, ensuring a comprehensive and reliable forecast. We began with the US market, where energy-specific industrial natural gas prices ($/kWh) are approximately two times lower than those in Germany. It's important to note that the cost of industrial natural gas in Germany, while not the highest in the European Union, places it in the middle of the countries ranked by industrial natural gas prices in Europe.

Second, if necessary, the number of installations can be increased using debt financing instead of an additional capital investment, which would require assigning a larger project share to an investor.

Finally, there are multiple indications of a substantial rise in hydrocarbon fuel costs in the foreseeable future in most developed countries due to a tightening carbon dioxide emission taxation of fossil fuel consumers. For example, the price of one ton of carbon dioxide (one carbon credit) in the carbon credits trading system in the EU is at least $60:[7]



[77] https://ember-climate.org/data/data-tools/carbon-price-viewer/

Combustion of one thousand cubic feet of natural gas produces around 53 kg. of carbon dioxide. Accordingly, if carbon prices in the US were the same as in the EU, the combined cost of 1 kWh of thermal energy from natural gas in the US would rise by [((53/293)*$60/1000/$0.013], i.e. 83%. In the foreseeable future, carbon emissions will also be taxed in the USA.

RISKS MITIGATION

The concomitant risk of launching any genuinely innovative technology is an unforeseen emergence of another related, similarly effective technology. This risk is unlikely in our case due to several reasons. Although we know that many companies worldwide are working in the pertinent art, there is no publicly available information that any of them have already achieved anything close to the technology we have.

For example, at least since 2015[8] Japanese governmental agency New Energy and Industrial Technology Development Organization (NEDO),[9] in cooperation with Toyota, Mitsubishi Heavy Industries, Nissan Motors, and four Japanese universities: Tohoku, Kyushu, Nagoya, and Kobe, have been engaged in a LENR-based power generation research project called "the nanometal hydrogen energy project (NEDO-MHE)", aimed at creation of carbon-free, high energy density power sources. The publicly available information on this project, if complete in scope, reveals that although the results were promising, the implementation stage is still far ahead. This example indicates that creating a similar technology is a challenging endeavor.

The second risk-alleviating factor is that even if very similar in potency, efficiency, affordability, and safety technology emerges, there will be more than enough space for each player on the market. Modernization of 60% of the world power industry and around 80% of the energy-intensive industries will, in the best-case scenario, take a decade and require hundreds of billion dollars of capital investments, even if the fast proliferation of renewable power is assumed.

The primary risk associated with the project is unauthorized copying (reverse-engineering) of the original AG-Burners by a third party, followed by uncontrollable and unconstrained proliferation of the technology in target markets. The strategy outlined in the business plan was developed with this risk in mind and ways of effectively mitigating and alleviating its potentially negative consequences if it outbreaks.

The vital protective measures, among others, include:

[8] https://news.newenergytimes.net/page/22/
[9] https://www.nedo.go.jp/english/

• launching the product in one country with a well-established legal system that could ensure enforcement of the owner's intellectual property rights;

• a method of delivering the unparalleled benefits of AG-Burners to consumers, which assumes providing them with thermal energy through an energy supply contract rather than selling AG-Burners as equipment;

• provide monitoring, maintenance, and overhauls of AG-Burners installed on consumer sites only by the owner's technical personnel.

In addition to the risk mentioned above related to reverse-engineering of the technology and the emergence of technology with similar features, one more risk is routinely associated with any changes in markets or organizations: resistance to any changes. Regarding our case, some people may have a hasty opinion that it might be reasonable to anticipate some degree of chaotic or coordinated opposition from various groups due to their apprehension of prompt devaluation of their previous investments. The good news is that AG-Burners will quickly recoup the lost value of any potentially stranded assets, bringing a lot of profit to their users so that the benefits will far outweigh losses in most cases.

That being said, it is our responsibility to provide complete information about AB-Burners to all potential users in a timely manner to avoid any opposition due to inaccurate or incomplete information. Licensing the technology to other major players, as well as coordination of our market strategy with such players throughout industrial associations, such as The Fertilizer Institute, Gas Turbine Association, American Iron and Steel Institute, Portland Cement Association, etc., will hopefully allow us to smooth the transition to the technology, help alleviate the accumulation of stranded assets in portfolios of major industrial players due to displacement of conventional combustion technologies and finally benefit both the pertinent industries and their consumers.

We want to address the concerns that oil and natural gas producers and distributors won't welcome the technology. Amazingly, they seem to become technology's primary beneficiary because the technology will expand the life-cycle of fossil fuel power, given the tightening competition from renewable energy. The subject is elaborated on below.

Natural Gas Producers. AG-conversion of coal-fired power plants will create a new expansive market for natural gas. In 2019, 38.4% and 23.5% of electricity in the US were generated from natural gas and coal, respectively. If, in 2019, all power plants using natural gas were AG-converted, as well as all coal plants, then the natural gas demand for power generations would have fallen by only 23.3%. In other words, a reduction in natural gas consumption due to the AG-conversion of natural gas combined cycle power plants would be partially mitigated by a

newly created demand from coal-fired power plants converted to AG-natural gas-fired power plants.

The unforeseen sharp reduction in costs of Li-ion batteries during the last couple of years, as well as the latest advancements in the field of graphene ultra-capacitors (aka graphene pseudo-batteries) with gravimetric energy approaching that of contemporary Li-ion batteries, have boosted the proliferation of EVs beyond any of the most optimistic forecasts. The routine assumption that power shortage problems and the high cost of materials for Li-ion batteries would naturally curb the expansion of the EV market does not materialize. This means that electricity demand will grow faster than expected. From this perspective, AG-Cycle can benefit power-generating utilities a lot. A rough estimate shows that comprehensive electrification of highway transportation in the US would require a 25% increase in power production.

Oil Producers. With solar PV, wind power surging, and EVs robustly phasing out conventional IC engine automobiles, oil producers have a lot of worries about their future. How they are slashing their investments reveals that the industry is preparing for dramatic oil demand reduction in the medium term. AG-Cycle is the only way for the oil industry to uphold the oil demand for at least a decade by providing fuel to AG-EVs, i.e., electric vehicles with a low-energy battery equipped with a gas turbine range extender with a retrofitted AG-Burner. AG-EVs will be a better choice for most consumers because the vehicles will be completely anxiety-free, more fuel efficient than EVs, and have a lower carbon dioxide footprint than conventional EVs.

Although AG-EVs will be around three times more fuel efficient than conventional IC engine vehicles, for the oil producers, AG-EVs will be a lesser evil than conventional EVs, which consume no gasoline. Estimates show that the reduction of gasoline demand from highway transportation will be fully recouped by a newly created oil demand from the emerging segment of AG-EVTOLS.

The reduction of gasoline consumption by highway transportation due to AG-EVs will be additionally compensated by emerging gasoline demand from households whose residents will own AG-EVs. The cost of electricity produced by an EV's gas turbine range extender (TRE) enhanced with AG-Cycle (AG-TRE) will be slightly less than [2.6/(33.7*0.6)], i.e., $0.13 per kWh, if AG-TRE's efficiency is 60% and cost of gasoline, $2.6 per gallon. Houses equipped with ultra-capacitor power storage and AG-EV will be able to produce affordable electricity. In other words, AG-Cycle will enable oil producers and refineries to sell liquid fuels to households for electricity generation, not only for heating.

From an economic perspective, this is the unsurpassed solution because the overnight specific cost of AG-TRE power will be at most $100 per kW, whereas that of advanced natural gas combined cycle with CCS is around $2,000; that of dispatchable PV is about $ 1,000 (without accounting for the capacity factor). Moreover, approximately 34m EVs equipped with 35 kW

AG-TRE will have the same, [35*31.4], i.e., 1.1 m MW, nameplate capacity as all US power-generating facilities in 2019. To put it differently, the plurality of such AG-EVs will make up a sustainable distributed backup power system.

Finally, we'd like to highlight that today, AG-Cycle is the only available to civilization "vaccine" against climate change. Renewable power, the best "medication" for climate change, will gradually replace fossil fuel power. The problem is that by the time this "medication" comes into full effect, the "patient," our civilization, might be badly, if not fatally, hurt. If forecasted climate change consequences are accurate, we need a solution today, not decades later. We believe that humanity's self-preservation instinct is the best antidote against any forces that might counteract the project's implementation in the long run.