Carbon Negative,
Energy Positive.
Fuel, Evolved.

LIQUID RENEWABLE FUELING SYSTEMS, INC.

LRFS
Liquid Renewable
Fueling Systems, Inc.℠

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ABSTRACT

Liquid Renewable Fueling Systems, Inc. ("LRFS" or the "Company") will make efforts to advance the availability and utilization of 100% renewable liquid fueling. Investments will be made in equipment necessary for 100% renewable liquid fueling. Coordination will be provided between fuel suppliers and retailers to increase 100% renewable liquid fueling availability. Consumers will be enabled to solicit increased transparency and continuous improvement in renewable fuel production and supply.

These efforts are expected to stimulate growth in 100% renewable liquid fueling and gain market share for the company, while facilitating a wide breadth of ancillary benefits.

THE IDEAL RENEWABLE FUEL

In pursuit of sustainable transportation, the ideal solution has many attributes. The basic requirement being an ability to capture renewable energy in a form that may be deployed as needed. Secondarily, any adverse effects in implementing this solution must be kept to a minimum. Further desired qualities include high energy density, reliability, affordability, and convenience. Finally, a seamless integration throughout deployment and adoption will be critical to overall success. As the urgency for renewably energy sources ever increases, the Company will deploy a solution to empower this ideal – **towards carbon negative, energy positive fueling**.

There is an automotive fuel in which solar energy is captured, concentrated, & stored[1]. The production of this fuel can sequester carbon[1]. This fuel does not require a massive expansion in lithium, cobalt, or nickel mining. This fuel, at room temperature, has a higher energy density than pure cryogenic liquid hydrogen (*and thus does not require pressurization or refrigeration for storage*)[2]. Feedstocks for this fuel may be produced along coastlines, in swamplands, and in dry climates – in addition to production on traditionally arable land[1,3]. The use of this fuel is expected to allow for nearly double the mileage (*per gallon*) of gasoline and nearly three times engine longevity (*vs. gasoline*)[1]. Many of the vehicles on the road today may be modified to use this fuel, and much of the United States' current infrastructure might be retrofitted for use of this automotive fuel[1,3,4]. *This fuel is 100% ethyl alcohol (ethanol) and has been used in vehicles for over a century*[1,3].

While the U.S. is the world's leading producer of fuel ethanol – with current output primarily directed to gasoline/ethanol fuel mixtures – environmental outcomes, in conjunction with ethanol production, have come into question[5,6,7]. Concerns have been expressed over fertilizer runoff, soil erosion, and inadequate land use management tied to corn grown for ethanol production[7]. The environmental impacts of current ethanol production can be reduced though, with improvements in sustainable agricultural practices, CO_2 diversion during fermentation, and use of renewables for heat generation in fermentation and distillation[1,8].

Additionally, corn is far from the only crop suitable as an ethanol feedstock[1,3,8]. There are numerous crops which may yield from 2 to 6 times the alcohol per acre (*in comparison to corn; excluding potential cellulose sources*) [see Appendix A], including drought resistant varieties and crops requiring significantly less chemical fertilizer[1]. Furthermore, possibilities exist to pair ethanol production with ocean cooling, methane generation, water filtration, and natural fertilizer production[1]. An abundance of associated benefits is possible with ethanol production, and in a balanced production system, ethanol can be produced in such a way that carbon is sequestered ("*carbon negative*") with positive returns on energy inputs ("*energy positive*")[1].

LRFS has developed a methodology in which environmental effects of ethanol production – positive and negative – might be considered as fuel ethanol is dispensed for use. At the same time, market-based incentives will be deployed to spur continuous improvement – reducing negative environmental impacts and encouraging associated benefits – in fuel ethanol production. With increased transparency and continuous improvement in fuel ethanol production, we believe **the ideal renewable fuel is within reach**.

IMPLEMENTATION STRATEGY

In collaboration with current fuel retailers, LRFS will invest in equipment suitable for the storage, dispensing, and selling of 100% hydrous ethanol (or "E100") motor fuel. Cash and revenue sharing will be deployed to accrue E100 designated fueling equipment. Profit may subsequently be obtained through E100 retail fuel sales.

Increased availability of E100 fueling is expected to facilitate (*manufacturer rated*) E100 compatible vehicle sales within the United States; a sizeable market currently exists for these vehicles in Brazil, with over a dozen manufacturers currently selling E100 compatible vehicles[9-21].

Current U.S. fuel ethanol production capacity will be employed to meet initial E100 fueling demand. Improvements in fuel production – lessoning environmental impacts and increasing associated benefits – may thereafter be solicited by consumers with the Company's tiered pricing model.

*"100% ethanol," "ethyl alcohol," "hydrous ethanol," "Neat ethanol," or "**E100**" is used to indicate a mixture of solely (ethyl) alcohol and water (with the exception of any denaturants required by law or potentially added lubricating fluid), absent any petroleum components – water content may be in the range of 4% of total volume*.[1]

COMPANY MISSION

LRFS is committed to empowering an evolution in fuel production and use within the United States – towards fully ***Carbon Negative, Energy Positive Fueling***.

<u>CARBON NEGATIVE</u>

ETHANOL AND THE CARBON CYCLE

While fermentation and distillation – the chemical creation and concentration of ethyl alcohol (ethanol) – and ethanol combustion do release carbon dioxide, carbon dioxide serves as much more than a harmful byproduct in the overall lifecycle of ethanol production and use[1]. A properly balanced system allows for the opposite – an overall absorption and sequestration of atmospheric carbon dioxide[1,8,22]. Through photosynthesis, carbon dioxide, water, and sunlight are transformed into plant carbohydrates[1,3] – which may then be converted to ethanol (via fermentation; concentrated with distillation). All the carbon dioxide transformed into vegetation; however, is not utilized in ethanol production. In addition to any fruit or vegetable, roots, stalks, and leaves are all derived from water and atmospheric carbon dioxide[1]. Up to 80% of the carbon absorbed by plants may be transferred through the roots to feed beneficial bacteria and fungi in the soil – sequestering carbon in the process[1]. Furthermore, CO_2 emitted during fermentation might be routed to stimulate ethanol feedstock growth – creating positive feedback, in which additional solar energy can be converted to carbohydrates[1]. Thus, fuel production potential may be increased. LRFS is committed to the pursuit of symbiotic relationships between agricultural practices (*including soil health*) and ethanol production in which a negative balance of carbon emissions is achieved[1,8,23].

ENERGY POSITIVE

POSITIVE RETURNS ON ENERGY INPUTS

Solar energy is captured in plant material through photosynthesis[1]. This energy can then be concentrated and stored – in a stable and easily transported form – as ethanol[1]. The energy gained with ethanol use is higher than the energy consumed during its production[1,24] – said another way, energy invested in crop and ethanol production generates positive returns[5]. In contrast, much of the energy consumed today is drawn from a finite source – underground stores of organic material transformed over millions of years[25]. In terms of investment, LRFS is working to realize a positive return – both in terms of money and energy.

ETHANOL AS A MOTOR FUEL

Alcohol was initially used as a fuel in the early days of the internal combustion engine[1,3]. Nicholas Otto and Karl Benz, among others, designed engines based on the combustion of alcohol[1]. Henry Ford preferred the use of alcohol compared to gasoline[1,3]. Early in the twentieth century, alcohol engines were advertised as less polluting than gasoline engines[1]. It was only with efforts from John D. Rockefeller and the Standard Oil Trust (*including the funding of prohibition initiatives*) that gasoline gained its role as the prevailing motor fuel used in the United States. As the focus now intensifies on sustainable transportation, we believe much is to be gained with a return to alcohol (*specifically E100*) as a primary motor fuel.

E100 FOR INTERNAL COMBUSTION

The primary use of fuel ethanol in the U.S. today is as an additive to gasoline, raising the fuel's "octane" (*essentially ensuring fuel does not burn prematurely*), with E10 (*up to 10% ethanol, remainder gasoline*) currently the country's most common fuel mix[1,3,5]. Other mixtures such as E85 (*up to approximately 85% ethanol*) are available;

however, **increased performance is available in engines optimized to use E100**[1,3,4,5,26,27]. Favorable chemical properties (*though perhaps overlooked*) and consistency – **ethanol's form is constant** [chemically: C_2H_5OH][1,3,5,27] – allow for ethanol's greater performance potential.

The term "gasoline," in contrast to ethanol, does not represent a specified mixture of elements. Up to 400 different compounds might be found in any mixture of gasoline – with each compound having independent chemical properties [*boiling ranges of which might range from 80º F to over 400º F*][1,3]. The mixture of any batch of gasoline is largely dependent on demand in chemical production and can vary daily[1,27]. As fuel mixtures constituting gasoline have varied over time – even day to day in production – gasoline engines must be tolerant of a wide range of fuel mixtures.

While it can be expressed that ethanol contains less energy than gasoline, with context, implications may be reversed. When expressed in terms of the potential for heat generation [*may be expressed in "British Thermal Units" – BTUs*], gasoline contains more (*heat generating*) "energy" than does ethanol [*gasoline having a low heating value of approx.111,000 Btu/gallon; ethanol having a low heating value of approx. 76,000 Btu/gallon*][1,3]. **The primary objective of motor fuels; however, is to produce forward motion; and not heat**[1,3]. <u>Compared to gasoline, ethanol offers a lower temperature burn, more complete combustion, a wider range of tolerable air to fuel ratios, and an increased volume of combustion gases</u>[1,3,26,27]. In fact, the additional heat generated in a gasoline engine can be harmful to engine components – with significant engine cooling systems required[1].

The high octane and high "heat of vaporization" of ethanol make it an exceptional fuel for spark ignition engines [*current gasoline engines are considered spark ignition engines; current diesel engines are considered compression ignition engines*][4,26,27]. With engines and transmissions built to specifications of ethanol combustion – instead of to the range of specifications for gasoline combustion – increased fuel efficiency is to be expected[1,3,4,26]. Conversion of a diesel engine (*used to take advantage of the higher compression ratio not available in a traditional gasoline engine*) to run on alcohol fuel has been documented[1,3,26] – with results <u>of up to 22% increased fuel efficiency</u> versus diesel[1] [*diesel engines are also known to operate more efficiently than gasoline* *engines*[27]]. In addition to potential gains in fuel efficiency, engines operating on ethanol would be expected to last up to three times as long as gasoline engines – with lower operating temperatures and fewer contaminants in E100 versus gasoline[1]. **Eliminating the volatile mixtures of gasoline from most fuels used today in the U.S. would result in a consistent fuel with properties suited for increased fuel efficiency and improved engine longevity – ethanol (E100)**.

E100 FOR FUEL CELLS

Liquid alcohol fuel offers the ability to compactly store and transport hydrogen for use in fuel cells[1] without the need for cooling or pressurization in storage containers. Paradoxically, at constant volumes, **a greater mass of hydrogen is contained in liquid alcohol than pure cryogenic liquid hydrogen**[2]. This hydrogen may be isolated for use in fuel cells in a reforming process – which can be done on board vehicles, using any of multiple viable catalysts[1]. Alcohol offers the potential for economical storage and transportation of hydrogen[1,2] – challenges that have inhibited the emergence of a hydrogen economy for decades.

ETHANOL PRODUCTION

CURRENT PRACTICES & GHG EMISSION REDUCTION POTENTIAL

Corn, at present, is the primary feedstock used for fuel ethanol production in the United States[5,7,23]. As such, much of the production capacity is concentrated in traditional agricultural lands within the country's Midwest[7,23]. Greenhouse gas (GHG) emissions from current production, as reported in carbon dioxide equivalence, vary according to a number of studies[7]. According to the Argonne National Laboratory (ANL), lifecycle corn ethanol production and use obtains approximately 42% reduction in GHG emissions when compared to gasoline[8]. Questions have been raised; however, as to whether a full accounting of effects from nitrogen (N) fertilizer application, conversions of natural lands to cropland, or foregone cropland retirements have been considered in GHG emission calculations[7]. *Lark, et al.* have suggested that unaccounted for Land Use Changes (LUC) – the conversion of natural lands to croplands or the forgoing of cropland retirements to natural cover – might negate approximately 31% of total GHG emission reductions (*in comparison to gasoline*), while nitrous oxide emissions derived from increased nitrogen fertilizer use might negate approximately 9% of GHG emission reductions (*compared to gasoline*)[7]. With combined data [*Lark, et al. & ANL*], it is suggested that reductions in GHG emissions with corn derived ethanol (*vs. gasoline*) may be closer to 3% [*vs. 42% estimated by ANL*][7].

It should be noted that current corn-derived fuel ethanol lifecycle GHG emissions, as reported by the ANL, exclude effects from alternative farming practices[8]. Furthermore, *Lark, et al*. build upon data from the ANL in their analysis and subsequently, alternative farming practices may not be considered in their analysis[7]. Consequently – along with additional measures which may be taken throughout ethanol feedstock and fuel production – innovation in farming practices may present a significant opportunity to further reduce GHG emissions throughout ethanol's lifecycle.

No till farming practices can significantly reduce Global Warming Potential in comparison to conventional tilling practices[28]. Under conventional tilling practices, a 26-32% increase in Global Warming Potential, compared to no-till, has been recorded[28]. Further measures may also be taken to reduce net greenhouse gas emissions below zero[1,8]. Notable reductions may be achieved with use of renewable heating in fermentation and distillation, carbon capture and storage (*in fermentation*), and the planting of cover crops – which, together, can reduce net GHG emissions to near or below zero[1,8].

ALTERNATIVE PRODUCTION POTENTIAL & ASSOCIATED BENEFITS

A variation of feedstocks and ethanol production methods might be utilized to also decrease environmental impacts encountered with current production[1,8]. Furthermore, potential exists for substantial external benefits – which may be paired with ethanol production.

Solar heat that would otherwise increase ocean temperatures may be absorbed by marine algae farms (*with solar energy being converted to algae carbohydrates*) – to provide a cooling effect in coastal waters[1]. Algae grown in this manner may then be used to not only generate fuel ethanol, but to produce natural wide-spectrum fertilizer and methane gas[1]. Fertilizer produced in this manner could eliminate much of the chemical fertilizers used in the nation's agriculture – fertilizers that may release toxic, or even radioactive, chemicals during production[1]. The American Gas Association has estimated that approximately 23 quadrillion Btu of methane [*the primary component of natural gas*] may be generated from algae off the California coast alone[1]. If ethanol was produced prior to methane, approximately 90 billion gallons of fuel could be captured annually – which would amount to nearly all motor fuel used in 2019 by light duty, short wheelbase vehicles in the U.S. – from only one of the nation's coastlines[1,29].

Cattails not only rapidly produce starches which may be converted to ethanol, they also serve as powerful water filters[1]. It is estimated that 35 acres of cattails can treat 5 million gallons of secondary sewage daily[1]. Each acre of cattails could also be utilized to produce approximately 2500 gallons of ethanol per crop cycle – with warmer climates likely producing 2-3 crop cycles annually[1]. In comparison, corn yields from 200 to 400 gallons of ethanol per acre[1].

Additional potential exists to pair external benefits with ethanol production. A byproduct in corn ethanol production, *distiller's dried grains with solubles* (DDGS) is a far superior cattle feed to corn itself[1]. With $^{1}/_{3}$ the weight of DDGS given to cattle versus corn, approximately 15% greater meat production is seen with time reductions of up to 30%[1]. Along with improvements in engine efficiency and longevity (*during use*), ethanol might be paired with ocean cooling, natural fertilizer production, water filtration, & carbon sequestration (*during production*)[1].

The Company is committed to enabling continuous improvement in ethanol production – to obtain the greatest possible benefits. **With increased transparency and consumer choice in fuel sourcing, associated benefits obtainable throughout fuel ethanol production and use are nearly boundless.**

E100 MARKET COMPONENTS

As momentum for sustainable transportation grows, the opportunity exists to utilize much of today's current infrastructure. The United States is the world's leading producer of fuel ethanol with the potential to produce much more[1,3,6]. Most fuel storage tanks deployed today are compatible with ethanol blends up to E100 (*though if currently used for petroleum blends, cleaning would be required prior to E100 use to avoid the absorption of contaminants left behind from petroleum storage*)[30]. Many vehicle manufacturers also currently produce vehicles designed to utilize 100% ethanol – with over a dozen manufacturers offering E100 compatible vehicles for sale in Brazil[9-21]. Many of the vehicles on the road today may also be modified for E100 use[1,3,26]. Moreover, there are over 100,000 retail fueling locations across the U.S. intent on serving the fueling needs of the public[31].

Widespread 100% renewable fueling is within reach in the United States. Consumers can benefit from affordable and durable vehicles using 100% renewable, 100% domestic, convenient fuels. Vehicle manufacturers may redirect current production capabilities to offer E100 certified vehicles for sale. Ethanol producers can promote long-term demand. Retailers may benefit from the rapid fueling possible with liquid fuels, while catering to consumers seeking "zero emissions" and leveraging current business best practices. Numerous other associated benefits may be realized. Components necessary for broad E100 fueling exist today.

MARKET DYNAMICS AND SIZE

According to National Transportation Statistics, in 2019, of nearly 200 million registered light duty, short wheelbase vehicles in the U.S., over 2.25 trillion miles were travelled, with a consumption of over 93 billion gallons of fuel [*approximate average: 24.1 mpg*][29]. In the same year, of over 59 million registered light duty, long wheelbase vehicles, over 669 billion miles were travelled, with a consumption of over 38 billion gallons of fuel [*reported as 17.6 mpg*][29]. Additionally, approximately 14 million commercial vehicles (*trucks & buses*) travelled 318 billion miles and consumed over 48 billion gallons of fuel in the same period [*averaging 6.6* mpg][29].

Approximately 80% of all automotive fuel purchased in the U.S. is sold by convenience stores with gas stations – of which there are over 115,000 locations[32,33]. These stores average over 1,000 customers per day [*over 400,000 annually*][34]. *Fuel sales equate to approximately 60% of total revenue for gas stations with convenience stores, though only about* $^1/_3$ *of all profit is derived from fuel sales*[33]. In 2021, the average gross margin on gasoline sold was $0.309/gallon, or approximately 10%[32]. Over five years, the gross margin on fuel sales at convenience stores averaged nearly 11%[32].

Making up nearly $^2/_3$ of convenience store with gas station profits – from approximately 40% of revenue – non-fuel sales are vital to the profitability of the industry[33]. In addition to gas price and foodservice quality, the speed at which a customer may enter and leave a convenience store has been ranked, by customers, as the top priority[35]. A point of pride in the industry, the average time for a customer to enter and leave a store, while making a purchase, is under 4 minutes[34]. The percentage of customers entering a convenience store, when purchasing fuel, rose to above 50% in 2020[35]. In the same year, only 6% of people who entered a convenience store left without any purchase[35]. While fuel sales may not directly account for most of the profit in convenience stores with gas stations, an important role is played in driving more profitable (*non-fuel*) merchandise sales.

A general presumption is that fuel retailers are threatened with reduced fuel demand from electric vehicle adoptions[35]. Bloomberg New Energy Finance, in its

Economic Transition Scenario, anticipates that electric vehicles will account for 75% of market share in new passenger vehicle sales across the U.S. in 2040[36]. Over half [*54%*] of current drivers queried; however, do not have the ability to charge an electric vehicle at either their house or their workplace[35]. While some convenience stores with gas stations have begun to add electric vehicle chargers – in anticipation of EV charging demand – the question of speed and convenience may still arise. Level 3 EV charging [*440V*] requires approximately 20 minutes to extend vehicle ranges approximately 50 miles[37]. *Tesla also offers a network of chargers which might be utilized to extend vehicle ranges 200 miles in approximately 15 minutes*[37]. In either case, against a metric of 4 minutes, additional consumer patience is required; along with, perhaps, diminished customer flows from a retailer's perspective.

Current ethanol production capacity in the U.S. is 17.468 billion gallons annually[38]. If this entire capacity were sold as E100 fuel [*instead of in an E10 or E85 fuel mix*], and if sellers were to obtain the same (*fuel*) gross sales margin as in 2021 [*$0.309/gallon*], the aggregate E100 market (*in potential gross profit margin*) in the United States would exceed $5 billion annually. If only 5% of the ethanol production capacity were sold as E100, at the same gross margin, the aggregate market size (*in potential gross profit margin*) would exceed $269 million annually.

In terms of the overall market for fuel sales at gas stations with convenience stores; assuming 80% of all fuel consumed by light-duty vehicles is sold at gas stations with convenience stores, with fuel consumption consistent with 2019 and gross sales margins consistent with 2021, the (*potential gross profit margin*) aggregate market size exceeds $32 billion annually. Under the same assumptions, the annual (*potential gross profit margin*) market for fuel sales to commercial vehicles nears $12 billion.

BUSINESS PROPOSAL

REVENUE MODEL

In coordination with current fuel retailers, LRFS will acquire (*E100*) designated fueling equipment to obtain profit through the retail selling of E100 motor fuel. Fuel sourcing data and brand loyalty will also be sought, through which premium revenue potential might be garnered.

FUNDING

The Company intends to secure funding through a series of capital raises. Cash will be sought in exchange for Company equity, which then may be used to acquire ownership in E100 designated fueling equipment, market E100 fuel, and support fuel supply coordination efforts.

ASSET ACQUISITION

LRFS will offer current fuel retailers cash and/or revenue sharing in exchange for the installation and/or designation of suitable E100 fuel storage and dispensing equipment on retail fueling lots. Offers will be contingent upon the Company's ability to collect revenue at the retail sale of E100 fuel from designated equipment.

FUEL SUPPLY

Liquid Renewable Fueling Systems, Inc. offers ethanol producers an avenue for potential long term market growth. In offering E100 fuel for sale (*as opposed to ethanol intended for gasoline blends*), ethanol producers may bolster long term demand for their product. Demand for E100 ethanol would be independent of gasoline use and mixture restrictions. E100 sales will also offer an alternative for consumers seeking "zero emission" transportation. The Company will coordinate with ethanol producers to ensure a supply of E100 fuel for sale at retail fueling locations.

<u>TIERED PRICING MODEL</u>

INTEGRATING FUEL SUPPLY TRANPARENCY & CONTINUOUS IMPROVEMENT

With the Company's fuel purchase program, consumers are empowered to solicit increased transparency and continuous improvement throughout the E100 supply chain. A consumer may wish to reward producers for increased transparency or for improved performance (*in terms of limiting environmental impacts and increasing associated benefits*) during feedstock and fuel production. Multiple pricing tiers will be employed to offer market-based incentives to ethanol feedstock and fuel producers for increased transparency and performance improvement.

Four pricing tiers are to be utilized. Consumers may pay a base price for E100 sourced from traditional production with no added transparency in resource utilization or production methodology. A second tier will offer a premium to any ethanol feedstock or fuel producer providing the Company with production data – including resource utilization and/or production methodology. This data will be made available to consumers at the point of sale and will also be used to analyze environmental impacts and any associated benefits in fuel production. Third and fourth pricing tiers will incentivize ethanol feedstock and fuel producers to follow best practices in reducing environmental impacts and increasing associated benefits – with payment premiums for top 50% and top 10% performers.

Through an accumulation of resource input and production methodology data, LRFS will analyze the carbon [*equivalent*] intensities and associated effects from ethanol fuel supply. Information will be collected, and best performers determined annually. **By rewarding – in cash payments – feedstock and fuel producers who offer increased transparency along with top performers, continuous improvement in E100 supply may be instilled.** <u>Continuous improvements in E100 supply will empower a full pursuit of carbon negative, energy positive fueling</u>.

SUPPLEMENTAL CARBON SEQUESTRATION AND CORPORATE GIVING

To further pursue ***carbon negative***, energy positive fueling, the Company is committed to designate a portion of proceeds achieved from the coordination of E100 fuel supply and sales to the conservation of both lands and oceans (*or alternative forms of carbon offsets*). Biomasses on natural lands and in oceans serve as critical carbon sinks for our planet. We pledge to provide **5%** of all net profits to either non-profit organizations working to safeguard these ecosystems or in the direct purchase of carbon offset credits.

COMMENTS ON INTELLECTUAL PROPERTY

Proprietary methods will be used for the ranking of ethanol feedstock and fuel producer performances. In contrast, the production of E100 fuel and motor vehicle manufacturing (or conversions)—for E100 utilization, might be performed by any number of parties.

Fermentation has been used for centuries as a process to create ethyl alcohol (*ethanol*). Distillation of fermented alcohol is also a well-established practice. As such, numerous fuel ethanol producers may enter the market.

Internal combustion engines have been used for over a century, with many different advances over the years. In the post-prohibition era, the oil crisis of the 1970's spurred a period of additional research and development for engine technologies with focuses on alcohol and other alternative fuels[1,3]. Once oil prices dropped (*post crisis*); however, gasoline and diesel regained focus in engine design and fuel sales across the United States. (*Brazil; however, developed a broader and long-lasting market for E100 fuels and vehicles – still current, though subject to numerous other factors over the years*)

Consequently, much knowledge and technology regarding the production and utilization of E100 fuel exists today. Though not presently a broad focus in the United States, numerous enterprises may leverage this available expertise. As E100 fueling availability is broadened, the Company expects multiple parties to subsequently enter the E100 market – further enhancing benefits available to consumers and beyond.

CONCLUSION

Much of the world currently relies on energy dense liquid fuels. As the urgency increases to reduce global emissions, a viable renewable alternative is needed to supplant current fuel supplies. Liquid Renewable Fueling Systems, Inc. is investing in a network of renewable fueling infrastructure and will empower consumers to solicit continuous improvement in renewable fuel supplies. Through these efforts, we aim to expand the reach and associated benefits of 100% renewable, energy dense, liquid fueling.

Multiple parties may directly benefit from an expansion of 100% renewable, liquid fuel use. Ethanol producers may bolster long term demand. Convenience stores with gas stations may cater to consumers seeking “zero emission” travel, while leveraging current business practices – thus defending current profits in a world of increasing uncertainty. Consumers can benefit from increased fuel efficiency and extended vehicle longevity. Carbon may be sequestered, oceans may be cooled, water may be filtered, and chemical fertilizer dependence may be reduced all in conjunction with fuel ethanol production.

Liquid Renewable Fueling Systems, Inc. is investing in a sustainable future. We are working towards a realization of “fuel, evolved.” ***We extend an open invitation to join this pursuit towards carbon negative, energy positive fueling.***

DISCLAIMERS

Statements made herein are true to the best knowledge of the Company and employees; however, certain statements within this document may be construed and should be taken as “matters of opinion.” Certain statements are also made in a forward-looking manner and shall not constitute any guarantees. Any actions taken with any respect to automotive fueling (*E100 or otherwise*), fuel manufacturing, and vehicle manufacture or modification should be performed in accordance with all local and federal guidelines and with respect to proper safety protocols. The Company does not accept any responsibility for actions performed by others.

APPENDIX A: Potential Ethanol Feedstocks

Alcohol Yield Potential (*199+ proof*) per Feedstock/Acre[1]

FEEDSTOCK	**NOTES**	**YIELD (*gallons*)**
Cattails	*single annual crop, managed, starch only*	2500
Cassava	*annual yield*	1662-2045
Cattails	*wild, approximate, annual yield*	1075
Fodder Beets	*annual yield*	940
Sugar Cane	*22-month yield*	900
Buffalo Gourd	*annual yield*	900
Nipa Palms	*wild, annual yield*	650
Jerusalem Artichokes	*annual yield*	550-750
Sugar Cane	*annual yield*	555
Prickly Pear	*cultivated, annual yield*	500-900
Sorghum Cane	*annual yield*	500-1000
Comfrey	*roots and foliage, sugar only, annual yield*	500
Pimelons	*managed, annual yield*	450
Sugar Beets	*annual yield*	400-770
Mesquite	*managed, annual yield*	341
Potatoes	*starch only, annual yield*	299-447
Corn	*annual yield*	214-392
Prickly Pear	*managed wild, annual yield*	200-500
Sweet Potatoes	*annual yield*	190-255
Rice	*rough, annual yield*	175-230
Lucerne	*annual yield*	145
Apples	*annual yield*	140
Dates	*dry, annual yield*	126
Grain Sorghum	*annual yield*	125-256
Carrots	*annual yield*	121
Yams	*annual yield*	94
Grapes	*annual yield*	91
Peaches	*annual yield*	84
Barley	*annual yield*	83-133
Wheat	*annual yield*	79
Pineapples	*annual yield*	78
Oats	*annual yield*	57
Rye	*annual yield*	54
Pears	*annual yield*	49
Apricots	*annual yield*	41
Buckwheat	*annual yield*	34

Alcohol Yield Potential (*199+ proof*) per Feedstock/Ton[1]

FEEDSTOCK	**NOTES**	**YIELD (*gallons*)**
Wheat		85.0
Corn		84.0
Buckwheat		83.4
Grain Sorghum		79.5
Rice	*rough*	79.5
Barley		79.2
Dates	*dry*	79.0
Rye		78.8
Mesquite		76.0
Molasses	*blackstrap*	70.4
Sorghum Cane		70.4
Oats		63.6
Lichens	*reindeer moss*	60.0
Marine Algae	*dry*	55.0
Cassava		48.0
Manure	*dairy cattle*	40.0
Sweet Potatoes		34.2
Buffalo Gourds		32.0
Yams		27.3
Chili Peppers		27.2
Jerusalem Artichokes		27.0
Fodder Beets		27.0
Onions		24.2
Prickly Pear		24.0
Garlic		23.1
Cattails	*starch only*	23.0
Potatoes		22.9
Sugar Beets		22.1
Lucerne	*dry weight*	21.1
Oranges	*whole*	21.0
Sugarcane		15.2
Grapes		15.1
Apples		14.4
Apricots		13.6
Pears		11.5
Peaches		11.5
Marine Algae	*wet*	6.0

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