CRUDE OIL FROM ALGAE: THE TIME IS NOW

Positive Impact On Economics, Energy Security, and Planetary Health

EXECUTIVE SUMMARY

Accelerated demand for electricity and liquid fuels for aviation and marine transit coupled with shortfalls in electrical energy production pose significant risks for increased economic development, especially with regard to the U.S. mandate to fast-track data center buildout. The development of algae bio-farms can play a significant role in providing crude algal oil to power biodiesel generators for electricity as well as blended to meet increasing demand for sustainable aviation fuel and sustainable marine fuel, all at greater levels of economic and CO_2 digestion efficiency than solar or wind, while improving energy, financial, and military security for the U.S.

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ENERGY: THE NEED & OPPORTUNITY

It is clearly understood that energy underscores every aspect of economic development everywhere on the planet.

Without sufficient supply and distribution of energy, as both liquid fuels for consumer and commercial ground, air, and water transportation, as well as electricity to meet residential, commercial, and industrial demand, economic development can be severely compromised.

Natural Gas For Electricity

At levelized cost of energy pricing ranging from about 3.6 to about 4.4 cents per kWh nationwide, natural gas plays a pivotal role in the U.S. electricity generation landscape.[1] Diesel is predominantly used in transportation, its role in electricity generation is minimal.

The U.S. Energy Information Administration (EIA) forecasts that the electric power sector in the U.S. will consume over 36 billion cubic feet per day (Bcf/d) of natural gas on average in 2025 and 2026, marking a 2% and 1% increase, respectively, from previous estimates.[2]

This uptick is largely driven by the escalating energy demands of data centers, especially those supporting artificial intelligence (AI) applications. Projections indicate that data centers could account for 9% of U.S. electricity consumption by 2030, leading to an additional natural gas demand of over 3 Bcf/d by the decade's end.[3]

The anticipated surge in electricity demand, driven by sectors like data centers, poses challenges for the U.S. power grid. The Federal Energy Regulatory Commission (FERC) emphasized the necessity of expanding natural gas-fired power plants and pipeline infrastructure to meet this rising demand.

The FERC also noted that while alternative energy sources such as small-scale modular nuclear power are considered, they face challenges such as lengthy construction times[4], high CAPEX and OPEX, and at costs projected to range from 5.8 cents per kWh to 18+ cents per kWh, significantly higher than natural gas.[5] Further, effective long-term containment of enriched uranium remains a potent challenge.[6]

Despite accelerating demand, electricity infrastructure development has not kept pace with production growth, leading to significant delays and cost increases in many projects throughout the U.S. This lag has contributed to a 35% rise in electricity costs over the past four years.[7]

Liquid Fuels For Ground Transit

The U.S. continues to exhibit substantial demand for liquid fuels, with gasoline and diesel being primary contributors. While specific projections for 2025-2030 are limited, the EIA's Short-Term Energy Outlook provides insights into current consumption patterns, which can serve as a baseline for future estimates.[8]

Liquid Fuels For Air & Marine Transit

The global aviation sector is poised for growth, with jet fuel demand projected to rise. According to Commodity Insights, global jet fuel and kerosene demand is forecasted to reach 8 million barrels per day (b/d) during the summer of 2025, returning to pre-pandemic levels. The annual average demand is expected to continue growing, with an increase of approximately 550,000 b/d in 2024 and a further 250,000 b/d in 2025, primarily driven by Western Europe and China.[9]

[1] https://www.chooseenergy.com/data-center/natural-gas-rates-by-state
[2] https://www.eia.gov/outlooks/steo/
[3] https://www2.deloitte.com/us/en/insights/industry/oil-and-gas/oil-and-gas-industry-outlook.html
[4] https://www.reuters.com/business/energy/ceraweek-natgas-key-meeting-rising-us-power-demand-ferc-chairman-says-2025-03-13/
[5] https:/world-nuclear.org/information-library/nuclear-fuel-cycle/nuclear-power-reactors/small-nuclear-power-reactors?
[6] https://www.iaea.org/newscenter/news/what-are-small-modular-reactors-smrs?
[7] https://www.reuters.com/business/energy/ceraweek-ai-lng-demand-keep-us-natgas-use-record-highs-bottlenecks-threaten-2025-03-12/?
[8] https://www.eia.gov/outlooks/steo/pdf/steo_full.pdf?
[9] https://cilive.com/commodities/agriculture/news-and-insight/080724-infographic-jet-fuel-demand-soars-saf-flight-summer-travel-aviation-pandemic-kerosene-cargo-decarbonization?

A report by GlobeNewswire projects that the aviation fuel market will grow from USD 200.21 billion in 2024 to USD 325.98 billion by 2030, at a compound annual growth rate (CAGR) of 8.5%. In terms of volume, this corresponds to an increase from 86.20 billion gallons in 2024 to 132.80 billion gallons by 2030, reflecting a CAGR of 7.5%.[10] The U.S. jet fuel market in early 2025 is expected to continue the pattern set over the final months of 2024.[11]

The maritime industry is experiencing a surge in biofuel demand. The global biofuel feedstock race is intensifying, driven by the aviation and maritime sectors, with Sustainable Aviation Fuel (SAF) demand anticipated to reach nearly 9 billion liters by 2030, constituting about 2% of global jet fuel demand.[12]

Bio-Diesel For Sustainable Aviation Fuel & Sustainable Marine Fuel

U.S. biodiesel consumption is projected to average 100,000 barrels per day in 2025 and 2026, consistent with previous forecasts.[13]

The SAF segment is expected to experience the highest market share growth between 2024 and 2030. The U.S. is set to capitalize on this rising demand, with biofuel production anticipated to increase by about 53% by the mid-2030s, reaching approximately 1.3 million barrels of oil equivalent per day.[14] The financial value of the U.S. SAF market is estimated to be $570B, growing at an estimated 57% annually.

A report by Kearney and the World Economic Forum estimates that global SAF demand could reach 17.1 million tons per annum (Mt/a) by 2030. This projection is based on mandates and targets set by various countries aiming to reduce the carbon footprint of the aviation industry.[15]

The maritime industry's shift towards sustainability is driving demand for biofuels, including Sustainable Marine Fuel (SMF). While specific projections for SMF are limited, the overall increase in biofuel production suggests a positive upward trend.[16]

In response to ever growing awareness regarding the relationship between climate change and burning of fossil fuels, the world, via the 2016 Paris Climate Agreement and COP 26, made a commitment to increase biofuel usage to 10% globally in SAF and MSF by 2030.

Currently, SAF comprises approximately 0.1% of aviation fuel usage. Many airlines have set individual targets to increase SAF usage to 10% by 2030, aligning with industry-wide goals to achieve net-zero emissions by 2050.[17]

In December 2024, the EU restricted SAF to not be created from vegetable oils such as palm oil and soy oil, each of which contribute either to deforestation in rainforest and subtropical regions or utilize agricultural land thereby displacing land needed for food crops.[18,19]

All of these metrics portend significant business opportunity if financially credible alternatives can be found with near or equivalent levels of energy density as natural gas and petroleum without contributing to accelerated greenhouse gas emissions.

[10] https://www.iea.org/energy-system/transport/aviation?
[11] https://www.opisnet.com/blog/2025-likely-to-bring-lower-jet-fuel-prices-higher-demand/
[12] https://www.spglobal.com/commodity-insights/en/news-research/latest-news/agriculture/100924-aviation-maritime-demand-to-rev-up-global-biofuel-feedstock-race-by-2030?
[13] https://biodieselmagazine.com/articles/eia-maintains-2025-2026-forecasts-for-biodiesel-renewable-diesel-and-saf-production?
[14] https://www.rystadenergy.com/news/booming-biofuels-us-diesel-sustainable-aviation-fuel?
[15] https://www.consulting.us/news/11523/sustainable-aviation-fuel-demand-projected-to-soar-by-2030?
[16] https://www.spglobal.com/commodity-insights/en/news-research/latest-news/agriculture/100924-aviation-maritime-demand-to-rev-up-global-biofuel-feedstock-race-by-2030?
[17] https://www.weforum.org/stories/2023/12/airlines-sustainable-aviation-fuel-carbon-targets/
[18] https://www.palmoilmagazine.com/bioavtur/2024/04/13/european-unions-intensified-saf-regulation-excludes-palm-oil-and-soyoil/
[19] https://apps.fas.usda.gov/newgainapi/api/Report/DownloadReportByFileName?fileName=Biofuel+Mandates+in+the+EU+by+Member+State+-+2023_Berlin_European+Union_E42023-0023&utm_

THE SOLUTION: INNOVO CRUDE ALGAL OIL

Algae is nearly as old as the earth.

Roughly 2.4 billion years ago, blue-green algae began producing oxygen through photosynthesis, transforming the earth's atmosphere into the oxygen rich and life sustaining air we breathe today.

Algae is an essential building block for all life.

Algae in the oceans convert vast amounts of CO_2 to produce half of the oxygen that we all breathe. Like terrestrial plants, algae use photosynthesis and ambient CO_2 to grow.

The exact number of algae species is unknown. Estimates range to a million or more, including large algae such as kelp as well as micro-algae, whereas only an estimated 50,000 to 80,000 are considered appropriate for commercial cultivation.

Certain micro-algae species are better for the production of food and related products, while other species produce a higher ratio of algal oil than algae biomass.

There is a good chance you have consumed algae either as a food supplement, super food, nutraceutical, cosmetic, weight loss product, pharmaceutical, food colorant, or indirectly as a supplement for animal foods or fish food.

Commercial production of algae for nutraceutical and related products have been done at small scale for the better part of 50 years in both fresh water and saline environments.

While it has been widely acknowledged that algal oil is a product of commercial algae production, the market feasibility to produce algal oil at industrial scale has been limited by small scale production and harvesting processes that do not readily permit industrial scale farms to be economically viable.

That is, until now.

What Is INNOVO Crude Algal Oil?

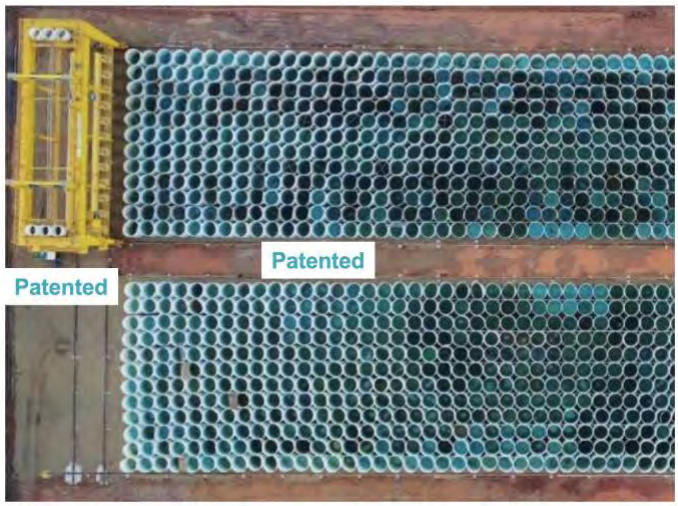
INNOVO crude algal oil (CAO) is one product derived from the commercial production of algae.

INNOVO CAO has roughly 75-80% the energy density and characteristics as Saudi Sweet Crude oil making it ideal as a transitional fuel to help support global goals to reduce greenhouse gas emissions and to support U.S. energy independence and sustained economic development.

INNOVO crude algal oil has an energy density of approximately 34.4 MJ/kg compared with that of Saudi Sweet Crude which ranges between 42 and 47 MJ/kg.[20]

INNOVO CAO can be refined as a neat bio-diesel onsite at the bio-farm and used directly in bio-diesel generators to create clean electricity.

INNOVO crude algal oil can be refined and blended to make Sustainable Aviation Fuel (SAF) or Sustainable Marine Fuel (SMF), much like ethanol, a corn-based biofuel, is blended with gasoline.



INNOVO CAO is price competitive with natural gas per kWh for electrical production at the levelized cost of energy. INNOVO crude algal oil is also price competitive with Saudi Sweet Crude (variable

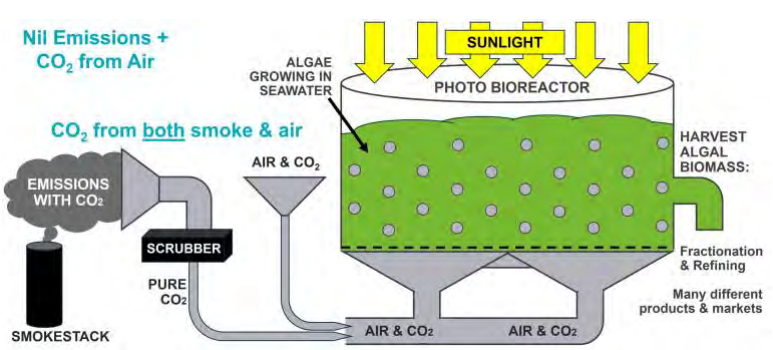
[20] https://www.sciencedirect.com/science/article/pii/S1978301917300190?utm_

dependencies on market pricing) and price competitive with other biofuels such as those from corn ethanol or cellulose as a source for SAF and MSF.

Equally important, INNOVO crude algal oil can be created in controlled commercial conditions using marginal arid/low humidity land not suitable for agriculture thus ensuring the integrity of food crops on arable land while not contributing to rainforest or subtropical deforestation for palm oil production.

How Is INNOVO Crude Algal Oil Made?

Industrial scale production of algal oil was first demonstrated by INNOVO's technology partner in SE Asia with a commercial scale bio-farm composed of 2,000 photo-bioreactor tanks. This bio-farm has been commercially operational since late 2019.

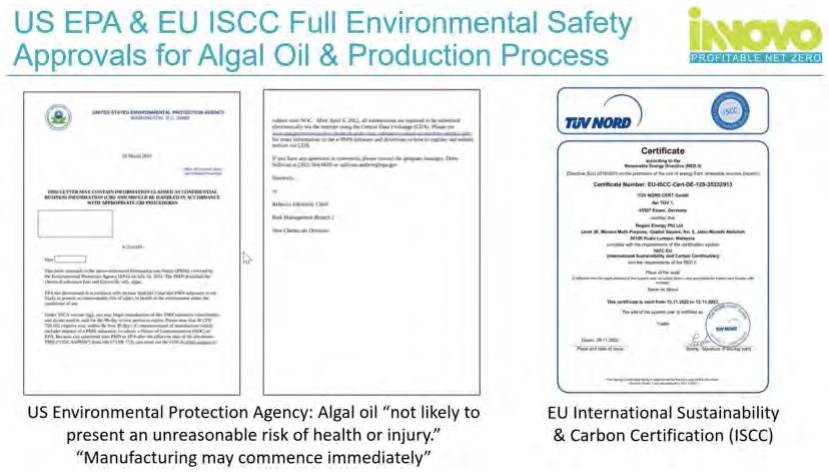


Each photo-bioreactor tank is filled with seawater (or salt brine infused water), a specific species of algae is added as a "starter" and the natural process of photosynthesis takes over including the uptake of atmospheric CO_2. The algae take roughly 24 hours to reach maturity before harvesting by an overhead crane (similar to that found at a port for cargo container loading). This crane also delivers nutrients as needed to enhance algae growth. The tanks and overhead crane are USPTO patented technology while the algae species, much like the Coca Cola recipe, is a trade secret.

Once harvested, water and oil are separated from the algae biomass. The algal oil is then processed onsite as a neat fuel for use in a bio-diesel genset or shipped to a traditional oil and gas refinery for blending into SAF or MSF.

This SE Asian facility is operational, consistently producing CAO at international specification. This CAO has been tested by US EPA and EU ISSEC (International Sustainable Carbon Certification) for safety and meets all standards as a biofuel for use in biodiesel generators as well as for SAF and MSF.

INNOVO Net Zero has taken this original 2,000 photo-bioreactor tank commercial grade bio-farm and redefined it to industrial scale. The INNOVO standard bio-farm size is 250 acres and 120,000 photo-bioreactor tanks and can be scaled up or down to meet land availability.



US Environmental Protection Agency: Algal oil "not likely to present an unreasonable risk of health or injury." "Manufacturing may commence immediately"

EU International Sustainability & Carbon Certification (ISCC)

A 250 acre algae bio-farm produces an estimated 368,000 metric tons of bio mass per year (~1472 metric tons/acre/year), divided roughly 55/45 algal oil/algae cake by weight. This equates to roughly 58 million gallons (~1.4 million barrels or ~202,000 metric tons) of CAO that can be sold directly as neat bio-diesel or refined and blended to supply the SAF or MSF market.

At the same time, a 250 acre bio-farm digests an estimated 600,000 metric tons of CO_2 per year (~2,648 tons/acre of CO_2 annually) compared with 250 acres of trees at ~2000 metric tons of CO_2 per year (~0.8 metric tons/acre of CO_2 annually).

Each algae bio-farm is a generator for local economic development by providing hundreds of living wage, managerial, and IT related jobs.

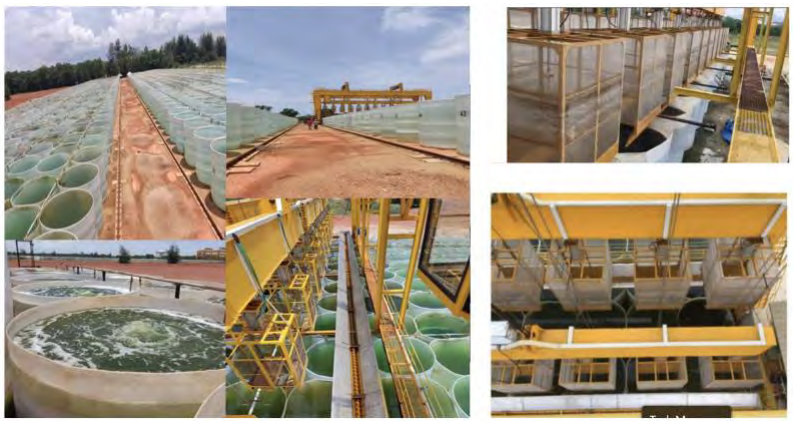
Who Is INNOVO?

INNOVO Net Zero is a climate tech solutions integrator whose mission is to profitably reduce greenhouse gas emissions by 2030 and assist the world in meeting the goals of the Paris Climate Accords and COP26.

Global greenhouse gas emissions were the highest ever in 2023 at a record 59 billion tons. McKinsey estimates that achieving net zero emissions by 2025 would require $9.2 Trillion annually.[21]

In 2013, the Algae Biomass Organization cited a peer reviewed study in Bioresource Technology that algae-derived biofuels can reduce lifecycle CO_2 emission by 50% to 70% compared to petroleum fuels.[22]

McKinsey also highlighted the cost of achieving net zero for heavy industries such as steel, chemicals, cement, paper, fossil fuels, and more, to be $4.4 trillion.[23] INNOVO algae bio-farms can use the CO_2 offtake from heavy emitters as a nutrient input to the algae farms helping to increase yields and shorten algae growth cycles. In effect, INNOVO algae bio-farms act as natural biological CO_2 scrubbers helping the emitter avoid the costs of paying fines or penalties to continue to emit, avoid much of the cost for industrial scrubbers, and avoid the costs of purchasing carbon credits.



INNOVO has an ongoing research agreement with The Center For Subtropical Algaculture, a consortium of 15 research universities in Australia that includes the Pacific Northwest National Laboratory in Seattle, WA. The research is focused on defining the best algae species for commercialization along with growth performance optimization.

In conjunction with our technology partner, INNOVO is in process of financing, building, and operating a large number of algae bio-farms in the U.S., Australia and other locations worldwide. U.S. based algae bio-farms are eligible for IRS approved Investment Tax Credits (ITC) and/or Production Tax Credits (PTC) for renewable fuels under the Inflation Reduction Act, as well as ITC for Made In America and ITC for Energy Community. Other potential tax credits may be identified on a location or project specific basis.

[21] https://www.mckinsey.com/capabilities/sustainability/our-insights/the-net-zero-transition-what-it-would-cost-what-it-could-bring
[22] https://algaebiomass.org/press/6762/algae-biofuel-can-cut-co2-emissions-up-to-68-compared-to-petroleum-fuels-finds-new-peer-reviewed-study-2/?utm_
[23] https://www.mckinsey.com/capabilities/sustainability/our-insights/Spotting-green-business-opportunities-in-a-surging-net-zero-world

VALUE PROPOSITION

INNOVO algae bio-farms create extraordinary financial upside value for our equity investors, steady and predictable returns for our debt providers, and significant direct and economic multiplier effects for local communities, all while helping the U.S. meet its energy security needs quickly and without negative impacts to the environment.

Some direct benefits include:

- **Expanding Market** – Global demand for SAF and MSF is steadily increasing and will accelerate the closer we get to 2030 to meet industry and governmental goals.
- **Rapid Time to Market** – A 250 acre algae bio-farms starts producing algal oil roughly 10-11 months after construction commences and is in full production by month 18.
- **Quick Time to ROI** – A 250 acre algae bio-farm breaks even in less than 4 years.
- **Three Liquid Fuel Products –** Onsite production creates neat fuel for bio-diesel generators or can be blended by an oil and gas refinery to make SAF or MSF.
- **Fast Agro-Industrial Growth Process –** Rapid 24 hour growth cycle ensures continuous staggered harvest.
- **Easily Scalable** – Modular photo-bioreactor construction enables each algae bio-farm to be easily scaled with photo-bioreactor tanks being constructed onsite.
- **Low Production Risk** – Simple production process combined with individual photo-bioreactor tanks reduces production and economic risk.
- **Oil & Gas EPC** – INNOVO is engaging with the top ten U.S. oil and gas EPC firms (Engineering, Procurement and Construction) for site design, build and operations to ensure construction, budget, and process integrity for each algae bio-farm.
- **Environmentally Sustainable** – No water or air pollution; all production processes are circular.
- **Local Economic Development** – Each 250 acre bio-farm creates roughly 700 jobs.
- **Effective Land Use –** Best built on marginal arid/low humidity land that is not suitable for agriculture or cattle, thereby adding non-productive land to tax rolls.
- **Accelerated Time To Energy Security** – Each 250 acre bio-farm produces roughly 58 million gallons / 1.4 Million barrels of CAO annually. At scale, with hundreds of algae bio-farms, INNOVO will significantly contribute to the energy and financial security of the U.S.

CONCLUSION

INNOVO algae bio-farms are the right liquid fuels answer to low carbon electricity production and low carbon jet and marine fuels. As commercial, industrial and residential demand for clean electricity exceeds current production capabilities in the U.S., INNOVO CAO can help meet this demand more quickly and more economically than comparable ethanol and cellulose biofuel options. As the commercial marine shipping and cruise markets demand sustainable fuels and the global aviation industry equally demands sustainable fuels to maintain market competitiveness, INNOVO CAO can play a significant role in meeting this demand. As the U.S. moves aggressively into its role as a net energy exporter and asserts its market advantage in AI and other rapid advances in information technology in part through greatly accelerated data center development, INNOVO CAO can play a mission- and business-critical role in helping the U.S. meet domestic and global demand, profitably, all while significantly reducing CO_2 emissions.

FOR MORE INFORMATION

For an investor video presentation, please go to: https://innovo-net-zero.com/investors

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