

# ENERGY, OIL & GAS

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## Green gas goes global

THE LARGEST PRODUCER OF BIOGAS ENERGY IN THE WORLD, NATURE ENERGY, IS ON COURSE TO TRANSFER ITS EXPERTISE TO NEW LOCATIONS AS PART OF ITS INTERNATIONAL GROWTH JOURNEY



### Coal

The outlook for coal as countries try to make their electricity supplies more environmentally friendly

### Computing

Quantum technology represents a revolution, and BP is one company already looking to benefit from its power

- ◆ Exus appointed by Copenhagen Infrastructure Partners to manage Texas and Utah solar projects
- ◆ Wind turbines on the world's largest offshore wind farm protected by AkzoNobel coatings



# Fuels for the future

From residual wood waste to carbon negative renewable diesel, Strategic Biofuels details the pioneering process it's using to singlehandedly shake up the fuel industry

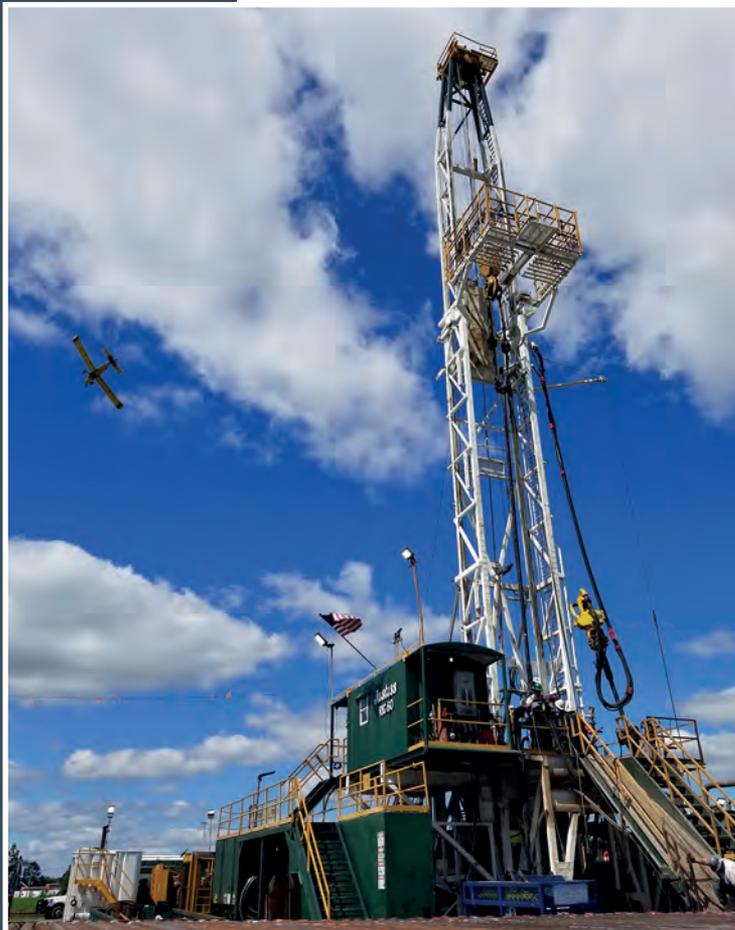
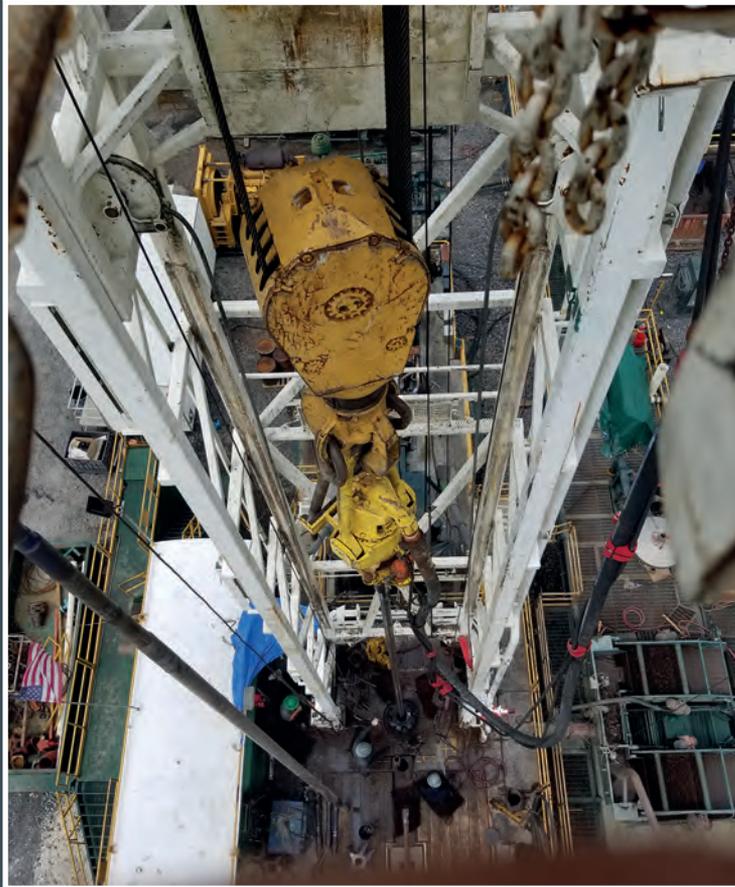
By developing a series of carbon negative and clean-burning renewable transportation fuels from responsibly managed and sustainable forest waste, Strategic Biofuels has undoubtedly become the leader of its industry niche. The company was founded in

the summer of 2020, making it a decidedly positive pandemic progeny, and has since brought together an expert team of highly experienced individuals with petrochemical, synthetic fuels, renewable fuels, and oil and gas backgrounds.



Though the pandemic proved to be an impediment to many companies, Strategic Biofuels is an impressive exception. The company continues to offer value to the environment and the communities where it works, reducing greenhouse gas emissions

by 400 percent (compared to fuel production from fossil fuel-derived sources). Such a staggering figure is attainable by doing two things: firstly, producing deeply negative carbon footprint drop-in fuels from non-food-based biomass materials so that the



fuel can be used at 100 percent (unlike biodiesel); secondly, utilizing carbon capture and sequestration technology to dramatically reduce CO<sub>2</sub> emissions by safely and securely storing the greenhouse gas deep underground.

These two processes also represent the fundamental tenets underpinning the new Louisiana Green Fuels Project (LGF), which is currently being constructed on a 300-acre site at the Port of Columbia in Caldwell Parish, Louisiana. By following these two core processes, as well as a host of other pioneering methods, the plant will achieve better than Net Zero emissions and remove more carbon from the environment than it produces. Proudly talking us through the landmark project, and the ground-breaking processes behind it, is Dr. Paul F. Schubert, CEO at Strategic Biofuels.

“In total, LGF will produce approximately 33 million gallons of renewable fuel each year,” he begins. “When broken down, that equates to about 87 percent renewable diesel and 13 percent renewable naphtha. This fuel will have the lowest carbon footprint of any liquid fuel; it represents almost a 400 percent reduction in greenhouse gas emissions when compared to its fossil fuel-production equivalents. Indeed, while the carbon intensity of our fuel has been scored by Life Cycle Associates at -294 gCO<sub>2</sub>e/MJ, fossil diesel is usually scored much higher, at around +100 gCO<sub>2</sub>e/MJ. In simpler terms, the carbon intensity of the renewable diesel we produce is extremely negative. In fact, it’s the lowest carbon intensity fuel in the world.”

Strategic Biofuels has secured more than \$42 million in funding for LGF thus far, including a \$15 million infrastructure improvement grant from the State of Louisiana to the Port, and will generate a total of 85.5 MW of biopower when fully operational. All of the power that LGF needs will be produced on-site through the conversion of a sawmill feedstock, which is garnered from waste generated by the lumber industry. This power will not only produce renewable fuels. It will also provide the amount of energy needed for carbon capture and the compression of the CO<sub>2</sub> for sequestration.

As Paul explains, carbon capture and sequestration are critical carbon mitigation methods, which, in turn, will be responsible for helping LGF achieve Net Zero status. “Strategic Biofuels has selected Louisiana as the location for its landmark project for several reasons, with one of them being the

fact that Louisiana has the necessary geology to facilitate sequestration: the process in which CO<sub>2</sub> produced alongside the making of renewable diesel is locked about a mile underground, where the same forces that have held oil and gas beneath the earth's surface for millions of years will trap the CO<sub>2</sub> forever.

“The sequestration is the dominant element creating the negative carbon intensity of LGF’s fuel,” he adds. “Louisiana has a visionary legislative and regulatory framework that supports carbon sequestration. This includes defining that the surface owner holds the right to inject CO<sub>2</sub> beneath their land under so called ‘pore rights.’ There is an eminent domain right for a sanctioned project to

acquire those pore rights from individuals, meaning that no owners can block the project. Furthermore, after the project ceases CO<sub>2</sub> injection and has validated that the locked-in greenhouse gas is secure, the state has created a fund to monitor and remediate the CO<sub>2</sub> storage – those funds will come from the initial operating revenues of the facility. We expect to sequester roughly 1.4 million tonnes of CO<sub>2</sub> per year.”

For Paul, the most important part of the project was completing the sequestration test well in the first half of 2021. The company recognized that the project’s economics all depended on this one test as it would demonstrate whether LFG’s geological

**CROSSBRIDGE ENERGY**

Crossbridge Energy is thrilled to partner with Strategic Biofuels as the asset manager to operate and maintain (O&M) the Louisiana Green Fuels project (LGF).

Crossbridge is bringing operating knowledge, organization, and standards to the project to assist in its development. Through our partnership with Becht, Crossbridge is applying decades of mega project production assurance experience to ensure all production risks have been adequately mitigated. The end goal is stable returns to LGF investors, by improving the day-zero operating readiness of the facility.



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foundations were, in fact, tenable. “The effort could’ve failed, and investors could’ve lost their money,” says Paul. “In our case, however, the sequestration test well was a complete success. The combination of our technology set and its use at scale is unprecedented. The technologies used in the plant are not new; they’re all well-established. However, it’s their new configuration, as applied at LGE, which makes them unique.

“We are using gasification and partial oxidation to produce syngas (CO plus hydrogen) from a solid, carbon containing feedstock,” he details. “This is followed by hydrocarbon synthesis via the Fischer-Tropsch process to make paraffinic wax and oil, which

are then hydrocracked using standard refinery technologies. These technologies have been utilized at a commercial scale with coal (a much more difficult feedstock) since at least the 1950s. At LGE, though, we make the process unique by combining carbon capture and sequestration techniques with a non-food-based biomass feedstock.”

Since we’ve covered the former, let’s now turn to the latter: the non-food-based biomass at the metaphorical heart of the industrial process. By utilizing pre-commercial thinnings – that is, excess trees taken from sustainable forestry plantations, which have been removed to allow the natural maturation of more dominant trees – Strategic Biofuels has

#### TRI

TRI’s advanced gasification system utilizes proprietary indirectly-heated, steam-reforming technology to process a wide spectrum of waste biomass to provide a utility grade syngas. The process is uniquely capable of absorbing variations in moisture, calorific content and contaminants while producing a uniform syngas, which is so important to downstream conversion to fuels, chemicals, hydrogen, etc. This flexibility enables the owner to take advantage of changes in the biomass market to lower its biomass procurement costs. TRI’s process is the key step to convert solid carbonaceous wastes to syngas, which is then conditioned and converted to products with existing commercially proven technologies.



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ensured that its fuel feedstock is sustainable on multiple fronts.

“First, it creates a new use for from forestry byproducts, improving economic returns in the timber industry,” explains Paul. “Second, since thinnings are non-food based and overly abundant, the feedstock doesn’t compete with food production and hence maintains food security. Unlike other crops, thinnings are produced all year. The amount of renewable fuel that can be produced per acre per year from thinnings is about 497 gallons, with a feedstock cost of about \$0.53 per gallon of renewable fuel. Whereas, in contrast, soybeans yield about 53 gallons per acre per year, with a feedstock cost of about \$6.00 per gallon.

Soybeans also compete for the allocation of arable land which would otherwise be used for growing food.

“The ultimate result of this process is an extremely high-performance synthetic diesel,” he adds. “Just like synthetic motor oil is superior to traditional motor oil, our synthetic diesel is superior to traditional diesel: it has a much higher cetane (the measure for diesel like octane is for gasoline), creates lower engine emissions with essentially zero sulfur, and is both non-toxic and biodegradable. Biodiesel is severely limited in terms of the amount which can be blended into diesel fuel; conversely, our renewable diesel can be used in any concentration – including 100 percent.

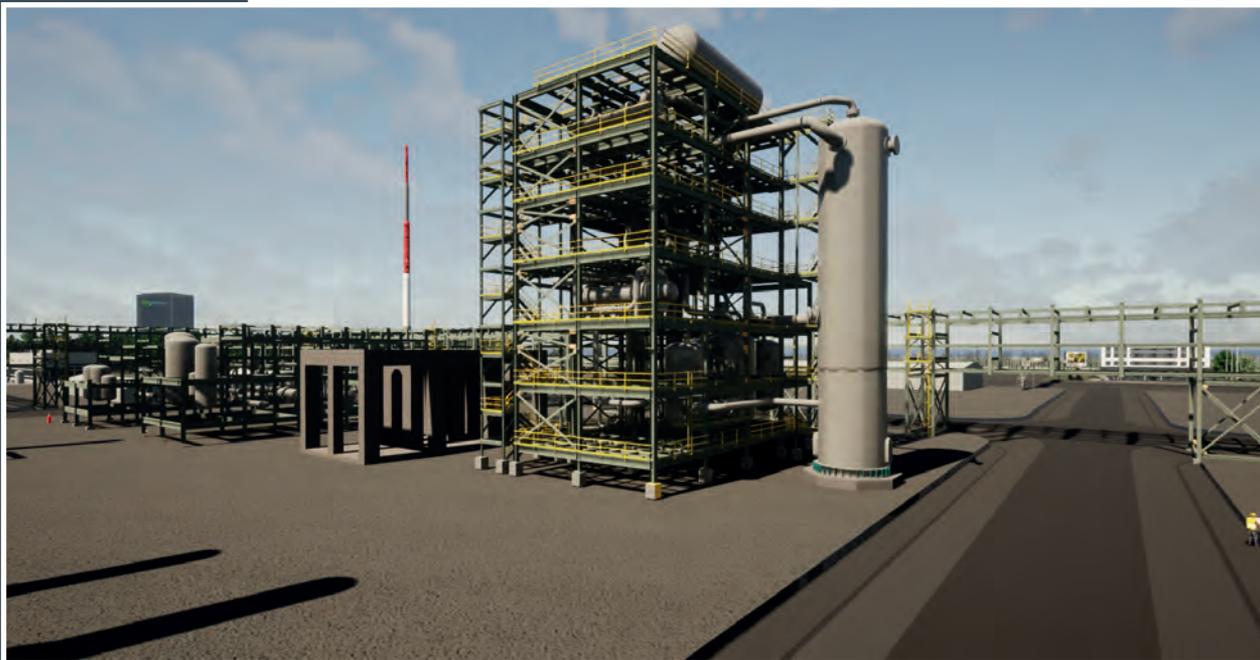
**JCL SERVICE COMPANY, LLC**

JCL Service Company LLC is providing dedicated safety, risk and material coordination professionals for the design, construction, and operation of Strategic Biofuels’ Louisiana Green Fuels project. Since 1997, the goal of our team is to operate with zero incidents and provide the highest quality and most experienced services available from any single source. Our award-winning results can be found in 47 states and six foreign countries. From the development of critical HSE procedures and process safety engineering, to O & M consultants and material coordination, JCL can customize a package and partner with you for success. Learn more at [jclsc.com](http://jclsc.com)



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All this makes it truly sustainable.”

However, sustainability does not refer to solely environmental factors. In fact, sustainability is a broad, wide-ranging term that also involves social and economic issues. Let’s zero in on LGF’s contribution to these two aspects of sustainability. The renewable fuels facility is, for instance, being built in the seventh poorest Congressional District (LA-5) in the US. In that region, the average household income is \$36,000 per year, compared to a national average of \$97,026.

“The first phase of the plant will create about 900 full-time jobs,” observes Paul.

“The direct employment of the plant, once operational, is expected to generate 150 full-time positions, with an average salary of \$69,000. However, indirectly, more than 750 full-time jobs will be created. Indeed, over the plant’s 31-month build schedule, the number of construction jobs available will peak at 1500. Once plant expansions in Caldwell Parish are completed, we’re also expecting to create about 600 direct and nearly 3000 indirect jobs. Needless to say, our project in Caldwell Parish will have a highly positive economic impact on the region.” In fact, LGF has already received a Community Impact Award from Trade & Industry

Development Magazine as part of its 2022 CICI Awards.

“Our engineering partner, Hatch, has also started a STEM (science, technology, engineering, and math) program in Caldwell Parish schools,” he continues. “Hatch engineers will provide mentoring to local students for their robotics competitions. This provides an unprecedented opportunity for the students in this poor community. Exposure to Hatch’s program, which is being committed to by the company for at least three years, will create vital opportunities for international interactions.”

As Paul has made clear, the work being carried out in Caldwell Parish, Louisiana

is not only groundbreaking – it’s truly sustainable, and in more ways than one. Over the next 10-to-12 years, Strategic Biofuels intends to grow, carrying out a three-phase expansion that will create new job opportunities and increase LGF’s production levels. Currently in phase one, the new plant is expected to make around 33 million gallons per year; however, Strategic Biofuels aims to incrementally increase its output, ultimately leading to its remarkable third phase, where a staggering 161 million gallons of renewable diesel will be produced each year. For LGF and its surrounding region, then, exciting and sustainable times are certainly ahead. ♦

**HATCH**

Hatch is passionately committed to the pursuit of a better world through positive change. We are known for highly differentiated engineering and project execution capabilities, particularly for effective and full integration of multiple technologies, as well as the required supporting infrastructure. Our energy sector has a longstanding history of involvement in innovative projects to capture value from not only unconventional resources, but also leadership in the development of renewable sources. Our dedicated and specialized ‘Anything to Liquids’ team has completed many assignments for the conversion of natural gas, biomass or waste, to either chemical products or re-deployable energy.

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**HATCH**