

South Africa Sows Crops-to-Energy Seeds

South Africa is sowing the first seeds in a national initiative that is expected to sprout a vibrant local biofuels industry.

Plans that propose the planting, harvesting and processing of crops such as maize, sugar cane, soy beans, cassava, oil seeds from trees and sorghum into bioethanol and biodiesel feedstocks for use in the liquid-fuels industry are germinating in a hothouse of interest.

Long viewed as a pipe dream, mainly owing to the lack of a financial imperative, the establishment of an economically-viable biofuels industry in South Africa is becoming an attainable goal as a result of the high - and rising - price of oil, and the requirement to diversify energy supply, the global drive to limit greenhouse gases and to curb global warming, technological advances that are lowering the cost of bio-fuels production and the enormous local job-creation potential of such an initiative, Engineeringnews.co.za reported.

In a speech during the launch of the National Energy Regulator of South Africa last month, Deputy President Phumzile Mlambo-Ngcuka said that Cabinet had approved a proposal by the departments of Minerals and Energy, Agriculture and Science and Technology to explore biofuels as an important component of the energy mix.

While the government is supportive of the establishment of a biofuels industry, it still has to finalise a national biofuels

strategy. On the other hand, local farmers, entrepreneurs and groups that represent some of the country's unemployed and historically-disadvantaged people are growing impatient, as they are eager to reap the advantages of producing biofuels.

And, judging from the experiences of overseas countries which have managed to grow their bio-fuels industries, government support is vital.

Local farmers, in particular, recognize much potential in a budding biofuels industry, as it will allow them to improve revenues on crops such as maize and sunflower, which have been selling for less than the average input cost on the local market.

While some farmers have started producing their own biodiesel from oil seeds such as sunflower and soy to supplement conventional diesel for their own use, large-scale production will require a structured economic and regulatory framework.

Besides producing oil seeds that can be converted into biodiesel, the South African agricultural industry also produces starch-rich local crops, such as maize, sugar cane and sorghum, which can be converted by a fermentation process into bioethanol.

To ensure the development of the biofuels-production industry in line with the government's vision, investors and interested parties, such as GrainSA, which represents grain farmers, are calling for clarity on the government's strategy.

They are also mooting that the government should change its voluntary policy on blending bioethanol into petrol and biodiesel into petroleum-based diesel, and follow in the footsteps of several developed countries by

ers and GrainSA members, grouped under Grain Alcohol Investments, are contributing between 160 000 t/y and 200 000 t/y of maize to pay for their shareholding in Ethanol Africa. The proposed Bothaville

octane number of unleaded fuel.

Hence, from the beginning of next year, there will be local demand for bioethanol.

CEF suggests a 10% blending ratio with conventional petrol.

forecast for oil favor the introduction of bio-fuels.

By using South African feedstocks and technology, bioethanol can be produced for R2,50 a litre, while the basic local fuel price is more than R3 a litre.

socioeconomic benefits.

The production of biofuels, including ethanol, creates about 100 more jobs than crude-oil refining.

A national study conducted into the socioeconomic benefits of the bioethanol industry alone-based on the 10% blending ratio envisaged by CEF - found that the production of bioethanol can support 35 000 additional jobs, or protect such jobs.

The number of jobs that can be supported or protected is about the same as the total number of assemblers employed by the motor industry.

However, government initiatives to assist the motor industry equate to a subsidy of about R10-billion a year, or R250 000 per job annually.

On the other hand, the government incentive for the biodiesel industry, which entails a 30% reduction in the fuel levy, is equivalent to a subsidy of R10 000 per job a year.

It is being mooted that the 30% reduction in the fuel levy should also be extended to the bioethanol industry.

If a 10% bioethanol blending ratio is achieved, bioethanol will add 0.25% to the country's GDP.

In addition, a 10% bioethanol blending ratio will enable South Africa to save R2.5-billion a year in imports, which equates to a reduction of 1% in overall national foreign expenditure.

A local bioethanol industry will also serve as a hedge against high oil prices, reducing the effects of high oil prices, as the rising profits of local producers will increase, and the producers will be taxed locally.

Depending on future oil prices and ethanol demand, the country and its neighbours in the Southern African Development Community could even become competitive bioethanol exporters.

The production costs of conventional ethanol and biodiesel in developed countries are two to three times the cost of production in the developing world.

Contrary to the bioethanol industry, the pricing model for the local biodiesel industry suggests that there will be a shortfall of about 2c/l at the prevailing oil price.

The government's aim is that bio-fuels should account for 40% of South Africa's renewable energy, to achieve the target of 10 000 GWh of renewable energy by 2013.

The government's engagement with stakeholders is in line with the International Energy Agency's (IEA's) recommendations for developing a national biofuels strategy.

The IEA's recommendations include performing a cost-benefit analysis, compiling a regulatory policy, establishing industry partnerships and strengthening international representation and collaboration.

In line with the recommendations, South Africa has, among other things, completed a baseline cost-benefit analysis, set the target of achieving a contribution of 10 000 GWh of renewable energy by 2013 and agreed on incentives which include on-cost capital subsidies and a 30% reduction in the fuel levy on biodiesel.



Biofuels are not only an environment-friendly alternative to the use of conventional fossil fuels, but their production also unlocks significant socioeconomic benefits.

enforcing a mandatory blending regime on oil companies.

Mandatory blending by oil companies will ensure that the biofuels industry is promoted and developed, and will provide certainty to investors.

GrainSA is supporting a project proposed by Ethanol Africa to build the first of eight bioethanol plants, in Bothaville, in the Free State.

GrainSA biofuels spokesperson Fanie Brink tells Engineering News that the organization's members view bioethanol production as a promising intervention to counter the challenge of low grain prices and South Africa's six-million-ton maize surplus.

About 400 maize farm-

plant, which is scheduled to start production in 2007, will process between 370 000 t/y and 400 000 t/y of maize to produce 155-million litres of ethanol.

Although the government has not yet finalized a national strategy concerning biofuels, it could become involved in the project itself, as the Energy Development Corporation (EDC), a division of CEF, is investigating the possibility of acquiring a 30% stake in Ethanol Africa.

The fact that South Africa is phasing out the use of lead by the beginning of next year is viewed as a boon to the ethanol industry, as ethanol can be used as an additive to boost the

Based on this proposal, and taking into account that South Africa uses about 11-billion litres of petrol a year, there is scope to produce 1.1-billion litres of bioethanol a year.

As bioethanol, as opposed to synthetic ethanol, will be used, between 10% and 15% of the product can be blended with conventional petrol, without it being necessary to adapt vehicles to use the product.

Nevertheless, EDC commercial manager Sibusiso Ngunabe emphasises that the uptake of bioethanol in the South African liquid-fuels industry will be an issue of price competitiveness.

Current crude-oil prices and the long-term price

The economic viability of producing biofuels will only be threatened if the crude oil price falls below \$40/bbl.

Measured against the pollutants emitted to produce economic wealth, South Africa is the third highest producer of carbon-dioxide (CO₂) in relation to per capita income in the world.

Compared to the use of crude oil, bioethanol reduces CO₂ emissions by 60%.

Compared to the use of oil from coal, it produces five times less CO₂ emissions.

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Too Cool for School ... Literally

Bundle up, kids. It's getting cold inside. As oil and natural gas prices soar, public schools are having to make some tough decisions: turning down the thermostat, finding alternative sources of fuel, even cutting back on the school week.

At Menomonee High School in western Wisconsin, principal Tom Wiatr has dropped the temperature a few degrees. Students started wearing zip-up sweat-shirts and fleeces to stay warm, raising questions about a school rule against wearing jackets indoors, AP reported.

So the school clarified its policy, even scheduling a fashion show to highlight acceptable clothing.

Naturally, it was snowed out. So far, students are lukewarm to the school's strategy. The classroom temperature is 68 degrees.

"When we get into February, when we are below zero and the building takes longer to warm up, maybe then they will be a little more uncomfortable," Wiatr said of his students. "We just remind kids to dress appropriately. It is common sense that you just don't wear a tank top to school in February."

Schools are being socked with high fuel bills, whether it's diesel fuel to run their buses or heating oil or natural gas to keep buildings warm. Fuel prices have risen because of tight international supplies and reduced production in the hurricane-strengthened Gulf Coast.

As schools lower the thermostats, they also encourage parents to make sure their children have a sweater

handy.

"We have kids who go to school wearing shorts even in the winter-time, and the schools are making sure parents know their kids need extra clothing," said John Ellis, executive director of the Indiana Association of Public School Superintendents. "We want to avoid a situation where two kids are side by side in a classroom,

Even the cost of brewing a cup of coffee on campus is going up.

In St. Paul, Minn., the school district has come up with a \$25-per-appliance annual fee as one in a series of steps to recoup utility costs. That means teachers have to pay to plug in their coffee makers, microwaves and refrigerators in classrooms and offices.

At the Summerfield High School in Louisiana's Claiborne Parish, the sprinklers for the ball fields have been shut off, as have the few lights that used to be kept on after hours.

In western North Dakota, the Killdeer School District is considering going to a four-day school week, triggered in part by higher fuel costs.

With the coldest months ahead, school business officers are worried most about heating their buildings. Rising fuel costs seem to affect the price of just about everything, they say, from furniture and deliveries to construction material and even garbage bags.

Simply budgeting more money to cover heating costs is more difficult than it sounds, said Anne Miller, executive director of the Association of School Business Officials International. Schools sometimes gamble, lured by mild winters and lower heating bills. They set aside less for heating and more for salaries or supplies. When a cold winter or an energy crisis comes, they may have to cut expenses from the class. Or just keep those classes colder.

"Cutting something from the instructional side isn't something that anyone wants to anticipate," Miller said. "It's more a case of, we'll deal with that when we get here."



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and one's warm and the other's freezing."

In Council, Idaho, the school district is switching this winter to a new heating system that uses extra wood from the surrounding Payette National Forest. "We believe that this will be the standard in many of the small towns in the Northwest, because there is so much potential fuel out there that is being wasted," said superintendent Murray Dalgleish.

At the Clayton Public Schools in rural southern New Jersey, reducing the temperature in class is more a cost-cutting tool. It's also a learning tool, argues Kathy Latschaw, secretary to the school system's superintendent. "For the little ones, it's teaching them about hot and cold," she said. "And in the upper grades, they're able to learn about the cost of things."

Where Are Gas Prices Headed?

As anyone who heats their home with natural gas knows, recent price increases are beginning to make gasoline look downright cheap. As demand shows no signs of slowing, natural gas producers are scrambling to bring more product to market.

To ease the crunch, dozens of new projects are under way around the world to produce and ship more liquefied natural gas, but those will take years to complete. In the meantime, ConocoPhillips' bid for gas producer Burlington Resources is a \$35 billion bet that high prices are here to stay, MSNDC reported.

No one knows just how high prices will go this winter. Last month, analysts at brokerage firm Raymond James told clients cold weather or supply interruptions could push natural gas as high as \$20 per thousand cubic feet. But if supplies hold up and the weather remains mild, gas prices could be near their peak. (Prices typically fall in late winter as temperatures begin to rise and demand starts to ease.) Prices have recently fallen but have not budged much since reaching their highs in September.

In announcing the company's bid for Burlington Resources, ConocoPhillips CEO Jim Mulva said he expects gas prices to fall. But he said they would remain high enough to make the deal profitable.

Natural gas prices have been rising for a number of reasons, sending consumers' energy bills soaring. Demand has grown along with the economy. Additionally, new electric power plants are using more of the fuel because it burns more cleanly than coal and other alternatives. Higher oil prices also have brought increased demand from industrial users that can switch from oil to gas.

U.S. suppliers have been struggling to keep up. Despite a record pace of drilling to produce more, natural gas production continues to fall because most of the best domestic gas fields already have been tapped. This fall, production was also hit hard by back-to-back hurricanes that shut down some operations in the Gulf of Mexico for months. As of this week, a quarter of all Gulf production capacity remains offline, and the total gas lost to the shutdowns amounts to about 14 percent of annual Gulf production, according to the U.S. Minerals Management Service.

Natural gas suppliers have been trying to make up the difference with imports, most of which come by pipeline from Canada. But much of Canada's available output has already been tapped. So boosting imports further means turning to liquefied natural gas, created by pressurizing and cooling gas so it can be shipped by tanker.

That is where the current bottleneck is most severe: There aren't enough LNG import terminals to make up

for the shortfall in supplies. The Energy Information Administration estimates that less than 1 percent of U.S. natural gas demand will be met by LNG in 2005. Much of the available natural gas from other countries is being sent to Europe, where prices are even higher.

To get through the winter, U.S. natural gas suppliers have stockpiled some 3 trillion cubic feet. That's about average for the past five winters, but 5 percent lower than this time last year, according to the EIA.

So predicting natural gas prices for the rest of the heating season is largely a matter of forecasting the weather. Colder-than-normal weather will squeeze gas supplies further. Even a return to average temperatures — after last year's relatively mild weather — will send total home heating bills up nearly 50 percent for homeowners who use gas, according to the EIA.

Cold weather isn't the only wild card. Earlier this year, problems at LNG production sites in Nigeria, Australia and Egypt sent gas prices rising, with markets already tight, any future production bottlenecks could boost prices again.

And like pump prices the price you pay for natural gas depends a lot on where you live. Much of the difference is the result of transportation costs: If you're in a region of the country where natural gas is produced or live near a major pipeline you'll pay less than customers where shipping costs are higher.

With domestic production falling, expanding supplies means greater reliance on LNG. Dozens of LNG production facilities are in the works around the world. But import terminals are in short supply.

In New England, for example, nearly 20 percent of demand is met with LNG imports shipped to a single terminal in Everett, Mass. At least seven new terminals have been proposed in coastal communities from Connecticut to Maine, but only one — in Fall River, Mass. — has won federal approval. Other projects have faced strong local opposition.

To try to ease the bottleneck, this year's energy bill strengthened the power of the Federal Energy Regulatory Commission to approve new terminals. But it remains to be seen how much those added powers will speed the approval process where local opposition remains strong.

Even if those projects were approved quickly, it would be years before they would be able to help ease the natural gas squeeze. The Energy Department Monday forecast that LNG will make up only 8 percent of U.S. gas imports by 2010 (down from last year's estimate of 10 percent), rising to 14 percent by 2020 (down from its previous estimate of 18 percent).