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It is evident from the elegant, yet understated Vienna-based headquarters in the city's first district what RAG stands for. The lovely historical building which hosts the company boasts a combination of tradition, innovation and success — just like the company itself.

This is further evidenced by the company's innovative and gregarious CEO, Markus Mitteregger, ensconced in his regular-guy office. It's not Dallas. It's not Riyadh. But the company has blazed its own trail in an industry that is very international, succeeding by going in the opposite direction and becoming less international. And it has done it the 'Austrian way' — without a lot of fuss or noise, simply nose-to-the-grindstone problem-solving.

The staff is Austrian, the innovations are local, and even the oil produced is refined and sold within Austria. Through diversification and driven by plain necessity — keeping RAG running meant hanging on to local jobs — the firm is now solidly standing on its own two feet.

With simple survival out of the way, it has had time to turn to innovation, proving that brown fields can remain profitable long after majors abandon them as not profitable enough.

When oil production began at the Gaiselberg field in Zistersdorf, where the company has a concession, 78 years ago, the global oil industry was in its infancy. In fact, Gaiselberg 1 is now one of the world's oldest active wells. RAG built its success at that time using unconventional technology and methods ahead of its time, like

steel drilling rigs, specially constructed drill bits and deviated wells. The company is replicating today's success on the same principles: find a solution, be daring.

Brown oil fields are often avoided by major oil companies, as they require much investment and normally bring declining return. RAG, however, only has very old fields and is still managing to stay profitable by recycling water into its fields, with a return of 97 per cent water and only three per cent oil.

"It's mainly about avoiding cost and you have to be creative and adapt technologies," says Mitteregger. "Three per cent oil is nothing, but still, due to a lot of technology advances and cost-containing, cost-effectiveness, we have managed to still be profitable and have shown it ... it's still well below \$40/barrel.

"It works and we are confident it will work for the next 20 years ... and to my estimation we are beyond 40–50 per cent, maybe at 60 per cent recovery, but 40 per cent is still there."

The system uses in-house technology called MURAG, developed and tested by RAG over the past ten years. It involves circular pumps and digitalization and is based



Markus Mitteregger, CEO, RAG.



Markus Mitteregger, CEO, RAG, with the OPEC Bulletin's Maureen MacNeill.

on an acoustic system that allows the steering of pumps from the desktop, including ongoing monitoring reservoir characteristics. "We already have contact with other operators who are buying the devices. We are servicing them and sharing their experiences to constantly improve the system," he says. RAG is hoping other countries and companies will be interested in the technology.

The greatest enemy of older fields is corrosion, continues Mitteregger. "Imagine we are pumping 97 per cent salt water, also containing CO₂, which is a very aggressive gas ... we really have a strong focus on preventing corrosion.

"Corrosion kills everything, because you get pipeline leaks, you get failures in pumps ... elder assets are more

sensitive to high cost like (these). We have really seen that no corrosion is by far the best."

The potential for brown-field technology is enormous, explained Mitteregger at OPEC's 6th International Seminar at the beginning of June. "Eighty per cent of today's oil fields are 40-plus years old," he said to a room full of some of the world's top oil ministers and executives.

Historical roots

Austria has a long history as an oil producer, with 1909 being a record production year for the country. More than two million tonnes of oil were produced, which accounted for about five per cent of the world's oil production. At that time, Austria was the third-largest oil-producing nation behind the US and Russia.

Oil production started in the republic of Austria in the mid-1930s after initial drilling in the Vienna Basin a few years earlier. Mobil Oil (then called Socony Vacuum Oil Company Inc) and part of the Royal Dutch Shell group founded RAG in 1935, each taking a 50 per cent stake. RAG was set up to secure oil supplies for the founding companies refineries in the Vienna area and reduce dependence on imports, still a key objective today.

In fact, ten per cent of Austrian oil is produced locally, though it was 100 per cent up until WWII, when the country was annexed and oil production taken over and rerouted to support the war efforts. The country's fields were exploited relentlessly, seeing a 20-fold increase in production between 1938 and 1941, making Austria the most important oil-producing country in the Third Reich. However, RAG saw very little of the profit from that time and the company's assets were declared enemy property.

RAG's exploration licences were transferred to four German oil companies and RAG was only allowed to keep fields in the Zistersdorf area, Aderklaa and Hohenruppersdorf. After liberation in 1945, production resumed under the Soviet army, which returned the company's concessions. Other rights were not returned. Production was low as the company tried to rebuild and at the end of 1955 the Oesterreichische Mineraloelverwaltung (OMV) acquired most of RAG's former fields in Lower Austria, granting some permits for concessions in other areas as compensation.

Today the company has 245 active wells and holds concessions in Austria (6.142 sq km), Germany (4.716 sq km) and Hungary (2.993 sq km).

Staying green

The company's Zistersdorf site is set among beautiful rolling hills, vineyards and an abundance of green landscape about an hour's drive north of Vienna. Here again, the company challenges the stereotypical image of oil production as a dirty and destructive business. Zistersdorf not only hosts some of the world's oldest production wells, it is one of Austria's oldest wine-growing areas as well.

Wine is produced alongside oil rigs and a view through a pair of binoculars shows an unblemished landscape, pure and filled with an abundance of wholesome agricultural goings-on.

The company has kept its oil business very green, and enjoys a very high rate of acceptance among locals and other Austrians.

"It is essential," says Mitteregger. "We know that for the long run it is really important to have no emissions. No methane, no CO₂, so we really try to keep everything down and we know that especially in Austria there is a strong trend in renewables and fossils are not really modern anymore, so we try to be modern. It's like a garden and people appreciate that. It looks very clean, it is clean, it's the latest technology and it really pays off."

The company states as its goal: Providing environmentally friendly, safe and affordable energy for the future is RAG's prime objective, its greatest challenge and the focal point of its operations. The steady rise in global energy demand means that responsible use of the valuable energy resources at our disposal, as well as environmental protection and gaining acceptance as a good neighbor, are more important than ever.

When OPEC Secretary General, Abdalla Salem El-Badri, visited Zistersdorf in 2011 he said, "RAG's long-standing facilities are an excellent example of environmentally friendly, resource-efficient and sustainable oil production — and we can learn a lot from them. What's more, production is taking place in the heart of one of Austria's most picturesque wine-growing regions."

Producing CNG

RAG has different projects, past and present, to ensure that the region remains beautiful. Recycling water in fields and capturing gas are ways of doing this. The company is now embarking on a new project, currently in the testing phase, that will bring more 'local content' to the gas released when producing oil. The plan is to capture

gas at the well and process it on site for local use as compressed natural gas (CNG) or liquefied natural gas (LNG).

"There are programmes in the EU to support that and you are seeing that this is a value gained. If you take this gas and process it directly at the well into CNG or LNG, you get about a three-fold price compared to just selling it as pipeline gas (normally the gas is separated, processed and sold to the local pipeline grid), says Mitteregger.

"This of course raises the revenue of the whole operation. Oil (price) is set by others, by the market, but you can do something about the value of your gas."

The idea was in the testing stage in the winter, with the intention of implementing it in a more widespread way in the coming months and years. It is most certainly profitable, says Mitteregger, adding that the company knows the operating costs and the gas.

"It's just a question you need half a year or one year of running time to make it perfect.

"Basically, it's already a business because you have a comparable price for CNG/LNG to diesel, which is three-fold the price of pipeline gas and it makes sense. It's economic, yes."

If it works, it would have a tremendous impact, he adds. For stranded gas, for associated gas, for preventing flare gas at smaller units. It's completely self-sufficient. Sites would be independent from other gas infrastructure and power lines aren't needed. "You just need



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nitrogen and the entire system works. It's modularized, it's small, not bigger than the pumping unit, it's a fuel station directly at the well." A source of isolated gas can also be captured and condensed on site and then transported by truck.

Austrians really look at where their consumables are coming from, he explains. "If it's coming from the vicinity here, then (they see it as) very good. You have a plant that is directly producing a commodity that you can use here. It fuels your car. They like it because with crude oil they can't do anything ... it's pumped away."

Mitteregger also sees the possible broader implications of this kind of business idea. "I think about remote areas in Nigeria or even Canada ... if you are in a remote village and they are producing oil, sometimes they are flaring the gas."

Gas storage

The company's decision to get into large-scale gas storage about ten years ago provided it with the financial cornerstone it needed to survive at a time when reservoirs were depleting.

"We saw it was necessary to grow also a sustainable long-term business next to the oil and gas business, and we got creative and discovered that gas storages

could be very interesting and we approached Gazprom and other big utilities and offered to do joint ventures with them. We have the storage, they normally provide the cushion gas, we divide the investment, but we are the operator."

In a typical sandstone formation like the oil reservoirs in Austria, there is about ten per cent space free for gas, with the rest covered by water. The gas is compressed by a factor of 200 at 2,000 metres, thus much can fit into a reservoir.

The storage sites are 99.5 per cent efficient, says Mitteregger. Only 0.5 per cent of energy is required to withdraw massive amounts of gas energy, he says, adding that about 50 per cent of the company's depleted reservoirs have been converted into gas storage.

"I am completely sure we have the most modern gas storage fleet in the world," he says, adding that the company now boasts the fourth-biggest gas storage operation in Europe. Ten storage facilities have been built in the last ten years, with Gazprom investing in two stages. The gas storage constitutes the majority of the businesses income currently. Through the storage sites, RAG plays an important part in security of supply for Austria and the whole of central Europe.

"Now that we have completed these storages, we want to really grow the oil production."

Oil ... in harmony with nature.



Research into renewables

Even though the company is small and local, it does not mean that it is not looking to the future. Mitteregger believes he has a possible solution to the current problem of fluctuating production that accompanies many renewable energy sources.

"Wind and sun are extremely unstable, either by far too much or too little ... so you need big, big power storages."

To this end, RAG is aiming to become an early adopter of power-to-gas. Excess electricity can be converted into hydrogen through electrolysis, which could be put into the company's reservoir storage until it is needed.

"How does the sandstone react, how does the cap rock react? We want to see the entire system working, and of course you always get some unknown effects, it's the reason you do research.



Ultra-low temperature compression (ULTC) module for LNG/CNG production.

“It shows a very interesting development over the next 20–40–50 years for the oil industry. We have the freedom to do this and the necessity. There are the same drivers. If you want to establish new business and are within the limits of Austria and there are no new fields for oil and gas ... we have to think about what to do.”

The company is currently building a small research storage facility — which should be ready to go into operation by September — where hydrogen will be placed, “just to see what happens”. There is a patent pending and field tests are expected in 2016, possibly converting a single-way industry into a sustainable cycle.

Potentially, green hydrogen could be added into the refinery system to improve octane levels of fuel, “adding green stuff to reserves and lowering emissions. Just an idea ...,” says Mitteregger. Crude is something that is a limited and very valuable resource, he states. Technologies can be

used to conserve it, stretch it and use it wisely and economically.

Currently, ten per cent of the crude produced in Austria and worldwide is not used for energy, but other industries, such as plastics, chemicals and pharmaceuticals, for example. “Literally, you cannot have one thing that is made without a drop of oil,” he states. “I don’t think you will find anything, even a banana. If you go to the grocery store, there are 2,000 products. Show me one completely made without the use of oil on the way when it’s been produced or in transport and packaging.”

Mitteregger, himself a petroleum engineer, has a rare passion and zeal for his work. Aside from the glamour which he freely admits is still part of the industry, his lifelong career also clearly stems from what he sees as an honest truth. “There is nothing comparable to one litre of oil. If you look in evolution, it took 4.5 billion years to develop such prestigious stuff to be honest. I am not exaggerating.”