

# ASX ANNOUNCEMENT

8 JULY 2008

# Hatch Appointed to Undertake Coal to Liquid ("CTL") Fuel Plant Pre-Feasibility Study in Vietnam

# Highlights

- Gulf Resources Ltd (ASX: GLF; "Gulf") and Hanoi General Export Import JSC ("Geleximco") have appointed Hatch to undertake the Coal to Liquid ("CTL") Fuel Plant Pre-Feasibility study.
- Hatch is a world leader in Consulting, Engineering, Procurement and Construction Management. Active globally in the principal divisions of Mining and Metallurgy, Energy and Infrastructure, the company comprises over 8,000 professional employees and provides engineering expertise worldwide.

#### Summary

Gulf Resources Ltd (ASX: GLF; "Gulf") recently entered into a Joint Development agreement with one of Vietnam's largest private industrial conglomerates, the Hanoi General Export Import JSC ("Geleximco") to establish the feasibility of, and the development and implementation of an up to 60,000 barrel per day (bpd), Coal To Liquid fuel plant in northern Vietnam ("Vietnam CTL Project").

Having considered a number of proposals from independent consultant engineers and following a joint meeting in Sydney, Gulf and Geleximco are pleased to announce that they have appointed Hatch to undertake the CTL Plant Pre-Feasibility study.

Hatch is an international consulting and EPCM (Engineering, Procurement and Construction Management) company active in the principal divisions of Mining and Metallurgy, Energy (which includes Oil and Gas), and Infrastructure. The company comprises over 8,000 professional employees spread across the globe. Hatch's hub offices are located in Canada, South Africa and Australia. Hatch currently has projects with a total value of over CAD 50 billion in execution.

#### Commentary

Scott Reid, Chairman of Gulf Resources, said, "The appointment of Hatch, a world leading engineering group, to undertake the CTL plant pre-feasibility study is another major step for Gulf and Geleximco as we jointly progress this significant and strategic energy project in Vietnam."

#### About Gulf Resources

Gulf Resources is a resources development and investment company that crosses the divide between Africa and Asia. Gulf's strategic position aims to maximise the natural development synergies that exist between Africa and Asia. Gulf operates at this new frontier of developed and developing markets in order to uplift shareholder value on a sustainable basis.

...continued

Level 10 Gold Fields House 1 Alfred Street Sydney NSW 2000 • PO Box R745 Royal Exchange NSW 1225 Australia t +61 2 8247 5333 • f +61 2 9247 7722 ACN 115 027 033 www.gulfresources.com.au

SYDNEY • LONDON • TANZANIA • VIETNAM

We seek Sustainable Success through:

- Partnerships for Prosperity
- Diversification of Assets
- Intellectual Expertise and Capital

With established bases in Tanzania and Vietnam, Gulf's team of seasoned engineering, project management and resources specialists are set to develop projects of major significance to both the company and the countries in which Gulf operates.

Coupled with a strong investment bias, experienced finance division and high level partnership approach, the group is on a growth trajectory to become a major consolidated resource development and investment enterprise within five years.

Gulf's current partners include:

- Hanoi General Export and Import Corporation, a member of the Hanoi General Export and Import Group ("Geleximco"), since its establishment in 1993 has become one of Vietnam's largest private industrial conglomerates with substantial interests across a broad range of sectors including mining, finance, manufacturing, commodity trading, agricultural processing, energy and resources.
- The National Development Corporation of Tanzania, an organization owned by the Government of the United Republic of Tanzania with a specific mandate to develop, coordinate and implement infrastructural and economic projects through Public Private Partnerships (PPP).
- The Tanzanian Port Authority (TPA) is a statutory body incorporated to establish and coordinate Tanzania's ports and harbours system and to provide services relating to ports and harbours facilities, including carrier, navigation, stevedore, wharfage and storage services. The TPA is also tasked with the construction and operation of ports and harbours. As an incorporated State entity, the TPA currently owns all the major ports and harbours in Tanzania, including Dar Es Salaam, Tanga, Mtwara and all lake ports in Tanzania.

#### **Background Information on Vietnam**

#### Demographics and Geographic Setting

Socialist Republic of Vietnam is the eastern most country on the Indochina Peninsula in Southeast Asia. It is bordered by China to the north, Laos to the northwest, and Cambodia to the southwest. On the country's east coast lies the South China Sea. With a population of over 85 million, Vietnam is the 13th most populous country in the world.

#### Mining and Resources

Vietnam has a wide variety of important mineral resources. The principal reserves, located mainly in the north, were; antimony, bauxite, carbonate rocks, chrome, clays, anthracite coal, copper, natural gas, gemstones, gold, graphite, iron ore, lead, manganese, mica, nickel, crude petroleum, phosphate rock (apatite), pyrophyllite, rare earths, silica sand, tin, titanium, tungsten, zinc, and zirconium. Coal dominates the mining sector, and, along with carbonate rocks, crude petroleum, and phosphate rocks, was produced in large quantity.

The mining sector plays an important role in the Vietnamese economy, and minerals trade also accounted for a large share of the country's overall merchandise trade. In 2005 (the latest year for which data were available), the output of the mining and quarrying sector (which included mineral fuels and non-fuel minerals) accounted for 5.75% of Vietnam's gross domestic product (GDP). The GDP in 1994 constant dollars was estimated to be \$24.87 billion.

In 2006, Vietnam's major mineral commodity exports were crude petroleum (\$8.32 billion) and coal (\$927 million); these commodities accounted for 21.0% and 2.3%, respectively, of total exports (\$39.6 billion). Vietnam's major mineral commodity imports were refined petroleum products (\$5.86 billion), steel (\$2.9 billion), and fertilizers (\$673 million), which accounted for 13.2%, 6.5%, and 1.5%, respectively, of total imports (\$44.4 billion) (General Statistics Office of Vietnam, 2006).

In 2006, Vietnam remained one of the world's leading producers and exporters of anthracite coal.

The mining industry comprised state-owned companies, several state-and-foreign mining and mineralprocessing company joint ventures, many small-scale local government-owned mining companies, local government-private mining company joint ventures, and local private miners.

# Financial Setting

Since 2001, Vietnamese authorities have reaffirmed their commitment to economic liberalization and international integration. They have moved to implement the structural reforms needed to modernize the economy and to produce more competitive, export-driven industries. The economy grew 8.5% in 2007. In an effort to stem high inflation which took off in 2007, early in 2008 Vietnamese authorities began to raise benchmark interest rates and reserve requirements. Hanoi is targeting an economic growth rate of 7.5-8% during the next four years.

Sources: USGS - Vietnam Country Profile 2006; CIA World Fact Book - Vietnam

# Background to Coal To Liquid (CTL) Process

Oil supply security and price concerns have led to a renewed interest in coal as an alternative feedstock for the production of transport fuels and chemicals. By using coal conversion technologies, such as coal-to-liquids, the world's vast coal resources could become an important alternative to crude oil.

CTL describes both coal gasification, combined with Fischer-Tropsch (FT) synthesis to produce liquid fuels, and the less developed, direct coal liquefaction technologies. Coal gasification is applied widely in the production of chemicals and fertilisers, notably in China where 8,000 coal gasifiers are operating. Fischer-Tropsch synthesis, first developed in Germany during the early decades of the 20th century, has been further developed and improved in South Africa by Sasol.



In the past, CTL has substituted for imported oil: during the 1930s and 1940s, when coalrich Germany needed a secure source of transport fuels; and, since the 1950s in South Africa, where 40 million tonnes of coal per year are still converted into 160,000 barrels per day of crude oil equivalent.

Today, with the return of high oil prices, China is constructing a 60,000 bpd CTL plant and, with plans for further projects, aims to produce one million barrels per day by 2020. In the USA, new incentives have been introduced for coal-based transport fuels and coal companies are now assessing the commercial viability of new projects as one component of a wider vision to make greater use of the country's vast coal resource.

# **Technical Background**

Coal may be used to produce liquid fuels suitable for transportation applications by the removal of carbon or addition of hydrogen, either directly or indirectly. The first approach is usually known as carbonisation or pyrolysis and has low yields; the second is called liquefaction. As the cost of converting coal into useful liquid fuels is higher than the cost of refining crude oil, it is the relatively low price of the raw coal feedstock that provides the main incentive to pursue the technology.

Commercially proven, indirect liquefaction process relies on the gasification of coal to produce synthesis gas (a mixture of carbon monoxide and hydrogen) which is then reacted over a catalyst at temperature and pressure to produce the desired liquid products. It is this indirect process, using well-established Fischer-Tropsch synthesis, that has been commercialised by Sasol in South Africa and will be used in several new projects proposed in China.

Direct liquefaction is potentially the most efficient route currently available, yielding in excess of 70% by weight of the dry, ash-free coal feed, under favourable conditions. Although many different direct processes exist, common features are the dissolution of a high proportion of the coal in a solvent at elevated temperature and pressure followed by catalysed hydrocracking of the dissolved coal with hydrogen gas. The overall energy efficiencies of modern processes are generally in the range 60-70% and the technology has been demonstrated at large pilot plants. Although no commercial plants yet exist, Shenhua Group's first CTL facility is under construction in China using direct liquefaction technology.

#### Sources

Workshop Notes: IEA Coal Industry Advisory Board workshop

IEA Headquarters in Paris, 2 November 2006

National Mining Association, www.futurecoalfuels.org

Coal Liquefaction, Technology Status Report 010, DTI/Pub URN 99/1120, London: Department of Trade and Industry, October 1999

Commercialization of Coal to Liquid Technology, www.EnergyBusinessReports.com