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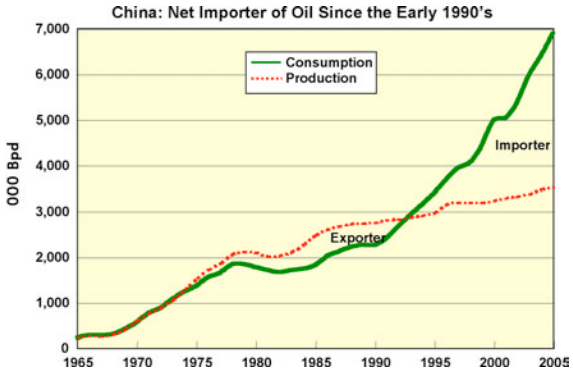
THE ECONOMICS OF SHIPPING VENEZUELAN CRUDE TO CHINA

by Roy Nersesian

China, whose energy needs are growing in tempo with its rapid economic development, must increase its oil intake to satisfy the mounting demand. China's domestic oil consumption has significantly outpaced its production since the early 1990's, as the following chart shows.



Source: BP Energy Statistics

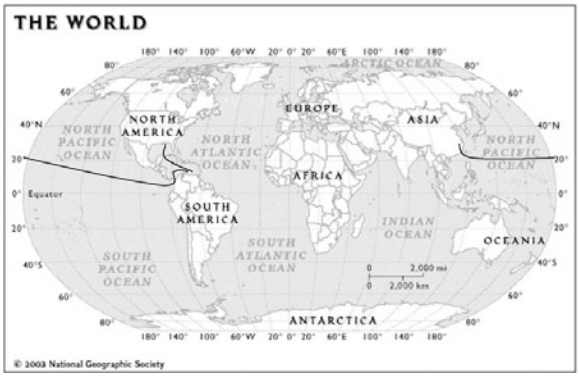
More than 50% of China's oil imports today come from the Middle East. Its only important source in the Pacific basin is Indonesia — whose own production is in a steep decline. Other sources, including Australia, Malaysia and Vietnam, are too small to satisfy a significant portion of Chinese demand.

China has expanded its horizon beyond the Pacific basin. Its most successful venture to date has been in Sudan, where China developed an oil field and built a 300,000 barrels per day oil export pipeline. China has also pursued upstream opportunities in Southeast Asia, the North Sea, and Canada. Perhaps its most aggressive move this year was the attempt by CNOOC to purchase the U.S. oil company Unocal. However, China has also made overtures to Latin American producers, including Venezuela where, in the spring of 2005, a Chinese delegation exploring the possibility of buying Venezuelan oil received a warm reception.

Exporting nations sell their oil either at the loading port ("FOB" sales) or on a delivered basis ("CIF" sales). In an FOB sale, the buyer is responsible for transporting the oil; it is the seller's responsibility in a CIF sale. In theory, the exporter decides whether to sell FOB or CIF to a given market based on whichever method will maximize the "netback" value of the exported oil (i.e., the amount received for the oil minus the cost of transporting it).

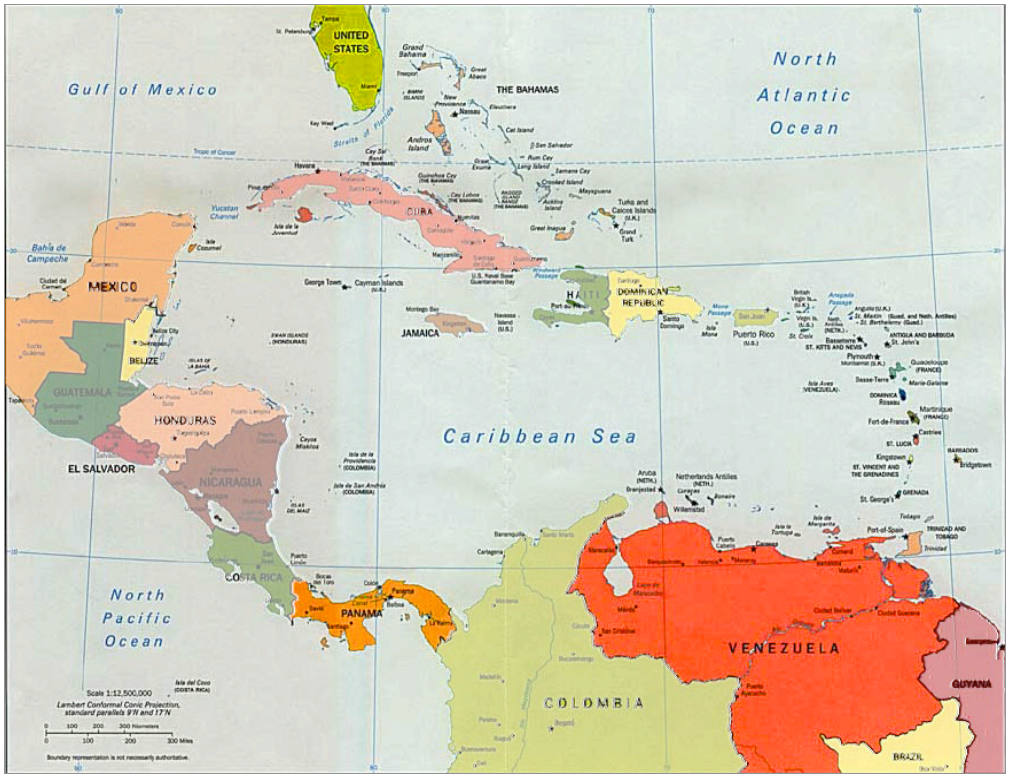
Venezuela's President, Hugo Chavez, has expressed concern about the extent of his country's dependence on the United States as a market for its crude and the discussions with China about possible exports have as one of their objectives reducing that dependence. The economics of this strategy would seem to be unfavorable, however, compared to exports to the United States because of the greater

voyage distance to China. This would result in much higher transportation costs and thus much lower netback values for Venezuela. There is, however, a way to offset most of this cost disadvantage.



The round trip voyage from Venezuela to U.S. Gulf ports is 3,600 miles. The round trip voyage to China (via the Panama Canal) is 17,000 miles, or nearly 5 times farther.

The most economic method of shipping Venezuelan crude to the U.S. Gulf is in an "Aframax" class of tanker — i.e., one between 80,000 and 120,000 deadweight tons. Aframax vessels in the Venezuela/U.S. Gulf trade carry cargos of around 70,000 tons — i.e., less than their full carrying capacity — because of draft limitations (shallow water depth) in Lake Maracaibo (the waterway surrounding Venezuela's principal crude loading ports) and in U.S. Gulf ports. The largest cargo that can be carried through the Panama Canal is around 55,000 tons because of beam (vessel width) and draft limitations that restrict vessel capacity and cargo size. Transiting the Panama Canal involves a toll, which would add to the cost of transportation to China. Venezuelan crude oil exports to China on Panamax tankers via the Panama Canal would cost five or more times as much as shipping the same crude to the U.S. Gulf.



The average Aframax tanker rate in 2004 was WS255[1], a historic high[2]. For the published Worldscale rate of $4.96 per ton, this yielded a freight rate of $12.65 per ton for the 3600-mile round-trip voyage from Venezuela to the U.S. Gulf.

Aframax Tanker Venezuela to U.S. Gulf	
Average WS Rate Caribbean/USG	WS255
Round trip voyage (miles)	3,600
WS Flat Rate	$4.96
$/Ton 2004 (2.55 x $4.96)	$12.65

Carrying crude in a Panamax tanker from Venezuela to China via the Panama Canal would result in a freight rate of over $60 per ton. This cost could be reduced by employing a Panamax tanker only for the portion of the voyage from Venezuela to Chiriqui Grande, the Atlantic terminus of the Trans-Panama pipeline.[3] From there the oil could be transported by pipeline to Charco Azul/Puerto Armuelles, the Pacific terminal of the pipeline, where there are storage facilities that can accommodate Very Large Crude Carriers (VLCCs). The voyage from Puerto Armuelles to China would take advantage of the lower shipping costs of the larger tankers.

Source: US Department of Energy

Although the voyage to Chiriqui Grande is shorter than to the U.S. Gulf and therefore has a lower shipping cost, the Trans-Panama pipeline toll of about $7/ton would raise the cost of shipping crude to Puerto Armuelles to over $15/ton, compared to $12.65/ton for shipments to the U.S. Gulf.

Venezuela/Chiriqui Grande	
Round trip voyage (miles)	1,500
WS Flat Rate	$3.25
$/ton 2004 (Flat Rate X 2.55)	$8.29
Estimated Trans-Panama pipeline toll	$7.00
Shipping Cost to Puerto Armuelles	$15.29

[1] Worldscale (WS) is a shipping industry term (short for "Worldwide Tanker Nominal Freight Scale") that refers to a published, standard schedule of tanker rates that are used as reference points in determining the freight rate for individual voyages. "WS255" means 255% of the published Worldscale rate, or 2.55 times that rate.

[2] The level of Worldscale rates is determined by the interplay of buyers (oil companies) and sellers (tanker owners) in a free market environment where rates reflect the relationship between the demand and supply of tankers. Worldscale rates in 2005 have been lower than in 2004 because the supply/demand relationship changed in favor of the buyers.

[3] The Trans-Panama pipeline was originally built to move North Slope (Alaska) crude eastward from the Pacific terminus at Puerto Armuelles to the Atlantic terminus at Chiriqui Grande. Declines in Alaskan crude production reduced the throughput volume of the pipeline and eventually led to a situation where all the crude was refined at U.S. west coast refineries. As a result, the Trans-Panama pipeline was deactivated. The pipeline was reactivated in 2003 and now ships about 100,000 barrels per day of crude from Ecuador eastward. If this stops, then it is possible to consider reversing the pipeline to move crude westward from Chiriqui Grande over the Panama highlands to existing storage tanks at Puerto Armuelles and from there to China on VLCCs.

Of course, moving Venezuelan crude from the west coast of Panama to China further increases the cost difference compared with shipments to the U.S.

Puerto Armuelles to China in VLCCs[4]

Distance Puerto Armuelles/China	15,540	Round trip
Days at sea	43.2	15 knots average speed
Days in port	3.0	Load and unload cargo
Contingency time	1.5	Weather and other delays
Total voyage time (days)	47.7	
Average daily rate VLCCs in 2004	$66,500[5]	
Voyage hire	$3,170,000	Daily rate X voyage days
Bunkers (tons)	3,313[6]	75 tons per day at sea
Bunker price per ton	$180	
Bunker cost ($180/ton)	$596,000	
Port charges	$100,000	Both ports
Total voyage costs	$3,866,000	
Tons cargo	295,000	300,000 dwt VLCC
$/ton Panama/China	$13.11	
$/ton Venezuela/Panama	$15.29	See previous table
Total $/ton	$28.40	
Venezuela/U.S. Gulf $/ton	$12.65	
Difference in shipping cost	$15.75	

[4] No Worldscale rate exists for this trade as no crude oil is currently shipped on this route. Thus the freight rate has to be calculated based on vessel daily earnings rate and voyage costs.

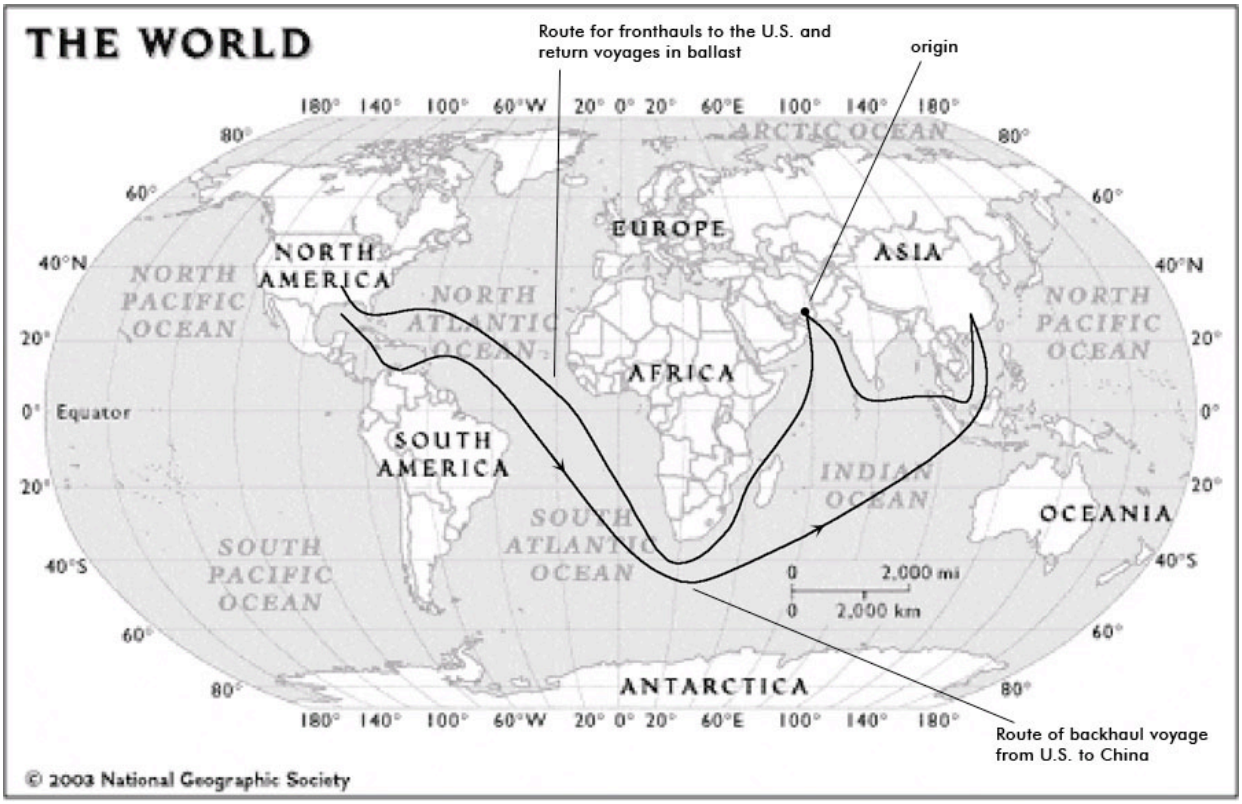
[5] The average daily earnings in 2004 for Very Large Crude Carriers (VLCCs) of 200,000 - 350,000 deadweight tons, $66,500 per day, was again a historically high rate.

[6] Bunker (ship's fuel) consumption reflects fuel consumed at sea (75 tons per day) and in port (another 75 tons to offload the cargo).

While employing VLCCs from Panama to China would be less costly than using Aframaxes, the voyage would still involve a substantial penalty of about $16 per ton in shipping costs. Thus, Venezuelan crude exports to China require a more imaginative use of shipping alternatives.

Backhaul Cargoes from Venezuela to China

VLCCs presently carry crude oil cargoes from the Middle East to the United States. Too large to enter U.S. ports, these vessels either offload their cargos into smaller, "lightering" vessels in deep waters of the Gulf of Mexico for delivery into U.S. Gulf ports, or they discharge their cargoes at the Louisiana Offshore Oil Port (LOOP), a deep water offshore terminal located about 30 miles from Louisiana which is connected to the coast by pipeline. Some years ago VLCCs would normally return to the Middle East "in ballast" — that is, without a return or "backhaul" cargo. Now a majority of VLCCs obtain backhaul cargoes of West African crude on the return voyage destined for India or China.



A similar approach would improve the economics of shipping Venezuelan crude to China. As the table on the next page demonstrates, transporting Venezuelan crude to China as a backhaul cargo on a VLCC after a Middle East – U.S. fronthaul voyage costs about the same as shipping an equivalent amount from Venezuela to the U.S. on Aframax vessels.

	Middle East fronthaul to U.S. Gulf, In Ballast on Return Voyage[7]	Middle East fronthaul to U.S., Backhaul from Venezuela to China on Return Voyage
Round trip distance in miles	24,500	33,375
Days at sea	68.1	92.7
+ Days in port	3.0	9.0[8]
+ Contingency time	1.5	3.0
= Total voyage time	72.6	104.7
Voyage hire	$4,825,000	$6,963,000
Bunkers	5,180	7,100
+ Bunker cost (@ $180/ton)	$932,000	$1,279,000
+ Port charges	$100,000	$200,000
= Total voyage costs	$5,857,000	$8,442,000
Cost Differential		$2,585,000
÷ Tons carried to China		260,000
= Effective cost per ton of crude carried to China		$9.93
+ Extra costs per ton loading VLCC in Venezuela for backhaul to China		$3.00
= Total backhaul shipping cost per ton for backhaul to China		$12.93
Compare with: Cost per ton for shipping from Venezuela to U.S. Gulf		$12.65

[7] Calculations based on a ballast voyage around South Africa. The ballast voyage could also be via the Suez Canal, which is shorter but involves paying tolls.

[8] This assumes VLCCs are loaded in offshore waters that would require 3 extra days plus an estimated cost of $3/ton for shuttle tankers. A transshipment terminal in Bonaire was built for incoming VLCC shipments of Arabian Gulf crude for transfer to smaller tankers for shipment to U.S. Gulf ports. It is possible to reverse this operation by offloading smaller tankers of Venezuelan crude for transfer to a VLCC for shipment to China. Still another alternative is loading crude at Jose, a terminal in Venezuela for Orimulsion exports.

The total voyage expense of transporting the fronthaul and backhaul cargoes ($8,442,000) minus the revenue from transporting the fronthaul Middle East cargo to the U.S. Gulf ($5,857,000) yields the cost of transport associated with the backhaul cargo ($2,585,000). This works out to $9.93/ton to ship a 260,000 ton cargo from Venezuela to China. Since ports in China generally cannot take a full cargo of 300,000 tons, a portion of the cargo is generally lightered before a VLCC enters port.

Conclusion

From Venezuela's perspective, the shipping cost is essentially the same whether Venezuelan crude oil is shipped to the U.S. Gulf or to China. However, there would be a difference in the value of Venezuelan crude in China versus the United States. Most Venezuelan crude is relatively heavy (i.e., requiring more extensive refining in order to produce the more valuable light products) and sour (higher sulfur content) compared to Middle East crude. There is limited refining capacity in China to process this type of crude. This could be partially overcome by limiting initial sales to Venezuela's lighter crudes (for example, Mesa - 30° API, 0.88% sulfur) that are comparable to key Middle East crudes such as Arab Light and Arab Medium. The economics of this strategy will depend on the continuation of Saudi Arabia's policy of pricing East-of-Suez exports at a premium to those to the West.

The United States is a logical market for Venezuelan crude not only because of its close proximity (which as this paper points out is not necessarily an economic advantage), but because U.S. refineries have been built specifically to handle Venezuelan crude. Even if a deal could be arranged between Venezuela and China, the volatility of the oil and tanker markets, as well as Saudi pricing policy, will continue to be factors beyond the parties' control that will affect the economics of the trade.

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