measures in progress. First, the 2010 federal Budget replaced the input subsidy in petroleum products and gas, with a direct subsidy to marketing companies at the point of sale. The 2011 Budget contained an identical policy measure for the fertiliser subsidy. Second, a new system of social security, the 'Unique Identification Number', began to be put in place, which aims to provide every Indian citizen with a unique number upon the collection of his or her biometric data, through which all direct transfers will be made in the future. This system attempts to overcome problems such as the exclusion of informal sector workers by requiring only nationality to be proved, and by linking it to informal sector work programmes such as the National Rural Employment Guarantee. Although an immense exercise that is likely to be susceptible to problems, it may reduce leakages from the illegal duplication of identity. The system was trialled in 2011, and was scheduled for launch in March 2012. It has, inevitably, run into delays. Finally, a significant reform in taxation, the Direct Tax Code, was due to come into force during 2012. This includes a Goods and Services Tax, which will allow for a unified market, whilst maintaining the fiscal autonomy of states. This could further influence fiscal policy in relation to energy subsidies, but it is as of now unclear how the energy sector will be affected.

As before, it can be argued that recent reform measures are part of a wider transition in the Indian economy. During this transition, as distortions mount, parts of the system are modified, usually in the broad direction of liberalisation and reform. But partial reform often has the effect of displacing the problems, for example from upstream to the consuming sectors, presenting new policy challenges, requiring further changes. The current situation is, arguably, a stage on the way. Although there is reason to be optimistic, it is a fragile transition. Indian policymakers currently face rising international oil prices, a depreciating Rupee, a potential slowing of GDP growth (estimated to be down to 7 percent for 2011) and growing public discontent. With the recent defeat of the ruling Congress Party in State Assembly elections, and a General Election fast approaching in 2014, the longevity of these reform measures is likely to be severely tested in the next couple of years. ■

# Pricing Reforms and Capacity Constraints in China's Petrochemical Sector

## DAMIAN TOBIN assesses the impact of China's changed energy pricing system on its downstream sector

**As an economy where the state continues to exercise control over the procurement of a wide range of goods and services, China offers a fascinating example of how economic necessity, mostly as a result of rapid growth in manufacturing, has forced the state to abandon the large-scale subsidisation of petrochemical products.**

Recent data from the IEA show that China's subsidisation of oil is among the lowest of developing nations, having fallen from US$ 27 billion in 2007 to just US$ 7.77 billion in 2010. The withdrawal of subsidies has had a dramatic effect on state-owned refiners, who had long benefited from a complex system of price subsidies for crude oil inputs and tariffs and quotas on imported petrochemical products. Their withdrawal has meant that the crude oil purchased by China's refineries is now priced close to the international price, but the retention of state control over oil and petrochemical product prices has meant that it is often state-owned refiners who are forced to absorb the costs of this adjustment. The result is that China's refineries have faced market prices long before a refining infrastructure appropriate for the needs of large-scale oil refining could be put in place. The following describes how the early removal of subsidies offered a powerful incentive for enterprise reform; but how it has also hindered the ability of refineries to overcome longstanding capacity and production constraints.

### China's Petrochemical Sector

In theory the gradual phasing out of state price subsidies and the benchmarking of production against international prices alongside the reduction of tariffs in product markets should have enabled China's petrochemical sector to improve its efficiency. Indeed over the past decade China has achieved a remarkable increase in refining capacity. Its aggregate refining capacity increased from 5407 thousand barrels daily or 6.5 percent of global refining capacity in 2000, to 10,121 thousand barrels daily or 11 percent of global refining capacity. China is now second only to the USA in terms of global refining capacity. China's position is such that it is now the principal driver of increases in global refining capacity. Of the 0.7 million barrels per day increase in global refining capacity in 2010, 91 percent (or 0.642 million barrels per day) was accounted for by China. What is surprising is that despite the impressive capacity increases, China's refining infrastructure continues to appear poorly equipped to deal with large-scale oil refining. Foreign participation in the sector remains low and many domestic refineries are small in size, geographically dispersed and suffer from the historical problems of low and variable throughput levels.

China's growth has had two specific impacts on the petrochemical sector. First, the upstream or exploration part of the sector has no longer been able to fully supply the downstream or refining part. In 2010, in order to meet domestic demand China imported 4710 thousand barrels daily of crude oil, equivalent to 12.5 percent of global crude imports. China's largest refiner Sinopec could no longer expect to meet its crude oil demand through self-supply. In 2009, Sinopec imported some 75 percent of the crude oil for its refining business from international suppliers.

Secondly, difficulties in increasing refining capacity have meant that domestic capacity alone could no longer match demand. State-owned

refineries typically sought to increase capacity through acquiring refining capacity from their state-owned ministry level parent companies or by acquiring smaller production units. As demand increased, expanding capacity via internal acquisitions was no longer appropriate to meet market demand. By 2010, China imported 1253 thousand barrels daily of refined products, equivalent to 8.1 percent of global imports. These pressures led to an early erosion of the privileged status of petrochemicals as purchasers of subsidised crude oil and a subsequent opening of the sector to international markets.

## Pricing Reforms

China's oil pricing policy has largely evolved in line with its increasing involvement in global manufacturing. Benchmarking the price of oil and gas to international prices became an economic necessity once China became a net importer of crude oil in 1993. The increasing demands of industry for petrochemical-based inputs alongside the failure of domestic state-owned oil companies to discover new oil supplies of sufficient quantity meant that the subsidising of refiners was no longer economically viable. This was to impact not just on the margins of refiners, but also and as a consequence, the extent to which they would be able to maintain and increase production throughputs.

Prior to 1993, petrochemical enterprises faced a three tier pricing system for crude oil requirements. This consisted of a price heavily subsidised by the state (a state low price), a less heavily subsidised price (a state high price), and an unsubsidised market price. For example, in 1992 the state low price for crude oil from *Daqing* and *Shengli* oilfields was RMB265 per ton, while the state high price for oil from *Daqing* and *Shengli* was RMB621 and RMB544 respectively. This compared with an average market price of RMB 1000 per ton. In 1993, the pricing system was reformed to reflect market conditions and all subsidised oil was charged at the state high price. This coincided with China's first year as a net importer of oil.

Up until 2001, crude oil prices were generally updated monthly on the basis of Singapore prices. For example, between November 1999 and August 2000, the state raised oil prices on six occasions in an attempt to keep pace with international developments and support enterprise profitability. Such adjustment encouraged the hoarding of inventories as enterprises could easily predict future price movements. The decision in October 2001, to switch to the issuing of guidance prices based on prices in three international markets therefore represented an important shift in regulatory policy. Guidance prices are calculated on a transparent formula thereby allowing enterprises more certainty. Although the state still retained some control over prices, the new pricing structure was sufficiently flexible to allow enterprises price products according to the price of inputs. This has been particularly important since 1996 when under GATT domestic refiners faced increasing competition from imported petrochemical products. For China's petrochemical enterprises, this had the effect of reducing the tariffs on imported products in their product markets from a range of 9 percent to 40 percent, to a range of 5 percent to 22 percent. Under the WTO tariffs on imported ethylene, synthetic resins and fibres, and gasoline were scheduled to fall significantly after 2003, 2008, 2004, and 2001 respectively.

Under the current pricing mechanism in place since 2009, the National Development and Reform Commission (NDRC) can consider changing benchmark retail prices of oil products when the international crude price rises or falls by a daily average of 4 percent over 20 days. In theory this provides refineries with a credible and transparent pricing mechanism. In practice fuel prices remain a politically contentious issue and price adjustments can be more arbitrary with upward and downward adjustment delayed due to political considerations. It also means that the margins of refineries are still after more than 30 years of economic reform, ultimately dependent on government pricing policy. For example in 2000 it was reported that in Beijing, the local government started providing taxi drivers with 100 Yuan in subsidies a month to help defray rising fuel costs. In 2003, China delayed adjusting prices, as it was feared that higher fuel prices might hurt some of the country's more vulnerable industries as a result of the SARs crisis. In 2011, China raised prices for gasoline, jet fuel and diesel reflecting the rising global prices of these products. But the increases were slower than the increase in the price of international crude. For petrochemical companies this meant that they were unable to pass on the full cost of price rises.

## Capacity Constraints and Squeezed Margins

Although the early removal of subsidies forced refineries to benchmark their prices to international trends, it has not resolved the problems of low capacities and variable throughputs. If anything the current pricing structure has created the incentive for refineries to reduce throughputs and slow production in order to protect already slim profits margins. It also creates the political incentive for the state to pass on international price increases to refiners. The magnitude of this problem is succinctly illustrated in Table 1, which shows the primary distillation capacity of Sinopec's largest refineries. The shaded areas represent refineries that are regarded as meeting international capacity standards. Even those larger refineries that meet international minimum capacity standards continue to suffer from variable throughput levels. Low capacity utilisation of refineries has been a historical feature of China's petrochemical sector. Although the sector achieved considerable improvements following the international listings of refineries in the 1990s, there still appear considerable variations across individual refineries. For Sinopec, China's largest refiner, throughput as a percentage of primary distillation capacity declined from 85.8 percent in 2007 to 80.1 percent in 2009 even though overall yield increased from 93.9 to 94.5 percent over the same period.

The data in Table 1 indicate that although refineries have been successful in bringing on-stream new refining capacity, market conditions and in particular pressures on refining margins and profits, may mean that the historical problem of low capacity utilisation remains. Although large state enterprises in China's oil and gas sector continued to account for a large and increasing proportion of state enterprise profits (31 percent of all SOE profits in 2010 up from 19 percent in 2009), the same is not true for the downstream refining side. Enterprises involved in petroleum, coking and fuel procession account for about 7 percent of total SOE profits and have substantially lower

returns on assets and sales than those on the upstream side. Survey data from China's State Statistical Bureau for 2011 indicate that the oil refining, coking and nuclear-fuel processing, communications equipment and computer manufacturing sectors saw profits plunge 83.9 percent in the period January to September 2011. The suspicion is that the current pricing structure allows the state to delay adjusting prices and force refineries to absorb the cost of any change in international prices thereby further putting pressure on refining margins. Pressures on margins make it difficult to justify running refineries at full capacity, particularly if it results in losses.

## Going Forward

The removal of state subsidies and the reduction of tariffs on a wide range of petrochemical products have led to a remarkable and unusual opening up of China's state-driven petrochemical sector. But it has also created considerable uncertainties, particularly in terms of the future role of the state as both price regulator and owner as well as how it intends to create a modern refining infrastructure capable of supplying China's rapidly growing industrial base. The removal of subsidies and the early opening up of the sector to imports has gone hand-in-hand with a dramatic expansion in capacity and improvements in efficiency. But it has also exposed refineries to volatile international prices without addressing the problems of small-scale and variable throughput. It also exposes refiners to political risk as the state retains the ability to force refiners to absorb increases in international prices. Addressing this will require important political compromises in a sector that has a long history as a strategic part of China's state-owned industrial base. ■

**Table 1:** Primary Distillation Capacity of Sinopec's refineries (Unit: Million barrels/year)

| Refinery | 1998 | 1999 | 2000 | 2004 | 2005 | 2006 | 2007 | 2009 | Throughput as % primary capacity (2009) |
|---|---|---|---|---|---|---|---|---|---|
| **Maoming** | 95.85 | 95.85 | 95.85 | 95.8 | 95.8 | 95.8 | 95.8 | 95.5 | 96.3 |
| **Zhenhai** | 67.45 | 85.2 | 85.2 | 142.0 | 142.0 | 142.0 | 142.0 | 169.69 | 80.3 |
| **Qilu** | 74.55 | 74.55 | 74.55 | 74.55 | 74.55 | 74.55 | 74.5 | 74.55 | 96.2 |
| **Yanshan** | 67.45 | 56.8 | 56.8 | 56.8 | 56.8 | 56.8 | 92.3 | 92.3 | 83.1 |
| **Guangzhou** | 54.67 | 54.67 | 54.67 | 54.67 | 54.67 | 93.72 | 93.7 | 93.72 | 84.8 |
| **Gaoqiao** | 51.83 | 51.83 | 51.83 | 78.1 | 78.1 | 78.1 | 78.1 | 78.1 | 95.5 |
| **Jinling** | 49.7 | 74.55 | 74.55 | 92.3 | 92.3 | 92.3 | 92.3 | 92.3 | 95.4 |
| **Tianjin** | 35.5 | 35.5 | 35.5 | 0 | 0 | 0 | 39.0 | 88.75 | 34.4 |
| **Yangzi** | 39.0 | 39.0 | 39.0 | 56.8 | 56.8 | 56.8 | 56.8 | 56.8 | 100.0 |
| **Shanghai** | 37.6 | 44.7 | 44.7 | 62.5 | 99.4 | 99.4 | 99.4 | 99.4 | 62.9 |
| **Changling** | 35.5 | 35.5 | 35.5 | 0 | 0 | 0 | 0 | 0 | |
| **Luovang** | 35.5 | 35.5 | 35.5 | 0 | 0 | 0 | 46.1 | 56.8 | 80.0 |
| **Jingmen** | 35.5 | 35.5 | 35.5 | 0 | 0 | 0 | 0 | 0 | |
| **Wuhan** | | | | | | 0 | 35.5 | 56.8 | 56.3 |
| **Fujian** | | | | | | 0 | 28.4 | 85.2 | 58.3 |
| **Hainan** | | | | | | 0 | 56.8 | 56.8 | 102.5 |
| **Qingdao** | | | | | | 0 | 0 | 71 | 90.0 |
| **Others** | 35.5 | 35.5 | – | 388.4 | 386.2 | 460.8 | 331.6 | 343.6 | |
| **Total** | **715.7** | **754.7** | **719.2** | **1101.9** | **1136.7** | **1250.3** | **1362.5** | **1611.7** | |

Notes: a) Converted using 7.1 barrels per tonne for Chinese Crude. All figures rounded to one decimal place. b) Refineries meeting the international capacity standard are highlighted. The international capacity standard is of the order of 10 million tons of crude per year equating to approximately 71 million barrels per year

*Sources: Form 20-F Sinopec various years*

# Reforming Energy Subsidies: The Iran Model

## HAMID TABATABAI traces the Iranian subsidy reform experience since 2010

### A Radical Reform

Removing fuel subsidies is a tricky business. Many governments try and fail, often having to backtrack in the face of public protest or political opposition. Bolivia and Nigeria are only the latest examples. Price increases do not have to be huge to provoke opposition. Iran had that experience a few years ago when a government-decreed 20 percent increase was rolled back after a year by a parliament dominated by a rival political current. It is all the more remarkable, therefore, that in December 2010 Iran itself managed to put in place one of the most radical fuel subsidy reforms ever attempted anywhere and make it stick. Prices of various fuels