China Petroleum - A Sense of History in the Making

By Paul Tempest*

The elaborate arrangements of the 15th World Petroleum Congress and International Petroleum Exhibition held in October in Beijing under the patronage of President Jiang Zemin, reflect the arrival of China among the top half-dozen oil producers in the world. China is already top coal producer and a major natural gas producer. Yet China is facing a serious energy policy dilemma.

Some 58 chairmen of major corporations, 38 Ministers and 5186 delegates assembled for a week of high level discussions and carefully prepared technological exchange and review, with the Chinese hosts deploying a total staff of over 800. It was by far the most meticulously organized congress in the 65 year history of the WPC and was followed by an extensive program of site visits to all parts of China.

Tianamen Square, the largest in the world, was especially decorated with flowers, illuminated and closed to the general public. A red carpet carried the delegates, diplomatic corps and top cadres of the Chinese Administration from the square into the still forbidden part of the Forbidden City, where for the first time for this sort of purpose, The Temple of The Imperial Ancestors, built in 1520 AD and renamed by Mao The Working People’s Palace, provided a dazzling backdrop to a reception and entertainment of 8500 guests. Then followed a comprehensive introduction to Chinese regional cuisine. Earlier the Great Hall of the People had provided an equally impressive venue for the Opening Ceremony and musical, gymnastic, opera and ballet entertainment where 4800 guests were served a 24 course banquet simultaneously without the slightest fuss or delay. A half-hour fireworks display had showed how computerized control will revolutionize fireworks displays in the 21st Century. The Chinese, who invented the art were again effectively demonstrating a new technological ascendancy and an ability to cope with large numbers, just as their medieval invention of the compass also changed the course of human history and gave man a new sense of direction.

The scale of China, one fifth of humanity, is ever-present. Walking around the Temple of the Imperial Ancestors with Wang Tao, for 11 years the President of the China National Petroleum Corporation, reminded me of my first meeting when I asked him how many people worked for CNPC. One point six, perhaps one point seven, he had replied. No need in China to even mention the word million. By comparison, the current worldwide staff of the two most powerful oil and gas multinationals in the world, Exxon and Shell, each are close to 100,000 which was the range of uncertainty conveyed by Wang Tao’s reply. On this hallowed spot, I could not help but think that even the Imperial Ancestors themselves might not be too displeased with this brilliant, creative display of traditional skill and rediscovered culture, so long stifled by revolutionary zeal and conformity and narrow-mindedness.

The Yin and Yang, the compass and the gunpowder, the fireworks and the fountain, the power and the poverty.

As far as domestic petroleum production is concerned, there is very good news. The heirs of the Chinese drillers who 2500 years ago perfected the techniques of drilling very many feet through solid rock and distributing natural gas by bamboo pipeline have reason to be pleased. The scale and style of the 15th World Petroleum Congress demonstrated beyond doubt the willingness of the Chinese authorities to attract foreign capital and the scramble by the foreign companies to secure a foothold.

The bad news is all on the demand side of the petroleum equation. Only within the past five years has China moved from being a net exporter of oil to being a major and growing importer. Domestic production is unlikely to keep pace with demand. The implications of this imbalance for the next two decades are profound. China must have its incremental oil to underpin its continued and remarkable level of economic growth. This gives added urgency to the search for new domestic resources, but it also signals increased economic dependence on external supply focused on the Gulf. There is a perceived geopolitical imperative to forge a political and commercial partnership with the three largest (and most unpredictable) Leviathans of petroleum supply - Iran, Iraq and Saudi Arabia, whose mutual antagonisms remain the cornerstone of U.S. containment policy and protection for the industrialized world against a repetition of the deeply damaging Gulf supply discontinuities of 1973-74 and 1979-80 which threw global economic activity into a period of disorder, inflation and unnecessary extended recession. China’s potential exposure to economic dependence and to the political turbulence of the Middle East is a very raw nerve in their thinking.

Contrasts spring readily to mind in China. As far as petroleum in China is concerned there is good news and there is bad news.

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Amongst the Congress plenary speakers, the Secretary General of OPEC and the Executive Director of the International Energy Agency had, therefore, more to say than the predictable rhetoric of sterile consumer/producer dialogue. This has become more or less irrelevant as the global oil and gas markets have taken over fully the role of price-setter and supply-allocator. The markets today also indicate, perhaps too easily, a very low chance of further global supply discontinuity. The IEA is concerned that China, unlike other major importers, does not hold the recommended 90 day level of strategic stocks as a cushion against supply interruption. OPEC, on the other hand, foresees, with some enthusiasm, the emergence of one large new customer who within ten years could begin to rival the oil import dependence of Japan, Western Europe and the United States.

What China thinks it needs most at present is advanced technology to maximize domestic production of oil and gas and, if possible (but unlikely) to achieve self-sufficiency. What it really needs is new technology to make the existing supply go much further. Further relaxations on the bans of the private use and ownership of automobiles indicate an imminent surge in the national stock of vehicles with incalculable consequences for demand for imported petroleum.

Already in Florida and California the prototypes of family saloons with hybrid engines not much larger than a bicycle pump, composite lightweight bodies and elaborate but cheap electronics have been tested and run for the last five years. They use about 20 percent of the petroleum consumed.

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today by the average family saloon. The world record for
distance traveled in a powered vehicle using one gallon of
petrol is now approaching 10,000 miles. There is, therefore,
immense opportunity now for increasing the efficiency of
automobile fuel consumption.

For the Chinese, not surprisingly, a quantum jump in
vehicle efficiency would provide solutions to many of their
energy problems. Yet, from their point of view, the automo-
tive, steel and petroleum industries in North America,
Europe and Japan appear reluctant to forge ahead in this
direction. Indeed, several key Chinese experts I have talked
to find it difficult not to conclude that the Chinese economy
is faced with a competitive conspiracy of free market forces,
institutional self-interest and imposed technological delay
which works to the disadvantage of the entire less-developed
world. While the world’s bankers and oilmen have no
difficulty in financing new exploration and production for oil
and gas without too much consideration of the consequent
environmental impacts, the new technologies of efficient
energy use are starved of capital, bought up at distressed
prices, stifled and shelved.

Governments, for their part, rant on about environmen-
tal protection but have neither the will nor the wit nor the
wherewithal to provide effective stimulus to new technolo-
gies of energy use. They excuse their lamentable lack of
interest by a naïve belief in and reliance on market forces to
solve this and other problems.

The usual answer given in the West to these allegations
is that too much is being expected too soon. That is probably
right. Nonetheless, I think that the Chinese have a point
which needs addressing seriously.

Imminent Breakthroughs in Automobile Design

Report from Beijing WPC Panel

- Lean-Burn - The lean-burn engine creates an air-fuel mix
  of 24:1 (current conventional engines 15:1). Stable
  combustion is achieved with enhanced fuel economy of
  about 20 percent. Several engines are already in produc-
  tion.

- In-Cylinder Direct-Injection - The in-cylinder direct-
  injection engine injects fuel direct into the cylinder head.
  A complex (and still costly) system of pumps and nozzles
  are needed but it achieves an air-fuel ratio of 40-50:1 with
  enhanced fuel economy of 30-35 percent and a marked
  redirection in noxious emissions.

- Cleaned-up Diesel - Injectors can now store pressurized
  fuel to achieve greater pressure-change control. Engine
  noise is reduced. Nitrogen oxides emissions are cut by 20
  percent. Together with catalytic converters for diesel
  engines, fuel savings are likely to be substantial once the
  various systems have been fully developed and tested.

- Electric-Hybrid Vehicles - This combination of a single
  small gasoline engine with multiple electric motors may
  provide fuel savings of 50-80 percent. The electricity
  generated by braking is returned to the battery. This
  technology is a marked advance on electronic vehicles

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which need frequent recharging. The high torque engine
gives immediate and good acceleration. CO₂ emissions are
halved and carbon monoxide, hydrocarbon and nitrogen
oxide emissions can be cut to 10 percent of the level
stipulated currently in Japan (which already has strict
standards).

- **Natural-Gas Powered Vehicle** – Natural gas vehicles use
  compressed natural gas or liquid petroleum gas. LPG
  requires very strict safety standards. CNG is likely to
  become the No. 2 fuel after gasoline, particularly in town
  use and urban delivery fleets. (CO₂ emission arc cut by 20
  percent). More development is needed to reduce the
  weight of fuel pumps and to extend the range.

- **Electric Vehicles** – Electric vehicles have zero emissions,
  almost no vehicle noise and high energy efficiency. They
  are used extensively for urban delivery fleets but the
  current state of battery technology severely limits their
  range.

- **Conventional Development** – Fuel efficiency is being
  gradually enhanced by electronically controlled fuel injec-
  tion, better design of combustion chambers, a greater use
  of lightweight materials, improved dynamics, more effi-
  cient drive systems, flex lock-up for automatic transmission,
  new tire technology.

- **Unconventional Development** – Solar and hydrogen pow-
  ered gas and gas turbine engines still need much further
development.

**Announcement and Call for Papers**

**GEE/IAEE European Conference on:**

**Energy Markets: What’s New?**

Berlin, September 9-10, 1998

Topics Include

- How to define a new corporate strategy in a
deregulated framework?
- How to cope with new environmental policies?
- How to take advantage of spot, options and
  futures?
- How to reduce CO₂ emissions through joint
  implementation?

Those who wish to present a paper are kindly asked to
submit an abstract prior to April 15, 1998 to:

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Or, submissions can be sent to one of the members of the
scientific committee:

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Participants in this GEE/IAEE European Conference
will have the opportunity to attend the 64th International
Conference of the Applied Econometric Association on
**Modeling Energy Markets** at a reduced fee. This conference
will be held in Berlin on September 10-11, 1998, immediately
following the GEE/IAEE European Conference. For more
information contact Georg Erdmann at the above address/fax.

**IAEE Headquarters Moves**

IAEE Headquarters has moved to new space in the same
office building. The new suite number is 350; however, the
old suite number will still reach us. All other numbers remain
the same. Phone 216-464-6365; fax 216-464-2737 and e-
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