

“Fueling our Future – to define a national strategy for energy in Canada”

November 29th, 2004, Ottawa, Canada.

“The International Setting”

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Introduction.

I am delighted and honored to be here. It is a compound challenge to present the international setting as a backdrop to discussions whose very ambitious aim is to define a national strategy for energy in Canada.

Of all the national energy strategy discussions in Canada that I can remember, this must be the first driven from outside government, and by groups right across the energy supply/demand spectrum. This deserves applause: it also speaks volumes.

Let me begin by recounting how and when I met Jodi White¹; its relevance will become evident. It was in, of all places, Saudi Arabia, on April 5th, 1986.

Over the previous year, in the face of expanding Non-OPEC production and falling world oil demand, Saudi Arabia had cut back its production from over 10 mmb/d to 3, to try to defend prices; then it refused to continue as swing supplier, and went instead for market share by changing to a netback pricing formulae. The world oil prices collapsed from \$27 to \$9.

The then Foreign Minister, the Honorable Joe Clark was in Rome, headed for the Middle East: Jodi was his Chief of Staff. He was scheduled to meet with Saudi Oil Minister, Sheikh Zaki Yamani in Dhahran and thought someone from the Energy department should be there.

When our embassy’s driver delivered me to the guest palace to await the delegation’s arrival, its front ramp was bristling with red berets and machine guns; frightened, he urged me out of the car, and sped off. A lapse in communication left me to fend for myself. I got past about 6 guards before I was grabbed, taken inside and shaken down. Eventually someone figured out I was on the Canadian delegation.

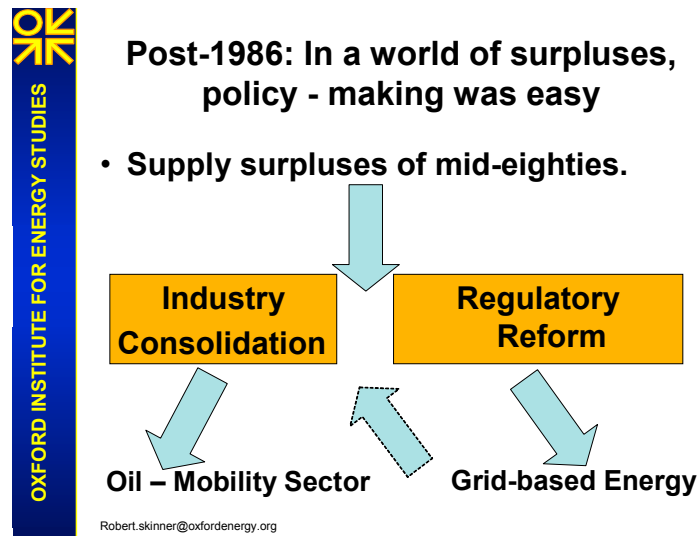
The excessive security was not for the Canadians. It was for U.S. Vice President George Bush Sr. and his entourage. He was emerging from the famous meeting in which he asked the Saudis to cut back on production. Mr. Bush Sr. was feeling the heat of the angry American oil lobby, whose production had dropped by 1 mmb/d; tens of thousands of American oil workers had been laid off. He explained himself by offering that **“low oil prices are a two-edged sword”**, nicely summing up the difficulty the Reagan-Bush Administration then faced in trying to deny what President Franklin D. Roosevelt once grumbled; **“The trouble with this country is that you can’t win an election without the oil block, and you can’t govern with it.”**

The price of oil doubled over the next seven months. OPEC was left holding 11 million b/d of spare capacity, and this was the starting point for a very long voyage in energy policy that has landed us with many of the problems we face today.

In the time available to me I will examine the international context for energy policy and its strategic challenges by looking at two structural themes that have left a legacy in the energy sector that we now must deal with. I will review the recent developments in the oil market as symptoms of the legacy.

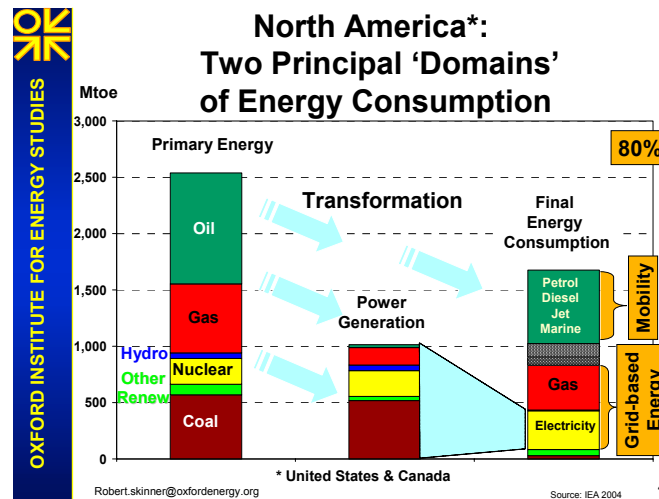
¹ Jodi White is the President of the Public Policy Forum of Canada.

Against this background, I will review the main elements and trends dominating global energy supply and demand and the issues they present, and will focus on a couple specific areas of concern confronting North America. Hopefully this will provide a basis for discussion.



The 1986 oil price crash created an environment into which two major interrelated themes were let loose, with major effect on energy over the eighties and nineties: these were industry consolidation and regulatory reform.

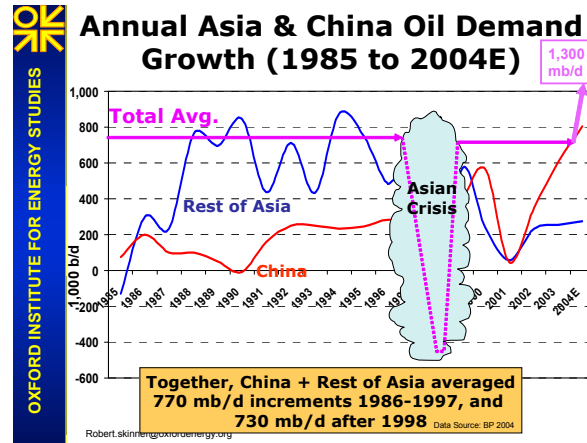
Both themes affected the primary energy supply industries, just as they affected telecoms, transport, banking and other industries. To understand the challenge from a public policy perspective, it helps to look at the energy sector in terms of both primary energy supply and final consumption.



It is the grid-based industries that have been the target of government's market reform policies. The oil market reformed itself in 1986 with the collapse of the OPEC Reference Price and the eventual shift to market related prices. The oil and grid-based energy industries represent two different domains or styles of energy: oil is mostly about mobility, and electricity and gas—the grid-based sectors—bring us a different set of energy services. These two domains have very different relationships with governments and regulators, and with consumers, investors and financiers and they confront quite different tensions in terms of fuel competition and substitution. The nature of their trade differs fundamentally: oil is global and

fungible; buyer and seller are not co-dependent. Gas and electricity are regional or local, their pipes and wires lock in co-dependence. Therefore how we think about their security of supply must differ. Just reflect on the one issue that is increasingly preoccupying these two energy domains: spare capacity, and contemplate the policy tools governments have or don't have to fix it, or more precisely, to create the investment environment that will see it fixed.

Oil and its pricing are central considerations when looking at world energy supply and demand. So, it is worth while to examine just how we got to \$55 oil?



We are told that this is a ‘Demand-Driven Price crisis’ that caught everyone off-guard. While we perhaps should have been surprised by the magnitude of the price change, which has been partly driven by events, we should not have been surprised by its direction. The early signs of an Asian-led demand surge were apparent for more than a decade before the Asian Crisis in 1997. The region’s demand growth averaged 770 mb/d per year since 1986, accounting for most of the annual growth in world demand. In fact, given the total world demand in the early nineties—some 14 million b/d less than today—one could say the Asian/Pacific market expansion was far more important to world oil markets back then than post-2000. But this last year has been different. The region’s oil demand increased by 1.3 mmb/d.

On top of this we had exceptional demand growth in North America of 700 mb/d. Overall global demand increased by 2.7 mmb/d. Regionally or globally, we have not experienced increments like these since 1976.

This reflects the step-jump in the world’s GDP, which according to the IMF grew nearly 5% over the last year, the greatest for the last 20 years, pulled by the North American and Chinese locomotives.

In very simple terms, America’s consumption-driven economy is in part pulling China’s production-based economy. But China is also a major consumer of commodities, which it transforms and partly exports. It is now the second largest oil consumer after the U.S., importing nearly 3 million b/d mostly for petrochemicals and for diesel to generate power and, because of the shortage of rolling stock and rails, to truck coal to power stations

The fact that Wal-Mart bought \$15 billion worth of merchandise from China last year prompts the following cartoon image of what is driving the world oil market: *‘if a boat carrying any convertible commodity floats out onto the Pacific ocean, it gets sucked into a Chinese port, offloaded and, with services and equipment imported from neighbouring Asian countries, converted into stuff that is exported to America where it is shuffled about the continent on trains and trucks to Big Box stores where consumers go 24/7 in their SUVs to buy it’.*

Is this a sustainable condition? Americans are consuming as ever and not saving, having received a boost from generous election year monetary and fiscal policy tonics—some believe this ‘wealth effect’ driven

consumption is illusory and cannot last. This is its first recovery in history without a corresponding growth in jobs.

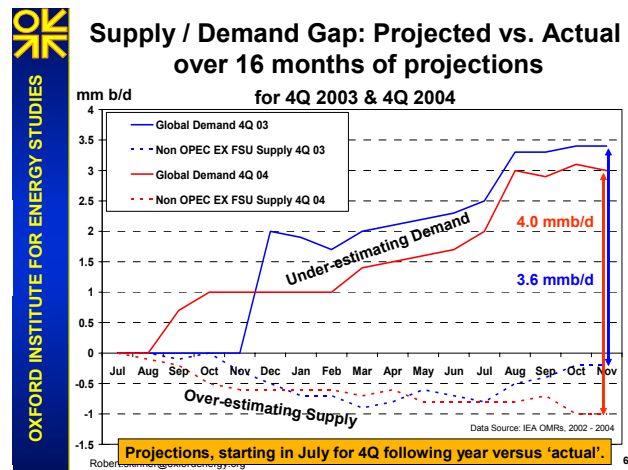
As for China's consumption, the case for collapse is not easy to make; but nor can we count on double digit growth forever.

So, yes, demand growth has been important.

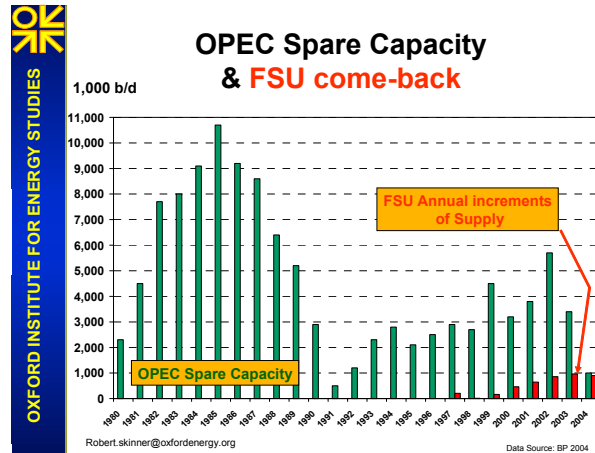
But the confluence of other factors has been very important in driving oil prices. I will mention four: information, spare capacity, political events, and Non-OPEC Supply.

At the risk of oversimplifying an arcane subject, the price of oil is largely determined by expectations about what might happen to supply and demand and how events might influence this balance.

Every day, thousands of pieces of information and misinformation are interpreted or misinterpreted by thousands of players. Important sources of market information are the weekly DOE/EIA and API reports and the monthly IEA and OPEC oil market reports. These have become the respected references. Each month when the IEA's Oil Market Report is published, banks, investment houses, research agencies and consultancies react and send out to their client networks their interpretation of the IEA's data and its forward analysis and estimates. The OPEC secretariat in turn supplements and adjusts its own view of how much oil the market will need, but perversely bases its actual production estimates based on information from secondary sources—not its own members. OPEC's announcements of quota are powerful signals in the market. They reflect the volumes OPEC thinks the market needs, while hopefully yielding a price that meets their members' budgetary requirements.

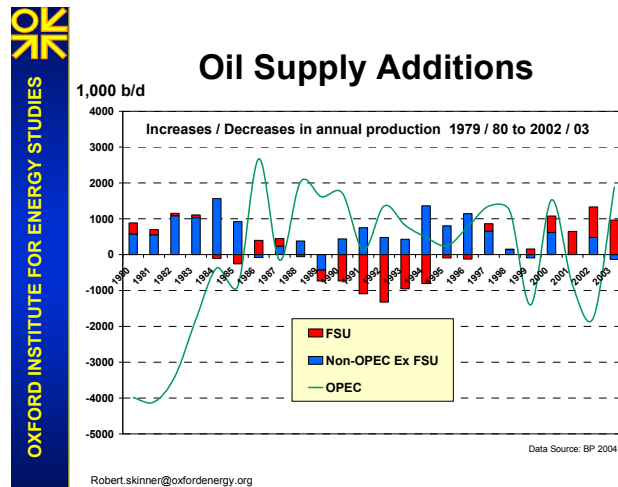


The IEA's OMR is a critical market reference. Each year with its July issue the Agency begins projecting oil supply and demand for the next year. For the last two years, its projections have turned out to leave a very large gap of 3.6 to 4 million b/d between originally expected and eventual actual world oil demand and Non-OPEC production. Above all they underestimated demand in China. The combined effect is like finding out that Iran—the 3rd largest producer in the world—closed up shop. This signalled to OPEC that new capacity was not needed; to oil buyers, that it would be imprudent to build inventories. The misreading of the meaning of inventories compounds the complexity. The role of non-commercial traders—hedge funds—and how OPEC must respond to their positions is another factor, but not the only as some politicians have claimed. So, information is critical.



The second factor was spare capacity. Since 1986, spare OPEC capacity has been gradually whittled down from nearly 11 million b/d to around 3. With the genius of timing that only politicians can muster, the U.S.- led military coalition invaded Iraq just when inventories were at a near-record low. To top it off, production had been seriously lost in Nigeria and Venezuela owing to domestic political upheavals. As Winston Churchill advised, **"However beautiful the strategy, you should occasionally look at the results."**

By August, OPEC's effective spare capacity was virtually eliminated. With spare capacity so thin, even the smallest upset in oil supply and political events had disproportionate impacts on the psychology of the market. To list a few: threats from Russian authorities against Yukos; strikes in the Norwegian oil sector (when the market was clamoring for its light sweet crude); hurricanes in the Gulf of Mexico, and despite hints from the IEA that 'help *could* be on the way' from Strategic Stocks, Vice President Cheney reminded us that the IEA was 'scabbard rattling'—the Strategic Petroleum Reserve saber was not in Paris but in Washington, where it would remain on a shelf.



An important factor was weak Non-OPEC production outside the Former Soviet Union: had Russian production not come back from its mid-nineties slump, we probably would have had this price squeeze earlier, simply because the rest of Non-OPEC failed to add sufficient productive capacity to meet the growth in demand.

The private oil industry, at the global level, has not been replacing capital and reserves. In the late eighties and through the nineties, faced with lower prices and fewer opportunities to invest capital profitably, the new management culture focused on ROCE. Value for shareholders was not to be found in exploration but rather in going for scale and squeezing the synergies from mergers and acquisitions. This metric of

performance for an industry that is fundamentally built on large, long term fixed capital investments was bound to leave supply wanting at some point, and now it has. I hasten to add, however, that since 2000, investment has increased dramatically and is now projected to be nearly \$140 billion for 2005—but the results of this investment will not be felt right away.

Just a few words about **regulatory reform**, the theme affecting investment in grid-based energy supply, in particular electricity: the mid-eighties saw the launch of the great micro-economic policy project, **market reform**. Governments, for many reasons, including to get utilities off the public borrowing ticket, privatized and liberalized gas and power. After all, like transport and telecoms, they are merely input industries; if competition could drive their costs down, some of the resulting savings would be passed on to their wholesale customers, who would retain or hopefully add jobs as they faced increasing competition in global markets. And the newly liberalized and commercialized power generators would be free to invest in non-OECD countries where investment was needed.

That was the theory. The fuel surpluses created by the pre-'85 run-up in prices and by state-owned and protected utilities' over-building, offered a great political opportunity. Introducing competition to industries with surplus supply pretty well guaranteed lower prices. The natural gas bubble in North America was just one example; currently the European power sector is working off its excess generating capacity. But, these surpluses were not an aberration of reform and liberalization, but a legacy of previous regulation and state intervention. And as with oil capacity, surpluses don't last forever.

One of the greatest misnomers in public policy making is the word, 'deregulation' to characterize this reform. Not only was it incorrect but it also dangerously misled governments and publics. Firms have always made, and always will make, their investment decisions within a framework of rules and laws determined by governmental institutions. Policy makers underestimated the creativity of competitive markets and therefore, in what might sound like a contradiction of the spirit of reform—but only if you call it 'deregulation'—the need to fine-tune it and institute the rules necessary to keep it working.

The record of power sector reform has not been stellar.

- Start-and-stop and incomplete reform;
- misapplication of the OECD model to developing countries;
- poor follow-on macro-economic policies; and
- reform simply for reform's sake,

have left a trail of disasters around the world, in developed and developing countries alike. These failures now merely serve as convenient excuses to hesitate in jurisdictions where reform is needed.

The overall effect has been increased uncertainty and risk. Both theory and empirical evidence confirm that policy uncertainty can result in stalled investment; reduced investment in turn has led to fragility, price volatility and, in the case of achieving environmental goals, perverse outcomes.

I now want to turn to global energy supply and demand.

The World Energy Outlook

Fossil Fuels currently meet 80% of the world's primary energy supply. According to the IEA's recent World Energy Outlook, in the absence of major changes in policies governing how we produce, transport and use energy, between now and 2030:

- 1) This share of fossil fuels could even grow as 85% of the growth in primary energy supply will be met by fossil fuels;

- 2) Two thirds of the increase in global energy demand will come from developing countries. Nearly four fifths of their energy growth will be met by fossil fuels. The Transition economies will look to fossil fuels to meet 94% of their growth in primary energy.
- 3) Energy resources are not where they are consumed. The share of energy that is traded will rapidly expand; The IEA worries that as resources in OECD, China and India decline, more and more of the fuels we consume will come from areas of the world perceived as unstable.
- 4) This longer-term concern is overlain by the increased risk of short-term disruptions in traded oil and LNG because they must pass through several key chokepoints potentially vulnerable to accident, extreme weather events or terrorist action. For the IEA and many governments, the prospect of so much traded energy resurrects old energy security concerns, dormant in public policy for many years. How governments might deal with this is creating uncertainty: they will surely ignore the empirical evidence that the causes of most supply disruptions are domestic, not foreign.
- 5) Russia and the Middle East will dominate incremental oil and gas supply, while the United States, China and India will determine growth in demand. The geopolitics of the Middle East are central to the international energy debate. Paradoxically, the region's stability depends on the evolution of macro-economic and political developments in the United States, Russia and China. Therefore, while the Middle East and the Arab world justifiably resist external pressures to reform, its future depends on developments *outside*; its prospects for political reform fundamentally depend on its scope for economic diversification and structural reform, of necessity built on and from their dependence on oil and gas revenue.
- 6) This energy future poses huge challenges for reducing global greenhouse gas emissions, especially within the framework of existing international instruments and national response measures (energy related CO₂ emissions will grow faster than energy use, and will be 60% higher in 2030 than they are now);
- 7) This challenge must be faced along with another; namely, that nearly 1.5 billion people will still be without access to electricity by 2030.
- 8) Developing energy supply will require massive investments. While the resources and money to develop them may be available, issues of risk and access to resources will retard or prevent investment—a condition common to many commodities.

I would like to make a few comments on some specific challenges we face.

Fossil Fuels' continued dominance of primary energy supply is a theme that has not changed for as long as I can remember seeing energy projections. In fact, the recent World Energy Outlook by the IEA provides a sobering reminder. China's energy demand for 2010 is now projected to be 25% higher than the Agency projected just two years ago, when it assumed China's GDP would grow at what turned out to be nearly half of what it actually did. Its CO₂ emissions are now expected to be nearly 6% higher in 2010 than projected two years ago, almost entirely due to coal's growth now expected to be 10% higher. This revision in emissions is nearly two times Canada's reduction commitment under the Kyoto Protocol.

Last year, World primary energy demand grew by 2.9%. Coal's growth at nearly 6% vastly outstripped that of any other conventional fuel, twice as fast as projected by the IEA. Coal is this century's fastest growing fuel by a mile. Meanwhile, the non carbon-based conventional sources of energy—nuclear and hydro, declined and stood still respectively.

The installation of wind generating capacity is happening at a truly impressive rate. The industry has now matured. 2 MW units are routine. And larger units are under development. But even with installed wind capacity growing at 15% per year, the global growth in *power* output from new wind plants last year was matched by the growth of output from new coal-fired plants in just 25 days.

Between 1973 through more than two decades of higher prices, fuel switching and efficiency gains up to when the UNFCCC was launched in 1995, Europe reduced its CO₂ emissions by a little less than 3%. It achieved this by primarily riding on reductions in France—due to nuclear build; in the UK—due to the double dash for gas (residential then power generation); and in Germany—due to re-unification and economic restructuring. Since 1995, EU emissions have increased by 11%. Canada's emissions, I am told are now 25% above 1990 levels.

We can't just simply wish all these numbers and facts away.

Moreover, when we go from the broad trends of the world energy picture, and drill down into specific fuels and regions, we encounter some ominous developments that policy makers need to confront. On the one hand, they see rising and increasingly volatile fuel prices. On the other hand, they see missed CO₂ targets. The former help to attack the latter, but the price mechanism is almost universally rejected by politicians.

Oil: I mentioned the tightness of OPEC spare capacity; but capacity is tight throughout the oil supply chain, from production through transport through to refining. It also extends to drilling rigs & crews and most critically to a skilled workforce. Investment all along the oil supply chain is required; nowhere is this more apparent than in North American refining.

No matter who or which organization examines the challenges facing the oil sector, they land on the need to catch up on investment, the need for access to resources and the need to develop and deploy new and cleaner technologies. Just because the Chairman of EXXON/Mobil says the same thing, neither destroys its validity nor the credibility of those who share the view. It is not a feeling; it is not some conspiracy; it is a fact.

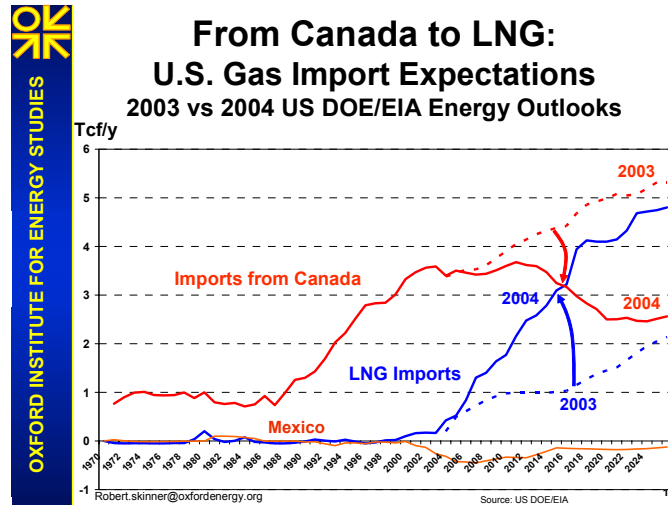
Natural Gas: The received view is that natural gas is all upside; lots of resource and reserves, spread around the world, technologies maturing, and investment underway. Most projections expect that 60% of the growth in global gas demand will go into power generation.

Regionally, the Asia-Pacific gas business has been built on LNG; but demand in its traditional markets is not growing and new high potential markets are starting from a very small base and face structural problems.

Europe is surrounded by gas, the UK is about to become a net importer, yet in the face of disconcerting political developments in Russia, European and British politicians are fretting about security of gas supply and their looming double dependence: importing gas to generate a growing share of electricity, largely an artefact of policies that rule out other fuels. Europe could actually worry itself into a gas bubble.

Here in North America, we have a real problem with gas. Comparing today with 1990, with gas prices more than three times as high, twice as many rigs drilling twice as many wells that are up to 20% deeper, the amount of recoverable gas found per well has dropped by one third or more, and while initial well production is higher, the decline rate in the first year has increased by 50 to 100%. Today the US gas industry has to add 50% more productivity than it did in 1990 just to keep production flat.

In the Western Canada Sedimentary Basin, one of the largest contributors to North American supply, the situation is even worse. For the first time in its history, gas production fell in 2002. In 1990, 3,000 wells found 1.7 Bcf/well. In 2002, three times as many wells found only 1/6th as much gas per well.



Since the late eighties the US has been increasingly relying on Canada to help meet U.S. gas requirements. One of the starkest changes in an energy outlook that I have ever seen is that of the DOE/EIA between its 2004 to 2003 for US gas imports—LNG and Canada virtually switched places in import prominence in the DOE's expectations.

North America faces a challenge. LNG can help, but site approvals for new terminals are not a given. North America is the only major gas market where public policy favors it over other conventional fuels, where undeveloped gas resources exist (in Canada, the U.S. and Mexico), where gas is in tight supply, yet public policy or the lack of it prevents access both to resources and to markets. The outlook is that most future gas on the continent will come from shales, tight sands and coal beds—so-called unconventional gas. This strategy is not without its environmental and technical problems.

Unconventional Oil: more and more unconventional liquids will appear on the scene and Canada's oil business will be based on the oil sands. The synthetic and blended products of oil sands compound the already serious capacity constraint in refining, especially in North America. Also, oil sands production adds to the strain on gas supplies. The emphasis on unconventional oil and gas in the portfolios of the major oil companies is in many ways a reflection of access restrictions they face in replacing reserves elsewhere. More and more they are chasing 'difficult hydrocarbons'—oil sands, ultra heavy crude, LNG, Fischer-Tropsch based liquids, ultra-deep offshore and politically difficult hydrocarbons in places like the FSU. In 2003 70% of the IOC's discoveries were in water depths greater than 200 meters; 65% in water > 1000 meters.

Nuclear: For the sake of discussion, I do not believe that we can hope to come anywhere close to achieving greenhouse gas reduction goals with nuclear ruled out as an option. It can't be ignored. The Blair government is very carefully keeping the option open. Yet I do not see how nuclear can move forward within the current industrial and financial structure and given the public's perception of nuclear.

Faced with the world energy trends presented here, what are we to conclude in terms of public policy? Certainly continued emphasis on **energy efficiency** makes sense. Most countries' climate change response measures rely on improving energy efficiency. But what are they really achieving? Have we learned how to truly measure efficiency gains and are we measuring actual net reductions in terms of associated CO₂ emissions? Certainly in the UK residential sector, since 1970 the energy use per household has remained remarkably stable, despite numerous energy efficiency programs.

Conclusion.

Last month I was invited to a reception at the Foreign and Commonwealth Office of Her Majesty's Government. The Foreign Minister, Jack Straw, set out the UK's International Priorities for its Energy and

Climate Strategy. The government recognizes that energy and climate change are linked to a range of other international issues and areas of foreign policy. They are therefore taking the battle internationally. One cannot but wonder if the UK has arrived at the same starting point as that of the US Senate on climate change; namely, that nothing short of a global approach will work.

Mr. Blair will join President George Bush in making international security a priority, but the British Prime Minister sees its links going beyond national and energy security, a preoccupation of President Bush. For Mr. Blair, climate change is an equal and linked priority, and we should expect him to make these central themes in 2005 as he hosts the G8 and holds the EU Presidency. Where George Bush campaigned this year on national security, Tony Blair shall campaign next year on addressing climate change, and he will urge his fellow leaders to join him in this different global battle.

To conclude, energy policy making in the current decade must reconcile and deal with the major legacies left by past policies. A key policy goal has to be removal of barriers to investment. Energy supply is fundamentally based on long term fixed capital investments that don't happen overnight. The disappearance of spare capacity along energy supply chains is reflected in increased price volatility. Price volatility is a symptom, it is a signal like the proverbial canary in the cage. My fear is that the political response time to price volatility will be far shorter than industry's.

Henry Adams wrote that *"Practical politics consists in avoiding the facts"*. Implicit in my remarks, if we are to meet the energy challenges before us and reconcile them with equally important environmental imperatives, we must face some facts. Therefore to Mr. Adams's aphorism I would add a necessary corollary: **"fiduciary performance of public service consists in ensuring politicians are at least aware of the facts."**

But technical and economic facts are not the only ones. That large numbers among the public do not accept the facts is also a fact. That, ladies and gentlemen, is the very essence of the public policy challenge in designing an energy strategy for Canada.