coming from gasoline and naphtha. Since 1990, the total exposure for the energy swaps market is estimated to have reached $1.5 trillion of notional underlying value – still a young market by comparison with the successes of the mature derivatives markets for OTC interest rate derivatives, but a sector which is enjoying annual compound growth.

As a guide, volume alone has its limitations. There are probably around fifteen hundred OTC oil derivatives price swaps per day being executed in the market – traded routinely by some sixty organisations. Liquidity is provided by the presence of three or four mainline internationally based broking houses. The size and maturity of each transaction varies enormously, but an average product swap might be 10,000 metric tonnes per month of a three-month run, such as 2nd quarter 2005 3.5% Rotterdam fuel barges. A typical crude swap might be 100,000 bbls per month of 2Q 2005 Brent or WTI. Equally, however, it might easily be 100,000 bbls per month for the calendar year of 2005 or 2006.

"all actors now refer to the long-term swap price as an input component in the planning process"

The arrival of derivatives has undoubtedly reduced the potential for market 'squeezes', and so it can legitimately claim credit for having helped to bring order to the markets. But another of the important contributions which the growth of the price swaps market has made is that for the first time, we can see genuine long-term curve shape. In crudes, for example, for several years there has been a clearly defined inter-year spread market available out to four or five years forward, allowing real, liquid two-way pricing. The pricing has a bid/offer spread of less than 5 cents for the shorter maturities (e.g. three years). This year, however, has seen the emergence of transparent price discovery in the very long-dated parts of the crude maturity curve, with interest readily being expressed out for fifteen years.

The very appearance of a visible curve shape has important consequences for the market's capacity to attract fresh users, and therefore for its future growth. Historically, many of the assumptions which underpinned important capital investment programmes were based on fundamental forecasting alone – pie in the sky in many cases, as things turned out. But the 'early teenage' years of the oil price swaps markets have delivered a confident and reliable place to look for valuation, and all actors now refer to the long-term swap price as an input component in the planning process. In exploration, for example, investors are carefully noting the red flags which the backwardated nature of the longdated crude price curve implies: crude oil three years forward is being priced – and can genuinely be fixed – at a full $3 per bbl lower than the spot price, with the market signalling an expected structural price upturn again only seven years from now.

For oil companies, traders, investors and end-users, the price discovery which the swaps market allows are an exciting development. For too long, oil companies have had to allow the value of their stock price – and therefore their capacity to raise fresh capital – to be immediately correlated to the price of a barrel of oil. Increasingly in today's world, the ability to reduce this uncertainty can free such companies up to focus on three simpler issues which will matter most to their increasingly sophisticated shareholders: the value of the assets, the value of the management input across those assets, and the expected return on capital to investors. Indeed, institutional shareholding investors and hedge funds, seeking to add oil price risk to their portfolios, have themselves now become end-users of the derivative market, recognising it as the place where forward oil prices can most naturally be discovered.

Critics argue that while a curve of some clearly defined shape does now exist for volumes such as 100,000 bbls–200,000 bbls per month, the actual liquidity for larger volumes is limited. They would argue that it is still difficult to execute much more than a quarter of a million bbls per month of 2006 risk without disturbing the market. If this is still so, it is nevertheless quite clear that liquidity is increasing month by month, as fresh end-using participants embrace the opportunities offered by these maturing instruments.

Multilateral Energy Co-operation in Northeast Asia: Promise or Mirage?

Philip Andrews-Speed, Xuanli Liao, Paul Stevens

In Northeast Asia are juxtaposed one of the world's largest energy producers (Russia) and some of the world's major energy importers (China, Japan and South Korea). At the same time the region forms the stage for some of the world's great power games. Russia, China and Japan are each a substantial economic and political power in their own right. The USA has a major political and military presence in the region. Finally, the problems of the Korean peninsula and of Taiwan remain unresolved.

At a time when energy demand in Northeast Asia continues to rise (mainly driven by economic growth in China) energy co-operation between these parties should bring direct economic benefits. These would include a reduced dependence on the Middle East for oil supplies, higher levels of investment in energy projects and greater transmission of energy within the region. With respect to the first of these, Japan has long held the view that over-dependence on the Middle East is inherently risky on account of

the political instability of this region. The last few years have seen China adopt the same perception. Together these three elements of co-operation should enhance the security of energy supply for the region, reduce the unit cost of energy and thus further enhance economic development and regional security.

Northeast Asia's Energy Challenge

The energy challenge for Northeast Asia is twofold. The first is the need to satisfy the energy needs of the major economic powers in the region, Japan, South Korea, China and Taiwan, all of which have a growing demand and a growing net import requirement (see Table 1). They are, moreover, at the same time in competition with other Asian states. The second, and related, challenge is for Russia to attract investment for the exploitation of the primary energy resources in the east of the country in such a way that the country and the eastern region realise a benefit. Given that Russia's energy exports and earnings have risen dramatically in recent years and that the government shows no urgency in exploiting the energy resources in the east, it is the first of these challenges which is driving discussions on energy co-operation in Northeast Asia.

Japan, South Korea, and Taiwan are each net importers of oil, gas and coal, whilst China is a net importer of oil, and a net exporter of coal. Both consumption and the net import requirement for the region rose significantly in the year 2003 for all three fuels (Table 1). These four countries together account for not only a substantial share of the world's total energy consumption but, more importantly, a growing share of global incremental energy demand: 51% for oil, 18% for gas and 70% for coal. The same year also saw the region's incremental imports accounting for approximately 34% of incremental globally-traded oil, and 19% of traded natural gas (Table 1).

The trends of growing energy consumption and growing energy import requirement for the region is set to continue increasing for the foreseeable future, underpinned by China's rapid economic growth and inefficient energy sector (Table 2). These trends necessarily raise concerns of security and cost of energy supply for these countries.

The Potential Role of Multilateral Co-operation

Multilateral co-operation between states has the potential to play a major role in enhancing security of energy supply and the cost of energy supply in the region. The primary aims of such co-operation are to remove obstacles to investment in energy production and to the transportation of energy across international boundaries, and to set up specific mechanisms to deal with energy supply crises.

Multilateral energy co-operation can enhance the overall energy security and reduce the overall unit cost of energy in the region in a number of ways:

Table 1: Summary statistics on consumption and net import requirements for main energy-importing countries of Northeast Asia for the years 2002 and 2003

	Consumption		*Net import requirement*	
	2003	*% Change 2002–2003*	2003	% Change *2002–2003*
Oil tb/d				
Japan	5451	1.7	5451	1.7
South Korea	2303	0.9	2303	0.9
China	5982	11.2	2586	29.8
Taiwan	880	4.4	880	4.4
Region	14616	5.4	11220	7.1
Region/World	18%	51	24%	34
Gas bcm				
Japan	76.5	6.4	76.5	6.4
South Korea	26.9	4.7	26.9	4.7
China	32.8	10.8	0	0.0
Taiwan	8.7	2.4	8.7	2.4
Region	144.9	6.8	112.1	5.7
Region/World	5.6%	18	18%	19
Coal mtoe				
Japan	112	4.7	110.7	4.8
South Korea	51.1	4.1	47.8	4.4
China	800	15.3	-70	9.1
Taiwan	35	7.0	35	7.0
Region	998.1	13.1	123.5	3.4
Region/World	39%	70	20%	–

Principal source: *BP Statistical Review of World Energy*, 2003 and 2004.

Table 2: Key changes in projected energy demand and energy imports for the year 2020 in comparison with 1999. 1999 = 1.0

	Japan	*S.Korea*	*China*	*Taiwan*	*Region*
Final energy demand: 2020/1999	1.20	2.00	1.75	1.76	1.63
Oil demand: 2020/1999	1.08	1.63	2.43	1.34	1.64
Net oil import: 2020/1999	1.09	1.63	7.78	1.34	1.89
Oil import/demand: 1999	1.00	1.00	0.22	1.10	0.74
Oil import/demand: 2020	1.00	1.00	0.69	1.00	0.85
Gas demand: 2020/1999	1.38	2.87	5.29	4.38	2.67
Net gas import: 2020/1999	1.44	2.87	n/a	4.50	2.76
Coal demand: 2020/1999	1.18	2.56	1.59	1.92	1.60
Net coal import: 2020/1999	1.20	2.91	(5.25)	1.93	1.39

Source: APEC Energy Demand and Supply Outlook (Tokyo: APERC, 2002)

Table 3: Summary of the main types of potential energy co-operation, and selected benefits and constraints

Type of co-operation	*Specific benefits*	*Specific constraints*
Transboundary networks (Oil, gas, electricity)	• New energy • Additional energy • Increased reliability • Lower cost • Clean energy (gas) • Revenue (RF)	• Distrust (esp. DPRK) • High cost • Better alternatives (e.g. LNG) • Economic nationalism • Poor FDI climate (RF) • Indecision (RF)
Joint Exploration & Production in disputed waters	• Additional energy • Lower cost • Better management	• Distrust • Economic nationalism
Security and Political initiatives such as SLOCS and Middle East issues	• Increased reliability • Reduced risk of interruption	• National security
Market information, especially oil	• Improved functioning of markets • Emergency response capability • Increased reliability	• National security • Economic nationalism
Nuclear power	• Improved management • Environment • Safety • Revenue (J)	• Better alternatives (France, USA) • National security
Emergency response mechanisms, especially oil (storage, sharing)	• Emergency response capability • Revenue (J, RoK)	• Distrust (free rider) • Economic nationalism • High cost • Insufficient benefit
Environmental measures especially coal use	• Cleaner environment	• Cost

RF = Russian Federation; DPRK = Democratic Republic of Korea; RoK = Republic of Korea; J = Japan; SLOCS = sea-lanes of communication.

- Enhancing long-term security of energy supply through the investment in development of primary energy resources, and through investment in construction of transportation infrastructure for energy products (crude oil, oil products, gas, electricity).
- Improving capability to react to oil supply crises, through the construction of emergency stocks and the development of sharing mechanisms and market information systems.
- Producing mechanisms to develop resources jointly in disputed waters and for deposits which straddle defined borders.
- Reducing the environmental impact of energy production and consumption through promoting the use of clean energies and the development and trade of energy efficiency and environmental technologies, by addressing regional environmental issues relating to energy (nuclear, acid rain, marine and river pollution), and developing global warming abatement mechanisms.
- Promoting coordinated approaches to international political and security threats to energy supply.

The peculiar economic and political characteristics of energy mean that all forms of energy co-operation will involve governments facing a conflict of interests, between those of their country and those of the multilateral group. Despite good intentions and favourable rhetoric, most governments will tend to put their own interests ahead of those of the multinational collective. Indeed, on some matters just reaching an agreement can be a major challenge, let alone implementing it. Table 3 summarises the principal benefits and constraints to the main forms of co-operation.

Effective energy co-operation between two or more states requires long-term commitments between governments, preferably underpinned by legally-binding agreements and by permanent institutions. The most prominent international regimes specifically designed for energy co-operation, but with quite contrasting objectives, are the Organisation of Petroleum Exporting Countries (OPEC) and the International Energy Agency (IEA). A further energy-focused institution, but one which has yet to make its mark, is the Energy Charter Treaty (ECT).

Of possibly greater relevance to Northeast Asia are those organisations which have a wider economic scope, but within which energy plays an important role. These include the European Union (EU), the North American Free Trade Agreement (NAFTA) and Mercosur.

Current Energy Co-operation in Northeast Asia

Until recently, all meaningful intergovernmental discussion on energy co-operation in Northeast Asia has been on a bilateral basis and few agreements of real substance have been reached, with the exception of specific investments by companies in purely domestic, rather than transboundary projects. Such bilateral energy co-operation in Northeast Asia was limited mainly to the trade of modest quantities of oil and coal, and to Japanese investment in China's upstream oil industry. In recent years a number of more ambitious projects have been discussed. These include Gazprom's potential but unrealised involvement in China's west-to-east gas pipeline, the construction of oil and gas export lines from Russia to China and South Korea, and the sale of LNG from Russia to China and Japan.

No stable and authoritative institution exists for the deliberation and

development of multilateral energy co-operation in Northeast Asia. Two types of multilateral institution involved in energy in the region can be identified: those institutions which have a wide geographical scope and which happen to include Northeast Asia such as APEC, IEA, Energy Charter Treaty, and ASEAN + 3; and those institutions which are focused on all or part of NE Asia, for example the Tumen River Area Development Programme (TRADP) and the Korean Peninsula Energy Development Organisation (KEDO). Besides these, there are a number of organisations which bring together government officials and academics for regular conferences. Examples include the Northeast Asia Oil Forum, the Symposium on Pacific Energy Co-operation, the Northeast Asia Gas and Pipeline Forum, the Northeast Asia Economic Forum and the Nautilus Institute.

Of these, the most active institution which has the greatest relevance to the energy importing countries of Northeast Asia is ASEAN + 3, a grouping which includes the ten ASEAN states plus Japan, China and South Korea. In the last two years ASEAN + 3 has identified five priorities for study and potential co-operation:

- The creation of an emergency network;
- The development of oil stockpiles;
- Studies of the Asian oil market;
- Improvement of natural gas development and transportation;
- Improvement of energy conservation and renewable energy.

ASEAN + 3 possesses two major drawbacks as a potential framework for energy co-operation in Northeast Asia. Firstly, the group does not include Russia, a major potential energy supplier. Secondly, the economic characteristics and energy needs of the Northeast Asian states are quite different from those of the ASEAN members. Japan and South Korea dominate the grouping in terms of GDP and energy import dependence, and together with China they dominate with respect to population and energy consumption. The geographic location of these three nations makes Russia attractive as a potential source of energy import, whereas the ASEAN states are better positioned to look west to the Middle East.

APEC has concluded two major studies on cross-border trade in both electricity and gas. Though Russia is a member, it is difficult to see APEC playing a crucial role in the development of multilateral energy co-operation in Northeast Asia because the regional scope of APEC is so large and its framework lacks legally-binding obligations. The Asian Co-operation Dialogue (ACD) is a similarly diverse group of nations within a non-binding framework, which stretches from Bahrain in the west, to Indonesia in the east and Mongolia in the north, but does not include Russia. In June 2004 the ACD launched the 'Qingdao Initiative' to voluntarily enhance energy co-operation between member states.

"The peculiar economic and political characteristics of energy mean that all forms of energy co-operation will involve governments facing a conflict of interests"

The Energy Charter Secretariat and the International Energy Agency are both active in Northeast Asian energy discussions and both offer model frameworks for addressing different energy challenges. However as neither Russia nor China are yet full participants of these institutions, it is difficult to see the role of the ECS and the IEA being anything more than advisory and exhortatory.

KEDO was established in 1995 in order to address the nuclear and energy supply issues in North Korea. Its membership includes South Korea, Japan, the United States and a number of other countries from outside the region. Although North Korea occupies a strategic location in the context of Northeast Asia energy co-operation, the ability of KEDO to contribute to such co-operation is presently constrained by its limited membership, its narrow focus and recent events which have rendered it inactive.

TRADP's membership is well-suited to addressing the energy challenges of Northeast Asia. China, North and South Korea, Russia and Mongolia are signatory members whilst Japan is an observer. TRADP was established by the UNDP in 1991 with the objective of creating a hub for international transport, trade and industry, but progress has been constrained by political, economic and physical obstacles. The importance of energy transportation to the region has been recognised, but TRADP recognises that the scale of the challenge is beyond the scope of its programme except to promote discussion on possible frameworks for energy co-operation and to undertake studies.

Another UN body, ESCAP (Economic and Social Commission for Asia and the Pacific) is in the process of establishing an intergovernmental collaborative framework for energy co-operation in northeast Asia. A series of meetings have been held since 2001 which have promoted the establishment of a Senior Officials Committee and a number of working groups to address specific areas of potential activity. These meetings have been attended by officials from the relevant governments (but not all governments have been represented at each meeting) as well as from other international institutions such as the IEA, the Asian Development Bank and the Asia Pacific Energy Research Centre.

A final, but apparently unlikely, potential candidate for the role of driving Northeast Asia's energy co-operation is the Six-Party Talks of which China, North and South Korea, Russia, Japan and the USA are members. This informal institution is currently focused on addressing the immediate political and security challenges on the Korean Peninsula. But given the vital role of energy supply in stabilising the peninsula, it is conceivable that this grouping could develop into a more formal economic

institution once solutions to the challenges emerge. The European Union provides a precedent, as its origin also lay in political and security concerns.

Outlook

Despite the importance and urgency of the need, and the proliferation of pertinent meetings and groupings, the outlook for the development of substantive multilateral energy co-operation in Northeast Asia is not good in the near term. Indeed, even bilateral initiatives are being obstructed by inter-government distrust, for example Japan and China, and domestic indecision, for example Russia. It is this distrust and the complementary conflicting interests which constrain both the progress of specific projects and the development of substantive institutions for multilateral energy co-operation. Individual and collective leadership is required from the key heads of state in order to set aside political differences and establish a legally-binding framework for multilateral energy co-operation in the region. Only then can the energy supplies be secured at a reasonable cost.

Lessons for North America

Edward Morse

Energy issues should have provided clear political lessons to governments over the past fifteen years, especially the United States, which twice led coalitions to battle in the Middle East over matters in which oil played a significant role. It was also a period when revenues from oil and the symbolic ties between the world's largest oil producer, Saudi Arabia, and Washington, became central to the al-Qaeda attacks on New York and Washington. Even in the domestic arena energy should have been front and centre, providing lessons for the future. For in the USA there were periodic spikes in gasoline, heating oil, natural gas and electricity prices, major power disruptions on both coasts and frequent public debates over LNG imports, environmental regulations, and resource exploitation on government lands, among other issues.

Yet, perhaps the most remarkable lesson of the past fifteen years for most people living not only in the USA but throughout the OECD is that energy issues are either not salient enough or tractable enough to rise to the top of the political agenda for long. This is certainly the case for the USA, Canada and Mexico (the three governments in the North American Free Trade Agreement), which, except for brief moments have found the status quo to be politically comfortable. Despite the episodic moments during which an energy issue has come to the fore, with rare exceptions that moment passes before critical decisions are required, and the government is free to ignore and avoid the difficult tradeoffs that are required.

Despite this complacency and the difficulty of moving away from the status quo, major challenges have emerged, both regionally and globally, and it is worth reviewing some of these challenges in that they may provide lessons for the future.

In the USA and Canada, as in most of the OECD (but certainly not in Mexico), two major trends have unfolded over the past decade and a half. These have involved first, the withdrawal of the state from active management of the energy sector, and second, the granting of authority to deal with the major factors affecting energy policy to technocrats charged with implementing environmental laws and regulations.

The state has, at both the federal and the state, or provincial levels in both countries relied increasingly on market forces rather than regulation to provide the framework in which energy commerce and investment unfold. For most of this period, the withdrawal of the state has not only borne few costs; it has spun off perceived tangible benefits. That's because, until quite recently, energy prices to consumers fell substantially over the time frame and governments and publics drew the conclusion that deregulation of energy markets bore permanent benefits. Indeed, through most of the 1990s, declining energy costs were a major factor in the extraordinary economic growth that took place in North America.

Yet, two situations have emerged that may demonstrate that deregulation may have created new problems. Thus far, the problems have not been sufficiently salient to warrant a re-thinking of the relationship between the public and private sectors in energy policy. However, before long that situation might be reversed and the role of the state might again come to the fore of debates. The two problems can be summarised under two words: 'costs' and 'cushions'. They are directly related to one another.

In terms of physical costs, most of the period between 1990 and 2000 was characterised by lower energy costs. Oil costs were persistently below $20, for WTI, Brent and the OPEC basket, except for the brief period after August 1990, when Iraq invaded Kuwait and the UN embargoed Iraqi oil exports. Natural gas and electricity costs likewise were reduced. Indeed, the extraordinary economic growth in North America during the last decade was buttressed by reduced energy costs.

The first sign of change came in 1997. That was when infrastructure constraints first started to loom large, as energy demand growth hit against physical constraints. Oil prices rose to twelve-year highs in nominal terms, as WTI crude, which had averaged $19.30 between 1985 and 1996, and had scarcely risen above $20 a barrel after 1993, suddenly spiked to over $27 a barrel. Day rates for semi-submersible rigs in the Gulf of Mexico, which had averaged less than $10,000 a day in the late 1980s and early 1990s, rose to over $75,000. And OPEC, meeting late that year, virtually lifted all quotas. However, by late 1998 and early 1999, as demand bounced off constraints, oil prices