Transit Troubles

Pipelines as a Source of Conflict

A Chatham House Report

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Paul Stevens
March 2009

Executive Summary

Recent events between Russia and Ukraine at the start of 2009 and Russia and Georgia in 2008 have brought transit pipelines back into the media spotlight. Any reading of the history of transit oil and gas pipelines suggests a tendency to produce conflict and disagreement, often resulting in the cessation of throughput, sometimes for a short period and sometimes for longer. It is tempting to attribute this to bad political relations between neighbours. This is certainly part of the story, but also important is the nature of the 'transit terms' – tariffs and offtake terms – whereby transit countries are rewarded for allowing transit. Put simply, the trouble with transit pipelines has a significant economic basis.

The report addresses three questions:

- Why will oil and gas transit pipelines become more important to global energy markets in the future?
- Why has the history of such pipelines been littered with conflict between the various parties?
- What might be done to improve this record in the future and make transit pipelines less troublesome?

Chapter 1 defines transit pipelines as lines which cross another's 'sovereign' territory to get the oil or gas to market. Such lines have a number of relevant, common characteristics which tend to generate conflict. Different parties are involved, each with different interests and motivations. This invites disagreement between the parties because of the benefits to be shared and the fact that mechanisms exist to encourage one or other party to seek a greater share. Even though this would apply to any commercial transaction, the key difference with transit pipelines is that there is no overarching jurisdiction. More transit pipelines will be needed in the future, since oil and gas reserves close to market are being depleted, and there is growing demand for natural gas in the world's primary energy mix. In recent years, there has been a noticeable fragmentation of legal jurisdictions as the Soviet Union and former Yugoslavia both collapsed. Many of the new transit pipeline projects being discussed are essentially the result of gaming strategies between the various players and will fail to materialize.

Chapter 2 starts with a brief history of the many transit pipelines which have been associated with very negative experiences. In the past, they included those operating in the Middle East; more recently, attention has been focused on those in the former Soviet Union. The chapter then describes lines which can be viewed either as success stories or as having too recent a history for the outcome to be determined. This history helps in identifying which characteristics make for 'good' and 'bad' transit countries. These include:

- the importance of foreign direct investment in the transit country's development strategy;
- the importance of the transit fee in the country's macro economy;
- the dependence upon offtake from the line;
- the availability of alternative routes;
- whether the transit country is also an oil or gas exporter in its own right.

Chapter 3 seeks explanations for poor performance in terms of politics but with the main discussion focusing on the underlying economics which generate conflict. One obvious source of political disputes is a history of bad relations between neighbouring countries. As for the economics, the key explanation is that there is no reasonable, objective basis for determining 'transit terms'. The only sensible reason for the existence of a transit fee is to allow the transit country to share in the benefits of the project. This share will reflect the relative bargaining power of the parties to the negotiations. Over time this changes and thus there are always pressures to change the transit terms. This trend is greatly encouraged by the existence of the 'obsolescing bargain', the structure of

pipeline costs and the growing volatility of oil and gas prices.

Chapter 4 considers possible solutions to help reduce conflict and supply disruptions. These include:

- a military solution;
- encouraging the transit country into the global economy to make it dependent upon foreign direct investment;
- making the transit country dependent upon its own gas and oil supplies from the pipeline, although this can be a double-edged sword;
- considering alternatives to the transit country not only in terms of geographic routes but (for gas) the actual means of transport including, for example, the use of liquefied natural gas (LNG);
- encouraging multilateral jurisdictional solutions such as the Energy Charter Treaty;
- developing mutual dependence between the transit country and the producer/consumer country.

Finally, the report considers a new solution: basing the 'transit terms' on a progressive fiscal arrangement similar to the sort of systems which govern upstream oil agreements.

The report concludes that there will be an increasing need for and dependence upon oil and gas transit pipelines but such pipelines are inherently unstable because of political disputes and also, of equal importance, as a result of commercial disputes over the transit terms. These commercial disputes arise because there is no objective, reasonable or fair way of setting the transit terms.

Many of the apparent solutions to this problem are, on closer examination, at best ineffective, at least in current circumstances. More generally, history suggests that a good experience with transit pipelines requires certain best- practice conditions to be met. These include:

- a clear definition and acceptance of the rules;
- projects driven by commercial considerations;
- credible threats to deter the 'obsolescing bargain';
- mechanisms to create a balance of interest.

However, it is difficult to turn this 'wish list' into a practical agenda.

The only practical, realistic solution in the near term is to introduce 'progressive' transit terms to existing and new agreements. However, ultimately both consumers and producers must diversify as far as is economically practical.

1. Introduction

Recent events between Russia and Ukraine at the start of 2009 and Russia and Georgia in 2008 have brought transit pipelines back into the headlines. Any reading of the history of transit oil and gas pipelines suggests a tendency to produce conflict and disagreement, resulting in the interruption of throughput, sometimes for a short period and sometimes for longer (Stevens, 1998; Stevens, 2000; Omonbude 2007a; ESMAP, 2003). It is tempting to attribute this to bad political relations between neighbours. Although this is certainly part of the story, also important is the nature of the 'transit terms'[1] on which transit countries are rewarded for allowing transit. Put simply, the problem with transit pipelines has a significant economic basis.

This report addresses three questions:

- Why will oil and gas transit pipelines become more important to global energy markets in the future?
- Why has the history of such pipelines been littered with conflict between the various parties?
- What might be done to improve this record in the future and make transit pipelines less troublesome?

The remainder of this chapter defines transit pipelines, explains why they will become more important in world energy markets and outlines some of the future projects currently under discussion. Chapter 2 examines the history of such pipelines, considering both failures and successes, and attempts to identify what characteristics make for 'good' or 'bad' transit countries. Chapter 3 seeks explanations for poor performance in terms of politics but with the main emphasis on the underlying economics which generate conflict. Chapter 4 considers possible solutions to help reduce conflict and supply disruptions. Chapter 5 offers a summary and conclusions.

Defining transit pipelines

A transit pipeline is defined as an oil or gas pipeline which crosses another 'sovereign' territory to get its throughput to market. 'Sovereign' is defined as having the unilateral ability (national or regional) to abrogate agreements. Thus for any transit pipeline to be built requires an agreement between the pipeline owner/operator and the government of the sovereign entity, which may be national or regional. Normally there are at least three parties to any transit pipeline agreement, each located in different 'sovereign' entities. These are the producer of the oil or gas, the consumer of the oil or gas and the third party, the transit country, through whose territory the pipeline passes – although in many cases there can be more than one transit country.[2] The agreement, among other things, determines the 'transit terms'. These are the payments made to the transit government to allow the pipeline to operate. Normally they include a transit fee but the agreement can also set the terms on which the transit country can lift offtake from the pipeline.

Often such an agreement between a government and another government would be viewed as a 'treaty' and as such be governed by international law (although how such law is to be interpreted and enforced is a matter of great debate and uncertainty).[3] Alternatively, an agreement with a commercial entity located outside the transit government's territory, i.e. a commercial agreement, would more likely be governed by some form of arbitration clause whereby a third party would act as arbitrator in the event of dispute.[4]

1 This term is used to include tariffs on the throughput of the line and the price and volumes of oil and gas offtake from the line.

2 As will be developed below, a transit country may also be an offtaker of the oil and gas.

3 Such treaties may well establish some kind of higher authority with responsibility for the line. Often they also exempt the line from much of the local law and administration regulations.

4 In this respect transit pipeline agreements might be very similar to some upstream agreements between a producing government and an international oil company whereby disputes are presented to a body such as the International Chamber of Commerce for arbitration.

However – and this is the central point – for any transit pipeline agreement there is no overarching jurisdiction to manage it, and as a result no obvious mechanism for its enforcement. Thus ultimately a 'sovereign' government can simply ignore what is after all only a piece of paper,[5] although such unilateral action is not without consequences (see below).

Transit pipelines have several relevant, common characteristics. Different parties are involved, each with different interests and motivations. Furthermore, the context created by these differing interests and motivations invites disagreement between the parties because the benefits of the project are to be shared between the various parties, and mechanisms exist to encourage one or other party to seek a greater share of those benefits. Transit pipelines are also similar to national or bilateral pipelines in that, once built, they create a kind of monopoly because they can be operated on a sunk-cost basis; but if they are not built, both producers and consumers may miss out in a valuable trading opportunity.

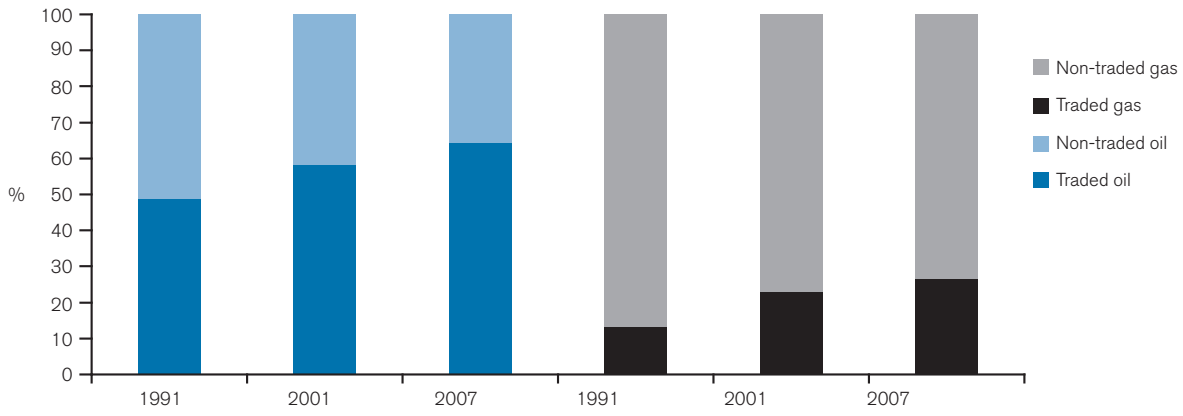
These characteristics lead to conflict or the potential for conflict. Such characteristics are, of course, common in any commercial transaction leading to a contract. However, the key difference with a transit pipeline is, as already outlined, that because of the 'sovereign' nature of governments there is no overarching jurisdiction that is effectively enforceable. Put simply, oil and gas transit pipelines are inherently unstable with no obvious mechanism, at least to date, to control or constrain that instability. This is important because more such lines will be needed

Why transit pipelines matter and will become more important

This section puts forward the argument that in future, global oil and gas markets will need more transit pipelines if expectations of future demand are to be met. Although in the current economic recession energy demand growth has slowed, in the medium to longer term there can be little doubt that more energy will be needed.[6]

The oil and gas trade has grown significantly in the past 50 years. Figure 1 shows the more recent growth in such trade as a proportion of all traded and non-traded oil and gas, where 'traded' refers to cross-border trade.

Figure 1: Internationally traded oil and gas, 1991–2007

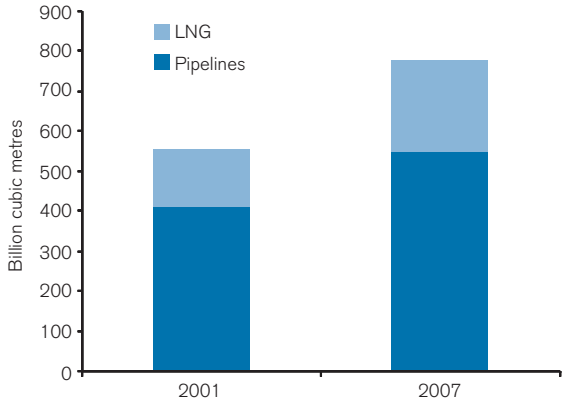


Source: *BP Statistical Review of World Energy 2008.*

5 For obvious reasons this argument is hated by lawyers but that does not alter historical experience, as will be developed below.

6 For example, see *World Energy Outlook 2008* (IEA, 2008).

Figure 2: International gas trade by transport mode, 2001 and 2007



Source: *BP Statistical Review of World Energy 2008.*

How much of the oil trade is carried by transit pipeline is uncertain. The vast majority of oil is moved on the high seas in large tankers but can also be transported by rail and trucks, with the result that precise data collection on oil transport methods is difficult. However, for gas there are only two serious transport options:[7] pipelines and liquefied natural gas (LNG). Data on gas transportation methods are therefore more readily available than for oil. Figure 2 illustrates the trends in recent years; as can be seen, most gas is transported by pipeline, although LNG transport is growing rapidly.

Several factors explain why in recent years transit pipelines have become more important for the increased cross-border oil and gas trade, and why this trend will continue.

Reserves close to traditional markets are being depleted. As oil and gas consumption continues to grow, especially in the emerging-market economies, newer, more remote sources of oil and gas will be required. Many of these will require pipeline delivery simply because they are land-locked.

A good example relates to the potential of the hydrocarbon resources of the Central Asian Republics of the former Soviet Union (FSU). These resources are undoubtedly large, although how large is open to question. The *BP Statistical Review of World Energy 2008* estimates the proven oil reserves of the Caspian basin (excluding Russia and Iran) at the end of 2007 at 48 billion barrels (bb). To put this in perspective, proven oil reserves in the US were 29.4 bb and in Europe and Eurasia, excluding Russia and the other Caspian producers, 16.3 bb. As for proven gas reserves in the Caspian (excluding Russia and Iran), these were estimated at 7.59 trillion cubic metres (tcm) while in the US they were 5.98 tcf and in Europe and Eurasia excluding Russia and the other Caspian producers 7.17 tcf.

In the US Department of Energy's *International Energy Outlook* for 2008 (DOE, 2008), the Caspian basin region accounts for a sizeable portion of the liquids production projected for non-OECD Europe and Eurasia. Thus

> Overall, production from the Caspian Basin is projected to grow at an average rate of 3.6 percent per year, resulting in an increment of 3.0 million barrels per day over the 2005-2030 period. Kazakhstan alone accounts for 2.3 million barrels per day of the projected increase, primarily as a result of the development of its Kashagan field and the expansion of gas reinjection at Tengiz, but also because undiscovered fields in its Caspian territory are expected to be developed before 2030. Azerbaijan and Turkmenistan are other Caspian producers expected to increase their production…. (p. 29).

The legal status of the Caspian Sea – whether it is a 'sea' or an 'inland lake' – has been the subject of much debate (Vinogradov & Wouters, 1996; Vinogradov, 1998). The significance is that if it is a 'sea', then the littoral states have their own designated offshore territory where they can operate as they please. If it is a 'lake', then all the littoral states must agree before any one state can take action, for example by allocating exploration acreage. Leaving aside that debate, it is clear that geographically the Caspian is a lake in the sense that there is no access to the high seas. Exports of oil or gas in any volume will require transit pipelines.[8]

7 Gas can also be transported as 'embodied gas,' whereby the gas is used to produce for export energy-intensive goods such as metals or petrochemicals which are then traded. Gas-to-liquids technology provides another trading option, as does 'gas-by-wire' (the transmission of gas-generated electricity) – see p. 32 below for more detail on these alternatives.

8 Oil has for many years been exported from the Caspian region by road, rail and barge, but this is expensive and not suitable for large volumes.

Growing markets for natural gas. Many gas markets have in the past been constrained by regulatory and institutional factors. Thus if the former Soviet Union is excluded from the data, the share of gas in commercial primary energy has changed relatively little since 1965. Between 1969 and 1991, its share in primary energy remained flat at around 20% (BP, 2008).

In recent years, these constraints have been eroded. A potential 'dash for gas' is being reinforced in many areas by a combination of factors: gas sector reform, creating gas-to-gas competition; electricity sector reform, leading to strong demand for combined-cycle gas turbine (CCGT) generation; and concerns about the environmental damage caused by the consumption of other hydrocarbons. After 1991, excluding the FSU, gas's share began to rise slowly, but by 2007 it had still reached only 21%. However, the IEA's *World Energy Outlook*, 2008 Reference Case projects an increase in natural gas demand between 2006 and 2030 of 150 bcm in OECD Europe, 160 bcm in Eastern Europe and Eurasia, and 380 bcm in Asia.

Another big point is that intra-regional gas trade in East Asia has reached the limit of regional gas export capacity, so that future growth in Asian gas must come from the Middle East (or Russia). It is a big unresolved commercial issue where the breakeven boundary will be. This depends on and will be affected by west-east pipelines.

In this context a great deal in interest is focused on gas from the Persian Gulf, which account for 41.3% of global gas reserves but only 10.2% of global gas production (BP, 2008). Clearly there is huge scope for gas exports. Transit pipelines are central to consideration of such exports, not least because (as will be developed in Chapter 4), concerns have been growing recently about the viability of LNG projects owing to rising costs.

Fragmentation of jurisdictions. In the last 20 years, a significant number of previously unified states have broken up, leading to a fragmentation of jurisdictions. The most spectacular example was, of course, the collapse of the Soviet Union: a single entity with a common jurisdiction and common oil and gas pipeline operations became effectively 15 'sovereign' states. Similarly, the break-up of Yugoslavia led to the creation of seven 'sovereign' states.

These three factors – increasingly remote and land-locked oil and gas reserves, growing gas demand and fragmented jurisdictions – have increased the importance of transit pipeline issues in global oil and gas markets and politics. This is confirmed by the evidence. Any casual observation of the trade press clearly shows many plans for an increasing number of such pipelines. The following section considers some of the transit pipelines being discussed.

Future plans for transit pipelines[9]

Table 1 lists some of the plans for oil and gas transit pipelines, focusing on three main points of origin – Russia, the Caspian region and the Middle East and North Africa – and several

Table 1: Planned oil and gas transit pipelines

From the Caspian region	From Middle East and North Africa	From Russia	Africa	Latin America
• Pan European Pipeline (PEOP)	• Dolphin Pipeline phase two	• Blue Stream	• TransMed	• Gasoducto del Sur
• Nabucco	• Iran-Pakistan-India gas pipeline (IPI)	• North Stream (Nordstream)	• Galsi	
• South Caucasus gas line	• Persian Pipeline	• OPAL pipeline	• Medgaz	
• Trans Adriatic Pipeline (TAP)	• Arab Gas Pipeline	• South Stream	• NIGAL (Trans-Saharan gas pipeline)	
• CPC	• Arish-Ashkelon pipeline		• West African Gas Pipeline (WAGP)	
• White Stream	• Greenstream pipeline			
• Trans-Caspian Gas Pipeline				
• Greece-Italy gas pipeline				
• Poseidon pipeline				

9 The information in this section has been taken from a variety of trade press sources.

options within Africa and Latin America. Some general points about these plans are worth emphasizing.

As Table 1 attests, there are a lot of plans for new pipelines. Several factors explain. First, it is a reflection of the expectations outlined earlier: not only will demand for oil (and especially) gas grow in the future, but these demands will need to be sourced from further away and from many places (most obviously the Caspian region) which are effectively land-locked.[10] Second, considerable strides have been made in the technology of laying, operating and maintaining deep-water sub-sea pipelines.[11] As a result, many routes previously regarded as impossible because of the water depth are now feasible. Such pipelines, however, are not without criticism. Many regard them as high-risk in terms of the potential for environmental disasters (although it must be said that often the objections have as much to do with attempts to prevent the development of competing routes as with genuine environmental concern).[12]

Many of the proposed projects are in effect a series of joint ventures including a mix of private companies, government and state-owned enterprises. The Nabucco project began in February 2002 on the basis of discussions between OMV of Austria and Botas of Turkey and with the active support of the European Commission, which saw the project as means of reducing dependence upon gas from Russia. The line will be connected with the Tabriz-Erzurum line and the South Caucasus pipelines, thus linking it to the proposed Trans-Caspian Gas Pipeline. The 3,300 km pipeline will run from Erzurum in Turkey to Austria. There has been discussion of a further link to Poland. Total eventual capacity is expected to be 31 bcm/y. Similarly, the Greece–Italy pipeline was created in 2006 as an intergovernmental project between Italy and Greece with the support of Turkey to carry Caspian gas (8–10 bcm/y) via Turkey to Greece and Italy. This joint-venture approach in part reflects a desire to spread the risks inherent in such projects but also provides a degree of political protection. It also reflects the fragmentation of European markets as a result of the collapse of the FSU and the break-up of Yugoslavia.

Many of the proposed pipelines are in effect little better than elements in various gaming strategies.[13] This explains the plethora of routes, many of which are clearly competing. For example, The South Stream project was launched in June 2007 as a joint project between ENI and Gazprom to transport Russian gas from the Black Sea via Bulgaria and Serbia to Italy and Austria. At Varna in Bulgaria the southwest route would traverse Greece and the Ionian Sea to southern Italy. A northwest pipeline would run through Serbia and Hungary into Austria or possibly through Slovenia to northern Italy with an option to also supply Bosnia and Herzegovina. The Black Sea part of the system would carry 31 bcm/y. At this stage feasibility studies are still under way but deliveries are projected to begin in 2013 and the whole project to cost $20 billion. Critics have suggested that the project is simply a political move by Russia to block Nabucco and extend Russian influence in the region. The large number of routes also explains why some projects are ignoring the basic economics of pipelines, which require a critical mass of throughput (oil or gas) to be in place before the project can be seriously considered. Some, most obviously Nabucco, are really projects in search of supply.

In terms of gaming strategies, it is clear (and perfectly understandable) that Russia wishes to maintain the dominant position of Gazprom in supplying gas to Europe.[14] This would also seem to be the case, to a lesser extent, with regard to Turkey. For example, the Blue Stream pipeline – the project began in 1997 – transports 16 bcm/y of Russian gas across the Black Sea to Turkey. The line is 1,213 km long.

10 Russia, of course, is not land-locked to the east.

11 For example, in terms of offshore operations in 1988, 400 metres was the deepest feasible operation; this had reached 3,000 metres by 2008.

12 A commonly heard concern relates to pipelines across the Caspian Sea, which is not only an earthquake zone but also has a unique ecosystem, notable for its sturgeon (and the associated production of caviar). There are also serious concerns among the Baltic littoral states with respect to the Nordstream project (see below).

13 Some are also clearly politically motivated. For example, The Gasoducto del Sur project was first agreed upon in January 2006 between the governments of Venezuela, Brazil and Argentina, largely at the instigation of Venezuela in an effort to promote Chávez's Bolivarian Revolution. It was for an 8–9,000 km pipeline to export 100 mcm/d of gas from Venezuela to Brazil and Argentina. The cost of the project was estimated at around $15–$20 billion. Since the announcement of a feasibility study in March 2006, little more has been heard of a project which on the face of it made little economic sense, given the huge distances involved and the obvious alternative to export the gas using LNG.

14 In 2007, Russia supplied by pipeline 25% of the EU's gas consumption (BP, 2008).

Gas began flowing in 2003 but pricing disputes meant it did not really start until 2005. It was explicitly built to avoid transit countries and also to discourage rival supplies into Turkey from the Caspian and then into Europe. In 2005, talks began on building a second line to supply Bulgaria, Serbia, Croatia and western Hungary, plus an expansion of the existing line. However, this second line has effectively been supplanted by the South Stream line.

> 'Continued bad relations between Iran and the US mean that many of the proposed export routes from Iran face serious barriers as the US pressures both markets and transit countries not to take Iranian gas'

To maintain Russian dominance requires controlling existing lines by increasing equity shares and proposing new lines. In part, these are designed to avoid transit problems – this is certainly the case for North Stream. This project commenced in 1997 with the intention of building a gas pipeline from Russia to northern Germany across the Baltic, providing an alternative gas export route between Russia and Germany that avoided the potential problems with the overland gas pipelines. A joint company, North Transgas Oy, was created between Gazprom and Fortum (formerly NESTE) to build and operate the pipeline. In 2001, Gazprom, Fortum, Ruhrgas and Wintershall set up a joint feasibility study. In May 2005 Fortum sold its 50% share in North Transgas Oy to Gazprom, making it the sole owner. In 2006 the project was renamed Nordstream. However, in some cases the proposed alternative lines call into question the viability of competing routes. For example, it is clear that South Stream will compete with Nabucco and that the Persian Pipeline[15] will compete with both. Other gas producers in the Caspian region want access to European markets without having to transit Russia. Finally, the European Union (in the form of the European Commission) is seeking to diversify its sources of gas imports away from Russia. The implication is that many of these planned gas pipelines are unlikely to materialize – a conclusion strongly reinforced by the current state of the European economy. Apart from anything else, while the global economic recession/depression lasts, there is likely to be a serious slowdown in the growth of gas demand in Europe.

The really big potential gas producers of the Persian Gulf – Iran and Qatar, which have around 30% of global proven gas reserves (BP, 2008) – are only on the fringe of new plans. In 2005 Qatar declared a five-year moratorium on new gas export projects. There is a view that this could well extend to 2012. Continued bad relations between Iran and the US mean that many of the proposed export routes from Iran face serious barriers as the US pressures both markets and transit countries not to take Iranian gas.[16] This is particularly relevant in the context of the Nabucco pipeline. In September 2008, the CEO of Hungary's oil and gas company MOL stated that securing Iranian gas supplies was vital for the development of the 31 bcm/year Nabucco line: 'Nabucco becomes a reality if we can get Iranian gas … an empty pipeline is pretty expensive' (*MEES* 51: 39, p. 15). Meanwhile, Iran has also warned OMV (Austria) that Nabucco cannot wait forever in deciding whether or not to include Iran. One Iranian export pipeline which is likely to go ahead is a proposal to export gas to Armenia in exchange for electricity.[17] The plan is to export 1.1 bcm/y of gas, rising to 2.3 bcm/y by 2019, in return for 3.3 billion kWh. This plan was

15 This is a 10 bcm/y gas line from South Pars in Iran via Turkey, Greece and Italy to Austria, first announced in 2008 (Torkan, 2008). However, it is reported that there are problems between Turkey and Iran over 'a number of energy projects agreed since 2007' (*MEES* 51: 34 (2008), p. 13).

16 For example, there is the Iran-Pakistan-India gas pipeline (IPI) also known as the Peace Pipeline. This would be a 2,775 km line delivering Iranian gas to Pakistan and then India with a possible further extension to China. The project was first mooted in 1989. There have been various negotiations, and MOUs signed on the issue. In a private conversation with a senior Pakistani official involved in this pipeline in 2006, the US pressure not to go ahead with the line was described to the author as 'brutal'.

17 This concept is interesting in the light of the idea of mutual dependence as a solution to conflict over 'transit terms', to be developed below.

developed in response to Russia's curtailing of current price subsidies and fears over the reliability of the present gas supplies to Armenia through the North–South Gas Pipeline via South Ossetia and Georgia. In the recent conflict, Georgia cut the throughput on this line by 30%.

In Latin America, the rise of resource nationalism in Venezuela and other political changes have meant that further talk of transit pipelines, especially the massive Gasoducto del Sur from Venezuela to Argentina (see footnote 13), has been muted.

In reality, it is clear that many of these projects will not come to fruition. In part this reflects the troublesome history of such pipelines, detailed in the next chapter.

2. A Brief History of Transit Pipelines

Tales of disruption

The central problem highlighted in this report is that transit pipelines have a history of vulnerability to disruption and of generating conflict that leads to the cessation of throughput, causing serious problems for both producers and consumers. While it is true that many operating pipelines have avoided such problems, those that have such a history have cast a disproportionately long shadow (ESMAP, 2003).

Oil transit pipelines

Much of the negative experience has been associated with transit pipelines in the Middle East.[18] The first ever transit pipeline was built by the Iraq Petroleum Company (IPC). It was completed in 1934 and exported oil from Kirkuk to the Mediterranean via Tripoli and Haifa. After the creation of Israel in 1948, the Haifa link was closed and a spur line to Banias in Syria was completed in 1952. The transit fee was agreed in 1955 with the governments of Lebanon and Syria after the IPC had secured a 50-50 profit-sharing agreement with the government of Iraq on its upstream operations. In August 1966, an extreme wing of the Ba'ath Party took control in Syria, triggering a succession of renegotiations over 'transit terms'. These were generally acrimonious (this was not helped by the natural antipathy between the Syrian and Iraqi Ba'ath parties) and frequently led to the cessation of pumping. This process was greatly aggravated by the higher oil prices after 1971, since Lebanon and Syria felt the value of their transit rights had increased in line with these price rises. Eventually, in April 1982, the IPC line was closed as the result of a deal with Iran, by now at war with Iraq, to supply Syria with crude. Periodically there are rumours that the line will reopen, despite the fact that much of the line's infrastructure in Syria has now been cannibalized into Syria's own production system.

As a result of these problems, Iraq developed alternative export routes via Turkey and Saudi Arabia. The first line, to Ceyhan on the Turkish Mediterranean coast, was inaugurated in 1977. It had a capacity of 700,000 barrels per day (b/d) which was increased to 1.5 million b/d in 1987. The record of the line was mixed, with constant disputes over 'transit terms' leading to a number of closures.[19] Although it is impossible to provide hard evidence, there was a growing suspicion that Syria and Turkey effectively took it in turns to demand a revision of 'transit terms' from Iraq on their respective pipelines. In 1982, Saudi Arabia granted a right of way allowing a spur line to be built from Iraq to link into the Saudi line from Ghawar to Yanbu on the Red Sea. In April 1985, plans were announced for an independent pipeline of 1.6 million b/d via Saudi Arabia, also terminating at Yanbu. This route suffered its own share of disputes; as on several occasions Saudi Arabia limited Iraqi throughput in an attempt to influence global oil markets. The lines have remained closed ever since the 1990 invasion of Iraq.

Another problematic transit pipeline in the region was the Trans-Arabian Pipeline (TAPLINE), first proposed by the US government in 1943 and completed in late 1950. The 320,000 b/d line (increased to 450,000 b/d in 1957) terminated at Sidon in Lebanon and transited Jordan and Syria. At the time, it was the largest privately financed construction project in the world.[20] As a private company, TAPLINE not only had problems negotiating with the transit countries; it also ran into problems with the Saudi

18 What follows is a brief digest of the detailed experiences described in Stevens (1998); Stevens (2000); and ESMAP (2003).

19 The line holds the unenviable record for the fastest ever call for renegotiation of transit terms. At the inauguration at a key pumping station in the Iraq desert, a letter was delivered by hand by the Turkish delegation to the Iraqi delegation as the latter was departing for Baghdad. The new line was closed only 30 minutes after being opened. It took three months to renegotiate the new terms.

20 The partners in TAPLINE were the same as those in the Arabian American Oil Company (ARAMCO), namely Chevron, Exxon, Mobil and Texaco.

government, which saw the line as part of Aramco's operations and was pushing for a profit-share rather than a straight transit fee. The 'renegotiations' with the transit countries led to frequent closures of the line. It also suffered disruption through military action (notably by the Popular Front for the Liberation of Palestine) and from 'accidents'.[21] However, the collapse in tanker rates after 1973 simply wiped out the economic viability of TAPLINE since it became cheaper to move the oil by tanker from Ras Tanura round Africa. The line was effectively closed in February 1975, although Saudi Arabia continued to use it to supply Jordan's Zarqa refinery. Even then, however, disputes over crude pricing and arrears led to periodic shutdowns.

It was not only the Middle East that had a history of negative experiences with oil transit pipelines. The Druzhba line is a case in point. This pipeline, at 4,000 km, is the longest oil pipeline in the world. It begins at Almetyevsk in Tartarstan, southeast Russia and transports oil from western Siberia, the Urals and the Caspian to Mozyr in Belarus where it splits into a northern and southern branch. The Northern Branch crosses Poland into Germany but also allows exports from Gdansk. The Southern Branch goes through Ukraine to Slovakia, the Czech Republic and Hungary. The capacity of the system is 1.2–1.4 million b/d and in 2007, according to the US Energy Information Administration (EIA), it ran 1.3 million b/d. Until mid-2007 it was running smoothly, but then oil supply delivery problems began to emerge as Lukoil cut supplies to refineries in Germany by one-third. These problems are, to some extent, not only linked to the transit issue as a result of which Belarus was cut off. Belarus responded to increased gas prices from Russia in January 2007 by imposing a transit tax on the Druzbha throughput.[22] But Russia too is interested in trying to get equity shares in European refineries.[23] Political motives also explain why supplies to Lithuania via a Druzbha spur were cut off in 2006.

Gas transit pipelines

More recently there has been a succession of problems with gas transit pipelines from Russia to Western Europe. When the first Russian gas export line to the region was mooted in early 1980s, the project faced huge opposition from the US: the Reagan administration saw it as a means for the Soviet Union to exert political pressure on European members of NATO.[24]

In the event, such fears appeared groundless even after the break-up of the Soviet Union. However, during the 1990s problems began to emerge between Russia and Ukraine over the terms of gas transit (Stern, 2006). In particular, these related to payments (or rather lack of payments) by Ukraine for gas lifted from the transit line. In the summer of 2004 a five-year agreement was reached, covering Central Asian gas supply to Ukraine, the price for future liftings and a settlement of past debts for unpaid gas bills.

In 2005, following the Orange Revolution, it became apparent that political relations between Ukraine and Russia were deteriorating. However, this also spilled over into an escalating dispute over gas exported via Ukraine – both over transit fees and over the terms on which Ukraine could lift gas from the line. Effectively the new Ukrainian government abrogated the 2004 agreement which was the basis for settling outstanding issues. The dispute was further aggravated by Turkmenistan's demand for higher prices for its gas supplies to Ukraine. These prices were still well below those prevailing in West European gas markets, which in any case were rising rapidly. On 1 January 2006 matters came to a head when Gazprom cut off supplies to Ukraine, which responded by diverting gas supplies that normally went to Western Europe. The cut-off lasted only four days before Gazprom began to pump more gas but clearly the damage to Russia's reputation as a gas supplier had been done, and security of gas supply moved very rapidly up the EU agenda. It was widely believed that the cut-off had been entirely

21 Famously, in 1970 a Syrian tractor driver ruptured the line near Dira'a but the Syrian government, in dispute over transit terms, refused to allow it to be repaired. This gave a great boost to Libyan negotiations with oil companies over posted price because it pushed up the price of crude in the Mediterranean. In 1971, Libya made a substantial aid donation to Syria.

22 Supplies to Belarus were also reduced in 2007 in response to changes in the Russian tax system which reduced the profitability of refining Russian crude in Belarus to supply products to Western Europe.

23 http://www.robertamsterdam.com/2007/08/friendship_pipeline_creates_mo.htm.

24 The US also wanted to prevent huge hard-currency revenues going to the FSU from gas exports, and actually asked Norway to produce the extra gas and send it to Germany. Norway refused, after a parliamentary commission decided that this would not be on the country's optimal depletion path.

motivated by Russian political objectives, and this added to security concerns.[25] The situation muddled along until late 2008, when negotiations on 'transit terms' stalled. The failure to reach agreement led Gazprom to cut supplies to Ukraine again, in January 2009. This time, however, supplies to Europe were seriously affected. A number of countries were forced to ration supplies or even cut off consumers altogether. The president of the European Commission, José Manuel Barroso, said it was 'utterly unacceptable that European gas consumers were held hostage to this dispute between Russia and Ukraine'.[26] The subsequent negotiations, in which the EU was also indirectly involved, illustrate just how difficult it is to disentangle politics from economics.[27]

Tales of success

Despite the list of failures described in the previous section, it is important to note that there are some transit pipelines where (at least to date) there have been few or no problems.

The ESMAP, 2003 Report (Appendix 1: The Case Studies) cites three categories of cross-border pipelines. The first are called 'Long-Term Success Cases'. These include the TransMed pipeline between Algeria and Italy via Tunisia, and the SuMed pipeline which runs parallel to the Suez Canal and acts as a link between the Red Sea and the Mediterranean. The inclusion of SuMed raises an important semantic distinction. A cross-border pipeline is not necessarily the same as a transit pipeline. A cross-border pipeline may simply be a pipeline transporting oil and gas from one country – a producing country – to another country for domestic consumption.[28] A transit pipeline, however, takes the oil beyond the consuming country, either to other countries or to other markets via the high seas. In the case of cross-border pipelines where no transit is involved, it is doubtful whether there should be any transit fee paid to a government, although there will be pipeline tariffs and costs and revenues to be managed. This important issue will be developed below since it goes some way to explain why transit pipelines within Western Europe have had no problems since the end of the Second World War (see Box 1 on p. 21).

The third 'success' listed is the 'Cross Border Pipelines of the Former Soviet Union'. As the previous section demonstrated, lines in this category could now be viewed as possible 'failures' – although it is too early to categorize them as 'Long-term Failures', unlike the Iraqi lines and TAPLINE, both of which were already listed as such in the ESMAP Report.

The final category is 'Recent Pipeline Projects'. The seven projects in this category were the Baku Early-Oil Project, which included the Western Route Export Pipeline from Baku to Supsa and the Northern Route Export Line from Baku to Novorossiysk on the Black Sea; the Maghreb–Europe Gas Line from Algeria to Spain via Morocco; the Caspian Pipeline Consortium; the Express Pipeline between Canada and the United States; the Bolivia–Brazil Gas Pipeline; the Baltic Pipeline System; and the GasAndes Pipeline. However, the last four are not transit pipelines as such. At the time the ESMAP Report was prepared in 2002–03 it was felt that it was too early to determine whether these seven projects had succeeded or not.

Two other oil transit pipelines have been operating since the ESMAP Report was prepared: the Baku–Tblisi–Ceyhan line (BTC) and the Chad–Cameroon pipeline. In both cases there have been problems. The BTC line was closed in July 2008 following an explosion in the Turkish sector[29] and then got caught up in the subsequent military action between Russia and Georgia, although this resulted only in its continued closure as a precautionary measure. In the case of the Chad–Cameroon line, the problems have been less about transit than about disputes between the World Bank and the government of Chad over how the oil revenues are being used (see Chapter 4).

25 Stern (2006) takes a different view, arguing very effectively that the dispute was essentially over commercial terms and that politics played a much less significant role.
26 Quoted on the BBC http://news.bbc.co.uk/1/hi/world/europe/7841870.stm.
27 At the time of writing – February 2009 – agreement appeared to have been reached, but similar announcements of a successful outcome had been made several times earlier in January, only to be reversed.
28 In that sense, because SuMed is entirely within Egyptian territory it is not even a cross-border pipeline, but it was included in the ESMAP Report.
29 Kurdish groups claimed responsibility but it is not clear whether it was simply an accident.

As discussed above, many other transit pipelines are being discussed at various levels of detail, but as yet none are operational.

From this history, one can deduce whether a planned transit pipeline is more or less likely to face problems.

What makes for 'good' and 'bad' transit countries?

By considering the history of specific transit pipelines it is possible to identify the characteristics of a transit country that may lead it to be a 'good' or a 'bad' transit country (Stevens, 2000). However, it must be emphasized that this cannot be a simple tick-box arithmetic exercise. The 'good' and 'bad' characteristics cannot be assumed to have equal weighting: a 'good' one does not necessarily cancel out a 'bad' one. Judgment is required in each case to weigh their relative importance. Moreover the characteristics change over time. However, the method does at least provide a transparent basis for further discussion. In this context, 'good' might be defined as tending to produce a situation where conditions are predictable and accepted by all, with the result that the most economic transportation method and route are chosen, the line is built and it operates successfully with minimal disruption. 'Bad' might be defined as tending to produce a situation where the line does not get built or is built and then experiences problems.

The role of security. There is a widespread assumption that pipelines are highly vulnerable pieces of energy infrastructure. They cover long distances and therefore every mile cannot be guarded all the time. They also carry flammable material which burns and explodes easily. However, the evidence shows that provided the authorities can get access to damaged parts of the line, they can be easily and quickly repaired (ESMAP, 2003). Oil tankers are not loaded directly from the pipeline, any more than gas consumers are supplied directly from a high-pressure pipeline. In between there is storage.[30] So unless the pipeline is out of action for more than a few days, export capability is not affected. A good example is provided by the activity of the FARQ guerrillas in Colombia. Initially they kept on blowing up the crude oil export pipeline. However, they gave up doing so since it rarely affected loading or export capability but seriously annoyed the local peasants because of the consequent damage to the immediate neighbourhood. Instead, the guerrillas took to simply leaving notice of their physical presence at points on the line – i.e. 'we could have blown it up if we had wanted to'.

> "It is tempting to assume that a good transit country is one where there is internal security and a stable government, and a bad transit country is one where there is internal domestic conflict and an unstable government. However, experience suggests this in not necessarily the case"

It is tempting to assume that a good transit country is one where there is internal security and a stable government, and a bad transit country is one where there is internal domestic conflict and an unstable government. However, again experience suggests this in not necessarily the case. Apart from Colombia, Algeria is a 'good' transit country despite experiencing some 15 years of civil war in which over 100,000 people have been killed

The importance of FDI to the transit government's development strategy. 'Sovereignty', as defined earlier, allows the unilateral abrogation of agreements or at the very least demands for renegotiation. However, such behaviour is not costless to the transit country. Unilaterally changing pipeline agreements to capture improved 'transit terms' means that potential investors in other sectors of the transit country's economy will become wary. Transit countries that are uninterested in or unable to attract foreign direct

30 An important recent exception to this is Iraq, where much of the storage capacity was destroyed by the United States in 2003.

investment (FDI) will be less constrained by any impact on their investment reputation. The corollary is that governments which are desperate to encourage FDI and believe they can attract an inflow will be very reluctant to threaten investment in other sectors by 'bad' behaviour over transit pipelines. However, this must be qualified by the potential prize for 'bad' behaviour in relation to the opportunity cost of lost investment. If the prize is large then the potential of the lost FDI will not act as a deterrent to bad behaviour.

Two examples illustrate. For Tunisia, maximizing FDI has always been central to its development strategy. Thus small gains on 'transit terms' from unilateral action would have made little sense in the wider context of securing FDI. In 2000, the International Finance Corporation (IFC) showed that Tunisia attracted $752 million in net FDI, which made it the second largest recipient of FDI in the Middle East and North Africa after Egypt. For Turkey, in the 1970s when its record on transit from Iraq was very poor, the state of the Turkish economy was such that virtually no one was interested in providing FDI. There was little or no penalty for bad behaviour. However, since the 1980s Turkey has gone to great lengths to attract FDI and so its behaviour with regard to the BTC line has (so far) been exemplary.[31] For example, according to the Turkish Central Bank,[32] in 1984 foreign investment in Turkey amounted to only $113 million. By 2007 this had reached a record $22,189 million.

The size of the benefits from the 'transit terms' to the transit government. The prize to be won from renegotiating the transit agreement concerns its relative importance in the macro-economy of the transit economy, specifically in terms of the government's access to revenue and foreign exchange. If transit fees represent a large proportion of government revenue and/or a country's access to foreign exchange, there is stronger pressure to push for more. If the prize is of only limited importance, the potential damage to other foreign investment may not justify the risk. For example, in the 1970s transit fees from the IPC line were an important part of the Syrian government's revenue and foreign exchange – in 1975, Syria's 'transit terms' generated $188 million (ESMAP, 2003). In the same year, according to IMF statistics, Syria's trade deficit was $755 million.

A variant on this theme is that a country which feels itself to be receiving less than its neighbours for transit may also be more likely to start pressuring for a renegotiation of transit fees. Thus, as will be discussed below, a recent publication on transit fees (Energy Charter Secretariat, 2007) shows huge variations between transit fees in the FSU. This will inevitably result in some countries trying to renegotiate terms. Indeed, the World Bank expressed concern that what it regarded as the extremely low transit fees negotiated on the BTC pipeline were likely to lead to future conflict over a pipeline in which the IFC was investing.[33]

Dependence by the transit country on offtake from the transit line. Domestic use of oil or gas offtake may inhibit the transit country from aggressive behaviour for fear of losing supplies – although this assumes its pressure would be such as to cause throughput to cease.[34] There is an important difference here between oil and gas. Denial of oil supplies can usually be offset by alternative means, given the ease of handling oil and the nature of the international market. Loss of gas supplies, however, is far more serious. Because of the very low energy content per unit of volume transported, alternative supplies of gas are unlikely to be available without huge expense, and certainly not at short notice. Also, the restoration of gas supplies, once reconnected, is far more complex than for oil. Before supplies are turned back on after an outage, ideally a gas engineer must check every burner tip for leaks and for air in the pipes. The presence of either could result in serious explosions. For large individual users such as power stations this presents no problem, but this is not the case for the residential sector.

Fear of supply loss may mute demands to increase transit fees. However, this can play both ways since the transit country can refuse to pay, but continue to lift. Supplies cannot be halted without cutting off consumers

31 Since the fall of Saddam, relatively little use has been made of the export route via Turkey and so it is difficult to asses whether the good behaviour towards BTC will translate into similar behaviour for the Iraqi line.

32 http://evds.tcmb.gov.tr/yeni/cbt-uk.html.

33 Based upon personal experience, although the issue did receive considerable attention at the time.

34 As will be explained below, because of the nature of pipeline costs the transit country can in fact usually squeeze extremely hard before the line is closed.

further downstream. As outlined earlier, a classic example of such behaviour is seen in the recent relationship between Ukraine and Russia.

The availability of alternative routes for the exporter. The cost of an alternative route places an upper limit on the transit fee which can be demanded.[35] However, an alternative route with sufficient capacity needs to be available and credible, and this obviously is specific to the transit country. For example, in the case of TAPLINE the obvious alternative was always tankers out of the Persian Gulf. In other cases, pipelines through other countries are required, although this more than doubles the cost of getting to market.[36] Furthermore, if such alternatives are to be effective, the routes must compete and not collude.

In this context, it is interesting to speculate whether the threat of an alternative route, without the actual investment, is sufficient to ensure 'good' behaviour by the transit country. Contestable market theory suggests the threat of entry to the market is sufficient to induce competitive behaviour (Baumol et al., 1982). Actual entry is not required. For transit pipelines this means that, assuming an alternative route is available at low cost, the threat of using a potential alternative could be sufficient to ensure 'good' behaviour. This argument could be particularly relevant to the Iranian route for Caspian exports which, without US objections, could be initiated with relatively small investment by linking to the existing Iranian network (Ghorban, 1998). However, there is no guarantee that this strategy will always work. For example, the threat of Nordstream to bypass Ukraine has so far not appeared to have changed Ukrainian behaviour.

Competition between the producing and transit countries for markets. Finally, if the transit country is a potential competing source of oil or gas to consumers, this could also result in 'bad' behaviour. Once the transit line is operating and supplying customers, a marketing infrastructure has obviously been developed. If the transit country stops the transit flow, it could then make use of that infrastructure downstream to supplant the original supplier and develop its own markets. Alternatively, it could welcome any transit supply disruption if this led to higher prices on its own exports. The experience of the Iraqi lines through Saudi Arabia provides a example of such behaviour (ESMAP, 2003).

However, while these various characteristics explain why transit countries may or may not be 'difficult', it does not explain the underlying problems with transit pipelines. This is explored in Chapter 3.

Box 1: Why no transit problems in Western Europe?

An oil and gas pipeline map of Western Europe shows a huge network of 'transit pipelines'. Yet this network has experienced none of the transit problems discussed above.

Several factors explain. First, virtually all of these pipelines began as cross-border rather than transit pipelines; hence there was no transit fee and hence no source of potential conflict. When later these pipelines were extended, it was as cross-border rather than transit pipelines. With the development of the European Union commencing with the Treaty of Rome in 1957 there was the start of a common jurisdiction which could govern disputes. Part of the development of this legislative environment was the increasing use of the concept of non-discrimination and third-party access, whereby pipelines essentially became a commercial operation. Thus state involvement (apart from influencing the regulatory context) was extremely limited. At the same time, although the pipelines were and are obviously of strategic and commercial importance, they are only a small part of a much wider economy. Finally, there is the issue of ownership. If the pipeline owner (whether sole or in a joint venture) is a private company which pays tax in the transit country on its profits from the line, this is effectively a mechanism for the transit country to 'share' in the benefits of the project without the necessity of a transit tariff.

35 What these alternatives might be is discussed below in Chapter 4.

36 It is assumed the cheapest route would be chosen first and so the second route would be more costly. Also, pipelines are subject to very large economies of scale (McLellan, 1992). Two pipelines built to carry a given total capacity would together incur very much higher average total costs than one line built to carry the same capacity.

3. Why Transit Pipelines Have Experienced Problems

In general, disputes and conflicts over transit pipelines can, depending on their specific characteristics, be explained as follows:

1. Different parties with different interests are involved in the pipeline project.
2. There is no overarching legal jurisdiction to police and regulate activities and contracts.
3. The projects attract profit and rent to be shared between the various parties.

Each characteristic may be associated with certain consequences.[37] Together, these consequences may combine to produce dispute and conflict.

The causes of the consequent disputes can be divided between politics and economics, although this division is often extremely unclear. A careful reading of the history of transit pipelines (Stevens, 2000; ESMAP, 2003) shows that often political motives are wrapped up in economic disputes and vice versa.

Politics

A rather obvious but important point is that neighbours do not necessarily have good relations. Indeed, history suggests that bad relations between neighbouring countries have been the norm.[38] These poor relations are reinforced when there are competing regions within a single nation-state, whether unified or federal.

The political conflicts arising from this obvious state of nature have affected transit pipelines in many different ways. For example, some of the problems of the IPC line through Syria arose because of ideological differences between the two factions of the Arab Ba'ath Party. Attempts to build a gas pipeline from Iran to India have stalled on long-standing disputes between India and Pakistan. Plans to run a gas export pipeline from Bolivia to the Chilean coast fell foul of a dispute originating in the 19th century, when Chile annexed part of Bolivia, preventing Bolivian access to the Pacific. Instead a longer, higher-risk route to the coast through Peru was considered. More recently, it has been difficult not to conclude that the dispute between Russia and Ukraine stems at least in part from Russia's attitude to the Orange Revolution in 2004–05. At a regional level there are the obvious problems in Nigeria and Colombia and potentially within Iraq.[39] These disputes are reinforced where the pipelines are of crucial importance to the central government, since they provide militant or politically disaffected regional groups with an extremely powerful lever to pursue their goals. Both in terms of national and regional conflicts, the growth of resource nationalism (Stevens, 2008) is likely to make this situation worse in the future.[40]

A more general point is that there are usually a number of unresolved issues between neighbouring countries, ranging from economics, travel and migration to combating crime, tax evasion and smuggling – all of which could be aggravated if a serious pipeline dispute arose.

37 Individually, the characteristics and consequences are not unique to cross-border pipelines. Collectively, however, they produce serious consequences for the operation of such pipelines.

38 Arguably this is part of man's DNA. As Thomas Hobbes observed in 1651 in *The Leviathan*, 'The condition of man … is a condition of war of everyone against everyone.' In similar vein, according to an Arabic proverb, 'The world began with war and will end with war' (Moseley, 2002).

39 The Iraqi pipeline to Turkey upon which the Kurdish Regional Government (KRG) will hope to export its oil runs through Sunni areas of Iraq, thereby inviting huge potential conflicts if the KRG tries to operate outside a unified state.

40 For example, if a central government is becoming more nationalistic, why should this not also encourage greater 'nationalism' from regional or tribal groups?

Equally, difficult relations over these issues could spill over into pipeline disputes. Again, the recent history between Russia and Ukraine illustrates this point rather well.

However, this aspect of transit pipelines deserves its own detailed, separate account.[41] The focus here is on the less obvious, economic source of conflict, namely in the form of disputes over 'transit terms'.

Economics

Economic sources of conflict revolve around the terms of transit plus profit- and 'rent'-sharing in the context of the 'obsolescing bargain'. Here, some definitions are required.

There are two components to a return on any project. The first is the economist's 'normal profit', which is the amount that the project must earn to be justified and to remain in business. In effect this is the required rate of return on the project. Anything above that return would be classed as 'super-normal profit'. Another definition might be 'economic rent', where 'rent' is defined as the difference between the full costs of the project (including 'normal profit') and the market price earned by the project. Rent arises because of a monopoly position and/or as the result of a gift of nature where natural resources offer below-average costs of production. In the case of oil and gas prices this rent can be considerable because of huge variations in the costs of producing the oil and gas and also, for oil, because OPEC restrains supply to secure higher prices. For pipelines the 'rent' might also reflect a monopoly position for the transit country.

The term 'obsolescing bargain' was coined by Ray Vernon in the 1960s (Vernon, 1971). It describes a situation in which, once the investment has been sunk and operations begin, relative bargaining power switches to the government from the company. This encourages the government to try unilaterally to secure a greater share of the rent. Although the concept was designed to describe the nature of relations between governments and companies in the context of upstream oil agreements, it applies equally to transit agreements.

As already noted, the transit agreement determines the transit fee to be paid to the transit government and also (in many cases) the terms on which the transit country can lift oil and gas from the line. A major problem associated with analysing such terms is that until recently the terms of many transit agreements have been treated as commercially (or indeed strategically) confidential. Thus histories of such agreements tend to present relatively sketchy data on what the terms actually are, often drawn from a mixture of trade press reports and rumour (Stevens, 2000). But as pipeline consortia are increasingly having recourse to the IFC arm of the World Bank for financing, this has meant that the terms of transit agreements are becoming more and more publicly available. The Energy Charter Treaty Secretariat has also undertaken a wide-ranging survey of tariffs in the context of the FSU (Energy Charter Secretariat, 2007). However, transparency of 'transit terms', while helping analysts, can also be a double-edged sword if revealing the terms of one agreement creates dissatisfaction over another.

The setting of transit fees to allow oil and gas pipelines though another's territory has always been a difficult and controversial area. As will be developed below, there is no 'objective' or 'fair' way of setting such fees. Thus the outcome, in the form of the transit agreement, depends upon relative bargaining power and the skill with which that power is used in the negotiations between the transit government and the transit pipeline company. The latter may be private or may include involvement by the producing or consuming country's government at either end of the line. Making the 'transit terms' dependent upon the outcome of bargaining power is undesirable since it makes any transit agreement signed vulnerable to pressure for renegotiation as the relative bargaining power changes – i.e. the 'obsolescing bargain' becomes operable. The changes may come about because of the situation between the signatories – for example once the investment in the pipeline is sunk the pipeline company becomes a hostage to fortune – or simply because changes to oil and gas prices have materially changed the value of the pipeline project. It is these changes which generate much of the conflict associated with transit pipelines.

41 For example, see Feakin (2007).

In order to determine whether there is an objective basis to determine transit fees (which may also include offtake from the line at preferential rates), it is necessary to consider the actual purpose of the transit fee. In the literature there are several strands of justification for the charging of a transit fee by a transit government (ESMAP, 2003).[42]

The first strand is that a transit fee is compensation for the negative impact of the pipeline on the transit country. However, this justification is at best thin. Normally the land used to construct the line – i.e. the right of way – is paid for as the result of negotiations between the pipeline company and the landowner, which may or may not be the government. It is thus quite separate from issues related to transit. Landowners clearly deserve some form of compensation for their loss, but this is normally covered by negotiated purchases.[43] Such purchases can often prove to be problematical since in most contexts there must be some form of rights of 'eminent domain' or 'compulsory purchase' which prevents a landowner from holding the project to ransom by refusing to sell. This may result in aggrieved landowners but it is not part of the transit issue affecting government-to-government relations.

There may also be environmental externalities associated with the building and operation of the pipeline, but these can be covered by well-known techniques to internalize the externalities[44] (Pearce et al., 1989). Finally, disruptions to local communities[45] from the pipeline are normally dealt with directly by the pipeline company, often through some form of Corporate Social Responsibility (CSR) spending within the community, or indeed by employing locals to assist in protecting the security of the line. Thus in general such negative impacts should not be considered part of any transit package, since mechanisms for their management already exist.

The second strand in the literature is that a transit fee is a reward to the government for sacrificing some of its 'sovereignty' by allowing the pipeline to operate on its territory, specifically by the treaty commitments it undertakes. Again, as with the previous argument, the logic is highly questionable. First, assuming no coercion, since the transit government of its own free will has negotiated and signed an agreement to allow the line to be built and to operate, it is not clear that 'sovereignty' has been breached. In any case, attempting to place some form of objective monetary value on sacrificing 'sovereignty' is next to impossible.[46]

In reality there is only one sound justification for paying a transit fee to a transit government. The transit pipeline contributes to creating a project of value to the producer and consumer of the oil and gas. Thus the transit country deserves some share of that value. While this is a reasonable approach conceptually, it raises two key questions: what the contribution of transit to the value of the project will be, and how to measure it. It also explains why, in the case of cross-border pipelines which are not transit pipelines, there is no need for a transit fee since both sides of the border (presumably) benefit from the project.

If the transit country is an active partner in the pipeline, contributing capital and bearing risk, then it is possible to determine what a reasonable rate of return on the transit country's investment might be – i.e. its 'normal profit', although this in itself can be extremely controversial (Penrose et al., 1992). And there is always another danger. If there are elements of monopoly in the route (which is often the case for geographical reasons), the transit country may seek – quite understandably in a world of profit maximization – to exploit this monopoly position by seeking higher returns on its investment given that its sovereign status protects it from anti-trust action.[47]

42 For a discussion of different methodologies used to set tariffs, see Energy Charter Secretariat, 2007.

43 With subsoil pipelines, landowners can still use the land although there may be restrictions on how far they can dig or plough below the surface. These restrictions would normally be reflected in the purchase price.

44 For example, the 'polluter pays' principle means external damage must be paid for by the perpetrator.

45 In general, barring major accidents, most of the disruption to local communities from transit pipelines comes in the construction phase) although this is often compensated for by increased local employment). Operation of the line tends to entail limited local disruption.

46 The case is well illustrated by reference to a famous exchange at a dinner party between the Irish playwright George Bernard Shaw and a beautiful woman. He asked her if she would go to bed with him for one million pounds. When she replied somewhat coyly that she might consider such an offer Shaw then enquired if she would for one pound. She immediately demanded to know what sort of woman Shaw thought she was. Shaw replied, 'Madam, we have established what sort of woman you are, we are now just haggling over the price'.

47 Of course membership of the WTO or some other form of treaty or organization might, at least on paper, constrain such behaviour.

Some have advocated making the transit fee conditional upon the length of the line in different countries (calculating on the basis of benefit to the project). Thus if three countries each share an equal length, each should receive one-third of the benefit associated with the line. However, such logic is seriously flawed. Even if only one mile of the line goes through a country's territory, without that one mile the pipeline cannot be built; therefore the contribution in terms of benefit from the project is equal to that of the country with much longer sections of the line.

Another obvious way of assessing the benefit contributed by the transit country is to consider the potential cost of an alternative method to make the project viable. As discussed in detail below, the alternative might be another geographic route or, in the case of gas, another method of transport. This 'saving' would be a direct and clear basis for determining the contribution of the transit country to the project, although it is more complicated than a simple comparison since it cannot be assumed that both possible routes would be able to negotiate the same transit fee. Differences in fee would have to be factored into the saving on construction and operating costs. If there is only one possible transit route, in theory all the value of the project above the 'normal profit' would be given to the transit country. In purely geographical terms, it is impossible to think of any transit route where there is no alternative, including sea-borne transport. However, often politics does limit routing options. In such cases the cost-saving argument starts to unravel.[48] This raises the issue of who is entitled to the 'rent' or 'super-normal profit' associated with the whole project – defined as the production, transportation and consumption of the oil or gas. Again, since this arises in the context of transit pipelines because of an accident of geography, no one is 'entitled'. It is essentially up for whoever can capture it.[49]

Thus the conclusion is that there is no objective means to set a transit fee.[50] It will be determined by naked bargaining power at the time of the negotiations.[51] However, once the agreement has been signed and the pipeline built, the relative bargaining power swings dramatically in favour of the transit country. Certainly in the past this has encouraged a renegotiation of 'transit terms', often simply imposed unilaterally by the transit country (Stevens, 2000). This is the 'obsolescing bargain' explained earlier.

Pipelines are especially vulnerable to the 'obsolescing bargain' because of their cost structures and physical inflexibility. They attract very large economies of scale and therefore tend to be very large, capital-intensive projects (McLellan, 1992). Thus they are characterized by very high fixed costs and very low variable costs. The majority of costs are fixed, associated with securing 'rights of way' and building the pipeline and pumping stations. Variable costs relate only to maintenance and fuel for pumping; in the case of gas pipelines the latter is often supplied at below-market prices. The economist's 'bygones rule' explains that even if an operation is making a loss, the owner would be advised to continue operating so long as variable costs are covered and some contribution is being made to fixed costs. Thus if the loss exceeds the variable cost, closing the operation will minimize losses. However, if some contribution is being made to fixed costs, closing would not remove the fixed costs, and losses would be higher than continued operation.[52]

Thus the transit country can keep increasing transit demands even if it means the pipeline begins to operate at a loss. It will not close if economic considerations are the only factor, since closure still entails fixed costs. This makes the transit agreement a very tempting target. Furthermore, pipelines are by their nature inflexible. If they are closed for any reason, countries at both ends of

48 A good example was the BTC pipeline from Azerbaijan to Turkey, with Georgia acting as the transit country. The most economic route for Azerbaijani oil was unquestionably via Iran but the attitude of the United States closed off that alternative.

49 This provides a strong argument for vertical integration between the upstream, midstream and downstream parts of an operation.

50 This conclusion is strongly reinforced by the findings of the Energy Charter Secretariat, 2007, which found that 'Transit tariffs across the Energy Charter constituency show a wide range of variations… [from]… as low as $0.47 per 100 tonnes per kilometer (100tkm) for a part of the Belarusian section of the Druzbha pipeline … to $1.95 per 100tkm in the case of the CPC pipeline' (p. 67).

51 For an excellent and accessible discussion of the economics of bargaining in the context of transit pipelines, see Omonbude (2007b).

52 The working of the 'bygones rule' is an extremely common phenomenon in the oil business. It explains why refiners continued to refine and tankers continued to sail despite the fact that huge losses were being made after the first oil shock in 1973–74 owing to declining oil demand.

the line suffer considerable problems. As already explained, this is especially true of gas since alternative transport means are virtually non-existent in the short run. This puts the transit country in an extremely strong bargaining position to squeeze ever more from the operation.

The fruits of renegotiation can be large. Furthermore, the pipeline owner/operator is also likely to be the producer of the oil or gas. This arises because of a further economic characteristic of pipelines. High fixed costs in any operation make full-capacity operation vital to protect profitability. Below-capacity operation means that the high fixed costs are spread across a smaller throughput, causing average fixed costs to rise exponentially. Hence, independent pipeline operators are a very rare breed.[53] The best guarantee for a full pipeline lies in owning both the production and the line. It is no accident that the Rockefeller Standard Oil Trust was based upon a pipeline network (Yergin, 1991). There is an important difference between oil and gas. Oil sales attract considerable 'rent' if only because of the existence of OPEC. By contrast, gas sales, at least in the past, had limited 'rent' and the prize was much less attractive.[54] Gas lines were therefore justifiably regarded as less vulnerable – at least until the recent problems between Russia and Ukraine (ESMAP, 2003).

Finally, transit pipelines are also vulnerable to demands for renegotiation if the value of the project keeps changing over time because of changes in the price of the oil or gas. This is an important issue, to be developed below.

To sum up, given the underlying nature of the economics of pipelines and transit agreements, it is not surprising that their record has been mixed. There have been innumerable disputes over 'transit terms', causing the flow of oil and gas to cease while new terms were negotiated.

53 It is probably true to say that outside the US, Canada and Western Europe, they are virtually unheard of.

54 The record supports this (ESMAP, 2003). However, whether this is still true today is debatable given the recent dramatic increase in gas prices. Thus in 2000 the EU cif price for gas was $3.25 per million btu but this steadily increased to reach $8.93 in 2007 (BP, 2008).

4. Possible Solutions

This chapter considers possible solutions to the problems identified in Chapter 3 as causing disruption to the flow through oil and gas transit pipelines.

Invasion

A rather extreme solution is actual or threatened military action by the countries damaged by the transit country's unilateral action. This might be overt military action or simply supporting political opposition elements within the transit country to create a variety of disruptions, peaceful or otherwise. It is noticeable that where transit relations have been good, it is often where the transit country is dominated by a large and potentially threatening neighbour. An obvious explanation for Transmed's success may lie in the vulnerability of Tunisia to pressure from both Algeria and Italy. The TransMed sales agreement was framed in such a way that once the gas crossed the Algerian frontier it immediately became Italian property. Therefore, any transit fee dispute would technically have been between Tunisia and Italy.

Syria and Turkey, on the other hand, were relatively immune to pressure from Iraq. Of course it might be argued that the experience of Ukraine and Russia negates this as a solution. It could be that Ukraine assumes that NATO would not allow a Russian military incursion given discussions about Ukraine's possible future membership.[55] However, Russia's incursion into South Ossetia and Georgia in 2008 (albeit under the guise of protecting Russians in South Ossetia) makes any such assumption somewhat debatable.

Globalization and dependence on FDI

Whenever a country acts unilaterally to change the terms of the transit agreement this is not a costless exercise. It clearly damages the reputation of the country and inhibits the flow of FDI into that country. As indicated earlier, various histories of transit pipelines suggest that when a government cannot get or does not want FDI as part of its development strategy, the costs of unilateral action are much less significant. One solution, therefore, is to increase the attractiveness of FDI as part of a development strategy and to encourage transit countries to enmesh themselves more in the global economy. To some extent this has been happening, as is reflected by the queue of countries trying to join the WTO.[56] Increasingly in the 1980s and 1990s, in a world of globalization, governments were basing their development strategy on attracting FDI.[57]

However, in recent years several problems with this solution have emerged. First, the view of globalization as the solution to national economic problems has come under wide-ranging attacks. These were most noticeable after the Asian financial crisis of 1998 and were driven in large part by the sense of many in the emerging market economies that they had seen little benefit from the process (Abdela and Segal, 2007). Second, there has been a strong revival of resource nationalism in many oil- and gas-producing countries (Stevens, 2008). However, it has also spread to neighbouring transit countries. This is not only by virtue of a demonstration effect but because many of the transit countries were experiencing the sort of post-imperial reaction that characterized much of the so-called 'Third World' in the 1950s and 1960s. Arguably, nationalism played a key role at a popular level both in the Orange Revolution in Ukraine and the Rose Revolution in Georgia, although in

55 It has been suggested by one of the reviewers they are under no such illusion.

56 According to the WTO website, at the end of 1995 WTO had 113 members. In 1996 fifteen countries joined; during 1997–99 seven; and during 2000–08 eighteen.

57 See the example of Turkey, alluded to above.

both cases a desire to integrate further into the West was also an important driver for the leaders of the revolutions.

Making the transit country an offtaker

Another possible solution might be to encourage the transit country to be an offtaker from the line, possibly by offering attractive lifting terms compared with the market rates. This would make it in the transit country's interest for the line to operate smoothly and efficiently in order to supply oil or gas for domestic consumption. It might be argued that high dependence by the transit country on oil or gas lifted from the pipeline would limit aggressive behaviour for fear of compromising domestic energy supplies. This would be especially relevant in the case of gas simply because, as already outlined, the logistics of gas supply makes it more difficult, if not impossible, to replace lost supplies in any feasible timeframe. However, given the 'bygones rule', closure of the line should only happen if the transit government miscalculates how hard it can push. In reality, such miscalculations can often happen, not least because often what starts as an economic dispute over 'transit terms' spills into underlying political differences – at which point economic motivations are often pushed down the policy agenda.

The danger with the offtake incentive is that the transit country takes its share of the throughput but then refuses to pay. The producing country cannot deny the transit country supplies without cutting off consumers further down the line.[58] Effectively this gives the transit country an extremely powerful tool: negotiations over lifting arrangements as part of a general renegotiation of the 'transit terms'.[59] Thus what at first sight may appear to be a solution to potential conflict is actually something which might generate greater conflict.

Alternatives to the transit country

Another possible solution to problems of transit is to find alternative methods to export the oil and gas. This has two variations – alternative routes and alternative transport methods.

Alternative routes. As discussed in Chapter 2, the probable behaviour of a transit country can be evaluated according to established 'good' and 'bad' transit country criteria. Thus an obvious solution would be to avoid 'bad' transit countries and use only 'good' ones. While this may not always be practical simply because of geographic limitations or political constraints, even where it is feasible there remain problems.

"Another possible solution might be to encourage the transit country to be an offtaker from the line, possibly by offering attractive lifting terms compared with the market rates"

There is the extra cost. As explained, pipelines attract very large economies of scale. Thus an exporter wishing to get 1 million b/d of oil to market ideally would only use one pipeline. Two pipelines with alternative routes, each with a capacity of 500,000 b/d which would transport the desired amount of oil to market, would significantly increase the unit transport costs (McLellan, 1992). Furthermore to build two pipelines, each with a capacity of 1 million b/d, with the second line acting as a form of insurance, more than doubles the cost of transportation (assuming that if only one line is built, the cheapest route would be chosen first).

There is another problem. As explained in Chapter 2, many factors contribute to an assessment of a transit country as 'good' or 'bad'. The assessment process is not a 'tick box' exercise; in most cases, potential transit countries are likely to have some 'good' and some 'bad'

58 Ukraine provides an obvious recent example of this phenomenon.

59 For this reason a distinction is often made in the literature between a transit country and a 'pure transit' country, which takes no share of the throughput (Omonbude, 2007a).

characteristics and trying to aggregate them into a single view would be at best controversial.[60] Thus it is not always obvious which alternative route is the better option. Finally, there is a danger that the two alternative transit countries might try to collude to squeeze the producing country.[61]

Alternative methods. In this context differences between oil and gas are important. There are many different transportation options for oil, ranging from road and rail tankers to barges and coastal tankers, assuming subsequent access to large ocean-going tankers. Furthermore the greater inherent 'rent' in oil means that even relatively expensive means of transportation are feasible. For example, at the height of the Iran–Iraq War in the mid-1980s, over 200,000 b/d of Iraqi oil was being transported by road to Aqaba via Jordan.[62]

For gas, however, the story is very different. Gas suffers from what has become called 'the tyranny of distance'. This arises because compared with oil, gas has very little energy content by volume. Thus a cubic metre of oil contains around 170 times more energy than a cubic metre of natural gas at ambient temperature and pressure. The result is that gas is far more expensive to transport per unit of energy than oil (Jensen, 2004b). One consequence is that there are limited alternative methods to transport gas. However, alternatives do exist and any appraisal of a transit pipeline project should consider any or all of the following: swaps; LNG; compressed natural gas (CNG); gas-to-liquids (GTL); gas by wire; and embodied gas.

Swaps: The classic example of this was seen in the 1970s, when Russia was struggling to supply gas to the Caucasus. At the same time Iran was beginning to consider how it might develop its huge gas resources but was constrained in these ambitions. Pipelines to Western Europe, which was the obvious potential market, were too large a project and the economics of LNG projects were extremely unattractive. The solution came in the form of IGAT I (the Iranian Gas Trunkline). According to this agreement, signed in 1966, Iran was to supply 6 bcm/y of gas to the Southern Soviet Republics in a 1,100 km line of 40–42 inches. In return, the Soviet Union would export (virtual Iranian) gas to Western Europe, thus effectively and economically bridging the geographic gap between Iran and Western Europe. The line was completed in 1970 at a cost of $700 million. Its success persuaded the two sides to create IGAT II. This would have a capacity of 27 bcm/y, of which 17 bcm/y would be used domestically within Iran and 10 bcm/y exported to the Soviet Union – which in turn would be swapped into Western Europe. The Iranian Revolution and the Iran–Iraq War effectively put a stop to this arrangement,[63] as did the subsequent collapse of the Soviet Union. The concept of swaps was revived in the debate about the optimal oil export routes from the Caspian. It clearly made sense to move Caspian oil into Northern Iran and in return have Iranian crude exported from Kharg Island as a swap. This would only require a short pipeline and the crude could be used in Iran's northern refineries (Ghorban, 1998). Obviously this option was closed by US sanctions. The only obvious drawback with any swap arrangement is that the swap exports compete with the mediating country's own exports, which might raise pricing issues.

LNG: Liquefied natural gas is methane which has been converted to a liquid by lowering its temperature to –161 degrees Celsius.[64] The liquid is then transported in specialized tankers to the market where it is then regasified and supplied to the consumer. Since the LNG tanker is

60 In this author's experience, only one potential transit country ticks virtually all of the 'bad' boxes and none of the 'good' ones. This is Afghanistan. The various proposals for transit pipelines through this country which have been around for quite some time (and well before the recent military engagement) simply beggar belief.

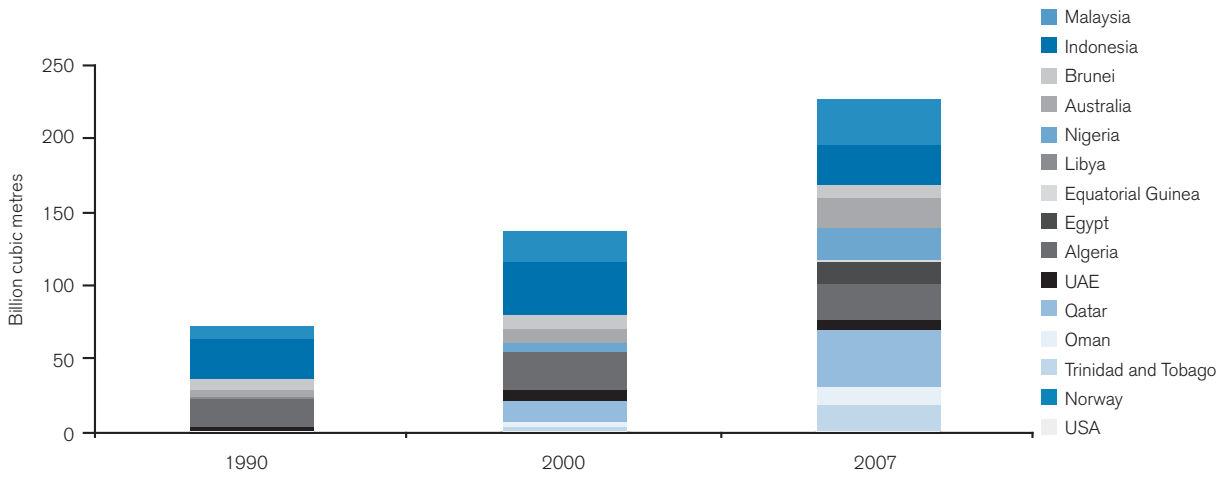
61 As already discussed there is some suggestion that this is what happened to Iraq with Syria and Turkey taking it in turns to squeeze on transit fees (Stevens, 1998).

62 This was also a favourite means of smuggling oil out of Iraq during the period of UN sanctions after 1990.

63 In 1987, at the time of the 'Tanker War' in the Gulf, inconclusive talks took place between Iran and the Soviet Union to convert IGAT I to export Iranian oil *MEES* 30: 45 (1987).

64 To give an indication of just how cold this is, a sheet of steel reduced to the same temperature and hit with a hammer would shatter as though it were a pane of glass.

Figure 3: LNG exports, 1990–2007



Source: *BP Statistical Review of World Energy* (various years).

normally an ocean-going vessel, then access to the high seas is a key requirement.[65] Assuming the sea access as a given, then the viability of LNG versus transit pipeline is effectively an issue of cost.

In the 1990s, LNG became the preferred option in many cases. This can be seen from the increase in total global LNG capacity and the number of LNG projects, and the growing role of LNG in gas trade (illustrated in Figures 2 and 3). Previously, LNG projects had been very costly and inflexible, and often provided very little revenue to the producing governments which owned the gas (Stauffer, 1997; Bartsch, 1998).

Several factors explain this change in the prospects for LNG in the 1990s (Jensen, 2003; Jensen, 2004a). First, there was the global increase in demand for gas, in part as the result of the spread of combined cycle gas turbine technology in the power-generation sector coupled with greater private-sector investment which made gas the fuel of choice.[66] However, there were also factors specific to LNG. The use of much larger LNG processing plants attracted large economies of scale, reducing project costs significantly. For example, Jensen (2004a) attributes around 40% of the lower capital cost per ton of a 4.0 million-ton 'train' in 1990 over a 1.8 million-ton train[67] in 1980 to economies of scale, and around 60% for a 7.55 million-ton train. As for LNG tankers, their costs have fallen as the emergence of South Korean shipbuilding capacity created competition with the Japanese. Thus in 1991 a 125,000 cubic metre tanker cost $2,200 per cubic metre to build. By 2004 a 138,000 cubic metre tanker cost $1,500 per cubic metre. Overall, a 2003 report from the Gas Technology Institute (quoted in EIA, 2003) claimed that liquefaction costs including transport had decreased by 35–50% since 1993.

New methods of project finance also made securing capital much easier. This helped to reduce not just the cost of capital but also the long lead time on the project, which was previously partly attributed to the difficulty of raising very large sums of capital on what were seen as highly risky projects.

There was also an increase in the size of 'commodity gas supply markets' as opposed to 'project gas supply markets', which made negotiating gas sales contracts much easier. A 'commodity gas supply market' is a market where there is

65 In some cases small LNG projects can deliver by road tanker, but this is unusual.

66 CCGT is attractive to private investors in power generation for several reasons. Small units are economical and the lead time is extremely short – one to two years. Both imply rapid payback on plant investment. In addition CCGT has much higher energy conversion efficiencies (around 60%) than conventional thermal power stations.

67 A 'train' is simply the technical term for an LNG processing unit.

an existing infrastructure, gas is widely bought and sold by many players and there is good transparency over the terms of sales (Jensen, 1994). Thus a gas price already exists, driven by gas-to-gas competition, although clearly gas as a fuel must also compete with other fuels. By contrast a 'project gas supply market' is a market with very limited gas transactions, few buyers or sellers and poor transparency. In such a market, the 'gas price' has to be determined by complex negotiations. Normally it is linked to the price of some other fuel – frequently oil products. Exporting to a 'commodity gas supply market' is very much easier since the contract can simply specify 'the gas price' at some specific point as the starting basis for the transaction.[68]

Another key factor behind the growth in LNG trade in the 1990s was that as more LNG projects came on-stream, flexibility in the trade began to increase, creating a self-feeding process. As can be seen from Figure 3, in 1990 there were relatively few LNG projects. This meant that because of the need for gasification and regasification plants, all trade was based upon long-term contracts, typically between 15 and 25 years. Thus all the output of the gasification plant had to be sold, as did the throughput of the regasification plants to ensure full-capacity operation to spread the extremely high fixed costs over the maximum throughput. Furthermore the vast majority of the throughput of the plant had to be secured by contract before any construction began. This made the lead times on such plants extremely long.[69] There was no flexibility in the trade and certainly no possibility of a 'spot trade' in LNG.[70] However, as more projects emerged, 'spot trade' became a reality. It was the prospect of growing 'spot trade' in LNG which began to make such projects extremely attractive. If an LNG cargo could enter a market at short notice when the gas price was spiking, a great deal of money could be made.[71]

However, two factors limit the extent to which LNG offers an alternative to transit pipelines. The first is the geographic constraint that requires an LNG project to have access to the high seas. The second is the issue of relative costs. In 2004, Jensen (2004a) argued that the economics of transporting gas by LNG or pipeline from the Middle East to Europe and Asia were roughly comparable, although he pointed out that this ignored the problems associated with transit pipelines. He further argued that this issue 'has heavily favoured LNG' (Jensen, 2004a, slide 24).

However, in the last couple of years, the costs of LNG projects have risen significantly, reflecting rising costs in the oil and gas industry generally. The Bechtel Group was cited as claiming that the cost of LNG plants had 'tripled in the last 6 years'.[72] The result of these cost escalations, according to Torkan (2008) is that for Iran, the breakeven distance for gas via LNG versus pipelines has now risen to 5,000 kilometres (in other words, if the gas is to be transported for a shorter distance, it is cheaper to use pipelines). This compares with a range of 1,500–3,000 kilometres in 2004, according to Jensen (2004). This has led Iran to postpone LNG projects in favour of pipelines (Torkan, 2008).

In terms of new export projects, therefore, leaving aside transit problems, pipelines currently appear a better prospect than LNG.

CNG: This is natural gas that has been compressed to 1% of its original volume. It is then used as a substitute for liquid transport fuels such as gasoline and diesel. The use of CNG in spreading rapidly, not least because it significantly reduces particulate emissions from diesel; it is also well suited to fleet vehicles such as buses since the CNG filling facilities can be concentrated in one place. Since the process takes natural gas and compresses it before putting it into vehicles, it is currently not a very attractive option for exporting gas. However, CNG has around 40% of the energy content of LNG and therefore longer-distance transport by sea-going tanker could be an option for the future, given that CNG is easier and cheaper to handle than LNG.

68 Currently North America, the UK and Argentina are 'commodity gas supply markets' while much of Asia remains as 'project supply markets'. The European Union is trying to convert Europe to a 'commodity gas supply market' but is facing serious barriers and opposition from many of the major gas players.

69 Typically it would take 3–5 years to negotiate the sale of the LNG, several more years to secure financing and then the plant and the tankers needed to be built. For some of the earlier LNG projects the lead times were 20–25 years.

70 'Spot trade' refers to a single one-off transaction to buy a specific stock of oil or gas. A 'term trade' is where a flow of oil and gas is sold over time.

71 For example, the US Department of Energy reports that the average monthly city gate price of gas in the US between 2000 and November 2008 ranged from a low of $3.27 to a high of $12.37 per tcf.

72 *International Herald Tribune*, 16 January 2007.

Moreover, it is attractive for smaller markets and suppliers, and also for closer markets, given that tanker transport accounts for much of the cost of CNG. There is growing discussion in the technical press of the viability of CNG as a serious option to export gas (Cano and Stephen, 2005).

GTL: Gas-to-liquids is a process that takes natural gas and, using technology based upon Fischer-Tropp,[73] converts it to a liquid. In the late 1990s there was a huge amount of interest in GTL with projections of very large increases in new capacity. However, since the product of GTL is a high-quality diesel, this competes in a different market from natural gas and as such is not strictly speaking a viable alternative for transit pipelines – except as a possible means for a gas producer to monetize its gas reserves. Also much of the earlier enthusiasm has been dampened by the rising costs of such projects. For example, according to *MEES*, the Pearl GTL project for a 140,000 b/d plant signed between Shell and Qatar in 2003 originally had a capital cost estimated at $6 billion but by 2008 this had escalated to $18 billion.[74]

Gas by wire: This is a process whereby electricity is generated on the gas field and then transported by high-voltage transmission lines. The logic is that it is cheaper to transport electricity than gas and thus a better means to monetize the gas reserves. The limitation lies in the transmission losses, which rise exponentially as the distance increases. It is likely that there will need to be a technological breakthrough in super-conductivity before this becomes a serious alternative to long-distance transit pipelines. Also it is arguable that the problems associated with transit gas pipelines, as highlighted in this report, would apply equally to transit electricity wires.

Embodied gas: One alternative to direct export is to use the energy content of the gas in some energy-intensive process such as metal smelting, and to export the consequent product. The basis of this option is what has become called in the literature 'Resource Based Industrialization'. However, the record has often been poor, not least because it is governments that have created and operated the industrial base (Auty, 1990). As has been frequently remarked in many contexts, governments are bad at picking winners, and losers are good at picking governments. Also, like GTL, this is a mechanism to monetize gas reserves for the producer government rather than an alternative to a transit pipeline in the context of a global gas market.

On balance, the prospects for alternative methods of transport to transit pipelines do not look good, especially in the current context of high-cost LNG projects.

Finding a common jurisdiction

As already noted, one of the major problems with transit pipelines is the absence of an overarching jurisdiction. Thus there is no ultimate authority to enforce the terms of the treaty or agreement which sets out the 'transit terms'. Given the unstable nature of the 'transit terms' because of changing relative bargaining powers and the 'obsolescing bargain', conflict is likely to follow. Two solutions suggest themselves. One is to remove the decision over transit payments from the parties to the agreement; the second is to try to create some form of common jurisdiction.

Removing payment decisions from the parties would involve the creation of some form of escrow account held and controlled by a third party. Backdated payment from the escrow account could then be made, assuming the transit country had not disrupted throughput. The obvious problem with such a solution is that it would involve such an abrogation of sovereignty by the government as to be almost unthinkable. However, the agreement which formed the basis for the IFC's financing of the Chad–Cameroon oil project did indeed require that a proportion of oil revenues accruing to the government of Chad would go into an offshore escrow account based in London, outside the Chad government's control. It would then be paid if Chad was seen to be using the revenues 'wisely'. However, in 2005, the

73 The Fischer-Tropp process was developed in Germany in the 1930s to convert coal into liquids by means of a catalysed chemical reaction.

74 *MEES* 51: 23 (9 June 2008).

Chadian parliament changed the basis of the arrangement. This led the World Bank to suspend loans to Chad and freeze the escrow account (BIC, 2006). Even though this related to an upstream agreement rather than a transit pipeline, it is a good illustration of a central theme of this report. Ultimately any agreement without the means of enforcement is only a piece of paper. The key therefore lies in trying to create a common jurisdiction covering all parties to the agreement with powers of enforcement.

One obvious source of such a common jurisdiction would be the World Trade Organization. During the negotiations setting up the WTO's predecessor, the General Agreement on Tariffs and Trade (GATT), in 1948, it appears there was a 'gentlemen's agreement' to exclude oil and gas from the rules. Subsequently the WTO did apply the rules to traded products with a high energy content, but oil and gas remained exempt. The current situation is not clear. For example, it can be argued that Saudi Arabia would never have joined WTO, nor would Russia be seeking membership, if the rules did apply to oil and gas. However, Selivanova (2007, p. vii) has claimed that it is 'now generally accepted that WTO rules also apply to energy products'. Certainly there have been discussions on the issues in the Doha round.

Whatever the situation regarding the rules, this is not necessarily helpful in the context of transit. Several factors explain. The emphasis of WTO rules is very much aimed at barriers to imports rather than exports, and so transit at best rather falls between the cracks. Article V of GATT requires freedom of transit but remains vague on terms apart from the principle of Most Favoured Nation treatment (i.e. no discrimination applies). The GATT rules drafted in 1948 required members to allow passage of goods across their territory. In the Doha Round a motion was tabled to discuss whether this also included fixed installations such as pipelines (Lamy, 2007). In any case, many of the key transit countries in Europe are not currently WTO members – including all of the littoral countries of the Caspian (including Russia), Belarus, Bosnia and Herzegovina and Serbia.[75] Often barriers to transit arise from private companies that, as such, are not subject to WTO rules, which apply only to government behaviour.[76] Finally, WTO rules can be suspended and members can take any action considered necessary to protect 'essential security interests'. For transit pipelines this can cover a multitude of sins.

Another possible route for a common jurisdiction lies with the Energy Charter Treaty (ECT). The ECT came out of the Lubbers plan proposed in June 1991.[77] This was originally intended to provide protection for investment by Western firms in energy projects in the FSU and to try to ensure that the collapse of the Soviet Union did not create chaos on the European energy market. However, during the course of negotiations its scope was expanded to cover not only west-to-east energy investments but also east-to-west and eventually west-to-west investments. The Treaty was signed in December 1994 in Lisbon and, following ratification by 30 signatories, came into force in 1998. However, three significant signatories have yet to ratify – Australia, Norway and Russia.[78] Russia's non-ratification is clearly a major barrier to the effective operation of the ECT, but there are a number of stumbling blocks. Gazprom is concerned that the ECT provides the possibility of third-party access to the Russian pipeline network. This would 'open the door to uncontrolled transit of Central Asian gas to Europe' (Stern, 2005, p. 138). Effectively this would break the current *de facto* monopoly position on gas supplies from the East into Europe. At the same time, Russia is concerned about the French blockade against Russian nuclear material, which France sees as its monopoly. In general Russia appears to accept the transit and trade coverage of the ECT but is unhappy when these

75 Ukraine only became a member in May 2008.

76 This is a rather a hazy area since State Trading Enterprises are often the main problem in the context of transit and under Article XVII of GATT they are expected to observe the general principles underlying WTO. However, 'The existence of the obligation to give access to transportation pipelines as a means to compete in sales would be difficult to prove …' (Selivanova, 2007, p. vii).

77 For extensive details on the ECT, see the website http://www.encharter.org/.

78 In addition, a number of important players such as Algeria, Canada, Iran, Morocco, Qatar, Saudi Arabia, Serbia, Tunisia and the UAE, among others, are merely 'observers' to the Treaty.

extend to investment issues.[79] Also it is likely that Russia sees ratification as a lever on other issues such as WTO membership.

A fundamental problem with the ECT is that it was negotiated in a hurry. Many contentious issues were glossed over to keep the negotiations alive (Waelde, 1996; Bamberger and Waelde, 1998). In particular, issues related to energy transit were extremely vague and lacked clear rules. This was despite the fact that much of the Treaty was trying to solve disputes over 'transit terms' without disruption of throughput.

After the adoption of the ECT, the governing body – the Energy Charter Conference – considered that energy transit issues in the treaty could be strengthened. Specifically they were looking for more detailed rules. In December 1999, the Conference mandated negotiations on an Energy Charter Transit Protocol (ECTP), and these began in 2000. However, they were complicated because of ongoing bilateral negotiations (including energy transit issues) between the EU and Russia in the context of Russia's attempts to accede to the WTO. Despite this, elements of an agreement on the ECTP were reached by the end of 2002.[80]

In June 2004, talks were resumed (Konoplyanik, 2004). A major issue clouding the ECTP negotiations continued to be the ongoing conflict between the EU and Russia over long-term energy supply contracts. For a long time the European Commission has seen long-term supply contracts and destination clauses as a major impediment to one of its central objectives, competition in energy markets. By contrast, Russia sees long-term contracts as essential for security of demand. In effect, it was decided that until these EU–Russian negotiations produced an agreement that could be presented to all the ECT member states, there was little point in continuing ECTP negotiations in isolation.[81] However, the Conference in December 2007 asked the responsible group – The Energy Charter Group on Trade and Transit – to have 'multilateral consultations' on the draft during 2008.

The current situation on the ECTP is extremely unclear. It is very unlikely that any resolution of the outstanding and complex issues will emerge in the near future.[82] Thus use of the the ECT as a possible solution to the transit problems as outlined here seems remote. The same is true of the discussions within the WTO.

Developing mutual dependence

During the Cold War, military strategists developed the concept of Mutual Assured Destruction (MAD). The idea was simple. If both sides had the capability to destroy each other by virtue of a nuclear exchange but did not have the capability to prevent a retaliatory strike after a first strike, then, assuming rational actors were in charge, this would keep the peace. If both sides were assured of being destroyed, neither would launch a first strike. This argument was frequently used to justify maintaining a nuclear capability.

On a less dramatic scale, the concept of developing mutual dependence in the context of transit pipelines might prove to be a fruitful option. If a situation could be contrived whereby 'bad' transit behaviour could be met by action from either the producing or the consuming country (or both), this would encourage better behaviour by the transit country. To some extent this was the logic behind making the transit country an offtaker from the pipeline. If the transit country is dependent upon oil or gas from the pipeline, it might be less willing to risk a cessation of throughput. However, as explained earlier, experience suggests this may simply create a double-edged sword since the terms of the offtake are part of the general 'transit terms'. Therefore some other lever might be needed.

The Iran-Pakistan-India gas pipeline (IPI) provides a good example. Clearly, leaving aside issues related to 'transit terms', political relations between India and Pakistan have hardly been congenial, most recently

79 For detailed background on these extremely complex issues, in addition to Stern (2005), see Belvi (2008) and Doeh et al. (2007).

80 The draft is available at http://www.encharter.org/fileadmin/user_upload/document/CC251.pdf.

81 The Russian position appears to be that the correct context to discuss transit issues is within the ECT (Stern, 2005).

82 There is a view that Russia's energy agenda has little interest in the ECT or the Energy Protocol but rather is more concerned with the use of energy as a means to pursue state power. For example, see the comments of Tim Eggar, House of Lords (2004). However, it is also likely that the profit motive remains important as a driver of Russian actions.

following the terrorist attacks in Mumbai in November 2008. This history of poor relations has been a major reason for the very slow development of a project first proposed in 1989. One option would be for India to build gas-fired power generation near the Pakistani border to supply Pakistan with electricity. Any cessation of the gas throughput as a result of unilateral action by Pakistan over 'transit terms' would obviously threaten electricity supplies in Pakistan. While it is legitimate to ask why Pakistan should put itself at risk in this way, to justify the economics of the whole project a link into India might be necessary. Thus exposing itself to the risk of an electricity cut-off might be the price Pakistan has to pay to secure its own gas supplies and transit fees from the project.

Introducing progressive 'transit terms'

Finally, another solution to conflict over transit pipelines relates to the nature of the 'transit terms'. It has been argued in this report that the only basis to justify a transit fee to the transit government is that it represents a share in the benefits. However, a major potential source of conflict is that, over time, these benefits will change with the price of the oil or gas throughput. The 'transit terms' agreed in the context of one price will soon be out of line with reasonable expectations if prices change significantly. This will lead the transit country to demand better terms if the price has risen. Indeed, much of the troubled history of the transit pipelines in the Middle East has been triggered by demands for renegotiations based upon the rising oil prices seen since 1970 (Stevens, 1998; Stevens 2000).

Oil and gas prices have been volatile and all the evidence suggests that volatility is increasing (Plourde & Watkins, 1994; Regnier, 2007).[83] Hence disputes over 'transit terms' are likely to intensify. In one sense there is little new here. The fiscal terms of any upstream agreement – whether concession, joint venture or production-sharing agreement – are designed to share the 'rent' inherent in oil and gas production between the owner of the oil and gas (except in the United States this is the host government) and the operator (the oil company). In the early days of the industry, this was based upon a fixed-sum royalty per ton of oil produced.[84] In 1948, Venezuela introduced the concept of a profits tax. From then on, one dimension of the history of the industry has been disputes over fiscal terms. To address this issue the trend has been to make these fiscal terms increasingly 'progressive',[85] so that the take of the producer government changes in line with changes in the price, and hence the profitability, of the upstream operations (Dam, 1976; Parra, 2004; Johnston, 2003).

> 'The 'transit terms' agreed in the context of one price will soon be out of line with reasonable expectations if prices change significantly. This will lead the transit country to demand better terms if the price has risen'

Of course, disputes between governments and companies over upstream oil operations have continued, although these are generally driven by political issues relating to resource nationalism (Stevens, 2008). However, there can be little doubt that the 'progressive' fiscal systems embodied in production-sharing agreements which are now very much the norm in the industry have reduced this

83 Gas prices tend to be linked to oil prices. This is either because of direct competition or because, as mentioned above, in 'project gas supply markets' the gas price is contractually linked to oil prices in some shape or form.

84 For further details on the fiscal terms in upstream oil agreements, see Penrose (1959); Garnaut and Clunies Ross (1975); Dam (1976); Seymour (1980).

85 A 'progressive' tax system is one where the revenue take changes in line with changes in profits or income. Thus if income or profits rise, proportionally more tax is paid. This is in contrast to a 'regressive' tax system where the take is fixed. A fixed royalty, a sales tax or indeed fixed transit terms are effectively an example of a 'regressive' tax system. Economists generally regard 'regressive' taxes as undesirable because they have a tendency to destroy the incentive system which drives economic activity.

as a source of conflict. As most transit fees are based upon a fixed fee per unit of volume throughput (Energy Charter Secretariat, 2007),[86] it seems obvious that introducing progressive 'transit terms' linked to the price of oil or gas might well achieve the same result. If the transit country automatically benefits from the improved profitability of the project arising from higher prices, as it would in a 'progressive' system, this must reduce the temptation to seek unilateral action or even a renegotiation. In similar vein, any transit offtake from the line by the transit government (which is part of the 'transit terms') should also be priced to adjust for changes in international prices.[87] Fitting into this logic is the situation described earlier, whereby the private owner of the pipeline earns profits and pays taxes on these profits in lieu of a transit fee. In many cases such profit taxes are 'progressive'.

86 Some do make allowances for inflation.

87 This does not preclude the usual practice of pricing the offtake below international prices as part of the incentive implied by the transit terms.

5. Conclusions

The report began by posing three questions. This conclusion is a summary of the answers that have emerged.

1. Why will oil and gas transit pipelines become more important to global energy markets in the future?

Several factors explain. First, oil and gas reserves close to market are being depleted. Although more reserves are being discovered, they are in areas further away from markets. They are also in areas which are land-locked and preclude access to the high seas. All the expectations are for growing gas demand in the global primary energy mix, and pipelines are the major source of transportation. Finally, the collapse of the Soviet Union and former Yugoslavia has increased the number of jurisdictions. This view that there will be more transit pipelines in the future is confirmed by the large number of projects currently under discussion.

2. Why has the history of such pipelines been littered with conflict between the various parties?

The history of such pipelines shows many examples where there have been conflicts leading to cessation of throughput and in some cases ultimately closure of the lines. Conditions for building and operating such pipelines are inherently unstable. While this is partially the result of political disputes between neighbours, possibly of equal importance is that it is the result of commercial disputes over the 'transit terms'.

These commercial disputes arise because there is no objective, reasonable or fair way of setting the 'transit terms'. Rather they are the result of the relative bargaining power between the parties to the transit agreement and the benefits associated with the project at the time the agreement is reached. However, the nature of the 'obsolescing bargain' and the fact that the 'rent' associated with the project will change with changing oil and gas prices make conflict inevitable if terms do not reflect changing realities.

3. What might be done to improve this record in the future and make transit pipelines less troublesome?

There are a number of solutions which might be considered. These include military action against the transit country; encouraging greater use of FDI; making the transit country an offtaker from the line; creating alternative routes and/or alternative methods of exporting gas; trying to develop a common jurisdiction through mechanisms such as the WTO or ECT; or developing mutual dependence. However, many of the apparent solutions in reality are illusory, at least in current circumstances. More generally, history suggests that a good experience with transit pipelines requires the following general best-practice conditions to be met:

- The rules are clearly defined and accepted.
- Projects are driven by commercial considerations.
- There are credible threats to deter the 'obsolescing bargain'.
- There are mechanisms to create a balance of interest.

However, this is a 'wish list' and how to turn it into reality is not obvious. The only practical solution which does offer a serious possibility of reducing conflict is to introduce progressive 'transit terms' to existing and new agreements.

Ultimately international oil and gas markets must live with the potential instability. The only way to mitigate this would be through diversification for both consumers and producers, as far as is economically practical. Winston Churchill's view on such issues, expressed to Parliament in 1913, was prescient:

> On no one quality, on no one process, on no one country, on no one route and on no one field must we be dependent. Safety and certainty in oil lie in variety and variety alone.

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