



Energy Security and Security Policy

**NATO and the Role of
International Security
Actors in Achieving
Energy Security**



Edited by Phillip E. Cornell



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NATO and the Role of International Security Actors in Achieving Energy Security

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1. Introduction

The following volume is meant to serve as an assessment of the major current issues at the nexus of security policy and energy security, particularly as NATO seeks to identify its added value toward guaranteeing the energy security of its members.

Energy security is a notoriously difficult subject to analyze because it cuts across so many different disciplines. Geological sciences and engineering, international economics and finance, regulatory policy, critical infrastructure protection, geopolitics, environmental sciences, business development, risk analysis and engineering management, and information technology only begin to scratch the surface. It also means very different things to different people – consumers, producers, transit countries, industry, the military, government, scientists, and economists may take different and often opposing views on the subject.

How then is security policy linked with energy security, how should security organisations define energy security, and how can those organisations contribute to enhancing that security?

This volume is the product of a few initiatives, and as such is something of an amalgamation – a conference report *cum* policy pamphlet.

At the NATO School Research Department I have been leading an ongoing research project into NATO and energy security since the Riga Summit, when the Heads of State and Government of the Allies formally instructed the North Atlantic Council to investigate threats to energy security and define NATO's role. This document's organization, construction, and publication are some of the primary products of that effort.

Secondly, on July 19-20 2007, the NATO School and the Institute for the Analysis of Global Security convened "The 'Security' of Energy Security", a conference designed to examine the role of the international security community in comprehensive energy security policies of the West. Delegates hailed from the academy, from government ministries, from international organisations, and from industry. **Sections 4 through 8 contain articles which have been faithfully adapted from the presentations offered in that forum.** Each section represents one of the thematic panels. Discussions were off the record, and therefore not included verbatim in this report. But the outcomes and their general thrust have been integrated into the conclusions.

Given the somewhat disparate sources of the material you will find here, these entries are intended as policy articles and adapted presentations rather than academic papers. The outstanding exception to that rule is the academic paper by Heiko Borchert and Katrina Forster in Section 9. It derives from previous work conducted by the authors within the framework of the IPA Network, and formed the basis for Dr. Borchert's presentation at the conference. I would like to extend my thanks to them for their unique efforts.

Phillip Cornell
NATO School Senior Fellow

2. Backgrounder: The Energy Environment and Impacts on European Security

Phillip Cornell
NATO School Research Department

The renewed prominence of energy security in recent years is no accident. A tight global oil market, combined with substantial and sustained price increases, a new era of resource nationalism, rapidly rising demand in the developing world, and the heightened terrorist threat to infrastructure and supply lines, equates to increased concerns about the availability of stable and sufficient supplies at reasonable prices. At the same time such concerns are by no means new, and while the issue is mainly an economic one, the military and security dimensions have historically constituted significant elements. Fundamentally, many of the contemporary debates about energy security, infrastructure and supply line protection, and consumer-supplier political relationships are not new either. However the regional dynamics in NATO's neighbourhood are fluid, and the blurred lines between traditional security and economic interchange (and especially energy flows) incurred by globalization, present contemporary challenges. Foremost is how to differentiate responsibilities among institutions originally designed to deal with more segmented threats. To that end, this paper will introduce the debate as to NATO and energy, and provide an overview of the broader international energy environment in which that debate takes place.

2.1. The Debate: Struggling to Define NATO's Role

Assessing a role for NATO is tricky, for both political and practical reasons. The potential role that NATO can play is most definitely multi-faceted, ranging from the direct protection of critical infrastructure for energy production and transport to training, crisis reaction, and political dialogue between and among consumer and supplier countries. Thinking more broadly, possibilities multiply and also become more controversial. In March 2006 the Polish foreign ministry proposed an "energy Article V" which would pledge all signatories to assist a country in the event of a supply disruption. The reference to NATO's founding charter, the unspoken target of that initiative (Russia), and the support professed at the 2006 Riga Summit by self-described cold warrior U.S. Senator Richard Lugar, uneasily implied a deterrent role for the organisation when it comes to energy.

But the sentiment was never widely shared, and indeed Poland's proposals represented the extreme end of the spectrum. Even those sympathetic to a stronger line against Russia were unwilling to support such a stance.

Indeed the political arguments *against* NATO's assumption of a substantial role, particularly with ambiguous and potential military ramifications, are compelling. "Militarizing" an issue which is fundamentally economic would have distortionary effects on the market, impeding investment necessary to expand capacity exactly when it is so necessary. It could sour relations with producing countries by adding an apparently confrontational dimension, further politicizing energy trading and at the same time casting a shadow over various other political issues. In short, a leading NATO role on the issue would be counterproductive to the end-goal of political and security risk reduction. And in the end, while a coordinated international approach to

energy security is certainly necessary, the policies which would have the greatest impact – liberalising the European market, facilitating greater connectivity between national energy networks, regulating reserve and supply chain capacity, supporting alternative energy development, and encouraging conservation – are decidedly outside NATO’s purview.

2.1.1. Where to add value?

Suggestions as to NATO’s role nevertheless span the realm of political possibility, or impossibility. Jamie Shea has proposed a collection of monitoring and assessment mechanisms at NATO; Article IV security assistance to Allies; maritime surveillance; and even possible interdiction operations.¹ Former SACEUR James Jones (now Director of the U.S. Chamber of Commerce Energy Institute) alluded to NATO’s possible contribution to stability in the Niger Delta, where sporadic attacks consistently keep national output at 20% below full production levels.² Others point to the fact that through NATO, Europe could bring U.S. political pressure to bear on Russia; Turkey could be institutionally involved in European energy security; and engagement with MD, ICI, and PFP producer countries on energy concerns could occur within those existing frameworks.³

Assistance towards critical energy infrastructure protection (CEIP) - through communications, surveillance, and training support - is more than a frequent suggestion. More ambitious proposals envision direct CEIP support, but a scenario in which NATO troops are stationed on platforms or along pipelines is precisely what so many Allies seek to avoid.

Indeed, many of the above suggestions are pipedreams, and at best politically unpalatable. More importantly, they may fall into that category of well-intentioned over-involvement which ultimately undermines the security it seeks to enhance. That includes both the security of supply of energy resources (by means of impeding investment), and also geopolitical security (by militarizing energy flows and the sensitive regions in which they tend to originate).

That is not to say that NATO cannot add significant value. The obvious field, and the one to which NATO has committed itself to examining, is still critical energy infrastructure protection (CEIP). Improving energy infrastructure security measures by providing those tools which the private sector cannot, including capital-intensive surveillance (air or space-based reconnaissance) and training support to the security sectors of producing and transit countries, can mitigate risks which otherwise drive up costs and impede investment.

In homeland security circles, there is an established and crucial security gap where public services are expected to operate, for instance to avert catastrophic debilitation. The international network-centric nature of enormous and complex energy supply chains means that the quality of such publicly-supplied security varies along the chain, so there is a role for NATO to identify the weakest links and assist in

¹ Shea, Jamie. “Energy security: NATO’s potential role”. *NATO Review*, Autumn 2006

² “Do we need a transatlantic energy policy?” speech by James Jones, 2006

³ Monaghan, Andrew. “What role for NATO?” *NATO Defence College Research Paper No. 29*, October 2006

ameliorating public security provision at those points. There is also a question about whether elements of public security provision which already exist (e.g. American maritime patrols or surveillance support) might benefit from their own internationalisation for purposes of enhanced legitimacy and access.

NATO can serve as a vital bridge between the energy and security communities, and define gaps between commercial and security logics by articulating the latter in relation to the former. In some cases, for example, additional transport capacity or diversification may not be commercially viable, but be of significant benefit to the security environment. Filling those gaps would then presumably be the responsibility of others - specifically market regulators, international organisations like the EU, and national governments. Insofar as energy supply disruptions represent a threat to collective security interests which are not reflected in private market-based decisions, defining the threat in order to construct an appropriate and collective regulatory response is necessary. Finally, providing security information to an energy market plagued by lack of information would reduce the risk premium deriving from that information scarcity.

2.1.2. Outside the CEIP box

Discussion within NATO for the foreseeable future will, perhaps appropriately, be very limited. At the moment, it is restricted to critical energy infrastructure protection, and even talks among nations on that issue are an arduous slog. If that situation is to improve, and a broader mandate for NATO at the nexus of energy and security is to be recognized, policy makers will have to think outside the CEIP box. But navigating the full range of political as well as practical possibilities for NATO involvement, and also defining the organization's interests in energy developments (insofar as they will substantially impact the security environment in which the Alliance operates), requires first a review of the contemporary energy security environment and its formation.

2.2. Euro-Atlantic Energy Security: Historical Notes

Over the past two hundred years, abundant supplies of energy have driven economic growth and sustained economic activity in industrial and post-industrial societies. Global economic growth boomed in the 20th century, and as late as the 1970s growth in economic production and energy consumption were directly proportional (i.e., energy efficiency was flat). Securing access to energy resources has consequently long been crucial to keeping factories humming and transport links running.

But such security is also key to keeping militaries moving. Indeed it is that requirement which has always made energy resources special – and a category of commodities so closely linked with national security. From the mid-nineteenth century steam developed as the main source of propulsion for modern navies, and coal producing regions like Alsace, Silesia, and southern Wales took on a military importance to complement their economic one. The American Civil War established the utility of railroads to transport troops and equipment over long distances at speed, and the exercise became central to strategy ahead of the First World War under planners like Alfred von Schlieffen. Generally however, the major powers possessed sufficient domestic coal deposits to reliably supply both industry and the military.

Winston Churchill's decision in 1912 to switch the entire Royal Navy to oil was therefore key, and widely regarded as the birth of international energy security concerns. The strategic advantages of oil were several – ships were faster⁴, more easily refuelled, and gained increased range due to oil's high thermal content.⁵ The disadvantage derived from Britain's lack of domestic oil endowment, and more generally from the unique global distribution of oil deposits. Baku led the world in production in the late-19th century, production and export having been largely financed by the Swedish Nobel brothers. Indeed, international investment and logistics management are not new to the industry. Other now-familiar regions were rising to prominence in Persia, Arabia, and Texas in the years before the First World War.

The British solution to its domestic oil shortage was to acquire a controlling stake in the Anglo-Persian Oil Company, later BP. The Admiralty was subsequently reliant upon the maintenance of steady supply from Persia, rendering Anglo-Persian political relations, open transport routes, and abundant proven petrochemical reserves matters of state security.

Other navies soon followed suit, and the emerging strategic importance of tanks, aeroplanes, and light vehicles only reinforced the centrality of oil in security planning. North Africa, the Middle East, the Caspian Basin, and the East Indies replaced Silesia and Wales, and in a stroke strategic energy resource competition “went global”. Indeed, much of the Second World War was dictated by the global-scale quest for energy security. The German attachment to its Romanian client state, Operation Barbarossa's aim to reach and hold Caspian fields, and Japan's rush to capture Dutch Indonesia were all motivated by militaries' mortal thirst for liquid hydrocarbons.

Following the war, the deep political commitment to oil intensified. Mossadeq's nationalisation of Iranian oil production in 1952 led directly to Anglo-American covert action to replace him with the pro-Western Shah. Nevertheless, a wave of nationalisations in the 1960s ousted the Seven Sisters (the established western majors) from many Arab producing countries, most of whom went on to form the Organisation for Petroleum Exporting Countries (OPEC). In the 1970s, oil prices quadrupled when OPEC cut supplies repeatedly. The first oil crisis, unleashed in response to American and Dutch support of Israel in 1973, demonstrated the potency of the “oil weapon” and the politicization of energy supply. It thus encouraged the first international efforts to develop an international framework for joint energy security provision.

The International Energy Agency (IEA) emerged in 1974 from international negotiations initiated by Henry Kissinger. French reluctance to participate, and absence from the membership, contrasted American ambitions for the body.⁶ The central mechanism of the IEA was an “oil sharing” plan designed to redistribute oil

⁴ Only oil allowed the new Queen Elizabeth class battleships to reach the crucial 25-knot speed necessary to cross the T of the German fleet. Once this “fast division” was established, Churchill saw it logical to convert the entire fleet.

⁵ Dahl, Erik. “Naval Innovation – From Coal to Oil” *Joint Force Quarterly*, Winter 2000

⁶ French Foreign Minister Michel Jobert nearly did not participate in the 1974 negotiations. France eventually joined the IEA in 1992.

among the signatories when a country lost more than 7% of its stocks, and thus counter embargoes against specific states such as that of 1973. In addition, the IEA Statistics Office enhanced transparency in the market by producing a report of energy supply and demand balances; a division for long-term cooperation conducted assessments of member-states' energy policies; and an R&D division encouraged sharing of costs and expertise in new energy development projects. The second oil crisis, sparked by the Iranian Revolution in 1979, presented a new problem of physical supply shortages.⁷ The IEA responded with demand suppression targets (seeking to drive demand down 4-5%), but panicked scrambles for excess supplies (for example in Saudi Arabia) and excessive stock-building drove prices above \$40/barrel. Thus by the time of the Iran-Iraq War, the main focus of the IEA shifted to the coordination of oil stock release. Indeed, that remains its primary crisis mechanism today.

In the 1980s the development of global financial markets surged in tandem with a new era of globalised goods, information, and capital flows. This was also the case with oil trading after the introduction of reference pricing in 1987, where the deepening of liquid forward/futures markets steadily diverged oil pricing from the fundamentals of production. Liberalised markets, which continued to deepen and quicken with increasingly complex financial tools and electronic trading technologies through the 1990s, led to higher price volatility while actually increasing security of supply.

OPEC, and particularly Saudi Arabia, no longer has the power it once did to control the global price by fiddling with the taps. On the other hand, with a few financial companies controlling the bulk of futures trading and often using similar trading algorithms, perception management has become key to tempering the herd-effect in the market. In short, perceptions of instabilities or threats to production can drastically affect increasingly sensitive oil prices, which in turn impact a broad array of energy markets (and prices across the economy, for that matter). Price collapses in the 1980s and late 1990s brutally stung producers, and the plummet to sub-\$10/barrel oil after the Jakarta conference in 1998 continues to impact investment decisions. Indeed the argument can be made that the increased volatility of the spot market, induced by deep futures markets⁸, has had a detrimental impact on security insofar as it impedes large-scale production investment by increasing risk and also reducing the price viability threshold of major projects.

At the same time oil, while still the dominant source of energy (along with coal), has been increasingly complemented by alternative sources of energy. Natural gas, used in lamps since the 19th century, is so difficult and expensive to transport that this valuable commodity was often simply burned off during petroleum extraction (indeed, this continues to be a big problem in places like Russia and is addressed through schemes such as the World Bank Global Gas Flaring programme). With the steady expansion of distribution networks and shippable liquefied natural gas (LNG) from about the 1970s, demand for gas has increased for both consumers (e.g. heating and cooking) and industrial use (e.g. electricity production), in turn pushing up prices and driving the importance of gas security in recent years. Nuclear energy production has

⁷ Iran's production plummeted by 4.5 million barrels/day within a few weeks, and the shortfall eventually amounted to 2 million barrels/day over a year

⁸ There is continuing debate about the extent to which futures markets increase the volatility of the spot market

never been subject to the same supply security concerns due to the relative abundance of uranium; rather, the technology remains highly controversial due to safety and waste management concerns. Smaller-scale alternatives, such as solar and wind, have always struggled to compete on the basis of price. This is changing with technological improvement and higher energy prices, and alternatives play a very important role in overall energy security strategies.

However, for the purposes of this analysis and insofar as NATO will likely be concerned, oil and gas remain the primary concerns due to their dominant role in global energy, but especially because their physical, international flows raise distinctly cross-border politico-security concerns.

2.2.1. A New Century of Concerns

Rising global demand for energy on the back of economic growth is nothing new, and energy security concerns are historically well established. In the new century however, a confluence of factors combine to intensify those concerns.

With regard to demand, rapid industrialization and economic growth occurring in much of the developing world, and particularly developing Asia (led by China and India), is driving sky-rocketing demand for energy. Industrial consumption is pushed by growing manufacturing production, and an expanding middle class drives personal consumption with new cars, televisions, and air conditioners.

Global supply has struggled to meet that demand partly because of instability in the Middle East, strikes in Venezuela, internal unrest in Nigeria, and other security concerns. But supply is especially constrained due to chronic underinvestment by both nationalized oil companies (NOCs) and private international companies (IOCs) since the 1990s when oil dipped to \$10/b. Some companies reportedly continue to measure future returns on potential investments at \$20/b oil even as forecasts predict long-term prices to stay above \$50/b for the foreseeable future. Such conservatism is driven by fear of a price collapse, and by the concurrent drive to maintain high prices by constricting supply. Investment by NOCs, as well as other nationalized energy producers, is further impeded by a lack of access to capital and technology on the scale enjoyed by the private majors.

The result today is diminished refinery capacity and shrinking spare capacity in energy supply chains. Such changes in fundamentals are not enough to induce the high oil prices of the past several years – refiners can manage today on lower inventories due to increased efficiency, and more flexible crude and product markets should effectively compensate for short-term discontinuities. Indeed price hikes are exacerbated by spot and futures markets. As discussed above, when prices are increasingly removed from flows of actual oil stocks they become more dependent on market perceptions, and therefore more volatile.

2.3. Supply Concentration and Regional Politics: Russia

Political debate about the reliability of Russian energy supply was reignited in January 2006 when Gazprom, the Russian state monopoly, signalled its intention to raise the price of previously subsidized gas exports to Ukraine from \$50 to \$230 per

1,000 cubic metres. As well as demanding western European prices for its natural gas, Gazprom demanded that contracts be settled in cash. Ukraine refused to pay the higher prices, and before a compromise was reached at \$95, Russia reduced the flow of gas through the country and accused Kiev of stealing supplies intended for Europe.

Through the year, a succession of similar disputes with Georgia, Azerbaijan, and even close ally Belarus stoked European fears that Russian political spats with transit countries could endanger western supply.

More ominously, they raised questions about Russia's willingness to use the "energy weapon" in its political dealings, and thus also about the wisdom of the heavy dependency of many European countries (mostly in central and eastern Europe) on Russian energy supplies. Although Gazprom was demanding "market" prices from Ukraine, i.e. those paid by western European customers, the move was widely seen to put pressure on President Viktor Yushenko after his defeat of the Kremlin's preferred candidate in the liberal 2005 "orange revolution".

In July, Transneft cited technical reasons to suspend oil shipments to the Mazeikiiai refinery in Lithuania for over a year, after that refinery was sold to a Polish company over a Russian rival. Political motivation was widely assumed. A gas price hike to Georgia, finally agreed to in December 2006 after Gazprom threatened to turn off the taps, was an extension of a September political row that saw relations between the two countries sink to new lows. Subsequent similar demands of Azerbaijan came when it assisted Georgia with cheap energy, and as oil exports began to circumvent Russia through the new BTC pipeline to Turkey. Those demands were summarily rejected when Baku substituted oil in its affected power plants, continued to supply gas to Georgia, and eventually cut-off all oil exports north to Russia in January 2007. The Belarusian case of that same month is somewhat more curious given President Lukachenka's filial relationship with Russia and with Putin himself, but has been linked to Lukachenka's attempts to rebalance the trade relationship between the two countries.

It was following the Ukrainian crisis, in March 2006, that Poland released its proposals for an "all-for-one" energy pact. Since then, political rumblings from mainly eastern quarters lament the lack of European solidarity in the face of Russian energy power and depict a growing security problem. The Nord Stream pipeline directly to Germany (bypassing Poland), and the Italian diversification toward rather than away from Russian gas in 2006, are purportedly examples. Such discrepancies among European energy strategies stem from differing assessments of Russian reliability and how best to sustain it.

2.3.1. Heavy reliance, heavy state hand

The mixture of sources of imported oil and gas are indeed marked in Europe by a substantial reliance on Russia for both commodities. Specifically, the EU imports 44% of its natural gas, 50% of which are supplied by Russia. However, there is an enormous variation across European importers when it comes to reliance on Russia. Hungary is particularly dependent, with over 90% of its imports coming from the east, but northwest Europe receives comparatively little Russian oil or gas. On the whole, though, Russia's increasing importance as mature North Sea production dwindles and

Middle Eastern violence continues is undeniable. The country possesses 6% of proven oil reserves globally, and 30% of gas reserves. Russian reliability as a supplier is in the end dependent on domestic political developments and policy choices there, both of which in turn are affected by the energy sector and debates surrounding it.

The creeping “shady-nationalization”⁹ of Russia’s energy industry is a tricky business. Unlike outright state control in other countries, Russian companies are tangled in a web of subsidiaries and joint ventures that bring the state in through the back door and render the entire sector notoriously opaque. Government agents or individuals representing their interests may sit on the board of one or more entities within these complex webs, which often extend well beyond Russian borders. But the state also exerts pressure via personal connections, regulatory pressure, scare tactics, and a host of public-private arrangements that represent gross conflicts of interest.

The rise of state control in the Russian energy sector is worrying in that energy sales and transport can be used as a political tool. Determining the extent to which the state intends to exercise that tool, and the broader role of energy in Russian foreign and security strategic thinking, is not easy given the centralised nature of decision making in the Kremlin, but official policy gives strong hints as to its importance.

The rising profile of the state also raises political-economic questions about how policy will be affected by the centrality of energy to the Russian economy. Corruption, already a severe problem, is exacerbated by the flow of resource assets into state pockets.

Reliance on energy income does not appear to be going away soon. The dreaded Dutch-disease, whereby petrodollars crowd out development in other sectors, is showing signs of afflicting the Russian economy where a large state-dominated energy sector threatens diversification. 2006 growth figures for key Russian industries bear out the increasing reliance of the economy on oil and gas prices. 6.1% overall economic growth in the country was buoyed by expansion in the construction (14%), financial (10%), and communication (10%) sectors. All three markets rely heavily on capital inflows from oil and gas, which account for 63% of the economy¹⁰. And the share of investment in GDP, which remained flat in 2006 at 18%, is judged to be “too small to expect successful diversification away from fuels and metals in the near future”¹¹.

The increasing reliance of the Russian economy on oil and gas, combined with the political-economic effects of creeping state control, combine to make fluctuating energy prices key to Russian stability in the near future as elections are scheduled for 2008. Some have equated the election date with the demand cycle for energy in Russia, seeing a connection devised to reinforce the incumbent clique.

Politically, the perceived rise of Russian assertiveness abroad (particularly in the use of energy exports) reflects the confidence of what some refer to as its “petro-infused

⁹ This term is used by Andrew Monaghan in “Russia and the Security of Europe’s Energy Supplies: Security in Diversity”, *Conflict Studies Research Centre Special Series 07/01, January 2007*

¹⁰ Per Natalya Orlova, Chief Economist of Alpha Bank, as quoted in *The Moscow Times*, 5 February 2007

¹¹ Renaissance Capital research note, as quoted in *The Moscow Times*, 5 February 2007

elite”. A sharp decline in energy prices could undermine the confidence of the political class in Russia and affect the power balance in the Kremlin, especially as Putin prepares to (supposedly) step down in 2008.

2.4. Supply Concentration and Regional Politics: The Middle East

As a region, the Middle East dominates energy production and global distribution. Saudi Arabia alone contains 23% of global oil reserves and serves as the “central bank” of oil via OPEC. What little spare capacity exists in global oil production is overwhelmingly in Saudi Arabia, but an increasingly deep and liquid market for oil futures has increased volatility and diminished the country’s ability to control prices over the past 15 years. The second and third largest oil reserves in the region are in Iraq and Iran, both of which present serious political and security problems as reliable suppliers. Given the intertwined nature of gas and oil at the production level, the region is also a leader in gas production – indeed Iran is second only in the world to Russia. However the political complexities of the region impede sufficient overland transport infrastructure to bring much of it to the European market. Thus Qatar is one of the largest producers of liquefied natural gas (LNG) globally, and undersea pipelines bring North African (primarily Algerian) gas to Europe via Spain and Italy. And while none of the three major oil producers has formal relations with NATO as an organisation, the Alliance does have official ties with many of the major gas players in the region including Algeria, Egypt, and Qatar.¹²

Middle Eastern politico-security concerns loom large, potentially impacting energy supplies from a region which will substantially increase its share of global exports over the next decades. And although a significant “risk premium” derives from ongoing uncertainties in Iraq, Iran, Saudi Arabia, and (more peripherally) in the Levant, individual incidents can still spook markets and send prices rocketing.¹³ Understanding those security issues is crucial if one is to identify how NATO can help to mitigate threats to energy supply and resultant market risks.

Patrick Clawson and Simon Henderson cite five major potential sources of an oil supply disruption in the region: terrorist attacks on energy facilities; an exodus of oil workers prompted by fears of unrest; domestic political instability (including regime changes or accession crises); and the spread of Iraqi instability into other producers; confrontation with Iran and subsequent threats to the Strait of Hormuz.

2.4.1. Saudi Arabia

The first three apply separately across a range of countries, but come together to threaten the primary energy player in the region and the centrepiece of global oil production - Saudi Arabia. Saudi Arabia alone possesses what excess production capacity exists in the global system, and with almost a quarter of global reserves J. Robinson West places concerns about Saudi Arabia’s stability as a supplier into three broad categories: regime stability (including terrorist threats), foreign policy and

¹² NATO relations with the MENA region take place under the Mediterranean Dialogue (MD) and the Istanbul Cooperation Initiative (ICI) frameworks. MD membership comprises Algeria, Egypt, Israel, Jordan, Mauritania, Morocco, and Tunisia. ICI membership comprises Bahrain, Qatar, Kuwait, and the United Arab Emirates.

¹³ The risk premium is difficult to calculate, and even more difficult to distribute among various causes.

external alignment, and production capabilities. An external security organisation can do little to affect production capabilities, particularly when Saudi Aramco monopolizes domestic production and investment decisions are not particularly affected by security risk assessments (but rather by price management targets and backroom negotiations, primarily with the US).

This is not to say that security risks are not negligible. Indeed since May 2003 a wave of Islamic militancy has targeted Westerners and energy infrastructures with the explicit aim of undermining the Saudi regime by disrupting oil revenues. After the 2004 Khobar Towers attack succeeded in killing many Western oil workers and impacting the world oil market by precipitating fears of a foreign exodus and production drop, the Saudi government passed various measures to tighten security. But divisions exist within the ruling family about balancing security crack-downs, political reform, and appeasing popular sentiment (which can tend toward religious extremity and anti-Western opinion). The Kingdom has also been very mindful in the past to construct numerous systemic redundancies and maintain excess capacity to mitigate the effects of attacks – but with spare capacity so low it is increasingly difficult to convince the market of Saudi Arabia’s ability to withstand future attacks with only negligible effects on output.

It was agreed in 2005 to increase production capacity, and indeed new infrastructure will come online in 2009. However, many are sceptical of the Kingdom’s assurances that its reserves are vast and easily tapped.

2.4.2. Iraq

Iraq presents an enormous uncertainty. Domestic political developments and how the U.S. manages its withdrawal over the next years will dictate the security situation, and by consequence impact the pace of production. Presently, production levels hover at 25% below pre-war output¹⁴ and attacks on installations are increasingly common.¹⁵ A March 2007 U.S. Defence Department report on Iraq security assesses that “the timing and location of more recent attacks [on infrastructure] resulted in greater disruption of service. In addition, weak ministerial oversight, ineffectual rapid-repair teams, and criminal harvesting of infrastructure assets have proved to be major impediments...”¹⁶ Indeed in January 2007 production dropped 300,000 b/d below the 2006 average. Predictive scenarios foresee a wide variety of possible security situations over the next ten years in Iraq, but most agree that the situation is likely to deteriorate before it improves. NATO’s role in Iraq is limited to the NATO Training Mission – Iraq (NTM-I) which oversees officer training both in-country at Ar Rustimiyah and also at the NATO School in Bavaria. Any further involvement is unlikely – having split the Allies apart in 2002, Iraq is a highly sensitive and

¹⁴ 2005 output est. 1.88 mb/d versus 1999-2002 average output est. 2.37 mb/d (from U.S. Energy Information Administration Statistics as posted in March 2007 International Petroleum Monthly)

¹⁵ Between January 1 and November 29, 2006, 94 separate attacks on “pipelines, oil installations, and oil personnel” were recorded by Iraq Pipeline Watch, a joint project between IAGS and Threat Resolution, Ltd.

¹⁶ “Measuring Stability and Security in Iraq”, U.S. Department of Defence Report to Congress, March 2007, pg 21 (available at http://www.defenselink.mil/home/pdf/9010_March_2007_Final_Signed.pdf)

essentially taboo subject notwithstanding the compounding controversy of NATO and energy.

2.4.3. Iran

Iranian political tensions with the West over its nuclear programme and suspected involvement in Iraq have raised the spectre of military confrontation. The country is a major player in the market, as the second oil producer and first gas producer in the MENA region. It also holds a strategic coastline along the Strait of Hormuz, through which 20% of the world's oil supply passes. Stated Iranian military strategy has long envisioned affecting this traffic to target either producer or consumer adversaries. In 1982 it targeted ships exporting Iraqi oil and met with American air attacks on its vessels. More recently, the supreme commander of Iran's Revolutionary Guards, Major General Yahya Safavi, threatened repeatedly in 2006 Iran's intention to block the straights if the country were to come under U.N. sanctions due to its nuclear programme.¹⁷

2.5. Supply Concentration and Regional Politics: The Caucasus and Central Asia

The area around the Caspian Sea, and particularly the coastal city of Baku, was at the beginning of the last century a leader in energy production. Under Soviet rule, Caspian basin and Central Asian deposits were under-utilized in favour of Siberian reserves. Thus as the region emerged as a collection of independent states after 1991, there were high hopes that it would provide a new alternative to Middle Eastern and Russian suppliers.

Transportation from this relatively inaccessible region has historically constituted the greatest hurdle to large-scale export. Indeed, the Nobel brothers financed an entire transcaucasian railway line in order to bring their Baku oil to market in the 19th century. Unsurprisingly, then, energy concerns in the region tend to revolve around a complex interplay of "pipeline politics".

Under the Soviet Union, the region was fully integrated into the Soviet pipeline system. As a result, post-independence exports were subject to the high transit fees charged by Transneft and Gazprom, or extremely low prices for gas and oil purchased directly. Even given high fees, underinvestment in the Russian transit systems meant that pipelines were often working to capacity, restricting exports and forcing them onto higher cost, lower capacity transport means (such as railways). By monopolizing the export networks, the Russian state-controlled transit companies thus subjected exports to potential political interference. But the same was true of imports, so that oil-rich Azerbaijan relied on Transneft to export Caspian oil and on Gazprom to import necessary gas supplies. Other states in the region are reliant on the two entities to different degrees depending on their oil and gas endowments. While this was the case, Caucasian and Central Asian states were held virtually hostage to Russian energy cooperation, and by extension Russian political pressure.

¹⁷ A recent example was on November 18 following the Iranian Great Prophet-2 naval exercises in the Gulf.

2.5.1. The Caucasus

It was in order to circumvent Russian distribution systems that western public financing was granted through the International Finance Corporation (IFC) and the European Bank for Reconstruction and Development (EBRD) towards the building of trans-Caucasian routes. An initial oil pipeline to the Georgian port of Supsa offered an alternative from Baku but still required shipping through the clogged Bosphorus. The South Caucasus gas pipeline provided an export route for Caspian gas through Turkey. But most importantly, since the completion in 2006 of the Baku-Tbilisi-Ceyhan (BTC) oil pipeline from the Azeri-Chirag-Guneshli (ACG) field to the southern Turkish coast, the political implications of a viable alternative oil export route are already apparent in the region.

In the wake of the Russian-Georgian row of 2006, the newly completed BTC line allowed Azerbaijan the political freedom to support its avidly pro-Western neighbour and compensate for Georgian gas shortages. When Gazprom tried to apply pressure in turn on Baku by doubling the price of gas exports south, Azerbaijan refitted some power generators to run on oil (thus eliminating its need for gas imports) and halted all oil exports north through Russia. The move was a final symbol of Azeri energy independence from Russia, and along with high oil prices it is driving the new-found confidence of the Azeri regime which is helping to transform the political and security landscape of the region. Revenues from energy are financing a new railroad to bring goods through Georgia to Turkey and on to Europe - another example of closer ties with its pro-Western regional neighbours and Europe itself.

Indeed Aliyev's efforts to court NATO and the EU have been intensifying steadily in recent months. While less vocal than Georgia, whose membership in NATO before the end of the decade cannot be ruled out, Azerbaijan is undoubtedly orienting itself towards the Euro-Atlantic community. Building direct energy interdependence and serving as a realistic option for European energy diversification are both integral parts of that process. In the case of both Georgia and Azerbaijan, new-found energy independence and tightening regional cooperation are providing room for maneuver in foreign and security policies that were previously impossible.

2.5.2. Central Asia

Across the Caspian, Turkmen and Kazakh oil and gas also seek transport routes to market – and the result has been a geopolitical tussle between Russia and the West. For its part, Kazakhstan has been keen to emphasize its cooperation with Russia. During a March 19, 2007 meeting with Vladimir Putin, President Nursultan Nazarbayev reaffirmed his country's energy commitment to Russia and intention to export most of its resources through Russian pipelines. In 2006, 43 million tons of oil and 24 billion cubic metres of gas were exported north. This is unlikely to change without new and very large transport infrastructure projects, since substantial Kazakh oil deposits are located near the northern border and well connected to the Russian network.

But Russian anxiety about a Kazakh reorientation is not wholly unfounded. Kazakhstan has been receptive to Chinese moves to strengthen bilateral energy relations. KazMunaiGaz and the China National Petroleum Company recently

pledged to draft a feasibility study for the construction of a gas pipeline between the two countries by 2012. More relevant for European supply and regional security interests, Astana has not been unreceptive to the recently revived trans-Caspian pipeline (TCP) plan. Azerbaijan has indeed taken the lead to pressure Kazakhstan to support such a move, but the most feasible version of the project is reliant on the cooperation of Turkmenistan.

In the world of Central Asian energy, Turkmenistan is emerging as a key potential transport hub. The political proclivities of its new leadership, following the death in December 2006 of autocratic ruler Saparmarat Niyazov, will decide what role Turkmenistan will play in the coming decades. Gurbanguly Berdymukhammedov, confirmed in February 2007 as Niyazov's successor, at first appeared committed to promoting the diversification of Turkmen export options away from Russian dependency. Indeed, Niyazov had already been actively pursuing such a course in the months before his death, promoting new export routes to China and through Afghanistan to South Asia, and negotiating a 54% price increase in gas sold to Russia. However in May Berdymukhammedov signed a deal with Putin to expand export capacity through Russia and construct the first gas pipelines in the country since the 1970s. He has repeated several times that the deal does not kill TCP prospects, and if indeed one day the TCP goes forward, the political implications for his country and Kazakhstan vis-à-vis the West could be as profound as those in the Caucasus.

NATO's standing in Central Asia is somewhat mixed. After September 11, those countries gained significant standing on the security agenda, and intensified partnership programmes have assisted with defence institution building and strengthened armed forces. However across the board significant entrenched business interests continue to bind the region to Russia, and Central Asian governments are cautious of political interference while welcoming the legitimacy and enhanced capabilities ties which NATO brings.

In all these cases, Turkey's bid to position itself as the energy transit hub between Europe and western Asia is clear. Rising tensions between many European countries and Turkey over EU membership could put crucial projects like the Nabucco gas pipeline at risk.

The lesson to take from Caspian energy politics is that they are part of a much larger geopolitical tussle with Russia. As Russia reasserts itself abroad, Caucasian and Central Asian neighbours are (to varying degrees) keen to escape from under Russian dominance, once manifested in an energy export stranglehold that commanded political and strategic subservience. Russia is anxious to lose lucrative transit fees and sources of cheap gas, and also to see competition in Europe and eventually in Asia. Accessing Central Asian energy, and encouraging political and economic regional development, are two sides of the same coin.

2.6. Conclusion

This article has attempted to offer only a background insight into the major issues regarding energy within NATO and on the European periphery. As European states seek to promote diversification of suppliers, the political relationships between Europe and those alternative sources will remain at the forefront. NATO's political-

security agenda in a rapidly changing economic environment therefore offers significant scope for influence.

3. Opening Remarks by the Chairman

*Phillip Cornell
Chairman of the Conference
NATO School Research Department*

Welcome to Oberammergau for “The ‘Security’ of Energy Security”, a NATO School conference looking at the role of the international security community in comprehensive energy security policies of the west. I’m very happy that you’ve all made it here, as I know that it is a bit of a journey. But I think you will all agree from the surroundings that it will certainly have been worth it. I hope you can enjoy some of the time you have here, exploring a bit around the area and taking advantage of this beautiful setting that the NATO School is so blessed with.

My name is Phillip Cornell. I am a Fellow in the Research Department here at the NATO School where we have been looking at this topic of energy security, as one of several things that we study, for several months now. And this is happening in coordination with a greater effort going on within NATO, especially since the Riga Summit in November 2006, to explore ways that the Alliance, but in the context of this meeting also other international security organisations and individuals, have to play in energy security policies.

I’d like to welcome you first just to the NATO School. This is NATO’s primary operational level education and training facility, and has been doing this for over 50 years. So it is a business I think we know well, and is well established.

In the spirit of the international sharing of ideas that goes on here on a weekly basis among military and civilian personnel from so many nations – NATO and partners, but also across the world – I hope that we can express candidly, openly, and without too much of the political constraints that so often go along with this topic.

This conference is also organised in cooperation with the Institute for the Analysis of Global Security. IAGS is a Washington-based think tank and one of the premier institutions that deals explicitly with energy security.

And of course that is our topic. Energy security is sometimes a tricky topic to cover, in that it can mean such different things to different people. However its link with international security has been there since the beginning - since Churchill changed over the Royal Navy from coal at the beginning of the century, through various military endeavours with energy security as their goal. Traditionally this is because militaries are moved on energy and secure flows of energy from abroad. Today it is somewhat more taboo of course to equate national security and energy, and of course ‘militarizing’ energy security issues raises the spectre of resource wars and even elements of neo-colonialism.

But the hard security threats are real. It has been popular in the last couple of years to talk about Russia and Gazprom. The claim that was made last week to some presumably neutral Arctic territory looks menacingly like a modern day scramble for Africa. The protection of sea lanes has for centuries been the responsibility of commercial powers, and today piracy and critical choke points make them even more

vulnerable. And of course there is the issue of international crime, and that word which is so ubiquitous and multiply definable – terrorism. These make up just a few of the threats facing the global supply chain which delivers much of our vital energy resources.

The international aspect is clear in all of these examples. When it comes to protecting energy infrastructure, the degree of internationalisation is a contentious issue and one that varies among NATO nations. But the energy market and environment are more international than they have been in the past, and increasingly so. It should be clear to all of us in industry, policy, or the academy, that what happens upstream and along the supply chain invariably affects consumers and downstream actors. The network is interconnected and international, and one which no single nation can guarantee alone.

The depth, liquidity, and global nature of product and financial markets mean that a British girl captured in Africa can affect oil prices more than the real price affect of a medium production cut. Perceptions matter, in the short run perhaps more than supply and demand. But because of that liquidity, it is so much more vital not to exaggerate the hard threats that we do face and artificially undermine confidence in future security. Defence officials sometimes cannot help being doomsayers – threats keep them in a job. But hypersensitive markets and those preparing the huge, risky, and necessary investments to guarantee our energy security are listening to them.

So it brings me to another point. In the proceedings, all of the presentations are on the record, all of the Q&A sessions and discussions afterward are off the record. As such, I am confident that we will not be causing any Black Tuesdays any time soon.

Our contributors hail from the academy and also from industry and international organisations.

The panels will look at

- Determining the Security Logic of Energy
- Critical Energy Infrastructure Protection
- Risk Assessment both in the security community and in industry
- The Security Politics of Energy Interdependence
- and Energy and the Future Security Environment

With that, I would like to open this conference, and once again welcome you to the NATO School.

4. Determining the Security Logic of Energy

4.1. NATO and Energy Security

Adrian Kendry¹⁸
Economics Directorate
NATO International Staff

A young man is at school in Chicago. He sees a very pretty young lady and begins to talk to her. She takes a liking to him, and so she invites him to visit her parents on their Texas ranch. The woman says to the man, “My father is very eccentric but he would be very happy to meet you.” They arrive to a barbecue taking place, and the man meets the father and the mother. The father says “Son, I’m happy to meet you. Any friend of my daughter is a friend of mine. You’re very welcome here, please join the party.” So the young man steps around the swimming pool, and he notices that there are a number of sharks swimming in the pool. Surprised, but remembering the eccentric father, the man thinks no more of it and joins the party. After one beer too many, suddenly he falls into the pool. Panic begins to descend on him, but he is quickly yanked out. The man, shaking, cold, and trembling with fear, is approached by the father. “I’m so sorry. Let me make this up to you, I’m prepared to give you our small back house for the upset that you’ve experienced.” And the young man says, “No”. Looking around, the father says, “I am prepared to give you one of those oil wells to compensate you for your distress”. And the young man says, “No”. Finally the father thinks he has clued in and says, “I realize that you probably want the hand of my daughter in marriage, so let me tell you here and now – I am prepared to give you her hand.” The young man says, “No”. Exasperated, the father cries, “Well then what is it that you want, son - what can I give you?” The man replies, “I just want to know the name of the person who pushed me.”

That story is rather the story of NATO and energy security. Who has pushed NATO into the limelight of energy security, among the sharks in the swimming pool?

4.1.2. Market Failure and Collective Action

A brief prologue: a key point about energy security is that it raises the prospect of market failure. The question about the provision of security to energy infrastructures raises important questions about the ability of national governments and the ability of private industry to provide the security that will underpin growing demands on energy infrastructures.

In the language of economics, there is the classic potential for market failure. That is to say, we are confronted with the possibility that markets will not be able to provide that security which is optimally deemed to be necessary. That in itself raises important questions about what is necessary. What security is required in what quantities to meet what risks?

This section is entitled, “Determining the Security Logic of Energy”. The word logic reminds me of a seminal work from over 40 years ago from Mancur Olson of Maryland. Olson was a great political scientist and economic thinker, who in a classic book, *The Logic of Collective Action*, pointed out that those kinds of issues where the

¹⁸ This article has been adapted from a talk given on July 19, 2007 at the NATO School

benefits from doing something could be regarded as excludable lead to very tight, well organised coalitions of interests. By excludable, that is to say you could shut out other people from taking advantage of the benefits of whatever you had invested in. Conversely, issues that give rise to spill-over effects (i.e. benefits which are non-excludable) lead to weaker coalitions.

Olsen's insights can be applied to this particular issue, in the context of thinking about what it is in terms of energy security that gives rise to a logic of collective action. Specifically, what leads to collective action not just among nations, but in fact within international organisations? And indeed even more specifically, what is the logic of collective action that could drive a role for NATO in this particular debate?

It is not an obviously easy question to answer, although there are some obvious elements to it. One thing to be aware of from the outset is the danger, and indeed the fallacy, of extrapolation. Looking at the world as it is today, one may be tempted to extrapolate in some linear manner into the world of tomorrow. It is therefore necessary to always consider the agility of organisations, firms, and governments to create the capacity for flexible responses.

What are some recent events in the past week (July 16-20) which relate to this debate? In the Arctic, there is important news about the Shtokman fields, which some project to be the most substantial natural gas reserve field in the world. Recently announced was an agreement with Total of France and sharing of technology, probably for liquefaction to produce LNG. Such stories are important in terms of what they reveal about energy security strategies coming out of not just Russia, but in other cases out of the whole of the Caspian Region and Central Asia. Less well reported were attacks on pipelines in Mexico by radical groups opposed to regional policies and the wealth distribution of the government. And the case of the kidnapping of a young girl in the Nigerian Delta was significant in its implications for the markets.

In the following remarks, I want to say something about NATO's Strategic Concept and the Riga Declaration of November 2006. From the Riga Declaration we might begin to contemplate what NATO's added role may be. I want to then say a few things about the complexity of energy policy in the context of regional and global trends. I will touch briefly on the Stern Report and climate change. I will try to reflect on some of the major fundamentals of energy security which are being reinforced by recent information produced by various organisations, not least the IEA. I will then finish up by saying something about the wider dimensions and military dimensions for the provision of energy security.

4.1.3. Exegesis of the Riga Summit Communiqué

The famous NATO Strategic Concept, coming out of the Washington Summit in 1999, talked about the need for NATO as an alliance to take account of the global context in which its security interests could be affected by risks of a wider nature. "Wider nature" was meant to refer to those risks beyond the more orthodox ones posed by the Warsaw Pact during NATO's monolithic engagement with the Soviet Union. The Strategic Concept points out that one such risk was the disruption of the flow of vital resources.

I think our meeting here will take on board questions about the potential for disruption, and what are the implications for whether we should act. Is there anything that we can do on a pro-interventionist basis, or is this something that can be managed exclusively through other logics, such as the logic of the market?

In November 2006 the Heads of State and Government at the Riga Summit made this declaration towards the end of the long communiqué:

- *“As underscored in NATO’s Strategic Concept, Alliance security interests can also be affected by the disruption of the flow of vital resources. We support a coordinated, international effort to assess risks to energy infrastructure security. With this in mind, we direct the Council in Permanent Session to consult on the most immediate risks in the field of energy security, in order to define those areas where NATO may add value to safeguard the security interests of the Allies and, upon request, assist national and international efforts.”*

One of the reasons that I am engaged here, having had the good fortune of meeting Phillip Cornell and Gal Luft over the past couple of years, is because at the beginning of 2006 I was engaged in writing a paper seeking to understand the meaning of the events that had come to pass between Russia and Ukraine. This contributed to a series of reflections which took us down the road towards Riga. It was not obvious then, and for some it is not obvious now, that such a declaration would be made. Notice though that this declaration again restates the disruption of vital resources, and talks about supporting a coordinated international effort to assess risks to energy *infrastructure* security.

The North Atlantic Council, the highest decision-making body at NATO, was thus directed by the Heads of State and Government to consult immediately, in a suitable timeframe, on the most immediate risks in the field of energy security. The aim was to understand where NATO could add value to safeguarding security interests and could then, upon request from nations and international organisations, seek to provide some assistance in a value-added manner.

Each element of this phrasing is significant.

- *“The Allies are to take a coordinated effort to assess the risks to energy infrastructure security.”*
 - Who are we coordinating with?
 - Who will take the lead?
 - How is this coordination precisely to take place?
 - What are the parameters of energy infrastructure security that would be seen to be not only relevant but also agreed by Allies to pursue?
- *“The Heads of State direct the NAC to consult on the most immediate risks in the field of energy security.”*
 - What is the time scale?
 - What are the boundaries for this consultation?

We are currently engaged in a continuing assessment of what is to be done. This has been a complex political process as many here will know. And it is a complex political process which continues. But as we will see, there is clear evidence that NATO will consult with international organisations, and with partners, on these issues.

To define those areas where NATO may add value to safeguard security, we must decide what criteria are to be used to determine where NATO indeed would or could do so. At the same time we must recognise the danger of NATO involvement being seen as the militarization of energy security, or indeed as holding the potential for conflict with national or other interests in this sphere. We therefore must be very clear minded about the dimensions of the boundaries.

- Finally, *“Allies will upon request assist national and international efforts.”*
 - What efforts would these be?
 - What could the nature of assistance be?

While it may appear little more than an exegetical exercise, reviewing the language is very important for the purpose of trying to understand and build upon what was said at Riga.

4.1.4. Debating Energy

NATO's is of course only one role, and may prove to be a very minor role. But an active debate is taking place about what can NATO as a comprehensive security provider do with regard to the potential for disruption, instability, and insecurity in this sphere?

It seems that this point is reinforced by the fact that NATO's geographic evolution, and various concerns among the Allies, are coming together. NATO has evolving partnerships, not just with Russia, Ukraine, countries in the South Caucasus, Central Asia, North Africa, the Near East, and the Gulf, but we now have emerging relationships with China, Japan, Australia, South Korea, and New Zealand. These relations - even though they are not focusing precisely on energy security or energy infrastructure security - nevertheless put us in close contact with wide variety of global energy providers, consumers, and transit countries.

Recently there have been some interesting lessons which have been emerging. One of them came at the end of June 2007 at the EAPC Security Forum at ministerial level at Lake Ohrid. Here there were very clear divergences about what NATO's role in the spectrum of energy infrastructure security could be. Nevertheless there was a consensus among the participants that the physical protection of energy infrastructures does link to NATO's core mission and skills. This was further reinforced by a discussion about the nature of NATO's offering of training and services in assistance with partners. Also discussed was NATO's traditional role in defence reform, which has encompassed all manner of issues including budgetary dimensions and economic dimensions. Among the main topics was the extent to which energy security can be seen as an issue intertwined with security and military assistance, or otherwise the extent to which it is to be guided exclusively by the logic of the market.

In July 2007 an important colloquium took place in Azerbaijan which brought together a number of participants from NATO members, from partners, and from industry. The conference essentially looked at how to deepen cooperation and exchange experiences on risk assessments to energy infrastructures and on estimating related costs, and how this could be done through EAPC and so-called IPAP mechanisms. While I will not go into details here about probabilities, risk assessments and net benefit analyses, suffice to say that the conference in Baku did take cognisance of these types of issues. There was also an exploration of the feasibility of training programmes for military and police forces to support national or regional critical energy infrastructure protection efforts and surveillance missions. This discussion took place only in partnership format, but the proceedings were useful in signalling how NATO might be able to develop a strategic dialogue on energy infrastructure security within the region of the South Caucasus, across the Caspian, and into Central Asia.

Common energy policy is fraught with complexities, as revealed in current debates over the importance of diversification of energy sources and channels of energy supply; the debate on Nabucco and Blue Stream; and the Nord Stream/South Stream issues of alternative lines, and what this implies for mediating relations between Russia and Europe in the energy sphere.

Recent reports focusing on the potential for energy instability in some of the countries of Central Asia, and the so-called resource curse which distorts economic competitiveness in energy-rich countries, raise serious questions about patterns of dependency and interdependency in this sphere.

One of the most significant agreements in the Caspian Region in 2007 was the May agreement between Russia and Turkmenistan, Kazakhstan, and Uzbekistan to accelerate the Caspian Central Pipeline System, noting the intergovernmental agreement projected for the beginning of September 2007.

We know from various sources that Middle East/North Africa (MENA) states will see a rising share in global energy resources by 2030. This will be accompanied by a declining share of OECD states in global energy resources. Recent forecasts by the IEA suggest that there could be a sharp divergence between supply and demand after 2010 among the non-OPEC countries in the field of gas, while the demand for oil is rising by over 2% per annum at this time.

Everyone I think is familiar with the Stern Report. Something worth emphasizing is that the demographic changes and economic growth projections coming out of Stern suggest the need for an energy system that doubles the energy efficiency of economies and halves carbon intensity of energy. Stern also highlights that these are among the issues of major concern regarding future tensions arising within states and across states.

4.1.5. Meeting Challenges

The resilience of energy security networks is increasingly vital. We know that mutual dependencies and interdependencies create vulnerabilities, as borne out by various

network analyses and examinations of complex “systems of systems”. Such is the nature of networks, and indeed energy security is increasingly dependent upon complex systems of **trans-national, interconnected** networks which create vitally important political, economic, and social consequences for stability within energy producing, energy consuming, and energy transit states.

Thus our dependency on such networks promotes vulnerability to potential and actual disruptions arising from terrorism, geological instability, inadequate energy conservation, economic and political instabilities, weaknesses in the system itself.

Ultimately of course, efficiency is the best source of new energy resources, and renewable energy technologies can rebalance the geography of energy supply. Still, even though current price levels are certainly promoting investment in alternative energy technologies, one of the points in the debate about renewables is that fossil fuels will still be needed for 85% of consumption in 25 years.

So renewables notwithstanding, long term investments in more traditional energy production will require huge financial resources. It is estimated that \$20 trillion will be needed by 2030 - \$14 trillion to invest in infrastructure (including transport networks) and \$6 trillion to produce the necessary oil, gas, and coal. Investment means not just new builds, but also maintenance – we need to pay attention to the degradation of existing capacity. The poor state of existing capacity offers the potential for failures arising out of critical energy infrastructures – not through acts of God nor man’s evil intents – but by nature of the weaknesses inherent to the current system.

In addition, the **politicization** of the energy market is revealed by the relative standing of national or state-owned oil companies (NOCs) and international or private (and mostly western) oil companies (IOCs). While the latter owns only 5% of existing resources, sovereign states own over 95% of them. In that political context, increasing resource competition, together with demographic changes, raises the question about the extent to which national security and energy security overlap. That energy is not just another resource, and that it is can be a tool in geopolitics (or geological politics), really makes this conference a vital one.

Therefore, from where risks of disruption derive is a critical point. The political nature of energy opens up a host of risks – energy “jihadism”, tensions arising from excessive state control of the energy sector (and the potential for leverage), economic and financial imbalances resulting from distortions in the use of energy revenues, legal or even physical conflict over natural energy sources, and targeting of energy infrastructures in the context of existing conflict.

The role of NATO is clearly being conceived in terms of what kinds of provision to make in terms of potential **attacks** on energy infrastructure and energy transportation. Yet we still need to figure out whether this is to be a reactive or proactive mode of response, for defining the role of armed forces in securing energy infrastructure is a sensitive issue. It is important to be clear about NATO’s role (and its limits), and avoid perceptions of creating an energy fortress or provocation in sensitive regions.

One of the military-energy issues that is relevant to NATO in a less controversial manner is how to secure the supplies to the forces of the Alliance. The affordability of future military operations for coalition forces in crisis situations is increasingly being assessed in terms of the financial viability of such operations, allowing for the cost of non-renewable carbon fuels. Indeed, militaries are grappling with their own challenges of increasing efficiency and planning for sustainable deployments in the presence of volatile energy prices, and of risk management of energy pricing for the wider military budgets.

NATO's role in maritime security clearly raises questions about a role in surveillance and protection with regard to maritime energy infrastructures and transport. But in the maritime sphere we are confronted again with the question of reactive or proactive capabilities to deal with meeting attacks upon energy infrastructure. None of us should be complacent about the potential for such attacks or about the incentives for them. They are not limited only to jihadist attacks, but include also those seeking to smuggle, to steal or to weaken the authority of legitimate governments.

I hope that I've been able to give you a NATO perspective on how we stand. The debate will continue within NATO Headquarters through 2007 and maybe will take us to next April's summit in Bucharest, with a new lease of energy for thinking about these issues. One could argue that NATO's response, involvement, and further engagement with international organisations over energy security is waiting for some dramatic event to take place that would trigger action. I'm satisfied from my discussions with many people from many nations (both partners and allies) that there is an understanding that in this uncertain volatile environment, there will indeed be a NATO role in energy security. One might say that if we neglect energy security, it will not neglect us.

Thank you.

4.2. Energy Security – What Does it Really Mean?

*Gal Luft*¹⁹

Director, Institute for the Analysis of Global Security

We are facing today a second wave of interest in energy security and matters. The first came in the 1970s with the oil embargoes, but today it is again becoming a major issue which is keeping us very busy.

But perhaps it would be appropriate to go to a very different time period to make the case that energy security is such a deep issue in world affairs. This month 70 years ago the Japanese military attacked what the Chinese called the Marco Polo bridge in a provocation aimed to give the Japanese a pretext to invade China. That attack was followed a very aggressive and expansionist policy throughout East Asia. Seven years later it ended with two mushroom clouds. It is worth reflecting on these issues to remember that the prime reason for Japan's aggressive and expansionist policies was to satisfy its need for resources. An island deprived of resources was driven to aggressive conflict by energy insecurity.

When you begin to look at world affairs in this perspective you begin to see that energy security has always defined world affairs. It has shaped much bigger trends and practices. While we may be entering into a much different and more complex environment, this is unlikely to change.

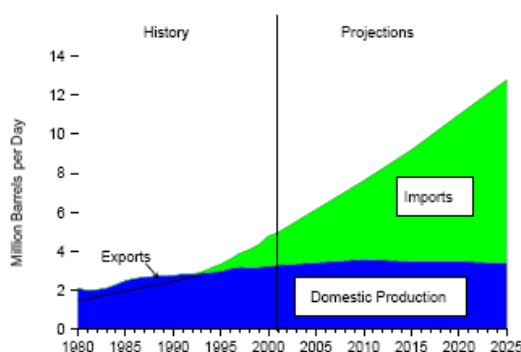
Let me take you from 70 years ago to where we are today. The latest IEA report, a quite bleak document, tells us the hard truth that supply and demand are not going to be in synch anymore. We are headed toward a time in which there will be a lot of inconvenience and tightness, and it will be more and more difficult to get access to resources. "Facing the Hard Truths about Energy," released by the National Petroleum Council and commissioned by the Secretary of Energy, came to very similar conclusions as the IEA report. Supply disruptions, tightness, and increasing difficulty in accessing resources are elements of the current environment. Both reports are a reflection of the overall mood among energy analysts, whether part of the industry or not. A third study surveying oil and gas industry executives showed 85% of them to be extremely worried about what the future holds in store for the industry. It seems therefore that if there was ever a state of denial in the industry, then it no longer exists. Overall, there is a belief that time is running out and that we need to embark on a set of very creative policies - rather than kicking the can down the road and hoping that things will happen by themselves.

So why is it that within just five years a new energy reality that has dawned on us? Five years ago energy security was not a very hot topic, and all of a sudden it has become one. The reason is a convergence of many things that are happening at the same time. It is almost a perfect storm of strategic, economic, and environmental factors that compound each other.

¹⁹ This article has been adapted from a talk given on July 19, 2007 at the NATO School

First and foremost, the war on terrorism and its offshoots created a very unstable strategic environment in the Middle East. I will elaborate on this later, but suffice to say for now that it is a key issue.

The second most important issue towards this change in the 21st century is the rise of the developing world, particularly China and India. Until the rise of China and India we had a market that was able to supply itself. There was steady growth, with fluctuations sometimes 1 or 2 percent to the right or left - but it was relatively manageable system. With the rise of China and India, together comprising a third of humanity, we are seeing very different dynamics now. There is a massive increase in demand that is not being matched by sufficient supply. Further, China and India are just at the beginning of their growth trajectory. If those two countries follow the growth model of other Asian countries, then the trend in demand growth will continue. The impact on the global market is significant also because the domestic resources of both countries are relatively limited. China's domestic oil base is very limited, and is basically flat now at 3 to 3.5 million barrels per day.



Source: EIA, *International Energy Outlook 2004*

Fig 1

Rising imports in turn affect foreign policy, international behaviour, and the Chinese position towards rogue countries like Sudan and Iran that are tied to other international security concerns. So far, the Chinese have been very effective in trying to avoid stepping on the toes of American and European companies. But we are heading towards a situation where the West and China will have to compete over the same sandbox - and that will probably be in the Middle East with all its security implications.

Very much due to the result of China and India's growth, as well as other major consuming countries, the markets today are extremely tight. The buffer of spare capacity in the past was much thicker, making it easier to withstand greater supply disruptions in the world market without extreme price spikes. But when you have a very, very thin buffer, it is like driving a car without shock absorbers - every little pebble on the road sends you to the ceiling. Market conditions which magnify the impact of attacks are ripe for terrorists and jihadists interested in creating disruptions to the global economy.

Iraq is one of the prime battlefields in which this economic jihad is taking place, and we at IAGS have sampled nearly 500 attacks. There have been many more which we have not captured. 500 attacks against infrastructure, in a country with the third largest reserves of oil in the world, hampers development of the industry. The investment climate is extremely inhospitable, so the oil we will need 5 to 10 years

from now, and whose development we need to start today, will not be there down the road. Even though the resource base is there, without companies willing to develop that resource base we will not be able to exploit it.

The jihadist movement is extremely aware of this sensitivity and vulnerability, and they talk about it all the time. Our staff surveys jihadist websites and communications and chat rooms on a daily basis. Potential attackers clearly realize that all they need to do is explode a facility in the Middle East and send oil prices up. They realize that in a country like the US which imports 12 million barrels of oil per day, a \$1 price increase wipes out \$12 million from US consumers. And attacks notwithstanding, they have succeeded in creating a fear factor, or terrorist premium in the market.

It would be forgivable to consider the attacks so far in Iraq as just pin pricks. The problem is that their large number adds up to about 1 million barrels of oil per day lost to politically motivated sabotage. Politically motivated sabotage does not refer to theft and looting (which are also rampant), but to people taking oil off the market for political reasons. Economists will agree that with an extra million barrels of oil per day would cool prices to \$40-45 per barrel from current prices at over \$70. Thus, the jihadist movement has succeeded in increasing the price by nearly \$30 per barrel just by targeting low-level infrastructures in Iraq. Such a price difference has a deep impact on the world economy, and will have an even bigger impact on the world economy as we move to a tighter environment.

Saudi Arabia is the lynchpin of the global oil market. Clearly the jihadist movement is very interested in taking out facilities in Saudi Arabia – not just because of gripes against the regime, but because they understand that it is the only way they can fundamentally shake the world economy. They also know that in Saudi Arabia the production industry is very centralized, much like an airport system, into hubs and spokes. Taking one hub down can take millions of barrels off the market within a few minutes. If heavily damaged, repairing such facilities could take many months. Saudi officials have reported a series of foiled attempts over the past few years, and more should be expected. The fact that few attacks failed does not mean that we will not face a successful attack in the future.

Going back to the overall environment, supply is so constrained because of a lack of investment, and I believe one prime reason for this is the inhospitable security climate on the ground.

Another reason though, is that so much of reserves are in the hands of unaccountable and opaque governments. Even if oil companies have a good deal of money these days to invest in new projects, they do not have enough investment opportunities. Why does a company like Exxon Mobil for example, the largest private oil company in the world, have only 5% of their investment in the Middle East? The reason is that host countries do not allow access to outsiders. The problem is that, truth be told, many of these countries simply do not want production to increase, and are understandably comfortable with high oil prices. It is a very comfortable situation where the less one produces, the more money can be made. OPEC reported this week that their revenues grew to nearly \$400 billion last year, an increase of \$77 billion over the year before when production was 50,000 barrels per day higher.

This brings me to the original question - what does energy security really mean. The answer is clearly – different things to different constituencies. Consumers would like to see low prices and greater reliability of supply, but when you begin to slice the cake you see that there are different consumers. Even within the transatlantic community there are different approaches to energy security. When you talk to Europeans for example, the first thing that comes to mind is gas and Russia. When you talk to an American about energy security, he doesn't think at all about Russia or natural gas, but about oil and cars, and about SUVs and the Middle East. The association which comes to mind is very different. For Europe energy security is first and foremost about electricity, or the ability to heat one's home. America however is essentially energy independent when it comes to electricity. And yet it is incredibly dependent on foreign oil, and the transportation sector is 97% petroleum based. So we are not always on the same wavelength concerning energy security, and it is interesting to see what different people really care about.

On the producer side, producers also have a lot of (quite different) concerns. They want access to markets, and they want to make sure they have expertise, investors, and access to sufficient capital, but on their own terms of course. And just like consumers they want to make sure the supply is uninterrupted, and they don't like their infrastructures being blown up.

There is also a third constituency - a relatively new set of transit countries with their own interests. It includes countries like Turkey, Georgia, Pakistan and others without a significant resource base but which function as facilitators by allowing energy to pass through their territory. Their definition of energy security has to do with the revenue that is generated from allowing resources to flow through their countries by pipeline or ship. They have a different concept about energy security.

Also, the private sector has its own set of concerns, and the list goes on. The aim is to see the interests of all these groups converge better. Everybody has a set of issues they want to protect and advance, and they are not always in line with other constituencies. The more we are able to merge these concerns, and to connect the relevant interdependencies, the more likely that we will achieve a more secure overall environment.

What, then, do we need to do?

The first thing is to protect what we already have. Our system is quite 'leaky' at the moment - and the first priority should be to fix the leakage, and avoid losing as much product in the process. The loss of 1 million barrels per day is simply unacceptable under current market conditions.

The second thing we need to do is to create alternative mechanisms of liquidity. Clearly the mechanism of liquidity we had before was in the hands of producers, in the form of spare capacity. It is a failing mechanism, because we will never go back to a world in which we have 5 million barrels of spare capacity. With Chinese and Indian demand growing, they will suck up every extra drop of oil Saudi Arabia brings into the market. We need to come to terms with the fact that producers are no longer able to bring us the liquidity we need.

So we need to take responsibility and develop an alternative form of liquidity that is in the hands of the consumers – that is called **Strategic Petroleum Reserves**. The US has a robust 770 million barrels of reserves, but other countries do not. Some are seriously behind in developing such an alternative method of liquidity – but on this front the situation is improving. The Chinese, the Japanese, and the Indians are building reserves. A general consensus is growing around the need to expand strategic reserves, particularly in light of President Bush’s decision to double the amount of American reserves to 1.5 billion barrels. That drive however requires buying oil and putting into the ground, adding extra demand to an already very tight market. Further, good coordinated management over these mechanisms of liquidity is lacking. There is no global blood bank, or something similar to the Fed in the US financial market - someone who decides when do we release oil and how much, or who decides what price band we want to see.

It is worth restating the importance of nurturing a hospitable investment climate. The oil and gas may be there, but they lie in the ground because of political and security constraints. The primary mechanism to improve that environment is frank dialogue with host countries. Some of the problems driving a lack of investment have to do with the political climate on the ground, and with disenfranchised minorities disgruntled with the distribution of revenues (and costs, perhaps environmental) of energy production. That is part of the problem in Nigeria, and is becoming a big issue in Mexico. Those countries should be encouraged to do a better job of distributing the wealth to minimize such disruptions. In turn those governments can benefit from outside investment, particularly from the expertise provided by IOCs to reach reserves that are beyond their capabilities. This is especially the case off shore, and in very difficult locations requiring sophisticated technologies of secondary and tertiary recovery.

Diversification of supply, conservation, and reinforcing multinational organisations are also key.

Perhaps one of the most important tenets of energy security at the moment is addressing the oil situation in the transportation sector. This is where American and European interests converge, and it is the lowest hanging fruit for NATO to pick. Militaries spend enormous amounts of money on fuel. Improving efficiency can save money for other operational elements and reduce overall dependency on local networks. Also, it doesn’t involve the political minefield which surrounds so many issues within NATO, and can set an example for the civilian transport sector as well as drive technological innovation.

Figure 102. Petroleum consumption by sector, 1970-2025 (million barrels per day)

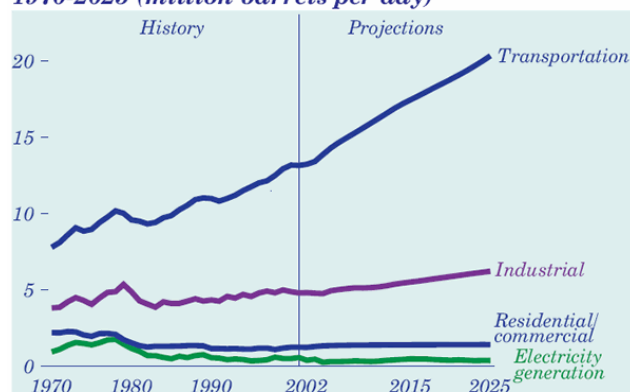


Fig 2

As you can see this is the big bird to kill, this is where demand growth is the sharpest. All the other sectors are pretty much flat. Electricity is not generally produced from oil anymore, and demand from the industrial and residential sectors is quite flat. We need to focus on transportation, even in Europe where efficiency in the transportation is higher.

The aim should be to move from a petroleum-based transportation sector to one that is more diversified, and link it more closely to our power sector. Electricity is made from a variety of sources – from coal, from nuclear, from natural gas, from solar, from wind turbines, etc. Such variety and diversification reinforces security. The key then, is how to link the sectors.

We need to encourage technologies which allow for the electrification of our transportation system - including mass transit, individual transit, and freight transport. Trains are an obvious mode to run on electricity, but it is also important that battery technology evolves to allow more cars to do so as well. In the US plug-in hybrids are a step forward - these cars give you a certain range on electricity from an external source but still have the fuel tank. It is a relatively easy technological leap, since we already have hybrid cars on the road. GM is talking about making this car within two years, and others within a range of three to four years. The more you have electricity replacing fuel, the more secure our system will be.

Another technology to be nurtured is gasoline substitutes, particularly alcohol fuels. In Europe you see bio-diesel already, and technologies are progressing to convert all forms of biomass into liquid fuel. Garbage, and even coal to liquids, allow us to utilize resources that are abundant and cheap for liquid fuel purposes. The aim should be to replace globally about 15-20 million barrels of oil with other resources. That will begin to have a serious impact toward taking off some of the burden, and alleviate a system that is currently extremely tight and restrictive.

At least in America, the grounds are shifting very quickly on these issues. Last year Bush launched a number of policies to increase the production of bio-fuels and other alternative fuels; to electrify transportation; to double the strategic reserves; and others. There is emerging a clear understanding in the US that the current system for energy security is unsustainable and requires an urgent and aggressive set of treatments. On the political landscape, the fact that both Republicans and Democrats are joining forces to make this happen is promising, but for energy advocates like me it is never enough. The progress through is striking.

Let me close with a thought about a final constituency. The next step is to bring the kinds of changes described above to the developing world. The policy prescriptions for an industrialized nation are often not applicable in a developing country, and yet those are the societies that will suffer most from increasing energy prices. Some developing countries still hold debts going back to the 1973 embargo, and still have not been able to release themselves from it. So they will be the first casualties of some kind of oil price spike, disruption, or mishap in the oil market. Developing countries require a dual approach which provides affordable energy while encouraging movement towards greater efficiency and security.

Thank you.

5. Critical Energy Infrastructure Protection

5.1. The U.S. Global Critical Energy Infrastructure Protection Strategy

Bruce Averill²⁰

*Senior Coordinator for Critical Energy Infrastructure Protection Policy
Office of the Coordinator for Counterterrorism, U.S. Department of State*

The unsuccessful attack against the Abqaiq facility in Saudi Arabia in February 2006 demonstrated to American policy makers the terrorist threat posed to major petroleum facilities. It thus prompted the development of an interagency strategy to work with host nations to deter terrorist attacks that would adversely affect both the global energy market and disproportionately affect the U.S. economy (as the largest energy consumer in the world). Our support is therefore not an altruistic effort to spread light. It is really an effort to improve our economic security; that was the original basis and it continues to guide us.

What are our assumptions?

- Not just U.S. national security, but the whole world economy and its security rely on secure access to supplies of petroleum.
- Terrorists are aware of our dependence on stable petroleum supplies and prices...
- ...and they know that if they can focus an attack to disrupt that supply it will have a substantial impact on the global energy market and the overall economy.

It came out of the National Security Council's counterterrorism initiative, and since this would be an effort primarily to work with other countries, the State Department logically took the lead and it was handed to our Coordinator for Counterterrorism's office. Walking around the State Department, they decided CEIP sounded a lot like CIP, so it was given to the Critical Infrastructure Protection (CIP) team in the Bureau of Political-Military Affairs where I was based. We then initiated a process to develop the appropriate program by convening a group of experts in energy security, or various aspects thereof. It was initially chaired by the CIP team, and included people from the Department State, Diplomatic Security, the Department of Energy, Department of Homeland Security, the National Security Council, the intelligence community, and various other agencies as appropriate.

First off, we had to decide that, if this was to be a CEIP programme, then some energy infrastructures must be more critical than others. How do we figure out which ones those are and measure criticality? Our method to do this involved a few factors including how long would the facility be off-stream and how long it would take to bypass. A key measure though looked at **capacity**. We have a limited set of resources and personnel to deal with this issue, and so reviewed capacity data from Oil and Gas Journal which publishes ranked listings of actual and ideal capacities of various facilities. At the level of 5 million barrels per day per facility (not country), there are only one or two facilities. At the level of 1 million barrels per day, there are about 15. At half a million barrels there are about 225 facilities, depending on how they are counted. Clearly, dealing with hundreds of facilities makes the problem less tractable.

²⁰ This article has been adapted from a talk given on July 19, 2007 at the NATO School

We had to make some compromise and focus on the larger facilities which, if taken out cleanly, would have a major disruptive effect on the global energy supply which could not be compensated for by simple market forces and relatively slow ramp-up of capacity elsewhere. **So the point is to try to focus on the biggest facilities – those which the market is most likely to be unable to deal with.**

It turned out that all the facilities that we identified as critical were located in what can loosely be called the Persian Gulf area, with two exceptions which happen to be in Russia. We then decided which countries we were likely to be able to engage with, and Russia was not on that list. I should add that neither was Iran, for what appear to be rather obvious reasons. The idea was to identify the facilities, and then start talking to host governments.

The facilities include processing centres, import/export terminals, and pipeline junctions. They do not include any pipelines, nor do they include any refineries. Pipelines are thought by experts to be too easily repairable. They are a nuisance if they continue to be blown up repeatedly as in Iraq or in Columbia where they are attacked rather frequently, but they are relatively straightforward to repair. And there simply are not any refineries in the world that are close to the capacities we were examining. Further, none of our identified facilities are in the Western Hemisphere. And I should note that initially there were no natural gas facilities on the list - which shows that this was clearly a US-biased assessment.

The working group then agreed on the content of our program. We agreed to institute bilateral outreach to selected host nations, and to do multilateral outreach to groups of appropriate nations. Wherever possible, we would build on and incorporate any existing initiatives. For example, under the Russian presidency the G8 Lyon-Roma Group had tabled a programme to address critical energy infrastructure protection. We wanted to make sure that effort and others were coordinated with ours in a bilateral fashion, so the left hand knows what the right hand is doing. The point is to avoid proposing things in one forum that are inappropriate in another. And this is a major undertaking, given how many things are going on.

The next thing to say, is that I can not say much. All of our bilateral interactions are at the request of host countries and are held in the strictest confidence. We cannot even confirm or deny the existence of these interactions, much less give any details about what we are doing with any specific country. Why is that? Within some of these countries there are substantial majorities (or minorities) who would not take well to American consultants scrutinizing their most valuable facilities – the crown jewels as it were. We generally try to keep a low unmarked profile. It is no secret that we are there, but we avoid advertising our presence. Confidentiality keeps us from telling one country that we work with another. If they talk to each other that's fine, but we can't divulge those confidences.

Bilateral Cooperation:

- Through appropriate channels we talk to the appropriate officials in the country and offer security assessments, training, or whatever else we think might be useful to the government.

- If accepted, we put together a team of experts of various aspects of physical security with an emphasis on energy security, including petroleum experts. They spend a few days visiting facilities, walking among the biggest and most important ones, and putting together a security assessment report telling them what we think is done well and what needs improvement.
- In many cases we offer recommendations. In one case we have a formal agreement with one country that institutes a joint working group of experts from the two governments to oversee improvements to security at that particular energy facility.
- Our aim is to maintain an ongoing dialogue after the assessment, rather than go over, tell them what we think, and go away. We try to make sure that our recommendations are effectively implemented, and then follow up to make sure they themselves are effective.

Multilateral cooperation: There are already many multilateral initiatives underway.

- GCC: Since many of the countries we deal with are in the Gulf, we want to make sure there is a unified approach within the Gulf region.
- APEC: Russia tabled an initiative on energy infrastructure security very similar to the one they had tabled at the G8.
- G8 (Lyon-Roma): Since the Russian motion, the German presidency has continued leadership on this topic, so it is not one that has gone away.
- OAS: At the CITCE meeting in Panama there was a declaration on critical infrastructure protection. One of the components of that was clearly critical energy infrastructure protection.
- NATO: As we heard earlier, NATO is still trying to figure out what its role is. But it is pretty sure it has one. And we will find out more about what that is as soon as Adrian and Phillip come back from some meetings.

What we are doing then, is really carrying forward the fundamental idea of ensuring that we minimize the probability of a successful attack. Part of the strategy from its inception was a public outreach portion. I have presented in Prague, Abu Dhabi, London, and at the NATO School. Typically, the aim is to focus on individuals who are from the private oil companies, national oil companies, governments, and security firms, and to convey that the US government is not sleeping on this issue. The rationale is that spreading information about our efforts will help dampen some of the fluctuations that occur in the absence of knowledge.

While some assume that the vulnerability has not changed much over the years, I can assure you that in at least a few cases there have been major security improvements at major energy facilities in various countries.

Our emphasis then is also on communication and outreach, and also to make sure the U.S. government continues to prioritize energy infrastructure security and aspects thereof. And beyond prevention, we work with other governments and NOC's on business continuity and mitigation measures. We discuss emergency response and how to respond if something bad happens, and insure proper measures are in place to minimize the impact. One example could be as simple as having custom-made giant valves that require a 6-9 month lead time, and considering keeping a spare part away from the original.

Our approach has encouraged this broader focus on regional and international cooperation. Another aspect of the initial strategy was to conduct a review after a year. That mid-2007 review would have to answer a few questions.

Primarily, was this the optimal way to organise the program, with State Department in the lead and the Departments of Energy, Homeland Security, and Defense in somewhat supportive roles? The consensus was yes, and so we have retained the current model.

Second, how should we focus our efforts geographically? Should we start examining places like Nigeria, Azerbaijan, or some other smaller energy producer? The answer at this point is no. We decided not to worry about them explicitly, because none of them meet the criteria of being large enough at a single facility so that disruption would significantly impact the U.S. or the world economy. To use a metaphor that I like, we are focusing on the big geese that lay the big golden eggs – and it is rather clear where those are.

Finally, were we going to also focus also on globally important LNG facilities? The answer here was yes. LNG is still not critical to the U.S. economy *per se*, but it is highly critical to the economies of some of our closest allies. In this case there may be a hint of altruism, but we would like to try to minimize shocks there as well since we have the connections and expertise to do it.

Given our review, we are going to press on and review again in a year. We want to monitor whether or not we are really having an impact, and identify what we have to change to have more of an impact in the shorter term. Also, we have to overcome an issue of resource constraints. In the U.S. government we budget two years ahead, so when this program was initiated, there was no money budgeted for it whatsoever. We have now put in a request for funds in the budget for fiscal year 2009, but how do we get from here to there without going bankrupt, or bankrupting other essential activities within the State Department?

The last thing I want to leave you with is the idea of the importance that the U.S. government has associated with this project. It was early April 2006 that this edict came down from the NSC. That group approved the strategy in mid-May, then it was transmitted for higher approval again on June 1. People ask me *in which year* April did you start - it can not possibly be this last April. Presumably things do not happen in six weeks in the U.S. government – but they can if it is important enough. Similarly, in the one case where we do have an MOU with a country for a joint working group, the agreement negotiated in an hour and half when I visited the capital of that country. It was sent back for clearance by the legal department and the appropriate agencies, then sent for translation into the appropriate dialect of Arabic, and it was signed by an Undersecretary of State and the appropriate minister in the Treaty Room at the State Department three weeks later. That makes three weeks from initial discussion to signed international agreement. People think that breaks world speed records in terms of bureaucratic accomplishment, but it does give you the idea of the speed with which the U.S. government can move when the issue is of prime importance, as the one of critical energy infrastructure protection is.

Thank you.

5.2. Energy Security and Dependence on the Sea

Rear Admiral Hubert Hass (GE N)²¹

Chief of Staff

Allied Maritime Component Command, Northwood

This article highlights the importance of the maritime environment to the exportation of natural energy supplies and safe and secure sea lines of communication. Both are fundamental to our ongoing prosperity and maintenance of our standard of living. This is true not just in the West, and not just for the NATO countries.

First I will highlight the huge reliance on the sea - not just as the source for much of the world's energy, but also as a means to transport our oil and gas. I will then outline some of the real threats, as we see them from a military perspective, which are posed by this medium if unregulated and if used by terrorists or for other illegal activities. For this I will use current events in Nigeria to emphasize our concerns, as well as briefly mentioning our outstanding choke points. Finally, I will show what we in the maritime domain can or could do to counter the myriad of real threats facing us.

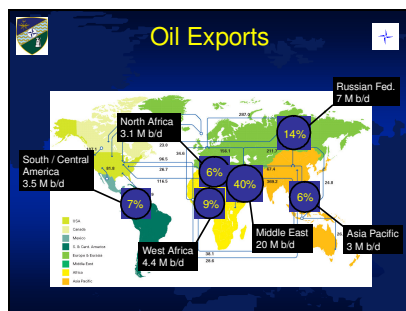


Fig 1

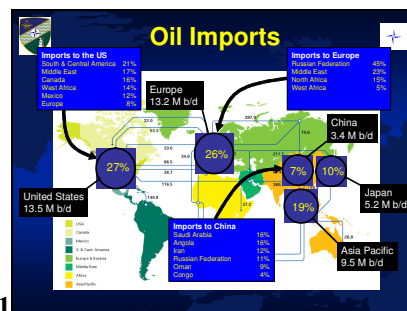


Fig2

I will dispense with the normal groundwork about oil production, where it takes place, and crude oil reserves, since I suspect the audience will be familiar with it. The following diagrams indicate from whence oil is being exported, and to where it is being imported.

Usually these two are quite a bit apart and separated by sea lines of communication. The diagrams show percentages of imports to the U.S., Europe, and China by their origin.

A relatively new subject is LNG. There is an increasing number of ships transporting this type of energy. It is not evident that LNG tankers can be easily exploded, but if one does for example in the heart of Rotterdam, the impact on the European Community and economy would be quite significant. The two diagrams below show similar import and export figures for LNG.

²¹ This article has been adapted from a talk given on July 19, 2007 at the NATO School

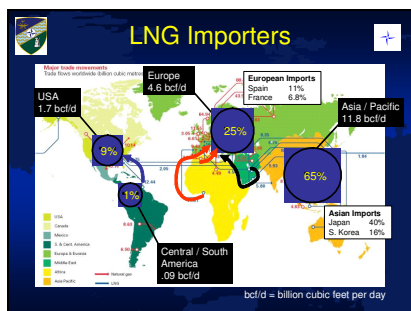


Fig 3

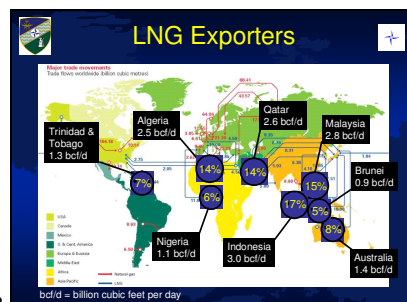


Fig 4

Something I know more about is how things swim. And while sometimes it is hard to understand how something weighing 300,000 tons can still swim, the fact is that 90% of the world crude oil trade is transported by a fleet of some 3,500 ocean tankers. Pipelines receive a good deal of attention, and recent concerns about Russia centre around pipelines (including submarine ones from which former politicians can make a bit of money). 90% of oil however is still transported through tankers.

Out of 1 billion tons of world shipping capacity, 35% is accounted for by tankers. And the tankers account for 50% of all seaborne trade. Significant questions remain about whether new tanker construction will be able to meet future demand, especially since all single-hulled tankers (comprising 1,400 of the total), will have to be phased out by international law by the end of 2010. Significantly, 80% of the global tanker fleet is owned by independent companies, implying that no single government or alliance of nations is able to control a significant proportion of the tanker fleet.

Meanwhile the LNG tanker trade is also expanding. The number of LNG terminals in Europe is projected to increase from 11 to 18 in the next decade, with 15 more planned. By 2020, 600 LNG tankers are expected to be operating worldwide.

The terrorist threat to the oil industry, and especially to its maritime component, is due to the elevated vulnerability of tankers, at terminals, and at choke points. It would only take one serious incident, such as the well known Lindburg attack, to send a shock-wave throughout the world's markets. The maritime domain is the world where a great deal of international crime takes place, in terms of terrorism, drug trafficking, human trafficking, piracy, and so forth.

Al Qaida has made clear what they think they should do, or what those working for them think they should do. They have described the world's energy system as its umbilical cord; called for the targeting of such "economic lifelines"; and expounded on the great impact of a rise in the oil price. As recently as February 2007 Al Qaida declared that "The goal is to cut its supplies, or to reduce them by any means." Their intentions should be quite clear.

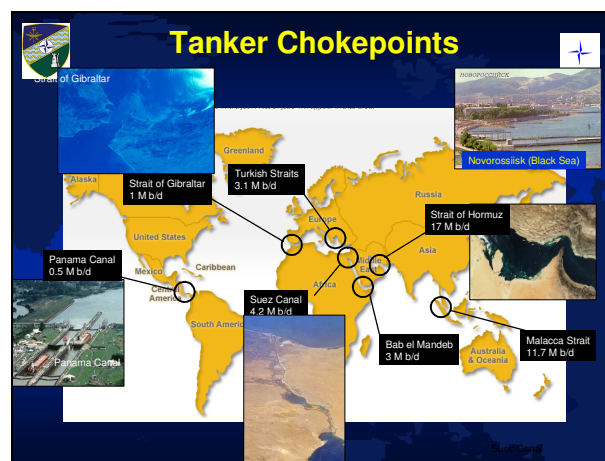


Fig 5

Energy is transported along a fixed set of maritime routes. Along the way transports encounter several geographic choke points or narrow channels that are critically important to world oil trade because of the sheer amount of oil that passes through them. These passages may be blocked, at least temporarily, and tankers passing through are very vulnerable targets at such narrow points. They are too slow and cumbersome to manoeuvre away from attackers. They lack their own protection, and have nowhere to hide. The following diagram shows the primary choke-points and the amount of oil in millions of barrels that passes through them daily.

On average, about 17 million barrels pass through the Strait of Hormuz each day. Much of it is destined for Western Europe, the U.S., China, and Japan. With so much daily flow moving around the Arabic Peninsula at this point, it is very prone to terrorists or even national attacks. It only consists of a two-mile wide channel for inbound and outbound traffic each, as well as a two-mile wide buffer zone.

I have worked in the past personally with fast-patrol boats, and know what can be done to a tanker with one. A tanker can easily be stopped from going on, caused to burn, and turned into blockage that is difficult and time-consuming to clear. That being said, it is quite difficult to sink. Still, a potential attacker can cause a good deal of harm rather easily.

Tanker terminals are also vulnerable. The Saudi oil maritime export infrastructure is the largest in the world, and attacks upon it would have a large impact on the world oil supply and of course on oil prices. The primary Saudi export terminals are at Ras Tanura, with 18 berths, and also Jaaiama. The Petzernal pipeline carries oil from the Abokai and Ghawar oil fields to the Jammu port on the Red Sea. Every year, more than 9,000 tankers call at these and other Saudi facilities. The ports, we state categorically, are Saudi Arabia's oil export Achilles' heel.

Another maritime energy infrastructure concern is the Niger Delta crisis. The delta region has seen low-intensity conflict for more than 25 years, but attacks have escalated recently. For more than nine months, the MEND, the "Movement for the Emancipation of the Niger Delta", has waged a violent campaign in the Niger Delta. Moreover, the MEND commander has threatened to attack oil tankers if international oil exploitation is not stopped. Currently there are more than 120 militant groups in the delta. Most are small local criminal gangs, and some are manipulated by the government in an effort to control other groups. The main underlying motivation is to strive for personal enrichment – to steal oil from pipelines, barges, and rigs, and to

extort oil companies. It is estimated that Nigeria loses much of its oil to these activities, with over 5% stolen and much more destroyed. Between 100,000 and 200,000 barrels per day are stolen from pipelines and well heads.

Moreover, Nigeria is a key oil producer for NATO members. While it might only represent a few percent of global production, in the current market climate of such tightness we cannot afford to cut production worldwide by even one or two million barrels per day. The Niger Delta supplies 10% of US oil imports, and will supply 25% by the next decade. It contains 30% of the world's newly discovered oil reserves. Shell is the leading oil company with immense infrastructure inland and offshore. Finally, China's role there has been growing as it seeks to expand its presence and provide investment to Nigeria's infrastructure.

In the Niger Delta there are 12 main offshore oil terminals which the biggest tankers use to load their cargo. Eight of the 12 terminals are more than 15 miles from the coast, putting them in international waters. As of recently, Nigerian unrest was blamed for causing a spike in oil prices, recently pushing it above \$76 per barrel. There is growing concern that Nigerian unrest will have an increasing impact on oil exports, in the form of piracy, taking of hostages, threatening installations, theft, etc.

Finally, it would seem that NATO's top brass is on the case when it comes to protecting maritime energy infrastructures, with particular reference having been made to Africa.

A few comments from our Secretary General in April 2006:

- "NATO warships could be called on to protect shipments of oil and gas from western Africa against the threat of attack from pirates and terrorists."
- "As far as oil and gas is concerned, I think NATO could play a role to defend the sea lanes."
- "NATO has a role to counter piracy off the Horn of Africa and in the Gulf of Guinea, especially when it threatens energy supply routes."

Also, a few statements by General James Jones, the former Supreme Allied Commander in Europe last year:

- "Uncertainty over future supplies shows a need for the alliance to plan for greater security for tankers, pipelines, and terminals."
- "Providing security for energy storage and transportation facilities in unstable regions is not a problem we can continue to walk away from much longer."

What are we doing about this currently at MCC Northwood? We are trying to create maritime situational awareness. We are trying to identify where "they" are.

"They" are the ships: the many thousands of ships at sea that may carry terrorists, drugs, people, or various other cargoes that governments want to know about. We have a mandate at Northwood, explicitly laid out in Military Committee documentation (MC401), to identify the exact location of all oil rigs and other oil-related installations in the North Sea.

Our primary mandate in this area is therefore maritime situational awareness. We can achieve that goal with NATO installations (helped by others) using what I call “our network.” We are still working on this network, and it is not completely in place yet.

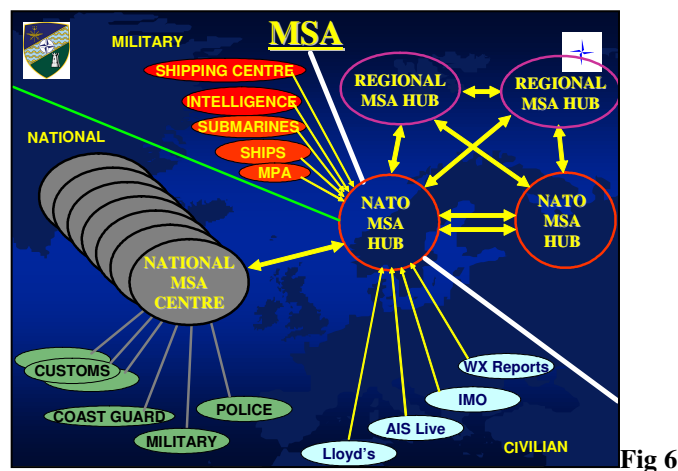


Fig 6

This figure shows the NATO hubs at Northwood and Naples (our sister installation), with regional hubs in the different countries. The military contribution to MSA consists of intelligence, submarines, and ships. National contributions are crucial and cut across a variety of services including customs, coast guard, military, and police. There is also a major international civilian contribution possible through the IMO, the AIS (Automatic Identification of Ships) system, Lloyd’s database, and weather reports given by ships identifying their positions when sending the report. This is the system that we are working on, and it is central to the important role we think NATO and its maritime HQ could play in maritime situational awareness.

The following is one recent example of this system in use, albeit one which is not oil related or energy related. We tracked a ship which will be referred to as MV ‘MCC NWD’. In April 2007 it transited the map without being of particular interest, but before leaving the map, intelligence was gained that it had up to ten illegal immigrants on board from different nations. The information was faxed to NATO by Spanish authorities on the 31st of April, with the request to report this contact of interest whenever feasible. Our own Standing Naval Maritime located the vessel in the Bay of Biscay, and reports were made to HQ at Northwood. This triggered further information flow between the group at sea, Naples, and Spanish and British authorities. The vessel’s track was confirmed by other NATO units and AIS data. The contact of interest was headed to Dagenham near London, via London. The British fleet took charge of further operations, with a Royal Naval destroyer detached to monitor on the 29th of April. The vessel entered the Thames Estuary, and was boarded and checked by HM Customs and Excise. They found more people than expected, but all people had the necessary documents to be on the ship. In the end, the ship sailed on – but this is only one example of international and interagency communication working to track a single suspect vessel over its entire journey around Europe.

Our own SMG1, sails around Africa this year. It must be made very clear that this is **not** to protect oil fields off Nigeria. The main purpose is to gain maritime situational awareness off the waters around Africa. The group will take part in a PASSEX with the South African Navy, will spend some time off the Somali coast, and will at the

end of the year actively join the Operation Active Endeavour (OAE). OAE is NATO's Mediterranean operation and is run by our sister command at Naples. Although this plan to circumnavigate Africa is quite simple, it is a significant first for NATO. As recently as 2006 we did not expect that such a plan could realistically be executed – but now it is a reality.

We can all agree that the maritime environment is one on which we are hugely dependent for our energy supplies. However, there are complex and growing threats associated with the maritime domain. The key enabler for safeguarding the continued prosperity and security of our energy is comprehensive situational awareness. That is the extent of what we are talking about for the time being. It is a concept that NATO has woken up to, and one which is a round-the-clock responsibility of our HQ in Northwood and also of our sister HQ in Naples.

Thank you.

5.3. Vulnerability Analysis in the Iraqi Oil and Gas Infrastructure as a Result of Pipeline Sabotage

*Antonio de la Cruz²²
European Satellite Centre*

ECMOST, Global Monitoring for Stability and Security is part of the European Commission programme on Global Monitoring for Environment and Security (GMES). The aim of this article is to provide an insight into the possibilities of geospatial techniques to monitor and determine sabotage trends against oil and gas infrastructures generally using our project focus on Iraq. In introducing and describing our project, I would like to also address issues brought up previously - for example the importance of demographics and NATO-EU collaboration. My purpose is not only to present our work, but also to explore further how such institutional collaboration and dissemination can take place. The collaboration of this research, and events such as the 2007 NATO School energy conference, will do wonders from the bottom up to increase NATO-EU collaboration.

Discussions about critical energy infrastructure protection sometimes tend to focus on policies and initiatives – but all this takes place on the ground in a specific geographical area. Therefore where I would prefer to add input is on the topic of what present technologies can do for us. What added value can we accrue from geographical imagery, from satellite information systems, and from the use of databases specific to the energy infrastructure issues we are addressing?

It is important to mention that our project results are the product of PhD students, not specific experts or consultants. The EUSC has been coordinating their enormous talent, and equipping them with new applications, new sensors, and new fields of expertise for these problems.

I hope to offer an insight into geospatial techniques, geospatial satellite techniques, and geographical information systems, and their role in monitoring trends of pipeline sabotage. As mentioned, our focus has been on the field of oil and gas pipeline infrastructure of Iraq. Iraq is a test case, but the methods developed here can be extrapolated to various other scenarios and countries - to other situations in which we could be facing these sorts of security situations.

Information from the ground has been integrated into a geographical information system (GIS). GIS is a powerful tool to integrate mapping of oil and gas infrastructure; satellite imagery; databases of different types; intelligence data; and so on. The overall aim is to offer a vulnerability assessment of the oil and gas pipeline system in Iraq, and to determine what is the relevant impact of these key infrastructures. For example, the high number of such attacks can be blamed for undermining the Iraqi economy; preventing the reconstruction of the country; and destabilizing the peace effort.

In recent years, terrorist attacks on oil installations have increased globally. Such incidents take place in Algeria, Ecuador, Columbia, the Philippines, Russia, Pakistan,

²² This article has been adapted from a talk given on July 19, 2007 at the NATO School

Iraq, and Turkey. Up to 2003, we can measure a significant increase of these attacks in Iraq, Russia, and Pakistan. There is a valid and widespread cause for concern.

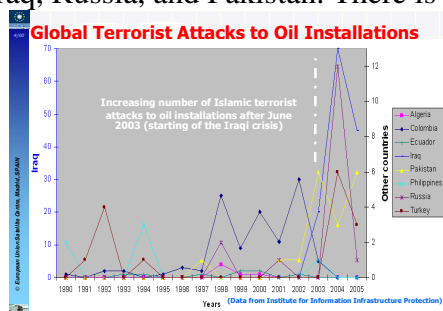


Fig 1

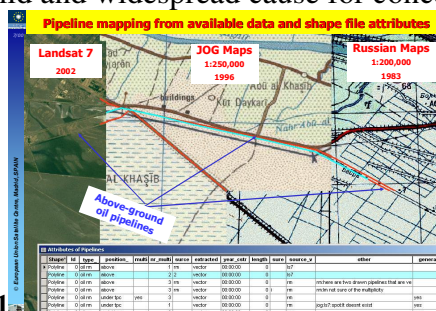


Fig 2

Our methodology comprises a multi-step process. First we have to start from mapping. Where are the pipelines we want to monitor? We start with a LANDSAT 7 mosaic of Iraq, all integrated. We have also used very detailed Russian military maps that give us an accurate representation of Iraq’s pipelines.

These are the problems that we were facing to map all the pipelines. We have LANDSAT data 2002 at 1:250,000 scale 1996, and the Russian maps at 1:200,000 1983 – you can see the difficulties. We were supposed to continue one timeline over the whole area with this mapping infrastructure that we had. In the next diagram you can see the results: the pipelines in Iraq carrying gas above the ground, gas under the ground, oil above, oil below and so on.

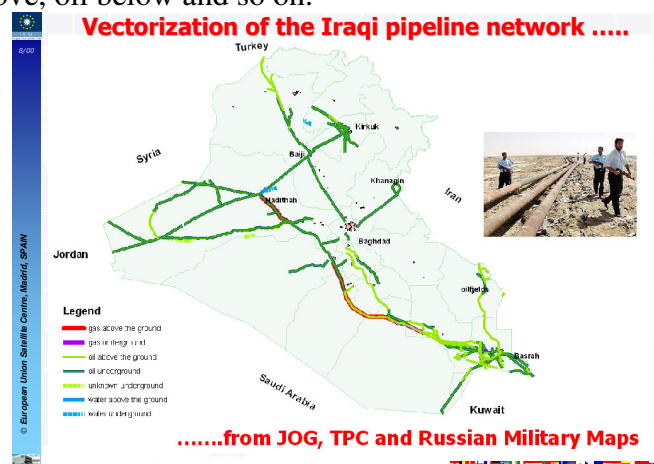


Fig 3

The attack incidents are then compiled into a comprehensive database comprising more than 300 entries. Data was collected from several strictly open sources, including information tracked by IAGS among others. The time frame spans from June 2003 to June 2006. Of course the attacks have continued since, but we stopped at June 2006 in order to meet our own project deadlines. Even though we were quite lucky to have access to so much information, compiling the databases required a good deal of time and effort.

But we were left facing two problems. First of all, not all the pipeline sabotages are being recorded, and even less published. Second, we did not have the level of accuracy we were looking for or required - specifically the geographical coordinates of the sabotages. We needed then to devise some additional way of finding out where sabotages took place, and how we could correlate them with this database.

To solve this we turned to environmental satellites from ISA and NASA. With NASA satellite imagery we could detect the small black plumes of smoke caused by one sabotage. We could also refer to this more accurately, because with the other NASA satellites, Terra and Aqua, we could acquire what is called the MODIS hotspot.

What is a MODIS hotspot? It is the algorithm that has been determined by the thermal infrared bands. This is very interesting information because it yields dates, coordinates, temperature - it gives everything we were looking for. So we were able to focus our attention on these MODIS hotspots (which had incidentally been developed for environmental applications). On the NASA website you can find these hotspots all over the world to determine the location of forest fires. But because fires resulting from sabotage burn for a particularly long time, the satellite is able to record these high temperatures. So we came up with the database of MODIS hotspots to compliment the recorded attacks.

Our friends at NASA sent us a very large collection of all MODIS hotspots all over Iraq. Looking for example at the Kirkuk-Baiji refinery, you can see all the hotspots produced by the sabotages. The pipeline mapping follows the trend of hotspots quite clearly.

There have been very few sabotages in the Iraqi western desert, as we will see later. However the satellite regularly passes and records all these sabotages, and sometimes they are repeated events which must be filtered out. At the same time, there are gas flares from wellheads that are not sabotages, but still recorded due to the plumes they emit.

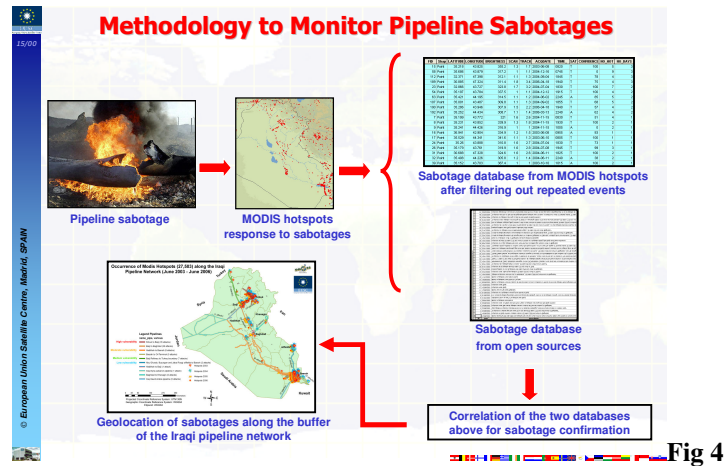
Yet we do not consider any attack a false alarm, because they can offer interesting information about the monitoring and activities of these oil and gas facilities. We identified more than 28,000 MODIS hotspots around Iraq from March 2003 to June 2006. We also detected quite a lot of MODIS hotspots over Iran and other countries, and it will be left to future study to acquire the pipeline charts and see if they may be sabotage or not. Together, this is an interesting security application of something that was developed originally for environmental applications.

What does it mean for security, and particularly in the context we are examining? We had the threat hazards, significantly vulnerable stakes, and major risks. And from this risk concept, we come up with these vulnerable stakes where economies, resources, infrastructure, populations are affected.

This figure shows the methodology we have followed to determine pipeline sabotages in the oil and gas structure of Iraq.

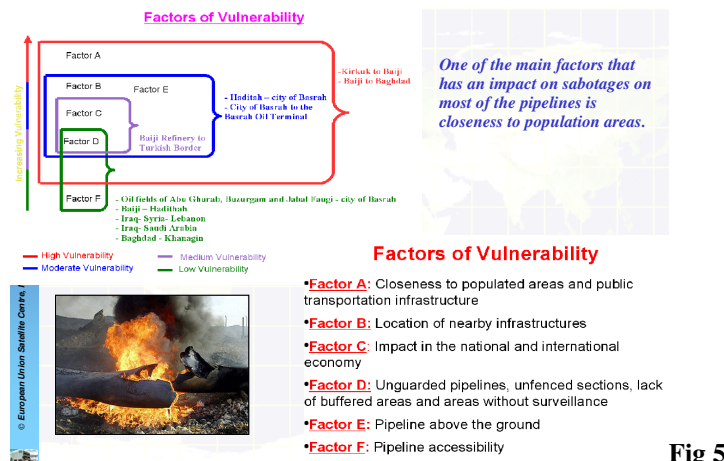
What we have focused on so far is developing the methodology - how to monitor occurrences; how to then derive a vulnerability assessment; and what kind of security response is applicable?

This figure shows the number of attacks and the types over the examined period. We can differentiate if it is an attack by explosion, automatic weapon, mortar, or suicide attack. We can see peaks in December 2003, August 2004, and November 2004.



This is the distribution of MODIS hotspots in the years 2003-2006. Distribution among the different pipeline systems becomes evident, allowing us to code pipelines as a function of their vulnerability. We then applied various vulnerability factors – for example ‘Factor A’ measuring proximity to population centers and the transportation infrastructure. The rationale is that terrorists need cover by populations and transportation infrastructures to escape. Other factors measured location of nearby infrastructure; the impact on national and international economy; whether the pipelines are guarded or unguarded; and pipeline accessibility, i.e. whether it is above or below ground.

We applied these factor vulnerabilities to different segments of the pipeline - for example ‘Factor A’ includes the Kirkuk-Tobaya facility, and so forth. We then measured accordingly different degrees of vulnerability for those sections. We found the of proximity to population to be particularly significant.



Having identified vulnerability factors, we superimposed appropriate databases - LANDSCAN for example shows the population density by pixel. The new maps reinforced the correlation between high population density and pipeline vulnerability. Accordingly, pipelines in the Western desert suffered very few sabotages. We could also measure population density immediately surrounding the pipelines (within a 5km buffer), and again recognized a high correlation. Another tool allows us to overlay maps showing ethnic group distribution - Kurds, Sunni Arabs, and Shias, but also the

various other groups. What is revealing is that most of the pipeline sabotages come in the ‘Sunni Triangle’ area.

This demonstrates the flexibility of our tool, and how we can relate a variety of mapping databases to the distribution of pipeline sabotages. We are also participating in a TANGO project using telecommunications and our mapping tool to devise a system for alarm. We know when these hotspots are created within 15 minutes thanks to our stationary satellite and the use of our distribution mapping. MOVIS itself provides new hotspots every 4 or 6 hours. This figure shows our concept for pipeline sabotage warning.

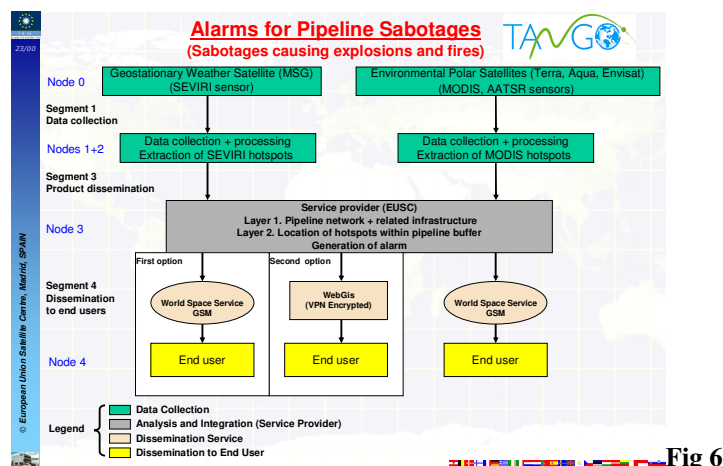


Fig 6

The use of these hotspots provides an overall mapping of security events, allows for an animated chronology, and provides rapid generation of databases for security applications. It can be integrated with other data on this specific issue of pipeline sabotage, and can be used to order the collection of satellite imagery. Thus, with simple information that is free and available, this tool can be used for warning and reporting as well as deciphering attack trends in different environments.

Thank you.

6. Risk Assessment

6.1. Risk Assessment in the Private Sector

Alfio Rapisarda²³
Head of International Security, ENI

I wish to express my thanks to the NATO School and to Phillip Cornell, who have given me the opportunity to participate and to explain how oil companies (and specifically ENI), look after energy security. More specifically, I would like to discuss how security departments contribute to the 'security' side of energy security.

One thing must be clear. Security departments do not interfere with commercial and political positions in companies of the oil industry. Our support is to the management, through information and expertise that we provide, to help them take the appropriate position when and before events may happen.

Imagine we have a pipeline. Security is monitoring the pipe, but it is not necessarily important to know the price or pressure of oil or gas flowing at that moment. It is one part of the entire business, but it is only a supporting part. We assure that the supply chain is safe and without interruption, but we look mostly to the environment and the protection of our premise. All the rest is the job of others in the company.

6.1.1. Security's Strategic Relevance

Security has assumed in recent years a strategic relevance in both an institutional context and in the private sector, in order to meet a growing need to live in a secure and protected daily environment – and to provide adequate responses to a growing awareness of how the world today has become vulnerable.

This general need for security, felt especially in the wake of the 9/11 attacks, has pushed the international community to immediately consider new or previously little considered themes such as transnational terrorism of an ideological nature. The response has been to identify new scenarios of international cooperation and innovative legal operative formulae to produce effective prevention and counter action. The task of the various institutions at national and international levels has been to add new types of crime, for instance international terrorism and its funding, to the various regulatory contexts. Institutions also have sought to establish protective methods for the most vulnerable sectors, such as the public transport of people and dangerous goods, infrastructure identified as critical for the national economy, and above all the energy sector.

This greater emphasis on the concept of security has revealed an already-advanced basis of awareness and maturity in the private sector – especially in large companies. This basis is the result of a consolidated habit of considering security as a vital part of the company's organizational and operative system, able at any moment to employ the instruments necessary to protect corporate property from possible risks. This global security approach has been adopted in Italy after a slow but constant evolution commensurate to the diverse perception of risks experienced by companies in various historical moments. In fact, company protection has changed from being typical

²³ This article has been adapted from a talk given on July 19, 2007 at the NATO School

industrial measures oriented to the physical security of infrastructures and higher management, to being a vision of an integrated protection of all the resources a company needs to operate – including human resources, material resources and material assets, know-how, and information. This change has expanded competence toward a modern concept of global protection of corporate property and integrity.

The security field has therefore grown to face emergent threats such as terrorism, the growing competitive nature of international markets, the use of new information and multimedia technologies, and the escalation of ever more sophisticated processes of internal and external legality. Security was previously considered a simple application of standard techniques and procedures, but this new attitude stimulates a more systematic integration of different company functions in a process making all employees responsible for, and sensitive to, security. This translates into the development of a new organizational security culture, and the creation of a global management system able to identify various risk profiles commensurate with the characteristic of the company and the complexity of the social-political scenarios in the areas of the world in which they operate. Furthermore, this new approach leads to the implementation of the appropriate methodologies to prevent and manage events in line with company security policy and the best international practices in the field.

6.1.2. Contemporary Global Threats

In particular, the oil world, both onshore and offshore, is vulnerable to threats like terrorism more than other businesses due to several factors. The physical and chemical properties of the material processed and stored at these facilities may create attractive targets for terrorists seeking to cause malicious release with the intent to harm the neighboring population. The strategic and critical importance of the products to domestic and international markets may make this disruption of the operation of the petroleum industry an attractive option. Reports from the State Department, FBI, and others have concluded that the petroleum industry is targeted by various terrorist groups. These new threats must be jointly addressed by government and industry due to the potential harm that intentional releases may cause. The general risks to energy supply and vulnerability varies by segment of the petroleum industry which we define generally for these purposes as petroleum exploration and production; refining; pipeline transportation; marine transport; petroleum products; distribution; and marketing.

Moreover, government and institutions have recognized together with industry the vital importance of a safe and reliable supply of energy to the world and its prosperity, and all physical, social, environmental, and economic risks that are associated with energy security. In this debate, security of gas supply is of particular significance here in Europe, a region that has been historically with a higher reliance on foreign flows. A clear example of this is the panic caused by the reduction of gas supply from Russia during the winter season, and the subsequent heated public debate in Italy and also other neighboring countries. Of course, at the international level many measures have been adopted so far by companies to guarantee and elevated level of supply – like the diversification of sources and transit routes; long term contracts with additional risk management tools; encouraging the right investment and regulatory climate; and regular dialogue with producing countries. But in the same way, security has considered a top priority also protection in terms of physical protection or, as

mentioned before, a global security protection. From protecting plants and infrastructure to training with local emergency response teams, companies have long recognized and responded to the need to protect workers, communities, and energy supply through a variety of strict standards and procedures.

The disaster of September 2001 has also enhanced and emphasized the concept of cooperation and partnership between government and industry to contribute to ensure the stability and security of economies and societies through mutual and effective sharing of information, knowledge, and experience – and also through joint coordinated action to improve and implement preventive measures. In this sense, new initiatives to regulate and harmonize the protection of critical infrastructures, and the structuring in different countries of homeland security organization, are clearly tangible. In several countries like the U.S., UK, Germany, France, and Italy, forms of cooperation between government and industry demonstrate that this is the right approach to succeed, both in market competitiveness and in effectiveness of prevention and security management. Consequently, owners and operators of critical infrastructures are engaging at the national and international level in an appropriate security dialogue in order to achieve a common approach on security assessment and risk management. They are sharing experience and best practices with the aim to apply common strategies to reduce risk where possible. The road however, is long and arduous.

In light of the 9/11 attacks, the oil and gas industry has immediately taken additional steps to secure their facilities. First of all, it has engaged in reassessing all critical facilities and installations worldwide in order to implement security measures adequate to reduce risk to as low as reasonably and practically possible.

ENI a major integrated energy company and the sixth largest oil company worldwide, has done the same. Its commitment is to grow in 68 countries in the activity of finding, producing, transporting, transforming, and marketing oil and gas. We are listed both in the Italian and NY stock exchange, and the main business which is exploring, producing, refining, transporting, and marketing oil gas and power, spreads all over the world with all criticalities possible. Unfortunately, oil and gas is not easily available in ‘non-critical’ countries, so we have to deal with almost 90% with ‘critical’ countries.

All that said, it is clear that ENI expansion throughout the world, the specific nature of our business, the areas where we work, and the importance of the Italian economic system for the global economy, exposes ENI to security risk. A strong obligation toward the protection of the people, material, and non-material resources of the company is indispensable, together with a commitment to protect activities of risk prevention. Therefore, protection of personnel, assets, and information represents a fundamental value in the overall strategy of ENI. Building on an awareness of the state of security inspired and stated in the code of practice and in the principles of the company, as well as a recognition of the risks by all employees, ENI has implemented a practice of security standards in line with international standards and best practice. The objective is to contribute to creating a secure business environment to minimize economic losses and business disruption, and to safeguard the group’s integrity and reputation.

The ENI corporate security function is under the authority of the Director General of Human Resources and Business Services, who leads the definition of the company's overall policy and security strategy. Moreover, the specific role of corporate security is to apply the company policy through the development of an ENI security management system, based on regulation and management procedure deriving from ENI's security strategy. This includes monitoring the overall implementation program and compliance with the ENI security system, and reporting and investigation on all security-related matters. Our aim is to consider security as a service to business that could not exist without the support of the business. Security is an investment, and not an expense - this can be difficult to explain. It is fully integrated with the whole corporate and communication process.

6.1.4. Risk Assessment Processes at ENI

How we manage risk assessment, and what is risk assessment for ENI? Of course, to have a good security management system in place, you need to implement several organizational, human, and technological tools to your business that must be integrated and fully operative with the business itself. The risk assessment programme is an essential part of our management system as the only way to assure the appropriate evaluation of risks, and in turn to reduce those risks and mitigate the consequence of incidents by providing essential information for decision makers. To do this, we apply the most common standards – international standards like those of the American Petroleum Institute (API), and the guidelines of the major associations like ASIS, OAGP and other upstream and downstream organizations. We have produced our own risk assessment process and plan, which is similar that in other competing companies.

Our risk assessment determines the relative risk to the facility in terms of expected effects on each critical asset as a function of consequence and probability of occurrence. Risk is therefore managed by identifying risks, assessing consequences and probabilities, and evaluating and implementing evaluation and mitigation measures. Risk assessments are conducted for ongoing operations, for new products, and in order to identify and quantify new risks to personnel, facilities, and the environment. Risk assessments are updated periodically or as changes may occur. The foundation of the security management approach is the need to analyze security threats and vulnerabilities, and to evaluate the adequacy of the counter-measures provided to mitigate these threats. The need for security enhancements will be determined partly by factors such as the degree of the threat, the degree of the vulnerability, the possible consequences of an incident, and the attractiveness of an asset of possible adversaries. In the case of terrorist attacks, higher risk sites of critical importance are of high attractiveness to the adversary, of a high level of consequence, and where the level of vulnerability and threat is high. Therefore the risk assessment is not quantitative, but qualitative using the best judgment of the security team

The expected outcome is a qualitative determination of risk to provide a sound basis for rank ordering of the security related risks, establishing priority for the application of counter-measures.

Appropriate strategy for managing security can vary widely depending on the individual circumstances of the facility, including the type of facility and threat faced.

The specific situations must be evaluated individually by local management using the best judgment and applicable practices. Appropriate security risk management decisions must be made commensurate with risk. This flexible approach recognizes that there is not a uniform approach to risk assessment in the industry, and that individual approach is necessary to mitigate high risk situations primarily. All owner-operators are encouraged to seek out assistance and coordinate efforts with federal, state, and local law enforcement agencies, and with the emergency services and other local committees. They can also obtain and share intelligence, and tap other resources to help deter attacks and to manage emergencies. Wherever we are, we are in host countries and under the responsibility of the local authority. We protect our premises and our installations from the inside, but the outside environment is not under our responsibility, so we have to respect and engage in dialogue with local authorities. If one site is critical for us, but may not be for the host country, in that case we provide at our own expense. But the dialogue is fundamental.

I do not want to go too much into depth with academic indications over the risk assessment process, but rather just a few words to explain it. We evaluate risk as an expression of the likelihood that threats can target and successfully attack a specific security vulnerability of a particular target or combination of targets to cause a given set of consequences. A high-risk event is represented by a high likelihood of a successful attack against a given critical target or asset. Likelihood is determined by the attractiveness to the adversary, the degree of threat, and the degree of vulnerability. Criticality is also determined by the asset's importance or value, and the potential consequences if attacked. If the likelihood of a successful attack against an important asset is high, then the risk is considered high, and appropriate counter-measures will be applied for a critical asset at high risk.

As previously mentioned, the risk of a security event is assessed qualitatively. It is based on the consensus judgment of a team of knowledgeable people as to how the likelihood of an undesirable scenario as an event compares to other events or scenarios. The assessment is based on best available information, using the experience and expertise of the team to make sound risk management decisions. The team may use a risk matrix, which is a graphical representation of the risk factors as a tool for risk assessment decision.

The severity of the consequences of the security event at a facility is generally expressed in terms of the injury or damage that will result if there were a successful attack. Malevolent attacks may involve effects that are more severe than expected with accidental risks. Some examples of relevant consequences include injury to the public or workers, environmental damages, direct or indirect financial losses to the company and to suppliers, disruption to the national economy, regional or local operation, loss of reputation of business viability, and needs to accommodate people living or working near the facility. The estimate of consequences may be different in magnitude or scope than normally anticipated for accidental releases. In the case of security events, adversaries are determined to maximize damage, so a worst credible security event has to be defined and considered. Critical infrastructures many have dependencies and interdependencies which require careful consideration. In addition, theft or release of hazardous materials should be included as terrorists may be interested in theft of such materials to either cause direct harm at a later date, or possibly to make chemical weapons using stolen materials. Consequences are used as

one of the key factors in determining the criticality of the assets, and the degree of security counter-measures required. During the facility characterization step, consequences are used to screen low-value assets from further consideration.

For example terrorists are assumed to be uninterested in low-consequence assets, or those that do not meet the criteria for valuable impacts. Not all assets are of equal value to adversaries. A basic assumption is that this perception of value from an adversary's perspective is a factor that influences the likelihood of a security event. Asset attractiveness is an estimate of the real or perceived value of a target to an adversary. The attractiveness of each asset should therefore be evaluated based on the adversary's intentions or anticipated level of interest in the target. Security strategies can be developed around the estimated targets and potential threats. These factors, along with consequences, are used to screen facilities for more specific scenario analysis and for further specific counter-measure considerations.

Threat can be defined as any indication of circumstance or event with the potential to cause loss of or damage to an asset. It can also be defined as the intention and capability to an adversary to undertake actions that will be detrimental to valuable assets. Source of threats may be categorized as terrorists, activists, pressure groups, single-issue zealots, disgruntled employees or contractors, criminals (white collar, cyber-attack, opportunist, etc). Threat information is therefore important reference data to allow the owner-operator to understand the adversaries interested in the assets or facility, their operating history, their methods and capabilities, their possible plans, and why they are motivated. This information should then be used to develop a design-basis threat or threats.

Each adversary type needs to be evaluated against each asset to appropriately understand vulnerabilities. Vulnerability is any weakness that can be exploited by an adversary to gain unauthorized access and subsequent destruction or theft of an asset. Vulnerabilities can result from, but are not limited to, weaknesses in current management practices, physical security, or operational security practices. Vulnerabilities are evaluated by properly considering the threats or hazards they could attack or affect, or analyzed by considering multiple potential specific consequences of an event, like a scenario-based approach.

The general approach is to apply risk assessment resources, and ultimately security resources, primarily where justified based on the vulnerability assessment result. For example, our facilities will maintain a minimum level of security with general counter-measures such as the plant access control strategy and administrative controls. Certain assets will justify a more specific level of security, based on their value and expected level of interest to adversaries. The benefit of evaluating specific assets is that general risks can be evaluated and specific counter-measures applied where justified in addition to more general counter-measures. Criticality of the considered assets is defined both in terms of the potential impact to the workers, community, environment, and company, as well as to the business importance of the asset. For example, a storage tank of hazardous material may not be the most critical part of the operational process; but if attacked, it has the greatest combined impact, so it may be given high priority for further analysis and special security counter-measures. Based on this first level of screening from all assets to critical assets, a critical asset list is produced. Next, the critical assets are reviewed in light of the threats. Adversaries

may have different objectives, so the critical asset list is reviewed from each adversary's perspective, and an asset attractiveness ranking is given. This factor is a quick measure of whether the adversary would succeed in damaging, compromising or stealing the asset; as a measure of the likelihood that an adversary would want to attack the asset; and also of the reason he might do so.

A critical aspect of the general approach and framework for conducting the security risk assessment is therefore to establish the context and understand the organization we are dealing with – where they are, who they are, what they are, what they do, and what we want to protect. We identify the potential risk event that when triggered would cause problems, and the related vulnerabilities. We assess the threats in terms of capabilities and intent. We assess the risk in terms of likelihood and potential impact. And then we identify counter-measures to reduce the risks to the allowable level – whether as implementations, plans, procedures, and so on.

As a follow-up step we reassess and review what we have done in order to measure the effectiveness of the assessment, and to gauge the residual risk. If it is acceptable, it is well done. If not, we have to reassess and identify other counter-measures. But as an ongoing process, reassessment and modification is a never-ending story.

6.1.5. Mitigating Threat through Dialogue

It is very important to apply standards and procedures which are common in the international world and the oil industry, and to work from common language that can reveal how other companies deal with risk and security in the same areas. But managed security risk, which is our main job, is not only achieved by organizational, procedural and standardized measures. For those standards to be effective you need to add dialogue. Dialogue is for our company a top priority, in combination with application of procedures and standards. We consider dialogue a very important value which in itself is an important addition to security and to protection.

For example, when our team visited Mali recently, we met Touareg heads of factions. We started a dialogue because we are expanding our business activities there, deep into the Sahara. Small signs of dialogue and understanding proved particularly successful: wearing their typical clothes when we entered the meeting, talking about our projects, and talking about their social impact. While this kind of dialogue might not on its face seem to be our department's responsibility, it is also a security measure. Such protective measures are also effective in Nigeria, with all the problems we have been facing there particularly since 2005. Community relations are a very important point from which to build the security process - even if they are not a classic security issue, they are an integral part of our security management. We work together with community relations functions, with local authorities, and with the local heads of all the main groups.

Usually such strategies are successful – and in the end the greatest success is the protection of people through dialogue with local communities and populations in the neighborhood. Mitigating threats reduces risk and vulnerability later, and makes our job easier and less expensive in the long term.

6.2. Managing Risks to Energy Sector Critical Infrastructure

Dr. Jack Clarke²⁴

Professor, George C. Marshall European Center for Security Studies

Threat vulnerability and criticality come together to create risk. When we talk about threats, we are talking not only about threats caused by acts of terror, but also other kinds of hazards which may involve natural hazards, industrial accidents, criminal acts, and so forth. It is not just the terrorist threat we are concerned with. When it comes to vulnerability, it is important to understand what it is about our systems that are vulnerable to discrete threats – to specific threats, not to all threats in general. But what is it about energy infrastructure in particular that makes it vulnerable to the range of threats that we think to be likely, probable, or even possible?

Also, there is the issue of criticality. Here we are looking at the extent to which a system is damaged by an attack or some other kind of incident, and how important that system is to other systems. When we look at energy infrastructure, the issue of criticality should be foremost in our mind. It is hard to imagine any of the other critical infrastructures in our countries operating effectively once our energy infrastructure has been degraded. Almost all of them depend on energy. I will discuss a bit later this aspect of interdependence, which is absolutely critical to understanding risk. The problem is that while we can get our arms around the challenge of first order effects of attacks, it is those second and third order effects – those interdependence issues – that give us so much trouble in assessing the risk to our societies and to our infrastructures.

So, three questions that must be asked:

- What is critical?
- Are critical assets vulnerable and to which threat?
- And what can we do to mitigate or lower the risk that we have?

Those are the three questions that any methodology we employ, and there are several, will lead us to answer.

The public does not like to be told that there are risks to infrastructures. The public wants to be assured, or reassured, that we have everything under control. Any time a political leader gets up in front of a press conference and talks about the risks, he always runs a risk of his own - of not being taken seriously. That is why it is important that we continue to repeat and emphasize the reality of living with risk. As is so oft repeated in the UK, the question of attack or system failure is not if, but when. Political leaders understandably have a problem talking about risks, but it is important that they do it. There fore we have to make it easier - we have to find a way to make the public aware of the risks, and of what is being done to lower the risks with which it is being asked to live.

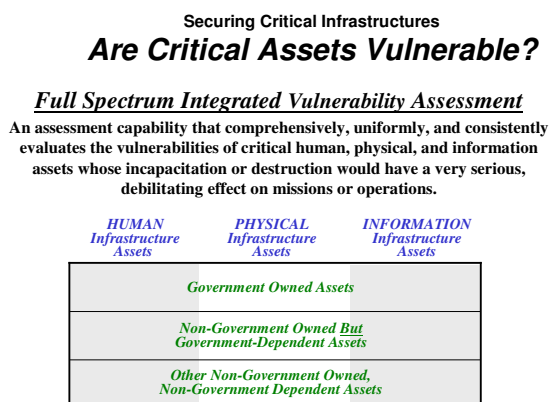
There are several different ‘domains’ which must be considered when we look at critical infrastructure – the infrastructure domain but also the ownership domain.

²⁴ This article has been adapted from a talk given on July 19, 2007 at the NATO School

The infrastructure domain consists of human, physical, and information assets. The problem is that most people only look at one of these aspects. When we think about infrastructure domains, we only usually tend to think about the one in the middle – the physical aspects. These are the tank farms, the pipelines, and all of the other assets whether upstream or downstream. They are important, and they frequently get attacked, but it is necessary to remember that infrastructures generally have two other aspects – the human infrastructure asset as well as an information infrastructure asset. They are not equally vulnerable, and not equally critical, but they all have to be considered. One can consider infrastructure like a three-legged stool - if you pull one leg of the stool out the thing collapses. That is why although most of our emphasis is on physical infrastructure, we have to consider the human in the loop as well as the information systems - the SCADA systems that control the infrastructure for example. This is often missed in many risk assessments.

There is also the ownership domain to think about. In many countries, much of the energy infrastructure is government-owned. In many of those countries we work with at the Marshall Center, for example in Central Asia, that infrastructure is almost exclusively owned by the state. But such regions are not the only cases. 80-85% of the critical infrastructure in the U.S. (not just energy infrastructure) is in private hands. Therefore, we have to have a ‘public-private protection partnership’. That is why looking at government assets alone is not enough in most places. You may also have to look at assets that, while not owned by the government, depend on state assets like pipelines, transmission wires, or some other aspect. The last category is assets that are neither owned by the government nor depend on government assets. But the public-private spectrum is very important to understanding what has to be protected. The government can take risks that private industry cannot, and vice-versa.

This brings us to the second question - are critical assets vulnerable? As has been elaborated earlier by Dr. Rapisarda, the key to answering that question is a full-spectrum integrated vulnerability assessment. That process should comprehensively, uniformly, and consistently evaluates the vulnerabilities of critical human, physical, and information assets whose incapacitation or destruction would have a very serious, debilitating effect on missions or operations.



◦ Fig 1

This figure shows some of the considerations we have when we get to the issue of risk management decisions.

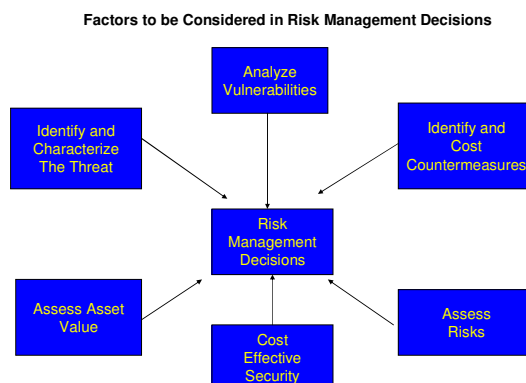


Fig 2

It is not enough to understand the threat –again, not just from terrorists but from all hazards. It is not enough to understand the risk. It is very important to understand the perceived value of the assets, and also to understand the vulnerabilities. Then we must understand what we can do to mitigate, reduce, or recover in the event there is an incident with relevant counter-measures. All of which helps us to understand risk management decisions.

But in the business world, the most important consideration is the one at the bottom – what is cost effective security, and how can we achieve an adequate level of security in a cost-effective manner. Here you may find a difference in the approach of government and industry, because industry is always concerned about how we can achieve security and still continue to make money. That is a fundamental difference, and it affects a lot of energy infrastructure.

What can we do to reduce our vulnerabilities while understanding that whatever we do, security will never be 100%? We will always have vulnerabilities. That is what risk assessment is all about - taking risks. We need to prioritize and make choices because we will not be able to do it all, and to protect everything.

I would like to elaborate on some of the thinking we normally engage in when looking at the probability and then at the severity of an incident. We try to determine the probability of an event's occurrence. One method is to list these events along a scale as:

- frequent (will occur often)
- probable (will occur several times)
- occasional (likely to occur sometime)
- remote (unlikely but possible to occur)
- improbable (so unlikely it can be assumed it will not be experienced)

We then try to similarly assess the severity level of the consequences of an undesired event.

- Catastrophic (death, system loss, or severe environmental damage)
- Critical (severe injury, severe illness, major system or environmental damage)
- Marginal (injury, minor illness, or minor system or environmental damage)
- Negligible (less than minor injury, occupational illness, or less than minor system or environmental damage)

Then we try to put those on a matrix using both criteria, which helps us to identify particular incidents.

We want to make sure not to take undue risks on those events that are frequent and severely critical or catastrophic. However we are able to take risks in areas where the probability is improbable and the severity marginal, or even with events that are frequent but whose severity is marginal. So this kind of methodology helps us to understand, particularly from a business standpoint, where we need to invest our efforts. It also tells us where we are taking risks.

In developing measures to protect our system, it is important to make sure that they are useful across a range of potential incidents. It is not enough, as we learned in the U.S., to have a homeland security strategy that is focused almost exclusively on terrorism. Hurricane Katrina taught the U.S. government that you do need to take an all-hazards approach, and that protection measures taken must be useful across a broad range of contingencies. When considering a contingency that is frequent, probable and also critical and catastrophic, you want to make sure that responsive measures have some applicability to other contingencies as well.

The general formula expresses risk as:

$$\text{risk} = \text{threat} + \text{criticality/vulnerability}^{25}$$

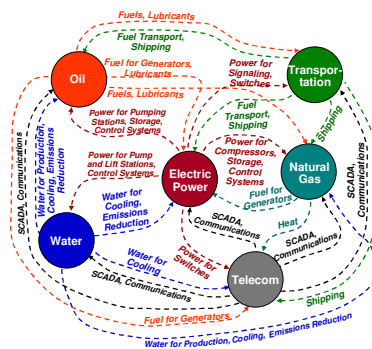
That is a very straight-forward risk management formula, and with it in hand we then need to go through the process of giving values to the variables.

I mentioned earlier public-private protection partnerships. The bottom line is that protection is a shared burden. It is not just the responsibility of national governments, of provincial governments, or of local governments. There is also a burden on commercial industry and individual citizens, and all must be working together. Regrettably, when we ask commercial interests to do something, it is often perceived as a financial burden or as a tax. We need to move beyond that thinking to understand that it is a shared burden, and that not only is industry bearing the burden but that it is shared throughout levels of government and society as well.

This chart will help us to understand a little bit about how dependent other critical infrastructure is on energy, and that a “system-of-systems” perspective is needed for analyzing those dependencies.

²⁵ Vulnerability expresses effort required to disrupt operations, so is in fact inverse vulnerability. Criticality expresses potential consequence of an attack or event.

A “System of Systems” Perspective Needed for Analyzing Energy Infrastructure Interdependencies



13 Fig 3

The issue here is not whether energy is **uniquely vulnerable** or not. That would depend on what specific threat is being considered, and which particular infrastructures. What we can all be certain of however is that it is **uniquely critical**.

In the middle of the figure is electric power. We need electric power for other energy infrastructures – for compression, storage, and systems control of gas systems for example. But there is an interdependency since power requires fuel for the generators to create the electricity. We also need power for water pumps, lift stations and control stations – and water for cooling and emissions reduction in power plants. The list goes on – water and natural gas; oil and electric power; oil and natural gas; and water and oil all form symbiotic relationships.

Telecommunication systems add a particularly interesting interdependency. Telecoms systems require power for the switches and for the SCADA (Systems Control and Data Automation) systems. Natural gas provides heat to telecoms, and water for cooling. In turn we use our telecoms systems to run SCADA to a degree of automation that most laymen probably do not appreciate. Most systems control takes place on a completely automatic basis. If electric power goes out or communication systems fail, the SCADA and communications aspects of all other infrastructure is affected.

The point here is that we are uniquely dependent on energy, and particularly electric power. Electric power is at the heart of other infrastructures, including other energy infrastructures. There are nodes in this system that are more vulnerable than others, and terrorists know that. They know that our need for SCADA and communications can be hacked into and severely degraded, resulting in degradation throughout the entire system. It is therefore important to take a systems of systems approach, and to understand second and third order effects of attacks.

To conclude, we go back to the questions we want to ask ourselves.

How much risk are we willing to accept? The answer of “none” is not acceptable. There may be certain types of industry in which we are not willing to accept too much risk – and in the energy industry that is the nuclear sector. We are not willing to take a lot of risk, but even with nuclear infrastructure, some has to be there. We cannot protect against every type of threat that we know about, because there will always be those threats that we don’t know about, or cannot anticipate. One of the recurrences of

homeland security is that we are almost inevitably surprised by the next attack - by the methodologies used, by the personalities involved, and by the target selection.

To which threats are assets vulnerable? The answer is, not against just the terrorist threat, but against the full range of all hazards. The next question is then, where should we accept risk. We need a sound methodology to help us in determining that. We need to recognize where on our matrix that point falls, to recognize that it is not static. It may change over time as the threats change. Things that we think are acceptable today may also not be acceptable tomorrow, and vice-versa.

Given the threat that we have, and given the criticality and vulnerability, what can we do to reduce threat? A threat-based approach to infrastructure implies that we will take action when we know there is a pending problem, a pending attack. That approach requires a great deal of intelligence which is not always available. Alternatively, a capability-based approach implies that we are going to protect all our systems as best we can, given what we know about the capabilities of our potential enemies or about the other kinds of all-hazards that exist in the area where infrastructure is located. We have to ask ourselves which approach is more appropriate. A capabilities-based approach requires a lot more money, and a threat-based approach requires much better intelligence. In the end we have to try to come up with the best aspects of each, recognizing that the system is not going to be perfect.

Beyond that, we need to consider what to do if an event occurs, which draws us into another entire realm - consequence management. The resiliency of infrastructure defines how do we as a society get back to business, and how companies get back to making money after a major incident occurs. So given the futility of total risk avoidance, it is necessary to employ consequence management planning as well.

Thank you.

7. Security Politics of Energy Interdependence

7.1. Energy Security: Any Role for NATO?

Dr Cezary Lusinski²⁶

*Director, Department of International Security Policy
Polish Ministry of Defence*

Much time has already been spent debating energy security and its relevance to the North Atlantic Alliance, so it is not necessary to convince anyone that it matters. The question though is how to achieve that security, and what role might be the most appropriate one for NATO. It seems obvious that no one of the international institutions should have a monopoly in this field. There will be a multitude of institutions involved in tackling such issues as organizing the interests of energy importing countries, or providing solidarity mechanisms. Among them is a definite role for the Alliance. The Riga Summit was very important because for the first time the issue was recognized by the highest decision-making body in the Alliance, and the ways to implement decisions coming out of Riga are now on the table.

Where we stand now is indeed an interesting question. There are definitely enough signs that we should be cautious with respect to the security of our infrastructure, including sea ports and pipelines. Indeed, infrastructure security has already been quite thoroughly elaborated upon in prior sections. But we simply must be aware that threatening incidents which we may associate with the greater Middle East or Africa can also happen in western countries, not least because many of them are perceived by Islamic terrorist groups to be prime targets whether we like it or not. While that may not be a particularly convenient situation, we must be prepared for attacks exactly in this particular sector whose vulnerability and criticality makes it so attractive to potential perpetrators. Can we do more than we do currently to protect ourselves and increase resilience? The hope, and my expectation, is that we can.

Energy security as a concept in geopolitics is definitely not an entirely new one. Nations wage wars on other nations in the pursuit of energy resources, and it has been a common experience of most of our countries. It is true however that the issue has reappeared in recent years with added importance. News headlines and our strategic predictions yield many examples of major problems caused by the disruption of flow of energy, or the threat of such disruption.

We are naturally focused mostly on oil and gas, but that focus varies across states and depends on each particular nation's energy balance – particularly with respect to the role of oil and gas, and import dependence. Some nations have nurtured a balance of energy resources which is particularly beneficial to maintaining a high level of energy independence or security. France is a prime example, and it in this respect it is a country to be envied, honestly speaking. They have managed to strike an enviable geographical and geopolitical balance of oil and gas suppliers, and that balance is supplemented with nuclear energy. It really yields a very comfortable situation.

We are not in such a situation in Poland, but we recognize the need to work hard towards it and to rethink our own energy mix. This means looking at developing our nuclear capacity, making better use of our coal endowment, and diminishing our

²⁶ This article has been adapted from a talk given on July 20, 2007 at the NATO School

dependency on just one single supplier in respect to oil and gas. Rebalancing our energy mix often means simply building new facilities. We recognize that it is the nation's responsibility to secure its own energy needs. However, if an attack or the intentional use of force renders nations more vulnerable than they would normally be, that should be a concern for the Alliance as well. In such a situation, partners should show solidarity to a nation that is endangered in its vital needs. Such scenarios demand at least our serious consideration.

Should energy security then be reflected in official NATO documents?

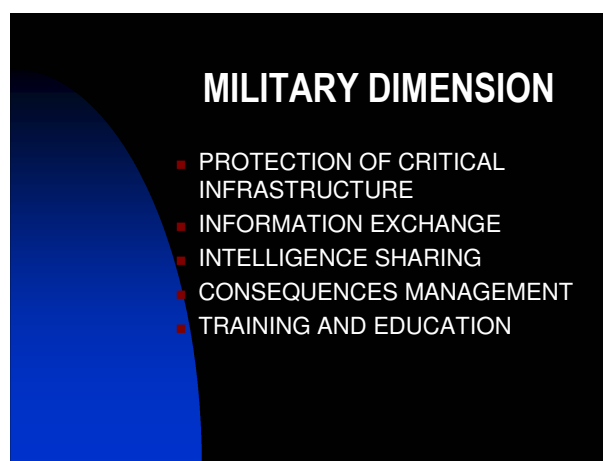


Fig 1

My answer is yes. It is already visible in the Comprehensive Political Guidance and, in the years to come, it will most likely be part of a new Strategic Concept. In any case, the issue will remain on the table during upcoming strategic negotiations.

7.1.1. Components of NATO Energy Security Policy

I would like to briefly elaborate on the components of energy security policy that would be particularly relevant for the Alliance. The most important is political assessment. To what extent would energy insecurity, or energy resource imbalances, provide for greater vulnerability of a particular allied nation or of the Alliance as a whole? Such an assessment would of course have further implications as to how to act and react.

Any such decisions would of course have to take into account the role of other institutions to tackle issues like management of the energy market in Europe. In that case, market management is definitely the role of the European Union, and fortunately there are finally steps being made to address this issue. Other sectors of our internal markets are regulated to a significant degree from Brussels, and it is surprising that in respect to energy that has not been the case. This leaves space for sometimes quite risky geopolitical developments.

One such example may be when a particular foreign energy producer pursues downstream ownership of large swathes of one's internal market or industry in order to consolidate its position and establish its long-term participation in that market. Under normal economic conditions that kind of interstate acquisition would not necessarily be problematic, but we have to ask questions about whether the partner in question would act according to economic or political thinking. This would make a

difference, particularly with such a strategic resource. And that is why some nations are very reluctant to accept Gazprom investment in the networks which directly service end-users' needs in a particular country.

Besides the EU, other organisations may also find energy security to be within their purview. As for International Energy Agency, its significant role is quite obvious. We may also consider the role of the UN. While the UN may not engage with the issue on an ongoing basis, it is sure to address the issue from time to time. In the case of a catastrophic occurrence, for example a massive attack on pipelines, seaports, or other such facilities, perhaps this may cause the Security Council to produce a resolution which causing or validating actions to cap such events. Finally, NATO should play a key role as well. Given its political-military importance, we could conceive of added value with respect to guarding, securing, and defending critical energy infrastructures. Given that previous sections describe more in depth and with greater competency the main issues of critical energy infrastructure protection, I will not elaborate further.



Fig 1

7.1.2. Allied Solidarity

I would complete my intervention with a few words on solidarity. Nurturing solidarity would be the best response to the endangerment of interests of an allied nation. We can see the value of such solidarity in response to non-conventional threats in such examples as the recent cyber-attacks on Estonia. There, a small but a reliable ally which is computerized to a very high extent felt the effects of a targeted blow to its critical infrastructure. The clear intention to exploit dependencies and attack where it causes the most pain was something which prompted us to show allied solidarity, and our ability to step up was commendable. Similarly with respect to Afghanistan, any nation engaged there would never think of acting there alone simply to defend its own national interest. But in a situation where one of the allies was harmed by people who found refuge in Afghanistan, it was enough to induce Alliance-wide solidarity with all of the necessary consequences.

We talk a lot about terrorism and its various manifestations against Euro-Atlantic civilization. That is the right thing to do. None of our nations can feel safe from this, simply for the fact that each of us may be perceived as a part of the Euro-Atlantic band of crusaders. That notion appears often enough in radical Islamic groups' papers and rhetoric. Integrating energy security into this picture reflects the kind of environment in which we live, and I believe it is the right thing to do.

7.2. The Euro-Atlantic Area, Russia, and Energy Interdependence

*Andrew Monaghan²⁷
Research Department
NATO Defence College*

First of all I would like to thank our hosts, the NATO School and especially Phil Cornell, for organizing these discussions.

What I would like to do in this forum is to be a little provocative and to question some of the basic notions about Russia and energy security that we hold in the Euro-Atlantic area. I am going to be a bit critical, even if it means putting my foot in my mouth with regards to NATO itself.

First an important starting point – I thought the preceding presentations were excellent. I found them very stimulating, and it is unusual to find that kind of discussion at the moment. I do however think there is a big gap between politics on the one hand, and practicalities and technicalities on the other. Here I would like to focus only on politics.

Second, I think the policy in the Euro-Atlantic area so far has been reactive, and it has been ineffective. Both have been the case to the extent that most of the discussions today, including those in this forum, are effectively blocked.

Finally, in this view I would like to say that there is no clear strategic horizon politically. We are looking very short term, and we are extremely fragmented in our views. Therefore, the move towards policy planning is very slow.

Per my promise to provoke, two more points at the beginning. Yes, diversity is good - of course it is. What I will argue shortly however is that diversification is likely to further undermine our energy security, and indeed already *is* undermining our energy security.

The second point is that Russia does in fact pose a lot of problems. I emphasize this because I will shortly be saying that we should engage more with Russia, and that position should not obscure the fact that Russia does pose enormous problems. In fact, as a Russianist I would say it poses more problems than most people at this forum are aware of, and considering the audience will probably be aware of a large number of them, that is quite a statement.

The background to the political situation at the moment reveals three key problems.

- **Resource inefficiency:** Hubbert's Peak is well known, and yet at a recent energy event where Russia was a central theme, not once were the major structural problems with Russian energy reserves cited. Some people at the extremes have called it 'a train wreck in progress,' and it would be remiss of us not to consider that Russia might not be able to meet its contractual agreements. Gazprom of course argues against any such notions. However we

²⁷ This article has been adapted from a talk given on July 20, 2007 at the NATO School

can identify a significant lag time in Russian production. Production stagnation can be expected around 2010-2011, followed by a lag time until about 2015 when major new fields come online.

- **Political blackmail:** This is one of the most vocalized concerns with regard to Russian gas, but I would suggest that the issue is very contextual. In a general sense, I would submit that it is not as easy as we might like to think.
- **Physical attacks:** These are the kinds of direct threats to energy infrastructures, for example by terrorist elements, which have been discussed at length so far.

In response to these three major sets of problems, I can identify five key responses on the part of the Euro-Atlantic community.

The EU-Russia energy dialogue is actually going quite well. Permanent partnership councils have been meeting, and as a result Moscow is being brought into the European energy dialogue. This is the basis of progress. However, the next four are beginning to undermine that dialogue quite successfully.

First of all, **the veto** that was brought in poses serious problems for negotiations. You can not negotiate if you are going to be vetoed. The practical result is that those negotiations have been stymied.

The focus on **the Energy Charter Treaty**, and trying to force Russia into ratifying it, is a big mistake. It shows that we are not listening and looking. The Russians have repeatedly said in very firm terms that they will not ratify the ECT as it stands. Going into negotiations with Moscow policy-makers have said that we must get Russia to break up Gazprom, and we must get them to ratify the ECT. But given that the Russians see those as the two big natural advantages that they have, it is very unlikely that they will be negotiated out of them.

We are not making progress on this – and we need something else. The final two points are the ones I'd like to focus on.

Diversification particularly is increasingly problematic. Although there are many good reasons for NATO to be involved in energy security, I would say the way it is being handled at the moment is causing increasing numbers of problems. So why then could diversity in its current form be problematic if, to reiterate, diversity in principle is good?

It is worth bearing in mind that in Europe particularly, but also within the NATO community, we are *already* very diverse both in terms of energy type, source, and transit routes. The problem is that we are talking about groups of countries which are 25 or 26 members large, creating a real problem. We cannot focus on the elements of diversity. The EU as a whole is very diverse, but states within it are not. The problem then is that if we diversify further, it magnifies the problem that we already have – the internal discord about the specific nature of the energy security challenge. Specifically, what is the threat, and to whom?

If on the one hand we talk about Russian gas, some allies will be reluctant to put much on the line because for them it may not be a problem. They may not use gas

very much, or they may import it from somewhere else. Oddly enough and somewhat paradoxically, if the EU as a whole was less diverse, it would be easier to formulate a common policy. But in reality it is so diverse in terms of its routes, sources, and energy types that members have real difficulties coming together and agreeing on common positions.

Another point to bear in mind with regard to diversification, is to where we are diversifying. Surely, Russia is problematic. Can we really say though that Iran is a better bet politically, and in terms of stability and productivity of resources, than Russia? It has been popular to look to Central Asian states, but are we really sure that Turkmenistan can meet the growing consumption needs of the Euro-Atlantic area or even its current contractual obligations? I for one am not sure that we can at the moment say that they are more reliable partners or more stable in terms of production.

Turning to supply routes, this notion of diversification begins to over-simplify some of the problems that are being faced. The Baku-Tblisi-Ceyhan (BTC) pipeline is up and running, and this is certainly beneficial, but it does run through rather a complex region. It passes through Georgia for example which has two unresolved conflicts ongoing. On the Azeri side, the pipeline passes precipitously close to Nagorno Karabakh – indeed within artillery range. It straddles the cease-fire line, and is separated by a very short tank journey. It is difficult to see how these options are better than the options we have now. Diversity, therefore, is easy to preach - but do we really know what we are contemplating in terms of the next step?

There is another problem with diversification – the Russians also hear that argument. They see the European drive to diversify, but they are still in need of a dependable market and so may choose to diversify themselves – to different customers. When that intention is heard in Brussels, fears that the Russians will not reliably satisfy European needs prompts the EU to push harder for diversification. What actually emerges then is a relationship which is managing politically to pull itself apart at the seams. This is odd, given that Europe relies on Russian natural gas having already regulated curbs on the use of indigenous coal or more abundant nuclear material for environmental reasons. We rely on Russia because we have an infrastructural relationship – and they too rely on us. The reality of infrastructural interdependence means that Europe should be engaging Moscow, not constantly moving away from it.

NATO, alongside the diversification point I would argue, is the major response. NATO involvement in this field has a number of negative backgrounds, and some members would argue that the EU and IEA are sufficient to cope with energy security these days and to deal with Russia specifically.

NATO does however have a number of clear benefits.

- First of all, the Alliance explicitly involves the U.S. and Turkey. These are two of Europe's major energy partners globally. We have already discussed quite a bit about the U.S., but Turkey is setting itself up as the fourth major artery to Europe. This is a major reason to bring NATO into energy security - because it brings Turkey squarely into the discussion.
- Second, NATO simply cannot afford not to think about this because we have to have secure energy supplies for the military alliance to work. Militaries

cannot perform the operations asked of them without large quantities of secure fuel, often relying on local commercial sources.

- The direct threats to energy infrastructures described in earlier sections are absolutely relevant for NATO. These represent security concerns where NATO expertise and assets can be used to enhance the energy security situation by actually enhancing the physical security situation.
- Finally, it is worth pointing out NATO's benefits in terms of avenues for dialogue. Not only is the Alliance bringing its members into the Euro-Atlantic energy security conversation, it also brings in partners. Russia is engaged within the framework of the NATO-Russia Council, which is much more effective it could be argued than some similar EU forums. Also, it brings in other relevant members. Azerbaijan has an Individual Partner Action Plan (IPAP) and is enjoying a new level of cooperation with NATO. Various states from the Mediterranean basin, Central Asia, and the Persian Gulf also enjoy specific partnerships with the Alliance, and are at the same time crucial to Europe's energy future.

Given all that, NATO involvement is also problematic for several reasons.

- The agenda is unclear, to put it diplomatically. There is a lack of consensus and a divergence of approach. Why should NATO be involved? It is difficult to get all members to agree on this. We can categorize three separate divergences.
 - First there is a split in defining energy security between the U.S. on one hand and Europe on the other. Europe understands energy security to be managing demand. Energy security in America is more about securing supply, although admittedly it seems to be moving towards restricting demand as well these days.
 - Within Europe there is also a split, here about what NATO might be used for. Some members want to use it to bring Washington's diplomatic weight to bear on Russia. Other European members do not see the necessity for that, and indeed fear that bringing in the U.S. in an apparently military format could be counterproductive with regard to Russian relations.
 - Finally of course there is the split between nation-states and the Alliance as a whole. Some states, particularly larger ones and those for whom the Russian issue is less immediate, prefer to deal with these issues on a national level rather than an Alliance level.

So there are reasons for a lack of consensus that are seriously undermining progress towards developing a coherent policy.

- It can be questioned whether NATO has a real influence in areas where it says it has simply by virtue of formal partnerships, for example in Central Asia and the South Caucasus.
- Finally, the role that NATO is playing is in fact beginning to undermine energy security as much as diversification is. Why? This is not a deliberate policy of NATO, but the problem is that NATO is emitting a series of signals which are being misinterpreted elsewhere by our partners. To give you one example, we heard earlier in this forum about NATO assets being used to protect or enhance the assets of international oil companies, particularly in the maritime sphere. This proposal was interpreted in Russia to mean that NATO

military assets might be used to protect the assets of international oil companies in third states, and this at the time when the Sakhalin 2 incident was being digested. It becomes evident how such signals can backfire. While we may be considering only a limited maritime role for the Alliance, it is being interpreted in Russia in a completely different way. This story was told to me by officials in Russia, and also published widely in their equivalent of *the Economist* magazine. Crucially, these discussions are taking place against the backdrop of very down-beat Russo-European relations. Things are currently looking quite bad, and energy security is one of the points behind this.

I have tried so far to be deliberately provocative, and I hope I may have staked out some positions that will stimulate debate. I would like to finish on two points though.

First of all, NATO has a conceptual benefit, or brings a conceptual benefit, to energy security. NATO understands that this is a chain, and a network which needs security from the moment resources are dug out of the ground to the moment you flip the switch. It is not simply a question of producer versus consumer, where the producer digs up a certain amount of energy, brings it to its border, and hands it over to the consumer. This notion of producer versus consumer is extremely damaging at the moment, and unfortunately that is the prevalent understanding of energy security.

Secondly, although NATO indeed poses a number of problems, we have to try to engage with producers and especially Russia much more comprehensively. The EU is trying to do this, but it is not necessarily getting very far and may lack the tools or weight to do so. We must use all relevant avenues to engage. This section is about interdependence – and indeed we are interdependent with Russia. Russia is the gravitational focus for energy security in the Euro-Atlantic community - particularly for Europe, but also it seems increasingly for the U.S. (politically, at any rate). Therefore we need to approach this issue together with producers, consumers, and transit states, and try and enhance the chain. That is true interdependence.

Thank you for your attention and your hospitality.

7.3. Turkey and the Politics of Pipelines in the Black Sea Region

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I would like to thank Phillip Cornell, NATO School, and IAGS for organizing this important conference and inviting me to share my ideas with you and this distinguished group of people.

First I would like to discuss Euro-Atlantic energy security and European dependence on Russian energy supplies, where I will set up my approach to energy security issues. That will be followed by a look at Turkey's role in the Black Sea region, and the importance of the Black Sea as an alternative energy corridor to the West. I will then review Turkey's energy cooperation with neighbouring states, and the politics of pipelines along the east-west and north-south axes.

The principles of Euro-Atlantic energy security in the post-Cold War era are characterized by both continuity and change. There is continuity because, as stated in Daniel Yergin in *Foreign Affairs* in 2006, energy security has constituted a major security issue since Winston Churchill converted the energy source of the British navy from coal to oil, rendering Britain more dependent on international energy deliveries from Persia. Winston Churchill, as quoted by Yergin, stated that safety and continuity of oil lie in variety and variety alone. That is a sentiment with which I think we can all agree.

Diversity of sources is the best way of ensuring energy security. But in the post-Cold War era we should also include interdependence and international cooperation to this concept of diversity of sources. This is the case because, if we stick to diversity issues and focus on the concept of diversity, we have to think in zero-sum game terms. Dependence on other countries, and particularly one country, is inherently a source of increased insecurity.

This may have been valid during the Cold War years. But in the post-Cold War era, the globalization process should, without ignoring the growing need for diversity, reinforce the necessity of interdependence and indeed the benefits of living in an interdependent world. Energy markets, and particularly the quest for stability in global energy markets, underscore this environment of interdependence. Consistent price levels are important not only for consumers, but also for producers, transit countries, and investors. Gal Luft's earlier contribution gives a very good view of energy security in highlighting the importance of harmonizing the interests of producers, consumers, industry, and transit countries.

7.3.1. Turkey and the Geopolitics of Transit

My comments will focus on transit countries, Turkey in particular, and the significance of pipelines. These arteries are important because they represent relatively safe and cheap ways of carrying energy sources from one country to

²⁸ This article has been adapted from a talk given on July 20, 2007 at the NATO School

another. But this makes energy issue not purely economic but also a geopolitical issue, because pipelines are territorially bound.

Given that, the geopolitics of pipelines touch many places in the world where producers and consumers are linked by these arteries across borders. I however will focus on the post-Soviet space and particularly the Black Sea area. In this region the key issue is dependence on Russian energy resources. It is for that reason that concepts such as diversification and energy interdependency are so prevalent in analyses of the area. Among the European countries, Greece, Austria, and Germany have some of the highest levels of dependence on Russian oil and gas. This puts the issue squarely into the geographic focus of the Euro-Atlantic security community. It should take notice not only because of the problem's proximity though. After the Ukraine crisis, the EU started to take this issue more seriously, publishing its Green Paper and Strategic Paper on energy security. But things are moving quite slowly there, and my central argument is that there needs to be more coordination between NATO and EU as the two major institutional frameworks of the Euro-Atlantic security area.

Diversification of energy supplies continues to be one of the main principles of European energy security policy - and indeed Turkey is contributing to this policy of diversification of resources. But it is also important to create interdependence among the actors involved in the region, including Russia. We should seek to reduce the European dependence on Russian oil and gas, but it is equally important not to exclude or ostracize Moscow. The key is to engage Russia on Euro-Atlantic terms, lest the conservative groups in Russia revive Cold War rhetoric. That scenario would be dangerous not just for energy security, but for global security at large. Identifying how we are going to deal with Russia, with regard to energy and security in a broader sense, is I believe one of the main security challenges facing Europe today.

Turkey seeks to become an energy hub in the region for both internal and external reasons. It has a rapidly growing economy, and seeks dependable energy sources to meet its growing internal consumption. Also, it is a NATO member country which serves as a security provider in this region. And its geographical position enables it to foster interdependencies in the region both political and economic, and to serve as a bridge between the Middle East and Europe. Together, these explanations help to explain why Turkey should and could become an effective regional energy hub.

The wider Black Sea region is important because if this region fails to provide an alternative energy corridor between Europe and the Caucasus and Central Asia, then the risk exists that China and India will secure the lion's share of energy resources in the Caspian Sea. We can see signs of this already, either via Russia or via direct pipeline links to Central Asia. Turkey, due to its important role in the Black Sea Economic Cooperation Organisation (BSECO), intensified its efforts at creating interdependencies within that forum. An initiative of Turkey, the BSECO is the only economic cooperation organisation in the Black Sea region and is an effective forum to harmonize regional interests. This year Turkey moved to introduce energy as one of the key concerns of this organisation.

7.3.2. From the Caspian to Europe

Simply looking at the map, Turkey's main role seems naturally to bridge the Caspian and Black Seas to Europe. However, the only country that actually borders both Caspian Sea and the Black Sea is Russia. The potential for competition is clear, and so is the unique position of Turkey to challenge the Russian transport monopoly. Politically, Ankara's challenge is to develop regional relations so that Europe and the Euro-Atlantic region may enjoy stable access to those resources. Otherwise, as mentioned earlier, China and India will secure access to the region via major infrastructure projects already under way, and Russia will be in the position to play these countries against Europe and vice-versa. That scenario endangers not only energy security, but creates a precarious security situation by fostering geo-strategic competition with Asia.

Russia enjoys the benefits of an effective monopsony in Central Asia. Kazakhstan is sandwiched between Russia and China, offering two major energy outlets, and to the south is gas-rich Turkmenistan. In practice Kazakhstan and Turkmenistan are largely dependent on Russia to sell their energy resources, and strong political and business ties reinforce that relationship. Russia also is dependent on its Central Asian neighbours, relying on them to sell it the gas and oil which it then resells to Europe at a significant mark-up. Indeed, the China option is more often used by Turkmenistan and Kazakhstan as a bargaining chip in contract negotiations with Russia rather than as a serious export alternative.

Iran is the other major Caspian player, so together with Russia these two countries form a problematic duo with respect to European access to Caspian Sea resources. Their oligopoly over those energy resources and access to them should be minimized or circumvented to a meaningful extent. Russia also takes advantage of its position on the Black Sea as well – its Novosibirsk port is used widely to transport not only Russian energy resources, but also resources originating from Central Asia and the Caspian Sea itself.

Moving focus to the Caucasus, Azerbaijan is luckier than its neighbours across the Caspian thanks to the BTC pipeline. It can send its oil and now natural gas to European markets via BTC and other pipelines running west via Turkey.

Georgia is ardently pursuing policies in line with Euro-Atlantic interests. It is a major partner of the BTC pipeline, and its own strained relationship with Russia is a testament to its pro-western orientation.

To some extent, the same can be said for Ukraine since the Orange Revolution, but Ukraine now suffers from deep domestic political differences - especially since the election of Viktor Yanukovich as prime minister. Kiev also has a deeply interdependent relationship with Russia, which is dependent on pipelines passing through Ukraine, which in turn depends on Russian natural gas for its domestic energy use.

7.3.3. Regional Energy Hub

Turkey combines the interests of many of these countries, including Russia, in such a way that it could play an effective regional energy hub role.

Turkey has recently concentrated its efforts on securing as much oil and natural gas as possible from the east and south to send to Europe. This is a clear and intentional purpose. Toward that aim, Turkey focused much of its efforts on links to the Caspian Sea – with the BTC pipeline at the centre of that strategy. The BTC pipeline became operational last year, and the South Caucasus gas pipeline became also operational.

It has been suggested to build a submarine trans-Caspian pipeline link to Central Asia and potentially transport the gas and oil resources of Kazakhstan and Turkmenistan directly to Europe. The project has long been delayed, again looks improbable after new hope earlier this year. But Turkey is still working on the trans-Caspian pipeline project, which is very important for the energy security of the Euro-Atlantic community.

There are also plans to increase natural gas and oil imports from Iran and Iraq and redirect them to the European market, but Iran and Iraq are quite unstable states. Iran takes advantage of its monopoly over the southern part of the Caspian Sea, and yesterday it was shown clearly that there are frequent terrorist attacks on energy infrastructures in Iraq.

On the western side to link-up with major European markets, Turkey has been developing two projects of note. One links the Turkish market with Greece and Italy, and construction has started on the Turkish-Greek pipeline. This line is expected to continue to Italy under a recent agreement signed between those countries. Secondly, Turkey supports the so-called Nabucco project, a link partly sponsored by the EU. It connects the Turkish market with Bulgaria, Romania, Hungary, and Austria, and is important also politically for Ankara because Turkey wants to increase ties with its regional neighbours.

Of those neighbours, Bulgaria and Romania are especially important regional partners, and also very vulnerable in terms of energy. As a result they are trying to develop their own alternative energy supply systems. The danger though is that Russia may then resort to divide and rule tactics – as Gazprom did in getting Hungary to choose its own project over Nabucco. It is important therefore to create common interests between Turkey, Romania, and Bulgaria. This is one of the aims of Nabucco.

Looking at north-south axis, we see cases of Turkey actually courting Russian cooperation. To some extent Turkish and Russian interest align, and as mentioned previously it is important not to alienate Moscow. While promoting east-west corridors, Turkey's support for constructing the Blue-Stream natural gas pipeline linking Russia and Turkey via the Black Sea demonstrates that Russian resources would not be shut out of the 'Turkish route'. The project also helped to alleviate worries about the BTC pipeline.

Turkey is not just looking west to markets, but also had plans to extend this pipeline network to Israel, both with natural gas and oil pipelines. Also, pipeline construction

can also alleviate some of the burdens on existing transit routes through Turkey, particularly by sea. The Turkish straits at the Dardenelles and the Bosphorus are quite threatened by tanker traffic for both economic reasons (since high volume means long and expensive delays) and for the safety of people living in Istanbul and other cities along the route. For this reason Turkey promoted a southern bypass. This pipeline is cost-effective and solves the problem of environmental security. Recently though Russia signed a deal with Bulgaria and Greece for the construction of a Bourgas-Alexandropolis pipeline, and some see it as the cheaper alternative. However, this weakens European energy security in that Russia controls 51% of the shares in this company. So it is not in the end a Greek-Bulgarian project - it is controlled mainly by Russia. It is important that parties should work on projects that strengthen Euro-Atlantic energy security rather than further enable Russia and succumb to divide-and-rule tactics.

To conclude, Turkey's role in the energy politics of the Black Sea region, and as an upcoming east-west energy hub, is quite vital. Secondly, there is a strong need to link the Black Sea region with Caspian energy resources, lest the region becomes inaccessible to the Euro-Atlantic community or becomes a supplier dedicated to alternative (eastern) markets. Finally, it is important for NATO and the EU to align their policies towards the region. In this, Turkey's role as the regional energy hub could be a major contribution to the success of Euro-Atlantic energy policies.

Thank you for your attention.

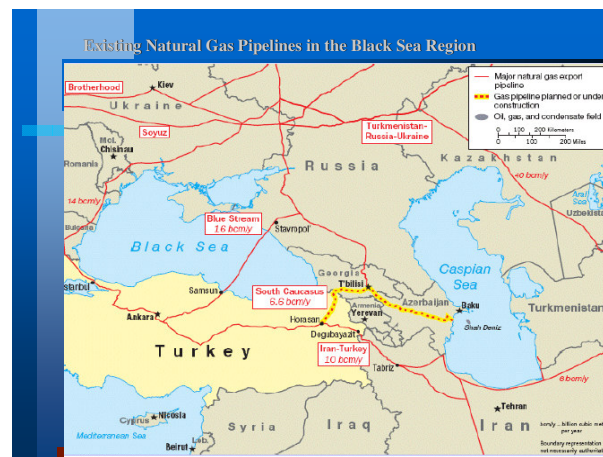


Fig 1

8. Energy and the Future Security Environment

8.1. Energy and the Future Security Environment

Khazar Ibrahim²⁹
Ministry of Foreign Affairs, Azerbaijan

I would like to offer my humble opinion on this issue of energy and the future security environment, and to give offer recommendations. This is very important because you cannot think about this issue without practicality, and for a practical approach you need recommendations.

First of all, it is important to clarify what I mean by energy security, because there have been very many different definitions mentioned in this forum. What is energy security? It may seem something of a simplification, but for me the primary dimension of secure energy is uninterrupted flow. That means that one has secure supplies of energy resources, and second that there is a sufficient amount of it coming to the market.

Another definition – when referring to energy here, I am referring only to oil and gas. This is not to discount the importance of various other energy sources, but only for the purposes of simplification given limited space.

The other (although perhaps secondary) dimension of secure energy is affordable price, because countries must be able to pay for energy commodities coming to the market without undue sacrifice. At the same time though, those providing and supplying resources should be able to sell it for a price which is comfortable for them. For example Azerbaijan will not sell oil at \$5 per barrel – it is not profitable or viable given the costs and risks of the industry.

I would like to elaborate on what the situation is today, and what are the trends. I see two things happening. One is growing sustained demand. The demand in China and India is rising dramatically. In Europe from 2005-2007 demand for oil increased just 0.1 million barrels per day. But for China specifically it was 1.2 million barrels per day – that is more than 10 times the demand growth for all of Europe.

The second trend today is increasingly disproportional energy resources – and most importantly energy supply chains. There only a few main suppliers. We have heard previously about Russia, the Middle East, North Africa, Central Asia – but that is not very many. And those resources which do remain are finite and will be exhausted one day. Those are important to keep in mind because our industries and economies as they work today are so heavily dependent on these two commodities.

8.1.1. Players in the Game

The third thing I want to address is how players work, and how they evolved within this big game of energy security. It really is a new ‘great game’ – it is played in some form in all places with energy resources, although different actors may play very differently. There are several ‘active’ players on both the demand and supply side. One is Russia.

²⁹ This article has been adapted from a talk given on July 20, 2007 at the NATO School

From discussions here, I take away the impression that there is not too much understanding of the Russian soul, one might say. Understanding that soul or mind-frame is not easy, and Russian moves should be seen for all their colours. They are never very simple. In Russian politics, especially in energy policy, there are many details which influence politics – whether energy politics, geopolitics, security politics, or domestic politics. Everything feeds into Russia's conduct of its energy policy.

China and India are also what I would class as 'active' players. In the previous section Dr. Tanrisever asserted that if Central Asian resources do not get into the Euro-Atlantic area, they may fall under the influence of China and India. I would downplay such a 'threat'. In any case China will need resources and will have to get them from somewhere. It is true though that they are really active in Central Asian markets, and to go even further, today China and India are trying to establish a significant presence in even niche energy projects. Therefore they are very active players.

The situation in central and eastern Europe is particularly complicated. They heavily rely on one source – Russia. That position of insecurity drives their search for alternative sources. Mr. Lusinski explains how Poland is trying to manage its relationship with Russia, but I see in this a rather unrealistic approach to Moscow. It is very clear that central and eastern Europe should talk to Russia, and it is important to find solutions with Russia. However the history shows that Russian interests have dominated and always prevailed over the foreign politics of those countries. Sometimes tragically for those countries, in the strategic chess game, Russia has always won.

The western Europeans I would classify as passive players. They have a low profile. If you look what major European nations are doing today in terms of energy security, they are hampered by a lack of clear understanding from their side about what they need. As a result, they are not taking the necessary steps either bilaterally or together as a team. I frankly do not see bold moves by the German government, or some others dependent on Russian oil, to explore alternatives.

Alternatives of course implies diversification of sources. There has been a healthy debate here on diversification, and Andrew Monaghan made the argument that diversification may not be the solution. I do not think that position shows a full understanding about what diversification really is. You are not *replacing* one route or supplier, you are complimenting it. If tomorrow a certain route does not work, you still have others. The goal is all about choice and options. The more options you have, the better your energy security is ensured. It is therefore crucial for western European countries and their institutions to move a bit boldly to explore alternatives and reduce dependency.

8.1.2. Evolving Developments

What of future developments? I will not try to build here best or worst case scenarios. Looking at international energy issues over centuries, never was there a separation between energy, politics, and security. Whenever you have energy dependence on one source, it inevitably leads to political dependence. It inevitably leads to economic

dependence. And it leads often to other dependences, including military-security dependence.

What I see currently is an over-dependence of the passive consumers on the resources of the active suppliers. At this rate, tomorrow active suppliers like Russia will most likely dominate – and that dominance will be not only in economic or energy terms. But those consumers that work most actively will probably see their energy security situation to be much more robust in the future.

Another consequence that I see is that allies of a dependent country may intervene. It may sound a bit naïve, because not many nations consider intervening militarily to support their ally when they are not getting enough oil and gas. Intervention need not be only military though - political and economic interventions can also cause major confrontation. Therefore it can influence dramatically the security environment of the future.

As for politically weaker suppliers, they will fall under the complete dependence of larger suppliers. In the example of Turkmenistan, you can see that Russia is essentially buying Turkmen gas for a low price and reselling it to Europe. This is a real danger for Turkmenistan's political independence. Turkmenistan is not the only example – and of course the situation was once very close in my nation. There are several examples of how smaller suppliers, meaning smaller nations with weaker political and economic systems but significant resources, can fall under the influence of those who have greater political influence. The result is to undermine the interests of smaller producers.

That pattern can definitely lead to security escalations in other areas. Looking at all major energy producing regions, there is good deal of potential for escalation due to unresolved conflicts, asymmetric threats, etc. Therefore it is very important to understand that when energy interests are concerned, other forms of state power are likely to be employed to guarantee access to resources.

8.1.3. Cooperation, Unity, Diversification, and Alternatives

The recommendation may be basic, but I think cooperation is much better than confrontation. Both consumers and suppliers must subscribe to that. Eventually, it's very much about interdependence - suppliers have to sell to make their societies flourish and their economies benefit, and consumers require stable supplies at reasonable prices for the same reasons.

Energy consumers should have a unified approach to this issue, in this case the role of the EU is essential from my perspective. The EU so far has been very low key in dealing with this issue. While it holds active discussions with Russia, and also with other energy rich nations like Azerbaijan, it is only talk so far. Ensuring reliable supply in the future is in everyone's interest, but if the EU is not acting as a single body and allowing national interests to dominate, then none of these nations will optimally ensure their energy security.

Diversification of energy supply is essential because it is fundamentally about complementarity. Supply routes and suppliers themselves need to complement each

other in this way. Nobody can exclude Russia – that aim would be unrealistic. Still, there should be other suppliers who can complement those resources and who can provide in times when Russian resources may not be available.

In the long term, the most essential thing is research and development in alternative energy. If you do not nurture wind power, solar power, or other alternatives in places where they are viable, then oil and gas resources will exhaust at some point. My nation has quite significant oil and gas resources, but we understand that in 30-40 years they will diminish dramatically. Our reaction has been to take advantage of our climate and foster wind and solar energy production.

Thank you.

8.2. The Future Energy Security Environment: No Alternative to a Radical Shift

*Susanne Peters*³⁰

Kent State University, Geneva

Since the energy crisis caused by Hurricane Katrina, we have realized how sensitive the oil market has become. A disruptive price increase could only be avoided by releases from the U.S. strategic reserves and by launching the IEA emergency system. But this looming disruption crisis has caused some uncertainty as to whether energy supply is really guaranteed for the foreseeable future.

From the beginning of the next decade on we will face a serious supply crisis caused by geological constraints. And this supply crisis will be exacerbated by the uneven distribution of the decline in resources along the north-south axis. Here I will argue that we have only two options. The first is to induce a radical energy shift, investing in renewable energy and efficiency. The second option is not doing that. At the moment we are not embarking upon the first option with full determination, and one result will be to enter into a more conflict prone global configuration. The most likely armed conflicts will in the future be those between energy producers and consumers along the north-south axis.

In order to make the point of why I am so pessimistic, and why my conclusions are so grim, let us examine the other two dominant views of how energy security and the future security environment is seen. They may be labelled the 'optimists' and 'realists'.

Among optimists are the economists and the liberals. The optimism is based in a very strong belief in the positive effects of globalisation and neo-liberalism, and that these are something of a blanket solution to many of the major problems we face today. They may not be able to flatly deny a looming energy crisis, but optimists are capable of recommending to us how to offset this crisis. The first is to continue the trend to liberalize the global energy market. The second is to count on the power of technology which is presumably limitless going forward. As the argument runs, due to the limitlessness of technology there are also no limits to growth. By that logic then, there are no limits to natural inputs. Seeing those arguments in the writings of so many economists, one may be astonished that the whole notion of peak oil has appeared to pass them by. The third method is to wait and see. Wait, and at the point when the need becomes painful enough, then we will come in and increase production.

Why does that theory not work? Firstly, world energy markets are not liberalised. Rather, there is a trend toward re-nationalisation. Western oil companies only have full access to 6% of the world's known reserves. They can invest in an additional 11% of reserves through joint ventures and production sharing arrangements. But the rest of the world is closed to them. Currently 72% of the world's oil reserves are held by national oil companies. That is no global liberalized market.

³⁰ This article has been adapted from a talk given on July 20, 2007 at the NATO School

Second, the belief in technology is also unfounded. It would be foolish to deny that there have been some dramatic progresses in technology, for example in deep water drilling and three-dimensional imaging. But if you put all your cards in technology, you ignore the second law of thermal dynamics – if you burn a piece of coal there is nothing that is going to replace it. There is no technological innovation to replace that whatsoever. The next argument is that this belief in technology is ignoring the limits of ingenuity – a concept more fashionably the Energy Return on Investment (EROI) factor. With the EROI one can measure however much you get out as a ratio of what you put in. At the beginning of the 1970s in the U.S. the EROI was 25:1. It is now down to 15:1. To exploit tar sands and oil shales it goes down to 4:1. The declining EROI points to the limits of technological development.

Realists do not generally think in terms of markets or geology, but rather of power and national egoism. They certainly are vindicated at the moment with the re-nationalisation of the energy market, and talk of emerging gas cartels. Their solution is risk reduction through the threat of the use of force. That sometimes may be the only solution at hand, but will only ever be a short or medium-term cure. It has been mentioned earlier by Andrew Monaghan the risks of such brinkmanship. If you do it too unilaterally it can be misunderstood by the producer countries.

I may belong to the group labelled “pessimists”, but I think we are realists too. In this group are most geologists, many from industry, and not many economists. They acknowledge that there are limits of nature. They acknowledge the effects that we will have to face of an irreversible depletion of fossil fuels. A good start to comprehending this pessimistic position is to examine the research to production ratio, which indicates that oil will last for another 40 years.

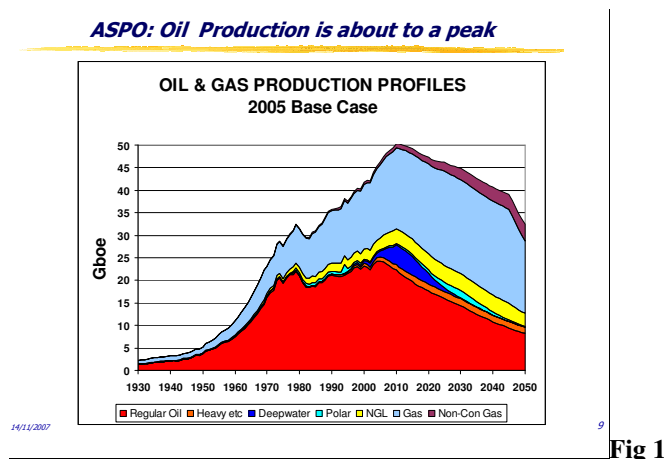


Fig 1

Peak oil theorists predict a trajectory shown in Figure 1. Here you see that around 2010 oil and gas will peak, based on Hubbert, who in the 1950’s predicted that the production of U.S. oil would follow a bell-shaped curve and peak in 1971. In the end that was precisely what happened.

At the point of peak oil, about half of reserves are still left. That does not sound too bad on the face of it – but the problem is that the pressure in the wells is declining significantly the moment you pass peak. You have to put a lot of energy into the wells (oil, gas, or others) to get the oil out of the soil or the water. That is worrying because production is predicted to decline sharply. In the theoretical plot of Figure 1, that

point will be reached in 2010. However, the fact that the date of peak has been revised so often doesn't do much to add to their credibility. In the end though, the point is not necessarily to pinpoint the year, but to understand the unsatisfied demand which will arise.

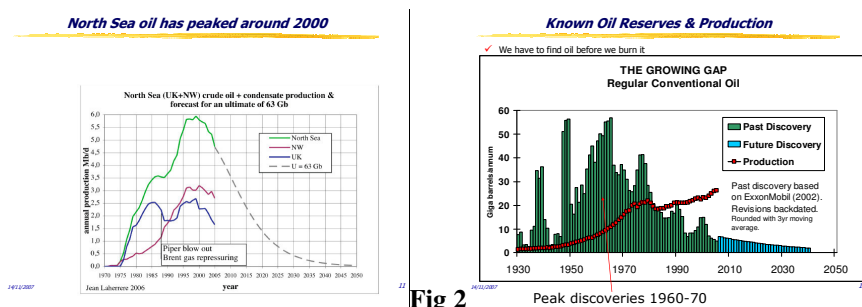


Figure 2 shows the peak already seen in the North Sea. It peaked in 2000, and since then production has gone down by 20%.

Figure 3 shows precisely the worrying factor which peak oil theorists see. It demonstrates the severe and worsening mismatch between production increase and decline of discoveries.

The expectations that new ones will be found is very low. The last major find was in the Caspian in 2000. Geologists have very compelling arguments that the world is already more or less explored and that the giant fields have already been found.

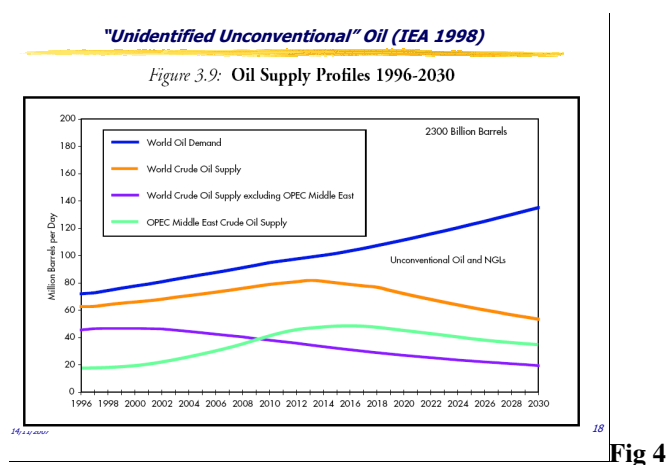
38% demand growth is not exactly helping, and rather exacerbating the dramatic scenario. There is some consensus that not all reserves have peaked or are close to peaking. Even the IEA recently published a report which said growth will cease (peak oil is no longer an acceptable term, it would seem) or you will see a plateau. Russia will reportedly see a plateau or cessation of growth by 2010. To put all the cards on Russia maybe a short-term or even medium-term strategy, but is not a long term solution.

Non-conventional oil is the big hope. Canada is 'one of us', and the tar sands are 'ours'. Extraction however is very energy intensive. You need a lot of energy in the form of gas pumping into the wells to get the oil out, resulting in only a 4:1 EROI. By 2030 the IEA sees such non-conventionals only accounting for 3.3% of world demand. The hopes are not so high as one would have thought.

So we are left with OPEC. It will focus on four countries in the long-term: Saudi Arabia, Iraq, UAE and Kuwait. The problem is that we do not actually know what is going on in OPEC – like Russia it is notoriously opaque. There is a concern that OPEC will not play the role of swing producer in the future, simply because it will not be able. There is some talk from expert such as Matt Simmons that Ghawar Field in Saudi Arabia, the largest field in the world, suffers a lot of water coming out of the wells. Those are indications that this Ghawar Field may have peaked already and may be aging. Misreporting does not help our pessimism.

Concessions add to the mistrust of the companies. Shell in 2004 had to admit that their reserves were actually 20% less than in 1993. The result was that Shell shares

dropped instantly by 10%. We are unlikely to get the truth from the oil companies because they are too much trying satisfy shareholders. There was recently a concession by the IEA that we would in fact see an oil supply crunch by around 2010. We could have known that as early as 1998 when the IEA for the first time published the profile in Figure 4 showing 19.1 billion barrels missing. That was a huge warning to the oil markets, but it was never been taken up and the director responsible for this report left the IEA hastily. Since then, the reports have been very optimistic. Pessimism was evidently discouraged, perhaps at the cost of accuracy.



If we fail to institute policies inducing a radical shift towards efficiency, conservation, and alternative energies, we will likely suffer the scenario described in Figure 4.

Stemming from such a dire scenario, I recognize two possible configurations for potential violent conflict.

- **Northern producers vs. southern producers.** About 85% of known oil reserves are held by 16 non-OECD countries, and all OPEC members still identify themselves as developing countries as expressed in their membership in the Group of 77. It also does not help that many OPEC members are also in the Arab League, raising the spectre of cultural clash.
- **Energy as a facilitating but secondary aim.** Many producers are known for their gross human rights violations. The incentive for the West to intervene in these countries because of human rights violations, together with the need to get resources, can also provoke violent conflict or war.

Looking at the long term energy security scenario, we have to acknowledge that we are getting to the beginning of the end of the oil age. If we fail to recognize this reality by inducing a radical energy shift, we will enter into a more dangerous world - and still without the energy which we need to desperately.

Thank you.

8.3. World Upstream Developments

Cyril Widdershoven³¹

GSA/Centre of Excellence Oil & Gas, CapGemini

Because it is NATO, the focus of this forum is naturally to the East – “Russia, Russia, Russia”. Some attention may be paid to the Middle East, as the common view is that we get all our oil from there – but that is not anymore the case. The U.S. imports oil mostly from its own region - from Venezuela, from Canada, and Mexico. Another large exporter to the U.S. is West Africa, and somewhere down the line is Saudi Arabia and others. The primary sources are no longer purely within the Arab region of OPEC. All or most of the new oil in the Gulf is not going west. It is going east to China, India, and Japan.

Unlike most other contributors, I am an oil and gas man who might be called an optimistic realist. Our dictum was, if you want to have peace you prepare for war - not the other way around. That is also how I also look at the oil and gas sector. I do believe oil and gas is not yet at its peak. In the end of course in 30-40 years the guy that was saying this in 1970 will be right because everything runs out one day. One day there will be a peak, but it has not happened yet.

Cap Gemini is an IT company, so no wonder we also believe in technology. Technology offers quick rewards, as with the introduction of smart fields. While just an IT integration of data processing of fields and wells, it will bring 6-8% production increases that are easy, and cheap.

Also, there is much more oil out there than we know about at present. Pessimists often point to production in the North Sea. Production in the North Sea has gone down, but it is not based on the fact that there is no oil left. We are not looking for extra oil because rules in the area prohibit oil and gas companies from searching elsewhere in the same area. 60% of the area in the North Sea has not even been subject to 3D imaging. RA40, a 3D image taken over time which shows even more, is not being used.

If oil price goes up it gets interesting. Companies are driven to do more when the price is at \$74 or \$78, compared to in 1999 when it was \$8. That represents quite a difference in oil investment opportunity, and oil and gas companies are conservative. They do not follow the simple rule that you invest when prices are low to gain when prices are high. They always invest when prices are high because then they have the cash on hand and think to take advantage of the price with higher production. By the time those investments come online, the price may well have fallen.

8.3.1. Getting the Regional Focus Right

We should certainly not only be focusing on Russia. It has a lot of gas and oil, but they are not the only ones. More worrying is our singular focus, because are only trying to set up deals with that one source. Unlike Andrew Monaghan, I do believe in

³¹ This article has been adapted from a talk given on July 20, 2007 at the NATO School

diversification. If one supplier falls out, and the Russians seem to be prone to it, then you have other ones. Also dangerous is to rely on gas, say for power generation, because gas sources are difficult to diversify. If your major supplier falls out, but is linked to Algeria, Egypt and others, then it is not only Russia but the so-called OPEC. Lucky for all of us, that is a development I just do not see.

Oil reserves are concentrated in the well known list of culprits – both friends and enemies. Saudi Arabia, Iran, Iraq, Kuwait, UAE, Venezuela, Russia, Nigeria, and then the others. Central Asia has a lot but reserves are not huge. We cannot expect to have more oil and gas coming from Central Asia or the Caspian than we were producing in the 1980s and 1990s in the North Sea. Not only is it not really substantial, but also it will not all come to Europe. China is very active in there, and so is India. And in the future, they will be willing to pay more than us. We are the best boys in the class - we don't want to break rules or hand over extra cash via offshore accounts to buy off Mr. Corrupt Official. I'm not saying we should - but sometimes you need to learn from history and from your competitors' tactics.

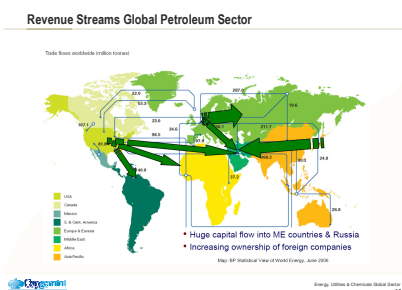


Fig 1

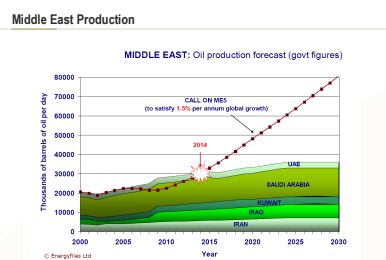


Fig 2

If you check where our ‘threats’ are, you also see where the cash is going. Figure 1 shows that it is to only two main regions – Russia and the Middle East. Yet strangely enough, no one has explicitly addressed the fact that for us in the Euro-Atlantic region, oil in Africa is more important than oil in the Middle East. If you are talking about real oil, rather than the oil price, where a flu of the Saudi King has a larger impact than a flu of the Nigerian president.

It is common to claim that the price of oil has gone up because of rising demand in China and India. People forget that the demand in the Middle East and Africa itself has increased higher and faster than China and India. Most of the new oil in Saudi Arabia and elsewhere is also being used in Saudi Arabia itself. That trend will be continuing in the next years.

Figure 2 shows some forecasts of production in the Gulf. These are figures provided by the governments there, and they show that after 2014 we will need more oil from that region than they themselves are saying they will produce. That creates a major problem short of significant additional investment. On the investment side, things need to change dramatically.

I agree that Saudi fields are under pressure, as has been mentioned earlier. Normal depletion rate is 8% per year, but among the biggest four ‘giant’ fields in Saudi Arabia that rate is 12-14% (as stated not by Saudi Aramco, but by others).

Lately most focus of investments are offshore, not onshore. Offshore drilling is safer – you are not confronted by rebels in the Niger Delta, by fundamentalists in Algeria, or by attacks on plants in Saudi Arabia or elsewhere. Plus we are able to send our ships to protect security in the producing regions.

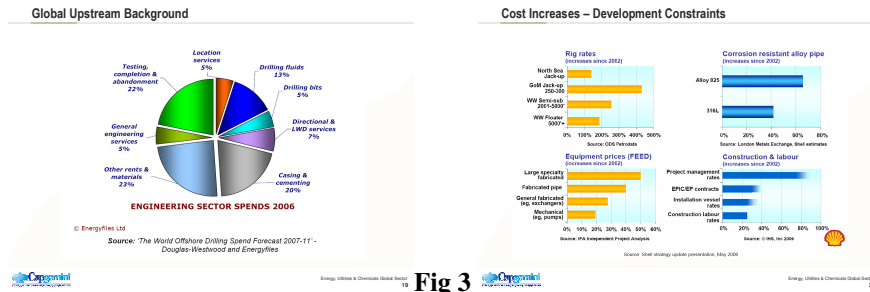
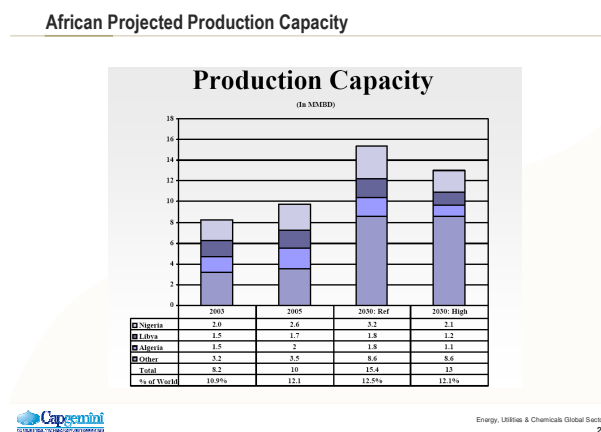


Figure 3 shows where the investments are going, and Figure 4 where cost increases are coming from. Costs are the main issue for the energy sector. Challenges are commercial resource ownership and the growth of influence of NOCs. The Shells, the BPs, and the Exxons of the world no longer have access to new reserves. Rather, it is in the hands of NOCs which we must learn to negotiate with. That is hard for the oilmen, because that is not what they are used to. Years ago, these companies could go in to producing countries and the governments would be kissing their hands. At this moment it is the other way around, particularly since they also now have the cash and technology. Often they simply do not need us any more.

8.3.2. Africa

Being from Holland, I like to use the term the Dutch disease. The Dutch disease has also struck in Africa. Unstable regimes are not willing to open up their books to transparent oversight, and most of the revenues have been squandered or carted off. Insecurity has risen. This picture is bleak. The role of NOCs is especially strong in Algeria, Libya, Egypt, Nigeria, and Angola, those main areas where oil and gas lies. They are now setting the rules, and focusing on investing their cash into the activities that Shell and others have been focusing on downstream. In the next couple of years, the NOCs will be owning the gasoline stations and refineries in the U.S., China, and elsewhere.



Does this affect us or represent a peak oil nightmare? The nightmare scenario is used by people, I dare to say, who want to scare us to go into alternatives. As an 'optimistic realist', I am not convinced yet that alternatives have any future while they are in the hands of oil and gas majors – some of the main investors in alternative power, strangely enough.

Africa is the main area we should be focusing on, partly to counter the so-called threat from Russia. What does this mean in the end for our security? Oil and gas is largely in areas that are unstable, like the Middle East and Russia. BP, Shell, and Total won't say it in public, but they have stories to tell and fumes to vent about doing business in Russia. But corruption and instability are also major problems in many parts of Africa. The emergence of extremism reaches most countries of North Africa and many in West Africa. Almost everywhere you have the clash between either ethnic groups, religious groups, elites against the poor, or among interregional groups.

It took NATO a little while to realize that they should be focusing not only east, but also south. Any place that was called 'out of area' was once a taboo subject in NATO, but we should have been looking there earlier. Other real threats – Al Qaeda in the Maghreb or associated Islamic groups in countries like Egypt – could rise with ongoing Middle East violence and the demise of U.S. allies such as Mubarak.

West Africa is not immune to such dangers. In Nigeria, Chad, Sudan, and Niger there are clashes between Muslims and Christians. The U.S. has come up in the last months with AFRICOM, officially to support stability and support regional allies to address certain threats. In reality the mission will likely be what is already being done - to train military forces. This is because there is a recognition among American strategists that African resources will be critical to our future energy mix.

What can we do? We must first acknowledge a situation where we need a more proactive approach to energy security – it is not only security of pipelines. We need to address more directly issues with Gazprom, because we are not winning that game. We should focus on a region where we could still have a certain power to wield certain interests. If others are addressing the issue by stationing military forces in Africa, perhaps we should take notice. Chinese naval forces are since years in Sudan. Iranian soldiers are in Sudan. Why are we keeping our soldiers in the barracks? I am not saying we should instigate energy security wars, but if we are not prepared then in the end we will have it.

Thank you.

9. The Security Dimension of Energy Infrastructure Security

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IPA Network

The strive for energy security is likely to dominate the international policy agenda of the 21st century. This is no surprise as every industrialized or developing economy depends on energy. What is however mostly overlooked is the fact that there is no energy security without energy infrastructure security.

Energy infrastructure security can be understood as a holistic approach that looks at ends, ways and means to detect and explore natural energy resources and to refine, store, transport, and distribute the relevant products. As the world depends on global energy supply chains that range from energy resources producing countries via countries of transit to the target markets, the provision of energy infrastructure safety and security is a complex and demanding task.

The dependence on a viable energy infrastructure is likely to grow for three reasons. First, energy consumption is rising worldwide. Strong economic growth in key developing countries such as India and China will spur the demand for fossil fuels and other energy sources in the next decades. This raises the need to explore existing energy resources more efficiently, find new energy resources, and increase production, refining and transmission capacities. Second, plans to diversify imports of oil and gas in particular will lead Europe, the United States and other consumers to new countries that are further away than current suppliers. This only reinforces the dependence on infrastructure as the energy supply chain will be extended. Finally, the political demand to use more renewable energy resources might help reduce geopolitical dependence, but it will not change the need for a reliable energy infrastructure. In many places current energy infrastructures are not yet appropriately designed to manage renewable energy flows such as wind power which is hard to control. This can lead to situations where the use of renewable energy poses infrastructure risks of its own.

Therefore energy infrastructure security must receive more political attention. There are clear indications that this is the case. NATO, for instance, is stepping up dialogue with energy companies and energy production countries. The 2006 declarations of the EU-US Summit and the G8 Summit in Saint Petersburg underlined the need for cooperative approaches towards energy infrastructure security. And the European Commission has proposed the European Program on Critical Infrastructure Protection (EPCIP) that outlines the first building blocks to identify European critical infrastructure.

* This paper builds on the authors' study "Energy Infrastructure Security: An Underestimated Foreign Policy Challenge" commissioned by the Swiss Ministry of Foreign Affairs and does not necessarily reflect the official position of the Swiss government.

Dealing with energy infrastructure security requires sophisticated approaches that span different policy areas and across the traditional public-private divide: Foreign policy action is needed to incorporate energy infrastructure security into external relations with energy production, transit, and consumption countries. Trade policy will have to assure a level playing field for state- and private-owned energy companies, which does not yet exist. Regulation policy has to pay more attention to the possible downside effect of market liberalization. Environmental policy has to be taken into account as demands for certain types of environmental protection measures can impose economic burdens that hamper energy infrastructure investments and thus reduce incentives for safety and security investments. Development policy can help address the broader political framework in energy-producing countries.

Finally, there is the security dimension. Despite recent declarations, the key message of our paper is that the security dimension of energy infrastructure security has so far been neglected – to the detriment of European energy security and European homeland security. We will argue that overcoming this shortfall requires a combination of hard and soft power.

Soft power refers to trust and confidence-building that are indispensable to enter into dialogue with state- and non-state actors about a very sensitive issue. Soft power also entails community building. By creating a sense of ownership local communities will have an incentive to avoid infrastructure-related incidents. Finally, standards are part of the soft power agenda as well. Defining standards can help direct public and private actions towards jointly agreed safety and security levels thereby taking into account not only the changed security landscape but also political demands for market liberalization and more eco-friendly energy consumption.

The global energy supply chain has a strong territorial footprint. Pipelines, in particular, create direct interdependencies between supplier and consumer markets. Europe, for example, imports roughly 85 % of its gas by pipeline.³² Ultimately there is also a role for hard power in protecting the critical energy infrastructure. While “boots on the ground” can be useful in certain cases, there are other defense and security capabilities that are likely to be more relevant. Think, for example, of unmanned platforms that can be used for infrastructure surveillance or concept development and experimentation tools to model interdependencies between the energy sector and other critical infrastructures. Furthermore, armed forces and emergency responders also have a valuable role to play in energy-infrastructure related cross-border incidents.

The focus of this paper is on concrete actions to advance the security dimension of energy infrastructure security. Before we turn to our recommendations we briefly outline our framework of analysis that highlights the complexity of energy infrastructure security.

³² Energy Sector Inquiry. DG Competition Report, SEC(2006) 1724, Brussels, 10 January 2007, p. 25, <http://ec.europa.eu/comm/competition/antitrust/others/sector_inquiries/energy/fr_part1.pdf> (access 13 July 2007).

9.1. Energy infrastructure security: What is it all about

Figure 1 illustrates the complexity of the tasks that must be taken into account when guaranteeing energy infrastructure security. Our model rests on three analytical dimensions:

■ 9.1.1. Energy supply chain

The energy supply chain at the center of Figure 1 illustrates the relevant steps to bring energy resources to consumer markets. Most importantly, the supply chain highlights the interconnectedness of all stakeholders involved: individual firms or nations depend not only on their own choices to guarantee infrastructure security, but also on those of others.³³

However, despite mutual dependence between the stakeholders, the global energy supply chain is characterized by power asymmetry. It is estimated that around 85-90 % of the world's oil reserves fall under direct government control. Governments receive at least 45-90 % of the net value of crude oil over the lifetime of around 40 years of an oil field. State players also account for about 78 % of world oil and 74 % of world gas production, leaving the rest to corporate actors such as Exxon Mobil, Royal Dutch Shell, BP or Total.³⁴

This means that a competition-based regulatory approach to energy security, which is followed by the European Union (EU) in particular, is seriously limited. In fact, competition only works on the European home market, and even there serious problems exist. As all other stages of the supply chain are dominated by power and monopolies, there are serious power asymmetries: Europe's market focus collides with the desire for upstream control of leading energy resource consumers such as China and India and the strive for downstream control followed by leading producers.

■ 9.1.2. Production, transit, and consumption countries

Energy infrastructures cross various countries and are thus subject to regulatory differences. This distinction makes it clear that there is a regulatory asymmetry.³⁵

On the one hand there are safety and security provisions defined locally by a single producing nation or the parties of an infrastructure project. On the other hand, there is a regional or even global dependence on the steady provision of energy resources that is directly affected by these local provisions.

³³ Jeffrey Heal et. al., "Interdependent security in interconnected networks," in Philip E. Auerswald et. al. (eds.), *Seeds of Disaster, Roots of Response. How Private Action Can Reduce Public Vulnerability* (Cambridge: Cambridge University Press, 2006), pp. 258-275, here p. 258.

³⁴ GAO, *International Energy: International Forums Contribute to Energy Cooperation with Constraints* (Washington, DC: GAO, 2006), p. 20; Xavier Harel, "La pétro-politique rebat les cartes," *La Tribune*, 12 June 2006, p. 36; Jill Shankelman, *Oil, Profits, and Peace. Does Business Have a Role in Peacemaking?* (Washington, DC: United States Institute of Peace Press, 2006), p. 40.

³⁵ For a similar analysis, see also: *The paradigm change in international natural gas markets and the impact on regulation* (The Hague: The Clingendael Institute, 2006), pp. 17-26.

Today, important production and transit countries lack energy infrastructure security concepts or strategies. If safety and security standards exist at all, they are not delineated from an overall concept. Given the logic of the supply chain, this directly weakens the security of supply of consuming countries. There is thus a serious need for an international regime that sets standards for energy infrastructure security commensurate with the security assessment across all stages of the global energy supply chain.

Furthermore there is the crucial role of chokepoints, i.e. narrow geographic bottlenecks through which energy supplies are channeled. For example, 88 % of all Persian Gulf oil exports need to pass the Strait of Hormuz.³⁶ If the Strait is blocked, there are alternative routes, but delivery takes longer which increases supply costs.

■ 9.1.3. Risks

There are manifold risks to the critical energy infrastructure. Physical infrastructure risks describe vulnerabilities of assets such as pipelines or pumping stations. Protecting and hardening these elements can improve physical security. Information and communication technology (ICT) refers to the dependence of energy infrastructure on networks and control systems. Electronic control systems, for instance, have been called an “inroad to critical infrastructure disaster” as information security for these elements lags behind general information security.³⁷ This makes energy infrastructure security even more complex as risks that can endanger the proper functioning of ICT can also affect energy infrastructures.

Human factors illustrate that human activity can pose security risks either by deliberate attacks (e.g. in case of terrorists) or occasional malfunctions. Finally, organizational aspects need to be taken into account in order to address interfaces between the various actors along the energy supply chain. In particular in Europe these interfaces become even more important as deregulation and competition in the energy sector have led to the outsourcing of various functions that have hitherto been integrated into single companies.

³⁶ Jean-Paul Rodrigue, “Straits, Passages and Chokepoints. Maritime Geostrategy of Petroleum Distribution,” *Cahier de Géographie du Québec*, 48:135 (December 2004), pp. 357-374, here p. 367.

³⁷ Eric A. M. Luijff, “SCADA: An Inroad to Critical Infrastructure Disaster,” Presentation to the 4th EAPC/PfP Workshop on Critical Infrastructure Protection and Civil Emergency Planning, Zurich, 24-26 August 2006.

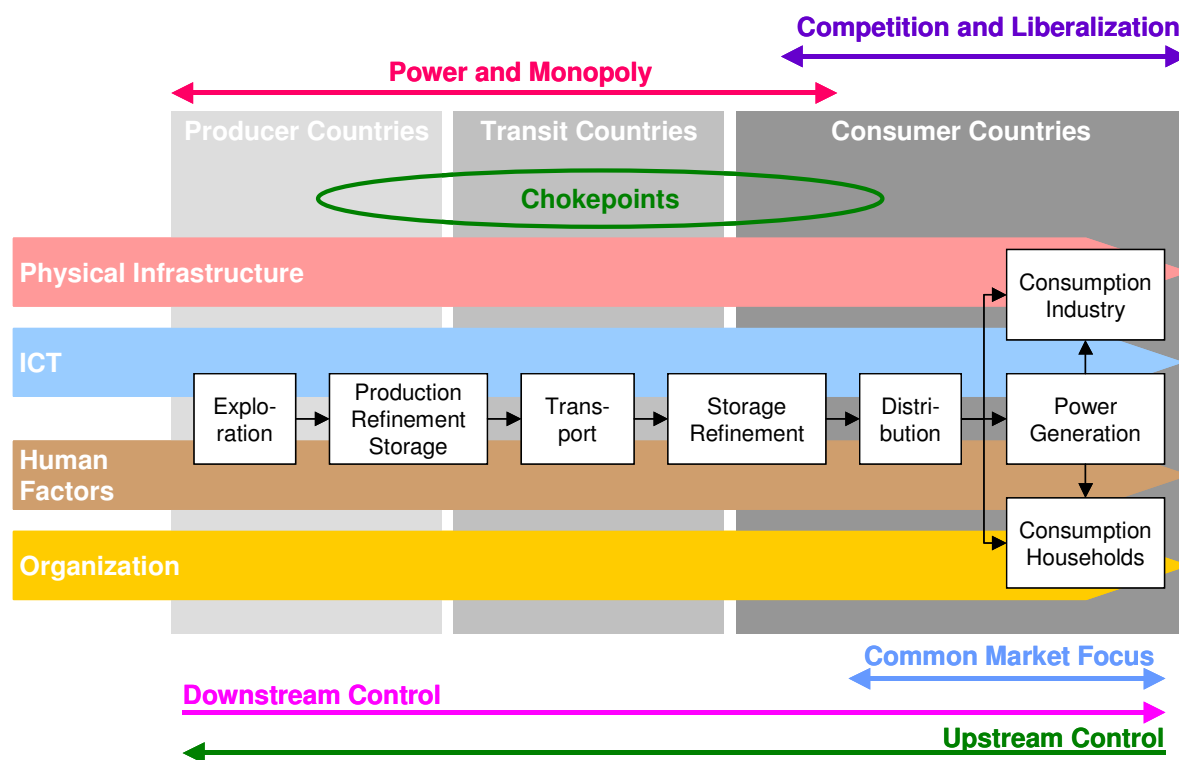


Figure 1: Energy Infrastructure Security – Model of Analysis

9.2. How to strengthen the security of energy infrastructure security

Against the background of our model of analysis in Figure 1 we see seven areas that should receive more attention in order to strengthen the security dimension of energy infrastructure security. First of all there is a need for an appropriate international setting to debate all aspects relevant to energy infrastructure security. The International Energy Forum (IEF) could present such a forum as all major production, transit, and consumption countries belong to it. In addition, EU member states should consider the appointment of a European Energy Infrastructure Security Coordinator to deal with all the inter-agency aspects of the issue. Second, given the different risk dimensions outlined above the adequacy of current energy infrastructure safety and security standards should be scrutinized.

Furthermore it is necessary to adapt current security paradigms with regard to the role of defense and security forces in several respects. Our third recommendation thus advocates to bring the Security Sector Reform (SSR) agenda in line with energy infrastructure security requirements. Fourth, EU member states in particular need to acknowledge that also hard power plays an important role to protect the global energy supply chain. So far, however, Europe’s ambitious external energy relations agenda is not linked with the EU’s security and defense policy. Fifth, private security contractors (PSC) are a matter of fact in the energy sector. Despite the risks of engaging PSC, they can also play useful roles that should be addressed more closely. Sixth, engagement efforts with local communities should be stepped up. By creating local ownership local communities have a stake in the longevity of energy infrastructures and will thus have an incentive to guarantee their security.

Finally, there is a need for cross-border emergency and consequence management along the global energy supply chain, which needs more attention. So far, mutual support for infrastructure related cross-border incidents is insufficient. This is not only an economic problem, as it hinders the free flow of energy as a basis for economic cooperation. It is also a serious problem for European homeland security.

9.2.1. Recommendation: Get the institutional setting right to address energy infrastructure security

Energy infrastructure security is in need of an adequate institutional environment. This is paradoxical, because there is no lack of international institutions dealing with different aspects of the issue. Overall, however, there is hardly a forum that provides the necessary comprehensiveness in particular with regard to representing the most important production, transit and consumption countries. The only organization that comes close to fulfilling this requirement is the International Energy Forum (IEF). In addition to a global platform there is also a need to advance interagency cooperation with regard to energy infrastructure security at the European level. This task could be assigned to a new European coordinator for energy infrastructure security.

9.2.1.1. USE THE INTERNATIONAL ENERGY FORUM AS A GLOBAL PLATFORM TO ADDRESS ENERGY INFRASTRUCTURE SECURITY

The IEF “provides the largest recurring global gathering of Energy Ministers”.³⁸ In addition to more than 60 states³⁹ almost all important international organizations have joined the IEF: the European Communities, the Gulf Cooperation Council, the International Energy Agency, the Organization of Arab Petroleum Exporting Countries, the Organization of Petroleum Exporting Countries, the United Nations and the World Trade Organization. Only NATO and the OSCE⁴⁰ are missing. Dialogue between Ministers and the industry is facilitated through the International Energy Business Forum (IEBF). The IEBF Joint Committee includes representatives from 30 national and international oil and gas companies.

The fact that the IEF is neither a negotiating nor a decision-making forum is a weakness that could turn out to be a strength in the initial phase of approaching energy infrastructure security. Like in the early days of the Conference for Security and Cooperation in Europe (CSCE), the IEF could provide an overall umbrella to discuss the matter. Concrete actions that require decision-making and specific programs could then be dealt with by the different international organizations participating in the IEF.

³⁸ GAO, *International Energy*, p. 13. For more on the forum, see: <<http://www.iefs.org.sa>> (access 13 July 2007).

³⁹ Algeria, Angola, Argentina, Australia, Austria, Bahrain, Bangladesh, Belgium, Brazil, Brunei, Canada, China, Czech Republic, Denmark, Ecuador, Egypt, Finland, France, Gabon, Germany, Greece, Hungary, India, Indonesia, Iran, Iraq, Ireland, Italy, Japan, Jordan, Kazakhstan, Kuwait, Lebanon, Libya, Malaysia, Mexico, Morocco, Netherlands, New Zealand, Nigeria, Norway, Oman, Pakistan, Philippines, Poland, Portugal, Qatar, Romania, Russia, Saudi Arabia, Slovakia, South Africa, South Korea, Spain, Sri Lanka, Sudan, Sweden, Switzerland, Syria, Thailand, Trinidad and Tobago, Tunisia, Turkey, UAE, United Kingdom, United States of America, Venezuela, Vietnam, and Yemen.

⁴⁰ Involving the OSCE could be of use in addressing energy security issues in the Caucasus and in Central Asia where the organization has established field missions.

There can be no doubt that energy infrastructure security is a very sensitive issue. States will thus be reluctant to provide detailed information. However, there is a momentum in favor of a sustained international dialogue about energy infrastructure security that should be seized. Information gathering and exchange about basic questions could be a starting point for the IEF. Among other things, the following topics should be addressed:

- Definition of and approach to energy infrastructure security (IEF dialogue between all relevant partners along the supply chain could highlight important differences in understanding and conceptualizing energy infrastructure security)
- Responsibilities of state and private actors with regard to setting up the necessary regulatory environment and providing infrastructure security
- Comparison of existing energy infrastructure safety and security standards and processes launched to define, review and update these standards
- Exchange of experience with regard to energy infrastructure vulnerability assessments (the comprehensive gathering of all relevant stakeholders in the IEF would also provide a unique opportunity to launch vulnerability assessments covering all stages of the energy supply chain)
- Comparison of best practice methods to identify, classify, and assess vulnerabilities, threats, and risks as well as protection and counter-measures commensurate to deal with these challenges
- Discussion of joint approaches to identify and protect critical infrastructure with cross-border importance (i.e. infrastructure residing in one country that is important for other countries)⁴¹
- Identification of lessons learned from different national protection strategies (To this purpose it would be important to include NATO because of the different roles national armed forces could play)
- Identification of international need for action, for instance with regard to providing regulatory incentives to stimulate investments, improve protection and modes of interaction to smoothen public-private cooperation.

9.2.1.2. APPOINT A EUROPEAN ENERGY INFRASTRUCTURE SECURITY COORDINATOR

The global IEF-based approach should be complemented by regional initiatives. To this purpose the EU should build on the idea of European coordinators for key European infrastructure projects⁴² and appoint a European energy infrastructure security coordinator.⁴³ In particular the new coordinator should raise awareness for the central importance of energy infrastructure safety and security, create a trustworthy environment for information exchange between public and private actors, and stimulate dialogue on risk and vulnerability assessments with all European and external partners involved in the energy supply chain.⁴⁴

⁴¹ The European Program for Critical Infrastructure Protection (EPCIP) provides a method to identify critical infrastructure. But protection strategies for European critical infrastructure have been left out. See: European Program for Critical Infrastructure Protection, COM(2006) 786, Brussels, 12 December 2006, <http://eur-lex.europa.eu/LexUriServ/site/en/com/2005/com2005_0576en01.pdf> (access 31 July 2007).

⁴² Priority Interconnection Plan, COM(2006) 846, Brussels, 10 January 2007, p. 10, <http://ec.europa.eu/energy/energy_policy/doc/11_priority_interconnection_plan_en.pdf> (access 31 July 2007).

⁴³ This idea resulted from talks with government officials, 22 January 2007.

⁴⁴ See also: "Russia-EU Energy Dialogue Report of the Energy Infrastructure Theme Group," October 2006, p. 8,

The new coordinator would also play a key role in coordinating the different inter-agency aspects of energy infrastructure security. As such he would coordinate energy infrastructure safety and security activities between the relevant European institutions. Furthermore he would make sure that energy infrastructure security receives the necessary attention in the conduct of Europe's external energy relations, at national and European levels and in other international fora dealing with regulatory issues to stimulate energy infrastructure investment (e.g. OECD, WTO).

As a first priority, the new coordinator should focus on European critical energy infrastructure that is currently being identified under the European Program for Critical Infrastructure Protection.⁴⁵ In doing so, the coordinator could establish an Energy Infrastructure Security Platform involving all relevant public and private stakeholders in Europe. The work of the platform should be coordinated with other international institutions such as the International Energy Forum. By bringing together all relevant stakeholders the new platform could, for instance, assess the adequacy of existing energy infrastructure safety and security standards and propose policy action to deal with existing shortfalls. In addition, public-public, public-private, and private-private interaction to guarantee energy infrastructure security could be analyzed in particular with regard to the division of tasks and responsibilities at European and national levels.

9.2.2. Recommendation: Take stock of existing energy infrastructure safety and security standards

The lack of common energy infrastructure safety and security standards in Europe and beyond is a problem for the cross-border management of energy flows. Among other actions the new European Program for Critical Infrastructure Protection (EPCIP) also includes methodological work to identify critical infrastructure and to assess their vulnerability. This provides Europe with a window of opportunity to address safety and security standards as well.

9.2.2.1. ASSESS EXISTING SAFETY AND SECURITY STANDARDS

An overview of existing national and international safety and security standards for the various components outlined in our model of analysis should be compiled. This should be done to assess the appropriateness of existing standards in light of future performance requirements such as the creation of a single European gas and electricity market, the increase of energy demand and the injection of increased levels of "green energy resources." In doing so, the following aspects will be important:

- At first, safety and security standards for those priority infrastructure projects that guarantee the supply of energy resources from production and transit countries to Europe should be scrutinized.⁴⁶ Performance requirements will need to be

<http://ec.europa.eu/energy/russia/reference_texts/doc/2006_10_infrastructure_en.pdf> (access 31 July 2007).

⁴⁵ The European Program for Critical Infrastructure Protection.

⁴⁶ Priority Interconnection Plan. Commission Staff Working Document Accompanying the Communication from the Commission Inquiry pursuant to Article 17 of Regulation (EC) No 1/2003 into the European gas and electricity sectors (Final Report), SEC(2006) 1715, Brussels, 10

discussed with the respective production and transit countries. If they cannot be met, European financial or technical assistance may be required.

- Mutual interdependencies between the energy sector and other critical infrastructure sectors such as information and communication and transportation need to be addressed. Following the assessment of these critical interdependencies it will be important to identify what should be done at European and national levels and how responsibilities and tasks should be shared between public and private actors.
- There is a need to deal with ICT safety and security standards in the energy sector and other critical infrastructure sectors. As every infrastructure sector will come up with specific ICT requests, there will be a need for horizontal coordination, especially when approaching the ICT industry that delivers the relevant products. SCADA safety and security should be looked at in particular. Again, there is a need for identifying and documenting best practice and for standardizing safety and security norms. In the United Kingdom, for instance, the National Infrastructure Security Coordination Center has organized different SCADA conferences and published a good practice guide for process control and SCADA security.⁴⁷ This could serve as a model for pan-European initiatives and for cooperation with energy-relevant partner countries.

9.2.2.2. THINK OF STANDARD SAFETY AND SECURITY AUDITS FOR ENERGY INFRASTRUCTURE PROJECTS

It could be argued that the need for energy infrastructure safety and security audits depends on the risks to be faced in each country. In many cases, social and environmental impact assessment of energy infrastructure projects could be enough to address security issues as well. However, this approach tends to overlook the fact that safety and security along the energy supply chain will be only as strong as its weakest link. Therefore we see a need for standard safety and security audits in particular for projects that are key for Europe's energy supply.

Among the different issues to be addressed by these audits, the following stand out as most important:

- The nature of a new infrastructure project (upstream, midstream, downstream) will define interfaces with existing infrastructure. These interfaces must be analyzed in particular because there is a need to address the interplay between new and ageing infrastructure in order to optimize safety and security. Furthermore, there is also a need for standards dealing with life extension of infrastructure components.⁴⁸
- ICT-related risks should be analyzed as a risk category of its own, as outlined above.
- Finally a life-cycle approach should be adopted in order to make sure that safety and security measures evolve commensurate with the aging of the infrastructure and the development of the relevant risk environment. If not yet the case, life-cycle

January 2007,
<http://ec.europa.eu/energy/energy_policy/doc/12_priority_interconnection_plan_annexe_en.pdf>
(access 31 July 2007).

⁴⁷ <<http://www.niscc.gov.uk/niscc/scada-en.html>> (access 13 July 2007).

⁴⁸ Joint Research Center, "Safety and Security of Energy Infrastructures in a Comparative View", Conference Report, Brussels, 14-16 November 2005, p. 3
<<http://www.energyrisks.jrc.nl/workshops/SEIF-CV/SummaryReport-SEIF-CV-Nov2005-final.pdf>> (access 13 July 2007).

costs should be added to investment costs in order to determine overall costs of infrastructure projects.

Requesting safety and security audits for energy infrastructure projects should become common practice for international financial institutions (IFI) that help finance these projects. This could also help advance risk-informed design by integrating safety and security issues in the design phase of an infrastructure project.⁴⁹ If IFIs want to exert this kind of influence, they will be required to adopt a common understanding of energy infrastructure security, the most important assessment criteria and the key measures to guarantee safety and security. Such a common understanding will be important in order to avoid diverging approaches between different IFIs that could be detrimental to the overall goal of secure energy supplies.

9.2.3. Recommendation: Make energy infrastructure security part of the security sector reform agenda

Within a relatively short time span the security sector reform (SSR) agenda has influenced the international development policy, foreign policy and military diplomacy community. By putting the main emphasis on how the security sector is governed SSR stipulates a clear link between security and development in the sense that “a responsible, accountable and effective security sector will engender conditions conducive to development, power reduction and democracy.”⁵⁰

Like every other paradigm, SSR defines a set of key principles.⁵¹ With regard to the need to improve energy infrastructure security, three aspects of the current SSR agenda should be reviewed: limiting security spending, the strict separation of different security forces, and the scope of capacity-building programs.

9.2.3.1. POSITIVE ASSESSMENT OF ENERGY INFRASTRUCTURE SECURITY SPENDING NEEDED

As a starting point it can be argued that the more a nation depends on revenues gained from extracting energy resources the more important is the steady flow of these revenues in order to fund state activities. In guaranteeing stable flows of energy, a secure energy infrastructure is key. Most energy producing countries interpret oil and gas as strategic goods and thus foresee state ownership and control. Depending on the security situation of the respective country, the physical protection of the energy infrastructure may be a premier task for the nation’s armed forces and/or its police forces. These forces must be trained and equipped to accomplish their tasks, which in turn requires adequate spending.

The SSR agenda, however, is still predominantly characterized by the focus on spending levels and spending processes with the aim of limiting or cutting back defense and security spending. Against the background of former war-torn societies where armed forces and the police were used to suppress the population, this is understandable. Given the new security landscape that might require armed forces and

⁴⁹ *ibid.*, p. 4.

⁵⁰ Mark Sedra, “European Approaches to Security Sector Reform: Examining Trends through the Lens of Afghanistan,” *European Security*, 15:3 (2006), pp. 323-338, here p. 325.

⁵¹ For a comprehensive overview, see: OECD, *Security System Reform and Governance* (Paris: OECD, 2005), <<http://www.oecd.org/dataoecd/8/39/31785288.pdf>> (access 13 July 2007).

the police to accomplish energy infrastructure security, this view is no longer enough. Rather the SSR agenda should be modified in order to take into account the important role of infrastructure security spending. In order to avoid false impressions, transparency building with regard to security spending, which is part of the SSR agenda, should address infrastructure security spending in particular. This could advance trust among neighboring countries and would help provide the international community with a better understanding of existing shortcomings that need to be tackled.⁵²

9.2.3.2. FOCUS ON INTEGRATED CAPABILITIES RATHER THAN INSTITUTIONAL SEPARATION

Furthermore, energy infrastructure protection requires specific capabilities. The SSR focus on the proper delineation of powers and the respective division of responsibilities and organizations⁵³ tends to overemphasize institutional separation of armed forces and police forces rather than focusing on the provision of integrated capabilities and smooth interagency interaction. Intelligence gathering for surveillance, for instance, could include the use of Unmanned Aerial Vehicles (UAV) maintained by the country's armed forces. Information from UAV-based sensors should be distributed to all relevant actors in order to improve situational awareness and situational understanding. Similarly, crowd and riot control is a task for the police, but it could also include the armed forces in order to guarantee the availability of an instrument of power commensurate with the escalation spectrum of regional incidents. That's why building up integrated capabilities that are useful for defense, security, and infrastructure protection tasks should receive more attention in SSR activities.

9.2.3.3. ADDRESS SPECIFIC CAPACITY BUILDING REQUIREMENTS OF THE HYDROCARBON SECTOR

Our plea for more jointness goes hand in hand with the demand for capacity building programs that take into account the specifics of the energy sector. Judicial and administrative reforms are most important.

In Nigeria, for instance, the justice department is in charge of all aspects of the hydrocarbon sector. In light of ongoing turmoil in particular in the Niger Delta, which is the heartland of Nigeria's oil reserves, the department's limits are becoming apparent.⁵⁴ There is no specialized unit within the judicial branch trained and equipped to tackle the highly complex and politically sensitive questions arising within the hydrocarbon sector. Reforming the judicial branch with a view on the

⁵² One could object that the provision of spending figures for energy infrastructure security is illusionary. This argument, however, can be countered with reference to the history of the Conference on Security and Cooperation in Europe (CSCE) which helped overcome cold world animosity between East and West at least in parts thanks to the provision of transparency with regard to military spending.

⁵³ Thomas Debiel and Ulf Terlinden, *Promoting good governance in post-conflict societies* (Eschborn/Berlin: Deutsche Gesellschaft für Technische Zusammenarbeit and Federal Ministry for Economic Cooperation and Development, 2004), p. 11, <<http://www.oecd.org/dataoecd/47/26/34481761.pdf>> (access 13 July 2007).

⁵⁴ For more on this, see in particular: International Crisis Group, *The Swamps of Insurgencies: Nigeria's Delta Unrest* (Brussels: ICG, 2006), <http://www.crisisgroup.org/library/documents/africa/west_africa/115_the_swamps_of_insurgency_nigeria_s_delta_unrest.pdf> (access 31 July 2007).

specific requirements of the hydrocarbon sector should thus become a key priority of future SSR activities.

International initiatives that increase transparency in the energy sector are important. However, collecting the necessary information to comply for example with the requirements of the Extractive Industries Transparency Initiative (EITI) requirements is tough. It requires seasoned personnel familiar with statistical work, a robust financial system that can track and trace the relevant money streams, budget planning and independent auditing.⁵⁵ As a consequence, there is a need to bring in line EITI requirements with international programs to strengthen local government institutions such as SSR.

9.2.4. Recommendation: Come to terms with the military dimension of energy infrastructure security

Ultimately energy infrastructure security also has a military dimension. Coming to terms with the role of armed forces is important for Europe's long-term energy security. Up to now, Europe has largely been free riding on the United States for the provision of hard power to guarantee energy supply security. Estimates assume that the United States spend around \$50 billion per year to defend the sea lanes of communication and to provide military assistance to oil supplying partner nations.⁵⁶ As a consequence, the military dimension of energy security is absent from Europe's most recent energy diplomacy agenda. At least so far, there is no direct link between this agenda and the necessary security and defense capabilities needed to underpin energy ambitions in particular vis-à-vis possible zones of turmoil that are important for Europe's energy resource supply. On Europe's homeland security front there is also no common approach to the role of armed forces and other security actors in energy infrastructure security.⁵⁷

In the following we will provide food for thought for the discussion about the possible role of armed forces in energy infrastructure security. To this purpose we will address possible military tasks and the potential roles of NATO and the ESDP.

9.2.4.1. IDENTIFY POSSIBLE MILITARY TASKS

The spectrum of possible energy infrastructure security tasks to be accomplished by armed forces is broad and could include:

- Confidence- and security building measures (CSBM)
CSBM in the field of energy infrastructure security comes with two distinct specifications. First, CSBM in energy-rich zones of turmoil can create transparency with regard to the purpose of existing military and security capabilities. As suggested in recommendation 3, it will be important to avoid the impression that

⁵⁵ Jürgen W. Cuno, "Stellungnahme für die Anhörung des Ausschusses für wirtschaftliche Zusammenarbeit zum Thema 'Rohstoffökonomien – Auswirkungen auf Entwicklungsländer', " Berlin, 20 September 2006 (mimeo), p. 6. The same also holds true for social and environmental impact assessments. See: Shankleman, *Oil, Profits, and Peace*, pp. 158-160.

⁵⁶ Jos van Gennip, "Energy Security," *NATO Parliamentary Assembly Report 170 ESC 06* (Brussels: NATO Parliamentary Assembly, 2006), para. 51
<<http://natopa.ibicenter.net/default.asp?SHORTCUT=1000>> (access 13 July 2007).

⁵⁷ For more on this, see: John L. Clarke (ed.), *Armies in Homeland Security: American and European Perspectives* (Washington, DC: NDU Press, 2006).

investment in military and security capabilities used for energy infrastructure security are used in an offensive manner or directed against anybody. Second, building up community relations has become an integrated aspect of infrastructure projects in turbulent regions. Given the importance of this issue it will be addressed separately below (recommendation 6).

- **Training and equipping armed forces, the police and emergency responders**
This is an important aspect in order to guarantee that the forces are mission ready and able to cooperate across existing organizational boundaries. Joint armaments export to adequately equip energy producing countries for energy infrastructure security tasks is far from being an area where European nations have similar interests. This, however, is detrimental to joint approaches for the growing need of upstream energy infrastructure security that is in Europe's strategic interest.
- **Intelligence gathering**
This is most important for risk and vulnerability assessments. While the categories to be analyzed can be deducted from the four risk dimensions outlined in our model of analysis in Figure 1 (tangible property, ICT, human factors, organization), intelligence fusion is more challenging. Infrastructure security depends on the provision of a comprehensive picture identifying domestic and international risks across the energy supply chain. So far, intelligence cooperation is not directed to the level of cooperation that is needed to achieve this. In particular there is a need for more and advanced intelligence sharing and cooperation between civil and military intelligence services (at national and international levels) and between the state's intelligence services, the energy sector, and private security contractors.
- **Surveillance**
Surveillance in all relevant dimensions of operations – i.e. land, sea, air, space, and cyberspace – is a traditional military task. Together with protection this task can have structural consequences⁵⁸ for the armed forces and thus needs to be treated with great care. A balance will have to be established between duties that require “boots on the ground” and the use of technology. At the technology front Europe's security research program and other activities aimed at the provision of dual use capabilities can be very valuable (see below).
- **Protection**
The task entails direct and indirect components. Direct components refer to proper infrastructure protection in the physical sense – either onshore or offshore.⁵⁹ This could also include military support in the cyber dimension where active and passive capabilities for electronic warfare could be used. Indirect components deal with the broader environment in which the infrastructure is located. Tasks to be fulfilled in this dimension could include perimeter control, the establishment of

⁵⁸ The key question is whether there will be dedicated units for energy infrastructure tasks (differentiated force model) or if the task will have to be accomplished by regular forces (unitary force model).

⁵⁹ According to NATO MC401 the defense and protection of offshore infrastructure in the north-western European and eastern Atlantic regions is a task for NATO's naval forces. Rear Admiral Hubert Hass, “Energy Security and Dependence on the Sea,” Presentation at the conference “The ‘Security’ of Energy Security,” NATO School, Oberammergau, 19-20 July 2007.

checkpoints or even challenging operations conducted against groups that sabotage the energy infrastructure. In some cases, this could also lead to counter-terrorist operations. Three protection tasks deserve special mentioning:

- Armed forces could be used in *interdiction operations* to secure the supply of energy resource flows.⁶⁰
 - Furthermore, the reliance on oil transport by sea makes *maritime transportation security* a specific task. The importance of this task is underlined by ongoing operations aimed at suppressing piracy or cutting off life lines for the support of terrorist groups. In addition, reliance on maritime security will increase with the raising demand of LNG, which is shipped.
 - Finally, *ecological security* should be addressed as well. Basically, the use of military or any other environmental modification techniques is prohibited by international environmental law. International regulations also foresee the protection of critical infrastructure containing dangerous material/goods (e.g. nuclear plants). Against this background the protection of energy infrastructure should be interpreted as a task for the armed forces. Given growing instabilities in major regions of supply, this task requires close cooperation between local armed forces and armed forces of international alliances.⁶¹
- Continuity of services
- Energy infrastructure operators must be able to guarantee continuity of services. Depending on the severity of an incident they might need security or military support to do so. This could be the case, for instance, in order to provide command and control to run control centers or to guarantee the functioning of the critical ICT infrastructure.
- Emergency and consequence management
- This entails all tasks to recover from an energy infrastructure incident. Most generally this could cover support for infrastructure rebuilding (e.g. heavy engineering material), logistics, medical aid or the use of military fuel storage capacity. In case an infrastructure incident results from an attack with weapons of mass destruction, CBRNE⁶² capabilities could be needed as well to clean the site and handle casualties.

⁶⁰ Jamie Shea, "Energy security: NATO's potential role," *NATO Review* (Autumn 2006), <<http://www.nato.int/docu/review/2006/issue3/english/special1.html>> (access 13 July 2007); Paul Gallis, "NATO and Energy," *CRS Report RS22409* (Washington, DC: Congressional Research Service, 2006).

⁶¹ We thank Kurt-Dieter Grill, former member of the German Bundestag, for bringing this to our attention. The 1977 Convention on the prohibition of military or any other hostile use of environmental modification techniques can be found at <<http://www.fas.org/nuke/control/enmod/text/enviro2.htm>> (access 13 July 2007). See also: Susana Pimiento Chamorro and Edward Hammond, *Addressing Environmental Modification in Post-Cold War Conflict. The Convention on the Prohibition of Military or Any other Hostile Use of Environmental Modification Techniques (ENMOD) and Related Agreements* (Austin: The Sunshine Project, 2001), <<http://www.edmonds-institute.org/pimiento.html>> (access 13 July 2007); Hans Günter Brauch, "Auswirkungen der Kriege auf die Umwelt im Mittelmeerraum und die Weiterentwicklung des Völkerrechts. Aufgaben für die Europäische Union", in Erich Reiter (Hrsg.), *Jahrbuch für internationale Sicherheitspolitik 2003* (Hamburg: Mittler & Sohn, 2003), pp. 695-720.

⁶² Chemical, Biological, Radiological, Nuclear, and Explosive.

■ Concept development and experimentation (CDE)

CDE has become a key instrument to support defense transformation. Based on modeling and simulation CDE enables armed forces to test new thinking on concepts, capabilities, structures and processes before implementing them into practice. Methodological know-how gained through CDE is also useful for energy infrastructure security. As argued above there are interdependencies between the energy sector and other critical infrastructure sectors that need to be identified and assessed in order to prepare adequate response. This can help establish cause and effect relationships. Furthermore CDE can be used to simulate interaction between armed forces, emergency responders, security forces of energy companies and other relevant stakeholders. Findings resulting from these and other simulations can be used to determine optimal capability packages to address energy infrastructure tasks.

9.2.4.2. ADVANCE NATO-EU COOPERATION

In principle the EU would provide the necessary instruments to address the military dimension of energy infrastructure security. However, apart from a very general reference to ESDP in the June 2006 Presidency Conclusions, the role of the armed forces in energy security seems to be a non issue in the most recent EU capstone documents. The EPCIP only refers to methodologies, standards and the role of operators. The EDA long-term vision, which outlines future capability requirements within the ESDP context, makes no reference to energy security or energy infrastructure protection tasks. The 2006 Solana paper on an external policy to serve Europe's energy interests and the most recent Commission outline for a European energy policy only focus on energy diplomacy and "soft power" instruments.⁶³

Within NATO there is not yet a clear consensus about the future role of the Alliance in energy security.⁶⁴ But at least there is a politically agreed basis for addressing this issue. The 2006 Riga summit declaration tasks the NATO Council to "consult on the most immediate risks in the field of energy security, in order to define those areas where NATO may add value." Furthermore, NATO's Comprehensive Political Guidance, which sets out capability requirements for the next 10 to 15 years, highlights the need to protect the "Alliance's populations, territory, critical infrastructure and forces, and to support consequence management."⁶⁵

In light of this, NATO Secretary-General Jaap de Hoop Scheffer and Policy Planning Director Jamie Shea argued that NATO's role in energy security could include monitoring and assessing the energy security situation, security assistance to allies,

⁶³ Presidency Conclusions, Brussels European Council, 15/16 June 2006, 10633/06, CONCL2, para. 24; A European Program for Critical Infrastructure Protection; An Initial Long-Term Vision for European Defense Capability and Capacity Needs, Brussels, 3 October 2006, pp. 16-19; An External policy to serve Europe's energy interest, Council of the European Union, 9971/06, Brussels, 30 May 2006.

⁶⁴ Background telephone interview with NATO official, 30 November 2006.

⁶⁵ Riga Summit Declaration issued by the Heads of State and Government participating in the meeting of the North Atlantic Council, Press Release (2006)150, Riga, 29 November 2006, para. 45, <<http://www.nato.int/docu/pr/2006/p06-150e.htm>> (access 13 July 2007); Comprehensive Political Guidance endorsed by the NATO Heads of State and Government, Riga, 29 November 2006, para. 16(c) <<http://www.nato.int/docu/basic/b061129e.htm>> (access 13 July 2007), para. 16(c).

maritime surveillance and threat-based response and interdiction operations.⁶⁶ In addition, Shea confirmed that NATO has entered into dialogue with oil companies and energy-exporting countries on how to best secure energy infrastructure.⁶⁷

For sustained operations to the benefit of energy security or energy infrastructure security there is probably a lack of capabilities in EU and NATO. The NATO Response Force (NRF) and the EU Battle Groups are land forces with naval and air components. Some NRF naval assets could be used as entry forces to deter aggressors, for example, to protect offshore infrastructure. However, enduring operations would have to take recourse to standing naval capabilities.⁶⁸ Naval support for energy security thus seems to fit perfectly into the most recent US ideas for the “1,000-ship Navy”⁶⁹ and could therefore revitalize transatlantic cooperation in a vital area.

These preliminary observations underline the need for further military planning. In particular energy infrastructure security-related tasks would need to enter force requirement catalogues in order to influence capability planning of the member states. Given the complexity of energy infrastructure security, close cooperation between all stakeholders involved along the supply chain will be needed. To this purpose the following additional issues should be addressed:

- Initiate regional military cooperation on energy infrastructure security
Military cooperation could be deepened via existing NATO initiatives such as the Mediterranean Dialogue and the Istanbul Cooperation Initiative. However, NATO lacks institutional ties with important producers such as Libya or Saudi Arabia, but has recently concluded an information security agreement with Kuwait. The Alliance also talks with Qatar about possible help to protect LNG facilities.⁷⁰

The EU would have to add a fully fledged military diplomacy dimension to the ESDP and bring it in line with the new neighborhood policy. Furthermore the military/security dimension should be added to Europe’s external energy relations. So far, reference to the means used for energy infrastructure security is absent from the recent energy cooperation agreements with Kazakhstan and the Caucasus.⁷¹

⁶⁶ Shea, “Energy security: NATO’s potential role;” “Keynote address by NATO Secretary-General Jaap the Hoop Scheffer at the EAPC Security Forum,” Ohrid, 29 June 2007, <<http://www.nato.int/docu/speech/2007/s070629b.html>> (access 13 July 2007).

⁶⁷ Tom Bergin, “NATO eyes naval patrols to secure oil facilities,” *Reuters*, 14 May 2007, <<http://uk.reuters.com/article/topNews/idUKL141495820070514>> (access 13 July 2007).

⁶⁸ Background telephone interview with NATO official, 30 November 2006.

⁶⁹ This is a metaphorical term coined by the US Navy to describe the need for international naval cooperation to halt and reduce threats on the high seas. See: Christopher P. Cavas, “Spanning the Globe. US Floats Fleet Cooperation Concept to Allies,” *Defense News*, 8 January 2007, pp. 11-12.

⁷⁰ Background telephone interview with NATO official, 30 November 2006; Nicholas Fiorenza, “Kuwait, NATO sign on information security agreement,” *Jane’s Defence Weekly*, 20 December 2006, p. 6; Bergin, “NATO eyes naval patrols to secure oil facilities.”

⁷¹ Ministerial Declaration on Enhanced energy co-operation between the EU, the Littoral States of the Black and Caspian Seas and their neighboring countries, Astana, 30 November 2006, pp. 2, 6, 8-10, <http://ec.europa.eu/dgs/energy_transport/international/regional/caucasus_central_asia/memorandum/doc/mou_azerbaijan_en.pdf> (access 13 July 2007); Memorandum of Understanding on co-operation in the field of energy between the European Union and the Republic of Kazakhstan, Draft Version, 14 November 2006, pp. 2-3,

An obvious region where both organizations could join forces to combine their respective strengths is Africa.⁷² Africa is a high priority for Europe not least since the adoption of the EU-Africa Partnership on Infrastructure and the proposal for a comprehensive Africa-Europe Energy Partnership.⁷³ NATO has provided support for operations in Darfur, and the African Union (AU) is interested in a memorandum of understanding on peacekeeping issues.⁷⁴ NATO and the EU could thus think about how to bolster existing and establish new local security and military capabilities and capacities to address energy infrastructure security. Strengthening local forces is mutually beneficial as it helps guarantee local and international security of supply. A dialogue on this issue could be launched in the trilateral AU-NATO-EU format thereby including the IEF. Given the interests of Russia and China in African energy resources, these two important outside actors could be included as well.

- Stimulate mutual learning
Exchange of lessons learned and best practice are powerful instruments to advance security/military capabilities in the field of infrastructure protection. Web-based information clearing houses could be established as a first step to exchange information. To this specific workshops and joint exercises could be added.
- Use security/Defense science and technology (S&T) programs for energy infrastructure security
NATO and the EU maintain dedicated S&T institutions (NATO Research and Technology Organization, EU Joint Research Centers) and programs (NATO Security through Science Program, 7th Framework Research Program). Some of the existing activities directly address infrastructure security. Beyond specific programs, S&T in the fields of ICT security, situational awareness, command and control, human factors, detection and protection technologies, material science, and modeling and stimulation, to name but a few examples, can provide valuable insights. Therefore it should be analyzed how energy-relevant production and transit countries could be included in respective S&T projects. The EU in particular should analyze how research activities from the 7th framework research program – outside the “security” domain and beyond the focus on energy efficiency – could be used to advance energy infrastructure security in relation with Europe’s energy-rich neighbors.⁷⁵

http://ec.europa.eu/dgs/energy_transport/international/regional/caucasus_central_asia/memorandum/doc/mou_kazakhstan_en.pdf (access 13 July 2007).

⁷² A similar approach for Central Asia could be possible, thereby using the EAPC and the OSCE as “antennas” to reach into the region.

⁷³ Interconnecting Africa: the EU-Africa Partnership on Infrastructure, COM(2006) 376, Brussels, 13 July 2006, p. 19, http://eur-lex.europa.eu/LexUriServ/site/en/com/2006/com2006_0376en01.pdf (access 13 July 2007).

⁷⁴ Background telephone interview with NATO official, 30 November 2006.

⁷⁵ Seventh Framework Program of the European Community for research, technological development and demonstration activities (2007-2013), Decision No 1982/2006/EC of the European Parliament and of the Council, 18 December 2006, OJ L 412, 30. December 2006, pp. 1-41, http://eur-lex.europa.eu/LexUriServ/site/en/oj/2006/l_412/l_41220061230en00010041.pdf (access 17 January 2007). The security and defense technology dimension is missing in the European strategic energy technology plan, which is part of the new energy policy for Europe. An Energy Policy for Europe, COM(2007) 1, Brussels, 10 January 2007, pp. 15-16,

One of the most obvious candidates is the European Galileo program, which can be used to provide real-time surveillance of energy networks.⁷⁶ Given Europe's dependence on energy resource imports, Galileo services should be expanded to cover the most important production and transit countries as well. An agreement with Norway, Europe's no. 2 gas supplier, is being drawn up and discussions with Saudi Arabia are underway.⁷⁷ To this list Russia and Algeria should be added as soon as possible, and cooperation with other African and Central Asian countries could follow in the future.

9.2.5. Recommendation: Look more closely at beneficial contributions of private security contractors

The debate about the role of private security contractors in international politics has intensified. The risks involved with contracting private security services and therefore the need to oversee and regulate this business is at the heart of the debate. By contrast positive contributions by private security contractors tend to be overlooked.

Private security contractors also provide services in the energy sector.⁷⁸ The main focus is on liaison between international oil and gas companies and national security agencies in order to harmonize security plans and arrange support.⁷⁹ In addition, they also engage with local communities, in particular to prevent conflicts from escalating. Private security contractors help train local forces and thus support the establishment of local security capacities. Furthermore private security contractors provide technical advice and consulting for company security plans (e.g. physical security concepts, installation of surveillance tools, engineering advice), help set up plans and procedures for different security contingencies (e.g. evacuation plans) and provide travel security. In some cases private security contractors are also involved in managing local companies that offer local guards. Finally, private security firms also offer assistance to international organizations. International financial lenders, for instance, contract private security consultants for security audits of infrastructure projects.

This illustrative list of tasks illustrates that private security contractors can offer beneficial services that should be taken into account more properly. To this purpose, the following recommendations could be helpful:

http://ec.europa.eu/energy/energy_policy/doc/01_energy_policy_for_europe_en.pdf (access 31 July 2007).

⁷⁶ Priority Interconnection Plan, p. 12.

⁷⁷ Taking stock of the Galileo program, COM(2006) 272, Brussels, 7 June 2006, p. 9

http://ec.europa.eu/dgs/energy_transport/galileo/documents/doc/comm_pdf_com_2006_0272_en.pdf (access 13 July 2007).

⁷⁸ This paragraph builds on background interviews with PSC experts, 10 November 2006 and 13 December 2006.

⁷⁹ Private security contractors hardly work for national oil and gas companies with Saudi Arabia being one of the most notable exceptions. Hiring private contractors would raise sensitive questions with regard to the performance of public armed and security forces in the respective countries. In those cases where national oil and gas companies hire private security contractors, they work with the security forces of these companies, rather than with uniformed military of the respective country.

- **Regulate division of tasks in security agreements**

The division of tasks between private security actors working for international gas and oil companies as well as local security and armed forces should be properly defined in security agreements. To this purpose the field guidelines for joint security measures within the work area of the Tangguh LNG project in Indonesia, where BP is involved,⁸⁰ could serve as a role model. These guidelines outline precisely who is doing what in case of demonstrations inside and outside the work area, withdrawal of the security assistance unit, evacuation, dealing with criminal acts and request for other security partners, in particular the armed forces. Furthermore the field guidelines also foresee that intelligence is provided by the police.⁸¹
- **Think about registration of private security contractors**

Private security contractors working in energy resource extracting countries could be registered in order to monitor contractor behavior. Oversight could be provided by the regulatory body in charge of the security sector. Information should be shared with the home governments of the private security contractors. Countries of origin could take further legal action against these companies if needed. In addition, private security contractor work should be regularly audited by the contracting companies.⁸² Whether contracting companies do this, could in turn be verified by the external auditors of the contracting companies and by international human rights organizations.
- **Oversee adherence to standards and promote “name and shame”**

Private security contractors willing to work for international oil and gas companies should demonstrate high standards with regard to respect for human rights and security services. To this purpose, adherence to the voluntary principles on security and human rights and demonstrating satisfactory levels of training could be basic requirements to be fulfilled by contracting companies.⁸³ As “name and shame” is a perfect approach to exert peer pressure, experience from oil and gas companies in hiring private contractors could be added to the public register for private security contractors.
- **Incorporate private security training for local security forces in SSR**

The contribution of private security contractors to train local security forces should be incorporated in SSR projects. To this purpose it could make sense to advance joint training courses for local state security forces, local private security personnel, security guards from companies and private contractors in order to advance a common understanding of the tasks to be met, the ways to accomplish these tasks and the capabilities and capacities needed to accomplish these tasks.

⁸⁰ Field Guidelines for Joint Security Measures within the Work Area of the Tangguh LNG Project. Letter of Joint Decree between Chief of the Regional Police of Papua and Executive VP Tangguh LNG, 16 April 2004,
<http://www.bp.com/liveassets/bp_internet/globalbp/STAGING/global_assets/downloads/T/Tangguh_Field_Guidelines_BP_Papaun_Police.pdf> (access 13 July 2007).

⁸¹ Field guidelines for joint security measures within the work area of the Tangguh LNG project, pp. 15-19, 22.

⁸² Voluntary Principles, “Five Year Overview and Company Efforts to Implement Specific Components of the Principles,” <<http://www.voluntaryprinciples.org/reports/2005/company-efforts-specific.php>> (access 13 July 2007).

⁸³ Ibid.

Such an integrated approach is at the heart of the Tangguh LNG security agreement.⁸⁴ A joint approach could also help harmonize and streamline SSR programs aimed at local capacity building through international organizations such as the EU, the United Nations, the OSCE or individual donor countries.⁸⁵

- Create a level playing field between local forces and PSC
There is a need to create a level playing field between private and public security forces. Therefore local armed forces and police forces should also comply with codes such as the voluntary principles on security and human rights and other standards deemed necessary for private security contractors. The international community should monitor government adherence to these principles and should make international aid contingent upon conformity with them.

Payment is an important issue to create the necessary transparency as the first step towards the level playing field. As in the case of the Tangguh LNG project it should be clearly stated when local security forces will get reimbursed from international oil and gas companies. These payments should be approved by the companies and the respective regulatory bodies of the local government. Furthermore, payments should be published.⁸⁶ In addition, it must be clear who employs the state's security forces and who pays their salaries. By considering salary rises and ensuring timely payment illicit bribery and side payments by companies for members of the local security forces could be contained.⁸⁷

9.2.6. Recommendation: Advance community relationship management

“Hard power” needs to be complemented by “soft power” approaches. These build on community relationship management in particular. The logic behind this approach, which has been implemented for the Tangguh LNG project and the Baku-Tbilisi-Ceyhan (BTC)⁸⁸ pipeline, is straightforward: by involving local communities in decision-making and guaranteeing security, local ownership is created. This in turn provides an incentive to create a resilient environment in order to ensure the longevity of infrastructure projects. In a certain sense, local communities can serve as the “first line of defense”, inter alia, by identifying potential sources of conflict and devising measures for non-violent conflict resolution. Furthermore, the engagement of local

⁸⁴ Field guidelines for joint security measures within the work area of the Tangguh LNG project, p. 26.

⁸⁵ This is also underlined by the audit report of the Tangguh security arrangement. See: Tony Ling and Gare A. Smith, *Human Rights and Security Monitoring Assessment and Peer Review of the Tangguh LNG Project* (Boston/Washington, DC: Foley Hoag, 2005), pp. 6, 20, 33-34
<http://www.bp.com/liveassets/bp_internet/indonesia/STAGING/home_assets/downloads/t/tangguh_human_rights_security_assmnt_2005_Aug_05th.pdf> (access 16 January 2007).

⁸⁶ <<http://www.bp.com/sectiongenericarticle.do?categoryId=9004771&contentId=7009147>> (access 13 July 2007).

⁸⁷ International Crisis Group, *The Swamps of Insurgencies: Nigeria's Delta Unrest* (Brussels: ICG, 2006), pp. 7-11;
<http://www.crisisgroup.org/library/documents/africa/west_africa/115_the_swamps_of_insurgency_nigeria_s_delta_unrest.pdf> (access 13 July 2007).

⁸⁸ BTC Security Concept,
<<http://subsites.bp.com/caspian/BTC/Eng/Misc/Security%20Concept.doc>> (access 13 July 2007).

security forces also creates economic off-springs that can benefit communities in the immediate environment of infrastructure projects.⁸⁹

In advancing community relationship management to the benefit of democratization and improved energy infrastructure security the following recommendations could be helpful:

- Use integrated community-based security as a role model
The Tangguh LNG project has advanced the idea of integrated community-based security (ICBS), which has been lauded as “mold-breaking” by independent assessors.⁹⁰ ICBS rests on the principle of shared responsibilities to maintain security. Local communities, government bodies, security forces, and the company involved are all given a role in providing security and resolving conflicts. Integration also foresees a joint security assistance team consisting of the local police forces, company security personnel and even armed forces, in case they are needed. Operational command and control rests with the regional unit commander of the police. The military will take over only in case martial law has been declared.⁹¹
- Use “security committees” to advance interaction with local population
It has been suggested to take integration one step further by establishing so called “security committees” consisting of local community leaders, representatives of the company security teams, private security contractors and local security forces. A security committee could “provide oversight for the community and local ‘eyes and ears’ for the project. It could also serve as a forum for emergency consultation and coordination, early warning, and crisis response.”⁹²
- Think about harmonizing programs for local community capacity-building
Capacity building for local communities is also at the heart of many international programs offered by the UN, the EU or the OSCE. These programs aim at netting the fabrics of civil societies in crises-prone and war-torn societies. Therefore it should be analyzed whether there is room for harmonization and cooperation between international community-building projects and programs launched for the specific purpose of energy-related projects. Activities aimed at providing forums for local population to make their voices heard or training programs to advance literacy and negotiation techniques could serve both goals and could thus be more closely coordinated.
- Advance best practice for the use of non-lethal weapons
Finally, there is a need to address the equipment of local security forces. Non-lethal weapons play a key role as they serve the goal of deterring potential aggressors without some of the effects of lethal weapons. In addition, non-lethal

⁸⁹ See also: Voluntary Principles, “Five Year Overview and Company Efforts to Implement Specific Components of the Principles,” <<http://www.voluntaryprinciples.org/reports/2005/company-efforts-specific.php>> (access 31 July 2007).

⁹⁰ Ling/Smith, *Human Rights and Security Monitoring Assessment and Peer Review of the Tangguh LNG Project*, p. 15.

⁹¹ Field guidelines for joint security measures within the work area of the Tangguh LNG project, pp. 7-9, 18.

⁹² Ling/Smith, *Human Rights and Security Monitoring Assessment and Peer Review of the Tangguh LNG Project*, p. 6, 24.

weapons also play an increasing role in crowd and riot control and other tasks to be fulfilled in international stabilization operations. This could open the door for a fruitful exchange of information with NATO and EU countries. Some of the related questions are under study by the NATO Research and Technology Organization.⁹³

9.2.7. Recommendation: Strengthen cross-border crises and consequence management

Physical protection of energy infrastructure with public security forces is also a challenge within Europe. While EU member states have more or less clear national regulations, cross-border cooperation is a problem. This seems to have two reasons.

First, European approaches to civil protection did not evolve by design but followed a more incremental way. The Commission has established mechanisms to facilitate cooperation and has suggested legislative action that would help pool transportation capacities, provide more money for emergency reaction and improve early warning as well as coordination of intervention in third countries. Nevertheless member states are still reluctant to share sovereignty with the Commission in this area.⁹⁴

In addition, cross-border cooperation to protect critical infrastructure poses significant challenges that remain to be addressed. Preliminary findings of the Vital Infrastructure Threats and Assurance project (VITA), sponsored within the EU preparatory action for security research, showed that that there is

- a lack of mutual understanding of each others crisis management systems and responsibilities,
- a lack of mutual understanding between private and public crisis management centers,
- not enough information about existing capabilities,
- not enough training on joint operations,
- long international and public-private consultation and reaction cycles, and
- a lack of permit for power line maintenance workers to work in other nations.⁹⁵

This makes it clear that Europe's single market for gas and electricity misses adequate cross-border emergency management procedures. This leads us to suggest the following recommendations:

- Advance situational awareness through Common Operational Pictures (COP) Emergency management depends on situational awareness and situational understanding. To this purpose COPs provided by situation centers are key. Given

⁹³ <<http://www.rta.nato.int/Pubs/RDP.asp?RDP=RTO-TR-SAS-040>> (access 17 January 2007).

⁹⁴ Magnus Ekengren, Nina Matzen, Mark Rhinard and Monica Svantesson, "Solidarity or Sovereignty? EU Cooperation in Civil Protection", *European Integration*, 28:5 (December 2006), pp. 457-476, here pp. 468-473; Establishing a Community civil protection mechanism (recast). Proposal for a Council Decision, COM(2006) 29, Brussels, 26 January 2006, pp. 7-11, <http://eur-lex.europa.eu/LexUriServ/site/en/com/2006/com2006_0029en01.pdf> (access 13 July 2007).

⁹⁵ Eric A.M. Luijff, "The VITA Project: Results and Recommendations," Paper prepared for the 4th EAPC/PfP Workshop on Critical Infrastructure Protection and Civil Emergency Planning, Zurich, 24-26 August 2006, pp. 5-7.

the complexity of the energy sector, there is a need for COPs integrating information from private energy companies and network operators as well as public information from police forces and other emergency responders, armed forces and intelligence services. The establishment of an overall public-private energy sector COP will be challenging. As a first step towards this goal an “operational COP” between public and private situation/operation centers should be created within and between countries. The 7th EU framework research program⁹⁶ and NATO activities, in particular within the Allied Command Transformation, could be used to establish these COPs.

- **Adopt bi-/multilateral prearrangements for cross-border emergency support**
As long as an overall European framework for cross-border infrastructure protection support is lacking, there is a need for bilateral or multilateral prearrangements.⁹⁷ As a minimum requirement these prearrangements should be commensurate with Europe’s Priority Interconnection Plan in order to make sure that cross-border emergency management for these projects is adequate.
- **Promote joint exercises**
Cross-border public-public, public-private, and private-private interaction in the field of energy infrastructure security should be advanced by joint exercises. In some countries there are regular civil protection/homeland security exercises that also involve the energy sector. Building on these and other experiences bi-national and multinational exercises should be launched. In doing so, the Euro-Atlantic Disaster Response Coordination Cell (EADRCC) should be involved as well in order to train interaction with NATO’s civil emergency mechanisms.
- **Include emergency assistance for infrastructure security into EU external energy relations**
External energy relations between the EU and neighboring countries should also include provisions for cross-border emergency assistance in the field of energy infrastructure security. These provisions should also include an assessment of local capabilities available for emergency management in these countries. NATO could support this endeavor. Recently, the Alliance has adopted a memorandum of understanding within the EAPC framework that shall provide faster and more efficient assistance for the provision of humanitarian assistance in response to disasters.⁹⁸
- **Address reimbursement for private companies**
While current civil protection mechanisms within the EU foresee compensation for government support, reimbursement for private actors providing cross-border support seems to be lacking. Given the increasing trend towards cross-border joint

⁹⁶ The security section of the 7th framework program addresses the security of infrastructures and utilities and security systems integration, interconnectivity, and interoperability. Seventh Framework Program of the European Community for research, technological development and demonstration activities (2007-2013), p. 27.

⁹⁷ Luijff, “The VITA Project: Results and Recommendations,” p. 5.

⁹⁸ Press Release (2006)109, 13 September 2006, <<http://www.nato.int/docu/pr/2006/p06-109e.htm>> (access 31 July 2007)

ventures and mergers in the energy sector, there seems to be a need to “override normal competitive business models in case of an emergency.”⁹⁹

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⁹⁹ Luijff, “The VITA Project: Results and Recommendations,” p. 7.

10. Aligning Security Risk: The Case for Public Security Provision of Internationally Critical Energy Infrastructures

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Security provision by the state for private infrastructures and physical investment located abroad, in international space, or across borders entails the deliverance of a public good outside the normal bounds of state sovereignty and responsibility, and should therefore be designed to fill gaps where local public national structures (host nation security) and/or the market (private security or investment patterns) prove insufficient. Ultimately public security and private investments constitute a two-way street – private investment and energy transport may fulfil common public needs beyond those expressed by the market, but they might also create negative security externalities which the state is expected to address. Both also possess an *international* dimension, and thus auger for a degree of international provision. It will be argued that energy infrastructure security provides a collective-action good in the form of dependable energy delivery and stable world prices, beyond the incentives for stable supply bestowed by the market upon private companies¹⁰⁰. Also, states may be responsible for regional energy security downstream, or may attract international security threats indeed because they host highly vulnerable or visible energy infrastructures – and for both reasons bear an arguably common burden.

Optimizing the balance between public and private security responsibility requires analyzing the different security interests of the interested players, and then designing transparent policies which instil appropriate expectations and incentives on the part of investors, insurers, and public bodies.

10.1. Definitions

This paper will intentionally look at critical energy infrastructure protection (CEIP) outside nationally-bound domestic security policies. This refers to three categories: protection of infrastructures in the international space (particularly sea lanes); protection of infrastructures on foreign territory (including direct protection and technical protection assistance provided from outside the host country); and to a lesser degree international coordination of CEIP policies (such as at the European Union level). The first two will together be referred to as CEIP ‘abroad’. The focus will be primarily on the Euro-Atlantic neighbourhood – i.e. Europe, West and Central Asia, and the Mediterranean Basin.

10.2. History

The history of providing security assistance for foreign commercial investment is long and controversial, but contemporary examples should not necessarily be limited to the illegal intrigues of ‘covert armies’ in the service of private multinational profits. Since

¹⁰⁰ In the case of stable prices, it can even be argued that the energy industry benefits from high-publicity disruptions, in the form of price spikes (exacerbated by the oil futures markets) which are out of proportion to losses incurred by individual strikes (from damaged infrastructure or lost revenue). Thus, industry’s collective incentive to adequately protect infrastructure is diminished.

the advent of international trading, states have sent military missions to protect specific economic interests abroad, including transport routes. To the extreme, this evolved into the imperial system of the 18th and 19th centuries, which violated concepts of local sovereignty altogether in the name of economic investment.¹⁰¹

With regard to transport infrastructure, Britain's naval superiority and suppression of piracy during the same era reduced the security risks of maritime trading in the 'international space' of the high seas, rendering commercially viable an entire era of overseas trading expansion. It also meant that British tax-payers provided an international public security good, the fruits of which were enjoyed by other European traders and economies.

This dynamic was further complicated by the growth of the international shipping insurance industry, developed initially in 16th century Venice and embodied later by the Lloyd's of London insurance collective. While these financial instruments became increasingly capable of pooling risk and thus reducing individual exposure, at the upper extreme of risk (derived for example from insecure or hostile environments) they were unable to bear the imposed costs. The issue then was not only to spread risk, but also to mitigate it at public cost through the dispatch of military or other security units. Naval patrols and escorts were common during the expansion of global trading during the "first era of globalization" in the 19th century.

Energy infrastructures located abroad gained importance with oil's rise to prominence as an energy source in the developed world. Europe possessed very little of the stuff, and relied on supplies from western-owned projects in places like Baku, Persia, and Saudi Arabia. Protecting production facilities, and especially transport routes, became imperatives not just for economic reasons but also because (following Churchill's 1912 conversion of the Royal Navy from coal to petroleum) it was oil that kept western militaries moving. During the First and Second World Wars, the drive for energy deposits was a prime strategic motivation. The value of the Saarland, Romania, the Caspian, Manchuria, and Indonesia were all based in coal or oil and shaped military operations. The purpose however, was to protect military operability rather than economic interests.

Indeed, this differentiation is critical. Protection of energy supplies for military-strategic use, and especially during operations, requires a somewhat different logic to determine burden sharing than protection of economic stability. Sufficient supplies to maintain the functioning of military, defence, and indeed all critical public services should be the priority of any energy security policy. In practice today however, disruptions to the point of threatening such stocks are unlikely. More likely are lower-level threats which on a much more frequent basis can have widespread economic effects. Presumably such disruptions can reach a magnitude at which the economic repercussions are so great as to have national security implications, long before energy supplies to critical services (including security services) are threatened.

In contemporary history, public provision of infrastructure security abroad has been varied. Following the collapse of European empires, ex-colonial powers continued to

¹⁰¹ This was particularly the case for the British Empire, whose designers emphasized its commercial versus cultural (or humanitarian) purposes to a greater degree than their French counterparts, for example.

lend significant political and military support to business interests in the newly independent states. The ongoing French military presence in many African states exist largely to ensure stability and safety for French nationals conducting business there.

More extreme cases, such as the overthrow of Mossadeq in Iran in 1952 in the face of nationalizations, represented clear breaches of sovereignty. Combined with the image of supporting big business, and the often covert nature of such actions, those events are examples of what not to do. But while such cases may have been the rare exception, they were also the most attractive to the media.

More common have been political agreements with foreign governments to allow for the safe conduct of business and the physical safety of personnel and infrastructures. On a broad level diplomatic support to foreign nationals is one such example. In more dangerous environments, such agreements may have included the augmentation of host-nation security capabilities or arms provision – or even the use of discrete military force to evacuate personnel or deter attacks on installations. Again however, the line between infrastructure protection and reinforcing unsavoury governments sometimes becomes uncomfortably blurred.

Protection of international spaces is decidedly less controversial. In 1984 the US Navy helped to escort ships through the Strait of Hormuz during the Iran-Iraq War. The aim was to maintain the right of passage for international commercial shipping from the Persian Gulf. Periodic Soviet shows of maritime force in the Bosphorus during Turkish coups served much the same purpose. And Norway conducts periodic Special Forces exercises simulating the capture of oil installations in the North Sea.

10.3. Balancing Interests

The aim of critical infrastructure protection policy should be to align the interests in maintaining security with the distribution of responsibility to do so.

Public security provision for international commerce and investment can be considered the ultimate in spreading the risk burden across the public. In the case of homeland defence, that cost sharing is clear. We all benefit from the public good of defence against threats to our being. However, exposure to economic threats vary widely across individuals, and depending on the nature of the threat itself. A disruption in, say, the banana trade could affect a small segment of the agricultural and food product markets (and annoy banana lovers) but impacts on the wider economy would be negligible. At the same time, protection of international transport spaces such as sea lanes, and efforts to augment physical security in foreign business environments, can impact across enough of the economic base so as to warrant public security provision and the pooling of risk cost across all tax-payers.

Energy infrastructures offer a prime such example. Fluctuations in the energy market ripple through almost all sectors of the economy. Moreover, the global nature of energy trading, pricing, and media exposure means that those fluctuations have immediately *wide* (geographically spatial and international), as well as *deep* (cross-sector) impact. Together with tight excess production capacity and strong long term demand growth, the combination of media exposure and futures markets means that prices fluctuate much more widely than does physical supply and demand. Clearly

then, there is a uniquely broad public interest in maintaining the security of energy infrastructures, and particularly maintaining market confidence in that security.

The problem is that there exists a fundamental misalignment between the public interest and the interests of private energy companies and international oil companies (IOCs) who are largely responsible for funding and organizing their corporate and infrastructure security.¹⁰² The price impact of an attack on energy infrastructure anywhere in the world is potentially the most wide-ranging and highly impacting effect, as a function of both its severity and visibility.¹⁰³ Highly severe or visible attacks which cause price spikes in the market may hurt an energy company in terms of real production losses and reputation (and resultant share price loss), but the price increase potentially garners enormous short-term gains for the entire industry (including the attacked firm – likely to the point of making up for any real production losses).

Less severe, but still highly visible attacks or attack attempts will increase that gap even further (although potentially exacerbate falls in share price of the stricken company). This would be the case for attacks at points popularly perceived to be “chokepoints” along transport routes or the wider production line.

Yet more severe, less visible attacks (such as some forms of cyber-attack) will also close that gap. No wonder then, that energy companies have secured their assets and operations against ordinary threats such as theft, low-level vandalism, and commercial espionage. Farrell, Zerriffi, and Dowlatabadi¹⁰⁴ claim that economically this constitutes a mixed public-private good.

“While the level of ‘routine security’ may vary from place to place... at any level it embodies at least an implicit agreement on adequate levels of routine security and on the means to pay for it, privately or publicly. Naturally, such agreements on the level and distribution of acceptable security costs are controversial, and politics is generally involved in reaching agreement.” Farrell, Zerriffi, and Dowlatabadi (428)

At the local level, private sector companies will take responsibility for fences and computer passwords because there is no reasonable expectation that the state will assume such responsibilities, particularly because they directly affect the company’s bottom line without incurring costs to the public in altered prices or reduced attractiveness of the region to investment. At the same time, there is the normal business expectation of support from the state in terms of typical policing and a sound legal and contractual environment. Larger-scale and more visible threats, from terrorism, separatism, internal warfare, interstate warfare, etc, are another matter – prices will go up and states will step in.

¹⁰² The degree to which private actors are responsible for such security varies widely across national policies, from the US which provides almost no public assistance for CEIP, to less developed producers who provide almost all security service through military or police structures.

¹⁰³ In turn, severity and visibility are linked, but necessarily as a direct function. Visibility and the intensity of market reaction are also the result of factors such as location – attacks on a few well-known facilities or transit points will elicit a disproportionately higher market reaction given equal attack severity and equal impact on real global energy movements.

¹⁰⁴ Alexander Farrell, Hisham Zerriffi, and Hadi Dowlatabadi. “Energy Infrastructure and Security” *Annual Review of Environment and Resources* Issue 29, 2004, pgs 421-469

All this is not to say that companies welcome attacks, but it creates a clear misalignment of interest. The risk premium benefits the insurance companies and producers who pay for and organize that infrastructure protection which is designed to mitigate the risk of an event whose costs are potentially enormous, and spread widely across the global economy in the form of price spikes induced by inflated market reaction.

The role of the market, and its disconnect from real production and delivery levels through complex futures and derivatives instruments, means that propagating a myth of security threats to infrastructures pads the risk premium further.

$$InterestPublic = - ((priceUp \int [visibility + severity]) * TotalConsumption)$$

$$InterestIOC = + ((priceUp \int [visibility + severity]) * spike\ duration) - (sharesDown \int [visibility + severity]) - (realLosses \int [severity])$$

$$RealLosses < priceUp$$

The misalignment of interests does not only occur with regard to protection before the fact, or even to protection *per se*. Indeed, negative security externalities created by infrastructures which may attract attack are sometimes uncalculated, and necessarily borne by public services.

One example may be where companies expect public (and perhaps military) support when disruptions threaten to reach the point of national security threat. This may be the case for example in the Strait of Hormuz, where any blockage or threats caused by regional violence will in all expectation be addressed by western militaries (as indeed happened during the 1984 escort of tankers by the US Navy). Thus diversification of the transport routes for energy supplies may have a strategic benefit that outweighs any costs which the private sector is prepared to bear. The strategic rewards to extra investment are simply not considered.

“What is not clear, however, is if these processes have considered the possibility of achieving functional security through an alternative infrastructure designed to be fault tolerant and, hence, an unrewarding target for disruption. This approach may have higher costs during routine operation but lower overall costs when non-routine events are considered.” Farrel, Zeffiri, and Dowlatabadi

10.4. The Case for Public Provision

The above section recognized how public and private interests with regard to infrastructures abroad can vary. Governments will seek to minimize the widespread economic impact of price spikes resulting from visible security breaches and attacks

But Farrel, Zerriffi, and Dowlatabadi rightly ask,

“How much and what kind of security for energy infrastructure do we want and who will pay for it? Current government CIP efforts tend to ignore this issue entirely, focusing on preventing attacks and protecting whatever energy infrastructure the private sector creates. These decisions are being made in a context in which many of the costs of security have been socialized for decades, favouring certain risk-creating technologies over others...” Farrel, Zerriffi, and Dowlatabadi (460)

The case, then, is not simply for public provision of existing infrastructures or a blank check to help protect whatever the private sector builds. Rather, the public sector is responsible for potentially bearing the burden of disruptions post-facto, either through emergency response or strategic losses. Hence they should be involved also in investment strategies.

When the public interest is threatened to a degree that is sufficiently under-represented in market incentives to suppliers to protect infrastructures or maintain service levels, the state has a role to ensure those levels continue.

On a domestic basis, this principle is well-understood. The ‘strategic’ nature of industries is often the basis for whole or part government ownership and control. As a distinct move towards privatization of (particularly energy) infrastructures has occurred over the past thirty years, especially in Europe, national emergency preparedness agencies have adopted various models to ensure the continued functioning of those infrastructures. More passive models provide non-binding guidelines to industry (as is often the case in the U.S.) while more stringent ones include mandatory protection measures and minimum emergency service levels.

Internationally, the lesson is less well heeded. Purely national policies though fail to account for society’s exposure to risks to international critical energy infrastructures. And in a world of international supply chains and networks where events upstream can have severe effects on downstream cross-border operations, governments cannot leave questions of security implications purely to the market.

10.5. A Case for Internationalization

The trend towards more interconnected and interdependent energy infrastructures, highlighted by the fast growth in international trading, clearly calls for international coordination.

The lack of coordination of critical energy infrastructure protection policies at the European level is striking. The European Program for Critical Infrastructure Protection Green Paper recognizes the need for interstate coordination in an environment of increasingly multinational networks, and lays down the foundation for a EPCIP framework. That framework would seek to establish common CIP principles, commonly agreed codes and standards, common definitions, a common list of critical infrastructure sectors, CIP priority areas, a description of stakeholder responsibilities, agreed benchmarks, and methodologies to prioritize infrastructures within sectors.

However, to date the EPCIP framework has not been implemented. While such coordination currently occurs on regional levels, for instance among the Nordic countries, the speedy implementation of a Europe-wide CIP coordination system and relevant guidelines or requirements would offer significant security advantages.

Extra-European international energy infrastructure protection is a rather different issue. Where companies are not based on European soil, or are not Europe-based, and are not subject to European regulation, the security of critical infrastructures is maintained by company security policies and/or host-nation security policies. Those

methods which may be employed from outside to enhance that security – surveillance assistance, training support, maritime patrolling and situational awareness, escorts, etc. – could be provided by individual states on the basis of bilateral assistance or national military operations. What then is the benefit of internationalization?

Internationalizing support to the security of internationally critical energy infrastructures not only pools the cost burden of what is ultimately a common good, but also reduces duplication and allows for optimal use of expertise among a group of nations. Combined international action allows for standard definitions of criticality and expectations of assistance, and also creates a “one-stop-shop” for third countries and companies seeking security support.

Finally, the public security costs eventually borne by badly designed energy infrastructures may fall across nations. This is especially the case if joint operations result from conflict arising due to those infrastructures, or if during joint operations nations are forced to find alternative energy supply routes. In both cases the costs presumably are shared.

10.6. Conclusion

The realization of various economic inefficiencies and market failures leads to a revisiting of the public policy shaping security for internationally critical energy infrastructures. There is a case for public security provision, whether in the form of security support to third countries or surveillance and operations in international space, because the public bears various costs which are not reflected in the private sector’s incentives to mitigate them.

- Widespread economic costs of higher energy prices incurred by attacks to infrastructures abroad, which are likely to benefit private sector suppliers
- Increased security costs incurred by infrastructures which are particularly vulnerable to attack, or which encourage attacks which public international security services (i.e. militaries) will meet
- Recovery or response costs which may be incurred by disruptions to infrastructures abroad, including both economic costs and increased security risk

There is also a case for the internationalization of security provision to share costs, reduce duplication, optimize expertise, standardize definitions and expectations of security support, and offer a ‘one-stop-shop’ to those seeking public security provision abroad.

12. Conclusions

Given the contributions here and those given during discussions at Oberammergau on 19-20 July, NATO's evolving approach to energy security should take a few key lessons into account.

Lesson 1: Signals matter. Energy security, by definition the provision of sufficient quantities of energy at reasonable prices, is driven by **two distinct sets of signals** with respect to gas and oil.

The first are signals to suppliers, whether private companies, state owned entities, or governments themselves. Failure on the part of producers to invest in sufficient quantities is one of the primary threats to meeting rising demand in the coming years – potentially leading to the kind of future energy gap described by Susan Peters and her fellow 'pessimists'. The development of the energy supply chain and 'just in time' logistics has already helped to tighten the oil market and discourage over-investment. That discouragement to invest is also pushed by fears of a late-1990s style price crash, by unstable political and regulatory climates in some states, by extra security costs in unstable theatres, and by a variety of other factors. Ideally, signals and actions taken by a body like NATO should be designed to encourage such investment, and should most certainly avoid discouraging it lest efforts to contribute to energy security backfire.

With regard to private companies, backfiring could mean associating too closely with a company and souring their relations with one of their host governments. On the other hand, NATO can also send encouraging signals to private producers, for example working with them during the project viability assessment phase to help reduce risks which might hamper investment on a project to project basis.

Andrew Monaghan, in the course of making the case against rash calls for diversification, warned that public admonishments of Russia and calls to turn away from it would prompt Russian companies to seek out new markets, and by extension to not make the investments necessary to increase supply to Europe. Discussions reinforced this notion. Russian investment in upstream developments and transport is direly lacking, leading to infrastructure failures (warned of by both Adrian Kendry and Gal Luft), to political reliance on Central Asian suppliers (particularly with regard to gas), to expensive short-term transport solutions (such as by rail or truck), and ultimately to questions about Russia's long-term viability as a supplier. Notions that any NATO energy security policy may be directed against Russia are detrimental, even if contingencies involving diminished Russian supply may indeed drive scenario planning to some degree.

Similarly, Monaghan also described how hints emanating from the Alliance that it may engage in helping to secure critical energy infrastructure without clarification or specificity are easily misinterpreted in Russian circles as the intent to become militarily involved in third countries. The issue of misinterpreted political signals was reiterated in discussions.

The point here is that NATO needs to move uncharacteristically quickly to clarify its intentions with regard to energy – the waffling which has gone on since Riga has done

nothing to provide the reduction of uncertainty so critical to a viable energy security strategy.

The second set of signals are those vital to tempering price (especially in oil and especially in the short to medium term) - signals to the financial markets. Markets are reliant upon information to minimize risk, reducing uncertainty and allowing for greater profit margins at tighter trading prices. Price stability and risk reduction are also tightly linked, since volatile markets breed investment insecurity helping to keep prices higher. One of the founding principles of the IEA is that greater transparency and information provision can keep prices more stable and ultimately encourage investment.

NATO undoubtedly has expertise and knowledge to provide. One recent example were the major price spikes caused by uncertainty over Turkish plans to conduct security operations inside Iraqi territory. Markets fear such military operations because they threaten the operation of key oil facilities, but have very little information about even the broadest nature of operational plans and therefore the threat to individual installations. On a wider level, NATO can use its breadth of intelligence information and military expertise to assess threats deriving from violent conflict to specific installations the world over.

Bruce Averill highlighted communication and outreach as key elements of the American CEIP support strategy abroad. Letting the world know that improvements are being made, and assuring them of reduced risks, is as important as doing the thing itself.

Lesson 2: Bilateral and multilateral cooperation is key. NATO and security organizations must work in tandem with other organizations, particularly the EU and the IEA. Relations with the EU take on a new importance, since NATO infrastructure protection value-added should be in support of the much wider array of tools which the EU can provide.

This includes capacities which can be employed in third countries such as judicial reform, governance support, regulatory reform, and civil security support – in short providing the civil environment in which to protect existing infrastructures and promote investment. Within Europe, only the EU should undertake market liberalization, coordinating intra-European domestic energy infrastructure protection efforts and standards, standardizing service continuity requirements, and conducting Europe-wide safety and security audits of energy infrastructures, among other activities. Many of these were outlined by Heiko Borchert and Karina Forster. EU expeditionary civilian capabilities, which represent a fundamental pillar of the European Security Strategy, are indispensable toward providing secure environments for energy projects. However, superior NATO capabilities in surveillance, military training, and military scenario planning should be recognized and incorporated into joint institutional efforts. Also, existing NATO civil emergency coordination mechanisms can and should add value to intra-EU energy infrastructure-related preparedness and response coordination.

At the same time, bilateral cooperation with partners is recognized to be indispensable. Although the question of diversification and its value was debated

extensively during the conference at Oberammergau, promoting the diversification of suppliers will generally not fall to NATO. At the same time, a few valuable lessons were learned with respect to NATO policy. Particularly, cooperation with Russia is key, and the pursuit of energy security interests should not cast Moscow as ‘the problem’. Indeed, encouraging investment within Russia by domestic firms, the Russian state, and potentially foreign investors is crucial to European energy security. NATO’s military to military cooperation with Russia remains relatively strong, if political relations are more frayed. Those should be used to reinforce Russian infrastructure security capabilities not just on its territory, but also in maritime spaces such as the Black Sea. Maritime cooperation similar to the brief Russian participation in Operation Active Endeavour should be promoted. Also, the NRC should be used as a key forum to discuss energy related tensions such as those in the Arctic region.

Finally, full bilateral cooperation is of course necessary in any activities with third countries. It goes without saying that national sovereignty should be held sacred, and that any security reinforcement should be strictly in support of host-nation activities and at the request of those governments.

Lesson 3: NATO and its members can add distinct value to CEIP. The U.S. program is designed to take advantage of domestic infrastructure security expertise which was significantly boosted since massive investments in CEIP were triggered by September 11. Washington also spends billions of dollars patrolling global chokepoints and maritime passages. Turkey has established experience protecting significant energy infrastructures on its soil in the face of irregular attacks and terrorist threats. Norway and the UK have long experience monitoring and protecting maritime infrastructures in the North Sea. France has a huge domestic nuclear infrastructure and experience securing it. Not least, the NATO Pipeline System itself was designed to withstand massive attack and continue to operate.

These are only a few examples of the vast experience NATO has to draw on. Discussions proved that such experience could be harnessed toward a series of activities which are generally cost-effective and high-impact.

- *Offering expertise and consultancy on-site by coordinating experts from member agencies.* The American program demonstrates the need and demand which exists for infrastructure security support, but also shows the limits of a national program. Organized at the NATO-level, such efforts would enjoy enhanced international legitimacy as well as region-specific security advice. Initially the program could take place at a relatively low-level, inspecting facility security in a manner similar to the State Department’s work. In a more developed form, such a program could also help to coordinate an integrated security model among host-nation militaries, police forces, and private investors.
- *Providing capital intensive surveillance assistance.* Rear Admiral Hass underscored that NATO’s primary value toward security of maritime energy infrastructures was its ability to develop situational awareness. The network being developed and already utilized at MCC Northwood to enhance maritime situational awareness (MSA) around energy infrastructures is a good example of security information provision made possible by international cooperation

and standing military assets. Helping to coordinate MSA worldwide, particularly around vulnerable choke points, is a relatively inexpensive next step which would significantly increase security at those points. Antonio de la Cruz showed the value of satellite data analysis techniques which could be provided for the purposes of detection and surveillance. He also manifested the potential for cross agency European cooperation as a representative of the EU Satellite Centre.

- *Providing training and support to domestic security services through education and training.* With discussions and research on this topic taking place at the NATO School, it was impossible to overlook the significant assets NATO has for providing training and education to military and civilian security personnel. The operational-level training provided by NATO School and the various PfP Training Centers can enhance critical infrastructure protection, defense against terrorism, petroleum logistics and energy transport security, and a wide array of other specific capabilities. Facilities such as the NATO Defence college and the Joint Warfare Centre can also provide education at the strategic and tactical levels, respectively, on issues related to energy security and energy infrastructure security. Mobile Education and Training Teams (METTs) can be deployed from all such institutions to conduct training in the field to military and security service personnel tasked with the protection of critical energy infrastructures.

- *Serving as a clearing-house for best practices in all elements of CEIP.* Information exchange and sharing of experience can be fostered through web-based databases and tools, joint exercises, conferences and workshops, and a variety of other tools. This would be important for members, but especially for partners working to develop effective CEIP policies for standards and oversight as well as providing security directly.

- *Providing threat assessments and information to national CIP organizations.* National organizations tasked with enhancing critical infrastructure protection need to know the kinds of external security threats they should be preparing for five to ten years down the line. This means understanding medium term threat developments in areas of terrorism and military matters. While national intelligence and defence agencies may be able to provide this to some degree, there is a strong interest to develop a coherent vision of threat evolution so as to harmonize preparedness, resilience, and consequence management strategies. Such a move would contribute toward the development of a Common Operational Picture (COP) and joint situational awareness among emergency management agencies.

- *Undertaking an assessment of where additional transport capacity or by-passes could be subsidized to mitigate vulnerabilities at choke-points.* Given that energy supply to operations is vulnerable at many of the same points as commercial supply, there is a military argument for providing excess capacity at relatively low cost compared to circumventing disruptions during an operation. This could be conceived as an ‘NPS for the 21st century’ with significant knock-on effects for the resiliency of commercial traffic in the event of a blockage, cut-off, or disruption.

- *Working with the IEA to provide unclassified information and regular threat assessments pertaining to dangers posed to infrastructures by violent conflict.* This is an area where NATO's expertise and ability to fuse various intelligence sources, as well as its reputed authority in this field, could mitigate uncertainty as to security risks, increase confidence, and help to reduce price volatility. To be effective, the information would have to be credible and unbiased, as well as authoritative. It would also have to take into careful account the sensitivity and strategic impact of the information, so as not to discourage members from participating.

A Comprehensive NATO policy

Given these findings, various 'faces' of a NATO energy security program should represent the concurrent supporting roles that NATO assumes in forming a comprehensive policy. As outlined in the capabilities above, such 'faces' include

- NATO as information provider;
- NATO as infrastructure security advice coordinator to third countries;
- NATO as trainer of critical infrastructure protectors;
- NATO as monitoring and surveillance support provider;
- NATO as supporter of EU civilian efforts;
- and NATO as dialogue facilitator. This includes dialogue between producer and consumer countries, and between the market and the security community.

Indeed, that policy should be a comprehensive, articulated, and distinct coordinated program. While it may be tempting to point simply to the various activities undertaken across NATO and consider the matter closed (or sufficiently brushed over), in this area more than most transparency and clear articulation is imperative.

Finding #1 emphasized the importance of signals. In the absence of a distinct program, the risk of misinterpretation or suspicion is significantly higher. Energy has often been the suspected driver behind western military operations. While everyone knows that NATO is looking for a role, nobody knows exactly what it will be or even how it is bounded. The result is uncertainty, fear, and often conceptions of the worst case scenario. All these bode badly for energy security given the close correlation between risk determination on the one hand, and energy investment, pricing, and supply on the other.

They are also detrimental though to wider NATO relations, where energy rumors fan flames of anti-NATO sentiment. Recent examples can be seen in the Russian press, and also in the October Azeri declaration that foreign troops will not guard the BTC pipeline (issued in response to a senior NATO official's comments about energy infrastructure protection).

Energy is a sensitive subject – but that is all the more reason to be clear and articulate, not evasive and vague in the hope of somehow downplaying the issue.

To Bucharest

Having already opened the question at Riga, there is a distinct advantage in moving decisively and in a timely manner to **developing** a coherent NATO policy on the issue of energy security. A formal declaration at the 2008 Bucharest Summit would settle the lingering questions about NATO's intentions and their limits.

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